

# **Anlagen zur Bachelorarbeit**

## **Anlagenverzeichnis**

- Anlage 1 Interviewleitfäden
- Anlage 2 Interviewtranskript Projektgruppe Dietenbach, Stadt Freiburg
- Anlage 3 Interviewtranskript Cradle to Cradle NGO
- Anlage 4 Statistisches Landesamt Baden-Württemberg: Gesamtaufkommen an Abfällen
- Anlage 5 Statistisches Bundesamt: Abfallbilanz 2019
- Anlage 6 Heuser, DIE ZEIT 2021
- Anlage 7 Asendorf, DIE ZEIT 2021
- Anlage 8 Cradle to Cradle NGO, Infomappe Netzwerk C2C Regionen
- Anlage 9 Riebl, Geht das überhaupt? Die Machbarkeitsanalyse
- Anlage 10 Dröge, Qualitative Interviews am Telefon oder online
- Anlage 11 McDonough/Braungart, The Hannover Principles
- Anlage 12 Kopnina, Philosophy of Management 2021
- Anlage 13 Hildebrandt, Warum der Begriff Kreislaufwirtschaft erweitert werden sollte
- Anlage 14 WCED, Our Common Future
- Anlage 15 United Nations, Transforming Our World
- Anlage 16 United Nations, The 17 Goals
- Anlage 17 UN Habitat, New Urban Agenda
- Anlage 18 Umweltbundesamt, New Urban Agenda
- Anlage 19 Wissenschaftliche Dienste Deutscher Bundestag, 2020
- Anlage 20 Ministerium für Umwelt, Klima und Energiewirtschaft Baden-Württemberg: Klimaschutzgesetz
- Anlage 21 LUBW, Abfallverwertung und Abfallbehandlung
- Anlage 22 Europäisches Parlament, Ressourceneffizienz und Kreislaufwirtschaft
- Anlage 23 Europäische Kommission, Ein neuer Aktionsplan für die Kreislaufwirtschaft
- Anlage 24 C2CPII, Cradle to Cradle Certified® & the UN Sustainable Development Goals
- Anlage 25 DGNB, Der DGNB Beitrag zu den Sustainable Development Goals
- Anlage 26 Cradle to Cradle NGO, Unsere Events



- Anlage 27 Cradle to Cradle NGO, C2C Congress
- Anlage 28 Kopnina, Visions for Sustainability 2017
- Anlage 29 Dressel, NZBau 2021
- Anlage 30 Stadt Bielefeld, Teilnahme der Stadt Bielefeld am EU-Projekt C2C-BIZZ
- Anlage 31 Streitbürger Speckmann, C2C
- Anlage 32 BAMB, Enabling a Circular Building Industry
- Anlage 33 BMI/BBSR, Neues Europäisches Bauhaus
- Anlage 34 Cradle to Cradle NGO, C2C Regionen – Unsere Mitglieder
- Anlage 35 Grimm, Was ist serielles Sanieren?
- Anlage 36 BAFA, Bundesförderung Serielles Sanieren
- Anlage 37 Gemeinde Straubenhardt, Leitvision
- Anlage 38 Gemeinde Straubenhardt, aus 6 mach 1: Die Gründe
- Anlage 39 Gemeinde Straubenhardt, aus 6 mach 1: Das Konzept (II)
- Anlage 40 Drees & Sommer, Vorbild Natur
- Anlage 41 Stadt Ludwigsburg, Dienstanweisung
- Anlage 42 Stadt Ludwigsburg, Nachhaltige Beschaffung
- Anlage 43 Vergabe Insider, Nachhaltig einkaufen nach dem Cradle to Cradle-Prinzip
- Anlage 44 Stadt Ludwigsburg, Neubau Fuchshofschule
- Anlage 45 Stadt Ludwigsburg, Fuchshof – Aktueller Planungsstand
- Anlage 46 Stadt Freiburg, Dietenbach. Städtebaulicher Rahmenplan
- Anlage 47 DAB, Cradle to Cradle ist machbar: gebaute Beispiele
- Anlage 48 Clement/Semple/u.a., Beschaffung
- Anlage 49 BMU, Umweltfreundliche öffentliche Beschaffung
- Anlage 50 EPEA, Unsere Leistungen
- Anlage 51 EPEA, Über uns
- Anlage 52 DGNB, Das DGNB Zertifizierungssystem
- Anlage 53 DGNB, Publikationen
- Anlage 54 BMI, Bewertungssystem Nachhaltiges Bauen
- Anlage 55 BMI, Leitfaden Nachhaltiges Bauen
- Anlage 56 Drees & Sommer, Presseinformation
- Anlage 57 EPEA, Straubenhardt – Feuerwehrhaus
- Anlage 58 BMVI, Digitales Planen und Bauen
- Anlage 59 Bayerischer Rundfunk, Wie Bauschutt wiederverwendet werden kann
- Anlage 60 Rauffmann, DIE ZEIT 2021

- Anlage 61 Altmannshofer, EU-Forschungsprojekt: Cradle-to-Cradle-Materialpass
- Anlage 62 BAMB, Materials Passports
- Anlage 63 Madaster, Die Madaster-Plattform
- Anlage 64 Sherwood, I'm useless, but not for long
- Anlage 65 van Nederveen/Gielingh, ITcon 2009
- Anlage 66 Wissenschaftliche Dienste Deutscher Bundestag, 2021
- Anlage 67 Grimm, DIN-Normen
- Anlage 68 Baunetz Wissen, Normen zur Nachhaltigkeit
- Anlage 69 Architektenkammer Baden-Württemberg, Informationen zur Konzeptvergabe
- Anlage 70 Bundesarchitektenkammer, Grundstücksübertragung nach Konzeptqualität
- Anlage 71 Cradle to Cradle NGO, Stellungnahme
- Anlage 72 Beschaffungsamt des BMI, Kompetenzstelle für nachhaltige Beschaffung – Baden-Württemberg
- Anlage 73 Umweltbundesamt, Umweltfreundliche Beschaffung
- Anlage 74 Stadt Pforzheim, Energiebericht 2021
- Anlage 75 Stadt Wien, Nachhaltiger Einkauf für Gebäude und Haustechnik
- Anlage 76 Matzig, Süddeutsche Zeitung 2021

Alle Anlagen wurden in einer separaten PDF-Datei zusammengefasst.

Die Anlagen 1, 2 und 3 liegen zum Ende dieser Arbeit in gedruckter Fassung bei.

## **Interviewleitfaden für Interview 1, Projektgruppe Dietenbach**

### **Einstieg**

Begrüßung

Einverständniserklärung zur Aufzeichnung

Kurze Vorstellung

Abriss der Problemstellung

### **Fragen**

1. Wie schätzen Sie die Verantwortung der Kommunen in der Einflussnahme zu mehr Nachhaltigkeit im privaten Bauen ein?
2. Welche Festsetzungen in Bebauungsplänen wären Ihrer Meinung nach für nachhaltiges Bauen nach Cradle to Cradle vorstellbar?
3. Welche Probleme sehen Sie im Hinblick auf die Bauleitplanung für eine mögliche Umsetzung von Cradle-to-Cradle-Konzepten?
4. Für wie geeignet halten Sie weitere Instrumente des Planungsrechts (z.B. vorhabenbezogener Bebauungsplan, städtebauliche Verträge) zur Umsetzung?
5. Welche Relevanz hat das Thema Holzbau für den neuen Stadtteil Dietenbach?
6. Sind Ansätze für eine Art Materialpass oder Baustoffkataster vorgesehen, um die Nachhaltigkeit von Gebäudeteilen später nachvollziehen zu können?
7. Was halten Sie für realistischer, um den Einsatz von recycelten oder kreislauffähigen Baustoffen zu erweitern: eher staatliche Förderung oder per Gesetz?

## **Interviewleitfaden für Interview 2, Cradle to Cradle NGO**

### **Einstieg**

Begrüßung

Einverständniserklärung zur Aufzeichnung

Kurze Vorstellung

Abriss der Problemstellung

### **Fragen**

1. Was wird der von Cradle to Cradle NGO in Bearbeitung befindliche Leitfaden zum nachhaltigen Bauen beinhalten?
2. Was ist Eure Absicht dahinter?
3. Welche Rolle seht Ihr in der kommunalen Aufgabenerfüllung, z.B. im Rahmen der Bauleitplanung?
4. Wenn man den Staat in die Pflicht nähme, um das private Bauen nachhaltiger zu machen, wie sollte er besser vorgehen: durch Änderungen bestehender Gesetze, Förderprogramme oder Ausweitung der Klimaschutzmaßnahmen durch Einbeziehen des Bauens?
5. Wie wichtig ist die Rolle der Wirtschaft, wenn es um kreislauffähiges Bauen und das Angebot nachhaltiger Baustoffe geht?
6. Wie versucht Ihr, mehr Kommunen für das Netzwerk C2C Regionen zu gewinnen?
7. In Anbetracht der Kosten nachhaltigen Bauens: Wie realistisch ist eine flächendeckende Bauweise nach C2C ohne anfängliche Kostenexplosionen?

**Telefoninterview Projektgruppe Dietenbach, Stadt Freiburg;  
19.08.2021, 11:00-12:00 Uhr**

Abkürzungen: **I.** = Interviewerin, **B.** = Befragter

1	[0:00:00.0] <b>I.:</b> Guten Tag, Herr B. Hier ist Natalie Kurz, wie verabredet zum Interview.
2	[0:00:06.1] <b>B.:</b> Ja.
3	[0:00:07.5] <b>I.:</b> Hallo. Ja?
4	[0:00:09.7] <b>B.:</b> Kann ich mir gerade noch kurz ein Wasser holen? Ich war gerade noch ( <b>unv.</b> ). Ich bin in einer
5	Minute wieder da. Einen Moment.
6	[0:00:15.7] <b>I.:</b> Alles klar, ich bleibe dran.
7	[0:00:18.6] <b>B.:</b> Danke.
8	[0:00:20.4] (...)
9	[0:00:37.8] <b>B.:</b> Jetzt bin ich wieder da.
10	[0:00:39.5] <b>I.:</b> Alles klar. Perfekt. Kurze Frage vorab: Ist es für Sie in Ordnung, wenn ich das Interview aufzeichne
11	zwecks Auswertung? Weil, ich muss dann noch ein Transkript erstellen für die Bachelorarbeit.
12	[0:00:50.8] <b>B.:</b> Ja, ja. Das können Sie machen.
13	[0:00:53.4] <b>I.:</b> Perfekt. Okay, alles klar. Gut, dann/ Sie haben Ihr Wasser, ich auch. Sie haben ja vorab die Fragen
14	von mir bekommen.
15	[0:01:10.7] <b>B.:</b> Ja, habe ich bekommen. Ich muss allerdings gestehen, wir sind jetzt ein bisschen Land unter mit
16	Dietenbach. Aber einmal quergelesen. Aber Sie müssen mich vielleicht am Anfang auch nochmal einmal
17	abholen.
18	[0:01:22.5] <b>I.:</b> Ja, kein Problem.
19	[0:01:23.5] <b>B.:</b> Was so der Hintergrund Ihrer Bachelorarbeit ist, et cetera.
20	[0:01:25.4] <b>I.:</b> Ja, genau. Das ist eigentlich auch relativ knapp möglich, das zusammenzufassen. Also mein
21	Ausgangspunkt ist ja das Cradle-to-Cradle-Konzept. Davon haben Sie bestimmt schon gehört, denke ich mal, im
22	Rahmen vom nachhaltigen Bauen.
23	[0:01:35.9] <b>B.:</b> Ja, diesen Begriff tatsächlich nicht. Also, den haben wir bisher auch noch nie verwendet. Ich
24	musste dann selbst mal/ Oder die Sekretärin hat bei uns mal gegoogelt, was es denn ist. Also, ich weiß nicht/
25	Wir nutzen dann eher das Thema Kreislaufstadt oder, klar, Nachhaltigkeit in all ihren Facetten. Aber das Wort
26	Cradle to Cradle war für mich jetzt so gesehen neu.
27	[0:01:56.2] <b>I.:</b> Okay, gut. Es ist im Prinzip eine/ Also, es gibt ja unter diesem Begriff Circular Economy, oder
28	Kreislaufwirtschaft, gibt es verschiedene so genannte Denkschulen. Verschiedene Ausgestaltungen. Eine davon
29	ist im Prinzip das Cradle-to-Cradle-Prinzip. Das schließt im Prinzip alles ein, was man so unter Kreislaufwirtschaft
30	oder Circular Economy kennt. Es geht halt noch ein bisschen weiter. Es hat einen sehr hohen Anspruch, was
31	gesunde Materialien angeht. Was natürlich auch gerade bei Baustoffen interessant ist. Und es schließt eben
32	auch die Verwendung von Erneuerbaren Energien ein. Also, es geht noch mal so einen Schritt weiter, einfach.
33	So ein ganzheitliches Konzept. Bei Gebäuden ist es natürlich besonders interessant, weil man da eben mit
34	Materialien, mit Energieversorgung, mit Wasserkreisläufen sehr viel machen kann. Und auch natürlich, wie ein
35	Gebäude mit der Umgebung, mit der Natur, interagiert. Genau. Und deswegen war das für mich der

1	Ausgangspunkt. Und dann das nachhaltige Bauen ist ja aktuell auch ein sehr großes Thema. Nicht nur
2	Energieeffizienz. Es geht ja jetzt auch mittlerweile deutlich darüber hinaus. Genau. Und meine Fragestellung,
3	vielleicht noch ganz kurz, lautet zusammengefasst: Wie lässt sich das Cradle-to-Cradle-Prinzip, oder eben die
4	Kreislaufwirtschaft, im Rahmen des nachhaltigen Bauens in die kommunale Aufgabenerfüllung einbinden und
5	welche kommunalen Dienstleistungsangebote, oder -aufgaben, könnten davon abgeleitet werden?
6	[0:03:16.4] <b>B.:</b> Okay, alles klar. Nein, gut. Genau. Vielleicht kann ich sonst einfach nochmal, bevor wir jetzt
7	einsteigen, auch so dazu, also, letztlich zu meinem Hintergrund was erzählen. Ich bin ja hier zuständig für,
8	letztlich, die Planungssteuerung des Stadtteils Dietenbach. Ich bin auch stellvertretender Projektleiter. Von der
9	Ausbildung her Raumplaner. Also, von daher auch immer schon mal so interdisziplinärer auch unterwegs
10	gewesen. Und letztlich ist es ja auch immer dieses Fundament der Nachhaltigkeit oder nachhaltigen
11	Entwicklung. Es ist ja auch mal sehr interdisziplinär angelegt. Es verzahnt ja so die Ziele der Stadtentwicklung,
12	Wohnungsbau, Freiraum, Verkehrsplanung, umweltpolitische Zielsetzungen, soziale Zielsetzungen. Und das
13	kommt letztlich mir ganz gut zugute auch bei diesem Projekt, weil Dietenbach ist/ Ich weiß nicht, inwieweit Sie
14	jetzt schon sich eingelesen haben in das Projekt Dietenbach.
15	Das ist eines der größten Projekte, die momentan in Deutschland entwickelt werden. Es ist eine große
16	Stadterweiterung, die in Freiburg passiert. Wir entwickeln hier auf einer Fläche von, also, wenn man jetzt die
17	kleine Fläche nimmt, auf der tatsächlich der Stadtteil entsteht ohne Ausgleichsflächen, dann sind das ungefähr
18	110 Hektar, auf der dann ein komplett neuer Stadtteil entsteht für 16.000 Menschen, mit bis zu 7.000
19	Wohneinheiten. Und ein neuer Stadtteil heißt eben auch, dass er die zentrale Eigenständigkeit besitzt und in
20	dem Fall die komplette Infrastruktur bereithält. Also die komplette Grundversorgung: Kitas, Schulen, Geschäfte,
21	Arbeitsplätze, Sport, Freizeit, und Haus der Kirchen, Stadttreff, Jugendangebote, et cetera. Und das ist
22	eigentlich einerseits eine riesige Chance, weil wir damit von Anfang an sehr viele Nachhaltigkeitsziele umsetzen
23	können. Und überhaupt schon aufgrund der Tatsache, dass wir hier eine eigenständige Stadtentwicklung, kein
24	reines Wohngebiet, wie auch direkt die Möglichkeit haben, durch ein gutes Mobilitätskonzept, durch einen
25	guten Städtebau von Anfang an auch letztlich die Bewohner in die Lage zu versetzen zum Beispiel auch Mobilität
26	ohne eigenes Auto zu machen. Und deshalb entsteht ein Stadtteil der kurzen Wege, wo verschiedene Nutzungen
27	miteinander verzahnt werden, wo man letztlich alles innerhalb eines 500-Meter-Nahversorgungsradius findet.
28	Ob das jetzt die Haltestelle der Stadtbahn ist oder die Geschäfte oder die Kita. Das heißt, ich kann mich eigentlich
29	sehr gut ohne Auto bewegen, was schon mal eine Grundvoraussetzung ist. Auch die Wohnkosten zu senken,
30	Lebensqualität zu erhöhen aber natürlich auch CO <sub>2</sub> einzusparen.
31	Ja, und man muss dazu aber auch sagen: Das ist eine Entwicklung und das ist jetzt so ein bisschen auch diese
32	große Herausforderung, weil, da sind wir ganz schnell bei dem Stichwort, eigentlich, Verbrauch. Es ist eine
33	Entwicklung, die nicht eine Innenentwicklung ist, wie wir es in Freiburg Jahrzehnte lang eigentlich auch gemacht
34	haben. Mit dem letzten FNP 2020 hat man in Freiburg komplett auf die Innenentwicklung gesetzt, das heißt
35	Wiedernutzung von Brachflächen, von Baulücken, et cetera. Nur sind wir in Freiburg mit der Entwicklung der
36	Stadtteile Rieselfeld und Vauban, als die dann aufgesiedelt waren, an einem Punkt angekommen, wo wir
37	gemerkt haben: Okay, jetzt beginnt gerade wieder eine absolute Schieflage. Der Wohnungsmarkt ist in Freiburg
38	extrem angespannt, die Bodenpreise schießen durch die Decke, genau, die Mietpreise. So und dann standen wir
39	vor der Herausforderung, was tun? Die Innenentwicklung ist weitgehend, also, ist nach wie vor wichtig, aber wir
40	kommen, um den wirklich hohen Bedarf an bezahlbarem Wohnraum zu decken, mit der Innenentwicklung nicht
41	mehr allein rum. Da ist nach der Aufstockung, et cetera, nichts. So dass wir hier in eine klassische
42	Außenentwicklung gehen. Das heißt, Dietenbach ist schon mal, das ist glaube ich ganz wichtig, es ist erstmal wie
43	gesagt ein Ort des Verbrauches. So muss man es auch sagen.
44	Gerade weil das eine Außenentwicklung ist, finde ich zumindest, ist die Herausforderung umso größer, weil man
45	da noch mehr auch Antworten finden muss auf wichtige Zukunftsfragen und sich auch die verschiedenen
46	Einzelkreisläufe in den Blick nehmen muss. Aber auch mit der Frage auseinandersetzen muss, wie wir auch
47	Rohstoff- und Energieverbrauch, et cetera, reduzieren können. Also ich finde, gerade weil es eine
48	Außenentwicklung ist, hat man eine ganz besondere Verantwortung hier. Es ist ein Eingriff in die Natur und
49	Umwelt und da müssen wir gucken, dass wir nicht nur sozialen Zielsetzungen, sondern letztlich auch

1	umweltpolitischen Zielsetzungen Rechnung tragen. Zum Klimaschutz, Klimaanpassung und alles was
2	dazugehört. Also, das vielleicht mal so vorab auch zu dem Stadtteil und zu der Herausforderung.
3	Und sicherlich eine Besonderheit ist auch, das ist halt ein riesiges Projekt, was sich dann auch nicht von heute
4	auf morgen entwickeln lässt. Sondern es ist ein Aufsiedlungszeitraum, der bis 2042 Stand jetzt geht. Es gab einen
5	Bürgerentscheid, es gab viele Vorplanungen, es gab einen städtebaulichen Wettbewerb auch schon, wo wir viele
6	Vorgaben gesetzt haben, die auch in Richtung nachhaltiges Bauen oder nachhaltigen Städtebau gehen. Und wir
7	werden dann Ende, oder sagen wir mal so, realistisch Mitte 2023 den ersten Bebauungsplan verabschieden und
8	das Gebiet wird dabei in sechs Bauabschnitte, eigentlich sechs Bebauungsplänen, entwickelt und hat damit
9	einen sehr langen Aufsiedlungszeitraum. Aber auch deswegen, gerade weil das Vorhaben so groß ist, aber auch
10	aufgrund der Langfristigkeit des Vorhabens, wir natürlich auch in die Zukunft denken müssen. Also natürlich
11	auch die Zukunftsfähigkeit des Stadtteils anstreben müssen und vor dem Hintergrund, dass zum Beispiel
12	Freiburg klimaneutrale Kommune wird, spätestens bis 2050 ist allein schon eine Verantwortung aufgrund der
13	langen Aufsiedlungszeit, dass Dietenbach jetzt auch nicht hinter dem Standard zurückbleibt, sondern natürlich
14	auch zum Beispiel klimaneutral entwickelt. Was, also, das Thema eines klimaneutralen Stadtteils ist ebenfalls
15	eines der Leitziele, die das Projekt auch trägt. Extrem ambitioniert, muss ich dazu sagen, extrem ambitioniert.
16	Also, so einen klimaneutralen Stadtteil gibt es so bisher auch noch nicht in Deutschland, weil wir die
17	Systemgrenzen auch brutal eng gesetzt haben. Halt letztlich soll die Energie, die Wärme oder der Strom, der vor
18	Ort verbraucht wird, auch vor Ort gewonnen werden, also relativ enge Systemgrenze, keine Anrechnung von
19	irgendwelchen Windkraftträgern oder sonstiges, die zwar auch regenerativ sind, aber wir setzen es noch enger.
20	Und genau. Und das ist ambitioniert, aber ist aus unserer Sicht auch ein Stück weit mehr notwendig, wenn wir
21	klimaneutral werden müssen.
22	[0:10:27.4] I.: Ja, natürlich.
23	[0:10:28.6] B.: Und damit hat Dietenbach eine Verantwortung.
24	[0:10:31.3] I.: Ja, okay. Auch gerade im Hinblick auf aktuelle Entwicklungen, also der jetzt vor kurzem
25	erschienene Teilbericht vom IPCC oder, ja, auch die Überschwemmungen und weitere Extremwetterereignisse
26	und all das, was sich ja doch immer stärker auch bemerkbar macht. Genau. Also, da sehe ich das mit der
27	Verantwortung auf jeden Fall auch und ich finde es voll interessant. Also, vom Umweltschutzamt, der Herr Z.,
28	hat beim Cradle-to-Cradle-Kongress im Juli mal einen Vortrag über Dietenbach gehalten. Den habe ich gehört
29	und einfach so die einzelnen Elemente vorgestellt. Ich glaube, das Wärmekonzept und auch etwas
30	Energieversorgung. Genau. Also, da kam schon ein bisschen was, auf jeden Fall. Ja, vielen Dank für die
31	Einführung noch mal. Es sind jetzt doch auf jeden Fall noch ein paar Stichworte, gerade zu diesem
32	Aufsiedlungszeitraum, das werde ich mir vielleicht auch noch mal ein bisschen genauer ansehen, genau. Dann
33	würde ich jetzt vielleicht einsteigen und/ Genau, meine Fragen gehen ja alle so in die Richtung, also welchen
34	Einfluss die Kommunen eben durch die Bauleitplanung auf die Nachhaltigkeit von Gebäuden nehmen könnten.
35	Und der Aufhänger ist eben, dass der Bausektor sehr viel Energie verbraucht. Herstellung des Materials, die
36	ganze graue Energie, aber natürlich auch Gebäude dann in ihrem Betrieb verbrauchen ja auch ziemlich viel
37	Energie und durch Instandsetzung und so weiter immer mehr Material. Sehr viel Abfall, der entsteht. Jetzt haben
38	wir ja das neue Landeskreislaufwirtschaftsgesetz und da gibt es ja diesen einen Absatz, der die Kommunen
39	eigentlich dazu bringen soll, in ihren eigenen Bauprojekten mehr nachhaltige Baustoffe einzusetzen, was ja
40	schon mal ein guter Anfang ist. Aber es fehlt eben noch so dieser Einfluss auf das private Bauen. Genau. Und da
41	ist eben für mich die Frage: Was können Kommunen hier vielleicht machen? Ist die Bauleitplanung da ein
42	sinnvoller Weg? Also sinnvoll wahrscheinlich schon, aber wie sind halt die Möglichkeiten? Und da wäre jetzt die
43	erste Frage: Wie schätzen Sie die Verantwortung der Kommunen in der Einflussnahme zu mehr Nachhaltigkeit
44	im privaten Bauen ein?
45	[0:12:45.0] B.: Ja, also es, haben Sie eigentlich gerade das jetzt auch schon gesagt. Sie ist extrem hoch natürlich.
46	Da habe ich ja eingangs auch gesagt, wir wissen alle, dass, klar, dort im Gebäudesektor auch ein großer Anteil
47	der globalen Treibhausgasemissionen stammt. Und wir können als Kommune natürlich die Voraussetzungen
48	erst mal schaffen durch so viele Punkte. Nehmen wir mal den Städtebau oder vielleicht einfach mal, wie wir

1 vorgegangen sind: Wir haben also einen städtebaulichen Rahmenplan, wo wir viele Ziele miteinander verzahnt  
 2 haben. Und das fängt ja eigentlich schon bei der Frage an, das Thema Nachhaltigkeit, aber auch an der sozial  
 3 nachhaltigen Bodenpolitik. Gerade weil wir bei einer Außenentwicklung sind: Wie können wir schonend mit  
 4 Grund und Boden umgehen?  
 5 Also, das ist ja auch schon ein Stück weit auch öffentlich ein Aspekt dieser Kreislaufstadt, dass man wirklich  
 6 kompakte, platzsparend angelegte Strukturen anlegt. Wir machen in Dietenbach eigentlich dieses Prinzip der  
 7 Blockstrukturen, wie man sie auch in Gründerzeitvierteln findet. Dies ist eigentlich fast die beste Ausnutzung,  
 8 die man damit bekommt. Dann haben wir eine sehr, sehr hohe GFZ, eine Geschossflächenzahl von 1,8. Machen  
 9 relativ parzellenorientierten Städtebau, der kleinteilig ist. Also, wie man es in der Gründerzeit auch kennt. Und  
 10 der ist deutlich robuster und damit auch nachhaltiger als jetzt so Strukturen wie man sie zum Beispiel in  
 11 Großwohnsiedlungen der Siebziger Jahre oder Sechziger Jahre findet. Das heißt, ich habe parzellenorientierten  
 12 Städtebau in einer Blockstruktur und habe immer die Möglichkeit auch mal einfach ein Gebäude rauszunehmen,  
 13 zu ersetzen, aber ich muss den kompletten Block nicht anpassen. Das heißt, es sind sehr nachhaltige Strukturen,  
 14 die sehr langlebig sind. Sieht man erst mal an die Gründerzeitstrukturen in Deutschland, es sind die schönsten  
 15 Viertel in der Regel und die sehen von ihren Parzellen und von ihren Strukturen oder im Gebäudebestand noch  
 16 so oft aus wie vor 100 Jahren. Während Großwohnsiedlungen, da man über Rückbau und sonstiges nachdenkt  
 17 und diese wie gesagt nur als Ganzes anzufassen sind und da habe ich wirklich durch diese Kleinteiligkeit bei  
 18 Gebäuden mit Brandwand an Brandwandstößen nicht nur energetische Vorteile, weil damit weniger  
 19 Wärmeverluste sind. Sondern ich kann wirklich so Einzelbausteine dann immer so rausbrechen. Und das sind so  
 20 städtebauliche Aspekte, die schon mal sehr wichtig sind, auch für das private Bauen in Führungszeichen.  
 21 Und was natürlich auch wichtig ist, dass wir sehr flächensparend Kfz-, Verkehrs- und Parkieranlagen  
 22 anlegen. Wir verzichten bei uns sowieso darauf, dass man auf seinem eigenen Grundstück parkt, sondern  
 23 letztlich muss jeder private Bauherr sein Auto in Hochgaragen abstellen. Wir haben so ein Erschließungssystem.  
 24 Ich kann Ihnen dann auch den Erläuterungsbericht nochmal schicken. Da findet sich dann vieles. Also, bei uns  
 25 das Erschließungssystem ist eigentlich dreistufig aufgebaut, das heißt wir haben eine große Haupteerschließung.  
 26 Das ist so eine Ringerschließung, die den Stadtteil einmal komplett umschließt, als Boulevard ausgebildet. Und  
 27 an dieser Ringerschließung sind dann unsere Hochgaragen. Das sind dann zwölf an der Zahl und in diesen  
 28 Hochgaragen wird der komplette ruhende Verkehr gebündelt. Das heißt, die ganzen Straßen, die davon  
 29 abgehen, von dieser Haupteerschließung, können dann als verkehrsberuhigte Wohnstraßen ausgebildet werden.  
 30 Oft dann sogar als Spielstraßen Tempo 7.

31 [0:16:20.9] I.: Ein bisschen wie in der Vauban?

32 [0:16:22.4] B.: Genau, das ist das Prinzip Vauban, nur noch viel, viel größer gedacht. Und wir gehen damit aber  
 33 auch auf einen Stellplatzschlüssel, der extrem niedrig ist, der auf 0,5 geht. Und schaffen das einerseits durch  
 34 diese Bündelung in den Hochgaragen, schaffen das auch dadurch, dass wir Wohnen und Parken komplett  
 35 entkoppeln. Sondern man muss dann/ Stellplätze sollen noch nicht verkauft werden, sondern sollen vermietet  
 36 werden. Das ist dann auch viel besser für die Lebenssituation. Es gibt halt Lebensphasen, da brauche ich  
 37 vielleicht mal ein Auto, andere Lebensphasen, da brauche ich kein Auto. Aber wir haben in Dietenbach  
 38 gleichzeitig dann auch das Ziel, sehr vielfältige Mobilitätsangebote zu schaffen. Das heißt, wir haben einen guten  
 39 Stadtbahnanschluss, wir schaffen sehr gute Anbindungen an das übergeordnete Radfahrnetz, wo ich eigentlich  
 40 querungsfrei Richtung Innenstadt dösen kann.  
 41 Wir haben jetzt im Rahmenplan gut 150 Carsharing-Standorte angedacht, Mobilitätszentrale, et cetera. Das  
 42 heißt, also, da geht es ja auch eigentlich los beim privaten Bauen. Dass sich ein privater Bauherr davon  
 43 verabschiedet, dann quasi sein Auto auf dem eigenen Grundstück zu parken oder auch in einer Tiefgarage zu  
 44 parken. Sondern es steht dann 300 Meter entfernt in einer Quartiersgarage. In der Hochgarage kann er zwar  
 45 immer noch mit dem Auto vor die Haustür fahren und da kurz halten, Einkäufe abladen oder sowas. Aber wir  
 46 werden den Verkehr dadurch deutlich reduzieren und auch durch dieses Maßnahmenbündel an Paketen, dazu  
 47 gehört auch dieser Stadtteil der kurzen Wege, was ich eingängig gesagt hatte, wie gesagt auch, denken wir,  
 48 zumindest die Dietenbacher in die Lage versetzen, Mobilität ohne eigenes Auto machen zu können.



1	[0:17:55.2] I.: Ja.
2	[0:17:56.5] B.: Und da Autos letztlich schon in der Herstellung sehr viel CO <sub>2</sub> verbrauchen, aber natürlich im
3	Betrieb auch, ist das eben auch ein städtebaulicher Baustein für mehr Nachhaltigkeit. Und der wird so dann über
4	Kaufverträge, aber natürlich auch übersetzt dann, also der Rahmenplan wird dann in die technische Sprache des
5	Bebauungsplans dann übersetzt. Und natürlich werden dann so Tiefgaragen für Autos, et cetera, im Rahmenplan
6	auch alle ausgeschlossen. Sondern das werden natürlich die Verkehrsflächen mit besonderer
7	Zweckbestimmung, in dem Fall die Hochgaragen, möglicherweise als Sondergebiete, dann natürlich im
8	Bebauungsplan auch so festgesetzt und dieser Rahmenplan mit seinen Ideen dann auch übersetzt. Und wir
9	haben auch den Vorteil dadurch, dass wir dann auch die Straßenräume anders gestalten können, wir auch
10	einfach Flächen haben, die entweder anderen Mobilitätsangeboten oder anderen Angeboten zugutekommen.
11	Und gleichzeitig auch ein Vorteil dadurch, dass wir keine Tiefgarage unter den Blöcken haben, haben wir halt
12	viel mehr Möglichkeiten, auch die Innenhöfe zu bepflanzen. Also oft ist es so: Im Beispiel Rieselfeld, da sind die
13	unterbaut, da kann ich aber keine tiefwurzelnden Bäume setzen. Aber wir können halt Bäume pflanzen, was aus
14	Sicht der Klimaanpassung, Klimaadaptation, dann auch wieder sehr wertvoll ist. Das heißt, wir haben auch andere
15	Möglichkeiten, die Blockinnenbereiche zu bepflanzen und zu begrünen, so dass, ja, also viele, viele Vorteile sich
16	damit ergeben. Also, das sind jetzt zum Beispiel mal zwei städtebauliche oder verkehrliche Konzeptbausteine.
17	Also, wie gesagt, dieser Städtebau auf der einen Seite, mit dieser Kleinteiligkeit in den Blockstrukturen, und auf
18	der anderen natürlich auch dieses Verkehrskonzept.
19	Und das sind ja alles Themen, die dann auch so in den Bauleitplan mit den Festsetzungen übersetzt werden.
20	Und natürlich auch das ganze Thema der Nutzungsmischung dann auch übersetzt wird, indem wir, also letztlich
21	nach der BauNVO gibt es inzwischen ja dieses urbane Gebiet als neuen Gebietstyp, überwiegend auch urbanes
22	Gebiet, mindestens aber Mischgebiet festsetzen. Jetzt aber ganz bewusst kein klassisches reines Gebiet oder
23	allgemeines Wohngebiet, weil wir das Prinzip der Nutzungsmischung, oder auch dieser hybriden Nutzung,
24	Stapelung von Nutzung/ Das heißt, nicht irgendwie, eigentlich, so einen Vollsortimenter mit so einem dicken
25	Fußabdruck als Solitär irgendwo hinstellen. Sondern, es wird halt alles integriert in die Wohnbebauung im
26	Erdgeschoss. Es ist für Urbanität, für Lebendigkeit wichtig, aber letztlich auch platzsparend und für uns auch in
27	der Nachnutzung viel besser und damit auch nachhaltig. Also selbst wenn eine Kita, die ich heute integriere und
28	nutzungsneutral ausgestalte, kann auch dann der Seniorentreff von morgen rein. Und selbst ein Stadtteiltreff
29	bei uns wird nicht als solitäres Gebäude gebaut, sondern wird auch integriert in eine Platzbebauung, so dass sie
30	dann auch später, ja, multifunktional nutzbar ist. Als wenn ich so ein tolles Gebäude, architektonisch super,
31	aber was dann halt sehr einseitig und monofunktional ausgerichtet ist. Das heißt, das Thema der Nachnutzung,
32	was für mich auch ein ganz wichtiger Baustein der Nachhaltigkeit ist, Nutzungsneutralität und der
33	Nutzungsmischung, sind auch wichtige Bausteine, die letztlich hier zum Zuge kommen. Und ja, in der
34	Bebauungsplanung dann auch in Festsetzungen sich wiederfinden.
35	[0:21:32.6] I.: Ja, auf jeden Fall. Also, finde ich jetzt auch ganz toll, dass Sie das erwähnt haben und dass das
36	auch so vorgesehen ist. Weil das ist ja tatsächlich oft noch ein Problem. Oder wenn man dann eben diese alten
37	Bebauungspläne hat, wo man vielleicht wirklich gute Gründe braucht, um sie dann tatsächlich zu ändern und
38	dann haben die immer noch die gleichen Festsetzungen wie in den Siebziger oder Sechziger Jahren. Und ist
39	natürlich eigentlich nicht mehr zeitgemäß, was an vielen Stellen noch vorgegeben ist. Ja. Okay. Ja, das finde ich
40	sehr gut. Jetzt haben Sie natürlich hier auch schon einige Sachen zu, gerade auch mit der Mobilität und auch der
41	Struktur der Gebäude, schon zur Bauleitplanung gesagt. Weil die nächste Frage wäre jetzt nämlich: Welche
42	Festsetzungen in Bebauungsplänen wären Ihrer Meinung nach für nachhaltiges Bauen nach dem
43	Kreislaufwirtschaftsmodell oder eben Cradle to Cradle vorstellbar? Gut, da haben Sie jetzt schon Mobilität,
44	Nachnutzung, dass alles schon erwähnt. Ich glaube Gebäudebegrünung war bei Dietenbach ja auch ein Thema,
45	wenn ich mich richtig erinnere.
46	[0:22:41.2] B.: Ja. Na ja, das sind dann aber die klassischen Zielkonflikte. Das kann ich im Bebauungsplan
47	natürlich auch festsetzen. Also, dass man eben die Fassaden mit irgendwie rankenden oder kletternden Pflanzen
48	begrünt. Das geht natürlich schon. Wir haben allerdings die Situation, dass wir/ Also, Klimaanpassung ist das
49	eine und Biodiversität ist das andere. Und es gibt natürlich das Thema Klimaschutz und da gibt's dann manchmal

1	auch klassische Zielkonflikte. Selbst bei den Themen. Weil wir haben ein Energiekonzept, was vor allem, ja, was
2	die Wärmebedarfe angeht, besteht aus einem Nahwärmenetz und hat dann die Umweltwärme als Baustein.
3	Das heißt, wir werden Grundwasserwärme nutzen als auch die Wärme eines Abwasserkanals nutzen, wo wir die
4	Wärme über Wärmetauscher entziehen. Und für den Strombedarf, der wird vollständig dann über PV-Nutzung
5	gedeckt. Und PV-Nutzung heißt ja, wir haben so eine Lärmschutzwand, um den, letztlich, den Lärm von der B31
6	und der Besançonallee abzuhalten. Da soll die Lärmschutzwand letztlich mit PV-Modulen bestückt sein und auf
7	den privaten Gebäuden ist großflächig PV-Nutzung erforderlich, um die Klimaneutralität zu erreichen. Das ist
8	ein ganz zentraler Schlüssel. Das heißt, wir gehen momentan davon aus, dass eigentlich mindestens 70 Prozent
9	der Dachflächen mit PV belegt werden müssten, aber auch ein Teil der Fassade. Wir wissen das von der
10	Potenzialstudie, dass die Fassaden die Richtung Blockinnenbereich gerichtet sind, da weniger geeignet sind, aber
11	die Außenfassaden gerade Richtung Süden, Südwesten, Südosten geeignet sind. Und von daher, ja, ist das dann
12	so ein Zielkonflikt zwischen Fassadenbegrünung zum einen und der PV-Nutzung. Aber da müssen wir jetzt auch
13	mal gucken, wie wir damit umgehen. Weil, es gibt ja nicht nur den Bebauungsplan, es gibt auch bei uns ein
14	Gestaltungshandbuch noch, et cetera. Aber ich denke, was zum Thema PV-Nutzung geht, gehe ich mal davon
15	aus, dass wir es auch so machen. Wie gesagt, der Bebauungsplan, der wurde jetzt erst begonnen. Jetzt fängt
16	man erstmal mit den planerischen Festsetzungen an, dann kommen die textlichen. Aber ich denke auch, dass
17	es da eine Regelung geben wird, wonach man sagt, dass ein gewisser Anteil der Dachflächen, zum Beispiel jetzt
18	mindestens 70 Prozent, mit Photovoltaikanlagen zu bestücken sind. Echt, sowas wird es in irgendeiner Form
19	sicherlich geben.
20	[0:25:03.4] I.: Okay. Also, ich habe auch was zu einem hohen Anteil von Holzbau gehört für Dietenbach. Ist das
21	noch irgendwie ein Thema, oder?
22	[0:25:14.3] B.: Ja, also das ist auf jeden Fall ein Thema. Allerdings wird das dann nicht im Bebauungsplan
23	erfolgen, sondern wir werden in Dietenbach die Grundstücke in Konzeptvergabe vergeben. Beziehungsweise ist
24	es ein bisschen komplizierter, weil es noch einen anderen Eigentümer gibt. Nicht nur die Stadt, sondern auch
25	die Sparkasse Freiburg. Aber das nachhaltige Bauen spielt eine ganz wichtige Rolle. Und Konzeptvergabe heißt,
26	dass wir die Grundstücke nicht nach Höchstpreis vergeben möchten und die Stadtkasse gut füllen, sondern
27	letztlich es gibt einen Festpreis und wir haben in Freiburg ja den Vorteil, dass wir momentan einen klaren
28	Nachfrageüberhang haben. Also, wir haben einen angespannten Wohnungsmarkt und die Grundstücke werden
29	sicherlich vielfach überzeichnet sein und das ist eine super Voraussetzung, um eigentlich in einen Wettstreit der
30	Ideen zu gehen. Das heißt, ich habe ein Grundstück, schreibe das aus und man kann sich auf dieses Grundstück
31	bewerben. Und das beste Konzept kriegt das Grundstück. Nur nicht der, der am meisten Geld zahlt, sondern der
32	das beste Konzept vorlegt. Und das ist ein riesiger Vorteil, dass ich die Grundstücke über Konzeptvergabe
33	vergeben möchte, zum Beispiel auch an Baugruppen oder so und man dann Projekte, die besondere
34	Nachhaltigkeitselemente beinhalten, auch bonifizieren kann und bevorzugen kann. Und da ist es am Ende dann
35	abhängig davon, wie ich genau diese Kriterien für die Grundstücksvergabe entwickle. Aber für uns ist klar, es
36	wird neben städtebaulichen und sozialen Gesichtspunkten auch gleichberechtigt Aspekte der Nachhaltigkeit
37	geben.
38	Und da gibt es jetzt zwei Ansätze von uns: Das eine ist, weil Sie das Thema Bauen mit Holz angesprochen haben,
39	ich weiß nicht, ob Sie das Projekt Prinz-Eugen-Kaserne in München kennen. Das ist so die größte Holzsiedlung,
40	die in Deutschland jetzt gebaut wurde. Und die sind so vorgegangen, dass die Projekte eigentlich die meisten
41	Punkte erhalten haben und damit zum Zug kommen, die am meisten Holz verbaut haben. Da gab es dann so ein
42	so genanntes NawaRos-Prinzip, so heißt das. Das heißt, es wurde eine Bewertung entwickelt, wo man die Masse
43	an nachwachsenden Rohstoffen, deswegen Na-wa-Ros, also nachwachsende Rohstoffe. In dem Fall hat also
44	jemand, der mehr Holz verbaut hat, hat mehr Punkte bekommen. So. Und das wäre dann zum Beispiel etwas,
45	was man in der Konzeptvergabe machen kann. Wir gehen da aber ein bisschen weiter, weil am Ende ist uns ja/
46	Also, Holz hat auch so viele Vorteile, aber uns ist am Ende ja wichtig, dass der Fußabdruck, der ökologische, klein
47	ist und ob das jetzt jemand ist, der mit Holz baut oder jemand der sagt, er nimmt vielleicht recycelbaren Beton
48	oder sowas, ist dann eigentlich egal. Und deswegen gehen wir momentan so daran, dass wir für die
49	Konzeptvergabe, aber das schreiben wir jetzt erst auch noch aus, uns dann Instrumente oder so einen
50	Werkzeugkoffer entwickeln lassen, so ein Bewertungstool entwickeln lassen, anhand dessen letztlich diese

1	Klimaperformance eines Gebäudes im Hinblick auf Klimaschutz, aber auch im Hinblick auf Ressourcenschutz,
2	gemessen werden kann. Und da gibt es das Unternehmen Faktor X oder Resource-Score, die da so eine Art, wie
3	so ein Label entwickelt haben. Und das finden wir wahnsinnig spannend, da also dieser Resource-Score besteht
4	aus einem Climate-Score, aus einem Energy-Score, aus einem Material-Score und kann, aber da müssen wir uns
5	jetzt noch viel stärker mit beschäftigen, der kann letztlich anhand relativ einfacher Parameter für die Architekten
6	sagen am Ende, wie ist der Fußabdruck, der ökologische Fußabdruck. Und berücksichtigt auch, und das ist halt
7	das wichtige, die graue Energie.
8	[0:28:59.2] I.: Ja.
9	[0:29:00.4] B.: Weil, das ist, muss man einfach sagen, beim Energiekonzept so, wir sind brutal ambitioniert mit
10	dem Energiekonzept. Wir schaffen auch da die Klimaneutralität. Allerdings betrifft das in dem Fall immer den
11	Nutzerstrom, die Nutzerwärme, die Binnenmobilität wird dabei auch berücksichtigt. Würde man das Thema
12	graue Energie noch reinnehmen, dann wäre die Klimaneutralität noch viel, viel ambitionierter. Und das
13	Energiekonzept ist erstmal so ein Wärmekonzept. Und jetzt ist halt die Frage: Okay, wie kann man dieses
14	nachhaltige Bauen halt noch pushen?
15	[0:29:31.4] I.: Ja.
16	[0:29:32.4] B.: Und dafür bietet sich wie gesagt diese Konzeptvergabe ganz hervorragend an. Wie wir es dann
17	machen, ob wir über das NawaRos-Prinzip und dann eher auf Holz setzen oder dieses, zum Beispiel, diesen
18	Resource-Score nehmen, müssen wir einfach nochmal gucken. Aber für uns ist klar, die Konzeptvergabe ist ein
19	sehr geeignetes Mittel.
20	[0:30:00.1] I.: Ja, das finde ich auch sehr spannend.
21	[0:30:04.4] B.: Ja. Und man kann da natürlich, wenn man die Konzeptvergabe gemacht hat, gibt es dann immer
22	Kaufverträge, die man dann abschließt mit den privaten Bauherren. Und da kann man dann in den Kaufverträgen
23	eben einiges festlegen. Also angefangen von diesen Energiestandards, Effizienzhausstandard 55, den wir in
24	Freiburg normalerweise haben. Aber man kann auch zum Beispiel sagen, wenn wir diesen Faktor-X-
25	Instrumentenkoffer nehmen, beispielsweise, und diesen Resource-Score, dass man einfach sagt, okay, es gibt
26	eine Zielklasse, die mindestens erreicht werden muss. Und wenn die nicht erreicht wird, gibt's eine
27	Vertragsstrafe. So, das heißt, ich habe auch über das Instrument Konzeptvergabe und dann später gekoppelt
28	mit Kaufverträgen die Möglichkeit, das zu implementieren. Das ist dann etwas, was aus meiner Sicht nicht im
29	Bebauungsplan geregelt wird. Es wird dann eher über die Konzeptvergabe, über Kaufverträge, und mit der EMD,
30	mit der Sparkasse, unserem Kooperationspartner, teilweise auch über eher so eine Art städtebaulichen Vertrag,
31	der so genannten Abfindungsvereinbarung, geregelt.
32	[0:31:20.1] I.: Ja, genau. Die städtebaulichen Verträge, dazu hätte ich auch noch mal gefragt. Aber das haben
33	Sie jetzt im Prinzip schon vorweggenommen, was ja auch gut ist. Zu diesem Instrumentenkoffer von Faktor X
34	bzw. Resource-Score fällt mir ein: Also, es sind ja grad im Bereich nachhaltiges Bauen diverse Sachen in der
35	Entwicklung. Es gibt teilweise schon so genannte Baustoffkataster oder zumindest sind die in der Anfangsphase.
36	Oder Materialpässe werden sie auch genannt, wo eingetragen wird, was dann tatsächlich verbaut wird, wo es
37	herkommt, wie die Zusammensetzung ist. Zum Beispiel bei Beton oder Zement. Und da ist eben die Idee, dass
38	man natürlich über die ganze Lebensdauer des Gebäudes eben zurückverfolgen kann, woher die Baustoffe
39	kommen und was eben dann auch am Lebensende des Gebäudes, wenn es denn mal dazu kommt, was dann
40	eben damit gemacht werden kann. Wie geeignet zum Beispiel der Baustoff ist, ob man ihn weiterverwenden
41	kann oder für welche Zwecke man ihn weiterverwenden kann. Wäre vielleicht so eine Art Materialpass auch
42	etwas, was in diesen Resource-Score praktisch einfließen könnte? Oder würden Sie das separat sehen?
43	[0:32:27.9] B.: Also, ich kann mir das schon gut vorstellen. Wir müssen nur bei der Konzeptvergabe aufpassen,
44	dass wir das nicht zu hochschwellig machen. Also, dass wir da nicht viele abschrecken, weil wir wollen ja ganz
45	bewusst, sagen wir mal so, einen Bauträger, der jedes Jahr 1.000 Wohnungen baut, der ist da auch geübter drin
46	so was alles auszuführen. Aber wir wollen ja auch ganz bewusst auch Baugruppen ansprechen, die auch dann

1	teilweise auch viel innovativer sind. Also auch gerade was zum Beispiel gemeinschaftliche Wohnformen angeht,
2	sind eher Baugruppen die innovativen Leute. Die übrigens dann auch durch gemeinschaftliche Wohnformen
3	oder dieses Thema Suffizienz, das halt auch überall immer herumgeistert, auch in der Lage sind, auch mit
4	Wohnflächenverbrauch anders umzugehen. Weil das Thema Sharing, auch was Wohnungen angeht oder
5	Gemeinschaftsräume, eine immer wichtigere Rolle wird und das geht so ein bisschen raus aus der Nische. Es
6	gibt ja jetzt immer mehr Begriffe: Cluster-Wohnungen und Sonstiges. Und auch deswegen sind uns Baugruppen
7	so wichtig. Und wir müssen halt aufpassen, dass wir bei der Konzeptvergabe, auch was diese
8	Eingangsvoraussetzungen angeht, auch was das Nachhaltigkeitskriterium angeht, am Ende vielleicht nicht zu
9	überpacen und damit abschrecken und viele, die wir eigentlich auch als Zielgruppen ansprechen möchten,
10	verschrecken.
11	Aber ich glaube schon, also, wir hatten mit dem Herrn Dosch von Faktor X da auch ein Gespräch, ein sehr gutes.
12	Und da gehört glaube ich schon auch wie so eine Art Raster dazu, was man dann auszufüllen hat. So, welchen
13	Baustoff nehme ich und so. Wichtig ist eben auch manchmal auch, man muss auch erstmal die Voraussetzungen
14	dafür schaffen. Und das ist nämlich gerade beim Thema Holz echt gar nicht so leicht, weil dazu gehört dann eben
15	auch mehr als jetzt nur das irgendwie zu verankern und am Ende kann aber keiner mit Holz bauen, weil es
16	Lieferengpässe gibt, weil der Rohstoffpreis zu hoch ist. Zielkonflikt bezahlbarer Wohnraum zum Beispiel. Da
17	hatten wir vor drei Wochen zu eingeladen. Haben wir Architekten, Architektenkammer und letztlich die
18	regionalen Akteure der Holzwirtschaft in Freiburg und Region eingeladen und einfach mal gefragt: Wie ist das
19	eigentlich in Zukunft, Bauen mit Holz? Momentan ist der Preis ja durch die Decke gegangen. Jetzt entspannt es
20	sich bisschen wieder. Aber inwieweit kann man da Bauen mit Holz günstiger machen, inwieweit kann man das
21	besser vernetzen? Und das ist, glaube ich, so ein ganz wichtiger, also, Begleitprozess, der enorm wichtig ist, um
22	das Thema zu pushen. Also Förderprogramme das eine, aber wirklich die Akteure auch zu vernetzen, das andere.
23	Also bis zu dem Gedanken, der noch momentan ziemlich abwegig klingt, aber auf jeden Fall ist es jetzt erstmal
24	als Gedanke im Raum, dass man überlegt, vielleicht sogar auf dem Dietenbach-Gelände am Anfang wie so eine
25	Art Lagerhalle als temporäres Gebäude hinzustellen und, wo letztlich Fertigteile für Holzbau gelagert werden
26	können und dann schneller verwendet werden können. Das kann dann sogar so weit gehen bis zu einer eigenen
27	Fertigungshalle. Das ist zwar jetzt alles ziemlich abwegig, aber aufgrund der Größe des Vorhabens von
28	Dietenbach sind das Gedanken, die wir uns jetzt auch machen. Ob uns das gelingt, wissen wir nicht, aber uns ist
29	auf jeden Fall klar, wenn wir das Thema Bauen mit Holz fördern möchten, müssen die Akteure untereinander,
30	Holzwirtschaft, Architekten, besser vernetzt sein und jetzt müssen die Leute eben auch sensibilisiert werden:
31	Wie baue ich richtig mit Holz? Und das ist etwas, was wir jetzt mal mit so einem Kick-off angestoßen haben und
32	jetzt einfach mal gespannt sind, wie sich die Gespräche in Zukunft weiterentwickeln werden.
33	Und wenn wir mit Holz bauen, wäre es natürlich auch schön, wenn es heimische Bäume sind und nicht irgendwo
34	aus Russland oder sonst was kommen. Weil das wäre natürlich, was den Fußabdruck angeht, auch wieder nicht
35	so gut. Und da ist bei uns das städtische Forstamt ganz wichtig, die letztlich die Forstwirtschaft hier betreiben.
36	Und die sagen uns, die Ressource Holz wäre im Schwarzwald, auch schon was die städtischen Flächen angeht,
37	ausreichend vorhanden. Aus Nachhaltigkeitsgesichtspunkten auch ausreichend vorhanden, um auch im großen
38	Stil weiter verstärkt mit Holz zu bauen. Also, wie gesagt, diese Begleitprozesse sind mindestens genauso wichtig
39	wie, quasi, das als Bedingung zu setzen. Weil als Bedingung zu setzen, aber die Randbedingungen sind so
40	schlecht, die Rahmenbedingungen, dass ich eigentlich gar nicht mit Holz bauen kann, dann hilft mir das wenig.
41	Sondern da habe ich am Ende gar keinen Bewerber.
42	[0:36:53.6] I.: Ja. Ja, gut und dann ist natürlich auch das Ausmaß, mit dem man tatsächlich dann mit Holz baut,
43	kann ja auch sehr unterschiedlich sein. Man kann ja sagen, man hat irgendwie Holzfassaden, ein Teil von der
44	Struktur des Dachs ja sowieso meistens, wenn man jetzt Satteldächer hat, zum Beispiel, sowieso meistens aus
45	Holzbalken. Und ansonsten kann man das ja auch dann variieren oder in verschiedenen Abstufungen machen.
46	Aber ich finde es halt schon ganz wichtig, weil es hat natürlich auch viele Vorteile, gerade so das Atmungsaktive,
47	in Anführungszeichen, und auch einfach auch sonst die klimatischen Aspekte und als regionaler Rohstoff
48	natürlich auch sehr geeignet, wenn man entsprechende Vorkommen hat. Ja.
49	[0:37:46.9] B.: Und es ist auch deswegen wichtig, weil es ist so ein eher wirtschaftliches Thema, aber ist auch
50	ein wirtschaftliches Thema, was zum Thema Nachhaltigkeit, denke ich, sehr nahekommt. Weil letztlich, wenn



1	wir auf heimische/ Also, das Ziel ist auch sehr stark bei der Vermarktung auch eher so regionale Bauherren und
2	Unternehmen anzusprechen. Und wenn die dann noch mit regionalen Rohstoffen wie Holz arbeiten, hilft das
3	halt dieser ganzen regionalen Wertschöpfungskette. Das heißt, man macht sich unabhängig, man fördert
4	letztlich so diese kommunale Autonomie. Übrigens bei so einem Energiekonzept auch. Wir machen uns da nicht
5	abhängig von irgendwelchen Energiepreisen oder von irgendwelchen Engpässen, die es irgendwo auf dem
6	Energiemarkt gibt. Sondern wir sind halt autonom. Transportwege verringern sich. Das sind alles Vorteile. Und
7	ist natürlich auch dann so, dass eigentlich, nehmen wir jetzt mal so einen regionalen Bauherrn, der wird auch
8	eher mit einem lokalen Architekten zusammenarbeiten, mit lokalen Handwerkern. Damit werden wieder
9	Arbeitsplätze in der Region geschaffen und sowas. Und auch das ist alles so eine Art, wie so eine
10	Kreislaufwirtschaft, die dann auch wie gesagt nachhaltig ökonomisch umgesetzt wird. Und sowohl letztlich der
11	Ökonomie nutzt, aber auch der Umwelt am Ende nutzt. Das ist ja ein Beispiel wie es beim Thema Holz eben auch
12	funktionieren kann.
13	[0:38:53.4] I.: Ja, okay. Da sind auf jeden Fall jetzt auch einige Aspekte dabei, die, sage ich mal, beim nachhaltigen
14	Bauen oder auch nachhaltige Stadtteile oder nachhaltige Quartiere jetzt nicht immer so im Vordergrund in der
15	Diskussion stehen. Von daher ist das jetzt für mich auch sehr interessant. Gerade das mit der regionalen
16	Wertschöpfungskette. Klar, bei Lieferketten und so wird es ständig diskutiert. Lebensmittel möglichst regional
17	einkaufen und da eben das alles unterstützen. Aber gerade auch so dieser Planungsaspekt, dass die Architekten
18	eben nicht, sagen wir mal, in München sitzen, sondern wirklich dann in Freiburg vor Ort und man da eben diese
19	Kompetenzen nutzt, die halt da sind. Und es gibt ja auch mittlerweile wirklich genug Angebot, nehme ich mal
20	an. Gerade in einer Stadt wie Freiburg oder in allen größeren Städten sollte das ja eigentlich kein Problem sein.
21	Genau. Jetzt ist mir spontan noch/ Also, wenn Sie noch einen Moment Zeit haben, ich weiß nicht, ansonsten/
22	[0:39:54.3] B.: Ja, doch. Bis zwölf habe ich Zeit.
23	[0:39:56.8] I.: Perfekt. Okay. Ist mir jetzt noch eingefallen zu diesem Thema Baustoffe und Nachhaltigkeit,
24	vielleicht, ob Sie da irgendwie eine Einschätzung haben: Was halten Sie für realistischer, wie man zum Beispiel
25	den Einsatz von recycelten Baustoffen oder kreislauffähigen Baustoffen erweitern könnte? Eher durch so eine
26	staatliche Förderung oder per Gesetz? Was würden Sie da so, mal aus dem Bauch raus, sagen?
27	[0:40:31.1] B.: Ist schwierig. Also, es ist auch wichtig, also überhaupt auch Architekten und dann auch Planer
28	dafür zu sensibilisieren. Also, da fängt es eigentlich an. Natürlich ist es durch Gesetz dann ein Stück weit/ Klar,
29	die Sensibilisierung kommt dann von allein. Aber/
30	[0:40:57.7] I.: Ja, es ist gar nicht so einfach, ich weiß.
31	[0:41:00.3] B.: Also, es gehört viel dazu. Also wir haben auch gemerkt, für uns ist das auch alles ein ganz neues
32	Thema und wir haben deswegen vor anderthalb Jahren eine große Veranstaltung zum Thema graue Energie und
33	Bauen geplant. Die musste dann coronabedingt abgesagt werden. Ist bei uns aber nach wie vor auch noch so im
34	Hinterkopf. Und weil uns auch wichtig ist, zu sensibilisieren, also die richtet sich dann auch/ Eine Veranstaltung,
35	die sich an die Architektenkammer richtet, aber natürlich auch sonst ans Fachpublikum und natürlich auch die
36	Medien eingeladen werden, um das Thema stärker ins Bewusstsein zu rufen.
37	Klar, gesetzlich ist ja jetzt auch schon einiges passiert. Also, es gibt ja auch diese Neuordnung des Abfallrechts,
38	glaube ich. Und das ist übrigens vielleicht auch nur so ein Beispiel, was auch dem Thema Kreislaufwirtschaft in
39	Dietenbach zugutekommt. Und das hängt auch vielleicht ein bisschen mit dieser Neuordnung des Abfallrechts
40	zusammen, was zumindest für uns eine ganz gute Klammer ist, um jetzt auch so zu agieren. Wir haben in
41	Dietenbach sehr hohe Grundwasserstände und müssen das Gebiet deswegen aufschütten für die ganze
42	Straßenerschließung, et cetera. Und um Kellergeschosse zu ermöglichen. Und das ist eigentlich anders als in
43	anderen Gebieten, die eher gar nicht wissen wohin dann mit der Erde. Wir brauchen Erde. So. Und jetzt wissen
44	wir aber auch, in der Region sind überall die Deponien knapp und die Laster fahren dann mit der Erde weite
45	Wege, um das dann abzulagern. Und wir machen das so, dass wir gesagt haben, und das ist der erste
46	Bebauungsplan sogar, der in Dietenbach folgt, der ist jetzt sogar schon rechtskräftig. Und seit einem Monat
47	laufen da die Vorbereitungsarbeiten. Wir haben in Dietenbach jetzt ein Erdaushubzwischenlager, also wie so

1	eine Erddeponie angelegt. Was ein bisschen abwegig erst mal klingt. So ein Baugebiet ist erstmal eine
2	Erddeponie, aber es hat halt den Vorteil, dass die Projekte, die es hier in der Region gibt und die Region wächst
3	ja auch, nicht nur Freiburg wächst, sondern die Region wächst, dass die letztlich ihre Erde nehmen und bei uns
4	das so mehr oder weniger aufs Gelände kippen. Damit sind für die die Transportwege kürzer, weil die nicht weite
5	Wege in die Deponie fahren müssen. Und wir haben gleichzeitig die Erde direkt vor Ort und können sie direkt
6	verbauen. Und auch das ist so ein bisschen das Thema, dass es ökologisch und ökonomisch viel effizienter ist so.
7	Sind Kleinigkeiten, aber betreffen letztlich auch das und trägt eben auch Rechnung, was so auf Gesetzesebene
8	in dieser Neuordnung des Abfallrechts passiert ist.
9	[0:43:30.6] I.: Ja, das stimmt.
10	[0:43:33.0] B.: Also, es ist beides wichtig. Per Gesetz ist wichtig, aber ist auch immer die Frage, wie kann ich als
11	Kommune selbst auch für das Thema sensibilisieren durch begleitende Veranstaltungen. Klar, durch
12	Konzeptvergabe, wo ich auch was setze und die Leute damit gleichzeitig auch draufklapfe. Bei uns noch durch
13	ein Gestaltungshandbuch, das ist dann noch etwas, was auch Anlage werden soll zum Kaufvertrag. Und dieses
14	Gestaltungshandbuch soll parallel zum Bebauungsplan entwickelt werden und soll dann eben auch ein eigenes
15	Kapitel enthalten zum Thema nachhaltiges Bauen. Das heißt, dieses Gestaltungshandbuch bekommt jeder
16	Bauherr, wenn er baut, kriegt er das an die Hand.
17	Oder dass wir zum Beispiel auch für die öffentlichen Gebäude Wettbewerber ausloben und bei den
18	Wettbewerben, ob es jetzt die Schulen sind oder ob es eine Brücke, eine Fahrradbrücke, ist, die wir über die B31
19	spannen in Richtung Radvorrangnetz, wo wir auch sagen, es muss aber nachhaltig sein. Also zum Beispiel die
20	Brücke, wäre gut, wenn da auch, wenn das zumindest so eine Holzhybridbrücke ist. Und das heißt auch bei
21	Wettbewerbsverfahren von Anfang an solche Kriterien setzen und damit eigentlich allen Architekten und
22	Landschaftsarchitekten, die sich beteiligen auch direkt in Erinnerung rufen, okay, also ich muss das mitdenken
23	und ich muss mir Gedanken machen. Und auch damit letztlich immer wieder so das Bewusstsein schärfen. Aber
24	ja, da gehört wie gesagt viel zu. Das (doing?) in der Kommune durch solche Wettbewerbe, Konzeptvergaben, et
25	cetera, Gestaltungshandbücher, wie Förderprogramme natürlich auch.
26	Die können enorm helfen. Weil, das muss man sich auch bewusst sein, auch das Bauen mit Holz ist momentan
27	einfach noch deutlich teurer. Wir haben das aus München kennengelernt bei der Prinz-Eugen-Kaserne. Das war
28	nur mit einem riesigen dicken Investitionsprogramm oder Förderprogramm möglich. Und sonst ist es momentan
29	noch nicht vergleichbar. Das wird sich in Zukunft aber auch ändern und da ist die Politik dann auch gefragt, weil
30	noch mag Holz teurer sein, aber wenn das Thema der CO <sub>2</sub> -Bepreisung auch immer stärker den Bausektor betrifft,
31	wird es da eher die fossilen Baustoffe betreffen. Also, sagen wir mal so, nicht die fossilen, ja, aber letztlich die
32	weniger nachhaltigen Baustoffe betreffen. Ist ja beim Energiesektor auch dasselbe dann, so dass wir vielleicht
33	heute noch merken, es ist teurer, aber auf die Zukunft gedacht, ist es günstiger, wenn die Politik ernst macht
34	und nach wie vor das Thema CO <sub>2</sub> -Bepreisung auch stärker forciert. Und damit gleichzeitig das eine teurer, aber
35	das andere damit natürlich auch viel wettbewerbsfähiger macht.
36	[0:46:18.6] I.: Ja. Na, ja klar, da haben natürlich die Produkte oder auch Baustoffe dann klar den Vorteil, die eben
37	geringere Emissionen in der Herstellung und im Transport und im Einsatz dann mitbringen.
38	[0:46:28.2] B.: Genau, ja.
39	[0:46:29.1] I.: Genau. Okay. Ja, so kann man das auf jeden Fall beeinflussen. Das heißt zusammengefasst, liefert
40	die Bauleitplanung eigentlich nur den Rahmen, also wirklich so diese Rahmenbedingungen für ein Quartier oder
41	einen neuen Stadtteil. Aber die Ausgestaltung für die einzelnen Grundstücke macht man eigentlich komplett
42	über Verträge, städtebauliche Verträge, Kaufverträge und eben diese Vergabe.
43	[0:46:47.0] B.: Und Wettbewerbe und sonst was.
44	[0:46:47.9] I.: Und Wettbewerbe, ja.
45	[0:46:49.3] B.: Genau. Wie gesagt, weil halt das Thema Nachhaltigkeit so interdisziplinär ist, geht es nicht nur
46	über die Bauleitplanung. Und die Bauleitplanung ist eigentlich/ Also, für uns ist eigentlich so das wichtigste

1	Instrument, auch wenn es erst mal nur ein informelles Instrument ist, der städtebauliche Rahmenplan. Da
2	stecken unsere ganzen Ideen drin. Diese Ideen werden jetzt quasi übersetzt in die Bauleitplanung, dann später
3	in die Konzeptvergabe, in so diese Wettbewerbsverfahren, Gestaltungshandbücher. Wo einfach viele Themen
4	noch mal weiter vertieft werden. Aber das war für uns die wichtigste Klammer und dann gibt es mehrere
5	Instrumente. Weitergehend auch, dass wir ein Betreiber- und Finanzierungskonzept für die Quartiersgaragen
6	machen, was ein ganz wichtiger Baustein ist für das Thema Mobilität, um das weiterzubringen. Es gibt so einen
7	großen Instrumentenkoffer neben der reinen Bauleitplanung. Ich gucke jetzt gerade mal in unseren
8	Erläuterungsbericht vom Rahmenplan. Da haben wir nämlich/ Ich schicke Ihnen den Link dann gerne. Da haben
9	wir, gut, Kapitel 6.2 "Instrumente zur Umsetzung der Rahmenplanung" da benannt. Da findet sich dann auch
10	letztlich so, ja, der Instrumentenkoffer. Und was wichtig ist, wir haben dort ein Kapitel 7, das heißt "Ausblick -
11	Die Kreislaufstadt von morgen" und das ist/ Also, einige Sachen, die ich Ihnen jetzt erzählt habe, die haben wir
12	da kurz und knapp zusammengefasst. Haben auch so ein Bild, so einen Kreislauf und letztlich die vielen/
13	[0:48:38.8] I.: Das kenne ich.
14	[0:48:39.5] B.: Genau. Ah, das kennen Sie. Ja, genau.
15	[0:48:41.1] I.: Das war im Vortrag von Herrn Z.
16	[0:48:42.5] B.: Ach, ist doch gut, dass er das verwendet. Das ist doch gut. Kam von mir. Genau.
17	[0:48:48.2] I.: Ja, das ist doch voll schön.
18	[0:48:49.6] B.: Ja, genau. Nein, also, schön finde ich das gar nicht so. Was, glaube ich, wichtig ist, ist einfach was
19	dahintersteht.
20	[0:48:56.3] I.: Deutlich. Sehr deutlich.
21	[0:48:58.0] B.: Und dass man auch/ Genau, ja.
22	[0:48:59.8] I.: Okay. Genau. Also, das finde ich auf jeden Fall schon mal ganz aufschlussreich, einfach zu hören,
23	dass man da wirklich auch verschiedene Instrumente hat und, ja, Bauleitplanung vielleicht tatsächlich nur halt
24	für den Rahmen gut ist oder eben für die Festsetzungen. Das, was man natürlich dann konkret festsetzen kann.
25	Dazu ist mir jetzt noch, das vielleicht als letzte Frage von meiner Seite, ist mir noch mal eingefallen: Im
26	Baugesetzbuch ist ja in Paragraf 1, ich glaube Absatz 5, eins der größeren Ziele, jetzt ja auch schon seit längerer
27	Zeit, Klimaschutz, Klimaanpassung in der Bauleitplanung umsetzen. Sehen Sie jetzt eigentlich so die aktuell
28	möglichen Festsetzungen in Bebauungsplänen als ausreichend an für dieses Ziel? Weil von dem, was ich bisher
29	so kenne, jetzt mal abgesehen von PV und Gebäudebegrünung/ Wäre es nicht auch sinnvoll, dass man
30	irgendwann mal auch mehr über Materialien und auch das Thema Rückbau irgendwie mit einbringt? Oder ist
31	das einfach aus Prinzip gar nicht möglich?
32	[0:50:05.2] B.: Ja, schon. Aber die Frage ist auch, ob da wieder die Bauleitplanung richtig/ Die übersetzen ja
33	quasi in dem Fall wieder zum Beispiel bei uns die Ideen des Rahmenplans. Und wenn ich jetzt mal das Thema
34	Klimaadaptation nehme, war es uns zum Beispiel wichtig, im Rahmenplan darauf zu achten, wir haben
35	Blockstrukturen, aber wir haben offene Blockstrukturen. Und das heißt, wir haben in der Regel immer noch zwei
36	Öffnungen, damit die besseren umweltmeteorologischen Bedingungen entstehen. Wir haben gleichzeitig, das
37	hatte ich auch vorhin auch gesagt, keine Tiefgaragen, sondern die Möglichkeit, Bäume zu pflanzen. Wir haben
38	im Rahmenplan, und im Bebauungsplan setze ich das dann so um, um diese Gebäudeöffnung letztlich auch
39	hinzubekommen, habe ich so genannte Baulinien, die ich einzuhalten habe. Baugrenzen sind flexibler, aber
40	Baulinien, da muss ich genau an die Linie bauen. Und damit kann ich auch direkt von Anfang an diese
41	Gebäudeöffnung festsetzen und auch dafür Sorge tragen, dass diese Öffnungen auch drin sind. Wir haben alle
42	Straßen, also ausnahmslos alle Straßen in den Querschnitten so entwickelt, dass sie eine Begrünung haben. Also
43	Straßenbäume haben. In der Summe kommen wir fast auf 2.000 Einzelbäume, die gepflanzt werden in
44	Dietenbach. Das heißt, das wird dann in der Erschließungsplanung jetzt, das ist dann ja was alles neben der
45	Bebauungsplanung läuft, dann letztlich alles weiter vertieft. Im Bebauungsplan kann ich aber natürlich

1	Pflanzgebote setzen. Ich kann sagen, welche Bäume gepflanzt werden oder ich kann auch den Standort der
2	Bäume festlegen. Das sind ja alles auch Maßnahmen der Klimaadaptation.
3	Und was ganz wichtig ist, das ist auch die Struktur, die der Rahmenplan vorgegeben hat. Wir haben drei große
4	Stadtteilparks. Und diese Stadtteilparks sind letztlich dafür da, die fungieren wie so regionale Luftleitbahnen
5	und sorgen für den Luftaustausch auch mit der Kernstadt. Und die werden natürlich auch übersetzt im
6	Bebauungsplan dann und sind dann halt als öffentliche Grünflächen festgesetzt und dürfen natürlich nicht
7	überbaut werden. Dass da irgendwie keine Raumwiderstände, was den Wind angeht, entstehen. Das heißt, der
8	Bebauungsplan übersetzt da auch viele Ideen natürlich aus dem Rahmenplan, die dann auch den Ideen der
9	Klimaanpassung, der Klimaadaptation Rechnung tragen. Und das waren halt wichtige Strukturen, also wenn ich
10	jetzt die drei Stadtteilparks nehme, die sind auch so angelegt, dass ich eigentlich von jeder meiner Wohnungen
11	relativ schnell einen Weg ins quartiersinterne Grün finde. Und dieses quartiersinterne Grün sind ja auch wie so
12	Art Kühlhasen bei Hitzeperioden. So dass ich da auch recht schnell, ja, mir Abkühlung verschaffen kann.
13	So und dann kann man später bei Wettbewerben zum, nehmen wir mal den Marktplatz, natürlich auch darauf
14	achten, dass man vielleicht auch eher helle Bodenbeläge verwendet und so weiter. Da gibt es dann, genau auch,
15	was die Klimaanpassung angeht, weitere Möglichkeiten. Oder wir haben so Arkaden dann bei uns direkt in der
16	Mitte, wo man dann auch so witterungsgeschützt, nicht nur vor Regen, sondern auch vor zu starker Sonne, auch
17	so einkaufen kann. Also wie gesagt, sagen wir so, das Thema Klimaadaptation muss, das ist glaube ich das
18	wichtigste, das muss im Städtebau von Anfang an mitgedacht werden. Und dann brauche ich natürlich, klar,
19	wird es dann technisch in Führungszeichen, in der technischen Planungssprache übersetzt in der
20	Bauleitplanung. Und später dann in der konkreten Erschließungsplanung und Landschaftsplanung natürlich
21	dann immer weiter konkretisiert in der Ausführungsplanung.
22	[0:53:50.9] I.: Okay. Gut. Ich merke jetzt gerade, es ist eigentlich doch schon einiges möglich allein über die
23	Bebauungspläne. Man vergisst es immer nur so ein bisschen. Ich hatte vor kurzem ein Praktikum und hab halt
24	mehr mit wirklich alten Bebauungsplänen zu tun gehabt. Und klar, ich kenne ein bisschen das BauGB. Aber das
25	war jetzt trotzdem nochmal gut zu wissen einfach für einen komplett neu konzipierten Stadtteil, was da
26	tatsächlich auch schon möglich ist und was umgesetzt werden soll. Also so als Überblick. Okay. Ich muss noch
27	mal kurz schauen, aber ich glaube, wir haben eigentlich alles abgedeckt, was ich so vorgesehen hatte. Da Sie ja
28	auch schon auf vieles von sich aus eingegangen sind. Dann würde ich sagen: Vielen Dank, also es war wirklich
29	überaus interessant und ich halte das Dietenbach-Projekt insgesamt eigentlich für eine sehr spannende
30	Planungsangelegenheit. Und ich bin auch ziemlich sicher, dass Sie eigentlich schon sehr, sehr viel von dem
31	abgedeckt haben, was man überhaupt abdecken kann, gerade was nachhaltige Planung, Stadtteilplanung und
32	dann eben auch das Bauen dann über diese Konzeptvergabe, wie Sie es ja dargestellt haben, machen kann. Und
33	das finde ich eigentlich sehr beeindruckend, weil es gibt natürlich auch andere Städte, wo neue Stadtteile
34	diskutiert werden oder Neubaugebiete natürlich auch. Und ganz viele Gemeinden, vor allem kleinere
35	Gemeinden, sind glaube ich noch relativ weit weg von diesem Ausmaß an Nachhaltigkeit.
36	[0:55:28.7] B.: Ja. Aber das ist halt auch der Vorteil an Freiburg. Also, dass man ja auch eine erstmal sehr aktive
37	Öffentlichkeit hat und natürlich auch einen Gemeinderat, der da auch selber nach vorne geht und auch die
38	Messlatten auch sehr hoch legt. Was ja schön ist. Also, macht dann schon Spaß.
39	[0:55:46.3] I.: Das stimmt.
40	[0:55:48.0] B.: Wenn Sie noch Informationen zu Dietenbach brauchen: Das einfachste ist, Sie gehen einfach auf
41	die Website freiburg.de/dietenbach und wenn Sie sich da mal durchwühlen, gibt es da zum Beispiel, da gucke
42	ich aber gerade mal selber, zum Beispiel auch den Rahmenplan, den ich jetzt häufiger erwähnt habe.
43	[0:56:03.4] I.: Ja, da gucke ich auf jeden Fall noch mal rein und/
44	[0:56:05.5] B.: Den gibt es als Langfassung und Kurzfassung da. Und als Langfassung, genau. Da werden Sie in
45	der Langfassung sehen, gibt es zum Beispiel auch extra ein Kapitel zum Thema Kreislaufstadt von morgen, als
46	Ausblick.



1	[0:56:17.2] <b>I.:</b> Ja. Perfekt. Gut. Sie hatten ja noch was von einem Link und noch etwas gesagt. Also meine E-Mail-
2	Adresse hat ja die Frau Saurer. Machen Sie das dann über die? Okay.
3	[0:56:33.5] <b>B.:</b> Ja, dann kann ich das darüber machen. Genau.
4	[0:56:36.0] <b>I.:</b> Perfekt. Okay. Ja, vielen Dank auch, dass Sie sich jetzt doch deutlich mehr Zeit genommen haben,
5	als wir ursprünglich vorgesehen hatten. Ich hoffe, das ist jetzt nicht ein zu großes Problem.
6	[0:56:50.1] <b>B.:</b> Nee, es ist ja ein spannendes Thema, was Sie haben. Also wir sind da manchmal/ Weil, wir kriegen
7	viele Anfragen. Aber ich finde manchmal, genau, helfen ja auch so, auch wenn es klein, in Anführungszeichen
8	nur, eine Bachelorarbeit wird. Aber das zeigt uns ja auch immer/ Also, wir merken auch von den Anfragen, die
9	von den Studenten kommen, ist das ja für uns dann manchmal auch interessant: Okay, was sind eigentlich
10	gerade die aktuellen Themen? Und ist ja dann oft auch eher für uns so ein bisschen auch Bestätigung, so weiter
11	zu denken. Also man merkt ja auch, dass wenn man/ Irgendwie kommen die Ideen in der Regel immer so ein
12	bisschen auch von unten. Von jungen Menschen und wo man auch merkt, so was sind so die Themen, die die
13	Zukunft betrachtet. Und deswegen finde ich das immer sehr spannend auch. Was wird so an der Uni momentan
14	gelehrt oder was sind so die Themen, die jetzt gerade aktuell sind, mit denen sich Studenten beschäftigen. Die
15	ja uns dann auch mal so ein bisschen, also wenn man da offen ist für zumindest, so ein bisschen ansprechen.
16	Genau. Also das sind so die Themen der Zukunft und da muss man ein Auge drauf haben. Von daher, ja.
17	[0:57:40.1] <b>I.:</b> Ja. Ja, genau. Und also in meinem Studiengang ist das jetzt glaube ich eher unterrepräsentiert das
18	Thema Klimaschutz und Nachhaltigkeit, weil öffentliche Verwaltung, ja, ist vielleicht nicht unbedingt
19	prädestiniert dafür. Aber ich finde eben auch, dass es gerade bei uns sehr wichtig ist, weil die Städte ja über die
20	Beschaffung und die Vergabe auch von öffentlichen Aufträgen einfach sehr viel Stellschrauben eigentlich haben,
21	um Einfluss zu nehmen, was das angeht. Und deswegen bin ich eigentlich da sehr streng dafür, dass da noch
22	mehr gepusht werden muss, sozusagen. Und würde vielleicht auch gern später mal in dem Bereich irgendwie
23	was machen, falls es klappt. Genau. Aber das haben Sie schon auf jeden Fall gut zusammengefasst. Okay, dann
24	bedanke ich mich und wünsche Ihnen weiterhin ganz viel Erfolg, dass bei der Umsetzung möglichst alles glatt
25	geht. So wie es halt möglich ist.
26	[0:58:34.1] <b>B.:</b> Weil, das man muss auch/ Das ist halt die Sache. Also, wir sind ja immer noch in der Phase, wo
27	wir so/ Wir haben super Ideen, sind auch alle mit so einem Stück weit Idealismus auch unterwegs. Dem nötigen
28	Pragmatismus natürlich auch. Aber genau. Das eine ist jetzt erstmal, das alles sich als Ziele vorzunehmen, das
29	andere, dann auch in die Praxis umzusetzen. Und das ist natürlich die ganz große Herausforderung.
30	[0:58:54.0] <b>I.:</b> Auf jeden Fall.
31	[0:58:56.5] <b>B.:</b> Okay, alles klar. Gut, Frau Kurz. Dann vielen Dank und dann viel Erfolg für die Arbeit.
32	[0:59:03.0] <b>I.:</b> Vielen Dank. Ihnen auch viel Erfolg und alles Gute.
33	[0:59:05.1] <b>B.:</b> Ja, Ihnen auch. Gut.
34	[0:59:05.9] <b>I.:</b> Tschüss.
35	[0:59:06.5] <b>B.:</b> Tschüss.

## C2C Science Sprechstunde über Zoom mit Tim Janßen von Cradle to Cradle NGO; 25.08.2021, 15:00-16:04 Uhr

Abkürzungen: **N.K.** = Verfasserin BA, **T.J.** = Tim Janßen  
weitere Beteiligte (nur Vornamen): **B. = Bernhard, M. = Max, S. = Stefan**

1	[0:00:00.0] (...)
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	<p>[0:00:03.1] <b>T.J.:</b> Super, dann läuft die Aufzeichnung. Wir haben den 25.08.2021. Tim Janßen mein Name. Und Kolleginnen und Kollegen hier aus dem wissenschaftlichen/ Mit wissenschaftlichen Fragestellungen vielleicht oder zumindest bezogen auf ihre wissenschaftlichen Arbeiten. Aber so viel schon als Preludes miteinander. Ich würde sagen, jetzt, ob das auf der Aufzeichnung drauf ist oder nicht, macht nicht so viel Unterschied. Vielleicht ganz kurze Vorstellungsrunde macht Sinn, glaube ich, um einfach mal zu sehen, wer hier gerade was macht. Und wir müssten dann, wenn wir jetzt sehen, wir haben jetzt hier vier Personen, dass man auch so ein bisschen einfach auf die Zeit achtet. Dass vielleicht auch jeder so im Schnitt dann mal zehn Minuten Zeit hat, seine Sachen abzuliefern. Und auch auf seine Sachen eine Antwort zu bekommen. Ich glaube, das wäre jetzt ungefähr ein fairer Deal. Dann haben wir hinten raus noch ein bisschen Zeit, um vielleicht noch an der ein oder anderen Stelle in die Tiefe zu gehen. Also, vielleicht ganz kurze Vorstellungsrunde. Ich habe ja schon was zu mir gesagt. Und bei den Kollegen habe ich jetzt so einen Mini-Abriss gemacht. Es soll ja um euch und eure wissenschaftlichen Arbeiten gehen. Aber auch fortfolgende Fragen gerne bei uns ans Bildungsreferat. Wie erreicht man euch? „bildung@“? Yes. „bildung@c2c.ngo“. Der Gianluca ist Umweltwissenschaftler. Die Anna kommt aus der Bildung und ist studierte Lehrerin. Sagt man das so? Anna? More or less. Sie kennt sich mit Bildung gut aus. Okay. Max, magst du ganz kurz sagen, wer du bist und was dein Thema ist?</p>
18 19 20 21 22 23 24 25 26 27 28 29 30 31	<p>[0:01:35.7] <b>M.:</b> Ja. Danke, dass du schon mir damit hilfst. Ja. Also, ich bin Max. Ich bin von der TU D. Ich schreibe gerade meine Masterarbeit zum Thema "Resource Matters". Ich beende damit mein Architekturstudium. Und die Arbeit befasst sich damit, Recyclingpotenziale so gesehen zu analysieren, auch aufzuschreiben. Das bezieht sich zum einen einmal natürlich auf die Materialität. Also, es ist eine materielle Studie, es ist aber auch eine konzeptionelle Studie. Das heißt, es soll auch um Konzepte gehen, wie man halt abgesehen von Materialrecycling den Recyclinggedanken besser implementieren kann. Dementsprechend auch das Cradle-to-Cradle-Knowhow irgendwie besser implementieren kann. Und, abgesehen von dem theoretischen Teil, mache ich auch selber Forschung so gesehen, also Materialforschung. Das heißt, ich habe mir als Frage gestellt: Was gibt es für alltägliche Abfälle, die nicht gut genutzt werden? Beziehungsweise wo man einfach tagtäglich dran vorbeigeht. Welche Potenziale gibt es, die man sich jederzeit greifen kann und nutzen kann? Und dazu habe ich letztes Jahr zum Beispiel schon ein halbes Jahr in Portugal gearbeitet, bei der NGO Critical Concrete. Ich weiß nicht, ob ihr die kennt. Auf jeden Fall, die machen auch viel Materialforschung. Die machen aber auch sehr viel, was soziale Architektur angeht und dort haben wir auch schon angefangen, an bestimmten Materialien zu forschen. Und da habe ich auch schon mitgearbeitet. Und so ist das Ganze entstanden.</p>
32 33	<p>[0:03:11.4] <b>T.J.:</b> Cool. Dann Danke für die Vorstellung schon mal. Stefan. Magst du vielleicht weitermachen, Stefan?</p>
34 35 36 37 38 39	<p>[0:03:18.0] <b>S.:</b> Ja. Hallo. Ich bin Stefan. Ich bin Student in W. und für Elektrotechnik. Und ja, ich habe jetzt gar nicht so viel große Fragen und Input, was ich hier besprechen würde. Ich hatte einfach, auch um das/ Also, das Konzept ist halt wichtig und nötig und in der Elektrotechnik, soweit ich weiß, irgendwie kaum vertreten. Und deshalb habe ich halt einfach nachgefragt in der Mail mal, wie man da Themen finden kann. Ob es Vernetzungen gibt, ob es Kontakte gibt, so was. Daher wollte ich/ Also, das ist jetzt auch noch relevant eher dann für meine Masterarbeit und später, aber. Genau. Da wollte ich mir halt einfach nur ein, zwei Tipps abholen.</p>
40	[0:03:49.0] (...)

1	[0:03:50.1] <b>T.J.:</b> Alles klar, Danke, Stefan. Ist auch immer gut, einfach gleich die Erwartungen mitzusagen. Danke
2	dir. Bernhard?
3	[0:03:55.3] (...)
4	[0:03:58.8] <b>B.:</b> Ja, hallo. ( <b>unv.</b> ) Bernhard. Ich studiere in W. Also, ich komme eigentlich aus der Steiermark. Also,
5	falls ich mal in einen komischen Dialekt ein falle, bitte sagen, falls man mich mal nicht versteht. Ja, wie gesagt,
6	ich studiere in W. und habe jetzt die Masterarbeit bezüglich/
7	[0:04:17.7] <b>T.J.:</b> Welche Uni?
8	[0:04:18.7] <b>B.:</b> Bitte?
9	[0:04:20.3] <b>T.J.:</b> Welche Uni oder Hochschule?
10	[0:04:21.8] <b>B.:</b> FH T.W.
11	[0:04:23.8] <b>T.J.:</b> Ah, T.W.
12	[0:04:25.5] <b>B.:</b> Genau. Ich war vorher auf der ( <b>unv.</b> ), auf der Bodenkultur. Die ist sicher bekannter. Genau, ich
13	bin jetzt auf der T. und mein Thema ist ziemlich speziell. Und zwar geht es um Matratzenproduktion, wie man
14	Matratzen designen kann, dass sie in einen biologischen Kreislauf, also in diesen biologischen Kreislauf von
15	diesem Cradle-to-Cradle-System einfließen kann.
16	[0:04:58.7] <b>T.J.:</b> Okay. Ganz konkret.
17	[0:05:02.4] <b>B.:</b> Ja. Also, ich bin schon ziemlich weit, weil ich habe angefangen auch, mich mit Materialien zu
18	beschäftigen, mit diesen Naturkautschuken. Weiter, also, es sind Matratzen, die ja gut zertifiziert haben, was
19	das Organische anbetrifft. Also, die Materialien sind alle zertifiziert und so weiter. Mir geht es jetzt darum, zu
20	schauen, was die Materialien für Inhaltsstoffe haben und ob es Möglichkeiten gibt, wie man diese Matratzen so
21	zu designen, dass man sie halt biologisch abbaubar macht.
22	[0:05:39.9] (...)
23	[0:05:41.4] <b>T.J.:</b> Alles klar.
24	[0:05:42.6] <b>B.:</b> Genau. und ( <b>unv.</b> )/
25	[0:05:44.3] <b>T.J.:</b> Cool, dann haben wir das/
26	[0:05:45.4] <b>B.:</b> Bitte?
27	[0:05:46.9] <b>T.J.:</b> Ich glaube, dann haben wir auch schonmal deinen Rahmen soweit grob umrissen. Oder?
28	Wolltest du noch etwas hinzufügen?
29	[0:05:51.7] <b>B.:</b> Also, nein. Es wäre schon Richtung Fragen dann gegangen. Aber die kann ich ja nachher stellen.
30	[0:05:55.6] <b>T.J.:</b> Ja, genau. Die, würde ich sagen, machen wir dann gleich. Und Natalie, Hochschule Ludwigsburg.
31	Danke dir erst mal, Bernhard.
32	[0:06:02.5] <b>N.K.:</b> Hallo. Ja, genau. Hochschule Ludwigsburg, sagt ja schon, das ist meine, also nicht Uni, sondern
33	Fachhochschule. Aber, genau, trotzdem relativ hohes Niveau. Mein Studiengang ist Public Management. Das
34	bereitet auf den zukünftigen Dienst in der öffentlichen Verwaltung vor. Und, genau, ich habe schon immer ein
35	großes Interesse an Umwelt und Nachhaltigkeit gehabt. Auf jeden Fall mache ich jetzt das. Das ist meine
36	Bachelorarbeit und mein Thema ist praktisch die Umsetzung von C2C in Kommunen im Rahmen des
37	nachhaltigen Bauens. Also C2C als Ganzes, dachte ich mir so, ist vielleicht ein bisschen komplex. Ich picke mir
38	irgendwas raus, was einen besonderen Impact hätte, wenn man es denn so umsetzen würde. Und da bin ich
39	letztendlich über mein Interesse an Architektur und Bauen eben dann beim nachhaltigen Bauen hängen

1	geblieben. Genau, da gibt es ja auch aktuell schon sehr viel zu, schon einiges gelesen. Und deswegen habe ich
2	da eben auch so ein paar Fragen, die auch in Richtung der Gesetzgebung, beziehungsweise Potenziale dafür,
3	aber natürlich auch eben kommunale Umsetzung, gehen. Ob ihr da vielleicht Ideen oder Sachen zu habt. Weil
4	ich weiß, es gibt ja dieses Netzwerk C2C Regionen und die Lorena Zangl und die Lena Juncker sind ja da, habe
5	ich gesehen. Genau, und von daher dachte ich mir, das müsste hier eigentlich auch eine gute Quelle sein.
6	[0:07:34.6] <b>T.J.:</b> Ja, klasse.
7	[0:07:35.2] <b>N.K.:</b> Genau, soweit von mir.
8	[0:07:36.1] <b>T.J.:</b> Dann wäre jetzt mein Vorschlag, wir haben jetzt Viertel nach. Und haben schon mal einen ganz
9	guten Blick auf die Themenvielfalt. Wenn jetzt vielleicht jeder mal zehn Minuten bekommt, wo ja in Teilen auch
10	vielleicht Sachen besprochen werden, die jeder andere auch nutzen kann. Und ich hätte gedacht, vielleicht
11	machen wir es dann jetzt genau rückwärts und fangen mit zehn Minuten mit dem Thema von Natalie an. Wenn
12	das fein ist, ich meine, die Reihenfolge ist, glaube ich, egal, weil jeder hätte dann ungefähr zehn Minuten Zeit.
13	Und dann haben wir hinten raus noch ein paar Minuten, um das irgendwie vielleicht abzuschließen miteinander.
14	Also, Natalie, fang doch vielleicht an mit deinen Fragen und ich gucke hier ziemlich genau auf die Uhr. Und dann
15	probieren wir das mal so.
16	[0:08:11.8] <b>N.K.:</b> Okay. Sollte kein Problem sein, die sind vorformuliert. Genau, also, vielleicht ganz kurz, das ist
17	wahrscheinlich am kürzesten abgehandelt. Also, ich habe gehört, dass ein Leitfaden in Arbeit ist zum Thema
18	nachhaltiges Bauen von eurer Seite. Genau. Und vielleicht kannst du da kurz, wenn du da was zu weißt, kurz was
19	dazu sagen: Was wird der ungefähr beinhalten? Und, ja, was ist so die Absicht?
20	[0:08:40.1] <b>T.J.:</b> Ja, klar. Also, wir haben ja einmal dieses Netzwerk jetzt initiiert, schon vor einiger Zeit und bauen
21	das gerade aus, weil wir denken, und das ist auch eine unserer fünf strategischen Säulen mit der Cradle to Cradle
22	NGO, dass in der kommunalen Entwicklung auch einfach ein interessanter Hebel ist für die Veränderung in der
23	Gesellschaft. Und dieser Leitfaden wird sich konkret an die öffentliche Hand richten, mit der Zielgruppe vor allen
24	Dingen eben der kommunalen, politischen-kommunalen Ebene und bezieht sich darauf, also, im Bereich Bauen,
25	wie wir sowohl in der Sanierung bestehender Gebäude, aber auch im Neubau, einen Plan an die Hand geben
26	können, nach welchen Kriterien da Materialien ausgewählt werden und auch in welchen Phasen des jeweiligen
27	Bauens auch welche Kompetenzen notwendig sind. Und auch mit welchen Erfahrungswerten aus erfolgreichen
28	oder angestoßenen Cradle-to-Cradle-Bauprojekten da sozusagen diese Schwelle, von Null an sozusagen,
29	übertreten werden kann, so dass wir das als Hilfestellung rausgeben wollen.
30	Das wird ein interaktiver Leitfaden, als Online-Website sein. Also, das wird man nicht klassisch als PDF
31	herunterladen können. Und der soll Richtung Oktober veröffentlicht werden. Das ist dieser Bauleitfaden und es
32	wird einen weiteren Leitfaden für die kommunale Entwicklung geben, zum Thema Beschaffung. Das heißt, das
33	eine ist ein Projekt mit der Nordakademie aus Hamburg und mit der Hans Sauer Stiftung zusammen arbeiten
34	wir an einem Leitfaden, der auch Richtung Ende diesen Jahres veröffentlicht werden soll. Wie kann man
35	öffentliche Beschaffung mit Zuschlagskriterien qualitativ untermauern und nicht nur nach Preisausschreiben.
36	Also, das sind so die beiden großen Papiere, die jetzt dieses Jahr rausgehen von unserer Seite aus.
37	[0:10:26.0] (...)
38	[0:10:27.7] <b>N.K.:</b> Okay, alles klar.
39	[0:10:28.7] (...)
40	[0:10:31.2] <b>N.K.:</b> Ja, es ist ( <b>unv.</b> ). Auch bei der Recherche, es gibt schon so viel. Deutsche Gesellschaft
41	Nachhaltiges Bauen, der Bund hat auch irgendwie sein eigenes Zertifizierungssystem, die DGNB hat ihr eigenes
42	Zertifizierungssystem. Und dann gibt es da noch zahlreiche andere Sachen oder manche Bundesländer haben
43	auch irgendwie schon Leitfäden so Richtung Klimaneutralität natürlich rausgegeben. Und das ist ja alles uferlos.
44	Also, ich glaube, da ist es doch irgendwie ganz gut, wenn man mal zentralisiert was hat, gerade auch für die
45	Öffentliche Hand, weil da müssen ja auch Kompetenzen gebildet werden. Okay, genau.

1	[0:11:02.9] (...)
2	[0:11:05.3] <b>N.K.:</b> Vielleicht noch kurz ( <b>unv.</b> ) Welche, also, das ist jetzt vielleicht eine spezielle Frage, aber mal
3	gucken, vielleicht können wir es ja machen. Welche Rolle seht ihr denn in der kommunalen Bauleitplanung, also
4	Bebauungspläne, et cetera, als Einfluss auf das private Bauen? Weil, da ist ja auch ein großer Impact, was
5	Emissionen angeht, Materialverbrauch.
6	[0:11:24.8] <b>T.J.:</b> Gut. Also, die Frage, die wir grundsätzlich sehen, ist: Kann die öffentliche Hand mit ihren Hebeln,
7	die natürlich jetzt erstmal auch im Finanzvolumen liegen, also, allein schon über das, was die öffentliche Hand
8	ausgibt in der Beschaffung, oder auch in der Errichtung, oder im weitesten Sinne auch eben über
9	Ausschreibungsverfahren? Was da sozusagen finanziell bewegt wird, kann natürlich erst mal über diese
10	Nachfrageseite natürlich auch das Angebot verändern. Und wir glauben eben auch, dass die öffentliche Hand
11	also neben dieser marktlichen Situation, von der wir uns erhoffen und das auch fordern, ( <b>unv.</b> ) unseres Papiers
12	zur Bundestagswahl jetzt in diesem Jahr, das wird Anfang nächster Woche veröffentlicht, auch mit vielen
13	Forderungen, die sozusagen als Chancen getarnt werden, zehn an der Zahl, ist auch eine eben die
14	Vorbildfunktion der öffentlichen Hand. Und neben dieser eben rein marktlichen Veränderung, dass man also
15	wirklich über die Nachfrage auch konkret Angebot schafft und Unternehmen auch darüber motiviert, dass sie
16	ihre Produkte ökologisch am Markt anbieten, soll natürlich auch darüber eine Vorbildfunktion entstehen, die
17	auch sich auf den privaten Sektor auswirken kann. Dass ein Häuslebauer auch sagt, das hat z.B. meine Stadt oder
18	in der kommunalen Bau-/ Baudezernat wurde das vorgemacht und da kann ich ja vielleicht auch konkretes
19	Wissen vielleicht auch in mein privates Bauprojekt mit integrieren womöglich. Das erhoffen wir uns natürlich
20	schon.
21	Frage bleibt am Ende immer, wie weit ist der Markt da schon entwickelt, gerade im Baubereich. Wir haben
22	selber als Bauherr das C2C Lab gebaut und wurden auch mit der/ Waren natürlich mit der Fragestellung
23	konfrontiert: Was ist jetzt schon Cradle to Cradle? Und nicht nur das in der Auswahl der Materiallieferanten.
24	Und natürlich auch bei größeren Bauprojekten muss natürlich derjenige, also, der Bauherr, Finanzier und der
25	Generalunternehmer, das Architekturbüro, alle beteiligten Planer, Berater bis hin zu den Handwerkern, müssen
26	das verstanden haben. Und ich glaube, da liegt im Moment auch so ein ganz kniffliger Punkt, wo man schon
27	konstatieren kann, dass vielleicht so am Horizont zu sehen ist, die Zielsetzung wird immer mehr verstanden. Das
28	ist dann, wird als zirkuläres Bauen oder Circular Economy, Kreislaufwirtschaft, Cradle to Cradle, da gibt es viele,
29	viele Begriffe. Daher von der Zielsetzung: Ja. Aber die Schritte dahin und der Weg und wie das dann funktioniert,
30	dieses Wissen liegt oft halt nach wie vor nicht so präsent oder nur in Pilotprojekten. Also, wir haben ganz konkret
31	mit Handwerkern auf dem Bau selbst Hand anlegen müssen, um zu verhindern, dass bestimmte Materialien
32	eingeklebt werden, sodass wir auch Reversibilität erzeugen. Also, da kann man sich den Mund wirklich fusselig
33	reden. Und am Ende kommen teilweise Bauteile, die für das Verkleben gemacht sind, gleich mit Klebeseite. Da
34	muss man nur noch so eine kleine Folie abziehen und dann klebt das direkt, das Baumaterial. Also, das sind dann
35	teilweise neben diesen planerischen und strategischen Komponenten auch so Wissenskomponenten und
36	Business-Management-Komponenten. Hapert es dann auch ganz konkret in Teilen auch an der Umsetzung mit
37	dem Handwerk. Also, ich glaube, da brauchen wir gesamtgesellschaftlich auch noch einen Blick drauf, über die
38	Handwerkskammern auch, dass das konkret in die Umsetzung und diese Qualität und dieses Bewusstsein auch
39	bis zum Handwerk runterzudeklinieren. Aber natürlich auch bei den Herstellern und allen, die sozusagen dann
40	mit Baumaterial etwas anfangen am gesamten sehr komplexen Bauprozess.
41	[0:14:55.3] (...)
42	[0:14:57.7] <b>N.K.:</b> Okay. Das heißt, zusammengefasst, klar, Vorbildfunktion durch die öffentliche Hand, die
43	wiederum beeinflusst die Nachfrage, also, fördert die Nachfrage und beeinflusst dann natürlich das Angebot
44	auch. Und eben Kompetenzbildung eigentlich im Bereich der Privatwirtschaft und natürlich auch im öffentlichen
45	Bereich, um das praktisch voranzubringen.
46	[0:15:19.4] <b>T.J.:</b> Das könnte natürlich auch staatliche Aufgabe sein. Bundesaufgabe, Landesaufgabe, kommunale
47	Aufgabe, auch, sich an dieser Bildung zu beteiligen natürlich und gleichzeitig natürlich auch Anreizsysteme zu
48	setzen. Also, einen Förderfonds, um auch den Häuslebauer vielleicht mit einer Prämie zu unterstützen, über die



1	Qualität der eingesetzten Baumaterialien mehr für Ökologie zu tun. Also, ich glaube, da gäbe es jetzt noch ganz
2	viele Einzelmaßnahmen, wie man sich da entwickeln könnte politisch.
3	[0:15:44.4] <b>N.K.:</b> Ja. Auch gut, dass du Förderfonds erwähnt hast. Ich hätte nämlich noch mal so ein bisschen
4	vorgefühlt, so in Richtung, ob ihr es jetzt für besser haltet, dass zum Beispiel der Gesetzgeber bestehende
5	Gesetze zum Beispiel anpasst in die Richtung, gerade was vielleicht so Baustoffvorschriften oder, ja, auf jeden
6	Fall Materialauswahl angeht, um das irgendwie vorwärtszubringen. Oder halt doch eher lieber
7	Förderprogramme. Oder vielleicht auch einfach so <b>(unv.)</b> Klimaschutzmaßnahmen, so dass man halt das
8	nachhaltige Bauen und dann eben auch natürlich möglichst mit kreislauffähigen Materialien, da mit einbezieht
9	und das einfach so als eine Art Maßnahmenpaket praktisch machen würde. Verst <b>(unv.)</b>
10	[0:16:27.9] <b>T.J.:</b> Also, ich glaube, dass man es schon auch/ Also, auf der einen Seite reden wir von dem Abbau
11	auch von Subventionen, die einfach Schädliches bewirken. Also, auch der Einsatz von Dämmstoffen, der
12	sozusagen eigentlich sich nicht rentiert in der Laufzeit und wo eben auch nicht kreislauffähige und teilweise auch
13	wirklich material- und gesundheitsbezogen, schädliche Stoffe im Einsatz kommen. Was aber dann noch vielleicht
14	gefördert wird, das ist das eine, das muss, glaube ich, abgebaut werden. Über Förderprogramme kann man
15	natürlich Anreize setzen. Jetzt habe ich gerade ehrlich gesagt kurz den Faden verloren. Was wollte ich noch
16	sagen? Der war schon lang, der Tag.
17	[0:17:12.2] (...)
18	[0:17:14.8] <b>N.K.:</b> Ja, ist nicht so schlimm. Ist ja auch ein komplexes Thema, also/
19	[0:17:18.3] (...)
20	[0:17:20.9] <b>T.J.:</b> Dann lassen wir es mal so stehen.
21	[0:17:22.2] <b>N.K.:</b> Es gibt ja wahrscheinlich nicht die eine Lösung.
22	[0:17:24.0] <b>T.J.:</b> Bei dir dropt die Internetverbindung manchmal so ein bisschen. Aber du hörst uns noch?
23	[0:17:28.0] <b>N.K.:</b> Ja. Ja, ich höre euch noch. Genau. Ja, ich weiß, das ist hier manchmal/
24	[0:17:32.7] <b>T.J.:</b> Achso, bestehende Gesetze. Du hattest gefragt, jetzt habe ich den Faden wieder, nach
25	bestehenden Gesetzen. Also, wir bewegen uns da natürlich auf der gesetzlichen Ebene und das zieht sozusagen
26	durch nahezu alle gesetzgebenden Bücher durch. Du müsstest eigentlich an jeder einzelnen Stelle/ Also, es ist
27	wirklich eine Frage von Umsatzsteuerrecht, Ertragssteuer, Verbraucherschutz. Das ist ein wirtschaftspolitisches
28	Thema, ein umweltpolitisches Thema, ein Bauthema, das ist gerade im Innenministerium ja angesetzt. Also,
29	wenn wir jetzt nur mal die Bundesebene angucken, dann über Landesgesetzgebung bis hin zu kommunalen
30	Verordnungen, Abfallrecht. Also, es sind so viele verschiedene Bereiche, die tangiert werden. Natürlich müsste
31	man da auch im Detail daran arbeiten. Also, wenn das die Frage ist, ja, das muss man auch. Also, da reichen jetzt
32	nicht nur Förderprogramme, weil da gibt es durchaus einfach auch Gesetzgebung, die Positives aktiv verhindert
33	und ja, das schon auch. Natalie, die zehn Minuten sind jetzt abgelaufen.
34	[0:18:32.8] <b>N.K.:</b> Ja. Okay. Alles klar. Erst mal so weit gut. Vielleicht kann man ja nachher noch eine Frage oder
35	so nachschieben. Aber wir machen erst mal weiter, Danke.
36	[0:18:41.1] <b>T.J.:</b> Cool. Danke dir. Das geht doch schneller als gedacht. Wer will als nächstes? Ist eigentlich egal.
37	Jeder kriegt auf jeden Fall seine zehn Minuten. Bernhard? Dann starten wir mit Bernhard weiter.
38	[0:18:50.8] (...)
39	[0:18:53.5] <b>B.:</b> Okay. Also, ich habe ja jetzt schon kurz angesprochen, worum es in meiner Masterarbeit geht,
40	und zwar um die Matratzen. Ich habe mir sehr viel angeschaut über die verschiedenen Materialien, die
41	eingesetzt werden. Und bei den Matratzen ist es ja so, also die Organischen, wir haben verschiedene Stoffe,
42	also, wir haben verschiedene Kautschuktypen. Die ganzen Lagen werden nachher miteinander verklebt, was

1 schon ein Riesenproblem ist in Sachen Cradle to Cradle. Und ich würde jetzt eigentlich weniger auf diese ganzen  
 2 Materialien und die Stoffe und Inhaltsstoffe eingehen, weil da habe ich ja ziemlich viel recherchiert. Das ist  
 3 ziemlich komplex. Schon allein beim Naturkautschuk hat man zum Beispiel verschiedene Additive, was bei der  
 4 Vulkanisation eingesetzt werden. Was aber toxikologisch wirklich Problemstoffe teilweise sind. Und mir geht es  
 5 jetzt eher um das Thema Zulieferkette. Da habe ich aber gemerkt, wie ich mit den Unternehmern gesprochen  
 6 habe, ist es ein großes Problem, dass das Unternehmen fungiert ja quasi nur als eine Stufe von der ganzen  
 7 Zulieferkette. Und die Frage ist: Wie kann das Unternehmen als einzelne Stufe schaffen, dass ein Cradle-to-  
 8 Cradle-basierter Produktionsansatz umgesetzt wird? Denn wir müssen das ja von einer Stufe quasi auf die  
 9 komplette Zulieferkette übertragen. Das heißt, die ganzen Materialien müssen ja in dem Fall biologisch  
 10 abbaubar gefertigt werden. So ist eben die Frage, wie man das in Form von Management-Themen, also, in Form  
 11 von, ja/ Wie kann man das umsetzen? Also, wie leitet man diesen Prozess? Vielleicht hast du da Beispiele, was  
 12 man da, oder Positivbeispiele, was man da einbringen könnte?

13 [0:20:53.8] T.J.: Also, was du da skizzierst, ist wirklich zentral, weil wir Produkte und Wertschöpfung und  
 14 Geschäftsmodelle heute an den allermeisten Stellen in einer sehr globalen Wertschöpfungskette betrachten  
 15 müssen. Und in der Tat ist die ganz große Herausforderung, und da gibt es natürlich so ein paar wenige  
 16 Ausreißer, wenn ich jetzt zum Beispiel an Wolfgang Grupp und das Unternehmen Trigema denke, er sozusagen  
 17 innerhalb seiner Wertschöpfungskette eigentlich versucht, weitestgehend in Europa zu bleiben und auch einige  
 18 wichtige Schritte dieser Wertschöpfung dann auch wirklich on-site in Burladingen irgendwie in Süddeutschland  
 19 passieren. Dann ist ja genau das das, was nicht passiert innerhalb der globalen Wertschöpfungskette. Und  
 20 besonders lang und heiß diskutieren kann man es natürlich so am Textilbeispiel, das ist ja dann auch nah an  
 21 deinem Matratzen-Thema dran. Und das kann ich auch aus allen Gesprächen immer wieder entnehmen, und  
 22 das sind auch Themen, die wir diskutieren, teilweise auch in Workshops. Also, wir hatten gerade zum Beispiel  
 23 ein Thema mit der fahrradherstellenden Industrie, das ist für die ein ähnliches Thema, aber auch in der textilen  
 24 Wertschöpfungskette. Die große Herausforderung ist, um deine Wertschöpfungskette sozusagen dann vom  
 25 Ende abzuwickeln oder zurückzuverfolgen, dass du sowohl in den Quantitäten, das ist immer klar, weil du  
 26 bestellst dann irgendwie X T-Shirts oder zig Kilometer Faden oder Farbstoff, sondern, dass man über die  
 27 Quantitäten hinaus in die Qualitäten schaut. Und dass man Anforderungen findet mit all seinen Zulieferern, die  
 28 eben dann compliant sind mit den Cradle-to-Cradle-Anforderungen an Kreislauffähigkeit, Materialgesundheit.  
 29 Und gerade aus dieser ökotoxikologischen Bewertung, auf die du ja gerade eingegangen bist, auch hinsichtlich  
 30 der Verschmutzung, beziehungsweise dann eben Nichtverschmutzung von Wasser, den gesundheitlichen  
 31 Folgeproblemen auch im Arbeitsschutz, beziehungsweise in den Sozialstandards und auch was die  
 32 Energieerzeugung an jeder Stelle jeweils in der Produktion bedeutet. Weil natürlich die Zielsetzung von Cradle  
 33 to Cradle auch ist, entlang der gesamten Wertschöpfung, gemessen an dem gesamten Produkt, das alles auch  
 34 ausgerichtet ist an der Nutzung erneuerbarer Energien, eben der Wasserreinhaltung, den Sozialstandards, der  
 35 Kreislauffähigkeit und der Materialgesundheit. Und das bedeutet dann letztendlich, dass du als Inverkehrbringer  
 36 einer Textilie an jeder einzelnen Stelle mit dem Hersteller des Farbstoffes, des Garns, der Faser und sozusagen  
 37 auch mit allen Prozesschemikalien, das hast du ja auch schon gerade angesprochen. Beim Kautschuk ist es in der  
 38 Vulkanisierung das Thema mit den Additiven und das haben wir natürlich auch zigfach multipliziert in der  
 39 Herstellung dieser einzelnen Gewerke. Und die ganz große Herausforderung ist dann, wenn du das nicht alles  
 40 selber in der Hand hast, also ein Beispiel, wie Schwalbe, die selber eben diese Reifen herstellen zum Beispiel  
 41 und die Schläuche. Und darüber, dass sie eine eigene Fabrik betreiben, ich glaube, in Thailand oder, ich glaube,  
 42 Sri Lanka, weiß es gerade nicht, ihre eigenen eingesammelten Altreifen und Altschläuche dann auch in ihre  
 43 eigene Fabrik zurückschicken und da so einen größeren Teil dieser Wertschöpfung auch in der eigenen Hand  
 44 haben. Dann ist natürlich diese Einflussgröße einfach gegeben und alles andere ist wiederum dann  
 45 Verhandlungssache. Und je nachdem, wie groß oder klein du bist, kann natürlich jetzt so ein C&A sagen, wir  
 46 schließen einen Exklusivvertrag mit einer Fabrik und knebeln die sozusagen jetzt im besten Sinne an diesen  
 47 Qualitätsstandard. Und der muss erfüllt werden, 365 Tage im Jahr. Wenn du aber wiederum ein kleiner  
 48 Textilhersteller bist, da stehst du schon vor der Herausforderung, zu sagen, ich will jetzt zum Beispiel zu einer  
 49 vollständig bioabbaubaren Textilie. Das heißt, ich will keinen Polyesterfaden einsetzen, sondern einen  
 50 Baumwollfaden. Da sind ja im T-Shirt einige, also, zig Kilometer vernäht. Und dann sind aber die

1	Materialeigenschaften dieses Baumwollfadens wieder andere, dann müssen die Maschinen da drauf eingestellt
2	werden. Dann ist also nicht auszuschließen, dass die Produktionsqualität dann aufrechterhalten werden kann.
3	Also, will sagen, wahnsinnig komplex und bedeutet einfach ein hochgradiges Management genau dieser
4	Wertschöpfungskette. Nicht nur rein nach ökonomischen Gesichtspunkten optimiert, sondern dann eben
5	integriert auch mit der Qualität, also, sprich diese Integration von Quantität und Qualität und nicht nur vor dem
6	rein ökonomischen Gesichtspunkt. Das ist die wahnsinnige Herausforderung dann bei der Entwicklung eines
7	Cradle-to-Cradle-Produkts entlang dieser gesamten Wertschöpfungskette. Und dann musst du wirklich alle
8	Stakeholder, die da beteiligt sind, letztlich mit an Bord holen. Weil, wenn da einer nicht will, dann bist du erst
9	mal dann im Zweifel mit der Suche nach einem alternativen Lieferanten beschäftigt. Von denen es aber auch
10	nicht immer Alternativen gibt am Markt.
11	[0:25:28.2] (...)
12	[0:25:30.1] <b>B.:</b> Okay, Danke. Also würdest du sagen, es ist besser, man designt ein Produkt neu am Reißbrett
13	und nimmt das nachher, was man schon hat bezüglich biologischer Abbaubarkeit? Oder man geht in ein
14	bestehendes Produkt und versucht, da Materialien oder die Inhaltsstoffe zu verbessern? Wie zum Beispiel beim
15	Naturkautschuk? Das könnte ja so quasi ein Lock-in-Effekt sein. Vielleicht schaffe ich es ja gar nicht, dass ich das
16	Material so designe, dass das bioabbaubar ist.
17	[0:26:03.9] <b>T.J.:</b> Ja, da hast du Recht. Ja. Also, ich glaube, das ist eine ganz große Gefahr. Ich glaube, immer von
18	Null zu starten heißt natürlich auch die Möglichkeit der Gestaltung, aber du musst auch bei Null starten und das
19	andere birgt natürlich die Gefahr, dass du es nicht schaffst. Und das ist, glaube ich, eine interessante Abwägung,
20	die auch sein Für und Wider hat in Startups oder auch bestehenden Unternehmen, die natürlich nicht bei null
21	starten. Und genau da kommen dann auch Widerstände mit rein, die dann sagen: Ich fasse das Thema vielleicht
22	nur bis zu einem gewissen Punkt an, weil ich habe trotzdem ein Running System und muss ja trotzdem auch
23	vielleicht mein Produkt am Markt platzieren. Was für auch den wirtschaftlichen Erhalt des Unternehmens
24	entscheidend ist.
25	[0:26:42.8] (...)
26	[0:26:45.8] <b>T.J.:</b> Also, wir erleben oft genau diese Widerstände im Bestehenden. "Haben wir immer schon so
27	gemacht" oder "geht nicht gegen den Widerstand unserer Zulieferer". Und dann kommt es immer letztlich auf
28	die Verhandlungsmasse und Größe an. Wenn da ein C&A, ein Lidl, ein G-Star, wenn also große Textilkonzerne,
29	wenn wir jetzt beim Textil-Thema bleiben, so was in den Raum stellen, dann ist Veränderung da natürlich
30	möglich. Weil wir über Absatzmengen sprechen, wo auch Zulieferer sagen: "Ich bin bereit mich da zu bewegen".
31	Und mit abnehmender Größe spielt natürlich auch diese strategische Komponente. Gleichzeitig hast du dann
32	natürlich auch die Herausforderung, mit steigender Größe des Betriebs musst du natürlich auch in der
33	Qualitätsstufe überhaupt erst mal am Markt beschaffen können. Also, wir reden dann auch ganz schnell
34	wiederum auf der anderen Seite mit einer Marktgröße natürlich auch über die Herausforderung, auch diese
35	Menge dann wiederum in der Qualität zu beschaffen. Also, auch das ist eine Herausforderung in der Lieferkette.
36	[0:27:39.2] <b>B.:</b> Man könnte sich aber auch als unterste Stufe der Lieferkette mit anderen zusammenschließen,
37	sozusagen eine größere Verbindung schaffen und mehr Druck auf die Zulieferer ausüben.
38	[0:27:58.0] <b>T.J.:</b> Das ist richtig. Also, auch da sehen wir Unternehmen, die das sehr kooperativ angehen und
39	andere, die wiederum auch sehr stark wettbewerbsorientiert die Kooperation eher ausschließen. Und wir
40	kennen Fälle, in denen auch sowas gemeinsam geschieht und andere, in denen eben auch gerade über exklusive
41	Produktionskapazitäten das dann sozusagen auch verhindert wird. Und natürlich ist man dann jetzt aus
42	gesellschaftlicher Perspektive eigentlich ja damit konfrontiert, dass man sagt, wir wollen ja eigentlich möglichst
43	schnell so viel wie möglich auch entlang der Wertschöpfungskette verbessern. Also, da sprichst du definitiv auch
44	so einen ganz interessanten Punkt in unserem wettbewerbsorientierten Marktsystem gerade an.
45	[0:28:36.5] <b>B.:</b> Habe ich noch kurz Zeit für eine weitere Frage?



1	[0:28:39.1] <b>T.J.:</b> Ja. Eine hast du noch und dann können wir später nochmal gucken, ob wir noch Zeit haben.
2	[0:28:42.6] <b>B.:</b> Gerade eine schnelle. Und zwar das Thema Entsorgung. Sobald man ja diese Nährstoffe oder
3	diese Materialien in ein öffentliches Entsorgungssystem einführt, sind die ja quasi verloren. Wie schaffe ich es
4	als Unternehmen, dass das nicht passiert, dass ich diese Materialien zurückbekomme? Kennst du so
5	Anreizsysteme? Was ich noch nicht gefunden habe, also jetzt abseits von ( <b>unv.</b> ) irgendeinen Store und
6	Gutscheine und so weiter. Gibt es da vielleicht noch ( <b>unv.</b> ) ?
7	[0:29:15.4] <b>T.J.:</b> Also, Cradle to Cradle diskutiert ja ganz heiß diesen Ansatz der Produktdienstleistungssysteme,
8	also aus dem Produkt sozusagen nur die Nutzung generieren, das als Geschäftsmodell anzubieten und darüber
9	sozusagen auch das Eigentum nicht zu übertragen. Und dann auch den Rohstoffrücklauf darüber sozusagen oder
10	die Einbindung des Kunden mit in den Kreis über dieses Dienstleistungssystem mit einzubeziehen. Du hast ja
11	auch schon gesagt, man kann das auch bepfanden, man kann da Gutscheine ausstellen, Rückkaufwerte. Wir
12	sprechen auch gerade mit Akteuren aus der Finanzindustrie, wie man es überhaupt schafft systemisch, diese
13	Wertbeimessung. Also, das ist ja eine kalkulatorische Größe auch, zu fragen: Was ist denn eigentlich das, was
14	jetzt nach der Erstnutzung übrigbleibt, überhaupt noch wert? Und ich glaube, es braucht am Markt auch diese
15	Wertfeststellung. Deswegen glaube ich, ist auch im weitesten Sinne die Branche der Finanz- und
16	Versicherungsdienstleistungen auch mit dem, was da etabliert ist, nämlich auch einer Risikoabwägung auch
17	gegenüber den Unternehmen, die heute eigentlich Müll produzieren statt kreislauffähiger Produkte, glaube ich,
18	auch eine entscheidende Größe. Weil wir müssen in Zukunft kalkulieren können, wie der Wert ist, auch am
19	Markt, der sich vermutlich auch über weitere Knappheit, die sich verschärfen wird, auch sozusagen auch einen
20	höheren Wert erhalten wird, auch in Zukunft. Und wenn man das dann kombiniert, aber mit Geschäftsmodellen
21	eben, wo auch zum Beispiel Inverkehrbringer, Produzent, Verkäufer über, so zum Beispiel, so ein
22	Dienstleistungssystem den Kunden eben mit einbezieht und darüber halt auch als kalkulierbare Größe
23	miteinbeziehen kann. In zwei Jahren, in fünf Jahren, in, weiß nicht, in sechs Monaten krieg ich auch verlässlich
24	diese wertvollen Rohstoffe zurück, oder schließt sich sozusagen eine Nachnutzung mit an. Aber dass zumindest
25	dann auch geregelt ist: Wer hat hier das Interesse daran? Also, das ist auf jeden Fall ein zentraler Vorschlag von
26	Cradle to Cradle, Produktdienstleistungssystem.
27	[0:30:56.4] <b>B.:</b> Okay.
28	[0:30:57.4] <b>T.J.:</b> Bernhard, dann machen wir da mal einen Punkt an der Stelle. Danke für deine spannenden
29	Fragen. Vielleicht haben wir gleich dann nochmal Zeit. Dann kommen wir jetzt, ja/ Stefan, von mir aus, Stefan
30	und dann Max.
31	[0:31:09.4] <b>S.:</b> Ja. Bei mir geht es, denke ich, ja schnell. Ich wollte ja bloß nachfragen, wie man sich denn am
32	besten jetzt ein Thema sucht in seinem Studiengang, wenn man quasi halt keine direkte Idee hat, wo man jetzt
33	ansetzen will oder kann.
34	[0:31:22.2] <b>T.J.:</b> Und du hattest gesagt, Elektrotechnik ist das bei dir?
35	[0:31:24.4] <b>S.:</b> Ja. Bei mir zum Beispiel. Ja.
36	[0:31:25.8] <b>T.J.:</b> Ist das denn eng gefasst, weil/ Also, ich kann dir jetzt mal so ein paar Angebote spielen, die jetzt
37	im weitesten Sinne mit Energie und allem, was da dranhängt, und das sind elektrotechnische Fragestellungen.
38	Vieles davon, muss man aber sagen, hat auch was mit Verfahrenstechnik zu tun und auch Materialwissenschaft.
39	Weil ein so ein Thema ist natürlich die Kreislauffähigkeit von Anlagen für die Erzeugung erneuerbarer Energien.
40	Also, wenn das ein Thema ist, zum Beispiel, mit dem du dich potenziell beschäftigen magst oder auch in
41	Kooperation vielleicht sogar mit anderen. Du hast gesagt Masterarbeit?
42	[0:32:00.6] (...)
43	[0:32:01.3] <b>S.:</b> Ja, dann demnächst. Genau, ja.

1	[0:32:03.4] <b>T.J.:</b> Weil, also, die ganz große Herausforderung ist natürlich gerade, dass wir in der Produktion von
2	Photovoltaikanlagen, genauso aber in der Produktion von Windkraftanlagen, das betrifft ja im Grunde fast alles,
3	was im Moment hergestellt wird, die Kreislauffähigkeit schwer gegeben ist. Und da haben wir es gerade ja mit
4	Kohlenfaserverbundstoffen zu tun, auf denen sozusagen ja die Bürde lastet, dass sie dann sozusagen die
5	werkstofflichen Eigenschaften haben, um das möglichst effizient, also mit einem hohen Wirkungsgrad zu
6	erzeugen, aber diese Kreislauffähigkeit einfach ein Riesenproblem ist. Und gleichzeitig, wenn ich mir jetzt zum
7	Beispiel angucke, im Bereich elektrischer Anlagenbau und wenn du dann noch in die kleineren, also vom
8	Detailgrad runter gehst, gerade der Verbau wertvoller Rohstoffe im Bereich Elektronik. Dann wird es ja noch
9	komplizierter auch diese Trennbarkeit und also Sortenreinheit dieser eingesetzten Komponenten zu
10	bewerkstelligen. Und ich weiß nicht, ob das was ist, was im weitesten Sinne sozusagen in deinem
11	Betrachtungsfeld liegen könnte, aber wir sind da sozusagen noch nicht so weit wie jetzt in anderen Bereichen,
12	einfach weil der Komplexitätsgrad ein völlig anderer ist. Wir haben, also bei den Anlagen zur Erzeugung der
13	regenerativen Energien, haben wir es natürlich mit absoluten Spezialwerkstoffen, die sonst auch aus der Luft-
14	und Raumfahrt natürlich bekannt sind, zu tun. Natürlich auch zunehmend Automotive, also auch dieser Bereich
15	Leichtbau und Elektromobilität. Genauso wäre natürlich jetzt auch im Scope die Frage zu stellen, die
16	Recyclingfähigkeit von Energieträgern und sozusagen inwiefern Demontage und Recycling auch von
17	Batteriespeicherlösungen sozusagen heute möglich ist und vor welchen Hürden das auch steht.
18	Und eine andere Frage ist sicherlich auch, also im weitesten Sinne, ich kann da jetzt noch mal so ein paar Themen
19	einfach anreißen: Heiß diskutiert wird natürlich die Frage der E-Fuels und der jeweiligen Wirkungsgrade. Also,
20	ich erlebe das auch gerade in einer sehr aufgeheizten öffentlichen Debatte, inwiefern jetzt der Umweg über
21	Wasserstoff oder Power-to-Gas-Verfahren und also unterschiedlichste hergestellte E-Fuels. Aber natürlich auch
22	teilweise über Carbon-Capture-Verfahren, die Nutzung von Kohlenstoff auch für ganz andere Szenarien, für die
23	Herstellung von Kunststoffen oder anderen Werkstoffen. Also, das sind ganz viele auch dieser Fragestellungen,
24	die sich mit dem Thema der Wirkungsgrade auseinandersetzen oder der Nutzung von E-Fuels auch für Szenarien,
25	in denen, ja, auf der einen Seite Elektromobilität vielleicht auch andere zusätzliche Nutzenparameter bereithält.
26	Also, wenn man sagt, in einer neutralen Kohlenstoffbilanz, wenn man sagt, wenn wir einen E-Fuel verbrennen,
27	dann bleibt zumindest die Kohlenstoffdioxidbilanz ausgeglichen, weil wir den Kohlenstoff aus der Atmosphäre
28	genommen haben. Trotzdem ist das vielleicht was, was wir jetzt sozusagen in der Masse so nicht in der Stadt
29	sehen wollen, weil das vielleicht trotzdem jetzt punktuell einfach zu viel Emissionen darstellt und dazu beiträgt,
30	dass das einfach kein lebenswertes Umfeld darstellt. Also, das sind auch alles so Fragestellungen, die gerade
31	auch heiß diskutiert werden, auch Richtung Wasserstoffstrategie und so weiter. Ja, das waren jetzt mal alles so,
32	auf jeden Fall mal, Gedanken die, jetzt so im weitesten Sinne, passen könnten. So ganz konkret weiß ich es jetzt
33	natürlich noch nicht, ob da was dabei ist. Was sagst du dazu?
34	[0:35:46.9] <b>S.:</b> Klingt schon alles mehr nach Werkstoffwissenschaften oder Physik und so was. Ja, genau. Aber
35	ich wollte, also prinzipiell, jetzt mehr darauf hinaus, ob ihr vielleicht irgendwelche Links oder Sachen ( <b>unv.</b> ), wie
36	man sich da/ Wie man da Themen finden kann. Oder ob man sich vernetzen kann. So was. Also, ich meine bloß,
37	dass man nicht unbedingt jetzt dich oder Nora dann dauernd ansprechen muss und fragen muss, ob ihr Themen
38	habt. Sondern, weiß ich halt nicht, ob es da irgendwas gibt, wo man quasi andere Hochschulen irgendwie
39	vernetzt und dass man da irgendwie was findet. Weil, zum Beispiel bei mir gibt es an der Hochschule halt keinen,
40	der für Nachhaltigkeit irgendwie das Thema hat. Es gibt halt Kommunikation, Energie, Automatisierung, aber es
41	gibt nicht Nachhaltigkeit.
42	[0:36:24.6] <b>T.J.:</b> Ja, interessant.
43	[0:36:25.5] <b>S.:</b> Es ist halt kein eigenständiges Thema. Also, das reicht wahrscheinlich nicht für eine eigene
44	Spezialisierungsrichtung.
45	[0:36:31.5] <b>T.J.:</b> Ja, wir pflegen natürlich auch Kontakte zu anderen Hochschulen. TU München, TU Hamburg,
46	auch an die RWTH. Ziel soll jetzt sein, aber das läuft jetzt erst langsam an, auch ein Netzwerk aufzubauen. Das
47	in der Tat gerade zu solchen fachspezifischen Fragen, wo wir dann auch im Grunde nur mit Überblick
48	weiterhelfen können oder auch mit einer generellen konzeptionellen Einschätzung, dann Leute wie du vielleicht

1	Mitstreiter finden, die auch in diesem Bereich an Instituten tätig sind, wo man dann Anknüpfung finden kann,
2	um vielleicht noch konkreter reinzugehen. Dieses Netzwerk besteht noch nicht. Aber da sind gerade auch die
3	Kollegen hier aus dem Referat Bildung auf jeden Fall dran. Das haben die schon auf dem Zettel. Das läuft aber
4	jetzt erst langsam an. Deswegen kann ich da jetzt an der Stelle leider mit diesem Netzwerk noch nicht dienen.
5	Ich hoffe, dass das sich in der Zukunft ändert, weil da wahnsinnig viele Leute eigentlich mit der ähnlichen
6	Fragestellung "Wie verknüpfe ich das eigentlich mit meinem Fachgebiet?" irgendwie auflaufen. Und jetzt in
7	deinem speziellen Fall ich da jetzt auch noch keinen besseren Vorschlag gerade habe und mir jetzt auch gerade
8	niemand einfällt im Bereich E-Technik, mit dem wir dich zusammenbringen könnten.
9	[0:37:45.2] <b>S.:</b> Okay. Ja. Aber dann wird es vielleicht in Zukunft. Das reicht mir.
10	[0:37:49.5] <b>T.J.:</b> Aber es wäre vielleicht auch gut, das müssen wir aber vielleicht noch mal intern auch im Prozess
11	dran entwickeln, dass auch auf der Grundlage jeder Science-Sprechstunde wer möchte da auch in dieses
12	Netzwerk mit aufgenommen wird. Weil die Fragestellung ja auch ist, bevor wir jetzt zu den Fragen von Max
13	kommen, wenn dann die wissenschaftliche Arbeit mit ihrem Teil oder auch einer umfangreicheren Behandlung
14	des Themas Cradle to Cradle, inwiefern man auch da Zugriff darauf haben kann und Leute auch in diesem
15	Netzwerk, sozusagen, auch ihre wissenschaftlichen Arbeiten und Findings auch miteinander teilen. Und da auch
16	natürlich die Einbindung auch mit anderen Instituten. Es gibt ja auch einige Hochschulinstitute, die sich auch
17	ganz konkret mit dem Thema Cradle to Cradle beschäftigen, wie an der TU Hamburg zum Beispiel im Bereich
18	Technologie und Innovationsmanagement, Professor Herstatt. Also, da gibt es ja auch durchaus Lehrstühle für
19	Leute, die vielleicht an einer Promotion oder am Post-Doc interessiert sind, die dann auch wissen zu dem Thema
20	„Gehe ich hierhin oder dorthin“. Und, genau, also, so viel vielleicht noch mal zu dieser Zielsetzung, im weitesten
21	Sinne, dieses Wissenschaftsnetzwerks, was wir aufbauen.
22	[0:38:50.0] (...)
23	[0:38:51.6] <b>S.:</b> Ja. Trotzdem Danke.
24	[0:38:53.7] <b>T.J.:</b> Danke dir, Stefan. Ja, Max, dann/
25	[0:38:58.0] <b>M.:</b> Let's go.
26	[0:38:59.0] <b>T.J.:</b> Deine Fragen.
27	[0:38:59.2] <b>M.:</b> Ja. Ich werde direkt relativ konkret. Mir geht es vor allem darum, ein paar Fakten und vor allem
28	ein paar vergleichbare Zahlen zu sammeln. Deswegen fange ich einfach erstmal mit einer Nicht-Zahlen-Frage
29	an, bevor wir zu den Zahlen kommen: Wie siehst du das Potenzial von Plattformen für gebrauchte
30	Baumaterialien? Jetzt Harvest Map oder Restado oder sowas. In Deutschland ist das ja alles noch ein bisschen
31	langsamer als zum Beispiel in vielen anderen Ländern. Und für mich stellt sich zum Beispiel auch die Frage, wie
32	es nach der Masterarbeit weitergeht. Ich würde gerne in die Richtung halt auch gehen. Wie siehst du das
33	Potenzial? Was siehst du aber auch gleichzeitig als Probleme, Hindernisse und Hemmungen, dass das gut fluppt?
34	[0:39:41.2] <b>T.J.:</b> Ja, interessante Frage. Letztlich ist das, was du da beschreibst, immer wieder ein durchaus
35	kritischer Punkt in der Fragestellung. Auch: Was ist ganzheitlich als Transformation zu betrachten? Und was
36	fungiert vielleicht heute als Brückentechnologie? Also, dass man sagt, wir haben eine Bauteile-Börse, wo
37	Sekundärrohstoff effektiv gehandelt wird. Die Idee ist super. Was ist die Herausforderung heute? Die
38	Herausforderung heute ist, dass wenn wir Rohstoffe jetzt am Beispiel Bau, also, wir haben ein Abbruchvorhaben
39	und sammeln da Materialien. Dann stellt sich natürlich die Fragestellung bei der Wiederinverkehrbringung
40	dieser Materialien, in welcher Qualität liegen die vor, ist das Wissen darüber überhaupt bekannt, in welcher Art
41	und Weise sind die potenziell verunreinigt. Und diese Bewertung, das ist aber an jeder Stelle, also, sei es jetzt
42	im Baubereich, wenn du an der textilen Wertschöpfungskette sagst, ich will eine Tonne Jeansstoff sekundär am
43	Markt beschaffen, oder auch bei der Einsammlung von Kunststoffen und der Wiederinverkehrbringung,
44	sozusagen als Rezyklat, bleibt am Ende dann immer die Frage, in welcher Qualität liegt das eigentlich vor. Und
45	wenn das nicht bewertet werden kann, hast du natürlich jetzt erstmal eine Unsicherheit, also, eine gewisse

1	Störgröße mit drin. Deswegen ist die Antwort heute ganz oft noch von Herstellern, dass sie eben auch ihre
2	Cradle-to-Cradle-Produkte, wenn man so will, leider auf einem Primärrohstoff aufsetzen, wo zu 100 Prozent die
3	Aussage darüber stimmen kann, wie die Inhaltsstoffe zu bewerten sind. Und das kann natürlich, also, das kann
4	jetzt eigentlich, wenn man systemisch Henne oder Ei, der erste Schritt eben sein zu sagen, wir starten jetzt den
5	sauberen Input. Und die Frage ist sozusagen, was machen wir mit den Reststoffen und Sekundärrohstoffen und
6	Waste Streams, die schon da sind. Und das ist auch eine Frage der papierverarbeitenden Industrie im Recycling.
7	Wir haben hochgradig Anreicherung von Blei im Glasrecycling, von Schwermetallen im Papierrecycling,
8	gleichfalls auch im Textilsektor. Und das stellt immer wieder die Frage dieses Inputs und der Qualität. Und
9	deswegen ist ja auch die eine Fragestellung bei Cradle to Cradle, über eine Digitalisierung und die Erfassung
10	qualitativer und quantitativer Daten eben dieses Wissen zu erzeugen. Damit du dann auch bewerten kannst, ob
11	du das, was du da vorliegen hast, wieder einsetzen kannst. Diese Risikoabwägung, die ist schwierig. Heute.
12	[0:42:14.7] <b>M.:</b> Ja, genau. Und dann gehen wir doch einfach mal direkt weiter. Weil das passt dazu. Jetzt
13	abgesehen von rechtlichen und finanziellen Hindernissen, die ja viele Bauherren oder Unternehmer irgendwie
14	noch als Grund annehmen, um nicht mit RC-Baustoffen zu bauen, zum Beispiel. Was siehst du abgesehen davon
15	noch als größtes Hindernis?
16	[0:42:34.4] (...)
17	[0:42:37.1] <b>T.J.:</b> Abseits, hast du gesagt, von rechtlich und abseits von?
18	[0:42:40.6] <b>M.:</b> Ja, rechtlich und finanziell ist ja momentan noch relativ klar. Also, rechtlich haben wir ja jetzt
19	auch schon gehört. Und bei dem Finanziellen ist es ja einfach momentan genau diese Situation, dass es halt
20	einfach das System noch nicht gibt, wie es für die, sagen wir jetzt mal, im Moment normale Wirtschaft gibt.
21	Wenn es das gleiche für die Cradle-to-Cradle-Wirtschaft geben würde, wären wir an einem ganz anderen Punkt.
22	Wenn die Lobby da wäre, wenn das System da wäre.
23	[0:43:06.0] <b>T.J.:</b> Also, was ich wahrnehme, das habe ich gerade in der Diskussion zum Beispiel mit einem
24	Unternehmen, das Zellfasern eben recycelt zu Hygienepapieren, diskutiert, dass die Zahlen darüber haben, dass
25	der Endabnehmer in diesem Bereich der Hygienepapiere, und das habe ich erst gar nicht glauben wollen, zu
26	einem ganz großen Anteil kein Recyclingpapier kaufen möchte. Das heißt, in Teilen ist das sozusagen ( <b>unv.</b> ) für
27	den Kunden heute im Supermarkt irgendwie ein emotional aufgeladenes Thema, zu sagen, ich brauche da eine
28	Frischfaser für meinen Hintern, in Anführungsstrichen. Und ich glaube, dass wir ähnliche Awareness-Themen
29	auch im Baubereich haben. Dass sich aus meiner Sicht noch viele Bauherren, Projektierer und Finanzierer und
30	Bauberater noch nicht detailliert genug mit diesem Thema und auch den Chancen und auch dem
31	Innovationsgrad dessen auseinandergesetzt haben und ich schon wahrnehme, dass da im Moment zwar viele
32	schreien "Das ist jetzt Innovation, das ist die Zukunft!", aber in der Breite ist das noch nicht da. Und da stellt sich
33	aus meiner Sicht eben die Frage, wie etablieren wir auch dieses Denken und dass das auch angenommen wird,
34	auch als eigene Qualität, auch ohne die Ressentiments sozusagen. Der Neubau hat ja dann sozusagen/ Eigentlich
35	ist es ja dann eher ein Bestandsbau, wieder neu aufgebaut. Aber ich könnte mir vorstellen, dass das also auch
36	kulturell einfach ein Thema ist, das begegnet uns an vielen Stellen.
37	[0:44:22.0] <b>M.:</b> Ja. Dann schiebe ich einmal ganz kurz eine Zahlenfrage ein. Und zwar, hast du eine Faustformel
38	für mich, Kostenvergleich Neubau versus Abriss? Und dann Bestand wieder aufbauen? Hast du da eine Quelle
39	für mich?
40	[0:44:36.7] <b>T.J.:</b> Das ist ganz konkret. Also, das ist eine Frage, die wir vielleicht noch mal mitnehmen können.
41	Weil wir haben bei uns in der Tat im Team noch eine Bauexpertin, die auch gerade konkret an diesem
42	Bauleitfaden arbeitet. Wenn ich da die beisitzenden Kollegen Britz und Ferraro bitten darf, die Frage einmal
43	mitzunehmen und mit der dazugehörigen Kollegin Frau Juncker zu klären. Vielleicht hat die da was. Weil, da
44	würde ich mich jetzt zu weit aus dem Fenster lehnen, auch vom Gefühl her.
45	[0:45:05.4] <b>M.:</b> Ja, ja. Das kann man natürlich auch nicht immer vereinheitlichen. Aber es geht einfach nur
46	darum, dass ich vielleicht auch in der Masterarbeit einfach herauslehnend sagen kann: "Hier, ne, C2C hat mir

1 2	das als Faustformel mitgegeben." Oder beziehungsweise, das wird so in Fachkreisen gehandelt. Daran kann man das/
3	[0:45:22.0] <b>T.J.:</b> Aber vielleicht liegt das vor. Das würde ich gerne einfach mitnehmen.
4	[0:45:25.2] <b>M.:</b> Das wäre sehr interessant.
5	[0:45:25.9] <b>T.J.:</b> Die Kollegen werden sich vielleicht da noch mal bei dir melden.
6	[0:45:28.8] <b>M.:</b> So, okay. Dann, ich glaube, zeitlich komme ich vielleicht noch auf eine Frage?
7	[0:45:32.5] <b>T.J.:</b> Ja, oder zwei. Es sind jetzt noch sechs Minuten.
8 9 10 11 12 13	[0:45:34.9] <b>M.:</b> Dann komme ich nochmal kurz auf das Ressentiment zurück. Und zwar ist das halt genau auch noch eine Frage: Welche nicht-materiellen Verbesserungsansätze siehst du als Möglichkeit für die Ressourcenschonung? Und zwar bezogen auf soziale Aufklärung. Also, könnte es/ Ich habe ganz oft den Gedanken: Wie wäre denn die Idee, ein Fach dafür einzuführen? Ja. Anstatt der klassischen Sachkunde gibt es zum Beispiel das Fach Umweltkunde oder Recyclingkunde oder sowas. Kann man sich so etwas vorstellen? Gibt es dazu schon Ideen?
14	[0:46:02.7] (...)
15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37	[0:46:03.8] <b>T.J.:</b> Da gibt es viele Ideen. Wir haben ja gerade dieses Papier, was nächste Woche rausgeht, zum Thema Bundestagswahl. Und was wir ja ganz stark auf einer Metaebene drüber diskutieren, ist die gesellschaftliche Einstellung gegenüber der menschlichen Existenz, im Kontext des menschlichen Wirkens und der Auswirkungen auf die Umwelt und auf die Biodiversität anderer Lebensformen. Und das Interessante ist ja, dass die Nachhaltigkeit über ihr Narrativ und auch alles, was sozusagen aus allen Zahlen und Analysen abgeleitet hat, sozusagen an einen Punkt gekommen ist, wo die Nachhaltigkeit eigentlich fordert, nachhaltiger wäre es eigentlich ohne uns. Also, sozusagen der Planet wäre eigentlich am besten dran, wenn der Mensch eigentlich gar nicht ganz existieren würde. Und das ist ja sozusagen so detached und nicht integriert. Und gerade gestern noch in der Vorstellung, da war Franz Alt mit dabei, das ist ja auch so ein Uraltpionier aus der Nachhaltigkeitsszene, hat viel im Bereich Erneuerbare Energien gemacht. Der sagte, wir müssen ja eben nicht den Planeten retten, sondern wir müssen das Leben auf dem Planeten retten. Weil, also, der Rest, der läuft auch so weiter, aber es geht eigentlich um das Leben auf dem Planeten. Und deswegen ist da so die Frage, inwiefern wir auch in der Bildung, ist auch natürlich eine Frage für die Kollegen, die hier mit dabei sind, immer und wir nennen das ja diese Diskussion zum positiven Fußabdruck. Beziehungsweise diese Kultur des Gelingens und auch des Integrierens. Also, man spricht ja in diesen Nachhaltigkeitsstrategien von der konsistenten Strategie neben der Effizienz und der Suffizienz. Und die Konsistenz ist ja eben diese Harmonisierung, dieses Gemeinsame, dieses Miteinander, auch ein Stück weit auch was man im natürlichen System teilweise sehen kann. In symbiotischen Zuständen und, jetzt nicht vollends romantisiert auf den Menschen, aber zu sagen, wie können denn wir Teil sein eines Ökosystems, in dem wir nicht dazu beitragen, dass Biodiversität abnimmt und wir unsere eigene Lebensgrundlage berauben. Und ich glaube, dass, zurück zu deiner Frage, glaube ich, ist aus meiner Sicht der Kern dieser Debatte, sich zu fragen, wie sieht denn eigentlich eine zugewandte Perspektive des Miteinanders und des Existierens aus, statt des Reduzierens und der Perspektive, dass eigentlich der Mensch der Schädling ist. Zu sagen, kann der Mensch nicht auch nützlich sein?
38	[0:48:22.7] <b>M.:</b> Ja.
39	[0:48:23.2] <b>T.J.:</b> Und das ist das, was wir als Cradle-to-Cradle-Denkschule meinen.
40 41 42 43	[0:48:26.1] <b>M.:</b> Okay, gut. Dann allerletzte Frage: Als das E-Auto rauskam, kamen ganz viele Vergleiche auf, wann es sich denn energiemäßig und CO <sub>2</sub> -mäßig lohnen würde, ein E-Auto zu benutzen im Vergleich zu einem herkömmlichen Verbrenner. Und die Frage switche ich jetzt genau auf das Haus auch. Und zwar, möchte ich die Frage stellen: Lieber Low und Reused Tech, weniger Ressourcen, Monomaterialität und höhere Energiekosten



1	dafür, weil vielleicht nicht so gut gedämmt, oder doch das Hightech-EnEV-Haus und als Passivhausstandard?
2	Was würde sich deiner Meinung nach/
3	[0:49:01.7] <b>T.J.:</b> Definitiv ( <b>unv.</b> ).
4	[0:49:02.5] <b>M.:</b> Ja, natürlich. Cradle to Cradle gesehen ganz natürlich. Aber es geht einfach wieder um die Zahl,
5	weißt du?
6	[0:49:08.2] <b>T.J.:</b> Ja. Ich, also/
7	[0:49:09.5] <b>M.:</b> Wenn man das energetisch vergleichen würde, weißt du?
8	[0:49:11.7] <b>T.J.:</b> Ja. Nee, aber ich glaube, dass der Energievergleich an der Stelle trotzdem hinkt. Weil wir auf
9	dem Sprung sind in eine Zeitenwende, in der die energetische Frage ganz anders zu beantworten wird. Und
10	deswegen glaube ich, dass, also als Ausblick in die Zukunft, die Energieeffizienz von Gebäuden längst nicht die
11	Tragweite haben wird. Also natürlich ist sie gerade eine wichtige Größe und auch einer der Hauptverursacher.
12	Das ist völlig klar, weil das natürlich alles fossil-based läuft, dementsprechend. Ich glaube aber, dass die
13	eigentliche knappe Größe, und das ist das, was wir eigentlich permanent mit Cradle to Cradle diskutieren, also
14	sprich die Ressourcenfrage da im eigentlichen Fokus stehen muss und eben aber auch diese Ressourcenfrage
15	auch verbunden mit der Erzeugung Erneuerbarer Energien, die wir ja brauchen und Energieträger, die wir
16	natürlich auch brauchen, auch im Hauskontext selbstverständlich, müssen wir das technisch lösen. Aber auf der
17	Fragestellung eben der Ressourcennutzung. Weil, von allem, was wir wissen, wird genügend Energie auch in die
18	Nutzung gehen. Das ist noch eine Frage auch der Transformation und das ist auch ganz stark ein politisches
19	Thema. Und natürlich müssen wir auch technisch gerade an den erneuerbaren Anlagen einfach noch einen
20	Schritt weiterkommen. Das schon auch. Das hatte ich ja vorhin schonmal skizziert. Aber deswegen eindeutig das
21	Erstere.
22	[0:50:24.5] <b>M.:</b> Okay. Eine Frage, die vielleicht auch für Bernhard interessant sein könnte: Du hattest ja das
23	Henne-und-Ei-Prinzip gerade nochmal erwähnt. Und ich bin gerade hier im "Reuse Atlas", bin ich ganz tief drin,
24	von Duncan Baker Brown. Ist ja schon drei Jahre her. Und da kommt ja auch ganz oft die Frage auf: Soll man
25	lieber von Null anfangen oder bestehende Materialien/ Weil, wir haben ja schon so viele Ressourcen. Ja, also,
26	sonst würde zum Beispiel Urban Mining keinen Sinn machen. Sonst würde es sehr viele Konzepte geben, die ja
27	einfach/ Für die es keine Nutzung geben würde. Wie siehst du das? Also, meiner Meinung nach muss man mit
28	dem, was man hat, arbeiten. Deswegen/ Ja, persönliche Meinung.
29	[0:51:08.5] <b>T.J.:</b> Also, ich glaube, die Risikoabwägung ist hier entscheidend. Ich würde das immer an dem
30	Nutzungsszenario festmachen. Ich würde auf jeden Fall dringend ausschließen, Materialien einzusetzen, die
31	irgendwie toxikologisch in der Bewertung nicht funktionieren, die dann dazu führen, dass wir VOCs in den
32	Innenräumen haben über die Nachnutzung. Wenn man sich anschaut, teilweise werden Restverschnitte, die
33	sind noch nicht mal post-consumer, sondern nur post-industrial, aus der PVC-Industrie dann zu Taschen
34	verarbeitet und es ist einfach Material, was überhaupt nicht nur in die Nähe von uns Menschen, geschweige
35	denn in Innenräumen, eigentlich hingehört. Und das ist dann für mich so dieses gut gemeinte und nicht gut
36	gemachte Recycling. Und ich glaube, das müssen wir transparent diskutieren in der Gesellschaft. Es gibt Waste
37	Streams, mit denen können wir sinnvolle Sachen machen, aber mir kommen da auch gerade im Baubereich
38	teilweise Sachen zu Ohren, die man kritisch diskutieren muss. Wenn man da Kunststoffeinschlüsse, irgendwie
39	mineralische Stoffe, einbringt, damit man dann irgendwie das Material/ Also, man verunreinigt damit ja auch
40	teilweise Streams weiter und vor allen Dingen, man kommt nicht zum Kern des Problems. Aber das ist vor allen
41	Dingen am Ende ein Meinungsaustausch auf der ganz großen konzeptionellen Ebene. Was wir definitiv
42	brauchen, sind Strategien in dieser Brücke, also diese Brückentechnologien, ohne die geht es nicht, weil wir
43	haben den Müll. Der muss behandelt werden und wir haben auch bestehende Recyclingvorgänge, die auch für
44	sich gesehen sinnvoll sind. Deswegen ist das nicht jetzt per se vollends abzulehnen, aber besonders, würde ich
45	sagen, unter den gesundheitlichen Aspekten durch den Nutzer, also sprich im jeweiligen Nutzungsszenario muss
46	man mindestens mal in der Nachnutzung bestehender Materialien deutlich ausschließen, dass das irgendwie in

1	eine gefährliche Situation kommt. Und das tut es zum Beispiel bei der Nutzung industrieller Abfälle aus der PVC-
2	Industrie, nur mal als ein Beispiel.
3	[0:52:58.6] <b>M.:</b> Okay.
4	[0:53:00.2] (...)
5	[0:53:01.6] <b>T.J.:</b> Ich würde sagen, wer von den anderen möchte? Weil du jetzt noch quasi eine Bonusfrage
6	bekommen hast, lieber Max.
7	[0:53:07.0] <b>M.:</b> Ja, Sorry.
8	[0:53:07.2] <b>T.J.:</b> Ist alles in Ordnung. Ich kann mir noch zwei, drei Minuten nehmen. Wenn Stefan, Bernhard oder
9	Natalie möchten, können wir gerne auch noch eine Frage stellen. Und wenn es da kein Bedarf ( <b>unv.</b> ) nicht
10	schlimm.
11	[0:53:23.1] <b>N.K.:</b> Also, wenn jetzt gerade niemand den ersten Schritt da macht, hätte ich vielleicht noch eine
12	Frage. Und zwar noch mal kurz/ Also, das war jetzt auch gerade schon, die letzten zwei Fragen schon, wahnsinnig
13	interessant. Auch für mich, bin ich sehr froh, dass das auch Thema geworden ist. Auf jeden Fall noch mal kurz
14	zurück zum Netzwerk C2C Regionen. Ob du da auch was dazu sagen kannst, wie ihr eigentlich versucht,
15	Kommunen für das Netzwerk zu gewinnen. Also, klar, über Veranstaltungen, Netzwerken, jetzt ein
16	Bürgermeister oder Ansprechpartner wie auch immer. Aber gibt es da außerhalb, zum Beispiel jetzt vom C2C-
17	Kongress oder so, noch irgendwie andere Ansätze?
18	[0:54:05.2] <b>T.J.:</b> Ja. Das ist eine gute Frage. Und die habe ich heute auch schon mal in einem anderen Kontext
19	irgendwie erklärt, weil ein eigentlich ganz erfolgversprechender Ansatz. Aber da sind wir sozusagen in der
20	Pilotphase oder im Testing. Wir motivieren auch schon seit längerem Stadträte dazu, eine Beschlussfassung zu
21	erlangen, die dann die Basis liefert, dass/ Also, das haben wir auch in mehreren Fällen schon erwirken können,
22	zum Beispiel in der, ich glaube, bei München die Gemeinde Haar, glaube ich, da gibt es einen Stadtratsbeschluss.
23	In Straubenhardt gibt es einen Stadtratsbeschluss und auch in Berlin-Pankow zum Beispiel, auf unsere Initiative
24	hin. Es braucht also ein bisschen Zeit, wenn man das Vertrauen auch unterschiedlichster politischer Fraktionen
25	oder das Interesse für dieses Thema wecken muss. Und erreicht aber teilweise, also, hier in Berlin zum Beispiel,
26	den Beschluss, den könnt ihr nachlesen. Die BVV, das ist sozusagen der Stadtrat auf städtischer Ebene in Berlin,
27	also, die Bezirksverordnetenversammlung für Pankow hat einen Beschluss gefasst, dass sie Cradle to Cradle in
28	Pankow per Beschluss sozusagen in die Umsetzung bringen wollen. Und das ist dann teilweise noch so ganz
29	abstrakt. Das schöne ist aber, dass du dann auf der kommunalen Ebene konkreter werden kannst, weil auf der
30	Grundlage eines Beschlusses, und sei der noch so butterweich, gibt es jetzt erstmal trotzdem halt die politische
31	Intention formuliert, dass da was passieren soll. Mit dem Commitment auf dem Thema. Und wenn du das hast,
32	dann kannst du weiterdenken auf dem Thema Beschaffung, auf dem Thema kommunale Bauprojekte,
33	Bürgerbeteiligung, Bildungsvorhaben. Also, was auch immer.
34	Und das scheint also ein interessantes Einfallstor zu sein, weil sich Kommunalpolitiker sozusagen dazu hinreißen
35	lassen, einfach zu sagen, dass das Thema ist von der Zielsetzung einfach das, was wir unterstützen möchten.
36	Und im nächsten Schritt kannst du das dann in der Stadt sozusagen anfangen zu diskutieren. Sei das mit den
37	Bürgern oder den Vertretern auch der kommunalen Verwaltung. Und das scheint im Moment also ein sehr
38	erfolgversprechender Ansatz zu sein, so Akteure zu beteiligen. Und was ja das Ziel des Netzwerks ist dann, dass
39	viele kommunale Akteure, die alle sagen, wir wissen vielleicht noch nicht genau wie es geht, aber wir wollen
40	Cradle to Cradle umsetzen. Gerade im Austausch untereinander, in Ludwigsburg zum Beispiel gibt es ja
41	jemanden in der Stadtverwaltung, der das Thema Beschaffung nach Cradle to Cradle ganz stark auf dem Zettel
42	hat. Und der engagiert sich auch bei uns in diesem Leitfaden im Übrigen. Und also, da gibt es dann viel
43	Austausch. Und so hoffen wir, dass wir über diese Initiative eigentlich an allen möglichen Stellen in Deutschland
44	unterschiedliche kleine Initiativen, die immer was Einzelnes vielleicht hinbekommen haben, so in Verbindung zu
45	bringen, dass die sich das gegenseitig nachmachen.

1	[0:56:50.1] <b>N.K.:</b> Ja, Okay. Ja, gut. Das mit den Stadträten oder Gemeinderäten hatte ich jetzt tatsächlich so
2	direkt nicht auf dem Schirm. Also, ich weiß, dass in Straubenhardt der Bürgermeister Herr Viehweg das sich
3	sozusagen auf die Fahne geschrieben hat. Aber, so über Gemeinderat oder Stadtrat, das hatte ich jetzt echt nicht
4	so/ Okay, Danke.
5	[0:57:10.1] <b>T.J.:</b> Danke für deine Frage, Natalie. Und, wenn möchte, gerne auch noch Bernhard. Und, wenn nicht,
6	auch nicht schlimm. Dann schließen wir die Runde.
7	[0:57:17.0] (...)
8	[0:57:20.1] <b>B.:</b> Auf die Schnelle bin ich eigentlich sehr zufrieden, muss ich sagen.
9	[0:57:22.8] <b>T.J.:</b> Okay.
10	[0:57:23.4] <b>B.:</b> Das Thema mit dieser Vernetzung. Da gibt es ja auch Produkte, ( <b>unv.</b> ) Standard. Gibt es ja diese
11	Internetseiten, wo man verschiedene Produkte findet, wo zum Beispiel Cradle-to-Cradle-zertifiziert sind. Kennst
12	du die?
13	[0:57:40.8] <b>T.J.:</b> Ja. Ja, klar.
14	[0:57:41.6] <b>B.:</b> Ja. Okay. Und ich glaube, das ist ja das Ziel oder, dass das immer mehr wird. Und so. Auch
15	Lieferanten auch werden immer mehr. Und das immer breitere Bewegung wird sozusagen in der ganzen
16	Wirtschaft.
17	[0:57:58.0] <b>T.J.:</b> Ja. Total.
18	[0:57:59.9] <b>B.:</b> Dass halt die Bildung/ Die Bildung ist nur noch so weit hinten. Dass man überhaupt Bewusstsein
19	schafft, dass das funktionieren könnte.
20	[0:58:10.0] <b>T.J.:</b> Also, vielleicht noch ein Satz dazu. Wir hoffen ja, dass wir gerade über das Zeigen des Möglichen,
21	also, eben gerade auch mit diesen Cases, auch eine sehr anschauliche Bildungsarbeit leisten können. Und das
22	motiviert auf jeden Fall viele Leute, weil sie sehen, da ist wirklich auch was möglich. Da geht es jetzt nicht nur
23	um Verzicht oder Verhindern, sondern auch um Gestalten und um neues Wirtschaften.
24	[0:58:32.2] <b>B.:</b> Wo siehst du eigentlich das größte Potenzial für dieses Cradle to Cradle? Ist das eher im
25	Bauwesen, da hört man ziemlich viel? Oder Textil? Oder generell in der Metallindustrie? Weil Metall ist ja, man
26	kann ja sagen, Metallherzeugung, das ist ja quasi Cradle to Cradle, oder?
27	[0:58:51.8] <b>T.J.:</b> Ja. Auch da geht es um Zusatzstoffe und Prozesschemikalien. Also, grundsätzlich kann man
28	sagen, wo gerade viel passiert, im Bereich Verpackungen, Kunststoffe, Bauen, Textil. Also, da ist wirklich viel los.
29	Das Potenzial sehe ich jetzt, glaube ich, erst mal in allen Bereichen. Also, das würde ich genauso auch
30	unterschreiben und sagen, eigentlich können wir das gesellschaftsweit und über alle Branchen hinweg
31	umsetzen. Aber es gibt gerade natürlich Bereiche, in denen mehr passiert. Und was wir natürlich hoffen, ist,
32	dass letztlich so ein gesamtgesellschaftliches Umdenken einsetzt. Und dass das nicht jetzt nur ein reines
33	Bauthema wird. Da geht es gerade so ein bisschen durch die Decke. Auch, ich glaube, weil der Bausektor sich
34	sozusagen auch seiner Schuld bewusst ist. Oder sozusagen, also, seinen Hebel kennt mit irgendwie 60 Prozent
35	in etwa in Deutschland so am Abfallaufkommen. Also, vielleicht auch ein schlechtes Gewissen so ein Stück weit
36	hat, aber ist sozusagen auch da einfach ein großer Hebel, der drinsteckt. Aber Appell wäre natürlich, mit allem
37	um uns herum, mit dem Ansatz von Cradle to Cradle, von den kleinen Dingen zu den großen. Auch bisschen auf
38	der systemischen Ebene, beispielsweise der Kreislaufführung von Nährstoffen auch in der Landwirtschaft.
39	Einfach Systeme zu kreieren, die regenerativ, kreislauffähig, zukunftsfähig dann eben auch für künftige
40	Generationen. Dann klingt es ja dann doch so schmalzig, aber auch für künftige Generationen Lebensgrundlage,
41	Lebens- und Wirtschafts- und Existenzgrundlage bietet. Die Zeit ist um.
42	[1:00:22.2] <b>B.:</b> Vielen Dank.



1	[1:00:23.5] <b>T.J.:</b> Ich danke euch herzlich. Danke für eure Fragen. Vielleicht, wenn eine Frage in die Runde erlaubt
2	ist. Einfach, weil wir das Format testen, vielleicht so eine kurze Einschätzung, inwiefern euch das weitergeholfen
3	hat, heute. Oder was ihr sagen würdet, was man verbessern kann. Also, wenn möglich, gerne auch kurzhalten.
4	Aber das wäre toll, wenn ihr da kurz was sagen könntet zu.
5	[1:00:47.8] <b>M.:</b> Dann mache ich kurz den Anfang. Ich fand es gut. Ich finde es sehr gut, dass man hier
6	verschiedene Bereiche sieht, also, Matratzen, Elektrotechnik, Kommunen und Bauen, an einem Tisch. Sieht man
7	wahrscheinlich sonst auch nicht so oft, würde ich jetzt mal sagen. Deswegen ist es ja auch irgendwie spannend
8	zu sehen, dass Cradle to Cradle irgendwie sehr viel verbinden kann. Und Danke auch für die Expertise, weil es
9	ist ja auch nicht einfach, auf alle Bereiche immer eine Antwort zu haben. Aber, also, jetzt vielleicht noch mal,
10	wenn diese Baufrage vielleicht doch noch mal irgendwie im Nachgang beantwortet werden könnte. Oder
11	irgendwie ihr mir noch mal eine Info geben könntet, würde ich mich freuen. Aber ansonsten würde ich/ Das
12	Einzige, was ich als Kritik sehe, ist, dass die Zeit sehr kurz ist. Aber keiner hat Zeit. Das ist ja immer so.
13	[1:01:35.6] <b>T.J.:</b> Alles klar. Danke dir, Max. Noch weiteres ergänzendes Feedback? Also, wenn ihr ähnliches habt,
14	dann könnt ihr zum Beispiel jetzt winken. Und wenn ihr noch etwas hinzuzufügen habt, dann gerne. Da wird
15	noch gewunken.
16	[1:01:48.8] (...)
17	[1:01:53.7] <b>B.:</b> Ich wollte mich nur noch bedanken. Für die schnelle Rückmeldung. Und, dass das jetzt so gut
18	funktioniert hat. Also, es ist nicht selbstverständlich, dass das du dir da die Zeit nimmst.
19	[1:02:05.6] <b>T.J.:</b> Ja, gerne. Das wollen wir auch beibehalten. Bleibt uns gewogen. Verfolgt uns auf allen Kanälen,
20	wenn ihr Lust habt. Bleibt am Ball. Und Danke euch, dass ihr euch dem Thema widmet in euren
21	wissenschaftlichen Arbeiten. Das finde ich super und/
22	[1:02:19.2] <b>M.:</b> Darf ich noch mal einen Satz sagen? Ganz kurz, sorry, Tim. Sorry, ich wollte dich nicht/ Aber jetzt
23	zum Beispiel in Sachen von Abschlussarbeiten. Also, man hat ja meistens einen begrenzten Zeitraum und/
24	[1:02:28.4] <b>T.J.:</b> Ja.
25	[1:02:28.9] <b>M.:</b> Ihr bietet das ja jetzt einmal im Monat an. Und wenn es jetzt mal ausfällt, sind zu/ Bei mir war
26	es jetzt zum Beispiel der Fall. Irgendwie hat sich das letzte Mal verschoben. Und das hat sich jetzt um zwei
27	Monate so gesehen verschoben. Also, vielleicht nur als Anregung, vielleicht, dass man das irgendwie anders
28	takten könnte. Kann ja dann auch irgendwie kürzer sein. Oder einfach nur, dass man so ein FAQ macht oder
29	vielleicht sowas nochmal.
30	[1:02:47.7] <b>T.J.:</b> Ja.
31	[1:02:48.1] <b>M.:</b> Das könnte vielleicht vielen Absolventen helfen. Weil, wenn man zwei Monate auf Infos
32	manchmal wartet oder auf ein Interview, dann geht ja schon viel Zeit von so einer Abschlussarbeit flöten.
33	[1:02:58.0] <b>T.J.:</b> Ja. Das ist ein guter Hinweis. Das nehme ich gerne mit, Max. Danke dir.
34	[1:03:00.9] <b>M.:</b> Okay. Dann/
35	[1:03:02.5] <b>T.J.:</b> Dann schicken wir euch die Aufnahme im Nachgang. Die könnt ihr euch runterladen. Die ist jetzt
36	in die Cloud aufgezeichnet worden. Und dann kann das für euch die Grundlage sein, wenn ihr da irgendwie
37	zitieren wollt. Dann viel Erfolg bei euren Arbeiten auf jeden Fall. Danke für das Interesse.
38	[1:03:13.0] <b>N.K.:</b> Noch eine kurze Frage.
39	[1:03:13.4] <b>T.J.:</b> Natalie. Ja?
40	[1:03:14.7] <b>N.K.:</b> Diese Frage, die Max vorhin gestellt hat. Ich weiß nicht mehr ganz genau. Es ging irgendwie um
41	Kosten, Neubau, C2C im Baubereich. Die ja an die Expertin weitergeht. Die ist tatsächlich einer von meinen

1	Fragen, die ich jetzt nicht gestellt habe, sehr ähnlich. Also, das würde mich auch sehr interessieren. Also, wenn
2	es da irgendwie die Möglichkeit gibt, wäre ich da auch an dem Ergebnis/
3	[1:03:34.6] <b>T.J.:</b> Also, die Kollegen sind dran und wissen dann jetzt auch, dass die Antwort, ob positiv oder
4	negativ, auf das Vorliegen oder nicht der Information an Max und Natalie geht. Klasse. Machen wir so. Dann
5	vielen Dank. Macht es gut. Einen schönen Tag euch. Bis dahin.
6	[1:03:53.2] <b>M.:</b> Danke. Ciao.
7	[1:03:53.8] <b>N.K.:</b> Danke. Tschüss. Alles Gute.
8	[1:03:55.8] <b>S.:</b> Tschüss.
9	[1:03:56.2] <b>B.:</b> Tschüss.
10	[1:03:56.7] (...)

## Gesamtaufkommen an Abfällen

Gesamtaufkommen an Abfällen in Baden-Württemberg 2019 nach Abfallarten und Art der Entsorgung									
Abfallarten	Aufkommen insgesamt	Davon zur							Verwertungsquote
		Beseitigung/ Behandlung insgesamt	davon zur			Verwertung insgesamt	davon zur		
			Depo- nierung	thermischen Behandlung	Behandlung zur Beseitigung		energetischen Verwertung	Verwertung, sonstigen Behand- lung <sup>1)</sup>	
1.000 t									%
<b>Insgesamt</b>	<b>50.588,8</b>	<b>6.718,9</b>	<b>6.199,1</b>	<b>80,4</b>	<b>439,4</b>	<b>43.869,9</b>	<b>3.265,1</b>	<b>40.604,8</b>	<b>86,7</b>
Siedlungsabfälle	5.998,4	0,1	0,1	–	–	5.998,2	2.174,8	3.823,4	(100) <sup>2)</sup>
Abfälle aus Produktion und Gewerbe	2.281,8	63,4	57,7	0,4	5,3	2.218,4	706,5	1.511,9	97,2
Klärschlamm aus kommunalen Kläranlagen	229,3	58,4	–	58,4	–	171,0	169,0	2,0	74,6
Bau- und Abbruchabfälle (Baumassenabfälle)	40.275,9	5.932,9	5.932,9	–	–	34.343,1	214,9	34.128,2	85,3
Boden und Steine (Bodenaushub)	28.915,1	5.500,6	5.500,6	–	–	23.414,5	–	23.414,5	81,0
Bauschutt, Straßenaufbruch, andere Bau- und Abbruchabfälle	11.360,8	432,3	432,3	–	–	10.928,5	214,9	10.713,7	96,2
Gefährliche Abfälle insgesamt	1.803,4	664,2	208,4	21,6	434,2	1.139,2	–	1.139,2	63,2
Verunreinigte Böden und Bauschutt	925,8	496,1	149,8	13,3	333,1	429,7	–	429,7	46,4
Gefährliche Abfälle aus Produktion und Entsorgung	877,6	168,1	58,6	8,4	101,1	709,5	–	709,5	80,8

1) Einschließlich Zwischenlager.  
2) Infolge veränderter Einstufung aller Hausmüllverbrennungsanlagen als R1 - Anlagen (energetische Verwertung).  
Berechnungsstand März 2021.  
Datenquelle: Erhebungen der Abfallentsorgung nach §§ 3 bis 5 Umweltstatistikgesetz.

© Statistisches Landesamt Baden-Württemberg, 2021

Anlage 4

---

**Zeichenerklärung**

- O** Mehr als nichts, jedoch weniger als die Hälfte der kleinsten verwendeten Einheit
- nichts vorhanden (genau Null)
- Zahlenwert unbekannt oder geheim zu halten
- X** Tabellenfach gesperrt, weil Aussage nicht sinnvoll
- ...** Angabe fällt später an
- /** Keine Angabe, da Zahlenwert nicht sicher genug
- ( )** Aussagewert eingeschränkt, da Zahlenwert statistisch relativ unsicher
- (·)** unter 50 erfasste Fälle bei einer Stichprobenerhebung
- p** vorläufige Zahl
- r** berichtigte Zahl
- s** geschätzte Zahl
- D** Durchschnitt (arithmetisches Mittel)

**Mill.** Millionen

**Mrd.** Milliarden

Abweichungen in den Summen durch Runden der Zahlen.

# Abfallwirtschaft

## Kurzübersicht Abfallbilanz

### Abfallbilanz 2019

Abfallart	Abfallauf- kommen	Davon Verbleib in Abfallentsorgungsanlagen mit					Verwertungs- quote
		Beseitigungsverfahren			Verwertungsverfahren		
		Ablagerung	Thermische Beseitigung	Behandlung zur Beseitigung	Energetische Verwertung	Stoffliche Verwertung	
1 000 Tonnen							%
<b>Insgesamt</b>	416 536	68 910	2 934	4 854	47 832	292 006	82
<b>davon</b>							
↳ <b>Siedlungsabfälle</b>	50 643	89	143	566	15 618	34 227	98
↳ <b>Abfälle aus Gewinnung und Behandlung von Bodenschätzen</b>	28 147	27 321	1	48	2	775	3
↳ <b>Bau- und Abbruchabfälle</b>	230 851	26 454	33	1 973	1 470	200 921	88
↳ <b>Sekundärabfälle</b>	56 197	4 893	191	761	18 889	31 463	90
↳ <b>Übrige Abfälle (insbesondere aus Produktion und Gewerbe)</b>	50 698	10 153	2 566	1 506	11 852	24 621	72

Stand 4. Juni 2021

Anlage 5



## Grüner Leben



40

Prozent  
der Treibhausgase entstehen  
beim Bauen und durch den Betrieb von  
Häusern und Infrastruktur

50

Prozent  
der Abfallmasse entstehen beim Bauen.  
Dieser Müll ließe sich mit Holzbau und einer  
Kreislauf-Bauwirtschaft verringern

Mjøstårnet (Turm am Mjøsa-See): Das Gebäude steht im norwegischen Brumunddal und gilt als das höchste Holzhaus der Welt

# Nichts für Betonköpfe

Der deutsche Klimapapst John Schellhuber möchte mit natürlichen Baustoffen das Klima retten VON UWE JEAN HEUSER

**H**ans Joachim, genannt John, Schellhuber wurde vor gut siebzig Jahren in einem niederbayerischen Holzhaus geboren. Jetzt will er zum Holzhaus zurück. Nicht für sich selbst, sondern für alle Menschen. Der deutsche Klimapapst, der bis 2018 einer der Chefs beim Potsdam-Institut für Klimafolgenforschung war, ist zum Aktivist geworden.

In dieser Woche stellt er seine neuen Pläne vor. Die unbescheidene Mission: eine weltweite

hervorbringt. Der deutsche Klimaforscher sah, wie durch die Beschneidung »das Leben sprießt«, und konnte sich auf einmal die Zone südlich der Sahara als riesige CO<sub>2</sub>-Senke vorstellen, in der Holz massenweise wächst und das Klimagas bindet.

Beim deutschen Umweltministerium hatte Schellhuber es später in einem Rat für Baukultur mit führenden Architekten zu tun. Er sah eine neue Form der Urbanisierung mit Holzbauquartieren entstehen. In dieser Vision wurden Kunst und Handwerk sowie die Einbettung von Umwelt und Sozialem eins – wie vor gut hundert Jahren in der Weimarer Bauhaus-Schule. Der Physiker nannte

Hoch bauen lässt sich mit dem nachwachsenden Material auch. Im norwegischen Brumunddal öffnete 2019 schon ein über 85 Meter hohes Holzhaus seine Türen, und in Eindhoven soll eine riesige Hochhausstruktur entstehen, die zwei Stadtteile verbindet. Grundsätzlich könne man mit Holz sogar höher bauen als mit Beton, sagt Schellhuber.

Aber hat der Plan nicht doch einen Haken? Die Aufforstung würde ja lauter Monokulturen entstehen lassen, die gefährdeter sind als natürliche Mischwälder, oder? »Bei uns auf der Nordhalbkugel sind die Monokulturen durch die Fichte schon da«, antwortet Schellhuber. Fürs Bauen könne man dagegen Misch-

erneuerbaren Energien und der Elektromobilität schlichte Unterfangen. Doch Schellhuber rechnet mit ähnlichen Mustern des Widerstands. Noch sei sein Bauhaus der Erde zwar »unter dem Radarschirm« der Stahlbetonlobby. Aber auch diese läuft seines Erachtens wie die Energie- und die Autoindustrie Gefahr, in die »Effizienzfalle« zu tappen und die alte Technologie immer weiter auszureizen, statt das Potenzial der neuen zu nutzen. So könne man mit Textilbeton vielleicht 15 Prozent CO<sub>2</sub> einsparen. Auch forsche die Industrie an der klimaneutralen Zementherstellung mithilfe von Wasserstoff. Aber all das erinnert ihn an besonders effiziente Kohlekraftwerke oder verbrauchs-

andere Naturstoffe neben Holz ebenso gelten wie Mischbauten, bei denen 90 Prozent der künftigen Baumasse aus Holz sind, und selbst bei nur 70 Prozent Holz »hätte das noch einen großen Effekt«. Hauptsache, es geht richtig los.

Damit das geschehen kann und die Wende über einzelne Leuchtturmprojekte hinausgeht, müssen sich allerdings Gesetze ändern, in denen noch die Angst vor Bränden und Termiten dominiert. Sie schränken den Holzbau kräftig ein. Dem langjährigen Politikberater Schellhuber schwebt ein Zukunftsressort für Bauen und Raumplanung in der Bundesregierung vor. Ermutigt fühlt er sich von den Reaktionen junger



Wende beim Bauen herbeizurufen. Die restliche Überzeugung: Die Rückkehr zum Holz als dem zentralen Baumaterial ist der wichtigste Beitrag gegen die Erwärmung der Erde. Das entscheidende Mittel: eine Erzählung, die Bürgerinnen und Politiker weltweit zu überzeugen vermag.

Kurz gesagt geht sie so: Holz ist ein vielseitiges, natürliches Baumaterial und kann jahrhundertlang große Mengen des Klimagases CO<sub>2</sub> speichern. Wird nun großflächig aufgeforstet und mit Holz statt Beton gebaut, wird der größte Klimasünder überhaupt, das Bauen nämlich, zum Klimafreund. Nicht nur entsteht dabei kein neues CO<sub>2</sub> mehr, die Dörfer und Städte binden dann vielmehr altes und schaffen es dadurch für lange Zeit aus der Welt.

Wenn John Schellnhuber seine Erzählung vorträgt, nennen die Leute, die mit ihm arbeiten, das den »Pitch«. Doch wie ein Start-up-Unternehmer plakatativ für seine Idee zu werben ist dem gelernten Physiker nicht ganz gegeben. Sein Kern-Sprachbild würde wahrscheinlich beim Massenpublikum durchfallen: die »Wald-Bau-Pumpe«, die versinnbildlichen soll, dass CO<sub>2</sub> erst in heranwachsenden Bäumen gebunden und dann in Gelen gespeichert wird. Auch sein eher spontan entworfener Slogan »Reforest and retimber the city« (Aufforsten und die Stadt wieder mit Holz versehen) dürfte es nicht in die Lehrbücher des Marketings schaffen. Aber in der Sache hat Schellnhuber gleich so viel zu sagen, dass man merkt: Der Mann hat sich das in allen Facetten überlegt.

Gleichzeitig wundert er sich, wie er so lange blind sein konnte für dieses zentrale Element der Klimawende. Rund 40 Prozent des Ausstoßes von Treibhausgasen gingen auf das Konto des Bauens und des Betriebens von Gebäuden und Infrastruktur, rechnet er vor. Und zumindest im Westen entstehe gut die Hälfte der Abfallmasse durch Abriss und Bau. Wer da nicht ansetze, könne die Erderwärmung gar nicht anhalten.

Tatsächlich ist der Bauvorgang heute eine einzige Abfolge von Klimasünden. Mit hohem Energieaufwand wird Kalk bei extremen Temperaturen gebrannt, um Zement herzustellen, wobei das im Kalk gebundene CO<sub>2</sub> frei wird. In immer weiteren industriellen Prozessen wird daraus schließlich Stahlbeton. Der Stahlbeton wird oft Hunderte Kilometer weit mit Diesellastern transportiert und schließlich mithilfe weiterer klimagiftiger Maschinen verbaut. Da aber der Großteil der Stunden außerhalb der Städte stattfindet, wurde das Bauen dort lange gar nicht als Klimakatastrophe wahrgenommen und auch bei Klimabilanzen kaum mitgezählt.

Schellnhuber erinnert sich noch an die Momente, in denen er das Potenzial schließlich doch erkannte. Einmal war er in der Sahelzone mit dem australischen Agrarökonom Tony Rinaudo unterwegs. Der hat den Alternativen Nobelpreis für seine Methode erhalten, mit der er versandete Baumwurzeln beschneidet und neues Wachstum

sein Projekt dann **baumaterial** der Erde 2017 versammelte sich der Initiativkreis dafür erstmals bei der Philosophin und Siemens-Aufsichtsrätin Nathalie von Siemens im Seebad Caputh nahe Berlin, wo sich vor rund hundert Jahren Albert Einstein sein Sommerhaus errichten ließ – aus Holz!

Aus dem Initiativkreis wurden die heutigen Botschafter des Projekts, zu denen neben von Siemens, Wissenschaftlern und Architekten auch Kulturstatsministerin Monika Grütters (CDU) gehört. Eine gemeinnützige GmbH wurde gegründet und von der Laudes-Stiftung der C&A-Familie Brennkmeijer auf zwei Jahre finanziert. Schellnhuber sucht gerade eine Geschäftsführerin und erzählt von ehrgeizigen Wachstumsplänen für die Organisation.

Er sagt, dass er auch Ursula von der Leyen von der Bauhaus-Idee berichtet habe. Die EU-Kommissionsschefin setzte dann noch vor dem deutschen

Professor ihre eigene Initiative um, das **Neue Europäische Bauhaus**, das den Green Deal der EU in lokalen Projekten umsetzen soll. Schellnhuber, der Menschenfänger mit der sanften, nimmermüden niederbayerischen Stimme, ist im Führungsgremium dabei.

Der Professor kommt mit seinem Vorstoß gerade rechtzeitig. Holzbauten sind en vogue, in der Hamburger HafenCity entsteht derzeit das mit 65 Metern höchste deutsche Holzhaus, das 128 Eigentumswohnungen fassen wird. Und in Berlin-

Tegel soll das Schumacher Quartier mit rund 5000 Wohnungen für über 10.000 Menschen überwiegend aus Holz entstehen und klimaneutral werden. Schellnhuber liefert nun die große Klimageschichte für diesen Aufbruch, sein »Narrativ« für die Bauwende.

Als Gegner hat er einen seiner Meinung nach überkommenen Begriff von Moderne ausgemacht. Er klagt, dass Holzbaufreunde als verirrt Naturromantiker wahrgenommen würden. Bloß sei die Natur nicht rückständig, sondern höchst innovativ, was die »unglaublichen Eigenschaften« des Holzes zeigten, das ebenso stabil wie flexibel sein könne. In komplexen Systemen wie der Umwelt sind demnach die Ergebnisse von Jahrmillionen der Evolution oft die besten Lösungen. Den Menschen sei mit der Idee von der Überlegenheit des Maschinellen aber einfach »das Gehirn gewaschen« worden, sagt der Klimaforscher. Dagegen tritt er an – baue die Menschheit weiter wie derzeit, dann werde sie allein damit den Planeten überhitzen.

Bewaffnet ist er mit Studien und Argumenten. Tatsächlich hat er Natur und Innovation oft auf seiner Seite. Moderne Holzhäuser brennen keineswegs leicht, und bricht ein Feuer aus, bleiben Decken und Pfeiler aus Holz sogar länger stabil als Betonkonstruktionen. Die oberste Schicht wird zwar angekokelt, diese Holzkohle schützt dann aber die darunterliegenden Schichten. Man braucht auch keine gefährlichen Chemikalien mehr, um das Bauholz zum Beispiel gegen Termiten zu sichern.

wald aufforsten und verschädigte Baumaterialien auch geschädigtes Holz nutzen. Gleichzeitig müsse man die Urwälder vor allem im Süden schützen.

Betrachtet man sie genauer, wird aus der einfachen Erzählung eben doch ein kompliziertes Weltprojekt. Gegen solch eine Bauwende waren die Einführung der

aufgeschoben haben und die Industrie selbst in Schwierigkeiten brachten.

Doch der Kipppunkt sei nah, meint Schellnhuber, die organischen Materialien würden kommen. Dabei will er keineswegs als Fundamentalist dastehen, lässt

didaten Olaf Scholz sieht er einen Anhänger seines Bauhauses. Und Annalena Baerbock ist längst die prominenteste offizielle Botschafterin seiner Idee.

Man kann John Schellnhuber nicht vorwerfen, dass er schlecht vorbereitet sei.



John Schellnhuber will mehr Holz

ANZEIGE

laden günstig,  
wenn alle schlafen

Mit E.ON SmartStrom Öko und der passenden Wallbox lädt Thomas sein E-Auto jetzt nachts besonders günstig -- und mit 100 % Ökostrom. So spart er gleich doppelt: Geld und CO<sub>2</sub>. Und je mehr wir alle auf E-Mobilität setzen, desto mehr freut sich auch die Umwelt. Gemeinsam für ein besseres Morgen.

Das WIR bewegt mehr.

[eon.de/emobility](http://eon.de/emobility)

**e.on**  
Drive



## Bauen

## Die wahren Kosten des Bauens

A B C D E

### Graue Energie

Gebäude verursachen ein gutes Drittel der deutschen Treibhausgas-Emissionen. Heizung und Kühlung machen rund die Hälfte davon aus, die andere Hälfte entfällt auf die sogenannte graue Energie. Sie wird über den gesamten Lebenszyklus eines Gebäudes hinweg verbraucht – angefangen bei der Herstellung der Baustoffe über den Bau, die Renovierungen und den Abriss bis zum Recycling des Bauschutts.



### Ressourcenausweis

Während der Energiebedarf für die Beheizung von Gebäuden bei Verkauf, Vermietung oder Verpachtung bereits seit mehr als zehn Jahren ausgewiesen werden muss, gibt es bisher keine Dokumentationspflicht für graue Energie. Die Grünen fordern die Einführung eines Ressourcenausweises, die FDP will ihn für öffentliche Bauten. Auch eine Expertenanhörung

# Ein ganz einfaches Haus



# D

ie Anforderungen waren extrem: Das neue Schmuttetal-Gymnasium im schwäbisch-bayerischen Diedorf sollte nicht nur vollständig aus Holz errichtet werden, sondern auch noch flexible, offene Lernlandschaften bieten und als Plus-Energie-Haus mehr Energie erzeugen, als es verbraucht. Florian Nagler, der Architekt, hat all diese Anforderungen tatsächlich erfüllt und ist für das Gebäude gleich dutzendfach ausgezeichnet worden, unter anderem mit dem Deutschen Architektur- und dem Deutschen Nachhaltigkeitspreis.

Trotzdem will er so nicht mehr bauen. »Der Erfolg wurde mit einem irren Aufwand an Haustechnik erkaufte«, sagt Nagler heute, sechs Jahre nach Fertigstellung des Gymnasiums. Dessen Lüftungsanlage ist so komplex, dass sie erst nach drei Jahren im Betrieb richtig funktioniert hat. »Der Hausmeister muss vor drei Bildschirmen sitzen, wie im Kontrollraum eines Kernkraftwerks«, sagt der Architekt, »wenn er krank war, ist im Sommer auch mal geheizt und im Winter gekühlt worden.« Die hölzernen Trennwände zwischen den Klassenräumen mussten, um alle Anforderungen an Dämmung, Brandschutz und Trittschalldämmung zu erfüllen, aus elf präzise berechneten und miteinander verleimten Schichten bestehen. »Da hab ich mir gesagt: Jetzt reicht's.«

»Einfach bauen« heißt das Konzept, das Florian Nagler heute verfolgt. Modern, energie-

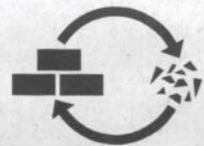


des Baustoffrecyclings hat Anfang März mehr Transparenz und eine gezielte Senkung der grauen Energie gefordert.



### Baustoffkataster

Welche Materialien beim Bau oder bei der Renovierung von Gebäuden verwendet werden, muss bislang nicht dokumentiert werden. Das erschwert das spätere Recycling. Ein Baustoffkataster könnte das ändern. In den Niederlanden gibt es so etwas bereits. Unter dem Namen »Madaster« ist nun auch in Deutschland ein Baustoffkataster im Aufbau, bisher noch auf freiwilliger Basis.



### Baustoffrecycling

Von einer Kreislaufwirtschaft ist die Baubranche in Deutschland noch weit entfernt. 60 Millionen Tonnen Bauschutt fallen jährlich in Deutschland an, 78 Prozent davon werden zwar offiziell recycelt. Fast immer handelt es sich dabei allerdings um ein Downcycling: Das Material landet als Schotter im Straßenbau. Ein Baustoffkataster würde die sortenreine Trennung und Wiederverwendung des Schutts erleichtern.



Die Prototyp-Häuser in Bad Aibling: Aus Leichtbeton (oben) und Ziegel (u. l.)



Der Bauunternehmer Ernst Böhm (l.) und der Architekt Florian Nagler



Die Wand des Holzhaus-Prototyps in der Seitenansicht

Fotos: Anna Aicher für DIE ZEIT; ZEIT-Grafik

ettiziert und komortabel sollen seine Gebäude noch immer sein, dabei aber auf das Wesentliche reduziert. Das erleichtert Planung und Bau. Und es reduziert die sogenannte graue Energie, also das, was ein Gebäude über den gesamten Lebenszyklus verbraucht, von der Baustoffherstellung über den Bau, die Renovierungen und den Abriss bis hin zum Recycling des Bauschutts. Heute entsteht ein gutes Drittel der deutschen Treibhausgas-Emissionen im Gebäudesektor, Tendenz steigend. Der Energieverbrauch für Heizung und Kühlung macht davon rund eine Hälfte aus, graue Energie die andere. Damit der Sektor bis 2050 klimaneutral werden kann, müssen fossile Erdgas- und Ölheizungen ersetzt und muss die graue Energie so weit wie möglich reduziert werden.

Einfaches Bauen kann dazu beitragen. Wie es in der Praxis funktioniert, demonstrieren Nagler und sein Team von der TU München im oberbayerischen Bad Aibling. Dort sind auf einem ehemaligen Kasernengelände drei Forschungshäuser entstanden. Draußen geht der Blick auf das Wendelsteinmassiv, drinnen riecht es nach Rohbau. Bevor die ersten Mieter einzogen, wurde das Zusammenspiel von Heizkörpern, Luftfeuchte, Raumtemperatur und Energieverbrauch mit einer ganzen Batterie an Messgeräten geprüft. Dabei zeigte sich: Die drei einfach gebauten Forschungshäuser erfüllen alle Energie-sparvorschriften, auch die des 2020 erst in Kraft getretenen Gebäudeenergiegesetzes.

Die je acht Wohnungen haben zwei klare Grundrisse: Wohnzimmer, Küche, Bad und ein oder zwei Schlafzimmer. Das erleichtert den Vergleich von Energieverbrauch, Nutzungsverhalten und Zufriedenheit der Bewohner. Eines der Häuser ist aus vorgefertigten Massivholzelementen zusammengesteckt, das zweite mit Ziegelsteinen gemauert und das dritte aus Beton gegossen. Während die Außenwände im Holzhaus nur 30 Zentimeter dick sind, müssen es beim Ziegelstein 42 und beim Beton sogar 50 Zentimeter sein. Alle Wände bestehen nur aus dem jeweils einen Material. Das Fundament kommt ohne chemischen Dämmstoff aus, und in den Betonwänden steckt kein Stahlgeflecht. »Die Häuser sind stinkeinfach auf den Boden gesetzt«, sagt Florian Nagler.

Auffällig sind nur die Fenster und Haustüren. Im Holzhaus haben sie die gewohnte rechteckige Form, in den Ziegel- und Betonwänden sind sie oben rund. Das spart die abstützenden Träger über den Fenstern und Türen und Dämmschichten aus Kunststoff und Mineralwolle. Bogenöffnungen waren aus statischen Gründen schon vor 1000 Jahren üblich. Und dass dicke Wände im Sommer kühlen und im Winter Wärme speichern, wusste man damals auch schon. Die heutige Architektur hat einfache Bauweisen und die natürliche Klimatisierung durch viel Technik ersetzt.

»Das schlimmste Beispiel ist dieses typische Wärmedämm-Verbundsystem mit sehr



## Bauen

## Klimafreundliche Gebäude sind oft mit Technik vollgestopft – das lässt sie schnell altern. Ein bayerisches Forschungsprojekt testet den Gegenentwurf. Das Ergebnis zeigt: Ganz modern ist, wer vom Altbau lernt

VON DIRK ASENDORPF

vielen aufeinandergepappten Schichten«, sagt die Architektin Anja Rosen. Sie ist auf das Recycling von Bauwerken spezialisiert – und lobt den Aufbau der drei Forschungshäuser. So können beim Abriss alle Baustoffe ohne großen Aufwand sortenrein getrennt werden – die wichtigste Voraussetzung für ein möglichst vollständiges Recycling. Weil das beim Entwurf der Forschungshäuser bereits berücksichtigt wurde, spricht die Architektin von »urban mining design«.

Florian Nagler will zudem die graue Energie minimieren, die bei der Rohstoffgewinnung, Baustoffherstellung, Verarbeitung, dem Abriss und der Entsorgung der Gebäude verbraucht wird. Auch deshalb hat er im Betonhaus auf die sonst übliche Stahlbewehrung verzichtet und für die Statik auf eine besonders dicke Wand aus leichtem Dämmbeton gesetzt. »Stahlbeton hat eine extrem schlechte Energiebilanz, und das liegt am Stahl.« Tatsächlich ist dessen Produktion sehr energieintensiv.

Am meisten graue Energie spart ein Haus ein, das sehr lange hält. Die Mauern einer Kirche aus der Barockzeit erfüllen auch nach 400 Jahren ihren Zweck. Was in den vergangenen Jahrzehnten gebaut wurde, ist dagegen äußerst kurzlebig. »Können Sie mir eine haustechnische Anlage sagen, die 30 Jahre hält?«, fragt Ernst Böhm.

Böhm ist Gründungsgesellschafter der B&O-Gruppe, eines großen Dienstleisters der deutschen Wohnungswirtschaft, und der Bauherr der drei Forschungshäuser. Von verklemmten Rollläden über kaputte Lüftungsanlagen bis zu versagenden Heizungen zählt die B&O-Gruppe in jedem Jahr durchschnittlich eine größere Reparatur in jeder von ihr betreuten Wohnung. Weil Haus und Haustechnik untrennbar verwoben sind, ist eine Modernisierung oft schon nach 30 Jahren teurer als Abriss und Neubau.

In den Forschungshäusern ist die Haustechnik reduziert und konzentriert. Alle zentralen Kabel und Leitungen stecken in den vorgefertigten Badezimmern, die mit einem Kran als Fertigteil ins Zentrum jeder Etage gehievt wurden. Ein Klempner musste die Rohre dann bloß noch miteinander verbinden. Wasseranschlüsse und Heizkörper gibt es deshalb nur an den Innenwänden in Richtung Bad und nicht wie in normalen Häusern auch an den Fensterseiten der Räume. Das spart Material und Arbeitszeit und erleichtert künftige Reparaturen. Für ausreichenden Sonnenschutz ist auch ohne Rollläden gesorgt, denn die Fenster sind in den dicken Außenwänden so tief nach innen versetzt, dass diese ausreichend Schatten spenden.

Den optimalen Zuschnitt und die Ausrichtung der Wohnungen haben Nagler und sein Team am Computermodell in 2600 Kombinationen simuliert. Das Ergebnis: ein knapp drei Meter breiter und sechs Meter tiefer Wohnraum mit einem hochgezogenen Fenster, das auch für den hinteren Bereich genügend Licht hereinlässt. »Weil die Decke mehr als drei Meter hoch ist, steht im Sommer die warme Luft oben, unten bleibt es kühl«, sagt Nagler. Das Ergebnis war keine Überraschung für ihn: »Unser idealer Raum ist ein klassisches Altbauzimmer.« Altbauwohnungen sind ausgesprochen beliebt. »Wenn wir das wissen, dann stellt sich doch die Frage: Warum bauen wir nicht mehr so?«

Nagler ist im oberbayerischen Thanning aufgewachsen, zwischen traditionellen Bauernhöfen mit ihren weit ausladenden Dächern und hölzernen Balkonen. Er hat Zimmerer gelernt und Kunstgeschichte studiert, bevor er sich der Architektur zuwandte und die Prinzipien der klassischen Moderne verinnerlichte: schnörkellos nüchterne Gebäude aus Beton, Stahl und Glas. »Ich bin überhaupt kein Technikfeind«, sagt er, »ich finde nur, die Technik sollte sinnvoll

eingesetzt werden.« Computersimulationen, industriell gefertigte, qualitätsüberwachte Luftziegel und Infralichtbeton seien für das einfache Bauen ausgesprochen nützlich. Aber nützlich seien eben auch die in der klassischen Moderne als spießig verschmähten Vordächer, Fensterläden, Rundbögen. »Wir müssen nicht so bauen wie früher, aber wir können von den alten Konstruktionen sehr viel lernen.«

Aus unbewehrtem Dämmbeton war zuvor noch kein dreistöckiges Wohnhaus errichtet worden, entsprechend hoch waren die Baukosten in Bad Aibling. »Das war viel zu experimentell, um billig zu sein«, sagt Nagler. Die beiden Forschungshäuser aus Ziegel und Holz lagen dagegen bei den reinen Baukosten im üblichen Preisrahmen. Bis zum Ende ihrer Lebenszeit werden sie aber deutlich weniger kosten als konventionelle Gebäude. »Wir haben mit besonders langlebigen Materialien gebaut, werden längere Wartungszyklen haben und sehr niedrige Verbüräuche. Das zahlt sich aus.«

Das gilt auch für den Klimaschutz. Von der Rohstoffgewinnung über den Bau und die Nutzung bis zu Abriss und Recycling sollen die gesamten Treibhausgas-Emissionen aller drei Forschungshäuser sogar niedriger bleiben als bei Passivhäusern. Diese sind besonders stark wärmegeklämt und reduzieren mittels Wärmetauscher Energieverluste durchs Lüften. Auf diese Weise erzeugen Passivhäuser zwar wesentlich weniger CO<sub>2</sub> beim Heizen, verbrauchen mit ihren aufwendigen Lüftungsanlagen aber viel Strom. Und auch die Herstellung der hoch gedämmten Bauteile ist CO<sub>2</sub>-intensiver als der einfache Wandaufbau der Forschungshäuser.

Das ist zumindest das Ergebnis einer Simulation, die das Projektteam mit sehr vielen technischen Daten durchgeführt hat. Allerdings hat sich in der Vergangenheit oft gezeigt, dass moderne, stark gedämmte Gebäude ihre theore-

tisch ermittelte Energieeffizienz in der Praxis nicht erreichen. Denn die Bewohner verhalten sich nicht immer so, wie es sich Architekten vorstellen. Steht zum Beispiel ein Badfenster stundenlang gekippt, geht auch im bestens gedämmten Gebäude viel Heizenergie verloren. In der Vergleichsrechnung heißt es über die Bewohner der einfach gebauten Forschungshäuser deshalb womöglich etwas zu optimistisch: »Es wird von einem intelligenten Nutzer ausgegangen, der die Fenster öffnet, sodass ein hygienischer Mindestluftwechsel vorliegt.« Also immer so viel lüften wie nötig.

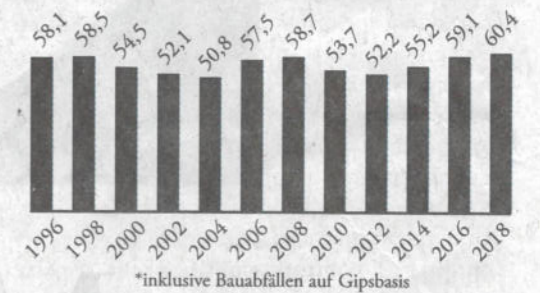
Ob die Realität hält, was die Simulation verspricht, will Florian Nagler auch mit seinem nächsten, von der Bundesstiftung Umwelt mit 520.000 Euro geförderten Projekt testen. Dabei geht es um den Bau von drei neuen Studierendenwohnheimen auf dem Campus der TU München in Garching. Trotz einfacher Bauweise sollen sie einen Null-Energie-Standard erreichen, mit den Solaranlagen auf ihren Dächern also mindestens so viel Energie erzeugen, wie die knapp 200 Bewohner für Heizung, Warmwasser und Elektrizität verbrauchen.

Je eines der Gebäude wird wiederum aus Dämmbeton, Holz oder Mauerwerk errichtet; so lässt sich später ermitteln, wie sich die verschiedenen Materialien langfristig auf den Energiebedarf und den Wohnkomfort auswirken.

Aus seinen ersten Erfahrungen stellt das Projektteam gerade einen Leitfaden für Kollegen zusammen. »Wenn man sich den ganzen Tag mit solchen Dingen beschäftigt, dann meint man schnell, alle würden schon so denken«, sagt Nagler, »wenn man dann aber durch die Gegend fährt, sieht man: Alle bauen eigentlich anders. Stahlbetonkonstruktion, Wärmeverbundsystem draufgeklatscht und fertig.« Bis einfaches Bauen der neue Standard sei, werde es wohl noch einige Zeit dauern.

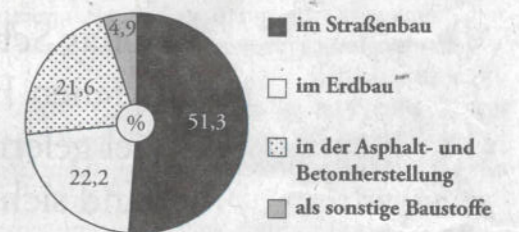
## Aus Alt mach Neu – aber nur ein kleines bisschen

Statistisch erfasste Mengen mineralischen Bauschutts\*  
(in Mio. t)



Als Bauschutt werden Klinkersteine, Ziegel, Mörtelreste, Mauerwerk, Kacheln, Keramik und andere mineralische Baustoffe bezeichnet. Eine sortenreine Trennung und Wiederverwendung des Bauschutts, das sogenannte *urban mining*, findet derzeit kaum statt.

Recyclingbaustoffe wurden 2018 verwertet:



Quelle: Bundesverband Baustoffe – Steine und Erden e. V.

Der Großteil des anfallenden Schutts wird in spezialisierten Unternehmen aufbereitet und im Straßenbau verwendet. Etwa ein Viertel eignet sich zur Herstellung von Asphalt und Beton. Neubauten bestehen deshalb im Schnitt nur zu 12,5 Prozent aus Recycling-Materialien.





**CRADLE TO CRADLE  
NGO**

# Netzwerk C2C Regionen

Kommunen der Zukunft  
gestalten

Anlage 8

**#C2C Modellregionen**

**#Zukunftsstädte**

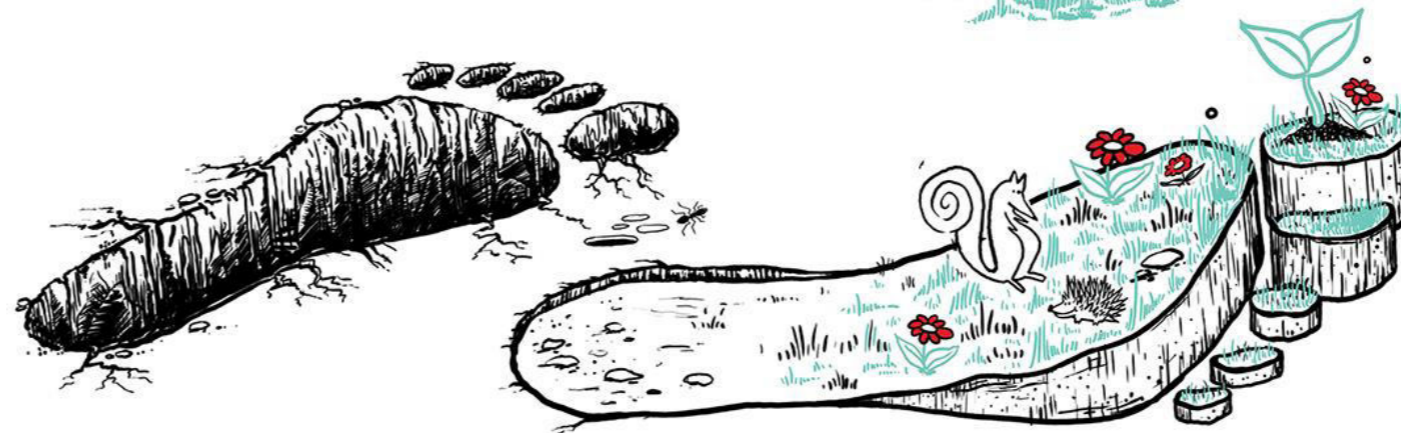
**#Urbane Transformation**



# URBANE RÄUME WIE WIR SIE UNS WÜNSCHEN

## DIE VISION

Wäre es nicht großartig, wenn unsere Städte und Gemeinden einen positiven Fußabdruck hinterlassen würden? Die wie ein Ökosystem **durch große Vielfalt an Lösungen und Lebewesen resilient** sind und über Jahrhunderte bestehen können? Indem wir zum Beispiel **Gebäude wie Bäume bauen**, deren grüne Fassaden die Biodiversität steigern, Sauerstoff erzeugen und Feinstaub binden? Gebäude, in denen die verwendeten Materialien gesund sind für Mensch und Umwelt, ihren Wert erhalten und niemals zu Müll werden? Urbane Räume, die **Sonne und Wind als Energieträger** nutzen und mehr erneuerbare und saubere Energie erzeugen, als sie verbrauchen? Regionen, in denen **nährstoffreicher Boden** aufgebaut und **gesunde Nahrungsmittel** erzeugt werden? In denen **Wasser in Kreisläufen** fließt, aus Regenwasser Trinkwasser und aus Schmutzwasser Nutzwasser wird? **Mobilitätsangebote mit einem positiven Fußabdruck**, die die Gesundheit von Mensch und Natur fördern? Mit Quartieren, in denen alle grundlegenden Bedürfnisse erfüllt werden und Menschen in vielfältigen Lebensmodellen als Teil des Ökosystems zusammenleben? Lebensräume, in denen **Vielfalt und Biodiversität** aktiv gefördert werden? Ganze Regionen, die ihren **Lebewesen ein zufriedenes und gesundes Leben** ermöglichen?





# C2C AUF KOMMUNALER EBENE

## GRÜNDE UND ZIELE

### WARUM BRAUCHEN WIR C2C AUF KOMMUNALER EBENE?

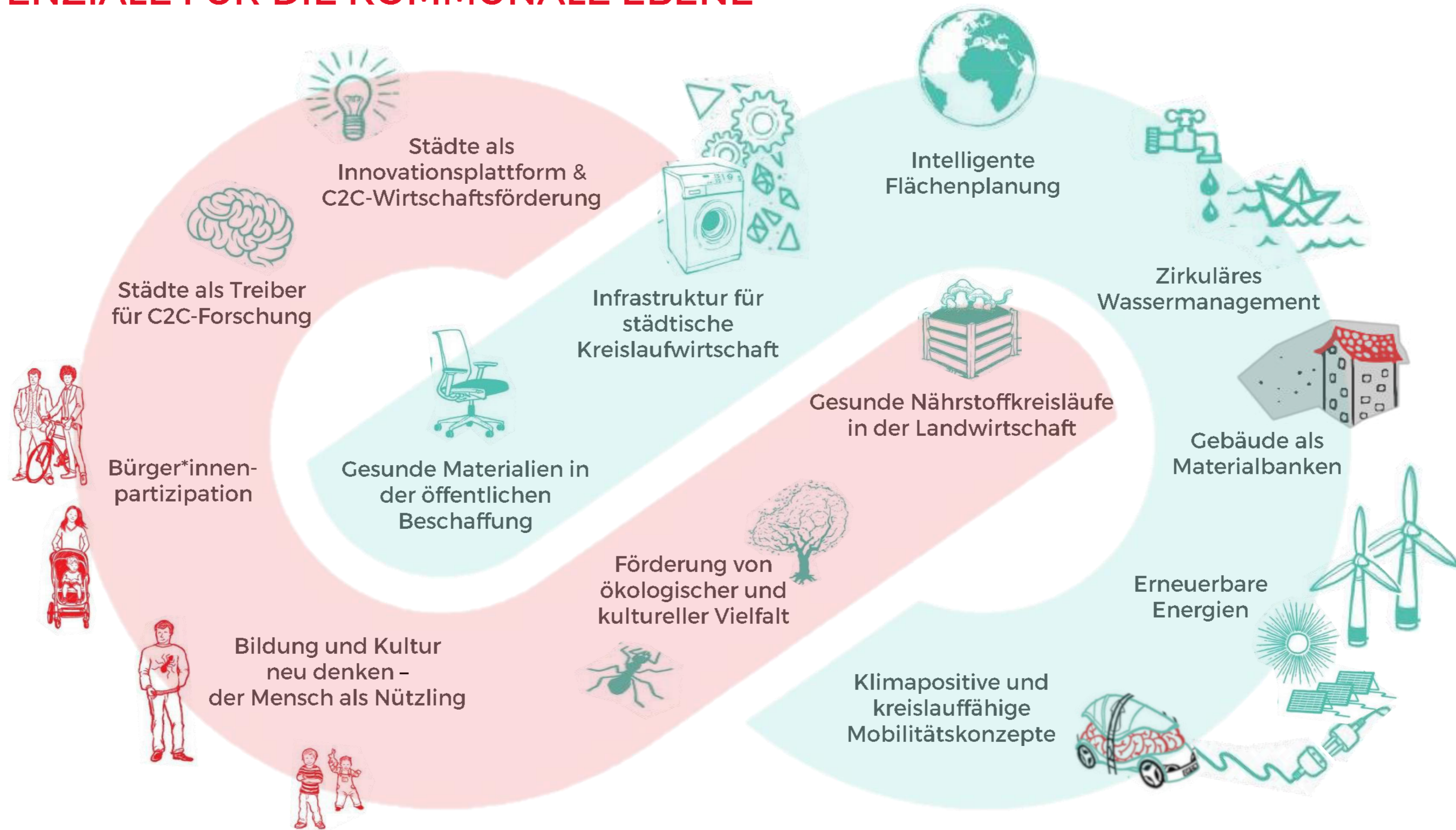
- Derzeitige lineare Produktions- und Wirtschaftsweisen „von der Wiege zur Bahre“ führen zu Ressourcenerschöpfung und Naturzerstörung
- Übergang hin zu einer innovativen, gesunden und kreislauffähigen Ökonomie, die „von der Wiege zur Wiege“ (Cradle to Cradle, C2C) denkt, ist dringend notwendig
- Städte und Kommunen bieten durch vielfältige Ansatzpunkte und Akteure besonders großes Potenzial für C2C-Lösungsansätze

### WAS SIND DIE ZIELE?

- Entscheidungsträger\*innen von der Cradle to Cradle Denkschule und dem Designkonzept begeistern, gemeinsam lokalspezifische Potenziale finden und aktiv werden
- Erfolgreiche C2C-Pioniere mit ambitionierten Stakeholdern vernetzen
- Kommunale C2C-Projekte anstoßen
- C2C als urbane Transformationsstrategie etablieren, die über „weniger schlecht sein“ hinausgeht

# WIE URBANE C2C-TRANSFORMATION AUSSEHEN KANN

## POTENZIALE FÜR DIE KOMMUNALE EBENE

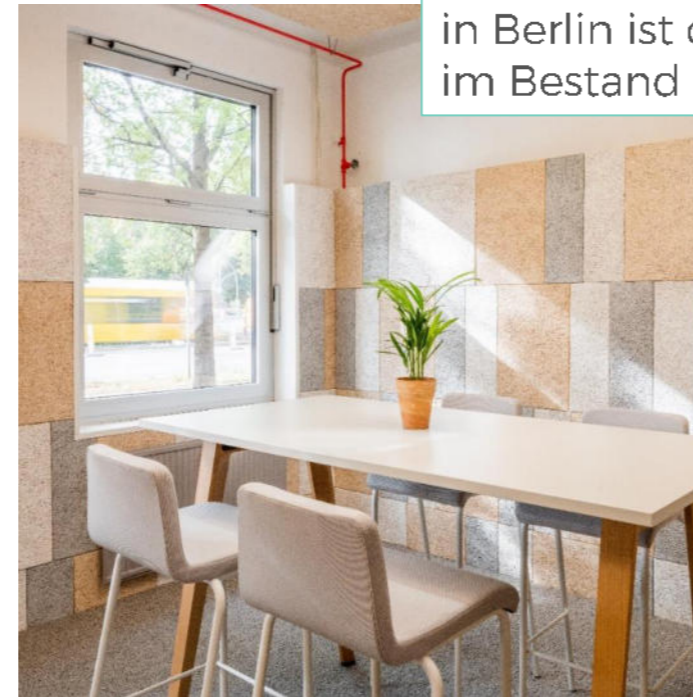




# BEST PRACTICE: INSPIRATIONEN FÜR DIE KOMMUNALE EBENE



**PREISGEWINNER FÜR C2C BESCHAFFUNG**  
Die ämterübergreifende Arbeitsgruppe für Nachhaltige Beschaffung bei der Stadt Ludwigsburg hat C2C in seine öffentliche Beschaffung integriert



**DAS C2C LAB**  
in Berlin ist die erste Sanierung im Bestand nach C2C



**INNOVATIVE FLÄCHENNUTZUNG**  
Lufa Farms nutzt leer stehende Dächer für die Nahrungsmittelproduktion, mit positivem Nutzen für Mensch und Umwelt. Die Begrünung des Kö-Bogen II in Düsseldorf fördert Biodiversität, Luftqualität und Klima



**INNOVATIVE MOBILITÄT**  
Mitfahrbank in Bleidenstadt, Elektro-Bus in Berlin und Bike-Snake in Copenhagen



**C2C-WOHNHAUS**  
„Moringa“ in der Hamburger HafenCity



**„SO SCHLAU WIE DIE NATUR“**  
C2C Kinder-Congress mit dem Kinder- und Jugendmuseum Donaueschingen



**DIE NATUR MITDENKEN**  
Keine Trennung von Natur und urbaner Infrastruktur



# PIONIERE AUF DEM WEG



**STRAUBENHARDT** hat 2019 einstimmig beschlossen, als C2C Modellgemeinde Pionierarbeit zu leisten. Bereits jetzt gibt es eine Windkraftanlage und ein C2C-Feuerwehrhaus nach dem Entwurf von wulf architekten (Fertigstellung vorauss. Frühjahr 2021). Der Bürgermeister Helge Viehweg war bereits Gastredner auf dem C2C Congress 2020 und im digitalen C2C LAB Talk.



**DIE REGION VENLO** ist ein Paradebeispiel für die Implementierung von C2C. Neben der C2C City Hall und anderen C2C Bauten, ist C2C als kommunale Gesamtstrategie unter anderem auch Bestandteil in der Bildung und in öffentlichen Ausschreibungsprozessen.



## DIE C2C ISLANDS

22 Inseln in der Nord- und Ostsee als Testplattformen für C2C-Innovation – von elektronischen Lastenfahrrädern und C2C Picknick Boxen bis hin zu intelligenter Straßenbeleuchtung wie hier auf Texel in den Niederlanden.



Cradle to Cradle®  
für barn

Författare: Rinus van den Berg Illustrationer: Pauline Meijer  
Svensk version



## RONNEBY

setzt neben dem Bau von C2C-Schulgebäuden auch auf Bildung und Forschung. Das Forschungszentrum Cefur vernetzt und klärt Bürger\*innen, Institutionen, Firmen und die Stadtverwaltung über C2C auf.



# SIE SIND...

... eine **Stadt oder Kommune** und wollen das Thema C2C in Ihrem kommunalen Kontext umsetzen?

... eine **Organisation** (z.B. Stiftung, Verein, Forschungseinrichtung, NGO) und möchten an der Gestaltung von urbanen Räumen mit positivem Fußabdruck mitwirken?

... ein **Unternehmen**, das C2C selbst aktiv umsetzen und regional vorantreiben möchte?

Werden Sie Teil des **Netzwerk C2C Regionen!**

# WERDEN SIE MITGLIED DES „NETZWERK C2C REGIONEN“

## Was das Netzwerk bietet

- Austauschplattform für Expertise und Wissen
- Regelmäßige Netzwerkveranstaltungen
- Zugriff auf Informationsmaterial und Hilfestellungen
- Eine Stimme, große Wirkung - Bündelung von Positionen und Interessensvertretung
- Potenzial für regionale Cluster zur Vernetzung von Unternehmen, Organisationen und politischen Akteuren
- Positionierung von C2C Engagement mit einem Logo des Netzwerks C2C Regionen
- Einbindung auf Website des Netzwerks
- Mögliche Einbindung auf Veranstaltungen von C2C NGO
- Rabatte auf alle C2C Formate (z.B. C2C Congress, Digital-Formate, Workshops, Fachforen)

**SIE WOLLEN ZUSÄTZLICH  
INDIVIDUELLE UNTERSTÜTZUNG  
AUF DEM WEG ZUR C2C  
MODELLREGION?**

**Wir unterstützen Sie gerne!**

Jetzt einen Termin vereinbaren unter  
030 46774780 oder  
lorena.zangl@c2c.ngo



# JAHRESBEITRÄGE FÜR MITGLIEDER DES NETZWERKS C2C REGIONEN

JAHRESBEITRÄGE						EXTRA	
<b>Städte, Kommunen &amp; Landkreise</b>	<b>900 €</b> <small>&lt; 20.000 Einwohner*innen</small>	<b>1.300 €</b> <small>20.000 – 100.000 Einwohner*innen</small>	<b>2.000 €</b> <small>100.000 – 500.000 Einwohner*innen</small>	<b>3.200 €</b> <small>500.000 – 1.000.000 Einwohner*innen</small>	<b>5.000 €</b> <small>&gt;1.000.000 Einwohner*innen</small>		<p><b>Individuelle Unterstützung</b> auf dem Weg zur C2C Modellregion, auf Ihren Wunsch zugeschnittene Veranstaltungsformate und viele weitere Möglichkeiten...</p> <p><b>Kontaktieren Sie uns</b> unter 030 46774780 oder <a href="mailto:lorena.zangl@c2c.ngo">lorena.zangl@c2c.ngo</a></p>
<b>Unternehmen, Wirtschaftsverbände &amp; Kommunalverbände</b>	<b>1.500 €</b> <small>Bis 150 Mitarbeitende/Mitglieder oder Bis 35 Mio. € Jahresumsatz</small>	<b>3.000 €</b> <small>Bis 2.500 Mitarbeitende/Mitglieder oder Bis 500 Mio. € Jahresumsatz</small>	<b>5.500 €</b> <small>&gt; 2.500 Mitarbeitende/Mitglieder oder Ab 500 Mio. € Jahresumsatz</small>				
<b>Stiftungen, Hochschulen &amp; Forschungseinrichtungen</b>	<b>1.500 €</b>						
<b>Vereine &amp; gemeinnützige Organisationen</b>	<b>1.100 €</b>						

Werden Sie jetzt Mitglied  
im Netzwerk C2C  
Regionen

HIER GEHT ES ZUR  
ANMELDUNG



Ihre Ansprechperson:

Lorena Zangl  
Referentin  
Städte & Kommunen

[lorena.zangl@c2c.ngo](mailto:lorena.zangl@c2c.ngo)

Cradle to Cradle NGO  
Head Office – C2C LAB  
Landsberg Allee 99c  
10407 Berlin

+49 (0) 30 / 4677 4780

[www.c2c.ngo](http://www.c2c.ngo)

[www.c2c-lab.org](http://www.c2c-lab.org)

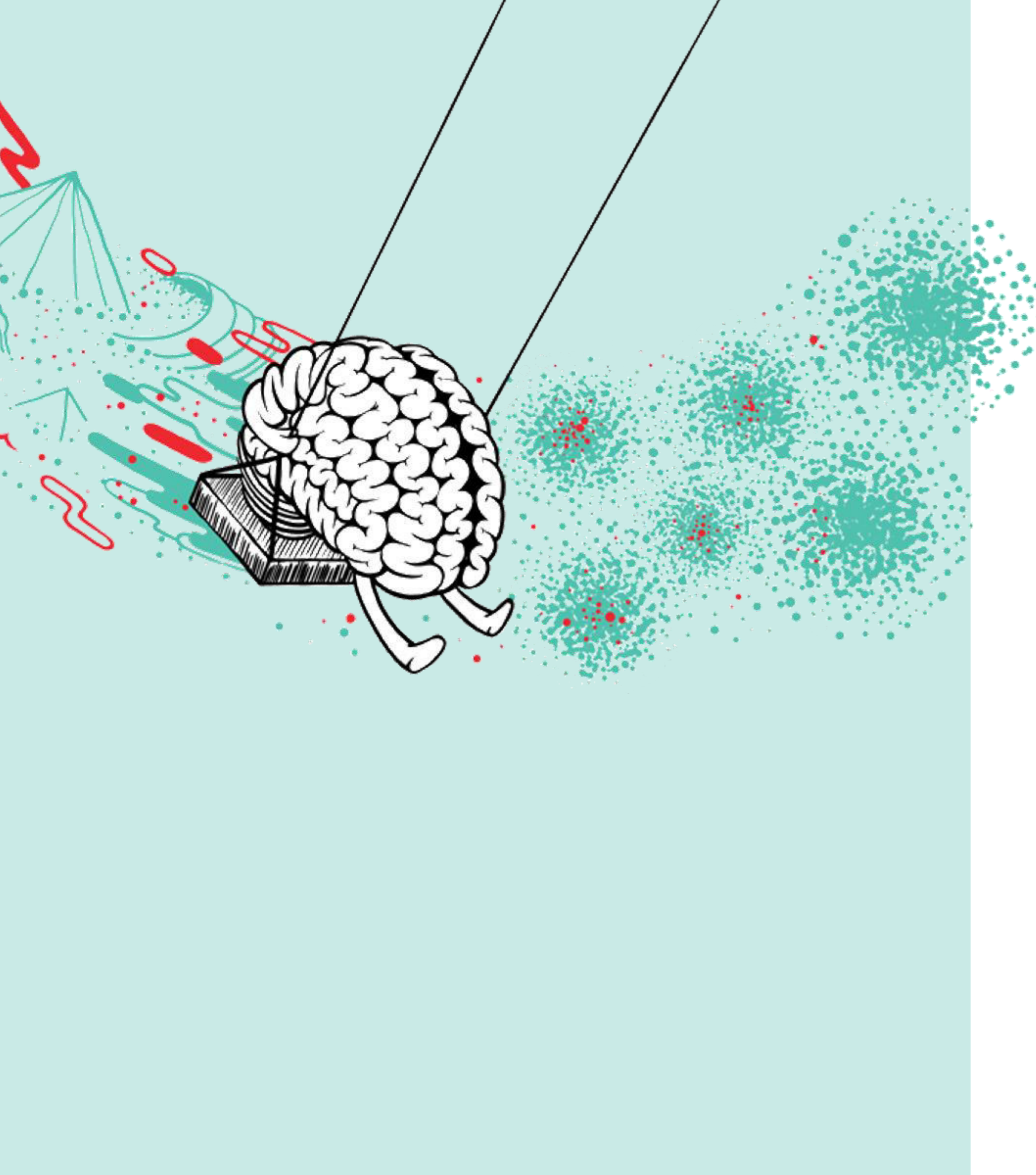


# APPENDIX



## Appendix:

- Cradle to Cradle NGO
- Was ist eigentlich Cradle to Cradle?
- Kontinuierliche Kreisläufe
- Formate und Meilensteine C2C NGO
- Impressum



# CRADLE TO CRADLE NGO

Probleme kann nur lösen, wer sie durchschaut hat – das fördern wir durch unsere Bildungsarbeit. C2C NGO vernetzt Wirtschaft, Wissenschaft, Bildung, Politik und Zivilgesellschaft. Unsere ehrenamtlichen Aktiven, die bundesweit organisiert sind, tragen die Idee von Cradle to Cradle in die Welt. Unser Congress ist die weltweit größte C2C-Plattform: Über 1.000 Teilnehmende aus der C2C-Community treffen hier jährlich auf zentrale Persönlichkeiten aus Wissenschaft, Wirtschaft und Politik. Foren, Vorträge und Workshops bieten Raum für Austausch und Vernetzung. 2019 haben wir das C2C LAB in Berlin aufgebaut: die weltweit erste umfassende Bestandssanierung nach C2C-Kriterien. Als Bildungszentrum, NGO Head Office und Reallabor werden Denkschule und Designkonzept praktisch erlebbar. Alle, die sich für einen positiven Fußabdruck engagieren wollen, können bei uns aktiv werden.



# WAS IST EIGENTLICH CRADLE TO CRADLE?

## C2C DENK- SCHULE

Sie vermittelt ein positives Menschenbild: Als Teil der Natur sind wir Nützlige und hinterlassen einen positiven Fußabdruck. Umdenken und neue Pfade beschreiten wir Menschen haben das Potenzial dafür.

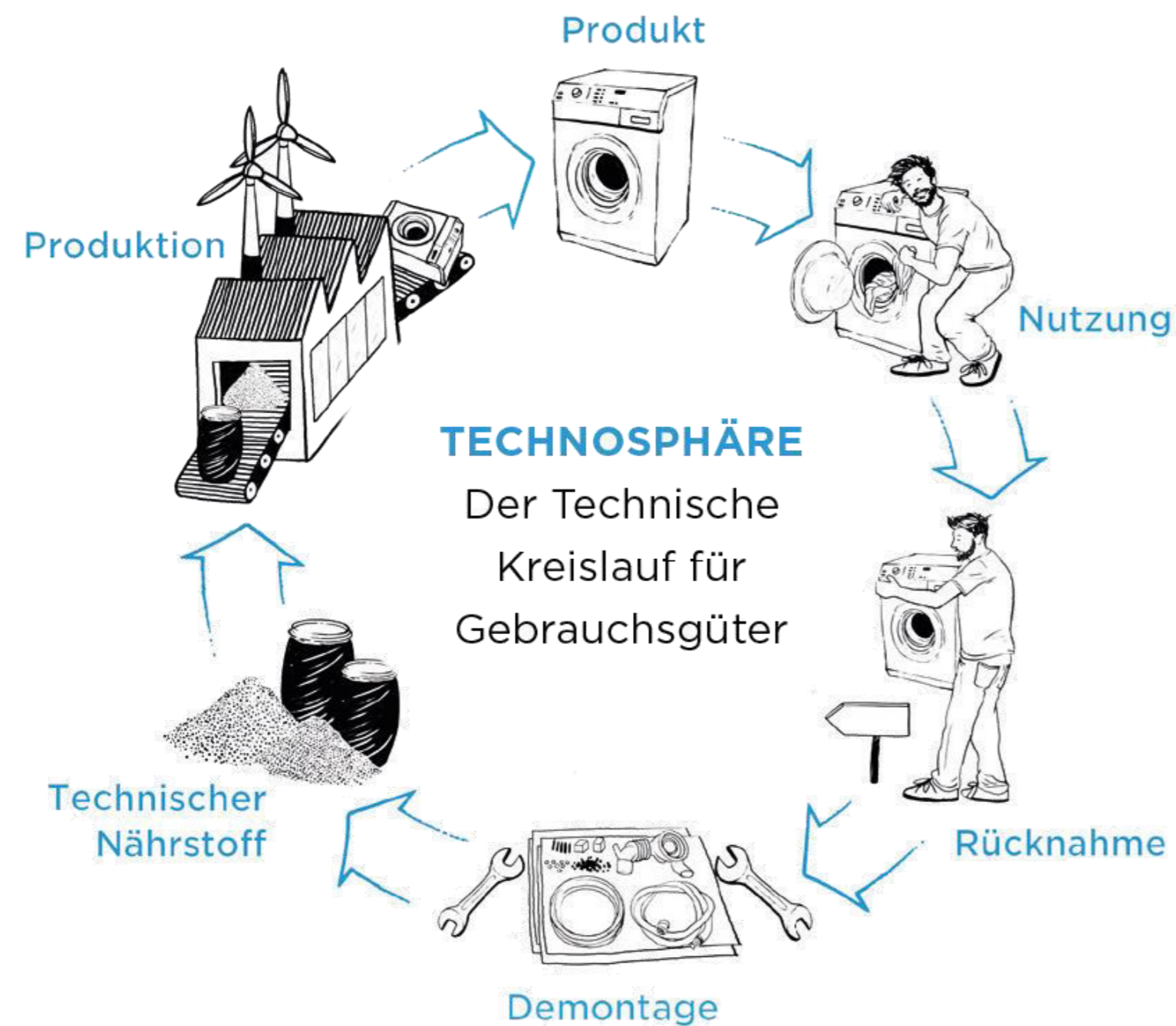


## C2C DESIGN- KONZEPT

Es basiert auf drei Prinzipien: Nährstoff bleibt Nährstoff – regenerative Energie – Vielfalt feiern. Für jedes Produkt und jede Dienstleistung definieren wir passende Nutzungsszenarien. Erst dann können gesunde und geeignete Materialien ausgewählt werden, die in biologischen und technischen Kreisläufen kontinuierlich zirkulieren.



# KONTINUIERLICHE KREISLÄUFE



In der Technosphäre zirkulieren Materialien in kontinuierlichen technischen Kreisläufen. Rohstoffe für die Technosphäre stehen begrenzt auf der Erde zur Verfügung. Deshalb müssen sie in gleichbleibend hoher Qualität erhalten werden. Auch nachwachsende Rohstoffe können in der Technosphäre zirkulieren, bevor sie wieder Nährstoff werden. Alles kann so hergestellt werden, dass die eingesetzten Materialien mit geringem Aufwand voneinander getrennt werden können. Design für Demontage, nie wieder Rohstoffmangel – dank Cradle to Cradle.

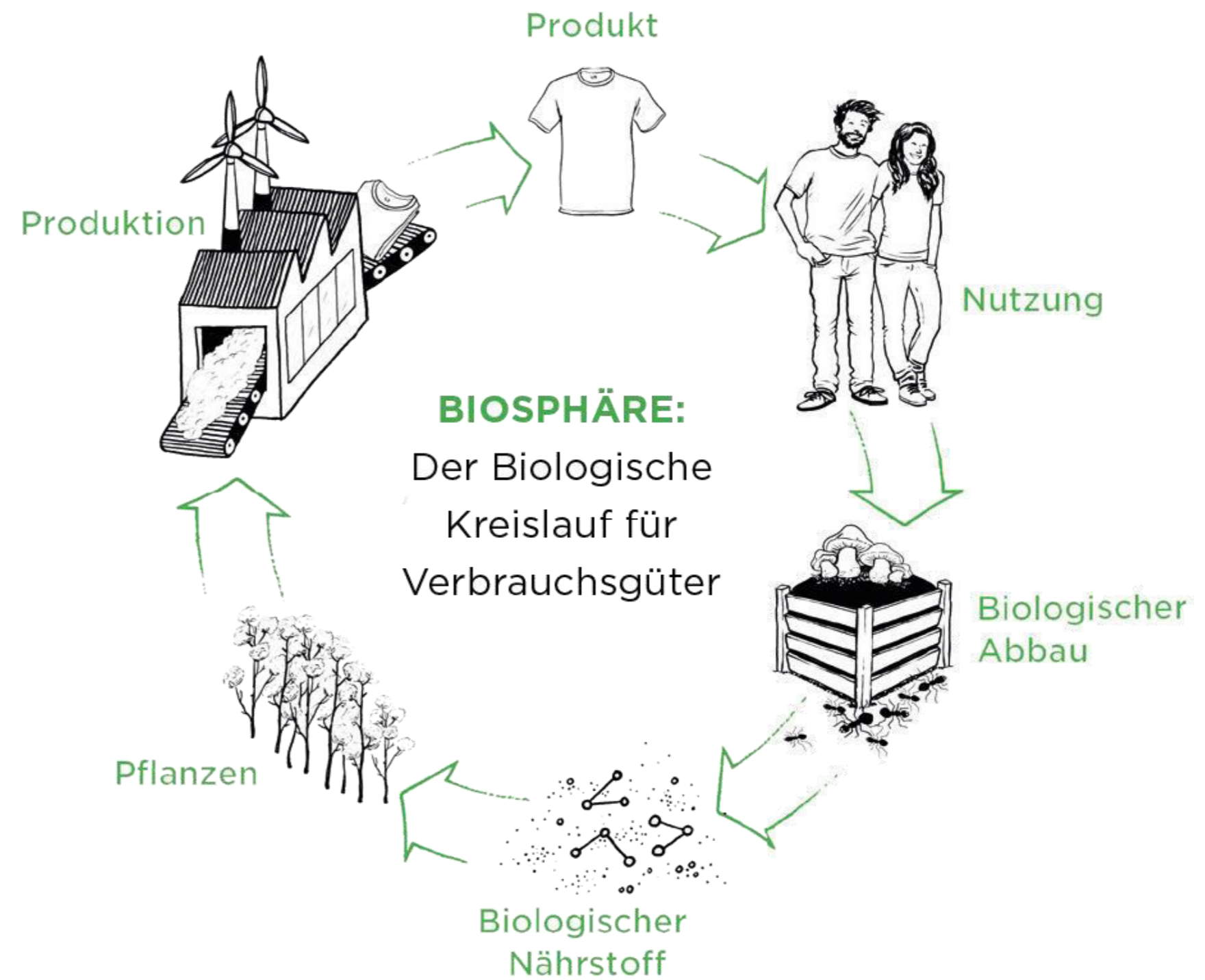
**TECHNOSPHERE**



# KONTINUIERLICHE KREISLÄUFE

## BIOSPHERE

In der Biosphäre zirkulieren Materialien im kontinuierlichen biologischen Kreislauf. Jeglicher Abrieb oder Verlust muss zu 100% biologisch abbaubar sein – nur so dient er der Biosphäre als Nahrung: von synthetischen Textilien über Verpackungen und Kosmetik bis zu Auto- und Fahrradreifen. Kompostieren ist gut – Abfall als Nährstoff zu betrachten noch besser. Wenn Seife nicht nur unsere Haut reinigt, sondern auch unser Wasser sauber hält, ist Cradle to Cradle Realität.



# IMPRESSUM

## Bildquellen: Best Practice

Electric Bus Berlin:

[https://commons.wikimedia.org/wiki/File:3VG\\_Solaris\\_Urbino\\_12\\_electric\\_Newurbino.jpg](https://commons.wikimedia.org/wiki/File:3VG_Solaris_Urbino_12_electric_Newurbino.jpg), „BVG Solaris Urbino 12 electric Newurbino“,

Mirkone/Wikimedia Commons, License:

<https://creativecommons.org/licenses/by-sa/3.0/legalcode>

Tierbrücke:

[https://commons.wikimedia.org/wiki/File:Animal\\_Over\\_Pass\\_Trans-Canada\\_Highway\\_-\\_panoramio.jpg](https://commons.wikimedia.org/wiki/File:Animal_Over_Pass_Trans-Canada_Highway_-_panoramio.jpg), „Animal Overpass – Trans Canada Highway“, Yoshio Kohara/Wikimedia Commons, License:

<https://creativecommons.org/licenses/by/3.0/deed.en>

Mitfahrbank in Bleidenstadt, Taunusstein:

[https://commons.wikimedia.org/wiki/File:Hilichhiking\\_bench\\_Taunusstein\\_Bleidenstadt.jpg](https://commons.wikimedia.org/wiki/File:Hilichhiking_bench_Taunusstein_Bleidenstadt.jpg), Kreuzschnabel/Wikimedia Commons, License:

<https://creativecommons.org/licenses/by-sa/3.0/legalcode>

Die Mitglieder der ämterübergreifenden Arbeitsgruppe für Nachhaltige Beschaffung bei der Stadt Ludwigsburg: Hearts&Minds/Difu

Lufa Farms: Eva Blue

Kö-Bogen II, Düsseldorf:

Architekt: ingenhoven architects

Projektmanagement: AIP Bauregie GmbH

Kopenhagen Bike Snake: Jakob Munk

Wohnhochhaus Moringa, Hamburg:

Architekt: kadawittfeldarchitektur

Projektentwickler: Landmarken AG

## Bildquellen: Pioniere

Windrad Straubenhardt: Marco Verch

Feuerwehrhaus Straubenhardt, Visualisierung: wulf architekten, Stuttgart

Rathaus Venlo, Außenansicht: c2cvenlo.nl

Ronneby Bildungsmaterial und Schule: Martina Adenholm

Straßenbeleuchtung, Texel: Twilight

## Bildquelle Titelseite:

Nordenfan

## Redaktion

Cradle to Cradle NGO  
Head Office – C2C LAB  
Landsberg Allee 99c  
10407 Berlin

+49 (0) 30 / 4677 4780

[www.c2c.ngo](http://www.c2c.ngo)

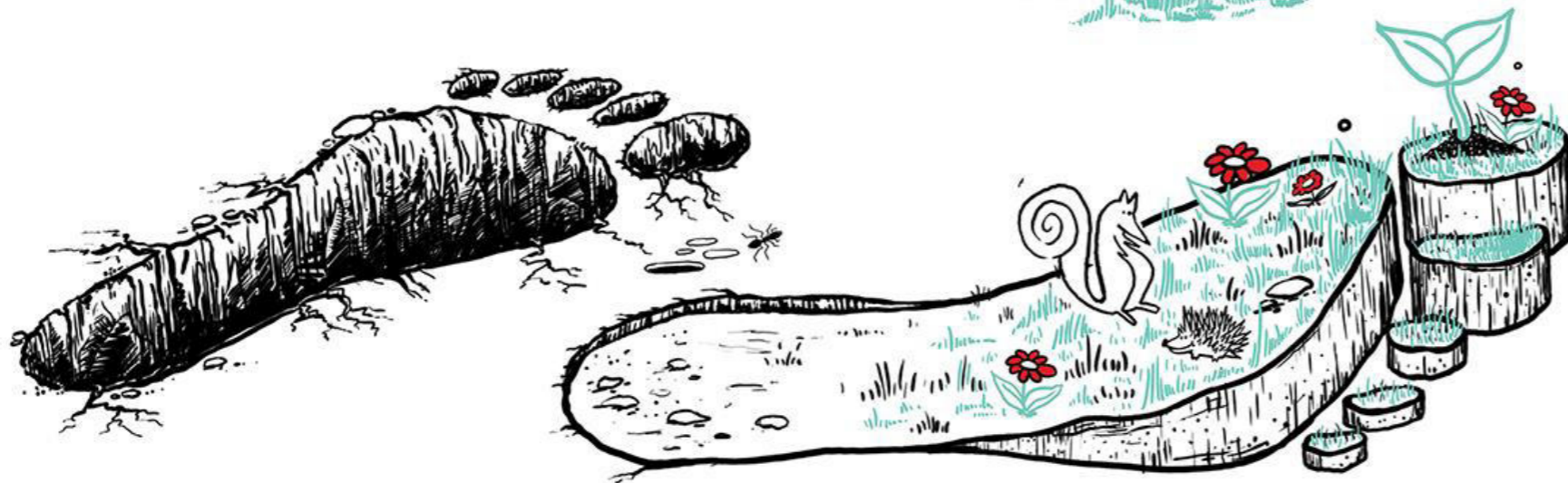
[www.c2c-lab.org](http://www.c2c-lab.org)



UMDENKEN FÜR EINEN  
GROSSEN POSITIVEN FUSSABDRUCK.



[WWW.C2C.NGO](http://WWW.C2C.NGO)



**CRADLE TO CRADLE  
NGO**

# Martin Riebl Projektmanagement

## Geht das überhaupt? Die Machbarkeitsanalyse

In technischen Projekten stellen sich in frühen Projektphasen oft Fragen nach der Technologie. Wie sollte die Software entwickelt werden? Besitzen wir dazu das Know How? Können wir die geforderten Produktmerkmale überhaupt fertigen? Wie kann das Produkt am günstigsten gefertigt werden? Die Machbarkeit eines Projekts ist aber nicht nur technisch bedingt. So kann zum Beispiel auch unklar sein, ob es einen Lieferanten gibt, der Güter oder Informationen in einer bestimmten Frist oder zu sonstigen relevanten Bedingungen liefern kann.

Machbarkeitsanalysen beschäftigen sich meist mit der Vereinbarkeit von Zielen. Die Durchführung einer Machbarkeitsanalyse ist also der Klärung der Projektziele nachgeordnet. Die Projektziele für ein neues Produkt beschreiben (u. a.) die Anforderung an das Produkt und dessen Herstellung. Die Ziele wären zum Beispiel eine Taktzeit von 1 Minute für den Herstellungsprozess sowie bestimmte Anforderungen an Material und die Spezifikation des fertigen Produkts (Maße, Toleranzen, Oberflächenbeschaffenheiten usw.). Die Machbarkeitsanalyse soll die Frage beantworten, ob diese Ziele vereinbar, also gleichzeitig erreichbar sind. Im selben Zusammenhang stellt sich natürlich sofort die Frage nach der Wirtschaftlichkeit und den Risiken. Häufig finden sich technische Lösungen am Markt, diese sind aber vielleicht sehr teuer oder brandneu und nicht ausgereift.

Es gibt in den Projektmanagement-Lehrbüchern zwei Ansätze für Machbarkeitsstudien. Die einen beschränken sich auf die technische Machbarkeit, die Analysen zur Wirtschaftlichkeit und zur Risikoabschätzung werden separat dokumentiert. Die Zweiten fassen in der Machbarkeitsstudie alle drei Punkte zusammen.

Wenn in einem Unternehmen oder in einem konkreten Projekt die Durchführung des Projektes vom Ergebnis der Machbarkeitsstudie abhängen, dann halte ich es für sinnvoll, die drei Punkte Technik, Wirtschaftlichkeit und Risiken zusammenzufassen.

Manchmal werden in Fachartikeln auch ganze Geschäftspläne als Machbarkeitsstudie benannt. Dann gehören folgerichtig auch Aspekte wie Markt- und Wettbewerbsanalysen und Kundensegmentierung dazu. Dieser Meinung kann ich mich nicht anschließen. Ein Geschäftsplan mag zwar eine Machbarkeitsstudie beinhalten oder darauf verweisen, ist jedoch etwas ganz anderes.

Wie oben beschrieben müssen die Ziele geklärt und mit dem Projektauftraggeber oder Kunden abgestimmt

sein. Die Projektbeteiligten erkennen meist recht früh den Bedarf für eine notwendige Machbarkeitsanalyse. Die Untersuchung der technischen Machbarkeit ist natürlich mit zeitlichem und finanziellem Aufwand verbunden. Da meist Mitarbeiter mit ganz bestimmtem Wissen, die berühmten Fachexperten, mitarbeiten müssen, kann es schnell zu personellen Engpässen kommen. Denn die Fachexperten sind oft recht gefragt im Unternehmen. Daher müssen der Aufwand und die benötigte Zeit im Projekt eingeplant und kostenseitig bewertet werden.

Ebenfalls sehr wichtig ist ein klarer Auftrag für die Person oder die Gruppe, die mit der Studie beauftragt wird. Was genau ist zu untersuchen? Wie grenzt sich die Fragestellung exakt ab? Und: Es soll kein Detailkonzept ausgearbeitet werden, das kommt später. Die Erwartungshaltung muss also geklärt werden. Gerade die Techniker tun sich oft schwer damit, auf einem gewissen Abstraktionslevel zu bleiben und nicht in unnötige Details abzutauchen. (Wobei zugegebenermaßen die Kunst genau darin liegt, die notwendigen von den unnötigen Details zu unterscheiden.) Ebenfalls geklärt gehört die Form des Ergebnisses. Wollen wir eine Präsentation, eine schriftliche Analyse mit allen Anlagen und Ergebnissen mit mindestens 50 Seiten oder eine maximal zweiseitige Zusammenfassung?

Das Ergebnis einer Machbarkeitsstudie ist je nach Bedeutung für das Gesamtprojekt einen Meilenstein wert. Denn nachfolgende Vorgänge hängen von dessen Ergebnis ab. Ganz wichtig finde ich auch die schnelle Kommunikation der Ergebnisse. Denn hier wird ja viel wertvolles Wissen aufgebaut, das sich lohnt, schnell an den relevanten Personenkreis weiterzugeben.

Dieser Beitrag wurde am 13. Januar 2014 [<http://riebl-pm.de/machbarkeitsanalyse/>] von Martin Riebl in PM-Methoden veröffentlicht. Schlagworte: Machbarkeit, Methoden, Projektmanagement, Ziele.

---



# Qualitative Interviews am Telefon oder online durchführen – Informationen für Studierende

Kai Dröge  
Hochschule Luzern Wirtschaft  
Institut für Sozialforschung Frankfurt am Main  
[kai.droege@hslu.ch](mailto:kai.droege@hslu.ch)

Vers. 0.2, aktualisierte Fassung, 3. September 2020  
Lizenz: gemeinfrei (public domain), unbeschränkte Nutzung  
<http://romanticentrepreneur.net/index.php/qualitative-interviews-am-telefon-oder-online-durchfuehren-informationen-fuer-studierende/>



Dieses Papier entstand im Kontext der Coronavirus-Pandemie im Frühjahr 2020 und wurde im September desselben Jahres aktualisiert. Es soll basale Hinweise dazu geben, wie auch unter diesen Umständen qualitative Sozialforschung weiter möglich ist, ohne sich und andere einem Infektionsrisiko auszusetzen.

Die naheliegende Lösung sind telefonische Interviews – sei es über das Smartphone oder über Plattformen wie Zoom oder Skype. Bisher war diese Interviewform in der qualitativen Sozialforschung wenig verbreitet. Sie wird auch in der Methodenliteratur nur selten behandelt. Gut möglich allerdings, dass sich dies zukünftig ändert. Viele Forschende, mit denen ich in den letzten Wochen gesprochen habe, waren durchaus zufrieden mit den Ergebnissen ihrer nun erstmals telefonisch durchgeführten Interviews. (Für eine ausführlichere Diskussion der methodischen Vor- und Nachteile von qualitativen Telefoninterviews siehe Niederberger & Ruddat, 2012.)

Bei der Durchführung von qualitativen Interviews am Telefon gelten grundsätzlich dieselben Verhaltensregeln wie in einer face-to-face Situation. Sie können also die entsprechenden Hinweise aus der Methodenliteratur grösstenteils übernehmen. Darüber gilt es aber ein paar Dinge zu beachten. Dies betrifft einmal die technische Seite (insbes. die Aufnahme), zum anderen die sozial-kommunikativen Besonderheiten eines Interviews am Telefon.

## Aufzeichnung von Telefoninterviews

Bei der Aufzeichnung von Interviews per Telefon/Zoom/Skype etc. stehen zwei wichtige Ziele im Zentrum:

1. Sie brauchen eine möglichst gute Aufnahmequalität, sonst wird die spätere Transkription des Gesprächs extrem zeitaufwändig. Jede Minute, die Sie vorab in eine Verbesserung der Tonqualität investieren, sparen Sie später bei der Transkription mehrfach wieder ein.
2. Die Technik soll während des Gesprächs möglichst wenig stören. Deshalb muss sie für Sie und Ihre Interviewpartner\_innen einfach, zuverlässig und möglichst vertraut sein.

## Allgemeine Tipps:

- Der wichtigste Rat: Testen Sie Ihre Technik gründlich! Wenn ein tolles Interview nachher nicht verwendbar ist, ist das sehr schade.
- Ihr Gegenüber sollte möglichst ein Headset benutzen oder das Smartphone direkt am Ohr haben. Die Tonqualität bei dem eingebauten Mikro des Computers oder bei einem auf Lautsprecher gestellten Smartphone ist meist sehr schlecht.
- Sie selbst und Ihr Gegenüber sollten sich in einem ruhigen Raum ohne Nebengeräusche befinden, mit geschlossenen Fenstern.

## Aufnahme direkt auf dem Smartphone

Die Aufnahme von Telefonaten auf dem Smartphone ist schwieriger als man denken könnte. Aufgrund der rechtlichen Probleme – Aufnahmen ohne Wissens des Gegenübers sind strafbar – wurden die technischen Möglichkeiten sehr eingeschränkt. Die verfügbaren Apps zur Aufnahme von Telefonaten funktionieren oft schlecht. Lesen Sie die Bewertungen im Appstore, gerade auch die neuen. Manche Apps, die früher funktionierten, gehen heute nicht mehr. Viele funktionieren nur auf manchen Geräten, auf anderen nicht oder eingeschränkt.

App-Empfehlungen:

*Android: Cube ACR* (im Playstore, die kostenlose Version reicht)

Die Tonqualität ist akzeptabel, die Aufnahmen lassen sich aus der App über die Funktion "Teilen" per Bluetooth oder Email an den Computer senden. Bei mir (Sony Xperia X) funktioniert nur die Aufnahme normaler Telefonate, nicht Skype oder Whatsapp. Das Dateiformat ist AMR. Dieses gehört zwar nicht zu den offiziell unterstützten Formaten der von uns empfohlenen Transkriptionssoftware [EasyTranscript](#), die Dateien liessen sich aber auf meinem Windows 10 PC trotzdem damit abspielen.

*iPhone:* Ohne Jailbreak gibt es im Moment offenbar keine kostenlosen Möglichkeiten. Es wird der kostenpflichtige Dienst TapeACall empfohlen: <https://www.heise.de/mac-and-i/tipps/iPhone-Telefonate-aufnehmen-3840291.html>

## Zoom

*Zoom* hat sich während des Lockdowns zu einem breit genutzten Kommunikationstool entwickelt. Viele Ihrer Interviewpartner\*innen werden es vermutlich kennen, was für die Nutzung spricht. Leider ist Zoom in der Vergangenheit immer wieder mit Datenschutzproblemen aufgefallen. Daher sollte es für sehr sensible Themen nicht verwendet werden.

Mit einem kostenlosen Account kann man aktuell (Sept. 2020) Zweiergespräche unbegrenzt führen und aufnehmen, Gruppengespräche (ab 3 Personen) dagegen nur max. 40 Minuten. Für die meisten qualitativen Interviews ist das zu kurz. Planen Sie daher gleich ein zweites Meeting direkt im Anschluss, in das Sie ggf. wechseln können.



Video ist für ein qualitatives Interview nicht unbedingt nötig. Richten Sie sich da nach den Wünschen Ihres Gegenübers. Sollte es zu Verbindungsproblemen kommen, kann die Abschaltung des Videostreams oft helfen.

Den Aufnahmeknopf finden Sie in der Funktionsleiste am unteren Bildschirmrand. Alle Beteiligten bekommen eine Meldung angezeigt, dass das Meeting nun aufgezeichnet wird. Holen Sie vorher das Einverständnis ein. Mehr Infos zur Aufnahme finden Sie hier: <https://support.zoom.us/hc/de/articles/201362473-Lokale-Aufzeichnung>

Die Tonqualität von Zoom ist akzeptabel, wenn Sie ein paar Dinge beachten:

- Beide Seiten sollten, wenn möglich, ein Headset verwenden.
- Vermeiden Sie gleichzeitiges Sprechen oder Nebengeräusche von Ihrem Mikrofon. Dadurch wird Ihr Gegenüber schnell unverständlich.
- Sorgen Sie für eine stabile Internetverbindung (WLAN oder Kabel) auf beiden Seiten. Die Nutzung über mobiles Internet ist nicht zu empfehlen.

## **Skype und Alternativen**

Auch *Skype* bietet eine eingebaute Aufnahmefunktion:

<https://support.skype.com/de/faq/FA12395/wie-zeichne-ich-skype-anrufe-auf>. Die Tonqualität ist tendenziell schlechter als bei Zoom, dafür sind Verbindungen nicht zeitlich begrenzt. Ansonsten gelten dieselben Hinweise wie für Zoom.

*Cleanfeed* (<https://cleanfeed.net>): Eine kostenlose Online-App aus der Podcast-Szene, die bessere Tonqualität als Zoom oder Skype verspricht. Sie schicken Ihrem Gegenüber einen Link, mit dem sie oder er direkt im Browser teilnehmen kann. Einschränkung: Beide Seiten sollten den Google Chrome Browser verwenden – Sie selbst auf einem PC oder Mac, Ihr Gegenüber kann auch Chrome für iOS oder Android verwenden. Anleitung/Demo: [https://www.youtube.com/watch?v=5zA\\_cd1P-Lw](https://www.youtube.com/watch?v=5zA_cd1P-Lw)

*Zencastr* (<https://zencastr.com/>): Ähnlich wie Cleanfeed, ebenfalls kostenlos, keine bekannten Browsereinschränkungen. Allerdings berichten recht viele Nutzer\*innen, dass längere Aufnahmen gegen Ende nicht mehr ganz synchron sind, dass also die Tonspuren Ihrer eigenen Stimme und die Ihres Gegenübers leicht auseinanderdriften können.

## **Notlösung oder Backup: Aufnahme über den Lautsprecher des Smartphones**

Vorgehen: Das eigene Smartphone wird auf Lautsprecher gestellt, der Ton mit einem Mikrofon auf dem Computer oder einem zweiten Smartphone aufgenommen. Studierende haben diese Möglichkeit ausprobiert, die Qualität ist weniger schlecht als erwartet. Als Notlösung kann das durchaus funktionieren. Wichtig ist eine sehr ruhige Umgebung ohne Nebengeräusche und die Platzierung des Aufnahmemikros möglichst nah am Lautsprecher.

## Vorbereitung und Durchführung von Telefoninterviews

**Wenn Sie einen Termin für Ihr Telefoninterview ausmachen, bitten Sie die befragte Person,**

- sich ausreichend Zeit zu nehmen,
- sich an einen ruhigen, ungestörten Ort zurückzuziehen – idealerweise in einem separaten Raum bei geschlossenen Fenstern,
- der Aufnahme des Gesprächs zuzustimmen.
- Besprechen Sie auch vorab die technischen Voraussetzungen – siehe dazu oben.

### **Zu Beginn des Gesprächs:**

- Halten Sie Papier, Stift und Leitfaden bereit.
- Erinnern Sie nochmals daran, dass das Gespräch aufgezeichnet wird.
- Ein wenig Smalltalk vorab ist gut, um warm zu werden. Sie können dies bereits aufnehmen, müssen es aber später nicht transkribieren (es sei denn, es gibt interessante Inhalte zu Ihrem Thema).

### **Während des Gesprächs:**

- Wie in allen qualitativen Interviewsituationen gilt: Halten Sie sich selbst zurück, lassen Sie Ihr Gegenüber ausführlich erzählen. Wenn mal eine kurze Pause entsteht, ist das auch kein Problem; vielleicht denkt Ihr Gegenüber nur nach. Werden Sie nicht ungeduldig.
- Wenn Ihnen eine gute Anschlussfrage in den Sinn kommt, machen Sie sich eine kurze Notiz. Unterbrechen Sie Ihr Gegenüber möglichst nicht. Bereits erledigte Themen/Fragen können Sie auf Ihrem Leitfaden durchstreichen.
- Bestätigungsformeln wie "Hmm" lassen die interviewte Person wissen, dass Sie noch da sind und aufmerksam zuhören. Das ist gut, er oder sie kann Sie ja (meist) nicht sehen. Allerdings kann es hier je nach Aufnahmemethode ein Problem geben: Insbesondere bei Skype oder Zoom wird Ihr Gegenüber schnell unverständlich, sobald von Ihrer Seite Töne übertragen werden. Andere Aufnahmemethoden sollten da unempfindlicher sein (vorher testen).

### **Am Ende des Gesprächs:**

- Hier gibt es wenig Spezielles zu beachten, es gelten die allgemeinen Regeln:
  - Stellen Sie eine offene Abschlussfrage (z.B.: "Gibt es von deiner/ihrer Seite noch etwas zum Thema, das wir bisher noch nicht besprochen haben?").
  - Danach sollten Sie noch Ihren Kurzfragebogen mit den soziodemographischen Angaben zur Person gemeinsam ausfüllen (oder Sie senden den Fragebogen schriftlich per Email).
  - Nachdem Sie das Telefonat beendet haben, kontrollieren und sichern Sie Ihre Aufnahme.



## Literatur

Marlen Niederberger & Michael Ruddat. (2012). "Let's talk about sex!" Über die Eignung von Telefoninterviews in der qualitativen Sozialforschung. Forum Qualitative Sozialforschung / Forum: Qualitative Social Research 13 (3). <http://nbn-resolving.de/urn:nbn:de:0114-fqs120329>. Zugegriffen: 18. März 2020.

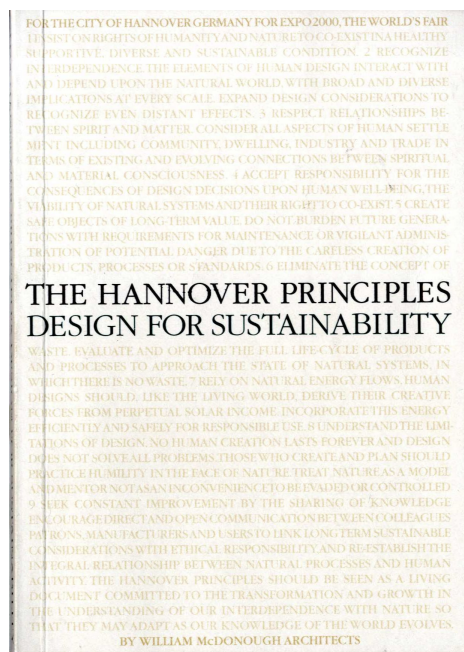
()

Menu

William McDonough (<https://mcdonough.com/>) » The Hannover Principles: Design for Sustainability (1992)

# The Hannover Principles: Design for Sustainability (1992)

([http://dev-mcdonough.pantheonsite.io/wp-content/uploads/2013/10/HannoverPrinciples\\_OG001.jpg](http://dev-mcdonough.pantheonsite.io/wp-content/uploads/2013/10/HannoverPrinciples_OG001.jpg))



Prepared in 1992 by [William McDonough Architects](http://www.mcdonoughpartners.com) (<http://www.mcdonoughpartners.com>) and Dr. Michael Braungart; commissioned by the City of Hannover, Germany, as design principles for Expo 2000, The World's Fair.

**ORDER NOW**

([http://www.amazon.com/Hannover-Principles-Design-Sustainability-Prepared/dp/B000QYP8E8/ref=sr\\_1\\_3?ie=UTF8&qid=1452890548&sr=8-3&keywords=the+hannover+principles](http://www.amazon.com/Hannover-Principles-Design-Sustainability-Prepared/dp/B000QYP8E8/ref=sr_1_3?ie=UTF8&qid=1452890548&sr=8-3&keywords=the+hannover+principles))

([http://dev-mcdonough.pantheonsite.io/wp-content/uploads/2013/10/HannoverPrinciples\\_OG001.jpg](http://dev-mcdonough.pantheonsite.io/wp-content/uploads/2013/10/HannoverPrinciples_OG001.jpg))

## The Hannover Principles

- 1. Insist on rights of humanity and nature to co-exist** in a healthy, supportive, diverse and sustainable condition.
- 2. Recognize interdependence.** The elements of human design interact with and depend upon the natural world, with broad and diverse implications at every scale. Expand design considerations to recognizing even distant effects.



- Menu
- 3. Respect relationships between spirit and matter.** Consider all aspects of human settlement including community, dwelling, industry and trade in terms of existing and evolving connections between spiritual and material consciousness.
  - 4. Accept responsibility for the consequences of design** decisions upon human well-being, the viability of natural systems and their right to co-exist.
  - 5. Create safe objects of long-term value.** Do not burden future generations with requirements for maintenance or vigilant administration of potential danger due to the careless creation of products, processes or standards.
  - 6. Eliminate the concept of waste.** Evaluate and optimize the full life-cycle of products and processes, to approach the state of natural systems, in which there is no waste.
  - 7. Rely on natural energy flows.** Human designs should, like the living world, derive their creative forces from perpetual solar income. Incorporate this energy efficiently and safely for responsible use.
  - 8. Understand the limitations of design.** No human creation lasts forever and design does not solve all problems. Those who create and plan should practice humility in the face of nature. Treat nature as a model and mentor, not as an inconvenience to be evaded or controlled.
  - 9. Seek constant improvement by the sharing of knowledge.** Encourage direct and open communication between colleagues, patrons, manufacturers and users to link long term sustainable considerations with ethical responsibility, and re-establish the integral relationship between natural processes and human activity.

*The Hannover Principles should be seen as a living document committed to the transformation and growth in the understanding of our interdependence with nature, so that they may adapt as our knowledge of the world evolves.*

## From the 2012 20th Anniversary Printing

---

November 2012

As an architect and designer, I am someone who spends time thinking about how we can imagine a future of abundance for our children. In 1991, we were commissioned by the City of Hannover, Germany, to craft sustainable design principles for Expo 2000, The World's Fair. The result was The Hannover Principles: Design for Sustainability, which was officially presented by Hannover as a gift to the 1992 Earth Summit's World Urban Forum in Rio de Janeiro, Brazil.

If design is the first signal of human intention, our intention today can be to love all ten billion people who will live on our planet by 2050. We can do this. If we imagine and embrace our cities as part of the same organism as the countryside, the rivers and the oceans, then we can celebrate ourselves, all

species and the natural systems we support and that support us. This is our design assignment. If we are principled and have positive goals, we can rise to this occasion. It will take us all; it will take forever—that is the point.

— *William McDonough*

## From the 2002 10th Anniversary Edition

---

### INTRODUCTION, by Teresa Heinz

I first became aware of William McDonough's work in 1984, when he redesigned the national headquarters of the Environmental Defense Fund. The redesign of the EDF office was a watershed event. Not only was it the first "green" office in New York City, it also laid the foundation for a new design philosophy: a commercially productive, socially beneficial and ecologically intelligent approach to the making of things that Bill and his colleague Michael Braungart would come to call eco-effectiveness.

When I hired Bill to design the Heinz family offices and Heinz Foundation offices in Pittsburgh in 1991, he and Michael had just been commissioned by the City of Hannover to develop a set of design principles for the 2000 World's Fair. Having chosen "Humanity, Nature and Technology" as the theme of the fair, the city wanted to showcase hopeful visions for a sustainable future. The Hannover Principles were to put forth an inspiring standard, presenting to the world the first coherent framework for rethinking design through the lens of sustainability.

Getting to know Bill and Michael as colleagues and friends over the last ten years has given me the opportunity to see firsthand the impact of the Hannover Principles. From their elegant insistence on "the rights of humanity and nature to co-exist" to their call to "eliminate the concept of waste," the Principles echo the deep human instinct—and wisdom—to care for the world. Indeed, they have become a cultural touchstone, providing information and grounding not just for the design community but also for all those devoted to bringing forth a world of social equity, environmental health and peaceful prosperity.

At their core is a simple truth: Human health, the strength of our economy and the well-being of our environment are all connected. I learned this lesson early in life, as a child growing up in Mozambique. In the East Africa of my youth, the interplay of nature, health and survival was a given, something that people who lived close to the natural world intuitively understood. For me, that understanding was reinforced by having a father who was a doctor. Observing him and the questions he asked of his patients taught me how illness can be related to environment and the practices of daily life.

We lived in a place where nature's laws of cause and effect were fairly clear. If you went swimming at sunrise or sunset, feeding time for sharks and river crocodiles (and indeed, for all the animals in the savannah), you might get a nasty nibble. We learned to respect the rules of the natural world because they had such obvious implications for people's personal well-being. Nature taught us the virtues of prevention—of solving problems by not creating them in the first place.

Industrialized societies tend to be less in touch with nature's rules. In the nineteenth century, the paradigm was that we should tame nature; in the twentieth, it became a sense that we are almost immune to its rules. Today, we tend to think of the natural world as somehow separate, an entity "out there" that can be controlled, held at bay or even ignored. Even our efforts to protect the environment have been informed by this "us versus it" mentality, a sense that we are in competition with the natural world and that the best we can hope for is to mitigate the damage we cause.

The simple genius behind the nine Hannover Principles was that they reframed the issue. Rather than take a certain amount of ecological harm as a given, with people on various sides of the environmental debate reduced to arguing over the permissible amount, Bill and Michael invited us to consider an alternative. Why not just design products and institutions that support the environment, they asked?

The Hannover Principles were the first expression of that transforming idea. In nine lean declarations they set forth a value system and a design framework that Bill and Michael continue to use as the foundation of their evolving design paradigm. As they write in *Cradle to Cradle: Remaking the Way We Make Things*, nature's cycles are not just lean and efficient; they are abundant, effective and regenerative. By going beyond mere efficiency to celebrate the abundance of nature, the practice of eco-effective, cradle-to-cradle design allows us to create materials, dwellings, workplaces, and commercial enterprises that generate not fewer negative impacts but more productivity, more pleasure and more restorative effects.

The key insight of eco-effective or cradle-to-cradle thinking is recognizing the materials of our daily lives—even highly technical, synthetic industrial materials—as nutrients that can be designed to circulate in human systems very much like nitrogen, water, and simple sugars circulate in nature's nutrient cycles. Rather than using materials once and sending them to the landfill—our current cradle-to-grave system—cradle-to-cradle materials are designed to be returned safely to the soil or to flow back to industry to be used again and again.

Far more than a theoretical notion, this central principle of sustainability can be readily seen in the work of Bill's architectural firm, William McDonough + Partners, and Bill and Michael's industrial design consultancy, McDonough Braungart Design Chemistry. Working with clients ranging from small companies like the Swiss textile mill Rohner to global megacorporations like the Ford Motor Company, both firms are showing that designers attuned to this cradle-to-cradle philosophy can replicate nature's closed-loop systems in the worlds of commerce and community. The result: safe,



beneficial materials that either naturally biodegrade or provide high-quality resources for the next generation of products; buildings designed to produce more energy than they consume; cities and towns tapped into local energy flows; places in every human realm that renew a sense of participation in the landscape.

My own hopes for the urban landscapes of Pittsburgh brought The Hannover Principles home, literally. At the Earth Summit in Rio in 1992, where the Principles were introduced to the international community, I invited Bill and Michael to come to Pittsburgh to share their ideas. Both were invited to lecture at Carnegie Mellon University and, as I had hoped, the Hannover Principles became a part of the dialogue going on in Pittsburgh at the time about the region's environmental future.

Today, Pittsburgh is gaining national recognition as a leader in green building and sustainable design. In many ways, that began with the building of the Heinz family offices, which represented the first, commercial-scale use of sustainably harvested tropical wood. Our offices served as a laboratory and model for others to learn from, and not just locally. The Discovery Channel covered it; architectural magazines wrote about it; and builders, designers and architects from across the country came to study its features. Since then, the ideas articulated in the Hannover Principles have never been far from the minds of the staff at The Heinz Endowments as they have advanced our green building agenda in Pittsburgh over the past decade.

Those ideas are making communities from Pittsburgh to Chicago and from Shanghai to Barcelona better places to live. They are helping people create buildings and landscapes where natural processes unfold with renewed vitality. They are transforming product design and shaping the work of such influential companies and institutions as Ford, Nike, BASF, the University of California, the Woods Hole Research Center and Oberlin College. As more and more companies and institutions adopt these sustaining principles, there is also the chance that the global economy as a whole will begin to find robust health and long-term strength through the practice of intelligent design.

Ultimately, that is the enduring value of The Hannover Principles and the reason why this tenth anniversary edition is as fresh and necessary as ever. The Principles urge us to start seeing ourselves as part of the natural world and to replicate the joyful, productive and intelligent practice of life itself.

---

Find the original 1992 edition here— [Hannover Principles 1992 \(/wp-content/uploads/2013/03/Hannover-Principles-1992.pdf\)](/wp-content/uploads/2013/03/Hannover-Principles-1992.pdf)

Download the [Hannover Principles 20th Anniversary Poster \(/wp-content/uploads/2013/03/HP-20\\_email\\_121023.pdf\)](/wp-content/uploads/2013/03/HP-20_email_121023.pdf).

[Site Map \(https://mcdonough.com/site-map/\)](https://mcdonough.com/site-map/) [Privacy Policy \(https://mcdonough.com/privacy-policy/\)](https://mcdonough.com/privacy-policy/)

Menu

# *Towards Ecological Management: Identifying Barriers and Opportunities in Transition from Linear to Circular Economy*

Helen Kopnina

Philosophy of Management

ISSN 1740-3812

Philosophy of Management  
DOI 10.1007/s40926-019-00108-x







# Towards Ecological Management: Identifying Barriers and Opportunities in Transition from Linear to Circular Economy

Helen Kopnina<sup>1</sup> 

Published online: 26 January 2019  
© Springer Nature Switzerland AG 2019

## Abstract

This article will discuss the concepts of Cradle to Cradle and Circular Economy in relation to sustainable production involving philosophical debates on economic growth, and the risk of subversion of managerial practice to business as usual. The case study is based on the assignments submitted by Masters students as part of a course related to sustainable production and consumption at Leiden University in The Netherlands. Some of the supposedly best practice cases placed on the website of the Ellen MacArthur Foundation or those awarded Cradle to Cradle certificate were evaluated by students as green-washing. Larger implications of circular production for business and ecological management are discussed.

**Keywords** Circular economy · Cradle to cradle · Green-washing · Ecological management

## Introduction: Circular Frameworks

One of the key developments in the area of sustainable production is the cradle-to-cradle (C2C) framework (McDonough and Braungart 2002). This book is inspired by the fields of industrial ecology (Frosch and Gallopoulos 1989) and ecological management that stimulates learning from nature, instead of using it as a mere resource to be consumed (Daly and Farley 2004). As discussed in this book, there are a number of fundamental problems with the current system of ‘cradle to grave’ production, which supports management practices that focus on economic benefits. This results in manufacturing of cheap consumer goods that are actually made *not* to last – the concept known as planned (or built-in) obsolescence (Bulow 1986). Since producers are interested in constant sales, built-in obsolescence makes repair or reuse economically unattractive. Within this logic, managing sustainable business came to signify *reduction* in harm, rather than *complete elimination* of resource-depleting production. ‘Waste to energy’ power production, for instance,

---

✉ Helen Kopnina  
h.kopnina@hhs.nl

<sup>1</sup> The Hague University of Applied Sciences, International Business, Johanna Westerdijkplein 75, 2521 EN Den Haag, The Netherlands

which is touted as sustainable, makes valuable mixed materials literally go up in smoke for a short surge of energy (Braungart 2013). While burning garbage to produce energy may be seen as efficient use of resources, it is not effective in the long run as biomass is being slowly destroyed.

Also, many products are made with the idea of ‘one size fits all’ (e.g. standard buildings constructed without taking into consideration local climatic conditions or materials), ‘brute force’ or toxic materials used such as bisphenol A or BPA, an industrial chemical shown to interact with the body’s endocrine system (Cooper et al. 2011), ‘culture of monoculture’ (e.g. palm or soya plantations) and ‘monstrous hybrids’ (e.g. an average juice container is made of different kinds of plastics, carton, and glue and does not have easy-to-disassemble parts) (McDonough and Braungart 2002). Many packaging materials could potentially last for hundreds of years and yet most packaging disposed of after the product is taken out (Davis and Song 2006). McDonough and Braungart lament the rise of the monocultures and the fact that diversity is ‘typically treated as a hostile force and a threat to design goals’ (2002:32–35).

By contrast to the styles of management that used to encourage such wasteful production, C2C in management would seek to utilize differences of the soil and climate, materials, and local knowledge (McDonough and Braungart 2002). Rather than create prosperity by “digging up or cutting down natural resources and then burying or burning them” and “eroding the diversity of species and cultural practices” (McDonough and Braungart 2002:18), C2C seeks to create a system of production which is actually beneficial to environment. Following this, responsible innovation and ecological management considers ethical issues associated with production processes that not only are profitable but also environmentally sustainable as well as socially desirable and acceptable (Klikauer 2014; Attfield 2015; Blok 2018). Thus, ecological manager or advisory team needs to have knowledge of geographic differences and conditions. Ecological knowledge of the manager can also help create products that follow C2C design principles, targeted at enhancing rather than depleting natural environment.

These principles, applied to business, imply that ecological management needs to emphasize effectiveness, and not just efficiency. While we are used to managers being affective in practices ranging from the use of information systems to human resources, the new type of ecological manager is more humble. Klikauer (2014) argues that the deep ecology environmental ethics requires a total image of humanity as a mere element of a larger environment, and that application of this philosophy in business requires a very different role for the manager. He or she reminds us of the limitations to the right to manage and of the management of resources on others’ behalf for “what is intrinsically valuable, and responsibilities not only to owners but also towards present and future people and other creatures” (Attfield 2015:85).

Efficient manager in this case follows the path of responsible innovations such as C2C and supports bold moves beyond mere minimizing of the damage by ‘slowing the process of destruction’ ptimising products that should not be there in the first place (McDonough and Braungart 2002). Instead of ‘making a bad design last longer’ – as, for example, electric cars still rely on fossil fuel –and just causing the rebound effect (e.g. Isenhour 2010; Kopnina 2016), C2C proposes being ‘all good’ (Genovese et al. 2015).

Ecological management that embraces this understanding needs to stimulate redesign of products in such a way that they can be not merely recycled (which is basically downcycling, whereby the product returns to the technical metabolism ‘at a lower level’) but *infinitely reused*. Ideally, products that can be infinitely re-used can be an example of absolute decoupling of economic growth from resource consumption. However, in reality, absolute decoupling is problematic (Fletcher and Rammelt 2017), especially given growing material demands and increasing population (Washington and Kopnina 2018). As Fletcher and

Rammelt (Ibid) further argue, “decoupling serves to sustain faith in the possibility of attaining sustainable development within the context of a neoliberal capitalist economy that necessitates continual growth to confront inherent contradictions”. In this context, the popular concept of “eco-efficiency” can be seen to make more efficient the system that is essentially based on increased consumption of resources.

At best, as in the case of food consumption, attempts at decoupling slow down the rate of depletion without completely eliminating the need for virgin materials (Rammelt and Crisp 2014). Worse, in the context of growing population and increased material demand, absolute decoupling appears to be wishful thinking that allows business-as-usual to continue (Burton 2015; Fletcher and Rammelt 2017). Indeed, focusing on the dream of absolute decoupling runs the risk of becoming part of the denial of the unsustainability of endless growth (Washington and Kopnina 2018). As Fletcher and Rammelt (2017:450) state, ‘decoupling fantasy’ functions to “obfuscate fundamental tensions among the goals of poverty alleviation, environmental sustainability, and profitable enterprise that it is intended to reconcile”. Indeed, trying to reconcile the increased need to produce and fairly distribute natural resources on the one hand and the need for environmental sustainability on the other hand, ecological management needs to avoid deceptive ‘have your cake and eat it too’ solution. Thus, ecological management needs to also confront the basic mechanisms of ravenous industrial development system that requires continuous supply of resources.

The deeper philosophical issue associated with economic growth is that it is exactly this economic paradigm that is at odds with the challenge of environmental problems as well as inequality issues. Indeed, the imperative of economic growth may be ‘responsible’ for resource depletion and thus the question of ‘responsible’ innovation or management within the same economic paradigm becomes suspect (Blok 2018). Braungart and McDonough (2009:3) emphasize that the current plundering of resources in the name of economic growth has disastrous consequences for all species.

Related to these concerns, this article inquires: Do current practices labeled as C2C or CE meet the ambitions (or promises) of these movements? Is it possible to have completely CE or C2C products? What is the effect of business-as-usual practices on new environmental sustainability movements? How much of actual decoupling is technologically and economically viable? After discussing the ideals of C2C and CE in the section below, the case studies illustrating the danger of subversion to economic objectives will be addressed.

## **Origins of the Circular Economy (CE)**

CE originates from the inference that the economy and the environment should coexist in equilibrium (Boulding 1966) - the concept known as ‘self-replenishing economy’ (Stahel and Reday-Mulvey 1981) or the Performance Economy (Stahel 2006). CE is defined as a “regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, narrowing, and ideally entirely closing material and energy loops”. This is achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling (Geissdoerfer et al. 2017). Thus, new circular thinking goes beyond churning out even more ‘sustainable’ products but re-using materials that are already there. This economy requires the ‘product service shift’ (PSS) through transition from selling a product to renting it through leasing contracts (pay-per-use instead of ownership). Stahel (1984) added an economic motivation stressing that product life-extension services such as monitoring and repair should lead to an increase in job creation. Murray et al. (2017:371)



defined CE as ‘an economic model wherein planning, resourcing, procurement, production and reprocessing are designed and managed, as both process and output, to maximize ecosystem functioning and human well-being’.

C2C is critical of eco-efficiency as it emphasizes only partial or relative decoupling and fails to reimagine the destructive practices of industry and merely allows them ‘to take place in smaller increments over a longer period of time’ (Braungart and McDonough 51; 54). In fact, eco-efficiency makes a destructive system appear ‘less bad’, yet essentially allows industry to ‘finish off everything, quietly, persistently, and completely’ (Braungart and McDonough 2009: 62; 65). Ecological managers need to reach out to a wider society to ensure that ‘environmental, social, and cultural concerns’ are afforded due consideration ‘at the outset’ of production rather than as an afterthought when waste is already generated (ibid: 150; 153).

Recent strategies maximizing of products’ lifespans and the reusability such as Design for Recycling, Design for Disassembly, and Design for Remanufacturing have emerged (Kopnina and Blewitt 2018). These strategies are crucial at the design stage of the manufacturing process and not just at the end when waste is already produced. Most products presently on the market are designed with planned obsolescence in mind (Bulow 1986).

The C2C framework is based on the ideas of cycles of either biological (biodegradable textiles, for example, can be used as compost) or technological “nutrients” (synthetic material that can safely in a closed-loop system of manufacture, recovery, and reuse). While biological cycles include organic waste that can be used for fertilization of the soil, for example, technical nutrients can be most often used for high quality products that can be leased, with manufacturer retaining ownership (McDonough and Braungart 2002). Thus, be it organic material containers for collecting organic waste like autumn leaves, or green funerals in which the grave serves literally as a cradle for formation of new soil, production strategies that utilize ecological cycles can be called truly green (Kopnina and Blewitt 2018). C2C aims to eliminate waste by ensuring production uses materials that can be of “nutritional value” for either biological or technological cycles. Like C2C, circular economy (CE) aims to decouple economic growth from the increased use of natural resources through utilization of these cycles. Thus, CE is seen as a way to both minimize the waste-flow, and limit and ideally keep constant the amount of resources extracted.

This requires material and waste management that not only effectively manages natural resources by radically reforming the system of production, but also recognizes intrinsic values of the natural world. In urban planning, for example, circular systems can allow for different species to share space with human inhabitants, embracing an ethics of conviviality that is emplaced and enlivened (Van Dooren and Rose 2012). For example, green buildings with plant-overgrown walls and roofs (e.g. Oberndorfer et al. 2007) are both safe and clean for human residents but also open to insect and bird species (e.g. Wang et al. 2017). The ecological management of such green buildings includes ‘natural’ management by the building itself that regulates storm-water flows and ventilation (e.g. Oberndorfer et al. 2007) as well as ‘management’ by other species that fortify the walls for building nests. More generally, the concept of CE offers a new perspective on waste and resource management to extend the productive life of resource (Blomsma and Brennan 2017).

It needs to be underscored that this radical transformation is just an aspiration, which has yet to be fully understood and supported by regulators, designers and the consumers. Transition to circularity requires nothing less but profound institutional and cultural changes as well as shared understanding and transparency between governments, corporations, and consumers (Kopnina and Blewitt 2018). Optimistically, introducing new forms of ownership and material

management can be balanced against the lucrative opportunities as a true potential to reap social and environmental benefits. Pessimistically, as much else in the field of marketing, the noble aims can be subverted to the one and only former benefit – lucrative opportunities, forgetting sustainability.

### **The Risks of Subversion to Business-as-Usual**

Ideally, transition to circular economy requires nothing less than radically re-designing industrial systems. The Ellen MacArthur Foundation, a charity founded in 2009 aims to provide a platform to re-think, re-design & build production system through the framework of a circular economy, lists companies on its website that supposedly provide cases of best practices. In popularizing and globalizing CE's appeal, the Foundation develops courses that stimulates innovation and encourages corporations, educators, and policymakers to follow best case studies of successful transitions. The corporate reports proudly highlight a trillion dollar opportunity in net material cost savings for businesses making the transition ([www.ellenmacarthurfoundation.org/business/](http://www.ellenmacarthurfoundation.org/business/)).

The Cradle-to-Cradle certification spans over five different categories (material health, material reutilization, renewable energy and carbon management, water stewardship, and social fairness) and five different levels (Basic, Bronze, Silver, Gold, Platinum). A product receives an achievement level in each level with the lowest achievement level representing the product's overall mark (Cradle to Cradle Certified 2014). For example, products certified at the Gold level are required to use at least 50% renewable electricity and offset at least 50% of greenhouse gas emissions associated with the final manufacturing stage (Kausch and Klosterhaus 2016). Platinum certification is supposed to offset 100% emissions. Yet, if strict assessment criteria are applied, few Ellen MacArthur Foundation's case studies appear to be really "best practice" (Kopnina 2017, 2018).

C2C and CE may overestimate the potential to close cycles of 'technical nutrients' if these circles keep expanding due to a growing population and material demands (Rammelt and Crisp 2014). The shift to 'biological nutrients' for anything from packaging to dealing with the actual human waste after eating, given population growth and current and growing consumer demand, require even more land to produce these materials. CE and C2C may be too optimistic about the physical basis such as food for seven and a half billion people (Kopnina and Blewitt 2018). If non-plastic packaging is used, for example, the wider monitoring of the sustainability of biomass needs to be considered (Pavanan et al. 2013). Thus, circular economy in business needs to be understood as most effective in the context of degrowth or drastic limitations to consumption (Isenhour 2010; Rees 2010; Washington 2015). The type of ecological management needed includes leadership in transition to service economy but also in the focus on not just producing new products, but making do with what we have.

Economic motivation in adopting circular economy still tends to dominate state policies. For example, facing significant natural resource consumption, environmental degradation, and resulting public frustration, the Chinese government adopted the circular economy as a new strategy for development in 2002. The initiative was framed as part of ecological modernization, green (low carbon) growth to stimulate continuous economic growth (Geng et al. 2013; Ghisellini et al. 2016).

While responsible innovation and ecological management have huge transformative potential, the words 'management' and 'innovation' have traditional connotations associated with

economic efficiency. These “technological fixes” risk obfuscating the need for fundamental changes to our economic model (Rees 2010: 2) and leave ‘ecology’ subservient to innovation, still treating nature as a resource (Crist 2012).

The cases below address the challenges of C2C or circular economy to drinking bottles. These bottles are intended to substitute for one-time-use Polyethylene Terephthalate (PET) bottles. PET, a synthetic plastic made from the polyester family, only has 10% recovery and recycling rate globally (Green 2015). There are thought to be 50 billion single-use PET bottles produced annually (Ban the Bottle 2016). PET bottles are what Braungart and McDonough (2009: 37) refer to as ‘crude’, ‘unintelligent and inelegant’ products that have not been ‘designed particularly for human and ecological health’. Pierre-Louis (2012: 88) states that four-fifths of plastic water bottles produced for the US market end up ‘in some combination of landfills and the world’s ocean’.

## Case Studies

The case studies below are based on the assignments submitted between 2016 and 2017 by Masters students as part of Environment and Development course at Leiden University in The Netherlands. The author was involved in coordinating and teaching of this course. One of the subjects discussed in class was critical evaluation of supposedly best practice case studies from the website of the Ellen MacArthur Foundation. The students were asked to write an essay of the subject of C2C and/or CE product, evaluating it as a “best practice” or green-washing. Below, cases of Coca Cola, The Doppet, the The Klean Kanteen (KK) are discussed and comparison is made between conventional plastic, biodegradable, and partially biodegradable bottles.

### “Plant Bottles”

The Coca-Cola has been placed on the list of best case studies of Ellen MacArthur Foundation. With much fanfare Coca-Cola has pioneered the so-called “Plant Bottles” which are supposedly on the way to make the company circular, as advertised on Ellen MacArthur’s website. Coca-Cola uses sugarcane and waste from sugarcane manufacturing to create PlantBottle (Arthur 2015). Since 2009 Coca-Cola has been using a version of Plant Bottle made from fossil-fuel based terephthalic acid and up to 30% plant-based MEG (Arthur 2015). The Plant Bottle available on the market, however, is actually made of up to 30% plant material, with the rest being non-organic material.

The students also found that Coca-Cola’s operations present a case of window-dressing masked by clever ethical branding boosting corporate reputation (Fan 2005; Holt 2012). Without addressing the Coca-Cola’s considerable water footprint (Hills and Welford 2005), and its plastic packaging (Balch 2011), the company seems eager to advertise itself as “circular”.

### The Doppet

The Doppet Original is a certified “Bronze” C2C product. The colored Doppet base and cap are made from Polypropylene (PP), the white shiny neck is made from Acrylonitrile Butadiene Styrene (ABS) (Preserve 2016b), and the ridges around the rim are made from Thermoplastic



Elastomers (TPE) (How it's Made 2014). It does not contain toxic substances like antimony or BPA (Preserve 2016a). It also endeavours to reduce plastic waste as its thermoplastics are in principle 100% recyclable (Dopper 2015d). Dopper states that through donating 5% of its net turnover to the Dopper foundation, 18,000 people in Nepal have access to clean water, thus contributing to social welfare (Dopper 2015e). However, the company does not specify what percentage of the bottles is made from recycled PP or old Doppers. Although the Dopper claims it is “produced with responsible water and energy use” it only received a Bronze for “Water Stewardship” (Cradle to Cradle Certified 2014).

While Dopper raises awareness about the impact of single-use plastic, the company is not highlighting the essential links between consumption and environmental degradation. A quote from a customer reflects this problem: ‘The Dopper is our handiest bottle! We have five of them’ (Dopper 2015b). The Dopper embodies the current emphasis on lifestyle choices and does not address issues of corporate and political regulation (Isenhour 2010).

### **Klean Kanteen (KK)**

The Klean Kanteen (KK) is a BPA-free water bottle made from stainless steel containing 18% chromium and 8% nickel, while the cap is made from silicone and bamboo (Klean Kanteen 2016a, 2016b, 2016c). The bottle has a lifetime guarantee due to steel's lasting durability. Although KK states: ‘sustainable business is one that gives more than it takes’ (Klean Kanteen 2016c), and despite stainless steel being one of the easiest materials to recycle, KK bottles are made entirely from virgin steel (Pierre-Louis 2012: 93). Although nickel and chromium are naturally abundant, nickel is mined in open pit mines that have a devastating long-term impact on the environment (ibid). The chromite ore is mined in South-Africa, Kazakhstan, Russia, and India (Materials World 2015). In India, chromite miners develop health problems as well as birth defects and stillbirths as a result of overexposure to ‘contaminated dust and water’ (Das and Singh 2011).

### **Comparison of Materials**

Material Input per Service Unit is a method of assessing the environmental impact throughout the life cycle of a product or service (Rithoff et al. 2002). This was used for comparing the environmental impact of the different materials, as shown below in Table 1.

The first row of the table compares the amount (in kilograms) of oil, water, and greenhouse gases that are used and emitted to produce one kilogram (kg) of each of the bottles' materials (PP, ABS, SS, PET). The second row calculates the material used for one bottle. KK has the greatest environmental impact as it uses 44.19 kg or liters of water to make one stainless steel bottle, over double the amount used to make one Dopper and over 15 times the amount needed to make one PET bottle. Like the Dopper and KK, production of PET bottles relies on oil and gas, but the fact they are designed for single usage makes them a particularly wasteful.

The final row compares the amount of resources used to make one Dopper to the two other bottles, revealing that the amount of oil needed for one Dopper could make over 5 PET bottles but only 13% of a KK bottle. Similarly, the amount of water needed for one Dopper could make 7 PET bottles but only a 47% of a KK bottle. Therefore, when one only examines the materials, PET bottles have the lowest impact on the environment. Also, some materials in the Dopper are ‘monstrous hybrids’, combining both technical and organic materials that cannot

**Table 1** Comparing the environmental impact of the different materials

Water bottle		Dopper			Klean Kanteen	Single-use bottle
Material		PP	ABS	Total bottle	SS	PET
Weight (grams)		72.00	28.00	100.00	215.40	12.70
Kg/1 kg Material	Oil	4.24	3.97	8.21	14.43	6.30
	Water	205.48	206.89	412.37	205.13	230.00
	GHG	3.37	3.75	7.12	2.83	3.50
kg/Bottle	Oil	0.31	0.11	0.42	3.11	0.08
	Water	14.79	5.79	20.59	44.19	2.92
	GHG	0.24	0.11	0.35	0.61	0.04
1 Dopper vs. Others	Oil			1.00	0.13	5.20
	Water			1.00	0.47	7.05
	GHG			1.00	0.57	7.82

be easily separated, thereby rendering it unable to be reused by either system (McDonough and Braungart 2002). However, this does not take into account the fact that PET bottles are meant for single use and thus repeated use of the Dopper would be a better use of resources than the other bottles.

### Manufacturing Process

The Dopper is manufactured in a similar manner to PET bottles, albeit at a much slower rate. The Dopper machine produces 120 bottles an hour (How it's Made 2014). The PP lid and ABS cup are injection molded and the PP bottle is injection molded into a pre-form and then blow molded into the correct size and shape (How it's Made 2014). Electric injection molding machines use between 30% and 60% less energy and up to 65% less water than hydraulic machines (Tangram Technology 2014). However, from an eco-effective perspective, such reductions only make the process 'less bad' rather than actively good (Braungart and McDonough 2009: 65).

The Dopper is produced in the Netherlands and people can buy bottles online and from 550 sales outlets. Its American partner, Preserve, helps Dopper offset the emissions produced from shipping to the US (Preserve 2016b). However, there is no further information about how this is done and whether all emissions or just a percentage are offset. The Dopper is also shipped to 24 other countries and it is not specified whether these emissions are also offset (Dopper 2015a).

Klean Kanteen bottles are 'hand crafted' in China. The steel body is welded together by hand, shaped to the required size using machinery, and 'electro polished' for a sleek finish (Hogan et al. 2014). The company buys Renewable Energy Certificates, equivalent to '88,000 kWh of Renewable Energy', from its partner 3Degrees that offset the environmental impact of their electricity use during manufacturing (Klean Kanteen 2016a).

All online orders are shipped by truck via UPS Ground in the US. One cannot purchase a KK online outside of US. Klean Kanteen (2016b) works with its partner, Green Mountain, to purchase carbon offsets that balance out the environmental impact of shipping. However it is not clear whether the impact of transporting the bottles from the factories in China to the headquarters in Chico, California is also offset.

## Recycling

Braungart and McDonough (2009: 104) argue that industry should design products to be nutrients for biological and technical metabolisms rather than them ending up as waste when people no longer have need for them. Doppers that are returned to the company will be recycled into new Doppers, which suggests they could be seen as a technical nutrient. However, although the Dopper is easily disassembled and 100% recyclable, #7 plastics are a mixed group of plastics that are usually downcycled into plastic lumber (Life Without Plastic 2015). Even PP can only be ‘recycled in a ‘closed loop’ four times’ before the polymer chains weaken from exposure to high temperatures during recycling (Thomas 2012). At this point, the plastic will either be landfilled or mixed with other plastics during recycling ‘to produce a hybrid of lower quality’ (Braungart and McDonough 2009: 56). Yet, over the period of time, the Dopper’s materials end up wasted, so its life cycle is “four steps removed” from cradle-to-grave (ibid: 6). Also, as virgin plastic is always added to the recycled content, the Dopper continues to rely on oil and gas (Pierre-Louis 2012: 93).

In contrast to materials used for Dopper, steel can be recycled an infinite number of times without its quality degrading, and can thus continually nourish technical cycles of industry (Braungart and McDonough 2009: 5). If stainless steel was made from 100% steel scrap, ‘energy use would be 67% less than virgin-based production and CO<sub>2</sub> emissions would be cut by 70%’ (Johnson et al. 2007: 1). Recycling steel allows valuable metals to be reused. However, due to the longevity of steel products currently ‘in service’ there is an inadequate amount of steel scrap in recycling streams (American Iron and Steel Institute 2016), which is not enough to satisfy growing demand. This may explain why KK is not in a ‘closed loop’ cycle.

PET bottles are made from similar polymer resins that lend themselves to injection molding and ‘reprocessing to polyester fibre’, which results in PET bottles being ‘recycled in a strictly closed-loop fashion’ (Hopewell et al. 2009). Yet, Braungart and McDonough (2009: 6) argue that reprocessing plastic bottles into polyester fibres used for synthetic clothing merely delays the cradle-to-grave life cycle, as the clothing eventually ends up in landfill (ibid: 6). While C2C favours products that can be reused or upcycled, downcycling is still preferable to products ending up on landfill (ibid: 171).

However, production of bioplastics can compete with food production and biodiversity (Vidal 2008); and also there is inadequate infrastructure for recycling bioplastics as they end up in landfill (Szaky 2015). Another issue is that PLA has a ‘low glass transition temperature’ of between 40 and 60 degrees Celsius, which means bottles would ‘deform’ in hot weather or hot water (Rogers 2015).

## Reflection

In sum, these case studies show that aspiring companies still focus *not* on elimination of damage and re-use but on *minimizing of* damage, *recycling*, and eco-efficiency. For example, Dopper’s claim that it ‘contributes to reducing the global plastic problem’ (Dopper 2015c) is paradoxical as it does this by producing plastic bottles from virgin materials. While KK prides itself on being “plastic-free”, it relies on the mining of virgin metals. However, Braungart and McDonough (2009: 171) argue, we cannot afford to wait for “the perfect bottle”. Thus, the



Dopper, as a product ‘made with care and consciousness’ from materials that use less oil than steel and can remain useful for four closed-loop technical cycles, is better than PET bottles and KK.

The cases of drinking bottles indicate that conventional and short-term thinking in terms of immediate costs can prevent fundamental revision of business. Some of the practices described in the case studies above testify to green-washing rather than to genuine efforts to promote fundamental change in production. While companies such as Coca Cola or other bottle producing companies improve one part of their operation, they fail to overhaul of the entire supply chain, mode of operation, or change product materials from the start, as well as how the final products are transported, packaged, and disposed of. This example shows that ‘simple and easy’ approaches to circularity may suggest subversion of the original aims of C2C/CE transformation.

From the examples above it appears that some of the current practices labeled as C2C or CE do not meet the ambitions (or promises) of these frameworks. While it is possible to have 100% CE or C2C products, it might be expensive or technically challenging. It is likely that 100% vegetable-based substitute is difficult to make due to price (as making it will require organically grown crops that compete for land with food crops) and convenience (e.g. fully biodegradable bottle might not be as strong for transportation and retail as plastic one). Besides, environmental considerations also need to be considered (e.g. the need for even more monoculture plantations to make new bottles) may misplace even more wild and pristine environments. Considering the huge scale at which Coca-Cola produces its bottles makes production of new, virgin material bottles all the more problematic. Indeed, in the United States over 17 million barrels of oil are needed for the plastic bottles’ production (Green 2015).

This does present serious concern about the effect of business-as-usual practices on the environmental sustainability movements that present themselves as new, disruptive, or radical. Continuous production of “sustainable” products is likely to result in the rebound effect, and continuous economic growth at the cost of environment. It remains challenging to achieve maximum technologically and economically viable decoupling (Burton 2015).

One needs to keep questioning whether, with the right political will, relative decoupling could proceed fast enough to achieve real reductions in throughput, allowing for continued economic growth, and whether this economic growth is desirable in the first place (Bauwens 2018). Even the founding fathers of the C2C are not immune to the appeal of “growth” and do not think that we should strive for ‘zero impact’ (Braungart and McDonough 2009: 66–7). Braungart and McDonough (2009: 11) argue that “unlimited growth” does not have to be destructive: ‘Cradle to Cradle goes beyond the environmental chorus saying that growth is wrong and that it is virtuous to prune the pleasures we take in things like cars or shoes until there is no pleasure left’ (ibid). This optimistic outlook bypasses consumers’ attempts to “buy less” or “buy none” (Isenhour 2010: 460), and does not challenge population growth and “Western way of life”.

As Crist (2012) has reflected, the heavy footprint of the growing consumer class coupled with the ethical aim of raising the standard of living of the world’s most poor people, translates not only into the worthy aim of ending severe deprivation, but serves as a euphemism for the global dissemination of consumer culture. Even renewable resources are being consumed ‘at a rate 50% higher than can be produced sustainably’ (Population Matters 2013). As Rammelt and Crisp (2014), Rees (2010) and Washington (2015) argue, the growth paradigm knows no ecological bounds. Thus the idea that ‘human ingenuity will find a substitute for any depleting resource’, which C2C could be seen as supporting, merely allows the ‘expansionist myth’

based on the idea of decoupling to continue (Rees 2010:5). In reflecting on the idea of decoupling natural resource consumption from economy, Victor and Jackson (2015) note that while there has been some ‘relative’ or partial decoupling’, any absolute decoupling is not evident.

The following “R” actions need to be considered in pragmatic planning (Table below adopted from Bauwens 2018):

<b>Circular economy</b>		<b>Strategies</b>	
Smarter product use and manufacture	R0 Refuse	Make product redundant by abandoning its function or by offering the same function with a radically different product	
	R1 Rethink	Make product use more intensive (e.g. by sharing product)	
	R2 Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources and materials	
Extend lifespan of product and its parts	R3 Reuse	Reuse by another consumer of discarded product which is still in good condition and fulfils its original function	
	R4 Repair	Repair and maintenance of defective product so it can be used with its original function	
	R5 Refurbish	Restore an old product and bring it up to date	
	R6 Remanufacture	Use parts of discarded product in a new product with the same function	
	R7 Repurpose	Use discarded product or its parts in a new product with a different function	
Useful application of materials	R8 Recycle	Process materials to obtain the same (high grade) or lower (low grade) quality	
	R9 Recover	Incineration of material with energy recovery	
<b>Linear economy</b>			

In the case of bottles above, the first two Rs, Refusal and Rethinking, is questionable, as most of the bottles are unlikely to be used endlessly or be shared by consumers, with growing number of consumers and growing demand for “sustainable” bottles implying that resource-intensive manufacturing of bottles is likely to continue. What is present is the third R, Reduction, but in ‘ideal’ CE/C2C framework reduction can be seen as more akin to eco-efficiency, which is not good enough for absolute decoupling. Some types of bottles do involve Reuse, Repair and Refurbishment, but the core business of KK, Dopper and certainly Pant Bottle of Coca-Cola remains production of new bottles.

Returning to the questions posed in the Introduction in relation to ecological management that might have a potential to challenge growth myths, ecological manager needs to take heed from the warnings that resources, however produced, if consumed by a large number of people, will be eventually depleted. Drawing on the Greek root of the ‘economy’, oikonomos, Haydn Washington (2015) reflects that it is derived from oikos, ‘house’ and nemein, ‘to manage’. ‘Good’ economics should be good management of the home, which consists of ecologically sound systems. However, Washington (2015) notes, modern economics and management are fraught with issues of economic worldview as well as ignorance and denial of ecological reality.

Linking this back to the cases drinking bottles, the production of neither KK, nor Dopper nor Plant Bottle shows a shift toward a system that will be replenishing, not just to the producer’s purse, but to a natural system. Ecological management then needs to include eco-justice for nature, and its intrinsic value and rights (Washington 2015) as well as deeper

understanding as to how innovative designs can contribute to restoration of the system. Even though C2C Certified products may still be environmentally preferable when compared directly against conventional products or across a broader array of indicators, ‘Gold’ certified C2C products achieve only 50% fossil-fuel reduction (Kausch and Klosterhaus 2016), which is far from perfect.

Most promising are the products and services where ‘circularity’ can be reached through continuous re-use of durable products made of non-toxic materials. This objective can be realized by production to service shift (sharing the same good quality washing machine which is owned by the company, leased to consumers, and can be almost entirely repaired and refurbished as its parts are reusable after the customers have returned the ‘old’ model after prolonged and repeated use).

Ecological management also requires honest understanding that production of any new parts for refurbishment or repair, or the growing number of consumers, does require new material input and thus can be harmful to environmental systems. As none of these bottles fully reflect the C2C ideals, it is worth considering some alternatives. For example, Polylactic Acid (PLA) is a durable bioplastic made from renewable sources such as tapioca, cornstarch and sugarcane. A PLA bottle left in the ocean would degrade in 6 to 24 months (Rogers 2015). One can also make PLA products using the same technology that manufacture PET bottles, which lowers the start up costs (*ibid.*). The fact that PLA can be made from a variety of locally grown sources rather than one monocrop would help maintain biodiversity (Rogers 2015).

To address the second question, ecological management can represent the intrinsic value of nature in embracing not just instrumental function but integrity of ecological systems. Indeed, ecological management has the potential to take a bolder look at the distinction between human needs and wants. The Doppet, KK or the Plant Bottle of Coca-Cola, if used and reused might be a good thing – but the drive to produce more risks taking out ‘ecology’ out of production management. Braungart and McDonough (2009: 153) highlight the fact that within “sustainable development” discourses social and ecological concerns are often secondary to economic ones. While eco-effectiveness requires that ecological projects are also ‘economically fecund’ (*ibid.*: 150; 153), it also requires recognizing the value of nature beyond mere utility.

## Conclusion

The case studies show that transformation toward sustainable economy requires ecological management and responsible innovation that enable ‘circularity’ and the systems thinking not just about concrete products or production processes. They are also about a more general subject of human industry’s place in a wider ecosystem needs to be considered. Despite this challenge, while truly sustainable production still has a long way to go in practice, C2C and CE do, as least theoretically, demonstrate robust potential for positive change.

Yet caution is needed. Responsible innovation leaders and ecological managers have to consider trade-off involved in the use of “new” synthetic and biological materials, hopefully without reducing valuable elements of nature to mere resources for human use. The potential as well as limitation of the techno-cycle are well-illustrated by the case of KK and the fact that due to the longevity of the currently used steel products there is an inadequate amount of steel scrap in reusable streams. While presently KK is not in a ‘closed loop’ cycle, it would have the greatest potential to enter such a cycle if recycled steel were readily available.



One of the challenges is that drinking bottles' manufacturers are free to market their products as green without necessary controls from governments or consumers. As Frosch and Gallopoulos (1989: 152) have stressed, in order to be affective, the concept of circularity must be recognized and valued by public officials, industry leaders and the media in order to be instilled into the social ethos and adopted by government as well as industry. Ecological managers thus need to coordinate this effort in order to inform not just internal production processes but wider society to prevent regression to business-as-usual.

What is significant about Cradle to Cradle and circular economy frameworks is that despite impossibility of absolute decoupling of economy from consumption of natural resources, these frameworks go much further in their critique of current 'weak' models of sustainability based on eco-efficiency and recycling. While these frameworks can be greatly strengthened by explicit realization that economic growth and population growth make even relative decoupling more difficult, the focus on circularity offers an appropriate lens through which many sustainability initiatives can be assessed.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

## References

- American Iron and Steel Institute. 2016. Steel is the world's most recycled material. <https://steel.org/sustainability/steel-recycling.aspx>. Accessed 30 Nov 2018.
- Arthur, R. 2015. Coca-Cola creates PET bottle made entirely from plants – but when will we see it on shelves? <https://www.beveragedaily.com/Article/2015/06/05/Coca-Cola-produces-first-PET-bottle-made-entirely-from-plants>. Accessed 30 Nov 2018.
- Atfield, R. 2015. Sustainability and management. *Philosophy of Management* 14: 85–93.
- Balch, O. 2011. Coca-Cola in green bottles. *The Guardian*, September 12. <https://www.theguardian.com/sustainable-business/coca-cola-green-plant-bottles>. Accessed 30 Nov 2018.
- Ban the Bottle. 2016. Bottled water facts. [www.banthebottle.net/bottled-water-facts/](http://www.banthebottle.net/bottled-water-facts/). Accessed 30 Nov 2018.
- Bauwens, T. 2018. Resources, waste and circular economy. Presentation given as part of guest lecture series for minor Sustainable Business, at The Hague University of Applied Science, October 30, 2018.
- Blok, V. 2018. Philosophy of innovation: a research agenda. *Philosophy of Management* 17 (1): 1–5.
- Blomsma, F., and G. Brennan. 2017. The emergence of circular economy: a new framing around prolonging resource productivity. *Journal of Industrial Ecology* 21 (3): 603–614.
- Boulding, K. 1966. The economics of the coming spaceship earth. In *Environmental quality in a growing economy—Essays from the sixth RFF forum*, ed. H. Jarrett. Baltimore: The Johns Hopkins University Press.
- Braungart, M. 2013. *Waste to energy*. <http://catalystreview.net/2010/02/cradle-to-cradle-transitioning-from-waste-incineration-to-beneficial-materials/>. Accessed 30 Nov 2018.
- Braungart, M., and W. McDonough. 2009. *Cradle to cradle: Remaking the way we make things*. London: Vintage.
- Bulow, J. 1986. An economic theory of planned obsolescence. *The Quarterly Journal of Economics* 101 (4): 729–749.
- Burton, M. 2015. The decoupling debate: can economic growth really continue without emission increases? *DeGrowth and Resilience*. <https://www.resilience.org/stories/2015-10-13/the-decoupling-debate-can-economic-growth-really-continue-without-emission-increases>. Accessed 30 Nov 2018.
- Cooper, J.E., E.L. Kendig, and Belcher SM. 2011. Assessment of bisphenol a released from reusable plastic, aluminum and stainless steel water bottles. *Chemosphere* 85: 943–947.
- Cradle to Cradle Certified. 2014. Cradle to cradle certified products registry: Doppo original. <http://www.c2ccertified.org/get-certified/levels>. Accessed 30 Nov 2018.
- Crist, E. 2012. Abundant earth and population. In *Life on the Brink: Environmentalists confront Overpopulation*, eds. P. Cafaro, E. Crist. Athens: University of Georgia Press. 141–153.
- Daly, H. and Farley, J. 2004. *Ecological economics: Principles and practice*. Island Press.
- Das, A.P., and S. Singh. 2011. Occupational health assessment of chromite toxicity among Indian miners. *Indian Journal of Occupational & Environmental Medicine* 15 (1): 6–13.

- Davis, G., and J.H. Song. 2006. Biodegradable packaging based on raw materials from crops and their impact on waste management. *Industrial Crops and Products* 23 (2): 147–161.
- Dopper. 2015a. Annual Report 2015: The bottle is the message. <https://dopper.com/annual-report/#firstSection>. Accessed 30 Nov 2018.
- Dopper. 2015b. Be the messenger. <https://dopper.com/usa/bethemessenger/>. Accessed 30 Nov 2018.
- Dopper. 2015c. Certifications. <https://dopper.com/usa/about-dopper/quality-certifications/>. Accessed 30 Nov 2018.
- Dopper. 2015d. Mission. <https://dopper.com/mission/>. Accessed 30 Nov 2018.
- Dopper. 2015e. Water in Nepal. <https://dopper.com/foundation/water-in-nepal/>. Accessed 30 Nov 2018.
- Fan, Y. 2005. Ethical branding and corporate reputation. *Corporate Communications: An International Journal* 10 (4): 341–350.
- Fletcher, R., and C. Rammelt. 2017. Decoupling: a key fantasy of the post-2015 sustainable development agenda. *Globalizations* 14 (3): 450–467.
- Frosch, R.A., and N.E. Gallopoulos. 1989. Strategies for manufacturing. *Scientific American* 261 (3): 144–152.
- Geissdoerfer, M., P. Savaget, N.M. Bocken, and E.J. Hultink. 2017. The circular economy—a new sustainability paradigm? *Journal of Cleaner Production* 143: 757–768.
- Geng, Y., J. Sarkis, S. Ulgiati, and P. Zhang. 2013. Measuring China's circular economy. *Science* 339 (6127): 1526–1527.
- Genovese, A., A. Acquaye, A. Figueroa, and S.C.L. Koh. 2015. Sustainable supply chain management and the transition towards a circular economy: evidence and some applications. *Omega* 66 (2017): 344–357.
- Ghisellini, P., C. Cialani, and S. Ulgiati. 2016. A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems. *Journal of Cleaner Production* 114: 11–32.
- Green, P. S. 2015. The life of a plastic water bottle. Bloomberg, February 27. <https://www.bloomberg.com/news/photo-essays/2015-02-27/the-life-of-a-plastic-water-bottle>.
- Hills, J., and R. Welford. 2005. Coca-Cola and water in India. *Corporate Social Responsibility and Environmental Management* 12 (3): 168–177.
- Hogan, J., N. Chu and P. Low. 2014. Klean Kanteen. *Design Life-Cycle*. <http://www.designlife-cycle.com/klean-kanteen-life-cycle/>. Accessed 30 Nov 2018.
- Holt, D.B. 2012. Constructing sustainable consumption: from ethical values to the cultural transformation of unsustainable markets. *The Annals of the American Academy of Political and Social Science* 644 (1): 236–255.
- Hopewell, J., R. Dvorak, and E. Kosior. 2009. Plastics recycling: challenges and opportunities. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences* 364 (1526): 2115–2126.
- How It's Made. 2014. The Dopper. <https://www.youtube.com/watch?v=2sMiBhdNGOA>. Accessed 30 Nov 2018.
- Isenhour, C. 2010. On conflicted Swedish consumers, the effort to stop shopping and neo-liberal environmental governance. *Journal of Consumer Behavior* 9: 454–469.
- Johnson, J., B.K. Reck, T. Wang, and T.E. Graedel. 2007. The energy benefit of stainless steel recycling. *Energy Policy*. <http://www.mgg-recycling.com/wp-content/uploads/2013/06/The-Energy-Benefit-of-Stainless-Steel-Recycling.pdf>. Accessed 30 Nov 2018.
- Kausch, M.F., and S. Klosterhaus. 2016. Response to 'are cradle to cradle certified products environmentally preferable? Analysis from an LCA approach'. *Journal of Cleaner Production* 113: 715–716.
- Klean Kanteen. 2016a. Energy. <https://www.kleankanteen.com/pages/energy>. Accessed 30 Nov 2018.
- Klean Kanteen. 2016b. Shipping. <https://www.kleankanteen.com/pages/shipping>. Accessed 30 Nov 2018.
- Klean Kanteen. 2016c. Sustainability. <https://www.kleankanteen.com/pages/sustainability>. Accessed 30 Nov 2018.
- Klikauer, T. 2014. Management philosophy and environmental ethics—critical reviews. *Philosophy of Management* 13 (1): 97–104.
- Kopnina, H. 2016. Animal cards, supermarket stunts and world wide fund for nature: exploring the educational value of a business-ENGO partnership for sustainable consumption. *Journal of Consumer Culture* 16 (3): 926–994.
- Kopnina, H. 2017. Teaching about sustainable production and consumption. In *Sociocultural perspectives on youth ethical consumerism*, ed. by G. Reis, M. P. Mueller, R. A. Gisewhite, L. Siveres and Brito, R, 131–147. Dordrecht: Springer.
- Kopnina, H. 2018. Teaching circular economy: Overcoming the challenge of green-washing. In *Handbook of engaged sustainability: Contemporary trends and future prospects*, ed. S.K. Dhiman and J. Marques. Dordrecht: Springer.
- Kopnina, H., and J. Blewitt. 2018. *Sustainable business: Key issues*. 2nd ed. New York: Routledge.
- Life Without Plastic. 2015. Common plastics #1 to #7. [https://www.lifewithoutplastic.com/store/common\\_plastics\\_no\\_1\\_to\\_no\\_7](https://www.lifewithoutplastic.com/store/common_plastics_no_1_to_no_7). Accessed 30 Nov 2018.

- Materials World. 2015. 5 things you didn't know about...chromium. <http://materialsworld.tumblr.com/post/123771554097/5-things-you-didnt-know-aboutchromium>. Accessed 30 Nov 2018.
- McDonough, W., and M. Braungart. 2002. *Remaking the way we make things: Cradle to cradle*. New York: North Point Press.
- Murray, A., K. Skene, and K. Haynes. 2017. The circular economy: an interdisciplinary exploration of the concept and application in a global context. *Journal of Business Ethics* 140 (3): 369–380.
- Oberndorfer, E., J. Lundholm, B. Bass, R.R. Coffman, H. Doshi, N. Dunnett, S. Gaffin, M. Köhler, K.K. Liu, and B. Rowe. 2007. Green roofs as urban ecosystems: ecological structures, functions, and services. *BioScience* 57 (10): 823–833.
- Pavanan, K.C., R.A. Bosch, R. Cornelissen, and J.C. Philp. 2013. Biomass sustainability and certification. *Trends in Biotechnology* 31 (7): 385–387.
- Pierre-Louis, K. 2012. *Green washed: Why we can't buy our way to a green planet*. New York: IG Publishing.
- Population Matters. 2013. Hans Rosling is ecologically illiterate. <http://www.populationmatters.org/hans-rosling-ecologically-illiterate/>. Accessed 30 Nov 2018.
- Preserve. 2016a. Purposeful plastics. <https://www.preserveproducts.com/explore/purposeful-plastics>. Accessed 11 Dec 2017
- Preserve. 2016b. Shop. <https://www.preserveproducts.com/shop/dopper-112>. Accessed 11 Dec 2017
- Rammelt, C., and P. Crisp. 2014. A systems and thermodynamics perspective on technology in the circular economy. *Real-world economics review* 68: 25–40.
- Rees, W. 2010. What's blocking sustainability? Human nature, cognition, and denial. *Sustainability: Science, Practice, & Policy* 6 (2): 13–25 [http://www.gci.org.uk/Documents/BlockingSustainability\(Final0910\).pdf](http://www.gci.org.uk/Documents/BlockingSustainability(Final0910).pdf). Accessed 30 Nov 2018.
- Rithoff, M., H. Rohn and C. Liedtke. 2002. Calculating MIPS: resource productivity of products and services. Wuppertal Institute for Climate, Environment, and Energy, 27e. <https://www.econstor.eu/bitstream/10419/59294/1/485276682.pdf>. Accessed 30 Nov 2018.
- Rogers, T. 2015. Everything you need to know about Polylactic Acid (PLA). Creative Mechanisms Blog, October 7.
- Stahel, W.R. 1984. The product-life factor. In *An inquiry into the nature of sustainable societies, the role of the private sector*, ed. Susan Grinton Orr. Houston, Texas: HARC.
- Stahel, W. 2006. *The performance economy*. 2nd ed. London: Palgrave MacMillan.
- Stahel, W.R., and G. Reday-Mulvey. 1981. *Jobs for tomorrow: The potential for substituting manpower for energy*. Vantage Press.
- Szaky, T. 2015. Sustainable solutions for ending water bottle waste. Treehugger, March 11. <http://bit.ly/1wZbVlr>. Accessed 30 Nov 2018.
- Tangram Technology. 2014. Energy efficiency in plastics processing: practical work sheets for industry. [http://www.tangram.co.uk/TI-Energy%20Worksheets%20\(Plastics\)%20-%20Tangram.PDF](http://www.tangram.co.uk/TI-Energy%20Worksheets%20(Plastics)%20-%20Tangram.PDF). Accessed 30 Nov 2018.
- Thomas, G. P. 2012. Clean tech 101: recycling of polypropylene (PP). AZO Cleantech, June 25. <http://www.azocleantech.com/article.aspx?ArticleID=240>. Accessed 30 Nov 2018.
- Van Dooren, T., and D.B. Rose. 2012. Storied-places in a multispecies city. *Humanimalia* 3 (2): 1–27.
- Victor, P., and T. Jackson. 2015. The trouble with growth. In *State of the World 2015: Confronting hidden threats to sustainability*, ed. L. Starke, 37–50. Washington, DC, USA: Worldwatch Institute.
- Vidal, J. 2008. Sustainable bio-plastic can damage the environment. *The Guardian*. April 23. <https://www.theguardian.com/environment/2008/apr/26/waste.pollution>. Accessed 30 Nov 2018.
- Wang, J.W., C.H Poh, C.Y.T. Tan, V.N. Lee, A. Jain, and E.L. Webb. 2017. Building biodiversity: drivers of bird and butterfly diversity on tropical urban roof gardens. *Ecosphere* 8 (9).
- Washington, H. 2015. *Demystifying sustainability: Towards real solutions*. London: Routledge.
- Washington, H., and H. Koprina. 2018. The insanity of endless growth. *Ecological Citizen* 2 (1): 57–63.

**Dr. Koprina, Helen** (Ph.D. Cambridge University, 2002) is currently employed at The Hague University of Applied Science (HHS) in The Netherlands, coordinating Sustainable Business program and conducting research within three main areas: sustainability, environmental education and biological conservation. Koprina is the author of over ninety peer reviewed articles and (co)author and (co)editor of thirteen books.



**Dr. Alexandra Hildebrandt****INSIDER** für Wirtschaft & Management, Nachhaltigkeit, Digitalisierung, Internet & Technologie

Folgen

Samstag, 14. August

## Warum der Begriff Kreislaufwirtschaft erweitert werden sollte



Pixabay

Wir leben in einer Welt endlicher Ressourcen. Dass sie immer knapper werden, ist seit Langem bekannt. Doch trotz kleiner Fortschritte sind wir von einer „echten“ Kreislaufwirtschaft noch weit entfernt.

Und das, obwohl es bereits seit 1996 in Deutschland ein Kreislaufwirtschaftsgesetz (KrWG) gibt. 1972 hieß es Abfallbeseitigungsgesetz, 1986 Abfallgesetz, ab 1996 dann Kreislaufwirtschafts- und Abfallgesetz, und seit 2012 heißt es Kreislaufwirtschaftsgesetz. Mit den unterschiedlichen Fassungen und Umbenennungen geriet neben der umweltgerechten Beseitigung verstärkt auch die Vermeidung und Verwertung von Abfällen in den Fokus. Seit der Neufassung 2012 legt es eine Zielehierarchie fest, die späte nationale Umsetzung der EU-Abfallrahmenrichtlinie von 2008:

1. Abfallvermeidung,
2. Vorbereitung zur Wiederverwendung,
3. Recycling (stoffliche Verwertung),

4. energetische Verwertung (Verbrennung),

5. Beseitigung.

Der Name Kreislaufwirtschaft ist also dem veränderten Ansatz geschuldet, Abfälle als Ressource zu sehen, sie entsprechend zu sortieren, zu behandeln, Recyclingmaterialien zu gewinnen und diese wieder in die Stoffkreisläufe einzuspeisen (Quelle: Politikmonitor Nachhaltigkeit 3/2021).

## Zum Unterschied zwischen „Kreislaufwirtschaft“ und „Circular Economy“

Neuere deutschsprachige Studien verwenden stattdessen häufig den englischen Begriff „Circular Economy“. Dieser meint „echte“ Kreislaufwirtschaft unter Einbezug der Produktentwicklung und der Sekundärrohstoffmärkte (einige sprechen auch von „zirkulärem Wirtschaften“). Was es heute braucht, ist eine Begriffsweiterung, denn es geht nicht mehr um herkömmliches Recycling, sondern auch den kreislauffähigen Einsatz von Rohstoffen, was bereits beim Produktdesign berücksichtigt werden sollte.

2015 hatte eine [Studie](#) der Ellen MacArthur Foundation mit McKinsey errechnet, dass die Ausgaben für Mobilität, Wohnen und Lebensmittel in Deutschland durch konsequente Kreislaufwirtschaft bis 2030 um 25 Prozent sinken und die Wirtschaft zugleich jährlich 0,3 Prozentpunkte schneller wachsen könnten. Dieses Ergebnis wurde allerdings kaum zur Kenntnis genommen, obwohl im gleichen Jahr der erste Aktionsplan Kreislaufwirtschaft der EU kam, der 2019 abgeschlossen wurde und ein zentrales Element des europäischen Green Deal ist. Mithilfe von **sieben Sektorstrategien**, die als „zentrale Produktwertschöpfungsketten“ betrachtet werden, soll die Umsetzung erfolgen:

- Bauwirtschaft und Gebäude,
- Batterien und Fahrzeuge,
- Elektronik und IKT,
- Kunststoffe,
- Lebensmittel, Wasser und Nährstoffe,
- Textilien,
- Verpackungen.

Angeregt durch den EU-Aktionsplan erschienen mehrere Studien, die sich mit den dringlichen Veränderungen beschäftigen: Eine [Studie](#) der Boston Consulting Group von 2020 verweist ebenfalls darauf, dass Deutschland sein Potenzial in der Kreislaufwirtschaft nicht ausschöpft und damit Ressourcenmangel für die Wirtschaft riskiert: Nur 10,4 Prozent der Produktionsmittel hierzulande stammen aus recycelten Materialien. Der Anteil der Kreislaufwirtschaft müsste bei mindestens 50 Prozent liegen, damit sich die Erde wieder regenerieren kann. Anfang 2021 kam eine [Studie](#) im Auftrag von Bundesumweltministerium und Umweltbundesamt zum Ergebnis, „dass sich die Transformation in Richtung Circular Economy in Deutschland noch in einer frühen Entwicklungsphase mit geringer Dynamik befindet“.

Die Agora Energiewende und Corporate Leaders Group (CLG) haben in einer gemeinsamen [Studie](#) „Circular Economy Roadmap für Deutschland“ Prioritäten identifiziert, wie die EU Marktanreize für klimaneutrale Materialien schaffen könnte. Sie reichen von CO<sub>2</sub>-Grenzwerten für importierte

materialintensive Endprodukte bis zu Maßnahmen in der öffentlichen Beschaffung. Auch die CEID hat im Mai 2021 [Handlungsempfehlungen](#) für Politik, Wirtschaft und Wissenschaft veröffentlicht. Hier wird ebenfalls die Bedeutung von unternehmensübergreifender Kollaboration betont und die Chancen einer „internationalen Neupositionierung der deutschen Industrie als Exportweltmeister für profitable Circular-Economy-Lösungen“ unterstrichen. Eine Grundaussage aller Publikationen ist, dass es veränderter Rahmenbedingungen und neuer Anreizsysteme bedarf, aber auch mehr Innovation, Kollaboration und Geld erforderlich sind, um die Ziele zu erreichen. Außerdem müssen Kreislaufwirtschaft und Klimaschutz zusammen gedacht werden. Hervorzuheben ist vor diesem Hintergrund auch der **zweite Aktionsplan COM** vom März 2020.

### Seine Ziele:

- einen starken und kohärenten Rahmen für die Produktpolitik zu schaffen,
- dass nachhaltige Produkte, Dienstleistungen und Geschäftsmodelle zur Norm werden,
- Verbrauchsmuster so zu verändern, dass von vornherein kein Abfall erzeugt wird.

Die produzierende Wirtschaft ist deshalb aufgerufen, Ressourcen im Kreislauf zu führen, Produkte nach ökologischen Vorgaben zu gestalten und neue Märkte für Sekundärrohstoffe aufzubauen. Zu den ganzheitlichen Ansätzen gehören die Schließung des Materialkreislaufs, Steigerung der Produkt- und Materialeffizienz, effizientere Nutzung von Produkten sowie die Substitution von Ressourcen. Die Vorteile liegen auf der Hand: Unternehmen können neue Marktsegmente und Umsatzpotenziale erschließen, die Produktion wird effizienter und autarker, die Industrie kann ihren ökologischen Fußabdruck verbessern, die Kontrolle über die eigene Lieferkette kann erhöht werden - und schließlich ist erwiesen, dass kreislaufwirtschaftlich agierende Unternehmen rentabler arbeiten. Schnell zu realisierende Chancen liegen beispielsweise in der Abfallvermeidung. Im Rahmen einer Kreislaufwirtschaft gibt es vier wesentliche Wege für kreislauffähige Verpackungen:

- Verzicht auf Verpackungen,
- Recyclingfähige Verpackungen,
- Biologisch abbaubare Verpackungen,
- Wiederverwendbare Verpackungen.

### Im Sinne des Umweltschutzes und der Vermeidung von Abfällen ist der beste Weg die Reduktion oder das Weglassen von Verpackungen

Allerdings muss auch hier der Schutz des Produktes gewährleistet sein zum Beispiel bei Küchenmöbeln. „Wir schließen Stoffkreisläufe, wo es möglich ist. Über die Verwaltungsgesellschaften wurden bei Häcker Küchen Verpackungsmaterialien lizenziert. Damit ist gewährleistet, dass Verpackungen von den Entsorgungspartnern gesammelt werden, erfasste Verpackungen stofflich verwertet und alle Anforderungen der Verpackungsordnung erfüllt werden“, heißt es im Nachhaltigkeitsbericht von Häcker Küchen. Die Verpackungen werden hier umweltfreundlich über die Recycling-Kontor Transportverpackungen GmbH & Co. KG (RKT) entsorgt (operative Rückführung gebrauchter Transportverpackungen). Kunststoffabfälle entstehen bei Häcker Küchen vor allem bei Warenanlieferungen. Paletten sind zur Transportsicherung in der Regel mit Kunststofffolie umhüllt. Teilweise werden Kunststoffbänder als zusätzliche Sicherung eingesetzt. Auch hier werden mit den Lieferanten Lösungen zum sparsamen Einsatz von Verpackungsmaterial erarbeitet.



Viele Fragen der Entsorger beziehen sich ausschließlich auf Styropor-Materialien, die bei der Sanierung/Rückbau von Gebäuden anfallen. Davon sind Verpackungsmaterialien, die aus Styropor bestehen, nicht betroffen. Seitens der Möbelhändler ist lediglich sicherzustellen, dass Styropor aus Verpackungen nicht mit anderen Styropor-Abfällen vermischt wird. Für „sauber“ gesammelte Styropor-Verpackungen gibt es weiterhin viele Verwertungsmöglichkeiten und eine Nachfrage auf dem Recycling-Markt. Bei Rückfragen nimmt RKT mit dem Entsorger Kontakt auf oder beauftragt ggf. einen neuen Entsorger, die Transportverpackungen abzuholen. Zur weiteren Plastikmüllvermeidung wurde 2018 eine Untersuchung vorgenommen, in der Zuschnittverpackung, in der heute Styropor und Schrumpffolie verwendet werden, zukünftig nur Pappe und Papier, ohne Einbußen in der Produktivität und Wirtschaftlichkeit, zu verwenden. Diese Maßnahme wurde im Rahmen des Werkneubaus in Venne und am Standort Rödinghausen umgesetzt. Wenn Verpackungen nicht wieder verwendet werden können, sollten sie so gestaltet sein, dass sich die Materialien leicht recyceln lassen und gut für neue Produkte verwendet werden können (Design für Recycling).

## Mehrweg statt Einweg im Versand - ein Praxisbeispiel

1995 wurde der Umweltpakt Bayern ins Leben gerufen. Mit dem aktuellen Umwelt- und Klimapakt arbeiten die Bayerische Staatsregierung und ihre Partner, die Vereinigung der Bayerischen Wirtschaft e.V. (vbw), der Bayerische Industrie- und Handelskammertag (BIHK) sowie der Bayerische Handwerkstag (BHT) daran, Lösungen im Umgang mit herausragenden Umwelt- und Nachhaltigkeitsthemen zu entwickeln, um damit Umwelt- und Klimaschutz in Unternehmen und Betrieben voranbringen. Dadurch sollen umwelt- und klimapolitische Zielsetzungen vorangebracht sowie Umweltstandards und -trends etabliert werden. Auch die verstärkte [Bewusstseinsbildung](#) zugunsten von Umwelt- und Klimaschutzziele spielt eine wichtige Rolle. Hier finden sich auch zahlreiche Praxisbeispiele, die einen Einblick in aktuelle Entwicklungen geben. Je nach Produkt gibt es verschiedene Anforderungen an Verpackungen und teilweise auch gesetzliche Vorschriften wie das Verpackungsgesetz, die von Herstellern zu beachten sind.

## Weiterführende Informationen

- [European Circular Economy Stakeholder Platform](#)
- [Das Wirtschaftsmodell der Zukunft: Circular Economy](#)
- [Kreislaufwirtschaft in der Holzindustrie](#)
- [Warum Circular Economy als ressourcenschonendes Wirtschaftsmodell der Zukunft gilt](#)

Merken

Gefällt mir 20

Kommentieren 3

Teilen

Report

### Wer schreibt hier?



[Dr. Alexandra Hildebrandt](#)

Freie Publizistin und Autorin, Nachhaltigkeitsexpertin, Dr. Alexandra Hildebrandt

[INSIDER](#) für Wirtschaft & Management, Nachhaltigkeit, Digitalisierung, Internet & Technologie

Als Publizistin, Herausgeberin, Bloggerin und Nachhaltigkeitsexpertin widme ich mich den Kernthemen Nachhaltigkeit und Digitalisierung. Beim Verlag SpringerGabler habe ich die CSR-Bände zu Digitalisierung, Energiewirtschaft und

Sportmanagement herausgegeben sowie "Klimawandel in der Wirtschaft".

[Mehr anzeigen](#)

**Folgen**

5.494 Follower

[Zur Artikelsammlung \(1.095\)](#)

---

[Nach oben](#) ^

# **Report of the World Commission on Environment and Development: Our Common Future**

## **Table of Contents**

*Acronyms and Note on Terminology*

*Chairman's Foreword*

*From One Earth to One World*

### **Part I. Common Concerns**

#### **1. *A Threatened Future***

**I. *Symptoms and Causes***

**II. *New Approaches to Environment and Development***

#### **2. *Towards Sustainable Development***

**I. *The Concept of Sustainable Development***

**II. *Equity and the Common Interest***

**III. *Strategic Imperatives***

**IV. *Conclusion***

#### **3. *The Role of the International Economy***

**I. *The International Economy, the Environment, and  
Development***

**II. *Decline in the 1980s***

**III. *Enabling Sustainable Development***

**IV. *A Sustainable World Economy***

### **Part II. Common Challenges**

#### **4. *Population and Human Resources***

**I. *The Links with Environment and Development***



**II. *The Population Perspective***

**III. *A Policy Framework***

**5. *Food Security: Sustaining the Potential***

**I. *Achievements***

**II. *Signs of Crisis***

**III. *The Challenge***

**IV. *Strategies for Sustainable Food Security***

**V. *Food for the Future***

**6. *Species and Ecosystems: Resources for Development***

**I. *The Problem: Character and Extent***

**II. *Extinction Patterns and Trends***

**III. *Some Causes of Extinction***

**IV. *Economic Values at Stake***

**V. *New Approach: Anticipate and Prevent***

**VI. *International Action for National Species***

**VII. *Scope for National Action***

**VIII. *The Need for Action***

**7. *Energy: Choices for Environment and Development***

**I. *Energy, Economy, and Environment***

**II. *Fossil Fuels: The Continuing Dilemma***

**III. *Nuclear Energy: Unsolved Problems***

**IV. *Wood Fuels: The Vanishing Resource***

**V. *Renewable Energy: The Untapped Potential***

**VI. *Energy Efficiency: Maintaining the Momentum***

**VII. *Energy Conservation Measures***

**VIII. *Conclusion***

**8. *Industry: Producing More With Less***

**I. *Industrial Growth and its Impact***

**II. *Sustainable Industrial Development in a Global Context***

**III. *Strategies for Sustainable Industrial Development***

**9. *The Urban Challenge***

**I. *The Growth of Cities***

**II. *The Urban Challenge in Developing Countries***

**III. *International Cooperation***

**Part III. *Common Endeavours***

**10. *Managing The Commons***

**I. *Oceans: The Balance of Life***

**II. *Space: A Key to Planetary Management***

**III. *Antarctica: Towards Global Cooperation***

**11. *Peace, Security, Development, and the Environment***

**I. *Environmental Stress as a Source of Conflict***

**II. *Conflict as a Cause of Unsustainable Development***

**III. *Towards Security and Sustainable Development***

**12. *Towards Common Action: Proposals For Institutional and Legal Change***

**I. *The Challenge for Institutional and Legal Change***

**II. *Proposals for Institutional and Legal Change***

### **III. A Call for Action**

#### **Annexes**

##### ***Annexe 1: Summary of Proposed Legal Principles for Environmental Protection and Sustainable Development Adopted by the WCED Experts Group on Environmental Law***

##### ***Annexe 2: The Commission and its Work***

Throughout this report, quotes from some of the many people who spoke at WCED public hearings appear in boxes to illustrate the range of opinions the Commission was exposed to during its three years of work. They do not necessarily reflect the views of the Commission.



## **Our Common Future, Chairman's Foreword**

"A global agenda for change" - this was what the World Commission on Environment and Development was asked to formulate. It was an urgent call by the General Assembly of the United Nations:

- to propose long-term environmental strategies for achieving sustainable development by the year 2000 and beyond;
- to recommend ways concern for the environment may be translated into greater co-operation among developing countries and between countries at different stages of economical and social development and lead to the achievement of common and mutually supportive objectives that take account of the interrelationships between people, resources, environment, and development;
- to consider ways and means by which the international community can deal more effectively with environment concerns; and
- to help define shared perceptions of long-term environmental issues and the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long term agenda for action during the coming decades, and aspirational goals for the world community.

When I was called upon by the Secretary-General of the United Nations in December 1983 to establish and chair a special, independent commission to address this major challenge to the world community, I was acutely aware that this was no small task and obligation, and that my day-to day responsibilities as Party leader made it seem plainly prohibitive. What the General Assembly asked for also seemed to be unrealistic and much too ambitious. At the same time, it was a clear demonstration of the widespread feeling of frustration and inadequacy in the international community about our own ability to address the vital global issues and deal effectively with them.

The fact is a compelling reality, and should not easily be dismissed. Since the answers to fundamental and serious concerns are not at hand, there is no alternative but to keep on trying to find them.

All this was on my mind when the Secretary-General presented me with an argument to which there was no convincing rebuttal: No other political leader had become Prime Minister with a background of several years of political struggle, nationally and internationally, as an environment minister. This gave some hope that the environment was not destined to remain a side issue in central, political decision making.

In the final analysis, I decided to accept the challenge. The challenge of facing the future, and of safeguarding the interests of coming generations. For it was abundantly clear: We needed a mandate for change.

We live in an era in the history of nations when there is greater need than ever for co-ordinated political action and responsibility. The United Nations and its Secretary-General are faced with an enormous task and burden. Responsibly meeting humanity's goals and

aspirations will require the active support of us all.

My reflections and perspective were also based on other important parts of my own political experience: the preceding work of the Brandt Commission on North-South issues, and the Palme Commission on security and disarmament issues, on which I served.

I was being asked to help formulate a third and compelling call for political action: After Brandt's Programme for Survival and Common Crisis, and after Palme's Common Security, would come Common Future. This was my message when Vice Chairman Mansour Khalid and I started work on the ambitious task set up by the United Nations. This report, as presented to the UN General Assembly in 1987, is the result of that process.

Perhaps our most urgent task today is to persuade nations of the need to return to multilateralism. The challenge of reconstruction after the Second World War was the real motivating power behind the establishment of our post-war international economic system. The challenge of finding sustainable development paths ought to provide the impetus - indeed the imperative - for a renewed search for multilateral solutions and a restructured international economic system of co-operation. These challenges cut across the divides of national sovereignty, of limited strategies for economic gain, and of separated disciplines of science.

After a decade and a half of a standstill or even deterioration in global co-operation, I believe the time has come for higher expectations, for common goals pursued together, for an increased political will to address our common future.

There was a time of optimism and progress in the 1960s, when there was greater hope for a braver new world, and for progressive international ideas. Colonies blessed with natural resources were becoming nations. The locals of co-operation and sharing seemed to be seriously pursued. Paradoxically, the 1970s slid slowly into moods of reaction and isolation while at the same time a series of UN conferences offered hope for greater co-operation on major issues. The 1972 *UN Conference on the Human Environment* brought the industrialized and developing nations together to delineate the "rights" of the human family to a healthy and productive environment. A string of such meetings followed: on the rights of people to adequate food, to sound housing, to safe water, to access to means of choosing the size of their families.

The present decade has been marked by a retreat from social concerns. Scientists bring to our attention urgent but complex problems bearing on our very survival: a warming globe, threats to the Earth's ozone layer, deserts consuming agricultural land. We respond by demanding more details, and by assigning the problems to institutions ill-equipped to cope with them. Environmental degradation, first seen as mainly a problem of the rich nations and a side effect of industrial wealth, has become a survival issue for developing nations. It is part of the downward spiral of linked ecological and economic decline in which many of the poorest nations are trapped. Despite official hope expressed on all sides, no trends identifiable today, no programmes or policies, offer any real hope of narrowing the growing gap between rich and poor nations. And as part of our "development", we have amassed weapons arsenals capable of diverting the paths that evolution has followed for millions of years and of creating a planet our ancestors would not recognize.

When the terms of reference of our Commission were originally being discussed in 1982, there were those who wanted its considerations to be limited to "environmental issues" only. This

would have been a grave mistake. The environment does not exist as a sphere separate from human actions, ambitions, and needs, and attempts to defend it in isolation from human concerns have given the very word "environment" a connotation of naivety in some political circles. The word "development" has also been narrowed by some into a very limited focus, along the lines of "what poor nations should do to become richer", and thus again is automatically dismissed by many in the international arena as being a concern of specialists, of those involved in questions of "development assistance".

But the "environment" is where we all live; and "development" is what we all do in attempting to improve our lot within that abode. The two are inseparable. Further, development issues must be seen as crucial by the political leaders who feel that their countries have reached a plateau towards which other nations must strive. Many of the development paths of the industrialized nations are clearly unsustainable. And the development decisions of these countries, because of their great economic and political power, will have a profound effect upon the ability of all peoples to sustain human progress for generations to come.

Many critical survival issues are related to uneven development, poverty, and population growth. They all place unprecedented pressures on the planet's lands, waters, forests, and other natural resources, not least in the developing countries. The downward spiral of poverty and environmental degradation is a waste of opportunities and of resources. In particular, it is a waste of human resources. These links between poverty, inequality, and environmental degradation formed a major theme in our analysis and recommendations. What is needed now is a new era of economic growth - growth that is forceful and at the same time socially and environmentally sustainable.

Due to the scope of our work, and to the need to have a wide perspective. I was very much aware of the need to put together a highly qualified and influential political and scientific team, to constitute a truly independent Commission. This was an essential part of a successful process. Together, we should span the globe, and pull together to formulate an interdisciplinary, integrated approach to global concerns and our common future. We needed broad participation and a clear majority of members from developing countries, to reflect world realities. We needed people with wide experience, and from all political fields, not only from environment or development and political disciplines, but from all areas of vital decision making that influence economic and social progress, nationally and internationally.

We therefore come from widely differing backgrounds: foreign ministers, finance and planning officials, policymakers in agriculture, science, and technology. Many of the Commissioners are cabinet ministers and senior economists in their own nations, concerned largely with the affairs of those countries. As Commissioners, however, we were acting not in our national roles but as individuals; and as we worked, nationalism and the artificial divides between "industrialized" and "developing", between East and West, receded. In their place emerged a common concern for the planet and the interlocked ecological and economic threats with which its people, institutions, and governments now grapple.

During the time we met as a Commission, tragedies such as the African famines, the leak at the pesticides factory at Bhopal, India, and the nuclear disaster at Chernobyl, USSR appeared to justify the grave predictions about the human future that were becoming commonplace during the mid-1980s. But at public hearings we held on five continents, we also heard from the individual victims of more chronic, widespread disasters: the debt crisis, stagnating aid to and investment in developing countries, falling commodity prices and falling personal incomes. We became convinced that major changes were needed, both in attitudes and in the way our societies are organized.



The question of population - of population pressure, of population and human rights - and the links between these related issues and poverty, environment, and development proved to be one of the more difficult concerns with which we had to struggle. The differences of perspective seemed at the outset to be unbridgeable, and they required a lot of thought and willingness to communicate across the divides of cultures, religions, and regions.

Another such concern was the whole area of international economic relations. In these and in a number of other important aspects of our analysis and recommendations, we were able to develop broad agreement.

The fact that we all became wiser, learnt to look across cultural and historical barriers, was essential. There were moments of deep concern and potential crisis, moments of gratitude and achievement, moments of success in building a common analysis and perspective. The result is clearly more global, more realistic, more forward looking than any one of us alone could have created. We joined the Commission with different views and perspectives, different values and beliefs, and very different experiences and insights. After these three years of working together, travelling, listening, and discussing, we present a unanimous report.

I am deeply grateful to all the Commissioners for their dedication, their foresight and personal commitment to our common endeavour. It has been a truly wonderful team. The spirit of friendship and open communication, the meeting of minds and the process of learning and sharing, have provided an experience of optimism, something of great value to all of us, and, I believe, to the report and its message. We hope to share with others our learning process, and all that we have experienced together. It is something that many others will have to experience if global sustainable development is to be achieved.

The Commission has taken guidance from people in all walks of life. It is to these people - to all the peoples of the world - that the Commission now addresses itself. In so doing we speak to people directly as well as to the institutions that they have established.

The Commission is addressing governments, directly and through their various agencies and ministries. The congregation of governments, gathered in the General Assembly of the United Nations, will be the main recipients of this report.

The Commission is also addressing private enterprise, from the one-person business to the great multinational company with a total economic turnover greater than that of many nations, and with possibilities for bringing about far-reaching changes and improvements.

But first and foremost our message is directed towards people, whose well being is the ultimate goal of all environment and development policies. In particular, the Commission is addressing the young. The world's teachers will have a crucial role to play in bringing this report to them.

If we do not succeed in putting our message of urgency through to today's parents and decision makers, we risk undermining our children's fundamental right to a healthy, life-enhancing environment. Unless we are able to translate our words into a language that can reach the minds and hearts of people young and old, we shall not be able to undertake the extensive social changes needed to correct the course of development.

The Commission has completed its work. We call for a common endeavour and for new norms of behaviour at all levels and in the interests of all. The changes in attitudes, in social values, and in aspirations that the report urges will depend on vast campaigns of education, debate

and public participation.

To this end, we appeal to "citizens" groups, to non governmental organizations, to educational institutions, and to the scientific community. They have all played indispensable roles in the creation of public awareness and political change in the past. They will play a crucial part in putting the world onto sustainable development paths, in laying the groundwork for Our Common Future.

The process that produced this unanimous report proven that it is possible to join forces, to identify common goals, and to agree on common action. Each one of the Commissioners would have chosen different words if writing the report alone. Still, we managed to agree on the analysis, the broad remedies, and the recommendations for a sustainable course of development.

In the final analysis, this is what it amounts to: furthering the common understanding and common spirit of responsibility so clearly needed in a divided world.

Thousands of people all over the world have contributed to the work of the Commission, by intellectual means, by financial means, and by sharing their experiences with us through articulating their needs and demands. I am sincerely grateful to everyone who has made such contributions. Many of their names are found in *Annexe 2* of the report. My particular gratitude goes to Vice Chairman Mansour Khalid, to all the other members of the Commission, and to Secretary-General Jim MacNeill and his staff at our secretariat, who went above and beyond the call of duty to assist us. Their enthusiasm and dedication knew no limits. I want to thank the chairmen and members of the Intergovernmental Inter-sessional Preparatory Committee, who co-operated closely with the Commission and provided inspiration and support. I thank also the Executive Director of the United Nations Environment Programme, Dr. Mostafa Tolba, for his valuable, continuous support and interest.

Gro Harlem Brundtland  
Oslo, 20 March 1987

# **Our Common Future, From One Earth to One World**

## **An Overview by the World Commission on Environment and Development**

### ***I. The Global Challenge***

- 1. Successes and failures***
- 2. The Interlocking Crises***
- 3. Sustainable Development***
- 4. The Institutional Gaps***

### ***II. The Policy Directions***

- 1. Population and Human Resources***
- 2. Food Security: Sustaining the Potential***
- 3. Species and Ecosystems: Resources for Development***
- 4. Energy: Choices for Environment and Development***
- 5. Industry: Producing More with Less***
- 6. The Urban Challenge***

### ***III. International Cooperation and Institutional Reform***

- 1. The Role of the International Economy***
- 2. Managing the Commons***
- 3. Peace, Security, Development, and the Environment***
- 4. Institutional and Legal Change***

#### ***4.1 Getting at the Sources***

#### ***4.2 Dealing with the Effects***



### ***4.3 Assessing Global Risks***

### ***4.4 Making Informed Choices***

### ***4.5 Providing the Legal Means***

### ***4.6 Investing in our Future***

## **IV. A Call for Action**

1. In the middle of the 20th century, we saw our planet from space for the first time. Historians may eventually find that this vision had a greater impact on thought than did the Copernican revolution of the 16th century, which upset the human self-image by revealing that the Earth is not the centre of the universe. From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery, and soils. Humanity's inability to fit its activities into that pattern is changing planetary systems, fundamentally. Many such changes are accompanied by life-threatening hazards. This new reality, from which there is no escape, must be recognized - and managed.

2. Fortunately, this new reality coincides with more positive developments new to this century. We can move information and goods faster around the globe than ever before; we can produce more food and more goods with less investment of resources; our technology and science gives us at least, the potential to look deeper into and better understand natural systems. From space, we can see and study the Earth as an organism whose health depends on the health of all its parts. We have the power to reconcile human affairs with natural laws and to thrive in the process. In this our cultural and spiritual heritages can reinforce our economic interests and survival imperatives.

3. This Commission believes that people can build a future that is more prosperous, more just, and more secure. Our report, **Our Common Future**, is not a prediction of ever increasing environmental decay, poverty, and hardship in an ever more polluted world among ever decreasing resources. We see instead the possibility for a new era of economic growth, one that must be based on policies that sustain and expand the environmental resource base. And we believe such growth to be absolutely essential to relieve the great poverty that is deepening in much of the developing world.

4. But the Commission's hope for the future is conditional on decisive political action now to begin managing environmental resources to ensure both sustainable human progress and human survival. We are not forecasting a future; we are serving a notice - an urgent notice based on the latest and best scientific evidence - that the time has come to take the decisions needed to secure the resources to sustain this and coming generations. We do not offer a detailed blueprint for action, but instead a pathway by which the peoples of the world may enlarge their spheres of cooperation.

## **I. The Global Challenge**

### **1. Successes and failures**

5. Those looking for success and signs of hope can find many: infant mortality is falling; human

life expectancy is increasing; the proportion of the world's adults who can read and write is climbing; the proportion of children starting school is rising; and global food production increases faster than the population grows.

6. But the same processes that have produced these gains have given rise to trends that the planet and its people cannot long bear. These have traditionally been divided into failures of 'development' and failures in the management of our human environment. On the development side, in terms of absolute numbers there are more hungry people in the world than ever before, and their numbers are increasing. So are the numbers who cannot read or write, the numbers without safe water or safe and sound homes, and the numbers short of woodfuel with which to cook and warm themselves. The gap between rich and poor nations is widening - not shrinking - and there is little prospect, given present trends and institutional arrangements, that this process will be reversed.

7. There are also environmental trends that threaten to radically alter the planet, that threaten the lives of many species upon it, including the human species. Each year another 6 million hectares of productive dryland turns into worthless desert. Over three decades, this would amount to an area roughly as large as Saudi Arabia. More than 11 million hectares of forests are destroyed yearly, and this, over three decades, would equal an area about the size of India. Much of this forest is converted to low-grade farmland unable to support the farmers who settle it. In Europe, acid precipitation kills forests and lakes and damages the artistic and architectural heritage of nations; it may have acidified vast tracts of soil beyond reasonable hope of repair. The burning of fossil fuels puts into the atmosphere carbon dioxide, which is causing gradual global warming. This 'greenhouse effect' may by early next century have increased average global temperatures enough to shift agricultural production areas, raise sea levels to flood coastal cities, and disrupt national economies. Other industrial gases threaten to deplete the planet's protective ozone shield to such an extent that the number of human and animal cancers would rise sharply and the oceans' food chain would be disrupted, industry and agriculture put toxic substances into the human food chain and into underground water tables beyond reach of cleansing.

8. There has been a growing realization in national governments and multilateral institutions that it is impossible to separate economic development issues from environment issues; many forms of development erode the environmental resources upon which they must be based, and environmental degradation can undermine economic development. Poverty is a major cause and effect of global environmental problems. It is therefore futile to attempt to deal with environmental problems without a broader perspective that encompasses the factors underlying world poverty and international inequality.

9. These concerns were behind the establishment in 1983 of the World Commission on Environment and Development by the UN General Assembly. The Commission is an independent body, linked to but outside the control of governments and the UN system. The Commission's mandate gave it three objectives: to re-examine the critical environment and development issues and to formulate realistic proposals for dealing with them; to propose new forms of international cooperation on these issues that will influence policies and events in the direction of needed changes; and to raise the levels of understanding and commitment to action of individuals, voluntary organizations, businesses, institutes, and governments.

10. Through our deliberations and the testimony of people at the public hearings we held on five continents, all the commissioners came to focus on one central theme: many present development trends leave increasing numbers of people poor and vulnerable, while at the same time degrading the environment. How can such development serve next century's world

of twice as many people relying on the same environment? This realization broadened our view of development. We came to see it not in its restricted context of economic growth in developing countries. We came to see that a new development path was required, one that sustained human progress not just in a few pieces for a few years, but for the entire planet into the distant future. Thus 'sustainable development' becomes a goal not just for the 'developing' nations, but for industrial ones as well.

## 2. The Interlocking Crises

11. Until recently, the planet was a large world in which human activities and their effects were neatly compartmentalized within nations, within sectors (energy, agriculture, trade), and within broad areas of concern (environment, economics, social). These compartments have begun to dissolve. This applies in particular to the various global 'crises' that have seized public concern, particularly over the past decade. These are not separate crises: an environmental crisis, a development crisis, an energy crisis. They are all one.

12. The planet is passing through a period of dramatic growth and fundamental change. Our human world of 5 billion must make room in a finite environment for another human world. The population could stabilize at between 8 and 14 billion sometime next century, according to UN projections. More than 90 per cent of the increase will occur in the poorest countries, and 90 per cent of that growth in already bursting cities.

13. Economic activity has multiplied to create a \$13 trillion world economy, and this could grow five to tenfold in the coming half century. Industrial production has grown more than fiftyfold over the past century, four-fifths of this growth since 1950. Such figures reflect and presage profound impacts upon the biosphere, as the world invests in houses, transport, farms, and industries. Much of the economic growth pulls raw material from forests, soils, seas, and waterways.

The World Commission on Environment and Development first met in October 1984, and published its Report 900 days later, in April 1987. Over those few days:

- The drought-triggered, environment-development crisis in Africa peaked, putting 36 million people at risk, killing perhaps a million.
- A leak from a pesticides factory in Bhopal, India, killed more than 2,000 people and blinded and injured over 200,000 more.
- Liquid gas tanks exploded in Mexico City, killing 1,000 and leaving thousands more homeless.
- The Chernobyl nuclear reactor explosion sent nuclear fallout across Europe, increasing the risks of future human cancers.
- Agricultural chemicals, solvents, and mercury flowed into the Rhine River during a warehouse fire in Switzerland, killing millions of fish and threatening drinking water in the Federal Republic of Germany and the Netherlands.
- An estimated 60 million people died of diarrhoeal diseases related to unsafe drinking water and malnutrition; most of the victims were children.

14. A mainspring of economic growth is new technology, and while this technology offers the potential for slowing the dangerously rapid consumption of finite resources, it also entails high risks, including new forms of pollution and the introduction to the planet of new variations of life forms that could change evolutionary pathways. Meanwhile, the industries most heavily reliant on environmental resources and most heavily polluting are growing most rapidly in the developing world, where there is both more urgency for growth and less capacity to minimize damaging side effects.

15. These related changes have locked the global economy and global ecology together in new ways. We have in the past been concerned about the impacts of economic growth upon the environment. We are now forced to concern ourselves with the impacts of ecological stress - degradation of soils, water regimes, atmosphere, and forests upon our economic prospects. We have in the more recent past been forced to face up to a sharp increase in economic interdependence among nations. We are now forced to accustom ourselves to an accelerating ecological interdependence among nations. Ecology and economy are becoming ever more interwoven locally, regionally, nationally, and globally into a seamless net of causes and effects.

16. Impoverishing the local resource base can impoverish wider areas: deforestation by highland farmers causes flooding on lowland farms; factory pollution robs local fishermen of their catch. Such grim local cycles now operate nationally and regionally. Dryland degradation sends environmental refugees in their millions across national borders. Deforestation in Latin America and Asia is causing more floods, and more destructive floods, in downhill, downstream nations. Acid precipitation and nuclear fallout have spread across the borders of Europe. Similar phenomena are emerging on a global scale, such as global warming and loss of ozone. Internationally traded hazardous chemicals entering foods are themselves internationally traded. In the next century, the environmental pressure causing population movements may be increase sharply, while barriers to that movement may be even firmer than they are now.

17. Over the past few decades, life-threatening environmental concerns have surfaced in the developing world. Countrysides are coming under pressure from increasing numbers of farmers and the landless. Cities are filling with people, cars, and factories. Yet at the same time these developing countries must operate in a world in which the resources gap between most developing and industrial nations is widening, in which the industrial world dominates in the rule-making of some key international bodies and in which the industrial world has already used much of the planet's ecological capital. This inequality is the planet's main 'environmental' problem; it is also its main 'development' problem.

18. International economic relationships pose a particular problem for environmental management in many developing countries. Agriculture, forestry, energy production, and mining generate at least half the gross national product of many developing countries and account for even larger shares of livelihoods and employment. Exports of natural resources remain a large factor in their economies, especially for the least developed. Most of these countries face enormous economic pressures, both international and domestic, to overexploit their environmental resource base.

19. The recent crisis in Africa best and most tragically illustrates the ways in which economics and ecology can interact destructively and trip into disaster. Triggered by drought, its real causes lie deeper. They are to be found in part in national policies that gave too little attention, too late, to the needs of smallholder agriculture and to the threats posed by rapidly rising populations. Their roots extend also to a global economic system that takes more out of a poor continent than it puts in. Debts that they cannot pay force African nations relying on



commodity sales to overuse their fragile soils, thus turning good land to desert. Trade barriers in the wealthy nations - and in many developing nations - make it hard for African nations to sell their goods for reasonable returns, putting yet more pressure on ecological systems. Aid from donor nations has not only been inadequate in scale, but too often has reflected the priorities of the nations giving the aid, rather than the needs of the recipients.

The Commission has sought ways in which global development can be put on a sustainable path into the 21st Century. Some 5,000 days will elapse between the publication of our report and the first day of the 21st Century. What environmental crises lie in store over those 5,000 days?

During the 1970s, twice as many people suffered each year from 'natural' disasters as during the 1960s. The disasters most directly associated with environment/development mismanagement - droughts and floods - affected the most people and increased most sharply in terms of numbers affected. Some 18.5 million people were affected by drought annually in the 1960s, 24.4 million in the 1970s. There were 5.2 million flood victims yearly in the 1960s, 15.4 million in the 1970s. Numbers of victims of cyclones and earthquakes also shot up as growing numbers of poor people built unsafe houses on dangerous ground.

The results are not in for the 1960s. But we have seen 35 billion afflicted by drought in Africa alone and tens of millions affected by the better managed and thus less-publicized Indian drought. Floods have poured off the deforested Andes and Himalayas with increasing force. The 1960s seem destined to sweep this dire trend on into a crisis-filled 1990s.

20. The production base of other developing world areas suffers similarly from both local failures and from the workings of international economic systems. As a consequence of the 'debt crisis' of Latin America, that continent's natural resources are now being used not for development but to meet financial obligations to creditors abroad. This approach to the debt problem is short-sighted from several standpoints: economic, political, and environmental. It requires relatively poor countries simultaneously to accept growing poverty while exporting growing amounts of scarce resources.

21. A majority of developing countries now have lower per capita incomes than when the decade began. Rising poverty and unemployment have increased pressure on environmental resources as more people have been forced to rely more directly upon them. Many governments have cut back efforts to protect the environment and to bring ecological considerations into development planning.

22. The deepening and widening environmental crisis presents a threat to national security - and even survival - that may be greater than well-armed, ill-disposed neighbours and unfriendly alliances. Already in parts of Latin America, Asia, the Middle East, and Africa, environmental decline is becoming a source of political unrest and international tension. The recent destruction of much of Africa's dryland agricultural production was more severe than if an invading army had pursued a scorched-earth policy. Yet most of the affected governments still spend far more to protect their people from invading armies than from the invading desert.

23. Globally, military expenditures total about \$1 trillion a year and continue to grow. In many

countries, military spending consumes such a high proportion of GNP that it itself does great damage to these societies' development efforts. Governments tend to base their approaches to 'security' on traditional definitions. This is most obvious in the attempts to achieve security through the development of potentially planet-destroying nuclear weapons systems. Studies suggest that the cold and dark nuclear winter following even a limited nuclear war could destroy plant and animal ecosystems and leave any human survivors occupying a devastated planet very different from the one they inherited.

24. The arms race - in all parts of the world - pre-empt resources that might be used more productively to diminish the security threats created by environmental conflict and the resentments that are fuelled by widespread poverty.

25. Many present efforts to guard and maintain human progress, to meet human needs, and to realize human ambitions are simply unsustainable - in both the rich and poor nations. They draw too heavily, too quickly, on already overdrawn environmental resource accounts to be affordable far into the future without bankrupting those accounts. They may show profit on the balance sheets of our generation, but our children will inherit the losses. We borrow environmental capital from future generations with no intention or prospect of repaying. They may damn us for our spendthrift ways, but they can never collect on our debt to them. We act as we do because we can get away with it: future generations do not vote; they have no political or financial power; they cannot challenge our decisions.

26. But the results of the present profligacy are rapidly closing the options for future generations. Most of today's decision makers will be dead before the planet feels; the heavier effects of acid precipitation, global warming, ozone depletion, or widespread desertification and species loss. Most of the young voters of today will still be alive. In the Commission's hearings it was the young, those who have the most to lose, who were the harshest critics of the planet's present management.

### **3. Sustainable Development**

27. Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. The concept of sustainable development does imply limits - not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. But technology and social organization can be both managed and improved to make way for a new era of economic growth. The Commission believes that widespread poverty is no longer inevitable. Poverty is not only an evil in itself, but sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfil their aspirations for a better life. A world in which poverty is endemic will always be prone to ecological and other catastrophes.

28. Meeting essential needs requires not only a new era of economic growth for nations in which the majority are poor, but an assurance that those poor get their fair share of the resources required to sustain that growth. Such equity would be aided by political systems that secure effective citizen participation in decision making and by greater democracy in international decision making.

29. Sustainable global development requires that those who are more affluent adopt life-styles within the planet's ecological means - in their use of energy, for example. Further, rapidly growing populations can increase the pressure on resources and slow any rise in living

standards; thus sustainable development can only be pursued if population size and growth are in harmony with the changing productive potential of the ecosystem.

30. Yet in the end, sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs. We do not pretend that the process is easy or straightforward. Painful choices have to be made. Thus, in the final analysis, sustainable development must rest on political will.

#### **4. The Institutional Gaps**

31. The objective of sustainable development and the integrated nature of the global environment/development challenges pose problems for institutions, national and international, that were established on the basis of narrow preoccupations and compartmentalized concerns. Governments' general response to the speed and scale of global changes has been a reluctance to recognize sufficiently the need to change themselves. The challenges are both interdependent and integrated, requiring comprehensive approaches and popular participation.

32. Yet most of the institutions facing those challenges tend to be independent, fragmented, working to relatively narrow mandates with closed decision processes. Those responsible for managing natural resources and protecting the environment are institutionally separated from those responsible for managing the economy. The real world of interlocked economic and ecological systems will not change; the policies and institutions concerned must.

33. There is a growing need for effective international cooperation to manage ecological and economic interdependence. Yet at the same time, confidence in international organizations is diminishing and support for them dwindling.

34. The other great institutional flaw in coping with environment/development challenges is governments' failure to make the bodies whose policy actions degrade the environment responsible for ensuring that their policies prevent that degradation. Environmental concern arose from damage caused by the rapid economic growth following the Second World War. Governments, pressured by their citizens, saw a need to clean up the mess, and they established environmental ministries and agencies to do this. Many had great success within the limits of their mandates - in improving air and water quality and enhancing other resources. But much of their work has of necessity been after-the-fact repair of damage: reforestation, reclaiming desert lands, rebuilding urban environments, restoring natural habitats, and rehabilitating wild lands.

35. The existence of such agencies gave many governments and their citizens the false impression that these bodies were by themselves able to protect and enhance the environmental resource base. Yet many industrialized and most developing countries carry huge economic burdens from inherited problems such as air and water pollution, depletion of groundwater, and the proliferation of toxic chemicals and hazardous wastes. These have been joined by more recent problems - erosion, desertification, acidification, new chemicals, and new forms of waste - that are directly related to agricultural, industrial, energy, forestry, and transportation policies and practices.

36. The mandates of the central economic and sectoral ministries are also often too narrow, too concerned with quantities of production or growth. The mandates of ministries of industry

include production targets, while the accompanying pollution is left to ministries of environment. Electricity boards produce power, while the acid pollution they also produce is left to other bodies to clean up. The present challenge is to give the central economic and sectoral ministries the responsibility for the quality of those parts of the human environment affected by their decisions, and to give the environmental agencies more power to cope with the effects of unsustainable development.

37. The same need for change holds for international agencies concerned with development lending, trade regulation, agricultural development, and so on. These have been slow to take the environmental effects of their work into account, although some are trying to do so.

38. The ability to anticipate and prevent environmental damage requires that the ecological dimensions of policy be considered at the same time as the economic, trade, energy, agricultural, and other dimensions. They should be considered on the same agendas and in the same national and international institutions.

39. This reorientation is one of the chief institutional challenges of the 1990s and beyond. Meeting it will require major institutional development and reform. Many countries that are too poor or small or that have limited managerial capacity will find it difficult to do this unaided. They will need financial and technical assistance and training. But the changes required involve all countries, large and small, rich and poor.

## **II. The Policy Directions**

40. The Commission has focused its attention in the areas of population, food security, the loss of species and genetic resources, energy, industry, and human settlements - realizing that all of these are connected and cannot be treated in isolation one from another. This section contains only a few of the Commission's many recommendations.

### **1. Population and Human Resources**

41. In many parts of the world, the population is growing at rates that cannot be sustained by available environmental resources, at rates that are outstripping any reasonable expectations of improvements in housing, health care, food security, or energy supplies.

42. The issue is not just numbers of people, but how those numbers relate to available resources. Thus the 'population problem' must be dealt with in part by efforts to eliminate mass poverty, in order to assure more equitable access to resources, and by education to improve human potential to manage those resources.

43. Urgent steps are needed to limit extreme rates of population growth. Choices made now will influence the level at which the population stabilizes next century within a range of 6 billion people. But this is not just a demographic issue; providing people with facilities and education that allow them to choose the size of their families is a way of assuring - especially for women - the basic human right of self-determination.

44. Governments that need to do so should develop long-term, multifaceted population policies and a campaign to pursue broad demographic goals: to strengthen social, cultural, and economic motivations for family planning, and to provide to all who want them the education, contraceptives, and services required.

45. Human resource development is a crucial requirement not only to build up technical



knowledge and capabilities, but also to create new values to help individuals and nations cope with rapidly changing social, environmental, and development realities. Knowledge shared globally would assure greater mutual understanding and create greater willingness to share global resources equitably.

46. Tribal and indigenous peoples will need special attention as the forces of economic development disrupt their traditional life-styles - life-styles that can offer modern societies many lessons in the management of resources in complex forest, mountain, and dryland ecosystems. Some are threatened with virtual extinction by insensitive development over which they have no control. Their traditional rights should be recognized and they should be given a decisive voice in formulating policies about resource development in their areas. (See *Chapter 4* for a wider discussion of these issues and recommendations.)

## **2. Food Security: Sustaining the Potential**

47. Growth in world cereal production has steadily outstripped world population growth. Yet each year there are more people in the world who do not get enough food. Global agriculture has the potential to grow enough food for all, but food is often not available where it is needed.

48. Production in industrialized countries has usually been highly subsidized and protected from international competition. These subsidies have encouraged the overuse of soil and chemicals, the pollution of both water resources and foods with these chemicals, and the degradation of the countryside. Much of this effort has produced surpluses and their associated financial burdens. And some of this surplus has been sent at concessional rates to the developing world, where it has undermined the farming policies of recipient nations. There is, however, growing awareness in some countries of the environmental and economic consequences of such paths, and the emphasis of agricultural policies is to encourage conservation.

49. Many developing countries, on the other hand, have suffered the opposite problem: farmers are not sufficiently supported. In some, improved technology allied to price incentives and government services has produced a major breakthrough in food production. But elsewhere, the food-growing small farmers have been neglected. Coping with often inadequate technology and few economic incentives, many are pushed onto marginal land: too dry, too steep, lacking in nutrients. Forests are cleared and productive drylands rendered barren.

50. Most developing nations need more effective incentive systems to encourage production, especially of food crops. In short, the 'terms of trade' need to be turned in favour of the small farmer. Most industrialized nations, on the other hand, must alter present systems in order to cut surpluses, to reduce unfair competition with nations that may have real comparative advantages, and to promote ecologically sound farming practices.

51. Food security requires attention to questions of distribution, since hunger often arises from lack of purchasing power rather than lack of available food. It can be furthered by land reforms, and by policies to protect vulnerable subsistence farmers, pastoralists, and the landless - groups who by the year 2000 will include 220 million households. Their greater prosperity will depend on integrated rural development that increases work opportunities both inside and outside agriculture. (See *Chapter 5* for a wider discussion of these issues and recommendations.)

### **3. Species and Ecosystems: Resources for Development**

52. The planet's species are under stress. There is a growing scientific consensus that species are disappearing at rates never before witnessed on the planet, although there is also controversy over those rates and the risks they entail. Yet there is still time to halt this process.

53. The diversity of species is necessary for the normal functioning of ecosystems and the biosphere as a whole. The genetic material in wild species contributes billions of dollars yearly to the world economy in the form of improved crop species, new drugs and medicines, and raw materials for industry. But utility aside, there are also moral, ethical, cultural, aesthetic, and purely scientific reasons for conserving wild beings.

54. A first priority is to establish the problem of disappearing species and threatened ecosystems on political agendas as a major economic and resource issue.

55. Governments can stem the destruction of tropical forests and other reservoirs of biological diversity while developing them economically. Reforming forest revenue systems and concession terms could raise billions of dollars of additional revenues, promote more efficient, long-term forest resource use, and curtail deforestation.

56. The network of protected areas that the world will need in the future must include much larger areas brought under some degree of protection. Therefore, the cost of conservation will rise - directly and in terms of opportunities for development foregone. But over the long term the opportunities for development will be enhanced. International development agencies should therefore give comprehensive and systematic attention to the problems and opportunities of species conservation.

57. Governments should investigate the prospect of agreeing to a 'Species Convention', similar in spirit and scope to other international conventions reflecting principles of 'universal resources'. They should also consider international financial arrangements to support the implementation of such a convention. (See *Chapter 6* for a wider discussion of these issues and recommendations.)

### **4. Energy: Choices for Environment and Development**

58. A safe and sustainable energy pathway is crucial to sustainable development; we have not yet found it. Rates of increase in energy use have been declining. However, the industrialization, agricultural development, and rapidly growing populations of developing nations will need much more energy. Today, the average person in an industrial market economy uses more than 80 times as much energy as someone in sub-Saharan Africa. Thus any realistic global energy scenario must provide for substantially increased primary energy use by developing countries.

59. To bring developing countries' energy use up to industrialized country levels by the year 2025 would require increasing present global energy use by a factor of five. The planetary ecosystem could not stand this, especially if the increases were based on non-renewable fossil fuels. Threats of global warming and acidification of the environment most probably rule out even a doubling of energy use based on present mixes of primary sources.

60. Any new era of economic growth must therefore be less energy intensive than growth in the past. Energy efficiency policies must be the cutting edge of national energy strategies for sustainable development, and there is much scope for improvement in this direction. Modern

appliances can be redesigned to deliver the same amounts of energy-services with only two-thirds or even one-half of the primary energy inputs needed to run traditional equipment. And energy efficiency solutions are often cost-effective.

61. After almost four decades of immense technological effort, nuclear energy has become widely used. During this period, however, the nature of its costs, risks, and benefits have become more evident and the subject of sharp controversy. Different countries world-wide take up different positions on the use of nuclear energy. The discussion in the Commission also reflected these different views and positions. Yet all agreed that the generation of nuclear power is only justifiable if there are solid solutions to the unsolved problems to which it gives rise. The highest priority should be accorded to research and development on environmentally sound and ecologically viable alternatives, as well as on means of increasing the safety of nuclear energy.

62. Energy efficiency can only buy time for the world to develop 'low-energy paths' based on renewable sources, which should form the foundation of the global energy structure during the 21st Century. Most of these sources are currently problematic, but given innovative development, they could supply the same amount of primary energy the planet now consumes. However, achieving these use levels will require a programme of coordinated research, development, and demonstration projects commanding funding necessary to ensure the rapid development of renewable energy. Developing countries will require assistance to change their energy use patterns in this direction.

63. Millions of people in the developing world are short of fuelwood, the main domestic energy of half of humanity, and their numbers are growing. The wood-poor nations must organize their agricultural sectors to produce large amounts of wood and other plant fuels.

64. The substantial changes required in the present global energy mix will not be achieved by market pressures alone, given the dominant role of governments as producers of energy and their importance as consumers. If the recent momentum behind annual gains in energy efficiency is to be maintained and extended, governments need to make it an explicit goal of their policies for energy pricing to consumers, prices needed to encourage the adoption of energy-saving measures may be achieved through several means. Although the Commission expresses no preference, 'conservation pricing' requires that governments take a long-term view in weighing the costs and benefits of the various measures. Given the importance of oil prices on international energy policy, new mechanisms for encouraging dialogue between consumers and producers should be explored.

65. A safe, environmentally sound, and economically viable energy pathway that will sustain human progress into the distant future is clearly imperative. It is also possible. But it will require new dimensions of political will and institutional cooperation to achieve it. (See *Chapter 7* for a wider discussion of these issues and recommendations.)

## **5. Industry: Producing More with Less**

66. The world manufactures seven times more goods today than it did as recently as 1950. Given population growth rates, a five- to tenfold increase in manufacturing output will be needed just to raise developing world consumption of manufactured goods to industrialized world levels by the time population growth rates level off next century.

67. Experience in the industrialized nations has proved that anti-pollution technology has been cost-effective in terms of health, property, and environmental damage avoided, and that

it has made many industries more profitable by making them more resource-efficient. While economic growth has continued, the consumption of raw materials has held steady or even declined, and new technologies offer further efficiencies.

68. Nations have to bear the costs of any inappropriate industrialization, and many developing countries are realizing that they have neither the resources nor - given rapid technological change - the time to damage their environments now and clean up later. But they also need assistance and information from industrialized nations to make the best use of technology. Transnational corporations have a special responsibility to smooth the path of industrialization in the nations in which they operate.

69. Emerging technologies offer the promise of higher productivity, increased efficiency, and decreased pollution, but many bring risks of new toxic chemicals and wastes and of major accidents of a type and scale beyond present coping mechanisms. There is an urgent need for tighter controls over the export of hazardous industrial and agricultural chemicals. Present controls over the dumping of hazardous wastes should be tightened.

70. Many essential human needs can be met only through goods and services provided by industry, and the shift to sustainable development must be powered by a continuing flow of wealth from industry. (See *Chapter 8* for a wider discussion of these issues and recommendations.)

## **6. The Urban Challenge**

71. By the turn of the century, almost half of humanity will live in cities; the world of the 21st century will be a largely urban world. Over only 65 years, the developing world's urban population has increased tenfold, from around 100 million in 1920 to 1 billion today. In 1940, one person in 100 lived in a city of 1 million or more inhabitants; by 1980, one in 10 lived in such a city. Between 1985 and the year 2000, Third World cities could grow by another three-quarters of a billion people. This suggests that the developing world must, over the next few years, increase by 65 per cent its capacity to produce and manage its urban infrastructure, services, and shelter merely to maintain today's often extremely inadequate conditions.

72. Few city governments in the developing world have the power, resources, and trained personnel to provide their rapidly growing populations with the land, services, and facilities needed for an adequate human life: clean water, sanitation, schools, and transport. The result is mushrooming illegal settlements with primitive facilities, increased overcrowding, and rampant disease linked to an unhealthy environment. Many cities in industrial countries also face problems - deteriorating infrastructure, environmental degradation, inner-city decay, and neighbourhood collapse. But with the means and resources to tackle this decline, the issue for most industrial countries is ultimately one of political and social choice. Developing countries are not in the same situation. They have a major urban crisis on their hands.

73. Governments will need to develop explicit settlements strategies to guide the process of urbanization, taking the pressure off the largest urban centres and building up smaller towns and cities, more closely integrating them with their rural hinterlands. This will mean examining and changing other policies - taxation, food pricing, transportation, health, industrialization - that work against the goals of settlements strategies.

74. Good city management requires decentralization of funds, political power, and personnel - to local authorities, which are best placed to appreciate and manage local needs. But the sustainable development of cities will depend on closer work with the majorities of urban poor



who are the true city builders, tapping the skills, energies and resources of neighbourhood groups and those in the 'informal sector'. Much can be achieved by 'site and service' schemes that provide households with basic services and help them to get on with building sounder houses around these. (See *Chapter 9* for a wider discussion of these issues and recommendations.)

### **III. International Cooperation and Institutional Reform**

#### **1. The Role of the International Economy**

75. Two conditions must be satisfied before international economic exchanges can become beneficial for all involved. The sustainability of ecosystems on which the global economy depends must be guaranteed. And the economic partners must be satisfied that the basis of exchange is equitable. For many developing countries, neither condition is set.

76. Growth in many developing countries is being stifled by depressed commodity prices, protectionism, intolerable debt burdens, and declining flows of development finance. If living standards are to grow so as to alleviate poverty, these trends must be reversed.

77. A particular responsibility falls to the World Bank and the International Development Association as the main conduit for multilateral finance to developing countries. In the context of consistently increased financial flows, the World Bank can support environmentally sound projects and policies. In financing structural adjustment, the International Monetary Fund should support wider and longer term development objectives than at present: growth, social goals, and environmental impacts.

78. The present level of debt service of many countries, especially in Africa and Latin America, is not consistent with sustainable development. Debtors are being required to use trade surpluses to service debts, and are drawing heavily on non-renewable resources to do so. Urgent action is necessary to alleviate debt burdens in ways that represent a fairer sharing between both debtors and lenders of the responsibilities and burdens.

79. Current arrangements for commodities could be significantly improved: more compensatory financing to offset economic shocks would encourage producers to take a long-term view, and not to overproduce commodities; and more assistance could be given from diversification programmes. Commodity-specific arrangements can build on the model of the International Tropical Timber Agreement, one of the few that specifically includes ecological concerns

80. Multinational companies can play an important role in sustainable development, especially as developing countries come to rely more on foreign equity capital. But if these companies are to have a positive influence on development, the negotiating capacity of developing countries vis a vis transnationals must be strengthened so they can secure terms which respect their environmental concerns.

81. However, these specific measures must be located in a wider context of effective cooperation to produce an international economic system geared to growth and the elimination of world poverty. (See *Chapter 3* for a more detailed discussion of issues and recommendations on the international economy.)

#### **2. Managing the Commons**

82. Traditional forms of national sovereignty raise particular problems in managing the 'global commons' and their shared ecosystems - the oceans, outer space, and Antarctica. Some progress has been made in all three areas; much remains to be done.

83. The UN Conference on the Law of the Sea was the most ambitious attempt ever to provide an internationally agreed regime for the management of the oceans. All nations should ratify the Law of the Sea Treaty as soon as possible. Fisheries agreements should be strengthened to prevent current overexploitation, as should conventions to control and regulate the dumping of hazardous wastes at sea.

84. There are growing concerns about the management of orbital space, centering on using satellite technology for monitoring planetary systems; on making the most effective use of the limited capacities of geosynchronous orbit for communications satellites; and on limiting space debris. The orbiting and testing of weapons in space would greatly increase this debris. The international community should seek to design and implement a space regime to ensure that space remains a peaceful environment for the benefit of all.

85. Antarctica is managed under the 1959 Antarctica Treaty. However, many nations outside of that pact view the Treaty System as too limited, both in participation and in the scope of its conservation measures. The Commission's recommendations deal with the safeguarding of present achievements; the incorporation of any minerals development into a management regime; and various options for the future. (See *Chapter 10* for more discussion in issues and recommendations on the management of the commons.)

### **3. Peace, Security, Development, and the Environment**

86. Among the dangers facing the environment, the possibility of nuclear war is undoubtedly the gravest. Certain aspects of the issues of peace and security bear directly upon the concept of sustainable development. The whole notion of security as traditionally understood in terms of political and military threats to national sovereignty - must be expanded to include the growing impacts of environmental stress - locally, nationally, regionally, and globally. There are no military solutions to 'environmental insecurity'.

87. Governments and international agencies should assess the cost-effectiveness, in terms of achieving security, of money spent on armaments compared with money spent on reducing poverty or restoring a ravaged environment.

88. But the greatest need is to achieve improved relations among those major powers capable of deploying weapons of mass destruction. This is needed to achieve agreement on tighter control over the proliferation and testing of various types of weapons of mass destruction - nuclear and non nuclear - including those that have environmental implications. (See *Chapter 11* for more discussion of issues and recommendations on the links between peace, security, development, and the environment.)

### **4. Institutional and Legal Change**

89. The Report that follows contains throughout (and especially in *Chapter 12*), many specific recommendations for institutional and legal change. These cannot be adequately summarized here. However, the Commission's main proposals are embodied in six priority areas.

#### **4.1 Getting at the Sources**

90. Governments must begin now to make the key national, economic, and sectoral agencies directly responsible and accountable for ensuring that their policies, programmes, and budgets support development that is economically and ecologically sustainable.

91. By the same token, the various regional organizations need to do more to integrate environment fully in their goals and activities. New regional arrangements will especially be needed among developing countries to deal with transboundary environmental issues.

92. All major international bodies and agencies should ensure that their programmes encourage and support sustainable development, and they should greatly improve their coordination and cooperation. The Secretary-General of the United Nations Organization should provide a high level centre of leadership for the UN system to assess, advise, assist, and report on progress made towards this goal.

#### **4.2 Dealing with the Effects**

93. Governments should also reinforce the roles and capacities of environmental protection and resource management agencies. This is needed in many industrialized countries, but most urgently in developing countries, which will need assistance in strengthening their institutions. The UN Environment Programme (UNEP) should be strengthened as the principal source on environmental data, assessment, and reporting and as the principal advocate and agent for change and international cooperation on critical environment and natural resource protection issues.

#### **4.3 Assessing Global Risks**

94. The capacity to identify, assess, and report on risks of irreversible damage to natural systems and threats to the survival, security, and well being of the world community must be rapidly reinforced and extended. Governments, individually and collectively, have the principal responsibility to do this. UNEP's Earthwatch programme should be the centre of leadership in the UN system on risk assessment

95. However, given the politically sensitive nature of many of the most critical risks, there is also a need for an independent but complementary capacity to assess and report on critical global risks. A new international programme for cooperation among largely non-governmental organizations, scientific bodies, and industry groups should therefore be established for this purpose.

#### **4.4 Making Informed Choices**

96. Making the difficult choices involved in achieving sustainable development will depend on the widespread support and involvement of an informed public and of NGOs, the scientific community, and industry. Their rights, roles and participation in development planning, decision-making, and project implementation should be expanded.

## **4.5 Providing the Legal Means**

97. National and international law is being rapidly outdistanced by the accelerating pace and expanding scale of impacts on the ecological basis of development. Governments now need to fill major gaps in existing national and international law related to the environment, to find ways to recognize and protect the rights of present and future generations to an environment adequate for their health and well-being, to prepare under UN auspices a universal Declaration on environmental protection and sustainable development and a subsequent Convention, and to strengthen procedures for avoiding or resolving disputes on environment and resource management issues.

## **4.6 Investing in our Future**

98. Over the past decade, the overall cost-effectiveness of investments in halting pollution has been demonstrated. The escalating economic and ecological damage costs of not investing in environmental protection and improvement have also been repeatedly demonstrated - often in grim tolls of flood and famine. But there are large financial implications: for renewable energy development, pollution control, and achieving less resource intensive forms of agriculture.

99. Multilateral financial institutions have a crucial role to play. The World Bank is presently reorienting its programmes towards greater environmental concerns. This should be accompanied by a fundamental commitment to sustainable development by the Bank. It is also essential that the Regional Development Banks and the International Monetary Fund incorporate similar objectives in their policies and programmes. A new priority and focus is also needed in bilateral aid agencies.

100. Given the limitations on increasing present flows of international aid, proposals for securing additional revenue from the use of international commons and natural resources should now be seriously considered by governments.

## **IV. A Call for Action**

101. Over the course of this century, the relationship between the human world and the planet that sustains it has undergone a profound change.

102. When the century began, neither human numbers nor technology had the power radically to alter planetary systems. As the century closes, not only do vastly increased human numbers and their activities have that power, but major, unintended changes are occurring in the atmosphere, in soils, in waters, among plants and animals, and in the relationships among all of these. The rate of change is outstripping the ability of scientific disciplines and our current capabilities to assess and advise. It is frustrating the attempts of political and economic institutions, which evolved in a different, more fragmented world, to adapt and cope. It deeply worries many people who are seeking ways to place those concerns on the political agendas.

103. The onus lies with no one group of nations. Developing countries face the obvious life-threatening challenges of desertification, deforestation, and pollution, and endure most of the poverty associated with environmental degradation. The entire human family of nations would suffer from the disappearance of rain forests in the tropics, the loss of plant and animal species, and changes in rainfall patterns. Industrial nations face the life-threatening challenges



of toxic chemicals, toxic wastes, and acidification. All nations may suffer from the releases by industrialized countries of carbon dioxide and of gases that react with the ozone layer, and from any future war fought with the nuclear arsenals controlled by those nations. All nations will have a role to play in changing trends, and in righting an international economic system that increases rather than decreases inequality, that increases rather than decreases numbers of poor and hungry.

104. The next few decades are crucial. The time has come to break out of past patterns. Attempts to maintain social and ecological stability through old approaches to development and environmental protection will increase instability. Security must be sought through change. The Commission has noted a number of actions that must be taken to reduce risks to survival and to put future development on paths that are sustainable. Yet we are aware that such a reorientation on a continuing basis is simply beyond the reach of present decision-making structures and institutional arrangements, both national and international.

105. This Commission has been careful to base our recommendations on the realities of present institutions, on what can and must be accomplished today. But to keep options open for future generations, the present generation must begin now, and begin together.

106. To achieve the needed changes, we believe that an active follow-up of this report is imperative. It is with this in mind that we call for the UN General Assembly, upon due consideration, to transform this report into a UN Programme on Sustainable Development. Special follow-up conferences could be initiated at the regional level. Within an appropriate period after the presentation of this report to the General Assembly, an international conference could be convened to review progress made, and to promote follow up arrangements that will be needed to set benchmarks and to maintain human progress.

107. First and foremost, this Commission has been concerned with people - of all countries and all walks of life. And it is to people that we address our report. The changes in human attitudes that we call for depend on a vast campaign of education, debate, and public participation. This campaign must start now if sustainable human progress is to be achieved.

108. The Members of the World Commission on Environment and Development came from 21 very different nations. In our discussions, we disagreed often on details and priorities. But despite our widely differing backgrounds and varying national and international responsibilities, we were able to agree to the lines along which change must be drawn.

109. We are unanimous in our conviction that the security, well-being, and very survival of the planet depend on such changes, now.

# **Our Common Future, Chapter 1: A Threatened Future**

## ***I. Symptoms and Causes***

1. *Poverty*
2. *Growth*
3. *Survival*
4. *The Economic Crisis*

## ***II. New Approaches to Environment and Development***

---

1. The Earth is one but the world is not. We all depend on one biosphere for sustaining our lives. Yet each community, each country, strives for survival and prosperity with little regard for its impact on others. Some consume the Earth's resources at a rate that would leave little for future generations. Others, many more in number, consume far too little and live with the prospect of hunger, squalor, disease, and early death.

2. Yet progress has been made. Throughout much of the world, children born today can expect to live longer and be better educated than their parents. In many parts, the new-born can also expect to attain a higher standard of living in a wider sense. Such progress provides hope as we contemplate the improvements still needed, and also as we face our failures to make this Earth a safer and sounder home for us and for those who are to come.

3. The failures that we need to correct arise both from poverty and from the short-sighted way in which we have often pursued prosperity. Many parts of the world are caught in a vicious downwards spiral: Poor people are forced to overuse environmental resources to survive from day to day, and their impoverishment of their environment further impoverishes them, making their survival ever more difficult and uncertain. The prosperity attained in some parts of the world is often precarious, as it has been secured through farming, forestry, and industrial practices that bring profit and progress only over the short term.

4. Societies have faced such pressures in the past and, as many desolate ruins remind us, sometimes succumbed to them. But generally these pressures were local. Today the scale of our interventions in nature is increasing and the physical effects of our decisions spill across national frontiers. The growth in economic interaction between nations amplifies the wider consequences of national decisions. Economics and ecology bind us in ever-tightening networks. Today, many regions face risks of irreversible damage to the human environment that threaten the basis for human progress.

5. These deepening interconnections are the central justification for the establishment of this Commission. We travelled the world for nearly three years, listening. At special public hearings organized by the Commission, we heard from government leaders, scientists, and experts, from citizens' groups concerned about a wide range of environment and development issues, and from thousands of individuals farmers, shanty-town residents, young people, industrialists, and indigenous and tribal peoples.

6. We found everywhere deep public concern for the environment, concern that has led not just to protests but often to changed behaviour. The challenge is to ensure that these new values are more adequately reflected in the principles and operations of political and economic structures.

7. We also found grounds for hope: that people can cooperate to build a future that is more prosperous, more just, and more secure; that a new era of economic growth can be attained, one based on policies that sustain and expand the Earth's resource base; and that the progress that some have known over the last century can be experienced by all in the years ahead. But for this to happen, we must understand better the symptoms of stress that confront us, we must identify the causes, and we must design new approaches to managing environmental resources and to sustaining human development

## **I. Symptoms and Causes**

8. Environmental stress has often been seen as the result of the growing demand on scarce resources and the pollution generated by the rising living standards of the relatively affluent. But poverty itself pollutes the environment, creating environmental stress in a different way. Those who are poor and hungry will often destroy their immediate environment in order to survive: They will cut down forests; their livestock will overgraze grasslands; they will overuse marginal land; and in growing numbers they will crowd into congested cities. The cumulative effect of these changes is so far-reaching as to make poverty itself a major global scourge.

9. On the other hand, where economic growth has led to improvements in living standards, it has sometimes been achieved in ways that are globally damaging in the longer term. Much of the improvement in the past has been based on the use of increasing amounts of raw materials, energy, chemicals, and synthetics and on the creation of pollution that is not adequately accounted for in figuring the costs of production processes. These trends have had unforeseen effects on the environment. Thus today's environmental challenges arise both from the lack of development and from the unintended consequences of some forms of economic growth.

### **1. Poverty**

10. There are more hungry people in the world today than ever before in human history, and their numbers are growing. In 1980, there were 340 million people in 87 developing countries not getting enough calories to prevent stunted growth and serious health risks. This total was very slightly below the figure for 1970 in terms of share of the world population, but in terms of sheer numbers, it represented a 14 per cent increase. The World Bank predicts that these numbers are likely to go on growing. /1

I think this Commission should give attention on how to look into the question of more participation for those people who are the object of development. Their basic needs include the right to preserve their cultural identity, and their right not to be alienated from their own society, and their own community. So the point I want to make is that we cannot discuss environment or development without discussing political development. And you cannot eradicate poverty, at least not only by redistributing wealth or income, but there must be more redistribution of power.

Aristides Katoppo

11. The number of people living in slums and shanty towns is rising, not falling. A growing number lack access to clean water and sanitation and hence are prey to the diseases that arise from this lack. There is some progress, impressive in places. But, on balance, poverty persists and its victims multiply.

12. The pressure of poverty has to be seen in a broader context. At the international level there are large differences in per capita income, which ranged in 1984 from \$190 in low income countries (other than China and India) to \$11,430 in the industrial market economies. (See Table 1-1)

**Table 1-1**

**Population Size and per capita GDP by Groups of Countries**

Countries	Population (millions)	Per capita GDP (1984 dollars)	Average annual growth rate of per capita GDP, 1965-1984 (per cent)
Low-income countries (excluding China, India)	611	190	0.9
China and India	1,778	390	3.2
Lower Middle-income Economies	691	740	1.0
Upper Middle-income Economies	497	1,980	3.1
High-Income Oil Exporters	19	11,350	3.2
Industrial Market Economies	732	11,430	2.4

**Source:** Based on data in World Bank, **World Development Report, 1985**. (New York, Oxford University Press, 1986)

13. Such inequalities represent great differences not merely in the quality of life today, but also in the capacity of societies to improve their quality of life in the future. Most of the world's poorest countries depend for increasing export earnings on tropical agricultural products that are vulnerable to fluctuating or declining terms of trade. Expansion can often only be achieved at the price of ecological stress. Yet diversification in ways that will alleviate both poverty and



ecological stress is hampered by disadvantageous terms of technology transfer, by protectionism, and by declining financial flows to those countries that most need international finance./2

14. Within countries, poverty has been exacerbated by the unequal distribution of land and other assets. The rapid rise in population has compromised the ability to raise living standards. These factors, combined with growing demands for the commercial use of good land, often to grow crops for exports, have pushed many subsistence farmers onto poor land and robbed them of any hope of participating in their nations' economic lives. The same forces have meant that traditional shifting cultivators, who once cut forests, grew crops, and then gave the forest time to recover, now have neither land enough nor time to let forests re-establish. So forests are being destroyed, often only to create poor farmland that cannot support those who till it. Extending cultivation onto steep slopes is increasing soil erosion in many hilly sections of both developing and developed nations. In any river valleys, areas chronically liable to floods are now farmed.

15. These pressures are reflected in the rising incidence of disasters. During the 1970s, six times as many people died from 'natural disasters' each year as in the 1960s, and twice as many suffered from such disasters. Droughts and floods, disasters among whose causes are widespread deforestation and overcultivation, increased most in terms of numbers affected. There were 18.5 million people affected by droughts annually in the 1960s, but 24.4 billion in the 1970s; 5.2 billion people were victims of floods yearly in the 1960s, compared with 15.4 million in the 1970s./3 The results are not in for the 1980s, but this disaster-prone decade seems to be carrying forward the trend, with droughts in Africa, India, and Latin America, and floods throughout Asia, parts of Africa, and the Andean region of Latin America.

16. Such disasters claim most of their victims among the impoverished in poor nations, where subsistence farmers must make their land more liable to droughts and floods by clearing marginal areas, and where the poor make themselves more vulnerable to all disasters by living on steep slopes and unprotected shores - the only lands left for their shanties. Lacking food and foreign exchange reserves their economically vulnerable governments are ill-equipped to cope with such catastrophes.

17. The links between environmental stress and developmental disaster are most evident in sub-Saharan Africa. Per capita food production, declining since the 1960s, plummeted during the drought of the 1980s, and at the height of the food emergency some 35 million people were exposed to risk. Human overuse of land and prolonged drought threaten to turn the grasslands of Africa's Sahel region into desert./4 No other region more tragically suffers the vicious cycle of poverty leading to environmental degradation, which leads in turn to even greater poverty.

If people destroy vegetation in order to get land, food, fodder, fuel, or timber, the soil is no longer protected. Rain creates surface runoff, and the soil erodes. When the soil is gone, no water is retained and the land can no longer produce enough food, fodder, fuel, or timber, so people need to turn to new land and start the process all over again.

All major disaster problems in the Third World are essentially unsolved development problems. Disaster prevention is thus primarily an aspect of development, and this must be a development that takes place within the sustainable limits.

Odd Grann  
 Secretary General, Norwegian Red Cross  
 WCED Public Hearing  
 Oslo, 24-25 June 1985

## 2. Growth

18. In some parts of the world, particularly since the mid-1950s, growth and development have vastly improved living standards and the quality of life. Many of the products and technologies that have gone into this improvement are raw material- and energy-intensive and entail a substantial amount of pollution. The consequent impact on the environment is greater than ever before in human history.

19. Over the past century, the use of fossil fuels has grown nearly thirtyfold, and industrial production has increased more than fiftyfold. The bulk of this increase, about three-quarters in the case of fossil fuels and a little over four-fifths in the case of industrial production, has taken place since 1950. The annual increase in industrial production today is perhaps as large as the total production in Europe around the end of the 1930s.<sup>/5</sup> Into every year we now squeeze the decades of industrial growth and environmental disruption that formed the basis of the pre-war European economy.

20. Environmental stresses also arise from more traditional forms of production. More land has been cleared for settled cultivation in the past 100 years than in all the previous centuries of human existence. Interventions in the water cycles have increased greatly. Massive dams, most of them built after 1960, impound a large proportion of the river flow. In Europe and Asia, water use has reached 10 per cent of the annual run off, a figure that is expected to rise to 20-25 per cent by the end of the century.<sup>/6</sup>

21. The impact of growth and rising income levels can be seen in the distribution of world consumption of a variety of resource intensive produce. The more affluent industrialized countries use most of the world's metals and fossil fuels. Even in the case of food products a sharp difference exists, particularly in the products that are more resource-intensive. (See Table 1-2.)

**Table 1-2**

### **Distribution of World Consumption, Averages for 1980-83**

Commodity	Developed Countries (26% of population)		Developing Countries (74% of population)	
	Units of Per Capita Consumption	Share in World Consumption	Share in World Consumption	per capita
		per cent	per cent	per capita
		per capita		

Food					
Calories	kcal/day	34	3,395	66	2,389
Protein	gms/day	38	99	62	
Fat	gms/day	53	127	47	40
Paper	kg/year	85	123	15	8
Steel	kg/year	79	459	21	41
Other Metals	kg/year	86	26	14	2
Commercial Energy	/year	80		20	0.5

**Source:** WCED estimates based on country-level data from FAO, UN Statistical Office, UNCTAD and American Metals Association

22. In recent years, industrial countries have been able to achieve economic growth using less energy and raw materials per unit of output. This, along with the efforts to reduce the emission of pollutants, will help to contain the pressure on the biosphere. But with the increase in population and the rise in incomes, per capita consumption of energy and materials will go up in the developing countries, as it has to if essential needs are to be met. Greater attention to resource efficiency can moderate the increase, but, on balance, environmental problems linked to resource use will intensify in global terms.

### 3. Survival

23. The scale and complexity of our requirements for natural resources have increased greatly with the rising levels of population and production. Nature is bountiful, but it is also fragile and finely balanced. There are thresholds that cannot be crossed without endangering the basic integrity of the system. Today we are close to many of these thresholds; we must be ever mindful of the risk of endangering the survival of life on Earth. Moreover, the speed with which changes in resource use are taking place gives little time in which to anticipate and prevent unexpected effects.

24. The 'greenhouse effect', one such threat to life support systems, springs directly from increased resource use. The burning of fossil fuels and the cutting and burning of forests release carbon dioxide (CO<sub>2</sub>). The accumulation in the atmosphere of CO<sub>2</sub> and certain other gases traps solar radiation near the Earth's surface, causing global warming. This could cause sea level rises over the next 45 years large enough to inundate many low lying coastal cities and river deltas. It could also drastically upset national and international agricultural production and trade systems./7

The remarkable achievements of the celebrated Industrial Revolution are now beginning seriously to be questioned principally because the environment was not considered at the time. It was felt that the sky was so vast and clear nothing could ever change its colour, our rivers so big and their water so plentiful that no amount of human activity could ever change their quality, and there were trees and natural forests so plentiful that we will never finish them. After all, they grow again.

Today we should know better. The alarming rate at which the Earth's surface is being denuded of its natural vegetative cover seems to indicate that the world may soon become devoid of trees through clearing for human developments.

Hon. Victoria Chitepo  
Minister of Natural Resources and Tourism, Government of Zimbabwe  
WCED Opening Ceremony  
Harare, 18 Sept 1986

25. Another threat arises from the depletion of the atmospheric ozone layer by gases released during the production of foam and the use of refrigerants and aerosols. A substantial loss of such ozone could have catastrophic effects on human and livestock health and on some life forms at the base of the marine food chain. The 1986 discovery of a hole in the ozone layer above the Antarctic suggests the possibility of a more rapid depletion than previously suspected.<sup>/8</sup>

26. A variety of air pollutants are killing trees and lakes and damaging buildings and cultural treasures, close to and sometimes thousands of miles from points of emission. The acidification of the environment threatens large areas of Europe and North America. Central Europe is currently receiving more than one gramme of sulphur on every square metre of ground each year.<sup>/9</sup> The loss of forests could bring in its wake disastrous erosion, siltation, floods, and local climatic change. Air pollution damage is also becoming evident in some newly industrialized countries.

27. In many cases the practices used at present to dispose of toxic wastes, such as those from the chemical industries, involve unacceptable risks. Radioactive wastes from the nuclear industry remain hazardous for centuries. Many who bear these risks do not benefit in any way from the activities that produce the wastes.

28. Desertification - the process whereby productive arid and semi-arid land is rendered economically unproductive - and large-scale deforestation are other examples of major threats to the integrity of regional ecosystems. Desertification involves complex interactions between humans, land, and climate. The pressures of subsistence food production, commercial crops, and meat production in arid and semi-arid areas all contribute to this process.

29. Each year another 6 million hectares are degraded to desert-like conditions.<sup>/10</sup> Over three decades, this would amount to an area roughly as large as Saudi Arabia. More than 11 million hectares of tropical forests are destroyed per year and this, over 30 years, would amount to an area about the size of India.<sup>/11</sup> Apart from the direct and often dramatic impacts within the immediate area, nearby regions are affected by the spreading of sands or by changes in water regimes and increased risks of soil erosion and siltation.

30. The loss of forests and other wild lands extinguishes species of plants and animals and drastically reduces the genetic diversity of the world's ecosystems. This process robs present



and future generations of genetic material with which to improve crop varieties, to make them less vulnerable to weather stress, pest attacks, and disease. The loss of species and subspecies, many as yet unstudied by science, deprives us of important potential sources of medicines and industrial chemicals. It removes forever creatures of beauty and parts of our cultural heritage; it diminishes the biosphere.

31. Many of the risks stemming from our productive activity and the technologies we use cross-national boundaries; many are global. Though the activities that give rise to these dangers tend to be concentrated in a few countries, the risks are shared by all, rich and poor, those who benefit from them and those who do not. Most who share in the risks have little influence on the decision processes that regulate these activities.

32. Little time is available for corrective action. In some cases we may already be close to transgressing critical thresholds. While scientists continue to research and debate causes and effects, in many cases we already know enough to warrant action. This is true locally and regionally in the cases of such threats as desertification, deforestation, toxic wastes, and acidification; it is true globally for such threats as climate change, ozone depletion, and species loss. The risks increase faster than do our abilities to manage them.

33. Perhaps the greatest threat to the Earth's environment, to sustainable human progress, and indeed to survival is the possibility of nuclear war, increased daily by the continuing arms race and its spread to outer space. The search for a more viable future can only be meaningful in the context of a more vigorous effort to renounce and eliminate the development of means of annihilation.

#### **4. The Economic Crisis**

34. The environmental difficulties that confront us are not new, but only recently have we begun to understand their complexity. Previously our main concerns centred on the effects of development on the environment. Today, we need to be equally concerned about the ways in which environmental degradation can dampen or reverse economic development. In one area after another, environmental degradation is eroding the potential for development. This basic connection was brought into sharp focus by the environment and development crises of the 1980s.

35. The slowdown in the momentum of economic expansion and the stagnation in world trade in the 1980s challenged all nations' abilities to react and adjust. Developing countries that rely on the export of primary products have been hit particularly hard by falling commodity prices. Between 1980 and 1984, developing countries lost about \$55 billion in export earnings because of the fall in commodity prices, a blow felt most keenly in Latin America and Africa.<sup>/12</sup>

36. As a consequence of this period of slow growth in the world economy - together with rising debt service obligations and a decline in the inflow of finance - many developing countries have faced severe economic crises. Over half of all developing countries actually experienced declining per capita GDP in the years 1982-85 and per capita GDP has fallen, for developing countries as a whole, by around 10 per cent in the 1980s. (See Table 1-3.)

37. The heaviest burden in international economic adjustment has been carried by the world's poorest people. The consequence has been a considerable increase in human distress and the overexploitation of land and natural resources to ensure survival in the short term.

**Table 1-3**  
**Annual Rate of Increase of Gross Domestic Product in Developing Countries, 1976-85**

38. Many international economic problems remain unresolved: Developing country indebtedness remains serious; commodity and energy markets are highly unstable; financial flows to developing countries are seriously deficient; protectionism and trade wars are a serious threat. Yet at a time when multilateral institutions, and rules, are more than ever necessary, they have been devalued. And the notion of an international responsibility for development has virtually disappeared. The trend is towards a decline in multilateralism and an assertion of national dominance.

## II. New Approaches to Environment and Development

39. Human progress has always depended on our technical ingenuity and a capacity for cooperative action. These qualities have often been used constructively to achieve development and environmental progress: in air and water pollution control, for example, and in increasing the efficiency of material and energy use. Many countries have increased food production and reduced population growth rates. Some technological advances, particularly in medicine, have been widely shared.

40. But this is not enough. Failures to manage the environment and to sustain development threaten to overwhelm all countries. Environment and development are not separate challenges; they are inexorably linked. Development cannot subsist upon a deteriorating environmental resource base; the environment cannot be protected when growth leaves out of account the costs of environmental destruction. These problems cannot be treated separately by fragmented institutions and policies. They are linked in a complex system of cause and effect.

41. First, environmental stresses are linked one to another. For example, deforestation, by increasing run off, accelerates soil erosion and siltation of rivers and lakes. Air pollution and acidification play their part in killing forests and lakes. Such links mean that several different problems must be tackled simultaneously. And success in one area, such as forest protection, can improve chances of success in another area, such as soil conservation.

42. Second, environmental stresses and patterns of economic development are linked one to another. Thus agricultural policies may lie at the root of land, water, and forest degradation. Energy policies are associated with the global greenhouse effect, with acidification, and with deforestation for fuelwood in many developing nations. These stresses all threaten economic development. Thus economics and ecology must be completely integrated in decision making and lawmaking processes not just to protect the environment, but also to protect and promote development. Economy is not just about the production of wealth, and ecology is not just about the protection of nature; they are both equally relevant for improving the lot of humankind.

How long can we go on and safely pretend that the environment is not the economy, is not health, is not the prerequisite to development, is not recreation? Is it realistic to see ourselves as managers of an entity out there called the environment, extraneous to us, an alternative to the economy, too expensive a value to protect in difficult economic times? When we organize ourselves starting from this premise, we do so with dangerous consequences to our economy, health, and industrial growth.

We are now just beginning to realize that we must find an alternative to our ingrained behaviour of burdening future generations resulting from our misplaced

belief that there is a choice between economy and the environment. That choice, in the long term, turns out to be an illusion with awesome consequences for humanity.

Charles Caccia  
Member of Parliament, House of Commons  
WCED Public Hearing  
Ottawa, 26-27 May 1986

43. Third, environmental and economic problems are linked to many social and political factors. For example, the rapid population growth that has so profound an impact on the environment and on development in many regions is driven partly by such factors as the status of women in society and other cultural values. Also, environmental stress and uneven development can increase social tensions. It could be argued that the distribution of power and influence within society lies at the heart of most environment and development challenges. Hence new approaches must involve programmes of social development, particularly to improve the position of women in society, to protect vulnerable groups, and to promote local participation in decision making.

44. Finally, the systemic features operate not merely within but also between nations. National boundaries have become so porous that traditional distinctions between matters of local, national, and international significance have become blurred. Ecosystems do not respect national boundaries. Water pollution moves through shared rivers, lakes, and seas. The atmosphere carries air pollution over vast distances. Major accidents - particularly those at nuclear reactors or at plants or warehouses containing toxic materials - can have widespread regional effects.

45. Many environment economy links also operate globally. For instance, the highly subsidized, incentive-driven agriculture of industrialized market economies generates surpluses that depress prices and erode the viability of the often neglected agriculture of developing countries. Soils and other environmental resources suffer in both systems. Each country may devise national agricultural policies to secure short-term economic and political gains, but no nation alone can devise policies to deal effectively with the financial, economic, and ecological costs of the agricultural and trade policies of other nations.

To successfully advance in solving global problems, we need to develop new methods of thinking, to elaborate new moral and value criteria, and, no doubt, new patterns of behaviour.

Mankind is on the threshold of a new stage in its development. We should not only promote the expansion of its material, scientific, and technical basis, but, what is most important, the formation of new value and humanistic aspirations in human psychology, since wisdom and humaneness are the 'eternal truths' that make the basis of humanity. We need new social, moral, scientific, and ecological concepts, which should be determined by new conditions for the life of mankind today and in the future.

I.T. Frolov  
Editor-in-Chief, Communist Magazine  
WCED Public Hearing  
Moscow, 6 Dec 1986

46. In the past, responsibility for environmental matters has been placed in environmental ministries and institutions that often have had little or no control over destruction caused by agricultural, industrial, urban development, forestry, and transportation policies and practices. Society has failed to give the responsibility for preventing environmental damage to the 'sectoral' ministries and agencies whose policies cause it. Thus our environmental management practices have focused largely upon after-the-fact repair of damage: reforestation, reclaiming desert lands, rebuilding urban environments, restoring natural habitats, and rehabilitating wild lands. The ability to anticipate and prevent environmental damage will require that the ecological dimensions of policy be considered at the same time as the economic, trade, energy, agricultural, and other dimensions.

47. In most countries, environmental policies are directed at the symptoms of harmful growth; these policies have brought progress and rewards and must be continued and strengthened. But that will not be enough. What is required is a new approach in which all nations aim at a type of development that integrates production with resource conservation and enhancement, and that links both to the provision for all of an adequate livelihood base and equitable access to resources.

48. The concept of sustainable development provides a framework for the integration of environment policies and development strategies - the term 'development' being used here in its broadest sense. The word is often taken to refer to the processes of economic and social change in the Third World. But the integration of environment and development is required in all countries, rich and poor. The pursuit of sustainable development requires changes in the domestic and international policies of every nation.

You talk very little about life, you talk too much about survival. It is very important to remember that when the possibilities for life are over, the possibilities for survival start. And there are peoples here in Brazil, especially in the Amazon region, who still live, and these peoples that still live don't want to reach down to the level of survival.

Speaker from the floor  
WCED Public Hearing



49. Sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future. Far from requiring the cessation of economic growth, it recognizes that the problems of poverty and underdevelopment cannot be solved unless we have a new era of growth in which developing countries play a large role and reap large benefits.

50. Economic growth always brings risk of environmental damage, as it puts increased pressure on environmental resources. But policy makers guided by the concept of sustainable development will necessarily work to assure that growing economies remain firmly attached to their ecological roots and that these roots are protected and nurtured so that they may support growth over the long term. Environmental protection is thus inherent in the concept of sustainable development, as is a focus on the sources of environmental problems rather than the symptoms.

51. No single blueprint of sustainability will be found, as economic and social systems and ecological conditions differ widely among countries. Each nation will have to work out its own concrete policy implications. Yet irrespective of these differences, sustainable development should be seen as a global objective.

52. No country can develop in isolation from others. Hence the pursuit of sustainable development requires a new orientation in international relations. Long term sustainable growth will require far-reaching changes to produce trade, capital, and technology flows that are more equitable and better synchronized to environmental imperatives.

53. The mechanics of increased international cooperation required to assure sustainable development will vary from sector to sector and in relation to particular institutions. But it is fundamental that the transition to sustainable development be managed jointly by all nations. The unity of human needs requires a functioning multilateral system that respects the democratic principle of consent and accepts that not only the Earth but also the world is one.

54. In the chapters that follow we examine these issues in greater detail and make a number of specific proposals for responding to the crises of a threatened future. Overall, our report carries a message of hope. But it is hope conditioned upon the establishment of a new era of international cooperation based on the premise that every human being - those here and those who are to come - has the right to life, and to a decent life. We confidently believe that the international community can rise, as it must, to the challenge of securing sustainable human progress.

---

## Footnotes

1/ World Bank, **Poverty and Hunger: Issues and Options for Food Security in developing Countries** (Washington, DC: 1986).

2/ Department of International Economic and Social Affairs, **Doubling Development Finance: Meeting a Global Challenge, Views and Recommendations of the Committee on Development Planning** (New York: UN, 1986)

3/ G. Hagman et al., **Prevention Better Than Cure, Report on Human and Environmental Disasters in the Third World** (Stockholm: Swedish Red Cross, 1984).

4/ UN, General Assembly, 'The Critical Economic Situation in Africa: Report of the Secretary General', A/S-13/2, New York, 20 May 1986.

5/ Based on data from W.W. Rostow, **The World Economy: History and Prospect** (Austin: University of Texas Press, 1976); UN, **World Energy Supplies in Selected Years 1929-1950** (New York: 1952); UN, **Statistical Yearbook 1982** (New York: 1985); UNCTAD, **Handbook of International Trade and Development Statistics 1985 Supplement** (New York: 1985); W.S. and E.S. Woytinsky, **World Population and Production: Trends and Outlook** (New York: Twentieth Century Fund, 1953).

6/ USSR Committee for the International Hydrological Decade, **World Water Balance and Water Resources of the Earth** (Paris: UNESCO, 1978).

7/ WMO, **A Report of the International Conference on the Assessment of Carbon Dioxide and other Greenhouse Gases in Climate Variations and Associated Impacts**, Villach, Austria, 9-15 October 1985, WMO No. 661 (Geneva: WMO/ICSU/UNEP, 1986).

8/ National Science Foundation, 'Scientists Closer to Identifying Cause of Antarctic Ozone Layer Depletion news release. Washington, DC, 20 October 1986.

9/ J. Lehmhaus et al., 'Calculated and Observed Data for 1900 Compared at EMEP Measurement Stations', Norwegian Meteorological Institute, EMEP/MSC-W Report 1-86, 1986.

10/ UNEP, 'General Assessment of Progress in the Implementation of the Plan of Action to Combat Desertification 1978-1984', Nairobi, 1984; WCED Advisory Panel on Food Security, Agriculture, Forestry and Environment', **Food Security** (London: Zed Books, 1987).

11/ World Resources Institute/International Institute for Environment and Development, **World Resources 1986** (New York: Basic Books, 1986).

12/ UNCTAD, **Trade and Development Report 1986** (New York: 1986).

# **Our Common Future, Chapter 2: Towards Sustainable Development**

## ***I. The Concept of Sustainable Development***

## ***II. Equity and the Common Interest***

## ***III. Strategic Imperatives***

- 1. Reviving Growth***
- 2. Changing the quality of Growth***
- 3. Meeting Essential Human Needs***
- 4. Ensuring a Sustainable Level of Population***
- 5. Conserving and Enhancing the Resource Base***
- 6. Reorienting Technology and Managing Risk***
- 7. Merging Environment and Economics in Decision Making***

## ***IV. Conclusion***

---

1. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

- the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

2. Thus the goals of economic and social development must be defined in terms of sustainability in all countries - developed or developing, market-oriented or centrally planned. Interpretations will vary, but must share certain general features and must flow from a consensus on the basic concept of sustainable development and on a broad strategic framework for achieving it.

3. Development involves a progressive transformation of economy and society. A development path that is sustainable in a physical sense could theoretically be pursued even in a rigid social and political setting. But physical sustainability cannot be secured unless development policies pay attention to such considerations as changes in access to resources and in the distribution of costs and benefits. Even the narrow notion of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation.

## ***I. The Concept of Sustainable Development***

4 The satisfaction of human needs and aspirations in the major objective of development. The essential needs of vast numbers of people in developing countries for food, clothing, shelter, jobs - are not being met, and beyond their basic needs these people have legitimate aspirations for an improved quality of life. A world in which poverty and inequity are endemic will always

be prone to ecological and other crises. Sustainable development requires meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life.

5. Living standards that go beyond the basic minimum are sustainable only if consumption standards everywhere have regard for long-term sustainability. Yet many of us live beyond the world's ecological means, for instance in our patterns of energy use. Perceived needs are socially and culturally determined, and sustainable development requires the promotion of values that encourage consumption standards that are within the bounds of the ecological possible and to which all can reasonably aspire.

6. Meeting essential needs depends in part on achieving full growth potential, and sustainable development clearly requires economic growth in places where such needs are not being met. Elsewhere, it can be consistent with economic growth, provided the content of growth reflects the broad principles of sustainability and non-exploitation of others. But growth by itself is not enough. High levels of productive activity and widespread poverty can coexist, and can endanger the environment. Hence sustainable development requires that societies meet human needs both by increasing productive potential and by ensuring equitable opportunities for all.

7. An expansion in numbers can increase the pressure on resources and slow the rise in living standards in areas where deprivation is widespread. Though the issue is not merely one of population size but of the distribution of resources, sustainable development can only be pursued if demographic developments are in harmony with the changing productive potential of the ecosystem.

8. A society may in many ways compromise its ability to meet the essential needs of its people in the future - by overexploiting resources, for example. The direction of technological developments may solve some immediate problems but lead to even greater ones. Large sections of the population may be marginalized by ill-considered development.

9. Settled agriculture, the diversion of watercourses, the extraction of minerals, the emission of heat and noxious gases into the atmosphere, commercial forests, and genetic manipulation are all examples of human intervention in natural systems during the course of development. Until recently, such interventions were small in scale and their impact limited. Today's interventions are more drastic in scale and impact, and more threatening to life-support systems both locally and globally. This need not happen. At a minimum, sustainable development must not endanger the natural systems that support life on Earth: the atmosphere, the waters, the soils, and the living beings.

10. Growth has no set limits in terms of population or resource use beyond which lies ecological disaster. Different limits hold for the use of energy, materials, water, and land. Many of these will manifest themselves in the form of rising costs and diminishing returns, rather than in the form of any sudden loss of a resource base. The accumulation of knowledge and the development of technology can enhance the carrying capacity of the resource base. But ultimate limits there are, and sustainability requires that long before these are reached, the world must ensure equitable access to the constrained resource and reorient technological efforts to relieve the pressure.

A communications gap has kept environmental, population, and development assistance groups apart for too long, preventing us from being aware of our common interest and realizing our combined power. Fortunately, the gap is closing. We now know that what unites us is vastly more important than what



divides us.

We recognize that poverty, environmental degradation, and population growth are inextricably related and that none of these fundamental problems can be successfully addressed in isolation. We will succeed or fail together.

Arriving at a commonly accepted definition of 'sustainable development' remains a challenge for all the actors in the development process.

'Making Common Cause'

U.S. Based Development, Environment, Population NGOs

WCED Public Hearing

Ottawa, 26-27 May 1986

11. Economic growth and development obviously involve changes in the physical ecosystem. Every ecosystem everywhere cannot be preserved intact. A forest may be depleted in one part of a watershed and extended elsewhere, which is not a bad thing if the exploitation has been planned and the effects on soil erosion rates, water regimes, and genetic losses have been taken into account. In general, renewable resources like forests and fish stocks need not be depleted provided the rate of use is within the limits of regeneration and natural growth. But most renewable resources are part of a complex and interlinked ecosystem, and maximum sustainable yield must be defined after taking into account system-wide effects of exploitation.

12. As for non-renewable resources, like fossil fuels and minerals, their use reduces the stock available for future generations. But this does not mean that such resources should not be used. In general the rate of depletion should take into account the criticality of that resource, the availability of technologies for minimizing depletion, and the likelihood of substitutes being available. Thus land should not be degraded beyond reasonable recovery. With minerals and fossil fuels, the rate of depletion and the emphasis on recycling and economy of use should be calibrated to ensure that the resource does not run out before acceptable substitutes are available. Sustainable development requires that the rate of depletion of non renewable resources should foreclose as few future options as possible.

13. Development tends to simplify ecosystems and to reduce their diversity of species. And species, once extinct, are not renewable. The loss of plant and animal species can greatly limit the options of future generations; so sustainable development requires the conservation of plant and animal species.

14. So-called free goods like air and water are also resources. The raw materials and energy of production processes are only partly converted to useful products. The rest comes out as wastes. Sustainable development requires that the adverse impacts on the quality of air, water, and other natural elements are minimized so as to sustain the ecosystem's overall integrity.

15. In essence, sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development; and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.

## **II. Equity and the Common Interest**

16. Sustainable development has been described here in general terms. How are individuals in the real world to be persuaded or made to act in the common interest? The answer lies partly

in education, institutional development, and law enforcement. But many problems of resource depletion and environmental stress arise from disparities in economic and political power. An industry may get away with unacceptable levels of air and water pollution because the people who bear the brunt of it are poor and unable to complain effectively. A forest may be destroyed by excessive felling because the people living there have no alternatives or because timber contractors generally have more influence than forest dwellers.

17. Ecological interactions do not respect the boundaries of individual ownership and political jurisdiction. Thus:

- In a watershed, the ways in which a farmer up the slope uses land directly affect run-off on farms downstream.
- the irrigation practices, pesticides, and fertilizers used on one farm affect the productivity of neighbouring ones, especially among small farms.
- The efficiency of a factory boiler determines its rate of emission of soot and noxious chemicals and affects all who live and work around it.
- The hot water discharged by a thermal power plant into a river or a local sea affects the catch of all who fish locally.

18. Traditional social systems recognized some aspects of this interdependence and enforced community control over agricultural practices and traditional rights relating to water, forests, and land. This enforcement of the 'common interest' did not necessarily impede growth and expansion though it may have limited the acceptance and diffusion of technical innovations.

19. Local interdependence has, if anything, increased because of the technology used in modern agriculture and manufacturing. Yet with this surge of technical progress, the growing 'enclosure' of common lands, the erosion of common rights in forests and other resources, and the spread of commerce and production for the market, the responsibilities for decision making are being taken away from both groups and individuals. This shift is still under way in many developing countries.

If the desert is growing, forest disappearing, malnutrition increasing, and people in urban areas living in very bad conditions, it is not because we are lacking resources but the kind of policy implemented by our rulers, by the elite group. Denying people rights and peoples' interests is pushing us to a situation where it is only the poverty that has a very prosperous future in Africa. And it is our hope that your Commission, the World Commission, will not overlook these problems of human rights in Africa and will put emphasis on it. Because it is only free people, people who have rights, who are mature and responsible citizens, who then participate in the development and in the protection of the environment.

Speaker from the floor  
WCED Public Hearing  
Nairobi, 23 Sept 1986

20. It is not that there is one set of villains and another of victims. All would be better off if each person took into account the effect of his or her acts upon others. But each is unwilling to assume that others will behave in this socially desirable fashion, and hence all continue to pursue narrow self-interest. Communities or governments can compensate for this isolation

through laws, education, taxes, subsidies, and other methods. Well-enforced laws and strict liability legislation can control harmful side effects. Most important, effective participation in decision-making processes by local communities can help them articulate and effectively enforce their common interest.

21. Interdependence is not simply a local phenomenon. Rapid growth in production has extended it to the international plane, with both physical and economic manifestations. There are growing global and regional pollution effects, such as in the more than 200 international river basins and the large number of shared seas.

22. The enforcement of common interest often suffers because areas of political jurisdiction and areas of impact do not coincide. Energy policies in one jurisdiction cause acid precipitation in another. The fishing policies of one state affect the fish catch of another. No supranational authority exists to resolve such issues, and the common interest can only be articulated through international cooperation.

23. In the same way, the ability of a government to control its national economy is reduced by growing international economic interactions. For example, foreign trade in commodities makes issues of carrying capacities and resource scarcities an international concern. (See *Chapter 3*.) If economic power and the benefits of trade were more equally distributed, common interests would be generally recognized. But the gains from trade are unequally distributed, and patterns of trade in, say, sugar affect not merely a local sugar-producing sector, but the economies and ecologies of the many developing countries that depend heavily on this product.

24. The search for common interest would be less difficult if all development and environment problems had solutions that would leave everyone better off. This is seldom the case, and there are usually winners and losers. Many problems arise from inequalities in access to resources. An inequitable landowner ship structure can lead to overexploitation of resources in the smallest holdings, with harmful effects on both environment and development. Internationally, monopolistic control over resources can drive those who do not share in them to excessive exploitation of marginal resources. The differing capacities of exploiters to commandeer 'free' goods - locally, nationally, and internationally - is another manifestation of unequal access to resources. 'Losers' in environment/development conflicts include those who suffer more than their fair share of the health, property, and ecosystem damage costs of pollution.

25. As a system approaches ecological limits, inequalities sharpen. Thus when a watershed deteriorates, poor farmers suffer more because they cannot afford the same anti-erosion measures as richer farmers. When urban air quality deteriorates, the poor, in their more vulnerable areas, suffer more health damage than the rich, who usually live in more pristine neighbourhoods. When mineral resources become depleted, late-comers to the industrialization process lose the benefits of low-cost supplies. Globally, wealthier nations are better placed financially and technologically to cope with the effects of possible climatic change.

26. Hence, our inability to promote the common interest in sustainable development is often a product of the relative neglect of economic and social justice within and amongst nations.

### **III. Strategic Imperatives**

27. The world must quickly design strategies that will allow nations to move from their present, often destructive, processes of growth and development onto sustainable development paths. This will require policy changes in all countries, with respect both to their own development and to their impacts on other nations' development possibilities. (This chapter concerns itself with national strategies. The required reorientation in international economic relations is dealt

with in *Chapter 3*.)

28. Critical objectives for environment and development policies that follow from the concept of sustainable development include:

- reviving growth;
- changing the quality of growth;
- meeting essential needs for jobs, food, energy, water, and sanitation;
- ensuring a sustainable level of population;
- conserving and enhancing the resource base;
- reorienting technology and managing risk; and
- merging environment and economics in decision making.

### **1. Reviving Growth**

29. As indicated earlier, development that is sustainable has to address the problem of the large number of people who live in absolute poverty - that is, who are unable to satisfy even the most basic of their needs. Poverty reduces people's capacity to use resources in a sustainable manner; it intensifies pressure on the environment. Most such absolute poverty is in developing countries; in many, it has been aggravated by the economic stagnation of the 1980s. A necessary but not a sufficient condition for the elimination of absolute poverty is a relatively rapid rise in per capita incomes in the Third World. It is therefore essential that the stagnant or declining growth trends of this decade be reversed.

30. While attainable growth rates will vary, a certain minimum is needed to have any impact on absolute poverty. It seems unlikely that, taking developing countries as a whole, these objectives can be accomplished with per capita income growth of under 3 per cent. (See Box 2-1.) Given current population growth rates, this would require overall national income growth of around 5 per cent a year in the developing economies of Asia, 5.5 per cent in Latin America, and 6 per cent in Africa and West Asia.

31. Are these orders of magnitude attainable? The record in South and East Asia over the past quarter-century and especially over the last five years suggests that 5 per cent annual growth can be attained in most countries, including the two largest, India and China. In Latin America, average growth rates on the order of 5 per cent were achieved during the 1960s and 1970s, but fell well below that in the first half of this decade, mainly because of the debt crisis.<sup>/1</sup> A revival of Latin American growth depends on the resolution of this crisis. In Africa, growth rates during the 1960s and 1970s were around 4-4.5 per cent, which at current rates of population growth would mean per capita income growth of only a little over 1 per cent.<sup>/2</sup> Moreover, during the 1980s, growth nearly halted and in two-thirds of the countries per capita income declined.<sup>/3</sup> Attaining a minimum level of growth in Africa requires the correction of short-term imbalances, and also the removal of deep-rooted constraints on the growth process.

32. Growth must be revived in developing countries because that is where the links between economic growth, the alleviation of poverty, and environmental conditions operate most directly. Yet developing countries are part of an interdependent world economy; their prospects also depend on the levels and patterns of growth in industrialized nations. The



medium-term prospects for industrial countries are for growth of 3-4 per cent, the minimum that international financial institutions consider necessary if these countries are going to play a part in expanding the world economy. Such growth rates could be environmentally sustainable if industrialized nations can continue the recent shifts in the content of their growth towards less material- and energy-intensive activities and the improvement of their efficiency in using materials and energy.

### **Box 2-1 Growth, Redistribution, and Poverty**

1. The poverty line is that level of income below which an individual or household cannot afford on a regular basis the necessities of life. The percentage of the population below that line will depend on per capita national income and the manner in which it is distributed. How quickly can a developing country expect to eliminate absolute poverty? The answer will vary from country to country, but much can be learned from a typical case.
2. Consider a nation in which half the population lives below the poverty line and where the distribution of household incomes is as follows: the top one-fifth of households have 50 per cent of total income, the next fifth have 20 per cent, the next fifth have 14 per cent, the next fifth have 9 per cent, and the bottom fifth have just 7 per cent. This is a fair representation of the situation in many low-income developing countries.
3. In this case, if the income distribution remains unchanged, per capita national income would have to double before the poverty ratio drops from 50 to 10 per cent. If income is redistributed in favour of the poor, this reduction can occur sooner. Consider the case in which 25 per cent of the incremental income of the richest one-fifth of the population is redistributed equally to the others. The assumptions here about redistribution reflect three judgements. First, in most situations redistributive policies can only operate on increases in income. Second, in low-income developing countries the surplus that can be skimmed off for redistribution is available only from the wealthier groups. Third, redistributive policies cannot be so precisely targeted that they deliver benefits only to those who are below the poverty line, so some of the benefits will accrue to those who are just a little above it.
4. The number of years required to bring the poverty ratio down from 50 to 10 per cent ranges from:
  - 18-24 years if per capita income grows at 3 per cent,
  - 26-36 years if it grown at 2 per cent, and
  - 51-70 years if it grows only at 1 per cent.

In each case, the shorter time is associated with the redistribution of 25 per cent of the incremental income of the richest fifth of the population and the longer period with no redistribution.

5. So with per capita national income growing only at 1 per cent a year, the time required to eliminate absolute poverty would stretch well into the next century. If, however, the aim is to ensure that the world is well on its way towards

sustainable development by the beginning of the next century, it is necessary to aim at a minimum of 3 per cent per capita national income growth and to pursue vigorous redistributive policies.

33. As industrialized nations use less materials and energy, however, they will provide smaller markets for commodities and minerals from the developing nations. Yet if developing nations focus their efforts upon eliminating poverty and satisfying essential human needs, then domestic demand will increase for both agricultural products and manufactured goods and some services. Hence the very logic of sustainable development implies an internal stimulus to Third World growth.

34. Nonetheless, in large numbers of developing countries markets are very small; and for all developing countries high export growth, especially of non-traditional items, will also be necessary to finance imports, demand for which will be generated by rapid development. Thus a reorientation of international economic relations will be necessary for sustainable development, as discussed in *Chapter 3*.

## **2. Changing the quality of Growth**

35. Sustainable development involves more than growth. It requires a change in the content of growth, to make it less Material- and energy-intensive and more equitable in its impact. These changes are required in all countries as part of a package of measures to maintain the stock of ecological capital, to improve the distribution of income, and to reduce the degree of vulnerability to economic crises.

36. The process of economic development must be more soundly based upon the realities of the stock of capital that sustains it. This is rarely done in either developed or developing countries. For example, income from forestry operations is conventionally measured in terms of the value of timber and other products extracted, minus the costs of extraction. The costs of regenerating the forest are not taken into account, unless money is actually spent on such work. Thus figuring profits from logging rarely takes full account of the losses in future revenue incurred through degradation of the forest. Similar incomplete accounting occurs in the exploitation of other natural resources, especially in the case of resources that are not capitalized in enterprise or national accounts: air, water, and soil. In all countries, rich or poor, economic development must take full account in its measurements of growth of the improvement or deterioration in the stock of natural resources.

37. Income distribution is one aspect of the quality of growth, as described in the preceding section, and rapid growth combined with deteriorating income distribution may be worse than slower growth combined with redistribution in favour of the poor. For instance, in many developing countries the introduction of large-scale commercial agriculture may produce revenue rapidly, but may also dispossess a large number of small farmers and make income distribution more inequitable. In the long run, such a path may not be sustainable; it impoverishes many people and can increase pressures on the natural resource base through overcommercialized agriculture and through the marginalization of subsistence farmers. Relying more on smallholder cultivation may be slower at first, but more easily sustained over the long term.

People have acquired, often for the first time in history, both an idea of their

relative poverty and a desire to emerge from it and improve the quality of their lives. As people advance materially, and eat and live better, what, were once luxuries tend to be regarded as necessities. The net result is that the demand for food, raw materials, and power increases to an even greater degree than the population. As demand increases, a greater and greater strain is put on the finite area of the world's land to produce the products needed.

Dr. I. P. Garbouchev  
Bulgarian Academy of Sciences  
WCED Public Hearing  
Moscow, 11 Dec 1986

38. Economic development is unsustainable if it increases vulnerability to crises. A drought may force farmers to slaughter animals needed for sustaining production in future years. A drop in prices may cause farmers or other producers to overexploit natural resources to maintain incomes. But vulnerability can be reduced by using technologies that lower production risks, by choosing institutional options that reduce market fluctuations, and by building up reserves, especially of food and foreign exchange. A development path that combines growth with reduced vulnerability is more sustainable than one that does not.

39. Yet it is not enough to broaden the range of economic variables taken into account. Sustainability requires views of human needs and well-being that incorporate such non-economic variables as education and health enjoyed for their own sake, clean air and water, and the protection of natural beauty. It must also work to remove disabilities from disadvantaged groups, many of whom live in ecologically vulnerable areas, such as many tribal groups in forests, desert nomads, groups in remote hill areas, and indigenous peoples of the Americas and Australasia.

40. Changing the quality of growth requires changing our approach to development efforts to take account of all of their effects. For instance, a hydropower project should not be seen merely as a way of producing more electricity; its effects upon the local environment and the livelihood of the local community must be included in any balance sheets. Thus the abandonment of a hydro project because it will disturb a rare ecological system could be a measure of progress, not a setback to development.<sup>4</sup> Nevertheless, in some cases, sustainability considerations will involve a rejection of activities that are financially attractive in the short run.

41. Economic and social development can and should be mutually reinforcing. Money spent on education and health can raise human productivity. Economic developments can accelerate social development by providing opportunities for underprivileged groups or by spreading education more rapidly.

### **3. Meeting Essential Human Needs**

42. The satisfaction of human needs and aspirations is so obviously an objective of productive activity that it may appear redundant to assert its central role in the concept of sustainable development. All too often poverty is such that people cannot satisfy their needs for survival and well-being even if goods and services are available. At the same time, the demands of those not in poverty may have major environmental consequences.

43. The principal development challenge is to meet the needs and aspirations of an expanding developing world population. The most basic of all needs is for a livelihood: that is,

employment. Between 1985 and 2000 the labour force in developing countries will increase by nearly 800 million, and new livelihood opportunities will have to be generated for 60 million persons every year.<sup>/5</sup> The pace and pattern of economic development have to generate sustainable work opportunities on this scale and at a level of productivity that would enable poor households to meet minimum consumption standards.

44. More food is required not merely to feed more people but to attack undernourishment. For the developing world to eat, person for person, as well as the industrial world by the year 2000, annual increases of 5.0 per cent in calories and 5.8 per cent in proteins are needed in Africa; of 3.4 and 4.0 per cent, respectively, in Latin America; and of 3.5 and 4.5 per cent in Asia.<sup>/6</sup> Foodgrains and starchy roots are the primary sources of calories, while proteins are obtained primarily from products like milk, meat, fish, pulses, and oil-seeds.

45. Though the focus at present is necessarily on staple foods, the projections given above also highlight the need for a high rate of growth of protein availability. In Africa, the task is particularly challenging given the recent declining per capita food production and the current constraints on growth. In Asia and Latin America, the required growth rates in calorie and protein consumption seem to be more readily attainable. But increased food production should not be based on ecologically unsound production policies and compromise long-term prospects for food security.

46. Energy is another essential human need, one that cannot be universally met unless energy consumption patterns change. The most urgent problem is the requirements of poor Third World households, which depend mainly on fuelwood. By the turn of the century, 3 billion people may live in areas where wood is cut faster than it grows or where fuelwood is extremely scarce.<sup>/7</sup> Corrective action would both reduce the drudgery of collecting wood over long distances and preserve the ecological base. The minimum requirements for cooking fuel in most developing countries appear to be on the order of 250 kilogrammes of coal equivalent per capita per year. This is a fraction of the household energy consumption in industrial countries.

In the developing world, mostly in the Third World, we realize that the main problem we have is that we do not have employment opportunities, and most of these people who are unemployed move from rural areas and they migrate into the cities and those who remain behind always indulge in processes - for example charcoal burning - and all this leads to deforestation. So maybe the environmental organizations should step in and look for ways to prevent this kind of destruction.

Kennedy Njiro  
Student, Kenya Polytechnic  
WCED Public Hearing  
Nairobi, 23 Sept 1986

47. The linked basic needs of housing, water supply, sanitation, and health care are also environmentally important. Deficiencies in these areas are often visible manifestations of environmental stress. In the Third World, the failure to meet these key needs is one of the major causes of many communicable diseases such as malaria, gastro-intestinal infestations, cholera, and typhoid. Population growth and the drift into cities threaten to make these problems worse. Planners must find ways of relying more on supporting community initiatives and self-help efforts and on effectively using low-cost technologies. See *Chapter 9*.

#### **4. Ensuring a Sustainable Level of Population**



48. The sustainability of development is intimately linked to the dynamics of population growth. The issue, however, is not simply one of global population size. A child born in a country where levels of material and energy use are high places a greater burden on the Earth's resources than a child born in a poorer country. A similar argument applies within countries. Nonetheless, sustainable development can be pursued more easily when population size is stabilized at a level consistent with the productive capacity of the ecosystem.

49. In industrial countries, the overall rate of population growth is under 1 per cent, and several countries have reached or are approaching zero population growth. The total population of the industrialized world could increase from its current 1.2 billion to about 1.4 billion in the year 2025.<sup>/8</sup>

50. The greater part of global population increase will take place in developing countries, where the 1985 population of 3.7 billion may increase to 6.8 billion by 2025.<sup>/9</sup> The Third World does not have the option of migration to 'new' lands, and the time available for adjustment is much less than industrial countries had. Hence the challenge now is to quickly lower population growth rates, especially in regions such as Africa, where these rates are increasing.

51. Birth rates declined in industrial countries largely because of economic and social development. Rising levels of income and urbanization and the changing role of women all played important roles. Similar processes are now at work in developing countries. These should be recognized and encouraged. Population policies should be integrated with other economic and social development programmes female education, health care, and the expansion of the livelihood base of the poor. But time is short, and developing countries will also have to promote direct measures to reduce fertility, to avoid going radically beyond the productive potential to support their populations. In fact, increased access to family planning services is itself a form of social development that allows couples, and women in particular, the right to self-determination.

52. Population growth in developing countries will remain unevenly distributed between rural and urban areas. UK projections suggest that by the first decade of the next century, the absolute size of rural populations in most developing countries will start declining. Nearly 90 per cent of the increase in the developing world will take place in urban areas, the population of which is expected to rise from 1.15 billion in 1985 to 3.25 billion in 2025.<sup>/10</sup> The increase will be particularly marked in Africa and, to a lesser extent, in Asia.

53. Developing-country cities are growing much faster than the capacity of authorities to cope. Shortages of housing, water, sanitation, and mass transit are widespread. A growing proportion of city-dwellers live in slums and shanty towns, many of them exposed to air and water pollution and to industrial and natural hazards. Further deterioration is likely, given that most urban growth will take place in the largest cities. Thus more manageable cities may be the principal gain from slower rates of population growth.

54. Urbanization is itself part of the development process. The challenge is to manage the process so as to avoid a severe deterioration in the quality of life. Thus the development of smaller urban centres needs to be encouraged to reduce pressures in large cities. Solving the impending urban crisis will require the promotion of self-help housing and urban services by and for the poor, and a more positive approach to the role of the informal sector, supported by sufficient funds for water supply, sanitation, and other services. See *Chapter 9*.

## **5. Conserving and Enhancing the Resource Base**

55. If needs are to be met on a sustainable basis the Earth's natural resource base must be conserved and enhanced. Major changes in policies will be needed to cope with the industrial world's current high levels of consumption, the increases in consumption needed to meet minimum standards in developing countries, and expected population growth. However, the case for the conservation of nature should not rest only with development goals. It is part of our moral obligation to other living beings and future generations.

56. Pressure on resources increases when people lack alternatives. Development policies must widen people's options for earning a sustainable livelihood, particularly for resource-poor households and in areas under ecological stress. In a hilly area, for instance, economic self-interest and ecology can be combined by helping farmers shift from grain to tree crops by providing them with advice, equipment, and marketing assistance. Programmes to protect the incomes of farmers, fishermen, and foresters against short-term price declines may decrease their need to overexploit resources.

57. The conservation of agricultural resources is an urgent task because in many parts of the world cultivation has already been extended to marginal lands, and fishery and forestry resources have been overexploited. These resources must be conserved and enhanced to meet the needs of growing populations. Land use in agriculture and forestry must be based on a scientific assessment of land capacity, and the annual depletion of topsoil, fish stock, or forest resources must not exceed the rate of regeneration.

58. The pressures on agricultural land from crop and livestock production can be partly relieved by increasing productivity. But short-sighted, short-term improvements in productivity can create different forms of ecological stress, such as the loss of genetic diversity in standing crops, salinization and alkalization of irrigated lands, nitrate pollution of groundwater, and pesticide residues in food. Ecologically more benign alternatives are available. Future increases in productivity, in both developed and developing countries, should be based on the better controlled application of water and agrochemicals, as well as on more extensive use of organic manures and non-chemical means of pest control. These alternatives can be promoted only by an agricultural policy based on ecological realities. (See *Chapter 5*.)

59. In the case of fisheries and tropical forestry, we rely largely on the exploitation of the naturally available stocks. The sustainable yield from these stocks may well fall short of demand. Hence it will be necessary to turn to methods that produce more fish, fuelwood, and forest products under controlled conditions. Substitutes for fuelwood can be promoted.

60. The ultimate limits to global development are perhaps determined by the availability of energy resources and by the biosphere's capacity to absorb the by-products of energy use.<sup>11/</sup> These energy limits may be approached far sooner than the limits imposed by other material resources. First, there are the supply problems: the depletion of oil reserves, the high cost and environmental impact of coal mining, and the hazards of nuclear technology. Second, there are emission problems, most notably acid pollution and carbon dioxide build up leading to global warming.

I work with rubber trees in the Amazon. I am here to speak about the tropical forest.

We live from this forest they want to destroy. And we want to take this opportunity of having so many people here gathered with the same objective in mind to defend our habitat, the conservation of forest, of tropical forest.

In my area, we have about 14-16 native products that we extract from the forest, besides all the other activities we have. So I think this must be preserved. Because it is not only with cattle, not only with pasture lands, and not only with highways that we will be able to develop the Amazon.

When they think of falling trees, they always think of building roads and the roads bring destruction under a mask called progress. Let us put this progress where the lands have already been deforested, where it is idle of labour and where we have to find people work, and where we have to make the city grow. But let us leave those who want to live in the forest, who want to keep it as it is.

We have nothing written. I don't have anything that was created in somebody's office. There is no philosophy. It is just the real truth, because this is what our life is.

Jaime Da Silva Araujo  
Rubber Tapper Council  
WCED Public Hearing  
Sao Paulo, 28-29 Oct 1985

61. Some of these problems can be met by increased use of renewable energy sources. But the exploitation of renewable sources such as fuelwood and hydropower also entails ecological problems. Hence sustainability requires a clear focus on conserving and efficiently using energy.

62. Industrialized countries must recognize that their energy consumption is polluting the biosphere and eating into scarce fossil fuel supplies. Recent improvements in energy efficiency and a shift towards less energy-intensive sectors have helped limit consumption. But the process must be accelerated to reduce per capita consumption and encourage a shift to non polluting sources and technologies. The simple duplication in the developing world of industrial countries' energy use patterns is neither feasible nor desirable. Changing these patterns for the better will call for new policies in urban development, industry location, housing design, transportation systems, and the choice of agricultural and industrial technologies.

63. Non-fuel mineral resources appear to pose fewer supply problems. Studies done before 1960 that assumed an exponentially growing demand did not envisage a problem until well into the next century.<sup>12</sup> since then, world consumption of most metals has remained nearly constant, which suggests that the exhaustion of non-fuel minerals is even more distant. The history of technological developments also suggests that industry can adjust to scarcity through greater efficiency in use, recycling, and substitution. More immediate needs include modifying the pattern of world trade in minerals to allow exporters a higher share in the value added from mineral use, and improving the access of developing countries to mineral supplies, as their demands increase.

Indigenous peoples are the base of what I guess could be called the environmental security system. We are the gate-keepers of success or failure to husband our resources. For many of us, however, the last few centuries have meant a major loss of control over our lands and waters. We are still the first to know about changes in the environment, but we are now the last to be asked or consulted.

We are the first to detect when the forests are being threatened, as they are under the slash and grab economics of this country. And we are the last to be asked about the future of our forests. We are the first to feel the pollution of our waters, as the Ojibway peoples of my own homelands in northern Ontario will attest. And, of course, we are the last to be consulted about how, when, and where developments should take place in order to assure continuing harmony for the seventh generation.

The most we have learned to expect is to be compensated, always too late and too little. We are seldom asked to help avoid the need for compensation by lending our expertise and our consent to development.

Louis Bruyere  
President, Native Council of Canada  
WCED Public Hearing  
Ottawa, 26-27 May 1986

64. The prevention and reduction of air and water pollution will remain a critical task of resource conservation. Air and water quality come under pressure from such activities as fertilizer and pesticide use, urban sewage, fossil fuel burning, the use of certain chemicals, and various other industrial activities. Each of these is expected to increase the pollution load on the biosphere substantially, particularly in developing countries. Cleaning up after the event is an expensive solution. Hence all countries need to anticipate and prevent these pollution problems, by, for instance, enforcing emission standards that reflect likely long-term effects, promoting low-waste technologies, and anticipating the impact of new products, technologies, and wastes.

## **6. Reorienting Technology and Managing Risk**

65. The fulfilment of all these tasks will require the reorientation of technology the key link between humans and nature. First, the capacity for technological innovation needs to be greatly enhanced in developing countries so that they can respond more effectively to the challenges of sustainable development. Second, the orientation of technology development must be changed to pay greater attention to environmental factors.

66. The technologies of industrial countries are not always suited or easily adaptable to the socio-economic and environmental conditions of developing countries. To compound the problem, the bulk of world research and development addresses few of the pressing issues facing these countries, such as arid-land agriculture or the control of tropical diseases. Not enough is being done to adapt recent innovations in materials technology, energy conservation, information technology, and biotechnology to the needs of developing countries. These gaps must be covered by enhancing research, design, development, and extension capabilities in the Third World.

67. In all countries, the processes of generating alternative technologies, upgrading traditional ones, and selecting and adapting imported technologies should be informed by environmental resource concerns. Most technological research by commercial organizations is devoted to product and process innovations that have market value. Technologies are needed that produce 'social goods', such as improved air quality or increased product life, or that resolve problems normally outside the cost calculus of individual enterprises, such as the external costs of pollution or waste disposal.

68. The role of public policy is to ensure, through incentives and disincentives, that commercial organizations find it worthwhile to take fuller account of environmental factors in the technologies they develop. (See *Chapter 6*.) Publicly funded research institutions also need such direction, and the objectives of sustainable development and environmental protection must be built into the mandates of the institutions that work in environmentally sensitive areas.

69. The development of environmentally appropriate technologies is closely related to questions of risk management. Such systems as nuclear reactors, electric and other utility distribution networks, communication systems, and mass transportation are vulnerable if stressed beyond a certain point. The fact that they are connected through networks tends to make them immune to small disturbances but more vulnerable to unexpected disruptions that exceed a finite threshold. Applying sophisticated analyses of vulnerabilities and past failures to technology design, manufacturing standards, and contingency plans in operations can make the consequences of a failure or accident much less catastrophic.

70. The best vulnerability and risk analysis has not been applied consistently across technologies or systems. A major purpose of large system design should be to make the consequences of failure or sabotage less serious. There is thus a need for new techniques and technologies - as well as legal and institutional mechanisms - for safety design and control, accident prevention, contingency planning, damage mitigation, and provision of relief.

71. Environmental risks arising from technological and developmental decisions impinge on individuals and areas that have little or no influence on those decisions. Their interests must be taken into account. National and international institutional mechanisms are needed to assess potential impacts of new technologies before they are widely used, in order to ensure that their production, use, and disposal do not overstress environmental resources. Similar arrangements are required for major interventions in natural systems, such as river diversion or forest clearance. In addition, liability for damages from unintended consequences must be strengthened and enforced.

## **7. Merging Environment and Economics in Decision Making**

72. The common theme throughout this strategy for sustainable development is the need to integrate economic and ecological considerations in decision making. They are, after all, integrated in the workings of the real world. This will require a change in attitudes and objectives and in institutional arrangements at every level.

73. Economic and ecological concerns are not necessarily in opposition. For example, policies that conserve the quality of agricultural land and protect forests improve the long-term prospects for agricultural development. An increase in the efficiency of energy and material use serves ecological purposes but can also reduce costs. But the compatibility of environmental and economic objectives is often lost in the pursuit of individual or group gains, with little regard for the impacts on others, with a blind faith in science's ability to find solutions, and in ignorance of the distant consequences of today's decisions. Institutional rigidities add to this myopia.

74. One important rigidity is the tendency to deal with one industry or sector in isolation, failing to recognize the importance of intersectoral linkages. Modern agriculture uses substantial amounts of commercially produced energy and large quantities of industrial products. At the same time, the more traditional connection - in which agriculture is a source



of raw materials for industry - is being diluted by the widening use of synthetics. The energy-industry connection is also changing, with a strong tendency towards a decline in the energy intensity of industrial production in industrial countries. In the Third World, however, the gradual shift of the industrial base towards the basic material producing sectors is leading to an increase in the energy intensity of industrial production.

75. These inter sectoral connections create patterns of economic and ecological interdependence rarely reflected in the ways in which policy is made. Sectoral organizations tend to pursue sectoral objectives and to treat their impacts on other sectors as side effects, taken into account only if compelled to do so. Hence impacts on forests rarely worry those involved in guiding public policy or business activities in the fields of energy, industrial development, crop husbandry, or foreign trade. Many of the environment and development problems that confront us have their roots in this sectoral fragmentation of responsibility. Sustainable development requires that such fragmentation be overcome.

The issues that have been brought forward here, I think, are wide-ranging and maybe you know, maybe you don't know, the answers to all those issues. But at least by hearing all those questions, stories, all these expressions that have been put forward, at least you could have some idea.

You don't know the answers nor the solutions, but you could suggest the way to solve many problems and this is by suggesting either to governments, or the UN, or international agencies, to solve any problem the best way: that is to include those with direct interests in it. The beneficiaries, as well as the victims of any development issue should be included, should be heard.

I think that is the one thing, maybe that all of us are hearing here, or expecting: that in every development planning or development issue as much as possible to listen and to include, to consult the people concerned. If that is taken care of, at least one step of the problem is resolved.

Ismid Hadad  
Chief Editor, Prisma  
WCED Public Hearing  
Jakarta, 26 March 1985

76. Sustainability requires the enforcement of wider responsibilities for the impacts of decisions. This requires changes in the legal and institutional frameworks that will enforce the common interest. Some necessary changes in the legal framework start from the proposition that an environment adequate for health and well-being is essential for all human beings including future generations. Such a view places the right to use public and private resources in its proper social context and provides a goal for more specific measures.

77. The law alone cannot enforce the common interest. It principally needs community knowledge and support, which entails greater public participation in the decisions that affect the environment. This is best secured by decentralizing the management of resources upon which local communities depend, and giving these communities an effective say over the use of these resources. It will also require promoting citizens' initiatives, empowering people's organizations, and strengthening local democracy./13

78. Some large-scale projects, however, require participation on a different basis. Public inquiries and hearings on the development and environment impacts can help greatly in

drawing attention to different points of view. Free access to relevant information and the availability of alternative sources of technical expertise can provide an informed basis for public discussion. When the environmental impact of a proposed project is particularly high, public scrutiny of the case should be mandatory and, wherever feasible, the decision should be subject to prior public approval, perhaps by referendum.

It has not been too difficult to push the environment lobby of the North and the development lobby of the South together. And there is now in fact a blurring of the distinction between the two, so they are coming to have a common consensus around the theme of sustainable development.

The building blocks are there. Environmental concern is common to both sides. Humanitarian concern is common to both sides. The difference lies in the methods of each and the degree to which each side tries to achieve its own economic interest through the development assistance process.

The time is right for bridging this gap for some very pragmatic political reasons. First of all, the people of the North do not want to see their taxes wasted. Secondly, they do not want to see growing poverty, and they obviously care for the environment, be it the environment of the North, where they live, or of the South. And the majority of people in the South do not want short-term overpass solutions.

In effect, there is a political community of interest, North and South, in the concept of sustainable development that you can build upon.

Richard Sandbrook  
International institute for Environment and Development  
WCED Public Hearing  
Oslo, 24-25 June 1985

79. Changes are also required in the attitudes and procedures of both public and private-sector enterprises. Moreover, environmental regulation must move beyond the usual menu of safety regulations, zoning laws, and pollution control enactments; environmental objectives must be built into taxation, prior approval procedures for investment and technology choice, foreign trade incentives, and all components of development policy.

80. The integration of economic and ecological factors into the law and into decision making systems within countries has to be matched at the international level. The growth in fuel and material use dictates that direct physical linkages between ecosystems of different countries will increase. Economic interactions through trade, finance, investment, and travel will also grow and heighten economic and ecological interdependence. Hence in the future, even more so than now, sustainable development requires the unification of economics and ecology in international relations, as discussed in the next chapter.

#### **IV. Conclusion**

81. In its broadest sense, the strategy for sustainable development aims to promote harmony among human beings and between humanity and nature. In the specific context of the development and environment crises of the 1980s, which current national and international political and economic institutions have not and perhaps cannot overcome, the pursuit of sustainable development requires:

- a political system that secures effective citizen participation in decision making.
- an economic system that is able to generate surpluses and technical knowledge on a self-reliant and sustained basis
- a social system that provides for solutions for the tensions arising from disharmonious development.
- a production system that respects the obligation to preserve the ecological base for development,
- a technological system that can search continuously for new solutions,
- an international system that fosters sustainable patterns of trade and finance, and
- an administrative system that is flexible and has the capacity for self-correction.

82. These requirements are more in the nature of goals that should underlie national and international action on development. What matters is the sincerity with which these goals are pursued and the effectiveness with which departures from them are corrected

---

## Footnotes

1/ UNCTAD, **Handbook of International Trade and Development Statistics 1985** Supplement (New York: 1985).

2/ Ibid.

3/ Department of International Economic and Social Affairs (DIESA), **Doubling Development Finance, Meeting a Global Challenge. Views and Recommendations of the Committee for Development Planning** (New York: UN, 1986).

4/ One example of such a decision to forgo a developmental benefit in the interest of conservation is provided by the dropping of the Silent Valley Hydro project in India.

5/ Based on data from World Bank, **World Development Report 1984** (New York: Oxford University Press, 1984).

6/ Based on per capita consumption data from FAO, **Production Yearbook 1984** (Rome: 1985) and population projections from DIESA, **World Population Prospects: Estimates and Projections as Assessed in 1984** (New York: UN, 1986).

7/ FAO, **Fuelwood Supplies in the Developing Countries**, Forestry Paper No. 42 (Rome: 1983).

8/ DIESA, **World Population Prospects**, op. cit.

9/ Ibid.

10/ Ibid.

11/ W. Hafele and W. Sassin, 'Resources and Endowments, An Outline of Future Energy Systems', in P.W. Hemily and M.N. Ozdas (eds.), **Science and Future Choice** (Oxford:

Clarendon Press, 1979).

12/ See, for example, OECD, **Interfutures: Facing the Future** (Paris: 1979) and Council on Environmental Quality and U.S. Department of State, **The Global 2000 Report to the President: Entering the Twenty-First Century, The Technical Report, Vol. Two** (Washington, DC: U.S. Government Printing Office, 1980).

13/ See 'For Municipal initiative and Citizen Power', in INDERENA, **La Campana Verde y los Concejos Verdes** (Bogota, Colombia: 1985).

# **Our Common Future, Chapter 3: The Role of the International Economy**

## ***I. The International Economy, the Environment, and Development***

### ***II. Decline in the 1980s***

#### ***1. The African Continent***

#### ***2. Latin American Debt***

### ***III. Enabling Sustainable Development***

#### ***1. Enhancing the Flow of Resources to Developing Countries***

##### *1.1 Increasing the Flow of Finance*

##### *1.2 Lending for Sustainable Development*

#### ***2. Linking Trade, Environment, and Development***

##### *2.1 International Commodity Trade*

##### *2.2 Protectionism and International Trade*

##### *2.3 'Pollution-intensive' Goods*

##### *2.4 The Mandates of Multilateral Trade Forums*

#### ***3. Ensuring Responsibility in Transnational Investment***

#### ***4. Broadening the Technological Base***

##### *4.1 The Diffusion of Environmentally Sound Technologies*

##### *4.2 Building Up Technological Capabilities in Developing Countries*

### ***IV. A Sustainable World Economy***

---

1. Through the ages, people have reached beyond their own borders to obtain essential, valued, or exotic materials. Today's surer communications and larger trade and capital movements have greatly enlarged this process, quickened its pace, and endowed it with far-reaching ecological implications. Thus the pursuit of sustainability requires major changes in international economic relations.



## **I. The International Economy, the Environment, and Development**

2. Two conditions must be satisfied before international economic exchanges can become beneficial for all involved. The sustainability of ecosystems on which the global economy depends must be guaranteed. And the economic partners must be satisfied that the basis of exchange is equitable; relationships that are unequal and based on dominance of one kind or another are not a sound and durable basis for interdependence. For many developing countries, neither condition is met.

3. Economic and ecological links between nations have grown rapidly. This widens the impact of the growing inequalities in the economic development and strength of nations. The asymmetry in international economic relations compounds the imbalance, as developing nations are generally influenced by - but unable to influence - international economic conditions.

4. International economic relationships pose a particular problem for poor countries trying to manage their environments, since the export of natural resources remains a large factor in their economies, especially those of the least developed nations. The instability and adverse price trends faced by most of these countries make it impossible for them to manage their natural resource bases for sustained production. The rising burden of debt servicing and the decline in new capital flows intensify those forces that lead to environmental deterioration and resource depletion occurring at the expense of long-term development.

5. The trade in tropical timber, for example, is one factor underlying tropical deforestation. Needs for foreign exchange encourage many developing countries to cut timber faster than forests can be regenerated. This overcutting not only depletes the resource that underpins the world timber trade, it causes the loss of forest-based livelihoods, increases soil erosion and downstream flooding, and accelerates the loss of species and genetic resources. International trade patterns can also encourage the unsustainable development policies and practices that have steadily degraded the croplands and rangelands in the drylands of Asia and Africa; an example of that is provided by the growth of cotton production for export in the Sahel region. (See Box 3-1.)



Net Transfer from Loans (all IDCs)*	30.7	0.8	27.7	0.8	-8.6	-22.0	-41.0
Net Transfer from all Resource Flows (all IDCs)**	41.4	39.3	41.5	10.1	-0.3	-12.5	-31.0
Net Transfer from all Resource Flows (to Latin America)	15.6	11.9	11.4	-16.7	-25.9	-23.2	-30.0

\* Net transfers on loans are net capital flows minus net interest paid. All loans, official and private, short and long-term, are included together with IMF credit

\*\* Total net resource flows relate to net loan transfers, grants and net direct investment (less net direct investment income)

**Source:** UN, **World Economic Survey 1986** (New York: 1986).

## II. Decline in the 1980s

8. The pressures of poverty and rising populations make it enormously difficult for developing countries to pursue environmentally sound policies even in the best of circumstances. But when international economic conditions are bad, the problems can become unmanageable. During the 1980s, economic growth rates declined sharply or even turned negative in much of the Third World, particularly in Africa and Latin America. Over the five years from 1981 to 1985, population growth outstripped economic growth in most developing countries./2

9. Deteriorating terms of trade, rising debt service obligations, stagnating flows of aid, and growing protectionism in the developed market economies caused severe external payment problems. The increased cost of foreign borrowing, at a time when exports were depressed, also helped to plunge many developing countries into debt crises. Austerity programmes laid down by the IMF as a prerequisite for extending credit to meet short-term balance-of-payments needs became particularly onerous after the debt crisis. Growth was cut back and many social objectives fell by the wayside, including those having to do with employment, health, education, environment, and human settlements.

We know that the world lives through an international finance crisis, which increases the misery and the poverty in the Third World and we sacrifice even more our environment, though we know that this situation can be reversed, if we can use correctly new technology and knowledge. But for this we have to find a new ethic that will include the relationship between man and nature above all.

Sergio Dialeachi  
 Speaker from the floor  
 WCED Public Hearing  
 Sao Paulo, 26-29 Oct 1985

10. This was a radical change from the 1960s and 1970s. Then it was rapid economic growth

that was seen as an ecological threat. Now it is recession, austerity, and falling living standards. The decline of the 1980s has aggravated pressures on the environment in several ways:

- Austerity measures and general recessionary conditions have brought sharp declines in per capita incomes and increased unemployment. This forces more people back into subsistence agriculture, where they draw heavily on the natural resource base and thus degrade it.
- Austerity programmes inevitably include government cutbacks in both the staff and expenditure of fledgling, weak environmental agencies, undermining even the minimal efforts being made to bring ecological considerations into development planning.
- Conservation always taken a back seat in times of economic stress. As economic conditions have worsened in developing countries and debt pressures have mounted, planners have tended to ignore environmental planning and conservation in both industrial and rural development projects.

11. The critical situations in sub Saharan Africa and the debt strapped countries of Latin America demonstrate, in an extreme way, the damaging impacts that unreformed international economic arrangements are having on both development and the environment.

## **1. The African Continent**

12. Africa on the whole has been caught up in a series of downward spirals:

- poverty and hunger leading to environmental degradation, deteriorating agriculture, and hence more poverty and hunger;
- falling savings and a neglect of new investment in the wake of growing poverty;
- high infant mortality, poverty, and lack of education;
- high population growth rates; and
- a flight from rural hunger to the cities, leading to explosive levels of urban growth and squalor, compounding the problems of inadequate food supplies.

13. The situation is not everywhere so bleak. Some nations have coped well, and some far-reaching and courageous policy reforms begun in the last few years have begun to bear fruit. Encouragement also comes from South Asia, where a comparable crisis 20 years ago has given way to an upward spiral of rising food production, diminishing (but still vast) poverty, slowing population growth, rising savings and investment, and greater attention to the long-term questions of environmental management and appropriate technology.

14. Among the many causes of the African crisis, the workings of the international economy stand out. Sub-Saharan Africa's economic well-being depends even more than low-income Asia's on developments in the world economy. Within the last decade, many sub-Saharan countries have been hit by adverse trends in commodity terms of trade and external shocks such as higher oil prices, fluctuating exchange rates, and higher interest rates. Over the last 10 years, the prices of major commodities such as copper, iron ore, sugar, ground-nuts, rubber, timber, and cotton have fallen significantly. In 1985, the terms of trade of sub-Saharan countries (except oil-exporting countries) were 10 per cent below 1970 levels. In countries eligible for funds from the International Development Association (IDA), the average fall was

well over 20 per cent, with even greater drops in some, including Ethiopia, Liberia, Sierra Leone, Zaire, and Zambia./3

15. The problem has been compounded by growing difficulties in attracting development capital from the industrial world. At the same time, debt repayments and interest charges have risen. Debt service rose in sub-Saharan Africa as a whole from 15 per cent of export earnings in 1980 to 31 per cent in 1985./4 This combination of events has led to a situation where net resource transfers to the area fell from an estimated \$10 billion a year in 1982 to \$1 billion in 1985./5 Thus nations have been able to import far less. In countries eligible for IDA loans, the import volume per person in 1984 was only 62 per cent of the volume in 1970./6 Imports for agriculture - machinery, fertilizers, and pesticides - and of essential supplies to meet basic needs have all been cut. The combination of diverse international and internal factors cut per capita incomes by 16 per cent in sub-Saharan Africa between 1960 and 1985./7

16. The economic difficulties of sub-Saharan countries have had devastating social impacts. Declining per capita food production has contributed to growing undernourishment. The recent drought placed some 35 million lives at risk in 1984/85, and as the drought receded some 19 million people continued to suffer famine./8 Malnutrition and hunger have weakened much of the population, reducing their productivity, and made more of them (especially children and the old) more susceptible to debilitating diseases and premature death. The crisis has reversed progress in supplying safe drinking water and sanitation.

The seriousness of the African crisis cannot be overemphasized and in its entirety, it should really engage the whole world. The lives of 400 million people living in Africa today are imperilled. And many more people yet to be born will face a very bleak future unless effective solutions are found and found quickly.

It requires of course very little imagination to appreciate the fact that it is not only Africa that is in danger. In the long term the entire world economy could be threatened not only because of the indivisibility of human welfare but because of Africa's crucial position in the global economy as a source of a large number of vital raw materials.

Maxime Ferrari  
Director, UNEP Regional Office for Africa  
WCED Public Hearing  
Harare, 18 Sept 1986

17. It is now more widely recognized that it is necessary to deal with the long-term causes rather than the symptoms. The vast misery brought on by the drought in Africa is now generally acknowledged, and the world community has responded with a substantial emergency programme. But emergency food aid is only a short-term reaction, and, at best, a partial answer. The roots of the problem lie in national and international policies that have so far prevented African economies from realizing their full potential for economic expansion and thus for easing poverty and the environmental pressures that it generates.

18. The resolution lies in large part with African decision makers, but the international community also has a heavy responsibility to support Africa's adjustment efforts with adequate aid and trade arrangements and to see to it that more capital flows into poorer nations than out. These two complementary aspects of the resolution of the problems have been fully recognized by the African countries themselves/9 and generally acknowledged by the



international community.<sup>/10</sup> The World Bank estimates that even if external economic conditions are favourable over the next five years, and even if African governments implement key policy reforms, a substantial gap will still remain between the finance or debt relief available on current donor policies and the amounts needed to prevent a further deterioration in the living standards of low-income Africa.<sup>/11</sup> And there is no money in this grim equation for restoring the damaged environment.

19. The international community must realize that Africa cannot pull itself out of the planet's most serious economic and ecological crisis without much more long-term assistance than is currently envisioned. In addition, greatly increased external financing for development must be accompanied by policy changes that recognize the need to avoid environmental degradation.

## **2. Latin American Debt**

20. Debt is an acute problem for many countries of Africa. But, because of the magnitudes of debt involved, it has had its most visible impact in some middle-income countries - particularly in Latin America. The debt crisis remains a threat to international financial stability, but its main impact so far has been on the process of development, both in its economic and ecological aspects. Of the total world debt of around \$950 billion in 1985, roughly 30 per cent was owed by four countries: Argentina, Brazil, Mexico, and Venezuela. Their debts constitute roughly two-thirds of the outstanding loans of banks to developing countries.<sup>/12</sup>

21. In the 1970s, Latin America's economic growth was facilitated by external borrowing. Commercial banks were happy to lend to growing countries rich in natural resources. Then major changes in international conditions made the debt unsustainable. A global recession restricted export markets, and tight monetary policies forced up global interest rates to levels far exceeding any in living memory. Bankers, alarmed by deteriorating creditworthiness, stopped lending. A flight of indigenous capital from developing countries compounded the problem.

22. The ensuing crisis forced governments into austerity policies to cut back imports. As a result, Latin American imports fell by 40 per cent in real terms over three years.<sup>/13</sup> The consequent economic contraction reduced per capita gross domestic product by an average of B per cent in the eight main Latin American countries.<sup>/14</sup> Much of the burden was carried by the poor, as real wages fell and unemployment rose. Growing poverty and deteriorating environmental conditions are clearly visible in every major Latin American country.

23. Further, the lack of new credit and the continuing burden of debt service forced these countries to service their debts by running trade surpluses. The net transfers from seven major Latin American countries to creditors rose to almost \$39 billion in 1984, and in that year 35 per cent of export earnings went to pay interest on overseas debt.<sup>/15</sup> This massive drain represents 5 to 6 per cent of the region's GDP, around a third of the internal savings, and nearly 40 per cent of export earnings. It has been achieved by adjustment policies that impose severe and regressively skewed cuts in wages, social services, investment, consumption, and employment, both public and private, further aggravating social inequity and widespread poverty. Pressures on the environment and resources have increased sharply in the search for new and expanded exports and replacements for imports, together with the deterioration and overexploitation of the environment brought about by the swelling number of the urban and rural poor in desperate struggle for survival. A substantial part of Latin America's rapid growth in exports are raw materials, food, and resource-based manufactures.

The impact of the present crisis on Latin America has been compared, in its depth and extension, with the Great Depression of 1929-32. The crisis has made it clear that, although the need to protect the environment against the traditional problems of deterioration and depletion continues to be a valid objective, policy-makers responsible for environmental management ought to avoid negative attitudes in the face of the need for economic reactivation and growth.

The expansion, conservation, maintenance, and protection of the environment can make an essential contribution to the improvement of the standard of living, to employment, and to productivity.

Oswaldo Sunkel  
Coordinator, Joint ECLAC/UNEP Development and Environment Unit  
WCED Public Hearing  
Sao Paulo, 28-29 Oct 1985

24. So Latin American natural resources are being used not for development or to raise living standards, but to meet the financial requirements of industrialized country creditors. This approach to the debt problem raises questions of economic, political, and environmental sustainability. To require relatively poor countries to simultaneously curb their living standards, accept growing poverty, and export growing amounts of scarce resources to maintain external creditworthiness reflects priorities few democratically elected governments are likely to be able to tolerate for long. The present situation is not consistent with sustainable development. This conflict is aggravated by the economic policies of some major industrial countries, which have depressed and destabilized the international economy. In order to bring about socially and environmentally sustainable development it is indispensable, among other elements, for industrial countries to resume internationally expansionary policies of growth, trade, and investment. The Commission noted that, in these circumstances, some debtor countries have felt forced to suspend or limit the outflow of funds.

25. Growing numbers of creditor banks and official agencies are realizing that many debtors simply will not be able to keep servicing their debts unless the burden is eased. Measures under discussion include additional new lending, forgiveness of part of the debt, longer-term rescheduling, and conversion to softer terms. But a necessary sense of urgency is lacking. Any such measures must incorporate the legitimate interests of creditors and debtors and represent a fairer sharing of the burden of resolving the debt crisis.

### **III. Enabling Sustainable Development**

26. Developing countries have sought, for many years, fundamental changes in international economic arrangements so as to make them more equitable, particularly with regard to financial flows, trade, transnational investment, and technology transfer.<sup>16</sup> Their arguments must now be recast to reflect the ecological dimensions, frequently overlooked in the past.

27. In the short run, for most developing countries except the largest a new era of economic growth hinges on effective and coordinated economic management among major industrial countries - designed to facilitate expansion, to reduce real interest rates, and to halt the slide to protectionism. In the longer term, major changes are also required to make consumption and production patterns sustainable in a context of higher global growth.

28. International cooperation to achieve the former is embryonic, and to achieve the latter, negligible. In practice, and in the absence of global management of the economy or the

environment, attention must be focused on the improvement of policies in areas where the scope for cooperation is already defined: aid, trade, transnational corporations, and technology transfer.

## **1. Enhancing the Flow of Resources to Developing Countries**

29. Two interrelated concerns lie at the heart of our recommendations on financial flows: one concerns the quantity, the other the 'quality of resource flows to developing countries. The need for more resources cannot be evaded. The idea that developing countries would do better to live within their limited means is a cruel illusion. Global poverty cannot be reduced by the governments of poor countries acting alone. At the same time, more aid and other forms of finance, while necessary, are not sufficient. Projects and programmes must be designed for sustainable development.

### **1.1 Increasing the Flow of Finance**

30. As regards the quantity of resources, the stringency of external finance has already contributed to an unacceptable decline in living standards in developing countries. The patterns and the needs of the heavily indebted countries that rely mainly on commercial finance have been described, along with those of low-income countries that depend on aid. But there are other poor countries that have made impressive progress in recent years but still face immense problems, not least in countering environmental degradation. Low-income Asia has a continuing need for large amounts of aid; in general, the main recipients in this region have a good record of aid management. Without such aid it will be much more difficult, to sustain the growth that, together with poverty-focused programmes, could improve the lot of hundreds of millions of the 'absolute poor'.

The universal importance of ecological problems can hardly be denied. Their successful solution will increasingly require coordinated activities not only within every country's economy but also within the scope of international cooperation. Ecological problems are unprecedented in the history of mankind.

Dr. Todor I. Bozninov  
Committee for Environment Protection, Bulgaria  
WCED Public Hearing  
Moscow, 8 Dec 1986

31. To meet such needs requires that the main donors and lending institutions re-examine their policies. Official development assistance (ODA) levels have stagnated in absolute terms, and most donor countries fall well short of internationally agreed targets. Commercial lending and lending by export credit agencies has fallen sharply. As part of a concerted effort to reverse these trends it is vitally important for development that there should be a substantial increase in resources available to the World Bank and IDA. Increased commercial bank lending is also necessary for major debtors.

### **1.2 Lending for Sustainable Development**

32. In the past, development assistance has not always contributed to sustainable development

and in some cases detracted from it. Lending for agriculture, forestry, fishing, and energy has usually been made on narrow economic criteria that take little account of environmental effects. For instance, development agencies have sometimes promoted chemical-dependent agriculture, rather than sustainable, regenerative agriculture. It is important therefore that there should be a qualitative as well as a quantitative improvement.

33. A larger portion of total development assistance should go to investments needed to enhance the environment and the productivity of the resource sectors. Such efforts include reforestation and fuelwood development, watershed protection, soil conservation, agroforestry, rehabilitation of irrigation projects, small scale agriculture, low-cost sanitation measures, and the conversion of crops into fuel. Experience has shown that the most effective efforts of this type are small projects with maximum grass-roots participation. The programmes most directly related to the objective of sustainable development may therefore involve higher local costs, a higher ratio of recurrent to capital costs, and a greater use of local technology and expertise.

34. A shift towards projects of this kind would also require donors to re-examine the content of their aid programmes, particularly with regard to commodity assistance, which has sometimes served to reduce rather than enhance the possibilities for sustainable development. (See *Chapter 5.*)

The industrialized world's demands for raw materials, higher productivity, and material goods have imposed serious environmental impacts and high economic costs not only in our own countries, but also on the developing world. The existing international patterns of financial, economic trade and investment policies further add to the problems.

We must all be willing to examine our relations in international trade, investments, development assistance, industry, and agriculture in light of the consequences these may have for underdevelopment and environmental destruction in the Third World. We must even be willing to go further and implement the means necessary to alienate these symptoms.

Rakel Surlien  
Former Minister of Environment  
Government of Norway  
WCED Opening Ceremony  
Oslo, 24 June 1985

35. The major priority is for sustainability considerations to be diffused throughout the work of international financial institutions. The roles of the World Bank and the IMF are particularly crucial because their lending conditions are being used as benchmarks for parallel lending by other institutions - commercial banks and export credit agencies. It is important in this context that sustainability considerations be taken into account by the Bank in the appraisal of structural adjustment lending and other policy-oriented lending directed to resource-based sectors - agriculture, fishing, forestry, and energy in particular - as well as specific projects.

36. A similar shift of emphasis is required in respect of adjustment programmes undertaken by developing countries. To date, 'adjustment' - particularly under IMF auspices - has led more often than not to cutbacks in living standards in the interest of financial stabilization. Implicit in many suggested plans for coping with the debt crisis is the growing recognition that future

adjustment should be growth-oriented. Yet it also needs to be environmentally sensitive.

37. The IMF also has a mandate for structural adjustment lending, as in its new Structural Adjustment Facility. There has been a strongly expressed demand from developing-country borrowers for the Fund to take into account wider and longer-term development objectives than financial stabilization: growth, social goals, and environmental impacts.

38. Development agencies, and the World Bank in particular, should develop easily usable methodologies to augment their own appraisal techniques and to assist developing countries to improve their capacity for environmental assessment.

## **2. Linking Trade, Environment, and Development**

39. The importance of foreign trade to national development has greatly increased for most countries in the post-war period. (See Table 3-2.) This is one measure of the extent to which trade has made nations, economically and ecologically, more interdependent. Patterns of world trade also have changed markedly. First, the value of trade in manufactured goods grew at a faster rate than that in primary products other than fuel, and a growing number of developing countries have emerged as major exporters of such goods. Manufactured goods now account for twice the value of developing countries' non-oil exports.<sup>/17</sup> (See *Chapter 8*.) Second, the industrialized market economies have come to depend more on fuel imports from developing countries, which accounted for 43 per cent of consumption in 1980-81 compared with only 16 per cent in 1959-60 and even less in pre-war years.<sup>/18</sup>

40. The dependence of the developed market economies on other mineral imports from the developing countries has also grown, and the share of these imports in consumption increased from 19 per cent in 1959-60 to 30 per cent in 1980-81.<sup>/19</sup> Non-renewable resources like fuels and minerals, as well as manufactured goods, are now far more important than tropical products and other agricultural materials in the flow of primary products from developing to industrial countries. In fact, the flow of food grains is in the opposite direction.

41. The main link between trade and sustainable development is the use of non-renewable raw materials to earn foreign exchange. Developing countries face the dilemma of having to use commodities as exports, in order to break foreign exchange constraints on growth, while also having to minimize damage to the environmental resource base supporting this growth. There are other links between trade and sustainable development; if protectionism raises barriers against manufactured exports, for example, developing nations have less scope for diversifying away from traditional commodities. And unsustainable development may arise not only from overuse of certain commodities but from manufactured goods that are potentially polluting.

### **2.1 International Commodity Trade**

42. Although a growing number of developing countries have diversified into manufactured exports, primary commodities other than petroleum continue to account for more than one-third of the export earnings of the group as a whole. Dependence on such exports is particularly high in Latin America (52 per cent) and Africa (62 per cent).<sup>/20</sup> The countries recognized as 'least developed' for the purposes of the UN Special Programme use primary commodities for 73 per cent of their export earnings.<sup>/21</sup>

43. Non-oil commodity prices fell during the early 1980s, not only in real but also in nominal terms. By early 1985, the UNCTAD commodity price index was 30 per cent below the 1980



average.<sup>22</sup> This recent weakness of commodity prices may not be only a temporary phenomenon. Commodity prices have not yet recovered from the depth of the world recession despite increased economic growth in consuming countries. The reasons may be partly technological (an acceleration in raw material substitution); partly monetary, caused by the high cost of holding stocks of commodities; and partly due to increases in supplies by countries desperate to earn foreign exchange.

**Table 3-2**

**The Growing Importance of Trade**

Economic Group	1950	1982
	(exports as a per cent of GDP or NMP)	
Developed Market Economies	7.7	15.3
Developing Market Economies	15.5	23.8
Socialist Countries of Eastern Europe	3.4*	16.6*
Socialist Countries of Asia	2.9*	9.7*

\* percentages to net material product (NMP).

**Source:** Based on UNCTAD, **Handbook of International Trade and Development Statistics, 1985 Supplement** (New York: United Nations, 1985).

44. These countries are turning the terms of trade against themselves, earning less while exporting more. The promotion of increased volumes of commodity exports has led to cases of unsustainable overuse of the natural resource base. While individual cases may not exactly fit this generalization, it has been argued that such processes have been at work in ranching for beef, fishing in both coastal and deep sea waters, forestry, and the growing of some cash crops. Moreover, the prices of commodity exports do not fully reflect the environmental costs to the resource base. In a sense, then, poor developing countries are being caused to subsidize the wealthier importers of their products.

45. The experience of oil has of course been different from that of most other commodities. (See *Chapter 7*.) It does provide one example of producers combining to restrict output and raise prices in ways that greatly increased export earnings while conserving the resource base and promoting energy saving and substitution on a large scale. Recent events suggest that regulation of the market by producers is very difficult in the long term, whether or not it is desirable in the wider, global interest, and in any event the conditions have not existed for other commodity exporters to operate in a like manner. Any arrangement encompassing measures to enhance the export earnings of producers, as well as to ensure the resource basis, would require consumer as well as producer support.

46. In recent years, Third World commodity exporters have sought to earn more by doing the

first-stage processing of raw materials themselves. This first stage often involves subsidized energy, other concessions, and substantial pollution costs. But these countries often find that they do not gain much from this capital- and energy-intensive first-stage processing, as the price spread shifts in favour of downstream products, most of which continue to be manufactured mainly in industrial countries. Tariff escalation in the industrial market economies reinforces this tendency.

47. The main international response to commodity problems has been the development of international commodity agreements to stabilize and raise developing countries' earnings from these exports. But real progress has been very limited and in fact there have been reversals. Moreover, environmental resource considerations have not played any part in commodity agreements, with the notable exception of the International Tropical Timber Agreement./23

48. Commodity agreements have not been easy to negotiate, and regulation of commodity trade has been notoriously controversial and difficult. Current arrangements could be improved in two crucial respects:

- Larger sums for compensatory financing to even out economic shocks - as under the IMF's Compensatory Financing Facility - would encourage producers to take a long-term view, and not to overproduce commodities where production is close to the limits of environmental sustainability during periods of market glut.
- Where producers need to diversify from traditional, single-crop production patterns, more assistance could be given for diversification programmes. The second window of the Common Fund could be used for promoting resource regeneration and conservation./24

49. Individual governments can better use renewable resources such as forests and fisheries to ensure that exploitation rates stay within the limits of sustainable yields and that finances are available to regenerate resources and deal with all linked environmental effects. As for non-renewable resources like minerals, governments should ensure that:

- the leaseholder undertakes exploration aimed at adding to proven reserves at least the amount extracted;
- that the ratio of production to proven reserve remains below a pre-specified limit;
- that the funds generated by royalties are used in a way that compensates for the declining income when the resource deposit is exhausted; and
- that the leaseholder is responsible for land restoration and other environmental control measures in the area affected by mining.

I think it is also of importance for the Commission to note the problem of negotiation of contracts on resource development. We have been trying for 10 years to include provisions on environment. We have been successful only to get from the investors a very broad description of what should be done in environmental protection. If you go into details you get problems with the lawyers and so on. That hampers then the investment.

For us, of course, it is a choice of whether to loosen the grip a little bit or if you maintain that, then of course, there will be no investment in the country. If an appeal could be made to the multinationals, mainly to understand that what has

been done in timber should also be applied to other agreements like coffee, tin, and others. I think this would be a great help.

Speaker from the floor  
Government agency  
WCED Public Hearing  
Jakarta, 26 March 1985

50. Relevant international organizations such as various UN agencies, the World Bank, and regional groups could develop further their work on model contracts and guidelines incorporating these principles.

## **2.2 Protectionism and International Trade**

51. The increase in protectionism in industrial countries stifles export growth and prevents diversification from traditional exports. The success of some Far Eastern developing countries in increasing exports of labour-intensive manufactured goods shows the development potential of such trade. However, other countries - especially low-income Asian and Latin American nations - seeking to follow the same route have found themselves severely handicapped by growing trade barriers, particularly in textiles and clothing. If developing countries are to reconcile a need for rapid export growth with a need to conserve the resource base, it is imperative that they enjoy access to industrial country markets for non traditional exports where they enjoy a comparative advantage. In many cases, the problems of protectionism relate to manufactures; but there are cases - sugar is a good example - where industrial countries employ agricultural trade restrictions in ways that are damaging ecologically as well as economically. (See Box 3-2.)

## **2.3 'Pollution-intensive' Goods**

52. The processing of certain raw materials - pulp and paper, oil, and alumina, for example - can have substantial environmental side effects. Industrial countries have generally been more successful than developing ones in seeing to it that export product prices reflect the costs of environmental damage and of controlling that damage. Thus in the case of exports from industrial countries, these costs are paid by consumers in importing nations, including those in the Third World. But in the case of exports from developing countries, such costs continue to be borne entirely domestically, largely in the form of damage costs to human health, property, and ecosystems.

### **Box 3-2**

#### **Sugar and Sustainable Development**

Thirty million poor people in the Third World depend on sugar cane for their survival. Many developing countries have a genuine comparative advantage in production and could earn valuable foreign exchange by expanding output. Some small states - Fiji, Mauritius, and several Caribbean islands - depend for their economic survival on cane sugar exports.

Industrial countries have actively promoted, and protected, beet sugar production, which competes with cane and has had quite damaging effects on developing countries: High-cost, protected beet production encourages artificial sweeteners; quotas have kept out Third World imports (except for some guaranteed imports as under the EEC's Sugar Protocol); and surpluses are dumped on world markets depressing prices.

In the **1986 World Development Report**, the World Bank estimated that industrial countries' sugar policies cost developing countries About \$7.4 billion in lost revenues during 1963, reduced their real income by about \$2.1 billion and increased price instability by about 25 per cent.

Over and above the increased developing country poverty that results from these practices, the promotion of beet production in industrial countries has had adverse ecological side effects. Modern beet growing is highly capital-intensive, it depends heavily on chemical herbicides, and the crop has poorer regenerative properties than others. The same product could be grown in developing countries, as cane, more cheaply, using more labour and fewer chemical additives.

53. In 1980 the industries of developing countries exporting to OECD members would have incurred direct pollution control costs of \$5.5 billion if they had been required to meet the environmental standards then prevailing in the United States, according to a study conducted for this Commission.<sup>/25</sup> If the pollution control expenditures associated with the materials that went into the final product are also counted, the costs would have mounted to \$14.2 billion. The evidence also suggests that OECD imports from developing countries involve products that entail higher average environmental and resource damage costs than do overall OECD imports.<sup>/26</sup> These hypothetical pollution control costs probably understate the real costs of environmental and resource damage in the exporting countries. Furthermore, these costs relate only to environmental pollution and not to the economic damage costs associated with resource depletion.

54. The fact that these costs remain hidden means that developing countries are able to attract more investment to export manufactured goods than they would under a more rigorous system of global environmental control. Many Third World policymakers see this as beneficial in that it gives developing countries a comparative advantage in 'pollution-intensive' goods that should be exploited. They also see that passing along more of the real costs could reduce the competitive position of their country in some markets, and thus regard any pressure in this direction as a form of disguised protectionism from established producers. Yet it is in developing countries' own long-term interests that more of the environmental and resource costs associated with production be reflected in prices. Such changes must come from the developing countries themselves.

## **2.4 The Mandates of Multilateral Trade Forums**

55. Although a number of UNCTAD research projects have considered the links between trade and environment, these issues have not been taken up systematically by intergovernmental organizations. The mandates of these organizations - principally GATT and UNCTAD - should include sustainable development. Their activities should reflect concern with the impacts of trading patterns on the environment and the need for more effective instruments to integrate

environment and development concerns into international trading arrangements.

56. International organizations dealing with trade will find it easier to reorientate their activities if each nation designates a lead agency with a broad mandate to assess the effects of international trade on sustaining the environmental and resource base of economic growth. This agency could be responsible for raising sustainability issues in the work of UNCTAD, GATT, OECD, CMEA, and other relevant organizations.

### **3. Ensuring Responsibility in Transnational Investment**

57. Overseas investment activity by companies in market economies has grown substantially over the past 40 years. (See Box 3-3.) Foreign affiliates now account for 40 per cent of sales, 33 per cent of net assets, and 56 per cent of net earnings for 380 of the largest industrial corporations in the market economies, according to data compiled by the UN Centre for Transnational Corporations.<sup>27</sup> A high proportion of transnational investment is within industrial market economies, another aspect of the growing integration of these economies.

58. Transnationals play an important role as owners, as partners in joint ventures, and as suppliers of technology in the mining and manufacturing sectors in many developing countries, especially in such environmentally sensitive areas as petroleum, chemicals, metals, paper, and automobiles. They also dominate world trade in many primary commodities.

59. In recent years, many developing countries have begun to take a more positive view of the role TNC investment can play in their development process. This has been somewhat influenced by these countries' needs for foreign exchange and their awareness of the role that foreign investment might play in providing it. Effective cooperation with TNCs is possible in creating equal conditions for all parties. This can be attained by a strict observance of the principle of sovereignty of the host country. For their part, many corporations have recognized the need to share managerial skills and technological know-how with host country nationals and to pursue profit-seeking objectives within a framework of long-term sustainable development.

#### **Box 3-3**

##### **The Role of Transnational Corporations**

- In 1983 chemicals accounted for roughly one-fourth of the stock of foreign direct investment in manufacturing in developing countries by companies from four leading countries - Japan (23 per cent), the United States (23 per cent), the United Kingdom (27 per cent), and the Federal Republic of Germany (14 per cent).
- Agriculture, mining, and other extractive industries accounted for 38 per cent of the stock of U.S. investment in developing countries in 1983, 29 per cent of the stock of Japanese investment in 1983, 21 per cent of the total FRG investment in 1981-83, and 9 per cent of the stock of U.K. investment in 1978.
- Eighty to ninety per cent of the trade in tea, coffee, cocoa, cotton, forest products, tobacco, jute, copper, iron ore, and bauxite is controlled in the case of each commodity by the three to six largest transnationals.



Source: UN Centre on Transnational Corporations, **Environmental Aspects of the Activities of Transnational Corporations: A Survey** (New York: UN, 1985).

60. But mutual suspicions still exist, usually because of an asymmetry in bargaining power between large corporations and small, poor, developing countries. Negotiations are often made one sided by a developing country's lack of information, technical unpreparedness, and political and institutional weaknesses. Suspicions and disagreements remain, particularly concerning the introduction of new technologies, the development of natural resources, and the use of the environment. If multinationals are to play a larger role in development, these conflicts and suspicions must be reduced.

61. Strengthening the bargaining posture and response of developing countries vis a vis transnationals is therefore critical. Where nations lack indigenous capacity to deal with large TNCs, regional and other international institutions should assist. As indicated earlier, they could expand existing help in the form of model agreements with transnationals for different situations, such as lease agreements for the exploitation of a mineral resource. They could also field technical assistance and advisory teams when a country negotiates with a transnational.

62. Transnational can have a substantial impact on the environment and resources of other countries and on the global commons. Both the home and host countries of TNCs share responsibilities and should work together to strengthen policies in this sphere. For example, information on policies and standards applied to and followed by corporations when investing in their own home country, especially concerning hazardous technologies, should be provided to host countries. Moreover, the policies of some industrialized countries that major investments are subject to prior environmental assessment should be considered for application to investments made elsewhere and should be broadened to include sustainability criteria. The information and recommendations thus arrived at should be shared with the host countries, which of course would retain the final responsibility.

63. Despite their importance, international measures regarding transnational have been generally lacking and have proved extremely difficult to negotiate. The codes of conduct for transnational corporations formulated by the OECD and under discussion in the UN should deal explicitly with environmental matters and the objective of sustainable development. More detailed and specific instruments are needed for other problems. In particular, when introducing a new technology, plant, product, or process, or when setting up a joint venture in a developing country, the parties involved must also recognize and accept certain special responsibilities. (See *Chapter 8*.)

#### **4. Broadening the Technological Base**

64. The promotion of resource productivity is largely the work of domestic economic policy. But the international economy impinges on possibilities for productivity improvement in several ways, particularly in the transfer of technology from one country to another.

##### **4.1 The Diffusion of Environmentally Sound Technologies**

65. The promotion of sustainable development will require an organized effort to develop and diffuse new technologies, such as for agricultural production, renewable energy systems, and

pollution control. Much of this effort will be based on the international exchange of technology: through trade in improved equipment, technology-transfer agreements, provision of experts, research collaboration, and so on. Hence the procedures and policies that influence these exchanges must stimulate innovation and ensure ready and widespread access to environmentally sound technologies.

66. The real challenge is to ensure that the new technologies reach all those who need them, overcoming such problems as the lack of information and in some cases an inability to pay for commercially developed technologies. The measures required at the national level to deal with these problems are discussed in Part II of this report. However, both these issues also arise in the international diffusion of technology.

Transfer of technology should be also looked upon as being a social process. Actually, ideally, it is the people themselves who have to make the selection, not us. So, to sum it up I think, talking about technology it is very important to, perhaps, understand that we are dealing here with a process of change. Technologies cannot be directly transferred except by relating this to a social process. So, actually technology is not an independent variable in this case, but it is very much dependent of social change.

M. Nashihin Hasan  
Speaker from the floor  
WCED Public Hearing  
Jakarta, 26 March 1985

67. Developing countries paid about \$2 billion in 1960 by way of royalties and fees, mainly to industrial countries.<sup>/28</sup> The gap in scientific and technological capabilities is particularly wide in areas of direct relevance to the objectives of sustainable development, including biotechnology and genetic engineering, new energy sources, new materials and substitutes, and low-waste and non-polluting technologies.

68. The principal policy issue as regards the impact of payments is the impact of patents and proprietary rights. In 1980, industrialized market economies accounted for 65 per cent of the world total of patents granted, and the socialist countries of Eastern Europe held 29 per cent.<sup>/29</sup> Developing countries held only 6 per cent, and most of these had been granted to non-residents. Proprietary rights are a key element in the commercial development of technology. But their application in certain areas may hamper the diffusion of environmentally sound technologies and may increase inequities.

69. In the past, publicly funded research provided new technology to small producers, particularly farmers, on a full or subsidized basis. The situation is not very different now, and in areas such as new seed varieties there is some reason to believe proprietary rights could act as a major barrier to developing countries' acquisition of new technologies. International cooperation is essential to maintain the flow of genetic material and to ensure an equitable sharing of gains.

## **4.2 Building Up Technological Capabilities in Developing Countries**

70. At present, most of the global research and development effort is devoted to military purposes or the commercial objectives of large corporations. Little of this is of direct relevance

to conditions in developing countries. In many areas the gap in technological capabilities is narrowing, but these efforts must be supported by international assistance, especially in such key areas as biotechnology. Unless action is taken to accumulate biological knowledge, valuable information as well as vital genetic variety will be lost forever, and developing countries will be at a permanent disadvantage in adapting the new biotechnologies to their own needs.

71. Developing countries therefore have to work, individually and together, to build up their technological capabilities. The creation and enhancement of the infrastructure for research and technology is a precondition for such cooperation. The countries concerned could share the burden by establishing cooperative research projects along the lines of the International Agricultural Research Centres.<sup>30</sup> Mission-oriented cooperative research ventures could be developed in areas such as dryland agriculture, tropical forestry, pollution control in small enterprises, and low-cost housing. Specific responsibilities would be assigned to institutions and corporations in the participating countries, and the agreement could provide for the equitable sharing and widespread diffusion of the technologies developed.

#### **IV. A Sustainable World Economy**

72. If large parts of the developing world are to avert economic, social, and environmental catastrophes, it is essential that global economic growth be revitalized. In practical terms, this means more rapid economic growth in both industrial and developing countries, freer market access for the products of developing countries, lower interest rates, greater technology transfer, and significantly larger capital flows, both concessional and commercial.

73. But many people fear that a more rapidly growing world economy will apply environmental pressures that are no more sustainable than the pressures presented by growing poverty. The increased demand for energy and other non-renewable raw materials could significantly raise the price of these items relative to other goods.

74. The Commission's overall assessment is that the international economy must speed up world growth while respecting the environmental constraints. Some favourable trends have been noted in the pattern of consumption and production in industrial countries, which collectively still consume most of the world's non-renewable resources.

75. Sustaining these trends will make it easier for developing countries to grow by diversifying their own economies. But for them to emerge from dependence a general acceleration of global economic growth is not enough. This would mean a mere perpetuation of existing economic patterns, though perhaps at a higher level of incomes. It must be ensured that the economies of developing countries grow fast enough to outpace their growing internal problems and fast enough for that first leap needed to acquire momentum. A continuation of economic growth and diversification, along with the development of technological and managerial skills, will help developing countries mitigate the strains on the rural environment, raise productivity and consumption standards, and allow nations to move beyond dependence on one or two primary products for their export earnings.

76. Future patterns of agricultural and forestry development, energy use, industrialization, and human settlements can be made far less material-intensive (see Chapters 5, 7, 8, and 9), and hence both more economically and environmentally efficient. Under these conditions, a new era of growth in the world economy can widen the options available to developing countries.

77. Reforms at an international level are now needed to deal simultaneously with economic and ecological aspects in ways that allow the world economy to stimulate the growth of developing countries while giving greater weight to environmental concerns. Such an agenda requires deep

commitment by all countries to the satisfactory working of multilateral institutions, such as the multilateral development banks; to the making and observance of international rules in fields such as trade and investment; and to constructive dialogue on the many issues where national interests do not immediately coincide but where negotiation could help to reconcile them.

78. The Commission therefore regrets but cannot ignore the recent decline in multilateral cooperation in general and a negative attitude to dialogue on development in particular. At first sight, the introduction of an environmental dimension further complicates the search for such cooperation and dialogue. But it also injects an additional element of mutual self-interest, since a failure to address the interaction between resource depletion and rising poverty will accelerate global ecological deterioration.

79. New dimensions of multilateralism are essential to human progress. The Commission feels confident that the mutual interests involved in environment and development issues can help generate the needed momentum and can secure the necessary international economic changes that it will make possible.

---

## Footnotes

1/ Department of International Economic and Social Affairs (DIESA), **Doubling Development Finance: Meeting a Global Challenge. Views and Recommendations of the Committee on Development Planning** (New York: UN, 1986)

2/ Ibid.

3/ World Bank, **Financing Adjustment with Growth in Sub-Saharan Africa** (Washington, DC, 1986).

4/ IMF, **World Economic Outlook**, October 1986.

5/ UN, **World Economic Survey 1986** (New York, 1986).

6/ World Bank, op. cit.

7/ Ibid.

8/ UN, General Assembly, 'The Critical Economic Situation in Africa: Report of the Secretary General', A/S-13/2, New York, 20 May 1986.

9/ Organization of African Unity Assembly of Heads of State of Government, **Africa's Priority Programme of Action 1986-1991** (Addis Ababa, 1985).

10/ UN General Assembly, **United Nations Programme of Action for African Economic Recovery and Development** (New York, 1986).

11/ World Bank, op. cit.

12/ Bank of International Settlements, **International Banking and Financial Markets Developments**. (Basle, 1986).

13/ Inter-American Development Bank, **Economic and Social Progress in Latin America** (Washington, DC, 1986).

14/ Unpublished data from UN Economic Commission on Latin America.

15/ Ibid.

16/ See, for example, UN, '*Programme of Action on a New International Economic Order*', General Assembly *Resolution 3202 (S-VI)*, 1 May 1974.

17/ see GATT, **International Trade 1985-86** (Geneva, 1986).

18/ UNCTAD, **Handbook of International Trade and Development Statistics, 1977 and 1985 Supplements** (New York: UN, 1977 and 1985).

19/ Ibid.

20/ UNCTAD, **Statistical Pocketbook** (New York: UN, 1984).

21/ Ibid.

22/ UNCTAD, **Trade and Development Report** (New York: UN, 1986).

23/ Alister MacIntyre, UNCTAD, statement at WCED Public Hearings, Oslo, 1985.

24/ The Common Fund is an international arrangement for the stabilization of prices for a group of commodities of particular interest to developing countries. The Second Window of the fund is meant to provide resources for promotional and research measures.

25/ I. Halter and J.H. Loudon, 'Environmental Costs and the Patterns of North-South Trade', prepared for WCED, 1986.

26/ Ibid.

27/ UN Centre on Transnational Corporations, **Transnational Corporations in World Development Third Survey** (New York: UN, 1983).

28/ Ibid.

29/ Commonwealth Working Group, **Technological Change** (London: Commonwealth Secretariat, 1985).

30/ The reference is to the activities of the international institutes that work under the umbrella of the Consultative Group on International Agricultural Research of the World Bank.



# **Our Common Future, Chapter 4: Population and Human Resources**

## ***I. The Links with Environment and Development***

## ***II. The Population Perspective***

- 1. Growth in Numbers***
- 2. Changes in Mobility***
- 3. Improved Health and Education***

## ***III. A Policy Framework***

- 1. Managing Population Growth***
- 2. Managing Distribution and Mobility***
- 3. From Liability to Asset***

- 3.1 Improving Health*
- 3.2 Broadening Education*
- 3.3 Empowering Vulnerable Groups*

## ***Footnotes***

### **Chapter 4: Population and Human Resources**

1. In 1985, some 80 million people were added to a world population of 4.8 billion. Each year the number of human beings increases, but the amount of natural resources with which to sustain this population, to improve the quality of human lives, and to eliminate mass poverty remains finite. On the other hand, expanding knowledge increases the productivity of resources.

2. Present rates of population growth cannot continue. They already compromise many governments' abilities to provide education, health care, and food security for people, much less their abilities to raise living standards. This gap between numbers and resources is all the more compelling because so much of the population growth is concentrated in low-income countries, ecologically disadvantaged regions, and poor households.

3. Yet the population issue is not solely about numbers. And poverty and resource degradation can exist on thinly populated lands, such as the drylands and the tropical forests. People are the ultimate resource. Improvements in education, health, and nutrition allow them to better use the resources they command, to stretch them further. In addition, threats to the sustainable use of resources come as much from inequalities in people's access to resources and from the ways in which they use them as from the sheer numbers of people. Thus concern over the 'population problem' also calls forth concern for human progress and human equality.

4. Nor are population growth rates the challenge solely of those nations with high rates of increase. An additional person in an industrial country consumer far more and places far greater pressure on natural resources than an additional person in the Third World. Consumption patterns and preferences are as important as numbers of consumers in the conservation of resources.

5. Thus many governments must work on several fronts to limit population growth; to control the impact of such growth on resources and, with increasing knowledge, enlarge their range and improve their productivity; to realize human potential so that people can better husband and use resources; and to provide people with forms of social security other than large numbers of children. The means of accomplishing these goals will vary from country to country, but all should keep in mind that sustainable economic growth and equitable access to resources are two of the more certain routes towards lower fertility rates.

6. Giving people the means to choose the size of their families is not just a method of keeping population in balance with resources; it is a way of assuring - especially for women the basic human right of self-determination. The extent to which facilities for exercising such choices are made available is itself a measure of a nation's development. In the same way, enhancing human potential not only promotes development but helps to ensure the right of all to a full and dignified life.

## **I. The Links with Environment and Development**

7. Population growth and development are linked in complex ways. Economic development generates resources that can be used to improve education and health. These improvements, along with associated social changes, reduce both fertility and mortality rates. On the other hand, high rates of population growth that eat into surpluses available for economic and social development can hinder improvements in education and health.

8. In the past, the intensification of agriculture and the production of higher yields helped nations cope with the increasing population pressures on available land. Migration and international trade in food and fuels eased the pressure on local resources. They permitted and helped sustain the high population densities of some industrialized countries.

9. The situation is different in most of the developing world. There, improvements in medicine and public health have led to a sharp drop in mortality rates and have accelerated population growth rates to unprecedented levels. But fertility rates remain high; much human potential remains unrealized, and economic development is stalled. Agricultural intensification can go some way towards restoring a balance between food production and population, but there are limits beyond which intensification cannot go. (See Box 4-1.)

10. The very possibility of development can be compromised by high population growth rates. Moreover, most developing countries do not have the resources to wait for a few generations before population stabilizes. The option of migration to new lands is virtually closed. And low levels of economic and social development combined with changing trade production relationships limit possibilities of using international trade to augment access to resources. Hence, in the absence of deliberate measures, the imbalance between population growth and resource development will worsen.

11. Population pressure is already forcing traditional farmers to work harder, often on shrinking farms on marginal land, just to maintain household income. In Africa and Asia, rural population nearly doubled between 1950 and 1985, with a corresponding decline in land availability.<sup>1</sup> Rapid population growth also creates urban economic and social problems that threaten to make cities wholly unmanageable. (See Chapter 9.)

12. Larger investments will be needed just to maintain the current inadequate levels of access to education, health care, and other services. In many cases, the resources required are just not available. Health, housing conditions, and the quality of education and public services all

deteriorate; unemployment, urban drift, and social unrest increase.

### **Box 4-1 The Food/Population Balance**

- The potential population-supporting capacity of land in developing countries has been assessed in a joint study by FAO and the International Institute for Applied Systems Analysis. Data on soil and land characteristics were combined with climatic data to calculate the potential yields of major crops, to select the optimum crops, and to derive the overall potential for calorie production. Three levels of crop production were calculated: the first at a low level of technology with no fertilizer or chemicals, traditional crop varieties, and no soil conservation; the second at an intermediate level, where the most productive crop mix is used on half the land along with fertilizers, improved varieties, and some soil conservation; and the third at a high level of technology with an ideal crop mix and technology on all lands. The population-supporting capacity was determined by dividing the total calorie production by a minimum per capita intake level. This figure was then compared with the medium-variant UN population projections.
- The 117 developing countries covered in the study, taken together, can produce enough food to feed one-and-a-half times their projected population in the year 2000. even at a low level of technology. But the picture is less hopeful in the cases of individual countries. At the low level of technology, 64 countries with a population of around 1.1 billion lack the resources to feed themselves. With the most advanced agricultural methods, the number of countries where food production potential would fall short of requirements drops to 19, with a total population of 100 million. Most are high-income West Asian countries and some small island states. Many of these countries have the capacity to earn enough foreign exchange to import their food requirements. In the others, the real issue is the modernization of agriculture on a sustainable basis.
- Some researchers have assessed the 'theoretical' potential for global food production. One study assumes that the area under food production can be around 1.5 billion hectares (close to the current level) and that average yields could go up to 5 tons of grain equivalent per hectare (as against the present average of 2 tons of grain equivalent}. Allowing for production from rangelands and marine sources, the total 'potential' is placed at 8 billion tons of grain equivalent.
- How many people can this sustain? The present global average consumption of plant energy for food, seed, and animal feed amounts to about 6,000 calories daily, with a range among countries of 3,000-15,000 calories, depending on the level of meat consumption. On this basis, the potential production could sustain a little more than 11 billion people. But if the average consumption rises substantially - say, to 9,000 calories - the population carrying capacity of the Earth comes down to 7.5 billion. These figures could be substantially higher if the area under food production and the productivity of 3 billion hectares of permanent pastures can be increased on a sustainable basis. Nevertheless, the data do suggest, that meeting the food needs of an ultimate world population of

around 10 billion would require tone changes in food habits, as well as greatly improving the efficiency of traditional agriculture.

B. Gilland. 'Considerations on World Population and Food Supply'. **Population and Development Review**. Vol. 9. No. 2. pp. 203-11; G M. Higgins et al., **Potential Population supporting Capacities of Lands in the Developing World** (Rome: FAO. 1982); D.J. Maler (ed.). **Rapid Population Growth and Human Carrying Capacity**. Staff Working Papers No. 690 (Washington, D.C.: World Bank, 1985).

13. Industrial countries seriously concerned with high population growth rates in other parts of the world have obligations beyond simply supplying aid packages of family planning hardware. Economic development, through its indirect impact on social and cultural factors, lowers fertility rates. International policies that interfere with economic development thus interfere with a developing nation's ability to manage its population growth. A concern for population growth must therefore be a part of a broader concern for a more rapid rate of economic and social development in the developing countries.

14. In the final analysis, and in both the developed and developing worlds, the population issue is about humane and not about numbers. It is misleading and an injustice to the human condition to see people merely fit; consumers. Their well being and security old age security, declining child mortality, health care, and so on are the goal o( development Almost any activity that increases well-being and security lessens peoples' desires to have more children than they and national ecosystems can support.

## II. The Population Perspective

### 1. Growth in Numbers

15. Population growth accelerated in the middle of the 18th century with the advent of the Industrial Revolution and associated improvements in agriculture, not just in the regions that are more developed but elsewhere as well. The recent phase of deceleration started around 1950 with the sharp reduction in mortality rates in the developing countries.

Since 1970 it has been fashionable to draw a distinction between population and environment as two crisis areas, but often times we forget that population is in fact a very integral part of the environment and therefore when we are addressing ourselves to population we are looking at not only the physical, biological, and chemical environments, we are also looking at the socio-cultural or socio-economic environment in which these development programmes are being set. And population makes much more sense if you are talking of population within a context.

Dr. J.O. Oucho  
Population Studies and Research institute  
WCED Public Hearing  
Nairobi. 23 Sept 1986

16. Between 1950 and 1985. world population grew at an annual rate of 1.9 per cent, compared

with 0.8 per cent in the half-century preceding 1950.<sup>/2</sup> population growth is now concentrated in the developing regions of Asia, Africa, and Latin America, which accounted for 85 per cent of the increase of global population since 1950. (See Table 4-1.)

17. The processes of population growth are changing in most developing countries as birth and death rates fall. In the early 1950s, practically all developing countries had birth rates over 40 and death rates over 20, the major exception being the low death rates in Latin America. (These rates refer to the annual number of births and deaths per 1,000 population.) Today the situation is quite different:

- Thirty-two per cent of the people in the Third World live in countries - such as China and the Republic of Korea - with birth rates below 25 and death rates below 10.
- Forty-one per cent are in countries where birth rates have fallen, but not as much as death rates, and their populations are growing at around 2 per cent - doubling, in other words, every 34 years. Such countries include Brazil, India, Indonesia, and Mexico.
- The remaining 27 per cent live in countries, such as Algeria, Bangladesh, Iran, and Nigeria, where death rates have fallen slightly but birth rates remain high. Overall population growth is in the range of 2.5 to 3 per cent (doubling every 28 to 23 years), with even higher growth rates in some countries, such as Kenya.<sup>/3</sup>

18. In the industrial world, fertility rates have declined and the population is not growing rapidly. In fact, it has stabilized in many countries. Still, the population in North America, Europe, the USSR, and Oceania is expected to increase by 230 million by the year 2025, which is as many people as live in the United States today.

**Table 4-1**  
**World Population 1950-85: Key Facts**

Size and Rates

	1950	1960	1970	1980	1985
Total Population			(billions)		
World	2.5	3.0	3.7	4.4	4.8
More developed regions	0.83	0.94	1.05	1.14	1.17
Less developed regions	1.68	2.07	2.65	3.31	3.66
Annual Growth *			(per cent)		
World		1.8	2.0	1.9	1.7
More developed regions		1.3	1.0	0.8	0.6
Less developed regions		2.1	2.5	2.3	2.0
Urban Population			(per cent)		



World	29	34	37	40	41
More developed regions	54	67	67	70	72
Less developed regions	17	22	25	29	31

\* Data are for growth over previous decade or, for last column, over previous five years.

**Source:** Department of International Economic and Social Affairs, **World Population Prospects: Estimates and Projections as Assessed in 1984** (New York: UN, 1986)

19. The acceleration of population growth in the Third World and the decline in fertility levels in industrial countries are (changing age distribution patterns radically. In developing countries, the young predominate. In 1900, 39 per cent of developing country populations were younger than 15; the figure for industrialized countries was only 23 per cent./<sup>4</sup> Yet in these countries, the proportion of the elderly is growing. Those 65 or older accounted for 11 per cent of the population in 1980; in developing countries, they represented only 4 per cent./<sup>5</sup> Thus in the industrial world, relatively fewer people of working age will bear the burden of supporting relatively larger numbers of older people.

20. A changing age structure helps to set patterns of future population growth. The large number of young people in developing countries means large numbers of future parents, so that even if each person produces fewer children. The total number of births will continue to increase. Population growth can continue to grow for some decades after fertility rates decline to the 'replacement level' of slightly over two children on average per couple. Thus in many nations, high population growth over the next few generations are assured.

21. Population projections indicate an increase in global population from 4.8 billion in 1985 to 6.1 billion by 2000, and to 8.2 billion by 2025. (See Table 4 2.) More than 90 per cent of this increase is expected in developing regions. Large differences exist among countries in these areas, and the momentum of population growth is higher in Africa than in Latin America or Asia. In some developing countries, such as China, population growth rates are already well below 2 per cent and are expected to fall below 1 per cent by the beginning of the next century./<sup>6</sup>

22. Reflecting the 'momentum' of population growth, long term UN projections show that at the global level:

- if replacement-level fertility is reached in 2010, global population will stabilize at 7.7 billion by 2060;
- if this rate is reached in 2025, population will stabilize at 10.2 billion by 2095;
- if, however, the rate is reached only in 2065, global population in 2100 would be 14.2 billion./<sup>7</sup>

23. These projections show that the world has real choices. Policies to bring down fertility rates could make a difference of billions to the global population next century. The greater part of the differences between the three variants is accounted for by South Asia, Africa, and Latin America. Hence much depends on the effectiveness of population policies in these regions.

## 2. Changes in Mobility

24. The number of people in Europe, Japan, North America, and the Soviet Union quintupled

between 1750 and 1950. and these regions' share in world population increased sharply over thin period./<sup>8</sup> By the latter part of the 19th century, there was growing concern about population pressures in Europe. Migration to North America, Australia, and New Zealand helped to some extent. At its peak between 1881 and 1910, permanent emigration absorbed nearly 20 per cent of the increase in population in Europe./<sup>9</sup>

25. Today, however, migration is not a major factor in determining population distribution among countries. Between 1970 and 1980 permanent emigration as a percentage of population increase fell to 4 per cent in Europe and was only 2.5 per cent in Latin America. The corresponding percentages in Asia and Africa were very much lower./<sup>10</sup> Thus the option of emigration to new lands has not been and will not be a significant element in relieving demographic pressures in developing countries. In effect, this reduces the time available to bring population into balance with resources.

26. Within countries, populations are more mobile. Improved communications have enabled large movements of people. Sometimes as a natural response to the growth of economic opportunities in different places. Some governments have actively encouraged migration from densely to sparsely settled areas. A more recent phenomenon is the flight of 'ecological refugees' from areas of environmental degradation.

**Table 4-2**  
**Current and Projected Population Size and Growth Rates\***

Region	Population			Annual Growth Rate		
	1985	2000	2025	1950	1985	2000
				to	to	to
				1985	2000	2025
	(billion)			(per cent)		
World	4.8	6.1	8.2	1.9	1.6	1.2
Africa	0.66	0.87	1.62	2.6	3.1	2.5
Latin America	0.41	0.55	0.78	2.6	2.0	1.4
Asia	2.82	3.55	4.54	2.1	1.6	1.0
North America	0.26	0.30	0.35	1.3	0.8	0.6
Europe	0.49	0.51	0.52	0.7	0.3	0.1
USSR	0.28	0.31	0.37	1.7	0.8	0.6
Oceania	0.02	0.03	0.04	1.9	1.4	0.9

\* Medium-variant projections.

**Source:** Department of International Economic and Social Affairs, **World Population Prospects; Estimates and Projections as Assessed in 1984** (New York: UN, 1986).

27. Much of the movement is from countryside to city. (See Chapter 9.) In 1985, some 40 per cent of the world's population lived in cities; the magnitude of the urban drift can be seen in the fact that since 1950, the increase in urban population has been larger than the increase in rural population both in percentage and in absolute terms. This shift is most striking in developing countries, where the number of city-dwellers quadrupled during this period./11

### 3. Improved Health and Education

28. Improvements in the health and education of all, but especially of women and in conjunction with other social changes that raise the status of women, can have a profound effect in bringing down population growth rates. In an initial period, however, better health care means that more babies live to reproduce and that women reproduce over longer time spans.

**Table 4-3**  
**Health Indicators**

Region	Life Expectancy at Birth		Infant Mortality Rates	
	1950-55	1980-85	1960-65	1980-85
	(years)		(deaths per 1,000 live births)	
World	49.9	64.6	117	81
Africa	37.5	49.7	157	114
Asia	41.2	57.9	133	87
South America	52.3	64.0	101	64
North America	64.4	71.1	43	27
Europe	65.3	73.2	37	16
USSR	61.7	70.9	32	25
Oceania	61.0	67.6	55	39

**Source:** WCED, based on data in World Resources Institute / International Institute for Environment and Development, **World Resources 1986** (New York: Basic Books, 1986).

29. The 'health status' of a society is a complex concept that cannot be measured easily. Two widely available indicators that reflect at least some aspects of a given society's health are life expectancy and infant mortality rates. (See Table 4-3.) These statistics suggest that health has improved virtually everywhere; and, at least with regard to these two indicators, the gap between industrial and developing regions has narrowed.

30. Many factors can increase life expectancy and reduce mortality rates: two are worth emphasizing. First, although generally speaking national wealth buys national health, some relatively poor nations and areas, such as China, Sri Lanka, and the Indian state of Kerala, have achieved remarkable success in lowering infant mortality and improving health through increases in education, especially of women; the establishment of primary health clinics; and

other health care programmes.<sup>/12</sup> Second, the principal reductions in mortality rates in the industrial world came about before the advent of modern drugs; they were due to improved nutrition, housing, and hygiene. The recent gains in developing countries have also been largely due to public health programmes, particularly for the control of communicable diseases.

31. Education is another key dimension of 'population quality'. The past few decades have seen a great expansion of educational facilities in virtually all countries. In terms of school enrolment, literacy rates, the growth in technical education, and the development of scientific skills, much progress has been achieved. (See Table 4-4.)

### **III. A Policy Framework**

32. Excessive population growth diffuses the fruits of development over increasing numbers instead of improving living standards in many developing countries: a reduction of current growth rates is an imperative for sustainable development. The critical issues are the balance between population size and available resources and the rate of population growth in relation to the capacity of the economy to provide for the basic needs of the population, not just today but for generations. Such a long-term view is necessary because attitudes to fertility rarely change rapidly and because, even after fertility starts declining, past increases in population impart a momentum of growth as people reach child-bearing age. However a nation proceeds towards the goals of sustainable development and lower fertility levels, the two are intimately linked and mutually reinforcing.

33. Measures to influence population size cannot be effective in isolation from other environment/development issues. The number, density, movement, and growth rate of a population cannot be influenced in the short run if these efforts are being overwhelmed by adverse patterns of development in other areas. Population policies must have a broader focus than controlling numbers: Measures to improve the quality of human resources in terms of health, education, and social development are as important.

34. A first step may be for governments to abandon the false division between 'productive' or 'economic' expenditures and 'social' expenditures. Policymakers must realize that spending on population activities and on other efforts to raise human potential is crucial to a nation's economic and productive activities and to achieving sustainable human progress - the end for which a government exists.

#### **1. Managing Population Growth**

35. Progress in population policies is uneven. Some countries with serious population problems have comprehensive policies. Some go no further than the promotion of family planning. Some do not do even that.

36. A population policy should set out and pursue broad national demographic goals in relation to other socio-economic objectives. Social and cultural factors dominate all others in affecting fertility. The most important of these is the roles women play in the family, the economy, and the society at large. Fertility rates fall as women's employment opportunities outside the home and farm, their access to education, and their age at marriage all rise. Hence policies meant to lower fertility rates not only must include economic incentives and disincentives, but must aim to improve the position of women in society. Such policies should essentially promote women's rights.

**Table 4-4**

## Male and Female Enrolment Ratios, by Region, 1960 and 1982

Region	Male		Female	
	1960	1982	1960	1982
<b>World</b>				
First Level	92.2	101.3	7.1	87.3
Second Level	31.3	53.3	23.1	42.5
<b>Africa</b>				
First Level	56.2	89.2	32.0	72.1
Second Level	7.3	29.6	2.9	19.5
<b>Latin America and Caribbean</b>				
First Level	75.0	106.2	71.2	103.3
Second Level	14.9	46.6	13.6	48.5
North America				
First Level	117.4	119.7	116.4	119.9
Second Level	69.4	85.4	71.4	86.6
<b>Asia</b>				
First Level	94.9	100.1	63.1	79.9
Second Level	29.3	49.3	16.6	32.9
<b>Europe and USSR</b>				
First Level	103.4	105.4	102.7	104.5
Second Level	46.5	76.2	44.6	81.3
<b>Oceania</b>				
First Level	102.2	102.9	100.7	98.9
Second Level	53.8	71.1	58.8	72.0

Note; The figures are percentages of appropriate groups receiving a given level of education. As many older children are in primary school percentages can be over 100.

Source: WCED, based on data in UNESCO, 'A Summary Statistical Review of Education in the World, 1960-1982, Paris, July 1984.

37. Poverty breeds high rates of population growth: Families poor in income, employment, and social security need children first to work and later to sustain elderly parents. Measures to provide an adequate livelihood for poor households, to establish and enforce minimum-age child labour laws, and to provide publicly financed social security will all lower fertility rates.



Improved public health and child nutrition programmes that bring down infant mortality rates - so parents do not need 'extra' children as insurance against child death - can also help to reduce fertility levels.

The environment is the business of everybody, development is the business of everybody, life and living is the business of everybody. I think the solution will be found in encouraging mass environmental literacy so that there can be democratic and literate decisions, because if decisions are taken by a few without the incorporation of the opinion of the masses, the NGOs especially included, the likelihood is that the situations will not succeed. They will be imposed from above, the people will not respond positively to them, and the project is lost before it is launched.

Joseph Ouma  
Dean of School of Environmental Studies, Moi University  
WCED Public Hearing  
Nairobi, 23 Sept 1986

38. All these programmes are effective in bringing down birth rates only when their benefits are shared by the majority. Societies that attempt to spread the benefits of economic growth to a wider segment of the population may do better at lowering birth rates than societies with both faster and higher levels of economic growth but a less even sharing of the benefits of that growth.

39. Thus developing-country population strategies must deal not only with the population variable as such but also with the underlying social and economic conditions of underdevelopment. They must be multifaceted campaigns: to strengthen social, cultural, and economic motivations for couples to have small families and, through family planning programmes, to provide to all who want them the education, technological means, and services required to control family size.

40. Family planning services in many developing countries suffer by being isolated from other programmes that reduce fertility and even from those that increase motivation to use such services. They remain separate both in design and implementation from such fertility-related programmes as nutrition, public health, mother and child care, and preschool education that take place in the same area and that are often funded by the same agency.

41. Such services must therefore be integrated with other efforts to improve access to health care and education. The clinical support needed for most modern contraceptive methods makes family planning services heavily dependent on the health system. Some governments have successfully combined population programme: with health, education, and rural development projects, and implemented them as part of major socio-economic programmes in villages or regions. This integration increases motivation, improves access, and raises the effectiveness of investments in family planning.

42. Only about 1.5 per cent of official development aid now goes for population assistance.<sup>/13</sup> Regrettably, some donor countries have cut back on their assistance for multilateral population programmes and so weakened them; this must be reversed.

43. Zimbabwe is one nation that has successfully integrated its family planning efforts not only with its rural health services but also with efforts to improve women's abilities to organize

group activities and earn money through their own labour. The government's initial efforts were aimed less at limiting population growth than at assisting women to space births in the interests of mother and child health and at helping infertile women to bear children. But gradually families have begun to use the contraceptives made available for child spacing as a way to limit fertility. Zimbabwe now leads sub-Saharan Africa in the use of modern contraceptive methods./14

## **2. Managing Distribution and Mobility**

44. Population distribution across a country's different regions is influenced by the geographical spread of economic activity and opportunity. Most countries are committed in theory to balancing regional development, but are rarely able to do this in practice. Governments able to spread employment opportunities throughout their nations and especially through their countrysides will thus limit the rapid and often uncontrolled growth of one or two cities. China's effort to support village-level industries in the countryside is perhaps the most ambitious of this sort of national programme.

45. Migration from countryside to city is not in itself a bad thing; it is part of the process of economic development and diversification. The issue is not so much the overall rural urban shift but the distribution of urban growth between large metropolitan cities and smaller urban settlements. (See Chapter 9.)

46. A commitment to rural development implies more attention to realizing the development potential of all regions, particularly those that are ecologically disadvantaged (See Chapter 6.) This would help reduce migration from these areas due to lack of opportunities. But governments should avoid going too far in the opposite direction, encouraging people to cove into sparsely populated areas such as tropical moist forests, where the land may not be able to provide sustainable livelihoods.

Demographic phenomena constitute the heart of the African Development problematique. They are the data that lead most analysts to project a continuing and deepening crisis in Africa. There is no doubt of the imperative and urgent need for a far reaching population policy to be adopted and vigorously implemented by African governments.

One issue of relevance that requires further research is the use of the tax system as a means for controlling population growth and discouraging rural-urban migration.

To slow down population growth, should families without children be given a tax incentive or tax break? Should a tax penalty be imposed for each child after a fixed number of children, considering that the tax system has not solved the population migration problem?

Adebayo Adedeji  
Executive Director, Economic Commission for Africa  
WCED Public Hearing  
Harare, 18 Sept 1986

## **3. From Liability to Asset**

47. When a population exceeds the carrying capacity of the available resources, it can become a liability in efforts to improve people's welfare. But talking of population just as numbers glosses over an important point: People are also a creative resource, and this creativity is an asset societies must tap. To nurture and enhance that asset, people's physical well-being must be improved through better nutrition, health care, and so on. And education must be provided to help them become more capable and creative, skilful, productive, and better able to deal with day-to-day problems. All this has to be achieved through access to and participation in the processes of sustainable development.

### 3.1 Improving Health

We in Asia, I feel, want to have an equilibrium between the spiritual and material life. I noticed that you have tried to separate religion from the technological side of life. Is that not exactly, the mistake in the West in developing technology, without ethics, without religion? If that is the case, and we have the chance to develop a new direction, should we not advise the group on technology to pursue a different kind of technology which has as its base not only the rationality, but also the spiritual aspect? Is this a dream or is this something we cannot avoid?

Speaker from the floor  
WCED Public Hearing  
Jakarta, 26 March 1985

48. Good health is the foundation of human welfare and productivity. Hence a broad-based health policy is essential for sustainable development. In the developing world, the critical problems of ill health are closely related to environmental conditions and development problems.

49. Malaria is the most important parasitic disease in the tropics, and its prevalence is closely related to wastewater disposal and drainage. Large dams and irrigation systems have led to sharp increases in the incidence of schistosomiasis (snail fever) in many areas. Inadequacies in water supply and sanitation are direct causes of other widespread and debilitating diseases such as diarrhoeas and various worm infestations.

50. Though much has been achieved in recent years, 1.7 billion people lack access to clean water, and 1.2 billion to adequate sanitation.<sup>15</sup> Many diseases can be controlled not just through therapeutic interventions but also through improvements in rural water supply, sanitation, and health education. In this sense, they really require a developmental solution. In the developing world, the number of water taps nearby is a better indication of the health of a community than is the number of hospital beds.

51. Other examples of links between development, environmental conditions, and health include air pollution and the respiratory illnesses it brings, the impact of housing conditions on the spread of tuberculosis, the effects of carcinogens and toxic substances, and the exposure to hazards in the workplace and elsewhere.

52. Many health problems arise from the nutritional deficiencies that occur in virtually all developing countries, but most acutely in low-income areas. Most malnutrition is related to a shortage of calories or protein or both, but some diets also lack specific elements and compounds, such as iron and iodine. Health will be greatly improved in low-income areas by

policies that lead to the production of more of the cheap foods the poor traditionally eat - coarse grains and root crops.

53. These health, nutrition, environment, and development links imply that health policy cannot be conceived of purely in terms of curative or preventive medicine, or even in terms of greater attention to public health. Integrated approaches are needed that reflect key health objectives in areas such as food production; water supply and sanitation; industrial policy, particularly with regard to safety and pollution; and the planning of human settlements. Beyond this, it is necessary to identify vulnerable groups and their health risks and to ensure that the socio-economic factors that underlie these risks are taken into account in other areas of development policy.

54. Hence, WHO's 'Health for All' strategy should be broadened far beyond the provision of medical workers and clinics, to cover health-related interventions in all development activities.<sup>16</sup> Moreover, this broader approach must be reflected in institutional arrangements to coordinate all such activities effectively.

55. Within the narrower area of health care, providing primary health care facilities and making sure that everyone has the opportunity to use them are appropriate starting points. Maternal and child health care are also particularly important. The critical elements here are relatively inexpensive and can have a profound impact on health and well-being. An organized system of trained birth attendants, protection against tetanus and other childbirth infections, and supplemental feeding can dramatically reduce maternal mortality. Similarly, low-cost programmes to assure immunization, teach and supply oral dehydration therapy against diarrhoeas, and encourage breast-feeding (which in turn can reduce fertility) can increase child survival rates dramatically.

56. Health care must be supplemented by effective health education. Some parts of the Third World may soon face growing numbers of the illnesses associated with life-styles in industrial nations - cancer and heart disease especially. Few developing nations can afford the expensive treatment required for the latter diseases, and should begin efforts now to educate their citizens on the dangers of smoking and of high-fat diets.

57. A rapid spread of acquired immune deficiency syndrome (AIDS) in both developed and developing nations could drastically alter all countries' health priorities. AIDS is threatening to kill millions of people and disrupt the economies of many countries. Governments should overcome any lingering shyness and rapidly educate their people about this syndrome and about the ways in which it is spread. International cooperation on research and the handling of the disease is essential.

58. Another major health problem with international ramifications is the increase in drug addiction. It is a problem closely linked to organized crime in the production of drugs, in large-scale international traffic in these drugs, and in the networks for distribution. It distorts the economy in many poor producing areas and destroys people the world over. International cooperation is essential in tackling this scourge. Some countries have to deploy considerable financial resources to halt the production and traffic in narcotics and to promote crop diversification and rehabilitation schemes in the producing areas, which are generally impoverished. To sustain their efforts, greater international assistance is essential

59. Most medical research focuses on pharmaceuticals, vaccines, and other technological interventions for disease management. Much of this research is directed at the diseases of industrialized countries, as their treatment accounts for a substantial part of the sales of pharmaceutical companies. More research is urgently needed on the environmentally related

tropical diseases that are the major health problem in the Third World, This research should focus not merely on new medicines, but also on public health measures to control these diseases. Existing arrangements for international collaboration on tropical disease research should be greatly strengthened.

Education and communication are vitally important in order to impress each individual of his or her responsibility regarding the healthy future of the earth. The best way for students to recognize that their action can make a difference is to have projects organized by the school or community on which the students can work. Once convinced that they can help, people tend to change both their attitude and their behaviour. New attitudes towards the environment will be reflected in decisions at home and in corporate boardrooms around the world.

Bernice Goldsmith  
Student, North Toronto Collegiate  
WCED Public Hearing  
Ottawa, 26-27 May 1986

### **3.2 Broadening Education**

60. Human resource development demands knowledge and skills to help people improve their economic performance. Sustainable development requires changes in values and attitudes towards environment and development - indeed, towards society and work at home, on farms, and in factories. The world's religions could help provide direction and motivation in forming new values that would stress individual and joint responsibility towards the environment and towards nurturing harmony between humanity and environment.

61. Education should also be geared towards making people more capable of dealing with problems of overcrowding and excessive population densities, and better able to improve what could be called 'social carrying capacities'. This is essential to prevent ruptures in the social fabric, and schooling should enhance the levels of tolerance and empathy required for living in a crowded world. Improved health, lower fertility, and better nutrition will depend on greater literacy and social and civic responsibility. Education can induce all these, and can enhance a society's ability to overcome poverty, increase incomes, improve health and nutrition, and reduce family size.

62. The investment in education and the growth in school enrolment during the past few decades are signs of progress. Access to education is increasing and will continue to do so. Today almost all the world's boys are getting some form of primary education. In Asia and Africa, however, enrolment rates for girls are much lower than for boys at all levels. A large gap also exists between developed and developing countries in enrolment rates beyond primary schools, as Table 4-4 indicated.

63. UN projections of enrolment rates for the year 2000 suggest a continuation of these trends. Thus despite the growth in primary education, illiteracy will continue to rise in terms of sheer numbers: there will be more than 900 million people unable to read and write at the end of the century. By then, girls' enrolment rates are still expected to be below the current rates for boys in Asia. As for secondary education, developing countries are not expected to attain even the 1960 industrial country levels by the year 2000./17



64. Sustainable development requires that these trends be corrected. The main task of education policy must be to make literacy universal and to close the gaps between male and female enrolment rates. Realizing these goals would improve individual productivity and earnings, as well as personal attitudes to health, nutrition, and child-bearing. It can also instill a greater awareness of everyday environmental factors. Facilities for education beyond primary school must be expanded to improve skills necessary for pursuing sustainable development.

65. A major problem confronting many countries is the widespread unemployment and the unrest that it leads to. Education has often been unable to provide the skills needed for appropriate employment. This is evident in the large numbers of unemployed people who have been trained for white-collar employment in swelling urban populations. Education and training should also be directed towards the acquisition of practical and vocational skills, and particularly towards making people more self-reliant. All this should be supported by efforts to nurture the informal sector and the participation of community organizations.

66. Providing facilities is only the beginning. Education must be improved in quality and in relevance to local conditions. In many areas, it should be integrated with children's participation in farm work, a process requiring flexibility in the school system. It should impart knowledge relevant for the proper management of local resources. Rural schools must teach about local soils, water, and the conservation of both, about deforestation and how the community and the individual can reverse it. Teachers must be trained and the curriculum developed so that students learn about the agricultural balance sheet of an area.

67. Most people base their understanding of environmental processes and development on traditional beliefs or on information provided by a conventional education. Many thus remain ignorant about ways in which they could improve traditional production practices and better protect the natural resource base. Education should therefore provide comprehensive knowledge, encompassing and cutting across the social and natural sciences and the humanities, thus providing insights on the interaction between natural and human resources, between development and environment.

68. Environmental education should be included in and should run throughout the other disciplines of the formal education curriculum at all levels - to foster a sense of responsibility for the state of the environment and to teach students how to monitor, protect, and improve it. These objectives cannot be achieved without the involvement of students in the movement for a better environment, through such things as nature clubs and special interest groups. Adult education, on-the-job training, television, and other less formal methods must be used to reach out to as wide a group of individuals as possible, as environmental issues and knowledge systems now change radically in the space of a lifetime.

69. A critical point of intervention is during teacher training. The attitudes of teachers will be key in increasing understanding of the environment and its links with development. To enhance the awareness and capabilities of teachers in this area, multilateral and bilateral agencies must provide support for the relevant curriculum development in teacher training institutions, for the preparation of teaching aids, and for other similar activities. Global awareness could be fostered by encouraging contacts among teachers from different countries, for instance in specialized centres set up for this purpose.

I am here as the son of a small nation, the Krenak Indian Nation. We live in the valley of the Rio Doce. which is the frontier of Espirito Santo with the State of Minas Gerais. We are a micro-country - a micro-nation.

When the government took our land in the valley of Rio Doce, they wanted to give us another place somewhere else. But the State, the government will never understand that we do not have another place to go.

The only possible place for the Krenak people to live and to re-establish our existence, to speak to our Gods, to speak to our nature, to weave our lives is where our God created us. It is useless for the government to put us in a very beautiful place, in a very good place with a lot of hunting and a lot of fish. The Krenak people, we continue dying and we die insisting that there is only one place for us to live.

My heart does not become happy to see humanity's incapacity. I have no pleasure at all to come here and make these statements. We can no longer see the planet that we live upon as if it were a chess-board where people just move things around. We cannot consider the planet as something isolated from the cosmic.

We are not idiots to believe that there is possibility of life for us outside of where the origin of our life is. Respect our place of living, do not degrade our living condition, respect this life. We have no arms to cause pressure, the only thing we have is the right to cry for our dignity and the need to live in our land.

Ailton Krenak  
Coordinator of Indian Nations Union  
WCED Public Hearing  
Sao Paulo. 28-29 Oct 1985

### **3.3 Empowering Vulnerable Groups**

70. The processes of development generally lead to the gradual integration of local communities into a larger social and economic framework. But some communities - so-called indigenous or tribal peoples - remain isolated because of such factors as physical barriers to communication or marked differences in social and cultural practices. Such groups are found in North America, in Australia, in the Amazon Basin, in Central America, in the forests and hills of Asia, in the deserts of North Africa, and elsewhere.

71. The isolation of many such people has meant the preservation of a traditional way of life in close harmony with the natural environment. Their very survival has depended on their ecological awareness and adaptation. But their isolation has also meant that few of them have shared in national economic and social development; this may be reflected in their poor health, nutrition, and education.

72. With the gradual advance of organized development into remote regions, these groups are becoming less isolated. Many live in areas rich in valuable natural resources that planners and 'developers' want to exploit, and this exploitation disrupts the local environment so as to endanger traditional ways of life. The legal and institutional changes that accompany organized development add to such pressures.

73. Growing interaction with the larger world is increasing the vulnerability of these groups, since they are often left out of the processes of economic development. Social discrimination, cultural barriers, and the exclusion of these people from national political processes makes these groups vulnerable and subject to exploitation. Many groups become dispossessed and

marginalized, and their traditional practices disappear. They become the victims of what could be described as cultural extinction.

74. These communities are the repositories of vast accumulations of traditional knowledge and experience that links humanity with its ancient origins. Their disappearance is a loss for the larger society, which could learn a great deal from their traditional skills in sustainably managing very complex ecological systems. It is a terrible irony that as formal development reaches more deeply into rain forests, deserts, and other isolated environments, it tends to destroy the only cultures that have proved able to thrive in these environments.

75. The starting point for a just and humane policy for such groups is the recognition and protection of their traditional rights to land and the other resources that sustain their way of life - rights they may define in terms that do not fit into standard legal systems. These groups' own institutions to regulate rights and obligations are crucial for maintaining the harmony with nature and the environmental awareness characteristic of the traditional way of life. Hence the recognition of traditional rights must go hand in hand with measures to protect the local institutions that enforce responsibility in resource use. And this recognition must also give local communities a decisive voice in the decisions about resource use in their area.

76. Protection of traditional rights should be accompanied by positive measures to enhance the well-being of the community in ways appropriate to the group's life-style. For example, earnings from traditional activities can be increased through the introduction of marketing arrangements that ensure a fair price for produce, but also through steps to conserve and enhance the resource base and increase resource productivity.

77. Those promoting policies that have an impact on the lives of an isolated, traditional people must tread a fine line between keeping them in artificial, perhaps unwanted isolation and wantonly destroying their life-styles. Hence broader measures of human resource development are essential. Health facilities must be provided to supplement and improve traditional practices; nutritional deficiencies have to be corrected, and educational institutions established. These steps should precede new projects that open up an area to economic development. Special efforts should also be made to ensure that the local community can derive the full benefit of such projects, particularly through jobs.

78. In terms of sheer numbers, these isolated, vulnerable groups are small. But their marginalization is a symptom of a style of development that tends to neglect both human and environmental considerations. Hence a more careful and sensitive consideration of their interests is a touchstone of a sustainable development policy.

---

## Footnotes

1/ Department of International Economic and Social Affairs (DIESA). **World Population Prospects; Estimates and Projections as Assessed in 1984** (New York: United Nations, 1986).

2/ Ibid.

3/ Based on data from UNCTAD, **Handbook of International Trade and Development Statistics 1985 Supplement** (New York: 1985).

4/ World Bank, **World Development Report 1984** (New York: Oxford University Press, 1984).

5/ Ibid.

6/ DIESA. op. cit.

7/ UN. **Population Bulletin of the United Nations**. No. 14. 1982 (New York: 1983).

8/ C. Clark, **Population Growth and Land Use** (New York: St. Martin's Press. 1957).

9/ World Bank. op. cit.

10/ Ibid.

11/ DIESA, op. cit.

12/ WHO, **Intersectoral Linkages and Health Development, Case Studies in India (Kerala State), Jamaica. Norway. Sri Lanka and Thailand** (Geneva: 1984).

13/ World Bank, op. cit.

14/ L. Timberlake. **Only One Earth: Living for the Future** (London: BBC/Earthscan. 1987).

15/ UNEP, **The State of the Environment: Environment and Health** (Nairobi: 1986).

16/ WHO. **Global Strategy for Health for All by the Year 2000** (Geneva: 1981).

17/ UNESCO. **A Summary Statistical Review of Education in the World. 1960-82** (Paris: 1984).

# **Our Common Future, Chapter 5: Food Security: Sustaining The Potential**

## ***I. Achievements***

## ***II. Signs of Crisis***

- 1. Impact of Subsidies**
- 2. Neglect of the Small Producer**
- 3. Degradation of the Resource Base**
  - 3.1 Loss of Soil Resources
  - 3.2 Impact of Chemicals
  - 3.3 Pressure on Forests
  - 3.4 Advancing Deserts

## ***III. The Challenge***

## ***IV. Strategies for Sustainable Food Security***

- 1. Government Intervention**
- 2. A Global Perspective**
- 3. The Resource Base**
  - 3.1 Land Use
  - 3.2 Water Management
  - 3.3 Alternatives to Chemicals
  - 3.4 Forestry and Agriculture
  - 3.5 Aquaculture
- 4. Productivity and yields**
  - 4.1 The Technological Base
  - 4.2 Human Resources
  - 4.3 Productivity of Inputs
- 5. Equity**
  - 5.1 Land Reforms
  - 5.2 Subsistence Farmers and Pastoralists
  - 5.3 Integrated Rural Development
  - 5.4 Food Availability Fluctuations

## ***V. Food for the Future***

### ***Footnotes***

## **Chapter 5 Food Security: Sustaining The Potential**

1. The world produces more food per head of population today than ever before in human history. In 1985, it produced nearly 500 kilogrammes per head of cereals and root crops, the primary sources of food.<sup>/1</sup> Yet amid this abundance, more than 730 million people did not eat enough to lead fully productive working lives.<sup>/2</sup> There are places where too little is grown;

there are places where large numbers cannot afford to buy food. And there are broad areas of the Earth, in both industrial and developing nations, where increases in food production are undermining the base for future production.

2. The agricultural resources and the technology needed to feed growing populations are available. Much has been achieved over the past few decades. Agriculture does not lack resources; it lacks policies to ensure that the food is produced where it is needed and in a manner that sustains the livelihoods of the rural poor. He can meet this challenge by building on our achievements and devising new strategies for sustaining food and livelihood security.

## I. Achievements

3. Between 1950 and 1985, cereal production outstripped population growth, increasing from around 700 million tons to over 1,800 million tons, an annual growth rate of around 2.7 per cent.<sup>/3</sup> This increase helped to meet escalating demands for cereals caused by population growth and rising incomes in developing countries and by growing needs for animal feed in developed countries. Yet regional differences in performance have been large. (See Table 5-1.)

4. As production has increased sharply in some regions and demand in others, the pattern of world trade in foods, especially cereals, has changed radically. North America exported barely 5 million tons of foodgrains yearly before the Second World War; it exported nearly 120 million tons during the 1980s. Europe's grain deficit is very much lower now. and the bulk of North American exports are to the USSR, Asia, and Africa. Three countries - China, Japan, and the USSR - took half the world exports in the early 1980s; much of the rest went to relatively wealthy developing countries, such as Middle Eastern oil exporters. Several poor agricultural countries, especially in sub-Saharan Africa, have become net importers of foodgrains. Still, although one-fourth of sub-Saharan Africa's population relied on imported grains in 1984, that region's imports have accounted for less than 10 per cent of world grain trade thus far in the 1980s.<sup>/4</sup>

**Table 5-1**  
**Two Decades of Agricultural Development**

	Per Capita		Per Capita		Per Hectare	
	Food Production		Gross Cropped Area		Fertilizer use	
	(Index 1961-64 = 100)		(Hectares)		(kg.)	
	1961-64	1981-84	1964	1984	1964	1984
World	100	112	0.44	0.31	29.3	85.3
North America	100	121	1.05	0.90	47.3	93.2
Western Europe	100	131	0.11	0.25	114.4	124.1
Eastern Europe and USSR	100	128	0.84	0.71	30.4	122.1
Africa	100	88	0.74	0.35	1.8	9.7
Near East*	100	107	0.53	0.35	6.9	53.6



Far East**	100	116	0.10	0.20	4.4	45.4
Latin America	100	108	0.49	0.45	11.6	11.4
CPE's of Asia***	100	135	0.17	0.10	15.5	170.3

\* An FAO grouping that includes West Asia plus Egypt, Libya and Sudan

\*\* An FAO grouping that covers South and South-East Asia excluding the centrally planned economies of Asia.

\*\*\* An FAO grouping of Centrally Planned Economies of Asia which covers China, Kampuchea, North Korea, Mongolia and Vietnam.

5. Other foods besides grains are changing the patterns of world food demand and production. Demand for milk and meat is growing as incomes rise in societies that prefer animal protein. and much agricultural development in the industrialized nations has been devoted to meeting these demands. In Europe, meat production more than tripled between 1950 and 1984, and milk production nearly doubled.<sup>/5</sup> Meat production for exports increased sharply, particularly in the rangelands of Latin America and Africa. World meat exports have risen from around 2 million tons in 1950-52 to over 11 million tons in 1984.<sup>/6</sup>

6. To produce this milk and meat required in 1984 about 1.4 billion cattle and buffaloes, 1.6 billion sheep and goats, 800 million pigs, and a great deal of poultry - all of which weigh more than the people on the planet.<sup>/7</sup> Most of these animals graze or browse or are fed local plants collected for them. However, rising demands for livestock feedgrains led to sharp increases in the production of cereals such as corn, which accounted for nearly two-thirds of the total increase in grain production in North America and Europe between 1950 and 1985.

7. This unprecedented growth in food production has been achieved partly by an extension of the production base: larger cropped areas, more livestock, more fishing vessels, and so on. But most of it is due to a phenomenal rise in productivity. Population increases have meant a decline in the area of cropped land in most of the world in per capita terms. And as the availability of arable land has declined, planners and farmers have focused on increasing productivity. In the past 35 years this has been achieved by:

- using new seed varieties designed to maximize yields, facilitate multiple cropping, and resist disease;
- applying more chemical fertilizers, the consumption of which rose more than ninefold<sup>/8</sup>;
- using more pesticides and similar chemicals, the use of which increased thirty-two-fold<sup>/9</sup>; and
- increasing irrigated area, which more than doubled.<sup>/10</sup>

8. Global statistics mask substantial regional differences. (See Box 5-1.) The impacts of new technology have been uneven, and in some respects the agricultural technology gap has widened. For instance, average African foodgrain productivity declined in relation to European productivity from roughly one-half to about one-fifth over the past 35 years. Even in Asia, where new technology has spread rapidly, productivity in relation to European levels dropped.<sup>/11</sup> Similar 'technology gaps' have emerged between regions within countries.

9. The past few decades have seen the emergence of three broad types of food production systems, 'Industrial agriculture', capital- and input-intensive and usually large-scale, is dominant in North America, Western and Eastern Europe, Australia and New Zealand, and in

some small areas in developing countries. 'Green Revolution agriculture' is found in uniform, resource-rich, often flat and irrigated areas in the agricultural heartlands of some developing countries. It is more widespread in Asia but is also found in parts of Latin America and North Africa. Though initially the new technologies may have favoured large farmers, they are today accessible to a growing number of small producers. 'Resource-poor agriculture' relies on uncertain rain rather than irrigation and is usually found in developing regions difficult to farm - drylands, highlands, and forests - with fragile soils. This includes most of sub-Saharan Africa and the remoter areas of Asia and Latin America. Here, per capita production has been declining and hunger is a critical problem. But today, all three systems of food production display signs of crises that endanger their growth.

## II. Signs of Crisis

10. Agricultural policies in practically all countries have focused on output growth. Despite this, it has proved far more difficult to raise world agricultural output by a consistent 3 per cent a year in the mid-1980s than it was in the mid-1950s. Moreover, production records have been offset by the appearance

### **Box 5-1 Regional Perspectives on Agricultural Development**

#### **Africa**

- a drop in per capita food output of about 1 per cent a year since the beginning of the 1970s
- a focus on cash crops and a growing dependence on imported food, fostered by pricing policies and foreign exchange compulsions
- major gaps in infrastructure for research, extension, input supply, and marketing
- degradation of the agricultural resource base due to desertification, droughts, and other processes
- large untapped potential of arable land, irrigation, and fertilizer use

#### **West Asia and North Africa**

- improvements in productivity due to better irrigation, the cultivation of high-yielding varieties, and higher fertilizer use
- limited arable land and considerable amounts of desert, making food self-sufficiency a challenge
- a need for controlled irrigation to cope with dry conditions

- **South and East Asia**

- increased production and productivity, with some countries registering grain surpluses
- rapid growth in fertilizer use in some countries and extensive development of irrigation
- government commitments to be self-reliant in food, leading to national research centres, development of high-yielding seeds, and the fostering of location-specific technologies
- little unused land, and extensive, unabated deforestation
- growing numbers of rural landless

## **Latin America**

- declining food imports since 1980, as food production kept pace with population growth over the last decade
- government support in the form of research centres to develop high-yielding seeds and other technologies
- inequitable distribution of land
- deforestation and degradation of the agricultural resource base, fueled partly by foreign trade and debt crisis
- a huge land resource and high productivity potential, though most of the potentially arable land is in the remote, lightly populated Amazon Basin, where perhaps only 20 per cent of the land is suitable for sustainable agriculture

## **North America and Western Europe**

- North America the world's leading source of surplus foodgrain, though the rate of increase in output per hectare and in total productivity slowed in the 1970s
- subsidies for production that are ecologically and economically expensive
- depressing effect of surpluses on world markets and consequent impact on developing countries
- a resource base increasingly degraded through erosion, acidification, and water contamination
- in North America, some scope for future agricultural expansion in frontier areas that can be intensively farmed only at high cost

## **Eastern Europe and the Soviet Union**

- food deficits met through imports, with the Soviet Union being the world's largest grain importer
- increased government investment in agriculture accompanied by eased farm distribution and organization to meet desires for food self-reliance, leading to production increases in meat and root crops
- pressures on agricultural resources through soil erosion, acidification, salinization, alkalization, and water contamination of linked economic and ecological crises: Industrialized countries are finding it increasingly difficult to manage their surplus food production, the livelihood base of millions of poor producers in developing countries is deteriorating, and the resource base for agriculture is under pressure virtually everywhere.

## **1. Impact of Subsidies**

11. The food surpluses in North America and Europe result mainly from subsidies and other incentives that stimulate production even in the absence of demand. Direct or indirect subsidies, which now cover virtually the entire food cycle, have become extremely expensive. In the United States, the cost of farm support has grown from \$2.7 billion in 1980 to \$25.8 billion in 1986. In the EEC, such costs have risen from \$6.2 billion in 1976 to \$21.5 billion in 1986.<sup>/12</sup>

12. It has become politically more attractive, and usually cheaper, to export surpluses - often as food aid - rather than to store them. These heavily subsidized surpluses depress the international market prices of commodities such as sugar and have created severe problems for several developing countries whose economies are based on agriculture. Non-emergency food

aid and low-priced imports also keep down prices received by Third World farmers and reduce the incentive to improve domestic food production.

13. The environmental consequences of a heavily subsidized production system are becoming evident within industrialized nations/<sup>13</sup>;

- lower productivity as soil quality declines due to intensive soil cultivation and overuse of chemical fertilizers and pesticides/<sup>14</sup>;
- the destruction of the countryside, through clearing of hedgerows, park: belts, and other protective cover and the levelling, occupation, and cultivation of marginal land and watershed protection areas; and
- nitrate pollution of ground-water aquifers due to the often subsidized overuse of nitrate fertilizers,

14. The financial, economic, and environmental effects of the current incentive systems are beginning to be questioned by many governments and groups, including farm organizations. A particular area of concern is the impact of these policies on developing countries. They depress international prices of products, such as rice and sugar, that are important exports for many developing countries and so reduce exchange earnings of developing countries. They increase the instability of world prices. And they discourage the processing of agricultural commodities in the producing countries./<sup>15</sup>

15. It is in the interests of all, including the farmers, that the policies be changed. Indeed, in recent years some conservation-oriented changes have taken place and some subsidy systems have increasingly stressed the need to retire land from production. The financial and economic burden of subsidies must be reduced. The harm that these policies do to the agriculture of developing countries by disrupting world markets must be eliminated.

## **2. Neglect of the Small Producer**

16. The new technology behind increases in agricultural productivity requires scientific and technological skills, a system for technology extension and other services for farmers, and commercial orientation in farm management. In many' parts of Asia, in particular, small farmers have shown a remarkable capacity to use new technology once they are given incentives and adequate financial and infrastructural support. Small cash-crop farmers in Africa have demonstrated the potential of the smallholder on that continent, and in the last few years successes have been recorded in food crops also. But ecologically disadvantaged areas and land-poor rural masses have not benefited from advances in technology and will not until governments are willing and able to redistribute land and resources, and give them the necessary support and incentives.

17. Agricultural support systems seldom take into account the special circumstances of subsistence farmers and herders. subsistence farmers cannot afford the high cash outlay of modern inputs. Many are shifting cultivators who do not have a clear title to the land they use. They may plant a variety of crops on one plot to meet their own needs, and are thus unable to use methods developed for large stands of a single crop.

18. Many herders are nomadic and difficult to reach with education, advice, and equipment. They, like subsistence farmers, depend on certain traditional rights, which are threatened by commercial developments. They herd traditional breeds, which are hardy but rarely highly productive.

19. Women farmers, though they play a critical role in food production, are often ignored by

programmes meant to improve production. In Latin America, the Caribbean, and Asia they form a large agricultural labour force, while most of sub-Saharan Africa's food is grown by women. Yet almost all agricultural programmes tend to neglect the special needs of women farmers.

I think that at a forum like this there always tends to be someone standing up and saying you forgot my issue. I think my serious sensitivity to women's role vis-a-vis the environment.

Especially in Africa, I think it has been clearly stated over and over again that women are responsible for between 60 to 90 per cent of the food production, processing, and marketing. No one can really address the food crisis in Africa or many of the other crises that seem to exist here without addressing the question of women, and really seeing that women are participants in decision-making processes at the very basic all the way through up the highest level.

Mrs. King  
The Greenbelt Movement  
WCED Public Hearing  
Nairobi. 23 Sept 1986

### **3. Degradation of the Resource Base**

20. Short-sighted policies are leading to degradation of the agricultural resource base on almost every continent: soil erosion in North America; soil acidification in Europe; deforestation and desertification in Asia, Africa, and Latin America; and waste and pollution of water almost everywhere. Within 40-70 years, global warming may cause the flooding of important coastal production areas. Some of these effects arise from trends in energy use and industrial production. Some arise from the pressure of population on limited resources. But agricultural policies emphasizing increased production at the expense of environmental considerations have also contributed greatly to this deterioration.

#### **3.1 Loss of Soil Resources**

21. Increases in cropped areas in recent decades have often extended cultivation in marginal lands prone to erosion. By the late 1970s, soil erosion exceeded soil formation on about a third of U.S. cropland, much of it in the midwestern agricultural heartland.<sup>/16</sup> In Canada, soil degradation has been costing farmers \$1 billion a year.<sup>/17</sup> In the USSR, the extension of cultivation to the so-called Virgin Lands was a major plank of agricultural policy, but now it is believed that much of this land is marginal.<sup>/18</sup> In India, soil erosion affects 25-30 per cent of the total land under cultivation.<sup>/19</sup> Without conservation measures, the total area of rainfed cropland in developing countries in Asia, Africa, and Latin America would shrink by 544 million hectares over the long term because of soil erosion and degradation, according to an FAO study.<sup>/20</sup>

22. Erosion makes soil less able to retain water, depletes it of nutrients, and reduces the depth available for the roots to take hold. Land productivity declines. Eroded topsoil is carried to rivers, lakes, and reservoirs, silts up ports and waterways, reduces reservoir storage capacity, and increases the incidence and severity of floods.

23. Poorly designed and implemented irrigation systems have caused waterlogging, salinization, and alkalization of soils. FAO and UNESCO estimate that as much as half the world's irrigation schemes suffer in some degree from these problems.<sup>/21</sup> These estimates indicate that some 10 million hectares of irrigated land are being abandoned each year.

24. Soil degradation erodes the overall resource base for agriculture. The loss of croplands encourages farmers to overuse the remaining land and to move into forests and onto rangelands. Sustainable agriculture cannot be based on methods that mine and deplete the soil,

### **3.2 Impact of Chemicals**

25. Chemical fertilizers and pesticides have played a large role in production increases since the Second World War, but clear warnings have been raised against over-reliance on them. The run-off of nitrogen and phosphates from excess use of fertilizers damages water resources, and such damage is spreading.

26. Using chemicals to control insects, pests, weeds, and fungi enhances productivity, but overuse threatens the health of humans and the lives of other species. Continuing, long-term exposure to pesticide and chemical residues in food, water, and even in the air is hazardous, particularly to children. A 1983 study estimated that approximately 10,000 people died each year in developing countries from pesticide poisoning and about 400,000 suffered acutely.<sup>/22</sup> The effects are not limited to the area where pesticides are used but travel through the food chain.

27. Commercial fisheries have been depleted, bird species endangered, and insects that prey on pests wiped out. The number of pesticide-resistant insect pest species worldwide has increased and many resist even the newest chemicals. The variety and severity of pest infestations multiply, threatening the productivity of agriculture in the areas concerned.

28. The use of agricultural chemicals is not in itself harmful. In fact, the level of use is still quite low in many regions. In these areas, response rates are high and the environmental consequences of residues are not yet a problem. Hence these regions would benefit by using more agrochemicals. However, the growth in the use of chemicals tends to be concentrated precisely where they may be doing more overall harm than good.

### **3.3 Pressure on Forests**

29. Forests are crucial for maintaining and improving the productivity of agricultural land. Yet agricultural expansion, a growing world timber trade, and woodfuel demand have destroyed much forest cover. Although this destruction has occurred worldwide, today the greatest challenge is in developing countries, particularly in tropical forests. (See Chapter 6.)

30. Growing populations and the decreasing availability of arable land lead poor farmers in these countries to seek new land in forests to grow more food. Some government policies encourage the conversion of forests to pastures and others encourage large resettlement schemes in forests. There is nothing inherently wrong with clearing forests for farming, provided that the land is the best there is for new farming, can support the numbers encouraged to settle upon it, and is not already serving a more useful function, such as watershed protection. But often forests are cleared without forethought or planning.



31. Deforestation most severely disrupts mountainous areas and upland watersheds and the ecosystems that depend on them. The uplands influence precipitation, and the state of their soil and vegetation systems influence how this precipitation is released into the streams and rivers and onto the croplands of the plains below. The growing numbers and growing severity of both floods and droughts in many parts of the world have been linked to the deforestation of upland watersheds./23

### 3.4 Advancing Deserts

32. Some 29 per cent of the earth's land area suffers slight, moderate, or severe desertification; an additional 6 per cent is classified as extremely severely desertified./24 In 1984, the world's drylands supported some 850 million people, of whom 230 million were on lands affected by severe desertification./25

33. The process of desertification affects almost every region of the globe, but it is most destructive in the drylands of South America, Asia, and Africa; for these three areas combined. 18.5 per cent (870 million hectares) of productive lands are severely desertified. Of the drylands in developing countries. Africa's Sudano-Sahelian zones and, to a lesser extent, some countries south of this zone suffer the most. In their arid and semi-arid lands are to be found 80 per cent of the moderately affected and 85 per cent of the severely affected people./26

34. Land permanently degraded to desert-like conditions continues to grow at an annual rate of 6 million hectares./27 Each year. 21 million additional hectares provide no economic return because of the spread of desertification./28 These trends are expected to continue despite some local improvements.

35. Desertification is caused by a complex mix of climatic and human effects. The human effects, over which we have more control, include the rapid growth of both human and animal populations, detrimental land use practices (especially deforestation), adverse terms of trade, and civil strife. The cultivation of cash crops on unsuitable rangelands has forced herders and their cattle onto marginal lands. The unfavourable international terms of trade for primary products and the policies of aid donors have reinforced pressures to encourage increasing cash-crop production at any cost.

36. A Plan of Action conceived by UNEP and drawn up at the 1977 UN Conference on Desertification has led to some slight, mainly local gains./29 Progress on the plan has been hampered by lack of financial support from the international community, by inadequacies of the regional organizations established to respond to the regional nature of the problem, and by the lack of involvement of grass-roots communities.

Small farmers are held responsible for environmental destruction as if they had a choice of resources to depend on for their livelihood, when they really don't. In the context of basic survival, today's needs tend to overshadow consideration for the environmental future. It is poverty that is responsible for the destruction of natural resources, not the poor.

Geoffrey Bruce  
Canadian International Development Agency  
WCED Public Hearing  
Ottawa, 26/27 May 1986

### III. The Challenge

37. Food demand will increase as populations increase and their consumption patterns change. In the remaining years of this century, about 1.3 billion people will be added to the human family (see Chapter 4); rising incomes, however, may account for 30 to 40 per cent of the increased demand for food in developing countries and about 10 per cent in industrial nations.<sup>/30</sup> Thus over the next few decades, the global food system must be managed to increase food production by 3 to 4 per cent yearly.

38. Global food security depends not only on raising global production, but on reducing distortions in the structure of the world food market and on shifting the focus of food production to food-deficit countries, regions, and households. Many of the countries not growing enough food to feed themselves possess the largest remaining reservoirs of untapped agricultural resources. Latin America and sub-Saharan Africa have much unused land, although its quality and quantity vary greatly from nation to nation and much of it is ecologically vulnerable.<sup>/31</sup> The Soviet Union and parts of North America have significant amounts of frontier land suitable for agriculture; only Asia and Europe are truly land-starved.

39. Global food security also depends on ensuring that all people, even the poorest of the poor, can get food. While on the world scale this challenge requires a reappraisal of global food distribution, the task weighs more immediately and heavily on national governments. Inequitable distribution of production assets, unemployment, and underemployment are at the heart of the problem of hunger in many countries.

40. Rapid, sound agricultural development will mean not only more food but more opportunities for people to earn money to purchase food. Thus when countries with untapped agricultural resources provide food by importing more, they are effectively importing unemployment. By the same token, countries that are subsidizing food exports are increasing unemployment in food-importing countries. This marginalizes people, and marginalized people are forced to destroy the resource base to survive. Shifting production to food-deficit countries and to the resource-poor farmers within those countries is a way of securing sustainable livelihoods.

41. Conserving the agricultural resource base and livelihood security of the poor can be mutually supportive in three ways. First, secure resources and adequate livelihoods lead to good husbandry and sustainable management. Second, they ease rural-to-urban migration, stimulate agricultural production from resources that otherwise would be underused, and reduce the need for food to be produced elsewhere. Third, by combating poverty, they help to slow population growth.

42. Shifting the focus of production to food-deficit countries will also reduce pressures on agricultural resources in the industrialized market economies, enabling them to move towards more sustainable agricultural practices. Incentive structures can be changed so that instead of encouraging overproduction, they encourage farm practices that improve soil and water quality. Government budgets will be relieved of the burdens of storing and exporting surplus products.

43. This shift in agricultural production will be sustainable only if the resource base is secure. As indicated, this is far from the case today. Thus to achieve global food security, the resource base for food production must be sustained, enhanced, and, where it has been diminished or destroyed, restored.

There are many contradictions in agricultural development. The blind imitation of models developed under different circumstances will have to give way to the realities and conditions existing in Africa. Large areas of virgin land have been opened up for export crops whose prices keeps declining. This is not in the interest of developing countries.

There are so many problems to be overcome that we forget that every problem is an opportunity to do something positive. This is an opportunity for us to think of conservation and environment in a broad educational context. In doing so, we will be able to capture the next generation and demonstrate the wonder and the benefits of the world around them.

Adolfo Mascarenhas  
IUCN Harare Office  
WCED Public Hearing  
Harare. 18 Sept 1986

## **IV. Strategies for Sustainable Food Security**

44. Food security requires more than good conservation programmes, which can be - and usually are - overridden and undermined by inappropriate agricultural, economic, and trade policies. Nor is it just a matter of adding an environmental component to programmes. Food strategies must take into account all the policies that bear upon the threefold challenge of shifting production to where it is most needed, of securing the livelihoods of the rural poor, and of conserving resources.

### **1. Government Intervention**

45. Government intervention in agriculture is the rule in both industrial and developing countries, and it is here to stay. Public investment in agricultural research and extension services, assisted farm credit and marketing services, and a range of other support systems have all played parts in the successes of the last half-century. In fact, the real problem in many developing countries is the weakness of these systems.

46. Intervention has taken other forms as well. Many governments regulate virtually the entire food cycle - inputs and outputs, domestic sales, exports, public procurement, storage and distribution, price controls and subsidies - as well as imposing various land use regulations: acreage, crop variety, and so on.

47. In general, patterns of government intervention suffer three basic defects. First, the criteria that underlie the planning of these interventions lack an ecological orientation and are often dominated by short-term considerations. These criteria should discourage environmentally unsound farm practices and encourage farmers to maintain and improve their soils, forests, and waters.

48. The second defect is that agricultural policy tends to operate within a national framework with uniform prices and subsidies, standardized criteria for the provision of support services, indiscriminate financing of infrastructure investments, and so forth. Policies that vary from region to region are needed to reflect different regional needs, encouraging farmers to adopt practices that are ecologically sustainable in their own areas.

The problem in agriculture is not faceless. I as a farmer am a potential victim of the system that we now operate under. Why are approximately a quarter of Canadian farmers facing the immediate prospects of farm bankruptcy? It is directly related to the general concept of a cheap food policy that has constituted a cornerstone of federal agricultural policy since the beginning of settlement.

We regard the current cheap food policy as a form of economic violence that is contributing towards soil exploitation and the growing impersonal relationship between farmers and the soil for economic survival. It is a policy of industrialization that can lead only towards disaster economically for us as farmers, and environmentally for us all as Canadians and as world citizens.

Wayne Easter  
President, National Farmers' Union  
WCED Public Hearing  
Ottawa, 26/27 May 1986

49. The importance of regional policy differentiation can be easily illustrated:

- Hill areas may require incentive prices for fruits and subsidized supplies of foodgrains to induce farmers to shift towards horticulture, which may be ecologically more sustainable.
- In areas prone to wind and water erosion, public intervention through subsidies and other measures should encourage farmers to conserve soil and water.
- Farmers on land over recharge areas for underground aquifers subject to nitrate pollution might be given incentives to maintain soil fertility and increase productivity by means other than nitrate fertilizers.

50. The third defect in government intervention lies in incentive structures. In industrialized countries, overprotection of farmers and overproduction represent the accumulated result of tax reliefs, direct subsidies, and price controls. Such policies are now studded with contradictions that encourage the degradation of the agricultural resource base and, in the long run, do more harm than good to the agricultural industry. Some governments now recognize this and are making efforts to change the focus of the subsidies from production growth to conservation.

51. On the other hand, in most developing countries the incentive structure is weak. Market interventions are often ineffective for lack of an organizational structure for procurement and distribution. Farmers are exposed to a high degree of uncertainty, and price support systems have often favoured the urban dweller or are limited to a few commercial crops, leading to distortions of cropping patterns that add to destructive pressures on the resource base. In some cases, price controls reduce the incentive to produce. What is required, in many cases, is nothing less than a radical attempt to turn the 'terms of trade' in favour of farmers through pricing policy and government expenditure reallocation.

52. Strengthening food security from a global point of view requires reducing incentives that force overproduction and non-competitive production in the developed market economies and enhancing those that encourage food production in developing countries. At the same time, these incentive structures must be redesigned to promote farming practices that conserve and enhance the agricultural resource base.

## **2. A Global Perspective**

53. Trade in agricultural products tripled between 1950 and 1970; it has doubled since then. Yet, when it comes to farming, countries are at their most conservative, continuing to think mainly in local or national terms and concerned, above all, to protect their own farmers at the expense of competitors.

54. Shifting food production towards food-deficit countries will require a major shift in trading patterns. Countries must recognize that all parties lose through protectionist barriers, which reduce trade in food products in which some nations may have genuine advantage. They must begin by redesigning their trade, tax, and incentive systems using criteria that include ecological and economic sustainability and international comparative advantage.

55. The incentive-driven surpluses in developed market economies increase pressures to export these surpluses at subsidized prices or as non-emergency food aid. Donor and receiving countries should be responsible for the impacts of aid and use it for long-term objectives. It can be beneficially used in projects to restore degraded lands, build up rural infrastructure, and raise the nutrition level of vulnerable groups.

### **3. The Resource Base**

56. Agricultural production can only be sustained on a long-term basis if the land, water, and forests on which it is based are not degraded. As suggested, a reorientation of public intervention will provide a framework for this. But more specific policies that protect the resource base are needed to maintain and even enhance agricultural productivity and the livelihoods of all rural dwellers.

#### **3.1 Land Use**

57. The initial task in enhancing the resource base will be to delineate broad land categories:

- enhancement areas, which are capable of sustaining intensive cropping and higher population and consumption levels;
- prevention areas, which by common consent should not be developed for intensive agriculture or, where developed, should be converted to other uses; and
- restoration areas, where land stripped of vegetative cover has either totally lost its productivity or had it drastically reduced.

58. Identifying land according to 'best use' criteria requires information that is not always available. Most industrial nations possess inventories and descriptions of their lands, forests, and waters that are detailed enough to provide a basis for delineating land categories. Few developing countries have such inventories, but they can and should develop them quickly using satellite monitoring and other rapidly changing techniques.<sup>/32</sup>

59. Selection of land for each category could be made the responsibility of a board or commission representing the interests involved, especially the poor and more marginalized segments of the population. The process must be public in character, with publicly agreed criteria that combine the best use approach with the level of development required to sustain livelihood. Classifying land according to best use will determine variations in infrastructure provision, support services, promotional measures, regulatory restrictions, fiscal subsidies, and other incentives and disincentives.

60. Lands identified as prevention areas should be denied supports and subsidies that would encourage their development for intensive agriculture. But such areas might well support

certain ecologically and economically sustainable uses such as grazing, fuelwood plantations, fruit farming, and forestry. Those redesigning support systems and incentives should focus on a broader range of crops, including those that enhance grazing, soil and water conservation, and so on.

61. In vast areas today natural factors and land use practices have reduced productivity to a point too low to sustain even subsistence farming. Treatment of these areas must vary from site to site. Governments should give priority to establishing a national policy and multidisciplinary programmes and to creating or strengthening institutions to restore such areas. Where these already exist, they should be better coordinated and designed. The UN Plan of Action to Combat Desertification, which is already in place, requires more support, particularly financial.

62. Restoration may require limits on human activities so as to permit the regeneration of vegetation. This can be difficult where there are large herds of animals or large numbers of people. For the agreement and participation of the local people are of the highest importance. The state, with the cooperation of those living locally, could protect these areas by declaring them national reserves. Where these areas are privately held, the state might wish either to purchase the land from the owners or to provide incentives for its restoration.

Intensive agriculture may quickly exhaust the soil cover, causing its degradation, unless some special soil protection measures aimed at constant restoration and expanded reproduction of fertility are taken. The task of agriculture is thus not confined to obtaining the biological product but extends to constant maintenance and augmentation of soil fertility. Otherwise we will very quickly consume what by right belongs to our children, grandchildren, and great-grandchildren, to say nothing of more distant descendants.

It is this misgiving - that our generation lives to a certain extent at the expense of the coming generations, thoughtlessly drawing on the basic reserves of soil fertility accumulated in the millennia of the biospheric development, instead of living off the current annual increment - that causes the increasing concern of scientists dealing with the state of the planetary soil cover.

B. G. Rozanov  
Moscow State University  
WCED Public Hearing  
Moscow, 11 Dec 1986

### **3.2 Water Management**

63. Improvements in water management are essential to raise agricultural productivity and to reduce land degradation and water pollution. Critical issues concern the design of irrigation projects and the efficiency of water use.

64. Where water is scarce, an irrigation project should maximize productivity per unit of water; where water is plentiful, it must maximize productivity per unit of land. But local conditions will dictate how much water can be used without damaging the soil. Salinization, alkalization, and waterlogging can be avoided by a more careful approach to drainage, maintenance, cropping patterns, the regulation of water quantities, and more rational water charges. Many of these objectives will be easier to realize in small-scale irrigation projects. But whether small or



large, the projects must be designed with the abilities and aims of the participating farmers in mind, and then involve them in the management.

65. In some areas excessive use of ground-water is rapidly lowering the water table - usually a case where private benefits are being realized at society's expense. Where ground-water use exceeds the recharge capacity of local aquifers, regulatory or fiscal controls become essential. The combined use of ground and surface water can improve the timing of water availability and stretch limited supplies.

### **3.3 Alternatives to Chemicals**

66. Many countries can and should increase yields by greater use of chemical fertilizers and pesticides, particularly in the developing world. But countries can also improve yields by helping farmers to use organic nutrients more efficiently. Hence governments must encourage the use of more organic plant nutrients to complement chemicals. Pest control must also be based increasingly on the use of natural methods. (See Box 5-2) These strategies require changes in public policies, which now encourage the increased use of chemical pesticides and fertilizers. The legislative, policy, and research capacity for advancing non-chemical and less-chemical strategies must be established and sustained.

67. Chemical fertilisers and pesticides are heavily subsidized in many countries. These subsidies promote chemical use precisely in the more commercially oriented agricultural areas where their environmental damage may already outweigh any increases in productivity they bring. Hence different regions will require different policies to regulate and promote chemical use.

68. Legislative and institutional frameworks for controlling agrochemicals must be greatly strengthened everywhere.

69. Industrialized countries must tighten controls on pesticide exports. (See Chapter 8.) Developing countries must possess the basic legislative and institutional instruments to manage the use of agricultural chemicals within their countries. And they will need technical and financial assistance to do so.

### **3.4 Forestry and Agriculture**

69. Undisturbed forests protect watersheds, reduce erosion. offer habitats for wild species, and play key roles in climatic systems. They are also an economic resource providing timber, fuelwood, and other products. The crucial task is to balance the need to exploit forests against the need to preserve them.

70. Sound forest policies can be based only on an analysis of the capacity of the forests and the land under them to perform various functions. Such an analysis might lead to some forests being cleared for intensive cultivation, others for livestock; some forestland might be managed for increased timber production or agroforestry use and some left intact for watershed protection, recreation, or species conservation. The extension of agriculture into forest areas must be based on scientific classification of land capacities.

71. Programmes to preserve forest resources must start with the local people who are both victims and agents of destruction, and who will bear the burden of any new management scheme.<sup>/33</sup> They should be at the centre of integrated forest management, which is the basis of sustainable agriculture.

72. Such an approach would entail changes in the way governments set development priorities, as well as the evolution of greater responsibility to local governments and communities. Contracts covering forest use will have to be negotiated, or overall environmental sustainability of forest exploitation and overall environmental and ecosystem conservation. Prices for forest products need to reflect the true resource value of the goods.

**Box 5-2**  
**Natural Systems of Nutrient Supply and Peat Control**

- Crop residues and farmyard manure are potential sources of soil nutrients.
- Organic wastes reduce run-off, increase the take-up of other nutrients, and improve soil's water-holding and erosion-resistance capacity.
- Using farmyard manure, especially in conjunction with intercropping and crop rotation, can greatly lower production costs.
- Overall systems efficiency is enhanced if manure or vegetable biomass is anaerobically digested in biogas plants, yielding energy for cooking and to run pumps, motors, or electric generators.
- Natural systems of biological nitrogen fixation through the use of certain annual plants, trees, and micro-organisms have a high potential.
- Integrated pest management (IPM) reduces the need for agrochemicals. improves a country's balance of payments. releases foreign exchange for other development projects, and creates jobs where they are most needed.
- IPM requires detailed information about pests and their natural enemies, seed varieties tailored to resist pests, integrated cropping patterns, and farmers who support the approach and are willing to modify farm practices to adopt it.

73. Portions of forests may be designated as prevention areas. These are predominantly national parks, which could be set aside from agricultural exploitation to conserve soil, water, and wildlife. They may also include marginal lands whose exploitation accelerates land degradation through erosion or desertification. In this connection, the reforestation of degraded forest areas is of utmost importance. Conservation areas or national parks can also conserve genetic resources in their natural habitats. (See Chapter 6.)

74. Forestry can also be extended into agriculture. Farmers can use agroforestry systems to produce food and fuel. In such systems, one or more tree crops are combined with one or more food crops or animal farming on the same land, though sometimes at different times. Well-chosen crops reinforce each other and yield more food and fuel than when grown separately. The technology is particularly suitable for small farmers and for poor-quality lands. Agroforestry has been practised by traditional farmers everywhere. The challenge today is to revive the old methods, improve them, adapt them to the new conditions. and develop new ones./34

75. International forestry research organizations should work in various tropical countries in various ecosystems along the lines now followed by the Consultative Group on International Agricultural Research. There is considerable scope for institution building and additional research on forestry's role in agricultural production, for example by developing models that better predict the effects on water and soil loss of removing specific portions of forest cover.

### 3.5 Aquaculture

76. Fisheries and aquaculture are critical to food security in that they provide both protein and employment. The greater part of world fish supply comes from marine fisheries, which yielded 76.8 million tons in 1983. Landings have increased by 1 million tons per year over the past few years; by the end of the century, a catch of around 100 million tons should be possible.<sup>/35</sup> This is well short of the projected demand. There are indications that much of the naturally available freshwater fish stocks are fully exploited or damaged by pollution.

77. Aquaculture, or 'fish-farming', which differs from conventional fishing in that fish are deliberately reared in controlled water bodies, can help meet future needs. Yields from aquaculture have doubled during the last decade and now represent about 10 per cent of world production of fishery products.<sup>/36</sup> A five- to tenfold increase is projected by the year 2000, given the necessary scientific, financial, and organizational support.<sup>/37</sup> Aquaculture can be undertaken in paddy fields, abandoned raining excavations, small ponds, and many other areas with some water, as well as on various commercial scales: individual, family, cooperative, or corporate. The expansion of aquaculture should be given high priority in developing and developed countries.

## 4. Productivity and yields

78. The conservation and enhancement of agriculture's resource base will increase production and productivity. But specific measures are required to make inputs more effective. This is best done by strengthening the technological and human resource base for agriculture in developing countries.

Thus at the root of this environmental problem is a land problem that has to be solved if any serious ecological policy is to be taken - and reorientation of the agricultural policy has to be undertaken. I believe that any conservationist policy has to be followed by a coherent agricultural policy that will meet the need not only of preservation as such but also meet the needs of the Brazilian population.

Julio M.G. Gaiger  
President, National Indian Support Association  
WCED Public Hearing  
Sao Paulo. 28/29 Oct 1985

### 4.1 The Technological Base

Blends of traditional and modern technologies offer possibilities for improving nutrition and increasing rural employment on a sustainable basis. Biotechnology, including tissue culture techniques, technologies for preparing value-added products from biomass, micro-electronics, computer sciences, satellite imagery, and communication. technology are all aspects of frontier technologies that can improve agricultural productivity and resource management.<sup>/38</sup>

80. Providing sustainable livelihoods for resource-poor farmers presents a special challenge for agricultural research. The major advances in agricultural technology in recent decades are better suited to stable, uniform, resource-rich conditions with good soils and ample water supplies. New technologies are most urgently needed in sub-Saharan Africa and the remoter

areas of Asia and Latin America, which typically have unreliable rainfall, uneven topography, and poorer soils, and hence are unsuited to Green Revolution technologies.

81. To serve agriculture in these areas, research has to be less centralized and more sensitive to farmers' conditions and priorities. Scientists will need to start talking to poor farmers and basing research priorities on growers' priorities. Researchers must learn from and develop the innovations of farmers and not just the reverse. More adaptive research should be done right on the farm, using research stations for referral and with farmers eventually evaluating the results.

82. Commercial enterprises can help develop and diffuse technology, but public institutions must provide the essential framework for agricultural research and extension. Few academic and research institutions in developing regions are adequately funded. The problem is most acute in the low-income countries, where expenditure on agricultural research and extension amounts to 0.9 per cent of total agricultural income, as against 1.5 per cent in the middle-income countries.<sup>/39</sup> Research and extension efforts must be greatly expanded, especially in areas where climate, soils, and terrain pose special problems.

83. These areas particularly will need new seed varieties, but so will much developing-country agriculture. At present, 55 per cent of the world's scientifically stored plant genetic resources is controlled by institutions in industrial countries, 31 per cent by institutions in developing countries, and 14 per cent by International Agricultural Research centres.<sup>/40</sup> Much of this genetic material originated in developing countries. These gene banks must increase their inventories of material, improve their storage techniques, and ensure that the resources are readily accessible to research centres in developing countries.

84. Private companies increasingly seek proprietary rights to improved seed varieties, often without recognizing the rights of the countries from which the plant matter was obtained. This could discourage countries rich in genetic resources from making these internationally available and thus reduce the options for seed development in all countries. The genetic research capabilities of developing countries are so limited that agriculture there could become excessively dependent on private gene banks and seed companies elsewhere. Thus international cooperation and a clear understanding on the sharing of gains are vital in critical areas of agricultural technology, such as the development of new seed varieties.

## **4.2 Human Resources**

85. The technological transformation of traditional agriculture will be difficult without a matching effort to develop human resources. (See Chapter 4.) This means educational reforms to produce researchers more attuned to the needs of rural peoples and agriculture. Illiteracy is still widespread among the rural poor. But efforts to promote literacy should focus attention on functional literacy covering the efficient use of land, water, and forests.

86. Despite women's critical role in agriculture, their access to education and their representation in research, extension, and other support services is woefully inadequate. Women should be given the same educational opportunities as men. There should be more female extension workers, and women should participate in field visits. Women should be given more power to take decisions regarding agricultural and forestry programmes.

## **4.3 Productivity of Inputs**

87. In traditional agriculture, local organic material provided farmers with sources of energy,

nutrients, and ways of controlling pests. Today, these needs are increasingly met by electricity, petroleum products, chemical fertilizers, and pesticides. The cost of these inputs forms a growing proportion of agricultural costs, and wasteful use does economic and ecological harm.

88. One of the most important energy-related needs is mechanical power for irrigation. The efficiency of pumps could be greatly improved by providing appropriate incentives for equipment producers and farmers, and through effective extension work. Energy for irrigation pumps can also be provided by wind generators or by conventional internal combustion engines running on biogas produced from local biomass wastes. Solar dryers and solar coolers can save agricultural products. These non-conventional sources should be promoted, particularly in areas poor in energy resources.

89. Nutrients are lost when fertilizers are improperly applied. Often they leach away with the flow of water in a field and degrade local water supplies. Similar problems of waste and destructive side effects occur in the use of pesticides. Hence extension systems and chemical manufacturers will need to give priority to programmes to promote careful and economical use of these expensive, toxic materials.

## **5. Equity**

90. The challenge of sustainable agriculture is to raise not just average productivity and incomes, but also the productivity and incomes of those poor in resources. And food security is not just a question of raising food production, but of ensuring that the rural and urban poor do not go hungry during the short term or midst a local food scarcity. All this requires the systematic promotion of equity in food production and distribution.

### **5.1 Land Reforms**

91. In many countries where land is very unequally distributed land reform is a basic requirement. Without it, institutional and policy changes meant to protect the resource base can actually promote inequalities by shutting the poor off from resources and by favouring those with large farms, who are better able to obtain the limited credit and services available. By leaving hundreds of millions without options, such changes can have the opposite of their intended effect, ensuring the continued violation of ecological imperatives.

92. Given institutional and ecological variations, a universal approach to land reform is impossible. Each country should work out its own programme of land reform to assist the land-poor and to provide a base for coordinated resource conservation. The redistribution of land is particularly important where large estates and vast numbers of the land-poor coexist. Crucial components include the reform of tenancy arrangements, security of tenure, and the clear recording of land rights. In agrarian reforms the productivity of the land and, in forest areas, the protection of forests should be a major concern.

93. In areas where holdings are fragmented into many non-contiguous plots, land consolidation can ease the implementation of resource conservation measures. Promoting cooperative efforts by small farmers - in pest control or water management, for instance - would also help conserve resources.

94. In many countries women do not have direct land rights; titles go to men only. In the interests of food security, land reforms should recognize women's role in growing food. Women, especially those heading households, should be given direct land rights.

## **5.2 Subsistence Farmers and Pastoralists**

95. Subsistence farmers, pastoralists, and nomads threaten the environmental resource base when processes beyond their control squeeze their numbers onto land or into areas that cannot support them.

96. The traditional rights of subsistence farmers, particularly shifting cultivators, pastoralists, and nomads, must therefore be protected from encroachments. Land tenure rights and communal rights in particular must be respected. When their traditional practices threaten the resource base, their rights may have to be curtailed, but only when alternatives have been provided. Most of these groups will need to be helped to diversify their livelihoods by entering the market economy through employment programmes and some cash-crop production.

97. Research should give early attention to the varied requirements of the mixed farming typical in subsistence agriculture. Extension and input supply systems must become more mobile to reach shifting cultivators and nomads and priority given to public investment to improve their cropland, grazing areas, and water sources.

## **5.3 Integrated Rural Development**

98. Rural populations will continue to increase in many countries. With existing patterns of land distribution, the number of smallholders and landless households will increase by about 50 million, to nearly 220 million, by the year 2000.<sup>/41</sup> Together, these groups represent three-quarters of the agricultural households in developing countries.<sup>/42</sup> Without adequate livelihood opportunities, these resource-poor households will remain poor and be forced to overuse the resource base to survive.

99. Considerable effort has gone into creating strategies of integrated rural development, and the requirements and pitfalls are well known. Experience has shown that land reform is necessary but alone is not enough without support through the distribution of inputs and rural services. Smallholders, including - indeed especially - women, must be given preference when allocating scarce resources, staff, and credit. Small farmers must also be more involved in formulating agricultural policies.

100. Integrated rural development also requires resources to absorb the large increases in rural working populations expected in most developing countries through non-agricultural work opportunities, which should be promoted in rural areas. Successful agricultural development and the growth in incomes should open up opportunities in service activities and small-scale manufacturing if supported by public policy.

## **5.4 Food Availability Fluctuations**

101. Environmental degradation can make food shortages more frequent and more severe. Hence sustainable agricultural development will reduce the season-to-season variability in food supplies. But such systems cannot eliminate it. There will be weather-induced fluctuations, and the growing dependence on only a few crop varieties over large areas may amplify the effects of weather and pest damage. Often it is the poorest households and the ecologically disadvantaged regions that suffer most from these shortages.

102. Food stocks are crucial in dealing with shortages. At present, the world stock of cereals is



on the order of 20 per cent of annual consumption: The developing world controls about one-third of the stock and the industrial world, two-thirds. More than half the developing-country stock is in two countries - China and India. Stock levels in most of the others provide only for immediate operational requirements; there is little by way of a reserve./43

As agriculture production is being developed, a rising number of farmers have been able to purchase tractors. But they find that, after using them for a year, it becomes much more expensive than they expected because they have to spend a tremendous amount of money on expensive spare parts. Perhaps we might recommend that Indonesia establish a factory that makes these spare parts, before they continue encouraging introduction of tractors in agriculture.

For this reason, a number of loans that the government has been providing for farmers to modernize their agricultural techniques, particularly buying tractors, have not been paid back. If the tractors were still running, they could probably pay back their loans. In fact, now these tractors are becoming a problem themselves, because they sit around getting rusty. and thus turning into pollution.

Andi Mappasala  
Chairman. Yayasan Tellung Poccoe  
WCED Public Hearing  
Jakarta. 26 March 1985

103. The food stocks of industrialized countries are essentially surpluses, and provide a basis for emergency assistance, which must be maintained. But emergency food aid is a precarious basis for food security: developing countries should build up national stocks in surplus years to provide reserves as well as encouraging development of food security at the household level. To do this, they will need an effective system of public support for measures facilitating the purchase, transportation, and distribution of food. The provision of strategically located storage facilities is critical both to reduce post-harvest losses and to provide a base for quick interventions in emergencies.

104. During most food shortages, poor households not only cannot produce food but also lose their usual sources of income and cannot buy the food that is available. Hence food security also requires that machinery is available promptly to put purchasing power in the hands of disaster-struck households, through emergency public works programme, and through measures to protect small farmers from crop failures.

## **V. Food for the Future**

105. The challenge of increasing food production to keep pace with demand, while retaining the essential ecological integrity of production systems, is colossal both in its magnitude and complexity. But we have the Knowledge we need to conserve our land and water resources. New technologies provide opportunities for increasing productivity while reducing pressures on resources. A new generation of farmers combine experience with education. With these resources at our command, we can meet the needs of the human family. Standing in the way is the narrow focus of agricultural planning and policies.

106. The application of the concept of sustainable development to the effort to ensure food security requires systematic attention to the renewal of natural resources. It requires a holistic approach focused on ecosystems at national, regional. and global levels, with coordinated land

use and careful planning of water usage and forest exploitation. The goal of ecological security should be embedded firmly in the mandates of FAO, other UN organizations that deal with agriculture, and all other appropriate international agencies. It will also require an enhancement and reorientation of international assistance. (See Chapter 3.)

107. The agricultural systems that have been built up over the past few decades have contributed greatly to the alleviation of hunger and the raising of living standards. They have served their purposes up to a point. But they were built for the purposes of a smaller, more fragmented world. New realities reveal their inherent contradictions. These realities require agricultural systems that focus as much attention on people as they do on technology, as much on resources as on production, as much on the long term as on the short term. Only such systems can meet the challenge of the future.

---

## Footnotes

1/ Based on data from FAO, **Production Yearbook 1985** (Rome: 1986).

2/ Based on World Bank estimates for 1980, according to which 340 million people in developing countries (excluding China) did not have enough income to attain a minimum calorie standard that would prevent serious health risks and stunted growth in children, and 730 million were below a higher standard that would allow an active working life. See World Bank, **Poverty and Hunger: Issues and Options for Food Security in Developing Countries** (Washington, DC: 1986).

3/ FAO, **Yearbook of Food and Agriculture Statistics, 1951** (Home: 1952); FAO, **Production Yearbook 1985**, op. cit.

4/ FAO, **Yearbook of Food and Agricultural Statistics, Trade Volume, Part 2 1951** and **Trade Yearbook 1982** and **1984** (Rome: 1952, 1983, and 1985).

5/ FAO, **Trade Yearbook 1968** and **Commodities Review and Outlook 1984-85** (Rome: 1969 and 1986).

6/ FAO, **Yearbook of Food and Agricultural Statistics, Trade Volume, Part 2 1954** (Rome: 1955); FAO, **Commodities Review**, op. cit.

7/ FAO, **Production Yearbook 1984** (Rome: 1985).

8/ L.R. Brown. 'Sustaining World Agriculture,' in L.R. Brown et al., **State of the World 1987** (London: W.W. Norton, 1987).

9/ A. Gear (ed.), **The Organic Food Guide** (Essex: 1983).

10/ USSR Committee for the International Hydrological Decade, **World Water Balance and Water Resources of the Earth** (Paris: UNESCO, 1978).

11/ FAO, **Yearbook of Food and Agricultural Statistics 1951** and **Production Yearbook 1984**, op. cit.

12/ 'Dairy, Prairie', **The Economist**, 15 November 1986.

13/ WCED Advisory Panel on Food Security, Agriculture, Forestry and Environment, **Food Security** (London: Zed Books, 1987).

- 14/ The term pesticides is used in a generic sense in this report and covers insecticides, herbicides, fungicides, and similar agricultural inputs.
- 15/ World Bank. **World Development Report 1986** (New York: Oxford University Press, 1986).
- 16/ Brown, op. cit.
- 17/ Standing Committee on Agriculture, Fisheries and Forestry. **Soil at Risk: Canada's Eroding Future**, A Report on Soil Conservation to the Senate of Canada (Ottawa: 1984).
- 18/ Brown, op. cit.
- 19/ Centre for Science and Environment, **The State of India's Environment 1984-85** (New Delhi: 1985).
- 20/ FAO, **Land, Food and People** (Rome: 1984).
- 21/ I. Szabolcs. 'Agrarian Change', prepared for WCED, 1985.
- 22/ Gear, op. cit./
- 23/ J. Bandyopadhyay, 'Rehabilitation of Upland Watersheds', prepared for WCED, 1985.
- 24/ UNEP. 'General Assessment of Progress in the Implementation of the Plan of Action to Combat Desertification 1978-1984'. Nairobi, 1984; WCED Advisory Panel, op. cit.
- 25/ UNEP, op. cit.
- 26/ Ibid.
- 27/ Ibid.
- 28/ Ibid.
- 29/ Ibid.
- 30/ FAO, **Agriculture Towards 2000** (Rome: 1981)
- 31/ FAO, **Potential Population Supporting Capacities of Lands in the Developing World** (Rome: 1982).
- 32/ The land capability classification developed by the U.S. Bureau of Land Management is an example of how the problem could be approached. A broader type of classification is implicit in FAO, **Potential Population Supporting Capacities**.
- 33/ INDERENA, **Caguan-Cagueta Report** (Bogota, Colombia: 1985).
- 34/ The agroforestry programmes implemented in India are examples of such an approach. They have been adopted enthusiastically by many farmers.
- 35/ FAO. **World Food Report** (Rome: 1985); WCED Advisory Panel, op. cit.
- 36/ WCED Advisory Panel, op. cit.
- 37/ Ibid.

38/ Ibid.

39/ FAO, **World Food Report**, op. cit.

40/ Data from Dag Hammarskjold Foundation, Sweden, in Centre for Science and Environment, op. cit.

41/ FAO estimates quoted in WCED Advisory Panel, op. cit.

42/ Ibid.

43/ FAO, **Food Outlook** (Rome: 1986).

# **Our Common Future, Chapter 6: Species and Ecosystems: Resources for Development**

## ***I. The Problem: Character and Extent***

## ***II. Extinction Patterns and Trends***

## ***III. Some Causes of Extinction***

## ***IV. Economic Values at Stake***

## ***V. A New Approach; Anticipate and Prevent***

## ***VI. International Action for National Species***

### ***1. Some Current Initiatives***

### ***2. Setting Priorities***

## ***VII. Scope for National Action***

## ***VIII. The Need for Action***

## ***Footnotes***

## **Chapter 6 Species and Ecosystems: Resources for Development**

1. Conservation of living natural resources - plants, animals, and micro-organisms, and the non-living elements of the environment on which they depend - is crucial for development. Today, the conservation of wild living resources is on the agenda of governments; nearly 4 per cent of the Earth's land area is managed explicitly to conserve species and ecosystems, and all but a small handful of countries have national parks. The challenge facing nations today is no longer deciding whether conservation is a good idea, but rather how it can be implemented in the national interest and within the means available in each country.

### **I. The Problem: Character and Extent**

2. Species and their genetic materials promise to play an expanding role in development, and a powerful economic rationale is emerging to bolster the ethical, aesthetic, and scientific cases for preserving them. The genetic variability and germplasm material of species make contributions to agriculture, medicine, and industry worth many billions of dollars per year.

3. Yet scientists have intensively investigated only one in every 100 of Earth's plant species, and a far smaller proportion of animal species. If nations can ensure the survival of species, the world can look forward to new and improved foods, new drugs and medicines, and new raw materials for industry. This - the scope for species to make a fast-growing contribution to human welfare in myriad forms - is a major justification for expanded efforts to safeguard Earth's millions of species.

4. Equally important are the vital life processes carried out by nature, including stabilization of climate, protection of watersheds and soil, preservation of nurseries and breeding grounds, and so on. Conserving these processes cannot be divorced from conserving the individual species within natural ecosystems. Managing species and ecosystems together is clearly the most rational way to approach the problem. Numerous examples of workable solutions to local problems are available./<sup>1</sup>

5. Species and natural ecosystems make many important contributions to human welfare. Yet these very important resources are seldom being used in ways that will be able to meet the growing pressures of future high demands for both goods and services that depend upon these natural resources.

6. There is a growing scientific consensus that species are disappearing at rates never before witnessed on the planet. But there is also controversy over those rates and the risks they entail. The world is losing precisely those species about which it knows nothing or little; they are being lost in the remotest habitats. The growing scientific concern is relatively new and the data base to support it fragile. But it firms yearly with each new field report and satellite study.

7. Many ecosystems that are rich biologically and promising in material benefits are severely threatened. Vast stocks of biological diversity are in danger of disappearing just as science is learning how to exploit genetic variability through the advances of genetic engineering. Numerous studies document this crisis with examples from tropical forests, temperate forests, mangrove forests, coral reefs, savannas, grasslands, and arid zones./<sup>2</sup> Although most of these studies are generalized in their documentation and few offer lists of individual species at risk or recently extinct, some present species-by-species details. (See Box 6-1.)

8. Habitat alteration and species extinction are not the only threat. The planet is also being impoverished by the loss of races and varieties within species. The variety of genetic riches inherent in one single species can be seen in the variability manifested in the many races of dogs, or the many specialized types of maize developed by breeders./<sup>3</sup>

9. Many species are losing whole populations at a rate that quickly reduces their genetic variability and thus their ability to adapt to climatic change and other forms of environmental adversity. For example, the remaining gene pools of major crop plants such as maize and rice amount to only a fraction of the genetic diversity they harboured only a few decades ago, even though the species themselves are anything but threatened. Thus there can be an important difference between loss of species and loss of gene reservoirs.

10. Some genetic variability inevitably will be lost, but all species should be safeguarded to the extent that it is technically, economically, and politically feasible. The genetic landscape is constantly changing through evolutionary processes, and there is more variability than can be expected to be protected by explicit government programmes. So in terms of genetic conservation, governments must be selective, and ask which gene reservoirs most merit a public involvement in protective measures. However, as a more general proposition, governments should enact national laws and public policies that encourage individual, community, or corporate responsibility for the protection of gene reservoirs.

11. But before science can focus on new ways to conserve species, policy makers and the general public for whom policy is made must grasp the size and the urgency of the threat. Species that are important to human welfare are not just wild plants that are relatives of agricultural crops, or animals that are harvested. Species such as earthworms, bees, and termites may be far more important in terms of the role they play in a healthy and productive ecosystem. It would be



grim irony indeed if just as new genetic engineering techniques begin to let us peer into life's diversity and use genes more effectively to better the human condition, we looked and found this treasure sadly depleted.

### **Box 6-1**

#### **Some Examples of Species Extinction**

- In Madagascar, until about mid-century, there were 12,000 plant species and probably around 190,000 animal species, with at least 60 per cent of them endemic to the island's eastern strip of forest (that is, found nowhere else on Earth). At least 93 per cent of the original primary forest has been eliminated. Using these figures, scientists estimate that at least half the original species have already disappeared, or are on the point of doing so.
- Lake Malawi in Central Africa holds over 500 cichlid fish species, 99 per cent of them endemic. The lake is only one-eighth the size of North America's Great Lakes, which feature just 173 species, fewer than 10 per cent of which are endemic. Yet Lake Malawi is threatened through pollution from industrial installations and the proposed introduction of alien species.
- Western Ecuador is reputed to have once contained between 8,000 and 10,000 plant species, some 40 and 60 per cent of them endemic. Given that there are between 10 and 30 animal species for every one plant species in similar areas, western Ecuador must have contained about 200,000 species. Since 1960, almost all the forests of western Ecuador have been destroyed to make way for banana plantations, oil wells, and human settlements. The number of species thus eliminated is difficult to judge, but the total could well number 50,000 or more - all in just 25 years.
- The Pantanal area of Brazil contains 110,000 square kilometres of wetlands, probably the most extensive and richest in the world. They support the largest and most diversified populations of waterfowl in South America. The area has been classified by UNESCO as 'of international importance'. Yet it suffers increasingly from agricultural expansion, dam construction, and other forms of disruptive development. Sources: W. Rauh. 'Problems of Biological Conservation in Madagascar', in D. Bramwell (ed.), **Plants and Islands** (London: Academic Press, 1979); D.C.N. Barel et al., 'Destruction of Fisheries in Africa's Lakes', **Nature**, Vol. 315, pp. 19-20, 1985; A.H. Gentry. 'Patterns of Neotropical Plant Species Diversity', **Evolutionary Biology**. Vol. 15, pp.1-84, 1982; D.A. Scott and M. Carbonell, 'A Directory of Neotropical Wetlands', IUCN. Gland. Switzerland. 1985.

Our Atlantic forest, this mass of tropical forest that is a narrow stretch from the North to the South, has been reduced drastically.

This forest is characterised by a large number of endemic species, that is species that only exist in this area, and only exist in Brazil. And consequently, it is up to us, Brazilians, to shoulder the responsibility of keeping these species in existence.

Ibsen de Gusmao Camara  
President, Brazilian Foundation for Preservation of Nature

## II. Extinction Patterns and Trends

12. Extinction has been a fact of life since life first emerged. The present few million species are the modern-day survivors of the estimated half-billion species that have ever existed. Almost all past extinctions have occurred by natural processes, but today human activities are overwhelmingly the main cause of extinctions.

13. The average duration of a species is some 5 million years. The best current estimates are that on average 900,000 species have become extinct every 1 million years during the last 200 million years, so the average 'background rate' of extinction has been very roughly one in every one and one-ninth years.<sup>/4</sup> The present human-caused rate is hundreds of times higher, and could easily be thousands of times higher.<sup>/5</sup> We do not know. We have no accurate figures on the current rates of extinctions, as most of the species vanishing are those least documented, such as insects in tropical forests.

14. Although tropical moist forests are by far the richest biological units in terms of genetic diversity and by far the most threatened through human activities, other major ecological zones are also under pressure. Arid and semi-arid lands harbour only a very small number of species compared with tropical forests. But because of the adaptations of these species to harsh living conditions, they feature many potentially valuable biochemicals, such as the liquid wax of the jojoba shrub and the natural rubber of the guayule bush. Many of these are threatened by, among other things, the expansion of livestock herding.

15. Coral reefs, with an estimated half-million species in their 400,000 square kilometres, are being depleted at rates that may leave little but degraded remnants by early next century. This would be a great loss, in that coral-reef organisms, by virtue of the 'biological warfare' they engage in to ensure living space in crowded habitats, have generated an unusual number and variety of toxins valuable in modern medicine.<sup>/6</sup>

16. Tropical moist forests cover only 6 per cent of the Earth's land surface but contain at least half the Earth's species (which totals 5 million at a minimum, but could be as many as 30 million). They may contain 90 per cent or even more of all species. The mature tropical forests that still exist cover only 900 million hectares, out of the 1.5-1.6 billion hectares that once stood. Between 7.6 million and 10 million hectares are eliminated outright each year, and at least a further 10 million hectares are grossly disrupted annually.<sup>/7</sup> But these figures come from surveys of the late 1970s, and since then deforestation rates have probably accelerated.

17. By the end of the century, or shortly thereafter, there could be little virgin tropical moist forest left outside of the Zaire Basin and the western half of Brazilian Amazonia, plus some areas such as the Guyana tract of forest in northern South America and parts of the island of New Guinea. The forests in these zones are unlikely to survive beyond a few further decades, as world demand for their produce continues to expand and as the number of forestland farmers increases.

18. If deforestation were to continue in Amazonia at present rates until the year 2000, but then halted completely (which is unlikely), about 15 per cent of plant species would be lost. Were Amazonia's forest cover to be ultimately reduced to those areas now established as parks and reserves, 66 per cent of plant species would eventually disappear, together with almost 69 per cent of bird species and similar proportions of all other major categories of species. Almost 20

per cent of the Earth's species are found in Latin American forests outside of Amazonia; another 20 per cent are found in forests of Asia and Africa outside the Zaire Basin.<sup>8</sup> All these forests are threatened, and if they were to disappear, the species loss could amount to hundreds of thousands.

19. Unless appropriate management measures are taken over the longer term, at least one-quarter, possibly one-third, and conceivably a still larger share of species existing today could be lost. Many experts suggest that at least 20 per cent of tropical forests should be protected, but to date well under 5 per cent has been afforded protection of any sort - and many of the tropical forest parks exist only on paper.

20. Even the most effectively managed parks and protected areas are unlikely to provide a sufficient answer. In Amazonia, if as much as half the forest were to be safeguarded in some way or another but the other half were to be eliminated or severely disrupted, there might well not be enough moisture in the Amazonian ecosystem to keep the remaining forest moist.<sup>9</sup> It could steadily dry up until it became more like an open woodland - with the loss of most of the species adapted to tropical moist forest conditions.

21. More widespread climatic changes are likely to emerge within the foreseeable future as the accumulation of 'greenhouse gases' in the atmosphere leads to global warming early in the next century. (See Chapter 7.) Such a change will produce considerable stress for all ecosystems, making it particularly important that natural diversity be maintained as a means of adaptation.

Twenty years ago, as we decided to intensify our forest exploitation, we just thought the resource is available, and we just took it. At the time, we also thought the intensive selecting out of the trees being cut wouldn't destroy forest regeneration. Because not all of the trees were being cut. But we forgot that we don't know yet about how the tropical forest should be rehabilitated.

An indigenous species such as meranti, I don't know the name in English, meranti, rami, is our high-valued wood, a timber that cannot make a shadow in its particular period of growth. And it cannot survive without that shadow. And we still didn't think about it, we just accepted the technology from the West that we have to cut, to exploit our forest.

Emmy H. Dharsono  
NGO Network for Forest Conservation  
WCED Public Hearing  
Jakarta, 26 March 1985

### III. Some Causes of Extinction

22. The tropics, which host the greatest number and diversity of species, also host most developing nations, where population growth is fastest and poverty is most widespread. If farmers in these countries are forced to continue with extensive agriculture, which is inherently unstable and leads to constant movement, then farming will tend to spread throughout remaining wildlife environments. But if they are helped and encouraged to practise more intensive agriculture, they could make productive use of relatively limited areas, with less impact on wildlands.

23. They will need help: training, marketing support, and fertilizers, pesticides, and tools they can afford. This will require the full support of governments, including ensuring that

conservation policies are designed with the benefit of agriculture foremost in mind. It may be expedient to stress the value to farmers rather than to wildlife of this programme, but in fact the destinies of the two are intertwined. Species conservation is tied to development, and the problems of both are more political than technical.

24. Population growth is a major threat to conservation efforts in many developing nations. Kenya has allocated 6 per cent of its territory as parks and reserves in order to protect its wildlife and to earn foreign exchange through tourism. But Kenya's present population of 20 million people is already pressing so hard on parks that protected land is steadily being lost to invading farmers. And the country's population is projected to grow fourfold in the next 40 years./10

25. Similar population pressures threaten parks in Ethiopia, Uganda, Zimbabwe, and other countries in which a growing but impoverished peasantry is forced to depend on a dwindling natural resource base. The prospects are bleak for parks that do not make important and recognizable contributions to national development objectives.

26. Brazil, Colombia, Indonesia, Cote d'Ivoire, Kenya, Madagascar, Peru, the Philippines, Thailand, and other nations with an unusual abundance of species already suffer a massive flow of farmers from traditional homelands into virgin territories. These areas often include tropical forests, perceived by the migrants encouraged to farm there as 'free' lands available for unimpeded settlement. The people who are already living on such lands at low population densities and with only traditional rights to the land are often swept aside in the rush to develop lands that might better be left in extensively used forest.

27. Many tropical countries with large forest resources have provoked wasteful 'timber booms' by assigning harvesting rights to concessionaires for royalty, rent, and tax payments that are only a small fraction of the net commercial value of the timber harvest. They have compounded the damage caused by these incentives by offering only short-term leases, requiring concessionaires to begin harvesting at once, and adopting royalty systems that induce loggers to harvest only the best trees while doing enormous damage to the remainder. In response, logging entrepreneurs in several countries have leased virtually the entire productive forest area within a few years and have overexploited the resource with little concern for future productivity (while unwittingly opening it for clearing by slash-and-burn cultivators)./11

28. In Central and South America, many governments have encouraged the large-scale conversion of tropical forests to livestock ranches. Many of these ranches have proved ecologically and economically unsound, as the underlying soils are soon depleted of nutrients; weed species replace planted grasses, and pasture productivity declines abruptly. Yet tens of millions of hectares of tropical forest have been lost to such ranches, largely because governments have underwritten the conversions with large land grants, tax credits and tax holidays, subsidized loans, and other inducements./12

29. The promotion of tropical timber imports into certain industrial countries, through low tariffs and favourable trade incentives, combined with weak domestic forest policies in tropical countries and with high costs and disincentives to harvesting in industrial countries, also drives deforestation. Some industrial countries typically import unprocessed logs either duty-free or at minimal tariff rates. This encourages developed country industries to use logs from tropical forests rather than their own, a pattern that is reinforced by domestic restrictions on the amounts that can be cut in domestic forests.

All of us in Africa are slowly waking up to the fact the African crisis is essentially an

environmental problem that has precipitated such adverse symptoms as drought, famine, desertification, overpopulation, environmental refugees, political instability, widespread poverty, etc.

We are awaking to the fact that if Africa is dying it is because her environment has been plundered, overexploited, and neglected.

Many of us in Africa are also waking up to the realization that no good Samaritans will cross the seas to come to save the African environment. Only we Africans can and should be sufficiently sensitive to the well-being of our environment.

Mrs. Rahab W. Mwatha  
The Greenbelt Movement  
WCED Public Hearing  
Nairobi, 23 Sept 1986

#### **IV. Economic Values at Stake**

30. Species conservation is not only justified in economic terms. Aesthetic, ethical, cultural, and scientific considerations provide ample grounds for conservation. For those who demand an accounting, the economic values inherent in the genetic materials of species are alone enough to justify species preservation.

31. Today, industrialized nations record far greater financial benefits from wild species than do developing countries, though unrecorded benefits to people living in the tropical countryside can be considerable. But the industrial countries have the scientific and industrial capacity to convert the wild material for industrial and medical use. And they also trade a higher proportion of their agricultural produce than do developing nations. Northern crop breeders are increasingly dependent on genetic materials from wild relatives of maize and wheat, two crops that play leading roles in the international grain trade. The U.S. Department of Agriculture estimates that contributions from plant genetic material lead to increases in productivity that average around 1 per cent annually, with a farm-gate value of well over \$1 billion (1980 dollars).<sup>/13</sup>

32. The U.S. maize crop suffered a severe setback in 1970. when a leaf fungus blighted croplands, causing losses to farmers worth more than \$2 billion. Then fungus-resistant genetic material was found in genetic stocks that had originated in Mexico.<sup>/14</sup> More recently, a primitive species of maize was discovered in a montane forest of south-central Mexico.<sup>/15</sup> This wild plant is the most primitive known relative of modern maize and was surviving in only three tiny patches covering a mere four hectares in an area threatened with destruction by farmers and loggers. The wild species is a perennial; all other forms of maize are annuals. Its cross-breeding with commercial varieties of maize opens up the prospect that farmers could be spared the annual expense of ploughing and sowing, since the plant would grow again yearly of its own accord. The genetic benefits of this wild plant, discovered when not more than a few thousand last stalks remained, could total several thousand million dollars a year.<sup>/16</sup>

33. Wild species likewise contribute to medicine. Half of all prescriptions dispensed have their origins in wild organisms.<sup>/17</sup> The commercial value of these medicines and drugs in the United States now amounts to some \$14 billion a year.<sup>/18</sup> Worldwide, and including non-prescription materials plus pharmaceuticals, the estimated commercial value exceeds \$40 billion a year.<sup>/19</sup> Industry also benefits from wildlife.<sup>/20</sup>

34. Wildlife-derived materials contribute gums, oils, resins, dyes, tanning, vegetable fats and

waxes, insecticides, and many other compounds. Many wild plants bear oil-rich seeds that can help in the manufacture of fibres, detergents, starch, and general edibles. For instance, the *Fevillea* genus of rain-forest vines in western Amazonia bear seeds with such a high oil content that a hectare of such vines in an original forest could produce more oil than a hectare of commercial oil palm plantation./21

35. A few plant species contain hydrocarbons rather than carbohydrates./22 Certain of these plants can flourish in areas that have been rendered useless through such activities as strip-mining. Hence land that has been degraded by extraction of hydrocarbons such as coal could be rehabilitated by growing hydrocarbons on the surface. Moreover, unlike an oil well, a 'petroleum plantation' need never run dry.

36. The emerging field of genetic engineering, by which science devises new variations of life forms, does not render wild genes useless. In fact, this new science must be based on existing genetic material and makes such material even more valuable and useful. Extinction, according to Professor Tom Eisner of Cornell University, 'no longer means the simple loss of one volume from the library of nature. It means the loss of a loose-leaf book whose individual pages, were the species to survive, would remain available in perpetuity for selective transfer and improvement of other species./23 And Professor Winston Brill of the University of Wisconsin has noted: 'We are entering an age in which genetic wealth, especially in tropical areas such as rain forests, until now a relatively inaccessible trust fund, is becoming a currency with high immediate value./24

37. Genetic engineering may mean that agriculture's Green Revolution will be superseded by a 'Gene Revolution'. This technology raises hopes of eventually harvesting crops from deserts, from seawater, and from other environments that did not previously support farming. Medical researchers foresee their own Gene Revolution bringing more innovative advances during the last two decades of this century than occurred during the previous 200 years.

38. Many of the nations with the least capacity for managing living resources are those richest in species; the tropics, which contain at least two-thirds of all species and a still greater proportion of threatened species, roughly coincide with the area generally referred to as the Third World. Many developing nations recognize the need to safeguard threatened species but lack the scientific skills, institutional capacities, and funds necessary for conservation. Industrial nations seeking to reap some of the economic benefits of genetic resources should support the efforts of Third World nations to conserve species; they should also seek ways to help tropical nations and particularly the rural people most directly involved with these species realize some of the economic benefits of these resources.

It will not be possible to restore the population of 'oomurasaki' - our purple emperor butterfly - to the previous level. The forest for oomurasaki requires weeding, planting of trees, and care and maintenance. The forest will be handed down to the succeeding generations. Isn't it wonderful to think that you are linked to the succeeding generations by handing down the forest where many oomurasaki fly and people enjoy themselves?

It would be nice if we could develop into the hearts of the children the love and affection for nature. We hope to make the forest we are making our gift to the children who will live in the 21st century.

Mika Sakakibara  
Student, Tokyo University of Agriculture and Technology



## **V. A New Approach; Anticipate and Prevent**

39. The historical approach of establishing national parks that are somehow isolated from the greater society has been overtaken by a new approach to conservation of species and ecosystems that can be characterized as 'anticipate and prevent.' This involves adding a new dimension to the now-traditional and yet viable and necessary step of protected areas. Development patterns must be altered to make them more compatible with the preservation of the extremely valuable biological diversity of the planet. Altering economic and land use patterns seems to be the best long-term approach to ensuring the survival of wild species and their ecosystems.

40. This more strategic approach deals with the problems of species depletion at their sources in development policies. anticipates the obvious results of the more destructive policies, and prevents damage now. A useful tool in promoting this approach is the preparation of National Conservation Strategies (NCS), which bring the processes of conservation and development together. Preparing an NCS involves government agencies, non-governmental organizations, private interests, and the community at large in analysis of natural resource issues and assessment of priority actions. In this way. it is hoped that sectoral interests will better perceive their interrelationships with other sectors and new potentials for conservation and development will be revealed.

41. The link between conservation and development and the need to attack the problem at the source can be seen clearly in the case of tropical forests. Sometimes it is government policy, not economic necessity, that drives the overexploitation and destruction of these resources. The direct economic and fiscal costs of this overexploitation - in addition to those of species extinction - are huge. The result has been wasteful exploitation of the tropical forests, the sacrifice of most of their timber and non-timber values. enormous losses of potential revenue to the government, and the destruction of rich biological resources.

42. Third World governments can stem the destruction of tropical forests and other reservoirs of biological diversity while achieving economic goals. They can conserve valuable species and habitat while reducing their economic and fiscal burdens. Reforming forest revenue systems and concession terms could raise billions of dollars of additional revenues, promote more efficient, long-term forest resource use. and curtail deforestation. Governments could save themselves enormous expense and revenue loss, promote more sustainable land uses, and slow down the destruction of tropical forests by eliminating incentives for livestock ranching.

43. The link between conservation and development also requires some changes in trade patterns. This has been recognized in the establishment in 1986 of the International Tropical Timber Organization, based in Yokohama, Japan, which seeks to rationalize trade flows. It has been set up to implement the first commodity agreement that incorporates a specific conservation component.

44. Numerous other opportunities can be found to encourage both species conservation and economic productivity. Many governments maintain unrealistically low taxes on rural land, while allowing settlers to establish title to 'virgin' land by converting it to farmland. Thus wealthy landowners can keep huge, underused estates at little or no cost, while land-hungry peasants are encouraged to clear forests to establish marginal holdings. Reforms of tax and tenure systems could increase productivity on existing holdings and reduce the pressures to

expand cultivation into forests and upland watersheds.

45. Well-designed ecosystem conservation contributes to the predominant' goals of sustainable development in a number of ways. Safeguards for critical tracts of wildlands can serve also to safeguard agricultural land, for example. This is particularly true for upland forests of the tropics, which protect valley fields from floods and erosion, and waterways and irrigation systems from siltation.

46. A case in point is the Duraoga-Bone Reserve in Indonesia's northern Sulawesi, covering some 3,000 square kilometres of upland forest. It protects large populations of most of Sulawesi's endemic mammals, and many of the island's 80 endemic bird species. It also protects the Dumoga Valley Irrigation Scheme, funded by a World Bank loan, set up in the flatlands below to achieve a tripling of rice production on more than 13,000 hectares of prime agricultural land.<sup>/25</sup> Similar examples include the Canaima National Park in Venezuela, which protects domestic and industrial water supplies for a major hydropower facility that, in turn, provides electricity to the nation's key industrial centre and its capital city.

47. One conclusion from this connection is that governments could think of 'parks for development', insofar as parks serve the dual purpose of protection for species habitats and development processes at the same time. National efforts to anticipate and prevent the adverse consequences of development policies in any of these areas would surely yield much more for species conservation than all the measures of the past 10 years in support of park building, ranger patrols, anti-poaching units, and the other conventional forms of wildlife preservation. The 3rd World Congress on National Parks, held in Bali, Indonesia, in October 1982, brought this message from protected area managers to the policy makers of the world, demonstrating the many contributions that protected areas managed in the modern way are making to sustaining human society.

## **VI. International Action for National Species**

48. Species and their genetic resources - whatever their origins - plainly supply benefits to all human beings. Wild genetic resources from Mexico and Central America serve the needs of maize growers and consumers globally. The principal cocoa-growing nations are in West Africa, while the genetic resources on which modern cocoa plantations depend for their continued productivity are found in the forests of western Amazonia.

49. Coffee growers and drinkers depend for the health of the crop on constant supplies of new genetic material from coffee's wild relatives, principally located in Ethiopia. Brazil, which supplies wild rubber germplasm to Southeast Asia's rubber plantation, itself depends on germplasm supplies from diverse parts of the world to sustain its sugar-cane, soybean, and other leading crops. Without access to foreign sources of fresh germplasm year by year, the nations of Europe and North America would quickly find their agricultural output declining.

50. The Earth's endowment of species and natural ecosystems will soon be seen as assets to be conserved and managed for the benefit of all humanity. This will necessarily add the challenge of species conservation to the international political agenda.

51. At the heart of the issue lies the fact that there is often a conflict between the short-term economic interest of the individual nations and the long-term interest of sustainable development and potential economic gains of the world community at large. A major thrust in actions to conserve genetic diversity must therefore be directed at making it more economically attractive both in the short term and in the longer perspective to protect wild species and their ecosystems. Developing countries must be ensured an equitable share of the economic profit

from the use of genes for commercial purposes.

## 1. Some Current Initiatives

52. A number of international measures are already being tried. But they are limited in scope, only partially successful, and reactive in nature. UNESCO operates a clearing-house for information on natural areas and genetic resources. Its World Heritage Fund supports the management of a handful of exceptional ecosystems around the world, but all these activities receive small budgets. UNESCO has sought to establish a global system of Biosphere Reserves representing the Earth's 200 'biotic provinces' and harbouring sample communities of species. But only one-third of the needed reserves have been established, even though instituting and operating the rest would cost only about \$150 million a year./26

53. UN agencies such as FAO and UNEP run programmes concerned with threatened species, genetic resources, and outstanding ecosystems. But their combined activities are tiny in the face of the large needs. Among national agencies, the U.S. Agency for International Development leads the field in recognizing the value of species conservation. Legislation passed by the U.S. Congress in 1986 will make available \$2.5 million a year for this purpose./27 Again, this should be considered an important gesture compared with what has been done to date by bilateral agencies, but trifling compared with the needs and opportunities.

54. IUCN, working in close collaboration with UNEP, WWF, the World Bank, and various international technical assistance agencies, has established a 'Conservation Monitoring Centre', to provide data on species and ecosystems for any part of the world quickly and easily. This service, which is available to all, can help ensure that development projects are designed with full information available about the species and ecosystems that might be affected. Technical assistance is also available for nations, sectors, and organizations interested in establishing local data bases for their own applications.

55. Species problems tend to be perceived largely in scientific and conservationist terms rather than as a leading economic and resource concern. Thus the issue lacks political clout. One important initiative that attempts to put conservation more squarely on the agenda of international development concerns has been the Tropical Forestry Action Plan. This collaborative effort coordinated by FAO involves the World Bank, IUCN, the World Resources Institute, and UNDP, along with numerous other collaborating institutions. The broad-based effort proposes the formulation of national forestry reviews, national forestry plans, identification of new projects, enhanced cooperation between development aid agencies at work in the forestry sector. and increased flows of technical and financial resources into forestry and related fields such as 'smallholder agriculture.

56. Establishing norms and procedures with respect to resource issues is at least as important as increased funding. Precedents for such norms include the Convention on Wetlands of International Importance, the Convention on Conservation of Islands for Science (both of which safeguard prime habitats and their species), and the Convention on International Trade in Endangered Species. These three precedents all help, although the first two are essentially reactive attempts to devise 'species refuges'.

As deforestation progresses, it reduces the quality of life of millions of people in developing countries; their survival is threatened by the loss of the vegetation upon which they depend for their sources of household energy and many other goods. If tropical forests continue to be cleared at the current rate, at least 556 million acres

(225 million hectares) will be cleared by the year 2000; if destruction of the tropical rain forests continues unabated, an estimated 10 to 20 per cent of the earth's plant and animal life will be gone by the year 2000.

Reversing deforestation depends on political leadership and appropriate policy changes by developing-country governments to support community-level initiatives. The key ingredient is active participation by the millions of small farmers and landless people who daily use forests and trees to meet their needs.

J. Gustave Speth  
President, World Resources Institute  
WCED Public Hearing  
Sao Paulo. 28-29 Oct 1985

## 2. Setting Priorities

57. A first priority is to establish the problem of disappearing species and threatened ecosystems on political agendas as a major resource issue. The World Charter for Nature, adopted by the UN in October 1982, was an important step towards this objective.

58. Governments should investigate the prospect of agreeing to a 'Species Convention', similar in spirit and scope to the Law of the Sea Treaty and other international conventions reflecting principles of 'universal resources'. A Species Convention, such as a draft prepared by IUCN, should articulate the concept of species and genetic variability as a common heritage.

59. Collective responsibility for the common heritage would not mean collective international rights to particular resources within nations. This approach need not interfere with concepts of national sovereignty. But it would mean that individual nations would no longer be left to rely on their own isolated efforts to protect species within their borders.

60. Such a Convention would need to be supported by a financial arrangement that would have the active backing of the community of nations. Any such arrangement, and there are several possibilities, must not only seek to ensure the conservation of genetic resources for all people, but assure that the nations that possess many of these resources obtain an equitable share of the benefits and earnings derived from their development. This would greatly encourage the conservation of species. One such arrangement might be a Trust Fund to which all nations could contribute, with those benefiting most from the use of these resources contributing an appropriate share. Governments of tropical forest nations could receive payments to support the conservation of given areas of forest, with such payments rising or falling depending on the degree to which the forests are maintained and protected./28

61. The sums required for effective conservation are large. Traditional-type conservation needs in tropical forests alone require outlays of \$170 million a year for at least five years./29 However, the network of protected areas that the world will need by the year 2050 must include much larger areas brought under some degree of protection and a sophisticated degree of flexibility in management techniques./30

62. More funds will also be required for conservation activities outside protected areas: wildlife management, ecodevelopment areas, education campaigns, and so on. Other approaches of a less expensive sort include the conservation of wild gene reservoirs of special significance through 'genetic conservation areas' in countries well endowed with biological wealth. Much of this work can be carried out by citizens' groups and other non-governmental means.

63. International development agencies - the World Bank and other major lending banks. UN agencies, and bilateral agencies -should give comprehensive and systematic attention to the problems and opportunities of species conservation. Although the international trade in wildlife and wildlife products is considerable, to date the economic values inherent in genetic variability and ecological processes have been generally disregarded. Possible measures include environmental impact analyses of development projects with particular attention to species' habitats and life-support systems, identification of crucial localities featuring exceptional concentrations of species with exceptional levels of endemism that face exceptional degrees of threat, and special opportunities for linking species conservation with development aid.

## **VII. Scope for National Action**

64. As indicated earlier, governments need to follow a new approach in this field - one of anticipating the impact of their policies in numerous sectors and acting to prevent undesirable consequences. They should review programmes in areas such as agriculture, forestry, and settlements that serve to degrade and destroy species' habitats. Governments should determine how many more protected areas are needed, especially in the spirit of how such areas can contribute to national development objectives, and make further provision for protection of gene reservoirs (for instance, primitive cultivated varieties) that may not normally be preserved through conventional protected areas.

65. In addition, governments need to reinforce and expand existing strategies. Urgent needs include better wildlife and protected-area management, more protected areas of a non-conventional type (such as the ecological stations that are proving reasonably successful in Brazil), more game cropping and ranching projects (such as the crocodile schemes in India, Papua New Guinea, Thailand, and Zimbabwe), more promotion of wildlife-based tourism, and stronger anti-poaching measures (even though relatively few species are threatened by poaching, compared with the vast numbers threatened by habitat loss). National Conservation Strategies, such as those already prepared in over 25 countries, can be important tools for coordinating conservation and development programmes.

66. Other measures governments could take to confront the crisis of disappearing species, recognizing that it constitutes a major resource and development challenge, include consideration of species conservation needs and opportunities in land use planning and the explicit incorporation of their genetic resource stocks into national accounting systems. This could entail establishing a natural-resource accounting system that directs particular attention to species as high-value yet little-appreciated resources. Finally, they should support and expand programmes of public education to ensure that the species question receives the attention it deserves throughout the entire population.

67. Every nation has only limited resources at its disposal for dealing with conservation priorities. The dilemma is how to use these resources most effectively. Cooperation with neighbouring nations sharing species and ecosystems can help streamline programmes as well as share expenses for regional initiatives. Explicit efforts to save particular species will be possible for only relatively few of the more spectacular or important ones. Agonizing as it will be to make such choices, planners need to make conservation strategies as systematically selective as possible. No one cares for the prospect of consigning threatened species to oblivion. But insofar as choices are already being made, unwittingly, they should be made with selective discretion that takes into account the impact of the extinction of a species upon the biosphere or on the integrity of a given ecosystem.

68. But even though public effort may be concentrated on a few species, all species are

important and deserve some degree of attention; this might take the form of tax credits to farmers willing to maintain primitive cultivars. an end to incentives to clear virgin forest, the promotion of research attention from local universities, and the preparation of basic inventories of native flora and fauna by national institutions.

The world is unfortunately not what we would like it to be. The problems are many and great. Actually, they can only be solved with cooperation and quick-wittedness.

I represent an organization called 'Nature and Youth'. I know that I have full support among our members when I say that we are worried about the future if drastic changes do not take place, concerning the world's way of treating our essential condition, nature.

We who work with youth, and are youth ourselves in Norway today, know very well how the destroying of nature leads to an apathetic fear among youth concerning their future and how it will turn out.

It is of great importance that common people get the chance to take part in deciding how nature should be treated.

Frederic Hauge  
Nature and Youth  
WCED Public Hearing  
Oslo, 24-25 June 1985

## VIII. The Need for Action

69. There are numerous signs that the loss of species and their ecosystems is being taken seriously as a phenomenon that carries practical implications for people all around the world, now and for generations to come.

70. The recent rise in public concern can be seen in such developments as the growth in Kenya's Wildlife Clubs, now numbering more than 1,500 school clubs with around 100,000 members.<sup>/31</sup> A parallel development in conservation education has occurred in Zambia. In Indonesia, some 400 conservation groups have joined together under the banner of the Indonesian Environmental Forum and exert strong political influence.<sup>/32</sup> In the United States, membership of the Audubon Society reached 385,000 in 1985.<sup>/33</sup> In the Soviet Union, nature clubs have over 35 million members.<sup>/34</sup> All of these indicate that the public puts a value on nature that is beyond the normal economic imperatives.

71. In response to this popular concern, governments have been moving to help species threatened within their borders, primarily through the establishment of additional protected areas. Today, the worldwide network of protected areas totals more than 4 million square kilometres, roughly equivalent to the size of most of the countries of Western Europe combined, or twice the size of Indonesia. In terms of continental coverage, protected areas in Europe (outside the USSR) amounted by 1985 to 3.9 per cent of territory; in the USSR, to 2.5 per cent; in North America, to 8.1 per cent; in South America, to 6.1 per cent; in Africa, to 6.5 per cent; and in Asia (outside the USSR) and Australia, to 4.3 per cent each.<sup>/35</sup>

72. Since 1970, the networks have expanded in extent by more than 80 per cent, around two-thirds of which are in the Third World. But a great deal more remains to be done; a consensus of professional opinion suggests that the total expanse of protected areas needs to



be at least tripled if it is to constitute a representative sample of Earth's ecosystems./36

73. There is still time to save species and their ecosystems. It is an indispensable prerequisite for sustainable development. Our failure to do so will not be forgiven by future generations.

---

## Footnotes

1/ J. McNeely and K. Miller (eds.), **National Parks Conservation and Development; The Role of Protected Areas in Sustaining Society**, Proceedings of the World Congress on National Parks (Washington, DC: Smithsonian Institution Press, 1984).

2/ W.B. Banage. 'Policies for the Maintenance of Biological Diversity', prepared for WCED, 1986; P.R. Ehrlich and A.H. Ehrlich. **Extinction** (New York: Random House. 1981); D. Western (ed.), **Conservation 2100**, Proceedings of Wildlife Conservation International and New York Zoological Society Conference, 21-24 October 1986 (New York: Zoological Society, in press); N. Myers, 'Tropical Deforestation and Species Extinctions, The Latest News', **Futures**, October 1985; R. Lewin, 'A Mass Extinction Without Asteroids', **Science**, 3 October 1986; P.H. Raven. 'Statement from Meeting of IUCN/WWF Plant Advisory Group', Las Palmas, Canary Islands, 24-25 November 1985; M.E. Soule (ed.), **Conservation Biology: Science of Scarcity and Diversity** (Sunderland, Mass.: Sinauer Associates, 1986); E.O. Wilson (ed.), **Biodiversity, Proceedings of National Forum held by National Academy of Sciences and Smithsonian Institution, 21-24 September 1986** (Washington, DC: National Academy Press, forthcoming).

3/ O.H. Frankel and M.E. Soule. **Conservation and Evolution** (Cambridge: Cambridge University Press, 1981); CM. Schonewald-Cox et al. (eds.). **Genetics and Conservation** (Menlo Park, Calif.: Benjamin/Cummings Publishing Company Inc., 1983).

4/ D.D. Raup. 'Biological Extinction in Earth History', **Science**. 28 March 1986.

5/ Wilson, op. cit.; Ehrlich and Ehrlich, op. cit.; Myers. 'The Latest News', op. cit.; Soule. op. cit.

6/ G.D. Ruggieri and N.D. Rosenberg, **The Healing Sea** (New York: Dodd Mead and Co., 1978).

7/ FAO/UNEP. **Tropical Forest Resources**. Forestry Paper No. 30 (Rome: 1982); J.M. Melillo et al., 'A Comparison of Recent Estimates of Disturbance in Tropical Forests', **Environmental Conservation**. Spring 1985; N. Myers. **The Primary Source** (New York: W.W. Norton, 1984); Myers 'The Latest News', op. cit.; J. Molofsky et al., 'A Comparison of Tropical Forest Surveys', Carbon Dioxide Program. U.S. Department of Energy. Washington DC. 1986.

8/ D. Simberloff, 'Are We On the Verge of a Mass Extinction in Tropical Rain Forests?' in D.K. Elliott (ed.), **Dynamics of Extinction** (Chichester. UK: John Wiley & Sons. 1986); Raven. op. cit.

9/ E. Salati and P.B. Vose, 'Amazon Basin: A System in Equilibrium', **Science**, 13 July 1984.

10/ Department of International Economic and Social Affairs, **World Population Prospects: Estimates and Projections as Assessed in 1984** (New York: UN. 1986).

11/ R. Repetto. 'Creating Incentives for Sustainable Forestry Development', World Resources

Institute. Washington. DC, August 1985.

12/ Ibid.

13/ Agricultural Research Service, **Introduction, Classification. Maintenance. Evaluation, and Documentation of Plant Germplasm** (Washington. DC: U.S. Department of Agriculture. 1985).

14/ L.A. Tatum. 'The Southern Corn Leaf Blight Epidemic', **Science**. Vol. 171. pp. 1113-16, 1971.

15/ H.H. Iltis et al., 'Zea diploperennis (Gramineae), a New Teosinte from Mexico', **Science**, 12 January 1979.

16/ A.C. Fisher. 'Economic Analysis and the Extinction of Species', Department of Energy and Resources. University of California. Berkeley. 1982.

17/ N.R. Farnsworth and D.D. Soejarto. 'Potential Consequence of Plant Extinction in the United States on the Current and Future Availability of Prescription Drugs', **Economic Botany**, Vol. 39. pp. 231-40. 1985.

18/ N. Myers, **A Wealth of Wild Species** (Boulder, Colo.: Westview Press. 1983).

19/ Ibid.

20/ M.L. Oldfield, 'The Value of Conserving Genetic Resources', National Park Service. U.S. Department of the Interior. Washington, DC, 1984; L.H. Princen, 'New Crop Development for Industrial Oils', **Journal of the American Oil Chemists' Society**, Vol. 56, pp. 845-48, 1979.

21/ A.H. Gentry and R. Wettach, 'Fevillea - A New Oilseed from Amazonian Peru', **Economic Botany**, Vol. 40, pp. 177-85, 1986.

22/ M. Calvin. 'Hydrocarbons from Plants: Analytical Methods and Observations', **Naturwissenschaften**. Vol. 67, pp. 525-33, 1980; C.W. Hinman et al., 'Five Potential New Crops for Arid Lands', **Environmental Conservation**. Winter 1985.

23/ T. Eisner. 'Chemicals. Genes, and the Loss of Species'. **Nature Conservancy News**, Vol. 33. No. 6, pp. 23-24, 1983.

24/ W.J. Brill. 'Nitrogen Fixation: Basic to Applied', **American Scientist**, Vol. 67, pp. 458-65. 1979.

25/ McNeely and Miller, op. cit.

26/ UNESCO, **International Coordinating Council of Man and the Biosphere**. MAB Report Series No. 58 (Paris: 1985).

27/ Letter to N. Myers, Consultant in Environment and Development, from Senator W. Roth (R-Del.), U.S. Congress, Washington. DC.

28/ R.A. Sedjo, Testimony before the Subcommittee on Human Rights and international Organizations. Foreign Affairs Committee, U.S. House of Representatives, 12 September 1984.

29/ International Task Force. **Tropical Forests: A Call for Action** (Washington, DC: World Resources Institute, 1985).

30/ R.L. Peters and J.D.S. Darling, 'The Greenhouse Effect of Nature Reserves', **Bioscience**, Vol. 35, pp. 707-17. 1984.

31/ 'Kenya's Wildlife Clubs' (Brochure). Ed Wilson. WWF Regional Office for East and Central Africa, personal communication, 3 February 1987.

32/ Centre for Environmental Studies, **Environmental NGO's in Developing Countries** (Copenhagen: 1985).

33/ Membership figure from Audubon circulation in **Ulrich's Periodicals** (New York: R.W. Bowker, 1985).

34/ Prof. Yazan, IUCN Vice-President and Regional Counsellor, **IUCN Bulletin**. Vol. 17, Nos. 7-9.

35/ **List of National Parks and Equivalent Reserves** (IUCN: 1985).

36/ McNeely and Miller, op. cit.

# **Our Common Future, Chapter 7: Energy: Choices for Environment and Development**

## ***I. Energy, Economy, and Environment***

## ***II. Fossil Fuels: The Continuing Dilemma***

- 1. Managing Climatic change***
- 2. Reducing Urban-Industrial Air Pollution***
- 3. Damage from the Long-Range Transport of Air Pollution***

## ***III. Nuclear Energy: Unsolved Problems***

- 1. The Peaceful Atom***
- 2. The Growing Understanding of Nuclear Issues***
- 3. The Current International Situation***
- 4. Conclusions and Recommendations***

## ***IV. Wood Fuels: The Vanishing Resource***

## ***V. Renewable Energy: The Untapped Potential***

## ***VI. Energy Efficiency: Maintaining the Momentum***

## ***VII. Energy Conservation Measures***

## ***VIII. Conclusion***

1. Energy is necessary for daily survival. Future development crucially depends on its long-term availability in increasing quantities from sources that are dependable, safe, and environmentally sound. At present, no single source or mix of sources is at hand to meet this future need.

2. Concern about a dependable future for energy is only natural since energy provides 'essential services' for human life - heat for warmth, cooking, and manufacturing, or power for transport and mechanical work. At present, the energy to provide these services comes from fuels - oil, gas, coal, nuclear, wood, and other primary sources (solar, wind, or water power) - that are all useless until they are converted into the energy services needed, by machines or other kinds of end-use equipment, such as stoves, turbines, or motors. In many countries worldwide, a lot of primary energy is wasted because of the inefficient design or running of the equipment used to convert it into the services required; though there is an encouraging growth

in awareness of energy conservation and efficiency.

3. Today's primary sources of energy are mainly non-renewable: natural gas, oil, coal, peat, and conventional nuclear power. There are also renewable sources, including wood, plants, dung, falling water, geothermal sources, solar, tidal, wind, and wave energy, as well as human and animal muscle-power. Nuclear reactors that produce their own fuel ("breeders") and eventually fusion reactors are also in this category. In theory, all the various energy sources can contribute to the future energy mix worldwide. But each has its own economic, health, and environmental costs, benefits, and risks - factors that interact strongly with other governmental and global priorities. Choices must be made, but in the certain knowledge that choosing an energy strategy inevitably means choosing an environmental strategy.

4. Patterns and changes of energy use today are already dictating patterns well into the next century. We approach this question from the standpoint of sustainability. The key elements of sustainability that have to be reconciled are:

- sufficient growth of energy supplies to meet human needs (which means accommodating a minimum of 3 per cent per capita income growth in developing countries);
- energy efficiency and conservation measures, such that waste of primary resources is minimized;
- public health, recognizing the problems of risks to safety inherent in energy sources; and
- protection of the biosphere and prevention of more localized forms of pollution.

5. The period ahead must be regarded as transitional from an era in which energy has been used in an unsustainable manner. A generally acceptable pathway to a safe and sustainable energy future has not yet been found. We do not believe that these dilemmas have yet been addressed by the international community with a sufficient sense of urgency and in a global perspective.

## I. Energy, Economy, and Environment

6. The growth or energy demand in response to industrialization, urbanization, and societal affluence has led to an extremely uneven global distribution of primary energy consumption.<sup>1</sup> The consumption of energy per person in industrial market economies, for example, is more than 80 times greater than in sub-Saharan Africa. (See Table 7-1.) And about a quarter of the world's population consumes three-quarters of the world's primary energy.

**Table 7-1**

### **Global Primary Energy Consumption Per Capita, 1984**

	GNP Per Capita	Energy Consumption	Mid-1984 Population	Total Consumption
	(1984 dollars)	(kW per capita*)	(million)	(TW)
World Bank GNP Economy Category				

Low Income	260	0.41	2,390	0.99
Sub-Saharan Africa	210	0.08	258	0.02
Lower-middle	740	0.57	691	0.39
Upper-middle	1,950	1.76	497	0.87
Sub-Saharan Africa	660	0.25	148	0.04
High-Income Oil Exporters	11,250	5.17	19	0.10
Industrial Market Economies	11,430	7.01	733	5.14
East European Non-Market Economies		6.27	389	2.44
World		2.11**	4,718	9.94

\*kW per capita is kW years/year per capita.

\*\* Population-weighted average energy consumption (kW/capita) for first three main categories is 0.654 and for industrial market and East European categories is 6.76.

Source: Based on World Bank, World Development Report 1985 (New York: Oxford University Press, 1986).

7. In 1980, global energy consumption stood at around 10TW.<sup>1/2</sup> (See Box 7-1.) if per capita use remained at the same levels as today, by 2025 a global population of 6.2 billion<sup>3</sup> would need about 14TW (over 4TW in developing and over 9TW in industrial countries) - an increase of 40 per cent over 1980. But if energy consumption per head became uniform worldwide at current industrial country levels, by 2025 that same global population would require about 55TW.

### Box 7-1 Energy Units

A variety of units are used to measure energy production and use in physical terms. This chapter uses; the kilowatt (kW); the Gigawatt (GW), which is equal to 1 million kW; and the Terawatt (TW), which is equal to 1 billion kilowatts. One kilowatt - a thousand watts of energy - if emitted continuously for a year is 1kW year. Consuming 1 kW year/year is equivalent to the energy liberated by burning 1,050 kilogrammes - approximately 1 ton - of coal annually. Thus a TW year is equal to approximately 1 billion tons of coal. Throughout the chapter, TW years/year is written as TW.

8. Neither the 'low' nor the 'high' figure is likely to prove realistic, but they give a rough idea of the range within which energy futures could move, at least hypothetically. Many other scenarios can be generated in-between, some of which assume an improved energy base for the developing world. For instance, if the average energy consumption in the low- and middle-income economies trebled and doubled, respectively, and if consumption in the high-income oil-exporting and industrial market and non-market countries remained the same as today,



then the two groups would be consuming about the same amounts of energy. The low- and middle-income categories would need 10.5TW and the three 'high' categories would use 9.3TW - totalling 20TW globally, assuming that primary energy is used at the same levels of efficiency as today.

9. How practical are any of these scenarios? Energy analysts have conducted many studies of global energy futures to the years 2020-2030.<sup>/4</sup> Such studies do not provide forecasts of future energy needs, but they explore how various technical, economic, and environmental factors may interact with supply and demand. Two of these are reviewed in Box 7-2, though a much wider range of scenarios - from 5TW up to 63TW - are available. In general, the lower scenarios (14.4TW by 2030,<sup>/5</sup> 11.2TW by 2020,<sup>/6</sup> and 5.2 by 2030<sup>/7</sup>) require an energy efficiency revolution. The higher scenarios (18.8TW by 2025,<sup>/8</sup> 24.7TW by 2020,<sup>/9</sup> and 35.2 by 2030<sup>/10</sup>) aggravate the environmental pollution problems that we have experienced since the Second World War.

## Box 7-2 Two Indicative Energy Scenarios

### Case A: High Scenario

By the year 2030, a 35TW future would involve producing 1.6 times as much oil, 3.4 times as much natural gas, and nearly 5 times as much coal as in 1960. This increase in fossil fuel use implies bringing the equivalent of a new Alaska pipeline into production every one to two years. Nuclear capacity would have to be increased 30 times over 1960 levels - equivalent to installing a new nuclear power station generating 1-gigawatt of electricity every two to four days. This 35TW scenario is still well below the 55TW future that assumes today's levels of energy consumption per capita in industrial countries are achieved in all countries.

### Case B: Low Scenario

Taking the 11.2TW scenario as a highly optimistic example of a strong conservation strategy. 2020 energy demand in developing and industrial countries is quoted as 7.3TW and 3.9TW respectively, as compared with 3.3TW and 7.0TW in 1980. This would mean a saving of 3.1TW in industrial countries by 2020 and an additional requirement of 4.0TW in developing countries. Even if developing countries were able to acquire the liberated primary resource, they would still be left with a shortfall of 0.9TW in primary supply. Such a deficit is likely to be much greater (possibly two to three times), given the extreme level of efficiency required for this scenario, which is unlikely to be realized by most governments. In 1980, the following breakdown of primary supply was quoted: oil, 4.2TW; coal, 2.4; gas, 1.7; renewables, 1.7; and nuclear, 0.2. The question is - where will the shortfall in primary energy supply come from? This rough calculation serves to illustrate that the postulated average growth of around 30 per cent per capita in primary consumption in developing countries will still require considerable amounts of primary supply even under extremely efficient energy usage regimes.

**Sources:** The 35TW scenario was originated in Energy Systems Group of the International Institute for Applied Systems Analysis, **Energy in a Finite World - A Global Systems Analysis**, (Cambridge, Mass.: Ballinger, 1981); all other calculations are from J. Goldemberg et al., 'An End-Use Oriented Global Energy Strategy', **Annual Review of Energy, Vol. 10**, 1985.

10. The economic implications of a high energy future are disturbing. A recent World Bank Study indicates that for the period 1960-95, a 4.1 per cent annual growth in energy consumption, approximately comparable to Case A in Box 7-2, would require an average annual investment of some \$130 billion (in 1982 dollars) in developing countries alone. This would involve doubling the share of energy investment in terms of aggregate gross domestic product.<sup>11</sup> About half of this would have to come from foreign exchange and the rest from internal spending on energy in developing countries.

11. The environmental risks and uncertainties of a high energy future are also disturbing and give rise to several reservations. Four stand out:

- the serious probability of climate change generated by the 'greenhouse effect' of gases

emitted to the atmosphere, the most important of which is carbon dioxide (CO<sub>2</sub>) produced from the combustion of fossil fuels<sup>/12</sup>;

- urban-industrial air pollution caused by atmospheric pollutants from the combustion of fossil fuels<sup>/13</sup>;
- acidification of the environment from the same causes<sup>/14</sup>; and
- the risks of nuclear reactor accidents, the problems of waste disposal and dismantling of reactors after their service life is over, and the dangers of proliferation associated with the use of nuclear energy.

Along with these, a major problem arises from the growing scarcity of fuelwood in developing countries. If trends continue, by the year 2000 around 2.4 billion people may be living in areas where wood is extremely scarce.<sup>/15</sup>

12. These reservations apply at even lower levels of energy use. A study that proposed energy consumption at only half the levels of Case A (Box 7-2) drew special attention to the risks of global warming from CO<sub>2</sub>.<sup>/16</sup> The study indicated that a realistic fuel mix - a virtual quadrupling of coal and a doubling of gas use, along with 1.4 times as much oil - could cause significant global warming by the 2020s. No technology currently exists to remove CO<sub>2</sub> emissions from fossil fuel combustion. The high coal use would also increase emissions of oxides of sulphur and nitrogen, much of which turns to acids in the atmosphere. Technologies to remove these latter emissions are now required in some countries in all new and even some old facilities, but they can increase investment costs by 15-25 per cent.<sup>/17</sup> If countries are not prepared to incur these expenses, this path becomes even more infeasible, a limitation that applies much more to the higher energy futures that rely to a greater extent on fossil fuels. A near doubling of global primary energy consumption will be difficult without encountering severe economic, social, and environmental constraints.

Energy is, put most simply, the fundamental unit of the physical world. As such, we cannot conceive of development without changes in the extent or the nature of energy flows. And because it is so fundamental, every one of those changes of flows has environmental implications. The implications of this are profound. It means that there is no such thing as a simple energy choice. They are all complex. And they all involve trade-offs. However, some of the choices and some of the trade-offs appear to be unequivocally better than others, in the sense that they offer more development and less environmental damage.

David Brooks  
Friends of the Earth  
WCED Public Hearings  
Ottawa, 26-27 May 1986

13. This raises the desirability of a lower energy future, where GDP growth is not constrained but where investment effort is switched away from building more primary supply sources and put into the development and supply of highly efficient fuel-saving end-use equipment. In this way, the energy services needed by society could be supplied at much reduced levels of primary energy production. Case B in Box 7-2 allows for a 50 per cent fall in per capita primary energy consumption in industrial countries and a 30 per cent increase in developing countries.<sup>/18</sup> By using the most energy-efficient technologies and processes now available in all sectors of the

economy, annual global per capita GDP growth rates of around 3 per cent can be achieved. This growth is at least as great as that regarded in this report as a minimum for reasonable development. But this path would require huge structural changes to allow market penetration of efficient technologies, and it seems unlikely to be fully realizable by most governments during the next 40 years.

14. The crucial point about these lower, energy-efficient futures is not whether they are perfectly realisable in their proposed time frames. Fundamental political and institutional shifts are required to restructure investment potential in order to move along these lower, more energy-efficient paths.

15. The Commission believes that there is no other realistic option open to the world for the 21st century. The ideas behind these lower scenarios are not fanciful. Energy efficiency has already shown cost-effective results. In many industrial countries, the primary energy required to produce a unit of GDP has fallen by as much as a quarter or even a third over the last 13 years, much of it from implementing energy efficiency measures.<sup>/19</sup> Properly managed, efficiency measures could allow industrial nations to stabilize their primary energy consumption by the turn of the century. They would also enable developing countries to achieve higher levels of growth with much reduced levels of investment, foreign debt, and environmental damage. But by the early decades of the 21st century they will not alleviate the ultimate need for substantial new energy supplies globally.

## **II. Fossil Fuels: The Continuing Dilemma**

16. Many forecasts of recoverable oil reserves and resources suggest that oil production will level off by the early decades of the next century and then gradually fall during a period of reduced supplies and higher prices. Gas supplies should last over 200 years and coal about 3,000 years at present rates of use. These estimates persuade many analysts that the world should immediately embark on a vigorous oil conservation policy.

17. In terms of pollution risks, gas is by far the cleanest fuel, with oil next and coal a poor third. But they all pose three interrelated atmospheric pollution problems: global warming,<sup>/20</sup> urban industrial air pollution,<sup>/21</sup> and acidification of the environment.<sup>/22</sup> Some of the wealthier industrial countries may possess the economic capacity to cope with such threats. Most developing countries do not.

18. These problems are becoming more widespread particularly in tropical and subtropical regions, but their economic, social, and political repercussions are as yet not fully appreciated by society. With the exception of CO<sub>2</sub>, air pollutants can be removed from fossil fuel combustion processes at costs usually below the costs of damage caused by pollution.<sup>/23</sup> However, the risks of global warming make heavy future reliance upon fossil fuels problematic.

### **1. Managing Climatic change**

19. The burning of fossil fuels and, to a lesser extent, the loss of vegetative cover, particularly forests, through urban-industrial growth increase the accumulation of CO<sub>2</sub> in the atmosphere. The pre-industrial concentration was about 280 parts of carbon dioxide per million parts of air by volume. This concentration reached 340 in 1980 and is expected to double to 560 between the middle and the end of the next century.<sup>/24</sup> Other gases also play an important role in this 'greenhouse effect', whereby solar radiation is trapped near the ground, warming the globe and changing the climate.

20. After reviewing the latest evidence on the greenhouse effect in October 1985 at a meeting in Villach, Austria, organized by the WMO, UNEP, and ICSU, scientists from 29 industrialized and developing countries concluded that climate change must be considered a 'plausible and serious probability. They further concluded that: 'Many important economic and social decisions are being made today on ... major water resource management activities such as irrigation and hydropower; drought relief; agricultural land use; structural designs and coastal engineering projects; and energy planning - all based on the assumption that past climatic data, without modification, are a reliable guide to the future. This is no longer a good assumption'./25

21. They estimated that if present trends continue, the combined concentration of CO<sub>2</sub> and other greenhouse gases in the atmosphere would be equivalent to a doubling of CO<sub>2</sub> from pre-industrial levels, possibly as early as the 2030s, and could lead to a rise in global mean temperatures 'greater than any in man's history'./26 Current modelling studies and 'experiments' show a rise in globally averaged surface temperatures, for an effective CO<sub>2</sub> doubling, of somewhere between 1.5°C and 4.5°C, With the warming becoming more pronounced at higher latitudes during winter than at the equator.

22. An important concern is that a global temperature rise of 1.5-4.5°C, with perhaps a two to three times greater warming at the poles, would lead to a sea level rise of 25-140 centimetres./27 A rise in the upper part of this range would inundate low-lying coastal cities and agricultural areas, and many countries could expect their economic, social, and political structures to be severely disrupted. It would also allow the 'atmospheric heat-engine', which is driven by the differences between equatorial and polar temperatures, thus influencing rainfall regimes./28 Experts believe that crop and forest boundaries will move to higher latitudes; the effects of warmer oceans on marine ecosystems or fisheries and food chains are also virtually unknown.

23. There is no way to prove that any of this will happen until it actually occurs. The key question is: How much certainty should governments require before agreeing to take action? If they wait until significant climate change is demonstrated, it may be too late for any countermeasures to be effective against the inertia by then stored in this massive global system. The very long time lags involved in negotiating international agreement on complex issues involving all nations have led some experts to conclude that it is already late./29 Given the complexities and uncertainties surrounding the issue, it is urgent that the process start now. A four track strategy is needed, combining:

- improved monitoring and assessment of the evolving phenomena;
- increased research to improve knowledge about the origins, mechanisms, and effects of the phenomena;
- the development of internationally agreed policies for the reduction of the causative gases; and
- adoption of strategies needed to minimize damage and cope with the climate changes, and rising sea level.

24. No nation has either the political mandate or the economic power to combat climatic change alone. However, the Villach statement recommended such a four track strategy for climate change, to be promoted by governments and the scientific community through WMO, UNEP, and ICSU - backed by a global convention if necessary./30

It is difficult to imagine an issue with more global impacts on human societies and the natural environment than the greenhouse effect. The signal is unclear but we may already be witnessing examples, if not actual greenhouse effects, in Africa.

The ultimate potential impacts of a greenhouse warming could be catastrophic. It is our considered judgement that it is already very late to start the process of policy consideration. The process of heightening public awareness, of building support for national policies, and finally for developing multilateral efforts to slow the rate of emissions growth will take time to implement.

The greenhouse issue is an opportunity as well as a challenge; not surprisingly, it provides another important reason to implement sustainable development strategies.

Irving Mintzer  
World Resources Institute  
WCED Public Hearing  
Oslo, 24-25 June 1985

25. While these strategies are being developed, more immediate policy measures can and should be adopted. The most urgent are those required to increase and extend the recent steady gains in energy efficiency and to shift the energy mix more towards renewables. Carbon dioxide output globally could be significantly reduced by energy efficiency measures without any reduction of the tempo of GDP growth.<sup>/31</sup> These measures would also serve to abate other emissions and thus reduce acidification and urban-industrial air pollution. Gaseous fuels produce less carbon dioxide per unit of energy output than oil or coal and should be promoted, especially for cooking and other domestic uses.

26. Gases other than carbon dioxide are thought to be responsible for about one-third of present global warming, and it is estimated that they will cause about half the problem around 2030.<sup>/32</sup> Some of these, notably chlorofluorocarbons used as aerosols, refrigeration chemicals, and in the manufacture of plastics, may be more easily controlled than CO<sub>2</sub>. These, although not strictly energy-related, will have a decisive influence on policies for managing carbon dioxide emissions.

27. Apart from their climatic effect, chlorofluorocarbons are responsible to a large extent for damage to the earth's stratospheric ozone.<sup>/33</sup> The chemical industry should make every effort to find replacements, and governments should require the use of such replacements when found (as some nations have outlawed the use of these chemicals as aerosols). Governments should ratify the existing ozone convention and develop protocols for the limitation of chlorofluorocarbon emissions, and systematically monitor and report implementation.

28. A lot of policy development work is needed. This should proceed hand in hand with accelerated research to reduce remaining scientific uncertainties. Nations urgently need to formulate and agree upon management policies for all environmentally reactive chemicals released into the atmosphere by human activities, particularly those that can influence the radiation balance on earth. Governments should initiate discussions leading to a convention on this matter.

29. If a convention on chemical containment policies cannot be implemented rapidly, governments should develop contingency strategies and plans for adaptation to climatic



change. In either case, WMO, UNEP, WHO, ICSU, and other relevant international and national bodies should be encouraged to coordinate and accelerate their programmes to develop a carefully integrated strategy of research, monitoring, and assessment of the likely impacts on climate, health, and environment of all environmentally reactive chemicals released into the atmosphere in significant quantities.

## **2. Reducing Urban-Industrial Air Pollution**

30. The past three decades of generally rapid growth worldwide have seen dramatic increases in fuel consumption for heating and cooling, automobile transport, industrial activities, and electricity generation. Concern over the effects of increasing air pollution in the late 1960s resulted in the development of curative measures, including air-quality criteria, standards, and add-on control technologies that can remove pollutants cost-effectively. All these greatly reduced emissions of some of the principal pollutants and cleaned air over many cities. Despite this, air pollution has today reached serious levels in the cities of several industrial and newly industrialized countries as well as in those of most developing countries, which in some cases are by now the world's most polluted urban areas.

31. The fossil fuel emissions of principal concern in terms of urban pollution, whether from stationary or mobile sources, include sulphur dioxide, nitrogen oxides, carbon monoxide, various volatile organic compounds, fly ash, and other suspended particles. They can injure human health and the environment, bringing increased respiratory complaints, some potentially fatal. But these pollutants can be contained so as to protect human health and the environment and all governments should take steps to achieve acceptable levels of air quality.

32. Governments can establish and monitor air quality goals and objectives, allowable atmospheric loadings, and related emission criteria or standards, as some successfully do already. Regional organizations can support this effort. Multilateral and bilateral development assistance agencies and development banks should encourage governments to require that the most energy-efficient technology be used when industries and energy utilities plan to build new or extend existing facilities.

## **3. Damage from the Long-Range Transport of Air Pollution**

33. Measures taken by many industrialized countries in the 1970s to control urban and industrial air pollution (high chimney stacks, for example) greatly improved the quality of the air in the cities concerned. However, it quite unintentionally sent increasing amounts of pollution across national boundaries in Europe and North America, contributing to the acidification of distant environments and creating new pollution problems. This was manifest in growing damage to lakes, soils, and communities of plants and animals.<sup>/34</sup> Failure to control automobile pollution in some regions has seriously contributed to the problem.

34. Thus atmospheric pollution, once perceived only as a local urban-industrial problem involving people's health, is now also seen as a much more complex issue encompassing buildings, ecosystems, and maybe even public health over vast regions. During transport in the atmosphere, emissions of sulphur and nitrogen oxides and volatile hydrocarbons are transformed into sulphuric and nitric acids, ammonium salts, and ozone. They fall to the ground, sometimes many hundreds or thousands of kilometres from their origins, as dry particles or in rain, snow, frost, fog, and dew. Few studies of their socio-economic costs are available, but these demonstrate that they are quite large and suggest that they are growing rapidly.<sup>/35</sup> They damage vegetation, contribute to land and water pollution, and corrode

buildings, metallic structures and vehicles, causing billions of dollars in damage annually.

35. Damage first became evident in Scandinavia in the 1960s. Several thousand lakes in Europe, particularly in southern Scandinavia/<sup>36</sup>, and several hundreds in North America/<sup>37</sup> have registered a steady increase in acidity levels to the point where their natural fish populations have declined or died out. The same acids enter the soil and groundwater, increasing corrosion of drinking water piping in Scandinavia./<sup>38</sup>

36. The circumstantial evidence indicating the need for action on the sources of acid precipitation is mounting with a speed that gives scientists and governments little time to assess it scientifically. Some of the greatest observed damage has been reported in Central Europe, which is currently receiving more than one gramme of sulphur on every square metre of ground each year, at least five times greater than natural background./<sup>39</sup> There was little evidence of tree damage in Europe in 1970. In 1962, the Federal Republic of Germany reported visible leaf damage in its forest plot samples nationwide, amounting in 1983 to 34 per cent, and rising in 1985 to 60 per cent./<sup>40</sup> Sweden reported light to moderate damage in 30 per cent of its forests, and various reports from other countries in Eastern and Western Europe are extremely disquieting. So far an estimated 14 per cent of all European forestland is affected./<sup>41</sup>

37. The evidence is not all in, but many reports show soils in parts of Europe becoming acid throughout the tree rooting layers,/<sup>42</sup> particularly nutrient-poor soils such as those of Southern Sweden/<sup>43</sup> The precise damage mechanisms are not known, but all theories include an air pollution component. Root damage/<sup>44</sup> and leaf damage appear to interact - affecting the ability of the trees both to take up water from the soil and to retain it in the foliage, so that they become particularly vulnerable to dry spells and other stresses. Europe may be experiencing an immense change to irreversible acidification, the remedial costs of which could be beyond economic reach./<sup>45</sup> (See Box 7-3.) Although there are many options for reducing sulphur, nitrogen, and hydrocarbon emissions, no single pollutant control strategy is likely to be effective in dealing with forest decline. It will require a total integrated mix of strategies and technologies to improve air quality, tailored for each region.

A forest in an ecosystem that exists under certain environmental conditions, and if you change the conditions, the system is going to change. It is a very difficult task for ecologists to foresee what changes are going to be because the systems are so enormously complex.

The direct causes behind an individual tree dying can be far removed from the primary pressure that brought the whole system into equilibrium. One time it might be ozone, another time it may be SO<sub>2</sub>, a third time it may be aluminium poisoning.

I can express myself by an analogy: If there is famine, there are relatively few people who die directly from starvation: they die from dysentery or various infectious diseases. And in such a situation, it is not of very much help to send medicine instead of food. That means that in this situation, it is necessary to address the primary pressures against the ecosystem.

Alf Johnels  
Swedish Museum of Natural History  
WCED Public Hearing  
Oslo, 24-25 June 1985

38. Evidence of local air pollution and acidification in Japan and also in the newly

industrialized countries of Asia, Africa, and Latin America is beginning to emerge. China and the Republic of Korea seem particularly vulnerable, as do Brazil, Colombia, Ecuador, and Venezuela. So little is known about the likely environmental loading of sulphur and nitrogen in these region and about the acid-neutralizing capacity of tropical lakes and forest soils that a comprehensive programme of investigation should be formulated without delay./46

39. Where actual or potential threats from acidification exist, governments should map sensitive areas, assess forest damage annually and soil impoverishment every five years according to regionally agreed protocols, and publish the findings. They should support transboundary monitoring of pollution being carried out by agencies in their region and, where there is no such agency, create one or give the job to any suitable regional body. Governments in many regions could gain significantly from early agreement to prevent transboundary air pollution and the enormous damage to their economic base now being experienced in Europe and North America. Even though the exact causes of the damage are hard to prove, reduction strategies are certainly within reach and economic. They could be viewed as a cheap insurance policy compared with the vast amount of potential damage these strategies avoid.

### **Box 7-3 The Damage and Control Costs of Air Pollution**

It is very difficult to quantify damage control costs, not least because cost figures are highly dependent on the control strategy assumed. However, in the eastern United States, it has been estimated that halving the remaining sulphur dioxide emissions from existing sources would cost \$5 billion a year, increasing present electricity rates by 2-3 per cent. If nitrogen oxides are figured in, the additional costs might be as high as \$6 billion a year. Materials corrosion damage alone is estimated to cost \$7 billion annually in 17 states in the eastern United States.

Estimates of the annual costs of securing a 55 to 65 per cent reduction in the remaining sulphur emissions in the countries of the European Economic Community between 1980 and 2000 range from \$4.6 billion to \$6.7 billion (1982 dollars) per year. Controls on stationary boilers to reduce nitrogen levels by only 10 per cent annually by the year 2000 range between \$100,000 and \$400,000 (1982 dollars). These figures translate into a one-time increase of about 6 per cent in the price of electrical power to the consumer. Studies place damage costs due to material and fish losses alone at \$3 billion a year, while damage to crops, forests, and health are estimated to exceed \$10 billion per year. Technologies for drastically reducing oxides of nitrogen and hydrocarbons from automobile exhaust gases are readily available and routinely used in North America and Japan, but not in Europe.

Japanese laboratory studies indicate that air pollution and acid rain can reduce some wheat and rice crop production, perhaps by as much as 30 per cent.

**Sources:** U.S. Congress, Office of Technology Assessment, **Acid Rain and Transported Air Pollutants: Implications for Public Policy** (Washington, DC: U.S. Government Printing Office, 1985); U.S. Environmental Protection Agency, **Acid Deposition Assessment** (Washington, DC: 1985); I.M. Torrens, 'Acid Rain and Air Pollution: A Problem of Industrialization', prepared for WCED, 1985; P. Mandelbaum, **Acid Rain - Economic Assessment** (New York: Plenum Press, 1985); M. Hashimoto, 'National Air quality Management Policy of Japan', prepared for WCED, 1985; OECD, **The State of the Environment** (Paris: 1985).

## **III. Nuclear Energy: Unsolved Problems**

### **1. The Peaceful Atom**

40. In the years following the Second World War, the nuclear knowledge that under military control had led to the production of atomic weapons was redeployed for peaceful 'energy' purposes by civilian technologists. Several benefits were obvious at the time.

41. It was also realized that no energy source would ever be risk-free. There was the danger of nuclear war, the spread of atomic weapons, and nuclear terrorism. But intensive international cooperation and a number of negotiated agreements suggested that these dangers could be avoided. For instance, the *Nonproliferation Treaty* (NPT), drafted in its final form in 1969, included a promise by signatory governments possessing nuclear weapons and expertise to pursue and undertake nuclear disarmament and also to assist the non-nuclear signatories in

developing nuclear power, but strictly for peaceful purposes only. Other problems, such as radiation risks, reactor safety, and nuclear waste disposal were all acknowledged as very important but, with the right amount of effort, containable.

42. And now, after almost four decades of immense technological effort to support nuclear development, nuclear energy has become widely used. Some 30 governments produce from nuclear generators a total of about 15 per cent of all the electricity used globally. Yet it has not met earlier expectations that it would be the key to ensuring an unlimited supply of low-cost energy. However, during this period of practical experience with building and running nuclear reactors, the nature of the costs, risks and benefits have become much more evident and as such, the subject of sharp controversy.

## **2. The Growing Understanding of Nuclear Issues**

43. The potential for the spread of nuclear weapons is one of the most serious threats to world peace. It is in the interest of all nations to prevent proliferation of nuclear weapons. All nations therefore should contribute to the development of a viable non-proliferation regime. The nuclear weapon states must deliver on their promise to reduce the number and ultimately eliminate nuclear weapons in their arsenals and the role those weapons play in their strategies. And the non-nuclear-weapon states must cooperate in providing credible assurances that they are not moving towards a nuclear weapon capability.

The health risks for the development of peaceful uses of nuclear technology, including nuclear electricity, are very small when compared with the benefits from the use of nuclear radiation for medical diagnosis treatment.

The safe application of nuclear radiation technology promises many benefits in environmental clean-up and in increasing world food supplies by eliminating spoilage.

With a recent and very notable exception, the international cooperation that has marked the development of nuclear power technology provides an excellent model by which to address common environmental and ethical problems posed by the development of other technologies.

Ian Wilson  
Vice-President, Canadian Nuclear Association  
WCED Public Hearing  
Ottawa, 26-27 May 1986

44. Most schemes for non-proliferation mandate an institutional separation between military and civilian uses of nuclear energy. But for countries with full access to the complete nuclear fuel cycle, no technical separation really exists. Not all states operate the necessary clear-cut administrative separation of civilian and military access. Cooperation is needed also among suppliers and buyers of civilian nuclear facilities and materials and the International Atomic Energy Agency, in order to provide credible safeguards against the diversion of civilian reactor programmes to military purposes, especially in countries that do not open all their nuclear programmes to IAEA inspection. Thus, there still remains a danger of the proliferation of nuclear weapons.

## 2.1 Costs

45. The costs of construction and the relative economics of electricity generating stations - whether powered by nuclear energy, coal, oil or gas - are conditioned by the following factors throughout the service life of a plant:

- the cost of borrowing money to finance plant construction,
- the impact of inflation;
- the duration of the period of planning, licensing, and construction;
- the cost of fuel and maintenance ;
- the costs of protective measures, to ensure safe operation; and
- waste disposal costs (land, air, and water pollution containment) and the costs of dismantling at the end of service life.

46. All these factors vary widely depending on differing institutional, legal, and financial arrangements in different countries. Cost generalizations and comparisons are therefore unhelpful or misleading. However, costs associated with several of these factors have increased more rapidly for nuclear stations during the last 5-10 years, so that the earlier clear cost advantage of nuclear over the service life of the plant has been reduced or lost altogether.<sup>47</sup> Nations should therefore look very closely at cost comparisons to obtain the best value when choosing an energy path.

## 2.2 Health and Environment Risks

47. Very strict codes of safety practice are implemented in nuclear plants so that under officially approved operating conditions, the danger from radiation to reactor personnel and especially to the general public is negligible. However, an accident occurring in a reactor may in certain very rare cases be serious enough to cause an external release of radioactive substances. Depending upon the level of exposure, people are under a certain level of risk of becoming ill from various forms of cancer or from alteration of genetic material, which may result in hereditary defects.

48. Since 1928, the International Commission on Radiological Protection (ICRP) has issued recommendations on radiation dosage levels above which exposure is unacceptable. These have been developed for occupationally exposed workers and for the general public. The 'Nuclear Safety Standards (NUSS) codes of IAEA were developed in 1975 to reduce safety differences among member states. Neither system is in any way binding on governments, if an accident occurs, individual governments have the responsibility of deciding at what level of radioactive contamination pasture land, drinking water, milk, meat, eggs, vegetables, and fish, are to be banned for consumption by livestock or humans.

49. Different countries - even different local government authorities within a country - have different criteria. Some have none at all, ICRP and NUSS notwithstanding. States with more rigorous standards may destroy large amounts of food or may ban food imports from a neighbour states with more permissive criteria. This causes great hardship to farmers who may not receive any compensation for their losses. It may also cause trade problems and political



tension between states. Both of these difficulties occurred following the Chernobyl disaster, when the need to develop at least regionally conformable contamination criteria and compensation arrangements was overwhelmingly demonstrated.

### **2.3 Nuclear Accidents Risks**

50. Nuclear safety returned to the newspaper headlines following the Three Mile Island (Harrisburg, United States) and the Chernobyl (USSR) accidents. Probabilistic estimates of the risks of component failure, leading to a radioactive release in Western style light water reactors were made in 1975 by the U.S. Nuclear Regulatory Commission.<sup>/48</sup> The most serious category of release through containment failure was placed at around 1 in 1,000,000 years of reactor operation. Post-accident analysis of both Harrisburg and Chernobyl - a completely different type of reactor - have shown that in both cases, human operator error was the main cause. They occurred after about 2,000 and 4,000 reactor-years respectively.<sup>/49</sup> The frequencies of such occurrences are well nigh impossible to estimate probabilistically. However, available analyses indicate that although the risk of a radioactive release accident is small, it is by no means negligible for reactor operations at the present time.

51. The regional health and environment effects of an accident are largely predictable from radioactive fall-out studies following early atomic weapons testing in the atmosphere and have been confirmed in practice following the Chernobyl accident. What could not be confidently predicted before Chernobyl were the local effects of such an accident. A much clearer picture is now emerging as a result of the experiences there when a reactor exploded, following a series of infringements of the official safety regulations, on 26 April 1986, causing the worst reactor accident ever experienced. As a result, the whole district had to be managed on something like a 'war footing' and efforts resembling a large military operation were needed to contain the damage.

### **2.4 Radioactive Waste Disposal**

52. Civil nuclear energy programmes worldwide have already generated many thousands of tons of spent fuel and high-level waste. Many governments have embarked on large-scale programmes to develop ways of isolating these from the biosphere for the many hundreds of thousands of years that they will remain hazardously radioactive.

53. But the problem of nuclear waste disposal remains unsolved. Nuclear waste technology has reached an advanced level of sophistication.<sup>/50</sup> This technology has not however been fully tested or utilized and problems remain about disposal. There is particular concern about future recourse to ocean dumping and the disposal of contaminated waste in the territories of small or poor states that lack the capacity to impose strict safeguards. There should be a clear presumption that all countries that generate nuclear waste dispose of it within their own territories or under strictly monitored agreements between states.

## **3. The Current International Situation**

54. During the last 25 years, a growing awareness of the difficulties outlined above has resulted in a wide range of reactions from technical experts, the public, and governments. Many experts still feel that so much can be learned from the problems experienced up to now. They argue that if the public climate allows then to solve the nuclear waste disposal and decommissioning issues and the cost of borrowing money remains reasonably below its 1980-82 peak, in the

absence of viable new supply alternatives there is no reason why nuclear energy should not emerge as a strong runner in the 1990s. At the other extreme, many experts take the view that there are so many unsolved problems and too many risks for society to continue with a nuclear future. Public reactions also vary. Some countries have exhibited little public reaction, in others there appears to be a high level of anxiety that expresses itself in anti-nuclear results in public opinion polls or large anti-nuclear campaigns.

Today the assessment of practical consequences can be based on practical experience. The consequences of Chernobyl has made Soviet specialists once again pose a question: Is not the development of nuclear energy on an industrial scale premature? Will it not be fatal to our civilization, to the ecosystem of our planet? On our planet so rich in all sorts of energy sources, this question can be discussed quite calmly. We have a real choice in this, both on a state and a governmental level, and also on the level of individuals and professionals.

We must put all our efforts to improve the technology itself, to develop and elaborate strict standards and norms of quality, of safety of a technology. We must work for the creation of anti-accident centres and centres devoting themselves to compensating for the losses to the environment. The upgrading of the industrial level of safety and the solution of the problem of the relations between man and machine would be a lot more natural thing to do than concentrating the efforts on only one element of the energy structure in the world. This would benefit the whole of humanity.

V. A. Legasov  
Member, Academy of Sciences of the USSR  
WCED Public Hearing  
Moscow, 8 Dec 1986

55. And so, whilst some states still remain nuclear-free, today nuclear reactors supply about 15 per cent of all the electricity generated. Total electricity production worldwide is in turn equivalent to around 15 per cent of global primary energy supply. Roughly one-quarter of all countries worldwide have reactors. In 1986, there were 366 working and a further 140 planned,<sup>/51</sup> with 10 governments possessing about 90 per cent of all installed capacity (more than 5 GW (e)). Of these, there are 8 with a total capacity of more than 9 GW (e),<sup>/52</sup> which provided the following percentages of electric power in 1985: France, 65; Sweden, 42; Federal Republic of Germany, 31; Japan, 23; United Kingdom, 19; United States, 16; Canada, 13; and USSR, 10. According to IAEA, in 1985 there were 55 research reactors worldwide, 33 of them in developing countries.<sup>/53</sup>

56. Nevertheless, there is little doubt that the difficulties referred to above have in one way or another contributed to a scaling back of future nuclear plans - in some countries, to a de facto nuclear pause. In Western Europe and North America, which today have almost 75 per cent of current world capacity, nuclear provides about one-third of the energy that was forecast for it 10 years ago. Apart from France, Japan, the USSR, and several other East European countries that have decided to continue with their nuclear programmes, ordering, construction, and licensing prospects for new reactors in many other countries look poor. In fact, between 1972 and 1986, earlier global projections of estimated capacity for the year 2000 have been revised downwards by a factor of nearly seven. Despite this, the growth of nuclear at around 15 per cent a year over the last 20 years is still impressive.<sup>/54</sup>

57. Following Chernobyl, there were significant changes in the nuclear stance of certain governments. Several - notably China, the Federal Republic of Germany, France, Japan, Poland, United Kingdom, United States, and the USSR - have maintained or reaffirmed their pro-nuclear policy. Others with a 'no nuclear' or a 'phase-out' policy (Australia, Austria, Denmark, Luxembourg, New Zealand, Norway, Sweden - and Ireland with an unofficial anti-nuclear position) have been joined by Greece and the Philippines. Meanwhile, Finland, Italy, the Netherlands, Switzerland, and Yugoslavia are re-investigating nuclear safety and/or the anti-nuclear arguments, or have introduced legislation tying any further growth of nuclear energy and export/import of nuclear reactor technology to a satisfactory solution of the problem of disposal of radioactive wastes. Several countries have been concerned enough to conduct referenda to test public opinion regarding nuclear power.

#### **4. Conclusions and Recommendations**

58. These national reactions indicate that as they continue to review and update all the available evidence, governments tend to take up three possible positions:

- remain non-nuclear and develop other sources of energy;
- regard their present nuclear power capacity as necessary during a finite period of transition, to safer alternative energy sources; or
- adopt and develop nuclear energy with the conviction that the associated problems and risks can and must, be solved with a level of safety that is both nationally and internationally acceptable.

The discussion in the Commission also reflected these tendencies, views, and positions.

59. But whichever policy is adopted, it is important that the vigorous promotion of energy-efficient practices in all energy sectors and large-scale programmes of research, development, and demonstration for the safe and environmentally benign use of all promising energy sources, especially renewables, be given the highest, priority.

60. Because of potential transboundary effects, it is essential that governments cooperate to develop internationally agreed codes of practice covering technical, economic, social (including health and environment aspects), and political components of nuclear energy. In particular, international agreement must be reached on the following specific items:

- full governmental ratification of the conventions on 'Early Notification of a Nuclear Accident' (including the development of an appropriate surveillance and monitoring system) and on 'Assistance in the Case of a Nuclear Accident or Radiological Emergency' as recently developed by IAEA;
- emergency response training - for accident containment and for decontamination and long-term clean-up of affected sites, personnel, and ecosystems;
- the transboundary movement of all radioactive materials - including fuels, spent fuels, and other wastes by land, sea, or air;
- a code of practice on liability and compensation;
- standards for operator training and international licensing;

- codes of practice for reactor operation, including minimum safety standards;
- the reporting of routine and accidental discharges from nuclear installations;
- effective, internationally harmonized minimum radiological protection standards;
- agreed site selection criteria as well as consultation and notification prior to the siting of all major civil nuclear - related installations;
- standards for waste repositories;
- standards for the decontamination and dismantling of time-expired nuclear reactors; and
- problems posed by the development of nuclear powered shipping.

61. For many reasons, especially including the failure of the nuclear weapons states to agree on disarmament, the *Nonproliferation Treaty* has not proved to be a sufficient instrument to prevent the proliferation of nuclear weapons, which still remains a serious danger to world peace. We therefore recommend in the strongest terms the construction of an effective international regime covering all dimensions of the problem. Both nuclear weapons states and non nuclear weapons states, should undertake to accept safeguards in accordance with the statutes of IAEA.

62. Additionally, an international regulatory function is required, including inspection of reactors internationally. This should be quite separate from the role of IAEA in promoting nuclear energy.

63. The generation of nuclear power is only justifiable if there are solid solutions to the presently unsolved problems to which it gives rise. The highest priority must be accorded to research and development on environmentally sound and economically viable alternatives, as well as on means of increasing the safety of nuclear energy.

#### **IV. Wood Fuels: The Vanishing Resource**

64. Seventy per cent of the people in developing countries use wood and, depending on availability, burn anywhere between an absolute minimum of about 350 kilogrammes to 2,900 kilogrammes of dry wood annually, with the average being around 700 kilogrammes per person.<sup>/55</sup> Rural woodfuel supplies appear to be steadily collapsing in many developing countries, especially in Sub-Saharan Africa.<sup>/56</sup> At the same time, the rapid growth of agriculture, the pace of migration to cities, and the growing numbers of people entering the money economy are placing unprecedented pressures on the biomass base<sup>/57</sup> and increasing the demand for commercial fuels: from wood and charcoal to kerosene, liquid propane, gas, and electricity. To cope with this, many developing country governments have no option but to immediately organize their agriculture to produce large quantities of wood and other plant fuels.

65. Wood is being collected faster than it can regrow in many developing countries that still rely predominantly on biomass wood, charcoal, dung, and crop residues - for cooking, for heating their dwellings, and even for lighting. FAO estimates suggest that in 1900, around 1.3 billion people lived in wood-deficit areas.<sup>/58</sup> If this population-driven overharvesting continues at present rates, by the year 2000 some 2.4 billion people may be living in areas where wood is 'acutely scarce or has to be obtained elsewhere'. These figures reveal great human hardship. Precise data on supplies are unavailable because much of the wood is not commercially traded

but collected by the users, principally women and children, but there is no doubt that millions are hard put to find substitute fuels, and their numbers are growing.

66. The fuelwood crisis and deforestation - although related are not the same problems. Wood fuels destined for urban and industrial consumers do tend to come from forests. But only a small proportion of that used by the rural poor comes from forests. Even in these cases, villagers rarely chop down trees; most collect dead branches or cut them from trees./59

67. When fuelwood is in short supply, people normally economize; when it is no longer available, rural people are forced to burn such fuels as cow dung, crop stems and husks, and weeds. Often this does no harm, since waste products such as cotton stalks are used. But the burning of dung and certain crop residues may in some cases rob the soil of needed nutrients. Eventually extreme fuel shortages can reduce the number of cooked meals and shorten the cooking time, which increases malnourishment.

68. Many urban people rely on wood, and most of this is purchased. Recently, as the price of wood fuels has been rising, poor families have been obliged to spend increasing proportions of their income on wood. In Addis Ababa and Maputo, families may spend a third to half of their incomes this way./60 Much work has been done over the past 10 years to develop fuel-efficient stoves, and some of these new models use 30-50 per cent less fuel. These, as well as aluminium cooking pots and pressure cookers that also use much less fuel, should be made more widely available in urban areas.

Fuelwood and charcoal are, and will remain, the major sources of energy for the great majority of rural people in developing countries. The removal of trees in both semiarid and humid land in African countries is a result to a large extent of increasing

## **V. Renewable Energy: The Untapped Potential**

73. Renewable energy sources could in theory provide 10-13TW annually - equal to current global energy consumption./63 Today they provide about 2TW annually, about 21 per cent of the energy consumed worldwide, of which 15 per cent is biomass and 6 per cent hydropower. However, most of the biomass is in the form of fuelwood and agricultural and animal wastes. As noted above, fuelwood can no longer be thought of as a 'renewable' resource in many areas, because consumption rates have overtaken sustainable yields.

74. Although worldwide reliance on all these sources has been growing by more than 10 per cent a year since the late 1970s, it will be some time before they make up a substantial portion of the world's energy budget. Renewable energy systems are still in a relatively primitive stage of development. But they offer the world potentially huge primary energy sources, sustainable in perpetuity and available in one form or another to every nation on Earth. But it, will require a substantial and sustained commitment to further research and development if their potential is to be realized.

75. Wood as a renewable energy source is usually thought of as naturally occurring trees and shrubs harvested for local domestic use. Wood, however, is becoming an important feedstock, specially grown for advanced energy conversion processes in developing as well as industrial countries for the production of process heat, electricity, and potentially for other fuels, such as combustible gases and liquids.

76. Hydropower, second to wood among the renewables, has been expanding at nearly 4 per

cent annually. Although hundreds of thousands of megawatts of hydropower have been harnessed throughout the world, the remaining potential is huge.<sup>/64</sup> In neighbouring developing countries, interstate cooperation in hydropower development could revolutionize supply potential especially in Africa.

In the choice of resources to be utilized we should not stare at renewable resources of energy blindly, we should not blow it out of proportion, we should not promote it for the sake of the environment per se. Instead we should develop and utilize all resources available, renewable sources of energy included, as a long-term endeavour requiring a continuous and sustained effort that will not be subject to short-term economic fluctuations, in order that we, in Indonesia, will achieve a successful and orderly transition to a more diversified and balanced structure of energy supply and environmentally sound energy supply system, which is the ultimate goal of our policy.

Speaker from the floor  
WCED Public Hearings  
Jakarta, 26 March 1985

77. Solar energy use is small globally, but it is beginning to assume an important place in the energy consumption patterns of some countries. Solar water and household heating is widespread in many parts of Australia, Greece, and the Middle East. A number of East European and developing countries have active solar energy programmes, and the United States and Japan support solar sales of several hundred million dollars a year. With constantly improving solar thermal and solar electric technologies, it is likely that their contribution will increase substantially. The cost of photovoltaic equipment has fallen from around \$500-600 per peak watt to \$5 and is approaching the \$1-2 level where it can compete with conventional electricity production.<sup>/65</sup> But even at \$5 per peak watt, it still provides electricity to remote places more cheaply than building power lines.

78. Wind power has been used for centuries - mainly for pumping water. Recently its use has been growing rapidly in regions such as California and Scandinavia. In these cases the wind turbines are used to generate electricity for the local electricity grid. The costs of wind-generated electricity, which benefited initially from substantial tax incentives, have fallen dramatically in California in the last five years and may possibly be competitive with other power generated there within a decade.<sup>/66</sup> Many countries have successful but small wind programmes, but the untapped potential is still high.

79. The fuel alcohol programme in Brazil produced about 10 billion litres of ethanol from sugar-cane in 1984 and replaced about 60 per cent of the gasoline that would have been required.<sup>/67</sup> The cost has been estimated at \$50-60 per barrel of gasoline replaced. When subsidies are removed, and a true exchange rate is used, this is competitive at 1981 oil prices. With present lower oil prices, the programme has become uneconomical. But it saves the nation hard currency, and it provides the additional benefits of rural development, employment generation, increased self-reliance, and reduced vulnerability to crises in the world oil markets.

80. The use of geothermal energy, from natural underground heat sources, has been increasing at more than 15 per cent per year in both industrial and developing countries. The experience gained during the past decades could provide the basis for a major expansion of geothermal-capacity.<sup>/68</sup> By contrast, technologies for low-grade heat via heat pumps or from solar ponds

and ocean thermal gradients are promising but still mostly at the research and development stage.

81. These energy sources are not without their health and environment risks. Although they range from rather trivial to very serious problems, public reactions to them are not necessarily in proportion to the damage sustained. For instance, some of the commonest difficulties with solar energy are, somewhat surprisingly, the injuries from roof falls during solar thermal maintenance and the nuisance of sun-glare off their glass surfaces. Or a modern wind turbine can be a significant noise nuisance to people living nearby. Yet, these apparently small problems often arouse very strong public reactions.

82. But these are still minor issues compared with the ecosystem destruction at hydropower sites or the uprooting of homesteads in the areas to be flooded, as well as the health risks from toxic gases generated by rotting submerged vegetation and soils, or from waterborne diseases such as schistosomiasis (snail fever). Hydrodams also act as an important barrier to fish migration and frequently to the movement of land animals. Perhaps the worst problem they pose is the danger of catastrophic rupture of the dam-wall and the sweeping away or flooding of human settlements downstream - about once a year somewhere in the world. This risk is small but not insignificant.

83. One of the most widespread chronic problems is the eye and lung irritation caused by woodsmoke in developing countries. When agricultural wastes are burned, pesticide residues inhaled from the dusts or smoke of the crop material can be a health problem. Modern biofuel liquids have their own special hazards. Apart from competing with food crops for good agricultural land, their production generates large quantities of organic waste effluent, which if not used as a fertilizer can cause serious water pollution. Such fuels, particularly methanol, may produce irritant or toxic combustion products. All these and many other problems, both large and small, will increase as renewable energy systems are developed.

84. Most renewable energy systems operate best at small to medium scales, ideally suited for rural and suburban applications. They are also generally labour-intensive, which should be an added benefit where there is surplus labour. They are less susceptible than fossil fuels to wild price fluctuations and foreign exchange costs. Most countries have some renewable resources, and their use can help nations move towards self-reliance.

85. The need for a steady transition to a broader and more sustainable mix of energy sources is beginning to become accepted. Renewable energy sources could contribute substantially to this, particularly with new and improved technologies, but their development will depend in the short run on the reduction or removal of certain economic and institutional constraints to their use. These are formidable in many countries. The high level of hidden subsidies for conventional fuels built into the legislative and energy programmes of most countries distorts choices against renewables in research and development, depletion allowances, tax write-offs, and direct support of consumer prices. Countries should undertake a full examination of all subsidies and other forms of support to various sources of energy and remove those that are not clearly justified.

86. Although the situation is changing rapidly in some jurisdictions, electrical utilities in most have a supply monopoly on generation that allows them to arrange pricing policies that discriminate against other, usually small, suppliers.<sup>69</sup> In some countries a relaxation of this control, requiring utilities to accept power generated by industry, small systems, and individuals, has created opportunities for the development of renewables. Beyond that, requiring utilities to adopt an end-use approach in planning, financing, developing, and marketing energy can open the door to a wide range of energy-saving measures as well as



renewables.

87. Renewable energy sources require a much higher priority in national energy programmes. Research, development, and demonstration projects should command funding necessary to ensure their rapid development and demonstration. With a potential of 10TW or so, even if 3-4TW were realized, it would make a crucial difference to future primary supply, especially in developing countries, where the background conditions exist for the success of renewables. The technological challenges of renewables are minor compared with the challenge of creating the social and institutional frameworks that will ease these sources into energy supply systems.

88. The Commission believes that every effort should be made to develop the potential for renewable energy, which should form the foundation of the global energy structure during the 21st Century. A much more concerted effort must be mounted if this potential is to be realized. But a major programme of renewable energy development will involve large costs and high risks, particularly massive-scale solar and biomass industries. Developing countries lack the resources to finance all but a small fraction of this cost although they will be important users and possibly even exporters. Large-scale financial and technical assistance will therefore be required.

## **VI. Energy Efficiency: Maintaining the Momentum**

89. Given the above analysis, the Commission believes that energy efficiency should be the cutting edge of national energy policies for sustainable development. Impressive gains in energy efficiency have been made since the first oil price shock in the 1970s. During the past 13 years, many industrial countries saw the energy content of growth fall significantly as a result of increases in energy efficiency averaging 1.7 per cent annually between 1973 and 1983.<sup>/70</sup> And this energy efficiency solution costs less, by savings made on the extra primary supplies required to run traditional equipment.

90. The cost-effectiveness of 'efficiency' as the most environmentally benign 'source' of energy is well established. The energy consumption per unit of output from the most efficient processes and technologies is one-third to less than one-half that of typically available equipment.<sup>/71</sup>

91. This is true of appliances for cooking, lighting and refrigeration, and space cooling and heating - needs that are growing rapidly in most countries and putting severe pressures on the available supply systems. It is also true of agricultural cultivation and irrigation systems, of the automobile, and of many industrial processes and equipment.

92. Given the large disproportion in per capita energy consumption between developed and developing countries in general, it is clear that the scope and need for energy saving is potentially much higher in industrial than in developing countries. Nonetheless, energy efficiency is important everywhere. The cement factory, automobile, or irrigation pump in a poor country is fundamentally no different from its equivalent in the rich world. In both, there is roughly the same scope for reducing the energy consumption or peak power demand of these devices without loss of output or welfare. But poor countries will gain much more from such reductions.

93. The woman who cooks in an earthen pot over an open fire uses perhaps eight times more energy than an affluent neighbour with a gas stove and aluminium pans. The poor who light their homes with a wick dipped in a jar of kerosene get one-fiftieth of the illumination of a 100-watt electric bulb, but use just as much energy. These examples illustrate the tragic paradox of poverty. For the poor, the shortage of money is a greater limitation than the

shortage of energy. They are forced to use 'free' fuels and inefficient equipment because they do not have the cash or savings to purchase energy-efficient fuels and end-use devices. Consequently, collectively they pay much more for a unit of delivered energy services.

94. In most cases, investments in improved end-use technologies save money over time through lowered energy-supply needs. The costs of improving the end-use equipment is frequently much less than the cost of building more primary supply capacity. In Brazil, for example, it has been shown that for a discounted total investment of \$4 billion in more efficient end-use technologies (such as more efficient refrigerators, street-lighting, or motors) it would be feasible to defer construction of 21 gigawatts of new electrical supply capacity, corresponding to a discounted capital savings for new supplies of \$19 billion in the period 1986 to 2000./72

We must change our attitude towards consumption goods in developed countries and we must create technological advances that will allow us to carry on economic development using less energy. We must ask ourselves can we solve the problems of underdevelopment without using or increasing the tremendous amount of energy used by these countries.

The idea that developing countries use very little energy is an incorrect idea. We find that the poorest countries of all have a different problem; their problem is inefficient use of energy. Medium countries such as Brazil use more efficient and modern sources of fuel. The great hope for these countries is that the future will be built not based on technologies of the past, but using advanced technology. This will allow them to leap forward in relation to countries that are already developed.

Jose Goldemberg  
President, Companhia Energetica de Sao Paulo  
WCED Public Hearing  
Brasilia, 30 Oct 1985

95. There are many examples of successful energy efficiency programmes in industrial countries. The many methods used successfully to increase awareness include information campaigns in the media, technical press, and schools; demonstrations of successful practices and technologies; free energy audits; energy 'labelling' of appliances; and training in energy-saving techniques. These should be quickly and widely extended. Industrialized countries account for such a large proportion of global energy consumption that even small gains in efficiency can have a substantial impact on conserving reserves and reducing the pollution load on the biosphere. It is particularly important that consumers, especially large commercial and industrial agencies, obtain professional audits of their energy use. This kind of energy 'book-keeping' will readily identify those places in their consumption patterns where significant savings can be made.

96. Energy pricing policies play a critical role in stimulating efficiency. At present, they sometimes include subsidies and seldom reflect the real costs of producing or importing the energy, particularly when exchange rates are undervalued. Very rarely do they reflect the external damage costs to health, property, and the environment. Countries should evaluate all hidden and overt subsidies to see how far real energy costs can be passed on to the consumer. The true economic pricing of energy - with safeguards for the very poor - needs to be extended in all countries. Large numbers of countries both industrial and developing are already adopting such policies.

97. Developing countries face particular constraints in saving energy. Foreign exchange difficulties can make it hard to purchase efficient but costly energy conversion and end-use devices. Energy can often be saved cost-effectively by fine-tuning already functioning systems.<sup>/73</sup> But governments and aid agencies may find it less attractive to fund such measures than to invest in new large-scale energy supply hardware that is perceived as a more tangible symbol of progress.

98. The manufacture, import, or sale of equipment conforming to mandatory minimal energy consumption or efficiency standards is one of the most powerful and effective tools in promoting energy efficiency and producing predictable savings. International cooperation may be required when such equipment is traded from nation to nation. Countries and appropriate regional organizations should introduce and extend increasingly strict efficiency standards for equipment and mandatory labelling of appliances.

99. Many energy efficiency measures cost nothing to implement. But where investments are needed, they are frequently a barrier to poor households and small-scale consumers, even when pay-back times are short. In these latter cases, special small loan or hire-purchase arrangements are helpful. Where investment costs are not insurmountable, there are many possible mechanisms for reducing or spreading the initial investment, such as loans with favourable repayment periods and 'invisible' measures such as loans repaid by topping up the new, reduced energy bills to the pre-conservation levels.

100. Transport has a particularly important place in national energy and development planning. It is a major consumer of oil, accounting for 50-60 per cent of total petroleum use in most developing countries.<sup>/74</sup> It is often a major source of local air pollution and regional acidification of the environment in industrial and developing countries. Vehicle markets will grow much more rapidly in developing countries, adding greatly to urban air pollution, which in many cities already exceeds international norms. Unless strong action is taken, air pollution could become a major factor limiting industrial development in many Third World cities.

101. In the absence of higher fuel prices, mandatory standards providing for a steady increase in fuel economy may be necessary. Either way, the potential for substantial future gains in fuel economy is enormous. If momentum can be maintained, the current average fuel consumption of approximately 10 litres per 100 kilometres in the fleet of vehicles in use in industrial countries could be cut in half by the turn of the century.<sup>/75</sup>

102. A key issue is how developing countries can rapidly improve the fuel economy of their vehicles when these are, on average, used for twice as long those as in industrial countries, cutting rates of renewal and improvement in half. Licensing and import agreements should be reviewed to ensure access to the best available fuel efficient designs and production processes. Another important fuel-saving strategy especially in the growing cities of developing countries is the organizing of carefully planned public transport systems.

103. Industry accounts for 40-60 per cent of all energy consumed in industrial countries and 10-40 per cent in developing countries. (See *Chapter 6*.) There has been significant improvement in the energy efficiency of production equipment, processes, and products. In developing countries, energy savings of as much as 20-30 per cent could be achieved by such skilful management of industrial development.

104. Agriculture worldwide is only a modest energy consumer, accounting for about 3.5 per cent of commercial energy use in the industrial countries and 4.5 per cent in developing countries as a whole.<sup>/76</sup> A strategy to double food production in the Third World through

increases in fertilizers, irrigation, and mechanization would add 140 million tons of oil equivalent to their agricultural energy use. This is only some 5 per cent of present world energy consumption and almost certainly a small part of the energy that could be saved in other sectors in the developing world through appropriate efficiency measures./77

105. Buildings offer enormous scope for energy savings, and perhaps the most widely understood ways of increasing energy efficiency are in the home and workplace. Buildings in the tropics are now commonly designed to avoid as much direct solar heating as possible by having very narrow east- and west-facing walls, but with long sides facing north and south and protected from the overhead sun by recessed windows or wide sills.

106. An important method of heating buildings is by hot water produced during electricity production and piped around whole districts, providing both heat and hot water. This extremely efficient use of fossil fuels demands a coordination of energy supply with local physical planning, which few countries are institutionally equipped to handle./78 Where it has been successful, there has usually been local authority involvement in or control of regional energy-services boards, such as in Scandinavia and the USSR. Given the development of these or similar institutional arrangements, the cogeneration of heat and electricity could revolutionize the energy efficiency of buildings worldwide.

## **VII. Energy Conservation Measures**

107. There is general agreement that the efficiency gains achieved by some industrialized countries over the past 13 years were driven largely by higher energy prices, triggered by higher oil prices. Prior to the recent fall in oil prices, energy efficiency was growing at a rate of 2.0 per cent annually in some countries, having increased gradually year by year./79

108. It is doubtful whether such steady improvements can be maintained and extended if energy prices are held below the level needed to encourage the design and adoption of more energy-efficient homes, industrial processes, and transportation vehicles. The level required will vary greatly within and between countries, depending on a wide range of factors. But whatever it is, it should be maintained. In volatile energy markets, the question is how.

109. Nations intervene in the 'market price' of energy in a variety of ways. Domestic taxes (or subsidies) on electrical power rates, oil, gas and other fuels are most common. They vary greatly between and even within countries where different states, provinces, and sometimes even municipalities have the right to add their own tax. Although taxes on energy have seldom been levied to encourage the design and adoption of efficiency measures, they can have that result if they cause energy prices to rise beyond a certain level - a level that varies greatly among jurisdictions.

110. Some nations also maintain higher than market prices on energy through duties on imported electricity, fuel, and fuel products. Others have negotiated bilateral pricing arrangements with oil and gas producers in which they stabilize prices for a period of time.

111. In most countries, the price of oil eventually determines the price of alternative fuels. Extreme fluctuations in oil prices, such as the world has experienced recently, endanger programmes to encourage conservation. Many positive energy developments worldwide that made sense with oil above \$25 per barrel, are harder to justify at lower prices. Investments in renewables, energy-efficient industrial processes, transport vehicles, and energy-services may be reduced. Most are needed to ease the transition to a safer and more sustainable energy future beyond this century. This goal requires a long, uninterrupted effort to succeed.

112. Given the importance of oil prices on international energy policy, the Commission recommends that new mechanisms for encouraging dialogue between consumers and producers be explored.

113. If the recent momentum behind annual gains in energy efficiency is to be maintained and extended, governments need to make it an explicit goal of their policies for energy pricing to consumers. Prices needed to encourage the adoption of energy-saving measures may be achieved by any of the above means or by other means. Although the Commission expresses no preference, conservation pricing requires that governments take a long-term view in weighing the costs and benefits of the various measures. They need to operate over extended periods, dampening wild fluctuations in the price of primary energy, which can impair progress towards energy conservation.

## VIII. Conclusion

114. It is clear that a low energy path is the best way towards a sustainable future. But given efficient and productive uses of primary energy, this need not mean a shortage of essential energy services. Within the next 50 years, nations have the opportunity to produce the same levels of energy services with as little as half the primary supply currently consumed. This requires profound structural changes in socio-economic and institutional arrangements and is an important challenge to global society.

115. More importantly, it will buy the time needed to mount major programmes on sustainable forms of renewable energy, and so begin the transition to a safer, more sustainable energy era. The development of renewable sources will depend in part on a rational approach to energy pricing to secure a stable matrix for such progress. Both the routine practice of efficient energy use and the development of renewables will help take pressure off traditional fuels, which are most needed to enable developing countries to realize their growth potential worldwide.

116. Energy is not so much a single product as a mix of products and services, a mix upon which the welfare of individuals, the sustainable development of nations, and the life-supporting capabilities of the global ecosystem depend. In the past, this mix has been allowed to flow together haphazardly, the proportions dictated by short-term pressures on and short-term goals of governments, institutions, and companies. Energy is too important for its development to continue in such a random manner. A safe, environmentally sound, and economically viable energy pathway that will sustain human progress into the distant future is clearly imperative. It is also possible. But it will require new dimensions of political will and institutional cooperation to achieve it.

---

## Footnotes

1/ World Bank, **World Development Report 1986** (New York: Oxford University Press, 1986).

2/ British Petroleum Company, **BP Statistical Review of World Energy** (London: 1986).

3/ Medium variant in Department of International Economic and Social Affairs, **World Population Prospects as Assessed in 1980**, Population Studies No. 78 (Annex), and **Long Range Population Projections of the World and Major Regions 2025-2150, Five Variants as Assessed in 1980** (New York: UN, 1981).

- 4/ For a useful comparison of various scenarios, see J. Goldemberg et al., 'An End-Use Oriented Global Energy strategy', **Annual Review of Energy**, Vol. 10, 1985; and W. Keepin et al., 'Emissions of CO<sub>2</sub> into the Atmosphere', in B. Bolin et al. (eds.), **The Greenhouse Effect, Climate Change and Ecosystems** (Chichester, UK: John Wiley & Sons, 1986).
- 5/ U. Colombo and O. Bernadini, 'A Low Energy Growth Scenario and the Perspectives for Western Europe', Report for the **Commission of the European Communities Panel on Low Energy Growth**, 1979.
- 6/ Goldemberg et al., 'Global Energy Strategy', op. cit.
- 7/ A.B. Lovins et al., 'Energy Strategy for Low Climatic Risk', Report for the German Federal Environment Agency, 1981.
- 8/ J.A. Edmonds et al., 'An Analysis of Possible Future Atmospheric Retention of Fossil Fuel CO<sub>2</sub>', Report for U.S. Department of Energy, DOE/OR/21400 1, Washington, DC, 1984.
- 9/ J-R Frisch (ed.), **Energy 2000-2020: World Prospects and Regional Stresses**, World Energy Conference (London: Graham and Trotman, 1983).
- 10/ Energy Systems Group of the International Institute for Applied Systems Analysis, **Energy in a Finite World - A Global Systems Analysis** (Cambridge, Mass.: Ballinger, 1981).
- 11/ World Bank, **The Energy Transition in Developing Countries** (Washington, DC: 1983).
- 12/ World Meteorological Organization, **A Report of the International Conference on the Assessment of the Role of Carbon Dioxide and of Other Greenhouse Gases in Climate Variations and Associated Impacts**, Villach, Austria, 9-15 October 1985, WMO No. 661 (Geneva: WMO/ICSU/UNEP, 1986).
- 13/ B.N. Lohani, 'Evaluation of Air Pollution control Programmes and Strategies in Seven Asian Capital Cities', prepared for WCED, 1986; H. Weidner, 'Air Pollution Control Strategies and Policies in the Federal Republic of Germany', prepared for WCED, 1986; M. Hashimoto, 'National Air quality Management Policy of Japan', prepared for WCED, 1985; CETESB, 'Air Pollution Control Programme and Strategies in Brazil - Sao Paulo and Cubatao Areas, 1985', prepared for WCED, 1985.
- 14/ National Research Council, **Acid Deposition: Long Term Trends** (Washington, DC: National Academy Press, 1985); L.P. Muniz and H. Lieferstad, 'Acidification Effects on Freshwater Fish', in D. Drablos and A. Tollan (eds.), **Ecological Impact of Acid Precipitation** (Oslo: SNSF, 1980); L. Hallbacken and C.O. Tamm, 'Changes in Soil Acidity from 1927/ to 1982- 4 in a Forest Area of South West Sweden', **Scandinavian Journal of Forest Research**, No. 1, pp. 219-32, 1986.
- 15/ FAO, **Fuelwood Supplies in the Developing Countries**, Forestry Paper No. 42 (Rome: 1983); Z. Mikdashi, 'Towards a New Petroleum Order', **Natural Resources Forum**, October 1986.
- 16/ Edmonds et al., op. cit.
- 17/ I.M. Torrens, 'Acid Rain and Air Pollution, A Problem of Industrialization', prepared for WCED, 1985.

- 18/ Goldemberg et al., 'Global Energy Strategy', op. cit.
- 19/ British Petroleum Company, op. cit.
- 20/ WMO, **Report of International Conference**, op. cit.; I. Mintzer, 'Societal Responses to Global Warming', submitted to WCED Public Hearings, Oslo, 1985; F.K. Hare, 'The Relevance of Climate', submitted to WCED Public Hearings, Ottawa, 1986.
- 21/ Lohani, op. cit.; Weidner, op. cit.; Hashimoto, op. cit.; CETESB, op. cit.
- 22/ Torrens, op. cit.; F. Lixun and D. Zhao, 'Acid Rain in China', prepared for WCED, 1985; H. Rodhe, 'Acidification in Tropical Countries', prepared for WCED, 1985; G.T. Goodman, 'Acidification of the Environment, A Policy Ideas Paper', prepared for WCED, 1986.
- 23/ Torrens, op. cit.
- 24/ Bolin et al., op. cit.
- 25/ WMO, **Report of International Conference**, op. cit.
- 26/ Ibid.
- 27/ Ibid.
- 28/ Goldemberg et al., 'Global Energy Strategy', op. cit.
- 29/ Mintzer, op. cit.
- 30/ WMO, **Report of International Conference**, op. cit.
- 31/ D.J. Rose et al., **Global Energy Futures and CO<sub>2</sub> - Induced Climate Change**, MITEL Report 83-015 (Cambridge, Mass.: Massachusetts Institute of Technology, 1983); A.M. Perry et al., 'Energy Supply and Demand Implication of CO<sub>2</sub>', **Energy**, Vol. 7, pp. 991-1004, 1982.
- 32/ Bolin et al., op. cit.
- 33/ G. Brasseur, 'The Endangered Ozone Layer: New Theories on Ozone Depletion', **Environment**, Vol. 29, No. 1, 1987.
- 34/ National Research Council, op. cit.; Muniz and Leiverstad, op. cit.
- 35/ OECD, **The State of the Environment** (Paris: 1985).
- 36/ Muniz and Leiverstad, op. cit.
- 37/ National Research Council, op. cit.
- 38/ National Swedish Environmental Protection Board, **Air Pollution and Acidification** (Solna, Sweden, 1986).
- 39/ J. Lehmhaus et al., 'Calculated and Observed Data for 1980 Compared at EMEP Measurement Stations', Norwegian Meteorological Institute, EMEP/MSC-W Report 1/86, 1986; C.B. Epstein and M. Oppenheimer, 'Empirical Relation Between Sulphur Dioxide Emissions and Acid Deposition Derived from Monthly Data', **Nature**, No. 323, pp. 245-47, 1985.



40/ 'Neuartige Waldschaden in der Bundesrepublik Deutschland', Das Bundesministerium für Ernährung, Landwirtschaft und Forsten, 1983; 'Waldschaden Sernebungen', Das Bundesministerium für Ernährung, Landwirtschaft und Forsten, 1985; S. Nilsson, 'Activities of Teams of Specialists: Implications of Air Pollution Damage to Forests for Roundwood Supply and Forest Products Markets: Study on Extent of Damage', TIM/R 124 Add.1 (Restricted), 1986.

41/ S. Postel, 'Stabilizing Chemical Cycles' (after **Allgemeine Forst Zeitschrift**, Nos. 46 (1985) and 41 (1986)); in L.R. Brown et al., **State of the World 1987** (London: W.W. Norton, 1987).

42/ T. Paces, 'Weathering Rates of Eneiss and Depletion of Exchangeable Cations in Soils Under Environmental Acidification', **Journal Ecological Society**, No. 143, pp. 673-77, 1986; T. Paces, 'Sources of Acidification in Contra] Europe Estimated from Elemental Budgets in Small Basins', **Nature**, No. 315, pp. 31-36, 1985.

43/ Hallbacken and Tamm, op. cit.

44/ G. Tyler et al., 'Metaller i Skogsmark - Deposition och omsattning', SNV PM 1692, Solna, Sweden, 1983.

45/ 'Neuartige Waldschaden', 1983, op. cit.; Paces, 'Weathering Rates', op. cit.

46/ Rodhe, op. cit.,

47/ R. Eden et al., **Energy Economics** (New York: Cambridge University Press, 1981); Nuclear Energy Agency, **Projected Costs of Generating Electricity from Nuclear and Coal-Fired Power Stations for Commissioning in 1995** (Paris: OECD, 1986).

48/ Nuclear Regulatory Commission, **Physical Processes in Reactor Meltdown Accidents, Appendix VIII to Reactor Safety Study** (WASH-1400) (Washington, DC: U.S. Government Printing Office, 1975).

49/ S. Islam and K. Lindgren, 'How many reactor accidents will there be?', **Nature**, No. 122, pp. 691-92, 1986; A.W.K. Edwards, 'How many reactor accidents?' **Nature**, No. 324, pp 417-18, 1986.

50/ F.L. Parker et al., **The Disposal of High Level Radioactive Waste - 1984**, Vols. 1 & 2 (Stockholm: The Beijer Institute, 1984); F.L. Parker and R.E. Kasperson, **International Radwaste Policies** (Stockholm: The Beijer Institute, in press).

51/ International Atomic Energy Agency, **Nuclear Power: Status and Trends, 1986 Edition** (Vienna: 1986).

52/ 'World List of Nuclear Power Plants', **Nuclear News**, August 1986.

53/ **IAEA Bulletin**, Summer 1986.

54/ C. Flavin, 'Reassessing Nuclear Power', in Brown et al., op. cit.; British Petroleum Company, op. cit.

55/ G. Foley, 'Wood Fuel and Conventional Fuel Demands in the Developing World', **Ambio**, Vol. 14 No. 5, 1985.

56/ FAO, **Fuelwood Supplies**, op. cit.; FAO/UNEP, **Tropical Forest Resources**, Forestry

Paper No. 30 (Rome: 1982).

57/ The Beijer Institute, **Energy, Environment and Development in Africa, Vols, 1-10** (Uppsala, Sweden: Scandinavian Institute of African Studies, 1984 87); 'Energy Needs in Developing Countries', **Ambio**, Vol. 14, 1985; E.N. Chidumayo, 'Fuelwood and Social Forestry', prepared for WCED, 1985; G.T. Goodman, 'Forest-Energy in Developing Countries: Problems and Challenges', International Union of Forest Research Organizations, **Proceedings**, Ljubljana, Yugoslavia, 1986.

58/ FAO, **Fuelwood Supplies**, op. cit.

59/ Beijer Institute, op. cit.; J. Bandyopadhyay, 'Rehabilitation of Upland Watersheds', prepared for WCED, 1986.

60/ Beijer Institute, op. cit.

61/ R. Overend, 'Bioenergy Conversion Process: A Brief State of the Art and Discussion of Environmental Implications', International Union of Forestry Research Organization, **Proceedings**, Ljubljana, Yugoslavia, 1986.

62/ W. Fernandes and S. Kulkarni (eds.), **Towards a New Forest Policy: People's Rights and Environmental Needs** (New Delhi, India: Indian Social Institute, 1983); P.N. Bradley et al., 'Development Research and Energy Planning in Kenya', **Ambio**, Vol. 14, No. 4; R. Hosier, 'Household Energy Consumption in Rural Kenya', **Ambio**, Vol 14, No. 4, 1985; 1985; R. Engelhard et al., 'The Paradox of Abundant On-Farm Woody Biomass, Yet Critical Fuelwood Shortage: A Case Study of Kakamega District (Kenya)', International Union of Forest Research Organization, **Proceedings**, Ljubljana, Yugoslavia, 1986.

63/ D. Deudney and C. Flavin, **Renewable Energy: The Power to Choose** (London: W.W. Norton, 1983).

64/ World Resources Institute/International Institute Environment and Development, **World Resources 1987** (New York, Basic Books, in press).

65/ Ibid.

66/ Ibid.

67/ Goldemberg et al., 'Global Energy Strategy', op. cit.; J. Goldemberg et al., 'Ethanol Fuel: A Use of Biomass Energy in Brazil', **Ambio**, Vol. 14, pp. 293-98, 1985; J. Goldemberg et al., 'Basic Needs and Much More, With One Kilowatt Per Capita', **Ambio**, Vol. 14, pp. 190-201, 1985.

68/ WRI/IIED, op. cit.

69/ N.J.D. Lucas, 'The Influence of Existing Institutions on the European Transition from Oil', **The European**, pp. 173-89, 1981.

70/ OECD, op. cit.

71/ E. Hirst et al., 'Recent Changes in U.S. Energy Consumption, What Happened and Why?' in D.J. Rose (ed.), **Learning About Energy** (New York: Plenum Press, 1986).

72/ H.S. Geller, 'The Potential for Electricity Conservation in Brazil', Companhia Energetica de Sao Paulo, Sao Paulo, Brazil, 1985.

73/ World Bank, **Energy Transition in Developing Countries**, op. cit.

74/ G. Leach et al., **Energy and Growth; A Comparison of Thirteen Industrialized and Developing Countries** (London: Butterworth, 1986).

75/ MIT International Automobile Program, **The Future of the Automobile** (London: George Allen & Unwin, 1984).

76/ FAO, **Agriculture; Towards 2000** (Rome: 1981).

77/ Ibid.

78/ Lucas, op. cit.

79/ OECD, op. cit.

# **Our Common Future, Chapter 8: Industry: Producing More With Less**

## ***I. Industrial Growth and its Impact***

- 1. The Changing structure of World Industry***
- 2. Environmental Decline and Response***

## ***II. Sustainable Industrial Development in a Global Context***

- 1. Industrialization in the Third World***
- 2. Use of Energy and Raw Materials***
- 3. Promises and Risks of New Technologies***

## ***III. Strategies for Sustainable Industrial Development***

- 1. Establish Environmental Goals, Regulations, Incentives, and Standards***
- 2. Make More Effective Use of Economic Instruments***
- 3. Broaden Environmental Assessments***
- 4. Encourage Action by Industry***
- 5. Increase Capacity to Deal with Industrial Hazards***
- 6. Strengthen International Efforts to Help Developing Countries***

1. Industry is central to the economies of modern societies and an indispensable motor of growth. It is essential to developing countries, to widen their development base and meet growing needs. And though industrialized countries are said to be moving into a post industrial, information-based era, this shift must be powered by a continuing flow of wealth from industry./1

2. Many essential human needs can be met only through goods and services provided by industry. The production of food requires increasing amounts of agrochemicals and machinery. Beyond this, the products of industry form the material basis of contemporary standards of living. Thus all nations require and rightly aspire to efficient industrial bases to meet changing needs.

3. Industry extracts materials from the natural resource base and inserts both products and

pollution into the human environment. It has the power to enhance or degrade the environment; it invariably does both. (See *Chapter 2* for a discussion of the concept of sustainable development within the context of industry and resource use.)

## I. Industrial Growth and its Impact

4. As recently as 1950, the world manufactured only one-seventh of the goods it does today, and produced only one-third of the minerals. Industrial production grew most rapidly between 1950 and 1973, with a 7 per cent annual growth in manufacturing and a 5 per cent growth in mining. Since then growth rates have slowed, to about 3 per cent yearly between 1973 and 1985 in manufacturing and virtually zero growth in mining./<sup>2</sup>

5. That earlier, rapid growth in production was reflected in the rising importance of manufacturing in the economies of virtually all countries. By 1982, the relative share of value added to gross domestic product by manufacturing (the 'manufacturing value added', or MVA) ranged from 19 per cent in developing countries as a whole to 21 per cent in industrialized market economies and 51 per cent of net material product in centrally planned economies. (See Table 8-1.) If the extractive industries are taken into account, the share is even higher.

**Table 8-1**

### Share of Manufacturing Value Added in GDP, by Economic Grouping and Income Group

	1960	1970	1980	1982
Group of Countries		per cent		
Developing Countries	14.2	16.6	19.0	19.0
Low income	11.2	13.8	15.0	15.0
Lower-middle income	11.0	13.5	16.4	16.6
Intermediate income	10.6	14.4	17.1	17.6
Upper-middle income	19.4	21.6	24.1	23.3
High income	17.2	16.2	17.2	17.9
Developed Market Economies	25.6	26.3	27.9	27.1
Centrally Planned Economies*	32.0	42.4	50.5	50.8

\* Figures refer to the share of manufacturing value added (estimated) in net material product. Data are constant (1975) prices.

**Source:** UNIDO, *World Industry: A Statistical Review 1985* (Vienna: 1986).

#### 1. The Changing structure of World Industry

6. In recent years, the trend of the 1950s and 1960s has been reversed. Manufacturing has declined in importance relative to other sectors of the economy. In many countries, this decline

has been in progress since 1973. It is most noticeable in the case of industrial market economies, but the share of MVA in GDP has also declined in nearly half the 95 developing countries surveyed by UNIDO.<sup>/3</sup> This may reflect the growing interaction between industry and all fields of science and technology and the increasing integration of industry and services, as well as industry's ability to produce more with less.

7. The relative importance of industry as an employer has been declining for some time in developed countries. But the shift in jobs towards the service sector has accelerated sharply over the past 15 years with the increasing adoption of new processes and technologies. Economists continue to argue over whether the advent of an information-based economy will further depress employment in industry or will expand job opportunities overall.<sup>/4</sup>

8. Most developing countries started at independence with virtually no modern industry. Then during the 1960s and 1970s their industrial production, employment, and trade consistently grow faster than these sectors in developed market economies. By 1984, developing countries accounted for 11.6 per cent of world MVA (still well short of the 'Lima target' of 25 per cent adopted by UNIDO in 1975). The centrally planned economies of Eastern Europe had raised their share of world MVA from 15.2 per cent in 1963 to 24.9 per cent in 1984.<sup>/5</sup>

9. The international trade in manufactured goods, which has consistently grown faster than has world manufacturing output, is one of the factors underlying the changing geography of industrialization. Many developing nations, particularly newly industrialized countries (NICs), have shared in this growth and made spectacular progress in industrialization. Taking the Third World as a whole, exports of manufactured goods have grown steadily relative to primary exports, rising from 13.3 per cent of their total non-oil exports in 1960 to 54.7 per cent in 1982. (See Table 8-2.)

10. In general, developing-country industrial production is diversifying and moving into more capital intensive areas such as metal products, chemicals, machinery, and equipment. And heavy industries, traditionally the most polluting, have been growing in relation to light industries. At the same time, the share of industries involved in food products, and to a lesser extent in textiles and clothing, has fallen significantly.

## **2. Environmental Decline and Response**

11. Industry and its products have an impact on the natural resource base of civilization through the entire cycle of raw materials exploration and extraction, transformation into products, energy consumption, waste generation, and the use and disposal of products by consumers. These impacts may be positive, enhancing the quality of a resource or extending its uses. Or they may be negative, as a result of process and product pollution and of depletion or degradation of resources.

12. The negative environmental impacts of industrial activity were initially perceived as localized problems of air, water, and land pollution. Industrial expansion following the Second World War took place without much awareness of the environment and brought with it a rapid rise in pollution, symbolized by the Los Angeles smog; the proclaimed 'death' of Lake Erie; the progressive pollution of major rivers like the Meuse, Kibe, and Rhine; and chemical poisoning by mercury in Minamata. These problems have also been found in many parts of the Third World as industrial growth, urbanization, and the use of automobiles spread.<sup>/6</sup>

13. Public concern grew rapidly and forced a broad debate on environment conservation and economic growth. The possibility that the process of industrial growth would run into material

resource constraints became an important theme in this debate. Although non-renewable resources are by definition exhaustible, recent assessments suggest that few minerals are likely to run out in the near future.

**Table 8-2**

**Composition of the Merchandise Trade of Developing Countries**

Item	Exports				Imports			
	1960	1970	1980	1982	1960	1970	1980	1982
	(billions of dollars)							
Primary Commodities	25	45	452	369	11	17	166	166
Non-oil	17	27	107	93	8	12	79	73
Petroleum	6	18	345	277	3	5	87	92
Manufactures	3	9	101	112	17	39	288	296
Total	27	55	553	481	28	56	454	462
Total Non-oil	20	36	208	204	25	51	367	370
	(per cent)							
Primary Commodities Including Oil	90.4	82.6	81.8	76.8	38.8	30.1	36.6	35.9
Non-oil	62.3	49.2	19.4	19.2	28.4	21.7	17.5	15.9
Petroleum	28.1	33.4	62.4	57.5	10.4	8.4	19.1	20.0
Manufactures	9.6	17.4	18.1	23.2	61.2	69.9	63.4	64.1
	Share in Non-oil Exports				Share in Non-oil Imports			
Primary Commodities (Non-oil)	86.7	73.9	51.6	45.3	32.7	23.7	71.6	19.8
Manufactures	13.3	26.1	48.4	54.7	68.3	76.3	78.4	80.2

**Source:** UNIDO, *Industry in a Changing World* (New York 1983); for 1982, WCED estimates based on UN, **1983 International Trade Statistics Yearbook, Vol. 1** (New York: 1985)

14. By the late 1960s, growing awareness and public concern led to action by governments and industry in both industrial and some developing countries. Environmental protection and resource conservation policies and programmes were established, along with agencies to administer them. Initially policies focused on regulatory measures aimed at reducing



emissions. Later a range of economic instruments were considered - taxation, pollution charges, and subsidies for pollution control equipment - but only a few countries introduced them. Expenditures rose, gradually at first, reaching 1.0 per cent and as high as 2.0 per cent of GNP in some industrial countries by the late 1970s.

15. Industry also responded to these problems by developing new technologies and industrial processes designed to reduce pollution and other adverse environmental impacts. Expenditures on pollution control measures rose rapidly in some highly polluting industries; and corporations began to set up their own environmental policy and control units. Guidelines and codes of conduct were published covering safety of products and plant operations, trade practices, technology transfer, and international cooperation.<sup>/7</sup> National and international industry associations have also developed guidelines and voluntary codes of practice.<sup>/8</sup>

I am one of the patients of air pollution. When Japanese economy grew very rapidly, my asthma deteriorated. I am 39 years old. I was hospitalized when I was 18 until I was 23 because of my severe asthma. I had no joy of life, no joie de vivre in those five years. I got a job and went to work but I cannot work as long a time as ordinary people. For the last 10 years I can hardly work. And when the law was enacted, the law concerning the abatement of pollution, it has given me compensation. That is my only income, from the compensation that this law provides. And if I should suffer another disease on top of asthma, I really don't know what to do.

Yoshi Suzuki  
Association of Patients of Pollution and Their Families  
WCED Public Hearing  
Tokyo, 27 Feb 1987

16. The results were mixed, but during the decade a number of industrial countries experienced a significant improvement in environmental quality. There was a considerable roll back in air pollution in many cities and water pollution in many lakes and rivers. Certain chemicals were controlled.

17. But these achievements were limited to some industrial countries. Taking the world as a whole, fertilizer run-off and sewage discharges into rivers, lakes, and coastal waters have increased, with resulting impacts on fishing, drinking water supply, navigation, and scenic beauty. The water quality of most major rivers has not markedly improved over the years. It is, in fact, worsening in many of them, as it is in many smaller rivers. Industrialized countries still suffer from 'traditional' forms of air and land pollution. Levels of sulphur and nitrogen oxides (NOV), suspended particulates, and hydrocarbons remain high and in some cases have increased. Air pollution in parts of many Third World cities has risen to levels worse than anything witnessed in the industrial countries during the 1960s.<sup>/9</sup>

18. It is becoming increasingly clear that the sources and causes of pollution are far more diffuse, complex, and interrelated - and the effects of pollution more widespread, cumulative, and chronic - than hitherto believed. Pollution problems that were once local are now regional or even global in scale. Contamination of soils, ground-water, and people by agrochemicals is widening and chemical pollution has spread to every corner of the planet. The incidence of major accidents involving toxic chemicals has grown. Discoveries of hazardous waste disposal sites - at Love Canal in the United States, for example, and at Lekkerkek in the Netherlands, Vac in Hungary, and Georgswerder in the Federal Republic of Germany - have drawn attention

to another serious problem.

It is absolutely clear now that the present scale and rate of development of the productive forces require a different approach to the questions connected with environmental protection and rational utilization of natural resources. This is a task of immense economic and social significance. For actually it is a question of people's health and a caring approach to the national wealth of each country. Moreover, it is also a question of the future. And on the solution depends the conditions in which the coming generations will live.

A. P. Semyonov  
Central Council of Trade Unions  
WCED Public Hearing  
Moscow, 8 Dec 1986

19. In the light of this and the growth trends projected through the next century, it is evident that measures to reduce, control, and prevent industrial pollution will need to be greatly strengthened. If they are not, pollution damage to human health could become intolerable in certain cities and threats to property and ecosystems will continue to grow. Fortunately, the past two decades of environmental action have provided governments and industry with the policy experience and the technological means to achieve more sustainable patterns of industrial development.

20. At the beginning of the 1970s, both governments and industry were deeply worried about the costs of proposed environmental measures. Some felt that they would depress investment, growth, jobs, competitiveness, and trade, while driving up inflation. Such fears proved misplaced. A 1984 survey by OECD of assessments undertaken in a number of industrial countries concluded that expenditures on environmental measures over the past two decades had a positive short term effect on growth and employment as the increased demand they generated raised the output of economies operating at less than full capacity. The benefits, including health, property, and ecosystem damages avoided, have been significant. More important, these benefits have generally exceeded costs./<sup>10</sup>

21. Costs and benefits have naturally varied among industries. One method of estimating the cost of pollution abatement in industry compares expenditures on new plants and equipment that have pollution control facilities to hypothetical expenditures on new plants without such features. Studies using this comparison in the United States found that pollution abatement expenditures for new plant and equipment for all manufacturing industries in that country in 1984 amounted to \$4.53 billion, or 3.3 per cent of total new expenditures. The chemical industry spent \$580 million (3.8 per cent) on such equipment./<sup>11</sup> Similar studies in the Japanese steel industry found that new investment in pollution control equipment reached as high as 21.3 per cent of total investment in 1976 and even today remains around 5 per cent./<sup>12</sup>

22. Firms involved in food processing, iron and steel, non-ferrous metals, automobiles, pulp and paper, chemicals, and electric power generation - all major polluters have borne a high proportion of the total pollution control investment by industry. Such costs provided a strong incentive for many of these industries to develop a broad range of new processes and cleaner and more efficient products and technologies. In fact, some firms that a decade ago established teams to research and develop innovative technologies to meet new environmental standards are today among the most competitive in their fields, nationally and internationally.

23. Waste recycling and reuse have become accepted practices in many industrial sectors. In some industrialized countries technologies to scrub sulphur and nitrogen compounds from smokestack gases made remarkable advances in a relatively short time. New combustion techniques simultaneously raise combustion efficiency and reduce pollutant emissions.<sup>/13</sup> Innovative products and process technologies are also currently under development that promise energy- and resource-efficient modes of production, reducing pollution and minimizing risks of health hazards and accidents.

24. Pollution control has become a thriving branch of industry in its own right in several industrialized countries. High-pollution industries such as iron and steel, other metals, chemicals, and energy production have often led in expanding into the fields of pollution control equipment, detoxification and waste disposal technology, measurement instruments, and monitoring systems. Not only have these industries become more efficient and competitive, but many have also found new opportunities for investment, sales, and exports. Looking to the future, a growing market for pollution control systems, equipment, and services is expected in practically all industrialized countries, including NICs.

## **II. Sustainable Industrial Development in a Global Context**

25. If industrial development is to be sustainable over the long term, it will have to change radically in terms of the quality of that development, particularly in industrialized countries. But this is not to suggest that industrialization has reached a quantitative limit, particularly in developing countries. Even today, according to UNIDO, world industrial output would have to be increased by a factor of 2.6 if consumption of manufactured goods in developing countries were to be raised to current industrial country levels.<sup>/14</sup> Given expected population growth, a five- to tenfold increase in world industrial output can be anticipated by the time world population stabilizes sometime in the next century. Such growth has serious implications for the future of the world's ecosystems and its natural resource base.

Our ecological movement is not against industry, but we must think of the social function of industries and that pollution and progress are not the same thing. Pollution is not the synonym of progress and therefore time has come for new development concepts to come up. Pollution should not be a synonym of progress because we know that pollution is controlled and when you do not control pollution you are transferring this pollution to the community of the whole.

Fabio Feldman  
Lawyer for Victims of Cubatao  
WCED Public Hearing  
Sao Paulo, 28-29 Oct 1985

26. In general, industries and industrial operations should be encouraged that are more efficient in terms of resource use, that generate less pollution and waste, that are based on the use of renewable rather than non renewable resources, and that minimize irreversible adverse impacts on human health and the environment.

### **1. Industrialization in the Third World**

27. Growing populations and high proportions of young people in the Third World are leading to large increases in the labour force. Agriculture cannot absorb them. Industry must provide

these expanding societies not only with employment but with products and services. They will experience massive increases in the production of basic consumer goods and a concomitant build-up of industrial infrastructure - iron and steel, paper, chemicals, building materials, and transportation. All this implies considerable increase in energy and raw material use, industrial hazards and wastes, accidents, and resource depletion.

28. The problems and prospects for industrial development vary among the countries of the Third World, which differ greatly in size and resources. There are some large countries with abundant natural resources and a substantial domestic market that provide a base for wide-ranging industrial development. Smaller, resource-rich countries are trying to build up an export-oriented processing industry. Several developing countries have based much of their industrial development on export industries in garments, consumer electronics, and light engineering. In many countries, however, industrial development is restricted to a few consumer-goods industries that cater to relatively small domestic markets.

29. The developing countries' share in world production of iron and steel rose from 3.6 per cent in 1955 to 17.3 per cent in 1984, when four countries - Brazil, China, India, and the Republic of Korea - produced more than 10 million tons of steel each, as much as in many medium-sized industrialized countries.<sup>/15</sup> At the same time that this industry is contracting in many developed countries, it is expected to expand by 38 million tons between 1982 and 1990 in the developing world. Latin America is projected to account for 41 per cent of this rise, Southeast Asia for 36 per cent, the Middle East for 20 per cent, and Africa for 1.3 per cent.<sup>/16</sup>

30. Many developing countries still depend heavily on their exports of minerals and other commodities, mostly in unprocessed or only intermediately processed forms. In the case of several major minerals such as aluminium and nickel, a few transnational corporations control the whole industry, from mining through final processing.<sup>/17</sup> Some countries have been moderately successful in increasing the share of refined products in their exports. Yet most of these 'manufactured' goods are processed further in the industrial country that imports them. Thus in 1980, only 39 per cent of all Third World exports of manufactured goods were ready for final use, while 43 per cent of its total exports were unprocessed.<sup>/18</sup> This ratio should improve as developing nations move into the further stages of processing. These improvements should be speeded up.

31. The expected growth in basic industries foreshadows rapid increases in pollution and resource degradation unless developing countries take great care to control pollution and waste, to increase recycling and reuse, and to minimize hazardous wastes. These countries do not have the resources to industrialize now and repair the damage later; nor will they have the time, given the rapid pace of technological progress. They can profit from the improvements in resource and environmental management being achieved in industrialized countries, and so avoid the need for expensive clean-ups. Such technologies can also help them reduce ultimate costs and stretch scarce resources. And they can learn from the mistakes of developed countries,

32. Economies of scale are no longer always the primary consideration. New technologies in communications, information, and process control allow the establishment of small-scale, decentralized, widely dispersed industries, thus reducing levels of pollution and other impacts on the local environment. There may, however, be trade-offs to be made: small-scale raw material processing, for example, is often labour-intensive and widely dispersed but intensive in the use of energy. Such dispersed industries could relieve big cities of some of their population and pollution pressures. They could provide non-farming jobs in the countryside, produce consumer goods that cater to local markets, and help spread environmentally sound technologies.

## 2. Use of Energy and Raw Materials

33. Industrial growth is widely seen as inevitably accompanied by corresponding increases in energy and raw material consumption. In the past two decades, however, this pattern appears to have fundamentally changed. As growth has continued in the developed market economies, the demand for many basic materials, including energy and water, has levelled off; in some cases, it has actually declined in absolute terms.

34. Energy consumption per unit of GDP in OECD countries has been dropping at a rate of 1-3 per cent every year since the late 1960s. Between 1973 and 1983, these nations improved energy efficiency by 1.7 per cent annually.<sup>/19</sup> Industrial water consumption per unit of production has also declined. Older pulp and paper mills typically used about 160 cubic metres of water per ton of pulp; those built during the 1970s, however, used only 70. With advanced techniques that keep water circulating within a closed system, and with proper staff training, use rates could be lowered to 20-30 cubic metres per ton of pulp.<sup>/20</sup>

35. An integrated steel mill uses about 80-200 tons of water for every ton of crude steel. However, since only about 3 tons of water per ton of crude steel are lost, mostly by evaporation, recycling can greatly reduce consumption.<sup>/21</sup> Closed water circulation systems are not unique to the steel industry or to developed market economies. Between 1975 and 1980, the chemical industry's output in the USSR increased by 76 per cent, but the total consumption of fresh water remained at the 1975 level.<sup>/22</sup> And between 1981 and 1986, Soviet industrial output increased by 25 per cent but industrial water consumption remained constant.<sup>/23</sup>

36. Declines in consumption of other raw materials began much earlier. In fact, the amount of raw materials needed for a given unit of economic output has been dropping over this entire century, except in wartime, for practically all non-agricultural commodities.<sup>/24</sup> A recent study of consumption trends of seven basic materials in the United States bears this out,<sup>/25</sup> as do studies in Japan. Japan used only 60 per cent as much raw materials for every unit of industrial production in 1984 as it used in 1973.<sup>/26</sup> These efficiency trends do not result from a decline in manufacturing in favour of service industries, for over these periods the output of the manufacturing sector continued to grow. The productivity and efficiency of resource use are constantly improving, and industrial production is steadily switching away from heavily material intensive products and processes.

37. The two oil price hikes of the 1970s shocked many countries into saving money by promoting conservation measures, switching to other fuels, and raising overall energy efficiency. These events demonstrated the importance of energy pricing policies that take into account their current stock, depletion rates, availability of substitutes, and any unavoidable environmental damage associated with their extraction or processing. (See *Chapter 7*.) They also indicated the potential of similar pricing policies for other raw materials.

I think there must be a persistent push, a persistent effort towards establishing some kind of international code for areas of technologies having high environmental risks. At the moment not many in Indonesia would be considered as very knowledgeable industries. We need also this kind of thing in order to guarantee some kind of minimum safety for countries like ours to develop within the context of international economic relations.

Speaker from the floor

38. Some have referred to these processes as the increasing 'de-materialization' of society and the world economy. Yet even the most industrially advanced economies still depend on a continued supply of basic manufactured goods. Whether made domestically or imported, their production will continue to require large amounts of raw materials and energy, even if developing countries progress rapidly in the adoption of resource-efficient technologies. To sustain production momentum on a global level, therefore, policies that inject resource efficiency considerations into economic, trade, and other related policy domains are urgently needed, particularly in industrial countries, along with strict observance of environmental norms, regulations, and standards.

### **3. Promises and Risks of New Technologies**

39. Technology will continue to change the social, cultural, and economic fabric of nations and the world community. With careful management, new and emerging technologies offer enormous opportunities for raising productivity and living standards, for improving health, and for conserving the natural resource base. Many will also bring new hazards, requiring an improved capacity for risk assessment and risk management. (See *Chapter 12*.)

40. Information technology based chiefly on advances in micro-electronics and computer science is of particular importance. Coupled with rapidly advancing means of communication, it can help improve the productivity, energy and resource efficiency, and organizational structure of industry.

41. New materials such as fine ceramics, rare metals and metal alloys, high-performance plastics, and now composites allow more flexible approaches to production. They also contribute to energy and resource conservation, as in general they require less energy to manufacture and, being lighter, contain less matter than conventional materials.

42. Biotechnology will have major implications for the environment. The products of genetic engineering could dramatically improve human and animal health. Researchers are finding new drugs, new therapies, and new ways of controlling disease vectors. Energy derived from plants could increasingly substitute for non-renewable fossil fuels. New high-yield crop varieties and those resistant to unfavourable weather conditions and pests could revolutionize agriculture. Integrated pest management will become more common. Biotechnology could also yield cleaner and more efficient alternatives to many wasteful processes and polluting products. New techniques to treat solid and liquid wastes could help solve the pressing problem of hazardous waste disposal./27

43. Advances in space technology, now the almost exclusive domain of industrial countries, also hold promise for the Third World, even for agriculture-based economies. Weather forecasting services provided through a satellite and communications network can help farmers in deciding when to plant, water, fertilize, and harvest crops. Remote sensing and satellite imagery could facilitate optimal use of the Earth's resources, permitting the monitoring and assessment of long-term trends in climatic change, marine pollution, soil erosion rates, and plant cover. (See *Chapter 10*.)

44. These new technologies and the Green Revolution blur the traditional distinctions between agriculture, industry, and services. And they make it possible for developments in one sector to

more radically affect those in another. Agriculture has become virtually an 'industry' in developed countries. Agriculture-related services - especially for regional weather forecasting, storage, and transport - are becoming ever more important. New techniques of tissue culture and genetic engineering could soon generate plant strains able to fix nitrogen from the air, a development that would drastically affect the fertilizer industry, but that would also reduce the threat of pollution by agrochemicals.

45. The chemical and energy industries are moving increasingly into the seeds business, providing new seeds that meet specific local conditions and requirements - but that may also need specific fertilizers and pesticides. Here research and development, production, and marketing need to be carefully guided so as not to make the world even more dependent on a few crop varieties - or on the products of a few large transnational

46. Yet new technologies are not all intrinsically benign, nor will they have only positive impacts on the environment. The large-scale production and widespread use of new materials, for example, may create hitherto unknown health hazards (such as the use of gallium arsenate in the microchip industry.)<sup>/28</sup> Risk research might be carried out and products manufactured where safeguards are weak or where people are unaware of the dangers. The need for caution in introducing a new technology is reinforced by the experience of the Green Revolution, which, despite formidable achievements, raises concerns over dependence on relatively few crop strains and large doses of agrochemicals. New life forms produced by genetic engineering should be carefully tested and assessed for their potential impact on health and on the maintenance of genetic diversity and ecological balance before they are introduced to the market, and thus to the environment.<sup>/29</sup>

### **III. Strategies for Sustainable Industrial Development**

47. Resource and environmental considerations must be integrated into the industrial planning and decision-making processes of government and industry. This will allow a steady reduction in the energy and resource content of future growth by increasing the efficiency of resource use, reducing waste, and encouraging resource recovery and recycling.

#### **1. Establish Environmental Goals, Regulations, Incentives, and Standards**

48. In dealing with industrial pollution and resource degradation, it is essential that industry, government, and the public have clear benchmarks. Where the workforce and financial resources permit, national governments should establish clear environmental goals and enforce environmental laws, regulations, incentives, and standards on industrial enterprises. In formulating such policies, they should give priority to public health problems associated with industrial pollution and hazardous wastes. And they must improve their environmental statistics and data base relating to industrial activities.

49. The regulations and standards should govern such matters as air and water pollution, waste management, occupational health and safety of workers, energy and resource efficiency of products or processes, and the manufacture, marketing, use, transport, and disposal of toxic substances. This should normally be done at the national level, with local governments being empowered to exceed, but not to lower, national norms. In preparing environmental regulations, it is important that flexible systems are adopted without specifying a particular process or technology and recognizing that governments differ greatly in their capacity to formulate legal standards and enforce them.

50. Regulations to control the impacts of industrial activity across national boundaries and on



the international commons are also needed. Existing or future international conventions dealing with transfrontier pollution or management of shared natural resources should enshrine certain key principles:

- the responsibility of every state not to harm the health and environment of other nations,
- liability and compensation for any damage caused by transfrontier pollution, and
- equal right of access to remedial measures by all parties concerned.

## **2. Make More Effective Use of Economic Instruments**

51. Pollution is a form of waste, and a symptom of inefficiency in industrial production. When industries recognize pollution as a cost, they are sometimes motivated to make investments in improved products and processes to increase efficiency and hence to reduce the pollution and waste they generate, particularly when there are economic incentives to do so, it largely depends on whether such investments will increase their economic performance.

52. But there are limits to what society can expect industry operating in competition with other industries to do voluntarily. Regulations imposing uniform performance standards are essential to ensure that industry makes the investments necessary to reduce pollution and waste and to enable them to compete on an equal footing.

53. Air and water have traditionally been regarded as 'free' goods, but the enormous costs to society of past and present pollution show that they are not free. The environmental costs of economic activity are not encountered until the assimilative capacity of the environment has been exceeded. Beyond that point, they cannot be avoided. They will be paid. The policy question is how and by whom they will be paid, not whether. Basically, there are only two ways. The costs can be 'externalized' - that is, transferred to various segments of the community in the form of damage costs to human health, property, and ecosystems. Or they can 'internalized' - paid by the enterprise. The enterprise may invest in measures to prevent the damages and, if the market for its product allows, pass the costs along to the consumer. Or it may invest in measures to restore unavoidable damage replanting forests, restocking fish, rehabilitating land after mining. Or it may compensate victims of health and property damage. In these cases, too, the costs may be passed on to the consumer.

54. Enterprises may be encouraged to invest in preventive, restorative, or compensatory measures with subsidies of various kinds. Indeed, in most industrialized and many developing countries, subsidies are a common way of encouraging companies to invest in measures needed to prevent external damage. But in this case, of course, it is the taxpayer who pays, rather than the consumer of the product. Moreover, if the subsidies are large and paid to industries operating in an international market, they can lead to trade distortions and should be avoided.

55. In 1972, the member countries of OECD agreed to base their environmental policies on a Polluter Pays Principle (PPP).<sup>30</sup> Essentially an economic efficiency measure, PPP is intended to encourage industries to internalize environmental costs and reflect them in the prices of products. At the same time, state regulations in CMEA countries are carried out through government bodies that allow environmental concerns to be taken into account.

We move towards attacking the sources and not the effects. But we also meet

environmental questions in our markets, among our own employees and in our local environment. This definitely provides experiences that underline the need for a more complete and comprehensive thinking about the systems of which environment becomes an integral part. We also, as industry, meet the problems of international relations and environment, unfortunately very often in the way of hidden trade barriers or difficulties in cooperation between authorities.

Rolf Marstrander  
Director, Environment Affairs, Norsk Hydro  
WCED Public Hearing  
Oslo, 24-25 June 1985

56. In the case of OECD, the guidelines on PPP were intended to discourage subsidies that could lead to distortions in trade. Countries agreed to phase out the use of subsidies over varying periods of time. (See *Chapter 3* for the application of PPP to international trade and investment.)

57. Incentives to reduce pollution can be enhanced by other measures. Energy and water pricing policies, for example, can push industries to consume less. Product redesign and technological innovations leading to safer products, more efficient processes, and recycling of raw materials can also be promoted by a more effective, integrated use of economic incentives and disincentives, such as investment tax breaks, low-interest loans, depreciation allowances, pollution or waste charges, and non-compliance fees.

58. Sometimes the way in which other policy objectives are promoted unintentionally reduces the effectiveness of environmental programmers. For example, subsidies on raw materials or water supply or energy to promote the development of industry in remote areas may well dilute the pressure to conserve resources. Governments should examine whether existing economic policies, instruments, or subsidies provided to various industry-based programmes and projects contribute effectively to the promotion of environmentally sound and resource efficient practices.

### **3. Broaden Environmental Assessments**

59. An increasing number of countries require that certain major investments be subject to an environmental impact assessment. This broader environmental assessment should be applied not only to products and projects, but also to policies and programmes, especially major macroeconomic, finance, and sectoral policies that induce significant impacts on the environment.

60. Many developing countries, particularly in Asia and Latin America, have adopted systems for environmental impact assessment. But the lack of institutional capacity and skilled personnel mean that these are often conducted by outside consultants, without quality checks. In some cases, government authorities would benefit from a second opinion on the environmental documentation they receive. Interested governments should create an independent international assessment body to help developing countries, upon request, evaluate the environmental impact and sustainability of planned development projects.

### **4. Encourage Action by Industry**

61. Industry's response to pollution and resource degradation has not been and should not be

limited to compliance with regulations. It should accept a broad sense of social responsibility and ensure an awareness of environmental considerations at a levels. Towards this end, all industrial enterprises, trade associations, and labour unions should establish company wide or industry-wide policies concerning resource and environmental management, including compliance with the laws and requirements of the country in which they operate.

62. International trade associations play a major role in setting standards and disseminating information, which must be significantly expanded. They should establish and make widely available sectoral guidelines for assessing the sustainability and potential hazards of new facilities, for developing accident contingency plans, and for selecting pollution control or waste treatment technologies. Such key industry associations as the International Chamber of Commerce and the European Council of Chemical Manufacturers' Federation that have taken important and encouraging leadership roles in dealing with environmental issues should now take a lead in addressing the broader concerns inherent in sustainable development.

63. With limited resources at their disposal, small and medium- sized industries often find themselves unable to afford the changes necessary to meet environmental regulations and product controls. Small scale businesses such as metal working, machine tools, printing, and tanning and dyeing are frequently among the worst offenders of environmental regulations in any country. New technologies, especially micro-electronics, already allow small industries inexpensive means to control an entire production process. Energy-saving biological systems may be well suited to the needs of small and medium sized industries for pollution control or waste disposal.

64. Small and medium scale enterprises, constituting the largest segment of industry in most nations, need information and may in some cases require financial and technical assistance from the public sector. Management and worker training can help them incorporate cleaner technologies and environmental planning into work patterns. Governments should encourage cooperative efforts smaller firms in joint research and development on environmental issues, for example, or joint use of pollution control or waste treatment facilities.

## **5. Increase Capacity to Deal with Industrial Hazards**

65. Chemical products have greatly improved health and life expectancies; increased agricultural production; raised comfort, convenience, and the general quality of life; and expanded economic opportunities. The chemical industry is also one of the most dynamic sectors in most countries, including many developing ones. Yet this industry, together with its products, can have a particularly severe impact on the environment. It has given rise to a host of new problems both of product and process pollution. It continues to generate an increasingly wider range of products and wastes whose effects, especially long-term ones, on human health and the environment are not precisely known. Major accidents have taken place, and the safety record of the industry has been challenged in recent years.

66. In a world more and more dependent on chemical products and highly complex large-scale technologies, accidents with catastrophic consequences are likely to increase. Some of the heavy metals and non-metallic minerals, such as asbestos, also pose serious hazards to health and the environment. Various hazardous products and processes are already built into current systems of production and the technological structure of contemporary society, and it will be a long time before these can be replaced with less dangerous, inherently safer technologies and systems. Some highly toxic chemicals that are known to cause cancer and birth defects and have long-term genetic effects are already in the environment in significant concentrations, and may take decades to be diffused.

## 5.1 Chemicals

67. Chemicals represent about 10 per cent of total world trade in terms of value,<sup>/31</sup> some 70,000-80,000 chemicals are now on the market - and hence in the environment.<sup>/32</sup> The figure is only an informed estimate because no complete inventory has been done. Some 1,000-2,000 new chemicals enter the commercial market each year, many without adequate prior testing or evaluation of effects.

68. According to a U.S. National Research Council sample of 65,725 chemicals in common use, data required for complete health hazard evaluations were available for only 10 per cent of pesticides and 18 per cent of drugs. No toxicity data existed for nearly 80 per cent of the chemicals used in commercial products and processes inventoried under the Toxic Substances Control Act.<sup>/33</sup> This situation is now beginning to change as governments move gradually from a system of post-market testing to one of pre-market testing of all new chemicals.

69. By 1986, more than 500 chemicals and chemical products had been banned altogether or had their uses severely restricted in the country of origin.<sup>/34</sup> In addition, an unknown number of chemicals are withdrawn from clearance processes every year in the light of control agency concerns, or are never submitted to national control agencies for clearance. Some of these end up on the export market.

70. In industrial countries, in an increasingly interdependent and effective system, chemical control agencies share test results and notify each other of new restrictions on chemicals. A ban or restriction in one country is thus often quickly followed by a review and appropriate action in the others.

71. Importing developing countries do not, as a rule, share in this system. Recently, some industrial countries undertook to require their industry to provide a one-time notification to importing countries of chemicals that they have formally banned or severely restricted. They agreed to provide prior notification of the proposed export/import of such chemicals and they also agreed to provide the importing country with the information that led them to ban or restrict the chemical, if it is requested. While the intent behind this system is laudable, it is difficult to see how it can work for importing countries that have no control institutions to receive the notification or professional capacity to assess the information.

72. Third World importers have no way to effectively control trade in chemicals that have been banned or severely restricted in exporting countries. Thus these countries badly need the infrastructure to assess the risks associated with chemical use. In view of the seriousness of this situation, the Commission recommends that all governments, particularly those of the major chemical-producing countries, should:

- undertake that no new chemicals be placed on international markets until the health and environmental impacts have been tested and assessed;
- reinforce on-going efforts to obtain international agreement on the selection of existing chemicals for priority testing, on criteria and procedures for their assessment, and on a system for international sharing of the tasks and the resources required;
- strictly regulate the export to developing countries of those chemicals for which authorization for domestic sale has not been sought or given, by extending requirements for prior notification and information exchange to them; and

- support the establishment in existing regional organizations of units qualified to receive such prior notification and information, to assess it and to advise governments in the region on the risks associated with the use of these chemicals, in order to permit individual governments to weigh these risks against benefits they may perceive from importation of the chemicals.

73. Consumer awareness should be increased. Governments should encourage the establishment of information centres on chemical products used by consumers and strengthen the international networks of information exchange, assessment, and data banks now evolving in the UN and elsewhere.<sup>/35</sup> Another essential step is the adoption and enforcement of regulations on the packaging and labelling of chemicals whose use may be potentially harmful, to ensure that clear directions are provided in common local languages. Consumer unions and other non-governmental organizations should take the lead in collecting and distributing comparative risk information on ingredients in consumer products such as cleaning agents and pesticides.

The most explosive development in the establishment of chemical and pollutive industry has come in developing countries. This is an outright danger. The last accidents are but a few of those that may come. However, we recognize that considerable responsibility tests on the trade union movement in the individual countries in pressing for influence on authorities and managements to avoid both such accidents and investments from companies that do not follow acceptable standards.

Technology development has improved environment in the industrial parts of the world. The new production and information systems make it more difficult, then, for the developing countries to use cheap labour as a means to attract industry to their countries. The future for these countries does not look very bright, unless the international society takes it upon itself to affect a sharing of production technology and resources. This is politically difficult indeed.

Juul Bjerke  
International Confederation of Free Trade Unions  
WCED Public Hearing  
Oslo, 24-25 June 1985

74. The chemical producer and user industries, as the source of the risks associated with chemicals and as the greatest beneficiary of their use should bear the responsibility for ensuring (and the liability for not ensuring) that their products meet the highest standards of safety, have the fewest adverse side effects on health and the environment, and are handled with appropriate care by workers and users. This will require the fullest possible disclosure of information about the properties and production processes of chemical substances and on comparative risks, not only to the regulatory authorities but also to the workers, consumers, and residents of the community in which a chemical industry operates.

## **5.2 Hazardous Wastes**

75. Industrialized countries generate about 90 per cent of the world's hazardous wastes. Although all estimates have a wide margin of error, given considerable differences in definition of 'hazardous waste', in 1984 some 325 million to 375 million tons were generated

worldwide,<sup>/36</sup> around 5 million tons of which were in the newly industrialized and developing areas of the world.<sup>/37</sup>

76. In OECD member countries alone, thousands of waste disposal sites exist, many of which are likely to require some form of remedial action. Clean-up is expensive: Estimates include \$10 billion for the Federal Republic of Germany, more than \$1.5 billion for the Netherlands, \$20-100 billion for the United States, and at least \$60 million for Denmark (in 1966 dollars).<sup>/38</sup> A large number of potentially hazardous sites may also exist in concentrated industrial-urban areas in centrally planned economies as well as in developing countries. Some form of government intervention is required through regulatory action or financial support.

77. Waste management in developing countries suffers from a variety of problems. Frequent and heavy rains in the tropics, for instance, leach wastes into the soils under landfills or even cause them to overflow. With little or no pretreatment of wastes, this could contaminate water supplies or cause local people to be directly exposed to the wastes. Land-filling generally occurs close to industrial states that are surrounded by poor neighbourhoods or shanty towns.<sup>/39</sup> These dangers point up the need for land use planning in developing countries, and the more urgent need to actually implement and enforce such plans.

78. The overriding policy objective must be to reduce the amount of waste generated and to transform an increasing amount into resources for use and reuse. This will reduce the volume that otherwise must be treated or disposed of through incineration, land disposal, or dumping at sea. This is first and foremost a problem of industrialized countries. But it is also a problem in NICs and developing countries, where rapid industrialization is bringing the same severe problems of hazardous waste management.

78. The amount of wastes crossing national frontiers is increasing and is likely to continue to do so. Between 1962 and 1983, wastes transported in Western Europe for disposal in another country virtually doubled, reaching some 250,000- 425,000 tons (1-2 per cent of the total hazardous wastes generated).<sup>/40</sup> This increase may be attributed partly to the availability of relatively low-cost, legal, land-based disposal facilities in some countries. For example, about 4,000 shipments of hazardous wastes went from the Netherlands to the German Democratic Republic in 1984. And the Federal Republic of Germany sent about 20,000 shipments to the German Democratic Republic the preceding year. International transport of wastes meant for disposal at sea, either by incineration or dumping, amounted to about 1.8 million tons in 1983.<sup>/41</sup> Small and poor countries are especially vulnerable to offshore dumping, as has occurred in the waters of the Pacific and the Caribbean.

80. Some countries have recently proposed what amounts to a commodity trade in hazardous (including radioactive) wastes. Strengthened international cooperation in this area is vitally important, and several international bodies have taken up the matter.<sup>/42</sup> An international agreement currently being developed by OECD is to be based on three important principles: equally strict controls on shipments to non member countries; prior notification to and consent from the country of final destination, whether member or non-member country; and a guarantee of existence of adequate disposal facilities in the recipient country. UNEP has drawn up extensive draft guidelines, but as of now there is no effective mechanism either to monitor or to control hazardous waste trade and dumping.<sup>/43</sup> Governments and international organizations must more actively support efforts to achieve an effective international regime to control the transfrontier movement of hazardous wastes.

### **5.3 Industrial Accidents**

81. Accidents involving toxic chemicals and radioactive materials can occur in plants in any region. According to a survey carried out by the U.S. Environmental Protection Agency, 6,928 accidents of varying severity occurred at U.S. plants between 1980 and 1965 - an average of five a day./44

82. In 1984, liquid gas storage tanks exploded in Mexico City, killing 1,000 people and leaving thousands more homeless. Only months after the Bhopal tragedy in India, which killed over 2,000 people and injured 200,000 more, an accident at a plant in West Virginia in the United States operated by the parent company of the Bhopal facility resulted in emergency evacuation of residents and some health problems. The accidental release in 1976 of the highly toxic and mutagenic chemical dioxin at Seveso, Italy, and the ensuing saga of drums of contaminated soil being passed around Europe, also showed that in industrial countries regulations can be evaded and minimum safety standards breached.

83. In early November 1986, a fire at a warehouse of a chemicals manufacturer in Basel, Switzerland, sent toxic fumes into France and the Federal Republic of Germany and released toxic chemicals into the Rhine, causing massive fish kills and affecting the vital water supply in countries downstream, all the way to the Netherlands. Scientists investigating the Rhine agreed that it could be years before the damaged riverine ecosystems would return to their former statue./45

84. Thus incidents at Mexico City, Bhopal, Chernobyl, and Basel - all occurring within the short lifetime of this Commission raised public concern about industrial disasters. They also demonstrated the likelihood of significant increases in the frequency and magnitude of industrial accidents with catastrophic consequences.

85. These events point to the need to strengthen national capabilities and the framework for bilateral and regional cooperation. National and local governments should:

- survey hazardous industrial operations and adopt, and enforce regulations or guidelines on the safe operation of industrial plants and on the transport, handling, and disposal of hazardous materials;
- adopt land use policies or regional development plans that would require or provide incentives to industries that have a high pollution or accident potential to locate away from population centres, and that would discourage people from moving close to plants and waste disposal sites;
- ensure that plant workers are provided with full information about the products and technologies they handle, and are given adequate training in safe operational procedures and emergency preparedness; and
- involve local governments and community residents in major siting decisions and emergency preparedness planning.

In industry, we feel it must now be made mandatory for any firm that is potentially polluting nature through liquid gas or particle emissions to enrol their staff in short but instructive courses of environmental education. Too often firms pollute not just through accident or design but through gross ignorance by the labour involved of the destructive effect on the environment.

Donald Aubrey



86. Increasingly, the consequences of accidents may seriously affect neighbouring countries. Nations should enter into arrangements with other nations that could be seriously affected by an accident in hazardous facilities located on its territory, under which they would agree to:

- notify each other of the location and essential characteristics of existing hazardous installations, an accident in which could spill over and affect lives, property, and ecosystems in the other;
- prepare contingency plans covering potential accidents in these installations;
- provide prompt alert, full information, and mutual assistance in case of accidents;
- establish criteria for selection of sites for new hazardous facilities, which would then be subject to the above; and
- establish standards for the liability and compensation for any damage caused by transfrontier pollution.

87. Industrial accidents and their consequences are to a large extent unpredictable. In order to better identify risks, governments, international organizations, and industry itself should promote further development of technology/risk assessment methodologies, establish data banks on such assessments conducted, and make them easily available to all countries.

## **6. Strengthen International Efforts to Help Developing Countries**

88. Pollution-intensive, resource-based industries are growing fastest in developing countries. These governments will thus have to substantially strengthen their environmental and resource management capabilities. Even where policies, laws, and regulations on the environment exist, they may not be consistently enforced. Many developing nations have begun to build up their educational and scientific infrastructure, but their technical and institutional capacity for making the most of imported or new technologies remains small. Some countries thus continue to depend on outside technical and managerial skills for the maintenance of industrial operations. For lack of capital, they often find that a new industry can only be started with the support of foreign aid, commercial loans, a direct investment, or a joint venture with a transnational corporation.

89. The importance of private investment and the key role of transnational corporations have already been highlighted. (See *Chapter 3*.) It is inconceivable that a successful transition to sustainable development can be achieved unless the policies and practices are reoriented around sustainable development objectives. Those external agencies that support and facilitate private investment, particularly export credit and investment insurance organizations, should also incorporate sustainable development criteria into their policies and practices.

90. The problems of developing-country governments are compounded by the vagaries of the international economic system, such as high debts, high interest rates, and declining terms of trade for commodities. These do not encourage hard-pressed governments to spend high proportions of their meagre resources on environmental protection and resource management. (See *Chapter 3*.)

91. The developing countries themselves will eventually have to bear the consequences of inappropriate industrialization, and the ultimate responsibility for ensuring the sustainability of their development rests with each government. They must define their own environmental goals and development objectives, and establish clear priorities among competing demands on their scarce resources. They will also need to search for more self-reliant means of industrial and technological development. The choices are theirs, but they will need all the assistance - technical, financial, and institutional - that the international community can muster to help them set an environmentally sound and sustainable course of development.

92. Large industrial enterprises, and transnational corporations in particular, have a special responsibility. They are repositories of scarce technical skills, and they should adopt the highest safety and health protection standards practicable and assume responsibility for safe plant and process design and for staff training. The transnational should also institute environmental and safety audits of their plants measured against standards at other subsidiaries, not just against those of other local companies, which may have less stringent requirements. These audits and their follow-up should be made available to governments and other interested parties.

93. Particular care is required in dealing with toxic chemicals and hazardous wastes, and in contingency planning for accidents. The views of non-governmental organizations and the local community should be sought in planning new industrial facilities. The relevant national and local authorities must be fully informed about the properties, potentially harmful effects, and any potential risks to the community of the technology, process, or product being introduced. The necessary information should be disclosed to nearby residents in an easily understandable manner. The enterprises must cooperate with the local government, and community in contingency planning and in devising clearly defined mechanisms for relief and compensation to pollution or accident victims.

94. Many developing countries need information on the nature of industry-based resource and environmental problems, on risks associated with certain processes and products, and on standards and other measures to protect health and ensure environmental sustainability. They also need trained people to apply such information to local circumstances. International trade associations and labour unions should develop special environmental training programmes for developing countries and disseminate information on pollution control, waste minimization, and emergency preparedness plans through local chapters.

---

## Footnotes

1/ As will be noted later in this chapter, the conventional classification of economic activities into three sectors - primary (agriculture and mining), secondary (manufacturing), and tertiary (commerce and other services) - has become increasingly ambiguous. Some economic activities cut across all three. Furthermore, the services sector has begun to occupy an important place of its own in industrialized economies. In this chapter, however, the term 'industry' will be used in the traditional sense to include mining and quarrying, manufacturing, construction, electricity, water, and gas.

2/ GATT, **International Trade 1985-66** (Geneva: 1986).

3/ UNIDO, **Industry in the 1980s: Structural Change and Interdependence** (New York: 1985).

4/ See, for example, W.W. Leontief, **The Impact of Automation** (Oxford: Oxford University Press, 1986); F. Duchin, 'Automation and its Effects on Employment', in E. Collings and L. Tanner (eds.), **Employment Implications of the Changing Industrial Base** (New York: Ballinger Books, 1984); J. Rada, **The Impact of Micro-electronics** (Geneva: ILO, 1980); and D. Werneke, **Microelectronics and Office Jobs** (Geneva: ILO, 1983).

5/ UNIDO, **Industry and Development: Global Report 1985** (New York: 1985).

6/ WHO, **Urban Air Pollution 1973-1980** (Geneva: 1984); World Resources Institute/International Institute for Environment and Development, **World Resources 1986** (New York: Basic Books, 1986).

7/ The UN Commission on Transnational Corporations has been working on a comprehensive code since 1977 but the sections on environmental and consumer protection have been virtually agreed. For other examples, see FAO, 'Code of Conduct on the Distribution and Use of Pesticides', Rome, 1985; UNEP, 'Guidelines on Risk Management and Accident Prevention in the Chemical Industry', adopted in 1982; and OECD, 'Declaration of OECD Member Countries on International Investment and Multinational Enterprise', 1976. and 'Clarification of the Environmental Concerns Expressed in Paragraph 2 of the General Policies Chapter of the OECD Guidelines for Multinational Enterprises', Paris, 1985.

8/ See, for example, International Chamber of Commerce, 'Environmental Guidelines for World Industry', Paris, 1976 (revised in 1981 and 1986); Hellenic Marine Environment Protection Association, 'To Save the Seas, Declaration of a Voluntary Commitment' and 'Guidelines for the Officers of HELMEPA Member Vessels', Athens, 1982; and U.S. National Agricultural Chemicals Association, 'Guidelines on Labelling Practices for Pesticide Products in Developing Areas of the World', Washington, DC, 1985.

9/ UNEP, **State of the Environment 1982** (Nairobi: 1982).

10/ OECD, 'The Impact of Environmental Measures on the Rate of Economic Growth, Rate of Inflation, Productivity and International Trade', **Background Papers Prepared for the International Conference on Environment and Economics, Vol. I** (Paris: 1984).

11/ U.S. Department of Commerce, 'Plant and Equipment Expenditures by Business for Pollution Abatement', **Survey of Current Business**, February 1986.

12/ Japanese Ministry of International Trade and Industry, data compiled annually for the Industrial Structural Council, Tokyo, 1970-86.

13/ The UN Economic Commission for Europe compiles and publishes a 'compendium of low- and non-waste technologies'. A special department in the French Ministry of Environment collects and disseminates information on clean processes and technologies ('les techniques propres').

14/ UNIDO, **Industry in the 1980s**, op. cit.

15/ N. Namiki, 'International Redeployment of Pollution-Intensive Industries and The Role of Multinational Corporations', prepared for WCED, 1986.

16/ OECD, **Developments in Steel Making Capacity in Non-OECD Market Economy Countries** (Paris: 1985).

17/ Namiki, op. cit.

18/ UNIDO, **Industry in a Changing World** (New York: 1983).

19/ OECD, **The State of the Environment 1985** (Paris: 1985).

20/ 'Industry Experience with Environmental Problem Solving', background paper prepared for the World Industry Conference on Environmental Management, organized by the International Chamber of Commerce and the UN Environmental Programme, Versailles, 14-16 November 1984.

21/ Ibid.

22/ UNEP, **The World Environment 1972-1982** (Nairobi: 1982).

23/ V. Anikeev, Director of the Department on Environment and Rational Use of Natural Resources, GOSPLAN, during a visit by WCED to the GOSPLAN headquarters, Moscow, 12 December 1986.

24/ P.F. Drucker, 'The Changed World Economy', **Foreign Affairs**, Spring 1986.

25/ E.D. Larson et al. 'Beyond the Era of Materials', **Scientific American**, June 1986.

26/ Drucker, op. cit.

27/ For a discussion of various possibilities for industrial application of biotechnology, see J. Elkington, **Double Dividends? U.S. Biotechnology and Third World Development**, WRI Papers, No. 2 (Washington, DC: World Resources Institute, 1986).

28/ The 1986 annual report of the Japanese Environment Agency to the Parliament dealt extensively with this topic of the potential environmental impacts and risks posed by the new technologies. **Quality of the Environment in Japan 1986** (Tokyo: 1987).

29/ The U.S. Government recently announced a comprehensive regulatory policy for ensuring the safety of biotechnology research and products. See 'Coordinated Framework for Regulation of Biotechnology', **Federal Register**, 26 June 1986.

30/ See OECD, 'Guiding Principles Concerning International Economic Aspects of Environmental Policies', Council Recommendation C(72)128, Paris, 26 May 1972.

31/ OECD, **Economic Aspects of International Chemicals Control** (Paris: 1983).

32/ The Conservation Foundation, 'Chemicals Policy in the Global Environment', paper prepared for WCED, 1986.

33/ National Research Council, **Toxicity Testing** (Washington, DC: National Academy Press, 1984).

34/ See 'Consolidated List of Products Whose Consumption and/or Sale Have Been Banned, Withdrawn, Severely Restricted or Not Approved by Governments', compiled by the United Nations, 1st revised edition, DIESA/WP/1, 1986.

35/ Notable examples include the International Programme on Chemical Safety (UNEP/WHO/ILO), International Register of Potentially Toxic Chemicals (UNEP), International Agency for Research on Cancer (WHO), and the UN's 'Consolidated List', op. cit.

36/ H. Yakowitz, 'Global Aspects of Hazardous Waste Management', prepared for WCED, 1985;

U.S. Congress, Office of Technology Assessment, **Superfund Strategy** (Washington DC: U.S. Government Printing Office, 1985). U.S. estimates include wastewater in very dilute form. The result is a much larger estimate of total hazardous wastes for the United States than for other countries.

37/ Some other sources quote figures as high as 34 million tons for Brazil alone, and 22 million and 13.6 million tons for Mexico and India, respectively. See H. J. Leonard, 'Hazardous Wastes: The Crisis Spreads' **National Development**, April 1986.

38/ Estimates quoted in an OECD Secretariat paper, Paris, 1986.

39/ UNEP, 'Transfrontier Movements of Hazardous Wastes With Regard to Developing Countries', prepared for the Working Group of Experts on Environmentally Sound Management of Hazardous Wastes, Munich, 1984.

40/ Yakowitz, op. cit.

41/ OECD, Background Papers for Conference on International Cooperation Concerning Transfrontier Movements of Hazardous Wastes, Basel, Switzerland, 26-27 March 1985.

42/ See EEC, 'Supervision and Control of Transfrontier Shipments of Hazardous Waste', Council Directive, Brussels, December 1984; OECD, Resolution of the Council C(85)100, Paris, June 1985.

43/ UNEP 'Transfrontier Movements', op. cit. See also M.J. Suess and J.W. Huismans (eds.), **Management of Hazardous Waste: Policy Guidelines and Code of Practice** (Copenhagen: WHO Regional Office for Europe, 1983).

44/ Preliminary findings of a study conducted for U.S. Environmental Protection Agency, 'Acute Hazardous Data Base Washington', D.C., 1985, quoted in Yakowitz, op. cit.

45/ See, for example, La Suisse, 3-9 November; Die Welt, 10 November; **Die Zeit**, 14 November; Der Spiegel, 17 November; International Herald Tribune, 14-16 November 1986.

# **Our Common Future, Chapter 9: The Urban Challenge**

## ***I. The Growth of Cities***

- 1. The Crisis in Third World Cities***
- 2. The Situation in Industrial World Cities***

## ***II. The Urban Challenge in Developing Countries***

- 1. National Urban Strategies***
- 2. Strengthening Local Authorities***
- 3. Self-Reliance and Citizen Involvement***
- 4. Housing and Services for the Poor***
- 5. Tapping More Resources***

## ***III. International Cooperation***

- 1. Cooperation Among Developing Countries***
- 2. International Support***

1. By the turn of the century, almost half the world will live in urban areas - from small towns to huge megacities.<sup>/1</sup> The world's economic system is increasingly an urban one, with overlapping networks of communications, production, and trade.<sup>/2</sup> This system, with its flows of information, energy, capital, commerce, and people, provides the backbone for national development. A city's prospects - or a town's - depend critically on its place within the urban system, national and international. So does the fate of the hinterland, with its agriculture, forestry, and mining, on which the urban system depends.

2. In many nations, certain kinds of industries and service enterprises are now being developed in rural areas. But they receive high-quality infrastructure and services, with advanced telecommunications systems ensuring that their activities are part of the national (and global) urban-industrial system. In effect, the countryside is being 'urbanized'.

**Table 9-1**

### **Proportion of Population Living In Urban Areas, 1950-2000**

1950                      1985                      2000

		(Per cent)	
World Total	29.2	41.0	46.6
More Developed Regions	53.8	71.5	74.4
Less Developed Regions	17.0	31.2	39.3
Africa	15.7	29.7	39.0
Latin America	41.0	69.0	76.8
(Temperate South America)	(64.8)	(84.3)	88.6
(Tropical South America)	(35.9)	(70.4)	(79.4)
Asia	16.4	28.1	35.0
(China)	(11.0)	(20.6)	(25.1)
(India)	(17.3)	(25.5)	(34.2)

	(in Millions)		
World Total	734.2	1982.8	2853.6
More Developed Regions	447.3	838.8	949.9
Less Developed Regions		1144.0	1903.7
Africa	35.2	164.5	340.0
Latin America	67.6	279.3	419.7
Asia	225.8	791.1	1242.4

**Source:** 'Urban and Rural Population Projections. 1984 Unofficial Assessment', Population Division. United Nations, New York.

## I. The Growth of Cities

3. This is the century of the 'urban revolution'. In the 35 years since 1950, the number of people living in cities almost tripled, increasing by 1.25 billion. In the more developed regions, the urban population nearly doubled, from 447 million to 838 million. In the less developed world, it quadrupled, growing from 286 million to 1.14 billion. (See Table 9-1.)

4. Over only 60 years, the developing world's urban population increased tenfold, from around 100 million in 1920 to close to 1 billion in 1980. At the same time, its rural population more than doubled.

- In 1940, only one person in eight lived in an urban centre, while about one in 100 lived in a city with a million or more inhabitants (a 'million city').
- By 1960, more than one in five persons lived in an urban centre, and one in 16 in a 'million city'.
- By 1980, nearly one in three persons was an urban dweller and one in 10 a 'million city'



resident./3

5. The population of many of sub-Saharan Africa's larger cities increased more than sevenfold between 1950 and 1980 Nairobi, Dar es Salaam, Nouakchott, Lusaka, Lagos, and Kinshasa among them./4 (See Table 9-2.) During these same 30 years, populations in many Asian and Latin American cities (such as Seoul, Baghdad, Dhaka, Amman, Bombay, Jakarta, Mexico City, Manila, Sao Paulo, Bogota, and Managua) tripled or quadrupled. In such cities, net immigration has usually been a greater contributor than natural increase to the population growth of recent decades.

6. In many developing countries, cities have thus grown far beyond anything imagined only a few decades ago and at speeds without historic precedent. (See Box 9-1.) But some experts doubt that developing nations will urbanize as rapidly in the future as in the last 10-40 years, or that megacities will grow as large as UN projections suggest. Their argument is that many of the most powerful stimuli to rapid urbanization in the past have less influence today, and that changing government policies could reduce the comparative attractiveness of cities, especially the largest cities, and slow rates of urbanization.

7. The urban population growth rate in developing countries as a whole has been slowing down from 5.2 per cent per annum in the late 1950s to 3.4 per cent in the 1990s./5 It is expected to decline even further in the coming decades. Nevertheless, if current trends hold, Third World cities could add a further three-quarters of a billion people by the year 2000. Over the same time, the cities of the industrial world would grow by a further 111 million./6

8. These projections put the urban challenge firmly in the developing countries, in the space of just 15 years (or about 5,500 days), the developing world will have to increase by 65 per cent its capacity to produce and manage its urban infrastructure, services, and shelter - merely to maintain present conditions. And in many countries, this must be accomplished under conditions of great economic hardship and uncertainty, with resources diminishing relative to needs and rising expectations.

**Table 9-2**

**Examples of Rapid Population Growth in Third World Cities**

	1950		Most Recent Figure	UN Projections for 2000
Mexico City	3.05		16.0 (1982)	22.3
Sao Paulo	2.7		12.6 (1980)	24.0
Bombay	3.0	(1951)	8.2 (1981)	16.0
Jakarta	1.45		6.2 (1977)	12.8
Cairo	2.5		8.5 (1979)	13.2
Delhi	1.4	(1951)	5.8 (1981)	9.6
Manila	1.78		5.5 (1980)	11.1
Lagos	0.27	(1952)	4.0 (1980)	8.3

Bogota	0.61		3.9	(1985)	9.6
Nairobi	0.14		0.83	(1979)	5.3
Dar es Salaam	0.15	(1960)	0.9	(1981)	4.6
Greater Khartoum	0.18		1.05	(1978)	4.3
Amman	0.03		0.78	(1978)	1.5
Nouakchott	0.0058		0.25	(1982)	1.1
Managua	0.11		0.51	(1980)	1.1
Santa Cruz	0.059		0.26	(1976)	1.0

**Source:** Recent census data used whenever possible; if none available, an estimate by the city government or a local research group has been used. UN projections for the year 2000 from Department of International Economic and Social Affairs, **Estimates and Projections of Urban, Rural and City Populations 1950-2025** (the 1982 Assessment). ST/ESA/SER.R/58. New York. 1985 and from UN, **Urban, Rural and City Populations 1950-2000** (as Assessed in 1978). Population Studies No. 68 (New York, 1980). Other data from Jorge E. Hardoy and David Satterthwaite, **Shelter: Need and Response** (Chichester, UK: John Wiley & Sons, 1981), with some figures updated with more recent census data.

## 1. The Crisis in Third World Cities

9. Few city governments in the developing world have the power, resources, and trained staff to provide their rapidly growing populations with the land, services, and facilities needed for an adequate human life: clean water, sanitation, schools, and transport. The result is mushrooming illegal settlements with primitive facilities, increased overcrowding, and rampant disease linked to an unhealthy environment.

### Box 9-1

#### Dominating Cities

**Nairobi, Kenya:** In 1975, Nairobi had 57 per cent of all Kenya's manufacturing employment and two-thirds of its industrial plants. In 1979, Nairobi contained around 5 per cent of the national population.

**Manila, Philippines:** Metropolitan Manila produces one-third of the nation's gross national product, handles 70 per cent of all imports, and contains 60 per cent of the manufacturing establishments. In 1981, it contained around 13 per cent of the national population.

**Lima, Peru:** The metropolitan area of Lima accounts for 43 per cent of gross domestic product, for four-fifths of bank credit and consumer goods production, and for more than nine-tenths of capital goods production in Peru. In 1981, it was home to around 21 per cent of Peruvians.

**Lagos, Nigeria:** In 1978, Lagos' metropolitan area handled over 40 per cent of the nation's external trade, accounted for over 57 per cent of total value added in manufacturing, and contained over 40 per cent of Nigeria's highly skilled workers. It contains only some 5 per cent of the national population.

**Mexico City, Mexico:** In 1970, with some 24 per cent of Mexicans living there, the capital contained 30 per cent of the manufacturing jobs, 28 per cent of employment in commerce, 38 per cent of jobs in services, 69 per cent of employment in national government, 62 per cent of national investment in higher education, and 80 per cent of research activities. In 1965, it contained 44 per cent of national bank deposits and 61 per cent of national credits.

**Sao Paulo, Brazil:** Greater Sao Paulo, with around one-tenth of Brazil's national population in 1980, contributed one-quarter of the net national product and over 40 per cent of Brazil's industrial value-added.

**Source:** J.E. Hardoy and D. Satterthwaite, 'Shelter, Infrastructure and Services in Third World Cities', **Habitat International**, Vol. 10, No 4, 1986.

10. In most Third World cities, the enormous pressure for shelter and services has frayed the urban fabric. Much of the housing used by the poor is decrepit. Civic buildings are frequently in a state of disrepair and advanced decay. So too is the essential infrastructure of the city; public transport is overcrowded and overused, as are roads, buses and trains, transport stations, public latrines, and washing points. Water supply systems leak, and the resulting low water pressure allows sewage to seep into drinking water. A large proportion of the city's population often has no piped water, storm drainage, or roads./7

Given the distribution of incomes, given the foreseeable availability of resources national, local, and worldwide given present technology, and given the present weakness of local government and the lack of interest of national governments in settlement problems, I don't see any solution for the Third World city.

Third World cities are and they will increasingly become centres of competition for a plot to be invaded where you can build a shelter, for a room to rent, for a bed in a hospital, for a seat in a school or in a bus, essentially for the fewer stable adequately paid jobs, even for the space in a square or on a sidewalk where you can display and sell your merchandise, on which so many households depend.

The people themselves organize and help construct most new housing units in Third World cities and they do so without the assistance from architects, planners, and engineers, nor from local or national governments. Furthermore, in many cases, national and local governments are frequently harassing these groups. The people themselves are becoming increasingly the true builders and designers of Third World cities and quite often the managers of their own districts.

Jorge Hardoy  
International Institute for Environment and Development  
WCED Public Hearing  
Sao Paulo, 28-29 Oct 1985

11. A growing number of the urban poor suffer from a high incidence of diseases; most are environmentally based and could be prevented or dramatically reduced through relatively small investments. (See Box 9-2.) Acute respiratory diseases, tuberculosis, intestinal parasites, and diseases linked to poor sanitation and contaminated drinking water (diarrhoea, dysentery, hepatitis, and typhoid) are usually endemic; they are one of the major causes of illness and death, especially among children. In parts of many cities, poor people can expect to see one in four of their children die of serious malnutrition before the age of five, or one adult in two suffering intestinal worms or serious respiratory infections./8

12. Air and water pollution might be assumed to be less pressing in Third World cities because of lower levels of industrial development. But in fact hundreds of such cities have high concentrations of industry. Air, water, noise, and solid waste pollution problems have increased rapidly and can have dramatic impacts on the life and health of city inhabitants, on their economy, and on jobs. Even in a relatively small city, just one or two factories dumping wastes into the only nearby river can contaminate everyone's drinking, washing, and cooking water. Many slums and shanties crowd close to hazardous industries, as this is land no one else wants. This proximity has magnified the risks for the poor, a fact demonstrated by great loss of life and human suffering in various recent industrial accidents.

### **Box 9-2**

#### **Environmental Problems in Third World Cities**

Out of India's 3,119 towns and cities, only 209 had partial and only 8 had full sewage and sewage treatment facilities. On the river Ganges, 114 cities each with 50,000 or more inhabitants dump untreated sewage into the river every day. DDT factories, tanneries, paper and pulp mills, petrochemical and fertilizer complexes, rubber factories, and a host of others use the river to get rid of their wastes. The Hoogly estuary (near Calcutta) is choked with untreated industrial wastes from more than 150 major factories around Calcutta. Sixty per cent of Calcutta's population suffer from pneumonia, bronchitis, and other respiratory diseases related to air pollution.

Chinese industries, most of which use coal in outdated furnaces and boilers, are concentrated around 20 cities and ensure a high level of air pollution. Lung cancer mortality in Chinese cities is four to seven times higher than in the nation as a whole, and the difference is largely attributable to heavy air pollution.

In Malaysia, the highly urbanized Klang Valley (which includes the capital, Kuala Lumpur) has two to three times the pollution levels of major cities in the United States, and the Klang river system is heavily contaminated with agricultural and industrial effluents and sewage.

**Sources:** Centre for science and Environment, **State of India's Environment: A Citizens' Report** (New Delhi: 1983); Vaclav Smil, **The Bad Earth: Environmental Degradation in China** (London: Zed Press, 1986); Sahabat Alam Malaysia, **The State of Malaysian Environment 1983-84 - Towards Greater Environmental Awareness** (Penang, Malaysia: 1983).

13. The uncontrolled physical expansion of cities has also had serious implications for the urban environment and economy. Uncontrolled development makes provision of housing, roads, water supply, sewers, and public services prohibitively expensive. Cities are often built on the most productive agricultural land, and unguided growth results in the unnecessary loss of this land. Such losses are most serious in nations with limited arable land, such as Egypt. Haphazard development also consumes land and natural landscapes needed for urban parks and recreation areas. Once an area is built up, it is both difficult and expensive to re-create open space.

14. In general, urban growth has often preceded the establishment of a solid, diversified economic base to support the build-up of housing, infrastructure, and employment. In many places, the problems are linked to inappropriate patterns of industrial development and the lack of coherence between strategies for agricultural and urban development. The link between national economies and international economic factors has been discussed in Part I of this report. The world economic crisis of the 1980s has not only reduced incomes, increased unemployment, and eliminated many social programmes, it has also exacerbated the already low priority given to urban problems, increasing the chronic shortfall in resources needed to build, maintain, and manage urban areas./9

## **2. The Situation in Industrial World Cities**

15. The Commission's focus on the urban crisis in developing countries is not meant to imply that what transpires in the cities of the industrial world is not of crucial importance to sustainable development globally. It is. These cities account for a high share of the world's resource use, energy consumption, and environmental pollution. Many have a global reach and draw their resources and energy from distant lands, with enormous aggregate impacts on the ecosystems of those lands.

16. Nor is the emphasis on Third World cities meant to imply that problems within the cities of industrialized countries are not serious. They are. Many face problems of deteriorating infrastructure, environmental degradation, inner-city decay, and neighbourhood collapse. The unemployed, the elderly, and racial and ethnic minorities can remain trapped in a downward spiral of degradation and poverty, as job opportunities and the younger and better-educated individuals leave declining neighbourhoods. City or municipal governments often face a legacy of poorly designed and maintained public housing estates, mounting costs, and declining tax bases.

17. But most industrial countries have the means and resources to tackle inner-city decay and linked economic decline. Indeed, many have succeeded in reversing these trends through enlightened policies, cooperation between the public and private sectors, and significant investments in personnel, institutions, and technological innovation./10 Local authorities usually have the political power and credibility to take initiatives and to assess and deploy resources in innovative ways reflecting unique local conditions. This gives them a capacity to manage, control, experiment, and lead urban development. In centrally planned economies, the ability to plan and implement plans for urban development has been significant. The priority given to collective goods over private consumption may also have increased the resources available for urban development.

18. The physical environment in many cities of the industrial world has improved substantially over the decades. According to the historical records of many major centres - like London, Paris, Chicago, Moscow, and Melbourne - it was not too long ago that a major part of their

population lived in desperate circumstances amid gross pollution. Conditions have improved steadily during the past century, and this trend continues, although the pace varies between and within cities.

Large cities by definition are centralized, manmade environments that depend mainly on food, water, energy, and other goods from outside. Smaller cities, by contrast, can be the heart of community-based development and provide services to the surrounding countryside.

Given the importance of cities, special efforts, and safeguards are needed to ensure that the resources they demand are produced sustainably and that urban dwellers participate in decisions affecting their lives. Residential areas are likely to be more habitable if they are governed as individual neighbourhoods with direct local participation. To the extent that energy and other needs can be met on a local basis, both the city and surrounding areas will be better off.

'Sustainable Development and How to Achieve It'  
Global Tomorrow Coalition  
WCED Public Hearing  
Ottawa, 26-27 May 1986

19. In most urban areas, almost everyone is served by refuse collection today. Air quality has generally improved, with a decline in the emission of particles and sulphur oxides. Efforts to restore water quality have met with a mixed record of success because of pollution from outside of cities, notably nitrates and other fertilizers and pesticides. Many coastal areas, however, close to major sewage outlets, show considerable deterioration. There is rising concern about chemical pollutants in drinking water and about the impacts of toxic wastes on groundwater quality. And noise pollution has tended to increase.

20. Motor vehicles greatly influence environmental conditions in the cities of the industrial world. A recent slowdown in the growth rate of vehicle numbers, stricter emission standards for new vehicles, the distribution of lead-free gasoline, improvements in fuel efficiency, improved traffic management policies, and landscaping have all helped reduce the impacts of urban traffic.

21. Public opinion has played a critical role in the drive to improve urban conditions. In some cities, public pressure has triggered the abandonment of massive urban development projects, fostered residential schemes on a more human scale, countered indiscriminate demolition of existing buildings and historic districts, modified proposed urban highway construction, and led to transformation of derelict plots into playgrounds.

22. The problems that remain are serious but they affect relatively limited areas, which makes them much more tractable than those of Cairo or Mexico City, for example. Certain aspects of urban decline even provide opportunities for environmental enhancement. The exodus of population and economic activities, while creating severe economic and social difficulties, reduces urban congestion, allows new uses for abandoned buildings, protects historic urban districts from the threat of speculative demolition and reconstruction, and contributes to urban renewal. The de-industrialization of these cities is often counterbalanced by the growth of the services sector, which brings its own problems. But this trend creates opportunities to remove heavy industrial pollution sources from residential and commercial areas.

23. The combination of advanced technology, stronger national economies, and a developed institutional infrastructure give resilience and the potential for continuing recovery to cities in the industrial world. With flexibility, space for manoeuvre, and innovation by local leadership, the issue for industrial countries is ultimately one of political and social choice. Developing countries are not in the same situation. They have a major urban crisis on their hands.

## **II. The Urban Challenge in Developing Countries**

24. Settlements - the urban network of cities, towns, and villages - encompass all aspects of the environment within which societies' economic and social interactions take place. Internationally, the major cities of the world constitute a network for the allocation of investment and for the production and sale of most goods and services. These centres are the first to be plugged into this network, through air- and seaports and telecommunications. New technologies usually arrive and are first put into practice in large and then smaller cities. Only if centres are firmly connected to this network can they hope to attract investment in technologies and manufacturing goods for world markets. Nationally, cities are veritable incubators of economic activities. Some enterprises are large-scale but the vast majority are small, doing everything from selling snack foods to mending shoes and building houses. The growth of these activities is the foundation of the domestic economy.

### **1. National Urban Strategies**

25. The natural evolution of this network of settlements, however, has caused apprehension in most developing countries. Of particular concern has been the phenomenal growth of often one or two major cities. In some countries, the desire to limit this growth has led to spatial policies designed to accelerate the development of secondary centres. Underlying this has been a particular concern that unbalanced growth is increasing interregional disparities and creating economic and social imbalances that can have serious consequences in terms of national unity and political stability.

26. Although far from conclusive, the available evidence suggests that most attempts by central governments to balance spatial development have been both expensive and ineffective. Major macroeconomic, social, and sectoral policies have often been directly opposed to the decentralization policy. Investments supported by governments and aid agencies have followed the same centralizing logic as private investments, and have built transportation facilities, educational and health institutions, and urban infrastructure and services where the demand exists - in the major city. Rural-urban migration has followed the same pattern. A major reason why so many migrants in recent decades went to cities such as Nairobi, Manila, Lagos, Mexico City, Sao Paulo, Rangoon, or Port au Prince was the dominant role each centre came to play in its national economy.

We see that the increasing urban drift is inevitable: There are a lot of 'push' factors working in the rural areas. Rural pluralization is caused by absence of land reform, by the increase of absentee landownership, by the displacement of the Green Revolution.

Resides the 'push' factors of the rural areas, there are, of course, the 'pull' factors, the glamour of the Big city, the higher pay of urban jobs as compared to rural income possibilities. So the informal sector of Jakarta has grown; maybe from the 7 million population of Jakarta, 3 or 4 million - at least two-thirds - are the result of the urban drift.



George Adicondro  
Director, Irian Jaya, Rural Community Development Foundation  
WCED Public Hearing  
Jakarta, 26 March 1985

27. The macroeconomic and pricing policies pursued by governments further reinforced this concentration. The major cities, often the capital, usually receive a disproportionately large share of the total national expenditure on education and on subsidies to reduce the prices of water, corn, electric power, diesel fuel, and public transport. Railroad freight rates sometimes favour routes that pass through the capital. Property taxes in the city and surrounding districts may be undervalued. New or expanded industries given a boost by the import substitution policies are encouraged to establish in or near the capital./<sup>11</sup>

28. Agricultural and food policies have also tended to promote rapid growth of larger cities. Low or even negative economic supports for agricultural products have driven smallholders off their land and added to the numbers of the rural poor. Urban food prices, held low by subsidies, have served to attract many of them to cities. In recent years, however, some developing countries have found it possible to begin to shift more income from the major cities to the rural areas and smaller towns. In some cases, policies to promote small landholdings and intensive farming have had this effect. Increasing production, a growth in agricultural employment, and higher average incomes have stimulated the development of small and intermediate centres in the agricultural regions they serve./<sup>12</sup>

29. There are some important lessons to be learned about spatial strategies for urban development:

- Nothing much short of coercion will prevent the growth of the major city in the early stages of development.
- The key to successful intervention is timing, to encourage deconcentration only when the advantages of concentration are diminishing.
- Avoid policy interventions that increase the attractiveness of the major city, particularly subsidies on food and energy, overly generous provision of urban infrastructure and other services, and excessive concentration of administrative power in the capital.
- The best way to encourage the growth of secondary centres is to build on the natural economic advantages of their regions, especially in resource processing and marketing, and the decentralized provision of government services.
- Rural and urban development strategies and approaches should be complementary rather than contradictory: The development of secondary centres is to the direct economic benefit of the resource areas they serve.

30. The job opportunities and housing provided by cities are essential to absorb the population growth that the countryside cannot cope with; as long as price controls and subsidies do not interfere, the urban market should offer advantages to rural producers. But there are obviously conflicts of interest between developing country city-dwellers and farmers. A major thrust of the discussion on food security (see *Chapter 5*) was to assert the importance of decisively turning the 'terms of trade' in favour of farmers, especially small farmers, through pricing and exchange rate policies. Many developing countries are not implementing such policies, partly for fear of losing the support of politically powerful urban factions. Thus they fail both to stem

urban drift and to improve food security.

31. These considerations can provide the basis for developing an explicit national settlements strategy and policies within which innovative and effective local solutions to urban problems can evolve and flourish. Every government has such a strategy in effect, but it is most often implicit in a range of macroeconomic, fiscal, budget, energy, and agricultural policies. These policies have usually evolved incrementally in response to the pressures of the day and, almost invariably, they contradict each other and the stated settlement goals of the government. A national urban strategy could provide an explicit set of goals and priorities for the development of a nation's urban system and the large, intermediate, and small centres within it. Such a strategy must go beyond physical or spatial planning, it requires that governments take a much broader view of urban policy than has been traditional.

32. With an explicit strategy, nations can begin to reorient those central economic and major sectoral policies that now reinforce megacity growth, urban decline, and poverty. They can likewise promote more effectively the development of small and intermediate urban centres, the strengthening of their local governments, and the establishment of services and facilities needed to attract development initiatives and investment. Ministries of Planning, Finance, Industry, Agriculture, and so on would have clear goals and criteria against which to assess the effects of their policies and expenditures on urban development. Contradictory policies and programmes could be changed. At the very least, the spatial biases inherent in macroeconomic and fiscal policies, annual budgets, pricing structures, and sectoral investment plans could be exposed and assessed. Within such a strategy, the traditional tools of urban policy, including land use planning and control, would stand a better chance of being effective.

33. The formulation of such a strategy is clearly a central government responsibility. Beyond this, however, the role of central governments should be primarily to strengthen the capacity of local governments to find and carry through effective solutions to local urban problems and stimulate local opportunities.

## **2. Strengthening Local Authorities**

34. The institutional and legal structures of local government in most developing nations are inadequate for these purposes. In most African and Asian nations the structure of urban government goes back to the colonial period and was designed to deal with predominantly rural and agricultural societies. It was never intended to cope with rapid urbanization or to manage cities of several million inhabitants. Newly independent governments inherited a framework of laws and procedures totally inappropriate to deal with the urban processes they were about to confront. Yet in many nations, this inherited framework remains largely in place.

35. Where the immediate colonial past is less evident, as in most Latin American nations, the political, institutional, and legal frameworks for local government are often just as inappropriate and inadequate. As in Asia and Africa, most are based on models imported from Europe or North America. This has made it difficult for them to influence the direction of urbanization and to manage the problems of large, rapidly expanding urban centres. It has created cities that are energy and material-intensive and dependent on imports, and that add to the burden on the national economy, including pressures on trade and balance of payments.

36. Urban development cannot be based on standardized models, imported or indigenous. Development possibilities are particular to each city and must be assessed within the context of its own region. What works in one city may be totally inappropriate in another. Although technical help from central agencies may be needed, only a strong local government can ensure

that the needs, customs, urban forms, social priorities, and environmental conditions of the local area are reflected in local plans for urban development. But local authorities have not been given the political power, decision making capacity, and access to revenues needed to carry out their functions. This leads to frustration, to continuing criticism of local government for insufficient and inefficient services, and to a downward spiral of weakness feeding on weakness.

A lot of youth in the Third World countries and even adults are unemployed. We want simple technologies whereby one particular person can do a kind of a job that could have provided job opportunities to several hundreds. What are we doing with the surplus potential energy? So again I say that development is people, it is not high technology, it is not modernization, it is not westernization. But it should be culturally relevant.

Jan Selego  
World Vision International  
WCED Public Hearing  
Nairobi, 23 Sept 1986

37. The lack of political access is a major weakness of local government in many developing countries. Most local governments have difficulties getting enough revenue to cover their operating expenses, let alone to make new investments to extend services and facilities. Even richer city governments have access to the equivalent of only \$10-50 per inhabitant to invest each year. Despite these weaknesses, the trend in recent decades has been for national governments to reduce the financial capacity of local governments in real terms.

38. The result is growing centralization and continuing weaknesses at both the central and local level. Instead of doing a few things well, central authorities end up doing too many things, none of them well. Human and financial resources get stretched too thin. Local governments do not gain the expertise, authority, and credibility needed to deal with local problems.

39. To become key agents of development, city governments need enhanced political, institutional, and financial capacity, notably access to more of the wealth generated in the city. Only in this way can cities adapt and deploy some of the vast array of tools available to address urban problems - tools such as land title registration, land use control, and tax sharing.

### **3. Self-Reliance and Citizen Involvement**

40. In most developing countries between one-fourth and one-half of the economically active urban population cannot find adequate, stable livelihoods. With few jobs available in established businesses or government services, people have to find or create their own sources of income. These efforts have resulted in the rapid growth of what has been termed the 'informal sector', which provides much of the cheap goods and services essential to city economies, business, and consumers.

41. Thus, while many poor people may not be officially employed, most are working - in unregistered factories and construction firms, selling goods on street corners, making clothes in their homes, or as servants or guards in better-off neighbourhoods. Most of the so-called unemployed are in fact working 10-15 hours a day, six to seven days a week. Their problem is not so much underemployment as underpayment.

42. Most house building, maintenance, or upgrading in the cities of developing countries is done outside official plans and usually in illegal settlements. This process mobilizes untapped resources, contributes to capital formation, and stimulates employment. These informal sector builders represent an important source of urban employment, in particular for low and unskilled labour. They are not capital- or technology-intensive, they are not energy-intensive, and as a rule they do not impose a drain on foreign exchange. In their way, they contribute their share to attaining some of the nation's major development objectives. Moreover, they are flexible in responding to local needs and demands, catering in particular to poorer households, which usually have nowhere else to turn. Many governments have begun to see the wisdom of tolerating rather than quashing their work. Large-scale bulldozing of squatter communities is now rarer, although it still happens.

43. Governments should give more support to the informal sector, recognizing its vital functions in urban development. Some governments have done so, facilitating loans and credit to small entrepreneurs, building cooperatives, and neighbourhood improvement associations. Providing tenure to those living in illegal settlements is basic to this process, as is easing some building and housing regulations.

44. Multilateral and bilateral development assistance agencies should follow suit, and some are beginning to do so. Non-governmental and private voluntary organizations are springing up in many countries to provide cost-effective channels for assistance, ensuring that it gets to those who can use it. A much larger proportion of assistance could be channelled directly through these organizations.

45. The above measures would also reinforce self-reliance and local governance by the poor in their own neighbourhood associations. Left to their own devices, the poor in many Third World cities have organized to fill gaps in services left by the local government. Among other things, community groups mobilize and organize fund-raising or mutual self-help to deal with security, environmental, and health problems within the immediate area.

46. Governments should move from a position of neutrality or antagonism to active support for such efforts. A few have actually institutionalized such programmes so that public ministries or agencies work continuously with community organizations. In the Indian city of Hyderabad, for example, an Urban Community Development Department set up by the municipal corporation works directly with community groups and non-government organizations in poorer neighbourhoods. By 1983, some 223 organizations had been formed by residents in low-income areas, plus 135 youth organizations and 99 women's groups.<sup>13</sup> In this way governments can become partners and sponsors of the people who are the main builders of their cities.

The shantytowns have found their own technique, their own resources without any assistance from anyone else, and they solved their housing problems. The real problem is not that. It is the poverty, the lack of planning, the lack of technical assistance, the lack of financing to buy construction materials, the lack of urban equipment.

To change this housing policy for human settlements, they should stimulate self-construction, instead of financing these large housing complexes. It would have been much better and would have cost less to help the people to carry out the self-construction.

Generally speaking, it seems clear that without meeting the basic needs of human beings, concern for the environment has to be secondary. Man has to survive, answer, and attend first to his basic survival needs - food, housing, sanitation - and then to the environment.

Walter Pinto Costa  
President, Environmental and Sanitation Association  
WCED Public Hearing  
Sao Paulo, 28-29 Oct 1985

#### **4. Housing and Services for the Poor**

47. In most developing-world cities, there is little low-cost housing. Generally those on low incomes either rent rooms - whether in tenements or cheap boarding-houses, or in someone else's house or shack - or they build or buy a house or shack in an illegal settlement. There are many kinds and degrees of illegality, and these influence the extent to which governments tolerate the existence of such settlements, or even provide them with public services and facilities.

48. Whatever form it takes, low-income accommodation generally shares three characteristics. First, it has inadequate or no infrastructure and services - including piped water, sewers, or other means of hygienically disposing of human wastes. Second, people live in crowded and cramped conditions under which communicable diseases can flourish, particularly when malnutrition lowers resistance. Third, poor people usually build on land ill-suited for human habitation: floodplains, dusty deserts, hills subject to landslide, or next to polluting industries. They choose these sites because the land's low commercial value means they stand a better chance of not being evicted.

49. Landownership structures and the inability or unwillingness of governments to intervene in these structures are perhaps the main factors contributing to 'illegal' settlements and chaotic urban sprawl. When half or more of a city's workforce has no chance of obtaining a legal plot on which a house can be built, let alone of affording to buy or rent a house legally, the balance between private landownership rights and the public good must be quickly rethought.

50. Given urbanization trends in most developing countries, there is no time to wait for slow and uncertain programmes. Government intervention must be reoriented so that limited resources are put to maximum effect in improving housing conditions for the poor. The options for intervention are many (see Box 9-3), but governments should be guided by these seven priorities:

- provide legal tenure to those living in 'illegal' settlements, with secure titles and basic services provided by public authorities;
- ensure that the land and other resources people need to build or improve their housing are available;
- supply existing and new housing areas with infrastructure and services;
- set up neighbourhood offices to provide advice and technical assistance on how housing can be built better and cheaper, and on how health and hygiene can be improved;

- plan and guide the city's physical expansion to anticipate and encompass needed land for new housing, agricultural land, parks, and children's play areas;
- consider how public intervention could improve conditions for tenants and those living in cheap rooming or boarding-houses; and
- change housing finance systems to make cheap loans available to lower-income and community groups.

51. Most cities urgently need a large and continuous increase in the availability of cheap housing plots convenient to the main centres of employment. Only government intervention can achieve this, but no general prescriptions are possible. Societies differ too much in how they view private landownership and land use rights, in how they use different instruments such as direct grants, tax write-offs, or deduction of mortgage interest, and in how they treat land speculation, corruption, and other undesirable activities that often accompany processes of this kind. Although the means are particular to each nation, the end must be the same: governments ensuring that there are cheaper, better-serviced, better-located, legal alternatives to illegal plots. If this need is not met, the uncontrolled growth of cities - and its accompanying high costs - will not be stopped.

52. Besides land, building materials are another major cost for people putting up their own houses. Government support for the production of materials and of certain structural components, fixtures, and fittings could reduce housing costs and create many jobs. Small neighbourhood workshops often have cost advantages because of the low cost of transport from the workshop to the building site.

### **Box 9-3**

#### **Three Ways to Use \$20 Million to Improve Conditions in a City of 1 Million**

##### **Option 1:**

Build 2,000 public housing units for poor families (with an average of six family members), each costing \$10,000. Conditions are improved for 12,000 people, but little cost recovery is possible for poor families. If the city's population grows at 5 per cent annually, 630,000 new inhabitants will be added over 10 years, so only a tiny fraction of total population will have benefited.

##### **Option 2:**

Establish a 'site-and-service scheme', whereby poor families are responsible for building their houses on an allocated site supplied with piped water, connection to a sewer system, and electricity, roads, and drainage. At \$2,000 per plot, this means housing for some 60,000 people - about 10 per cent of the city's population growth over 10 years.

##### **Option 3:**

Allocate \$100,000 to a neighbourhood organization representing 1,000 poor households (6,000 people) in an existing low-income settlement. It chooses to improve drainage and roads, build a health clinic, establish a cooperative to produce

inexpensive building materials and components, and reblock the settlement to improve access roads and provide 50 new plots. With \$10 million, 100 such community initiatives are supported, reaching 600,000 people and providing 5,000 new housing plots. Many new jobs are stimulated. The remaining \$10 million is spent on installing piped water; at \$100 per household, all 600,000 people reached.

53. The majority of building codes and standards are ignored because following them would produce buildings too expensive for most people. A more effective approach might be to set up neighbourhood offices to provide technical advice on how health and safety can be improved at minimum cost. Good professional advice can lower building costs and improve quality, and might be more effective than prescribing what can or cannot be built.

54. Many poor people rent accommodation; half or more of a city's entire population may be tenants. Increasing the availability of house sites, materials, and credits does little for those who must rent. One possibility is financial support to non-governmental, non-profit organizations to purchase and develop property specifically for rental units. A second is support for tenants to buy out landlords and convert tenancy into cooperative ownership.

55. Governments, especially those strapped for resources, may claim that piped water supplies and sewage disposal systems are too expensive. As a consequence, poor people may have to pay water vendors far more per litre of water than middle- or upper-income groups pay public agencies to pipe water into their homes. Western water-borne sewage systems and treatment plants may be prohibitively expensive. But other techniques and systems cost between one-tenth and one-twentieth as much per household, and most of these use much less water. Moreover, lower-cost technology can be upgraded over time, as money becomes available.<sup>14</sup>

56. Major improvements can be made relatively cheaply in all these areas. But costs will remain low only if low-income groups are encouraged to participate fully in defining what they need, in deciding what they will contribute to the new services, and in doing the job with their own hands. This cooperation depends on establishing the new relationship between citizens and government called for earlier.

## **5. Tapping More Resources**

57. The available resources in or close to cities are often underused. Many landowners leave well-located sites undeveloped in order to benefit later from their increasing value as the city grows. Many public agencies have land that could be put to better use, such as the area next to stations and harbours controlled by railway and port authorities. Several countries have introduced special programmes to encourage public and private cooperation in the development of such lands, a trend that should be encouraged. There is a general need to find innovative and effective ways of pooling land for the common good. Most cities have mechanisms for acquiring land either at market rates (which means that schemes are never implemented), or at arbitrarily low confiscatory rates (where the alliance of political forces and landlords blocks the acquisition anyway).

58. Governments should also consider supporting urban agriculture. This may have less relevance in cities where land markets are highly commercialized and land for housing is in short supply. But in most cities, especially those with less commercialized land markets, considerable potential exists. Many African cities already realize this. Urban agriculture, especially on city fringes, is undertaken by people as a way to feed themselves, in other



instances, the process is more commercialized, with enterprises specializing in vegetable production for sale within the city.

59. Officially sanctioned and promoted urban agriculture could become an important component of urban development and make more food available to the urban poor. The primary purposes of such promotion should be to improve the nutritional and health standards of the poor, help their family budgets (50-70 per cent of which is usually spent on food), enable them to earn some additional income, and provide employment. Urban agriculture can also provide fresher and cheaper produce, more green space, the clearing of garbage dumps, and recycling of household waste./15

I'm an expert in slum dwelling. We're establishing a small, tiny organization trying to organize slum dwellers, because we see so many slums. Slums in the city, slums in the villages, slums in the forests.

I have worked for four years to motivate my fellow slum dwellers to become transmigrants, and they finally migrated to ten places all over Indonesia. They are still in very good communication with me. They're still sending me letters, and they say that life is not better in the transmigration areas. Living in the shadows in the urban slums or living in the shadows in the transmigration site is just the same.

When I go back to my people, the slum dwellers, tonight they will ask me what I have got from this meeting in the big hotel. They won't ask for information, just 'Have you brought some money for us to build new houses?'

Syamsuddin Nainggolan  
Founder, Yayasan Panca Bakti  
WCED Public Hearing  
Jakarta, 26 March 1986

60. Another poorly used resource is solid wastes, the disposal of which has become a major problem in many cities, with much of it dumped and uncollected. Promoting the reclamation, reuse, or recycling of materials can reduce the problem of solid waste, stimulate employment, and result in savings of raw materials. Composting can support urban agriculture. If a municipal government lacks the resources to collect household wastes regularly, it can support existing community-based schemes. In many cities, literally thousands of people already make a living sorting through wastes by hand on municipal tips. Investing in a more capital-intensive, automatic recycling plant could be doubly counterproductive if it unnecessarily consumes scarce capital or if a plant would destroy many people's livelihoods. But an immediate need here is to give health advice and provide health care services to those who are making a living off municipal tips./16

### **III. International Cooperation**

61. The future will be predominantly urban, and the most immediate environmental concerns of most people will be urban ones. The effectiveness of efforts to improve urban life depends largely on the health of national economies. In many developing countries, this is linked closely to the state of the world economy. An improvement in international economic relations (see *Chapter 3*) would perhaps do more than anything else to enhance the capacity of developing countries to address their linked urban and environmental problems. But beyond that is the need to strengthen cooperation among developing countries and to increase various types of

direct support from the international community.

## **1. Cooperation Among Developing Countries**

62. Developing countries can do a great deal together to develop the policy concepts, programmes, and institutions needed to tackle the urban crisis they share. Although the management problems confronting Caracas, Dakar, or Delhi have little relevance to those confronting London or Paris, the cities of Latin America, West Africa, or South Asia have much in common. As they formulate broad national urban strategies, it is important that they share experiences on the management of their growing megacities, on the development of small and intermediate centres, on strengthening local government, on upgrading illegal settlements, on crisis-response measures, and on a range of other problems that are more or less unique to the Third World.

63. Further research could provide the basis for rethinking the Third World city. It could also feed in-country training programmes (or, for smaller nations, regional training programmes) for city and municipal government staff. Good policy proposals and good training courses depend on good local information and analysis; far too little of all three of these is found within developing countries and cities.

## **2. International Support**

64. A greater flow of international resources is required to support the efforts of developing countries to tackle the unfolding urban crisis. An agreed definition of 'urban development assistance' does not exist, but the Development Assistance Committee recently estimated that total bilateral and multilateral aid for urban programmes averaged about \$900 million per year over 1980-84.<sup>17</sup> It is also estimated that to date fewer than 5 per cent of the developing world's urban population has been reached by a housing or neighbourhood upgrading project sponsored by a development assistance agency. This level of support needs to be increased significantly. Moreover, the scope of support should be broadened and its quality and terms improved.

65. In addition, development assistance agencies should increase aid and technical assistance in three areas:

- to set up infrastructure funds for local governments;
- to undertake tasks such as reorganizing local tax assessments and collection, preparing or updating maps of property ownership, and setting up technical teams to advise households and community groups on improving housing;
- for in-country training courses and on-the job training for local officials.

66. Part of the increased aid should go directly to community groups, using intermediaries such as national or international NGOs. Several bilateral aid programmes have already demonstrated the cost-effectiveness of this approach; various NGOs have been responsible for many successful community based schemes to improve housing and provide basic services. They are generally more successful at reaching the poorest. More aid should also go to supporting independent research groups working in housing and urban issues, particularly those providing advice to local governments and community groups; many are doing so already, especially in Latin America.

## Box 9-4

### Misunderstanding Women's Needs in Housing Projects

Housing projects often use a gridiron layout that does not allow women to work in their house and at the same time keep an eye on their own or their neighbours' children. House designs and plot sizes rarely consider the fact that many women will want to use their houses as workshops (to make clothes, for instance) or as shops, which in fact are often forbidden in low-income housing projects. Application procedure for low-income housing sometimes requires 'husbands' to apply; this excludes women-headed households - between 30 and 50 per cent of all households. Women's special needs in different cultures are ignored - in Islamic societies, for example, women's need for private open space within the house is rarely considered in house designs, while their need for relatively sheltered pathways to get to shops and clinics is not acknowledged in site layouts.

**Source:** Based on C.O.N. Moser, 'Housing Policy: Towards a Gender Awareness Approach', Working Paper #71, Development Planning Unit, London, 1985.

67. International cooperation can also contribute to developing low cost technologies for urban needs and studying ways of meeting the housing needs of women. (See Box 9-4.)

68. Many technical agencies within the UN system have the appropriate knowledge bases to play a valuable role in advising and supporting governments, notably the UN Centre for Human Settlements (UNCHS, or Habitat). They should identify the information and guidelines that city governments need and the form in which it can be made accessible and usable by them. This could be patterned, for example, upon the ongoing efforts to prepare guidebooks for community workers on identifying disease vectors and mobilizing communities to deal with them, and on interventions to promote child survival and health. More generally, Habitat can strengthen international cooperation at the global level, as in the UN *International Year of Shelter for the Homeless*. The capacity of the UN system to provide leadership on human settlements issues through Habitat needs to be strengthened.

---

## Footnotes

1/ This chapter draws heavily on four background papers prepared for WCED: I. Burton, 'Urbanization and Development', 1985; J.E. Hardoy and D. Satterthwaite, 'Shelter, Infrastructure and Services in Third World Cities', 1985 (printed in **Habitat International**, Vol. 10, No. 4, 1986); J.E. Hardoy and D. Satterthwaite, 'Rethinking the Third World City, 1986; and I. Sachs, 'Human Settlements: Resource and Environmental Management', 1985.

2/ See J. Jacobs, **Cities and the Wealth of Nations** (New York: Random House, 1984).

3/ UN, **The Growth in the World's Urban and Rural Population 1920-1980**, Population Studies No. 44 (New York: 1969); UN, **Urban, Rural and City Populations 1950-2000** (as assessed in 1978), Population Studies No. 68 (New York: 1980).

4/ The expansion of 'city' or 'metropolitan area' boundaries accounts for some of the

population growth in Table 9 2. The UN projections are based on extrapolating past trends. This method often provides a poor guide to future trends, especially long-term ones. But the data base with which to make better projections is not available.

5/ UNCHS (Habitat) position paper for October 1986 DAC meeting on Urban Development, OECD document DAC (86)47, 27 August 1986.

6/ Department of International Economic and Social Affairs, 'Urban and Rural Population Projections, 1984' (unofficial assessment), UN, New York, 1986.

7/ J.E. Hardoy and D. Satterthwaite, **Shelter: Need and Response; Housing, Land and Settlement Policies in Seventeen Third World Nations** (Chichester, UK: John Wiley & Sons, 1981). For the situation in Sao Paulo, See Jorge Wilhelm, 'Sao Paulo: Environmental Problems of the Growing Metropolis', submitted to WCED Public Hearings, Sao Paulo, 1985.

8/ J.E. Hardoy and D. Satterthwaite, 'Third World Cities and the Environment of Poverty', **Geoforum**, Vol. 15, No. 3, 1984. See also World Social Prospects Association, **The Urban Tragedy** (Geneva: UNITAR, 1986).

9/ See Osvaldo Sunkel, 'Debt, Development and Environment', submitted to WCED Public Hearings, Sao Paulo, 1985; Ricardo Jordan S., 'Population and the Planning of Large Cities in Latin America', paper submitted to the International Conference on Population and the Urban Future, Barcelona, Spain, 19-22 May 1986.

10/ G. Scimemi, 'Cita e Ambiente', DAEST, Instituto Universitario di Architettura, Venezia, 1987. See also, **The State of the Environment in OECD Member Countries** (Paris: OECD, 1979 and 1985).

11/ I. Scott, **Urban and Spatial Development in Mexico** (London: Johns Hopkins University Press, 1982).

12/ See Chapter 8 in J.E. Hardoy and D. Satterthwaite (eds.), **Small and Intermediate Urban Centres; Their role in Regional and National Development in the Third World** (London: Hodder and Stoughton, 1986).

13/ UNCHS, 'Habitat Hyderabad Squatter Settlement Upgrading Project, India', project monograph produced for the International Year of Shelter for the Homeless, Nairobi, 1986

14/ J. M. Kalbermatten et al., **Appropriate Technology for Water Supply and Sanitation; a Summary of Technical and Economic Options** (Washington DC: World Bank, 1980).

15/ D. Silk, 'Urban Agriculture', prepared for WCED, 1986.

16/ N. Khouri-Dagher, 'Waste Recycling: Towards Greater urban Self-Reliance', prepared for WCED, 1985.

17/ See draft annotated agenda for October 1986, DAC Meeting on Urban Development. OECD document DAC (86)15. The World Bank definition of urban development assistance was used, which includes fostering urban efficiency and alleviating poverty, shelter, urban transport, integrated urban development, and regional development on secondary cities.

# **Our Common Future, Chapter 10: Managing The Commons**

## ***I. Oceans: The Balance of Life***

- 1. The Balance Under Threat***
- 2. Oceans Management***

## ***II. Space: A Key to Planetary Management***

- 1. Remote Sensing from Space***
- 2. The Geosynchronous Orbit***
- 3. The Pollution of Orbital Space***
- 4. Nuclear Power in Orbit***
- 5. Towards a Space Regime***

## ***III. Antarctica: Towards Global Cooperation***

- 1. Guard Present Achievements***
- 2. Anticipate Pressures for Mineral Development***
- 3. Promote Evolution of Antarctic Treaty System***
- 4. Establish a Means for More Effective Communication***

1. The traditional forms of national sovereignty are increasingly challenged by the realities of ecological and economic interdependence. Nowhere is this more true than in shared ecosystems and in 'the global commons' - those parts of the planet that fall outside national jurisdictions. Here, sustainable development can be secured only through international cooperation and agreed regimes for surveillance, development, and management in the common interest. But at stake is not just the sustainable development of shared ecosystems and the commons, but of all nations whose development depends to a greater or lesser extent on their rational management.

2. By the same token, without agreed, equitable, and enforceable rules governing the rights and duties of states in respect of the global commons, the pressure of demands on finite resources will destroy their ecological integrity over time. Future generations will be impoverished, and the people who suffer most will be those who live in poor countries that can least assert their own claims in a free-for-all.

3. Management of the various commons - the oceans, outer space, and Antarctica - is at different stages of evolution, as is the very 'commonality' of these areas. In the *Law of the Sea*, the international community has developed one of the most ambitious and advanced of international conventions ever for the seas and the sea-bed. But a few countries have so far declined to adhere to the multilateral regime that had been the subject of protracted global negotiations, and this is blocking implementation of certain key aspects. Boundaries have been drawn on the oceans to separate the common seas from national Exclusive Economic Zones (EEZs), but as the common and claimed waters form interlocked ecological and economic systems, and as the health of one depends on the health of the other, both are discussed in this chapter. As for outer space, the least tapped global commons, discussion of joint management has only just begun. Antarctica has been covered for over a quarter of a century by a binding Treaty. Many states that are not party to it feel they should by right have a stake in the management of what they see as a part of the global commons.

## **I. Oceans: The Balance of Life**

4. In the Earth's wheel of life, the oceans provide the balance.<sup>/1</sup> Covering over 70 per cent of the planet's surface, they play a critical role in maintaining its life-support systems, in moderating its climate, and in sustaining animals and plants, including minute, oxygen-producing phytoplankton. They provide protein, transportation, energy, employment, recreation, and other economic, social, and cultural activities.

5. The oceans also provide the ultimate sink for the by-products of human activities. Huge, closed septic tanks, they receive wastes from cities, farms, and industries via sewage outfalls, dumping from barges and ships, coastal run-off, river discharge, and even atmospheric transport. In the last few decades, the growth of the world economy, the burgeoning demand for food and fuel, and accumulating discharges of wastes have begun to press against the bountiful limits of the oceans.

6. The oceans are marked by a fundamental unity from which there is no escape, interconnected cycles of energy, climate, marine living resources, and human activities move through coastal waters, regional seas, and the closed oceans. The effects of urban, industrial, and agricultural growth are contained within no nation's Exclusive Economic Zone; they pass through currents of water and air from nation to nation, and through complex food chains from species to species, distributing the burdens of development, if not the benefits, to both rich and poor.

7. Only the high seas outside of national jurisdiction are truly 'commons'; but fish species, pollution, and other effects of economic development do not respect these legal boundaries. Sound management of the ocean commons will require management of land-based activities as well. Five zones bear on this management: inland areas, which affect the oceans mostly via rivers; coastal lands - swamps, marshes, and so on - close to the sea, where human activities can directly affect the adjacent waters; coastal waters - estuaries, lagoons, and shallow waters generally - where the effects of land-based activities are dominant; offshore waters, out roughly to the edge of the continental shelf; and the high seas, largely beyond the 200-mile EEZs of coastal states' control.

8. Major fisheries are found mostly in offshore waters, while pollution affecting them comes mostly from inland sources and is concentrated in coastal waters. Formal international management is essential in the areas beyond the EEZs, although greater international cooperation, including improved frameworks to coordinate national action, is needed for all areas.

## 1. The Balance Under Threat

9. Today, the living resources of the sea are under threat from overexploitation, pollution, and land-based development. Most major familiar fish stocks throughout the waters over the continental shelves, which provide 95 per cent of the world's fish catch, are now threatened by overfishing.

10. Other threats are more concentrated. The effects of pollution and land development are most severe in coastal waters and semi-enclosed seas along the world's shore-lines. The use of coastal areas for settlement, industry, energy facilities, and recreation will accelerate, as will the upstream manipulation of estuarine river systems through dams or diversion for agriculture and municipal water supplies. These pressures have destroyed estuarine habitats as irrevocably as direct dredging, filling, or paving. Shore-lines and their resources will suffer ever increasing damage if current, business-as-usual approaches to policy, management, and institutions continue.

The world's environmental problems are greater than the sum of those in each country. Certainly, they can no longer be dealt with purely on a nation-state basis. The World Commission on Environment and Development must strike at this fundamental problem by recommending specific ways for countries to cooperate to surmount sovereignty, to embrace international instruments in order to deal with global threats. The growing trend towards isolationism demonstrates that the current rhythm of history is out of harmony with human aspirations, even with its chances for survival.

The challenge ahead is for us to transcend the self-interests of our respective nation-states so as to embrace a broader self-interest -- the survival of the human species in a threatened world.

Hon. Tom McMillan  
Minister of Environment, Government of Canada  
WCED Public Hearing  
Ottawa, 26-27 May 1986

11. Certain coastal and offshore waters are especially vulnerable to ecologically insensitive onshore development, to competitive overfishing, and to pollution. The trends are of special concern in coastal areas where pollution by domestic sewage, industrial wastes, and pesticide and fertilizer run-off may threaten not only human health but also the development of fisheries.

12. Even the high seas are beginning to show some signs of stress from the billions of tons of contaminants added each year. Sediments brought to the oceans by great rivers such as the Amazon can be traced for as much as 2,000 kilometres out to sea.<sup>/2</sup> Heavy metals from coal-burning plants and some industrial processes also reach the oceans via the atmosphere. The amount of oil spilled annually from tankers now approaches 1.5 million tons.<sup>/3</sup> The marine environment, exposed to nuclear radiation from past nuclear weapons tests, is receiving more exposure from the continuing disposal of low-level radioactive wastes.

13. New evidence of a possible rapid depletion of the ozone layer and a consequent increase in ultraviolet radiation poses a threat not only to human health but to ocean life. Some scientists



believe that this radiation could kill sensitive phytoplankton and fish larvae floating near the ocean's surface, damaging ocean food chains and possibly disrupting planetary support systems./4

14. High concentrations of substances such as heavy metals, organochlorines, and petroleum have been found on the oceans' surface. With continued accumulation, these could have complex and long lasting effects./5 The sea-floor is a region of complex physical, chemical, and biological activity where microbial processes play a major role, but as yet serious damage is known to have occurred only in very localized regions. Although these findings are encouraging, given accelerating pressures and the inadequacy of present data, they provide no grounds for complacency.

## **2. Oceans Management**

15. Looking to the next century, the Commission is convinced that sustainable development, if not survival itself, depends on significant advances in the management of the oceans. Considerable changes will be required in our institutions and policies and more resources will have to be committed to oceans management.

16. Three imperatives lie at the heart of the oceans management question:

- The underlying unity of the oceans requires effective global management regimes.
- The shared resource characteristics of many regional seas make forms of regional management mandatory.
- The major land-based threats to the oceans require effective national actions based on international cooperation.

17. Mutual dependence has increased in recent years. The *Law of the Sea Convention*, with the establishment of the 200-mile EEZs, has put an additional 35 per cent of the oceans surface under national control with regard to management of natural resources. It has also provided an institutional setting that could lead to better management of these areas, given that single governments may be expected to manage more rationally resources over which they have sole control. However, this expectation ignores the realities of short sighted political and economic goals.

18. An international ecosystem approach is required for the management of these resources for sustained use. Significant gains have been made in past decades, nationally and internationally, and many essential components have been put in place. But they do not add up to a system that reflects the imperatives mentioned above. Where the EEZs of several states come together in semi-enclosed or regional seas, integrated management requires varying degrees of international cooperation, such as joint monitoring and research on migratory species and measures to combat pollution and regulate actions whose effects reach across boundaries.

19. When it comes to the high seas beyond national jurisdiction, international action is essential. The sum of the multiple conventions and programmes now in place do not and cannot represent such a regime. Even the separate UN programmes cannot easily be coordinated, given the structure of the United Nations./6

20. The Commission believes that a number of actions are urgently needed to improve regimes for oceans management. Thus the Commission proposes measures to:

- strengthen capacity for national action, especially in developing countries;
- improve fisheries management;
- reinforce cooperation in semi-enclosed and regional seas;
- strengthen control of ocean disposal of hazardous and nuclear wastes; and
- advance the *Law of the Sea*.

## **2.1 National Action**

21. Coastal governments should launch an urgent review of the legal and institutional requirements for integrated management of their EEZs, and of their roles in arrangements for international cooperation. This review should be undertaken within the framework of a clear statement of national goals and priorities. Reducing overexploitation of fisheries in coastal and offshore waters might be one such goal. The rapid clean-up of municipal and industrial pollution discharging into critical marine habitats could be another. Others might include strengthening national research and management capacity, and producing an inventory of coastal and marine resources.

22. Given the increased pressures on coastal and marine resources projected through the year 2000, all coastal states should have a complete inventory of these assets. Drawing on senior experts from national and international agencies, nations could deploy the latest satellite mapping and other techniques to put together an inventory of these resources and then monitor changes in them.

23. Many developing countries will require assistance to strengthen their legal and institutional frameworks needed for integrated management of coastal resources. Many small island and maritime developing countries lack the economic or military means to prevent the exploitation of their coastal resources or the pollution of their waters by powerful countries or companies. This has become a major concern in the Pacific in particular, and threatens the political stability of the region. International development banks and development assistance agencies should establish programmes to support the development of this Institutional capacity.

## **2.2 Fisheries Management**

24. World fisheries have been expanding since the Second World War, with the global catch rising at a steady 6-7 per cent annually from 20 million to 65 million tons between 1950 and 1969. But after 1970, as more and more stocks were depleted, the average annual growth in catches fell to only about 1 per cent. (See Table 10-1.) With conventional management practices, the growth era in fisheries is over. Even assuming restored productivity in now depleted stocks, and an increased harvest from underutilized fisheries, FAO sees only a gradual increase in catches, perhaps rising from current levels of over 80 million tons to about 100 million. This does not augur well for future food security, especially in low-income countries where fish are a principal source of animal protein and where millions secure their livelihoods from fisheries activities./7

25. Overexploitation threatens many stocks as economic resources. Several of the world's largest fisheries - the Peruvian anchoveta, several North Atlantic herring stocks, and the

Californian sardine - have collapsed following periods of heavy fishing. In some of the areas affected by these collapses, and in other rich fisheries such as the Gulf of Thailand and off West Africa, heavy fishing has been followed by marked changes in species composition.<sup>8</sup> The reasons for these changes are not well understood, and more research is needed into the responses of marine resources to exploitation so that managers can receive better scientific advice. Greater support for such work is urgently needed, and this support must include additional assistance to developing countries in increasing their research capacity and their knowledge of their own resources.

26. One factor leading to the establishment of extended EEZs was the concern of coastal states, both industrialized and developing, over the depletion of fisheries off their coasts. A large number of conventions had been established covering most major fisheries, but they proved inadequate in most cases. Participating countries were in general unable to overcome the difficulties of allocating shares to limited common resources. Improved management was seen as an urgent need, and open access was perceived as the main obstacle to it.

27. The advent of extended EEZs under the Law of the Sea Convention was expected to solve or at least alleviate the problem. Coastal states were required to introduce effective conservation and management of the living resources in their EEZs. They could also control the activities of foreign fishermen and develop their own fisheries.

28. Industrial countries have been much more successful in doing this than developing countries. In the north-west Atlantic, the annual catch by long-range fleets has declined from over 2 million tons before 1974 to around a quarter of a million tons in 1983, and the share of the catch taken by the United States and Canada has risen from under 50 per cent to over 90 per cent.

**Table 10-1**

**World Fish Catch in Major Fisheries, 1979-84**

Region	1979	1980	1981	1982	1983	1984
	(thousand tons)					
North Atlantic	14,667	14,676	14,489	13,597	13,891	13,940
North Pacific	20,303	20,733	21,908	22,603	23,666	26,416
Central Atlantic	6,064	6,867	6,833	7,239	7,210	1,164
Central Pacific	7,536	7,910	6,478	8,175	7,648	8,531
Indian Ocean	3,541	3,693	3,728	3,852	4,061	4,362
South Atlantic	4,420	3,895	4,037	4,340	4,314	3,957
South Pacific	7,242	6,619	7,240	8,328	6,724	8,684
Inland	7,240	7,603	8,138	8,455	9,131	9,716
Total*	71,014	71,996	74,850	76,590	76,846	82,770

Developed	37,143	38,234	38,890	39,265	37,991	42,412
Developing	33,871	33,758	35,961	37,326	36,655	40,358
Developing countries catch as per cent of world total	47.7	46.9	48.0	48.7	48.0	46.6

\* Columns do not add to totals due to rounding.

**Source:** Based on data in FAO, **Yearbooks of Fishery Statistics** (Rome: 1979-84).

29. Yet long-range industrial fishing fleets still catch about 5 million tons annually in developing regions. Off West Africa, for example, over half the total catch is still taken by such fleets.<sup>9</sup> This is due partly to the fact that many of the biggest resources lie off thinly populated areas - the western edge of the Sahara and off Namibia. But it is also due to the common lack of locally available capital, and to a shortage of local expertise in many technical aspects of fisheries, especially processing and marketing.

30. Coastal developing countries can usually obtain some modest revenue in the form of licence fees, but this represents only a fraction of what they could earn from a full national use of the resource. Another 10-15 million tons of so far underutilized or unexploited resources could be added to the existing fisheries off their coasts.<sup>10</sup> There is a pressing need for these resources to be managed sustainably, for the benefit of developing countries and in ways that help to meet global nutritional needs.

The opinion of the public is what you see here in this room. You see important leaders from all over Brazil, from all over the country that have come here, from the rubberman that was under a palmtree yesterday and was here speaking to the U.N. Commission and leaders that are independent. The Brazilian population yearned to have someone to speak to. Someone who will listen, who will not sort of mystify things, and someone who will not trick them. So there is an enormous expectation with regards to the seriousness of your Commission.

Randau Marques  
Journalist  
WCED Public Hearing  
Sao Paulo, 28-29 Oct 1985

31. Whaling offers another example. Recognizing that the history of whaling up to the 1960s was that of overexploitation, the International Whaling Commission (IWC), the main international body regulating whaling, has taken a series of conservation measures since the early 1970s and now all stocks that are below a certain level have been classified as protected from commercial whaling.

32. In its early days, the IWC was dominated by whaling nations. After 1979, non-whaling nations became an increasingly significant majority of the membership. This change was reflected in the IWC's decisions, which increasingly opted in cases of scientific doubt for a cautious approach and the reduction of catch levels or the cessation of whaling altogether on certain stocks.

33. This trend culminated in the moratorium decision of 1982. Members have the right to object and continue commercial whaling or to catch whales for scientific purposes. There is a strongly held view in conservation circles that whaling for scientific purposes can be used as a loophole by whaling nations. Permissions for such hunting should be stringently applied by IWC members, or the IWC's credibility will be undermined.

34. An important political factor in recent developments has been the ability of the U.S. Government to invoke legislation that enables contracts for fishing in U.S. waters to be withheld from nations that undermine marine conservation agreements. The value of such fishery concessions is large and the legislation has significant political and economic leverage. Another important factor has been the strength of the NGOs in organizing support for anti-whaling actions, lobbying governments and organizing boycotts of fish and other products from whaling nations.

35. By early 1987, whaling was restricted to scientific catches by Iceland and the Republic of Korea and to a small catch by Norway, which continued to object to the moratorium, but which planned to halt its commercial whaling following the 1967 season. And there were catches by Japan and the Soviet Union. The Soviet Union had indicated it would observe the moratorium after the 1987 Antarctic season, and Japan had withdrawn its objection to the moratorium with effect from 1988. However, Japan may continue whaling for scientific purposes.<sup>11</sup> In addition, some whaling was being performed by native peoples in the Soviet Union and Alaska.

36. If the moratorium is observed and whaling for scientific purposes is not abused, commercial whaling will no longer be a major threat to the conservation of whale stocks taken as a whole. The annual rate of increase of these stocks, however, is unlikely to exceed a few per cent. Thus substantial whale populations will probably not be observed much before the second half of the next century.

### **2.3 Cooperation on Regional Seas**

37. A large number of agreements have been entered into on regional seas. The Commission has not attempted to evaluate them all, but given the Commission's origin in the UNEP Governing Council and the General Assembly resolution, it has given special attention to UNEP's Regional Seas Programme. This programme now brings together over 130 states bordering 11 different shared seas around the world, states that have an interest in cooperating for their own and mutual benefit.

38. UNEP provides the initial impetus by bringing governments together to develop a flexible legal framework within which further agreements can be negotiated as needs require and politics allow. UNEP also provides some initial seed money for programme development, but the governments of the region themselves are meant to take over funding and management, drawing on the technical advice of UN and other agencies. The result is a gradually evolving action-oriented programme rooted in the needs of the regions as perceived by the governments concerned. Fourteen UN agencies and over 40 international and regional organizations participate in the worldwide programme.

39. The political strategy behind the programme' and the requirement that management and financing be undertaken by the participating countries have clearly been crucial to its success. But it is one thing to contribute a few million dollars for research, and quite another to incorporate the resulting findings into land-based development plans and to enforce strong pollution control programmes. The massive U.S.-Canadian clean up of the Great Lakes over the

past 15 years cost \$8.85 billion for partial treatment of municipal and industrial wastes.<sup>/12</sup> Huge investments will also be required to roll back land-based pollution along UNEP's regional seas. Yet nowhere have the sums been committed under agreed schedules to construct the necessary urban and industrial pollution control systems and to underwrite policies to control agricultural run-off. The programme now has to confront the regional seas challenge through the year 2000 - moving beyond general agreement on goals and research to a solid schedule of investment on a scale that will make a difference.

## 2.4 Measures to Control Ocean Disposal of Waste

40. The *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter* (London Dumping Convention), which has world-wide application, was concluded in November 1972 and entered into force on 30 August 1975.<sup>/13</sup> Its political evolution parallels that of the International Whaling Commission. Initially, it consisted largely of dumping states, but non-dumping states are now in the majority. At present it has 61 contracting parties, and secretariat facilities are provided by the International Maritime Organization. The dumping of wastes is regulated by the three annexes to the Convention:<sup>/14</sup> on extremely dangerous substances including high-level radioactive wastes, the dumping of which is prohibited, (*Annex I*); on somewhat less noxious substances, the dumping of which can be permitted only by 'prior special permit' (*Annex II*); and all other substances, which can be dumped only after a general permit has been obtained from national authorities (*Annex III*). Although the Convention applies to all wastes dumped deliberately at sea, the ocean disposal of radioactive wastes has attracted the most attention. It is this question that the Commission considers here.

41. Prior to 1963, the United Kingdom, Switzerland, Belgium, and the Netherlands had been dumping low-level wastes regularly at the north-east Atlantic dumpsite in international waters off the coast of Spain. Despite protests from representatives of these nations at the London Dumping Convention meeting that they would ignore a moratorium resolution on low-level wastes and carry out dumping during 1983, a de facto moratorium - which all countries honour but to which some have not formally agreed - went into and remains in effect. Under it, no disposal should take place until it can be demonstrated that it is environmentally safe.

42. In 1985, the London Dumping Convention voted to extend indefinitely the moratorium on the ocean dumping of low-level radioactive wastes.<sup>/15</sup> As a result, the burden of proof that such activities are safe was effectively reversed, being put on those nations who want to dump. This revolutionary reversal, though not binding, reflects the changed composition of the London Dumping Convention.

43. In 1986, the London Dumping Convention established an intergovernmental panel of experts to examine the issue of comparative risks of land- and sea-based options for disposal of radioactive waste. Without prejudging this assessment, the Commission would urge all states to continue to refrain from disposing of either low or high- level wastes at sea or in the sea-bed. Moreover, it would seem prudent to anticipate continuing opposition to sea dumping and to actively pursue the siting and development of environmentally safe, land based methods of disposal.

Why must we gamble with the lives of innocent children in order to generate plutonium for bombs? Even to contemplate dumping radioactive waste in waters that belong to all of us as part of our global heritage is an outrage. For us to make such important decisions on behalf of future generations without taking into

account the morality of using international waters as an exclusive rubbish bin is an arrogant act.

Peter Wilkinson  
Greenpeace  
WCED Public Hearing  
Oslo, 24-25 June 1985

44. Several other conventions regulate the dumping of wastes in the north-east Atlantic and North Sea, the Mediterranean Sea, and the Baltic Sea. Most of the Regional Seas Conventions also include a general provision calling on contracting parties to take all appropriate measures to prevent and reduce pollution caused by dumping.

45. Land-based sources of nuclear waste have become significant in the North Sea, where high levels of radioactivity have been found in fish, and could threaten other seas.<sup>/16</sup> The *Convention for the Prevention of Marine Pollution from Land Based Sources* (Paris Convention) was ratified in 1978 by eight states and the European Economic Community. While it has achieved some international cooperation, its silence on nuclear plants and its acceptance of the 'best available technology' principle in determining permitted levels of radioactive discharges clearly needs to be reviewed.

46. The *Law of the Sea Convention* requires states to establish national laws and regulations to 'prevent, reduce and control pollution of the marine environment from dumping'. It also requires express prior approval by the coastal state for dumping in the territorial sea, in the EEZs, and onto the continental shelf. The legislative history of this Article indicates that coastal states have not only the right to act but a duty to do so. States also have an obligation under the Law of the Sea to ensure that their activities do not injure the health and environment of neighbouring states and the commons.

47. The Commission encourages the *London Dumping Convention* to reaffirm the rights and responsibilities of states to control and regulate dumping within the 200-mile EEZ. It is urgent that they do so, as oceans and food chains respect no boundaries.

48. Moreover, all states should undertake to report releases of toxic and radioactive substances from land-based sources into any body of water to the appropriate Convention Secretariat so that they may begin to report on the aggregate releases into various seas. Competent authorities must be designated to keep records of the nature and quantities of wastes dumped. Beyond that, regional institutions should forward this information to the London Dumping Convention Secretariat.

## **2.5 The Law of the Sea**

49. The United Nations Conference on the *Law of the Sea* was the most ambitious attempt ever to provide an internationally agreed regime for the management of the oceans. The resulting Convention represents a major step towards an integrated management regime for the oceans. It has already encouraged national and international action to manage the oceans.<sup>/17</sup>

50. The Convention reconciled widely divergent interests of states, and established the basis for a new equity in the use of the oceans and their resources. It confirmed that coastal states are empowered to exercise sovereignty over their territorial sea, sea-bed and subsoil, and the superjacent air space, up to a distance of 12 nautical miles. It redefined the rights of coastal



states concerning the continental shelf. It established Exclusive Economic Zones of up to 200 nautical miles within which the coastal state may exercise sovereign rights with regard to the management of national resources, living and non-living, in the waters, sea bed, and subsoil.

51. The Convention removed 35 per cent of the oceans as a source of growing conflict between states. It stipulates that coastal states must ensure that the living resources of the EEZs are not endangered by overexploitation. Thus, governments now have not only the legal power and the self-interest to apply sound principles of resource management within this area, but they have an obligation to do so. The Convention calls for regional cooperation in formulating and implementing conservation and management strategies for living marine resources, including cooperation in the exchange of scientific information, the conservation and development of stocks, and the optimum use of highly migratory species.

52. Similarly, coastal states now have a clear interest in the sound management of the continental shelf and in the prevention of pollution from land- and sea-based activities. Under the Convention, coastal states may adopt laws and regulations for their EEZs compatible with international rules and standards to combat pollution from vessels.

53. The Convention also defines the waters, sea bed, and subsoil beyond the limits of national jurisdiction, and recognizes this as international. Over 45 per cent of the planet's surface, this sea-bed area and its resources are declared to be the 'common heritage of mankind', a concept that represents a milestone in the realm of international cooperation. The Convention would bring all mining activities in the sea-bed under the control of an International Seabed Authority.

54. By early 1987, the Convention had been signed by 159 nations, and 32 countries had ratified it. However, a small number of significant states had indicated that they were unlikely to ratify it.<sup>18</sup> The reasons for this rest largely with the regime proposed to manage the common sea bed.

55. Despite this, many of the Convention's other provisions have been broadly accepted and have already entered into international law and practice in various ways. This process should be encouraged, especially as regards those provisions that relate to the environment. This Commission believes that the Convention should be ratified by the major technological powers and come into force. Indeed, the most significant initial action that nations can take in the interests of the oceans' threatened life-support system is to ratify the Law of the Sea Convention.

## **II. Space: A Key to Planetary Management**

56. Outer space can play a vital role in ensuring the continued habitability of the Earth, largely through space technology to monitor the vital signs of the planet and aid humans in protecting its health. According to the 1967 Outer Space Treaty, outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use of occupation, or by any other means. The UN Committee on the Peaceful Uses of Outer Space has been labouring to see that these ideals remain on the agenda. This Commission, in view of these developments, considers space as a global commons and part of the common heritage of mankind.

57. The future of the space as a resource will depend not so much on technology as on the slow and difficult struggle to create sound international institutions to manage this resource. It will depend most of all upon humanity's ability to prevent an arms race in space.

## 1. Remote Sensing from Space

58. If humanity is going to respond effectively to the consequences of changes human activity has induced - the build-up of atmospheric carbon dioxide, depletion of stratospheric ozone, acid precipitation, and tropical forest destruction - better data on the Earth's natural systems will be essential.

59. Today several dozen satellites contribute to the accumulation of new knowledge about the Earth's systems: for example, about the spread of volcanic gases, enabling scientists for the first time to describe the specific links between a major natural disturbance of the upper atmosphere and changes in the weather thousands of miles away./19

60. Satellites also played a key scientific role after the 1986 discovery of a 'hole' in the ozone layer over Antarctica. When ground-based observers noted this phenomenon, archived satellite data were examined and provided a record of seasonal ozone fluctuation extending back nearly a decade./20 And scientists have been able to follow closely the unfolding of the drought in the Sahel region of Africa in the 1980s. Satellite-generated maps correlating rainfall patterns and biomass have served as a tool in understanding droughts and helped in the targeting of relief aid.

We need a kind of new earth/space monitoring system. I think that it goes farther than simply an earth environmental system. It's a combined earth/space monitoring system, a new agency that would have the resources to be able to monitor, report, and recommend in a very systematic way on the earth/space interaction that is so fundamental to a total ecological view of the biosphere.

Maxwell Cohen  
University of Ottawa  
WCED Public Hearing  
Ottawa, 26-27 May 1986

61. Recently, an international and interdisciplinary group of scientists has proposed a major new initiative - the International Geosphere-Biosphere Programme (IGBP) to be coordinated through ICSU. It would investigate the biosphere using many technologies, including satellites. This proposal seemed in 1987 to be gaining momentum; it was already influencing the budget decisions of several nations on allocations for future satellite launches and is increasing coordination between existing efforts.

62. The primary frustration about this wealth of data is that the information is dispersed among governments and institutions, rather than being pooled. UNEP's Global Environment Monitoring System is a modest effort to pool space data relevant to the Earth's habitability. It should be strengthened. But most such efforts are underfunded, undercoordinated, and inadequate to the tasks.

63. The primary responsibility for action rests initially with national governments, cooperating to pool, store and exchange data. In time, international efforts might be funded through some direct global revenue source or through contributions from individual nations. (See *Chapter 12.*)

## 2. The Geosynchronous Orbit

64. From an economic point of view, the most valuable part of the Earth's orbital space is the geosynchronous orbit, a band of space 36,000 kilometres, above the equator.<sup>/21</sup> Most communication and many weather satellites - as well as many military orbits - are in geosynchronous orbit. To prevent signals to and from the satellites interfering with one another, satellites must be placed some distance apart, effectively limiting the number that can use this valuable band to 180. Thus, the geosynchronous orbit is not only a valuable but also a scarce and limited global resource.

65. The growth in satellite communication traffic during the 1970s led to many predictions that slots would soon be saturated. Thus conflict emerged over the use and ownership of the geosynchronous orbit, largely between industrial nations that have the capacity to put satellites in this orbit and the equatorial developing nations that do not but that lie beneath this band of space.

66. The first effort to devise a property regime for geosynchronous orbit was the 1976 Bogota Declaration, signed by seven equatorial countries.<sup>/22</sup> These countries declared that the orbits above them were extensions of their territorial airspace. The Bogota Declaration has been challenged by some nations that see it as contradicting the 'non-appropriation' principle of the *Outer Space Treaty*. Another group of developing countries proposed a licensing system for the use of geosynchronous orbits.<sup>/23</sup> Countries would be awarded slots that could then be sold, rented, or reserved for future use.

67. Another way of managing this resource and capturing its rental value for the common interest would be for an international body to own and license the slots to bidders at an auction. Such an alternative would be analogous to the Seabed Authority in the *Law of the Sea Convention*.

66. Industrial countries have opposed the creation of a property rights regime for geosynchronous orbit, especially a regime that granted rights to slots to countries that cannot now use them. They argue that a regime of prior allocation would drive up costs and reduce the incentive of the private sector to develop and use this orbit. Others, who see a rapidly growing role for satellite communications, argue that regulatory regimes should be established before competition makes such a step more difficult.

69. Since satellite communications involve the use of radio waves, a de facto regime for the parcelling out of slots in geosynchronous orbit has emerged through the activities of the International Telecommunications Union (ITU) in the past several years. The ITU allocates the use of the radio waves (those parts of the electromagnetic spectrum used for communication).<sup>/24</sup> The highly technical character of the task of parcelling out radio waves, combined with the fact that strict compliance is necessary to allow any user to enjoy access to this resource, has produced a successful international resource regime, based on three regional conferences, for effective management of the resource.<sup>/25</sup> Whether this approach will endure depends in large part upon the perceived justice of the decisions reached by the regional conferences.

## 3. The Pollution of Orbital Space

70. Debris in orbit is a growing threat to human activities in space. In 1981, a panel of experts convened by the American Institute of Aeronautics and Astronautics concluded that the

growth of space debris could pose 'an unacceptable threat' to life in space within a decade.<sup>/26</sup> This debris consists of spent fuel tanks, rocket shells, satellites that no longer function, and shrapnel from explosions in space: it is concentrated in the region between 160 and 1,760 kilometres above the Earth.

71. With greater care in the design and disposal of satellites, much of it could be avoided. However, the creation of debris is an integral and unavoidable consequence of the testing and use of space weapons. The contribution of military activities to the Earth's 'debris belt' could grow greatly if plans to place large numbers of satellite based weapons and weapons-related sensors are realized.

72. The most important measure to minimize space debris, therefore, is to prevent the further testing and deployment of space based weapons or weapons designed for use against objects in space.

73. Clean up would be expensive. It has been proposed that the major powers lead an international effort to retrieve the larger pieces of space debris from orbit. Such work would involve the design, construction, and launch of vehicles that could manoeuvre in space and grapple with large, jagged, tumbling space objects. The proposal has elicited little enthusiasm.

#### **4. Nuclear Power in Orbit**

74. Many spacecraft are nuclear-powered and threaten contamination if they fall to the Earth.<sup>/27</sup> There are two basic approaches to the problem: Ban or regulate. The option of banning all radioactive materials from space is the simplest to enact. It would eliminate the problem and would also severely stunt the further development of space-based warfare systems. A total ban should exempt scientific uses in deep-space, as small amounts of fissionable materials have been essential for the powering of deep-space probes. A ban on reactors in space would be easy to monitor, because reactors produce waste heat detectable by infrared sensors at great distances. Verifying the absence of small nuclear power systems would be more difficult, but still possible.

75. A wide variety of methods are available for regulating the use of radioactive materials in space. The most important include limiting the size of reactors permitted in orbit, requiring shielding around radioactive material sufficient to withstand reentry into the Earth's atmosphere, and requiring deep space disposal of spacecraft that contain radioactive material. All are technologically feasible, but would add cost and complexity to missions. Nevertheless, these measures should be implemented, as a minimum step.

#### **5. Towards a Space Regime**

76. Soon after the aeroplane was invented, it became obvious that collisions would occur unless a general air traffic control regime was established. This model offers a useful way to think about the need for and contents of a space regime. The creation of 'rules of the road' for orbital space could ensure that the activities of some do not degrade the resource for all.

Utilization of spacecraft for solving the problems of forestry provides a good example of the peaceful use of space. Taking into account the interests of the present and future generations, there is no other more favourable area of space technology application than environmental protection, to study the natural

resources of Earth and control their rational utilization and reproduction. We think that in the forthcoming years international cooperation in this field will be further expanded.

L. E. Mikhailov  
USSR State Committee on Forestry  
WCED Public Hearing  
Moscow, 11 Dec 1986

77. Orbital space cannot be effectively managed by any one country acting alone. The inherently international character of orbital space has been recognized by a majority of nations in the *Outer Space Treaty*. The international community should seek to design and implement a space regime to ensure that space remains a peaceful environment for the benefit of all.

78. An essential step towards efficient management of the space resource is to abandon the notion that because outer space in general is unlimited, orbital space can absorb all human activity. Because of the speeds involved, orbital space is for practical purposes much 'closer' than the atmosphere. A system of space traffic control in which some activities were forbidden and others harmonized cuts a middle path between the extremes of a sole Space Authority and the present near anarchy.

79. The electromagnetic spectrum has been effectively regulated by international agreement, and through this regulation has begun to emerge the beginnings of a space regime for geosynchronous orbital space. An extension of this type of approach to control debris and the use of nuclear materials in orbit is the next logical step.

80. A fine balance must be struck between regulating activities too late and regulating non-existent activities too soon. Regulating activities on the Moon, for example, beyond the general principles laid out in the *Outer Space Treaty* is clearly premature. But regulating space debris and nuclear materials in Earth orbit is clearly overdue.

### **III. Antarctica: Towards Global Cooperation**

81. The Antarctic continent - larger than the United States and Mexico combined - for over a generation has been managed under a regime of multilateral cooperation that has secured environmental protection. Signed on 1 December 1959, the *Antarctic Treaty* has been the vehicle for a number of important initiatives in pursuit of its two primary objectives: to maintain Antarctica for peaceful uses only, prohibiting all military activities, weapons testing, nuclear explosions, and disposal of radioactive wastes; and to promote freedom of scientific investigation in Antarctica and international cooperation to that end./28

82. The fact that the 'question of Antarctica' is today on the UN agenda/29 indicates the reality that there is a debate in the international community over the future management of the continent. Under the combined pressures of economic, technological, environmental, and other trends, there are new initiatives to establish a regime for minerals exploitation. New questions about equitable management are presenting challenges that may reshape the political context of the continent within the next decade./30

83. During the forthcoming period of change, the challenge is to ensure that Antarctica is managed in the interests of all humankind, in a manner that conserves its unique environment, preserves its value for scientific research, and retains its character as a demilitarized, non-nuclear zone of peace.

84. Responsibility for guiding change at present rests initially with the countries party to the Antarctic Treaty./<sup>31</sup> Eighteen nations now enjoy full decision-making status under the Treaty, with these consultative parties exercising their rights and carrying out their obligations in peaceful cooperation despite their divergent views on the territorial claims to parts of the continent. An additional 17 nations have observer status at the biennial Antarctic Treaty System (ATS) meetings.

85. The *Antarctic Treaty* is open to accession by any state that is a member of the United Nations, and by others invited to accede. To become a Consultative Party, a state must demonstrate concrete interest in Antarctica by conducting substantial scientific research there. The Treaty nations feel that this system is applied flexibly and opens the Treaty to all nations with a genuine interest in Antarctica. Many developing nations without the resources to conduct research on the continent feel that this condition effectively excludes most of the world's nations./<sup>32</sup>

86. But the question of participation is not polarized between industrial and developing countries. Not all industrialized countries are members of the Treaty, and Argentina, Brazil, Chile, China, India, and Uruguay have consultative status under it, while several additional developing countries have acceded to it. However, the overwhelming majority of developing countries, including all those of Africa, remain outside the arrangements.

87. There is furthermore no general agreement as to whether Antarctica is part of the international commons. For example, seven states maintain territorial claims. Moreover, many developing countries reject the idea that what they regard as the common heritage of mankind should be managed by some countries to the exclusion of others. Many of them see the Antarctic Treaty System as the exclusive preserve of the rich and technologically advanced countries. Some object to what they consider the exclusivity of the Treaty system, with countries self-appointed to determine the future of the continent. Although the Consultative Parties assert that they have managed Antarctica in the interests of all peoples, several nations maintain that these interests should not be defined by the Consultative Parties alone; this view has gained many new sources of expression since 1959. Despite the present debate over the continent's future, many nations outside the Treaty have recognized the trusteeship role played by the Treaty nations in protecting the environment of Antarctica./<sup>33</sup>

88. The Commission does not propose to adjudicate the status of Antarctica. But it sees it as essential that the continent be managed and protected in a responsible manner that takes into account the common interests at stake, it notes also that the legal and management regimes are in the midst of a process of change leading to wider participation.

89. The Antarctic Treaty Consultative Parties have endeavoured to demonstrate a strong concern for the protection of the continent's environment and the conservation of its natural resources. (See Box 10-1.) In 1964, they adopted the '*Agreed Measures for the Conservation of Antarctic Fauna and Flora*'/<sup>34</sup> which amount to a conservation protocol to the Treaty. At subsequent biennial meetings, they have continued to develop environmental principles and measures to guide the planning and execution of their activities. Additional measures would improve the scope and effectiveness of environmental protection, and it would be useful to consider means to ensure that the record of compliance with these measures is widely known.

90. The Consultative Parties have also played a leading role in the promulgation of two important international conventions relating to conservation of living resources: the 1972 *Convention on the Conservation of Antarctic Seals* and the 1980 *Convention on the Conservation of Antarctic Marine Living Resources*./<sup>35</sup> The second arose out of concern that

the depletion of Antarctic fish stocks, particularly shrimp like krill, could have severe and unpredictable effects on related and dependent species. It adopts an 'ecosystem approach' to resource management./36

91. Taken together, these legal instruments and accompanying protocols and recommendations, along with the non governmental body the Scientific Committee on Antarctic Research (SCAR), constitute what is referred to as the Antarctic Treaty System. This system demonstrates the evolution that has taken place under the Antarctic Treaty since it entered into force.

92. Several international NGOs have begun to monitor the adequacy of and compliance with environmental protection and conservation measures in Antarctica and have frequently been critical of these measures. They have also sought observer status at ATS meetings and greater involvement in the formulation and review of Antarctic policies. Some UK agencies are concerned with southern hemisphere meteorology, oceanography, or fishing and have become involved in Antarctic science and politics. A concrete result of this interest has been invitations extended to WMO, FAO, IOC, IUCN, IWC, SCAR, and the Scientific Committee on Oceanic Research to attend as observers meetings of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). The European Economic Community is also a CCAMLR member as a result of its member states ceding competence to it with respect to fisheries management policies.

#### **Box 10-1**

##### **Antarctica's Unique Treaty Arrangements**

Under the *Antarctic Treaty*, the seven states claiming territory there have agreed with non-claimant parties to the Treaty to Bet aside the disputed territorial status of Antarctica in order to carry out agreed-upon activities in the area.

While the Treaty is in force, no acts or activities taking place will 'constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica', nor may any new claim, or enlargement of an existing claim, be asserted.

Decisions are taken by consensus, which guarantees to both claimant and non-claimant states that no activity or management practice prejudicial to their position on the territorial status of Antarctica will be approved. The Treaty provides for on-site inspection at any time in any or all areas of Antarctica by designated nationals of the consultative parties.

**Source:** Based on Lee Kimball, 'Testing the Great Experiment' **Environment**, September 1985.

93. For the ATS to remain viable into the next century, it will need to continue to evolve and adapt itself to deal with new issues and new circumstances. Although the Treaty could run indefinitely, in 1991 any of the Consultative Parties may call for a general conference of the signatory nations, to review its operation.

## **1. Guard Present Achievements**



94. Although further change in the management status of Antarctica is inevitable, it is essential that such change not jeopardize the achievements of the Treaty System in the areas of peace, science, conservation, and environment. Antarctica has been an agreed zone of peace for nearly 30 years, free of all military activities, nuclear tests, and radioactive wastes. This is a foundation on which humanity must build.

95. Cooperation in scientific investigation has steadily expanded; it must be further strengthened, especially concerning Antarctica's role in global atmospheric and oceanic circulation and world climate. At the same time, more efforts should be made to secure full participation in such research. Means must be found to expand consultation and participation and to extend the benefits of international cooperation in Antarctic science and technology to the international community as a whole.

The most cruel environmental threat comes from the environmental movement itself as we see the animal rights laws systematically destroy our way of life and violate our right as aboriginal peoples to our traditions and values. Yet our people, including the Arctic people, need development. The challenge is to find strategies for development that meet the needs of the people and the environment.

Rhoda Inuksu  
Inuit Indian  
WCED Public Hearing  
Ottawa, 26-27 May 1986

96. Several suggestions along these lines have been made. They include establishing a fund to facilitate the participation of interested developing countries in Antarctic science, and inviting more scientists from developing nations to join projects and visit scientific stations. Given the costly technologies involved in Antarctic science, possibilities should be explored for sharing Antarctic base and logistics capabilities with interested non-consultative states. The right to consultative status could be extended to states participating in scientific activities on a joint basis.

97. As Antarctic activities multiply, sound conservation will also require increased data collection, monitoring, and environmental assessment. The interactive and cumulative effects of these projects must be carefully reviewed and areas of unique scientific and environmental value protected.

## **2. Anticipate Pressures for Mineral Development**

98. Minerals of various kinds are known to exist in Antarctica, but the minerals talks have triggered false assumptions about the imminence of their development. Even given the most optimistic growth trends, it seems clear that more accessible sources will be developed elsewhere long before Antarctica attracts major investment. Only two minerals have been found that might exist in concentrations suitable for exploitation - coal in the Transantarctic Mountains and iron in the Prince Charles Mountains. Mining them would be a fool's venture.<sup>/37</sup> The costs would be prohibitive, and sufficient coal and iron can be found closer to the main markets.

99. Circumstantial evidence suggests the existence of offshore oil and gas, but no deposits have yet been discovered. The USSR, Japan, France, the United Kingdom, and the Federal Republic

of Germany have surveyed Antarctica's continental shelves. The surveys were of a scientific nature, but, coinciding as they did with the first serious discussions of a minerals regime, were viewed by some observers as signalling commercial interests.

100. The 18 Consultative Parties are conducting negotiations among themselves to complete an agreed legal framework for determining the environmental acceptability of possible minerals exploration and development in Antarctica and to govern any such activities.<sup>/38</sup> Treaty members felt that it would be more difficult to agree on such a regime after actual finds have been made. The negotiations in many ways are an expression of the idea that prevention is better than cure, forethought preferable to afterthought.

101. Antarctica is an enormous continent where claims to sovereignty are in dispute and where there are no agreed legal bases for issuing licences, leasing or selling mineral rights, or receiving royalty payments. These delicate questions have now been raised and will not lie silent until they have been answered within an internationally agreed framework. Until these matters are resolved, and protection of the Antarctic environment is assured, it seems unlikely that any nation or group of nations will be able to invest securely in developing the continent's mineral resources.<sup>/39</sup>

102. Given the absence of technologies tested in the ultimate extremities of Antarctic conditions, the lack of agreement on procedures to assess and take account of the impacts of any development, and the sparse data base, it could take a generation or more of dedicated research and technological development to ensure that minerals exploitation would not destroy the Antarctic's fragile ecosystem and its place in global environmental processes. Thus it is important that no minerals activity takes place until these conditions have changed, and then only in consonance with a regime that guarantees implementation of the most stringent standards needed to protect the continent's environment and share the proceeds equitably.

### **3. Promote Evolution of Antarctic Treaty System**

103. In the years ahead, activities in Antarctica will expand in kind and scale, as will the numbers of participants in such activities. Further efforts must be made to ensure effective management of those activities and an orderly expansion of participation in such management. A variety of options are being discussed by the international community. More effective management, including expanded participation, could evolve gradually through the existing Treaty System. But given the extent of probable change and the lure of mineral wealth, however remote, such an approach could be too slow to retain political support. Another is that the above goals might be reached through the negotiation of an entirely new system. However, neither of these approaches would be free of difficulty. Yet another alternative would be to intensify efforts to make the Treaty System more universal, more open, and responsive to expressions of concrete and legitimate concern and interest in Antarctica.

### **4. Establish a Means for More Effective Communication**

104. As activities under the different treaties increase, so does the importance of coordination among the advisory and decision making authorities responsible for various areas. Antarctica may require the establishment of somewhat more formal institutions than have governed the first generation of activities, in order to foster better communication and coordination both within and outside the Treaty System.

Some unique objects like Lake Baikal and Siberia, the Great Lakes in Africa and North America, are part of our global patrimony. They are some of the absolute values our planet possesses and their significance transcends any national boundaries. We should learn how to foresee their future and how to anticipate the after-effects of large-scale engineering projects.

Since people's interests vary, it cannot be taken for granted that people will accept scholars' recommendations and come to agreement on that score. And their agreement is of special importance in situations where global problems are involved and where the human race as a whole may be threatened with perils generated by the absence of such agreement.

What is needed today is the moulding of a new ethos and new arrangements for building an understanding among people, countries, and regions. And as a first step we should produce new knowledge, concentrate our research efforts on maintaining life on earth, and develop a system distributing and disseminating knowledge and new moral criteria in a way that makes it available to billions of people who inhabit our planet.

Academician N.N. Moiseev  
USSR Academy of Sciences  
WCED Public Hearing  
Moscow, 8 Dec 1986

105. Antarctica is on the agenda of the UN General Assembly and will probably remain so. Nothing will happen, however, unless the participants in the debate find terms of reference that can command broad-based support and an agreed upon means to explore and give effect to improved management.

106. To focus on longer-term strategies to preserve and build on the achievements of the existing Treaty System, nations must create the means to foster dialogue among politicians, scientists, environmentalists, and industries from countries within and outside it. A good place to start would be the development of closer working relationships between the parties to Antarctic regimes and the international organizations within and outside the UN system that have responsibilities for science and technology, conservation, and environmental management.

107. National policy processes could also be structured to provide for dialogue with concerned industries, public interest organizations, and expert advisors, perhaps through an Antarctic advisory committee. The U.S. Government has been in the forefront of those countries appointing industry and public interest advisors to its delegations to Consultative Parties meetings. Australia, New Zealand, and Denmark have more recently followed suit.

108. Hammering out an internationally supported consensus on Antarctica is a huge task requiring time and patience. And the lure of minerals increases with every new rumour of a find. Yet such a consensus is the only way to prevent a tragic plundering of the silent continent, and to maintain Antarctica as a symbol of peaceful international cooperation and environmental protection.

---

## Footnotes

1/ This section draws on F. Szekely, 'The Marine and Coastal Environment', prepared for WCED, 1986; J. Beddington, 'Whaling', prepared for WCED, 1986; V. Sebek, 'Policy Paper on Dumping', prepared for WCED, 1986.

2/ M.W. Holdgate et al., 'The Marine Environment', in **The World Environment 1972-1982** (Dublin: Tycooly International Publishing Ltd., 1982).

3/ See National Academy of Sciences, **Oil in the Sea** (Washington, DC: National Academy Press, 1985); and OECD, **Maritime Transport**, 1984 (Paris: 1986).

4/ 'Scientists Closer to Identifying Cause of Antarctic Ozone Depletion', **National Science Foundation News**, 20 October 1986; Ad Hoc Working Group of Legal and Technical Experts for the Elaboration of a Protocol on the Control of Chlorofluorocarbons to the Vienna Convention for the Protection of the Ozone Layer (Vienna Group), 'Report of the Second Part of the Workshop on the Control of Chlorofluorocarbons, Leesburg, USA, UNEP/WG.151/Background 2, Na.86-2184, UNEP, Nairobi, 15 October 1986; A.S. Miller and I.M. Mintzer, **The Sky Is the Limit: Strategies for Protecting the Ozone Layer**, WRI Research Report No. 3 (Washington, DC: World Resources Institute, 1986).

5/ GESAMP in a recent evaluation of the present state of the health of the oceans, 'The Health of the Oceans', Regional Seas Reports and Studies No. 16, UNEP, Nairobi, 1982.

6/ M. Bertrand, 'Some Reflections on Reform of the United Nations', Joint Inspection Unit, United Nations, Geneva, 1985.

7/ E.P. Eckholm, **Down to Earth** (London: Pluto Press, Ltd., 1982).

8/ J.A. Gulland and S. Garcia, 'Observed! Patterns in Multispecies Fisheries.' in R.M. May (ed.), **Exploitation of Marine Communities** (Berlin: Springer-Verlag, 1984); FAO, 'Review of the State of World Fishery Resources', Fisheries Circular 710 (rev. 4), Rome, 1985.

9/ Dr J. Gulland, Marine Resources Assessment Group, Imperial College of Science and Technology, London, personal communication, 20 January 1987.

10/ FAO, op. cit.

11/ IWC, **Report of the IWC 36th Session, 1986** (Cambridge: forthcoming).

12/ **1965 Report on Great Lakes Water Quality: Great Lakes Water quality Board Report to the International Joint Commission** (Windsor, Ont.: IJC, 1985).

13/ IMO, 'The Provisions of the London Dumping Convention, 1972', and Decisions made by the Consultative Meetings of Contracting Parties, 1975-1984.

14/ Dumping in the Convention means any deliberate disposal at sea of material and substances of any kind, form, or description from vessels, aircraft, platform, or other artificial structures, as well as the disposal of vessels, aircraft, platforms, or other artificial structures themselves.

15/ Twenty-five nations, led by Spain, Australia, and New Zealand, supported the resolution, while Canada, France, South Africa, Switzerland, the United Kingdom, and the United States voted against.

16/ U. Grimas and A. Svansson, **Swedish Report on the Skagerak** (Stockholm: National Environmental Protection Board, 1985).

17/ United Nations, Final Act of the Third Conference on the Law of the Sea, Montego Bay, Jamaica, December 1982. In its final form, the Convention is composed of 17 main parts (320 articles), dealing with the territorial sea and contiguous zone; straits used for international navigation; archipelagic states; exclusive economic zone; continental shelf; high seas; regime of islands; enclosed or semi-enclosed seas; right of access of land-locked states to and from the sea and freedom of transit; the area, protection, and preservation of the marine environment; marine scientific research; development and transfer of marine technology; settlement of disputes; general provisions; and final provisions. There are nine annexes to the Convention: highly migratory species; Commission on the Limits of the Continental Shelf; basic conditions of prospecting; exploration and exploitation; statute of the International Tribunal for the Law of the Sea; Statute of the Enterprise; conciliations; arbitration and special arbitration and participation by international organizations. Under the Convention, coastal states may adopt laws and regulations in the EEZ compatible with international rules and standards to combat pollution from vessels.

18/ Among other things, declaration by the President of the United States, on 9 July 1982, and **L.O.S. Bulletin**, July 1985, issued by the Office of the Special Representative of the Secretary General for the Law of the Sea Convention.

19/ W. Sullivan, 'Eruption in Mexico Tied to Climate Shift Off Peru.' **New York Times**, 12 December 1982.

20/ R. Kerr, 'Taking Shots at Ozone Hole Theories,' **Science**, 14 November 1986.

21/ When the speed of a satellite matches the speed of the planet's rotation, the satellite is stationary relative to particular places on the Earth. There is only one band or arc, directly above the equator, where it is possible to achieve geosynchronous orbit.

22/ The general case for a regulatory regime and several alternative regimes are spelled out in K.G. Gibbons, 'Orbital Saturation: The Necessity for International Regulation of Geosynchronous Orbits', **California Western International Law Journal**, Winter 1979

23/ A summary of Third World views is found in H.J. Levin, 'Orbit and Spectrum Resource Strategies: Third World Demands', **Telecommunications Policy**, June 1981.

24/ The allocation is done every 10 years at World Administrative Radio Conferences (WARCs), the last of which was held in 1979. U.S. Congress, Office of Technology Assessment, **Radiofrequency Use and Management: Impacts from the World Administrative Radio Conference of 1979** (Washington, DC: U.S. Government Printing Office, 1980).

25/ These conferences are described in G. Coding, Jr., 'The USA and the 1985 Space WARC', and A.M. Rutkowski, 'Space WARC: The Stake of the Developing Countries, the GEO and the WARC-ORB 85 Conference', **Space Policy**, August 1985.

26/ AIAA Technical Committee on Space Systems, **Space Debris**, July 1981.

27/ The United States has launched 23 spacecraft that relied at least in part upon nuclear power sources: one source was a reactor; the rest were radioactive materials the decay heat of which is converted into electricity (thermoelectric generators). By the end of 1986 the Soviet Union had launched 31 nuclear-powered spacecraft, almost all of which contained fission reactors, and it currently operates all of the reactor-powered satellites.

28/ 'Antarctic: A Continent in Transition', Fact Sheet Folio, International Institute for Environment and Development, London, 1986.

29/ In 1983, the Seventh Summit Conference of the Non-Aligned Countries included a paragraph on Antarctica in its communique. That same year, the question of Antarctica was put on the agenda of the UN General Assembly. The debate resulted in a consensus resolution asking for the elaboration of a special report by the Secretary General, which was debated by the UN General Assembly at its 39th Session in November 1984. The consensus has not been maintained. At subsequent General Assembly sessions, resolutions on Antarctica have been passed over the objections of the parties to the Treaty, most of whom chose not to participate in the vote.

30/ L. Kimball, 'Testing the Great Experiment', **Environment**, September 1985.

31/ 'Antarctic Treaty', concluded 1 December 1959 and entered into force 23 June 1961, summarized in M.J. Bowman and D.J. Harris (eds.), **Multilateral Treaties: Index and Current Status** (London: Butterworths, 1964).

32/ They include the original seven claimants: Argentina, Australia, Chile, France, New Zealand, Norway, and the United Kingdom; an additional five who were original signatories: Belgium, Japan, South Africa, USSR and the United States; plus six who have since acceded to the Treaty and become full Consultative Parties: Poland (1977), the Federal Republic of Germany (1981), Brazil and India (1983), and China and Uruguay (1985). Any country can accede to the Treaty, becoming a full 'Consultative Party' providing, and during such time as, it demonstrates an interest in the continent through the presence of a substantial scientific activity. Seventeen other countries have acceded to the Treaty, but do not hold consultative status. Since 1983, they have been invited to attend Antarctic Treaty meetings as observers.

33/ Both in their declaration of principles concerning the environment and in the text of the *Convention on the Conservation of Antarctic Marine Living Resources*, the Consultative Parties insist that the primary responsibility for these matters lies with them by virtue of their status as Consultative Parties, a proposition that Parties to the Convention who are not also Parties to the Treaty are obliged to affirm.

34/ 'Agreed Measures for the Conservation of Antarctic Fauna and Flora', agreed 2-13 June 1984, reprinted in W.M. Bush (ed.), **Antarctica and International Law** (London: Oceana Publications, 1982).

35/ '*Convention for the Conservation of Antarctic Seals*', concluded 11 February 1972 and entered into force 11 March 1978, summarized in Bowman and Harris, op. cit.; '*Convention on the Conservation of Antarctic Marine Living Resources*', concluded 20 May 1980 and entered into force 7 April 1981, summarized in ibid. See also J.N. Barnes, 'The Emerging Convention on the Conservation of Antarctic Marine Living Resources: An Attempt to Meet the New Realities of Resource Exploitation in the Southern Ocean', in J.I. Charney (ed.), **New Nationalism and the Use of Common Spaces** (Totowa, NJ: Allenheld Publishers, 1982).

36/ J.A. Beddington and R.M. May, 'The Harvesting of Interacting Species in a Natural Ecosystem', **Scientific American**, November 1982.

37/ J.H. Zumborge, 'Mineral Resources and Geopolitics in Antarctica', **American Scientist**, January-February 1979; G. Pontecorvo, 'The Economics of the Resources of Antarctica', in Charney, op. cit.

38/ L. Kimball, 'Unfreezing International Cooperation in Antarctica', **Christian Science Monitor**, 1 August 1982.

39/ D. Shapley, 'Antarctic Up for Grabs', **Science** **82**, November 1982.

# **Our Common Future, Chapter 11: Peace, Security, Development, and the Environment**

## ***I. Environmental Stress as a Source of Conflict***

## ***II. Conflict as a Cause of Unsustainable Development***

- 1. Nuclear War - Threat to Civilization***
- 2. Other Weapons of Mass Destruction***
- 3. The Costs of the 'Arms Culture'***
- 4. World Armaments and the Growth of the 'Arms Culture'***

## ***III. Towards Security and Sustainable Development***

- 1. Principles***
- 2. Cooperative Management***
- 3. The Importance of Early Warning***
- 4. Disarmament and Security***

1. Among the dangers facing the environment, the possibility of nuclear war, or military conflict of a lesser scale involving weapons of mass destruction, is undoubtedly the gravest. Certain aspects of the issues of peace and security bear directly upon the concept of sustainable development. Indeed, they are central to it.

2. Environmental stress is both a cause and an effect of political tension and military conflict.<sup>/1</sup> Nations have often fought to assert or resist control over raw materials, energy supplies, land, river basins, sea passages, and other key environmental resources. Such conflicts are likely to increase as these resources become scarcer and competition for them increases.

3. The environmental consequences of armed conflict would be most devastating in the case of thermo-nuclear war. But there are damaging effects too from conventional, biological, and chemical weapons, as well as from the disruption of economic production and social organization in the wake of warfare and mass migration of refugees. But even where war is prevented, and where conflict is contained, a state of 'peace' might well entail the diversion into armament production of vast resources that could, at least in part, be used to promote sustainable forms of development.

4. A number of factors affect the connection between environmental stress, poverty, and security, such as inadequate development policies, adverse trends in the international economy, inequities in multi-racial and multi-ethnic societies, and pressures of population



growth. These linkages among environment, development, and conflict are complex and, in many cases, poorly understood. But a comprehensive approach to international and national security must transcend the traditional emphasis on military power and armed competition. The real sources of insecurity also encompass unsustainable development, and its effects can become intertwined with traditional forms of conflict in a manner that can extend and deepen the latter.

## **I. Environmental Stress as a Source of Conflict**

5. Environmental stress is seldom the only cause of major conflicts within or among nations. Nevertheless, they can arise from the marginalization of sectors of the population and from ensuing violence. This occurs when political processes are unable to handle the effects of environmental stress resulting, for example, from erosion and desertification. Environmental stress can thus be an important part of the web of causality associated with any conflict and can in some cases be catalytic.

6. Poverty, injustice, environmental degradation, and conflict interact in complex and potent ways. One manifestation of growing concern to the international community is the phenomenon of 'environmental refugees'.<sup>2</sup> The immediate cause of any mass movement of refugees may appear to be political upheaval and military violence. But the underlying causes often include the deterioration of the natural resource base and its capacity to support the population.

7. Events in the Horn of Africa are a case in point. In the early 1970s, drought and famine struck the nation of Ethiopia. Yet it has been found that the hunger and human misery were caused more by years of overuse of soils in the Ethiopian highlands and the resulting severe erosion than by drought. A report commissioned by the Ethiopian Relief and Rehabilitation Commission found: 'The primary cause of the famine was not drought of unprecedented severity, but a combination of long-continued bad land use and steadily increased human and stock populations over decades'.<sup>3</sup>

8. Wars have always compelled people to leave their homes and their lands, to become refugees. Also, the wars in our time have forced large numbers of people to leave their homelands. In addition, we now have the phenomenon of environmental refugees. In 1984-85, some 10 million Africans fled their homes, accounting for two-thirds of all refugees worldwide. Their flight was not surprising in a region where 35 million suffered from famine. Many of them swarmed into cities. But many others moved across national boundaries, heightening interstate tensions. Cote d'Ivoire, Ghana, and Nigeria have been generous in welcoming refugees from the desertified Sahel. Tanzania, Zambia, and Zimbabwe have also been receiving large numbers of refugees. Yet, the Cote d'Ivoire, for instance, which depends for much of its export revenues on timber, is suffering rapid deforestation caused in part by land hunger, and one-third of landless people are immigrants. Agriculture destroys 4.5 times as much forestland in the Cote d'Ivoire as logging does.<sup>4</sup>

9. Almost 1 million Haitian 'boat people', one-sixth of the entire populace, have fled that island nation, an exodus fuelled in large part by environmental degradation. Haiti suffers some of the world's most severe erosion, down to bedrock over large parts of some regions, so that even farmers with reasonable amounts of land cannot make a living. According to a US Agency for International Development (USAID) report, 'The social and economic effects of environmental degradation are great, and contribute to the growing outflow from rural areas. Thousands of rural Haitians leave their homes each year for Port au Prince, other Caribbean islands and the United States in search of employment and better living conditions'.<sup>5</sup> El Salvador, one of the

most troubled nations of Central America, is also one of the most environmentally impoverished, with some of the worst erosion rates in the region. The fundamental causes of the present conflict are as much environmental as political, stemming from problems of resource distribution in an overcrowded land, according to a draft USAID environmental profile of El Salvador.<sup>/6</sup>

Today we cannot secure security for one state at the expense of the other. Security can only be universal, but security cannot only be political or military, it must be as well ecological, economical, and social. It must ensure the fulfilment of the aspirations of humanity as a whole.

A. S. Timoshenko  
Institute of State and Law, USSR Academy of Sciences  
WCED Public Hearing  
Moscow, 11 Dec 1986

10. South Africa reveals similar problems. The inhuman policy of apartheid is at the core of the state of political conflict in Southern Africa. One of the many ways by which apartheid institutionalizes both conflict and environmental degradation is by allocating, through the 'homelands' system, 14 per cent of the nation's land to 72 per cent of the population.<sup>/7</sup> Young working-age blacks flee the overcultivated and overgrazed 'homelands' to seek work in the cities, where, on top of the squalor of overcrowded townships, they encounter extreme socio-economic inequality and racial segregation. They fight back. Repression intensifies, and the victims seek refuge over the border - whereupon the South African regime widens the conflict into neighbouring states. The entire region is becoming caught up in the ensuing violence, which could well ignite wider conflict drawing in major powers.

11. In addition to the interrelated problems of poverty, injustice, and environmental stress, competition for non-renewable raw materials, land, or energy can create tension. It was the quest for raw materials that underlay much of the competition between colonial powers and the subjugation of their holdings. Conflicts in the Middle East inevitably contain the seeds of great power intervention and global conflagration, in part because of the international interest in oil.

12. As unsustainable forms of development push individual countries up against environmental limits, major differences in environmental endowment among countries, or variations in stocks of usable land and raw materials, could precipitate and exacerbate international tension and conflict. And competition for use of the global commons, such as ocean fisheries and Antarctica, or for use of more localized common resources in fixed supply, such as rivers and coastal waters, could escalate to the level of international conflict and to threaten international peace and security.

13. Global water use doubled between 1940 and 1980, and it is expected to double again by 2000, with two thirds of the projected water use going to agriculture. Yet 80 countries, with 40 per cent of the world's population, already suffer serious water shortages.<sup>/8</sup> There will be growing competition for water for irrigation, industry, and domestic use. River water disputes have already occurred in North America (the Rio Grande), South America (the Rio de la Plata and Parana), South and Southeast Asia (the Mekong and the Ganges), Africa (the Nile), and the Middle East (the Jordan, Litani, and Orontes, as well as the Euphrates).

How can the world of nature and the community of peoples with their national economies be harmonized? Posing the question this way suggests that the two are separate. But not so. Humanity, the human species, exists and is supported within the world of nature. And I mean that not figuratively but literally.

We are deep-air animals living inside an ecological system. We draw boundaries, of course, on the ecosphere for national and regional purposes. But it is all of one piece.

When, therefore, we optimistically declare that economic development and environmental maintenance can go along hand in hand, this qualifier must immediately be added: only if the maintenance of the ecosphere is made the first priority. Economic development must be secondary, guided by strict ecological standards. These fundamental ideas are far from being universally accepted.

Stanley Rowe  
Saskatchewan Environmental Society  
WCED Public Hearing  
Ottawa, 26-27 May 1986

14. Fisheries, whether coastal or oceanic, are fundamental to the diets of many countries. For some countries, fishing is a key economic sector, and overfishing poses immediate dangers to several national economies. In 1974 Iceland, largely dependent on its fishing industry, found itself embroiled with the United Kingdom in a 'cod war'. Similar tensions exist in the Japanese and Korean seas and on both sides of the South Atlantic. The 1986 declaration of an exclusive fishery zone around the Falkland/Malvinas Islands has further unsettled relations between Britain and Argentina. Disputes over fishing rights in the South Pacific and the search for tuna by distant-water fleets led to increased competition for diplomatic and fisheries advantages by the major powers in that region in 1986. Fisheries-related disputes may well become more frequent as nations harvest fish stocks beyond the level of sustainable yields.

15. Environmental threats to security are now beginning to emerge on a global scale. The most worrisome of these stem from the possible consequences of global warming caused by the atmospheric build-up of carbon dioxide and other gases.<sup>9</sup> (See *Chapter 7*.) Any such climatic change would quite probably be unequal in its effects, disrupting agricultural systems in areas that provide a large proportion of the world's cereal harvests and perhaps triggering mass population movements in areas where hunger is already endemic. Sea levels may rise during the first half of the next century enough to radically change the boundaries between coastal nations and to change the shapes and strategic importance of international waterways - effects both likely to increase international tensions. The climatic and sea-level changes are also likely to disrupt the breeding grounds of economically important fish species. Slowing, or adapting to, global warming is becoming an essential task to reduce the risks of conflict.

## **II. Conflict as a Cause of Unsustainable Development**

16. Arms competition and armed conflict create major obstacles to sustainable development. They make huge claims on scarce material resources. They pre-empt human resources and wealth that could be used to combat the collapse of environmental support systems, the poverty, and the underdevelopment that in combination contribute so much to contemporary political insecurity. They may stimulate an ethos that is antagonistic towards cooperation among nations whose ecological and economic interdependence requires them to overcome

national or ideological antipathies.

17. The existence of nuclear weapons and the destructive potential inherent in the velocity and intensity of modern conventional warfare have given rise to a new understanding of the requirements for security among nations. In the nuclear age nations can no longer obtain security at each other's expense. They must seek security through cooperation, agreements, and mutual restraint; they must seek common security.<sup>/10</sup> Hence interdependence, which is so fundamental in the realm of environment and economics, is a fact also in the sphere of arms competition and military security. Interdependence has become a compelling fact, forcing nations to reconcile their approach to 'security'.

## **1. Nuclear War - Threat to Civilization**

18. The likely consequences of nuclear war make other threats, to the environment pale into insignificance. Nuclear weapons represent a qualitatively new step in the development of warfare. One thermo-nuclear bomb can have an explosive power greater than that of all the explosives Used in wars since the invention of gunpowder. In addition to the destructive effects of blast and heat, immensely magnified by these weapons, they introduce a new lethal agent - ionizing radiation - that extends lethal effects over both space and time.

19. In recent years, scientists have in addition called our attention to the prospect of 'nuclear winter'. It has been most authoritatively explored by some 300 scientists from the United States, the USSR, and more than 30 other countries - working on a collaborative basis in some cases across ideological divides.<sup>/11</sup>

All youth organizations believe that environmental issues stand high on the priority list of global problems. However, their solution depends on the preservation of peace on our planet. The quest of solutions to ecological problems is impossible without the curbing of the arms race, for the arms race absorbs tremendous intellectual and material resources of mankind. The solution of ecological problems also depends on the way of life of young people and their value orientation.

Dr. I.I. Russin  
Moscow State University  
WCED Public Hearing  
Moscow, 8 Dec 1986

20. The theory contends that the smoke and dust ejected into the atmosphere by a nuclear war could absorb enough solar radiation to remain aloft for some time, preventing sunlight from reaching the surface of the earth, causing a widespread and prolonged cooling of land areas. There would be severe repercussions for plant life generally and for agriculture in particular, disrupting the production of food to sustain survivors of the war. Great uncertainties remain about the scale and linkages determining environmental effects, but large-scale environmental perturbations are considered probable. A nuclear war cannot be won, and must never be fought. In the aftermath, there would be no difference between so called victor and vanquished. The nuclear-weapon states must spare no effort to conclude a verifiable agreement on banning all nuclear weapon tests.

21. The findings on nuclear winter are vitally important too for non-aligned nations, predominantly in the South, which are not parties to the East West conflict. They cannot

expect to avoid the potentially disastrous environmental consequences of nuclear war in the northern hemisphere. The aftermath of such a war would envelop the world. There is a danger that nuclear weapons will spread to more and more countries and be used in what begins as a limited regional conflict. Beyond the five recognized nuclear-weapon states, at least six others have a widely acknowledged potential nuclear weapons capability; a dozen others are not far behind. The nuclear-weapon states cannot expect the non-nuclear-weapon states to abstain from exercising the nuclear option in the absence of real progress on the road to nuclear disarmament. It is imperative, therefore, that the probable consequences of nuclear war be recognized universally and that all states become involved in efforts to prevent the proliferation - and above all the use of nuclear weapons.

## **2. Other Weapons of Mass Destruction**

22. Other forms of war and other weapons of mass destruction have large scale effects on both human societies and the human environment. Biological warfare could release new agents of disease that would prove difficult to control. Recent advances in biotechnology multiply the potentially lethal applications of such weapons. Likewise, the deliberate manipulation of the environment (for example, through artificial earthquakes and floods) would have consequences far beyond the borders of those involved in a conflict, were they ever used. Chemical agents can seriously damage the environment, as demonstrated by the defoliants used in South-east Asia. The dangerous and environmentally unpredictable consequences of biological and chemical weapons have led to international agreements banning their use.<sup>/12</sup> But there is need for further efforts to strengthen the regimes to which these agreements contribute. In particular, the Geneva protocol prohibiting the use of chemical weapons should be supplemented by agreements prohibiting the production and stockpiling of such weapons.

23. Military applications of new technologies now threaten to make outer space a focus of international competition and conflict. (See *Chapter 10*.) Most countries in the international community see space as a global commons that should benefit humanity as a whole and be preserved from military competition - a feeling reflected in the 1967 *Outer Space Treaty*, under which nations agreed not to deploy weapons of mass destruction there. Governments should now agree on measures to prevent an arms race in space and stop it on Earth. Failing such agreement, the arms race could expand, with dire consequences for humanity.

## **3. The Costs of the 'Arms Culture'**

24. The absence of war is not peace; nor does it necessarily provide the conditions for sustainable development. Competitive arms races breed insecurity among nations through spirals of reciprocal fears. Nations need to muster resources to combat environmental degradation and mass poverty. By misdirecting scarce resources, arms races contribute further to insecurity.

25. The coexistence of substantial military spending with unmet human needs has long evoked concern. President Eisenhower, for example, observed at the end of his term in office that 'every gun that is made, every warship launched, every rocket fired represents, in the final analysis, a theft from those who hunger and are not fed, who are cold and are not clothed'.<sup>/13</sup>

26. Global military spending in 1985 was well in excess of \$900 billion.<sup>/14</sup> This was more than the total income of the poorest half of humanity. It represented the equivalent of almost \$1,000 for every one of the world's 1 billion poorest. Put another way, military spending surpassed the combined gross national products of China, India, and the African countries

south of the Sahara. Moreover, global military spending has risen not only absolutely but proportionately - from an estimated 4.7 per cent of world output in 1960 to over 6 per cent - representing an increase of about 150 per cent in real (constant price) terms. Three-quarters of current expenditure is in the industrial world./15

27. The true cost of the arms race is the loss of what could have been produced instead with scarce capital, labour skills, and raw materials. The plants that manufacture weapons, the transport of those weapons, and the mining of minerals for their production all place enormous demands on energy and mineral resources and are a major contributor to pollution and environmental deterioration.

28. The distorting effects of the 'arms culture' are most striking in the deployment of scientific personnel. Half a million scientists are employed on weapons research world-wide, and they account to: around half of all research and development expenditure./16 This exceeds the total combined spending on developing technologies for new energy sources, improving human health, raising agricultural productivity, and controlling pollution. Military research and development - \$70-80 billion world-wide in 1984 - is growing at twice the rate of military spending as a whole./17 At the same time, there is a paucity of resources available for monitoring global climatic change, for surveying the ecosystems of disappearing rain forests and spreading deserts, and for developing agricultural technologies appropriate to rainfed, tropical agriculture.

29. Nations are seeking a new era of economic growth. The level of spending on arms diminishes the prospects for such an era - especially one that emphasizes the more efficient use of raw materials, energy, and skilled human resources. It also has a bearing, albeit indirect, on the willingness of rich countries to provide development assistance to developing countries. Clearly, there is no simple correspondence between reduced defence spending and increased aid. There are other reasons aside from domestic resource constraints for a reluctance to expand aid, and nations cannot wait for disarmament before devoting more resources to ensuring sustainable development. Nonetheless, increased defence spending puts pressure on other budgetary items, and aid is an easy target, despite being a relatively small outlay for most donor countries./18

30. Although redeployment is clearly possible, resources currently employed in military applications cannot be redeployed quickly or easily elsewhere in other sectors or other countries. There are technical problems in achieving such a transformation, not least the contribution made by military spending to jobs in economies with high unemployment. And beyond the technical problems are questions of political will. Nonetheless, some countries - China, Argentina, and Peru, for example - have recently shown that it is both technically and politically possible to make substantial shifts from military to civilian spending within a short time./19

#### **4. World Armaments and the Growth of the 'Arms Culture'**

31. Traditionally, nations have adhered to an 'arms culture'. They find themselves locked into arms competitions fuelled among other things by powerful vested interests in the 'military-industrial complex' as well as in the armed forces themselves. Industrial nations account for most of the military expenditures and the production and transfer of arms in international society. However, the influence of this 'arms culture' is not confined to these nations. It is present also in the developing world, fostered both by the desire of many governments to seek security through acquisition of arms and by a burgeoning world arms trade.

I have here listened to people speaking about financial crises, famine, pollution, and social injustice at various levels. As an ecologist, I cannot see any of these questions without linking them to the armaments question and to the nuclear issue.

Poverty generates tensions and conflicts, urban and rural violence. The indigenous people are still awaiting solutions for their problems. All this depends on money and nevertheless we are spending money on our nuclear programmes. They say that this has peaceful objectives. This is not true because precious money is being spent on this.

The greatest crime: the death of hope, the death of all of the rights we all have, especially that of the young of believing in a future, the hope for a normal life, a difficult life but something that appears as a challenge to live it the best we can. We have a right to this chance.

Cacilda Lanuza  
Brazilian Ecological Movement  
WCED Public Hearing  
Sao Paulo, 28- 29 Oct 1985

32. Since the early 1960s, military spending in developing countries as a whole has increased fivefold. Their share of total spending increased from under one-tenth to almost a quarter of a far larger total.<sup>/20</sup> Some developing countries, such as the Republic of Korea, have achieved a high level of development in spite of military spending. But systematic analysis suggests that increases in military spending have had negative effects on economic performance.<sup>/21</sup>

33. Moreover, defence expenditure is one of the most import-intensive of activities, usually creating a large secondary demand for imported spares, ammunition, servicing, training, and fuel. It has been estimated that 20 per cent of the external debt acquired by non-oil developing countries in the decade to 1982 could be attributed to arms imports.<sup>/22</sup> And high levels of arms spending motivated by a variety of reasons have undoubtedly contributed to the severity of the crises of development in Africa, where military spending rose, in real terms, by 7.8 per cent per annum between 1971 and 1982, and arms imports rose by 18.5 per cent.<sup>/23</sup> It should be noted in this connection that in the case of the Frontline States they have been compelled to expand their armed forces because of the threat from South Africa.

34. The development of an 'arms culture' in many developing countries presents particular dangers in the context of environmental and poverty-induced stresses. There are already numerous simmering disputes in the Third World - over 40 unresolved - many arising from boundaries defined in colonial times.

35. Sophisticated weapons can help convert the potential into actual conflict. According to the UN Group of Governmental Experts on the Relationship Between Disarmament and Development:

There can no longer be the slightest doubt that resource scarcities and ecological stresses constitute real and imminent threats to the future well-being of all people and nations. These challenges are fundamentally non-military and it is imperative that they be addressed accordingly. If this is not recognized, ... there is a grave risk that the situation will deteriorate to the point of crisis where, even with low probability of success, the use of force could be seen as a way to produce results quickly enough. This is far from being a remote possibility. In recent years, there has been a marked tendency

in international relations to use or to threaten to use military force in response to non-military challenges to security./24

36. The situation in many developing countries presents particular dangers in the context of environmental and poverty-induced stresses. Large-scale movements of refugees, competition for scarce water and fertile lands, deposits of oil and raw materials, ill-defined boundaries, and so on all add to tensions and increase possibilities for conflict. The importation of armaments by developing countries has increased also because of these real or potential conflicts. It is sometimes encouraged by the arms manufacturers because of the important profits that can themselves sustain the manufacture of arms in the exporting countries. The export of arms have been evaluated at more than \$35 billion annually. The arms trade is estimated to have absorbed over \$300 billion over the last two decades, three-quarters in the form of sales to developing countries./25

### **III. Towards Security and Sustainable Development**

#### **1. Principles**

37. The first step in creating a more satisfactory basis for managing the interrelationships between security and sustainable development is to broaden our vision. Conflicts may arise not only because of political and military threats to national sovereignty; they may derive also from environmental degradation and the pre-emption of development options.

38. There are, of course, no military solutions to 'environmental insecurity'. And modern warfare can itself create major internationally shared environmental hazards. Furthermore, the idea of national sovereignty, has been fundamentally modified by the fact of interdependence in the realm of economics, environment, and security. The global commons cannot be managed from any national centre: The nation state is insufficient to deal with threats to shared ecosystems. Threats to environmental security can only be dealt with by joint management and multilateral procedures and mechanisms.

Environment must also be an approach to development. Environment is a social justice issue and environment even is a peace and security issue. The barriers to achieving sustainable development are great, as might be expected in a major historical transformation, but they are far from insurmountable.

We approach the millennium in a world in which global interdependence is the central reality, but where absolute poverty and environmental degradation cloud our vision of a common future, and where a geopolitical climate dominated by nuclear terrorism and increasing militarization saps the idealism of the young and the will to dream in us all.

Ralph Torrie  
On Behalf of Canadian Environment, Development and Peace Organizations  
WCED Public Hearing  
Ottawa, 26-27 May 1986

#### **2. Cooperative Management**

39. Already, environmental stresses are encouraging cooperation among nations, giving some



indication of ways to proceed. Antarctica is subject to a far-reaching agreement that provides a collective approach to management. (See *Chapter 10*.) There are now various institutional systems, often of complex and advanced form, to foster bilateral and regional cooperation for marine fisheries in order to regulate maximum sustainable yields and the distribution of catches. One of the main threats to the oceans the dumping of highly toxic wastes has so far been managed by the *London Dumping Convention*. As for international water bodies, impressive progress has been made by the bilateral U.S.-Canadian Commission for the Great Lakes. The Mediterranean Convention, only one of the many such treaties concluded within the context of the UNEP Regional Seas Programme, brings together coastal nations in an arrangement to monitor and combat pollution at sea.

40. Some of the most challenging problems require cooperation among nations enjoying different systems of government, or even subject to antagonistic relations. The 1986 Chernobyl reactor accident in the Soviet Union has resulted in two agreements covering international cooperation in cases of such accidents. In the future, the nation concerned will immediately alert neighbouring states; they, in turn, will offer assistance at cost and free of liability.<sup>/26</sup> The 1979 Convention on Transboundary Pollution has provided a framework for monitoring and assessing damage from pollutants causing acid rain in Europe.<sup>/27</sup>

41. Cooperation on environmental issues among developing countries has often been made difficult by poor communications. Nonetheless, many now participate in UNEP's Regional Seas Programme. The nations of the Sahel have formed a regional organization to deal with desertification, and there is emerging a body of successful case histories with respect to river basin development: Witness the joint management programmes in Africa for the Senegal River Basin.

### Box 11-1

#### Spending on Military Versus Environmental Security

The world spent well over \$900 billion on military purposes in 1985, more than \$2.5 billion a day. The real cost is what the same resources might otherwise be used for:

- An Action Plan for Tropical Forests would cost \$1.3 billion a year over the course of five years. This annual sum is the equivalent of half a day of military expenditure worldwide.
- Implementing the UN Action Plan for Desertification would cost \$4.5 billion a year during the last two decades of this century - the equivalent of less than two days of military spending.
- One of the greatest environmental hazards in the Third World is lack of clean water for household use, contributing to 80 per cent of disease. The UN Water and Sanitation Decade, although given only a small fraction of support needed, would have cost \$30 billion a year during the 1980s. This is the approximate equivalent of 10 days of military spending.
- To supply contraceptive materials to all women already motivated to use family planning would cost an additional \$1 billion per year on top of the \$2 billion spent today. This additional \$1 billion is the equivalent of 10 hours of military spending.

**Sources:** International Task Force, **Tropical Forests: A Call for Action** (Washington, DC: World Resources Institute, 1965); Dr M.K. Tolba, 'Desertification and the Economics of Survival', **UNEP Information** 86/2. 25 March 1986; A. Agarwal et al., **Water, Sanitation and Health for All?** (London: IIED/Earthscan, 1981); World Bank, **World Development Report**, 1984 (New York: Oxford University Press, 1984).

### 3. The Importance of Early Warning

42. Since it is often uncertainty and insecurity that prompts international conflict, it is of the utmost importance that governments become aware of imminent environmental stress before the damage actually threatens core national interests. Governments are usually not well equipped with this kind of foresight.

43. It would be highly desirable if the appropriate international organizations, including appropriate UN bodies and regional organizations, were to pool their resources and draw on the most sophisticated surveillance technology available - to establish a reliable early warning system for environmental risks and conflict. (See *Chapter 12.*) such a system would monitor indicators of risks and potential disputes, such as soil erosion, growth in regional migration, and uses of commons that are approaching the thresholds of sustainability. The organizations would also offer their services for helping the respective countries to establish principles and institutions for joint management.

#### **4. Disarmament and Security**

44. Action to reduce environmental threats to security requires a redefinition of priorities, nationally and globally. Such a redefinition could evolve through the widespread acceptance of broader forms of security assessment and embrace military, political, environmental, and other sources of conflict.

45. A broader approach to security assessment would no doubt find many cases in which national, regional, and global security could be enhanced through expenditures quite small in relation to the levels of military spending. Four of the most urgent global environmental requirements - relating to tropical forests, water, desertification, and population - could be funded with the equivalent of less than one month's global military spending. (See Box 11-1.) It is difficult to shift budgetary resources, but individual governments have already shown that transformation is possible, given political will. In some of the countries most seriously affected by environmental stress and poverty, the sums required to alleviate these conditions are small in relation to what is now spent on disaster relief, let alone military activities.<sup>28</sup> However, these sums must be spent quickly, before deteriorating conditions require much larger expenditures.

46. But in terms of the aggregate resources involved in arms spending and the potential threat to the environment from war, the greatest need is to improve relations among those major powers capable of deploying weapons of mass destruction. This is needed to achieve agreement on tighter control over the proliferation and testing of various types of weapons of mass destruction nuclear and non-nuclear including those that have environmental implications.<sup>29</sup>

47. A substantial number of agreements already show the potential for negotiated, multilateral solutions. President Reagan and General Secretary Gorbachev made substantial progress towards strategic arms agreement, which must be carried forward to reverse the alarming trends of several decades. Apparently, the two major powers came close to agreeing on intermediate range systems in Europe, to be followed by agreements banning forward deployment of shorter range systems. It would alleviate significantly the pressures exercised by nuclear weapons on the security order in Europe. In addition, they are moving towards, a 50 per cent reduction agreement on strategic systems, followed by total elimination agreements. They also need to agree on effective measures to prevent an arms race in space. Successful negotiations would contribute significantly to stemming the spread of nuclear weapons as the major nuclear-weapon states would deliver on their promise to build down their nuclear arsenals. Such progress is consistent with the basic needs of our times and the right of humanity to have the spectre of nuclear destruction removed from the face of the Earth.

48. Nations must turn away from the destructive logic of an 'arms culture' and focus instead on their common future. The level of armaments and the destruction they could bring about bear no relation to the political conflict that triggered the arms competition in the first place. Nations must not become prisoners of their own arms race. They must face the common danger inherent in the weapon of the nuclear age. They must face the common challenge of providing for sustainable development and act in concert to remove the growing environmental sources of conflict.

---

#### **Footnotes**

- 1/ For some preliminary analyses along these lines, see L. Timberlake and J. Tinker, 'Environment and Conflict: Links Between Ecological Decay, Environmental Bankruptcy and Political and Military Instability, Earthscan Briefing Document. Earthscan, London, 1964; N. Myers, 'The Environmental Dimension to Security Issues', **The Environmentalist**, Winter 1986; R.H. Ullman, 'Redefining Security', *International Security*, Summer 1983; and A.H. Westing (ed.), **Global Resources and International Conflict** (Oxford: Oxford University Press, 1986).
- 2/ E. El-Hinnawi, **Environmental Refugees** (Nairobi: UNEP, 1985).
- 3/ Relief and Rehabilitation Commission, 'Drought and Rehabilitation in Wollo and Tigr'ai', Addis Ababa, 1975.
- 4/ L. Timberlake, **Africa in Crisis** (London: International Institute for Environment and Development/Earthscan, 1985).
- 5/ Project Paper for Haiti Agroforestry Outreach Project (Project 521-0122), U.S. Agency for International Development, Washington, DC, 1981.
- 6/ National Park Service/U.S. Man and the Biosphere Secretariat, 'Draft Environmental Profile of El Salvador', Bureau of Science and Technology, U.S. Agency for International Development, Washington, DC, April 1982. See also T.P. Anderson, **The War of the Dispossessed: Honduras and El Salvador 1969** (Lincoln, Neb.: University of Nebraska Press, 1981); W.H. Durham, **Scarcity and Survival in Central America: Ecological Origins of the Soccer War** (Stanford, Calif.: Stanford University Press, 1979).
- 7/ D. Smith, 'Update: Apartheid in South Africa', Queen Mary College, London, 1984.
- 8/ M. Falkenmark, 'New Ecological Approach to the Water Cycle: Ticket to the Future', **Ambio**, Vol. 13, No. 3, 1964; S. Postel, **Water: Rethinking Management in an Age of Scarcity**, Worldwatch Paper 62 (Washington, DC: WorldWatch Institute, 1984).
- 9/ B. Bolin et al., **The Greenhouse Effect: Climatic Change and Ecosystems** (Chichester, UK: John Wiley & Sons, 1986); National Research Council, **Changing Climate** (Washington, DC: National Academy Press, 1983); S. Seidel and D. Keyes, **Can We Delay a Greenhouse Warming?** (Washington, DC: U.S. Environmental Protection Agency, 1983).
- 10/ Independent Commission on Disarmament and Security Issues under the Chairmanship of Olof Palme, **Common Security** (London: Pan Books, 1982).
- 11/ SCOPE, **Environmental Consequences of Nuclear War** (Chichester, UK: John Wiley & Sons, 1985). Some of the other major studies on the nuclear winter scenario are R. Turco et al., 'Nuclear Winter: Global Consequences of Multiple Nuclear Explosions', **Science**, 23 December 1983; P. Ehrlich et al., **The Cold and the Dark: The World After Nuclear War** (New York: W.W. Norton, 1984); M.A. Hartwell and T.C. Hutchinson, **Environmental Consequences of Nuclear War, Volume II: Ecological and Agricultural Effects** (Chichester, UK: John Wiley & Sons, 1985); National Research Council, **The Effects on the Atmosphere of a Major Nuclear Exchange** (Washington, DC: National Academy Press, 1985); A. Ginsberg et al., 'Global Consequences of a Nuclear War: A Review of Recent Soviet Studies', **World Armaments and Disarmament, SIPRI Yearbook 1985** (London: Taylor & Francis, 1985); A.B. Pittock et al., **Environmental Consequences of Nuclear War, Volume I: Physical and Atmospheric Effects** (Chichester, UK: John Wiley & Sons, 1986); S.L. Thompson and S.H. Schneider, 'Nuclear Winter Reappraised', **Foreign Affairs**, Summer 1986. The effects of nuclear war are explored in Y.I. Chazor et al., **The Danger of**

**Nuclear War: Soviet Physicians' Viewpoint** (Moscow: Novosti Press, 1982); S. Glasstone and P.J. Dolan (eds.), **The Effects of Nuclear Weapons**, 3rd ed. (Washington, DC: U.S. Government Printing office, 1977); National Academy of Sciences, **Long-term Worldwide Effects of Multiple Nuclear Weapon Detonations** (Washington, DC: National Academy Press, 1975); Office of Technology Assessment, U.S. Congress, **The Effects of Nuclear War** (Washington, DC: U.S. Government Printing Office, 1980); UN, **Comprehensive Study of Nuclear Weapons (A/35/392)** (New York: 1980); World Health Organization, **Effects of Nuclear War on Health and Health Services** (Geneva: 1984).

12/ Outright banning of particularly lethal weapons has its origin in the St. Petersburg Declaration banning the use of 'dum-dum bullets' and the Hague war rules outlining the use of shaped charges (1899). Also relevant are the Geneva Protocol banning the military use of chemical and bacteriological weapons (1925); the Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological and Toxin Weapons (1975); and the Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (1978).

13/ The Eisenhower quote is taken from his final, valedictory address (Speech to the American Society of Newspaper Editors Washington, DC, April, 1953) which also includes the more famous reference to the 'military-industrial complex'.

14/ Estimates from R.L. Sivard, **World Military and Social Expenditures** (Washington, DC: World Priorities, Inc., 1986). More details in M. Brzoska et al., 'World Military Expenditure and Arms Production', **SIPRI Yearbook**, op. cit. The figure of total military spending is necessarily approximate because of the enormous problems of aggregating spending in different - and often non-convertible - currencies and from countries with different statistical conventions. According to Sivard, total military spending in 1983 was \$728 billion. On the basis of trends and preliminary data, a figure of at least \$900 billion and possibly \$1,000 billion in current prices and exchange rates seems appropriate for 1986.

15/ Sivard, 1986 edition, op. cit., **SIPRI Yearbook**, op. cit.

16/ Sivard, 1986 edition, op. cit., **SIPRI Yearbook**, op. cit.

17/ M. Ackland-Hood, 'Military Research and Development Expenditure', **SIPRI Yearbook**, op. cit.

18/ According to calculations based on OECD Development Assistance Committee data, which are not universally accepted, together with Sivard, total non-military development aid measured in net concessional flows from industrial to developing countries represents roughly 5 per cent of the amount spent by all industrial countries on armaments. For the United States, foreign aid accounts for 4 per cent of armaments spending, and for the USSR, 1.5 per cent. In Austria, Denmark, the Netherlands, Norway, and Sweden, by contrast, the proportion is close to 30 per cent, and it is over 10 per cent for Australia, Belgium, Canada, France, FRG, and Switzerland,

19/ According to L.H. Brown et al., in *State of the World 1986* (London: W.W. Norton, 1986), China in 1972 spent 14 per cent of its gross national product (GNP) on military purposes, one of the highest levels in the world. Since 1970 (except for 1979), the government has systematically reduced this until by 1985 it amounted to only 7.5 per cent. In mid 1985 the government announced it would cut the armed forces to 3.2 million, a drop of 24 per cent. In Argentina, by 1984 new President Raul Alfonsin had cut arms outlays to half their peak level of 1980 (nearly 4 per cent of GNP) by reordering priorities and shifting resources to social programmes.

Peruvian President Alan Garcia Perez, on taking office in mid-1985, announced he would reduce military outlays, which then totalled 5 per cent of GNP, or one-quarter of the federal budget. First he cancelled half the order for 26 French Mirage fighter planes.

20/ Over 1960-81, Third World military expenditures grew by some 7 per cent per year, as compared with 3.7 per cent in the industrial world. In 1960, Third World military expenditures accounted for less than one-tenth of the global total 1981 for more than one fifth of a far larger total. R.L. Sivard, **World Military and Social Expenditures** (Washington, DC: World Priorities, Inc., 198b).

21/ L. Taylor, 'Military Economics in the Third World', prepared for The Independent Commission on Disarmament and Security Issues, 1981.

22/ R. Tullberg, 'Military Related Debt in Non-Oil Developing Countries', **SIPRI Yearbook**, op. cit.

23/ R. Luckham, 'Militarization in Africa', **SIPRI Yearbook**, op. cit.

24/ I. Thorsson et al., **Relationship Between Disarmament and Development**, Disarmament Study Review No. 5 (A/36/536) (New York: UN Department of Political and Security Council Affairs, 1982).

25/ Arms Export from L.R. Brown et al., op. cit, based on U.S. Arms Control and Disarmament Agency; estimate of cumulative spending on the arms trade in Sivard, 1985 edition, op. cit.

26/ 'Negotiations on Agreement Concerning Nuclear Safety Reach Consensus', press release (PR8-86/17), IAEA, 15 August 1986.

27/ 'Convention on Long-Range Transboundary Air Pollution' concluded 13 November 1979 and entered into force 16 March 1983, summarized in M.J. Bowman and D.J. Harris (eds.), **Multilateral Treaties: Index and Current Status** (London: Butterworths, 1984).

28/ The amount that the United Nations has recently budgeted for Ethiopia to cater for anti-erosion, reforestation, and related measures under its Anti-Desertification Plan suggests that no more than \$50 million a year would have been required to counter much of the highlands' problem if the investment had been undertaken in due time. By contrast, the amount required to counter Ethiopia's famine during 1985 amounted to \$500 million for relief measures alone. Between 1976 and 1980 Ethiopia spent an average of \$225 million a year on military activities.

29/ Among international treaties specifically designed to protect the global commons from militarization are the *Antarctic Treaty* (1959); the *Moscow Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water* (1963); the *Outer Space Treaty* (1967); the *Treaty of Tlatelolco* (1967); the *Treaty on the Non Proliferation of Nuclear Weapons* (1968); and the *Sea Bed Treaty* (1971).

# **Our Common Future, Chapter 12: Towards Common Action: Proposals For institutional and Legal Change**

## ***I. The Challenge for Institutional and Legal Change***

- 1. Shifting the Focus to the Policy Sources***
- 2. New Imperatives for International Cooperation***

## ***II. Proposals for Institutional and Legal Change***

### ***1. Getting at the Sources***

#### ***1.1 National Policies and Institutions***

#### ***1.2 Regional and Interregional Action***

#### ***1.3 Global Institutions and Programmes***

### ***2. Dealing With the Effects***

#### ***2.1 National Environmental Protection and Natural Resources Management Agencies***

#### ***2.2 Strengthen the United Nations Environment Programme***

##### ***2.2.1 Focus on Environmental Protection Issues***

##### ***2.2.2 Priority to Global Environmental Assessment and Reporting***

##### ***2.2.3 Strengthen International Environmental Cooperation***

##### ***2.2.4. Increase the Revenue and Focus of the Environment Fund***

### ***3. Assessing Global Risks***

### ***4. Making Informed Choices***

#### ***4.1 Increase the Role of the Scientific Community and Non-Governmental Organizations***

#### ***4.2 Increase Cooperation with Industry***

## **5. *Providing the Legal Means***

### **5.1 *Recognizing Rights and Responsibilities***

### **5.2 *A Universal Declaration and a Convention on Environmental Protection and Sustainable Development***

### **5.3 *Strengthen and Extend Existing International Conventions and Agreements***

### **5.4 *Avoiding and Settling Environmental Disputes***

## **6. *Investing in Our Future***

### **6.1 *National Action***

### **6.2 *International Action***

#### *6.2.1 Reorienting Multilateral Financial Institutions*

#### *6.2.2 Reorienting Bilateral Aid Agencies*

#### *6.2.3 New Sources of Revenue and Automatic Financing*

## **III. *A Call for Action***

1. In the middle or the 20th century, we saw our planet from space for the first time. Historians may eventually find that this vision had a greater impact on thought than did the Copernican revolution of the 16th century, which upset humans' self-image by revealing that the Earth is not the centre of the universe. From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery, and soils. Humanity's inability to fit its activities into that pattern is changing planetary systems fundamentally. Many such changes are accompanied by life-threatening hazards, from environmental degradation to nuclear destruction. These new realities, from which there is no escape, must be recognized - and managed.

2. The issues we have raised in this report are inevitably of far reaching importance to the quality of life on earth - indeed to life itself. We have tried to show how human survival and well-being could depend on success in elevating sustainable development to a global ethic. In doing so, we have called for such major efforts as greater willingness and cooperation to combat international poverty, to maintain peace and enhance security world-wide, and to manage the global commons. We have called for national and international action in respect of population, food, plant and animal species, energy, industry, and urban settlements. The previous chapters have described the policy directions required.

3. The onus for action lies with no one group of nations. Developing countries face the challenges of desertification, deforestation, and pollution, and endure most of the poverty associated with environmental degradation. The entire human family of nations would suffer from the disappearance of rain forests in the tropics, the loss of plant and animal species, and



changes in rainfall patterns. Industrial nations face the challenges of toxic chemicals, toxic wastes, and acidification. All nations may suffer from the releases by industrialized countries of carbon dioxide and of gases that react with the ozone layer, and from any future war fought with the nuclear arsenals controlled by those nations. All nations will also have a role to play in securing peace, in changing trends, and in righting an international economic system that increases rather than decreases inequality, that increases rather than decreases numbers of poor and hungry.

In the case of environmental problems, it is obvious that the problems cannot be solved by one group, one group working in separation. You cannot say because people are dying of poisoning, it is the Ministry of Health that will solve it. Or to say because it comes from factories, it is the Ministry of Industry. That is impossible.

I think the problems need a more holistic approach. The United Nations Organization, as a professional organization, has developed this fragmentation. It started automatically with no bad intention at all. But at the same time, the member countries requested and national bodies also requested entry points in recipient countries. So WHO corresponds with the Ministry of Health, UNESCO corresponds with the Ministry of Education, FAO corresponds with the Ministry of Agriculture the fragmentation is getting worse.

Speaker from the floor  
Government Agency  
WCED Public Hearing  
Jakarta, 26 March 1985

4. The time has come to break out of past patterns. Attempts to maintain social and ecological stability through old approaches to development and environmental protection will increase instability. Security must be sought through change. The Commission has noted a number of actions that must be taken to reduce risks to survival and to put future development on paths that are sustainable.

5. Without such reorientation of attitudes and emphasis, little can be achieved. We have no illusions about 'quick-fix' solutions. We have tried to point out some pathways to the future. But there is no substitute for the journey itself, and there is no alternative to the process by which we retain a capacity to respond to the experience it provides. We believe this to hold true in all the areas covered in this report. But the policy changes we have suggested have institutional implications, and it is to these we now turn emphasizing that they are a complement to, not a substitute for, the wider policy changes for which we call. Nor do they represent definitive solutions, but rather first steps in what will be a continuing process.

6. In what follows we put forward, in the first place, what are essentially conceptual guidelines for institutions at the national level. We recognize that there are large differences among countries in respect of population size, resources, income level, management capacity, and institutional traditions, only governments themselves can formulate the changes they should make. Moreover, the tools for monitoring and evaluating sustainable development are rudimentary and require further refinement.

7. We also address, in more specific terms, the question of international institutions. The preceding chapters have major implications for international cooperation and reforms, both

economic and legal. The international agencies clearly have an important role in making these changes effective, and we endeavour to set out the institutional implications, especially as regards the United Nations system.

## **I. The Challenge for Institutional and Legal Change**

### **1. Shifting the Focus to the Policy Sources**

8. The next few decades are crucial for the future of humanity. Pressures on the planet are now unprecedented and are accelerating at rates and scales new to human experience: a doubling of global population in a few decades, with most of the growth in cities; a five- to tenfold increase in economic activity in less than half a century; and the resulting pressures for growth and changes in agricultural, energy, and industrial systems. Opportunities for more sustainable forms of growth and development are also growing. New technologies and potentially unlimited access to information offer great promise.

9. Each area of change represents a formidable challenge in its own right, but the fundamental challenge stems from their systemic character. They lock together environment and development, once thought separate; they lock together 'sectors' such as industry and agriculture; and they lock countries together as the effects of national policies and actions spill over national borders. Separate policies and institutions can no longer cope effectively with these interlocked issues. Nor can nations, acting unilaterally.

10. The integrated and interdependent nature of the new challenges and issues contrasts sharply with the nature of the institutions that exist today. These institutions tend to be independent, fragmented, and working to relatively narrow mandates with closed decision processes. Those responsible for managing natural resources and protecting the environment are institutionally separated from those responsible for managing the economy. The real world of interlocked economic and ecological systems will not change; the policies and institutions concerned must.

11. This new awareness requires major shifts in the way governments and individuals approach issues of environment, development, and international cooperation. Approaches to environment policy can be broadly characterized in two ways. One, characterized as the 'standard agenda', reflects an approach to environmental policy, laws, and institutions that focuses on environmental effects. The second reflects an approach concentrating on the policies that are the sources of those effects.<sup>/1</sup> These two approaches represent distinctively different ways of looking both at the issues and at the institutions to manage them.

12. The effects-oriented 'standard agenda' has tended to predominate as a result of growing concerns about the dramatic decline in environmental quality that the industrialized world suffered during the 1950s and 1960s. New environmental protection and resource management agencies were added on to the existing institutional structures, and given mainly scientific staffs.<sup>/2</sup>

13. These environment agencies have registered some notable successes in improving environmental quality during the past two decades.<sup>/3</sup> They have secured significant gains in monitoring and research and in defining and understanding the issues in scientific and technical terms. They have raised public awareness, nationally and internationally. Environmental laws have induced innovation and the development of new control technologies, processes, and products in most industries, reducing the resource content of growth.<sup>/4</sup>

14. However, most of these agencies have been confined by their own mandates to focusing almost exclusively on the effects. Today, the sources of these effects must be tackled. While these existing environmental protection policies and agencies must be maintained and even strengthened, governments now need to take a much broader view of environmental problems and policies.

15. Central agencies and major sectoral ministries play key roles in national decision making. These agencies have the greatest influence on the form, character, and distribution of the impacts of economic activity on the environmental resource base. It is these agencies, through their policies and budgets, that determine whether the environmental resource base is enhanced or degraded and whether the planet will be able to support human and economic growth and change into the next century.

16. The mandated goals of these agencies include increasing investment, employment, food, energy, and other economic and social goods. Most have no mandate to concern themselves with sustaining the environmental resource capital on which these goals depend. Those with such mandates are usually grouped in separate environment agencies or, sometimes, in minor units within sectoral agencies. In either case, they usually learn of new initiatives in economic and trade policy, or in energy and agricultural policy, or of new tax measures that will have a severe impact on resources, long after the effective decisions have been taken. Even if they were to learn earlier, most lack the authority to ensure that a given policy is implemented.

17. Environmental protection and sustainable development must be an integral part of the mandates of all agencies of governments, of international organizations, and of major private-sector institutions. These must be made responsible and accountable for ensuring that their policies, programmes, and budgets encourage and support activities that are economically and ecologically sustainable both in the short and longer terms. They must be given a mandate to pursue their traditional goals in such a way that those goals are reinforced by a steady enhancement of the environmental resource base of their own national community and of the small planet we all share.

## **2. New Imperatives for International Cooperation**

18. National boundaries have become so porous that traditional distinctions between local, national, and international issues have become blurred. Policies formerly considered to be exclusively matters of 'national concern' now have an impact on the ecological bases of other nations' development and survival. Conversely, the growing reach of some nations' policies - economic, trade, monetary, and most sectoral policies - into the 'sovereign' territory of other nations limits the affected nations' options in devising national solutions to their 'own' problems. This fast-changing context for national action has introduced new imperatives and new opportunities for international cooperation.

19. The international legal framework must also be significantly strengthened in support of sustainable development. Although international law related to environment has evolved rapidly since the *1972 Stockholm Conference*, major gaps and deficiencies must still be overcome as part of the transition to sustainable development. Much of the evidence and conclusions presented in earlier chapters of this report calls into question not just the desirability but even the feasibility of maintaining an international system that cannot prevent one or several states from damaging the ecological basis for development and even the prospects for survival of any other or even all other states.

20. However, just at the time when nations need increased international cooperation, the will to cooperate has sharply declined. By the mid-1980s, multilateral institutions were under siege for many, and often contradictory, reasons. The UN system has come under increasing attack for either proposing to do too much or, more frequently, for apparently doing too little. Conflicting national interests have blocked significant institutional reforms and have increased the need for fundamental change.<sup>5</sup> By the mid-1980s, funds for many international organizations had levelled off or declined in both relative and absolute terms.

21. Bilateral development assistance has declined as a percentage of GNP in many industrial countries, falling even further below the targets proposed in the early 1970s.<sup>6</sup> The benefits and effectiveness of aid have come under serious question, in part because of criticism based on environmental considerations.<sup>7</sup> Yet, sustainable development creates the need for even greater international aid and cooperation.

22. Nations must now confront a growing number, frequency, and scale of crises. A major reorientation is needed in many policies and institutional arrangements at the international as well as national level. The time has come to break away. Dismal scenarios of mounting destruction of national and global potential for development - indeed, of the Earth's capacity to support life - are not inescapable destiny. One of the most hopeful characteristics of the changes the world is racing through is that invariably they reflect great opportunities for sustainable development, providing that institutional arrangements permit sustainable policy options to be elaborated, considered, and implemented.

## **II. Proposals for Institutional and Legal Change**

23. The ability to choose policy paths that are sustainable requires that the ecological dimensions of policy be considered at the same time as the economic, trade, energy, agricultural, industrial, and other dimensions - on the same agendas and in the same national and international institutions. That is the chief institutional challenge of the 1990s.

24. There are significant proposals for institutional and legal change in previous chapters of our report. The Commission's proposals for institutional and legal change at the national, regional, and international levels are embodied in six priority areas:

- getting at the sources,
- dealing with the effects,
- assessing global risks,
- making informed choices,
- providing the legal means, and
- investing in our future.

Together, these priorities represent the main directions for institutional and legal change needed to make the transition to sustainable development. Concerted action is needed under all six.

### **1. Getting at the Sources**

## 1.1 National Policies and Institutions

25. The way countries achieve sustainable development will vary among the many different political and economic systems around the world. Governments differ greatly in their capacity to monitor and evaluate sustainable development, and many will need assistance. Several features should be common to most countries.

26. Sustainable development objectives should be incorporated in the terms of reference of those cabinet and legislative committees dealing with national economic policy and planning as well as those dealing with key sectoral and international policies. As an extension of this, the major central economic and sectoral agencies of governments should now be made directly responsible and fully accountable for ensuring that their policies, programmes, and budgets support development that is ecologically as well as economically sustainable.

27. Where resources and data permit, an annual report and an audit on changes in environmental quality and in the stock of the nation's environmental resource assets are needed to complement the traditional annual fiscal budget and economic development plans.<sup>/8</sup> These are essential to obtain an accurate picture of the true health and wealth of the national economy, and to assess progress towards sustainable development.<sup>/9</sup>

All governments should develop a 'foreign policy for the environment' as one major way of improving the international coordination of national environmental policies.

But in the long-term perspective, and here I think the World Commission could have an important message, I think that it will be politically sound and wise to get support from the NGOs to prepare for changes that have to take place anyway sooner or later. So I think it would be politically wise to look into that in a much broader way than what has been done so far.

Mats Segnestam  
Swedish Society for the Conservation of Nature  
WCED Public Hearing  
Oslo, 24-25 June 1985

28. Governments who have not done so should consider developing a 'foreign policy for the environment'.<sup>/10</sup> A nation's foreign policy needs to reflect the fact that its policies have a growing impact on the environmental resource base of other nations and the commons, just as the policies of other nations have an impact on its own. This is true of certain energy, agricultural, and other sectoral policies discussed in this report, as well as certain foreign investment, trade, and development assistance policies and those concerning the import or export of hazardous chemicals, wastes, and technology.

## 1.2 Regional and Interregional Action

29. The existing regional and subregional organisations within and outside the UN system need to be strengthened and made responsible and accountable for ensuring that their programmes and budgets encourage and support sustainable development policies and

practices. In some areas, however, especially among developing countries, new regional and subregional arrangements will be needed to deal with transboundary environmental resource issues.

30. Some countries already enjoy comparatively well developed bilateral and regional structures, although many of them lack the mandate and support required to carry out the greatly expanded role they must assume in the future. These include many specialized bilateral organizations such as the Canada/USA International Joint Commission; subregional agencies in Europe such as the different Commissions for the Rhine River, the Danube River, and the Baltic Sea; and organizations such as the CMEA, OECD, and EEC. These bodies provide member countries with a strong foundation on which to build. Although most of them have effective programmes for international cooperation on environmental protection and natural resources management, these programmes will need to be strengthened and adapted to new priorities. The regional organizations in particular need to do more to integrate environment fully in their macroeconomic, trade, energy, and other sectoral programmes.

31. Similar organizations among developing countries should be strengthened, particularly at bilateral and subregional levels. Organizations such as the Organization of African Unity, the Southern Africa Development Coordination Conference, the Gulf Cooperation Council, the Arab League, the Organisation of American States, the Association of South East Asian Nations, and the South Asian Association for Regional Cooperation could work together to develop contingency plans and the capacity to respond quickly to critical situations and issues. They need in such bodies to develop comparable economic and environmental statistics, base-line quantity and quality surveys of shared resources, and early-warning capabilities to reduce environment and development hazards. They could develop and apply in concert basic common principles and guidelines concerning environmental protection and resource use, particularly with respect to foreign trade and investment. In this respect, developing countries have much to gain through sharing their common experiences and taking common action.

32. A new focus on the sustainable use and management of transboundary ecological zones, systems, and resources is also needed. There are, for example, over 200 distinct biogeographic zones in the world. Moreover, most non-island countries in the world share at least one international river basin. The entire national territories of nearly one-quarter of those countries is part of an international river, basin. Yet over one-third of the 200 major international river basins in the world are not covered by any international agreement, and fewer than 30 have any cooperative institutional arrangements. These gaps are particularly acute in Africa, Asia, and Latin America, which together have 144 international river basins./11

33. Governments, directly and through UNEP and IUCN, should support the development of regional and subregional cooperative arrangements for the protection and sustained use of transboundary ecological systems with joint action programmes to combat common problems such as desertification and acidification.

### **1.3 Global Institutions and Programmes**

34. At the global level, an extensive institutional capacity exists that could be redirected towards sustainable development. The United Nations, as the only intergovernmental organization with universal membership, should clearly be the locus for new institutional initiatives of a global character.

35. Although the funds flowing to developing countries through UN programmes represents a

relatively small portion of total ODA flows, the UN can and should be a source of significant leadership in the transition to sustainable development and in support of developing countries in effecting this transition. Under existing conditions the UN system's influence is often fragmented and less effective than it might be because of the independent character of the specialized agencies and endemic weaknesses of coordination. However, recent moves towards organizational reform and greater economy and efficiency could improve the capacity of the UN to provide this leadership, and should include sustainable development as an important criterion.

In retrospect, even if the institutional and policy goals of the decade had been achieved, one is left with the feeling that most developing countries would be only marginally better off than they are today. The reason for this is a striking and humbling one. Although governments, environmentalists, and the aid agencies kept their eye on the environmental ball during the 1970s and the early 1980s, recent events have starkly demonstrated that they were watching the wrong ball. While the world was worrying about the environmental impacts of investments, controlling pollution, and conserving resources, we collectively failed to notice the dramatic decline in what had complacently been called 'renewable resources'.

David Runnals  
International Institute for Environment and Development  
WCED Public Hearing  
Ottawa, 26-27 May 1986

36. All major international bodies and agencies of the UN system should be made responsible and accountable for ensuring that their programmes and budgets encourage and support development policies and practices that are sustainable. Governments, through parallel resolutions in the respective governing bodies, should now begin to reorient and refocus the mandates, programmes, and budgets of key agencies to support sustainable development. They should also insist on much greater coordination and cooperation among them.

37. Each agency will need to redeploy some staff and financial resources to establish a small but high-level centre of leadership and expertise. That centre should be linked to the programme planning and budget processes.

38. Each agency should be directly responsible (or ensuring that the environmental and resource aspects of programmes and projects are properly taken into account when they are being planned, and that the financial resources needed are provided directly from its own budget. In line with these new responsibilities, the following bodies should also assume full financial responsibility within their own budgets for certain programmes presently supported by the Environment Fund of UNEP: WHO on 'Environmental Health', FAO on 'Agricultural Chemicals and Residues', UNDRO on 'Natural Disasters', UNIDO on 'Industry and Transport', ILO on 'Working Environment', UNDA on 'Arms Race and the Environment', DIESA on 'Environmental Aspects of Development Planning and Cooperation', UNESCO on 'Education', and UNDP on 'Technical Cooperation'. UNEP (discussed extensively in the next section) should continue to cooperate closely with these agencies and help identify new programme needs and monitor performance.

39. As in each agency, there is also a need for a high-level centre of leadership for the UN system as a whole with the capacity to assess, advise, assist, and report on progress made and needed for sustainable development. That leadership should be provided by the Secretary-

General of the United Nations Organization.

40. Governments at the UN General Assembly should therefore take the necessary measures to reinforce the system-wide responsibility and authority of the UN Secretary-General concerning interagency coordination and cooperation generally, and for achieving sustainable development specifically. This will require that the representatives of those same governments in the governing bodies of all major UN organizations and specialized agencies take complementary measures. This could be done as an integral part of the parallel resolutions just proposed on building sustainable development objectives and criteria into the mandates, programmes, and budget of each agency

41. To help launch and guide the interagency coordination and cooperation that will be needed, the UN Secretary-General should constitute under his chairmanship a special UN Board for Sustainable Development. The principal function of the Board would be to agree on combined tasks to be undertaken by the agencies to deal effectively with the many critical issues of sustainable development that cut across agency and national boundaries.

## **2. Dealing With the Effects**

42. Governments should also strengthen the role and capacity of existing environmental protection and resource management agencies./<sup>12</sup>

### **2.1 National Environmental Protection and Natural Resources Management Agencies**

43. Strengthening of environmental agencies is needed most urgently in developing countries. Those that have not established such agencies should do so as a matter of priority. In both cases, bilateral and multilateral organizations must be prepared to provide increased assistance for institutional development. Some of this increased financial support should go to community groups and NGOs, which are rapidly emerging as important and cost-effective partners in work to protect and improve the environment locally and nationally, and in developing and implementing national conservation strategies.

44. Industrialized countries also need greatly strengthened environmental protection and resource management agencies. Most face a continuing backlog of pollution problems and a growing range of environment and resource management problems too. In addition, these agencies will be called upon to advise and assist central economic and sectoral agencies as they take up their new responsibilities for sustainable development. Many now provide institutional support, technical advice, and assistance to their counterpart agencies in developing countries, and this need will grow. And, almost inevitably, they will play a larger and more direct role in international cooperation, working with other countries and international agencies trying to cope with regional and global environmental problems.

### **2.2 Strengthen the United Nations Environment Programme**

45. When UNEP was established in 1972, the UN General Assembly gave it a broad and challenging mandate to stimulate, coordinate, and provide policy guidance for environmental action throughout the UN system./<sup>13</sup> That mandate was to be carried out by a Governing Council of 58 member states, a high-level UN interagency Environment Coordination Board (ECB),/<sup>14</sup> a relatively small secretariat located in Nairobi, and a voluntary fund set initially at a



level of \$100 million for the first five years. UNEP's principal task was to exercise leadership and a catalytic influence on the programmes and projects of other international organizations, primarily in but also outside the UN system. Over the past 10 years, the Environment Fund has levelled off at around \$30 million annually, while its range of tasks and activities have increased substantially.

46. This Commission has recommended a major reorientation and refocusing of programmes and budgets on sustainable development in and among all UN organizations. Within such a new system-wide commitment to and priority effort on sustainable development, UNEP should be the principal source on environmental data, assessment, reporting, and related support for environmental management as well as be the principal advocate and agent for change and cooperation on critical environment and natural resource protection issues. The major priorities and functions of UNEP should be:

- to provide leadership, advice, and guidance in the UN system on restoring, protecting, and improving the ecological basis for sustainable development;
- to monitor, assess, and report regularly on changes in the state of the environment and natural resources (through its EarthWatch programme);
- to support priority scientific and technological research on critical environmental and natural resource protection issues;
- to develop criteria and indicators for environmental quality standards and guidelines for the sustainable use and management of natural resources;
- to support and facilitate the development of action plans for key ecosystems and issues to be implemented and financed by the governments directly concerned;
- to encourage and promote international agreements on critical issues identified by Earthwatch and to support and facilitate the development of international law, conventions, and cooperative arrangements for environmental and natural resource conservation and protection;
- to support the development of the institutional and professional capacity of developing countries in all of these areas and help them develop specific programmes to deal with their problems and advise and assist development assistance agencies in this respect; and
- to provide advice and assistance to the United Nations Development Programme, the World Bank, and other UN organizations and agencies regarding the environmental dimensions of their programmes and technical assistance projects, including training activities.

The environment has quickly deteriorated in certain areas and we don't know where to put the thresholds for nature's tolerance. We must move very fast towards a consensus on the necessity for taking urgent action. There is a strong popular support for this in our country. The findings of several opinion polls tell us that ecological issues have heightened priority. People feel anxious about the legacy our generation will be passing on to the next one. A new environmental awareness has germinated among large sections of the community and mainly among young people.

Dr. Litre V. Nagy  
Environment Protection Committee of the Patriotic People's Front, Hungary  
WCED Public Hearing  
Moscow, 6 Dec 1986

### **2.2.1 Focus on Environmental Protection Issues**

47. UNEP has been a key agent in focusing the attention of governments on critical environmental problems (such as deforestation and marine pollution), in helping develop many global and regional action plans and strategies (as on desertification), in contributing to the negotiation and implementation of international conventions (on *Protection of the Ozone Layer*, for example), and in preparing global guidelines and principles for action by governments (such as on marine pollution from land-based sources). UNEP's Regional Seas Programme has been particularly successful, and could serve as a model for some other areas of special concern, especially international river basins.

48. UNEP's catalytic and coordinating role in the UN system can and should be reinforced and extended. In its future work in critical environmental protection issues, UNEP should focus particularly on:

- developing, testing, and helping to apply practical and simple methodologies for environmental assessment at project and national levels;
- extending international agreements (such as on chemicals and hazardous wastes) more widely;
- extending the Regional Seas Programme;
- developing a similar programme for international river basins; and
- identifying the need for and advising other UN organizations and agencies in establishing and carrying out technical assistance and training courses for environmental protection and management.

### **2.2.2 Priority to Global Environmental Assessment and Reporting**

49. Although more is known about the state of the global environment now than a decade ago, there are still major gaps and a limited international capability for monitoring, collecting, and combining basic and comparable data needed for authoritative overviews of key environmental issues and trends. Without such, the information needed to help set priorities and develop effective policies will remain limited.

50. UNEP, as the main UN source for environmental data, assessment, and reporting, should guide the global agenda for scientific research and technological development "or environmental protection. To this end, the data collection, assessment, and state of the environment reporting sections (Earthwatch) of UNEP need to be significantly strengthened as a major priority. The Global Environment Monitoring System should be expanded as rapidly as possible, and the development of the Global Resource Information Database should be accelerated to bridge the gap between environmental assessment and management. Special priority should be accorded to providing support to developing countries to enable them to participate fully in and derive maximum benefits from these programmes.

### **2.2.3 Strengthen International Environmental Cooperation**

51. The UNEP Governing Council cannot fulfil its primary role of providing leadership and policy guidance in the UN system nor have a significant influence on national policies unless governments increase their participation and the level of representation. National delegations to future meetings should preferably be led by Ministers, with their senior policy and scientific advisers. Special provisions should be made for expanded and more meaningful participation by major non governmental organizations at future sessions.

### **2.2.4. Increase the Revenue and Focus of the Environment Fund**

52. The UNEP voluntary funding base of \$30 million annually is too limited and vulnerable for an international fund dedicated to serving and protecting the common interests, security, and future of humanity. Six countries alone provided over 75 per cent of the 1985 contributions to the Environment Fund (the United States, Japan, USSR, Sweden, FRG, and UK).<sup>/15</sup> Considering the critical importance of renewed efforts on environmental protection and improvement, the Commission appeals to all governments to substantially enlarge the Environment Fund both through direct contributions by all members of the UN and through some of the sources cited later in this chapter in the section 'Investing in Our Future'.

53. A substantial enlargement of the Environment Fund seems unlikely in the current climate of financial austerity. Any additional funds made available by states for UN development programmes and activities will likely be channelled largely through UNDP and the development programmes of other UN agencies. Moreover, as recommended earlier, the budgets of all of those agencies should be deployed so that environmental considerations are built into the planning and implementation of all programmes and projects.

54. The Environment Fund can be made more effective by refocusing the programme on fewer activities. As other UN agencies assume full responsibility for certain activities now provided through the Environment Fund and finance them entirely from their own budgets, some resources will be released for other purposes. These should be concentrated on the principal functions and priority areas identified earlier.

55. Expanding support and cooperation with NGOs capable of carrying out elements of UNEP's programme will also increase the effectiveness of the Environment Fund. Over the last decade, non-governmental organizations and networks have become increasingly important in work to improve environmental protection locally, nationally, and internationally. However, financial support from the Environment Fund for cooperative projects with NGOs declined in both absolute and relative terms in the last 10 years, from \$4.5 million (23 per cent of the Fund) in 1976 to \$3.6 million (13 per cent) in 1985.<sup>/16</sup> The amount and proportion of Environment Fund resources for cooperation and projects with NGOs should be significantly increased by using the capacities of those NGOs that can contribute to UNEP's programmes on a cost-effective basis.

## **3. Assessing Global Risks**

56. The future - even a sustainable future - will be marked by increasing risk.<sup>/17</sup> The risks associated with new technologies are growing.<sup>/18</sup> The numbers, scale, frequency, and impact of natural and human-caused disasters are mounting.<sup>/19</sup> The risks of irreversible damage to natural systems regionally (for example through acidification, desertification, or deforestation) and globally (through ozone layer depletion or climate change) are becoming significant.<sup>/20</sup>

57. Fortunately, the capacity to monitor and map Earth change and to assess risk is also growing rapidly. Data from remote sensing platforms in space can now be merged with data from conventional land-based sources. Augmented by digital communications and advanced information analysis, photos, mapping, and other techniques, these data can provide up-to-date information on a wide variety of resource, climatic, pollution, and other variables.<sup>/21</sup> High-speed data communications technologies, including the personal computer, enable this information to be shared by individuals as well as corporate and governmental users at costs that are steadily falling. Concerted efforts should be made to ensure that all nations gain access to them and the information they provide either directly or through the UNEP Earthwatch and other special programmes.

58. Governments, individually and collectively, have the principal responsibility to collect their information systematically and use it to assess risks, but to date only a few have developed a capacity to do so. Some intergovernmental agencies have a capacity to collect and assess information required for risk assessment, such as FAO on soil and forest cover and on fisheries; WMO on climate; UNEP on deserts, pollutants, and regional seas; quasi-governmental organizations like IUCN have a similar capacity. These are only a few examples from a long list. But no intergovernmental agency has been recognized as the centre of leadership to stimulate work on risk assessment and to provide an authoritative source of reports and advice on evolving risks. This gap needs to be filled both within and among governments. Beyond our proposal that the global environment assessment and reporting functions of UNEP should be significantly strengthened, the Commission would now propose that UNEP's Earthwatch be recognized as the centre of leadership on risk assessment in the UN system.

59. But neither UNEP nor other intergovernmental organizations can be expected to carry out these important functions alone. To be effective, given the politically sensitive nature of many of the most critical risks, intergovernmental risk assessment needs to be supported by independent capacities outside of government. Several national science academies and international scientific groups such as ICSU and its Scientific Committee on Problems of the Environment, with special programmes such as the newly inaugurated International Geosphere-Biosphere Programme (see *Chapter 10*); the Man and the Biosphere Programme of UNESCO; quasi-governmental bodies such as IUCN; and certain industry groups and NGOs are active in this field. But, again, there is no recognized international non-governmental centre of leadership through which the efforts of these groups can be focused and coordinated.

60. During the 1970s, the growing capacity of computers led various governments, institutes, and international bodies to develop models for integrated policy analysis. They have provided significant insights and offer great promise as a means of anticipating the consequences of interdependent trends and of establishing the policy options to address them.<sup>/22</sup> Without suggesting any relationship between them, early attempts were all limited by serious inconsistencies in the methods and assumptions employed by the various sources on which they depended for data and information.<sup>/23</sup> Although significant improvements have been made in the capability of models and other techniques, the data base remains weak.<sup>/24</sup>

61. There is an urgent need to strengthen and focus the capacities of these and other bodies to complement and support UNEP's monitoring and assessment functions by providing timely, objective, and authoritative assessments and public reports on critical threats and risks to the world community. To meet this need, we recommend the establishment of a Global Risks Assessment Programme:

- to identify critical threats to the survival, security, or well-being of all or a majority of

people, globally or regionally;

- to assess the causes and likely human, economic, and ecological consequences of those threats, and to report regularly and publicly on their findings;
- to provide authoritative advice and proposals on what should or must be done to avoid, reduce, or, if possible, adapt to those threats; and
- to provide an additional source of advice and support to governments and intergovernmental organizations for the implementation of programmes and policies designed to address such threats.

62. The Global Risk Assessment Programme would not require the creation of a new international institution as such, as it should function primarily as a mechanism for cooperation among largely non-governmental national and international organizations, scientific bodies, and industry groups. To provide intellectual leadership and guide the programme, there should be a steering group composed of eminent individuals who together would reflect a broad cross-section of the major areas of knowledge, vocations, and regions of the world, as well as the major bodies active in the field.

63. The steering group would serve as the focal point for identifying the risks to be addressed by the programme, agreeing on the research needed to assess those risks, and coordinating the work among the various participating bodies. It could form special consortia and task forces made up of experts from these bodies and it would also establish special expert and advisory groups consisting of world-known authorities in specialized areas of science, economics, and law. The steering group would be responsible for the overall evaluation of results, for their wide dissemination, and for follow-up activities.

64. The steering group would also be charged with helping mobilize funds for implementing the programme through contributions by the Environment Fund of UNEP, states, foundations, and other private sources. Funding would principally be for the purpose of financing the various activities that would be carried out by other organizations as part of the programme, with only a small portion required to meet the costs of the steering group.

#### **4. Making Informed Choices**

65. As is evident from this report, the transition to sustainable development will require a range of public policy choices that are inherently complex and politically difficult. Reversing unsustainable development policies at the national and international level will require immense efforts to inform the public and secure its support. The scientific community, private and community groups, and NGOs can play a central role in this.

If the NGO community is to translate its commitment to sustainable development into effective action, we will need to see a matching level of commitment from the governmental and intergovernmental communities, in genuine partnership with NGOs. The success and cost-effectiveness of NGO action is to an important degree a function of their spontaneity and freedom of action.

Both among NGOs and amongst governments, we must find ways to engender a new period of international cooperation. The urgency of our tasks no longer permits us to spill our energies in fruitless and destructive conflict. Whilst we fight our wars of ideology on the face of this planet, we are losing our productive

relationship with the planet itself.

David Bull  
Environmental Liaison Centre  
WCED Public Hearing  
Nairobi, 23 Sept 1986

#### **4.1 Increase the Role of the Scientific Community and Non-Governmental Organizations**

66. Scientific groups and NGOs have played - with the help of young people/<sup>25</sup> - a major part in the environmental movement from its earliest beginnings. Scientists were the first to point out evidence of significant environmental risks and changes resulting from the growing intensity of human activities. Other non-governmental organizations and citizens' groups pioneered in the creation of public awareness and political pressures that stimulated governments to act. Scientific and non-governmental communities played a vital role in the *United Nations Conference on the Human Environment in Stockholm*./<sup>26</sup>

67. These groups have also played an indispensable role since the Stockholm Conference in identifying risks, in assessing environmental impacts and designing and implementing measures to deal with them, and in maintaining the high degree of public and political interest required as a basis for action. Today, major national 'State of the Environment' reports are being published by some NGOs (in Malaysia, India, and the United States, for instance)./<sup>27</sup> Several international NGOs have produced significant reports on the status of and prospects for the global environment and natural resources./<sup>28</sup>

68. The vast majority of these bodies are national or local in nature, and a successful transition to sustainable development will require substantial strengthening of their capacities. To an increasing extent, national NGOs draw strength from association with their counterparts in other countries and from participation in international programmes and consultations. NGOs in developing countries are particularly in need of international support - professional and moral as well as financial - to carry out their roles effectively.

69. Many international bodies and coalitions of NGOs are now in place and active. They play an important part in ensuring that national NGOs and scientific bodies have access to the support they require. These include regional groups providing networks linking together environment and development NGOs in Asia, Africa, Eastern and Western Europe, and North and South America. They also include a number of regional and global coalitions on critical issues such as pesticides, chemicals, rain, seeds, genetic resources, and development assistance. A global network for information exchange and joint action is provided through the Environment Liaison Centre (ELC) in Nairobi. ELC has over 230 NGO member groups, with the majority from developing countries, and is in contact with 7,000 others.

70. Only a few international NGOs deal on a broad basis with both environment and development issues, but this is changing rapidly. One of them, the International Institute for Environment and Development, has long specialized in these issues and pioneered the conceptual basis for the environment/development relationship. Most of them work with and support related organizations in the developing world. They facilitate their participation in international activities and their links with counterparts in the international community. They provide instruments for leadership and cooperation among a wide variety of organizations in their respective constituencies. These capabilities will be ever more important in the future.

An increasing number of environment and development issues could not be tackled without them.

71. NGOs should give a high priority to the continuation of their present networking on development cooperation projects and programmes, directed at the improvement of the performance of NGO bilateral and multilateral development programmes. They could increase their efforts to share resources, exchange skills, and strengthen each other's capacities through greater international cooperation in this area. In setting their own house in order, 'environment' NGOs should assist 'development' NGOs in reorienting projects that degrade the environment and in formulating projects that contribute to sustainable development. The experience gained would provide a useful basis for continuing discussions with bilateral and multilateral agencies as to steps that these agencies might take to improve their performance.

72. In many countries, governments need to recognize and extend NGOs' right to know and have access to information on the environment and natural resources; their right to be consulted and to participate in decision making on activities likely to have a significant effect on their environment; and their right to legal remedies and redress when their health or environment has been or may be seriously affected.

73. NGOs and private and community groups can often provide an efficient and effective alternative to public agencies in the delivery of programmes and projects. Moreover, they can sometimes reach target groups that public agencies cannot. Bilateral and multilateral development assistance agencies, especially UNDP and the World Bank, should draw upon NGOs in executing programmes and projects. At the national level, governments, foundations, and industry should also greatly extend their cooperation with NGOs in planning, monitoring, and evaluating as well as in carrying out projects when they can provide the necessary capabilities on a cost-effective basis. To this end, governments should establish or strengthen procedures for official consultation and more meaningful participation by NGOs in all relevant intergovernmental organizations.

74. International NGOs need substantially increased financial support to expand their special roles and functions on behalf of the world community and in support of national NGOs. In the Commission's view, the increased support that will allow these organizations to expand their services represents an indispensable and cost-effective investment. The Commission recommends that these organizations be accorded high priority by governments, foundations, and other private and public sources of funding.

## **4.2 Increase Cooperation with Industry**

75. Industry is on the leading edge of the interface between people and the environment. It is perhaps the main instrument of change that affects the environmental resource bases of development, both positively and negatively. (See *Chapter 8*.) Both industry and government, therefore, stand to benefit from working together more closely.

76. World industry has taken some significant steps through voluntary guidelines concerning industry practices on environment, natural resources, science, and technology. Although few of these guidelines have been extended to or applied regionally in Africa, Asia, or Latin America, industry continues to address these issues through various international associations.

77. These efforts were advanced significantly by the 1984 World Industry Conference on Environmental Management (WICEM).<sup>29</sup> Recently, as a follow-up to WICEM, several major

corporations from a number of developed countries formed the International Environment Bureau to assist developing countries with their environment/development needs. Such initiatives are promising and should be encouraged. Cooperation between governments and industry would be further facilitated if they established joint advisory councils for sustainable development - for mutual advice, assistance, and cooperation in helping to shape and implement policy, laws, and regulations for more sustainable forms of development. Internationally, governments in cooperation with industry, and NGOs should work through appropriate regional organizations to develop basic codes of conduct for sustainable development, drawing on and extending relevant existing voluntary codes, especially in Africa, Asia, and Latin America.

78. The private sector also has a major impact on development through commercial bank loans from within and outside countries. In 1983, for example, the proportion of the total net receipts of developing countries from private sources, mostly in the form of commercial bank loans, was greater than all ODA that year. Since 1963, as indebtedness worsened, commercial bank lending to developing countries has declined.<sup>/30</sup>

79. Efforts are being made to stimulate private investment. These efforts should be geared to supporting sustainable development. The industrial and financial corporations making such investments, and the export credit, investment insurance, and other programmes that facilitate them, should incorporate sustainable development criteria into their policies.

## **5. Providing the Legal Means**

80. National and international law has traditionally lagged behind events. Today, legal regimes are being rapidly outdistanced by the accelerating pace and expanding scale of impacts on the environmental base of development. Human laws must be reformulated to keep human activities in harmony with the unchanging and universal laws of nature. There is an urgent need;

- to recognize and respect the reciprocal rights and responsibilities of individuals and states regarding sustainable development,
- to establish and apply new norms for state and interstate behaviour to achieve sustainable development,
- to strengthen and extend the application of existing laws and international agreements in support of sustainable development, and
- to reinforce existing methods and develop new procedures for avoiding and resolving environmental disputes.

### **5.1 Recognizing Rights and Responsibilities**

81. *Principle 1 of the 1972 Stockholm Declaration* said that 'Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being'.<sup>/31</sup> It further proclaimed the solemn responsibility of governments to protect and improve the environment for both present and future generations. After the Stockholm Conference, several states recognized in their Constitutions or laws the right to an adequate environment and the obligation of the state to protect that environment.



82. Recognition by states of their responsibility to ensure an adequate environment for present as well as future generations is an important step towards sustainable development. However, progress will also be facilitated by recognition of, for example, the right of individuals to know and have access to current information on the state of the environment and natural resources, the right to be consulted and to participate in decision making on activities likely to have a significant effect on the environment, and the right to legal remedies and redress for those whose health or environment has been or may be seriously affected.

What are we to do? It is axiomatic that we as individuals or groups of individuals share territory in resources. We need to define common norms of behaviour. This is true whether we are speaking of a family, small town, a province or country, or the world community. However, the definition of common norms of behaviour is not in itself sufficient for the creation of a body of rules and regulation.

To operate effectively, certain basic conditions must be fulfilled: the existence of a general will among members of the community to accept and adhere to regulations; the existence of a political framework not only for defining and quantifying common behaviour or norms, but also for adopting existing rules to change within the community; a means of determining compliance with international rules and regulations; and, finally, the means for enforcement.

Fergus Watt  
World Association of World Federalists  
WCED Public Hearing  
Ottawa, 26-27 May 1986

83. The enjoyment of any right requires respect for the similar rights of others, and recognition of reciprocal and even joint responsibilities. States have a responsibility towards their own citizens and other states:

- to maintain ecosystems and related ecological processes essential for the functioning of the biosphere;
- to maintain biological diversity by ensuring the survival and promoting the conservation in their natural habitats of all species of flora and fauna;
- to observe the principle of optimum sustainable yield in the exploitation of living natural resources and ecosystems;
- to prevent or abate significant environmental pollution or harm;
- to establish adequate environmental protection standards;
- to undertake or require prior assessments to ensure that major new policies, projects, and technologies contribute to sustainable development; and
- to make all relevant information public without delay in all cases of harmful or potentially harmful releases of pollutants, especially radioactive releases.

84. It is recommended that governments take appropriate steps to recognize these reciprocal rights and responsibilities.<sup>32</sup> However, the wide variation in national legal systems and

practices makes it impossible to propose an approach that would be valid everywhere. Some countries have amended their basic laws or constitution; others are considering the a 'option of a special national law or charter setting out the rights and responsibilities of citizens and the state regarding environmental protection and sustainable development Others may wish to consider the designation of a national council or public representative or 'ombudsman' to represent the interests and rights of present and future generations and act as an environmental watchdog, alerting governments and citizens to any emerging threats.

## **5.2 A Universal Declaration and a Convention on Environmental Protection and Sustainable Development**

85. Building on the *1972 Stockholm Declaration*, the *1982 Nairobi Declaration*, and many existing international conventions and General Assembly resolutions, there is now a need to consolidate and extend relevant legal principles in a new charter to guide state behaviour in the transition to sustainable development. It would provide the basis for, and be subsequently expanded into, a Convention, setting out the sovereign rights and reciprocal responsibilities of all states on environmental protection and sustainable development. The charter should prescribe new norms for state and interstate behaviour needed to maintain livelihoods and life on our shared planet, including basic norms for prior notification, consultation, and assessment of activities likely to have an impact on neighbouring states or global commons. These could include the obligation to alert and inform neighbouring states in the event of an accident likely to have a harmful impact on their environment. Although a few such norms have evolved in some bilateral and regional arrangements, the lack of wider agreement on such basic rules for interstate behaviour undermines both the sovereignty and economic development potential of each and all states.

86. We recommend that the General Assembly commit itself to preparing a universal Declaration and later a Convention on environmental protection and sustainable development. A special negotiating group could be established to draft a Declaration text for adoption in 1986. Once it is approved, that group could then proceed to prepare a Convention, based on and extending the principles in the Declaration, with the aim of having an agreed Convention text ready for signature by states within three to five years. To facilitate the early launching of that process the Commission has submitted for consideration by the General Assembly, and as a starting point for the deliberations of the special negotiating group, a number of proposed legal principles embodied in 22 Articles which were prepared by its group of international legal experts. These proposed principles are submitted to assist the General Assembly in its deliberations and have not been approved or considered in detail by the Commission. A summary of the principles and Articles appears as Annexe 1 of this report.

## **5.3 Strengthen and Extend Existing International Conventions and Agreements**

87. In parallel, governments should accelerate their efforts to strengthen and extend existing and more specific international conventions and cooperative arrangements by:

- acceding to or ratifying existing global and regional conventions dealing with environment and development, and applying them with more vigour and rigour;
- reviewing and revising those relevant conventions that need to be brought in line with the latest available technical and scientific information; and

- negotiating new global and regional conventions or arrangements aimed at promoting cooperation and coordination in the field of environment and development (including, for example, new conventions and agreements on climate change, on hazardous chemicals and wastes, and on preserving biological diversity).

Law does not stand alone. It depends on the functioning of many things. Experience from the past 15 years of development has taught us that there is a danger that bureaucracy with all its strength coming from the West, in Indonesia's case because of the oil and gas revenues, will strangle the community with so many laws. They have, for instance, laws that ask every gathering of five or more people to have permission from the police. Sometimes I feel that maybe the best government is the one who governs the least. In this case, I feel that sometimes the Asian countries learn from each other.

Adi Sasono  
Institute for Development Studies  
WCED Public Hearing  
Jakarta, 26 March 1985

88. It is recommended that the UNEP secretariat, in close cooperation with the IUCN Environmental Law Centre, should help in these efforts.

#### **5.4 Avoiding and Settling Environmental Disputes**

89. Many disputes can be avoided or more readily resolved if the principles, rights, and responsibilities cited earlier are built into national and international legal frameworks and are fully respected and implemented by many states. Individuals and states are more reluctant to act in a way that might lead to a dispute when, as in many national legal systems, there is an established and effective capacity as well as ultimately binding procedures for settling disputes. Such a capacity and procedures are largely lacking at the international level, particularly environmental and natural resource management issues./33

90. it is recommended that public and private organizations and NGOs help in this area by establishing special panels or rosters of experts with experience in various forms of dispute settlement and special competence on the legal and substantive aspects of environmental protection, natural resources management, and sustainable development. In addition, a consolidated inventory and referral system or network for responding to requests for advice and assistance should be established in avoiding or receiving such disputes.

91. To promote the peaceful and early settlement of international disputes on environmental and resource management problems, it is recommended that the following procedure be adopted. States should be given up to 18 months to reach mutual agreement on a solution or on a common dispute settlement arrangement. If agreement is not reached, then the dispute can be submitted to conciliation at the request of any one of the concerned states and, if still unresolved, thereafter to arbitration or judicial settlement.

92. This proposed new procedure raises the possibility of invoking a binding process of dispute settlement at the request of any state. Binding settlement is not the preferred method for settling international disputes. But such a provision is now needed not only as a last resort to avoid prolonged disputes and possible serious environmental damage, but also to

encourage and provide an incentive for all parties to reach agreement within a reasonable time on either a solution or a mutually agreed means, such as mediation.

93. The capabilities of the Permanent Court of Arbitration and the International Court of Justice to deal with environmental and resource management problems also should be strengthened. States should make greater use of the World Court's capacity under *Article 26 of its Statute* to form special chambers for dealing with particular cases or categories of cases, including environmental protection or resource management cases. The Court has declared its willingness and readiness to deal with such cases fully and promptly.

## **6. Investing in Our Future**

94. We have endeavoured to show that: it makes long-term economic sense to pursue environmentally sound policies. But potentially very large financial outlays will be needed in the short term in such fields as renewable energy development, pollution control equipment, and integrated rural development. Developing countries will need massive assistance for this purpose, and more generally to reduce poverty. Responding to this financial need will be a collective investment in the future

### **6.1 National Action**

95. Past experience teaches us that these outlays would be good investments. By the late 1960s, when some industrial countries began to mount significant environmental protection programmes, they had already incurred heavy economic costs in the form of damage to human health, property, natural resources, and the environment. After 1970, in order to roll back some of this damage, they saw expenditures on environmental pollution measurer, alone rise from about 0.3 per cent of GNP in 1970 to somewhere between 1.5 per cent and, in some countries, 2.0 per cent around the end of the decade. Assuming low levels of economic growth in the future, these same countries will probably have to increase expenditures on environmental protection somewhere between 20 to 100 per cent just to maintain current levels of environmental quality.<sup>/34</sup>

First, if the problems of environmental degradation and of poverty, particularly in the Third World, are to be solved, a continued economic development is essential. Second, we must reconcile environmental protection with economic growth. There is a growing consensus that this is perfectly possible and desirable. Third, there is also a great consensus that the application of strict environmental standards is good for economic growth, as well as for the environment, and that they encourage innovation, promote inventiveness and efficiency, and generate employment. Fourth, to achieve the goals of sustainable development, good environment, and decent standards of life for all involves very large changes in attitude.

Stanley Clinton-Davis  
Commissioner for Environment European Economic Community  
WCED Public Hearing  
Oslo, 24-25 June 1985

96. These figures relate only to expenditures to control environmental pollution.

Unfortunately, similar figures are not available on the level of expenditures made to rehabilitate lands and natural habitats, re-establish soil fertility, reforest areas, and undertake other measures to restore the resource base. But they would be substantial.

97. Nations, industrial and developing, that did not make these investments have paid much more in terms of damage costs to human health, property, natural resources, and the environment. And these costs continue to rise at an accelerating pace. Indeed, countries that have not yet instituted strong programmes now face the need for very large investments. Not only do they need to roll back the first generation of environmental damage, they also need to begin to catch up with the rising incidence of future damage. If they do not, their fundamental capital assets, their environmental resources, will continue to decline.

98. In strictly economic terms, the benefits of these expenditures have been generally greater than the costs in those countries that have made them.<sup>/35</sup> Beyond that, however, many of these countries found that economic, regulatory, and other environmental measures could be applied in ways that would result in innovation by industry. And those companies that did respond innovatively are today often in the forefront of their industry. They have developed new products, new processes, and entire plants that use less water, energy, and other resources per unit of output and are hence more economic and competitive.

99. Nations that begin to reorient major economic and sectoral policies along the lines proposed in this report can avoid much higher future levels of spending on environmental restoration and curative measures and also enhance their future economic prospects. By making central and sectoral agencies directly responsible for maintaining and enhancing environmental and resource stocks, expenditures for environmental protection and resource management would gradually be built into the budgets of those agencies for measures to prevent damage. The unavoidable costs of environmental and resource management would thus be paid only once.

We must have a true participation of all of the society in the decision-making and More particularly in the allocation of resources. And why so? because all of us are perfectly aware that there will never be sufficient resources for everything that we wish, but if the population participates in the decision making it will benefit those who need the most and it will express their thought about the allocation of resources and it will give us the certainty that that which is bring done is the legitimate aspiration of the people.

Aristides Marquee  
National Council for Urban Development  
WCED Public Hearing  
Brasilia, 30 Oct 1985

## **6.2 International Action**

100. Developing countries, as noted earlier, need a significant increase in financial support from international sources for environmental restoration, protection, and improvement and to help them through the necessary transition to sustainable development.

101. At the global level, there is an extensive institutional capacity to channel this support. This consists of the United Nations and its specialized agencies: the multilateral development

banks, notably the World Bank; other multilateral development cooperation organizations, such as those of the European Economic Community; national development assistance agencies, most of whom cooperate within the framework of the Development Assistance Committee of OECD or of OPEC; and other international groups, such as the Consultative Group on International Agricultural Research, that play an important role and influence on the quality and nature of development assistance. Together, the development organizations and agencies are responsible for the transfer of about \$35 billion of ODA annually to developing countries. In addition, they are the source of most technical assistance and policy advice and support to developing countries.

102. These organizations and agencies are the principal instruments through which the development partnership between industrial and developing countries operates and, collectively, their influence is substantial and pervasive. It is imperative that they play a leading role in helping developing countries make the transition to sustainable development. Indeed, it is difficult to envisage developing countries making this transition in an effective and timely manner without their full commitment and support.

### **6.2.1 Reorienting Multilateral Financial Institutions**

103. The World Bank, IMF, and Regional Development Banks warrant special attention because of their major influence on economic development throughout the world. As indicated in *Chapter 3*, there is an urgent need for much larger flows of concessional and non-concessional finance through the multilateral agencies. The role of the World Bank is especially important in this respect, both as the largest single source of development lending and for its policy leadership, which exerts a significant influence on both developing countries and donors. The World Bank has taken a significant lead in reorienting its lending programmes to a much higher sensitivity to environmental concerns and to support for sustainable development. This is a promising beginning. But it will not be enough unless and until it is accompanied by a fundamental commitment to sustainable development by the World Bank and the transformation of its internal structure and processes so as to ensure its capacity to carry this out. The same is true of other multilateral development banks and agencies.

104. The IMF also exerts a major influence on the development policies of developing countries and, as described in *Chapter 3*, there is deep concern in many countries that the conditions that accompany its lending are undermining sustainable development. It is therefore essential that the IMF, too, incorporate sustainable development objectives and criteria into its policies and programmes.

105. Several countries have already formally instructed their representatives on the Board of the World Bank to ensure that the environmental impacts of projects proposed for approval have been assessed and adequately taken into account. We recommend that other governments take similar action, not only with regard to the World Bank but also in the Regional Banks and the other institutions. In this way they can support the ongoing efforts within the Banks and other institutions to reorient and refocus their mandates, programmes, and budgets to support sustainable development. The transition to sustainable development by the development assistance agencies and the IMF would be facilitated by the establishment of a high-level office in each agency with the authority and resources to ensure that all policies, projects, and loan conditions support sustainable development, and to prepare and publish annual assessments and reports on progress made and needed. A first step is to develop simple methodologies for such assessments, recognizing that they are at present experimental and need further work.

106. In making these changes, the multilateral financial institutions fortunately have some base on which to build. In 1980, they endorsed a Declaration of Environmental Policies and Procedures Relating to Economic Development. Since then they have been meeting and consulting through the Committee of International Development Institutions on the Environment (CIDIE).<sup>/36</sup> Some have articulated clear policies and project guidelines for incorporating environmental concerns and assessments into their planning and decision making, but only a few have assigned staff and resources to implementing them, notably the World Bank, which is now considering even further institutional changes to strengthen this work. Overall, as pointed out by the UNEP Executive Director in his statement reviewing the first five years of work. CIDIE has not yet truly succeeded in getting environmental considerations firmly ingrained in development policies. "There has been a distinct lack of action by several multilaterals." CIDIE members have "gone along with the Declaration in principle more than in major shifts in action."<sup>/37</sup>

107. In order to marshal and support investing its in conservation projects and national conservation strategies that enhance the resource base for development, serious consideration should be given to the development of a special international banking programme or facility<sup>/38</sup> linked to the World Bank. Such a special conservation banking programme or facility could provide loans and facilitate joint financing arrangements for the development and protection of critical habitats and ecosystems, including those of international significance, supplementing efforts by bilateral aid agencies, multilateral financial institutions, and commercial banks.

106. In the framework of the Council of Mutual Economic Assistance (CMEA), there has been since the early 1970s a Committee for Environmental Protection with the participation of the heads of appropriate organizations in the member states. This Committee coordinates the relevant research and development programmes and, in some cases, organizes technical assistance for the interested member states, involving the Investment Bank of CMEA.

### **6.2.2 Reorienting Bilateral Aid Agencies**

109. Bilateral aid agencies presently provide nearly four times as much total ODA as is provided by international organizations. As indicated in *Chapter 3*, a new priority and focus in bilateral aid agencies is needed in three main areas:

- new measures to ensure that all projects support sustainable development;
- special programmes to help restore, protect, and improve the ecological basis for development in many developing countries; and
- special programmes for strengthening the institutional and professional capacities needed for sustainable development.

110. Proposals for special bilateral aid programmes in the areas of agriculture, forestry, energy, industry, human settlements, and genetic resources are made in earlier chapters of this report. The first two priority areas in this chapter also contain proposals for strengthening the institutional and professional capacities in developing countries. The focus here is therefore on the first area: new measures to ensure that all bilateral aid projects support sustainable development.

The problems of today do not come with a tag marked energy or economy or

CO2 or demography, nor with a label indicating a country or a region. The problems are multi-disciplinary and transnational or global.

The problems are not primarily scientific and technological. In science we have the knowledge and in technology the tools. The problems are basically political, economic, and cultural.

Per Lindblom  
International Federation of Institutes of Advanced Studies  
WCED Public Hearing  
Oslo, 24-25 June 1985

111. Over the past decade, bilateral aid agencies have gradually given more attention to the environmental dimensions of their programmes and projects. A 1980 survey of the environmental and practices of six major bilateral aid agencies indicated that only one, USAID, had systematic and enforceable procedures backed by the staff resources necessary to carry them out.<sup>/39</sup> Since then, others have made some progress on the policy level, increased funds for environmental projects, and produced guidelines or checklists to guide their programmes. However, a 1983 study of those guidelines concluded that there was little evidence of their systematic application.<sup>/40</sup>

112. An important step towards concerted action was taken in 1986 with the adoption by OECD of a recommendation to member governments to include an environmental assessment policy and effective procedures for applying it in their bilateral aid programmes.<sup>/41</sup> It is based on a detailed analysis and studies carried out by a joint group of governmental experts from both the Development Assistance Committee and the Environmental Committee.<sup>/42</sup> The recommendation includes proposals for adequate staff and financial resources to undertake environmental assessments and a central office in each agency to supervise implementation and to assist developing countries wishing to improve their capacities for conducting environmental assessments. We urge all bilateral aid agencies to implement this recommendation as quickly as possible, it is essential, of course, that this should not reduce aid flows in the aggregate or slow disbursements or represent a new form of aid conditionality.

### **6.2.3 New Sources of Revenue and Automatic Financing**

113. We have made a series of proposals for institutional change within and among the organizations and specialized agencies of the UN system in the sections on 'Getting at the Sources' and 'Dealing with the Effects'. Most of those changes will not require additional financial resources but can be achieved through a reorientation of existing mandates, programmes, and budgets and a redeployment of present staff. Once implemented, those measures will make a major difference in the effective use of existing resources in making the transition to sustainable development.

114. Nevertheless, there is also a need to increase the financial resources for new multilateral efforts and programmes of action for environmental protection and sustainable development. These new funds will not be easy to come by if the international organizations through which they flow have to continue to rely solely on traditional sources of financing: assessed contributions from governments, voluntary contributions by governments, and funds borrowed in capital markets by the World Bank and other international financial institutions.

115. Assessed contributions from governments have traditionally been used largely for the administrative and operating costs of international organizations; they are not intended for



multilateral assistance. The total assessed contributions from governments are much smaller than the amount provided through voluntary contributions and the prospects of raising significant, additional funds through assessed contributions are limited.

116. Voluntary contributions by governments give the overall revenue system some flexibility, but they cannot be adjusted readily to meet new or increased requirements. Being voluntary, the flow of these funds is entirely discretionary and unpredictable. The commitments are also extremely short-term, as pledges are normally made only one or two years in advance. Consequently, they provide little security or basis for effective planning and management of international actions requiring sustained, longer-term efforts. Most of the limited funds provided so far for international environmental action have come through voluntary contributions, channelled principally through UNEP and NGOs.

117. Given the current constraints on major sources and modes of funding, it is necessary to consider new approaches as well as new sources of revenue for financing international action in support of sustainable development. The Commission recognizes that such proposals may not appear politically realistic at this point in time. It believes, however, that - given the trends discussed in this report - the need to support sustainable development will become so imperative that political realism will come to require it.

118. The search for other, and especially more automatic, sources and means for financing international action goes almost as far back as the UN itself. It was not until 1977, however, when the Plan of Action to Combat Desertification was approved by the UN General Assembly that governments officially accepted, but never implemented, the principle of automatic transfers. That Plan called for the establishment of a special account that could draw resources not only from traditional sources but also from additional measures of financing, 'including fiscal measures entailing automaticity'.<sup>/43</sup>

119. Since then, a series of studies and reports<sup>/44</sup> have identified and examined a growing list of new sources of potential revenue, including:

- revenue from the use of international commons (from ocean fishing and transportation, from sea-bed mining, from Antarctic resources, or from parking charges for geostationary communications satellites, for example);
- taxes on international trade (such as a general trade tax; taxes on specific traded commodities, on invisible exports, or on surpluses in balance of trade; or a consumption tax on luxury goods); and
- international financial measures (a link between special drawing rights and development finance, for example, or IMF gold reserves and sales).

120. In its 1980 report, the Brandt Commission called for raising additional funds from more automatic sources such as those cited above. In its follow-up report in 1983, the Brandt Commission strongly urged that these most 'futuristic' of all the Report's proposals not be lost completely from view.<sup>/45</sup> Nevertheless, they again rank below the short term horizon of the international agenda.

121. The World Commission on Environment and Development was specifically given the mandate by the UN General Assembly to look once again beyond that limited horizon. We have done so and, given the compelling nature, pace, and scope of the different transitions affecting our economic and ecological systems as described in this report, we consider that at least some of those proposals for additional and more automatic sources of revenue are fast becoming

less futuristic and more necessary. This Commission particularly considers that the proposals regarding revenue from the use of international commons and natural resources now warrant and should receive serious consideration by governments and the General Assembly.

### **III. A Call for Action**

122. Over the course of this century, the relationship between the human world and the planet that sustains it has undergone a profound change. When the century began, neither human numbers nor technology had the power to radically alter planetary systems. As the century closes, not only do vastly increased human numbers and their activities have that power, but major, unintended changes are occurring in the atmosphere, in soils, in waters, among plants and animals, and in the relationships among all of these. The rate of change is outstripping the ability of scientific disciplines and our current capabilities to assess and advise. It is frustrating the attempts of political and economic institutions, which evolved in a different, more fragmented world, to adapt and cope. It deeply worries many people who are seeking ways to place those concerns on the political agendas.

123. We have been careful to base our recommendations on the realities of present institutions, on what can and must be accomplished today. But to keep options open for future generations, the present generation must begin now, and begin together, nationally and internationally.

124. To achieve the needed change in attitudes and reorientation of policies and institutions, the Commission believes that an active follow-up of this report is imperative. It is with this in mind that we call for the UN General Assembly, upon due consideration, to transform this report into a UN Programme of Action on Sustainable Development. Special follow-up conferences could be initiated at the regional level. Within an appropriate period after the presentation of the report to the General Assembly, an international Conference could be convened to review progress made and promote follow-up arrangements that will be needed over time to set benchmarks and to maintain human progress within the guidelines of human needs and natural laws.

125. The Commissioners came from 21 very different nations. In our discussions, we disagreed often on details and priorities. But despite our widely differing backgrounds and varying national and international responsibilities, we were able to agree to the lines along which institutional change must be drawn.

126. We are unanimous in our conviction that the security, well-being, and very survival of the planet depend on such changes, now.

---

### **Footnotes**

1/ The characteristics and differences of the two approaches are described in our inaugural report, 'Mandate for Change: Key Issues, Strategy and Workplan', Geneva, 1985.

2/ L.G. Uy, 'Combating the Notion of Environment as Additionality: A study of the Integration of Environment and Development and a Case for Environmental Development as Investment', Centre for Environmental Studies, University of Tasmania, Hobart, Tasmania, 1985 (to be published).

3/ OECD, **Environment and Economics, Vols. I and II**. Background Papers for the

International Conference on Environment and Economics (Paris: 1984).

4/ OECD, 'The Impact of Environmental Policies on Industrial Innovation', in **Environment and Economics, Vol. III**. op. cit.

5/ R. Bertrand, 'Some Reflections on Reform of the United Nations'. Joint Inspection Unit, UN, Geneva, 1985.

6/ V. Fernando, 'Development Assistance, Environment and Development', paper prepared for WCED, Geneva, 1985.

7/ 'List of Projects with Possible Environmental Issues' transmitted to Congress by U.S. Agency for International Development, 1967, as included in Public Law 9? -591.

8/ L. Gagnon, Union Québécoise pour la Conservation de la Nature, Québec, 'Pour Une Révision des Sciences Economiques', submitted to WCED Public Hearings, Ottawa, 1986. See also the review of the state-of-the art concerning natural resource accounts, including detailed case studies from Norway and France, in OECD, **Information and Natural Resources** (Paris: 1986).

9/ T. Friend, 'Natural Resource Accounting and its Relationship with Economic and Environmental Accounting', Statistics Canada, Ottawa, September 1966.

10/ The need for an explicit 'foreign policy for environment' was raised in different ways in the discussion at many WCED public hearings, but originally in a joint submission by Nordic NGOs to the Public Hearings in Oslo, 1985.

11/ See 'Report of the Secretary-General: Technical and Economic Aspects of International River Basin Development', UN E/C.7/35, New York, 1972. An updated list of relevant international agreements was provided by the IUCN Environmental Law Centre. See also Department of Technical Cooperation for Development, **Experiences in the Development and Management of International River and Lake Basins**, Proceedings of the UN Interregional Meeting of International River Organizations held at Dakar, Senegal, in May 1981 (New York: UN, 1983).

12/ In 1982, there were environment and natural resource management agencies operating in 144 countries. At the time of the 1972 Stockholm Conference, only 15 industrial countries and 11 developing countries had such agencies. World Environment Centre, **World Environment Handbook** (New York: 1985).

13/ See General Assembly *resolution 2997 (XXVII)* of 16 December 1972 on 'Institutional and financial arrangements for international environmental cooperation'.

14/ The Environment Coordination Board was abolished in 1977 and its functions assumed by the Administrative Committee on Coordination (ACC). See General Assembly Resolution 32/197, Annex, para 54. The ACC subsequently established a Committee of Designated Officials for Environmental Matters (DOEM).

15/ In addition to the Environment Fund there were 1.8 special Trust Funds with contributions totalling \$5-6 million in 1985. See UNEP, **1985 Annual Report** (Nairobi: 1986).

16/ Ibid., Annex V, Table B.

17/ J. Urquhart and K. Heilmann, **Risk Watch: The Odds of Life** (Bicester, UK: Facts on File, 1984).

18/ 'Risk Assessment and Risk Control', **Issue Report**, Conservation Foundation, Washington, DC, 1985; C. Schweigman et al., "Agrisk", Appraisal of Risks in Agriculture in Developing Countries', University of Groningen, The Netherlands, 1981.

19/ A. Wijkman and L. Timberlake, **Natural Disasters: Acts of God and Acts of Men?** (London: Earthscan for the International Institute for Environment and Development and the Swedish Red Cross, 1984).

20/ WMO, **A Report of the International Conference on the Assessment of the Role of Carbon Dioxide and of Other Greenhouse Gases in Climate Variations and Associated Impacts**. Villach, Austria, 9-15 October 1985, WMO No. 661 (Geneva: WMO/ICSU/UNEP, 1986).

21/ For an overview of the current technological capabilities and possibilities, see A. Khosla, Development Alternatives, New Delhi, 'Decision Support Systems for Sustainable Development', prepared for WCED, 1986.

22/ See M.C. McHale et al., **Ominous Trends and Valid Hopes: A Comparison of Five World Reports** (Minneapolis, Minn.: Hubert Humphrey Institute of Public Affairs, (year?) for a comparison of **North-South: A Programme for Survival** (Cambridge, Mass.: MIT Press, 1980); World Bank, **World Development Report 1980** (Washington, DC: 1980); U.S. Department of State and Council on Environmental Quality, **Global 2000 Report to the President: Entering the Twenty First Century** (Washington, DC: U.S. Government Printing Office, 1980); IUCN/WWF/UNEP, World Conservation Strategy (Gland, Switzerland: 1980); and OECD, **Interfutures: Facing the Future, Mastering the Probable and Managing the Unpredictable** (Paris: 1979). See also D. Meadows et al. **Groping In the Dark - The First Decade of Global Modelling** (Chichester, UK: John Wiley & Sons, 1982) for an analysis of various models.

23/ See C.O. Barney, Study Director, **Global 2000 Report**, op. cit.

24/ See OECD, **Economic and Ecological Interdependence**. (Paris: 1982).

25/ The importance of involving youth in nature conservation and environmental protection and improvement activities were emphasized in many presentations at WCED Public Hearings. See, for example the report 'Youth Nature Conservation Movement in the Socialist Countries' to the Public Hearing at Moscow, December 1986.

26/ For an overview of the role and contribution of NGOs to environment and development action at the national and international levels, see 'NGOs and Environment-Development Issues', report to WCED by the Environment Liaison Centre, Nairobi, 1986. It includes a selection of 20 case studies of successful NGO environmental action around the world.

27/ NGOs in Chile, Colombia, the Federal Republic of Germany, and Turkey have also published 'State of the Environment' reports. Official reports have appeared in Australia, Austria, Canada, Denmark, Finland, France, Ireland, Israel, Japan, the Netherlands, the Philippines, Poland, Spain, Sweden, the United States, and Yugoslavia.

28/ See, for example, the annual **State of the World** report by WorldWatch Institute, the **World Resources Report** by World Resources Institute and the International Institute for Environment and Development, and the **World Conservation Strategy** by IUCN.

29/ **Report of the World Industry Conference on Environmental Management** sponsored by the International Chamber of Commerce and UNEP, 1984; see particularly the principles adopted by OECD in 1985 as a clarification of the OECD Guiding Principles for Multinational Enterprises in **International Legal Materials**, vol 25, No. 1 (1986); see also the presentation to WCED Public Hearings, Oslo, June 1985, on 'World Industry Conference Follow-Up' by the Chairman of the Environment Committee of the International Chamber of Commerce.

30/ See P.S. Thacher 'International Institutional Support: The International System, Funding and Technical Assistance', paper presented to the World Conservation Strategy Conference, Ottawa, Canada, June 1986.

31/ United Nations, **Report of the United Nations Conference on the Human Environment**, document *A/CONF.48/14/Rev.1, Chapter 1* (New York: 1972).

32/ These and other principles have been developed as proposed Articles for a Convention in the report to WCED by its Experts Group on Environmental Law. Their report also contains a commentary on the legal precedents and references for each Article. See **Legal Principles for Environmental Protection and Sustainable Development** (Dordrecht, The Netherlands: Martinus Nijhoff, in press).

33/ For an overview of dispute settlement procedures, mechanisms, and needs, see R.E. Stein and G. Grenville Wood, 'The Settlement of Environmental Disputes: A Forward Look', prepared for WCED, 1985.

34/ OECD, **Environment and Economics, Vol. I**, op. cit.

35/ OECD, **Environment and Economics**, Results of the International Conference on Environment and Economics (Paris: 1985).

36/ For a summary report on the work of the Committee of International Development Institutions on the Environment, see UNEP, **1985 Annual Report**, op. cit.

37/ Statement by Dr M.K. Tolba, UNEP Executive Director, at the opening of the sixth session of CIDIE, hosted by the Organization of American States, Washington, DC, June 1985.

38/ A proposal for a World Conservation Bank was made by M. Sweatman of the International Wilderness Leadership Foundation at the WCED Public Hearings, Ottawa, 1986.

39/ R.D.G. Johnson and R.O. Blake, **Environmental and Bilateral Aid** (London: International Institute for Environment and Development, 1960).

40/ J. Horberry, **Environmental Guidelines Survey: An Analysis of Environmental Procedures and Guidelines Governing Development Aid** (London and Gland: IIED and IUCN, 1963).

41/ 'Environmental Assessment of Development Assistance Projects and Programmes', OECD Council Recommendation C(85)104 (Paris: OECD, 20.6.85); 'Measures Required to Facilitate the Environmental Assessment of Development Assistance Projects and Programmes' OECD Council Recommendation C(86)26 (final) OECD, Paris, 20 November 1986.

42/ 'Final Report on Environmental Assessment and Development Assistance' **OECD Environment Monograph** No 4 (Paris: OECD, 1986).

43/ **Report of the United Nations Conference on Desertification**, document A/CONF.74/36 (New York: UN, 1977).

44/ See for example, E.B. Steinberg and J.A. Yager, 'New Means of Financing International Needs', **The Brookings Institution**, Washington, DC, 1978; 'Additional Measures and Means of Financing for the Implementation of the Plan of Action to Combat Desertification', document UNEP/GC.6/9/Add.1, 1978; UN, 'Study on Financing the United Nations Plan of Action to Combat Desertification: report of the Secretary-General', General Assembly document A/35/396, 1980; Dag Hammarskjold Foundation 'The Automatic Mobilization of Resources for Development', **Development Dialogue**, No. 1, 1981; UN, 'Study on Financing the Plan of Action to Combat Desertification: Report of the Secretary-General', General Assembly document A/36/141, 1981.

45/ Independent Commission on International Development Issues, **North-South: A Programme for Survival** (London: Pan Books, 1980); Common Crisis, North-South: **Cooperation for World Recovery** (London: Pan Books, 1983).

# **Our Common Future, Annexe 1: Summary of Proposed Legal Principles for Environmental Protection and Sustainable Development Adopted by the WCED Experts Group on Environmental Law**

## **I. General Principles, Rights, and Responsibilities**

### **Fundamental Human Right**

1. All human beings have the fundamental right to an environment adequate for their health and well being.

### **Inter-Generational Equity**

2. States shall conserve and use the environment and natural resources for the benefit of present and future generations.

### **Conservation and Sustainable Use**

3. States shall maintain ecosystems and ecological processes essential for the functioning of the biosphere, shall preserve biological diversity, and shall observe the principle of optimum sustainable yield in the use of living natural resources and ecosystems.

### **Environmental Standards and Monitoring**

4. States shall establish adequate environmental protection standards and monitor changes in and publish relevant data on environmental quality and resource use.

### **Prior Environmental Assessments**

5. States shall make or require prior environmental assessments of proposed activities which may significantly affect the environment or use of a natural resource.

### **Prior Notification, Access, and Due Process**

6. States shall inform in a timely manner all persons likely to be significantly affected by a planned activity and to grant them equal access and due process in administrative and judicial proceedings.

### **Sustainable Development and Assistance**

7. States shall ensure that conservation is treated as an integral part of the planning and implementation of development activities and provide assistance to other States, especially to developing countries, in support of environmental protection and sustainable development.

## **General Obligation to Cooperate**

8. States shall cooperate in good faith with other States in implementing the preceding rights and obligations.

## **II. Principles, Rights and Obligations Concerning Transboundary Natural Resources and Environmental Interferences**

### **Reasonable and Equitable Use**

9. States shall use transboundary natural resources in a reasonable and equitable manner.

### **Prevention and Abatement**

10. States shall prevent or abate any transboundary environmental interference which could cause or causes significant harm (but subject to certain exceptions provided for in #11 and #12 below).

### **Strict Liability**

11. States shall take all reasonable precautionary measures to limit the risk when carrying out or permitting certain dangerous but beneficial activities and shall ensure that compensation is provided should substantial transboundary harm occur even when the activities were not known to be harmful at the time they were undertaken.

### **Prior Agreements When Prevention Costs Greatly Exceed Harm**

12. States shall enter into negotiations with the affected State on the equitable conditions under which the activity could be carried out when planning to carry out or permit activities causing transboundary harm which is substantial but far less than the cost of prevention. (If no agreement can be reached, see Art. 22).

### **Non-Discrimination**

13. States shall apply as a minimum at least the same standards for environmental conduct and impacts regarding transboundary natural resources and environmental interferences as are applied domestically (i.e., do not do to others what you would not do to your own citizens).

### **General Obligation to Cooperate on Transboundary Environmental Problems**

14. States shall cooperate in good faith with other States to achieve optimal use of transboundary natural resources and effective prevention or abatement of transboundary environmental interferences.

### **Exchange of Information**



15. States of origin shall provide timely and relevant information to the other concerned States regarding transboundary natural resources or environmental interferences.

### **Prior Assessment and Notification**

16. States shall provide prior and timely notification and relevant information to the other concerned States and shall make or require an environmental assessment of planned activities which may have significant transboundary effects.

### **Prior Consultations**

17. States of origin shall consult at an early stage and in good faith with other concerned States regarding existing or potential transboundary interferences with their use of a natural resource or the environment.

### **Cooperative Arrangements for Environmental Assessment and Protection**

18. States shall cooperate with the concerned States in monitoring, scientific research and standard setting regarding transboundary natural resources and environmental interferences.

### **Emergency Situations**

19. States shall develop contingency plans regarding emergency situations likely to cause transboundary environmental interferences and shall promptly warn, provide relevant information to and co-operate with concerned States when emergencies occur.

### **Equal Access and Treatment**

20. States shall grant equal access, due process and equal treatment in administrative and judicial proceedings to all persons who are or may be affected by transboundary interferences with their use of a natural resource or the environment.

## **III. State Responsibility**

21. States shall cease activities which breach an international obligation regarding the environment and provide compensation for the harm caused.

## **IV. Peaceful Settlement of Disputes**

22. States shall settle environmental disputes by peaceful means. If mutual agreement on a solution or on other dispute settlement arrangements is not reached within 18 months, the dispute shall be submitted to conciliation and, if unresolved thereafter, to arbitration or judicial settlement at the request of any of the concerned States.

---

### **Footnote**

\* This summary is based on the more detailed legal formulations in the report to the

Commission by the international legal experts group. (See *Annexe 2* for a list of group members.) This summary highlights only the main thrusts of the principles and Articles and is not a substitute for the full text is published in *Legal Principles for Environmental Protection and Sustainable Development* (Dordrecht, The Netherlands: Martinus Nijhoff Publishers, in press).

# **Our Common Future, Annexe 2: The Commission and its Work**

## ***The Commissioners***

***Chairman***

***Vice-Chairman***

***Members***

## ***The Commission's Mandate***

## ***The Commission's Work***

## ***Members of the Secretariat***

***Senior Professional Staff:***

***General Services and Support Staff:***

## ***Inaugural Meeting & Workplan***

## ***Public Hearings***

## ***Expert Special Advisors***

***Advisory Panel on Energy***

***Advisory Panel on Industry***

***Advisory Panel of Food Security***

***Advisory Panel Reports***

## ***Financial Contributions***

## ***Other Contributions***

## ***Further Activities***

## ***Acknowledgements***

The World Commission on Environment and Development was created as a consequence of General Assembly *resolution 38/161* adopted at the 38th Session of the United Nations in the fall of 1983. That resolution called upon the Secretary General to appoint the Chairman and

Vice Chairman of the Commission rind in turn directed them to jointly appoint the remaining members, at least half of whom were to be selected from the developing world. The Secretary General appointed Mrs. Gro Harlem Brundtland of Norway, then leader of the Norwegian Labour Party, as Chairman and Dr. Mansour Khalid, the former Minister of Foreign Affairs from Sudan, as Vice-Chairman. They together appointed the remaining members of the Commission.

The Commission has functioned as an independent body. All its members have served the Commission in their individual capacities, not as representatives of their governments. The Commission has thus been able to address any issues, to solicit any advice, and to formulate and present any proposals and recommendations that it considered pertinent and relevant.

In pursuing its mandate, the commission has paid careful attention to the Terms of Reference suggested by the General Assembly in *Resolution 38/161* and has operated in close collaboration with the Intergovernmental Inter-sessional Preparatory Committee of the Governing Council of the UN Environment Programme, which has itself been preparing an intergovernmental report on environmental perspectives to the year 2000 and beyond.

After the Commission's report has been discussed by UNEP's Governing Council, it is to be submitted to the General Assembly of the United Nations for its consideration during its 42nd Session in the fall of 1987.

## **The Commissioners**

### **Chairman**

Gro Harlem Brundtland, Norway. Prime Minister, Parliamentary Leader of the Labour Party 1981-86, Member of Parliament from 1977, Minister of Environment 1974-79. Associate Director Oslo school Health Services 1968-74.

### **Vice-Chairman**

Mansour Khalid, Sudan. Deputy Prime Minister 1976, Minister of Education 1975-76, President, UN Security Council 1972, Minister of Foreign Affairs 1971-75, Minister of Youth and Social Affairs 1969-71.

### **Members**

Susanna Agnelli, Italy. Italian Senator, writer, Undersecretary of State for Foreign Affairs. Member of the Independent Commission on International Humanitarian Issues. Member of the European Parliament 1979-81, Mayor of Monte Argentario 1974-84, Member of Chamber of Deputies 1976-83.

Saleh Abdulrahman Al-Athel, Saudi Arabia. President of King Abdulaziz City for Science and Technology; Vice-President for Graduate Studies and Research, King Saud University 1976-64; Dean, College of Engineering, King Saud University 1975-76.

Pablo Gonzalez Casanova, Mexico. Professor of Political and social Sciences, National Autonomous University of Mexico, President of the Latin American Association of Sociology. [In August 1986, for personal reasons, Pablo Gonzalez Casanova ceased to participate in the work of the Commission.]

Bernard T. G. Chidzero, Zimbabwe. Minister of Finance, Economic Planning and Development; Chairman, Development Committee of the World Bank and the International Monetary Fund; Member, UN Committee for Development Planning; Member, Board of the World Institute for Development Economics and Research; Director, Commodities Division, United Nations Conference on Trade and Development (UNCTAD) 1968-1977; Deputy Secretary General, UNCTAD 1977-80.

Lamine Mohamed Padika, Cote d'Ivoire. Minister of Marine Affairs, Chairman of the National Council for Environment, Secretary of State for Marine Affairs 1974-76.

Volker Hauff, Federal Republic of Germany. Member of Parliament; Vice Chairman, Social Democratic Party Parliamentary Group, Responsible for Environment; Minister for Transportation 1980-82; Minister for Research and Technology 1979-80; Parliamentary Secretary of State for Science Research and Technology 1972-78.

Istvan Lang, Hungary. Secretary General of the Hungarian Academy of Sciences; Deputy Secretary General 1970-85, and Executive secretary 1963-70, Section of Biology, Hungarian Academy of Sciences; Research Institute of Soil Science and Agricultural Chemistry, Hungarian Academy of Sciences 1955-63.

Ma Shijun, Peoples Republic of China. Director of the Research Center of Ecology, Academia Sinica, Chairman of the Commission of Environmental Sciences, President of the Ecological Society of China.

Margarita Marino do Botero, Colombia. Chairman, Fundacion El Colegio de Villa de Leyva (The Green College); Director General, National Institute of Renewable Natural Resources and the Environment (INDERENA) 1983-86; Director, Office of International Affairs, INDERENA 1978-83; Regional Consultant, United Nations Environment Programme 1973-77.

Nagendra Singh, India. President of the International Court of Justice, President of IMO Assembly 1969, President of ILO Maritime Session 1971, President of the Indian Academy of Environmental Law and Research, President of the National Labour Law Association of India, Life Member of the Board of Governors of the International Council for Environmental Law, Member of the Permanent Court of Arbitration; Deputy Chairman of CEPLA (IUCN); Chancellor of the University of Goa; Fellow of the British Academy.

Paulo Nogueira-Neto, Brazil. Federal District Secretary of Environment, Science and Technology, National Council of Environment; Federal Secretary of the Environment 1974-86; Associate Professor, Department of Ecology, University of Sao Paulo; President, Association for the Defence of the Environment 1954-83; President, Sao Paulo State Forest Council 1967-74.

Saburo Okita, Japan. President, International University; Advisor to the Ministry of Foreign Affairs; Advisor to the Environment Agency; Executive Committee Member of the Club of Rome; Chairman, World Wildlife Fund Japan; Chairman, Advisory Committee for External Economic Issues 1984-85; Government Representative for External Economic Relations 1980-81; Foreign Minister 1979-80; Member of the Pearson Commission 1968-69.

Shridath S. Ramphal, Guyana. Secretary General of the Commonwealth of Nations, Minister for Foreign Affairs 1972-75, Minister of Justice 1973-75, Minister of State for Foreign Affairs 1967-72, Attorney General 1966-72.

William Doyle Ruckelshaus, United States. Attorney, Perkins, Coie; Administrator, U.S.

Environmental Protection Agency 1970-73, 1983-84; Senior Vice President for Law and Corporate Affairs, Weyerhaeuser company 1976-83; Acting Director of the Federal Bureau of Investigation 1973; Deputy Attorney General, US Department of Justice 1973.

Mohamed Sahnoun, Algeria. Algerian Ambassador to the United States; Chief of Algerian Permanent Mission to the United Nations 1982-84; Algerian Ambassador, Paris 1979-82; Algerian Ambassador, Bonn 1975-79; Deputy Secretary General, Arab League 1973-74; Deputy Secretary General, Organization of African Unity 1964-73.

Emil Salim, Indonesia. Minister of State for Population and the Environment; Minister of State for Development Supervision and the Environment 1978-83; Member People's Consultative Assembly 1977-32; Minister of Communications 1973-78; Minister of State for Administrative Reform; Deputy Chairman, National Planning Board 1971-81.

Bukar Shaib, Nigeria. Minister of Agriculture, Water Resources and Rural Development 1983-86, Special Advisor to the President of Nigeria 1980-83, Nigerian Ambassador to Rome 1979, Permanent Secretary, Federal Ministry of Agriculture and Water Resources 1968-78.

Vladimir Sokolov, USSR. Director, Institute of Evolutionary Animal Morphology and Ecology, USSR Academy of Sciences; Professor and Head of Department of Vertebrate Zoology, Faculty of biology, Moscow State University; Deputy Chairman, Section of Chemical and Technological and Biological Sciences, Presidium, USSR Academy of Sciences.

Janez Stanovnik, Yugoslavia. Member, Presidium of the Socialist Republic of Slovenia; Professor, University of Ljubljana; Executive Secretary, UN Economic Commission for Europe 1967-83; Member of the Federal Cabinet and Federal Executive Council 1966-67.

Maurice Strong, Canada. President, American Water Development, Inc.: former Under-Secretary General and Special Advisor to the Secretary-General of the United Nations; Executive Director of the United Nations Office for Emergency Operations in Africa 1985-86; Chairman of the Board, Petro-Canada 1976-78; Executive Director, United Nations Environment Programme 1973-75; Secretary-General, United Nations Conference on the Human Environment 1970-72.

Jim MacNeill, Canada. Secretary-General of the Commission and ex officio member; Director of Environment, OECD 1978-84; Secretary (Deputy Minister), Canadian Ministry of State for Urban Affairs 1974-76; Canadian Commissioner General, UN Conference on Human Settlements 1975-76; Assistant Secretary, Canadian Ministry of State for Urban Affairs 1972-74.

## **The Commission's Mandate**

The Commission's Mandate, officially adopted at its Inaugural Meeting in Geneva on 1-3 October 1984, states:

The World Commission on Environment and Development has been established at a time of unprecedented growth in pressures on the global environment, with grave predictions about the human future becoming commonplace.

The Commission is confident that it is possible to build a future that is more prosperous, more just, and more secure because it rests on policies and practices that serve to expand and sustain the ecological basis of development.

The Commission is convinced, however, that this will no happen without significant changes in current approaches: changes in perspectives, attitudes and life styles; changes in certain critical policies and the ways in which they are formulated and applied; changes in the nature of cooperation between governments, business, science, and people; changes in certain forms of international cooperation which have proved incapable of tackling many environment and development issues; changes, above all, in the level of understanding and commitment by people, organizations and governments.

The World Commission on Environment and Development therefore invites suggestions, participation, and support in order to assist it urgently:

1. to re-examine the critical issues of environment and development and to formulate innovative, concrete, and realistic action proposals to deal with them;
2. to strengthen international cooperation on environment and development and to assess and propose new forms of cooperation that can break out of existing patterns and influence policies and events in the direction of needed change; and
3. to raise the level of understanding and commitment to action on the part of individuals, voluntary organizations, businesses, institutes, and governments.

The Commission solicits the views of those individuals, scientific institutes, non-governmental organizations, specialized agencies, and other bodies of the United Nations, and national governments concerned with environment and development issues. It requests their support and it will facilitate their participation in the work of the Commission. It wishes especially to hear the views of youth.

In fulfilling its tasks, the Commission will pay careful attention to the Terms of Reference suggested by the General Assembly of the United Nations in *resolution 38/161*, in which the General Assembly welcomed the establishment of the Commission.

## **The Commission's Work**

In May of 1984, an Organizational Meeting of the Commission was held in Geneva to adopt its rules of procedure and operation and to appoint a Secretary General to guide its work. In July of 1964, a Secretariat was established in Geneva, temporarily at the Centre de Morillon and later at the Palais Wilson.

## **Members of the Secretariat**

Members of the Secretariat have included:

Secretary General: Jim MacNeill

## **Senior Professional Staff:**

Nitin Desai, Senior Economic Advisor

Vitus Fernando, Senior Programme Officer

Branislav Gosovic, Senior Programme Officer

Marie-Madeleine Jacquemier, Finance and Administrative Officer

Kazu Kato, Director of Programmes

Warren H. Lindner, Secretary of the Commission and Director of Administration

Elisabeth Monosovski, Senior Programme Officer

Gustavo Montero, Programme Planning Officer

Shimwaa'i Muntemba, Senior Programme Officer

Janos Pasztor, Senior Programme Officer

Peter Robbs, Senior Public Information Advisor

Vicente Sanchez, Director of Programmes

Linda Starke, Editor

Peter Stone, Director of Information

Edith Surber, Finance and Administrative Officer

### **General Services and Support Staff:**

Brita Baker

Elisabeth Bohler-Goodship

Marie-Pierre Destouet

Marian Doku

Tamara Dunn

Teresa Harmand

Aud Loen

Jelka de Marsano

Chedra Mayhew

Christel Ollesch

Ellen Permato

Guadalupe Quesado



Mildred Raphoz

Evelyn Salvador

Iona D'Souza

Kay Streit

Vicky Underhill

Shane Vanderwert

## **Inaugural Meeting & Workplan**

The Commission held its first official meeting in Geneva on 1-3 October 1984. During that meeting, the Commission agreed upon its Mandate, the key issues it would address in the course of its deliberations, the strategy it would employ to achieve its objectives, and the workplan and timetable that would be used to guide its work. Immediately following that meeting, the Commission publicly released its principal working document, 'Mandate for Change'.

At its Inaugural Meeting, the Commission selected eight key issues for analysis during the course of its work:

- Perspectives on Population, Environment, and Sustainable Development;
- Energy: Environment and Development;
- Industry: Environment and Development;
- Food Security, Agriculture, Forestry, Environment, and Development;
- Human Settlements: Environment and Development;
- International Economic Relations, Environment, and Development;
- Decision Support Systems for Environmental Management; and
- International Cooperation.

It agreed that it would examine these issues from the perspective of the year 2000 and beyond and from the perspective of their common sources in economic, social, and sectoral policies.

At its Inaugural Meeting, the Commission also decided that its processes would be open, visible, and participatory and that in conducting its work, strategies would be employed to ensure it of receiving the broadest range of views and advice on the key issues it was addressing.

## **Public Hearings**

The Commission therefore decided that it would hold deliberative meetings in all regions of the world and that it would take the occasion of those meetings to get a first hand view of environment and development issues in those regions. It also decided to use these visits to hold open Public Hearings where senior government representatives, scientists and experts, research institutes, industrialists, representatives of non-governmental organizations, and the

general public could openly express their concerns to the Commission and submit their views and advice on issues of common concern.

These Public Hearings, which are a unique feature of the Commission, have become its 'trademark', demonstrating both to the Commissioners and the participants that the issues addressed by the Commission are indeed of global concern and do transcend national boundaries and disparate cultures. Hundreds of organizations and individuals gave testimony during the Public Hearings and over 800 written submissions constituting more than 10,000 pages of material were received by the Commission in connection with them. The Public Hearings have been of immeasurable benefit to the Commissioners and the Secretariat, and the gratitude of the Commission is extended to all who contributed to their success.

Deliberative meetings, site visits, and/or Public Hearings of the Commission were held in Jakarta, Indonesia, 27-31 March 1985; Oslo, Norway, 21-28 June 1985; Sao Paulo and Brasilia, Brazil, 25 October-4 November 1985; Vancouver, Edmonton, Toronto, Ottawa, Halifax, and Quebec City, Canada, 21-31 May 1986; Harare, Zimbabwe, 15-19 September, Nairobi, Kenya, 20-23 September 1986; Moscow, USSR, 6-12 December 1986; and Tokyo, Japan, 23-28 February 1987. Special working group meetings of the Commission were also held in Geneva, Moscow, and Berlin (West).

### **Expert Special Advisors**

To further widen its base of information and advice, the Commission appointed a group of expert Special Advisors to assist it and the Secretariat in the analysis of the key issues. These included Edward S. Ayensu on Food Security and Forestry, Gamani Corea on International Economic Relations, Gordon T. Goodman on Energy, Ashok Khosla on Decision Support Systems for Environmental Management, Robert D. Munro on International Cooperation and Legal Regimes, Michael Royston on Industry, Johan Jorgen Hoist on Environment and Security, and Guy-Olivier Segond on Youth. The Chairman was also advised by Hans Christian Bugge and Morten Wetland. Later in its work, the Commission appointed Lloyd Timberlake as Special Editorial Advisor.

To assist it in its work in three of the key issue areas - Energy, Industry, and Food Security - the Commission constituted Advisory Panels of leading experts to advise it on the recommendations and conclusions it should consider making. The chairmen and members of the Commission's Advisory Panels were:

### **Advisory Panel on Energy**

Chairman:

Enrique Iglesias, Foreign Minister of Uruguay

Members:

Abdlatif Y. Al-Hamad (Kuwait)

Toyoaki Ikuta (Japan)

Gu Jian (China)

Al Noor Kassum (Tanzania)

Ulf Lantzke (deceased) (Federal Republic of Germany)

Wangari Maathai (Kenya)

David J. Rose (deceased) (United States)

Prero Shankar Jha (India)

Carl Tham (Sweden)

Gyorgy Vajda (Hungary)

### **Advisory Panel on Industry**

Chairman: Umberto Colombo (Italy), President of ENfca

Members:

Betsy Ancker-Johnson (United States)

M.J. Flux (United Kingdom)

Arnoldo Jose Gabaldon (Venezuela)

Alexander C. Helfrich (Netherlands)

Charles Levinson (Canada)

Finn Lied (Norway)

George P. Livanos (Greece)

Mohamed Mazouni (Algeria)

Thomas McCarthy (United States)

Jose E. Mindjin (Brazil)

Keichi Oshima (Japan)

Roger Strelow (United States)

Naval Tata (India)

Erna Witoelar (Indonesia)

### **Advisory Panel of Food Security**

**Chairman:**

M.S. Swarainathan (India), Director General of the International Rice Research Institute

**Members:**

Nyle Brady (United States)

Robert Chambers (United Kingdom)

K. Chowdhry (India)

Gilberto Gallopin (Argentina)

Joe Hulse (Canada)

Kenneth King (Guyana)

V. Malima (Tanzania)

Samir Radwan (Egypt)

Lu Liang Shu (China)

### **Advisory Panel Reports**

The reports of the three Advisory Panels were submitted to the Commission for its consideration during its meeting in Canada in May of 1986 and have since been published under the titled Energy 2000, Industry 2000, and Food 2000.

The Commission was also assisted in its review of legal rights and principles by a group of international legal experts chaired by Robert Munro (Canada) with Johan G. Lammers (Netherlands) as Rapporteur. The members of the group included Andronico Adede (Kenya), Francoise Burhenne (Federal Republic of Germany), Alexandre-Charles Kiss (France), Stephen McCaffrey (United States), Akio Morishima (Japan), Zaki Mustafa (Sudan), Henri Smets (Belgium), Robert Stein (United States), Alberto Szekely (Mexico), Alexandre Timoehenko (USSR), and Amado Tolentino (Philippines) Their report was submitted to and considered by the Commission during its meeting in Harare in September 1986. It will be published under the title Legal Principles for Environmental Protection and Sustainable Development.

During the course of its work, the Commission also engaged experts, research institutes, and academic centres of excellence from around the globe to prepare more than 75 studies and reports relating to the eight key issues for the Commission's review and consideration. These studies and reports provided an invaluable resource base for the final reports of the Commission's Advisory Panels and for the final chapters of this report.

### **Financial Contributions**

Initial funding to permit the Commission to commence its work came from the governments of Canada, Denmark, Finland, Japan, the Netherlands, Norway, Sweden, and Switzerland. Each of these 'sponsoring' governments had been instrumental in the creation of the Commission and during the course of the Commission's work, each of them increased their contribution beyond their original pledge.

In addition to the 'sponsoring' group of countries, the Commission has also received untied financial contributions from the governments of Cameroon, Chile, the Federal Republic of Germany, Hungary, Oman, Portugal, and Saudi Arabia. Significant contributions have also been received from the Kord Foundation and the John D. and Catherine T. MacArthur Foundation, as well as from NOPAD and SIDA.

### **Other Contributions**

The City and Canton of Geneva restored and furnished one wing of the Palais Wilson and provided that to the Commission's Secretariat free of rent and utilities. The local costs of the Commission's meetings in Indonesia, Brazil, Zimbabwe, and the USSR were covered by the host governments. The costs of the Commission's working group meeting in Moscow were also covered by the Soviet Government. The costs of the working group meeting in Berlin (West) were covered by the Federal Republic of Germany. The Arab Fund for Economic and Social Development hosted and covered all of the costs of a meeting in Kuwait of the Advisory Panel on Energy. The accounts of the Commission have been audited by Hunziker and Associates of Geneva.

The Commission's sincere appreciation is extended to all the governments, foundations, and institutes that provided the financial and other support necessary for it to complete its work, including those that contributed funds too late to be acknowledged here.

### **Further Activities**

Between the issuance of this report and its consideration by the UN General Assembly during its 42nd Session in the fall of 1987, the Commission will be meeting during a series of regional presentational meetings with senior governmental representatives, the business and scientific communities, non-governmental organizations, and the press to discuss this report and, it is hoped, to build a body of public and governmental support for the recommendations and conclusions.

There are no plans for the Commission to continue after its report has been considered by the General Assembly, and it will officially cease its operations on 31 December 1987.

### **Acknowledgements**

Since its creation in late 1963, the Commission has received advice and support from thousands of individuals, institutes, and organizations the world over, many of whom are listed here. Many labored long hours in preparing submissions for the Public Hearings, reports for the Advisory Panels, and studies for submission to the Commission. Without their dedication, cooperation, and advice as well as that of the Special Advisors and the chairmen and members of the Advisory Panels and Legal Experts Group, this report would not have been possible. The Commission's sincerest appreciation is extended to them all. (Affiliations and titles are as of the date of communication with the Commission. Verification of all the following names and titles was not possible, and the Commission apologizes for any inaccuracies.)



# United Nations

---

Department of Economic and Social Affairs  
Sustainable Development

## Transforming our world: the 2030 Agenda for Sustainable Development

### Preamble

This Agenda is a plan of action for people, planet and prosperity. It also seeks to strengthen universal peace in larger freedom. We recognise that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. All countries and all stakeholders, acting in collaborative partnership, will implement this plan. We are resolved to free the human race from the tyranny of poverty and want and to heal and secure our planet. We are determined to take the bold and transformative steps which are urgently needed to shift the world onto a sustainable and resilient path. As we embark on this collective journey, we pledge that no one will be left behind. The 17 Sustainable Development Goals and 169 targets which we are announcing today demonstrate the scale and ambition of this new universal Agenda. They seek to build on the Millennium Development Goals and complete what these did not achieve. They seek to realize the human rights of all and to achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental.

The Goals and targets will stimulate action over the next fifteen years in areas of critical importance for humanity and the planet:

## People

We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment.

## Planet

We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.

## Prosperity

We are determined to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature.

## Peace

We are determined to foster peaceful, just and inclusive societies which are free from fear and violence. There can be no sustainable development without peace and no peace without sustainable development.

## Partnership

We are determined to mobilize the means required to implement this Agenda through a revitalised Global Partnership for Sustainable Development, based on a spirit of strengthened global solidarity, focussed in particular on the needs of the poorest and most vulnerable and with the participation of all countries, all stakeholders and all people.

The interlinkages and integrated nature of the Sustainable Development Goals are of crucial importance in ensuring that the purpose of the new Agenda is realised. If we realize our ambitions across the full extent of the Agenda, the lives of all will be profoundly improved and our world will be transformed for the better.

## DECLARATION

### Introduction

1. We, the Heads of State and Government and High Representatives, meeting at the United Nations Headquarters in New York from 25-27 September 2015 as the Organization celebrates its seventieth anniversary, have decided today on new global Sustainable Development Goals.
2. On behalf of the peoples we serve, we have adopted a historic decision on a comprehensive, far-reaching and people-centred set of universal and transformative Goals and targets. We commit ourselves to working tirelessly for the full implementation of this Agenda by 2030. We recognize that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. We are committed to achieving sustainable development in its three dimensions – economic, social and environmental – in a balanced and integrated manner. We will also build upon the achievements of the Millennium Development Goals and seek to address their unfinished business.
3. We resolve, between now and 2030, to end poverty and hunger everywhere; to combat inequalities within and among countries; to build peaceful, just and inclusive societies; to protect human rights and promote gender equality and the empowerment of women and girls; and to ensure the lasting protection of the planet and its natural resources. We resolve also to create conditions for sustainable, inclusive and sustained economic growth, shared prosperity and decent work for all, taking into account different levels of national development and capacities.

4. As we embark on this great collective journey, we pledge that no one will be left behind. Recognizing that the dignity of the human person is fundamental, we wish to see the Goals and targets met for all nations and peoples and for all segments of society. And we will endeavour to reach the furthest behind first.

5. This is an Agenda of unprecedented scope and significance. It is accepted by all countries and is applicable to all, taking into account different national realities, capacities and levels of development and respecting national policies and priorities. These are universal goals and targets which involve the entire world, developed and developing countries alike. They are integrated and indivisible and balance the three dimensions of sustainable development.

6. The Goals and targets are the result of over two years of intensive public consultation and engagement with civil society and other stakeholders around the world, which paid particular attention to the voices of the poorest and most vulnerable. This consultation included valuable work done by the General Assembly Open Working Group on Sustainable Development Goals and by the United Nations, whose Secretary-General provided a synthesis report in December 2014.

## Our vision

7. In these Goals and targets, we are setting out a supremely ambitious and transformational vision. We envisage a world free of poverty, hunger, disease and want, where all life can thrive. We envisage a world free of fear and violence. A world with universal literacy. A world with equitable and universal access to quality education at all levels, to health care and social protection, where physical, mental and social well-being are assured. A world where we reaffirm our commitments regarding the human right to safe drinking water and sanitation and where there is improved hygiene; and where food is sufficient, safe, affordable and nutritious. A world where human habitats are safe, resilient and sustainable and where there is universal access to affordable, reliable and sustainable energy.

8. We envisage a world of universal respect for human rights and human dignity, the rule of law, justice, equality and non-discrimination; of respect for race, ethnicity and cultural diversity; and of equal opportunity permitting the full realization of human potential and contributing to shared prosperity. A world which invests in its children and in which every child grows up free from violence and exploitation. A world in which every woman and girl enjoys full gender equality and all legal, social and economic barriers to their empowerment have been removed. A just, equitable, tolerant, open and socially inclusive world in which the needs of the most vulnerable are met.

9. We envisage a world in which every country enjoys sustained, inclusive and sustainable economic growth and decent work for all. A world in which consumption and production patterns and use of all natural resources – from air to land, from rivers, lakes and aquifers to oceans and seas - are sustainable. One in which democracy, good governance and the rule of law as well as an enabling environment at national and international levels, are essential for sustainable development, including sustained and inclusive economic growth, social development, environmental protection and the eradication of poverty and hunger. One in which development and the application of technology are climate-sensitive, respect biodiversity and are resilient. One in which humanity lives in harmony with nature and in which wildlife and other living species are protected.

## Our shared principles and commitments

10. The new Agenda is guided by the purposes and principles of the Charter of the United Nations, including full respect for international law. It is grounded in the Universal Declaration of Human Rights, international human rights treaties, the Millennium Declaration and the 2005 World Summit Outcome Document. It is informed by other instruments such as the Declaration on the Right to Development.

11. We reaffirm the outcomes of all major UN conferences and summits which have laid a solid foundation for sustainable development and have helped to shape the new Agenda. These include the Rio Declaration on Environment and Development; the World Summit on Sustainable Development; the World Summit for Social Development; the Programme of Action of the International Conference on Population and Development, the Beijing Platform for Action; and the United Nations Conference on Sustainable Development ("Rio+20"). We also reaffirm the follow-up to these conferences, including the outcomes of the Fourth United Nations Conference on the Least Developed Countries, the Third International Conference on Small Island Developing States; the Second United Nations Conference on Landlocked Developing Countries; and the Third UN World Conference on Disaster Risk Reduction.

12. We reaffirm all the principles of the Rio Declaration on Environment and Development, including, inter alia, the principle of common but differentiated responsibilities, as set out in principle 7 thereof.

13. The challenges and commitments contained in these major conferences and summits are interrelated and call for integrated solutions. To address them effectively, a new approach is needed. Sustainable development recognizes that eradicating poverty in all its



forms and dimensions, combatting inequality within and among countries, preserving the planet, creating sustained, inclusive and sustainable economic growth and fostering social inclusion are linked to each other and are interdependent.

## Our world today

14. We are meeting at a time of immense challenges to sustainable development. Billions of our citizens continue to live in poverty and are denied a life of dignity. There are rising inequalities within and among countries. There are enormous disparities of opportunity, wealth and power. Gender inequality remains a key challenge. Unemployment, particularly youth unemployment, is a major concern. Global health threats, more frequent and intense natural disasters, spiralling conflict, violent extremism, terrorism and related humanitarian crises and forced displacement of people threaten to reverse much of the development progress made in recent decades. Natural resource depletion and adverse impacts of environmental degradation, including desertification, drought, land degradation, freshwater scarcity and loss of biodiversity, add to and exacerbate the list of challenges which humanity faces. Climate change is one of the greatest challenges of our time and its adverse impacts undermine the ability of all countries to achieve sustainable development. Increases in global temperature, sea level rise, ocean acidification and other climate change impacts are seriously affecting coastal areas and low-lying coastal countries, including many least developed countries and small island developing States. The survival of many societies, and of the biological support systems of the planet, is at risk.

15. It is also, however, a time of immense opportunity. Significant progress has been made in meeting many development challenges. Within the past generation, hundreds of millions of people have emerged from extreme poverty. Access to education has greatly increased for both boys and girls. The spread of information and communications technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies, as does scientific and technological innovation across areas as diverse as medicine and energy.

16. Almost fifteen years ago, the Millennium Development Goals were agreed. These provided an important framework for development and significant progress has been made in a number of areas. But the progress has been uneven, particularly in Africa, least developed countries, landlocked developing countries, and small island developing States, and some of the MDGs remain off-track, in particular those related to maternal, newborn and child health and to reproductive health. We recommit ourselves to the full realization of all the MDGs, including the off-track MDGs, in particular by providing focussed and scaled-up assistance to least developed countries and other countries in special situations, in line with relevant support programmes. The new Agenda builds on the Millennium Development Goals and seeks to complete what these did not achieve, particularly in reaching the most vulnerable.

17. In its scope, however, the framework we are announcing today goes far beyond the MDGs. Alongside continuing development priorities such as poverty eradication, health, education and food security and nutrition, it sets out a wide range of economic, social and environmental objectives. It also promises more peaceful and inclusive societies. It also, crucially, defines means of implementation. Reflecting the integrated approach that we have decided on, there are deep interconnections and many cross-cutting elements across the new Goals and targets.

## The new Agenda

18. We are announcing today 17 Sustainable Development Goals with 169 associated targets which are integrated and indivisible. Never before have world leaders pledged common action and endeavour across such a broad and universal policy agenda. We are setting out together on the path towards sustainable development, devoting ourselves collectively to the pursuit of global development and of "win-win" cooperation which can bring huge gains to all countries and all parts of the world. We reaffirm that every State has, and shall freely exercise, full permanent sovereignty over all its wealth, natural resources and economic activity. We will implement the Agenda for the full benefit of all, for today's generation and for future generations. In doing so, we reaffirm our commitment to international law and emphasize that the Agenda is to be implemented in a manner that is consistent with the rights and obligations of states under international law.

19. We reaffirm the importance of the Universal Declaration of Human Rights, as well as other international instruments relating to human rights and international law. We emphasize the responsibilities of all States, in conformity with the Charter of the United Nations, to respect, protect and promote human rights and fundamental freedoms for all, without distinction of any kind as to race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth, disability or other status.

20. Realizing gender equality and the empowerment of women and girls will make a crucial contribution to progress across all the Goals and targets. The achievement of full human potential and of sustainable development is not possible if one half of humanity continues to be denied its full human rights and opportunities. Women and girls must enjoy equal access to quality education, economic

resources and political participation as well as equal opportunities with men and boys for employment, leadership and decision-making at all levels. We will work for a significant increase in investments to close the gender gap and strengthen support for institutions in relation to gender equality and the empowerment of women at the global, regional and national levels. All forms of discrimination and violence against women and girls will be eliminated, including through the engagement of men and boys. The systematic mainstreaming of a gender perspective in the implementation of the Agenda is crucial.

21. The new Goals and targets will come into effect on 1 January 2016 and will guide the decisions we take over the next fifteen years. All of us will work to implement the Agenda within our own countries and at the regional and global levels, taking into account different national realities, capacities and levels of development and respecting national policies and priorities. We will respect national policy space for sustained, inclusive and sustainable economic growth, in particular for developing states, while remaining consistent with relevant international rules and commitments. We acknowledge also the importance of the regional and sub-regional dimensions, regional economic integration and interconnectivity in sustainable development. Regional and sub-regional frameworks can facilitate the effective translation of sustainable development policies into concrete action at national level.

22. Each country faces specific challenges in its pursuit of sustainable development. The most vulnerable countries and, in particular, African countries, least developed countries, landlocked developing countries and small island developing states deserve special attention, as do countries in situations of conflict and post-conflict countries. There are also serious challenges within many middle-income countries.

23. People who are vulnerable must be empowered. Those whose needs are reflected in the Agenda include all children, youth, persons with disabilities (of whom more than 80% live in poverty), people living with HIV/AIDS, older persons, indigenous peoples, refugees and internally displaced persons and migrants. We resolve to take further effective measures and actions, in conformity with international law, to remove obstacles and constraints, strengthen support and meet the special needs of people living in areas affected by complex humanitarian emergencies and in areas affected by terrorism.

24. We are committed to ending poverty in all its forms and dimensions, including by eradicating extreme poverty by 2030. All people must enjoy a basic standard of living, including through social protection systems. We are also determined to end hunger and to achieve food security as a matter of priority and to end all forms of malnutrition. In this regard, we reaffirm the important role and inclusive nature of the Committee on World Food Security and welcome the Rome Declaration on Nutrition and Framework for Action. We will devote resources to developing rural areas and sustainable agriculture and fisheries, supporting smallholder farmers, especially women farmers, herders and fishers in developing countries, particularly least developed countries.

25. We commit to providing inclusive and equitable quality education at all levels – early childhood, primary, secondary, tertiary, technical and vocational training. All people, irrespective of sex, age, race, ethnicity, and persons with disabilities, migrants, indigenous peoples, children and youth, especially those in vulnerable situations, should have access to life-long learning opportunities that help them acquire the knowledge and skills needed to exploit opportunities and to participate fully in society. We will strive to provide children and youth with a nurturing environment for the full realization of their rights and capabilities, helping our countries to reap the demographic dividend including through safe schools and cohesive communities and families.

26. To promote physical and mental health and well-being, and to extend life expectancy for all, we must achieve universal health coverage and access to quality health care. No one must be left behind. We commit to accelerating the progress made to date in reducing newborn, child and maternal mortality by ending all such preventable deaths before 2030. We are committed to ensuring universal access to sexual and reproductive health-care services, including for family planning, information and education. We will equally accelerate the pace of progress made in fighting malaria, HIV/AIDS, tuberculosis, hepatitis, Ebola and other communicable diseases and epidemics, including by addressing growing anti-microbial resistance and the problem of unattended diseases affecting developing countries. We are committed to the prevention and treatment of non-communicable diseases, including behavioural, developmental and neurological disorders, which constitute a major challenge for sustainable development.

27. We will seek to build strong economic foundations for all our countries. Sustained, inclusive and sustainable economic growth is essential for prosperity. This will only be possible if wealth is shared and income inequality is addressed. We will work to build dynamic, sustainable, innovative and people-centred economies, promoting youth employment and women's economic empowerment, in particular, and decent work for all. We will eradicate forced labour and human trafficking and end child labour in all its forms. All countries stand to benefit from having a healthy and well-educated workforce with the knowledge and skills needed for productive and fulfilling work and full participation in society. We will strengthen the productive capacities of least-developed countries in all sectors, including through structural transformation. We will adopt policies which increase productive capacities, productivity and productive employment; financial inclusion; sustainable agriculture, pastoralist and fisheries development; sustainable industrial development; universal access to affordable, reliable, sustainable and modern energy services; sustainable transport systems; and quality and resilient infrastructure.

28. We commit to making fundamental changes in the way that our societies produce and consume goods and services. Governments, international organizations, the business sector and other non-state actors and individuals must contribute to changing unsustainable consumption and production patterns, including through the mobilization, from all sources, of financial and technical assistance to strengthen developing countries' scientific, technological and innovative capacities to move towards more sustainable patterns of consumption and production. We encourage the implementation of the 10-Year Framework of Programmes on Sustainable Consumption and Production. All countries take action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.

29. We recognize the positive contribution of migrants for inclusive growth and sustainable development. We also recognize that international migration is a multi-dimensional reality of major relevance for the development of countries of origin, transit and destination, which requires coherent and comprehensive responses. We will cooperate internationally to ensure safe, orderly and regular migration involving full respect for human rights and the humane treatment of migrants regardless of migration status, of refugees and of displaced persons. Such cooperation should also strengthen the resilience of communities hosting refugees, particularly in developing countries. We underline the right of migrants to return to their country of citizenship, and recall that States must ensure that their returning nationals are duly received.

30. States are strongly urged to refrain from promulgating and applying any unilateral economic, financial or trade measures not in accordance with international law and the Charter of the United Nations that impede the full achievement of economic and social development, particularly in developing countries.

31. We acknowledge that the UNFCCC is the primary international, intergovernmental forum for negotiating the global response to climate change. We are determined to address decisively the threat posed by climate change and environmental degradation. The global nature of climate change calls for the widest possible international cooperation aimed at accelerating the reduction of global greenhouse gas emissions and addressing adaptation to the adverse impacts of climate change. We note with grave concern the significant gap between the aggregate effect of Parties' mitigation pledges in terms of global annual emissions of greenhouse gases by 2020 and aggregate emission pathways consistent with having a likely chance of holding the increase in global average temperature below 2 °C or 1.5 °C above pre-industrial levels.

32. Looking ahead to the COP21 conference in Paris in December, we underscore the commitment of all States to work for an ambitious and universal climate agreement. We reaffirm that the protocol, another legal instrument or agreed outcome with legal force under the Convention applicable to all Parties shall address in a balanced manner, inter alia, mitigation, adaptation, finance, technology development and transfer, and capacity-building, and transparency of action and support.

33. We recognise that social and economic development depends on the sustainable management of our planet's natural resources. We are therefore determined to conserve and sustainably use oceans and seas, freshwater resources, as well as forests, mountains and drylands and to protect biodiversity, ecosystems and wildlife. We are also determined to promote sustainable tourism, tackle water scarcity and water pollution, to strengthen cooperation on desertification, dust storms, land degradation and drought and to promote resilience and disaster risk reduction. In this regard, we look forward to COP13 of the Convention on Biological Diversity to be held in Mexico in 2016.

34. We recognize that sustainable urban development and management are crucial to the quality of life of our people. We will work with local authorities and communities to renew and plan our cities and human settlements so as to foster community cohesion and personal security and to stimulate innovation and employment. We will reduce the negative impacts of urban activities and of chemicals which are hazardous for human health and the environment, including through the environmentally sound management and safe use of chemicals, the reduction and recycling of waste and more efficient use of water and energy. And we will work to minimize the impact of cities on the global climate system. We will also take account of population trends and projections in our national, rural and urban development strategies and policies. We look forward to the upcoming United Nations Conference on Housing and Sustainable Urban Development in Quito, Ecuador.

35. Sustainable development cannot be realized without peace and security; and peace and security will be at risk without sustainable development. The new Agenda recognizes the need to build peaceful, just and inclusive societies that provide equal access to justice and that are based on respect for human rights (including the right to development), on effective rule of law and good governance at all levels and on transparent, effective and accountable institutions. Factors which give rise to violence, insecurity and injustice, such as inequality, corruption, poor governance and illicit financial and arms flows, are addressed in the Agenda. We must redouble our efforts to resolve or prevent conflict and to support post-conflict countries, including through ensuring that women have a role in peace-building and state-building. We call for further effective measures and actions to be taken, in conformity with international law, to remove the obstacles to the full realization of the right of self-determination of peoples living under colonial and foreign occupation, which continue to adversely affect their economic and social development as well as their environment.

36. We pledge to foster inter-cultural understanding, tolerance, mutual respect and an ethic of global citizenship and shared responsibility. We acknowledge the natural and cultural diversity of the world and recognize that all cultures and civilizations can contribute to, and are crucial enablers of, sustainable development.

37. Sport is also an important enabler of sustainable development. We recognize the growing contribution of sport to the realization of development and peace in its promotion of tolerance and respect and the contributions it makes to the empowerment of women and of young people, individuals and communities as well as to health, education and social inclusion objectives.

38. We reaffirm, in accordance with the Charter of the United Nations, the need to respect the territorial integrity and political independence of States.

## Means of Implementation

39. The scale and ambition of the new Agenda requires a revitalized Global Partnership to ensure its implementation. We fully commit to this. This Partnership will work in a spirit of global solidarity, in particular solidarity with the poorest and with people in vulnerable situations. It will facilitate an intensive global engagement in support of implementation of all the Goals and targets, bringing together Governments, the private sector, civil society, the United Nations system and other actors and mobilizing all available resources.

40. The means of implementation targets under Goal 17 and under each SDG are key to realising our Agenda and are of equal importance with the other Goals and targets. The Agenda, including the SDGs, can be met within the framework of a revitalized global partnership for sustainable development, supported by the concrete policies and actions as outlined in the outcome document of the Third International Conference on Financing for Development, held in Addis Ababa from 13-16 July 2015. We welcome the endorsement by the General Assembly of the Addis Ababa Action Agenda, which is an integral part of the 2030 Agenda for Sustainable Development. We recognize that the full implementation of the Addis Ababa Action Agenda is critical for the realization of the Sustainable Development Goals and targets.

41. We recognize that each country has primary responsibility for its own economic and social development. The new Agenda deals with the means required for implementation of the Goals and targets. We recognize that these will include the mobilization of financial resources as well as capacity-building and the transfer of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed. Public finance, both domestic and international, will play a vital role in providing essential services and public goods and in catalyzing other sources of finance. We acknowledge the role of the diverse private sector, ranging from micro-enterprises to cooperatives to multinationals, and that of civil society organizations and philanthropic organizations in the implementation of the new Agenda.

42. We support the implementation of relevant strategies and programmes of action, including the Istanbul Declaration and Programme of Action, the SIDS Accelerated Modalities of Action (SAMOA) Pathway, the Vienna Programme of Action for Landlocked Developing Countries for the Decade 2014-2024, and reaffirm the importance of supporting the African Union's Agenda 2063 and the programme of the New Partnership for Africa's Development (NEPAD), all of which are integral to the new Agenda. We recognize the major challenge to the achievement of durable peace and sustainable development in countries in conflict and post-conflict situations.

43. We emphasize that international public finance plays an important role in complementing the efforts of countries to mobilize public resources domestically, especially in the poorest and most vulnerable countries with limited domestic resources. An important use of international public finance, including ODA, is to catalyse additional resource mobilization from other sources, public and private. ODA providers reaffirm their respective commitments, including the commitment by many developed countries to achieve the target of 0.7% of ODA/GNI to developing countries and 0.15% to 0.2% of ODA/GNI to least developed countries.

44. We acknowledge the importance for international financial institutions to support, in line with their mandates, the policy space of each country, in particular developing countries. We recommit to broadening and strengthening the voice and participation of developing countries – including African countries, least developed countries, land-locked developing countries, small-island developing States and middle-income countries – in international economic decision-making, norm-setting and global economic governance.

45. We acknowledge also the essential role of national parliaments through their enactment of legislation and adoption of budgets and their role in ensuring accountability for the effective implementation of our commitments. Governments and public institutions will also work closely on implementation with regional and local authorities, sub-regional institutions, international institutions, academia, philanthropic organisations, volunteer groups and others.

46. We underline the important role and comparative advantage of an adequately resourced, relevant, coherent, efficient and effective UN system in supporting the achievement of the SDGs and sustainable development. While stressing the importance of strengthened

national ownership and leadership at country level, we express our support for the ongoing ECOSOC Dialogue on the longer-term positioning of the United Nations development system in the context of this Agenda.

## Follow-up and review

47. Our Governments have the primary responsibility for follow-up and review, at the national, regional and global levels, in relation to the progress made in implementing the Goals and targets over the coming fifteen years. To support accountability to our citizens, we will provide for systematic follow-up and review at the various levels, as set out in this Agenda and the Addis Ababa Action Agenda. The High Level Political Forum under the auspices of the General Assembly and the Economic and Social Council will have the central role in overseeing follow-up and review at the global level.

48. Indicators are being developed to assist this work. Quality, accessible, timely and reliable disaggregated data will be needed to help with the measurement of progress and to ensure that no one is left behind. Such data is key to decision-making. Data and information from existing reporting mechanisms should be used where possible. We agree to intensify our efforts to strengthen statistical capacities in developing countries, particularly African countries, least developed countries, landlocked developing countries, small island developing States and middle-income countries. We are committed to developing broader measures of progress to complement gross domestic product (GDP).

## A call for action to change our world

49. Seventy years ago, an earlier generation of world leaders came together to create the United Nations. From the ashes of war and division they fashioned this Organization and the values of peace, dialogue and international cooperation which underpin it. The supreme embodiment of those values is the Charter of the United Nations.

50. Today we are also taking a decision of great historic significance. We resolve to build a better future for all people, including the millions who have been denied the chance to lead decent, dignified and rewarding lives and to achieve their full human potential. We can be the first generation to succeed in ending poverty; just as we may be the last to have a chance of saving the planet. The world will be a better place in 2030 if we succeed in our objectives.

51. What we are announcing today – an Agenda for global action for the next fifteen years – is a charter for people and planet in the twenty-first century. Children and young women and men are critical agents of change and will find in the new Goals a platform to channel their infinite capacities for activism into the creation of a better world.

52. "We the Peoples" are the celebrated opening words of the UN Charter. It is "We the Peoples" who are embarking today on the road to 2030. Our journey will involve Governments as well as Parliaments, the UN system and other international institutions, local authorities, indigenous peoples, civil society, business and the private sector, the scientific and academic community – and all people. Millions have already engaged with, and will own, this Agenda. It is an Agenda of the people, by the people, and for the people – and this, we believe, will ensure its success.

53. The future of humanity and of our planet lies in our hands. It lies also in the hands of today's younger generation who will pass the torch to future generations. We have mapped the road to sustainable development; it will be for all of us to ensure that the journey is successful and its gains irreversible.

### Sustainable Development Goals and targets

54. Following an inclusive process of intergovernmental negotiations, and based on the Proposal of the Open Working Group on Sustainable Development Goals, which includes a chapeau contextualising the latter, the following are the Goals and targets which we have agreed.

55. The SDGs and targets are integrated and indivisible, global in nature and universally applicable, taking into account different national realities, capacities and levels of development and respecting national policies and priorities. Targets are defined as aspirational and global, with each government setting its own national targets guided by the global level of ambition but taking into account national circumstances. Each government will also decide how these aspirational and global targets should be incorporated in national planning processes, policies and strategies. It is important to recognize the link between sustainable development and other relevant ongoing processes in the economic, social and environmental fields.

56. In deciding upon these Goals and targets, we recognise that each country faces specific challenges to achieve sustainable development, and we underscore the special challenges facing the most vulnerable countries and, in particular, African countries, least

developed countries, landlocked developing countries and small island developing States, as well as the specific challenges facing the middle-income countries. Countries in situations of conflict also need special attention.

57. We recognize that baseline data for several of the targets remain unavailable, and we call for increased support for strengthening data collection and capacity building in Member States, to develop national and global baselines where they do not yet exist. We commit to addressing this gap in data collection so as to better inform the measurement of progress, in particular for those targets below which do not have clear numerical targets.

58. We encourage ongoing efforts by states in other fora to address key issues which pose potential challenges to the implementation of our Agenda; and we respect the independent mandates of those processes. We intend that the Agenda and its implementation would support, and be without prejudice to, those other processes and the decisions taken therein.

59. We recognise that there are different approaches, visions, models and tools available to each country, in accordance with its national circumstances and priorities, to achieve sustainable development; and we reaffirm that planet Earth and its ecosystems are our common home and that 'Mother Earth' is a common expression in a number of countries and regions.

## Sustainable Development Goals

- Goal 1. End poverty in all its forms everywhere
- Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3. Ensure healthy lives and promote well-being for all at all ages
- Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5. Achieve gender equality and empower all women and girls
- Goal 6. Ensure availability and sustainable management of water and sanitation for all
- Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10. Reduce inequality within and among countries
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12. Ensure sustainable consumption and production patterns
- Goal 13. Take urgent action to combat climate change and its impacts\*
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

\* Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

### Goal 1. End poverty in all its forms everywhere

1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day

1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable

1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance

1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

1.a Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement

programmes and policies to end poverty in all its dimensions

1.b Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions

## **Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture**

2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round

2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons

2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment

2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed

2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries

2.b Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round

2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility

## **Goal 3. Ensure healthy lives and promote well-being for all at all ages**

3.1 By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births

3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births

3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases

3.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being

3.5 Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol

3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents

3.7 By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes

3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all

3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

3.a Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate

3.b Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all



- 3.c Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States
- 3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks

## **Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**

- 4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes
- 4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education
- 4.3 By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university
- 4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship
- 4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations
- 4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy
- 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development
- 4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all
- 4.b By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries
- 4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

## **Goal 5. Achieve gender equality and empower all women and girls**

- 5.1 End all forms of discrimination against all women and girls everywhere
- 5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation
- 5.3 Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation
- 5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate
- 5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life
- 5.6 Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences
- 5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws
- 5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women
- 5.c Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels

## **Goal 6. Ensure availability and sustainable management of water and sanitation for**



## **all**

- 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all
- 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
- 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
- 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
- 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
- 6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies
- 6.b Support and strengthen the participation of local communities in improving water and sanitation management

## **Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all**

- 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services
- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
- 7.3 By 2030, double the global rate of improvement in energy efficiency
- 7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
- 7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support

## **Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all**

- 8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries
- 8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors
- 8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services
- 8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead
- 8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value
- 8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training
- 8.7 Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms
- 8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment
- 8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products
- 8.10 Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all
- 8.a Increase Aid for Trade support for developing countries, in particular least developed countries, including through the Enhanced

Integrated Framework for Trade-Related Technical Assistance to Least Developed Countries

8.b By 2020, develop and operationalize a global strategy for youth employment and implement the Global Jobs Pact of the International Labour Organization

## **Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation**

9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries

9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets

9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending

9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States

9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities

9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020

## **Goal 10. Reduce inequality within and among countries**

10.1 By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average

10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status

10.3 Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard

10.4 Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality

10.5 Improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations

10.6 Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions

10.7 Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies

10.a Implement the principle of special and differential treatment for developing countries, in particular least developed countries, in accordance with World Trade Organization agreements

10.b Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes

10.c By 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent

## **Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable**

11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums

- 11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
- 11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
- 11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage
- 11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
- 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
- 11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities
- 11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
- 11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels
- 11.c Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials

## **Goal 12. Ensure sustainable consumption and production patterns**

- 12.1 Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries
- 12.2 By 2030, achieve the sustainable management and efficient use of natural resources
- 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses
- 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment
- 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
- 12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle
- 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities
- 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature
- 12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production
- 12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products
- 12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities

## **Goal 13. Take urgent action to combat climate change and its impacts\***

- 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
- 13.2 Integrate climate change measures into national policies, strategies and planning
- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
- 13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through

its capitalization as soon as possible

13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

\* Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

## **Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development**

14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics

14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation

14.7 By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism

14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries

14.b Provide access for small-scale artisanal fishers to marine resources and markets

14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of The Future We Want

## **Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss**

15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development

15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species

15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed

15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products

15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and

water ecosystems and control or eradicate the priority species

15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems

15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation

15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities

## **Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels**

16.1 Significantly reduce all forms of violence and related death rates everywhere

16.2 End abuse, exploitation, trafficking and all forms of violence against and torture of children

16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all

16.4 By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime

16.5 Substantially reduce corruption and bribery in all their forms

16.6 Develop effective, accountable and transparent institutions at all levels

16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels

16.8 Broaden and strengthen the participation of developing countries in the institutions of global governance

16.9 By 2030, provide legal identity for all, including birth registration

16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements

16.a Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime

16.b Promote and enforce non-discriminatory laws and policies for sustainable development

## **Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development**

### **Finance**

17.1 Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection

17.2 Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of ODA/GNI to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries

17.3 Mobilize additional financial resources for developing countries from multiple sources

17.4 Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress

17.5 Adopt and implement investment promotion regimes for least developed countries

### **Technology**

17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism

17.7 Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed

17.8 Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology

## Capacity-building

17.9 Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation

## Trade

17.10 Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda

17.11 Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020

17.12 Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access

## Systemic issues

### *Policy and institutional coherence*

17.13 Enhance global macroeconomic stability, including through policy coordination and policy coherence

17.14 Enhance policy coherence for sustainable development

17.15 Respect each country's policy space and leadership to establish and implement policies for poverty eradication and sustainable development

### *Multi-stakeholder partnerships*

17.16 Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries

17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships

### *Data, monitoring and accountability*

17.18 By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts

17.19 By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries

### Means of implementation and the Global Partnership

60. We reaffirm our strong commitment to the full implementation of this new Agenda. We recognize that we will not be able to achieve our ambitious Goals and targets without a revitalized and enhanced Global Partnership and comparably ambitious means of implementation. The revitalized Global Partnership will facilitate an intensive global engagement in support of implementation of all the goals and targets, bringing together Governments, civil society, the private sector, the United Nations system and other actors and mobilizing all available resources.

61. The Agenda's Goals and targets deal with the means required to realise our collective ambitions. The means of implementation targets under each SDG and Goal 17, which are referred to above, are key to realising our Agenda and are of equal importance with the other Goals and targets. We shall accord them equal priority in our implementation efforts and in the global indicator framework for

monitoring our progress.

62. This Agenda, including the SDGs, can be met within the framework of a revitalized global partnership for sustainable development, supported by the concrete policies and actions outlined in the Addis Ababa Action Agenda, which is an integral part of the 2030 Agenda for sustainable development. The Addis Ababa Action Agenda supports, complements and helps contextualize the 2030 Agenda's means of implementation targets. These relate to domestic public resources, domestic and international private business and finance, international development cooperation, international trade as an engine for development, debt and debt sustainability, addressing systemic issues and science, technology, innovation and capacity-building, and data, monitoring and follow-up.

63. Cohesive nationally owned sustainable development strategies, supported by integrated national financing frameworks, will be at the heart of our efforts. We reiterate that each country has primary responsibility for its own economic and social development and that the role of national policies and development strategies cannot be overemphasized. We will respect each country's policy space and leadership to implement policies for poverty eradication and sustainable development, while remaining consistent with relevant international rules and commitments. At the same time, national development efforts need to be supported by an enabling international economic environment, including coherent and mutually supporting world trade, monetary and financial systems, and strengthened and enhanced global economic governance. Processes to develop and facilitate the availability of appropriate knowledge and technologies globally, as well as capacity-building, are also critical. We commit to pursuing policy coherence and an enabling environment for sustainable development at all levels and by all actors, and to reinvigorating the global partnership for sustainable development.

64. We support the implementation of relevant strategies and programmes of action, including the Istanbul Declaration and Programme of Action, the SIDS Accelerated Modalities of Action (SAMOA) Pathway, the Vienna Programme of Action for Landlocked Developing Countries for the Decade 2014-2024, and reaffirm the importance of supporting the African Union's Agenda 2063 and the programme of the New Partnership for Africa's Development (NEPAD), all of which are integral to the new Agenda. We recognize the major challenge to the achievement of durable peace and sustainable development in countries in conflict and post-conflict situations.

65. We recognize that middle-income countries still face significant challenges to achieve sustainable development. In order to ensure that achievements made to date are sustained, efforts to address ongoing challenges should be strengthened through the exchange of experiences, improved coordination, and better and focused support of the United Nations Development System, the international financial institutions, regional organizations and other stakeholders.

66. We underscore that, for all countries, public policies and the mobilization and effective use of domestic resources, underscored by the principle of national ownership, are central to our common pursuit of sustainable development, including achieving the sustainable development goals. We recognize that domestic resources are first and foremost generated by economic growth, supported by an enabling environment at all levels.

67. Private business activity, investment and innovation are major drivers of productivity, inclusive economic growth and job creation. We acknowledge the diversity of the private sector, ranging from micro-enterprises to cooperatives to multinationals. We call on all businesses to apply their creativity and innovation to solving sustainable development challenges. We will foster a dynamic and well-functioning business sector, while protecting labour rights and environmental and health standards in accordance with relevant international standards and agreements and other on-going initiatives in this regard, such as the Guiding Principles on Business and Human Rights and the labour standards of ILO, the Convention on the Rights of the Child and key multilateral environmental agreements, for parties to those agreements.

68. International trade is an engine for inclusive economic growth and poverty reduction, and contributes to the promotion of sustainable development. We will continue to promote a universal, rules-based, open, transparent, predictable, inclusive, non-discriminatory and equitable multilateral trading system under the World Trade Organization (WTO), as well as meaningful trade liberalization. We call on all WTO members to redouble their efforts to promptly conclude the negotiations on the Doha Development Agenda. We attach great importance to providing trade-related capacity-building for developing countries, including African countries, least-developed countries, landlocked developing countries, small island developing states and middle-income countries, including for the promotion of regional economic integration and interconnectivity.

69. We recognize the need to assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief, debt restructuring and sound debt management, as appropriate. Many countries remain vulnerable to debt crises and some are in the midst of crises, including a number of least developed countries, small-island developing States and some developed countries. We reiterate that debtors and creditors must work together to prevent and resolve unsustainable debt situations. Maintaining sustainable debt levels is the responsibility of the borrowing countries; however we acknowledge that lenders also have a responsibility to lend in a way that does not undermine a country's debt sustainability. We will support the maintenance of debt sustainability of those countries that have received debt relief and achieved sustainable debt levels.



70. We hereby launch a Technology Facilitation Mechanism which was established by the Addis Ababa Action Agenda in order to support the sustainable development goals. The Technology Facilitation Mechanism will be based on a multi-stakeholder collaboration between Member States, civil society, private sector, scientific community, United Nations entities and other stakeholders and will be composed of: a United Nations Interagency Task Team on Science, Technology and Innovation for the SDGs, a collaborative Multistakeholder Forum on Science, Technology and Innovation for the SDGs and an on-line platform.

- The United Nations Interagency Task Team on Science, Technology and Innovation for the SDGs will promote coordination, coherence, and cooperation within the UN System on STI related matters, enhancing synergy and efficiency, in particular to enhance capacity-building initiatives. The Task Team will draw on existing resources and will work with 10 representatives from the civil society, private sector, the scientific community, to prepare the meetings of the Multistakeholder Forum on Science, Technology and Innovation for the SDGs, as well as in the development and operationalization of the on-line platform, including preparing proposals for the modalities for the Forum and the on-line platform. The 10 representatives will be appointed by the Secretary General, for periods of two years. The Task Team will be open to the participation of all UN agencies, funds and programmes, and ECOSOC functional commissions and it will initially be composed by the entities that currently integrate the informal working group on technology facilitation, namely: UN Department of Economic and Social Affairs, United Nations Environment Programme, UNIDO, United Nations Educational Scientific and Cultural Organization, UNCTAD, International Telecommunication Union, WIPO and the World Bank.
- The on-line platform will be used to establish a comprehensive mapping of, and serve as a gateway for, information on existing STI initiatives, mechanisms and programmes, within and beyond the UN. The on-line platform will facilitate access to information, knowledge and experience, as well as best practices and lessons learned, on STI facilitation initiatives and policies. The online platform will also facilitate the dissemination of relevant open access scientific publications generated worldwide. The on-line platform will be developed on the basis of an independent technical assessment which will take into account best practices and lessons learned from other initiatives, within and beyond the United Nations, in order to ensure that it will complement, facilitate access to and provide adequate information on existing STI platforms, avoiding duplications and enhancing synergies.
- The Multi-stakeholder Forum on Science Technology and Innovation for the SDGs will be convened once a year, for a period of two days, to discuss STI cooperation around thematic areas for the implementation of the SDGs, congregating all relevant stakeholders to actively contribute in their area of expertise. The Forum will provide a venue for facilitating interaction, matchmaking and the establishment of networks between relevant stakeholders and multi-stakeholder partnerships in order to identify and examine technology needs and gaps, including on scientific cooperation, innovation and capacity building, and also in order to help facilitate development, transfer and dissemination of relevant technologies for the SDGs. The meetings of the Forum will be convened by the President of the ECOSOC before the meeting of the High Level Political Forum under the auspices of ECOSOC or, alternatively, in conjunction with other fora or conferences, as appropriate, taking into account the theme to be considered and on the basis of a collaboration with the organizers of the other fora or conference. The meetings of the Forum will be co-chaired by two Member States and will result in a summary of discussions elaborated by the two co-chairs, as an input to the meetings of the High Level Political Forum, in the context of the follow-up and review of the implementation of the Post-2015 Development Agenda.
- The meetings of the HLPF will be informed by the summary of the Multistakeholder Forum. The themes for the subsequent Multistakeholder Forum on Science Technology and Innovation for the SDGs will be considered by the High Level Political Forum on sustainable development, taking into account expert inputs from the Task Team.

71. We reiterate that this Agenda and the Sustainable Development Goals and targets, including the means of implementation are universal, indivisible and interlinked.

#### Follow-up and review

72. We commit to engage in systematic follow-up and review of implementation of this Agenda over the next fifteen years. A robust, voluntary, effective, participatory, transparent and integrated follow-up and review framework will make a vital contribution to implementation and will help countries to maximize and track progress in implementing this Agenda in order to ensure that no one is left behind.

73. Operating at the national, regional and global levels, it will promote accountability to our citizens, support effective international cooperation in achieving this Agenda and foster exchanges of best practices and mutual learning. It will mobilize support to overcome shared challenges and identify new and emerging issues. As this is a universal Agenda, mutual trust and understanding among all nations will be important.

74. Follow-up and review processes at all levels will be guided by the following principles:

- a. They will be voluntary and country-led, will take into account different national realities, capacities and levels of development and will respect policy space and priorities. As national ownership is key to achieving sustainable development, the outcome from national level processes will be the foundation for reviews at regional and global levels, given that the global review will be primarily based on national



official data sources.

- b. They will track progress in implementing the universal Goals and targets, including the means of implementation, in all countries in a manner which respects their universal, integrated and interrelated nature and the three dimensions of sustainable development.
- c. They will maintain a longer-term orientation, identify achievements, challenges, gaps and critical success factors and support countries in making informed policy choices. They will help mobilize the necessary means of implementation and partnerships, support the identification of solutions and best practices and promote coordination and effectiveness of the international development system.
- d. They will be open, inclusive, participatory and transparent for all people and will support the reporting by all relevant stakeholders.
- e. They will be people-centred, gender-sensitive, respect human rights and have a particular focus on the poorest, most vulnerable and those furthest behind.
- f. They will build on existing platforms and processes, where these exist, avoid duplication and respond to national circumstances, capacities, needs and priorities. They will evolve over time, taking into account emerging issues and the development of new methodologies, and will minimize the reporting burden on national administrations.
- g. They will be rigorous and based on evidence, informed by country-led evaluations and data which is high-quality, accessible, timely, reliable and disaggregated by income, sex, age, race, ethnicity, migration status, disability and geographic location and other characteristics relevant in national contexts.
- h. They will require enhanced capacity-building support for developing countries, including the strengthening of national data systems and evaluation programs, particularly in African countries, LDCs, SIDS and LLDCs and middle-income countries.
- i. They will benefit from the active support of the UN system and other multilateral institutions.

75. The Goals and targets will be followed-up and reviewed using a set of global indicators. These will be complemented by indicators at the regional and national levels which will be developed by member states, in addition to the outcomes of work undertaken for the development of the baselines for those targets where national and global baseline data does not yet exist. The global indicator framework, to be developed by the Inter Agency and Expert Group on SDG Indicators, will be agreed by the UN Statistical Commission by March 2016 and adopted thereafter by the Economic and Social Council and the General Assembly, in line with existing mandates. This framework will be simple yet robust, address all SDGs and targets including for means of implementation, and preserve the political balance, integration and ambition contained therein.

76. We will support developing countries, particularly African countries, LDCs, SIDS and LLDCs, in strengthening the capacity of national statistical offices and data systems to ensure access to high-quality, timely, reliable and disaggregated data. We will promote transparent and accountable scaling-up of appropriate public-private cooperation to exploit the contribution to be made by a wide range of data, including earth observation and geo-spatial information, while ensuring national ownership in supporting and tracking progress.

77. We commit to fully engage in conducting regular and inclusive reviews of progress at sub-national, national, regional and global levels. We will draw as far as possible on the existing network of follow-up and review institutions and mechanisms. National reports will allow assessments of progress and identify challenges at the regional and global level. Along with regional dialogues and global reviews, they will inform recommendations for follow-up at various levels.

## National level

78. We encourage all member states to develop as soon as practicable ambitious national responses to the overall implementation of this Agenda. These can support the transition to the SDGs and build on existing planning instruments, such as national development and sustainable development strategies, as appropriate.

79. We also encourage member states to conduct regular and inclusive reviews of progress at the national and sub-national levels which are country-led and country-driven. Such reviews should draw on contributions from indigenous peoples, civil society, the private sector and other stakeholders, in line with national circumstances, policies and priorities. National parliaments as well as other institutions can also support these processes.

## Regional level

80. Follow-up and review at the regional and sub-regional levels can, as appropriate, provide useful opportunities for peer learning, including through voluntary reviews, sharing of best practices and discussion on shared targets. We welcome in this respect the cooperation of regional and sub-regional commissions and organizations. Inclusive regional processes will draw on national-level reviews and contribute to follow-up and review at the global level, including at the High Level Political Forum on sustainable development (HLPF).

81. Recognizing the importance of building on existing follow-up and review mechanisms at the regional level and allowing adequate policy space, we encourage all member states to identify the most suitable regional forum in which to engage. UN regional commissions are encouraged to continue supporting member states in this regard.

## Global level

82. The HLPF will have a central role in overseeing a network of follow-up and review processes at the global level, working coherently with the General Assembly, ECOSOC and other relevant organs and forums, in accordance with existing mandates. It will facilitate sharing of experiences, including successes, challenges and lessons learned, and provide political leadership, guidance and recommendations for follow-up. It will promote system-wide coherence and coordination of sustainable development policies. It should ensure that the Agenda remains relevant and ambitious and should focus on the assessment of progress, achievements and challenges faced by developed and developing countries as well as new and emerging issues. Effective linkages will be made with the follow-up and review arrangements of all relevant UN Conferences and processes, including on LDCs, SIDS and LLDCs.

83. Follow-up and review at the HLPF will be informed by an annual SDG Progress Report to be prepared by the Secretary General in cooperation with the UN System, based on the global indicator framework and data produced by national statistical systems and information collected at the regional level. The HLPF will also be informed by the Global Sustainable Development Report, which shall strengthen the science-policy interface and could provide a strong evidence-based instrument to support policy-makers in promoting poverty eradication and sustainable development. We invite the President of ECOSOC to conduct a process of consultations on the scope, methodology and frequency of the Report as well as its relation to the SDG Progress Report, the outcome of which should be reflected in the Ministerial Declaration of the HLPF session in 2016.

84. The HLPF, under the auspices of ECOSOC, shall carry out regular reviews, in line with Resolution 67/290. Reviews will be voluntary, while encouraging reporting, and include developed and developing countries as well as relevant UN entities and other stakeholders, including civil society and the private sector. They shall be state-led, involving ministerial and other relevant high-level participants. They shall provide a platform for partnerships, including through the participation of major groups and other relevant stakeholders.

85. Thematic reviews of progress on the Sustainable Development Goals, including cross-cutting issues, will also take place at the HLPF. These will be supported by reviews by the ECOSOC functional commissions and other inter-governmental bodies and forums which should reflect the integrated nature of the goals as well as the interlinkages between them. They will engage all relevant stakeholders and, where possible, feed into, and be aligned with, the cycle of the HLPF.

86. We welcome, as outlined in the Addis Ababa Action Agenda, the dedicated follow-up and review for the Financing for Development outcomes as well as all the means of implementation of the SDGs which is integrated with the follow-up and review framework of this Agenda. The intergovernmentally agreed conclusions and recommendations of the annual ECOSOC Forum on Financing for Development will be fed into the overall follow-up and review of the implementation of this Agenda in the HLPF.

87. Meeting every four years under the auspices of the General Assembly, the HLPF will provide high-level political guidance on the Agenda and its implementation, identify progress and emerging challenges and mobilize further actions to accelerate implementation. The next HLPF, under the auspices of the General Assembly, will take place in 2019, with the cycle of meetings thus reset, in order to maximize coherence with the Quadrennial Comprehensive Policy Review process.

88. We also stress the importance of system-wide strategic planning, implementation and reporting in order to ensure coherent and integrated support to implementation of the new Agenda by the UN development system. The relevant governing bodies should take action to review such support to implementation and to report on progress and obstacles. We welcome the ongoing ECOSOC Dialogues on the longer term positioning of the UN development system and look forward to taking action on these issues, as appropriate.

89. The HLPF will support participation in follow-up and review processes by the major groups and other relevant stakeholders in line with Resolution 67/290. We call on these actors to report on their contribution to the implementation of the Agenda.

90. We request the Secretary General, in consultation with Member States, to prepare a report, for consideration at the 70th session of the General Assembly in preparation for the 2016 meeting of the HLPF, which outlines critical milestones towards coherent efficient, and inclusive follow-up and review at the global level. This report should include a proposal on the organizational arrangements for state-led reviews at the HLPF under the auspices of ECOSOC, including recommendations on a voluntary common reporting guidelines. It should

**Download** national responsibilities and provide guidance on annual themes, on a sequence of thematic reviews, and on options for periodic reviews for the HLPF.

- [A/RES/70/1 - Transforming our world: the 2030 Agenda for Sustainable Development](#)

91. We reaffirm our unwavering commitment to achieving the Agenda and utilizing it to the full to transform our world for the better by

2030. [Transforming our world: the 2030 Agenda for Sustainable Development](#) (Publication)

## Follow-Up

The High-level Political Forum on Sustainable Development is the central UN platform for the follow-up and review of the 2030 Agenda for Sustainable Development adopted at the United Nations Sustainable Development Summit on 25 September 2015.

- [High-level Political Forum on Sustainable Development](#)
- [UN Conferences and High-Level Events related to sustainable development](#)



Join the conversation:    

---

[CONTACT](#) | [COPYRIGHT](#) | [FRAUD ALERT](#) | [PRIVACY NOTICE](#) | [TERMS OF USE](#)



Home

SDG Knowledge ▾

Intergovernmental Processes ▾

HLPF

SIDS ▾

Partnerships

Engage ▾

News

About

# THE 17 GOALS

**169**

Targets

**3085**

Events

**1303**

Publications

**5475**

Actions









# History



# History

[The 2030 Agenda for Sustainable Development](#), adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

The SDGs build on decades of work by countries and the UN, including the [UN Department of Economic and Social Affairs](#)

- In June 1992, at the [Earth Summit](#) in Rio de Janeiro, Brazil, more than 178 countries adopted [Agenda 21](#), a comprehensive plan of action to build a global partnership for sustainable development to improve human lives and protect the environment.
- Member States unanimously adopted the Millennium Declaration at the [Millennium Summit](#) in September 2000 at UN Headquarters in New York. The Summit led to the elaboration of eight [Millennium Development Goals \(MDGs\)](#) to reduce extreme poverty by 2015.
- The Johannesburg Declaration on Sustainable Development and the Plan of Implementation, adopted at the [World Summit on Sustainable Development](#) in South Africa in 2002, reaffirmed the global community's commitments to poverty eradication and the environment, and built on Agenda 21 and the Millennium Declaration by including more emphasis on multilateral partnerships.
- At the [United Nations Conference on Sustainable Development \(Rio+20\)](#) in Rio de Janeiro, Brazil, in June 2012, Member States adopted the outcome document "[The Future We Want](#)" in which they decided, inter alia, to launch a process to develop a set of SDGs to build upon the MDGs and to establish the [UN High-level Political Forum on Sustainable Development](#). The Rio +20 outcome also contained other measures for implementing sustainable development, including mandates for future programmes of work in development financing, small island developing states and more.
- In 2013, the General Assembly set up a 30-member [Open Working Group](#) to develop a proposal on the SDGs.
- In January 2015, the General Assembly began the negotiation process on the [post-2015 development agenda](#). The process culminated in the subsequent adoption of the [2030 Agenda for Sustainable Development](#), with [17 SDGs](#) at its core, at the [UN Sustainable Development Summit](#) in September 2015.
- 2015 was a landmark year for multilateralism and international policy shaping, with the adoption of several major agreements:
  - [Sendai Framework for Disaster Risk Reduction](#) (March 2015)
  - [Addis Ababa Action Agenda on Financing for Development](#) (July 2015)
  - [Transforming our world: the 2030 Agenda for Sustainable Development](#) with its 17 SDGs was adopted at the [UN Sustainable Development](#)

- [Transforming our world: the 2030 Agenda for Sustainable Development](#) with its 17 SDGs was adopted at the [UN Sustainable Development Summit](#) in New York in September 2015.
- [Paris Agreement on Climate Change](#) (December 2015)
- Now, the annual [High-level Political Forum on Sustainable Development](#) serves as the central UN platform for the follow-up and review of the SDGs.

Today, the [Division for Sustainable Development Goals \(DSDG\)](#) in the United Nations [Department of Economic and Social Affairs \(UNDESA\)](#) provides substantive support and capacity-building for the SDGs and their related thematic issues, including [water](#), [energy](#), [climate](#), [oceans](#), [urbanization](#), [transport](#), [science and technology](#), the [Global Sustainable Development Report \(GSDR\)](#), [partnerships](#) and [Small Island Developing States](#). DSDG plays a key role in the evaluation of UN systemwide implementation of the 2030 Agenda and on advocacy and outreach activities relating to the SDGs. In order to make the 2030 Agenda a reality, broad ownership of the SDGs must translate into a strong commitment by all stakeholders to implement the global goals. DSDG aims to help facilitate this engagement.

Follow DSDG on Facebook at [www.facebook.com/sustdev](http://www.facebook.com/sustdev) and on Twitter at [@SustDev](https://twitter.com/SustDev).







# SUSTAINABLE DEVELOPMENT GOALS

Ansehen auf YouTube

## SDGs Icons. Downloads and guidelines.

- Download SDGs icons according to guidelines at this link: <http://www.un.org/sustainabledevelopment/news/communications-material/>
- Please send inquiries to:  
United Nations Department of Global Communications

# NEW URBAN AGENDA

---



Anlage 17







# NEW URBAN AGENDA

---



United Nations

© 2017 United Nations

A/RES/71/256\*  
New Urban Agenda  
English  
2017  
ISBN: 978-92-1-132731-1

The New Urban Agenda was adopted at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador, on 20 October 2016. It was endorsed by the United Nations General Assembly at its sixty-eighth plenary meeting of the seventy-first session on 23 December 2016.

This publication is not subject to copyright, and it may be freely reproduced provided acknowledgement is given to the United Nations.

An electronic version of this publication, as well as other documents from the Habitat III preparatory process and the Conference itself, are available for download from the Habitat III website at [www.habitat3.org](http://www.habitat3.org)

This is a United Nations publication issued by the Habitat III Secretariat.

Cover: Quito urban pattern

The printing of this publication was supported by the Government of the Republic of Ecuador.

## FOREWORD



# FOREWORD

The New Urban Agenda represents a shared vision for a better and more sustainable future – one in which all people have equal rights and access to the benefits and opportunities that cities can offer, and in which the international community reconsiders the urban systems and physical form of our urban spaces to achieve this.

In this unprecedented era of increasing urbanization, and in the context of the 2030 Agenda for Sustainable Development, the Paris Agreement, and other global development agreements and frameworks, we have reached a critical point in understanding that cities can be the source of solutions to, rather than the cause of, the challenges that our world is facing today. If well-planned and well-managed, urbanization can be a powerful tool for sustainable development for both developing and developed countries.

The New Urban Agenda presents a paradigm shift based on the science of cities; it lays out standards and principles for the planning, construction, development, management, and improvement of urban areas along its five main pillars of implementation: national urban policies, urban legislation and regulations, urban planning and design, local economy and municipal finance, and local implementation. It is a resource for every level of government, from national to local; for civil society organizations; the private sector; constituent groups; and for all who call the urban spaces of the world “home” to realize this vision.

The New Urban Agenda incorporates a new recognition of the correlation between good urbanization and development. It underlines the linkages between good urbanization and job creation, livelihood opportunities, and improved quality of life, which should be included in every urban renewal policy and strategy. This further highlights the connection between the New Urban Agenda and the 2030 Agenda for Sustainable Development, especially Goal 11 on sustainable cities and communities.

Member States; intergovernmental organizations; the United Nations Human Settlements Programme (UN-Habitat) plus more than 40 United Nations agencies, funds, and programmes; 200 Policy Unit experts with 20 co-leading organizations; 16 partner constituent groups of the General Assembly of Partners; thousands of subnational and local governments and all major networks of local and regional governments coordinated by the Global Taskforce of Local and Regional Governments; 197 participating states; over 1,100 organizations; and more than 58,000 networks were involved in the preparations of the New Urban Agenda. These expert and stakeholder inputs formed the foundation of the zero draft of this document and further feedback was exchanged with Member States during the informal hearings with local governments and stakeholders, and taken into account throughout the intergovernmental negotiations that took place prior to the Conference, where the New Urban Agenda was adopted without reservations.

This participatory approach extended into the very framework of the Habitat III Conference in Quito, Ecuador, which is now widely considered to be among the most inclusive and innovative United Nations conferences. Side by side with the intergovernmental plenary sessions and high-level roundtables were the assemblies, which opened and framed the Conference by giving a space to constituent groups, as did the stakeholders’ roundtables, special sessions, dialogues, and other events organized by various organizations and partners throughout the Conference. It further maximized this participation and focused on implementation of the principles, policies, and actions for sustainable urban development by including

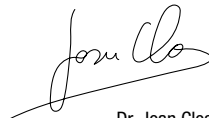
the One UN Pavilion to showcase and enable collaboration among the United Nations agencies, the Habitat III Exhibition to highlight independent organizations' innovations, and the Habitat III Village to exemplify urban solutions through actual interventions at the neighborhood level.

The Habitat III Conference and the city of Quito welcomed 30,000 participants from 167 countries, with online platforms and tools that enabled people all over the world to follow principal events online. It witnessed a historic realization of the principle of inclusivity, including gender and regional balance considerations on all panels; the meaningful inclusion of slum dwellers and grassroots leaders; the groundbreaking second World Assembly of Local and Regional Governments, as well as the involvement of a wide range of stakeholder groups, which all have a critical role to play in the implementation of this shared vision.

It has been my great honor to be the Secretary-General of the Conference. I wish to extend my sincere thanks and congratulations to the Republic of Ecuador for its hospitality and efforts as the host country of the Habitat III Conference. I also extend my gratitude to the members of the Bureau of the Preparatory Committee who guided the entire process, the Co-facilitators of the informal intergovernmental negotiations of the New Urban Agenda, and the official delegations involved in these negotiations, as well as the governments and cities that hosted the Habitat III Regional and Thematic Meetings and sessions of the Preparatory Committee, in addition to the members and co-leaders of the Policy Units, the United Nations Task Team on Habitat III, the General Assembly of Partners, the Global Taskforce for Local and Regional Governments, and other organizations that observed the negotiations and contributed to subsequent drafts of the New Urban Agenda.

I also extend my thanks to all staff who worked tirelessly to ensure that the expertise and voices of many thousands of contributors around the world were amplified and carried into these pages.

There is no single prescription for improving urbanization and achieving sustainable urban development, but the New Urban Agenda provides the principles and tested practices to bring its vision to life, off of these pages and into reality. May it inspire and inform the decision-makers and urban inhabitants of the world to take ownership of our shared urban future: one policy, law, plan, design, or project at a time. At this critical juncture in human history, rethinking the way we plan, build, and manage our urban spaces is not an option but an imperative. Our work to realize this vision begins now.



**Dr. Joan Clos**

Secretary-General of the United Nations Conference  
on Housing and Sustainable Urban Development (Habitat III)



## CONTENTS

Foreword.....	iii
New Urban Agenda.....	1
Quito Declaration on Sustainable Cities and Human Settlements for All.....	2
Quito Implementation Plan for the New Urban Agenda .....	10
Acknowledgements .....	45
Habitat III Roadmap.....	50



# NEW URBAN AGENDA

QUITO  
DECLARATION  
ON  
SUSTAINABLE  
CITIES AND  
HUMAN  
SETTLEMENTS  
FOR ALL

1. We, Heads of State and Government, Ministers and High Representatives, have gathered at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) from 17 to 20 October 2016 in Quito, with the participation of subnational and local governments, parliamentarians, civil society, indigenous peoples and local communities, the private sector, professionals and practitioners, the scientific and academic community, and other relevant stakeholders, to adopt a New Urban Agenda.

2. By 2050, the world's urban population is expected to nearly double, making urbanization one of the twenty-first century's most transformative trends. Populations, economic activities, social and cultural interactions, as well as environmental and humanitarian impacts, are increasingly concentrated in cities, and this poses massive sustainability challenges in terms of housing, infrastructure, basic services, food security, health, education, decent jobs, safety and natural resources, among others.

3. Since the United Nations Conferences on Human Settlements in Vancouver, Canada, in 1976 and in Istanbul, Turkey, in 1996, and the adoption of the Millennium Development Goals in 2000, we have seen improvements in the quality of life of millions of urban inhabitants, including slum and informal-settlement dwellers. However, the persistence of multiple forms of poverty, growing inequalities and environmental degradation remain among the major obstacles to sustainable development worldwide, with social and economic exclusion and spatial segregation often an irrefutable reality in cities and human settlements.

4. We are still far from adequately addressing these and other existing and emerging challenges, and there is a need to take advantage of the opportunities presented by urbanization as an engine of sustained and inclusive economic growth, social and cultural development, and environmental protection, and of its potential contributions to the achievement of transformative and sustainable development.

5. By readdressing the way cities and human settlements are planned, designed, financed, developed, governed and managed, the New Urban Agenda will help to end poverty and hunger in all its forms and dimensions; reduce inequalities; promote sustained, inclusive and sustainable economic growth; achieve gender equality and the empowerment of all women and girls in order to fully harness their vital contribution to sustainable development; improve human health and well-being; foster resilience; and protect the environment.

6. We take full account of the milestone achievements of the year 2015, in particular the 2030 Agenda for Sustainable Development<sup>1</sup>, including the Sustainable Development Goals, the Addis Ababa Action Agenda of the Third International Conference on Financing for Development<sup>2</sup>, the Paris Agreement adopted under the United Nations Framework Convention on Climate Change<sup>3</sup>,

<sup>1</sup>Resolution 70/1.

<sup>2</sup>Resolution 69/313, annex.

<sup>3</sup> See FCCC/CP/2015/10/Add.1, decision 1/CP.21, annex.



the Sendai Framework for Disaster Risk Reduction 2015-2030<sup>4</sup>, the Vienna Programme of Action for Landlocked Developing Countries for the Decade 2014-2024<sup>5</sup>, the SIDS Accelerated Modalities of Action (SAMOA) Pathway<sup>6</sup> and the Istanbul Programme of Action for the Least Developed Countries for the Decade 2011-2020<sup>7</sup>. We also take account of the Rio Declaration on Environment and Development<sup>8</sup>, the World Summit on Sustainable Development, the World Summit for Social Development, the Programme of Action of the International Conference on Population and Development<sup>9</sup>, the Beijing Platform for Action<sup>10</sup>, the United Nations Conference on Sustainable Development and the follow-up to these conferences.

7. While recognizing that it did not have an intergovernmental agreed outcome, we take note of the World Humanitarian Summit held in May 2016 in Istanbul.

8. We acknowledge the contributions of national Governments, as well as the contributions of subnational and local governments, in the definition of the New Urban Agenda, and take note of the second World Assembly of Local and Regional Governments.

9. The New Urban Agenda reaffirms our global commitment to sustainable urban development as a critical step for realizing sustainable development in an integrated and coordinated manner at the global, regional, national, subnational and local levels, with the participation of all relevant actors. The implementation of the New Urban Agenda contributes to the implementation and localization of the 2030 Agenda for Sustainable Development in an integrated manner, and to the achievement of the Sustainable Development Goals and targets, including Goal 11 of making cities and human settlements inclusive, safe, resilient and sustainable.

10. The New Urban Agenda acknowledges that culture and cultural diversity are sources of enrichment for humankind and provide an important contribution to the sustainable development of cities, human settlements and citizens, empowering them to play an active and unique role in development initiatives. The New Urban Agenda further recognizes that culture should be taken into account in the promotion and implementation of new sustainable consumption and production patterns that contribute to the responsible use of resources and address the adverse impact of climate change.

<sup>4</sup> Resolution 69/283, annex II.

<sup>5</sup> Resolution 69/137, annex II.

<sup>6</sup> Resolution 69/15, annex.

<sup>7</sup> *Report of the Fourth United Nations Conference on the Least Developed Countries, Istanbul, Turkey, 9-13 May 2011 (A/CONF.219/7)*, chap. II.

<sup>8</sup> *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference* (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex I.

<sup>9</sup> *Report of the International Conference on Population and Development, Cairo, 5-13 September 1994* (United Nations publication, Sales No. E.95.XIII.18), chap. I, resolution 1, annex.

<sup>10</sup> *Report of the Fourth World Conference on Women, Beijing, 4-15 September 1995* (United Nations publication, Sales No. E.96.IV.13), chap. I, resolution 1, annex II.

## Our shared vision

11. We share a vision of cities for all, referring to the equal use and enjoyment of cities and human settlements, seeking to promote inclusivity and ensure that all inhabitants, of present and future generations, without discrimination of any kind, are able to inhabit and produce just, safe, healthy, accessible, affordable, resilient and sustainable cities and human settlements to foster prosperity and quality of life for all. We note the efforts of some national and local governments to enshrine this vision, referred to as “right to the city”, in their legislation, political declarations and charters.

12. We aim to achieve cities and human settlements where all persons are able to enjoy equal rights and opportunities, as well as their fundamental freedoms, guided by the purposes and principles of the Charter of the United Nations, including full respect for international law. In this regard, the New Urban Agenda is grounded in the Universal Declaration of Human Rights<sup>11</sup>, international human rights treaties, the Millennium Declaration<sup>12</sup> and the 2005 World Summit Outcome<sup>13</sup>. It is informed by other instruments such as the Declaration on the Right to Development<sup>14</sup>.

13. We envisage cities and human settlements that:

*(a)* Fulfil their social function, including the social and ecological function of land, with a view to progressively achieving the full realization of the right to adequate housing as a component of the right to an adequate standard of living, without discrimination, universal access to safe and affordable drinking water and sanitation, as well as equal access for all to public goods and quality services in areas such as food security and nutrition, health, education, infrastructure, mobility and transportation, energy, air quality and livelihoods;

*(b)* Are participatory, promote civic engagement, engender a sense of belonging and ownership among all their inhabitants, prioritize safe, inclusive, accessible, green and quality public spaces that are friendly for families, enhance social and intergenerational interactions, cultural expressions and political participation, as appropriate, and foster social cohesion, inclusion and safety in peaceful and pluralistic societies, where the needs of all inhabitants are met, recognizing the specific needs of those in vulnerable situations;

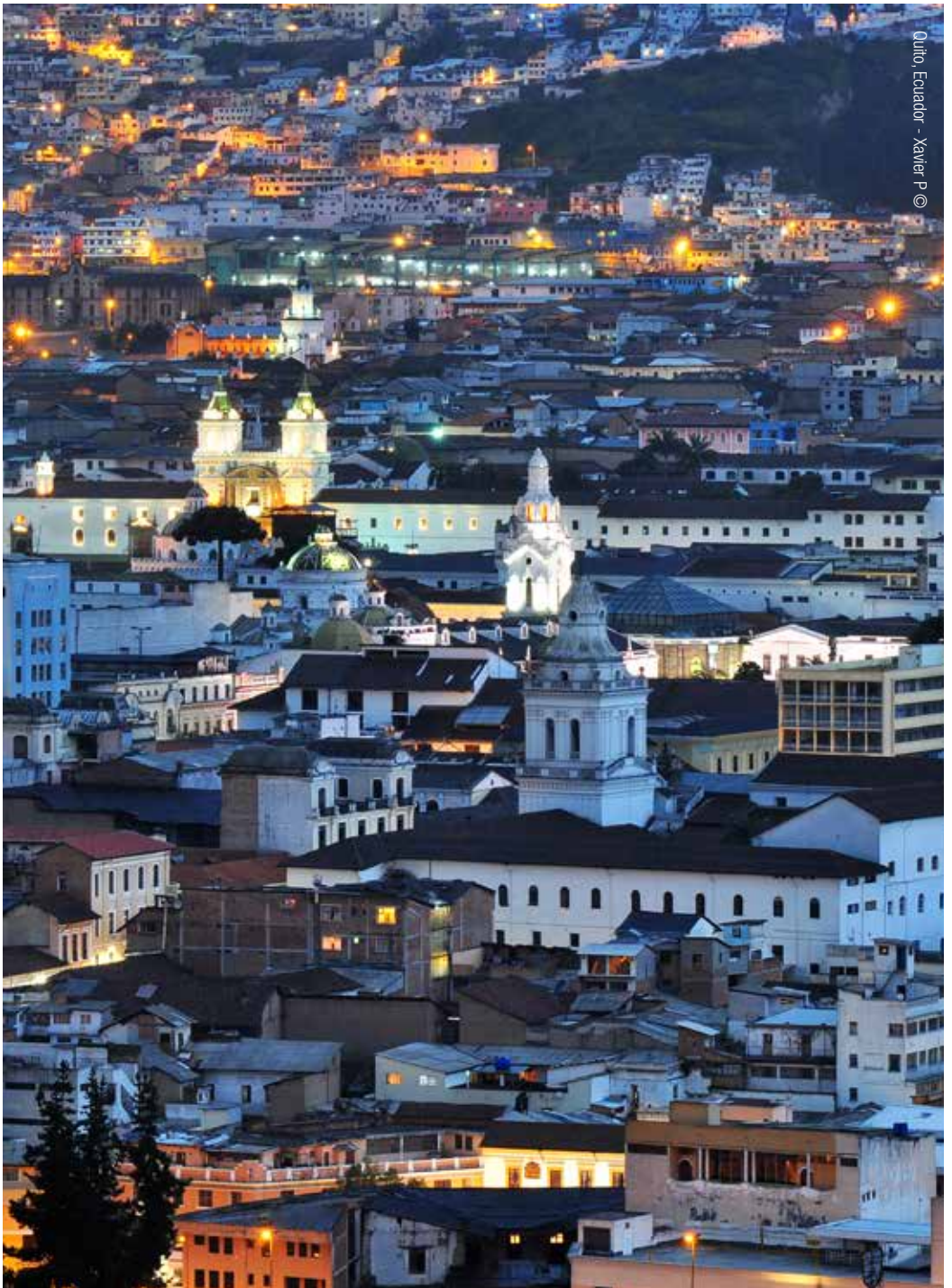
*(c)* Achieve gender equality and empower all women and girls by ensuring women’s full and effective participation and equal rights in all fields and in leadership at all levels of decision-making, by ensuring decent work and equal pay for equal work, or work of equal value, for all women and by preventing and eliminating all forms of discrimination, violence and harassment against women and girls in private and public spaces;

<sup>11</sup> Resolution 217 A (III).

<sup>12</sup> Resolution 55/2.

<sup>13</sup> Resolution 60/1.

<sup>14</sup> Resolution 41/128, annex.



*(d)* Meet the challenges and opportunities of present and future sustained, inclusive and sustainable economic growth, leveraging urbanization for structural transformation, high productivity, value-added activities and resource efficiency, harnessing local economies and taking note of the contribution of the informal economy while supporting a sustainable transition to the formal economy;

*(e)* Fulfil their territorial functions across administrative boundaries and act as hubs and drivers for balanced, sustainable and integrated urban and territorial development at all levels;

*(f)* Promote age- and gender-responsive planning and investment for sustainable, safe and accessible urban mobility for all and resource-efficient transport systems for passengers and freight, effectively linking people, places, goods, services and economic opportunities;

*(g)* Adopt and implement disaster risk reduction and management, reduce vulnerability, build resilience and responsiveness to natural and human-made hazards and foster mitigation of and adaptation to climate change;

*(h)* Protect, conserve, restore and promote their ecosystems, water, natural habitats and biodiversity, minimize their environmental impact and change to sustainable consumption and production patterns.

## Our principles and commitments

14. To achieve our vision, we resolve to adopt a New Urban Agenda guided by the following interlinked principles:

*(a)* Leave no one behind, by ending poverty in all its forms and dimensions, including the eradication of extreme poverty, by ensuring equal rights and opportunities, socioeconomic and cultural diversity, and integration in the urban space, by enhancing liveability, education, food security and nutrition, health and well-being, including by ending the epidemics of AIDS, tuberculosis and malaria, by promoting safety and eliminating discrimination and all forms of violence, by ensuring public participation — providing safe and equal access for all, and by providing equal access for all to physical and social infrastructure and basic services, as well as adequate and affordable housing;

*(b)* Ensure sustainable and inclusive urban economies by leveraging the agglomeration benefits of well-planned urbanization, including high productivity, competitiveness and innovation, by promoting full and productive employment and decent work for all, by ensuring the creation of decent jobs and equal access for all to economic and productive resources and opportunities and by preventing land speculation, promoting secure land tenure and managing urban shrinking, where appropriate;

*(c)* Ensure environmental sustainability by promoting clean energy and sustainable use of land and resources in urban development, by protecting ecosystems and biodiversity, including adopting healthy lifestyles in harmony with nature, by promoting sustainable consumption and production patterns, by building urban resilience, by reducing disaster risks and by mitigating and adapting to climate change.

15. We commit ourselves to working towards an urban paradigm shift for a New Urban Agenda that will:

*(a)* Readdress the way we plan, finance, develop, govern and manage cities and human settlements, recognizing sustainable urban and territorial development as essential to the achievement of sustainable development and prosperity for all;

*(b)* Recognize the leading role of national Governments, as appropriate, in the definition and implementation of inclusive and effective urban policies and legislation for sustainable urban development, and the equally important contributions of subnational and local governments, as well as civil society and other relevant stakeholders, in a transparent and accountable manner;

*(c)* Adopt sustainable, people-centred, age- and gender-responsive and integrated approaches to urban and territorial development by implementing policies, strategies, capacity development and actions at all levels, based on fundamental drivers of change, including:

*(i)* Developing and implementing urban policies at the appropriate level, including in local-national and multi-stakeholder partnerships, building integrated systems of cities and human settlements and promoting cooperation among all levels of government to enable the achievement of sustainable integrated urban development;

*(ii)* Strengthening urban governance, with sound institutions and mechanisms that empower and include urban stakeholders, as well as appropriate checks and balances, providing predictability and coherence in urban development plans to enable social inclusion, sustained, inclusive and sustainable economic growth and environmental protection;

*(iii)* Reinvigorating long-term and integrated urban and territorial planning and design in order to optimize the spatial dimension of the urban form and deliver the positive outcomes of urbanization;

*(iv)* Supporting effective, innovative and sustainable financing frameworks and instruments enabling strengthened municipal finance and local fiscal systems in order to create, sustain and share the value generated by sustainable urban development in an inclusive manner.

## Call for action

16. While the specific circumstances of cities of all sizes, towns and villages vary, we affirm that the New Urban Agenda is universal in scope, participatory and people-centred, protects the planet and has a long-term vision, setting out priorities and actions at the global, regional, national, subnational and local levels that Governments and other relevant stakeholders in every country can adopt based on their needs.

17. We will work to implement the New Urban Agenda in our own countries and at the regional and global levels, taking into account different national realities, capacities and levels of development, and respecting national legislation and practices, as well as policies and priorities.

18. We reaffirm all the principles of the Rio Declaration on Environment and Development, including, inter alia, the principle of common but differentiated responsibilities, as set out in principle 7.

19. We acknowledge that in implementing the New Urban Agenda particular attention should be given to addressing the unique and emerging urban development challenges facing all countries, in particular developing countries, including African countries, least developed countries, landlocked developing countries and small island developing States, as well as the specific challenges facing middle-income countries. Special attention should also be given to countries in situations of conflict, as well as countries and territories under foreign occupation, post-conflict countries and countries affected by natural and human-made disasters.

20. We recognize the need to give particular attention to addressing multiple forms of discrimination faced by, inter alia, women and girls, children and youth, persons with disabilities, people living with HIV/AIDS, older persons, indigenous peoples and local communities, slum and informal-settlement dwellers, homeless people, workers, smallholder farmers and fishers, refugees, returnees, internally displaced persons and migrants, regardless of their migration status.

21. We urge all national, subnational and local governments, as well as all relevant stakeholders, in line with national policies and legislation, to revitalize, strengthen and create partnerships, enhancing coordination and cooperation to effectively implement the New Urban Agenda and realize our shared vision.

22. We adopt this New Urban Agenda as a collective vision and political commitment to promote and realize sustainable urban development, and as a historic opportunity to leverage the key role of cities and human settlements as drivers of sustainable development in an increasingly urbanized world.

QUITO  
IMPLEMENTATION  
PLAN FOR  
THE NEW  
URBAN AGENDA

23. We resolve to implement the New Urban Agenda as a key instrument for enabling national, subnational and local governments and all relevant stakeholders to achieve sustainable urban development.

### **Transformative commitments for sustainable urban development**

24. To fully harness the potential of sustainable urban development, we make the following transformative commitments through an urban paradigm shift grounded in the integrated and indivisible dimensions of sustainable development: social, economic and environmental.

#### *Sustainable urban development for social inclusion and ending poverty*

25. We recognize that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. We also recognize that growing inequality and the persistence of multiple dimensions of poverty, including the rising number of slum and informal-settlement dwellers, are affecting both developed and developing countries, and that the spatial organization, accessibility and design of urban space, as well as the infrastructure and the basic services provision, together with development policies, can promote or hinder social cohesion, equality and inclusion.

26. We commit ourselves to urban and rural development that is people-centred, protects the planet, and is age- and gender-responsive and to the realization of all human rights and fundamental freedoms, facilitating living together, ending all forms of discrimination and violence, and empowering all individuals and communities while enabling their full and meaningful participation. We further commit ourselves to promoting culture and respect for diversity and equality as key elements in the humanization of our cities and human settlements.

27. We reaffirm our pledge that no one will be left behind and commit ourselves to promoting equally the shared opportunities and benefits that urbanization can offer and that enable all inhabitants, whether living in formal or informal settlements, to lead decent, dignified and rewarding lives and to achieve their full human potential.

28. We commit ourselves to ensuring full respect for the human rights of refugees, internally displaced persons and migrants, regardless of their migration status, and support their host cities in the spirit of international cooperation, taking into account national circumstances and recognizing that, although the movement of large populations into towns and cities poses a variety of challenges, it can also bring significant social, economic and cultural contributions to urban life. We further commit ourselves to strengthening synergies between international migration and development at the global, regional, national, subnational and local levels by ensuring safe, orderly and regular migration through planned and well-managed migration policies, and to supporting local authorities in establishing frameworks that enable the positive contribution of migrants to cities and strengthened urban-rural linkages.



29. We commit ourselves to strengthening the coordination role of national, subnational and local governments, as appropriate, and their collaboration with other public entities and non-governmental organizations in the provision of social and basic services for all, including generating investments in communities that are most vulnerable to disasters and those affected by recurrent and protracted humanitarian crises. We further commit ourselves to promoting adequate services, accommodation and opportunities for decent and productive work for crisis-affected persons in urban settings and to working with local communities and local governments to identify opportunities for engaging and developing local, durable and dignified solutions while ensuring that aid also flows to affected persons and host communities to prevent regression of their development.

30. We acknowledge the need for Governments and civil society to further support resilient urban services during armed conflicts. We also acknowledge the need to reaffirm full respect for international humanitarian law.

31. We commit ourselves to promoting national, subnational and local housing policies that support the progressive realization of the right to adequate housing for all as a component of the right to an adequate standard of living, that address all forms of discrimination and violence and prevent arbitrary forced evictions and that focus on the needs of the homeless, persons in vulnerable situations, low-income groups and persons with disabilities, while enabling the participation and engagement of communities and relevant stakeholders in the planning and implementation of these policies, including supporting the social production of habitat, according to national legislation and standards.

32. We commit ourselves to promoting the development of integrated and age- and gender-responsive housing policies and approaches across all sectors, in particular the employment, education, health-care and social integration sectors, and at all levels of government — policies and approaches that incorporate the provision of adequate, affordable, accessible, resource-efficient, safe, resilient, well-connected and well-located housing, with special attention to the proximity factor and the strengthening of the spatial relationship with the rest of the urban fabric and the surrounding functional areas.

33. We commit ourselves to stimulating the supply of a variety of adequate housing options that are safe, affordable and accessible for members of different income groups of society, taking into consideration the socioeconomic and cultural integration of marginalized communities, homeless persons and those in vulnerable situations and preventing segregation. We will take positive measures to improve the living conditions of homeless people, with a view to facilitating their full participation in society, and to prevent and eliminate homelessness, as well as to combat and eliminate its criminalization.

34. We commit ourselves to promoting equitable and affordable access to sustainable basic physical and social infrastructure for all, without discrimination, including affordable serviced land, housing, modern and renewable energy, safe drinking water and sanitation, safe, nutritious and adequate food, waste disposal, sustainable mobility, health care and family planning, education, culture, and

information and communications technologies. We further commit ourselves to ensuring that these services are responsive to the rights and needs of women, children and youth, older persons and persons with disabilities, migrants, indigenous peoples and local communities, as appropriate, and to those of others in vulnerable situations. In this regard, we encourage the elimination of legal, institutional, socioeconomic and physical barriers.

35. We commit ourselves to promoting, at the appropriate level of government, including subnational and local government, increased security of tenure for all, recognizing the plurality of tenure types, and to developing fit-for-purpose and age-, gender- and environment-responsive solutions within the continuum of land and property rights, with particular attention to security of land tenure for women as key to their empowerment, including through effective administrative systems.

36. We commit ourselves to promoting appropriate measures in cities and human settlements that facilitate access for persons with disabilities, on an equal basis with others, to the physical environment of cities, in particular to public spaces, public transport, housing, education and health facilities, public information and communication (including information and communications technologies and systems) and other facilities and services open or provided to the public, in both urban and rural areas.

37. We commit ourselves to promoting safe, inclusive, accessible, green and quality public spaces, including streets, sidewalks and cycling lanes, squares, waterfront areas, gardens and parks, that are multifunctional areas for social interaction and inclusion, human health and well-being, economic exchange and cultural expression and dialogue among a wide diversity of people and cultures, and that are designed and managed to ensure human development and build peaceful, inclusive and participatory societies, as well as to promote living together, connectivity and social inclusion.

38. We commit ourselves to the sustainable leveraging of natural and cultural heritage, both tangible and intangible, in cities and human settlements, as appropriate, through integrated urban and territorial policies and adequate investments at the national, subnational and local levels, to safeguard and promote cultural infrastructures and sites, museums, indigenous cultures and languages, as well as traditional knowledge and the arts, highlighting the role that these play in rehabilitating and revitalizing urban areas and in strengthening social participation and the exercise of citizenship.

39. We commit ourselves to promoting a safe, healthy, inclusive and secure environment in cities and human settlements enabling all to live, work and participate in urban life without fear of violence and intimidation, taking into consideration that women and girls, children and youth, and persons in vulnerable situations are often particularly affected. We will also work towards the elimination of harmful practices against women and girls, including child, early and forced marriage and female genital mutilation.

40. We commit ourselves to embracing diversity in cities and human settlements, to strengthening social cohesion, intercultural dialogue and understanding, tolerance, mutual respect, gender equality, innovation, entrepreneurship, inclusion, identity and safety, and the dignity of all people, as well as to fostering liveability and a vibrant urban economy. We also commit ourselves to taking steps to ensure that our local institutions promote pluralism and peaceful coexistence within increasingly heterogeneous and multicultural societies.

41. We commit ourselves to promoting institutional, political, legal and financial mechanisms in cities and human settlements to broaden inclusive platforms, in line with national policies, that allow meaningful participation in decision-making, planning and follow-up processes for all, as well as enhanced civil engagement and co-provision and co-production.

42. We support subnational and local governments, as appropriate, in fulfilling their key role in strengthening the interface among all relevant stakeholders, offering opportunities for dialogue, including through age- and gender-responsive approaches, and with particular attention to potential contributions from all segments of society, including men and women, children and youth, older persons and persons with disabilities, indigenous peoples and local communities, refugees, internally displaced persons and migrants, regardless of their migration status, without discrimination based on race, religion, ethnicity or socioeconomic status.

*Sustainable and inclusive urban prosperity and opportunities for all*

43. We recognize that sustained, inclusive and sustainable economic growth, with full and productive employment and decent work for all, is a key element of sustainable urban and territorial development and that cities and human settlements should be places of equal opportunities, allowing people to live healthy, productive, prosperous and fulfilling lives.

44. We recognize that urban form, infrastructure and building design are among the greatest drivers of cost and resource efficiencies, through the benefits of economy of scale and agglomeration and by fostering energy efficiency, renewable energy, resilience, productivity, environmental protection and sustainable growth in the urban economy.

45. We commit ourselves to developing vibrant, sustainable and inclusive urban economies, building on endogenous potential, competitive advantages, cultural heritage and local resources, as well as resource-efficient and resilient infrastructure, promoting sustainable and inclusive industrial development and sustainable consumption and production patterns and fostering an enabling environment for businesses and innovation, as well as livelihoods.

46. We commit ourselves to promoting the role of affordable and sustainable housing and housing finance, including social habitat production, in economic development, and the contribution of the sector to stimulating productivity in other economic sectors, recognizing that housing enhances capital formation, income, employment generation and savings and can contribute to driving sustainable and inclusive economic transformation at the national, subnational and local levels.

47. We commit ourselves to taking appropriate steps to strengthen national, subnational and local institutions to support local economic development, fostering integration, cooperation, coordination and dialogue across levels of government and functional areas and relevant stakeholders.

48. We encourage effective participation and collaboration among all relevant stakeholders, including local governments, the private sector and civil society, women, organizations representing youth, as well as those representing persons with disabilities, indigenous peoples, professionals, academic institutions, trade unions, employers' organizations, migrant associations and cultural associations, in order to identify opportunities for urban economic development and identify and address existing and emerging challenges.

49. We commit ourselves to supporting territorial systems that integrate urban and rural functions into the national and subnational spatial frameworks and the systems of cities and human settlements, thus promoting sustainable management and use of natural resources and land, ensuring reliable supply and value chains that connect urban and rural supply and demand to foster equitable regional development across the urban-rural continuum and fill social, economic and territorial gaps.

50. We commit ourselves to encouraging urban-rural interactions and connectivity by strengthening sustainable transport and mobility, and technology and communications networks and infrastructure, underpinned by planning instruments based on an integrated urban and territorial approach, in order to maximize the potential of these sectors for enhanced productivity, social, economic and territorial cohesion, as well as safety and environmental sustainability. This should include connectivity between cities and their surroundings, peri-urban and rural areas, as well as greater land-sea connections, where appropriate.

51. We commit ourselves to promoting the development of urban spatial frameworks, including urban planning and design instruments that support sustainable management and use of natural resources and land, appropriate compactness and density, polycentrism and mixed uses, through infill or planned urban extension strategies, as applicable, to trigger economies of scale and agglomeration, strengthen food system planning and enhance resource efficiency, urban resilience and environmental sustainability.

52. We encourage spatial development strategies that take into account, as appropriate, the need to guide urban extension, prioritizing urban renewal by planning for the provision of accessible and well-connected infrastructure and services, sustainable population densities and compact design and integration of new neighbourhoods into the urban fabric, preventing urban sprawl and marginalization.

53. We commit ourselves to promoting safe, inclusive, accessible, green and quality public spaces as drivers of social and economic development, in order to sustainably leverage their potential to generate increased social and economic value, including property value, and to facilitate business and public and private investments and livelihood opportunities for all.



54. We commit ourselves to the generation and use of renewable and affordable energy and sustainable and efficient transport infrastructure and services, where possible, achieving the benefits of connectivity and reducing the financial, environmental and public health costs of inefficient mobility, congestion, air pollution, urban heat island effects and noise. We also commit ourselves to giving particular attention to the energy and transport needs of all people, particularly the poor and those living in informal settlements. We also note that reductions in renewable energy costs give cities and human settlements an effective tool to lower energy supply costs.

55. We commit ourselves to fostering healthy societies by promoting access to adequate, inclusive and quality public services, a clean environment, taking into consideration air quality guidelines, including those elaborated by the World Health Organization, and social infrastructure and facilities, such as health-care services, including universal access to sexual and reproductive health-care services to reduce newborn child and maternal mortality.

56. We commit ourselves to increasing economic productivity, as appropriate, by providing the labour force with access to income-earning opportunities, knowledge, skills and educational facilities that contribute to an innovative and competitive urban economy. We also commit ourselves to increasing economic productivity through the promotion of full and productive employment and decent work and livelihood opportunities in cities and human settlements.

57. We commit ourselves to promoting, as appropriate, full and productive employment, decent work for all and livelihood opportunities in cities and human settlements, with special attention to the needs and potential of women, youth, persons with disabilities, indigenous peoples and local communities, refugees, and internally displaced persons and migrants, particularly the poorest and those in vulnerable situations, and to promote non-discriminatory access to legal income-earning opportunities.

58. We commit ourselves to promoting an enabling, fair and responsible business environment based on the principles of environmental sustainability and inclusive prosperity, promoting investments, innovations and entrepreneurship. We also commit ourselves to addressing the challenges faced by local business communities by supporting micro-, small and medium-sized enterprises and cooperatives throughout the value chain, in particular businesses and enterprises in the social and solidarity economy, operating in both the formal and informal economies.

59. We commit ourselves to recognizing the contribution of the working poor in the informal economy, particularly women, including unpaid, domestic and migrant workers, to the urban economies, taking into account national circumstances. Their livelihoods, working conditions and income security, legal and social protection, access to skills, assets and other support services, and voice and representation should be enhanced. A progressive transition of workers and economic units to the formal economy will be developed by adopting a balanced approach, combining incentives and compliance measures, while promoting preservation and improvement of existing livelihoods. We will take into account specific national circumstances, legislation, policies, practices and priorities for the transition to the formal economy.



60. We commit ourselves to sustaining and supporting urban economies to transition progressively to higher productivity through high-value-added sectors, by promoting diversification, technological upgrading, research and innovation, including the creation of quality, decent and productive jobs, including through the promotion of cultural and creative industries, sustainable tourism, performing arts and heritage conservation activities, among others.

61. We commit ourselves to harnessing the urban demographic dividend, where applicable, and to promoting access for youth to education, skills development and employment to achieve increased productivity and shared prosperity in cities and human settlements. Girls and boys, young women and young men are key agents of change in creating a better future and when empowered they have great potential to advocate on behalf of themselves and their communities. Ensuring more and better opportunities for their meaningful participation will be essential for the implementation of the New Urban Agenda.

62. We commit ourselves to addressing the social, economic and spatial implications of ageing populations, where applicable, and harnessing the ageing factor as an opportunity for new decent jobs and sustained, inclusive and sustainable economic growth, while improving the quality of life of the urban population.

#### *Environmentally sustainable and resilient urban development*

63. We recognize that cities and human settlements face unprecedented threats from unsustainable consumption and production patterns, loss of biodiversity, pressure on ecosystems, pollution, natural and human-made disasters, and climate change and its related risks, undermining the efforts to end poverty in all its forms and dimensions and to achieve sustainable development. Given cities' demographic trends and their central role in the global economy, in the mitigation and adaptation efforts related to climate change, and in the use of resources and ecosystems, the way they are planned, financed, developed, built, governed and managed has a direct impact on sustainability and resilience well beyond urban boundaries.

64. We also recognize that urban centres worldwide, especially in developing countries, often have characteristics that make them and their inhabitants especially vulnerable to the adverse impacts of climate change and other natural and human-made hazards, including earthquakes, extreme weather events, flooding, subsidence, storms, including dust and sand storms, heatwaves, water scarcity, droughts, water and air pollution, vector-borne diseases and sea level rise, which particularly affect coastal areas, delta regions and small island developing States, among others.

65. We commit ourselves to facilitating the sustainable management of natural resources in cities and human settlements in a manner that protects and improves the urban ecosystem and environmental services, reduces greenhouse gas emissions and air pollution and promotes disaster risk reduction and management, by supporting the development of disaster risk reduction strategies and periodical assessments of disaster risk caused by natural and human-made hazards, including standards for risk levels, while fostering sustainable economic development and protecting the

well-being and quality of life of all persons through environmentally sound urban and territorial planning, infrastructure and basic services.

66. We commit ourselves to adopting a smart-city approach that makes use of opportunities from digitalization, clean energy and technologies, as well as innovative transport technologies, thus providing options for inhabitants to make more environmentally friendly choices and boost sustainable economic growth and enabling cities to improve their service delivery.

67. We commit ourselves to promoting the creation and maintenance of well-connected and well-distributed networks of open, multipurpose, safe, inclusive, accessible, green and quality public spaces, to improving the resilience of cities to disasters and climate change, including floods, drought risks and heat waves, to improving food security and nutrition, physical and mental health, and household and ambient air quality, to reducing noise and promoting attractive and liveable cities, human settlements and urban landscapes and to prioritizing the conservation of endemic species.

68. We commit ourselves to giving particular consideration to urban deltas, coastal areas and other environmentally sensitive areas, highlighting their importance as ecosystems' providers of significant resources for transport, food security, economic prosperity, ecosystem services and resilience. We commit ourselves to integrating appropriate measures into sustainable urban and territorial planning and development.

69. We commit ourselves to preserving and promoting the ecological and social function of land, including coastal areas that support cities and human settlements, and to fostering ecosystem-based solutions to ensure sustainable consumption and production patterns, so that the ecosystem's regenerative capacity is not exceeded. We also commit ourselves to promoting sustainable land use, combining urban extensions with adequate densities and compactness to prevent and contain urban sprawl, as well as preventing unnecessary land-use change and the loss of productive land and fragile and important ecosystems.

70. We commit ourselves to supporting local provision of goods and basic services and leveraging the proximity of resources, recognizing that heavy reliance on distant sources of energy, water, food and materials can pose sustainability challenges, including vulnerability to service supply disruptions, and that local provision can facilitate inhabitants' access to resources.

71. We commit ourselves to strengthening the sustainable management of resources, including land, water (oceans, seas and freshwater), energy, materials, forests and food, with particular attention to the environmentally sound management and minimization of all waste, hazardous chemicals, including air and short-lived climate pollutants, greenhouse gases and noise, and in a way that considers urban-rural linkages, functional supply and value chains vis-à-vis environmental impact and sustainability and that strives to transition to a circular economy while facilitating ecosystem conservation, regeneration, restoration and resilience in the face of new and emerging challenges.





72. We commit ourselves to long-term urban and territorial planning processes and spatial development practices that incorporate integrated water resources planning and management, considering the urban-rural continuum on the local and territorial scales and including the participation of relevant stakeholders and communities.

73. We commit ourselves to promoting the conservation and sustainable use of water by rehabilitating water resources within the urban, peri-urban and rural areas, reducing and treating wastewater, minimizing water losses, promoting water reuse and increasing water storage, retention and recharge, taking into consideration the water cycle.

74. We commit ourselves to promoting environmentally sound waste management and to substantially reducing waste generation by reducing, reusing and recycling waste, minimizing landfills and converting waste to energy when waste cannot be recycled or when this choice delivers the best environmental outcome. We further commit ourselves to reducing marine pollution through improved waste and wastewater management in coastal areas.

75. We commit ourselves to encouraging national, subnational and local governments, as appropriate, to develop sustainable, renewable and affordable energy and energy-efficient buildings and construction modes and to promoting energy conservation and efficiency, which are essential to enable the reduction of greenhouse gas and black carbon emissions, ensure sustainable consumption and production patterns, help create new decent jobs, improve public health and reduce the costs of energy supply.

76. We commit ourselves to making sustainable use of natural resources and focusing on the resource efficiency of raw and construction materials such as concrete, metals, wood, minerals and land. We commit ourselves to establishing safe material recovery and recycling facilities, promoting the development of sustainable and resilient buildings and prioritizing the use of local, non-toxic and recycled materials and lead-additive-free paints and coatings.

77. We commit ourselves to strengthening the resilience of cities and human settlements, including through the development of quality infrastructure and spatial planning, by adopting and implementing integrated, age- and gender-responsive policies and plans and ecosystem-based approaches in line with the Sendai Framework for Disaster Risk Reduction 2015-2030 and by mainstreaming holistic and data-informed disaster risk reduction and management at all levels to reduce vulnerabilities and risk, especially in risk-prone areas of formal and informal settlements, including slums, and to enable households, communities, institutions and services to prepare for, respond to, adapt to and rapidly recover from the effects of hazards, including shocks or latent stresses. We will promote the development of infrastructure that is resilient and resource efficient and will reduce the risks and impact of disasters, including the rehabilitation and upgrading of slums and informal settlements. We will also promote measures for strengthening and retrofitting all risky housing stock, including in slums and informal settlements, to make it resilient to disasters, in coordination with local authorities and stakeholders.

78. We commit ourselves to supporting moving from reactive to more proactive risk-based, all-hazards and all-of-society approaches, such as raising public awareness of risks and promoting ex-ante investments to prevent risks and build resilience, while also ensuring timely and effective local responses to address the immediate needs of inhabitants affected by natural and human-made disasters and conflicts. This should include the integration of the “build back better” principles into the post-disaster recovery process to integrate resilience-building, environmental and spatial measures and lessons from past disasters, as well as awareness of new risks, into future planning.

79. We commit ourselves to promoting international, national, subnational and local climate action, including climate change adaptation and mitigation, and to supporting the efforts of cities and human settlements, their inhabitants and all local stakeholders as important implementers. We further commit ourselves to supporting building resilience and reducing emissions of greenhouse gases from all relevant sectors. Such measures should be consistent with the goals of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change, including holding the increase in the global average temperature to well below 2 degrees Celsius above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels.

80. We commit ourselves to supporting the medium- to long-term adaptation planning process, as well as city-level assessments of climate vulnerability and impact, to inform adaptation plans, policies, programmes and actions that build the resilience of urban inhabitants, including through the use of ecosystem-based adaptation.

## Effective implementation

81. We recognize that the realization of the transformative commitments set out in the New Urban Agenda will require enabling policy frameworks at the national, subnational and local levels, integrated by participatory planning and management of urban spatial development and effective means of implementation, complemented by international cooperation as well as efforts in capacity development, including the sharing of best practices, policies and programmes among Governments at all levels.

82. We invite international and regional organizations and bodies, including those of the United Nations system and multilateral environmental agreements, development partners, international and multilateral financial institutions, regional development banks, the private sector and other stakeholders, to enhance coordination of their urban and rural development strategies and programmes to apply an integrated approach to sustainable urbanization, mainstreaming the implementation of the New Urban Agenda.

83. In this regard, we emphasize the need to improve United Nations system-wide coordination and coherence in the area of sustainable urban development, within the framework of system-wide strategic planning, implementation and reporting, as stressed in paragraph 88 of the 2030 Agenda for Sustainable Development.

84. We strongly urge States to refrain from promulgating and applying any unilateral economic, financial or trade measures not in accordance with international law and the Charter of the United Nations that impede the full achievement of economic and social development, particularly in developing countries.

*Building the urban governance structure: establishing a supportive framework*

85. We acknowledge the principles and strategies contained in the International Guidelines on Decentralization and Strengthening of Local Authorities and the International Guidelines on Access to Basic Services for All<sup>15</sup>, adopted by the Governing Council of the United Nations Human Settlements Programme (UN-Habitat) in its resolutions 21/3 of 20 April 2007<sup>15</sup> and 22/8 of 3 April 2009<sup>16</sup>.

86. We will anchor the effective implementation of the New Urban Agenda in inclusive, implementable and participatory urban policies, as appropriate, to mainstream sustainable urban and territorial development as part of integrated development strategies and plans, supported, as appropriate, by national, subnational and local institutional and regulatory frameworks, ensuring that they are adequately linked to transparent and accountable finance mechanisms.

87. We will foster stronger coordination and cooperation among national, subnational and local governments, including through multilevel consultation mechanisms and by clearly defining the respective competences, tools and resources for each level of government.

88. We will ensure coherence between goals and measures of sectoral policies, inter alia, rural development, land use, food security and nutrition, management of natural resources, provision of public services, water and sanitation, health, environment, energy, housing and mobility policies, at different levels and scales of political administration, across administrative borders and considering the appropriate functional areas, in order to strengthen integrated approaches to urbanization and implement integrated urban and territorial planning strategies that factor them in.

89. We will take measures to establish legal and policy frameworks, based on the principles of equality and non-discrimination, to enhance the ability of Governments to effectively implement national urban policies, as appropriate, and to empower them as policymakers and decision makers, ensuring appropriate fiscal, political and administrative decentralization based on the principle of subsidiarity.

90. We will, in line with countries' national legislation, support strengthening the capacity of subnational and local governments to implement effective local and metropolitan multilevel governance, across administrative borders, and based on functional territories, ensuring the involvement of subnational and local governments in decision-making and working to provide

<sup>15</sup> See *Official Records of the General Assembly, Sixty-Second Session, Supplement No. 8 (A/62/8)*, annex 1.

<sup>16</sup> *Ibid.*, *Sixty-Fourth Session, Supplement No. 8 (A/64/8)*, annex 15.

them with the necessary authority and resources to manage critical urban, metropolitan and territorial concerns. We will promote metropolitan governance that is inclusive and encompasses legal frameworks and reliable financing mechanisms, including sustainable debt management, as applicable. We will take measures to promote women's full and effective participation and equal rights in all fields and in leadership at all levels of decision-making, including in local governments.

91. We will support local governments in determining their own administrative and management structures, in line with national legislation and policies, as appropriate, in order to adapt to local needs. We will encourage appropriate regulatory frameworks and support to local governments in partnering with communities, civil society and the private sector to develop and manage basic services and infrastructure, ensuring that the public interest is preserved and concise goals, responsibilities and accountability mechanisms are clearly defined.

92. We will promote participatory age- and gender-responsive approaches at all stages of the urban and territorial policy and planning processes, from conceptualization to design, budgeting, implementation, evaluation and review, rooted in new forms of direct partnership between Governments at all levels and civil society, including through broad-based and well-resourced permanent mechanisms and platforms for cooperation and consultation open to all, using information and communications technologies and accessible data solutions.

#### *Planning and managing urban spatial development*

93. We acknowledge the principles and strategies for urban and territorial planning contained in the International Guidelines on Urban and Territorial Planning, approved by the Governing Council of UN-Habitat in its resolution 25/6 of 23 April 2015<sup>17</sup>.

94. We will implement integrated planning that aims to balance short-term needs with the long-term desired outcomes of a competitive economy, high quality of life and sustainable environment. We will also strive to build flexibility into our plans in order to adjust to changing social and economic conditions over time. We will implement and systematically evaluate these plans, while making efforts to leverage innovations in technology and to produce a better living environment.

95. We will support the implementation of integrated, polycentric and balanced territorial development policies and plans, encouraging cooperation and mutual support among different scales of cities and human settlements, strengthening the role of small and intermediate cities and towns in enhancing food security and nutrition systems, providing access to sustainable, affordable, adequate, resilient and safe housing, infrastructure and services, facilitating effective trade links across the urban-rural continuum and ensuring that small-scale farmers and fishers are linked to local, subnational, national, regional and global value chains and markets. We will also support urban agriculture and farming, as well as responsible, local and sustainable consumption and production, and social interactions, through enabling and accessible networks of local markets and commerce as an option for contributing to sustainability and food security.

<sup>17</sup> Ibid., *Seventieth Session, Supplement No. 8 (A/70/8)*, Annex.

96. We will encourage the implementation of sustainable urban and territorial planning, including city-region and metropolitan plans, to encourage synergies and interactions among urban areas of all sizes and their peri-urban and rural surroundings, including those that are cross-border, and we will support the development of sustainable regional infrastructure projects that stimulate sustainable economic productivity, promoting equitable growth of regions across the urban-rural continuum. In this regard, we will promote urban-rural partnerships and inter-municipal cooperation mechanisms based on functional territories and urban areas as effective instruments for performing municipal and metropolitan administrative tasks, delivering public services and promoting both local and regional development.

97. We will promote planned urban extensions and infill, prioritizing renewal, regeneration and retrofitting of urban areas, as appropriate, including the upgrading of slums and informal settlements, providing high-quality buildings and public spaces, promoting integrated and participatory approaches involving all relevant stakeholders and inhabitants and avoiding spatial and socioeconomic segregation and gentrification, while preserving cultural heritage and preventing and containing urban sprawl.

98. We will promote integrated urban and territorial planning, including planned urban extensions based on the principles of equitable, efficient and sustainable use of land and natural resources, compactness, polycentrism, appropriate density and connectivity, and multiple use of space, as well as mixed social and economic uses in built-up areas, in order to prevent urban sprawl, reduce mobility challenges and needs and service delivery costs per capita and harness density and economies of scale and agglomeration, as appropriate.

99. We will support the implementation of urban planning strategies, as appropriate, that facilitate a social mix through the provision of affordable housing options with access to quality basic services and public spaces for all, enhancing safety and security and favouring social and intergenerational interaction and the appreciation of diversity. We will take steps to include appropriate training and support for service delivery professionals and communities in areas affected by urban violence.

100. We will support the provision of well-designed networks of safe, accessible, green and quality streets and other public spaces that are accessible to all and free from crime and violence, including sexual harassment and gender-based violence, considering the human scale, and measures that allow for the best possible commercial use of street-level floors, fostering both formal and informal local markets and commerce, as well as not-for-profit community initiatives, bringing people into public spaces and promoting walkability and cycling with the goal of improving health and well-being.

101. We will integrate disaster risk reduction and climate change adaptation and mitigation considerations and measures into age- and gender-responsive urban and territorial development and planning processes, including greenhouse gas emissions, resilience-based and climate-effective design of spaces, buildings and construction, services and infrastructure, and nature-based solutions. We will promote cooperation and coordination across sectors and build the





capacities of local authorities to develop and implement disaster risk reduction and response plans, such as risk assessments concerning the location of current and future public facilities, and to formulate adequate contingency and evacuation procedures.

102. We will strive to improve capacity for urban planning and design and the provision of training for urban planners at national, subnational and local levels.

103. We will integrate inclusive measures for urban safety and the prevention of crime and violence, including terrorism and violent extremism conducive to terrorism. Such measures will, where appropriate, engage relevant local communities and non-governmental actors in developing urban strategies and initiatives, including taking into account slums and informal settlements as well as vulnerability and cultural factors in the development of policies concerning public security and crime and violence prevention, including by preventing and countering the stigmatization of specific groups as posing inherently greater security threats.

104. We will promote compliance with legal requirements through strong, inclusive management frameworks and accountable institutions that deal with land registration and governance, applying transparent and sustainable management and use of land, property registration and sound financial systems. We will support local governments and relevant stakeholders, through a variety of mechanisms, in developing and using basic land inventory information, such as cadastres, valuation and risk maps, and land and housing price records, to generate the high-quality, timely and reliable data — disaggregated by income, sex, age, race, ethnicity, migration status, disability, geographic location and other characteristics relevant in the national context — needed to assess changes in land values, while ensuring that these data will not be used for discriminatory land-use policies.

105. We will foster the progressive realization of the right to adequate housing as a component of the right to an adequate standard of living. We will develop and implement housing policies at all levels, incorporating participatory planning and applying the principle of subsidiarity, as appropriate, in order to ensure coherence among national, subnational and local development strategies, land policies and housing supply.

106. We will promote housing policies based on the principles of social inclusion, economic effectiveness and environmental protection. We will support the effective use of public resources for affordable and sustainable housing, including land in central and consolidated areas of cities with adequate infrastructure, and encourage mixed-income development to promote social inclusion and cohesion.

107. We will encourage the development of policies, tools, mechanisms and financing models that promote access to a wide range of affordable, sustainable housing options, including rental and other tenure options, as well as cooperative solutions such as co-housing, community land trusts and other forms of collective tenure that would address the evolving needs of persons and communities, in order to improve the supply of housing (especially for low-income groups), prevent segregation and arbitrary forced evictions and displacements and provide dignified and adequate



reallocation. This will include support to incremental housing and self-build schemes, with special attention to programmes for upgrading slums and informal settlements.

108. We will support the development of housing policies that foster local integrated housing approaches by addressing the strong links between education, employment, housing and health, preventing exclusion and segregation. Furthermore, we commit ourselves to combating homelessness as well as to combating and eliminating its criminalization through dedicated policies and targeted active inclusion strategies, such as comprehensive, inclusive and sustainable housing-first programmes.

109. We will consider increased allocations of financial and human resources, as appropriate, for the upgrading and, to the extent possible, prevention of slums and informal settlements, with strategies that go beyond physical and environmental improvements to ensure that slums and informal settlements are integrated into the social, economic, cultural and political dimensions of cities. These strategies should include, as applicable, access to sustainable, adequate, safe and affordable housing, basic and social services, and safe, inclusive, accessible, green and quality public spaces, and they should promote security of tenure and its regularization, as well as measures for conflict prevention and mediation.

110. We will support efforts to define and reinforce inclusive and transparent monitoring systems for reducing the proportion of people living in slums and informal settlements, taking into account the experiences gained from previous efforts to improve the living conditions of slum and informal-settlement dwellers.

111. We will promote the development of adequate and enforceable regulations in the housing sector, including, as applicable, resilient building codes, standards, development permits, land-use by-laws and ordinances, and planning regulations, combating and preventing speculation, displacement, homelessness and arbitrary forced evictions and ensuring sustainability, quality, affordability, health, safety, accessibility, energy and resource efficiency, and resilience. We will also promote differentiated analysis of housing supply and demand based on high-quality, timely and reliable disaggregated data at the national, subnational and local levels, considering specific social, economic, environmental and cultural dimensions.

112. We will promote the implementation of sustainable urban development programmes with housing and people's needs at the centre of the strategy, prioritizing well-located and well-distributed housing schemes in order to avoid peripheral and isolated mass housing developments detached from urban systems, regardless of the social and economic segment for which they are developed, and providing solutions for the housing needs of low-income groups.

113. We will take measures to improve road safety and integrate it into sustainable mobility and transport infrastructure planning and design. Together with awareness-raising initiatives, we will promote the safe-system approach called for in the Decade of Action for Road Safety, with special attention to the needs of all women and girls, as well as children and youth, older persons and

persons with disabilities and those in vulnerable situations. We will work to adopt, implement and enforce policies and measures to actively protect and promote pedestrian safety and cycling mobility, with a view to broader health outcomes, particularly the prevention of injuries and non-communicable diseases, and we will work to develop and implement comprehensive legislation and policies on motorcycle safety, given the disproportionately high and increasing numbers of motorcycle deaths and injuries globally, particularly in developing countries. We will promote the safe and healthy journey to school for every child as a priority.

114. We will promote access for all to safe, age- and gender-responsive, affordable, accessible and sustainable urban mobility and land and sea transport systems, enabling meaningful participation in social and economic activities in cities and human settlements, by integrating transport and mobility plans into overall urban and territorial plans and promoting a wide range of transport and mobility options, in particular by supporting:

*(a)* A significant increase in accessible, safe, efficient, affordable and sustainable infrastructure for public transport, as well as non-motorized options such as walking and cycling, prioritizing them over private motorized transportation;

*(b)* Equitable “transit-oriented development” that minimizes the displacement, in particular, of the poor, and features affordable, mixed-income housing and a mix of jobs and services;

*(c)* Better and coordinated transport and land-use planning, which would lead to a reduction of travel and transport needs, enhancing connectivity between urban, peri-urban and rural areas, including waterways, and transport and mobility planning, particularly for small island developing States and coastal cities;

*(d)* Urban freight planning and logistics concepts that enable efficient access to products and services, minimizing their impact on the environment and on the liveability of the city and maximizing their contribution to sustained, inclusive and sustainable economic growth.

115. We will take measures to develop mechanisms and common frameworks at the national, subnational and local levels to evaluate the wider benefits of urban and metropolitan transport schemes, including impacts on the environment, the economy, social cohesion, quality of life, accessibility, road safety, public health and action on climate change, among other things.

116. We will support the development of these mechanisms and frameworks, based on sustainable national urban transport and mobility policies, for sustainable, open and transparent procurement and regulation of transport and mobility services in urban and metropolitan areas, including new technology that enables shared mobility services. We will support the development of clear, transparent and accountable contractual relationships between local governments and transport and mobility service providers, including on data management, which further protect the public interest and individual privacy and define mutual obligations.

117. We will support better coordination between transport and urban and territorial planning departments, in mutual understanding of planning and policy frameworks, at the national, subnational and local levels, including through sustainable urban and metropolitan transport and mobility plans. We will support subnational and local governments in developing the necessary knowledge and capacity to implement and enforce such plans.

118. We will encourage national, subnational and local governments to develop and expand financing instruments, enabling them to improve their transport and mobility infrastructure and systems, such as mass rapid-transit systems, integrated transport systems, air and rail systems, and safe, sufficient and adequate pedestrian and cycling infrastructure and technology-based innovations in transport and transit systems to reduce congestion and pollution while improving efficiency, connectivity, accessibility, health and quality of life.

119. We will promote adequate investments in protective, accessible and sustainable infrastructure and service provision systems for water, sanitation and hygiene, sewage, solid waste management, urban drainage, reduction of air pollution and storm water management, in order to improve safety in the event of water-related disasters, improve health, ensure universal and equitable access to safe and affordable drinking water for all, as well as access to adequate and equitable sanitation and hygiene for all and end open defecation, with special attention to the needs and safety of women and girls and those in vulnerable situations. We will seek to ensure that this infrastructure is climate resilient and forms part of integrated urban and territorial development plans, including housing and mobility, among other things, and is implemented in a participatory manner, considering innovative, resource-efficient, accessible, context-specific and culturally sensitive sustainable solutions.

120. We will work to equip public water and sanitation utilities with the capacity to implement sustainable water management systems, including sustainable maintenance of urban infrastructure services, through capacity development, with the goal of progressively eliminating inequalities and promoting both universal and equitable access to safe and affordable drinking water for all and adequate and equitable sanitation and hygiene for all.

121. We will ensure universal access to affordable, reliable and modern energy services by promoting energy efficiency and sustainable renewable energy and supporting subnational and local efforts to apply them in public buildings, infrastructure and facilities, as well as in taking advantage of the direct control, where applicable, by subnational and local governments of local infrastructure and codes, to foster uptake in end-use sectors, such as residential, commercial and industrial buildings, industry, transport, waste and sanitation. We also encourage the adoption of building performance codes and standards, renewable portfolio targets, energy-efficiency labelling, retrofitting of existing buildings and public procurement policies on energy, among other modalities as appropriate, to achieve energy-efficiency targets. We will also prioritize smart-grid, district energy systems and community energy plans to improve synergies between renewable energy and energy efficiency.



122. We will support decentralized decision-making on waste disposal to promote universal access to sustainable waste management systems. We will support the promotion of extended producer-responsibility schemes that include waste generators and producers in the financing of urban waste management systems reduce the hazards and socioeconomic impacts of waste streams and increase recycling rates through better product design.

123. We will promote the integration of food security and the nutritional needs of urban residents, particularly the urban poor, in urban and territorial planning, in order to end hunger and malnutrition. We will promote coordination of sustainable food security and agriculture policies across urban, peri-urban and rural areas to facilitate the production, storage, transport and marketing of food to consumers in adequate and affordable ways in order to reduce food losses and prevent and reuse food waste. We will further promote the coordination of food policies with energy, water, health, transport and waste policies, maintain the genetic diversity of seeds, reduce the use of hazardous chemicals and implement other policies in urban areas to maximize efficiencies and minimize waste.

124. We will include culture as a priority component of urban plans and strategies in the adoption of planning instruments, including master plans, zoning guidelines, building codes, coastal management policies and strategic development policies that safeguard a diverse range of tangible and intangible cultural heritage and landscapes, and will protect them from potential disruptive impacts of urban development.

125. We will support the leveraging of cultural heritage for sustainable urban development and recognize its role in stimulating participation and responsibility. We will promote innovative and sustainable use of architectural monuments and sites, with the intention of value creation, through respectful restoration and adaptation. We will engage indigenous peoples and local communities in the promotion and dissemination of knowledge of tangible and intangible cultural heritage and protection of traditional expressions and languages, including through the use of new technologies and techniques.

#### *Means of implementation*

126. We recognize that the implementation of the New Urban Agenda requires an enabling environment and a wide range of means of implementation, including access to science, technology and innovation and enhanced knowledge-sharing on mutually agreed terms, as well as capacity development and mobilization of financial resources, taking into account the commitment of developed and developing countries and tapping into all available traditional and innovative sources at the global, regional, national, subnational and local levels, as well as enhanced international cooperation and partnerships among Governments at all levels, the private sector, civil society, the United Nations system and other actors, based on the principles of equality, non-discrimination, accountability, respect for human rights and solidarity, especially for those who are the poorest and most vulnerable.

127. We reaffirm the commitments on means of implementation included in the 2030 Agenda for Sustainable Development and the Addis Ababa Action Agenda.

128. We will encourage UN-Habitat, other United Nations programmes and agencies, and other relevant stakeholders to generate evidence-based and practical guidance for the implementation of the New Urban Agenda and the urban dimension of the Sustainable Development Goals, in close collaboration with Member States, local authorities, major groups and other relevant stakeholders, as well as through the mobilization of experts. We will build on the legacy of the Habitat III conference and the lessons learned from its preparatory process, including the regional and thematic meetings. We note, in this context, the valuable contributions of, inter alia, the World Urban Campaign, the General Assembly of Partners for Habitat III and the Global Land Tool Network.

129. We urge UN-Habitat to continue its work to develop its normative knowledge and provide capacity development and tools to national, subnational and local governments in designing, planning and managing sustainable urban development.

130. We recognize that sustainable urban development, guided by prevailing urban policies and strategies, as appropriate, can benefit from integrated financing frameworks that are supported by an enabling environment at all levels. We acknowledge the importance of ensuring that all financial means of implementation are firmly embedded in coherent policy frameworks and fiscal decentralization processes, where available, and that adequate capacities are developed at all levels.

131. We support context-sensitive approaches to financing urbanization and enhancing financial management capacities at all levels of government through the adoption of specific instruments and mechanisms necessary to achieve sustainable urban development, recognizing that each country has the primary responsibility for its own economic and social development.

132. We will mobilize endogenous resources and revenues generated through the capture of benefits of urbanization, as well as the catalysing effects and maximized impact of public and private investments, in order to improve the financial conditions for urban development and open access to additional sources, recognizing that, for all countries, public policies and the mobilization and effective use of domestic resources, underpinned by the principle of national ownership, are central to our common pursuit of sustainable urban development, including implementation of the New Urban Agenda.

133. We call on businesses to apply their creativity and innovation to solving sustainable development challenges in urban areas, acknowledging that private business activity, investment and innovation are major drivers of productivity, inclusive growth and job creation, and that private investment, particularly foreign direct investment, along with a stable international financial system, are essential elements of development efforts.

134. We will support appropriate policies and capacities that enable subnational and local governments to register and expand their potential revenue base, for example, through multipurpose cadastres, local taxes, fees and service charges, in line with national policies, while ensuring that women and girls, children and youth, older persons, persons with disabilities, indigenous peoples and local communities, and poor households are not disproportionately affected.

135. We will promote sound and transparent systems for financial transfers from national Governments to subnational and local governments based on the latter's needs, priorities, functions, mandates and performance-based incentives, as appropriate, in order to provide them with adequate, timely and predictable resources and enhance their ability to raise revenue and manage expenditures.

136. We will support the development of vertical and horizontal models of distribution of financial resources to decrease inequalities across subnational territories, within urban centres and between urban and rural areas, as well as to promote integrated and balanced territorial development. In this regard, we emphasize the importance of improving the transparency of data on spending and resource allocation as a tool for assessing progress towards equity and spatial integration.

137. We will promote best practices to capture and share the increase in land and property value generated as a result of urban development processes, infrastructure projects and public investments. Measures such as gains-related fiscal policies could be put in place, as appropriate, to prevent its solely private capture, as well as land and real estate speculation. We will reinforce the link between fiscal systems and urban planning, as well as urban management tools, including land market regulations. We will work to ensure that efforts to generate land-based finance do not result in unsustainable land use and consumption.

138. We will support subnational and local governments in their efforts to implement transparent and accountable expenditure control instruments for assessing the necessity and impact of local investment and projects, based on legislative control and public participation, as appropriate, in support of open and fair tendering processes, procurement mechanisms and reliable budget execution, as well as preventive anti-corruption measures to promote integrity, accountability, effective management and access to public property and land, in line with national policies.

139. We will support the creation of robust legal and regulatory frameworks for sustainable national and municipal borrowing, on the basis of sustainable debt management, supported by adequate revenues and capacities, by means of local creditworthiness as well as expanded sustainable municipal debt markets when appropriate. We will consider the establishment of appropriate financial intermediaries for urban financing, such as regional, national, subnational and local development funds or development banks, including pooled financing mechanisms, which can catalyse public and private, national and international financing. We will work to promote risk mitigation mechanisms such as the Multilateral Investment Guarantee Agency, while managing currency risk, to reduce the cost of capital and to stimulate the private sector and households to participate in sustainable urban development and resilience-building efforts, including access to risk transfer mechanisms.







140. We will support the development of appropriate and affordable housing finance products and encourage the participation of a diverse range of multilateral financial institutions, regional development banks and development finance institutions, cooperation agencies, private-sector lenders and investors, cooperatives, moneylenders and microfinance banks to invest in affordable and incremental housing in all its forms.

141. We will also consider establishing urban and territorial transport infrastructure and service funds at the national level, based on a variety of funding sources ranging from public grants to contributions from other public entities and the private sector, ensuring coordination among actors and interventions as well as accountability.

142. We invite international multilateral financial institutions, regional development banks, development finance institutions and cooperation agencies to provide financial support, including through innovative financial mechanisms, to programmes and projects for implementing the New Urban Agenda, particularly in developing countries.

143. We support access to different multilateral funds, including the Green Climate Fund, the Global Environment Facility, the Adaptation Fund and the Climate Investment Funds, among others, to secure resources for climate change adaptation and mitigation plans, policies, programmes and actions for subnational and local governments, within the framework of agreed procedures. We will collaborate with subnational and local financial institutions, as appropriate, to develop climate finance infrastructure solutions and to create appropriate mechanisms for identifying catalytic financial instruments, consistent with any national framework in place to ensure fiscal and debt sustainability at all levels of government.

144. We will explore and develop feasible solutions to climate and disaster risks in cities and human settlements, including by collaborating with insurance and reinsurance institutions and other relevant actors with regard to investments in urban and metropolitan infrastructure, buildings and other urban assets, as well as for local populations to secure their shelter and economic needs.

145. We support the use of international public finance, including official development assistance, among other things, to catalyse additional resource mobilization from all available sources, public and private, for sustainable urban and territorial development. This may include the mitigation of risks for potential investors, in recognition of the fact that international public finance plays an important role in complementing the efforts of countries to mobilize public resources domestically, especially in the poorest and most vulnerable countries with limited domestic resources.

146. We will expand opportunities for North-South, South-South and triangular regional and international cooperation, as well as subnational, decentralized and city-to-city cooperation, as appropriate, to contribute to sustainable urban development, developing capacities and fostering exchanges of urban solutions and mutual learning at all levels and by all relevant actors.

147. We will promote capacity development as a multifaceted approach that addresses the ability of multiple stakeholders and institutions at all levels of governance and combines the individual, societal and institutional capacity to formulate, implement, enhance, manage, monitor and evaluate public policies for sustainable urban development.

148. We will promote the strengthening of the capacity of national, subnational and local governments, including local government associations, as appropriate, to work with women and girls, children and youth, older persons and persons with disabilities, indigenous peoples and local communities, and those in vulnerable situations, as well as with civil society, academia and research institutions in shaping organizational and institutional governance processes, enabling them to participate effectively in decision-making about urban and territorial development.

149. We will support local government associations as promoters and providers of capacity development, recognizing and strengthening, as appropriate, both their involvement in national consultations on urban policies and development priorities and their cooperation with subnational and local governments, along with civil society, the private sector, professionals, academia and research institutions, and their existing networks, to deliver on capacity-development programmes. This should be done by means of peer-to-peer learning, subject-matter-related partnerships and collaborative actions, such as inter-municipal cooperation, on a global, regional, national, subnational and local scale, including the establishment of practitioners' networks and science-policy interface practices.

150. We underscore the need for enhanced cooperation and knowledge exchange on science, technology and innovation to benefit sustainable urban development, in full coherence, coordination and synergy with the processes of the Technology Facilitation Mechanism established under the Addis Ababa Action Agenda and launched under the 2030 Agenda for Sustainable Development.

151. We will promote capacity-development programmes to help subnational and local governments in financial planning and management, anchored in institutional coordination at all levels, including environmental sensitivity and anti-corruption measures, embracing transparent and independent oversight, accounting, procurement, reporting, auditing and monitoring processes, among others, and to review subnational and national performance and compliance, with particular attention to age- and gender-responsive budgeting and the improvement and digitalization of accounting processes and records, in order to promote results-based approaches and build medium- to long-term administrative and technical capacity.

152. We will promote capacity-development programmes on the use of legal land-based revenue and financing tools, as well as on real estate market functioning for policymakers and local public officials, focusing on the legal and economic foundations of value capture, including the quantification, capturing and distribution of land value increments.



153. We will promote the systematic use of multi-stakeholder partnerships in urban development processes, as appropriate, establishing clear and transparent policies, financial and administrative frameworks and procedures, as well as planning guidelines for multi-stakeholder partnerships.

154. We recognize the significant contribution of voluntary collaborative initiatives, partnerships and coalitions that plan to initiate and enhance the implementation of the New Urban Agenda, highlighting best practices and innovative solutions, including by promoting co-production networks between subnational entities, local governments and other relevant stakeholders.

155. We will promote capacity-development initiatives to empower and strengthen the skills and abilities of women and girls, children and youth, older persons and persons with disabilities, indigenous peoples and local communities, as well as persons in vulnerable situations, for shaping governance processes, engaging in dialogue, and promoting and protecting human rights and anti-discrimination, to ensure their effective participation in urban and territorial development decision-making.

156. We will promote the development of national information and communications technology policies and e-government strategies, as well as citizen-centric digital governance tools, tapping into technological innovations, including capacity-development programmes, in order to make information and communications technologies accessible to the public, including women and girls, children and youth, persons with disabilities, older persons and persons in vulnerable situations, to enable them to develop and exercise civic responsibility, broadening participation and fostering responsible governance, as well as increasing efficiency. The use of digital platforms and tools, including geospatial information systems, will be encouraged to improve long-term integrated urban and territorial planning and design, land administration and management, and access to urban and metropolitan services.

157. We will support science, research and innovation, including a focus on social, technological, digital and nature-based innovation, robust science-policy interfaces in urban and territorial planning and policy formulation and institutionalized mechanisms for sharing and exchanging information, knowledge and expertise, including the collection, analysis, standardization and dissemination of geographically based, community-collected, high-quality, timely and reliable data disaggregated by income, sex, age, race, ethnicity, migration status, disability, geographic location and other characteristics relevant in national, subnational and local contexts.

158. We will strengthen data and statistical capacities at national, subnational and local levels to effectively monitor progress achieved in the implementation of sustainable urban development policies and strategies and to inform decision-making and appropriate reviews. Data collection procedures for the implementation of follow-up to and review of the New Urban Agenda should primarily be based on official national, subnational and local data sources, and other sources as appropriate, and be open, transparent and consistent with the purpose of respecting privacy rights and all human rights obligations and commitments. Progress towards a global people-based definition of cities and human settlements may support this work.

159. We will support the role and enhanced capacity of national, subnational and local governments in data collection, mapping, analysis and dissemination and in promoting evidence-based governance, building on a shared knowledge base using both globally comparable as well as locally generated data, including through censuses, household surveys, population registers, community-based monitoring processes and other relevant sources, disaggregated by income, sex, age, race, ethnicity, migration status, disability, geographic location and other characteristics relevant in national, subnational and local contexts.

160. We will foster the creation, promotion and enhancement of open, user-friendly and participatory data platforms using technological and social tools available to transfer and share knowledge among national, subnational and local governments and relevant stakeholders, including non-State actors and people, to enhance effective urban planning and management, efficiency and transparency through e-governance, approaches assisted by information and communications technologies, and geospatial information management.

## Follow-up and review

161. We will carry out a periodic follow-up to and review of the New Urban Agenda, ensuring coherence at the national, regional and global levels, in order to track progress, assess impact and ensure the Agenda's effective and timely implementation, accountability to our citizens and transparency, in an inclusive manner.

162. We encourage voluntary, country-led, open, inclusive, multilevel, participatory and transparent follow-up and review of the New Urban Agenda. The process should take into account contributions of national, subnational and local levels of government and be supplemented by contributions from the United Nations system, regional and subregional organizations, major groups and relevant stakeholders, and should be a continuous process aimed at creating and reinforcing partnerships among all relevant stakeholders and fostering exchanges of urban solutions and mutual learning.

163. We acknowledge the importance of local governments as active partners in the follow-up to and review of the New Urban Agenda at all levels and encourage them to develop, jointly with national and subnational governments, as appropriate, implementable follow-up and review mechanisms at the local level, including through relevant associations and appropriate platforms. We will consider strengthening, where appropriate, their capacity to contribute in this respect.

164. We stress that the follow-up to and review of the New Urban Agenda must have effective linkages with the follow-up to and review of the 2030 Agenda for Sustainable Development to ensure coordination and coherence in their implementation.

165. We reaffirm the role and expertise of UN-Habitat, within its mandate, as a focal point for sustainable urbanization and human settlements, in collaboration with other United Nations system entities, recognizing the linkages between sustainable urbanization and, inter alia, sustainable development, disaster risk reduction and climate change.

166. We invite the General Assembly to request the Secretary-General, with voluntary inputs from countries and relevant regional and international organizations, to report on the progress of the implementation of the New Urban Agenda every four years, with the first report to be submitted during the seventy-second session of the Assembly.

167. The report will provide a qualitative and quantitative analysis of the progress made in the implementation of the New Urban Agenda and internationally agreed goals and targets relevant to sustainable urbanization and human settlements. The analysis will be based on the activities of national, subnational and local governments, UN-Habitat, other relevant entities of the United Nations system, relevant stakeholders in support of the implementation of the New Urban Agenda and the reports of the UN-Habitat Governing Council. The report should incorporate, to the extent possible, the inputs of multilateral organizations and processes where appropriate, civil society, the private sector and academia. It should build on existing platforms and processes such as the World Urban Forum convened by UN-Habitat. The report should avoid duplication and respond to local, subnational and national circumstances and legislation, capacities, needs and priorities.

168. The preparation of the report will be coordinated by UN-Habitat in close collaboration with other relevant entities of the United Nations system, ensuring an inclusive United Nations system-wide coordination process. The report will be submitted to the General Assembly through the Economic and Social Council<sup>18</sup>. The report will also feed into the high-level political forum on sustainable development convened under the auspices of the General Assembly, with a view to ensuring coherence, coordination and collaborative linkages with the follow-up and review of the 2030 Agenda for Sustainable Development.

169. We will continue to strengthen mobilization efforts through partnerships, advocacy and awareness-raising activities relating to the implementation of the New Urban Agenda using existing initiatives such as World Habitat Day and World Cities Day, and will consider establishing new initiatives to mobilize and generate support from civil society, citizens and relevant stakeholders. We note the importance of continuing to engage in the follow-up to and review of the New Urban Agenda with subnational and local government associations represented at the World Assembly of Local and Regional Governments.

170. We reaffirm General Assembly resolutions 51/177 of 16 December 1996, 56/206 of 21 December 2001, 67/216, 68/239 and 69/226, as well as other relevant resolutions of the Assembly, including resolutions 31/109 of 16 December 1976 and 32/162 of 19 December 1977. We reiterate the importance of the Nairobi headquarters location of UN-Habitat.

171. We underline the importance of UN-Habitat, given its role within the United Nations system as a focal point on sustainable urbanization and human settlements, including in the implementation, follow-up to and review of the New Urban Agenda, in collaboration with other United Nations system entities.

<sup>18</sup> The report is intended to replace the report of the Secretary-General to the Economic and Social Council on the coordinated implementation of the Habitat Agenda. It is also intended to be part of, and not additional to, the report of the Secretary-General requested by the General Assembly in its resolution under the relevant agenda item.

172. In light of the New Urban Agenda and with a view to enhancing the effectiveness of UN-Habitat, we request the Secretary-General to submit to the General Assembly during its seventy-first session an evidence-based and independent assessment of UN-Habitat. The result of the assessment will be a report containing recommendations to enhance the effectiveness, efficiency, accountability and oversight of UN-Habitat, and in this regard it should analyse:

- (a) The normative and operational mandate of UN-Habitat;
- (b) The governance structure of UN-Habitat, for more effective, accountable and transparent decision-making, considering alternatives, including universalization of the membership of its Governing Council;
- (c) The work of UN-Habitat with national, subnational and local governments and with relevant stakeholders in order to tap the full potential of partnerships;
- (d) The financial capability of UN-Habitat.

173. We decide to hold a two-day high-level meeting of the General Assembly, to be convened by the President of the General Assembly during the seventy-first session, to discuss the effective implementation of the New Urban Agenda and the positioning of UN-Habitat in this regard. The meeting will discuss, *inter alia*, best practices, success stories and the measures contained in the report. A Chair's summary of the meeting will serve as an input to the Second Committee during the seventy-second session for its consideration of action to be taken in the light of the recommendations contained in the independent assessment in its annual resolution under the relevant agenda item.

174. We encourage the General Assembly to consider holding the next United Nations Conference on Housing and Sustainable Urban Development (Habitat IV) in 2036 within a renewed political commitment to assessing and consolidating progress on the New Urban Agenda.

175. We request the Secretary-General, in his quadrennial report to be presented in 2026 pursuant to paragraph 166 above, to take stock of the progress made and challenges faced in the implementation of the New Urban Agenda since its adoption and to identify further steps to address them.







## ACKNOWLEDGEMENTS

## ACKNOWLEDGEMENTS

The formulation and successful adoption of the New Urban Agenda was made possible by the contributions of many organizations and individuals from different countries, regions, and cities, representing national, subnational, and local governments, as well as various stakeholders' constituencies. Special thanks and recognition go to:

The President of the Republic of Ecuador, Rafael Correa, and the people of the Republic of Ecuador, for their hospitality and commitment to the Habitat III Conference and to sustainable urban development;

The Permanent Representatives and Deputy Permanent Representatives of the Republic of Ecuador to the United Nations in New York who supported the preparatory process and the Conference itself:

Xavier Lasso Mendoza  
Diego Morejón Pazmiño  
Horacio Sevilla Borja  
Helena Yáñez Loza;

The Mayor of Quito, Mauricio Rodas, as well as the city of Quito and its inhabitants, for hosting and supporting the Habitat III Conference, as well as warmly welcoming over 30,000 participants;

The vision and the tireless efforts and contributions of the Bureau of the Preparatory Committee, guiding the innovative and participatory process towards the Habitat III Conference, particularly the Co-chairs of the Bureau of the Preparatory Committee:

Diego Aulestia (Ecuador)  
María de los Ángeles Duarte (Ecuador)<sup>1</sup>  
Maryse Gautier (France);

As well as the other members of the Bureau of the Preparatory Committee:

Eric Miangar (Chad)  
Bárbara Richards (Chile)  
Jaime Silva (Chile)<sup>2</sup>  
Daniela Grabmüllerová (Czech Republic)  
Tania Roediger-Vorwerk (Germany)

<sup>1</sup> Elected at the first plenary meeting of the second session of the Habitat III Preparatory Committee on 14 April 2015 to replace Diego Aulestia (Ecuador).

<sup>2</sup> Elected at the first plenary meeting of the second session of the Habitat III Preparatory Committee on 14 April 2015 to replace Bárbara Richards (Chile).

Csaba Kőrösi (Hungary)  
Purnomo A. Chandra (Indonesia)  
Mamadou Mbodj (Senegal) (also designated as Rapporteur)  
Elena Szolgayova (Slovakia)<sup>3</sup>  
Majid Hasan Al-Suwaidi (United Arab Emirates);

The Co-facilitators of the informal intergovernmental negotiations of the New Urban Agenda, Lourdes Ortiz Yparraguirre, Permanent Representative of the Republic of the Philippines to the United Nations, and Juan José Gómez Camacho, Permanent Representative of the United States of Mexico to the United Nations, and his representative, Dámaso Luna Corona, whose commitment and dedication enabled the agreement of the New Urban Agenda prior to the Habitat III Conference in Quito;

All Member States' and intergovernmental organizations' delegations that participated in the negotiations of the New Urban Agenda, particularly those who were engaged in the work of the Second Committee of the General Assembly;

The Government of the Republic of Indonesia and the city and the people of Surabaya, for hosting the third session of the Habitat III Preparatory Committee;

The hosts of the Habitat III Regional and Thematic Meetings that adopted declarations as part of the official inputs to the New Urban Agenda. The Regional Meetings were hosted by Jakarta (Indonesia), Prague (Czech Republic), Abuja (Nigeria), and Toluca (Mexico); and the Thematic Meetings were hosted by Tel Aviv (Israel), Montreal (Canada), Cuenca (Ecuador), Abu Dhabi (United Arab Emirates), Mexico City (Mexico), Barcelona (Spain), and Pretoria (South Africa);

The Habitat III Policy Units co-lead organizations as well as the 200 Policy Unit experts, for sharing their knowledge and expertise through the 10 Policy Papers that resulted in key policy recommendations on specific themes used as building blocks for the New Urban Agenda;

<sup>3</sup> Elected at the first plenary meeting of the second session of the Habitat III Preparatory Committee on 14 April 2015 to replace Csaba Kőrösi (Hungary).

The voluntary efforts of all members of the General Assembly of Partners (GAP) for providing the views and inputs from 16 Partner Constituent Groups during the whole process, and in particular the 34 members of the Executive Committee who ensured that feedback and priorities of millions of people were channelled into each draft of the New Urban Agenda and its final version;

The Global Taskforce for Local and Regional Governments, which played an essential role in mobilizing the local authorities in the consultative process for the New Urban Agenda in recognition of the distinct and vital role of subnational and local governments in the transformation of urban spaces;

The United Nations system for its support to the Habitat III process, especially the members of the United Nations Task Team on Habitat III, for their comments and inputs to the drafts of the New Urban Agenda and the contributions made through the 22 Issue Papers;

The United Nations departments of the General Assembly Conference Management, Safety and Security, Public Information, and the Office of Legal Affairs for all the technical and procedural support during the intersessional process and the Conference itself, and finally;

The contributions and efforts of those mentioned above, and of many more that cannot all be named here, made the formulation of this shared vision possible. The active engagement of all citizens, governments, and stakeholders will be necessary to ensure the implementation of the New Urban Agenda and the realization of its principles.



# ROADMAP TOWARDS THE NEW URBAN AGENDA

Vancouver 1976

## HABITAT I



Governments recognize the need for sustainable human settlements and sustainable urbanization.

World Leaders adopt the Habitat Agenda as a global plan of action for adequate shelter for all, with the notion of sustainable human settlements driving development in an urbanizing world.

- a. Cities are the engines of global growth;
- b. Urbanization is an opportunity;
- c. Call for a stronger role of local authorities
- d. Recognition of the power of participation.

Istanbul 1996

## HABITAT II



Capturing, creating, organizing and disseminating knowledge towards the New Urban Agenda.  
NATIONAL, REGIONAL AND GLOBAL REPORTS



## URBAN FORUM

NATIONAL, REGIONAL AND WORLD URBAN FORUMS

Medellín, April 2014

## WUF7

Governments, private sector, international organizations, academia, professionals and CSOs reaffirm the commitment to integrate urban equity into the development agenda.

OUTCOME: THE MEDELLÍN DECLARATION

22,000

Participants



URBAN EQUITY

New York, September 17 - 18, 2014

## PREPCOM1

Nairobi, April 14 - 16, 2015

## PREPCOM2

## ENGAGEMENT

Ensuring inclusive participation, engaging partnerships and advocacy to raise awareness and build consensus towards the New Urban Agenda.

- Global Task Force of Local and Regional Governments
- United Nations Task Team
  - National Urban Forums
  - Urban Breakfasts
- Urban Journalism Academies
  - Urban Walks



UNITED NATIONS CONFERENCE ON CLIMATE CHANGE (COP21 / CMP11)

HABITAT III  
URBAN DIALOGUES

## POLICY

Securing renewed political commitment. Addressing action for new challenges.

HIGH LEVEL REGIONAL & THEMATIC MEETINGS



## KNOWLEDGE



### ISSUE PAPERS

The Issue Papers provide in depth review and analysis of specific issues relevant to the discussions of the Conference.

CHECK OUT THE ISSUE PAPERS ON [HABITAT3.ORG](http://HABITAT3.ORG)

A series of e-discussions with the aim to gather views from all interested players to bring forward new and emerging thinking on urban issues.  
Thematic Consultations  
July 6 - 31, 2015



SDG - GOAL 11:  
SUSTAINABLE CITIES  
AND COMMUNITIES



### POLICY UNITS

Mobilization of high-level expertise to develop independent policy recommendations on sustainable urban development

## URBAN OCTOBER

WORLD HABITAT DAY

WORLD CITIES DAY

LOCAL GOVERNMENTS  
JOINT-MESSAGE  
TOWARDS THE  
NEW URBAN AGENDA

INDONESIA NIGERIA CZECH REPUBLIC MEXICO

TEL-AVIV MONTREAL CUENCA ABU DHABI

MEXICO CITY BARCELONA PRETORIA

## ZERO DRAFT DOCUMENT

May to July 2016

### INTERSESSIONAL MEETINGS



Surabaya, July 25 - 27, 2016

### PREPCOM3

URBAN OCTOBER

## WELCOME TO QUITO



2nd World Assembly of Local and Regional Governments

Urbanization is an endogenous source of sustainable development as well as a tool for social integration and equity.



## NEW URBAN AGENDA

## LEGACY







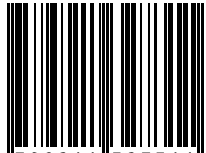




United Nations

[www.habitat3.org](http://www.habitat3.org)  
#NewUrbanAgenda #Habitat3

ISBN 978-92-1-132731-1



9 789211 327311 >



## New Urban Agenda – Werkzeugkasten für moderne Städte



**Mehr Wohnraum schaffen, aber grüne Lungen und Erholungsflächen erhalten – für Städte ein Spagat.**

Quito, Hauptstadt von Ecuador

Quelle: nidadfoto / Fotolia.com

**Der globale Fahrplan für die nachhaltige Stadtentwicklung der kommenden zwanzig Jahre liegt vor: die New Urban Agenda. Sie ist das zentrale Ergebnis der UN-Konferenz „Habitat III“ zu Wohnen und nachhaltiger Stadtentwicklung, die am 20. Oktober 2016 in der ecuadorianischen Hauptstadt Quito zu Ende ging.**

26.10.2016

Mit der New Urban Agenda haben die Staaten ein Dokument vorgelegt, das sich mit der Entwicklung, Funktion und nachhaltigen Ausgestaltung von Städten befasst – und das zum ersten Mal unter dem Eindruck einer bereits heute stark verstädterten Welt und mit der Perspektive weiter zunehmender Urbanisierung. Die New Urban Agenda ist für Stadtverwaltungen von großem Wert – auch wenn sie eine unverbindliche Vereinbarung ist – denn sie stellt klare Forderungen für eine moderne Stadt: kompakte Siedlungsentwicklung mit angemessenen Freiräumen, sparsamer Umgang mit Ressourcen, Stärkung öffentlicher Verkehrsmittel und gesunde Lebensbedingungen für alle in Städten.

Sie wird damit zum Werkzeugkasten für Akteure der kommunalen Ebene und ist eine Richtschnur und politische Stärkung in ihrem Engagement für eine nachhaltige und integrierte Stadtentwicklung. Dabei ist die New Urban Agenda auch ein wesentlicher Baustein für die Umsetzung der UN-Nachhaltigkeitsziele

„Sustainable Development Goals“ (SDGs) (insbesondere SDG 11 inclusive and resilient cities), sowie mit ihren Forderungen einer energiesparenden und erneuerbare Energien fördernden Stadtentwicklung auch zu den Beschlüssen der UN-Klimakonferenz COP 21 in Paris.

Die Städte sind die zentralen Akteure für die Umsetzung der New Urban Agenda, auch wenn die Unterzeichner die Mitgliedstaaten der Vereinten Nationen sind. Kommunale Akteure waren zahlreich und hochrangig auf der Konferenz vertreten und haben in ihren Beiträgen illustriert, dass Stadtentwicklung ein Prozess ist, der kontinuierlich mit sich wandelnden Rahmenbedingungen konfrontiert ist, für die orts- und situationsangepasste Lösungen gefunden werden müssen. Die New Urban Agenda kann dabei Richtschnur und Impulsgeber sein, aber es kann nicht ihr Anspruch sein, für die kommenden 20 Jahre alle bestehenden und kommenden Handlungsfelder der Stadtentwicklung gleichermaßen zu adressieren. Die Netzwerke der städtischen Akteure arbeiten kontinuierlich weiter daran, die Anforderungen der New Urban Agenda auszufüllen, zu konkretisieren, anzuwenden und sich über die Erfahrungen auszutauschen und zu lernen. Ein gutes Beispiel hierfür ist der „Quito Implementation Plan“, der mit der Habitat III gestartet wurde und Selbstverpflichtungen der unterschiedlichsten Akteure zur Umsetzung der New Urban Agenda enthält.

## **Der Beitrag des UBA**

Das Umweltbundesamt hat mit zwei Veranstaltungen zur Habitat III beigetragen, die die zentrale Bedeutung der städtischen Ebene herausgestellt haben:

Zusammen mit der Deutschen Gesellschaft für internationale Zusammenarbeit (GIZ), der UN-Wirtschaftskommission für Europa (UNECE) und dem Umweltprogramm der Vereinten Nationen (UNEP) hat UBA ein Side-Event zu „Rapid urbanization and material usage: Resource efficiency through sustainable construction and urban planning“ durchgeführt. Im Fokus stand die Frage, wie angesichts rasanter Urbanisierungsprozesse der enorme Ressourcenbedarf nachhaltig gedeckt werden kann. Die Podiumsdiskussion hat gezeigt, dass dem sparsamen und effizienten Umgang mit Material eine entscheidende Rolle zukommt – Urban Mining ist hierfür eine wichtige Strategie. Um dem schnellen Wachstum der Städte ressourceneffizient zu begegnen, zeigte das Side-Event weitere mögliche Maßnahmen auf: eine kompakte Stadtentwicklung, die Förderung von aktiver Mobilität, aber auch neue Finanzierungsmodelle zur Realisierung verbesserter Energieeffizienz.

Im deutschen Pavillon hat UBA zusammen mit ICLEI – einem weltweiten Netzwerk aus Städten und Regionen – und unter Mitwirkung des Deutschen Städtetags und des Umweltamts Dresden eine Veranstaltung zu „Impulses of the New Urban Agenda for urban environmental protection“ durchgeführt. Das Ergebnis: Auch für deutsche Kommunen bedeutet die New Urban Agenda eine politische Stärkung in ihrem Engagement für eine nachhaltige Stadtentwicklung. Sie ist ein Werkzeugkasten, mit dem die Städte ihre Maßnahmen entwickeln können. Klar ist: Der Prozess ist mit Habitat III nicht abgeschlossen. Es braucht Mechanismen für Monitoring, sowie einen kontinuierlichen Prozess, der die sich schnell wandelnden Rahmenbedingungen und Entwicklungstrends, die auf Stadtentwicklung einwirken, aufnehmen und auf diese reagieren kann.

## **Die Habitat III-Konferenz**

Vom 17. bis 20.10.2016 trafen sich mehr als 30.000 Teilnehmerinnen und Teilnehmer aus 167 Ländern und von unterschiedlichen staatlichen Ebenen sowie nicht-staatlichen Organisationen, um im Rahmen der dritten UN-Konferenz zu Wohnen und nachhaltiger Stadtentwicklung (Habitat III) über die Herausforderungen, Ziele und Lösungsansätze einer inklusiven, umweltverträglichen und ökonomisch ausgewogenen Stadtentwicklung zu diskutieren. Im Fokus der Konferenz stand die „New Urban Agenda“, eine freiwillige Vereinbarung zu Zielen und Entwicklungspfaden hin zu einer nachhaltigen Stadtentwicklung.

Nach viermonatigen Verhandlungen zwischen den Staaten der Vereinten Nationen wurde die New Urban Agenda bereits im September finalisiert und vom Plenum auf der Habitat III-Konferenz verabschiedet. Neben

Sitzungen des Plenums und verschiedenen High-Level- und Stakeholder-Roundtables wurde Habitat III durch die Side- und Networking- Events der zahlreich vertretenen staatlichen und nicht-staatlichen Organisationen geprägt, sowie durch eine öffentlich zugängliche Ausstellung mit Länderpavillons.

---

## Links

- Habitat III, New Urban Agenda (<http://www.habitat3.org/the-new-urban-agenda>)
  - Quito Implementation Plan (<http://habitat3.org/quito-implementation-plan>)
  - UBA-Themenseite zur deutschen Ressourcenpolitik (<https://www.umweltbundesamt.de/strategien-programme-der-bundesregierung>)
  - SDG 11: Make cities and human settlements inclusive, safe, ... (<https://sustainabledevelopment.un.org/sdg11>)
- 

„Für Mensch und Umwelt“ ist der Leitspruch des UBA und bringt auf den Punkt, wofür wir da sind. In diesem Video geben wir Einblick in unsere Arbeit.

## Umweltbundesamt

### Kontakt

*Wörlitzer Platz 1*

*06844 Dessau-Roßlau*

***Bitte kontaktieren Sie uns bevorzugt per E-Mail: [buergerservice@uba.de](mailto:buergerservice@uba.de)***

*Telefonisch erreichen Sie uns Mo - Fr zu den Servicezeiten 9.00 – 15.00 Uhr unter: +49-340-2103-2416*

*Fax: +49-340-2104-2285*



---

**Sachstand**

---

**Zum „Cradle to Cradle“- Ansatz in der Kreislaufwirtschaft**

**Zum „Cradle to Cradle“-Ansatz in der Kreislaufwirtschaft**

Aktenzeichen: WD 8 - 3000 - 031/20  
Abschluss der Arbeit: 11. Juni 2020  
Fachbereich: WD 8: Umwelt, Naturschutz, Reaktorsicherheit, Bildung und  
Forschung

---

Die Wissenschaftlichen Dienste des Deutschen Bundestages unterstützen die Mitglieder des Deutschen Bundestages bei ihrer mandatsbezogenen Tätigkeit. Ihre Arbeiten geben nicht die Auffassung des Deutschen Bundestages, eines seiner Organe oder der Bundestagsverwaltung wieder. Vielmehr liegen sie in der fachlichen Verantwortung der Verfasserinnen und Verfasser sowie der Fachbereichsleitung. Arbeiten der Wissenschaftlichen Dienste geben nur den zum Zeitpunkt der Erstellung des Textes aktuellen Stand wieder und stellen eine individuelle Auftragsarbeit für einen Abgeordneten des Bundestages dar. Die Arbeiten können der Geheimschutzordnung des Bundestages unterliegende, geschützte oder andere nicht zur Veröffentlichung geeignete Informationen enthalten. Eine beabsichtigte Weitergabe oder Veröffentlichung ist vorab dem jeweiligen Fachbereich anzuzeigen und nur mit Angabe der Quelle zulässig. Der Fachbereich berät über die dabei zu berücksichtigenden Fragen.



---

## Inhaltsverzeichnis

<b>1.</b>	<b>Einleitung</b>	<b>4</b>
<b>2.</b>	<b>Der Kreislaufgedanke im Abfallrecht</b>	<b>4</b>
2.1.	EU-Recht	4
2.2.	Nationales Recht	5
<b>3.</b>	<b>Bedeutung Cradle to Cradle in deutschlandweiten Ausschreibungen</b>	<b>5</b>
<b>4.</b>	<b>Initiativen und Projekte in der EU</b>	<b>6</b>
4.1.	EU-Forschungsprojekt „Buildings as Material Banks“	6
4.2.	Cradle to Cradle Network	7

## 1. Einleitung

Bei dem „Cradle to Cradle“ (C2C)-Ansatz geht es um die Verbesserung der Kreislaufwirtschaft. Ziel ist es, Güter so zu produzieren, dass die eingesetzten Rohstoffe nach Gebrauch biologisch abgebaut und als „Nährstoffe“ wieder in den natürlichen Stoffkreislauf zurückgeführt werden oder ohne Verluste zu neuen Gütern verarbeitet werden können. Giftige oder umweltgefährdende Stoffe, die sich nicht recyceln lassen, werden für das Produktdesign ausgeschlossen. Die Energie für Produktion und Re-Design sollen erneuerbare Energien liefern.

„Cradle to Cradle“ ist eine eingetragene Marke des Non-Profit Instituts „Cradle-to-Cradle Products Innovation Institute“ mit Sitz in Oakland in Kalifornien und einer Niederlassung in Amsterdam. Das Institut führt eine Produktzertifizierung durch und teilt die Produkte in die Kategorien Basic, Bronze, Silber, Gold und Platin ein.

In Deutschland wurde 2012 der Verein „Cradle to Cradle e.V.“ gegründet, welcher jährlich einen internationalen „Cradle to Cradle“ Kongress und ein Fachforum veranstaltet, eine „C2C-Akademie“ und das „C2C-Lab“ leitet und somit die Verbreitung und Implementierung des Prinzips erreichen will.<sup>1</sup>

## 2. Der Kreislaufgedanke im Abfallrecht

### 2.1. EU-Recht

Das Abfallrecht ist durch eine Vielzahl europäischer Rechtsakte geprägt. Zu den zentralen Richtlinien im Bereich der Abfallwirtschaft zählt die Abfallrahmenrichtlinie (Richtlinie 2008/98/EG)<sup>2</sup>. Sie definiert die wesentlichen abfallbezogenen Begrifflichkeiten und legt unter anderem eine fünfstufige Abfallhierarchie fest. Diese lässt sich Art. 4 der Richtlinie entnehmen (Vermeidung-Vorbereitung der Verwertung-Recycling-sonstige Verwertung, wie beispielsweise eine energetische Verwertung und schließlich die Beseitigung). Hier spiegelt sich der Grundgedanke der Kreislaufwirtschaft wieder, dass so wenig Abfall wie möglich entstehen soll. Ist dies (mit verhältnismäßigem Aufwand) nicht vermeidbar, sollen überwiegend wiederverwertbare Stoffe verwendet werden. Übrig gebliebene Abfälle müssen anschließend auf ökologisch möglichst schonende Art und Weise beseitigt werden.

Das EU-Parlament hat im Jahr 2018 umfangreiche Änderungen an den Richtlinien zur Vermeidung, Verwertung und Beseitigung von Abfällen in der EU beschlossen. Darunter fällt nicht nur die Novellierung der Abfallrahmenrichtlinie, auch die Verpackungs-, Elektrogerät-, Batterie und Altfahrzeugrichtlinie wurden überarbeitet. Die überarbeiteten Richtlinien müssen bis zum 5. Juli

---

1 Abrufbar unter: [https://c2c-ev.de/wp-content/uploads/2019/09/Stellungnahme-zur-Novellierung-des-Kreislaufwirtschaftsgesetzes-KrWG\\_Ausarbeitung-C2C-e.V..pdf](https://c2c-ev.de/wp-content/uploads/2019/09/Stellungnahme-zur-Novellierung-des-Kreislaufwirtschaftsgesetzes-KrWG_Ausarbeitung-C2C-e.V..pdf) (zuletzt aufgerufen am 02.06.2020).

2 Richtlinie 2008/98/EG des Europäischen Parlaments und des Rates vom 19. November 2008 über Abfälle und zur Aufhebung bestimmter Richtlinien, abrufbar unter <https://eur-lex.europa.eu/legal-content/DE/TXT/HTML/?uri=CELEX:32008L0098&from=DE> (zuletzt aufgerufen am 02.06.2020).

2020 in nationales Recht umgesetzt werden. Eine entsprechende Novelle des Kreislaufwirtschaftsgesetzes (KrWG)<sup>3</sup> wurde am 20. Mai 2020 von der Bundesregierung<sup>4</sup> verabschiedet.<sup>5</sup>

## 2.2. Nationales Recht

In Deutschland bildet das Gesetz zur Förderung der Kreislaufwirtschaft und Sicherung der umweltverträglichen Bewirtschaftung von Abfällen (KrWG) die Kernregelung abfallrechtlicher Vorschriften. Das Kreislaufwirtschaftsgesetz des Bundes wird ergänzt und konkretisiert durch die Abfallgesetze der Länder.

## 3. Bedeutung Cradle to Cradle in deutschlandweiten Ausschreibungen

In § 45 Abs. 1 S. 1 KrWG schreibt der Bundesgesetzgeber für die Dienststellen des Bundes sowie die der Aufsicht des Bundes unterstehenden Körperschaften, Anstalten und Stiftungen des öffentlichen Rechts die Verpflichtung nieder, durch ihr Verhalten zur Erfüllung der Zwecke des Gesetzes, d.h. zur Förderung der Kreislaufwirtschaft zur Schonung der natürlichen Ressourcen und zur Sicherung der umweltverträglichen Beseitigung von Abfällen, beizutragen.

Diese Verpflichtung dient unter anderem der Vorbildfunktion, die die öffentliche Hand insoweit für die private Wirtschaft einnimmt.<sup>6</sup> Insbesondere bei der öffentlichen Beschaffung sollen die Grundsätze der Kreislaufwirtschaft Berücksichtigung finden. So lassen sich in der Praxis (bislang wohl noch vereinzelte) Beispiele finden, in denen der „Cradle to Cradle“-Ansatz Eingang gefunden hat. Exemplarisch kann hierfür eine aktuelle Ausschreibung des Bundesministeriums für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ) zur Beschaffung von Bürostühlen und Bürodrehstühlen angeführt werden, in der explizit gefordert wurde, dass der Standard der „Cradle to Cradle“-Zertifizierung auf dem Niveau „Bronze“ oder ein gleichwertiger Standard erfüllt wird.<sup>7</sup> Die Bundestagsverwaltung hat kürzlich ebenfalls in einer Ausschreibung für Büro-

---

3 Kreislaufwirtschaftsgesetz vom 24. Februar 2012 (BGBl. I S. 212), das zuletzt durch Artikel 2 Absatz 9 des Gesetzes vom 20. Juli 2017 (BGBl. I S. 2808) geändert worden ist, abrufbar unter: <https://www.gesetze-im-internet.de/krwg/BJNR021210012.html> (zuletzt aufgerufen am 02.06.2020).

4 Gesetzentwurf der Bundesregierung Entwurf eines Gesetzes zur Umsetzung der Abfallrahmenrichtlinie der Europäischen Union, Bundestagsdrucksache 19/19373.

5 Hierzu abrufbar eine Stellungnahme zur Novellierung des Kreislaufwirtschaftsgesetzes des eingetragenen Vereins Cradle to Cradle, [https://c2c-ev.de/wp-content/uploads/2019/09/Stellungnahme-zur-Novellierung-des-Kreislaufwirtschaftsgesetzes-KrWG\\_Ausarbeitung-C2C-e.V..pdf](https://c2c-ev.de/wp-content/uploads/2019/09/Stellungnahme-zur-Novellierung-des-Kreislaufwirtschaftsgesetzes-KrWG_Ausarbeitung-C2C-e.V..pdf) (zuletzt aufgerufen am 02.06.2020).

6 Beckmann: in Landmann/Rohmer, Umweltrecht, Werkstand: 91. EL September 2019, KrWG, § 45, Rn. 5.

7 Ausschreibung Rahmenvertrag Cradle to Cradle Bürostühle und Bürodrehstühle, abrufbar unter: <https://www.evergabe-online.de/tenderdetails.html;jsessionid=2D09A18C7B455A022A658772E89E6E5B.node061?0&id=238114> (zuletzt aufgerufen am 02.06.2020). Die Recherche in dieser Datenbank ermöglicht keinen vollständigen Überblick über bereits erfolgte Ausschreibungen, da abgeschlossene Verfahren in der Regel nicht mehr einsehbar sind.

drehstühle Bezug auf die „Cradle to Cradle“-Zertifizierung genommen. Eine solche war nicht Voraussetzung für die Abgabe eines Angebotes, wurde aber im Rahmen der Auswahlentscheidung durch die Vergabe von Zusatzpunkten positiv berücksichtigt.

Bei der Ausschreibung öffentlicher Leistungen sind allerdings auch die Grundsätze der wirtschaftlichen und sparsamen Haushaltsführung zu beachten, § 34 Abs. 2 Bundeshaushaltsordnung (BHO)<sup>8</sup>. Vor diesem Hintergrund folgt aus der in § 45 Abs. 1 S. 1 KrWG normierter Förderpflicht lediglich ein Optimierungsgebot dahingehend, dass die günstigste Relation zwischen Zweck und Mittel anzustreben ist.<sup>9</sup>

Bei der Bewertung, welche ökologischen Kriterien der Bund bei Beschaffungsverfahren für Aufträge oberhalb und unterhalb der EU-Schwellenwerte beim Auftragsgegenstand, bei der Leistungsbeschreibung, bei den Ausschlusskriterien und der Eignungsprüfung sowie der Auftragsführung anlegt sind, werden produkt- und einzelfallbezogene Nachhaltigkeitskriterien gefordert.<sup>10</sup> Im Rahmen der ökologischen Kriterien – wie beispielsweise Energieeffizienz, Verwendung von Recyclingpapier und klimaneutraler Versand – kann hier auch das Kriterium „Cradle to Cradle“ Eingang in den Kriterienkatalog finden.<sup>11</sup>

#### 4. Initiativen und Projekte in der EU

##### 4.1. EU-Forschungsprojekt „Buildings as Material Banks“

Im Vordergrund des EU-finanzierten Projekts „Building as Material Banks“ (BAMB)<sup>12</sup> steht die Verwendung von schadstofffreien und C2C-zertifizierten Bauprodukten. Das BAMB untersucht Möglichkeiten, den Wert von Baumaterialien zu steigern, was zur Abfallvermeidung und zur Verringerung des Verbrauchs natürlicher Ressourcen führt.<sup>13</sup> Das Forschungsprojekt ist in zwei Teile strukturiert: Zum einen den Aufbau einer BIM(Building-Information-Modeling)-fähigen Systematik und zum anderen einer Datenbank für den elektronischen Materialpass und die Entwicklung von Baukonstruktionen mit wiederverwertbaren Materialien.

---

8 Bundeshaushaltsordnung vom 19. August 1969 (BGBl. I S. 1284), die zuletzt durch Artikel 3 des Gesetzes vom 9. Dezember 2019 (BGBl. I S. 2053) geändert worden ist, abrufbar unter: <https://www.gesetze-im-internet.de/bho/BJNR012840969.html> (zuletzt aufgerufen am 02.06.2020).

9 Dippel, in: BeckOK Umweltrecht, Giesberts/Reinhardt, 54. Edition, Stand 01.04.2020, §45 KrWG, Rn. 10.

10 Antwort der Bundesregierung auf die Große Anfrage der Abgeordneten Uwe Kekeritz u.a. und der Fraktion BÜNDNIS 90/DIE GRÜNEN, Ökologische, soziale und menschenrechtliche Kriterien in der öffentlichen Beschaffung als Beitrag für eine nachhaltige Entwicklung weltweit, Bundestagsdrucksache 19/3166, abrufbar unter: <http://dip21.bundestag.de/dip21/btd/19/075/1907567.pdf>, S. 15 f. (zuletzt aufgerufen am 02.06.2020).

11 Ebenda.

12 Abrufbar unter: <https://cordis.europa.eu/project/id/642384/de> (zuletzt aufgerufen am 02.06.2020).

13 BAMB, Buildings as Material Banks, abrufbar unter: <https://www.bamb2020.eu/> (zuletzt aufgerufen am 02.06.2020).

---

Während in Deutschland „Cradle to Cradle“ im Bauwesen nur sehr vereinzelt angekommen ist, sind in den Niederlanden, bereits circa 20 Projekte unter dieser Zertifizierung geführt.<sup>14</sup> Als Vorreiter hierfür gilt die Stadt Venlo, die das Prinzip beispielhaft umgesetzt hatte. Im Anschluss daran haben sich Unternehmen dort niedergelassen.<sup>15</sup>

#### 4.2. “Cradle to Cradle Network”

Das „Cradle to Cradle (C2C) Network“ ist ein EU-finanziertes Projekt von zehn Partnern aus verschiedenen EU-Mitgliedsstaaten. Von 2007 bis 2013 haben diese Partner zusammen an dem C2C-Projekt gearbeitet, um diverse „Cradle to Cradle“-Vorgehensweisen und Strategien zusammenzutragen und in den Projektbereichen (Bau, Industrie, Governance und Flächennutzung) zu implementieren. Am Ende des Projekts haben alle Partner regionale Aktionspläne erstellt, um auszuarbeiten, wie man die erarbeiteten Strategien und Methoden bestmöglich regional umsetzen kann.<sup>16</sup> Ziel dieser Aktionspläne ist es, das Konzept von „Cradle to Cradle“ zu stärken und neue Perspektiven und Möglichkeiten einer effektiven Kreislaufwirtschaft aufzuzeigen.

\* \* \*

---

14 Abrufbar unter: <https://www.dabonline.de/2020/04/28/cradle-to-cradle-ist-machbar-beispiele-architektur-baustoffe-c2c-infos/> (zuletzt aufgerufen am 02.06.2020).

15 Exemplarisch haben Unternehmen, wie Jalema, Staco BV, AGMI, Noble Benelux, Van Houtum und AMI erfolgreich in Cradle-to-Cradle-Produkte investiert.

16 Cradle to Cradle Network, abrufbar unter: <https://keep.eu/projects/422/> (zuletzt aufgerufen am 02.06.2020).



Ministerium für Umwelt, Klima und Energiewirtschaft  
Baden-Württemberg

GESETZLICHER RAHMEN

📅 15.06.2021

# Klimaschutzgesetz Baden- Württemberg



📷 sdecoret/Fotolia

Der Klimawandel gehört zu den größten Herausforderungen unserer Zeit. Um ihm wirksam entgegenzuwirken, ist ein engagierter Klimaschutz unerlässlich. Den gesetzlichen Rahmen für die Klimaschutzpolitik des Landes setzt das Klimaschutzgesetz Baden-Württemberg (KSG BW).

Das Klimaschutzgesetz ist am 31. Juli 2013 in Kraft getreten. Im Jahr 2020 wurde es umfassend weiterentwickelt. Seit 24. Oktober 2020 ist die [Novelle des Klimaschutzgesetzes](#) in Kraft. Eine aktuelle Version des Klimaschutzgesetzes finden Sie auf den Seiten von [Landesrecht BW](#).

Zentrales Element des Klimaschutzgesetzes sind die Klimaschutzziele für die Jahre 2020, 2030 und 2050. Sie geben die Richtung für die Klimapolitik des Landes vor. Mit einem regelmäßigen Monitoring überprüft die Landesregierung die Erreichung der Klimaschutzziele. Falls sich abzeichnet, dass diese nicht erreicht werden, beschließt die Landesregierung zusätzliche Maßnahmen.

Daneben enthält das Klimaschutzgesetz auch konkrete Maßnahmen. Dazu zählen insbesondere die kommunale Wärmeplanung und die Pflicht, auf neugebauten Nichtwohngebäuden Photovoltaikanlagen zu installieren.

Klimaschutz erfordert die Unterstützung und Mitgestaltung aller. Das Klimaschutzgesetz richtet sich daher mit einer allgemeinen Verpflichtung zum Klimaschutz an alle Bürgerinnen und Bürger sowie mit besonderen Regelungen an das Land, die Kommunen und die Wirtschaft.

## Die wichtigsten Inhalte des Klimaschutzgesetzes:

---

### Klimaschutzziele

Das Klimaschutzgesetz macht klare Vorgaben, den Ausstoß von Treibhausgasen zu reduzieren: Der Treibhausgasausstoß des Landes soll im Vergleich zu den Gesamtemissionen des Jahres 1990 bis 2020 um mindestens 25 Prozent und bis 2030 um mindestens 42 Prozent sinken. Bis zum Jahr 2050 soll der Ausstoß um 90 Prozent gegenüber 1990 gemindert werden.

---

### Monitoring

Das Klimaschutzgesetz schreibt vor, dass die Landesregierung mit einem **regelmäßigen Monitoring** auf Basis quantitativer und qualitativer Erhebungen überprüft, ob die eingeleiteten Maßnahmen greifen und die Klimaschutzziele erreicht werden. Das Monitoring besteht aus drei Berichten:

- einem Klimaschutz-Kurz-Bericht, der jedes Jahr erscheint,
  - einem Klimaschutz- und Projektionsbericht, der spätestens alle drei Jahre erscheint, und
  - einem Bericht zur **Anpassung an den Klimawandel**, der spätestens alle fünf Jahre erscheint.
- 

### Mechanismus beim Verfehlen der Klimaschutzziele

Der Klimaschutz- und Projektionsbericht, den die Landesregierung alle drei Jahre veröffentlicht, enthält Projektionen von Treibhausgasemissionen in Baden-Württemberg und deren Auswirkungen auf die Klimaschutzziele.

Wird dabei festgestellt, dass die Ziele (voraussichtlich) nicht erreicht werden können, enthält der Bericht zudem eine Analyse der Ursachen und der betroffenen Ebene wie Bund oder Land. Außerdem beinhaltet er zusätzlich vorgeschlagene Maßnahmen, um die Zielvorgaben noch zu erreichen.



Die Landesregierung legt den Klimaschutz- und Projektionsbericht einschließlich der Stellungnahme des Beirats für Klimaschutz nach Beschlussfassung dem Landtag vor. Droht eine Zielabweichung, beschließt die Landesregierung innerhalb von vier Monaten nach Beschlussfassung erforderliche Maßnahmen und unterrichtet hierüber den Landtag.

---

## Integriertes Energie- und Klimaschutzkonzept (IEKK) ✓

Dem Auftrag im Klimaschutzgesetz folgend hat die Landesregierung das [Integrierte Energie- und Klimaschutzkonzept \(IEKK\)](#) im Jahr 2014 beschlossen. Es enthält Sektorziele sowie konkrete Strategien und Maßnahmen, um die Klimaschutzziele zu erreichen.

## Anpassung an den Klimawandel ✓

Das Klimaschutzgesetz sieht vor, die unvermeidbaren Auswirkungen des Klimawandels mit Hilfe einer [landesweiten Anpassungsstrategie](#) zu begrenzen. Die Landesregierung hat im Jahr 2015 die Anpassungsstrategie Baden-Württemberg verabschiedet. Sie soll im Jahr 2022 und danach alle fünf Jahre fortgeschrieben werden.

---

## Vorbildfunktion der öffentlichen Hand beim Klimaschutz ✓

Der öffentlichen Hand kommt beim Klimaschutz eine Vorbildfunktion zu. Das Land hat sich zum Ziel gesetzt, die Landesverwaltung bis zum Jahr 2040 weitgehend klimaneutral zu organisieren. Hierzu hat das Umweltministerium ein [Konzept zur klimaneutralen Landesverwaltung](#) vorgelegt.

---

## Erfassung des Energieverbrauchs durch Kommunen ✓

Alle Gemeinden, Städte und Landkreise müssen ihre [Energieverbräuche jährlich in einer vom Land bereitgestellten elektronischen Datenbank erfassen](#). Ziel ist, in der Folge den kommunalen Energieverbrauch zu senken und insbesondere die Liegenschaften energieeffizienter zu betreiben.

Jeweils bis zum 30.6. des Folgejahres erfassen alle Kommunen ihre Energieverbräuche und die dazugehörigen spezifischen Daten in sieben Kategorien. Wenn sie bereits ein systematisches Energiemanagement betreiben, genügen Energiebericht und Summendaten.

Die kostenlose Datenbank erlaubt Auswertungen und gibt den Kommunen hilfreiches Feedback, wo sie beim Energieverbrauch stehen. Basis dafür ist „kom.EMS“, ein Werkzeug zur Qualitätssicherung und Bewertung von Energiemanagementsystemen in Kommunen.

Die Datenerfassung der Energieverbräuche schafft – als erster wichtiger Schritt auf dem Weg zu einem Energiemanagement – Transparenz und Erkenntnisgewinn und somit die Voraussetzung, Einsparpotentiale zu erkennen und zu erschließen.



# Weitere Informationen

[KEA-BW: Datenbank zur Erfassung des Energieverbrauchs](#)

---

## Pflicht zur kommunalen Wärmeplanung

Ein kommunaler Wärmeplan bildet die Grundlage um einen klimaneutralen Gebäudesektor zu erreichen. Das Klimaschutzgesetz legt für alle Kommunen in Baden-Württemberg fest, welche Elemente ein solcher kommunaler Wärmeplan enthält.

Die kommunale Wärmeplanung umfasst eine Bestandsanalyse zum Wärmebedarf und zur Versorgungsstruktur sowie eine Analyse der vorhandenen Potenziale zur Wärmeversorgung mittels erneuerbarer Energien. Darauf aufbauend erstellen die Kommunen ein Szenario für eine klimaneutrale Wärmeversorgung im Jahr 2050. Außerdem wird eine Strategie entwickelt, wie dieser Umbau gelingen kann und wie die Prioritäten zu setzen sind.

Mit Hilfe dieses Fahrplans sollen die Kommunen, die richtigen Entscheidungen treffen, um eine klimaneutrale Wärmeversorgung aller Gebäude zu ermöglichen. Genauso soll er auch alle anderen lokalen Akteure bei individuellen Investitionsentscheidungen unterstützen.

Stadtkreise und Große Kreisstädte sind verpflichtet, bis zum 31. Dezember 2023 einen kommunalen Wärmeplan zu erstellen und beim zuständigen Regierungspräsidium einzureichen. Dadurch entstehen Wärmepläne für über 50 Prozent der Einwohnerinnen und Einwohner Baden-Württembergs. Doch auch für alle anderen Kommunen ist ein Wärmeplan sinnvoll und wird zeitnah gefördert werden.

Das Umweltministerium hat einen [Handlungsleitfaden zur kommunalen Wärmeplanung](#) veröffentlicht, der die Kommunen, aber auch andere Planungsbeteiligte bei dieser wichtigen Aufgabe unterstützt. Außerdem steht [Klimaschutz- und Energieagentur Baden-Württemberg \(KEA-BW\)](#) für Rückfragen zur Verfügung und stellt auf ihrer Internetseite umfangreiche Informationsmaterialien bereit.

---

## Pflicht zur Installation von Photovoltaikanlagen

Beim Neubau von Nichtwohngebäuden müssen Photovoltaikanlagen zur Stromerzeugung installiert werden. Ebenso beim Bau von großen Parkplätzen mit mehr als 75 Stellplätzen.

Von den Photovoltaik-Pflichten werden Bauvorhaben erfasst, deren Anträge auf Baugenehmigung ab dem 1. Januar 2022 bei der zuständigen Behörde eingehen.

Das Umweltministerium erarbeitet derzeit eine Rechtsverordnung, die die Bestimmungen der Photovoltaik-Pflichten mit näheren Regelungen ergänzt.

## Weitere Informationen

[KEA-BW: Photovoltaik-Pflichten](#)

---

### Klimamobilitätspläne

Gemeinden, Städte und Landkreise können Klimamobilitätspläne aufstellen. Mit Hilfe dieser Pläne sollen die Kommunen ihre Treibhausgasemissionen im Mobilitätsbereich dauerhaft senken.

Fachlich zuständig für die Klimamobilitätspläne ist das Verkehrsministerium.

## Weitere Informationen

[Verkehrsministerium: Klimamobilitätspläne](#)

[KEA-BW: Klimamobilitätspläne](#)

---

### Klimaschutzvereinbarungen mit Unternehmen

Unternehmen können auf freiwilliger Basis mit dem Land [Klimaschutzvereinbarungen](#) abschließen. Dadurch sollen sie zu zusätzlichen Klimaschutzaktivitäten motiviert werden.

---

### Nachhaltiges Bauen in Förderprogrammen

Das Klimaschutzgesetz stärkt das nachhaltige Bauen in Förderprogrammen des Landes für den Hochbau. So sollen diese Förderprogramme, die Nichtwohngebäude zum Gegenstand haben, den Grundsätzen des nachhaltigen Bauens grundsätzlich Rechnung tragen. Denn nachhaltiges Bauen soll die ökologischen, ökonomischen und soziokulturellen Gebäudequalitäten steigern.

Mindestvoraussetzung für die Förderung ist, dass der Antragsteller nachweist, dass er die Grundsätze des nachhaltigen Bauens geprüft hat. Details regeln die jeweiligen Förderprogramme, die die Ministerien bis zum 24. Januar 2022 an die neue Regelung anpassen.

## Weitere Informationen

[N!BBW – Nachhaltiges Bauen Baden-Württemberg](#)

[KEA-BW: Nachhaltiges Bauen](#)

---

## Beteiligung der Regierungspräsidien zum Klimaschutz

Die Regierungspräsidien sollen bei bestimmten Bauleitplanverfahren, die die Standorte von Anlagen zur Nutzung erneuerbarer Energien regeln, als Träger öffentlicher Belange für den Klimaschutz beteiligt werden.

---

## Zum Herunterladen

[Landtag von Baden-Württemberg: Gesetz zur Weiterentwicklung des Klimaschutzes in Baden-Württemberg \(Gesetzesbeschluss\) \(Drucksache 16/8993\)](#)

[Landtag Baden-Württemberg: Gesetz zur Weiterentwicklung des Klimaschutzes in Baden-Württemberg \(Gesetzentwurf\) \(Drucksache 16/8570\)](#)

## Zum Herunterladen (Das Klimaschutzgesetz in englisch und französisch)

[Baden-Württemberg Climate Protection Act \[PDF; 01/21; 181 KB\]](#)

[Baden-Württemberg Climate Protection Act – summary \[PDF; 12/20; 96 KB\]](#)

[Loi sur la protection du climat du Bade-Wurtemberg \[PDF; 01/21; 193 KB\]](#)

[Loi sur la protection du climat du Bade-Wurtemberg – résumé \[PDF; 12/20; 69 KB\]](#)

## Weitere Informationen

[Landesrecht BW: Gesetzestext Klimaschutzgesetz Baden-Württemberg](#)

[KEA-BW: Das Klimaschutzgesetz in Baden-Württemberg](#)

[Monitoring der Klimaschutzziele und der Umsetzung des Integrierten Energie- und Klimaschutzkonzeptes](#)

[Integriertes Energie- und Klimaschutzkonzept](#)

[Anpassungsstrategie Baden-Württemberg](#)

[Klimaneutrale Landesverwaltung](#)





Sie sind hier: Startseite / Themen / Abfall- und Kreislaufwirtschaft / Verwertung und Behandlung von Abfällen



Suchbegriff eingeben

## Abfall- und Kreislaufwirtschaft ▼

### Abfallverwertung

Seit den 80er Jahren gewinnt das Recycling von Wertstoffen aus unseren Abfällen immer stärker an Bedeutung. Landeten in den 90er Jahren etwa 87 % der Siedlungsabfälle in der Restmülltonne so waren es 2008 nur noch 39 %. Bevor die Wertstoffe, die im Abfall enthalten sind, einem Recyclingverfahren zugeführt werden können, muss der Abfall behandelt werden. Diese **Behandlung** kann auf unterschiedliche Arten und Weisen erfolgen. Es wird zwischen einer stofflichen und einer energetischen Verwertung unterschieden, wobei die stoffliche Verwertung im Sinne der **Abfallhierarchie** höherwertiger ist und der energetischen Verwertung, sofern technisch möglich und wirtschaftlich zumutbar, vorzuziehen ist.

Die Umsetzung der Abfall- und Kreislaufwirtschaft wird neben dem zentralen Kreislaufwirtschaftsgesetz (KrWG) noch durch eine Vielzahl weiterer Gesetze und Verordnungen geregelt, welche die **Gewerbeaufsicht Baden-Württembergs** gebündelt zur Verfügung stellt. Daneben bietet die **Abfallbilanz Baden-Württembergs**, herausgegeben vom Umweltministerium Baden-Württemberg, einen umfassenden Überblick über den Stand der Abfall- und Kreislaufwirtschaft im Land. Über diesen **Link** gelangen Sie zu weiteren Datenquellen.



# Abfallverwertungskonzept nach LKreiWiG

Seit dem 31.12.2020 gilt in Baden-Württemberg das neue **Landes-Kreislaufwirtschaftsgesetz (LKreiWiG)**, dessen Ziel unter anderem die Weiterentwicklung der Kreislaufwirtschaft unter Berücksichtigung des Schutzes von Mensch und Umwelt bei der Erzeugung und Bewirtschaftung von Abfällen ist. Einen Schwerpunkt bildet die Vermeidung und Verwertung von Bau- und Abbruchabfällen. Im Falle verfahrenspflichtiger Baumaßnahmen ist daher gemäß § 3 Absatz 4 LKreiWiG der Baurechtsbehörde ein **Abfallverwertungskonzept** vorzulegen, das durch die zuständige Abfallrechtsbehörde geprüft werden soll.

Zur Hilfestellung sowohl für den Abfallerzeuger als auch für die beteiligten Behörden wurde in Abstimmung zwischen dem Umweltministerium Baden-Württemberg und der LUBW Formblätter zur anforderungsgerechten Erstellung eines Verwertungskonzeptes erarbeitet. In Abhängigkeit des Umfangs einer Maßnahme, insbesondere der anfallenden Mengen, wurde ein Formblatt „ **Abfallverwertungskonzept**“ sowie ein Formblatt „ **Vereinfachtes Abfallverwertungskonzept**“ bereitgestellt. Hinweise zur Handhabung und Anwendung dieser Formblätter enthalten die hierzu durch das Umweltministerium bereitgestellten „ **Erläuterungen und Hinweise zu den Formblättern**“.

## Wertstoffe

Die Wertstoffe aus dem Gelben Sack oder der Wertstofftonne bestehen überwiegend aus Glas, Metall, Papier-Pappe-Kartonagen und unterschiedlichen Kunststoffen. Für diese Wertstoffe existieren unterschiedliche Recyclingverfahren die die Rückgewinnung und einen Einsatz als Sekundärrohstoff in einem erneuten Herstellungsprozess ermöglichen.

Über die Navigationsleiste gelangen Sie zu den ausführlichen Beschreibungen der einzelnen Recyclingverfahren für den jeweiligen Wertstoff. Oftmals sind diese Wertstoffe Teil einer Verpackung. Wie die einzelnen Wertstoffströme von der Sammlung über die Sortierung bis hin zur stofflichen oder energetischen Verwertung gelenkt werden, wurde erstmals in der Verpackungsverordnung festgelegt. Diese war in der 7. Novelle seit dem 23. Juli 2014 in Kraft und letztmalig am 18. Juli 2017 geändert worden. Sie gab konkrete Recyclingquoten für die einzelnen Wertstoffarten vor. Am 01. Januar 2019 löste das neue **Verpackungsgesetz** die bisherige Verpackungsverordnung ab. Die unten stehende Tabelle gibt einen Überblick über die ab diesem Zeitpunkt geltenden höheren Recyclingquoten für die jeweiligen Wertstoffe.



<b>Material</b>	Startseite / Themen / Abfall- und Kreislaufwirtschaft / Verwertung und Behandlung von Abfällen	<b>früher</b>	<b>Ab 2019</b>	<b>Ab 2022</b>
Glas		75%	80%	90%
Pappe, Papier, Karton		70%	80%	90%
Eisenmetalle		70%	80%	90%
Aluminium		60%	80%	90%
Getränkekartonverpackungen		60%	75%	80%
Sonstige Verbundverpackungen		60%	55%	70%
Kunststoffe (werkstoffliche Verwertung)		36%	59%	63%

Bildnachweis: flaticon, LUBW

**LUBW**

**Angebote**

**Themen A-L**

**Themen M-Z**

**Ministerien**

[Startseite](#) / [Themen](#) / [Abfall- und Kreislaufwirtschaft](#) / [Verwertung und Behandlung von Abfällen](#)

© 2021 - Landesanstalt für Umwelt Baden-Württemberg

[Impressum](#) | [Datenschutz](#) | [Erklärung zur Barrierefreiheit](#)



## Kurzdarstellungen zur Europäischen Union Europäisches Parlament

[Zurück](#)

# Ressourceneffizienz und Kreislaufwirtschaft

[Die Datei im pdf-Format herunterladen](#)

Die Ressourcennutzungsmuster der Vergangenheit und von heute haben zu einer hohen Umweltbelastung, zu Umweltschäden und zur Erschöpfung der natürlichen Ressourcen geführt. Die EU-Abfallpolitik reicht weit in die Vergangenheit zurück und ist traditionell auf eine umweltfreundlichere und nachhaltigere Abfallbewirtschaftung ausgerichtet. Mit dem Fahrplan für ein ressourcenschonendes Europa und dem Paket zur Kreislaufwirtschaft soll dieser Entwicklung durch nachhaltige Gestaltung der EU-Wirtschaft bis 2050 gegengesteuert werden. Mit den vier neuen Richtlinien zu Abfall, die vor Kurzem im Rahmen des Pakets zur Kreislaufwirtschaft verabschiedet wurden, werden für die Abfallwirtschaft in Bezug auf die Vermeidung, die Wiederverwendung, das Recycling und die Deponierung von Abfällen neue Ziele festgelegt. Im Rahmen des europäischen Grünen Deals bietet der neue Aktionsplan für die Kreislaufwirtschaft eine zukunftsorientierte Agenda für ein saubereres und wettbewerbsfähigeres Europa, die in vollem Umfang zur Klimaneutralität beiträgt.

## Rechtsgrundlage

Artikel 191 bis 193 des Vertrags über die Arbeitsweise der Europäischen Union (AEUV).

## Erfolge

Alle Erzeugnisse haben eine natürliche Ausgangsbasis. Die Wirtschaft der EU ist stark von natürlichen Ressourcen abhängig. Wenn weiter nach den derzeitigen Mustern verfahren wird, werden die Schädigung der Umwelt und die Erschöpfung der natürlichen Ressourcen ebenso zunehmen wie das Abfallaufkommen. Die Ressourcennutzung hat inzwischen eine solche Größenordnung erreicht, dass künftige Generationen – und Entwicklungsländer – nicht mehr auf ihren gerechten Anteil an den knappen Ressourcen zählen können. Die rationelle Verwendung natürlicher Ressourcen war eine der ersten ökologischen Überlegungen, die die Grundlage der ersten Europäischen Verträge bildeten. Der Fahrplan für ein ressourcenschonendes Europa ([KOM\(2011\) 571](#)) ist eine der zentralen Initiativen des Siebten Umweltaktionsprogramms. Eines der Hauptziele dieses Programms besteht darin, das wirtschaftliche Potenzial der EU zu erschließen, sodass die Produktivität bei geringerem Ressourceneinsatz gesteigert werden kann

Kreislaufwirtschaft Maßnahmen, die dazu beitragen werden, den Übergang der EU zu einer Kreislaufwirtschaft durch mehr Recycling und Wiederverwendung in Gang zu bringen, die globale Wettbewerbsfähigkeit zu steigern, nachhaltiges Wirtschaftswachstum zu fördern und neue Arbeitsplätze zu schaffen.

## A. Ressourceneffizienz

Der Fahrplan für ein ressourcenschonendes Europa ist Teil der Leitinitiative für Ressourceneffizienz der Strategie Europa 2020. Er unterstützt die Veränderung hin zu einem nachhaltigen Wachstum über eine ressourceneffiziente, CO<sub>2</sub>-arme Wirtschaft. In dem Fahrplan wird den Fortschritten im Rahmen der thematischen Strategie für eine nachhaltige Nutzung natürlicher Ressourcen ([KOM\(2005\) 670](#)) von 2005 und der EU-Strategie für nachhaltige Entwicklung Rechnung getragen und ein Rahmen für die Gestaltung und Umsetzung künftiger Maßnahmen festgelegt. Außerdem werden darin die bis 2050 notwendigen strukturellen und technischen Änderungen sowie die bis 2020 angestrebten Etappenziele aufgestellt. Darüber hinaus werden Möglichkeiten der Steigerung der Ressourcenproduktivität und der Entkopplung des Wirtschaftswachstums von der Ressourcennutzung und den Umweltfolgen vorgestellt.

## B. Abfallbewirtschaftung und -vermeidung

Die geltende Abfallrahmenrichtlinie ([2008/98/EG](#)) setzte bei der thematischen Strategie für Abfallvermeidung und -recycling ([KOM\(2005\) 666](#)) an; die vorherige Abfallrahmenrichtlinie (75/442/EWG, kodifizierte Fassung 2006/12/EG), die Richtlinie über gefährliche Abfälle (91/689/EWG) und die Richtlinie über die Altölbeseitigung (75/439/EWG) werden damit aufgehoben. Ziel war es, die EU-Politik zu reformieren und zu vereinfachen, indem ein neuer Rahmen eingeführt wird und neue Zielsetzungen formuliert werden, wobei der Schwerpunkt auf der Abfallvermeidung liegt.

In der Verordnung über die Verbringung von Abfällen ([\(EG\) Nr. 1013/2006](#)) sind Vorschriften für die Verbringung von Abfällen innerhalb der EU sowie zwischen der EU und Drittländern festgelegt; dabei geht es hauptsächlich um einen besseren Umweltschutz. Die Verordnung erstreckte sich auf die Verbringung praktisch aller Arten von Abfällen (mit Ausnahme von radioaktivem Material) über Straße, Schiene, Wasserwege oder Lufttransport. Insbesondere die Ausfuhr von gefährlichen Abfällen in Staaten, für die der OECD-Beschluss nicht galt, und von Abfällen, die zur Entsorgung in Staaten außerhalb der EU/der Europäischen Freihandelsassoziation bestimmt sind, war verboten. Da die illegale Abfallverbringung jedoch nach wie vor ein großes Problem ist, wurde die Verordnung (EG) Nr. 1013/2006 durch die neue Verordnung ([\(EU\) Nr. 660/2014](#)) geändert, um eine einheitlichere Anwendung der Verordnung über die Verbringung von Abfällen zu erreichen. Die Verordnung ([\(EU\) Nr. 660/2014](#)) enthielt strengere Bestimmungen für Inspektionen als die geltenden Rechtsvorschriften und strengere Auflagen für nationale Inspektionen und Planung.

## C. Spezielle Rechtsvorschriften für Produktion und Abfallströme

Mit der [Richtlinie 2000/53/EG](#) sollten Abfälle durch Altfahrzeuge und deren Bauteile verringert werden, indem beispielsweise Wiederverwendung und Verwertung bis 2015 auf 95 % und Wiederverwendung und Recycling auf mindestens 85 % erhöht werden sollten. Außerdem wurden Hersteller und Importeure aufgefordert, den Anteil gefährlicher Stoffe zu reduzieren und stärker auf Recyclingmaterial zurückzugreifen. Ein Durchführungsbericht ([KOM\(2009\) 635](#)) ergab, dass sich die Durchsetzung der Richtlinie über Altfahrzeuge in vielen Mitgliedstaaten problematisch gestaltet: Die Zahl der abgemeldeten Fahrzeuge stimmte nicht mit der Zahl der angemeldeten Altfahrzeuge überein; außerdem wurden Altfahrzeuge illegal in Entwicklungsländer verbracht.

Die Verordnung über das Recycling von Schiffen ([\(EU\) Nr. 1257/2013](#)) trat am 30. Dezember 2013 in Kraft. Im Kern sollten mit der Verordnung durch das Recycling und die Behandlung von EU-Schiffen bedingte Unfälle, Verletzungen und andere gesundheitliche Beeinträchtigungen sowie Umweltschäden vermieden, gemindert und ausgeräumt werden. um insbesondere sicherzustellen, dass gefährliche Abfälle des Schiffsrecyclings umweltgerecht behandelt

werden. Die Verordnung enthielt eine Reihe von Auflagen für EU-Schiffe, EU-Schiffseigner, Abwrackeinrichtungen, die das Recycling von EU-Schiffen übernehmen würden, und die zuständigen Gebietskörperschaften oder Behörden.

Die [Richtlinie 2002/96/EG](#) ist – in der durch die [Richtlinie 2008/34/EG](#) geänderten Fassung – auf den Schutz von Boden, Wasser und Luft ausgerichtet: Das Aufkommen an Elektro- und Elektronik-Altgeräten (EEAG) sollte gesenkt und die Entsorgung dieser Altgeräte verbessert werden. Die [Richtlinie 2002/95/EG](#) zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (RoHS), die zeitgleich mit der EEAG-Richtlinie verabschiedet wurde, diente dem Schutz von Umwelt und Gesundheit: In der Richtlinie waren Einschränkungen für die Verwendung von Blei, Quecksilber, Kadmium, Chrom und bromierten Flammschutzmitteln in den betreffenden Geräten festgelegt. Die Umsetzung der EEAG- und der RoHS-Richtlinie in den Mitgliedstaaten gestaltete sich jedoch schwierig: Nur ein Drittel der Elektro- und Elektronik-Altgeräte wurde gesammelt und sachgemäß behandelt. Entsprechend wurden 2012 – am Ende eines langen Legislativverfahrens – Neufassungen der EEAG-Richtlinie ([2012/19/EU](#)) und der RoHS-Richtlinie ([2012/18/EU](#)) erlassen. Nach den beiden Richtlinien waren die Mitgliedstaaten verpflichtet, den gesammelten Anteil an EEAG zu erhöhen und dafür zu sorgen, dass Verbraucher Geräte bei jeder Verkaufsstelle für kleine Elektrogeräte zurückgeben können, ohne zum Kauf neuer Waren verpflichtet zu sein.

Ziel der [Richtlinie 2006/66/EG](#) war es, die Abfallbewirtschaftung und die Umweltbilanz von Batterien und Akkumulatoren sowie Altbatterien und Alttakkumulatoren mit entsprechenden Vorschriften für Sammlung, Recycling, Behandlung und Entsorgung zu verbessern. In der Richtlinie wurden auch Grenzwerte für bestimmte gefährliche Stoffe (insbesondere Quecksilber und Kadmium) in Batterien und Akkumulatoren festgelegt. In der [Änderungsrichtlinie 2013/56/EG](#) wurde die Ausnahmeregelung für Knopfzellen mit einem Quecksilberanteil von bis zu zwei Gewichtsprozent gestrichen.

Nach der [Richtlinie 96/29/Euratom des Rates](#) über radioaktiven Abfall und radioaktive Stoffe sind Tätigkeiten, die mit einer Gefährdung durch ionisierende Strahlung verbunden sein können, in den Mitgliedstaaten meldepflichtig. Die Verbringung radioaktiver Abfälle ist durch die Verordnung (Euratom) Nr. 1493/93 des Rates und die [Richtlinie 2006/117/Euratom des Rates](#) geregelt.

Die [Richtlinie 94/62/EG](#) gilt für alle in der EU in Verkehr gebrachten Verpackungen und alle Verpackungsabfälle unabhängig davon, ob sie in der Industrie, im Handel, in der Verwaltung, im Gewerbe, im Dienstleistungsbereich, in Haushalten oder anderswo anfallen. In der [Änderungsrichtlinie 2004/12/EG](#) wurden Kriterien festgelegt und der Begriff „Verpackung“ definiert. Außerdem wurde mit der [Richtlinie \(EU\) 2015/720](#) vom 29. April 2015 die Richtlinie 94/62/EG geändert, um den Verbrauch von leichten Kunststofftragetaschen zu senken, die oft nicht der Abfallbewirtschaftung zugeführt werden und sich in der Umwelt anhäufen, insbesondere in den Meeren. Nach der Richtlinie sollte der Verbrauch leichter Kunststofftaschen drastisch eingeschränkt werden, indem der Schwerpunkt auf alle Kunststofftragetaschen, die dünner sind als 15 µg, gelegt wurde.

Ziel der Richtlinie über die Bewirtschaftung von Abfällen aus der mineralgewinnenden Industrie (der Bergbauabfallrichtlinie [2006/21/EG](#)) war die Verringerung der beträchtlichen Umwelt- und Gesundheitsrisiken, die mit dem Aufkommen und dem Verschmutzungspotenzial alter und aktueller Bergbauabfälle verbunden sind.

#### D. Abfallbehandlung und -entsorgung

Durch die schrittweise Umsetzung der Richtlinie über die Behandlung von kommunalem Abwasser ([91/271/EWG](#)) in allen Mitgliedstaaten stieg die Menge des zu entsorgenden Klärschlammes.

Mit der Richtlinie über Abfalldeponien ([1999/31/EG](#)) sollten durch die Deponierung von Abfällen bedingte Umweltschäden vor allem Auswirkungen auf Oberflächengewässer, Grundwasser, Boden und Luft sowie

Gesundheit, verhindert oder gemindert werden. Die Umsetzung ist jedoch nach wie vor nicht zufriedenstellend, da noch immer nicht alle Bestimmungen in allen Mitgliedstaaten in nationales Recht übertragen worden sind und es nach wie vor viele illegale Deponien gibt.

Mit der Richtlinie [2000/76/EG](#) über die Abfallverbrennung sollte die durch die Verbrennung oder Mitverbrennung von Abfällen bedingte Verschmutzung von Luft, Wasser und Boden möglichst weitgehend verhindert oder gemindert werden. Die Richtlinie wurde im November 2010 durch die [Richtlinie 2010/75/EU](#) über Industrieemissionen und damit verbundene Richtlinien aufgehoben und ersetzt.

## E. Das Paket zur Kreislaufwirtschaft von 2018

Im Dezember 2015 legte die Kommission einen Aktionsplan für die Kreislaufwirtschaft und vier Gesetzgebungsvorschläge zur Änderung folgender Rechtsakte vor: a) Abfallrahmenrichtlinie, b) Richtlinie über Abfalldeponien, c) Richtlinie über Verpackungen und Verpackungsabfälle und d) Richtlinien über Altfahrzeuge, über Batterien und Akkumulatoren sowie Altbatterien und Altakkumulatoren sowie über EEAG. Auf einige dieser Vorschläge wurde mit der rechtlichen Verpflichtung zur Überprüfung der Zielvorgaben für die Abfallbewirtschaftung reagiert. Nach der Abfallrahmenrichtlinie war die Kommission verpflichtet, bis Ende 2014 die bis 2020 angestrebten Zielvorgaben für die Wiederverwendung und das Recycling von Hausmüll sowie Bau- und Abbruchabfällen zu überprüfen, für 2020 Zielvorgaben für die Abfallvermeidung festzulegen und eine Reihe von Maßnahmen wie die erweiterte Herstellerverantwortung zu bewerten. Nach der Richtlinie über Abfalldeponien war die Kommission verpflichtet, die in der Richtlinie festgelegten Zielvorgaben bis Juli 2014 und die Verpackungsrichtlinie bis Ende 2012 zu überprüfen.

Die vier Richtlinien, die im Mai 2018 nach interinstitutionellen Verhandlungen zwischen dem Parlament und dem Rat angenommen wurden ([\(EU\) 2018/849](#), [\(EU\) 2018/850](#), [\(EU\) 2018/851](#) und [\(EU\) 2018/852](#)), umfassen die folgenden Kernelemente:

- Bei Siedlungsabfällen soll in der EU bis 2035 eine Recyclingrate von 65 % (55 % bis 2025 und 60 % bis 2030) erreicht werden.
- Bei Verpackungsabfällen soll in der EU bis 2030 eine Recyclingrate von 70 % erreicht werden.
- Bis 2035 dürfen nur noch höchstens 10 % der Siedlungsabfälle deponiert werden.
- Verboten werden soll die Ablagerung von getrennt gesammeltem Abfall auf Deponien, was eine getrennte Sammlung von Bioabfällen bis 2023 sowie von Textilabfällen und gefährlichen Haushaltsabfällen bis 2025 erfordert.
- Wirtschaftliche Lösungen, die eine Abkehr von Deponien bewirken, werden gefördert.
- Begriffsbestimmungen werden vereinfacht und verbessert und die Methoden zur Berechnung der Recyclingrate EU-weit vereinheitlicht.
- Es werden konkrete Maßnahmen zur Förderung von Wiederverwendung und Industriesymbiose getroffen, damit Nebenprodukte einer Branche zum Ausgangsstoff einer anderen Branche werden.
- Es werden Systeme der erweiterten Herstellerverantwortung dafür geschaffen, dass Hersteller umweltfreundlichere Erzeugnisse auf den Markt bringen, und für Verwertung und Recycling (z. B. von Verpackungen, Batterien, Elektro- und Elektronikgeräten, Altfahrzeugen) werden Fördermaßnahmen vorgesehen.

## F. Kunststoffe in der Kreislaufwirtschaft

Am 16. Januar 2018 veröffentlichte die Kommission eine Mitteilung, in der sie eine Strategie für Kunststoffe in der Kreislaufwirtschaft darlegte. In der Strategie werden die zentralen Herausforderungen beschrieben, darunter die

Verbrennung von Kunststoffen verursachten Treibhausgasemissionen und Kunststoffabfälle im Meer. Die Kommission schlägt vor, dass bis 2030 alle Kunststoffverpackungen so gestaltet sein sollten, dass sie recycelt oder wiederverwendet werden können. Um sich diesem Ziel zu nähern, werden in der Strategie zahlreiche Maßnahmen dargelegt, hauptsächlich in vier Bereichen: 1) Verbesserung der wirtschaftlichen Rahmenbedingungen und der Qualität des Kunststoffrecyclings, 2) Eindämmung des Aufkommens von Kunststoffabfällen und der Vermüllung, 3) Mobilisierung von Investitionen und Innovationen in der Kunststoffwertschöpfungskette sowie 4) Unterstützung von Maßnahmen auf globaler Ebene.

Als Teil der Kunststoffstrategie zur Verringerung verschwenderischen und schädlichen Kunststoffmülls durch legislative Maßnahmen und nach einem Vorschlag der Kommission vom 28. Mai 2018 einigten sich der Rat und das Parlament darauf, die Verschmutzung durch Kunststoff durch die Festlegung einschneidender neuer Beschränkungen für bestimmte Einwegprodukte aus Kunststoff zu verringern ([Richtlinie \(EU\) 2019/904](#)). Zu den Produkten, die in der EU verboten sein werden, gehören Plastikbesteck (Gabeln, Messer, Löffel und Essstäbchen (Chopsticks)), Kunststoffteller und Trinkhalme, Speisen- und Getränkebehälter aus Styropor sowie Wattestäbchen aus Kunststoff. Ab 2025 gilt für die Mitgliedstaaten das verbindliche Ziel, dass alle PET-Getränkeflaschen zu mindestens 25 % aus recyceltem Kunststoff bestehen müssen. Bis 2030 müssen alle Kunststoffflaschen zu mindestens 30 % aus recyceltem Kunststoff bestehen.

### G. Der neue Aktionsplan für die Kreislaufwirtschaft im Rahmen des europäischen Grünen Deals

Der [neue Aktionsplan für die Kreislaufwirtschaft](#) für ein saubereres und wettbewerbsfähigeres Europa wurde im März 2020 veröffentlicht und bildet einen der Eckpfeiler des europäischen Grünen Deals, der neuen Agenda der EU für nachhaltiges Wachstum. Mit ihm wurden Maßnahmen angekündigt, die sich über den gesamten Lebenszyklus von Produkten erstrecken und sich beispielsweise auf deren Gestaltung konzentrieren, Kreislaufwirtschaftsprozesse und einen nachhaltigen Verbrauch fördern und sicherstellen sollen, dass die genutzten Ressourcen so lange wie möglich in der EU-Wirtschaft verbleiben.

Am 10. Dezember 2020 nahm die Kommission das erste Etappenziel des Aktionsplans an. Es handelt sich um einen Vorschlag für eine Verordnung zur Modernisierung der EU-Rechtsvorschriften für Batterien. Ziel ist es, dass in der EU in Verkehr gebrachte Batterien über ihren gesamten Lebensweg hinweg nachhaltig, kreislauffähig, hochleistungsfähig und sicher sind sowie gesammelt, umgenutzt und recycelt werden und so zu einer wahren Quelle für die Rückgewinnung wertvoller Rohstoffe werden. Die vorgeschlagene Verordnung beinhaltet verbindliche Anforderungen an alle Batterien (d. h. Industrie-, Fahrzeug-, Traktions- und Gerätebatterien), die in der EU in Verkehr gebracht werden. Diese Anforderungen betreffen die verantwortungsvolle Beschaffung von Rohstoffen mit eingeschränkter Nutzung gefährlicher Stoffe, einen Mindestgehalt an recycelten Materialien, den CO<sub>2</sub>-Fußabdruck, die Leistung und Haltbarkeit, die Kennzeichnung sowie die Einhaltung von Sammel- und Recyclingzielen.

## Rolle des Europäischen Parlaments

Das Parlament hat wiederholt gefordert, im Interesse des künftigen Wachstums in Europa eine neue Agenda mit dem Kernelement Ressourceneffizienz aufzustellen. Eine solche Agenda würde, was die gängigen Produktions- und Verbrauchsmuster betrifft, einige radikale Änderungen erfordern. Die Berücksichtigung des gesamten Lebenszyklus dürfte sich in Bezug auf die Nutzung von Sekundärrohstoffen positiv auswirken und die richtigen wirtschaftlichen Anreize für die Vermeidung und Wiederverwendung von Abfall bieten.

Als Mitgesetzgeber hat das Parlament das Paket für die Kreislaufwirtschaft im Ausschuss für Umweltfragen, öffentliche Gesundheit und Lebensmittelsicherheit (ENVI) erörtert und 2 000 Änderungsanträge dazu eingereicht. Die Stellungnahme des Parlaments wurde im ENVI-Ausschuss am 24. Januar 2017 und im Plenum am 14. März 2017 ohne größere Änderungen und mit großer Mehrheit angenommen. Nach interinstitutionellen Verhandlungen

gelangten das Parlament und der Rat am 18. Dezember 2017 zu einer vorläufigen Einigung bei allen vier Gesetzgebungsvorschlägen. Die vereinbarten Texte wurden vom Parlament im Rahmen seiner Plenartagung im April 2018 angenommen.

Auf die Strategie der Kommission für Kunststoffe in der Kreislaufwirtschaft vom Januar 2018 hin nahm das Parlament [im September 2018 eine Entschließung zu dieser Strategie](#) an. Darin wird die Kommission unter anderem dazu aufgefordert, die Einführung von Anforderungen in Erwägung zu ziehen, die den Mindestgehalt an Recyclingmaterial für bestimmte, in der EU in Verkehr gebrachte Kunststoffprodukte betreffen. Es wird die Schaffung eines echten Binnenmarktes für recycelte Kunststoffe angeregt, und es werden Maßnahmen zur Reduzierung der Abfälle im Meer vorgeschlagen. Außerdem wird bis 2020 ein Verbot von Mikroplastik in Kosmetika und Reinigungsmitteln gefordert.

In seiner [Entschließung vom 15. Januar 2020 zu dem Thema „Der europäische Grüne Deal“](#) fordert das Parlament einen ehrgeizigen neuen Aktionsplan für die Kreislaufwirtschaft, der darauf abzielen muss, den ökologischen Fußabdruck und den Ressourcenverbrauch der Produktion und des Verbrauchs in der EU insgesamt zu verringern und gleichzeitig starke Anreize für Innovationen, nachhaltige Unternehmen und Märkte für klimaneutrale und kreislauffähige schadstofffreie Produkte zu schaffen. Es hebt die weitreichenden Synergien zwischen Klimaschutzmaßnahmen und der Kreislaufwirtschaft hervor, insbesondere in energie- und CO<sub>2</sub>-intensiven Industriezweigen, und fordert die Festlegung eines Ziels für die Ressourceneffizienz auf EU-Ebene.

Georgios Amanatidis

## [Umweltpolitik](#)

---

[Umweltpolitik: allgemeine Grundsätze und grundlegender Rahmen](#)

---

[Bekämpfung des Klimawandels](#)

---

[Biologische Vielfalt, Landnutzung und Forstwirtschaft](#)

---

[Schutz und Bewirtschaftung von Gewässern](#)

---

[Luftverschmutzung und Lärmbelastung](#)

---

Ressourceneffizienz und Kreislaufwirtschaft

---




[Nachhaltigkeit in Produktion und Verbrauch](#)

---

[Chemikalien und Pestizide](#)

[Wie gefällt Ihnen diese Seite?](#)

---

Diese Seite teilen:   

Abonnieren Sie wichtige Nachrichten per Email

## Kurzdarstellungen zur Europäischen Union

### **Plenartagung**

[Plenartagungen](#)

[Rund um die Plenartagung](#)

[Anfragen und Erklärungen](#)

[Angenommene Legislativtexte](#)

[Sitzungskalender](#)

### **Delegationen**

[Home](#)

[Sitzungskalender](#)

[Mehr über die Delegationen](#)

### **Ausschüsse**

[Von besonderem Interesse](#)

[Sitzungen](#)

[Dokumente](#)

[Veranstaltungen](#)

[Ergänzende Analysen](#)

---

## Europäisches Parlament

[Aktuelles](#)

[Abgeordnete](#)

[Das Parlament](#)

[Plenartagung](#)

[Ausschüsse](#)

[Delegationen](#)

---

[Kontakt](#)

[Siteübersicht](#)

[Rechtlicher Hinweis](#)

[Datenschutzbestimmungen](#)

[WAI AA-WCAG 2.0](#)





Brüssel, den 11.3.2020  
COM(2020) 98 final

**MITTEILUNG DER KOMMISSION AN DAS EUROPÄISCHE PARLAMENT, DEN  
RAT, DEN EUROPÄISCHEN WIRTSCHAFTS- UND SOZIALAUSSCHUSS UND  
DEN AUSSCHUSS DER REGIONEN**

**Ein neuer Aktionsplan für die Kreislaufwirtschaft  
Für ein saubereres und wettbewerbsfähigeres Europa**



## INHALT

1.	EINLEITUNG .....	2
2.	EIN RAHMEN FÜR EINE NACHHALTIGE PRODUKTPOLITIK .....	4
2.1.	Design nachhaltiger Produkte.....	4
2.2.	Stärkung der Position von Verbrauchern und öffentlichen Auftraggebern.....	7
2.3.	Das Kreislaufprinzip in Produktionsprozessen .....	8
3.	ZENTRALE PRODUKTWERTSCHÖPFUNGSKETTEN.....	8
3.1.	Elektronik und IKT.....	9
3.2.	Batterien und Fahrzeuge.....	10
3.3.	Verpackungen.....	10
3.4.	Kunststoffe .....	11
3.5.	Textilien.....	13
3.6.	Bauwirtschaft und Gebäude .....	13
3.7.	Lebensmittel, Wasser und Nährstoffe .....	15
4.	WENIGER ABFALL, MEHR WERT .....	15
4.1.	Verbesserte Abfallpolitik zur Förderung der Abfallvermeidung und des Kreislaufprinzips .....	15
4.2.	Stärkung des Kreislaufprinzips in einer schadstofffreien Umwelt.....	16
4.3.	Schaffung eines gut funktionierenden EU-Marktes für Sekundärrohstoffe.....	17
4.4.	Abfallausfuhren aus der EU .....	18
5.	EINE FUNKTIONIERENDE KREISLAUFWIRTSCHAFT FÜR MENSCHEN, REGIONEN UND STÄDTE.....	19
6.	BEREICHSÜBERGREIFENDE MAßNAHMEN .....	20
6.1.	Kreislauforientierung als Voraussetzung für Klimaneutralität.....	20
6.2.	Schaffung des richtigen wirtschaftlichen Umfelds.....	20
6.3.	Vorantreiben des Wandels durch Forschung, Innovation und Digitalisierung .....	21
7.	FÜHRENDE ROLLE BEI DEN BEMÜHUNGEN AUF GLOBALER EBENE .....	22
8.	ÜBERWACHUNG DER FORTSCHRITTE .....	23
9.	SCHLUSSFOLGERUNG .....	23

## 1. EINLEITUNG

**Es gibt nur einen Planeten Erde, aber bis 2050 wird der weltweite Verbrauch ein Niveau erreichen, als ob wir drei davon hätten.**<sup>1</sup> Der weltweite Verbrauch von Materialien wie Biomasse, fossilen Brennstoffen, Metallen und Mineralien dürfte sich in den nächsten vierzig Jahren verdoppeln<sup>2</sup>, während das jährliche Abfallaufkommen bis 2050 voraussichtlich um 70 % steigen wird<sup>3</sup>.

Da die gesamten Treibhausgasemissionen zur Hälfte und Biodiversitätsverlust und Wasserstress zu mehr als 90 % auf die Gewinnung und Verarbeitung von Ressourcen zurückzuführen sind, wurde mit dem **europäischen Grünen Deal**<sup>4</sup> eine konzertierte Strategie für eine klimaneutrale, ressourceneffiziente und wettbewerbsfähige Wirtschaft ins Leben gerufen. **Die Ausweitung der Kreislaufwirtschaft von den Vorreitern auf die etablierten Wirtschaftsakteure** wird entscheidend dazu beitragen, **bis 2050 Klimaneutralität** zu erreichen, **das Wirtschaftswachstum von der Ressourcennutzung zu entkoppeln** und zugleich die langfristige Wettbewerbsfähigkeit der EU zu sichern und niemanden zurückzulassen.

Für dieses ehrgeizige Ziel **muss die EU den Übergang zu einem Modell des regenerativen Wachstums, das dem Planeten mehr zurückgibt als es ihm nimmt, beschleunigen**, dafür sorgen, **dass ihr Ressourcenverbrauch innerhalb der Belastungsgrenzen des Planeten bleibt**, und sich deshalb bemühen, **ihren Fußabdruck im Hinblick auf den Verbrauch zu senken und den Anteil kreislaforientiert verwendeter Materialien in den kommenden zehn Jahren zu verdoppeln**.

Für die Unternehmen wird **die Zusammenarbeit bei der Schaffung eines Rahmens für nachhaltige Produkte** neue Möglichkeiten innerhalb und außerhalb der EU eröffnen. Dieser **allmähliche, aber unumkehrbare Übergang zu einem nachhaltigen Wirtschaftssystem** ist unverzichtbarer Bestandteil der **neuen EU-Industriestrategie**. Bei Anwendung der Grundsätze der Kreislaufwirtschaft in der gesamten Wirtschaft der EU könnte es Schätzungen einer aktuellen Studie zufolge gelingen, das BIP der EU bis 2030 um zusätzliche 0,5 % zu steigern und etwa 700 000 neue Arbeitsplätze zu schaffen.<sup>5</sup> Auch für einzelne Unternehmen liegen die wirtschaftlichen Vorteile auf der Hand: Da die Unternehmen des verarbeitenden Gewerbes in der EU im Schnitt etwa 40 % ihrer Ausgaben für Materialien aufwenden, können Modelle mit geschlossenen Kreisläufen die Rentabilität dieser Unternehmen steigern und sie zugleich vor Schwankungen der Ressourcenpreise schützen.

Aufbauend auf dem Binnenmarkt und dem Potenzial digitaler Technologien kann die Kreislaufwirtschaft **die industrielle Basis der EU stärken** sowie **Unternehmensgründungen und das Unternehmertum im KMU-Bereich fördern**. Neue Geschäftsmodelle, die auf einer engeren Beziehung zum Kunden, kundenspezifischer Massenproduktion, der Wirtschaft des Teilens und der kollaborativen Wirtschaft basieren und sich auf digitale Technologien wie das Internet der Dinge, Big Data, Blockchain und künstliche Intelligenz stützen, werden nicht nur den Übergang zur Kreislaufwirtschaft, sondern auch die Entmaterialisierung der Wirtschaft beschleunigen und die Abhängigkeit Europas von Primärrohstoffen verringern.

---

<sup>1</sup> <https://www.un.org/sustainabledevelopment/sustainable-consumption-production/>

<sup>2</sup> OECD (2018), *Global Material Resources Outlook to 2060*.

<sup>3</sup> Weltbank (2018), *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*.

<sup>4</sup> COM(2019) 640 final.

<sup>5</sup> Cambridge Econometrics, Trinomics und ICF (2018), *Impacts of circular economy policies on the labour market*.

Den **Bürgerinnen und Bürgern** wird die Kreislaufwirtschaft **hochwertige, funktionelle und sichere Produkte bieten, die effizient und erschwinglich**, langlebiger und auf Wiederverwendung und Reparatur sowie ein hochwertiges Recycling ausgelegt sind. Eine ganze **neue Palette von nachhaltigen Dienstleistungen**, Modellen des Typs „Produkt als Dienstleistung“ und digitalen Lösungen wird zu mehr Lebensqualität, innovativen Arbeitsplätzen und verbesserten Kenntnissen und Kompetenzen führen.

**Der vorliegende Aktionsplan für die Kreislaufwirtschaft bietet eine zukunftsorientierte Agenda für ein saubereres und wettbewerbsfähigeres Europa, das gemeinsam mit Wirtschaftsakteuren, Verbrauchern, Bürgerinnen und Bürgern sowie Organisationen der Zivilgesellschaft geschaffen wird.** Der Plan soll den tief greifenden Wandel, den der europäische Grüne Deal fordert, beschleunigen und dabei an die seit 2015 umgesetzten Maßnahmen für die Kreislaufwirtschaft<sup>6</sup> anknüpfen. Mit diesem Plan wird sichergestellt, dass der Rechtsrahmen gestrafft und auf eine nachhaltige Zukunft ausgerichtet wird, die neuen Chancen, die der Wandel bietet, bestmöglich genutzt werden und zugleich der Aufwand für Menschen und Unternehmen so gering wie möglich gehalten wird.

Der Plan enthält ein Paket miteinander verknüpfter Initiativen, die darauf abzielen, **einen starken und kohärenten Rahmen für die Produktpolitik zu schaffen, durch den nachhaltige Produkte, Dienstleistungen und Geschäftsmodelle zur Norm werden, und die Verbrauchsmuster so zu verändern, dass von vornherein kein Abfall erzeugt wird.** Dieser Rahmen für die Produktpolitik wird schrittweise eingeführt, wobei zentrale Produktwertschöpfungsketten vorrangig behandelt werden. Weitere Maßnahmen werden darauf abzielen, **Abfälle zu verringern** und sicherzustellen, dass die EU über einen **gut funktionierenden Binnenmarkt für hochwertige Sekundärrohstoffe** verfügt. Darüber hinaus wird es für die EU leichter werden, die Verantwortung für ihre Abfälle zu übernehmen.

Europa wird keinen tief greifenden Wandel herbeiführen können, wenn es allein handelt. Die EU wird **auf dem Weg zu einer Kreislaufwirtschaft auf globaler Ebene<sup>7</sup>** weiterhin die **Führungsrolle** übernehmen und ihren Einfluss, ihr Fachwissen und ihre finanziellen Ressourcen zur Verwirklichung der **Nachhaltigkeitsziele für 2030** nutzen. Mit diesem Plan soll auch sichergestellt werden, dass die Kreislaufwirtschaft im Dienste der Menschen, Regionen und Städte steht, in vollem Umfang zur Klimaneutralität beiträgt und das Potenzial von Forschung, Innovation und Digitalisierung nutzt. Er sieht Maßnahmen vor, mit denen ein **solider Überwachungsrahmen** weiterentwickelt werden soll, der zur Messung des Wohlergehens über das BIP hinaus beiträgt.

## **2. EIN RAHMEN FÜR EINE NACHHALTIGE PRODUKTPOLITIK**

### **2.1. Design nachhaltiger Produkte**

Obwohl bis zu 80 % der Umweltauswirkungen von Produkten ihren Ursprung in der Designphase haben<sup>8</sup>, **bietet das lineare Muster der Wegwerf-Gesellschaft (in der genommen, hergestellt, verbraucht und weggeworfen wird) den Herstellern keine ausreichenden Anreize, ihre Produkte kreislaufgerechter zu gestalten.** Viele Produkte gehen zu schnell kaputt, können nicht ohne Weiteres wiederverwendet, repariert oder recycelt werden, und viele sind nur für den einmaligen Gebrauch bestimmt.

---

<sup>6</sup> COM(2015) 614 final.

<sup>7</sup> SWD(2020) 100 final.

<sup>8</sup> <https://op.europa.eu/en/publication-detail/-/publication/4d42d597-4f92-4498-8e1d-857cc157e6db>

Zugleich schafft der Binnenmarkt eine kritische Masse, die es der EU ermöglicht, globale Standards für die Nachhaltigkeit von Produkten zu setzen und Einfluss auf Produktdesign und Wertschöpfungskettenmanagement weltweit zu nehmen.

**Es gibt bereits Initiativen und Rechtsvorschriften der EU, die – auf obligatorischer oder freiwilliger Basis – in gewissem Umfang Nachhaltigkeitsaspekte von Produkten betreffen.** Insbesondere werden mit der Ökodesign-Richtlinie<sup>9</sup> die Energieeffizienz und einige für die Kreislaufwirtschaft relevante Merkmale energieverbrauchsrelevanter Produkte erfolgreich geregelt. Zugleich gibt es Instrumente wie das EU-Umweltzeichen<sup>10</sup> oder die EU-Kriterien für die umweltorientierte öffentliche Beschaffung<sup>11</sup> (GPP), die breiter angelegt sind, aber aufgrund der Begrenzungen von freiwilligen Ansätzen geringere Wirkung zeigen. Tatsächlich gibt es **kein umfassendes Paket von Vorschriften**, die sicherstellen würden, dass alle in der EU in Verkehr gebrachten Produkte immer nachhaltiger werden und in der Kreislaufwirtschaft bestehen können.

Um **Produkte für eine klimaneutrale, ressourceneffiziente und kreislaforientierte Wirtschaft geeignet zu machen**, Abfälle zu verringern und sicherzustellen, dass die Nachhaltigkeitsleistung von Vorreitern schrittweise zur Norm wird, wird die Kommission **eine Rechtsetzungsinitiative für eine nachhaltige Produktpolitik** vorschlagen.

Bei dieser **Rechtsetzungsinitiative** geht es im Kern darum, die Ökodesign-Richtlinie über energieverbrauchsrelevante Produkte hinaus so zu erweitern, **dass der Ökodesign-Rahmen auf ein möglichst breites Produktspektrum angewendet werden kann und zur Kreislaufwirtschaft beiträgt.**

Die Kommission wird die Möglichkeit prüfen, im Rahmen dieser Rechtsetzungsinitiative und gegebenenfalls durch ergänzende Legislativvorschläge **Nachhaltigkeitsgrundsätze** und andere geeignete Wege zur Regulierung folgender Aspekte festzulegen:

- Verbesserung der **Haltbarkeit, Wiederverwendbarkeit, Nachrüstbarkeit und Reparierbarkeit** von Produkten, Umgang mit dem Vorhandensein **gefährlicher Chemikalien** in Produkten sowie Steigerung der **Energie- und Ressourceneffizienz** von Produkten;
- Erhöhung des **Rezyklatanteils in Produkten** bei gleichzeitiger Gewährleistung von deren Leistung und Sicherheit;
- Ermöglichung der **Wiederaufarbeitung** und eines **hochwertigen Recyclings**;
- Verringerung des **CO<sub>2</sub>-Fußabdrucks und des ökologischen Fußabdrucks**;
- Beschränkung des **einmaligen Gebrauchs** und Maßnahmen gegen **vorzeitige Obsoleszenz**;
- Einführung eines **Verbots der Vernichtung unverkaufter, nicht verderblicher Waren**;

---

<sup>9</sup> Richtlinie 2009/125/EG des Europäischen Parlaments und des Rates vom 21. Oktober 2009 zur Schaffung eines Rahmens für die Festlegung von Anforderungen an die umweltgerechte Gestaltung energieverbrauchsrelevanter Produkte (ABl. L 285 vom 31.10.2009, S. 10).

<sup>10</sup> Verordnung (EG) Nr. 66/2010 des Europäischen Parlaments und des Rates vom 25. November 2009 über das EU-Umweltzeichen (ABl. L 27 vom 30.1.2010, S. 1).

<sup>11</sup> [https://ec.europa.eu/environment/gpp/eu\\_gpp\\_criteria\\_en.htm](https://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm)

- Schaffung von Anreizen für das Modell „**Produkt als Dienstleistung**“ oder andere Modelle, bei denen der Hersteller Eigentümer des Produkts bleibt oder die Verantwortung für dessen Leistung während des gesamten Lebenszyklus übernimmt;
- Mobilisierung des Potenzials der **Digitalisierung** von Produktinformationen, mit Lösungen wie **digitale Produktpässe, Markierungen und Wasserzeichen**;
- Auszeichnung von Produkten auf der Grundlage ihrer **jeweiligen Nachhaltigkeitsleistung**, auch durch Schaffung von Anreizen für hohe Leistungsniveaus.

**Der Schwerpunkt liegt auf Produktgruppen, die im Zusammenhang mit den in diesem Aktionsplan behandelten Wertschöpfungsketten festgelegt wurden, wie Elektronik, IKT und Textilien, aber auch Möbel und Zwischenprodukte mit hohen Umweltauswirkungen** wie Stahl, Zement und Chemikalien. Weitere Produktgruppen werden auf der Grundlage ihrer Umweltauswirkungen und ihres Kreislaufpotenzials festgelegt.

Bei der Ausarbeitung dieser Rechtsetzungsinitiative und etwaiger anderer ergänzender regulatorischer oder freiwilliger Ansätze wird darauf geachtet, dass **die Kohärenz mit bestehenden Instrumenten zur Regulierung von Produkten in verschiedenen Phasen ihres Lebenszyklus verbessert wird**. Die Kommission beabsichtigt, die **Grundsätze der Produktnachhaltigkeit umfassenderen politischen und legislativen Entwicklungen künftig als Richtschnur zugrunde zu legen**. Die Kommission wird auch die Wirksamkeit der geltenden Ökodesign-Richtlinie über energieverbrauchsrelevante Produkte erhöhen, unter anderem durch die rasche Annahme und Umsetzung eines neuen Arbeitsplans für Ökodesign und Energieverbrauchskennzeichnung 2020-2024 für einzelne Produktgruppen.

Die Überprüfung der Ökodesign-Richtlinie sowie weitere Arbeiten zu bestimmten Produktgruppen innerhalb des Ökodesign-Rahmens oder im Zusammenhang mit anderen Instrumenten werden sich gegebenenfalls auf Kriterien und Vorschriften stützen, die im Rahmen der Verordnung über das EU-Umweltzeichen, des Konzepts des Umweltfußabdrucks von Produkten<sup>12</sup> und der GPP-Kriterien der EU festgelegt wurden. Die Kommission wird die etwaige Einführung verbindlicher Anforderungen prüfen, um die Nachhaltigkeit nicht nur von Waren, sondern auch von Dienstleistungen zu verbessern. Die Möglichkeit, Anforderungen im Zusammenhang mit ökologischen und sozialen Aspekten entlang der Wertschöpfungskette – von der Produktion über die Verwendung bis zum Ende der Lebensdauer – einzuführen, wird ebenfalls sorgfältig geprüft, auch im Zusammenhang mit den WTO-Regeln. So kann beispielsweise die Gewährleistung der Barrierefreiheit bestimmter Produkte und Dienstleistungen<sup>13</sup> neben einem Beitrag zur sozialen Inklusion den zusätzlichen Nutzen einer zunehmenden Haltbarkeit und Wiederverwendbarkeit der Produkte haben.

Um die **wirksame und effiziente Anwendung** des neuen Rahmens für nachhaltige Produkte zu unterstützen, wird die Kommission außerdem

<sup>12</sup> [https://ec.europa.eu/environment/eussd/smgp/PEFCR\\_OEFSR\\_en.htm](https://ec.europa.eu/environment/eussd/smgp/PEFCR_OEFSR_en.htm)

<sup>13</sup> Richtlinie (EU) 2019/882 des Europäischen Parlaments und des Rates vom 17. April 2019 über die Barrierefreiheitsanforderungen für Produkte und Dienstleistungen (ABl. L 151 vom 7.6.2019, S. 70).

- einen gemeinsamen **europäischen Datenraum für intelligente kreislauforientierte Anwendungen**<sup>14</sup> mit Daten zu Wertschöpfungsketten und Produktinformationen einrichten;
- gemeinsam mit den nationalen Behörden verstärkte Anstrengungen zur **Durchsetzung bestehender Nachhaltigkeitsanforderungen** für in der EU in Verkehr gebrachte Produkte unternehmen, insbesondere durch **gemeinsame Kontrollen und Marktüberwachungsmaßnahmen**.

## 2.2. Stärkung der Position von Verbrauchern und öffentlichen Auftraggebern

Die Stärkung der Position von Verbrauchern und die Schaffung von Möglichkeiten zur Kosteneinsparung sind ein wichtiger Baustein des Rahmens für eine nachhaltige Produktpolitik. Um die Beteiligung der Verbraucher an der Kreislaufwirtschaft zu verbessern, wird die Kommission eine Überarbeitung des EU-Verbraucherrechts vorschlagen, damit sichergestellt ist, dass **die Verbraucher an der Verkaufsstelle zuverlässige und sachdienliche Informationen über Produkte erhalten**, einschließlich Informationen über deren **Lebensdauer** und über die **Verfügbarkeit von Reparaturdiensten, Ersatzteilen und Reparaturanleitungen**. Die Kommission wird die weitere **Stärkung des Schutzes der Verbraucher vor Grünfärberei und vorzeitiger Obsoleszenz** prüfen und Mindestanforderungen für **Nachhaltigkeitssiegel/-logos** sowie für **Informationsinstrumente** festlegen.

Zudem wird die Kommission auf die **Schaffung eines neuen „Rechts auf Reparatur“** hinarbeiten und **neue horizontale materielle Rechte für Verbraucher** prüfen, beispielsweise in Bezug auf die Verfügbarkeit von Ersatzteilen oder den Zugang zu Reparaturen und – im Falle von IKT und Elektronik – zu Nachrüstungen. Hinsichtlich der Rolle, die **Garantien** bei der Bereitstellung von stärker kreislauforientierten Produkten spielen können, wird die Kommission mögliche Änderungen auch im Zusammenhang mit der Überarbeitung der Richtlinie (EU) 2019/771<sup>15</sup> prüfen.

Darüber hinaus wird die Kommission vorschlagen, dass **Unternehmen ihre Umweltaussagen** anhand von Methoden zur Messung des Umweltfußabdrucks von Produkten und Organisationen **belegen** müssen. Die Kommission wird die Einbeziehung dieser Methoden in das EU-Umweltzeichen prüfen und Langlebigkeit, Recyclingfähigkeit und Rezyklatanteil systematischer in die Kriterien für das EU-Umweltzeichen aufnehmen.

Die Kaufkraft der Behörden macht 14 % des BIP der EU aus und kann die Nachfrage nach nachhaltigen Produkten stark ankurbeln. Um dieses Potenzial zu nutzen, wird die Kommission **in sektorspezifischen Rechtsvorschriften verbindliche Mindestkriterien und Zielvorgaben für die umweltorientierte öffentliche Beschaffung (GPP)** vorschlagen und schrittweise eine **obligatorische Berichterstattung** einführen, um die **Verbreitung der umweltorientierten öffentlichen Beschaffung** zu überwachen, ohne dass öffentlichen Auftraggebern dadurch ein ungerechtfertigter Verwaltungsaufwand entsteht. Darüber hinaus wird die Kommission weiterhin durch Leitfäden, Schulungen und die Verbreitung bewährter Verfahren den Kapazitätsaufbau unterstützen und öffentliche Auftraggeber zur Teilnahme an der Initiative **„Öffentliche Auftraggeber für**

<sup>14</sup> COM(2020) 67 final.

<sup>15</sup> Richtlinie (EU) 2019/771 des Europäischen Parlaments und des Rates vom 20. Mai 2019 über bestimmte vertragsrechtliche Aspekte des Warenkaufs (ABl. L 136 vom 22.5.2019, S. 28).

**Klima und Umwelt**“ ermuntern, die den Austausch zwischen Auftraggebern, denen an einer umweltorientierten öffentlichen Beschaffung gelegen ist, erleichtern wird.

### 2.3. Das Kreislaufprinzip in Produktionsprozessen

Das Kreislaufprinzip ist wesentlicher Bestandteil eines umfassenderen Wandels der Industrie hin zu Klimaneutralität und langfristiger Wettbewerbsfähigkeit. Es kann erhebliche Materialeinsparungen in allen Wertschöpfungsketten und Produktionsprozessen bewirken, einen Mehrwert schaffen und wirtschaftliche Chancen eröffnen. In Synergie mit den Zielen der Industriestrategie<sup>16</sup> wird die Kommission eine stärkere Verbreitung des Kreislaufprinzips in der Industrie durch folgende Maßnahmen verbessern:

- Prüfung von Optionen zur weiteren Förderung des Kreislaufprinzips in industriellen Prozessen im Rahmen der Überprüfung der **Richtlinie über Industrieemissionen**<sup>17</sup>, einschließlich der Einbeziehung von Verfahren der Kreislaufwirtschaft in künftige Referenzdokumente zu den besten verfügbaren Techniken (BVT-Merkblätter);
- Erleichterung der Industriesymbiose durch die Entwicklung eines **von der Industrie getragenen Berichterstattungs- und Zertifizierungssystems** und Ermöglichung der Umsetzung der Industriesymbiose;
- Unterstützung des **nachhaltigen, kreislauforientierten biobasierten Sektors** durch Umsetzung des Aktionsplans für Bioökonomie<sup>18</sup>;
- Förderung der Nutzung **digitaler Technologien für die Erkundung, Verfolgung und Inventarisierung von Ressourcen**;
- Förderung der Einführung grüner Technologien durch ein System der zuverlässigen Verifizierung, indem das **EU-System für die Verifizierung von Umwelttechnologien** als EU-Gütesiegel **eingetragen wird**.

Die neue **KMU-Strategie**<sup>19</sup> wird die kreislauforientierte industrielle Zusammenarbeit zwischen KMU fördern und sich dabei auf Schulungen, Beratung im Rahmen des „Enterprise Europe Network“ in Bezug auf Cluster-Zusammenarbeit sowie auf den Wissenstransfer über das Europäische Wissenszentrum für Ressourceneffizienz stützen.

## 3. ZENTRALE PRODUKTWERTSCHÖPFUNGSKETTEN

Das Nachhaltigkeitsproblem im Zusammenhang mit den zentralen Wertschöpfungsketten erfordert sofortige, umfassende und koordinierte Maßnahmen, die integraler Bestandteil des in Abschnitt 2 dargestellten Rahmens für eine nachhaltige Produktpolitik sein werden. Diese Maßnahmen werden zur Reaktion auf die Klimakrise beitragen und in die EU-Industriestrategie sowie in die künftige Biodiversitätsstrategie, die künftige Strategie „Vom Hof auf den Tisch“ und die künftige Forststrategie einfließen. Bei der Steuerung der sektorspezifischen Maßnahmen wird die Kommission eng mit Interessenträgern in

---

<sup>16</sup> COM(2020) 102.

<sup>17</sup> Richtlinie 2010/75/EU des Europäischen Parlaments und des Rates vom 24. November 2010 über Industrieemissionen (integrierte Vermeidung und Verminderung der Umweltverschmutzung) (ABl. L 334 vom 17.12.2010, S. 17).

<sup>18</sup> COM(2018) 763 final.

<sup>19</sup> COM(2020) 103.

zentralen Wertschöpfungsketten zusammenarbeiten, um Hindernisse für die Expansion der Märkte für kreislauffähige Produkte zu ermitteln und Wege zur Beseitigung dieser Hindernisse zu finden.

### 3.1. Elektronik und IKT

Elektro- und Elektronikgeräte gehören mit derzeitigen jährlichen Wachstumsraten von 2 % weiterhin zu den am schnellsten wachsenden Abfallströmen in der EU. Schätzungen zufolge werden in der EU weniger als 40 % der Elektronikabfälle recycelt.<sup>20</sup> Es geht Wert verloren, wenn vollständig oder teilweise funktionelle Produkte weggeworfen werden, weil sie nicht reparierbar sind, die Batterie nicht ersetzt werden kann, die Software nicht mehr unterstützt wird, oder wenn in diesen Geräten verarbeitete Materialien nicht zurückgewonnen werden. Rund zwei Drittel der Europäer würden ihre derzeitigen digitalen Geräte gerne länger nutzen, sofern deren Leistung nicht wesentlich beeinträchtigt wird.<sup>21</sup>

Um diesen Herausforderungen zu begegnen, wird die Kommission eine **Initiative für auf die Kreislaufwirtschaft ausgerichtete Elektronik** vorlegen, mit der bestehende und neue Instrumente mobilisiert werden. Im Einklang mit dem neuen politischen Rahmen für nachhaltige Produkte wird diese Initiative eine längere Produktlebensdauer fördern und unter anderem folgende Maßnahmen umfassen:

- Regulierungsmaßnahmen für Elektronik und IKT, einschließlich **Mobiltelefone, Tablets und Laptops** im Rahmen der Ökodesign-Richtlinie, damit die Geräte auf Energieeffizienz und Haltbarkeit, Reparierbarkeit, Nachrüstbarkeit, Wartung, Wiederverwendung und Recycling ausgelegt werden. Das künftige Ökodesign-Arbeitsprogramm wird nähere Einzelheiten dazu enthalten. **Drucker und Verbrauchsgüter wie Kartuschen** werden ebenfalls einbezogen, es sei denn, der Sektor erzielt innerhalb der nächsten sechs Monate eine ehrgeizige freiwillige Vereinbarung;
- Schwerpunkt auf Elektronik und IKT als **vorrangiger Sektor für die Umsetzung des „Rechts auf Reparatur“**, einschließlich des Rechts auf Aktualisierung veralteter Software;
- Regulierungsmaßnahmen für **Ladegeräte für Mobiltelefone und ähnliche Geräte**, einschließlich der **Einführung eines einheitlichen Ladegeräts**, die auch die Verbesserung der Haltbarkeit von Ladekabeln betreffen, sowie Anreize, den Kauf von Ladegeräten vom Kauf neuer Geräte abzukoppeln;
- Verbesserung der Sammlung und Behandlung von Elektro- und Elektronik-Altgeräten<sup>22</sup>, unter anderem durch die Prüfung von Optionen für **ein EU-weites Rücknahmesystem für die Rückgabe oder den Rückverkauf alter Mobiltelefone, Tablets und Ladegeräte**;
- Überprüfung der EU-Vorschriften über **Beschränkungen für gefährliche Stoffe in Elektro- und Elektronikgeräten**<sup>23</sup> und Bereitstellung von Leitfäden zur Verbesserung

---

<sup>20</sup> [https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=de&pcode=t2020\\_rt130&plugin=1](https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=de&pcode=t2020_rt130&plugin=1)

<sup>21</sup> Eurobarometer Spezial 503, Januar 2020.

<sup>22</sup> Richtlinie 2012/19/EU des Europäischen Parlaments und des Rates vom 4. Juli 2012 über Elektro- und Elektronik-Altgeräte (ABl. L 197 vom 24.7.2012, S. 38).

<sup>23</sup> Richtlinie 2011/65/EU zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten (ABl. L 305 vom 21.11.2017, S. 8).



der Kohärenz mit den einschlägigen Rechtsvorschriften, einschließlich REACH<sup>24</sup> und Ökodesign.

### 3.2. Batterien und Fahrzeuge

Nachhaltige Batterien und Fahrzeuge bilden die Grundlage für die Mobilität der Zukunft. Um die Nachhaltigkeit der entstehenden Batteriewertschöpfungskette für Elektromobilität rasch zu verbessern und das Kreislaufpotenzial sämtlicher Batterien zu steigern, wird die Kommission in diesem Jahr einen **neuen Rechtsrahmen für Batterien** vorschlagen. Dieser Legislativvorschlag stützt sich auf die Evaluierung der Batterierichtlinie<sup>25</sup> und die Arbeit der Batterieallianz unter Berücksichtigung folgender Elemente:

- **Vorschriften für den Rezyklatanteil** und Maßnahmen zur Verbesserung der **Sammel- und Recyclingquoten für sämtliche Batterien**, Sicherstellung der **Rückgewinnung wertvoller Materialien** und Bereitstellung von **Leitfäden für die Verbraucher**;
- Umgang mit **nicht wiederaufladbaren Batterien** mit dem Ziel, deren Verwendung schrittweise einzustellen, sofern es Alternativen gibt;
- **Nachhaltigkeits- und Transparenzanforderungen für Batterien**, bei denen beispielsweise der CO<sub>2</sub>-Fußabdruck der Batteriefertigung, die ethische Beschaffung von Rohstoffen und die Versorgungssicherheit berücksichtigt werden und die die Wiederverwendung, die Umfunktionierung und das Recycling erleichtern.

Die Kommission wird auch eine Überarbeitung der Vorschriften für **Altfahrzeuge**<sup>26</sup> vorschlagen, um stärker kreislauforientierte Geschäftsmodelle zu fördern (**Verknüpfung von Auslegungsaspekten mit der Behandlung am Ende der Lebensdauer**), **Vorschriften für den obligatorischen Rezyklatanteil in bestimmten Werkstoffen** von Bauteilen zu prüfen und die **Recyclingeffizienz zu verbessern**. Darüber hinaus wird die Kommission prüfen, mit welchen Maßnahmen die Sammlung und umweltgerechte Behandlung von **Altölen** am wirksamsten gewährleistet werden können.

Unter einem breiteren Blickwinkel wird im Rahmen der künftigen umfassenden europäischen **Strategie für nachhaltige und intelligente Mobilität** geprüft, wie die Synergien mit dem Übergang zur Kreislaufwirtschaft verbessert werden können, insbesondere durch das Anbieten von Produkten als Dienstleistung, um den Verbrauch neuer Materialien zu verringern, nachhaltige alternative Kraftstoffe zu verwenden, die Infrastruktur und die Fahrzeugnutzung zu optimieren, den Belegungsgrad und die Auslastung zu erhöhen und Abfall und Umweltverschmutzung zu vermeiden.

### 3.3. Verpackungen

Die Menge der für Verpackungen verwendeten Materialien nimmt kontinuierlich zu, und im Jahr 2017 stieg die Menge der Verpackungsabfälle in Europa mit 173 kg pro Einwohner, dem höchsten jemals erreichten Wert, auf ein Rekordniveau. Damit alle

---

<sup>24</sup> Verordnung (EG) Nr. 1907/2006 des Europäischen Parlaments und des Rates vom 18. Dezember 2006 zur Registrierung, Bewertung, Zulassung und Beschränkung chemischer Stoffe (REACH) und zur Schaffung einer Europäischen Chemikalienagentur (ABl. L 396 vom 30.12.2006, S. 1).

<sup>25</sup> Richtlinie 2006/66/EG des Europäischen Parlaments und des Rates vom 6. September 2006 über Batterien und Akkumulatoren sowie Altbatterien und Alttakkumulatoren und zur Aufhebung der Richtlinie 91/157/EWG (ABl. L 266 vom 26.9.2006, S. 1).

<sup>26</sup> Richtlinie 2000/53/EG des Europäischen Parlaments und des Rates vom 18. September 2000 über Altfahrzeuge (ABl. L 269 vom 21.10.2000, S. 34).

Verpackungen auf dem EU-Markt bis 2030 in wirtschaftlich vertretbarer Weise wiederverwendet oder recycelt werden können, wird die Kommission die Richtlinie 94/62/EG<sup>27</sup> überprüfen, um die **verbindlichen grundlegenden Anforderungen an Verpackungen**, die auf dem EU-Markt zugelassen werden sollen, zu **verschärfen** und andere Maßnahmen in Erwägung zu ziehen, wobei der Schwerpunkt auf folgenden Aspekten liegt:

- **Verringerung von (übertrieben aufwendigen) Verpackungen und Verpackungsabfällen**, unter anderem durch Festlegung von Zielvorgaben und andere Maßnahmen zur Abfallvermeidung;
- Förderung eines **Designs mit Blick auf die Wiederverwendung und Recyclingfähigkeit von Verpackungen**, einschließlich der Prüfung von Beschränkungen für die Verwendung einiger Verpackungsmaterialien für bestimmte Anwendungen, insbesondere wenn alternative wiederverwendbare Produkte oder Systeme vorhanden sind oder Verbrauchsgüter auch ohne Verpackung sicher gehandhabt werden können;
- Prüfung der **Verringerung der Komplexität von Verpackungsmaterialien**, einschließlich der Anzahl der verwendeten Materialien und Polymere.

Im Rahmen der in Abschnitt 4.1 genannten Initiative zur Harmonisierung der Systeme der Getrenntsammlung wird die Kommission prüfen, ob eine EU-weite **Kennzeichnung** eingeführt werden kann, **die die korrekte Trennung von Verpackungsabfällen an der Quelle erleichtert**.

Die Kommission wird außerdem **Regeln für das sichere Recycling von anderen Kunststoffen als PET zur Verwendung als Lebensmittelkontaktmaterialien** festlegen.

Darüber hinaus wird die Kommission die Umsetzung der in der Trinkwasserrichtlinie geforderten **Einrichtung von Trinkwasseranlagen in öffentlichen Räumen**, die die Abhängigkeit von abgefülltem Wasser verringern und das Entstehen von Verpackungsabfällen verhindern wird, genau überwachen und unterstützen.

### 3.4. Kunststoffe

Mit der **EU-Strategie für Kunststoffe in der Kreislaufwirtschaft**<sup>28</sup> wurde ein umfassendes Paket von Initiativen auf den Weg gebracht, mit denen auf ein Problem reagiert wird, das die Öffentlichkeit stark beschäftigt. Da sich der Verbrauch von Kunststoffen jedoch in den kommenden 20 Jahren voraussichtlich verdoppeln wird, wird die Kommission weitere gezielte Maßnahmen ergreifen, um die Nachhaltigkeitsprobleme im Zusammenhang mit diesem allgegenwärtigen Material anzugehen, und weiterhin einen konzertierten Ansatz zur Bekämpfung der Verschmutzung durch Kunststoffe auf globaler Ebene fördern (siehe Abschnitt 7).

Um den Einsatz von recycelten Kunststoffen zu steigern und zu einer nachhaltigeren Verwendung von Kunststoffen beizutragen, wird die Kommission **verbindliche Anforderungen an den Rezyklatanteil sowie Maßnahmen zur Abfallreduzierung für wichtige Produkte wie Verpackungen, Baustoffe und Fahrzeuge** vorschlagen, wobei auch die Tätigkeiten der Allianz für die Kunststoffkreislaufwirtschaft berücksichtigt werden.

---

<sup>27</sup> Richtlinie 94/62/EG des Europäischen Parlaments und des Rates vom 20. Dezember 1994 über Verpackungen und Verpackungsabfälle (ABl. L 365 vom 31.12.1994, S. 10).

<sup>28</sup> COM(2018) 28 final.

Zusätzlich zu den Maßnahmen zur Reduzierung von Kunststoffabfällen wird sich die Kommission mit dem **Vorhandensein von Mikroplastik in der Umwelt** beschäftigen, indem sie

- **den gezielten Zusatz von Mikroplastik beschränkt** und sich – unter Berücksichtigung der Stellungnahme der Europäischen Chemikalienagentur – mit dem Granulat-Problem befasst;
- **Kennzeichnungs-, Standardisierungs-, Zertifizierungs- und Regulierungsmaßnahmen** in Bezug auf die unbeabsichtigte Freisetzung von Mikroplastik entwickelt, einschließlich Maßnahmen zur Erhöhung der **Abscheidung von Mikroplastik** in allen relevanten Phasen des Lebenszyklus von Produkten;
- Methoden zur **Messung von unbeabsichtigt freigesetztem Mikroplastik**, insbesondere aus Reifen und Textilien, weiterentwickelt und harmonisiert und harmonisierte Daten über Mikroplastikkonzentrationen im Meerwasser bereitstellt;
- die Lücken in Bezug auf die **wissenschaftlichen Erkenntnisse über die Risiken und das Vorkommen** von Mikroplastik in der Umwelt, im Trinkwasser und in Lebensmitteln schließt.

Darüber hinaus wird sich die Kommission mit neu entstehenden Nachhaltigkeitsproblemen befassen, indem sie einen **Politikrahmen** für folgende Aspekte entwickelt:

- **Beschaffung, Kennzeichnung und Verwendung biobasierter Kunststoffe** auf der Grundlage einer Bewertung der Frage, wo die Verwendung biobasierter Rohstoffe echte Vorteile für die Umwelt mit sich bringt, die über die Verringerung der Nutzung fossiler Ressourcen hinausgehen;
- **Verwendung biologisch abbaubarer oder kompostierbarer Kunststoffe** auf der Grundlage einer Bewertung der Anwendungen, bei denen die Verwendung solcher Kunststoffe der Umwelt zuträglich sein kann, sowie der Kriterien für solche Anwendungen. Damit soll sichergestellt werden, dass die Kennzeichnung eines Produkts als „biologisch abbaubar“ oder „kompostierbar“ die Verbraucher nicht dazu verleitet, das Produkt so zu entsorgen, dass es wegen ungeeigneter Umweltbedingungen oder eines für den Abbau zu kurzen Zeitraums zur Vermüllung oder zur Verschmutzung durch Kunststoffe kommt.

Die Kommission wird die zügige Umsetzung der neuen Richtlinie über **Einwegkunststoffartikel**<sup>29</sup> und Fanggeräte sicherstellen, um das Problem der Meeresverschmutzung durch Kunststoffe anzugehen und zugleich den Binnenmarkt zu schützen, insbesondere in Bezug auf die

- harmonisierte Auslegung der unter die Richtlinie fallenden Produkte;
- Kennzeichnung von Produkten wie Tabak, Getränkebechern und Feuchttüchern und die Einführung von am Behälter befestigten Verschlüssen für Flaschen, um Vermüllung zu vermeiden;
- erstmalige Ausarbeitung von Vorschriften für die Messung des Rezyklatanteils in Produkten.

---

<sup>29</sup> Richtlinie (EU) 2019/904 des Europäischen Parlaments und des Rates vom 5. Juni 2019 über die Verringerung der Auswirkungen bestimmter Kunststoffprodukte auf die Umwelt (ABl. L 155 vom 12.6.2019, S. 1).

### 3.5. Textilien

Textilien stehen bei der Inanspruchnahme von Primärrohstoffen und Wasser (nach Lebensmittelherstellung, Wohnungsbau und Verkehr) an vierter und als Verursacher von Treibhausgasemissionen an fünfter Stelle.<sup>30</sup> Schätzungen zufolge werden weltweit weniger als 1 % aller Textilien zu neuen Textilien recycelt.<sup>31</sup> Der Textilsektor in der EU, der überwiegend aus KMU besteht, hat nach einer langen Umstrukturierungsphase begonnen, sich zu erholen, wobei wertmäßig 60 % der Bekleidung in der EU anderswo hergestellt werden.

Angesichts der Komplexität der Textilwertschöpfungskette wird die Kommission zur Bewältigung dieser Herausforderungen **eine umfassende EU-Strategie für Textilien** vorschlagen, die sich auf Beiträge der Industrie und anderer Interessenträger stützt. Ziele der Strategie sind die Stärkung der industriellen Wettbewerbsfähigkeit und der Innovation in der Branche, der Ausbau des EU-Markts für nachhaltige und kreislauffähige Textilien, einschließlich des Markts für die Wiederverwendung von Textilien, der Umgang mit Fast Fashion und die Förderung neuer Geschäftsmodelle. Dies soll durch ein umfassendes Maßnahmenpaket erreicht werden, das u. a. Folgendes umfasst:

- Anwendung des in Abschnitt 2 dargestellten **neuen Rahmens für nachhaltige Produkte** auf Textilien, einschließlich der Entwicklung von **Ökodesign-Maßnahmen**, um sicherzustellen, dass Textilprodukte für die Kreislaufwirtschaft geeignet sind; Gewährleistung der Verwendung von Sekundärrohstoffen; Umgang mit dem Vorhandensein gefährlicher Chemikalien und **Befähigung von Unternehmen und privaten Verbrauchern, nachhaltige Textilien zu wählen und einfachen Zugang zu Wiederverwendungs- und Reparaturdiensten zu erhalten**;
- Verbesserung des wirtschaftlichen und regulatorischen Umfelds für nachhaltige und kreislauffähige Textilien in der EU, insbesondere durch **Anreize für Modelle des Typs „Produkt als Dienstleistung“**, **kreislauffähige Materialien und kreislauforientierte Produktionsprozesse und deren Förderung** sowie Steigerung der Transparenz durch **internationale Zusammenarbeit**;
- Bereitstellung von Leitfäden zur Erreichung **hoher Quoten bei der Getrenntsammlung von Textilabfällen**, die die Mitgliedstaaten bis 2025 sicherstellen müssen;
- Förderung der **Sortierung, der Wiederverwendung und des Recyclings von Textilien**, auch durch **Innovation; Förderung industrieller Anwendungen und Regulierungsmaßnahmen** wie erweiterte Herstellerverantwortung.

### 3.6. Bauwirtschaft und Gebäude

Die bauliche Umwelt hat erhebliche Auswirkungen auf viele Wirtschaftszweige, die Arbeitsplätze vor Ort und die Lebensqualität. Sie erfordert enorme Ressourcen und ist für etwa 50 % der gesamten Rohstoffgewinnung verantwortlich. Auf das Baugewerbe entfallen über 35 % des gesamten Abfallaufkommens in der EU.<sup>32</sup> Die Treibhausgasemissionen aus der Rohstoffgewinnung, der Herstellung von Bauprodukten,

---

<sup>30</sup> EUA-Briefing, November 2019.

<sup>31</sup> Ellen McArthur Foundation (2017), *A new Textiles Economy*.

<sup>32</sup> Eurostat-Daten für 2016.

dem Bau und der Renovierung von Gebäuden werden auf 5-12 % der gesamten nationalen Treibhausgasemissionen geschätzt.<sup>33</sup> Mit einer höheren Materialeffizienz könnten 80 % dieser Emissionen eingespart werden.<sup>34</sup>

Um das Potenzial zur Steigerung der Materialeffizienz und zur Verringerung der Klimaauswirkungen auszuschöpfen, wird die Kommission eine neue umfassende **Strategie für eine nachhaltige bauliche Umwelt** auf den Weg bringen. Diese Strategie wird die Kohärenz zwischen den einschlägigen Politikbereichen wie Klima, Energie- und Ressourceneffizienz, Bewirtschaftung von Bau- und Abbruchabfällen, Zugänglichkeit, Digitalisierung und Kompetenzen gewährleisten. Sie wird die Grundsätze der Kreislaufwirtschaft während des gesamten Lebenszyklus von Gebäuden fördern durch

- Berücksichtigung der Nachhaltigkeitsleistung von Bauprodukten im Rahmen der Überarbeitung der **Bauprodukteverordnung**<sup>35</sup>, einschließlich der möglichen Einführung von **Anforderungen an den Rezyklatanteil** für bestimmte Bauprodukte unter Berücksichtigung ihrer Sicherheit und Funktionalität;
- Förderung von Maßnahmen zur Verbesserung der Langlebigkeit und Anpassungsfähigkeit von Bauten im Einklang mit den Grundsätzen der Kreislaufwirtschaft für die Gestaltung von Gebäuden<sup>36</sup> und Entwicklung **digitaler Gebäude-Logbücher**;
- Nutzung von Level(s)<sup>37</sup> zur **Einbeziehung der Lebenszyklusanalyse in die öffentliche Auftragsvergabe** und des **EU-Rahmens zur Erleichterung nachhaltiger Investitionen** sowie Prüfung der Zweckmäßigkeit der Festlegung von CO<sub>2</sub>-Reduktionszielen und des Potenzials der CO<sub>2</sub>-Speicherung;
- Prüfung einer Überarbeitung der **in den EU-Rechtsvorschriften festgelegten Zielvorgaben für die stoffliche Verwertung von Bau- und Abbruchabfällen und ihren materialspezifischen Fraktionen**;
- Förderung von Initiativen zur **Verringerung der Bodenversiegelung**, zur Sanierung stillgelegter oder kontaminierter Brachflächen und zur Verbesserung der sicheren, nachhaltigen und kreislauforientierten Nutzung von ausgehobenen Böden.

Darüber hinaus wird die im europäischen Grünen Deal angekündigte **Initiative „Renovierungswelle“**, die zu erheblichen Verbesserungen der Energieeffizienz in der EU führen soll, im Einklang mit den Grundsätzen der Kreislaufwirtschaft umgesetzt, insbesondere in Bezug auf eine optimierte Lebenszyklusleistung und eine höhere Lebensdauer von Bauten. Im Rahmen der Überarbeitung der Zielvorgaben für die Verwertung von Bau- und Abbruchabfällen wird die Kommission besonders auf Isoliermaterialien achten, die einen wachsenden Abfallstrom generieren.

---

<sup>33</sup> <https://www.boverket.se/sv/byggande/hallbart-byggande-och-forvaltning/miljoindikatorer---aktuell-status/vaxthugaser/>

<sup>34</sup> Hertwich, E., Lifset, R., Pauliuk, S., Heeren, N., IRP, (2020), *Resource Efficiency and Climate Change: Material Efficiency Strategies for a Low-Carbon Future*.

<sup>35</sup> Verordnung (EU) Nr. 305/2011 des Europäischen Parlaments und des Rates vom 9. März 2011 zur Festlegung harmonisierter Bedingungen für die Vermarktung von Bauprodukten und zur Aufhebung der Richtlinie 89/106/EWG des Rates (ABl. L 88 vom 4.4.2011, S. 5).

<sup>36</sup> <https://ec.europa.eu/docsroom/documents/39984>

<sup>37</sup> <https://ec.europa.eu/environment/eussd/buildings.htm>

### 3.7. Lebensmittel, Wasser und Nährstoffe

Die Kreislaufwirtschaft kann die negativen Auswirkungen der Rohstoffgewinnung und -nutzung auf die Umwelt erheblich verringern und zur Wiederherstellung der biologischen Vielfalt und des Naturkapitals in Europa beitragen. Biologische Ressourcen sind ein wichtiger Input in die Wirtschaft in der EU, und ihre Bedeutung wird künftig noch zunehmen. Die Kommission will die Nachhaltigkeit erneuerbarer biobasierter Materialien gewährleisten, unter anderem durch Maßnahmen im Anschluss an die Bioökonomiestrategie und den dazugehörigen Aktionsplan.

Während einerseits die Lebensmittelwertschöpfungskette für erhebliche Ressourcen- und Umweltbelastungen verantwortlich ist, gehen andererseits schätzungsweise 20 % der insgesamt erzeugten Lebensmittel in der EU verloren oder werden verschwendet. Daher wird die Kommission im Einklang mit den Nachhaltigkeitszielen und im Rahmen der in Abschnitt 4.1 genannten Überarbeitung der Richtlinie 2008/98/EG<sup>38</sup> ein **Ziel für die Verringerung der Lebensmittelverschwendung** als Schlüsselmaßnahme der künftigen EU-Strategie „Vom Hof auf den Tisch“ vorschlagen, die sich umfassend mit der Lebensmittelwertschöpfungskette befassen wird.

Die Kommission wird zudem Maßnahmen für einen nachhaltigeren Vertrieb und Verbrauch von Lebensmitteln prüfen. Im Rahmen der Initiative für nachhaltige Produkte wird die Kommission eine Analyse durchführen, um den Geltungsbereich einer Rechtsetzungsinitiative zur Wiederverwendung festzulegen, die darauf abzielt, **Einwegverpackungen, -geschirr und -besteck in Verpflegungsdienstleistungen durch wiederverwendbare Produkte zu ersetzen**.

Die neue Verordnung über Wasserwiederverwendung wird kreislaforientierte Ansätze für die Wiederverwendung von Wasser in der Landwirtschaft fördern. Die Kommission wird die **Wasserwiederverwendung und -effizienz, auch in industriellen Prozessen, erleichtern**.

Darüber hinaus wird die Kommission einen Plan für **integriertes Nährstoffmanagement** ausarbeiten, um eine nachhaltigere Ausbringung von Nährstoffen zu gewährleisten und die Märkte für wiedergewonnene Nährstoffe zu sensibilisieren. Die Kommission wird auch eine **Überprüfung der Richtlinien über Abwasserbehandlung und Klärschlamm** prüfen und **natürliche Mittel zur Eliminierung von Nährstoffen** wie etwa Algen bewerten.

## 4. WENIGER ABFALL, MEHR WERT

### 4.1. Verbesserte Abfallpolitik zur Förderung der Abfallvermeidung und des Kreislaufprinzips

Trotz der Anstrengungen auf EU-Ebene und nationaler Ebene geht das Abfallaufkommen nicht zurück. Das jährliche Abfallaufkommen aus allen Wirtschaftstätigkeiten in der EU beläuft sich auf 2,5 Mrd. t bzw. 5 t pro Kopf und Jahr, und jeder Einwohner erzeugt im Schnitt fast eine halbe Tonne Siedlungsabfälle. Die Entkopplung des Abfallaufkommens vom Wirtschaftswachstum erfordert erhebliche Anstrengungen in der gesamten Wertschöpfungskette und in allen Haushalten.

---

<sup>38</sup> Richtlinie 2008/98/EG des Europäischen Parlaments und des Rates vom 19. November 2008 über Abfälle und zur Aufhebung bestimmter Richtlinien (ABl. L 312 vom 22.11.2008, S. 3).

Die Einführung der nachhaltigen Produktpolitik und ihre Umsetzung in spezifische Rechtsvorschriften (siehe Abschnitte 2 und 3) werden entscheidend dazu beitragen, Fortschritte bei der Abfallvermeidung zu erzielen. Darüber hinaus muss das Abfallrecht der EU ausgebaut, weiter gestärkt und besser umgesetzt werden.

Das EU-Abfallrecht hat, unterstützt durch EU-Mittel, seit den 1970er Jahren zu erheblichen Verbesserungen bei der Abfallbewirtschaftung geführt. Es muss jedoch laufend modernisiert werden, um es an die Kreislaufwirtschaft und das digitale Zeitalter anzupassen. Wie in Abschnitt 3 erläutert, wird eine Überarbeitung der **EU-Rechtsvorschriften für Batterien, Verpackungen, Altfahrzeuge und gefährliche Stoffe in Elektronikgeräten** vorgeschlagen, um Abfälle zu vermeiden, den Rezyklatanteil zu erhöhen, sicherere und sauberere Abfallströme zu fördern und ein hochwertiges Recycling zu gewährleisten.

Darüber hinaus wird die Kommission im Rahmen eines umfassenderen Maßnahmenpakets zur Abfallvermeidung im Zusammenhang mit der Überarbeitung der Richtlinie 2008/98/EG **Zielvorgaben für die Abfallreduzierung** bei bestimmten Abfallströmen vorschlagen. Die Kommission wird auch die Umsetzung der kürzlich angenommenen Anforderungen an **Systeme der erweiterten Herstellerverantwortung** verbessern, Anreize schaffen und den Austausch von Informationen und bewährten Verfahren im Bereich des Abfallrecyclings fördern. All dies dient dem Ziel, das Gesamtabfallaufkommen erheblich zu verringern und **die Menge der (nicht recycelten) Restsiedlungsabfälle bis 2030 zu halbieren**.

Ein hochwertiges Recycling setzt eine wirksame Getrennsammlung von Abfällen voraus. Um Bürger, Unternehmen und Behörden bei einer besseren Abfalltrennung zu unterstützen, wird die Kommission **vorschlagen, die Systeme der Getrennsammlung von Abfällen zu harmonisieren**. Gegenstand dieses Vorschlags sind insbesondere die effizientesten Kombinationen von Modellen der Getrennsammlung, die Dichte und Zugänglichkeit von Getrennsammelstellen, auch in öffentlichen Räumen, unter Berücksichtigung der regionalen und lokalen Gegebenheiten von städtischen Gebieten bis hin zu Gebieten in äußerster Randlage. Weitere Aspekte, die die Einbindung der Verbraucher erleichtern, werden ebenfalls berücksichtigt, z. B. einheitliche Abfallbehälterfarben, harmonisierte Symbole für wichtige Abfallarten, Produktetiketten, Informationskampagnen und wirtschaftliche Instrumente. Des Weiteren werden eine Standardisierung und der Einsatz von Qualitätsmanagementsystemen angestrebt, um die Qualität der gesammelten Abfälle zu gewährleisten, die zur Verwendung in Produkten, insbesondere als Lebensmittelkontaktmaterial, bestimmt sind.

Es bedarf zusätzlicher Anstrengungen, um die Mitgliedstaaten bei der Abfallbewirtschaftung zu unterstützen. Die Hälfte der Mitgliedstaaten laufen Gefahr, das für 2020 gesetzte Ziel des Recyclings von 50 % der Siedlungsabfälle zu verfehlen. Um politische Reformen voranzutreiben, wird die Kommission einen **Austausch auf hoher Ebene zu Kreislaufwirtschaft und Abfall** organisieren und **die Zusammenarbeit mit den Mitgliedstaaten, Regionen und Städten intensivieren**, um die EU-Mittel bestmöglich zu nutzen. Erforderlichenfalls wird die Kommission auch von ihren Durchsetzungsbefugnissen Gebrauch machen.

#### **4.2. Stärkung des Kreislaufprinzips in einer schadstofffreien Umwelt**

Die Chemikalienpolitik und das Chemikalienrecht der EU, insbesondere REACH, fördern die Umstellung auf nach dem „Safe-by-Design-Konzept“ entwickelte Chemikalien und die schrittweise Substitution gefährlicher Stoffe, um Mensch und

Umwelt besser zu schützen. Die Sicherheit von Sekundärrohstoffen ist jedoch nach wie vor nicht gewährleistet, wenn beispielsweise in recycelten Rohstoffen weiterhin verbotene Stoffe vorkommen. Um das Vertrauen in die Verwendung von Sekundärrohstoffen zu stärken, wird die Kommission

- die Entwicklung von Lösungen für **hochwertige Sortierung und die Entfernung von Schadstoffen aus Abfällen** – auch solcher, die aus einer unabsichtlichen Verunreinigung herrühren – fördern;
- **Methoden zur Minimierung des Vorhandenseins von gesundheits- oder umweltschädlichen Stoffen in recycelten Materialien und daraus hergestellten Erzeugnissen** entwickeln;
- mit der Industrie zusammenarbeiten, um – in Synergie mit Maßnahmen des Rahmens für eine nachhaltige Produktpolitik und mit der ECHA-Datenbank für Erzeugnisse, die besonders besorgniserregende Stoffe enthalten – schrittweise **harmonisierte Systeme zur Verfolgung und Verwaltung von Informationen über Stoffe**, die als sehr besorgniserregend ermittelt wurden, über andere relevante Stoffe, insbesondere diejenigen mit chronischen Auswirkungen<sup>39</sup> und Stoffe, die bei den Verwertungsverfahren entlang der Lieferkette technische Probleme bereiten, sowie zur **Ermittlung solcher Stoffe in Abfällen** zu entwickeln;
- Änderungen der **Anhänge der Verordnung über persistente organische Schadstoffe** entsprechend dem wissenschaftlichen und technischen Fortschritt und den internationalen Verpflichtungen im Rahmen des Stockholmer Übereinkommens vorschlagen;
- die **Einstufung und Bewirtschaftung gefährlicher Abfälle** verbessern, um saubere Recyclingströme aufrechtzuerhalten, gegebenenfalls auch durch weitere Angleichung an die Einstufung chemischer Stoffe und Gemische.

Die künftige **Nachhaltigkeitsstrategie für Chemikalien** wird sich weiter mit der Schnittstelle zwischen Chemikalien-, Produkt- und Abfallrecht befassen und die Synergien mit der Kreislaufwirtschaft stärken.

#### **4.3. Schaffung eines gut funktionierenden EU-Marktes für Sekundärrohstoffe**

Sekundärrohstoffe weisen gegenüber Primärrohstoffen eine Reihe von Problemen auf, die nicht nur mit ihrer Sicherheit, sondern auch mit ihrer Leistung, Verfügbarkeit und ihren Kosten zusammenhängen. Eine Reihe von in diesem Plan vorgesehenen Maßnahmen, insbesondere die Einführung von Anforderungen an den **Rezyklatanteil** in Produkten, werden dazu beitragen, ein Missverhältnis zwischen Angebot und Nachfrage bei Sekundärrohstoffen zu vermeiden und eine reibungslose Ausweitung des Recyclingsektors in der EU zu gewährleisten. Zur Schaffung eines gut funktionierenden Binnenmarktes für Sekundärrohstoffe wird die Kommission

- auf der Grundlage der Überwachung der Anwendung der überarbeiteten Vorschriften für das Ende der Abfalleigenschaft und für Nebenprodukte durch die

---

<sup>39</sup> genannt in Verordnung (EG) Nr. 1907/2006 und Verordnung (EG) Nr. 1272/2008 des Europäischen Parlaments und des Rates vom 16. Dezember 2008 über die Einstufung, Kennzeichnung und Verpackung von Stoffen und Gemischen, zur Änderung und Aufhebung der Richtlinien 67/548/EWG und 1999/45/EG und zur Änderung der Verordnung (EG) Nr. 1907/2006 (ABl. L 353 vom 31.12.2008, S. 1).



Mitgliedstaaten prüfen, inwieweit **EU-weite Kriterien für das Ende der Abfalleigenschaft für bestimmte Abfallströme** entwickelt werden müssen, und grenzübergreifende Initiativen für die Zusammenarbeit zur Harmonisierung der nationalen Kriterien für das Ende der Abfalleigenschaft und für Nebenprodukte unterstützen;

- die Rolle der **Normung** auf der Grundlage der laufenden Bewertung bestehender Normungsarbeiten auf nationaler, europäischer und internationaler Ebene stärken;
- zügig von den Beschränkungen für die Verwendung **besonders besorgniserregender Stoffe in Erzeugnissen** in Fällen, in denen die Verwendung des Stoffes genehmigungspflichtig ist, Gebrauch machen und zugleich die Durchsetzung an den Grenzen weiter verbessern;
- die Durchführbarkeit der Einrichtung einer **Marktbeobachtungsstelle für wichtige Sekundärstoffe** prüfen.

#### 4.4. Abfallausfuhren aus der EU

Auf dem globalen Markt für Abfälle vollziehen sich derzeit erhebliche Veränderungen. In den letzten zehn Jahren wurden Millionen Tonnen Abfälle aus Europa in Nicht-EU-Länder ausgeführt, wobei häufig nicht ausreichend auf eine ordnungsgemäße Abfallbehandlung geachtet wurde. In vielen Fällen haben Abfallexporte sowohl negative Auswirkungen auf die Umwelt und die Gesundheit in den Bestimmungsländern gehabt als auch zum Verlust von Ressourcen und wirtschaftlichen Chancen für die Recyclingindustrie in der EU geführt. Die jüngsten Einfuhrbeschränkungen, die von einigen Drittländern eingeführt wurden, haben die übermäßige Abhängigkeit der EU von der Abfallbehandlung im Ausland deutlich gemacht, aber auch die Recyclingindustrie dazu motiviert, ihre Kapazitäten zu erhöhen und aus Abfällen in der EU Mehrwert zu schöpfen.

Angesichts dieser Entwicklungen und der Tatsache, dass die illegale Verbringung von Abfällen nach wie vor Anlass zur Sorge gibt, wird die Kommission Maßnahmen ergreifen, um **sicherzustellen, dass die EU ihre Abfallproblematik nicht auf Drittländer verlagert**. Maßnahmen zu Produktgestaltung, Qualität und Sicherheit von Sekundärstoffen und die Verbesserung ihrer Märkte werden dazu beitragen, dass die Bezeichnung „**Recycelt in der EU**“ zu einem Synonym für hochwertige Sekundärstoffe wird.

Durch eine gründliche Überarbeitung der **EU-Vorschriften über die Verbringung von Abfällen**<sup>40</sup> soll die Vorbereitung zur Wiederverwendung und zum Recycling von Abfällen in der EU verbessert werden. Die Überprüfung zielt auch darauf ab, **die Ausfuhr von Abfällen, die schädliche Auswirkungen auf die Umwelt und die Gesundheit in Drittländern haben oder die innerhalb der EU behandelt werden können, zu beschränken**, wobei der Schwerpunkt auf die Bestimmungsländer, problematische Abfallströme, bedenkliche Arten von Abfallbewirtschaftungsmaßnahmen sowie auf Durchsetzungsmaßnahmen zur Bekämpfung illegaler Verbringungen gelegt wird. Die Kommission wird auch Maßnahmen auf multilateraler, regionaler und bilateraler Ebene unterstützen, um **Umweltkriminalität insbesondere im Hinblick auf illegale Ausfuhren und illegalen Handel zu bekämpfen**, die **Kontrolle von**

---

<sup>40</sup> Verordnung (EG) Nr. 1013/2006 des Europäischen Parlaments und des Rates vom 14. Juni 2006 über die Verbringung von Abfällen (ABl. L 190 vom 12.7.2006, S. 1).

**Abfallverbringungen** zu verstärken und die nachhaltige Bewirtschaftung von Abfällen in diesen Ländern zu verbessern.

## **5. EINE FUNKTIONIERENDE KREISLAUFWIRTSCHAFT FÜR MENSCHEN, REGIONEN UND STÄDTE**

Von 2012 bis 2018 stieg die Zahl der mit der Kreislaufwirtschaft verbundenen Arbeitsplätze in der EU um 5 % auf rund 4 Millionen.<sup>41</sup> Es ist davon auszugehen, dass die Kreislaufwirtschaft eine positive Nettowirkung auf die Schaffung von Arbeitsplätzen haben wird, sofern die Arbeitnehmer die für den Übergang zu einer grünen Wirtschaft erforderlichen Qualifikationen erwerben. Das Potenzial der **Sozialwirtschaft**, die eine Vorreiterrolle bei der Schaffung von Arbeitsplätzen mit Bezug zur Kreislaufwirtschaft spielt, wird durch den beiderseitigen Nutzen aufgrund der Unterstützung des grünen Wandels und der Stärkung der sozialen Inklusion, insbesondere im Rahmen des Aktionsplans zur Umsetzung der **europäischen Säule sozialer Rechte**, noch stärker genutzt.<sup>42</sup>

Die Kommission wird sicherstellen, dass ihre Instrumente zur Förderung von Kompetenzen und zur Schaffung von Arbeitsplätzen auch dazu beitragen, den Übergang zur Kreislaufwirtschaft zu beschleunigen, unter anderem im Zusammenhang mit der Aktualisierung ihrer **Kompetenzagenda**, der Schaffung eines **Kompetenzpakts** mit groß angelegten Multi-Stakeholder-Partnerschaften und dem Aktionsplan für die Sozialwirtschaft. Weitere Investitionen in Systeme der allgemeinen und beruflichen Bildung, lebenslanges Lernen und soziale Innovation werden im Rahmen des **Europäischen Sozialfonds Plus** gefördert.

Um die notwendigen Investitionen auf regionaler Ebene zu fördern und dafür Sorge zu tragen, dass alle Regionen vom Übergang profitieren, wird die Kommission auch das Potenzial der Finanzierungsinstrumente und -fonds der EU ausschöpfen. Ergänzend zu Sensibilisierung, Zusammenarbeit und Kapazitätsaufbau werden die im Rahmen der **Kohäsionspolitik** bereitgestellten Mittel den Regionen dabei helfen, Strategien für die Kreislaufwirtschaft umzusetzen und ihre Wirtschaftsstruktur und ihre Wertschöpfungsketten zu stärken. Für die **Gebiete und Inseln in äußerster Randlage** werden aufgrund ihrer Abhängigkeit von Ressourceneinfuhren, des durch den Tourismus verursachten hohen Abfallaufkommens und ihrer Abfallexporte maßgeschneiderte Lösungsansätze für die Kreislaufwirtschaft entwickelt. Mit dem im Rahmen der Investitionsoffensive für einen europäischen Grünen Deal und InvestEU vorgeschlagenen **Mechanismus für einen gerechten Übergang**<sup>43</sup> können Projekte mit Schwerpunkt auf der Kreislaufwirtschaft unterstützt werden.

Die vorgeschlagene **Europäische Stadtinitiative**, die **Initiative „Intelligent Cities Challenge“** und die **Initiative „Kreislauforientierte Städte und Regionen“** werden den Städten wertvolle Unterstützung bieten. Die Kreislaufwirtschaft wird zu den Schwerpunktbereichen der **„Vereinbarung für Grüne Städte“** gehören.

Die **Europäische Plattform der Interessenträger für die Kreislaufwirtschaft** wird weiterhin der Ort für den Austausch von Informationen zwischen den Interessenträgern sein.

---

<sup>41</sup> [https://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=cei\\_cic010&language=de](https://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=cei_cic010&language=de)

<sup>42</sup> COM(2020) 14 final.

<sup>43</sup> [https://ec.europa.eu/commission/presscorner/detail/de/fs\\_20\\_39](https://ec.europa.eu/commission/presscorner/detail/de/fs_20_39)

## 6. BEREICHSÜBERGREIFENDE MAßNAHMEN

### 6.1. Kreislauforientierung als Voraussetzung für Klimaneutralität

Um Klimaneutralität zu erreichen, müssen die Synergien zwischen der Kreislaufwirtschaft und der Verringerung von Treibhausgasemissionen verstärkt werden. Die Kommission wird

- analysieren, wie die **Auswirkungen der Kreislaufwirtschaft auf die Eindämmung des Klimawandels und die Anpassung an seine Folgen** systematisch gemessen werden können;
- die **Modellierungsinstrumente zur Erfassung der Vorteile der Kreislaufwirtschaft für die Verringerung der Treibhausgasemissionen** auf EU-Ebene und nationaler Ebene verbessern;
- die **Rolle der Kreislaufwirtschaft bei künftigen Überarbeitungen der nationalen Energie- und Klimapläne** und gegebenenfalls im Rahmen anderer klimapolitischer Maßnahmen stärken.

Um Klimaneutralität zu erreichen, muss zusätzlich zur Verringerung der Treibhausgasemissionen Kohlendioxid aus der Atmosphäre entfernt, in unserer Wirtschaft ohne Freisetzung verwendet und länger gespeichert werden. Diese CO<sub>2</sub>-Entfernung kann naturbasiert erfolgen, unter anderem durch Wiederherstellung von Ökosystemen, Schutz der Wälder, Aufforstung, nachhaltige Bewirtschaftung der Wälder und Bindung von Kohlendioxid im Boden, oder auf der Grundlage einer verstärkten Anwendung des Kreislaufprinzips, z. B. durch langfristige Speicherung im Holzbau oder durch Wiederverwendung und Speicherung von CO<sub>2</sub> in Produkten wie bei der Mineralisierung von Baustoffen.

Um **Anreize für die CO<sub>2</sub>-Entfernung und die verstärkte Anwendung des Kreislaufprinzips in Bezug auf Kohlendioxid** zu schaffen und dabei den Biodiversitätszielen in vollem Umfang Rechnung zu tragen, wird die Kommission die Entwicklung eines **Rechtsrahmens für die Zertifizierung der Entfernung von Kohlendioxid** auf der Grundlage einer robusten und transparenten CO<sub>2</sub>-Bilanzierung prüfen, um somit die Einhaltung der Verfahren zur CO<sub>2</sub>-Entfernung überwachen und überprüfen zu können.

### 6.2. Schaffung des richtigen wirtschaftlichen Umfelds

Die Beschleunigung des grünen Wandels erfordert umsichtige, aber entschlossene Maßnahmen, um Finanzströme auf nachhaltigere Produktions- und Verbrauchsmuster umzulenken. Die Kommission hat in diesem Zusammenhang bereits eine Reihe von Initiativen ergriffen, darunter die **Integration des Ziels der Kreislaufwirtschaft in die EU-Taxonomieverordnung**<sup>44</sup> und die Vorarbeiten zu den **Kriterien für das EU-Umweltzeichen für Finanzprodukte**. Die **Plattform zur Unterstützung der Finanzierung der Kreislaufwirtschaft** wird den Projektträgern weiterhin Orientierungshilfen zu kreislauforientierten Anreizen, Kapazitätsaufbau und Risikomanagement bieten. EU-Finanzinstrumente wie KMU-Garantien im Rahmen des bestehenden Rechtsrahmens und ab 2021 InvestEU mobilisieren private Finanzierungen

---

<sup>44</sup> Das EU-Klassifizierungssystem für ökologisch nachhaltige Tätigkeiten:  
<https://eur-lex.europa.eu/legal-content/en/HIS/?uri=CELEX%3A52018PC0353>

zur Unterstützung der Kreislaufwirtschaft. Die Kommission hat außerdem eine neue **Eigenmittelquelle für den EU-Haushalt vorgeschlagen, die sich auf die Menge nicht recycelter Verpackungsabfälle aus Kunststoff** stützt. Ferner wird die Kommission

- im Rahmen der bevorstehenden **Überarbeitung der Richtlinie über die Angabe nichtfinanzieller Informationen** die Vorschriften zur Offenlegung von Umweltdaten durch Unternehmen stärken;
- eine von **Unternehmen getragene Initiative zur Entwicklung von Grundsätzen für die Umweltrechnungslegung** unterstützen, in deren Rahmen Finanzdaten durch Leistungsdaten der Kreislaufwirtschaft ergänzt werden;
- durch eine Verbesserung des Corporate-Governance-Rahmens die **Einbeziehung von Nachhaltigkeitskriterien in Unternehmensstrategien** fördern;
- die Ziele im Zusammenhang mit der Kreislaufwirtschaft im Rahmen der **Neuausrichtung des Europäischen Semesters** und im Zusammenhang mit der bevorstehenden Überarbeitung der **Leitlinien für staatliche Beihilfen in den Bereichen Umwelt und Energie** widerspiegeln;
- die breitere Anwendung gut durchdachter **wirtschaftlicher Instrumente** weiterhin fördern, wie etwa **Umweltsteuern, einschließlich der Besteuerung von Deponierung und Verbrennung**, und den Mitgliedstaaten ermöglichen, **Mehrwertsteuersätze (MwSt)** anzuwenden, durch die Tätigkeiten der Kreislaufwirtschaft, die sich an Endverbraucher richten (insbesondere Reparaturdienste), gefördert werden.<sup>45</sup>

### 6.3. Vorantreiben des Wandels durch Forschung, Innovation und Digitalisierung

Die europäischen Unternehmen sind Vorreiter bei kreislauforientierten Innovationen. Der **Europäische Fonds für regionale Entwicklung** wird durch intelligente Spezialisierung, das **LIFE-Programm** und **Horizont Europa** private Finanzierungen von Innovationen ergänzen und den gesamten Innovationszyklus unterstützen, um Lösungen auf den Markt zu bringen. Horizont Europa wird die Entwicklung von Indikatoren und Daten, neuartigen Materialien und Produkten, die Substitution und Beseitigung gefährlicher Stoffe auf der Grundlage des „Safe-by-Design“-Ansatzes, kreislauforientierte Geschäftsmodelle und neue Produktions- und Recyclingtechnologien unterstützen, einschließlich der Erschließung des Potenzials des chemischen Recyclings, wobei die Rolle digitaler Instrumente zur Verwirklichung der Ziele der Kreislaufwirtschaft zu berücksichtigen ist. Darüber hinaus können die **Marie-Sklodowska-Curie-Maßnahmen** die Entwicklung von Kompetenzen, die Ausbildung und die Mobilität von Forschern in diesem Bereich unterstützen.

Durch digitale Technologien können die Wege von Produkten, Komponenten und Materialien nachverfolgt und die daraus resultierenden Daten auf sichere Weise zugänglich gemacht werden. Der in Abschnitt 2 genannte **europäische Datenraum für intelligente kreislauforientierte Anwendungen** wird die Architektur und das Governance-System für Anwendungen und Dienste wie Produktpässe, Inventarisierung von Ressourcen und Verbraucherinformation bereitstellen.

Das **Europäische Innovations- und Technologieinstitut** wird Innovationsinitiativen zur Kreislaufwirtschaft in Zusammenarbeit mit Hochschulen, Forschungseinrichtungen,

---

<sup>45</sup> Vorbehaltlich des Ergebnisses des laufenden Gesetzgebungsverfahrens.

Industrie und KMU im Rahmen der **Wissens- und Innovationsgemeinschaften** koordinieren.

Die **Regelung für geistiges Eigentum** muss für das digitale Zeitalter und den grünen Wandel geeignet sein und die Wettbewerbsfähigkeit der Unternehmen in der EU fördern. Die Kommission wird eine **Strategie für geistiges Eigentum** vorschlagen, um sicherzustellen, dass geistiges Eigentum ein Schlüsselfaktor für die Kreislaufwirtschaft und das Entstehen neuer Geschäftsmodelle bleibt.

## 7. FÜHRENDE ROLLE BEI DEN BEMÜHUNGEN AUF GLOBALER EBENE

Die EU kann nur erfolgreich sein, wenn ihre Bemühungen dazu führen, auch auf globaler Ebene den Übergang zu einer gerechten, klimaneutralen, ressourceneffizienten und kreislauforientierten Wirtschaft voranbringen. Es besteht zunehmend die Notwendigkeit, die Beratungen über die Definition eines „sicheren Handlungsspielraums“ voranzubringen, in dem die Nutzung verschiedener natürlicher Ressourcen bestimmte lokale, regionale oder globale Schwellenwerte nicht überschreitet und die Umweltauswirkungen innerhalb der Belastbarkeitsgrenzen des Planeten bleiben.

Für Länder mit einer EU-Beitrittsperspektive, unsere engsten Nachbarn im Süden und Osten, aufstrebende Volkswirtschaften und wichtige Partner in der ganzen Welt werden die neuen nachhaltigen Modelle Geschäfts- und Beschäftigungsmöglichkeiten eröffnen und gleichzeitig die Beziehungen zu europäischen Wirtschaftsakteuren stärken.<sup>46</sup>

Um einen globalen Übergang zu einer Kreislaufwirtschaft zu unterstützen, wird die Kommission

- auf der Grundlage der europäischen Kunststoffstrategie eine Führungsrolle bei den Bemühungen auf internationaler Ebene zur Erreichung eines **globalen Übereinkommens über Kunststoffe** übernehmen und die Verbreitung des Ansatzes der EU für die Kreislaufwirtschaft in Bezug auf Kunststoffe fördern;
- eine **Globale Allianz für die Kreislaufwirtschaft** vorschlagen, um Wissens- und Governance-Lücken bei der Förderung einer globalen Kreislaufwirtschaft zu ermitteln und Partnerschaftsinitiativen, auch mit großen Volkswirtschaften, voranzubringen;
- prüfen, inwieweit die Definition eines „**sicheren Handlungsspielraums**“ für die Nutzung natürlicher Ressourcen möglich ist und die Aufnahme von Gesprächen über ein **internationales Übereinkommen über die Bewirtschaftung der natürlichen Ressourcen** in Betracht ziehen;
- eine engeren **Partnerschaft mit Afrika** aufbauen, um die Vorteile des grünen Wandels und der Kreislaufwirtschaft zu maximieren;
- sicherstellen, dass **Freihandelsabkommen** die erweiterten Ziele der Kreislaufwirtschaft widerspiegeln;
- die Kreislaufwirtschaft im **Beitrittsprozess mit den westlichen Balkanstaaten** und im Rahmen **bilateraler, regionaler und multilateraler politischer Dialoge, Foren und Umweltübereinkommen** sowie im Rahmen der Heranführungshilfe und der Programme für Nachbarschaft, Entwicklung und internationale

---

<sup>46</sup> SWD(2020) 100 final.

Zusammenarbeit, einschließlich der Internationalen Plattform für nachhaltiges Finanzwesen, weiter fördern;

- **Outreach-Aktivitäten** intensivieren, unter anderem im Rahmen der europäischen Diplomatie des Grünen Deals und der Missionen zur Kreislaufwirtschaft, und mit den EU-Mitgliedstaaten zusammenzuarbeiten, um die Koordinierung und die gemeinsamen Bemühungen um eine globale Kreislaufwirtschaft zu verbessern.

## 8. ÜBERWACHUNG DER FORTSCHRITTE

Im Einklang mit dem europäischen Grünen Deal und der jährlichen Strategie für nachhaltiges Wachstum 2020<sup>47</sup> wird die Kommission die **Überwachung der nationalen Pläne und Maßnahmen zur Beschleunigung des Übergangs zu einer Kreislaufwirtschaft im Rahmen der Neuausrichtung des Europäischen Semesters auf eine umfassendere Nachhaltigkeitsdimension verstärken**.

Die Kommission wird zudem den **Überwachungsrahmen für die Kreislaufwirtschaft**<sup>48</sup> aktualisieren. Neue Indikatoren, die sich so weit wie möglich auf europäische Statistiken stützen, werden den Schwerpunktbereichen dieses Aktionsplans und den Zusammenhängen zwischen Kreislaufwirtschaft, Klimaneutralität und dem Null-Schadstoff-Ziel Rechnung tragen. Gleichzeitig werden Projekte im Rahmen von Horizont Europa und Copernicus-Daten auf verschiedenen Ebenen die Parameter für die Kreislaufwirtschaft verbessern, die in den amtlichen Statistiken noch nicht berücksichtigt sind.

Die **Indikatoren für die Ressourcennutzung, einschließlich Konsum- und Materialfußabdruck** zur Berücksichtigung des Materialverbrauchs und der Umweltauswirkungen im Zusammenhang mit unseren Produktions- und Verbrauchsmustern, werden ebenfalls weiterentwickelt und mit der Überwachung und Bewertung der Fortschritte bei der Entkoppelung des Wirtschaftswachstums von der Ressourcennutzung und ihren Auswirkungen innerhalb und außerhalb der EU verknüpft.

## 9. SCHLUSSFOLGERUNG

Der Übergang zur Kreislaufwirtschaft wird innerhalb und außerhalb der EU systemisch, tief greifend und transformativ sein. Da er bisweilen zu Störungen führen wird, muss er fair gestaltet werden. Dies erfordert eine Abstimmung und Zusammenarbeit aller Interessenträger auf allen Ebenen – auf EU-Ebene, auf nationaler, regionaler und lokaler Ebene sowie auf internationaler Ebene.

Daher fordert die Kommission die Organe und Einrichtungen der EU auf, diesen Aktionsplan zu billigen und aktiv zu seiner Umsetzung beizutragen. Zudem legt sie den Mitgliedstaaten nahe, ihre nationalen Strategien, Pläne und Maßnahmen für die Kreislaufwirtschaft im Lichte ihrer ehrgeizigen Ziele zu verabschieden oder zu aktualisieren. Darüber hinaus wird die Kommission empfehlen, dass Thema Kreislaufwirtschaft in die Diskussion über die Zukunft Europas einzubeziehen und es zu einem regelmäßigen Thema des Bürgerdialogs zu machen.

---

<sup>47</sup> COM(2019) 650 final.

<sup>48</sup> <https://ec.europa.eu/eurostat/web/circular-economy/indicators/monitoring-framework>



Brüssel, den 11.3.2020  
COM(2020) 98 final

ANNEX

**ANHANG**

*der*

**MITTEILUNG DER KOMMISSION AN DAS EUROPÄISCHE PARLAMENT, DEN  
RAT, DEN EUROPÄISCHEN WIRTSCHAFTS- UND SOZIALAUSSCHUSS UND  
DEN AUSSCHUSS DER REGIONEN**

**Ein neuer Aktionsplan für die Kreislaufwirtschaft**

**Für ein saubereres und wettbewerbsfähigeres Europa**

## ANHANG

Schlüsselmaßnahmen	Zeitraum
<b>EIN RAHMEN FÜR EINE NACHHALTIGE PRODUKTPOLITIK</b>	
Legislativvorschlag für eine <b>Initiative für eine nachhaltige Produktpolitik</b>	2021
Legislativvorschlag zur <b>Stärkung der Position der Verbraucher beim grünen Wandel</b>	2020
Legislative und nichtlegislative Maßnahmen zur Schaffung eines neuen „ <b>Rechts auf Reparatur</b> “	2021
Legislativvorschlag zur Belegung von <b>Umweltaussagen</b>	2020
<b>Verbindliche GPP-Kriterien und -Zielvorgaben</b> in sektoral-spezifischen Rechtsvorschriften und schrittweise Einführung einer <b>obligatorischen GPP-Berichterstattung</b>	ab 2021
Überprüfung der <b>Richtlinie über Industrieemissionen</b> , einschließlich der Einbeziehung von Verfahren der Kreislaufwirtschaft in künftige Referenzdokumente zu den besten verfügbaren Techniken	ab 2021
Einführung eines <b>von der Industrie getragenen Berichterstattungs- und Zertifizierungssystems für die Industriesymbiose</b>	2022
<b>ZENTRALE PRODUKTWERTSCHÖPFUNGSKETTEN</b>	
<b>Initiative für auf die Kreislaufwirtschaft ausgerichtete Elektronik, Lösung für ein einheitliches Ladegerät und Anreizsysteme für die Rückgabe alter Geräte</b>	2020/2021
Überprüfung der Richtlinie über die <b>Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten</b> und Leitfäden zur Klärung ihrer Verbindungen zu REACH und Ökodesign-Anforderungen	2021
Vorschlag für einen neuen <b>Rechtsrahmen für Batterien</b>	2020
Überprüfung der Vorschriften für <b>Altfahrzeuge</b>	2021
Überprüfung der Vorschriften für die ordnungsgemäße Behandlung von <b>Altölen</b>	2022
Überprüfung zur Verschärfung der <b>grundlegenden Anforderungen an Verpackungen</b> und zur <b>Verringerung von (übertrieben aufwendigen) Verpackungen sowie von Verpackungsabfällen</b>	2021
Verbindliche Anforderungen an den <b>Gehalt an recyceltem Kunststoff</b> und <b>Maßnahmen zur Verringerung von Kunststoffabfällen</b> für wichtige Produkte wie Verpackungen, Baustoffe und Fahrzeuge	2021/2022
Beschränkung des <b>gezielten Zusatzes von Mikroplastik</b> und Maßnahmen zur Verringerung der <b>unbeabsichtigten Freisetzung von Mikroplastik</b>	2021



Politikrahmen für <b>biobasierte Kunststoffe und biologisch abbaubare oder kompostierbare Kunststoffe</b>	2021
<b>EU-Strategie für Textilien</b>	2021
<b>Strategie für eine nachhaltige bauliche Umwelt</b>	2021
Initiative zur <b>Ersetzung von Einwegverpackungen, -geschirr und -besteck durch wiederverwendbare Produkte in Verpflegungsdienstleistungen</b>	2021
<b>WENIGER ABFALL, MEHR WERT</b>	
<b>Zielvorgaben für die Abfallreduzierung bei bestimmten Abfallströmen und andere Maßnahmen zur Abfallvermeidung</b>	2022
EU-weit <b>harmonisiertes Modell für die getrennte Sammlung von Abfällen und die Kennzeichnung</b> zur Erleichterung der getrennten Sammlung	2022
<b>Methoden zur Ermittlung und Minimierung des Vorhandenseins besorgniserregender Stoffe</b> in recycelten Materialien und daraus hergestellten Erzeugnissen	2021
<b>Harmonisierte Informationssysteme</b> für das Vorhandensein besorgniserregender Stoffe	2021
Festlegung des Rahmens für die Entwicklung weiterer <b>EU-weiter Kriterien für das Ende der Abfalleigenschaft und für Nebenprodukte</b>	2021
Überarbeitung der Vorschriften für die <b>Verbringung von Abfällen</b>	2021
<b>EINE FUNKTIONIERENDE KREISLAUFWIRTSCHAFT FÜR MENSCHEN, REGIONEN UND STÄDTE</b>	
Unterstützung des Übergangs zur Kreislaufwirtschaft durch die <b>Kompetenzagenda</b> , den anstehenden <b>Aktionsplan für die Sozialwirtschaft</b> , den <b>Kompetenzpakt</b> und den <b>Europäischen Sozialfonds Plus</b>	ab 2020
Unterstützung des Übergangs zur Kreislaufwirtschaft durch im Rahmen der <b>Kohäsionspolitik bereitgestellte Mittel</b> , den <b>Mechanismus für einen gerechten Übergang</b> und <b>städtische Initiativen</b>	ab 2020
<b>BEREICHSÜBERGREIFENDE MAßNAHMEN</b>	
Verbesserung der Mess-, Modellierungs- und Politikinstrumente zur Nutzung von <b>Synergien zwischen der Kreislaufwirtschaft und dem Klimaschutz und der Anpassung an den Klimawandel</b> auf EU- und nationaler Ebene	ab 2020
Regulierungsrahmen für die <b>Zertifizierung der Entfernung von Kohlendioxid</b>	2023
Berücksichtigung der Ziele der Kreislaufwirtschaft bei der Überarbeitung der Leitlinien für <b>staatliche Beihilfen in den Bereichen Umwelt und Energie</b>	2021
Durchgängige Berücksichtigung der Ziele der Kreislaufwirtschaft in den Vorschriften für die <b>Angabe nichtfinanzieller Informationen</b> und in Initiativen für <b>nachhaltige Corporate-Governance</b> und eine <b>von Unternehmen getragene</b>	2020/2021

<b>Umweltrechnungslegung</b>	
<b>FÜHRENDE ANSTRENGUNGEN AUF GLOBALER EBENE</b>	
Führungsrolle bei den Bemühungen um ein <b>globales Übereinkommen über Kunststoffe</b>	ab 2020
Vorschlag für eine <b>Globale Allianz für die Kreislaufwirtschaft</b> und Aufnahme von Gesprächen über ein <b>internationales Übereinkommen über die Bewirtschaftung der natürlichen Ressourcen</b>	ab 2021
Durchgängige Berücksichtigung der Ziele der Kreislaufwirtschaft in <b>Freihandelsabkommen</b> , anderen <b>bilateralen, regionalen und multilateralen</b> Prozessen und Abkommen sowie in den <b>Außenfinanzierungsinstrumenten der EU</b>	ab 2020
<b>ÜBERWACHUNG DER FORTSCHRITTE</b>	
Aktualisierung des <b>Überwachungsrahmens für die Kreislaufwirtschaft</b> zur Berücksichtigung neuer politischer Prioritäten und Ausarbeitung weiterer <b>Indikatoren für die Ressourcennutzung</b> , auch in Bezug auf <b>Verbrauch und materiellen Fußabdruck</b>	2021



News Events Webinars

The Institute

Cradle to Cradle Certified®

Resources

Find Products



## Cradle to Cradle Certified® & the UN Sustainable Development Goals

[Cradle to Cradle Certified Version 4.0](#)

[What is Cradle to Cradle Certified?](#)

[How to Certify](#)

[Inquire About Certification](#)

[Material Health Certificate](#)

[Global Recognition for Cradle to Cradle Certified](#)

[UN Sustainable Development Goals](#)

The Cradle to Cradle Certified® Product Standard offers a pathway for product manufacturers to make measurable progress towards UN Sustainable Development Goals (SDGs) associated with natural resource stewardship, social fairness and sustainable production and consumption. By setting forth rigorous parameters for product sustainability across the product life cycle from ingredient materials to material reuse, the standard provides a transformative framework for designing and making products in a manner that helps to address many SDGs.

[See the full details on how Cradle to Cradle Certified can support UN SDGs here.](#)

### Goal 1: No Poverty



Cradle to Cradle Certified contributes modestly to achieving this goal and to target 1.1, by encouraging applicants to be aware of manufacturing facilities and direct suppliers of input materials for certified products that are associated with a high risk of paying poverty level wages. This is determined by industry- and location-based risk identification. Applicants are asked to develop a strategy for identifying and addressing high risk facilities and suppliers within their supply chain each time they re-certify a product. All applicants are also expected to meet legal minimums as a baseline.

### Goal 3: Good Health & Well-being



Cradle to Cradle Certified contributes to achievement of this goal and target 3.9 by requiring a comprehensive approach to identifying, assessing, and optimizing the safety of chemicals that are used to manufacture certified products. If all chemicals used in manufacturing were optimized for safety using the Cradle to Cradle Certified Product Standard, negative human health effects resulting from exposure to hazardous substances, either directly, or through environmental contamination, could be avoided. At the Gold level of certification, chemicals and materials intentionally added to the product and/or released with effluent during the to product manufacturing stage must be known as safe for human health and the environment during the final manufacturing, use, and end-of-use stages of the product life cycle. Hazardous chemicals may not be used, or alternately, exposure to any hazardous chemicals that are used during these stages must be unlikely or expected to be negligible.

### Goal 6: Clean Water & Sanitation



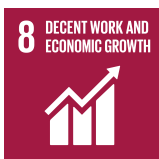
Through requirements in the Water Stewardship certification category, Cradle to Cradle Certified contributes to the achievement of this goal and targets 6.3, 6.4, and 6.6. The Water Stewardship category encourages manufacturers to treat water as a precious, shared resource through successively demanding requirements focused on ensuring that manufacturing effluent does not contain substances that are problematic for human health or the environment (including aquatic species). The Cradle to Cradle Certified Product Standard also encourages manufacturers to take actions to reduce water use where water resources are stressed, and to develop an understanding of and a strategy to address water-related issues and risks within

## Goal 7: Affordable & Clean Energy



Cradle to Cradle Certified contributes to achievement of this goal and targets 7.2 and 7.3 through requirements in the Renewable Energy & Climate Management Category. The category encourages manufacturers to increasingly contribute to the demand for renewable energy through their energy purchasing choices (including the purchase of carbon credits, offsets and energy from alternative sources), increase their use of renewable energy over time, and with the ultimate goal of producing excess renewable energy that can be released to the local grid, thereby increasing the share of renewable electricity available for others to use.

## Goal 8: Decent Work & Economic Growth



### Economic Growth

Cradle to Cradle Certified contributes to the achievement of Goal 8 target 8.4 - the decoupling of economic growth from environmental degradation in principle and in practice. By eliminating the concept of waste in favor of a circular economic system in which products are designed and made using safe, healthy materials that can remain in cycles of use and reuse through either biological or technical cycles (as appropriate for the material), the Cradle to Cradle Certified Product Standard decouples economic growth from the environmental degradation, especially environmental degradation caused by resource extraction, raw materials consumption and material disposal at the end of a product's useful life. This is one of the foundational principles of Cradle to Cradle Certified. The standard's requirements for Material Health and Material Reutilization, along with the Renewable Energy & Carbon Management and Water Stewardship, operationalize this principle: By promoting a system in which safe materials (i.e. that do not use problematic chemicals) can be used over and over and/or made/managed using methods that facilitate the channeling of these materials through a cycle of use and reuse (i.e. the product is made for disassembly so that parts can be cycled and/or a strategy is in place for ensuring maximum usage and return of materials to an entity that is able to reuse or recycle), Cradle to Cradle Certified sets forth a regenerative approach to economic growth predicated upon a system of responsible production and consumption that avoids the environmental degradation associated with continuously extracting, growing and producing new materials. Products that achieve the Gold and Platinum levels of certification have fully realized these ideals.

### Decent Work

Cradle to Cradle Certified contributes modestly to the achievement of Goal 8, targets 8.7 and 8.8 by encouraging applicants to be aware of manufacturing facilities and direct suppliers of certified product input materials that are associated with a high risk of child labor, forced labor, occupational health and safety issues, excessive working time, and low wages. This is determined based on industry and location based risk identification. Applicants are asked to develop a strategy for addressing high-risk issues and report on progress at each

recertification. All applicants are also expected to meet legal minimums as a baseline.

## Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation



Cradle to Cradle Certified contributes to the achievement of Goal 9, target 9.2 and 9.4 by providing a pathway towards fully sustainable manufacturing, a critical driver of economic growth and employment. By setting forth a circular system for manufacturing products using safe, healthy materials that can remain in cycles of use and reuse, the standard provides a transformative framework for resilient, sustainable industrialization that ultimately yields positive social, environmental and economic impact. From an innovation standpoint, the standard is designed to promote the continuous improvement of a product's environmental and social performance through ascending levels of certification. The process of moving products towards higher and higher levels of achievement under the Cradle to Cradle Certified standard fosters significant opportunities for innovation, particularly in the areas of material health and material reuse, including optimizing existing material chemistry for human and environmental health and safety; the innovation of new materials that are both safe and circular; optimizing product design and manufacturing processes to recoup or reuse materials, and driving infrastructure innovation to close the loop on reclaiming and reusing materials from one product life cycle to the next. The platinum level of certification represents the fullest expression of sustainable manufacturing and innovation.

## Goal 11: Sustainable Cities and Communities



Cradle to Cradle Certified contributes to the achievement of Goal 11, target 11.6 and, more indirectly, target 11.4, by providing a pathway for manufacturers to ultimately produce products in a fully sustainable manner. This was first described in the context of Goals 7, 8, and 9. A transition to sustainable manufacturing in combination with the design and making of safe, healthy materials and products for a circular economy will also reduce the environmental impact of cities because the majority of manufacturing and product use occurs in or near cities. Regarding air pollution (which is explicitly mentioned in target 11.6): energy production is a major contributor to air pollution and manufacturing is responsible for more than one-third of global energy use. Therefore, a transition by manufacturers to using renewable energy will greatly reduce this impact. Regarding waste management (also explicitly mentioned in target 11.6): Cradle to Cradle provides a pathway for eventually eliminating the very concept of waste. In an ideal scenario, waste management becomes materials management. This was first discussed in the context of Goal 8, target 8.7 which calls for a decoupling of economic growth and environmental degradation.

## Goal 12: Responsible Consumption & Production



Cradle to Cradle Certified directly fosters responsible consumption and production by providing a continuous improvement pathway for manufacturers to produce products in a sustainable way, and by providing a means whereby manufacturers, institutions, and consumers can identify and select sustainably produced materials and products. In this way, the program directly contributes to the achievement of Goal 12, targets 12.2, 12.4, 12.5, and 12.6. As an international product certification program that is aligned with the Sustainable Development Goals that are relevant to products, Cradle to Cradle Certified directly provides a means by which public procurement officials, and other purchasers, can achieve target 12.7 -- by specifying Cradle to Cradle Certified products.

---

## Goal 13: Climate Action



Cradle to Cradle requires that manufacturers be aware of the climate impacts associated with the products they produce, and requires action to address those impacts (use renewable energy and purchase offsets). In this way, the program contributes to achieving Goal 13, target 13.1 (Note: The majority of the specific targets associated with this goal are not directly applicable to the Cradle to Cradle Certified standard due the focus on adaptation and change management.)

---

## Goal 14: Life Below Water - Conserve and sustainably use the oceans, seas and marine resources



Cradle to Cradle Certified contributes to achieving Goal 14 target 14.1 through the Water Stewardship category criteria.

The category encourages manufacturers to treat water as a precious, shared resource through successively demanding requirements focused on ensuring that manufacturing effluent does not contain substances that are problematic for human health or the environment (including aquatic species). The standard contributes modestly towards achieving target 14.2 by requiring manufacturers to identify direct negative impacts their operations have on local ecosystems, develop a strategy to address those issues, and report on progress at recertification. The standard supports target 14.3 (which addresses ocean acidification) by encouraging a transition to renewable energy use and offsetting of any emissions that are not avoided (acidification is largely a result of CO<sub>2</sub> uptake by oceans and is tied to release of CO<sub>2</sub> during energy production).

---

## Goal 15: Life on Land - Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss



Cradle to Cradle Certified contributes to achieving Goal 15 target 15.1, 15.2, and 15.A & B through the Water Stewardship criteria and Material Reutilization criteria. In Water Stewardship, applicants whose activities have a direct impact on sensitive ecosystems through their operations must identify these issues, develop a plan to address the issues, and report on progress made. In addition, the program supports sustainable forest management including biodiversity conservation by requiring that wood in products be certified to a sustainable forestry certification program (e.g. Forest Stewardship Council) at the Gold level. The program contributes modestly to achieving target 15.7 by excluding all materials from endangered or threatened species from the program.

### Navigate

[The Institute](#)

[Cradle to Cradle Certified®](#)

[Resources](#)

### Contact Us

475 14th Street Suite 290

Oakland, CA 94612

[info@c2ccertified.org](mailto:info@c2ccertified.org)

### Connect With Us

[Subscribe to Our Newsletter](#)

[Send Feedback](#)

[Find Products](#)

[Search](#)

Piet Heinkade 55

1019 GM, Amsterdam

The Netherlands



DGNB Blog rund um Nachhaltiges Bauen

## IMPULS, WELTWEIT

Schreibe einen Kommentar

# Saving the World – Der DGNB Beitrag zu den Sustainable Development Goals der UN

von **Dr. Anna Braune**

## SUSTAINABLE DEVELOPMENT GOALS



Am 1. Januar 2016 trat die wegweisende Agenda 2030 der Vereinten Nationen in Kraft. Die Agenda definiert Ziele, um die weitere Entwicklung unserer Welt sinnvoll zu gestalten, um damit langfristig ein Umdenken und somit ein Leben in einer nachhaltigen Welt zu ermöglichen. Diese 17 Ziele, die **Sustainable Development Goals** (SDGs), gliedern sich in 169 Unterziele, welche der UN und ihren Mitgliedsstaaten als Richtlinie für deren Entwicklung in den kommenden 15 Jahren dienen sollen. Auf diesen Zielen fußt auch die von der Bundesregierung aktuell veröffentlichte Neuauflage der **Deutschen**

## Nachhaltigkeitsstrategie 2016.

*„Die Neuauflage der Nachhaltigkeitsstrategie ist ein großer Erfolg. Sie ist ein klares Bekenntnis zum Schutz unseres Planeten. Mit der Strategie stellt die Bundesregierung die Weichen dafür, dass sich Deutschland bis zum Jahr 2030 zu einer der weltweit effizientesten und umweltschonendsten Volkswirtschaften entwickeln kann.“*

Bundesumweltministerin Dr. Barbara Hendricks

Auch immer mehr private Unternehmen und Nicht-Regierungs-Organisationen orientieren sich an den SDGs als maßgebliche Wegweiser für ihre jeweiligen Nachhaltigkeitsstrategien und Tätigkeiten.

Als die zentrale Organisation zum nachhaltigen Bauen hat sich die DGNB ebenfalls dazu entschieden, die globalen Nachhaltigkeitsziele aktiv zu unterstützen. In einem ersten Schritt haben wir unsere bisherigen Aktivitäten und Inhalte mit den SDGs und deren Unterzielen abgeglichen. Zudem werden wir unsere zukünftigen Handlungsfelder daran ausrichten und uns inspirieren lassen. Auch unsere Mitglieder und unser Netzwerk möchten wir in diesem Kontext zum aktiven Mitarbeiten aufrufen.

Bei vielen der SDGs zeigt sich, dass zu deren Umsetzung dem Gebäudesektor eine besondere Rolle zukommt. Unsere gebaute Umwelt ist aktuell für **ein Drittel des globalen Ressourcenverbrauchs** sowie für fast die Hälfte des globalen Energieverbrauchs verantwortlich und verursacht darüber hinaus mindestens ein Drittel der globalen Treibhausgasemissionen. Allein in Deutschland sind etwa **2,8 Millionen Menschen** in der Immobilienwirtschaft beschäftigt. Durch die Globalisierung und die vernetzten Wertschöpfungsketten ist die Gesamtzahl der durch deutsche Bautätigkeiten „betroffenen“ Menschen um ein Vielfaches höher.

Der Abgleich der globalen Nachhaltigkeitsziele mit unserem aktuellen DGNB System zeigt: Bereits heute gibt es zahlreiche Schnittstellen und Synergien.

## Klimaschutz



Im November 2016 wurden in Deutschland mit dem Klimaschutzplan 2050 durch die Bundesregierung Zielvorgaben für 2050 und Reduktionsziele für 2030 definiert, die dazu beitragen sollen, dass die globale Temperaturerwärmung, wie im Paris-Abkommen vereinbart, auf maximal 2 °C begrenzt wird. So sollen etwa die Treibhausgasemissionen im Gebäudesektor in Deutschland um 66 bis 67 Prozent gegenüber 1990 gesenkt werden. Wie bereits in unserem [Blogbeitrag zum Klimaschutzplan](#)

dargelegt, sind wir der Meinung, dass der Gebäudebestand hierfür ein besonders großes Potenzial bietet, etwa aufgrund der hohen Verbrauchswerte im Betrieb und der derzeit noch überwiegend



eingesetzten fossilen Brennstoffe. Diese Reduktionsziele verdeutlichen die Notwendigkeit und Dringlichkeit einer Einführung von Maßnahmen zum Klimaschutz, die gleichzeitig in die SDGs einzahlen.

Das DGNB System, dessen übergeordnetes Ziel eine Steigerung der Nachhaltigkeit in der gebauten Umwelt ist, trägt in seiner Gesamtheit direkt zum SDG 13 „Maßnahmen zum Klimaschutz“ bei. Im Rahmen des DGNB Zertifizierungssystems werden ambitionierte Ziel- und belastbare Orientierungswerte für CO<sub>2</sub>-Emissionen für das Bauen und Betreiben von neuen und bestehenden Gebäuden definiert. Der aktuelle Zielwert für den Energiebedarf fordert eine dreißigprozentige Unterschreitung der gesetzlichen Vorgaben, inklusive der grauen Energie der eingesetzten Baustoffe.

Darüber hinaus leistet die DGNB als Verein durch die ganzheitliche Arbeit mit ihren Mitgliedern und ihrem breit aufgestellten Netzwerk einen wichtigen Beitrag, um Klimaschutzziele im Gebäudesektor zu verankern und die Relevanz des Themas immer wieder hervorzuheben. In enger und vertrauensvoller Zusammenarbeit mit Herstellern, Investoren, Bauherren, Architekten und Ingenieuren, Bauunternehmen, Betreibern, Nutzern aber auch mit anderen Verbänden sowie Forschungseinrichtungen wird die Entwicklung und die Einführung innovativer Technologien, Lösungen und Materialien für mehr Klimaschutz vorangetrieben. Zudem beteiligt sich die DGNB über [Positionspapiere und Stellungnahmen](#) an der politischen Debatte zu aktuellen Themen mit Bezug zum Klimawandel, wie mit einer [Stellungnahme zum Klimaschutzplan 2050](#) oder zur Novellierung der Energiegesetzgebung für Gebäude. Über die [DGNB Akademie](#) wird das bei der DGNB vorhandene Wissen weitergetragen und multipliziert, wodurch das Bewusstsein für die Relevanz des Klimaschutzes gestärkt wird.

## Ressourcen und Konsum



Die natürlichen Ressourcen der Erde sind ein kostbares Gut, das es zu

schützen gilt. Der Verbrauch von Ressourcen geht immer mit Wirkungen auf Flora, Fauna und Menschen einher. Die Verfügbarkeit vieler Ressourcen ist inzwischen sehr begrenzt und führt zunehmend zu Verteilungskonflikten. Das DGNB System fördert ein nachhaltiges Wirtschaften sowie eine effiziente Nutzung aller eingesetzten Ressourcen. Der konkret für das Gebäude anfallende

Ressourcenverbrauch – etwa der Frischwasserverbrauch, der Verbrauch endlicher materieller und

energetischer Ressourcen – wird je Gebäude strukturiert ermittelt, transparent gemacht und anschließend bewertet. Über die Ökobilanz werden außerdem die Umweltwirkungen des Gebäudes berechnet und bewertet, die eine Verschmutzung von Boden und Gewässern etwa durch Versauerung oder Überdüngung hervorrufen und so zu Wald- und Fischsterben führen können.

Neben der Reduzierung des Ressourcenverbrauchs wird der Einsatz erneuerbarer Energieträger sowie die effiziente Nutzung von Flächen beurteilt. Für mehr Nachhaltigkeit bei der Materialgewinnung honoriert die DGNB den Einsatz von Holz und Naturstein aus nachhaltigem An- und Abbau. Darüber hinaus wird ein risiko- und schadstoffarmer Bau, der Einsatz recyclingfreundlicher Baustoffe sowie eine rückbaubare Konstruktion durch die DGNB gefördert. Damit ist der übergeordnete Leitgedanke einer verantwortungsbewussten, kreislaufforientierten Ressourcennutzung gemäß der „Circular Economy“ bereits durch eine Vielzahl von Kriterien in unserem System verankert und wird zukünftig noch weiter ausgebaut.

## Nachhaltigkeit im Quartier



Bei der Betrachtung der Nachhaltigkeit in der gebauten Umwelt dürfen Gebäude nicht losgelöst von ihrer Umgebung entworfen und/oder bewertet werden. So kann ein großes Angebot an Transportmöglichkeiten und Leihsystemen für Elektrofahrzeuge sowie die entsprechende Infrastruktur eine nachhaltige Mobilität langfristig fördern und auch die Qualität des Gebäudes erhöhen. Des Weiteren bietet das DGNB System die Möglichkeit, ganze Stadt- oder Gewerbequartiere und Industriestandorte zu betrachten. Hier werden etwa der Einbezug der Nutzer in Entscheidungsprozesse, Governance-Themen sowie das Vorhandensein von zugänglichen Frei- und Grünflächen in unmittelbarer Umgebung bewertet.

## Gesundheit und Komfort



Um sicherzustellen, dass die in zertifizierten Gebäuden verwendeten Materialien und Innenausbauten möglichst keine gesundheitsgefährdenden Risiko- und Schadstoffe enthalten, wird im Rahmen der Zertifizierung die Erstellung eines vollständigen Bauteilkatalogs gefordert. Dieser ermöglicht die Einstufung der verwendeten Materialien und Baustoffe hinsichtlich ihrer Umweltverträglichkeit. Ob tatsächlich im Gebäude vorhandene Schadstoffe in der Innenraumluft vorhanden sind, wird über eine Messung nach Fertigstellung ermittelt. Das Ziel, eine gesunde Raumluftqualität einzuhalten, sichert in den meisten

Fällen ab, dass schädigende Baustoffe gar nicht erst eingesetzt werden. Im Rahmen der Ökobilanz-Berechnung wird außerdem ermittelt, wieviele Emissionen über den gesamten Lebenszyklus von der Herstellung über die Nutzung bis zum Lebensende entstehen, die der Umwelt und den Menschen beeinträchtigen können.

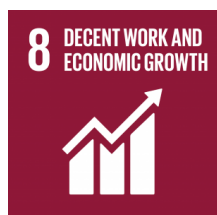
## Gleichberechtigung und Teilhabe



Die DGNB möchte im Rahmen ihrer Möglichkeiten dafür Sorge tragen, dass Gebäude die notwendigen Voraussetzungen erfüllen, um eine gleiche Behandlung der Geschlechter sowie eine Teilhabe aller am gesellschaftlichen Leben zu ermöglichen. Das DGNB System behandelt diese Themen mit großer Sorgfalt, was

sich etwa darin widerspiegelt, dass Gebäude, welche die Mindestanforderungen an die Barrierefreiheit nicht erfüllen, von der Zertifizierung ausgeschlossen sind. Durch den Ausbau familienfördernder Gebäudestrukturen, wie beispielsweise Räumlichkeiten für die Kinderbetreuung sowie Wickel- und Stillmöglichkeiten, wird eine Vereinbarkeit von Familie und Beruf gefördert und allen die Möglichkeit geboten, gleichberechtigt am öffentlichen und beruflichen Leben mitzuwirken.

## Indirekter Beitrag zu weiteren SDGs



Einen indirekten Beitrag leistet die DGNB darüber hinaus zu drei weiteren Nachhaltigkeitszielen. So unterstützt die DGNB etwa die Entkopplung von Wirtschaftswachstum und

Umweltschädigung und fördert die wissenschaftliche Forschungsarbeit sowie die Entwicklung von Innovationen. Als Verein trägt die DGNB dazu bei, Entscheidungsträgern auf sämtlichen Ebenen Hilfestellungen für repräsentative, belastbare und nachhaltige Entscheidungen zu geben, die langfristig zum Klimaschutz und zur Erreichung der hier beschriebenen Ziele beitragen.

## Appell für mehr Nachhaltigkeit

Die DGNB nimmt die Herausforderung der Agenda 2030 an. Die UN-Ziele für die Menschheit und unsere Erde, die Basis für ein friedvolles Zusammenleben, geben uns als Organisation Orientierung und

Inspiration. Wir werden mit all unseren Kräften daran arbeiten, die Ziele erreichbar zu machen und hoffen, auf diesem Weg viele Mitstreiter zu gewinnen.

Die Sustainable Development Goals als Kernthema in der Version 2017 des DGNB Systems!

Bilder: <http://www.un.org/sustainabledevelopment/news/communications-material/>

**VERÖFFENTLICHT AM** 12. Januar 2017

**KATEGORIE:** Impuls, Weltweit

**SCHLAGWORT:** globale Nachhaltigkeitsziele, Nachhaltigkeitsstrategie, SDGs, Sustainable Development Goals, UN-Ziele

von **Dr. Anna Braune**



Anna Braune studierte Technischer Umweltschutz an der Technischen Universität Berlin und schrieb ihre Diplomarbeit über Ökobilanzen von Abwasseranlagen in Zusammenarbeit mit der École Polytechnique Fédérale de Lausanne (Schweiz). Sie arbeitete für verschiedene Beratungsunternehmen im Bereich Nachhaltigkeit und Gebäudetechnik. Von 2004 bis 2007 war sie als Wissenschaftliche Mitarbeiterin an der Universität Stuttgart, am Lehrstuhl für Bauphysik, Abteilung Ganzheitliche Bilanzierung, tätig. Sie war Initiatorin und bis Ende 2008 die Gründungsgeschäftsführerin der Deutschen Gesellschaft für Nachhaltiges Bauen (DGNB). Danach arbeitete sie beim Nachhaltigkeits-Beratungs- und Softwareunternehmen PE International, umbenannt seit 2014 in thinkstep. Als Principal Consultant war sie verantwortlich für das Team "Nachhaltiges Bauen" des Beratungsbereichs. Seit September 2015 arbeitet Anna Braune wieder für die DGNB, als Leiterin Forschung und Entwicklung.

---

C2C LAB  
(<https://c2c-lab.org/>)

C2C CONGRESS  
(<https://www.c2c-congress.org/>)



für Unternehmen  
(<https://c2c.ngo/partner-werden/>)

für Presse  
(<https://c2c.ngo/presse/>)

Spenden  
(<https://c2c.ngo/spenden/>)

KONTAKT  
(<https://c2c.ngo/kontakt/>)

ce a itt m nn  
fbo m er /c del  
ok co co in o /U  
.c /cr /C pa CL  
o ad 20 ny... h  
m let \_N /cr O Uf  
/C oc G ad Zi  
2C ra O) le- 8  
.e ra dl to- w  
V/ e. cr 2f  
) ng ad 6e  
o/ ) le- fS  
oh  
Bs  
g)



# UNSERE EVENTS

Wir bilden und vernetzen Menschen für die Transformation hin zu einer zirkulären Gesellschaft nach Cradle to Cradle. Unsere Events sind genau das richtige Instrument dafür. Neben unserem Internationalen C2C Congress (<https://c2c-congress.org/>), bei dem wir jährlich bis zu 1.000 Menschen zusammenbringen, veranstalten wir viele weitere Formate – sei es vor Ort, digital oder hybrid.

Wir verankern Cradle to Cradle seit 2014 aktiv in der Mitte der Gesellschaft. Durch unsere Bildungsformate, unsere fachspezifischen und öffentlichen Events, mit unseren 800 Ehrenamtlichen im DACH-Raum und in unserem C2C LAB. Unser Mehrwert für Sie? Wir sind das C2C-Sprachrohr, das Ihre Kund\*innen, Geschäftspartner\*innen sowie Politik und Wissenschaft erreicht. Dafür benötigen wir eine solide Finanzierung und starke Partner\*innen. Werden Sie eine\*r davon!



### Internationaler C2C Congress

Der Internationale Cradle to Cradle Congress ist die weltweit größte C2C-Plattform – hier trifft die C2C



### C2C Summit

Akteur\*innen aus den unterschiedlichsten Branchen, Politiker\*innen sowie Vertreter\*innen



### LAB Talk

Die LAB Talks sind ein Livestream-Format, in dem wir uns mit entscheidenden Persönlichkeiten aus Politik, Wirtschaft, Wissenschaft,



Community jährlich auf zentrale Persönlichkeiten aus Wirtschaft, Politik, Wissenschaft und Gesellschaft.

**>> Zur Congress-Webseite**  
(<https://www.c2c-congress.org/>)

aus Wissenschaft und Zivilgesellschaft diskutieren einen Tag lang über ausgewählte Themen und teilen ihre Erfahrungen bei der Umsetzung von C2C.

**>> Schaut Euch die Summits auf unseren Youtube-Kanal an.**  
(<https://www.youtube.com/playlist?list=PL4jnVdlkmlQfp17ybek81aE5PYpsvWtvt>)

Kunst und Kultur sowie der Zivilgesellschaft unterhalten und Cradle to Cradle aus unterschiedlichen Blickwinkeln beleuchten.

**>> Alle LAB Talks sind auf unserem Youtube-Kanal zu sehen.**  
(<https://www.youtube.com/playlist?list=PL4jnVdlkmlQdA-vjT8IS8jLEyGO5fIZC2>)



### C2C Akademie

Unsere Akademie findet von, mit und für unsere Ehrenamtlichen statt. Das mehrtägige Format steht ganz im Zeichen der Weiterbildung und Vernetzung und beinhaltet zahlreiche



### C2C Forum

Unser öffentliches Forum bietet eine Austauschplattform für Alle, die an C2C interessiert sind. Akteur\*innen aus verschiedenen Bereichen diskutieren zu ausgewählten Themen und bietet C2C-



### C2C Fachforum

In Fachforen bringen wir politische Entscheider\*innen und Fachexpert\*innen aus unterschiedlichen Wirtschaftszweigen zusammen. Sie diskutieren zu ausgewählten

Workshops, Inputs und Diskussionen.

**>> Zur Akademie-Webseite**  
**(<https://ehrenamt.c2c.ngo/akademie>)**

Wissen aus erster Hand.

**>> Zu unserem Youtube-Kanal**  
**(<https://www.youtube.com/watch?v=so8i8LHdFXM&list=PL4jnVdlkmlQfX7NwCGCIL6JQhiESRj01>)**

Fachthemen und tauschen sich über C2C-Wissen aus.

**>> Schaut Euch die Fachforen bei Youtube an.**  
**(<https://www.youtube.com/watch?v=so8i8LHdFXM&list=PL4jnVdlkmlQfX7NwCGCIL6JQhiESR>)**



### **C2C LAB – Bildungszentrum**

Ob Seminare, Workshops, Vorträge, Führungen oder Podiumsdiskussionen – lasst Euch inspirieren und bildet Euch weiter. Egal ob als Schulklasse, Fachabteilung oder Expert\*innengruppe.

**>> Zur C2C LAB-Website**



[\(https://c2c-lab.org/\)](https://c2c-lab.org/)

## IHRE ANSPRECHPARTNERIN



**Anna Oberschmidt**  
Events

events[at]c2c.ngo



Cradle to Cradle NGO  
Bundesgeschäftsstelle  
Landsberger Allee 99c  
10407 Berlin

Telefon: +49 (0) 304 677 4780  
E-Mail: [info\[at\]c2c.ngo](mailto:info@c2c.ngo)

C2C LAB (<https://c2c-lab.org/>)

C2C CONGRESS (<https://www.c2c-congress.org/>)

für Presse (<https://c2c.ngo/presse/>)

Kontakt (<https://c2c.ngo/kontakt/>)

C2C REGIONEN (<https://c2c-regionen.org/>)

für Unternehmen (<https://c2c.ngo/partner-werden/>)

Datenschutz (<https://c2c.ngo/datenschutzerklaerung/>)

EHRENAMT (<https://ehrenamt.c2c.ngo/>)

für Ehrenamtliche (<https://ehrenamt.c2c.ngo/>)

Impressum (<https://c2c.ngo/impressum/>)

AKADEMIE (<https://ehrenamt.c2c.ngo/winterakademie2021/>)

für Spendende (<https://c2c.ngo/spenden/>)

Bleib auf dem Laufenden und melde dich für unsere monatlichen C2C NGO News an.

E-Mail

**Anmelden**

© CRADLE TO CRADLE NGO



**14. Juli**  
Freiburg

**NEXT INDUSTRIAL  
REVOLUTION -  
SCALING INNOVATION**

**7. September**  
Mainz

**PLASTICS & PACKAGING  
FOR TOMORROW**

**4. November**  
Mönchengladbach

**CITIES & REGIONS  
DRIVING CHANGE**

**#C2CC21**

C2C NGO | (<https://c2c.ngo/>) C2C LAB (<https://c2c-lab.org/>)

PRESSE | (<https://www.c2c-congress.org/presse/>) KONTAKT (<https://www.c2c-congress.org/kontakt/>)



(<https://www.facebook.com/C2C.eV/>) ([https://twitter.com/C2C\\_NGO](https://twitter.com/C2C_NGO))



(<https://www.linkedin.com/company/cradle-to-cradle-ngo>)



(<https://www.youtube.com/user/cradletocradleev?lang=de>)

**Anlage 27**



(<https://www.instagram.com/cradletocradle.ngo/>)

 ([HTTPS://WWW.C2C-CONGRESS.ORG/](https://www.c2c-congress.org/))



---

# Herzlich Willkommen zum 7. Internationalen Cradle to Cradle Congress 2021!

---

## DER INTERNATIONALE C2C CONGRESS

Der Internationale Cradle to Cradle Congress ist die weltweit größte C2C-Plattform – hier trifft die C2C Community jährlich auf zentrale Persönlichkeiten aus Wirtschaft, Politik, Wissenschaft und Gesellschaft. 2021 findet das Event in neuer Form statt: Drei Etappen in drei Städten mit drei Schwerpunktthemen. Die Teilnahme ist dabei vor Ort sowie digital via Live-Stream möglich. Was gleich bleibt: Der C2CC21 bietet spannende Einblicke in die C2C-Praxis durch Diskussionen und Vorträge, sowie Raum für Networking.

## CRADLE TO CRADLE NGO – DIE GASTGEBERIN

C2C NGO ist der Beschleuniger für Cradle to Cradle: Wir treiben Ideen voran, mit denen wir Menschen zu Nützlingen werden. Wir stoßen Organisationen und Personen zum Umdenken und Umgestalten an. Das C2C LAB in Berlin ist unser Head Office, Bildungszentrum und Reallabor. In unseren Netzwerken bringen wir Menschen aus Wirtschaft, Wissenschaft, Bildung, Politik, Kunst und Zivilgesellschaft zusammen. Unsere Botschaft tragen wir in alle Teile der Gesellschaft und mischen uns in öffentliche Debatten ein.

## DER CRADLE TO CRADLE CONGRESS 2021



Die Corona-Pandemie hat Großveranstaltungen in den vergangenen 18 Monaten schwierig bis unmöglich gemacht. Aber den Kopf in den Sand zu stecken ist nicht unsere Art, schließlich sind positive Ziele und eine lösungsorientierte Herangehensweise fest in unserer DNA verankert! Unsere größte Veranstaltung in diesem Jahr ausfallen zu lassen, kam daher nicht in Frage. Also findet der 7. Internationale Cradle to Cradle Congress 2021 als hybrides Event statt: Mit drei Etappen in drei Städten, vor Ort und digital.

[Zum Blogbeitrag der zweiten Etappe](#)

(<https://c2c.ngo/drei-panels-zehn-speakerinnen-viele-c2c-loesungen/>)

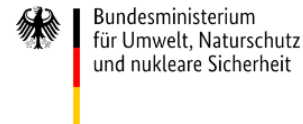
[Zu den Blogbeiträgen der ersten Etappe](#)

(<https://c2c.ngo/wir-starten-mit-einem-knall-in-den-cradle-to-cradle-congress-2021/>)

**UNTER DER SCHIRMHERRSCHAFT VON**

**Svenja Schulze**

Bundesministerin für Umwelt,  
Naturschutz und nukleare  
Sicherheit



# URBAN FUTURE | INTERNATIONAL | INNOVATION

Bitte hier klicken, um  
die Marketing-Cookies  
zu akzeptieren und  
diesen inhalt zu  
aktivieren

Der C2C Congress 2020 in  
Berlin!

Bitte hier klicken, um  
die Marketing-Cookies  
zu akzeptieren und  
diesen inhalt zu  
aktivieren

Werden Sie Teil der C2C  
Community!

Bitte hier klicken, um  
die Marketing-Cookies  
zu akzeptieren und  
diesen inhalt zu  
aktivieren

Treffen Sie internationale  
C2C Changemaker!

Bitte hier klicken, um  
die Marketing-Cookies  
zu akzeptieren und  
diesen inhalt zu  
aktivieren

Innovative Produktideen,  
spannende  
Geschäftspartner &

wertvolles Recruiting!

DER C2C  
CONGRESS  
SEIT 2014

0  
TEILNEHMENDE

0  
SPEAKER\*INNEN

0  
EHRENAMTLICHE  
HELFER\*INNEN

# HIGHLIGHTS 2014 - 2020

Speaker\*innen der letzten Jahre



# Werden Sie exklusiver Partner des Internationalen C2C Congresses!

Nehmen Sie Kontakt mit uns auf. Wir freuen uns auf Ihre Nachricht.



Ihr  
Ansprechpartner:  
Wolter Student



Montag -  
Freitag  
10:00 - 17:00 Uhr



Senden Sie uns  
eine E-Mail an  
[partner\[at\]c2c.ngo](mailto:partner@c2c.ngo)



Rufen Sie uns  
an  
+49 (0) 30 4677  
4780

 (<https://www.facebook.com/C2C.eV/>)  ([https://twitter.com/C2C\\_NGO](https://twitter.com/C2C_NGO))  
 (<https://www.linkedin.com/company/cradle-to-cradle-ngo>)  
 (<https://www.youtube.com/user/cradletocradleev?lang=de>)  
 (<https://www.instagram.com/cradletocradle.ngo/>)

KONTAKT I (<https://www.c2c-congress.org/kontakt/>) PRESSE (<https://www.c2c-congress.org/presse/>)

Impressum (<https://www.c2c-congress.org/impressum/>) | Datenschutz (<https://www.c2c-congress.org/datenschutzerklaerung/>) ©  
C2C NGO 2021

## European Renewable Energy. Applying Circular Economy Thinking to Policy-Making

**Helen Kopnina**

Institute of Cultural Anthropology and Development Sociology, Leiden University, The Netherlands.  
Sustainable Business Programme, The Hague University of Applied Science, The Netherlands

### **Abstract.**

This article addresses European energy policy through conventional and transformative sustainability approaches. The reader is guided towards an understanding of different renewable energy options that are available on the policy making table and how the policy choices have been shaped. In arguing that so far, European energy policy has been guided by conventional sustainability framework that focuses on eco-efficiency and 'energy mix', this article proposes greater reliance on circular economy (CE) and Cradle to Cradle (C2C) frameworks. Exploring the current European reliance on biofuels as a source of renewable energy, this article will provide recommendations for transition to transformative energy choices.

**Key words.** climate change · Circular Economy (CE) · Cradle to Cradle (C2C) · European Union · renewable energy · solar energy · wind energy

**ISSN** 2384-8677

**DOI:** <http://dx.doi.org/10.13135/2384-8677/0000>

**Article history:** Submitted August 08, 2017. Accepted September 22, 2017

**Published online:** September 26, 2017

**Citation:** Kopnina, H.. (2017). European Renewable Energy. Applying Circular Economy Thinking to Policy-Making. *Visions for Sustainability*, 8: 00-00.

**Copyright:** ©2017 Kopnina, H. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Competing Interests:** The author has declared that no competing interests exist.

**Corresponding Author:** Helen Kopnina, The Netherlands.

**E.mail:** [alenska1973@yahoo.com](mailto:alenska1973@yahoo.com); [h.kopnina@hhs.nl](mailto:h.kopnina@hhs.nl)

**Perspective:** *Theoretical and research visions*

**Fields:** *Earth Life Support Systems, Economy and Technology*

**Issues:** *Renewable Energy*

## Introduction

The use of renewable energy is seen as one of the crucial components of sustainability strategy developed by the European Union (EU) over the past decade. In 2016, the European Commission aimed at designing the European Energy policies for the next decade<sup>1</sup>. These policies are aimed to devote a major effort to establishing new sustainability criteria for biomass and biofuels within the larger framework of sustainability largely in terms of increasing eco-efficiency and increasing the use of renewable energy.

According to the International Energy Agency,<sup>2</sup> “renewable energy is derived from natural processes that are replenished at a higher rate than they are consumed”. Solar, wind, geothermal, hydropower, bio-energy from biomass, power of ocean or sea, and more contentiously, nuclear generation are associated with renewable energy<sup>3</sup>. Today, wind power, solar power, tidal waves, and geothermal power stations and the like produced about 1.3% between them<sup>4</sup>.

Basically, some types of renewable energy, like hydropower, are considered clean, safe, and widely available from local sources<sup>5</sup>. However, the same hydropower may have unintended negative side-effects, such as dams that can cause disruption of natural systems, affecting river environments, fisheries and land<sup>6,7</sup>. Other

renewable energy sources have been even more controversial. For example, after the Fukushima nuclear accident in 2011, Germany has permanently shut down eight of its 17 reactors.<sup>8</sup> Presently, there is no broad scientific consensus about how safe nuclear energy is, and the debates are still raging in both scientific, as well as political, public and vested interests arenas.

While some sustainability experts, including those involved in formulating European energy policy, propose eco-efficiency (*reducing* energy use per unit of output) or a mix of strategies (*combining* both fossil fuels and renewable energy); others are in favour of more strict and transformative measures<sup>9</sup>. Generally, eco-efficiency as a term associated with sustainability is widely accepted in European policy documents as well as public discourse. Those advocated more transformative measures will be discussed further in this article.

This article will focus on specific types of renewable energy, biofuels on the one hand and wind and solar energy on the other hand, and examine these through the use of Cradle to Cradle (C2C) and Circular Economy (CE) frameworks. The CE<sup>10</sup> and C2C<sup>11</sup> are specifically highlighted as they provide measures that seek to reach beyond conventional approaches that are based on the assumption that pragmatic approach to renewable is more feasible and economically desirable<sup>12</sup>. Concretely, pragmatism in this case implies that the ‘energy

---

<sup>1</sup> [http://europa.eu/rapid/press-release\\_IP-16-4009\\_en.htm](http://europa.eu/rapid/press-release_IP-16-4009_en.htm) Accessed 13 May 2017.

<sup>2</sup> IEA (International Energy Agency). FAQ: renewable energy.

<http://www.iea.org/aboutus/faqs/renewableenergy/> (2015). Accessed 13 December 2016.

<sup>3</sup> Stigka et al 2014

<sup>4</sup> The Economist 2015b

<sup>5</sup> <https://www.energy.gov/eere/water/benefits-hydropower>

<sup>6</sup> [http://www.conserve-energy-future.com/Disadvantages\\_HydroPower.php](http://www.conserve-energy-future.com/Disadvantages_HydroPower.php)

<sup>7</sup> International Rivers

<http://www.internationalrivers.org/environmental-impacts-of-dams>

---

<http://www.internationalrivers.org/environmental-impacts-of-dams> ‘Environmental Impact of Dams’ Accessed 13 June 2015.

<sup>8</sup> Breidhardt 2011.

<sup>9</sup> Ellen MacArthur Foundation 2014

<sup>10</sup> EC [http://ec.europa.eu/environment/circular-economy/index\\_en.htm](http://ec.europa.eu/environment/circular-economy/index_en.htm) ‘Circular economy strategy’ Accessed 13 June 2017.

<sup>11</sup> McDonough and Braungart 2002; EC [http://ec.europa.eu/environment/ecoap/about-eco-innovation/good-practices/eu/575\\_en.htm](http://ec.europa.eu/environment/ecoap/about-eco-innovation/good-practices/eu/575_en.htm) ‘Eco-innovation’ Accessed 13 June 2017.

<sup>12</sup> Duflou et al 2012.

'mix' includes whatever sources of energy are balanced in accordance to economic imperatives, social needs and partially ecological requirements.

By contrast to conventional eco-efficiency, CE and C2C postulate that rather than environment being merely one of the three commonly accepted pillars of sustainability (the terms coined by John Elkington 'people, planet, profit'), it is foundational as economic and social systems are contingent upon functioning of healthy ecosystems. Ideally, at least, circular economy is 'restorative and regenerative by design, and aims to keep products, components, and materials at their highest utility and value at all times'.<sup>13</sup> Consequently, these transformative frameworks advocate renewable energy, outlining the danger of compromise in which economic imperatives take the front seat. According to C2C, eco-efficiency allows energy sources that are harmful to 'be less bad' rather than eliminating them altogether<sup>14</sup>. One example of 'less bad' energy source is biofuel derived from wood.

*The Economist*<sup>15</sup> journal termed the use of wood as a renewable energy source 'Environmental lunacy in Europe'. The article reflects that while biofuels are supposed to be 'carbon neutral', biomass plantations are harvested at the rate faster than they grow back. Also, these plantations displace ecologically diverse ecosystems that could have absorbed carbon more efficiently. They also compete with land that could have been used for food production. A poverty-combatting charity *Action Aid* has issued this statement: "If biofuels targets set by the U.S. and Europe are met the amount of land used to create fuel rather than food will increase dramatically. The

---

<sup>13</sup> Ellen MacArthur Foundation

<https://www.ellenmacarthurfoundation.org/circular-economy>

<sup>14</sup> McDonough and Braungart 2002; MacArthur Foundation 2014

<sup>15</sup> The Economist 2013.

result? Food prices could rise by up to 76% by 2020, pushing 600 million people into hunger<sup>16</sup>. This article will focus on the energy policy in the European Union in the larger context of sustainability, considering both conventional and alternative approaches. The sections below will place the issue of energy in Europe in the larger context of climate change, and then turn to the discussion of renewable energy. It will be argued that while EU claims to lead ecological modernization,<sup>17</sup> as well addressing global concerns about climate change<sup>18</sup> – yet its leadership role for a transition to renewable energy leaves some room for interpretation<sup>19</sup>, especially in European embrace of biofuels.<sup>20</sup> We shall discuss the problematic role of biofuels in the European 'energy mix' in the sections below by first introducing the concept of C2C and CE, and then discussing how renewable energy is currently conceived in Europe. The question explored in this article is how the C2C and CE can be applied to evaluate the energy policy in Europe. The reason why these specific frameworks are especially relevant to the task of transition to sustainable energy is that they reach beyond the currently acceptable 'energy mix' solutions which still allow non-renewable or partially renewable sources of energy to be used. In being more categorically opposed to any sources of non-renewable energy, C2C and CE promise to address the root causes as well as offer realistic solutions to climate change, one of the key issues of concern identified in European environmental policy.

---

<sup>16</sup>

[https://www.actionaid.org.uk/sites/default/files/publications/biofuels\\_fuelling\\_hunger.pdf](https://www.actionaid.org.uk/sites/default/files/publications/biofuels_fuelling_hunger.pdf)

<sup>17</sup> Schelly 2015, pp 55-69.

<sup>18</sup> Lewis 2015.

<sup>19</sup> EC

[http://ec.europa.eu/clima/policies/international/negotiations/future/index\\_en.htm](http://ec.europa.eu/clima/policies/international/negotiations/future/index_en.htm) 'Paris agreement' Accessed May 17, 2016

<sup>20</sup> Van Renssen 2016.

## Climate Change

Increased consumption of fossil fuels results in emissions of greenhouse gases (GHG) and particularly carbon dioxide (CO<sub>2</sub>) that most scientists agree cause climate change and air pollution.<sup>21</sup> The International Panel for Climate Change (IPCC)<sup>22</sup> has established that it is necessary to limit GHG to avoid the 2 degrees Celsius warming threshold. However, at present, the use of fossil fuels has not subsided and the global GHG emissions have actually risen to about 40% after the signing of Kyoto Protocol.<sup>23</sup> The Kyoto Protocol<sup>24</sup> signed in 1987 was followed by initiatives developed in the consequent climate change conferences, including the Paris agreement (2015) that is currently threatened by the American presidency of Donald Trump<sup>25</sup>. A great threat to climate change is the immense complexity of the challenge, in social, economic and even cultural terms. Climate change is intimately intertwined with energy, transportation and tax policies, with the very fabric of 'modern' living dependent on fossil fuel economy<sup>26</sup>. As a result of difficulties of addressing climate change, at the turn of the millennium, the five-year mean of global surface air temperature has increased by 0.5 degrees Celsius.<sup>27</sup>

Despite present American withdrawal from climate mitigation commitments the curbing of emissions is seen as an issue of primary importance within international sustainability politics. The climate and energy package developed by the EU is a set of binding legislation, which aims to ensure the targets for 2020. Known as the "20-20-20" targets for

2020, the targets include a 20% reduction in EU emissions from 1990 levels; raising the share of EU's renewable energy consumption to 20%; and a 20% improvement in the EU's energy efficiency<sup>28</sup>. There is large variation in the level of target fulfilment with France, the Netherlands and UK lagging behind, and Sweden, Denmark, Finland and Belgium over-fulfilling their target<sup>29</sup>. Remarkably, many laggard countries rely on biofuels as primary sources of renewable energy<sup>30</sup>.

## Circular economy (CE) and Cradle to Cradle (C2C) frameworks

The authors of the Cradle to Cradle concept, McDonough and Braungart<sup>31</sup>, criticize the dominant method of industrial production as a "cradle to grave" process in which a product is made and then wasted. Recycling is in reality 'down-cycling' – an energy-costly process that invariably involves transportation, energy and water, and results in a product of less value. In fact, McDonough and Braungart argue, most products are not made from the start to be recycled, or even better, re-used infinitely: most of ubiquitous materials such as paper and plastic diminish in quality if recycled.

Another problem with conventional sustainability thinking is reliance on eco-efficiency – a strategy that tends to 'save' at least part of the product, such as electricity, by using it more efficiently. As McDonough and Braungart argue, however, a bad thing (such as

---

<sup>28</sup>EC

[http://ec.europa.eu/clima/policies/international/paris\\_protocol/energy/index\\_en.htm](http://ec.europa.eu/clima/policies/international/paris_protocol/energy/index_en.htm) 'A Global Deal for Climate'. Accessed 13 June 2015.

<sup>29</sup>

[https://ens.dk/sites/ens.dk/files/Globalcooperation/eu\\_energy\\_and\\_climate\\_policy\\_overview.pdf](https://ens.dk/sites/ens.dk/files/Globalcooperation/eu_energy_and_climate_policy_overview.pdf)

<sup>30</sup>[http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Biofuels%20Annual\\_The%20Hague\\_EU-28\\_7-15-2015.pdf](http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Biofuels%20Annual_The%20Hague_EU-28_7-15-2015.pdf)

<sup>31</sup> McDonough and Braungart 2002

---

<sup>21</sup> Kopnina and Blewitt 2014.

<sup>22</sup> IPCC 2011.

<sup>23</sup> IPCC 2014.

<sup>24</sup> IPCC 2014.

<sup>25</sup><http://www.independent.co.uk/news/world/americas/us-elections/president-donald-trump-disaster-paris-climate-change-agreement-cop-22-un-climate-summit-a7406366.html>

<sup>26</sup> Kopnina and 2014

<sup>27</sup> IPCC 2011.

fossil fuel converted to electricity) should not be 'efficient'. Efficiency helps to retain unsustainable products, instead of eliminating them altogether. In fact, most products, from cars to phones, are based on the 'built-in-obsolence' or 'planned obsolescence' principle<sup>32</sup>. This means that products are intentionally not made to last, stimulating consumers to buy newer models.

C2C formulates three key design principles for production, which are also crucial for understanding sustainable energy generation principles: (a) waste equals food; (b) use current solar income, and (c) celebrate diversity. More concretely:

*Waste equals food.* Unproductive waste does not exist in nature because the processes of each organism contribute to the health of the whole ecosystem. Typically, for example, a cherry tree's 'waste' is productive and even nutritional for other species – if not eaten, the berries and the leaves decompose into food for other living things providing nutrients flow indefinitely. Besides biological metabolism, the technical metabolism is designed to mirror natural cycles in a closed-loop system in which valuable, high-tech synthetics circulate in cycles of production, use, recovery and remanufacture.

*Use current solar income.* Noting that plants literally convert sunlight into useful substances used by other 'users' that are dependent on oxygen and vegetable food, sunlight is a logical source of endless renewable energy. Broadly, in C2C systems, any other types of endlessly available energy can be used, including wind and kinetic (power generated by movement) energy.

*Celebrate diversity.* Diversity in this case refers to healthy and various ecosystems that include highly complex communities of living things with a unique adaptation system to their surroundings that works in concert with other elements of this ecosystem. In recognising this

---

<sup>32</sup> Bulow 1986

natural diversity, C2C uses the idea of highly diversified and locally adapted natural systems as a prototype for making products<sup>33</sup>.

In C2C planning, life cycle assessment helps to make informed choices at various stages in the product's life<sup>34</sup>. Life cycle assessments<sup>35</sup>, which are also very useful as cradle-to-cradle analyses, are a way to look at all the inputs (raw materials, energy, etc.) and all the outputs created from the production, use, and disposal of the product (the product itself, pollution, waste by-products, etc.). In this way, business leaders or indeed energy companies can use life cycle assessments to select the types of energy sources or materials that are really safer and cleaner and without unforeseen negative side effects. Based on C2C, a circular economy framework proposes 'closed-loop' systems in which it is – at least ideally – possible to decouple<sup>36</sup> economic growth from impact. In the section below, we shall discuss how the case of renewable energy can be viewed through C2C and CE frameworks.

### Renewable energy

Biomass is typically constituted from organic material such as plants, or algae and agricultural and urban organic (biodegradable) rest-products, with these materials used for generation of heat, electricity, fuel, and chemicals (ECg<sup>37</sup>). Another way to produce energy from biomass is garbage incineration, a technology otherwise known as "waste-to-

---

<sup>33</sup> Kopnina and Blewitt 2014.

<sup>34</sup><http://eplca.jrc.ec.europa.eu/uploads/LCT-Making-sustainable-consumption-and-production-a-reality-A-guide-for-business-and-policy-makers-to-Life-Cycle-Thinking-and-Assessment.pdf>

<sup>35</sup> <https://www.gdrc.org/uem/lca/lca-define.html>

<sup>36</sup> Kopnina and Blewitt 2014.

<sup>37</sup>

<http://ec.europa.eu/energy/en/topics/renewable-energy/biomass> 'Biomass' Accessed 13 June 2017.

energy technologies” or “energy recovery”, which is a widely used energy source notably in The Netherlands<sup>38</sup>. However, some sustainability experts have pointed out that there are severe side effects of most of such renewable energy sources.<sup>39</sup> The monocultures of ‘fuel forests’ compete with productive agricultural land<sup>40</sup> and wild habitats. Biofuels generate CO<sub>2</sub> when burned, but also the process that involves planting crops for generation of biofuel, fertilizing, harvesting, processing, and distribution emits significant amounts of CO<sub>2</sub>.<sup>41</sup> Biofuels also require continuous supply of timber, some of which takes tens of years to regenerate.<sup>42</sup>

Solar and wind were singled out as the most promising sources of renewable energy and were calculated to be able to supply between 10 and 31% of electricity worldwide by 2050.<sup>43</sup> Complementary to wind and solar energy, geothermal energy, the energy of the ocean’s waves, which are driven by both the tides and the wind<sup>44</sup> look promising. Geothermal energy, using hot water or steam reservoirs deep in the earth, taps the Earth’s internal heat for electricity and heat production<sup>45</sup>. Tidal stream systems utilize the kinetic energy from water currents to turn turbines<sup>46</sup>. Indeed, according to

<sup>38</sup> [http://www.suez-environnement.fr/wp-content/uploads/2015/03/Reenergy\\_EN.pdf](http://www.suez-environnement.fr/wp-content/uploads/2015/03/Reenergy_EN.pdf)

<sup>39</sup> Steer and Hanson 2015.

<sup>40</sup> Walsh 2014.

<sup>41</sup> Steer and Hanson 2015.

<sup>42</sup> The Economist 2013.

<sup>43</sup> Barthelmie and Pryor 2014, pp 684-688; Diesendorf 2014.

<sup>44</sup> Renewable Energy World <http://www.renewableenergyworld.com> ‘Renewable Energy News & Information’. Accessed 13 June 2017.

<sup>45</sup> NREL [http://www.nrel.gov/learning/re\\_geothermal.html](http://www.nrel.gov/learning/re_geothermal.html) ‘Geothermal energy basics’ Accessed 13 June 2017.

<sup>46</sup> Tidal energy EUa [http://www.tidalenergy.eu/tidal\\_stream\\_system.html](http://www.tidalenergy.eu/tidal_stream_system.html)

C2C and CE frameworks, such systems are the only truly renewable sources of energy. Below we will focus on solar and wind energy and relate them to European energy policy.

### Wind power

Wind power is known for hundreds of years for its use in windmills, and wind turbines today.<sup>47</sup> The Dutch windmills, for example, were present before the fourteenth century, with wind power applied to a wide range of industrial production<sup>48</sup>.

At present, wind power can be stored either as electricity in batteries, heat in such media as molten salt, or as hydrogen, compressed air, or pumped storage, so that power is available on demand.<sup>49</sup> Battery storage has recently helped to improve capacity to store intermittent wind energy.<sup>50,51</sup> The enlargement of the grid system, linking geographically dispersed wind turbines has facilitated power transfer.<sup>52</sup>

The challenge of integrating wind power into established electric power grids is described in the report *Technology Roadmap: Wind Energy*, by the International Energy Agency<sup>53</sup>. The *Roadmap* estimates that wind energy could account for up to 18% of the world’s electricity by 2050, compared with 2.6% today. Yet, continuous obstacles hamper the successful spread of wind energy. One of the central arguments against wind energy is its cost.<sup>54</sup> An important factor in this respect is when established power companies buy excess power

[ms.html](https://www.iea.org/publications/freepublications/publication/Wind_2013_Roadmap.pdf) ‘Tidal energy stream systems’ Accessed 13 June 2017.

<sup>47</sup> Manwell et al. 2010.

<sup>48</sup> Kaldellis and Zafirakis 2011, pp 1887-1901.

<sup>49</sup> Armand and Tarascon 2008, pp 52-657.

<sup>50</sup> Divya and Østergaard 2009, pp 511-520.

<sup>51</sup> Teleke et al 2010, pp 787-794

<sup>52</sup> Sathyajith 2006

<sup>53</sup>

[https://www.iea.org/publications/freepublications/publication/Wind\\_2013\\_Roadmap.pdf](https://www.iea.org/publications/freepublications/publication/Wind_2013_Roadmap.pdf) Accessed 13 June 2017.

<sup>54</sup> Breton and Moe 2009, pp 646-654.



from disseminated wind power sources at a good price.<sup>55</sup> In the UK, the Government's Department for Energy and Climate Change (DECC) introduced the feed-in-tariffs or FITs in 2010,<sup>56</sup> providing opportunity for consumers to get money from their energy supplier if they installed a wind electricity-generating technology<sup>57</sup>, enabling private users to save money on self-generated electricity, exporting surplus electricity to the grid.<sup>58</sup> According to the European Wind Energy Association (EWEA), onshore wind is cheaper than most other sources of energy when the costs of 'external' factors like pollution; toxicity and GHGs are taken into account.

Direct support mechanisms, such as government subsidies, as well as indirect ones, such as tax exemptions, price controls, trade restrictions, and limits to market access in regard to renewable energy need to be examined<sup>59</sup>. Indeed, if government regulators were to levy a significant carbon tax, they would drive the most polluting energy generators off the market, instead of relying on the European Emissions Trading system which at present has a very low carbon price<sup>60</sup>.

One significant barrier is industrial lobbies unwilling to undertake costly transition from fossil to renewable energy,<sup>61</sup> as well as protectionist national laws.<sup>62</sup> Fossil fuel lobbies often mediate public support of<sup>63</sup> or protest

against<sup>64</sup> renewables<sup>65</sup>. Clever political and media manipulation by established power hegemonies<sup>66</sup> often places renewable energy production at a disadvantage in comparison to more 'traditional' industries that supposedly provide jobs and economic prosperity.<sup>67</sup> Such manipulation obscures the multiple benefits offered by wind power, including job creation and indeed, long-term prosperity.<sup>68</sup> The so-called 'green jobs' within wind industry are professions including engineers, iron and steel workers, millwrights, sheet metal workers, construction equipment operators, industrial truck drivers, and industrial production managers.<sup>69</sup> Thus, wind power provides hope for a possibility of generation of environmentally benign generation on the global scale.<sup>70</sup>

### Solar power

In 1905, Albert Einstein published a paper explaining the photoelectric effect on a quantum basis.<sup>71</sup> Since then, technologies have been developing quickly. Generating solar power involves the conversion of sunlight into electrical charge, either directly or through concentrated solar power (CSP)<sup>72, 73</sup>. CSP can generate electricity without direct sunshine<sup>74</sup>, rather requiring clear-sky solar radiation.<sup>75</sup> As in the case of wind energy, research and development helped to bring down the price of

---

<sup>55</sup> Mendonça 2009.

<sup>56</sup> Seyfang et al. 2013, pp 977-989.

<sup>57</sup> Walker 2012, pp 383-388. (2012).

<sup>58</sup> Energy Saving Trust 2015, UK. scheme <http://www.energysavingtrust.org.uk/domestic/content/feed-tariff-scheme>. Accessed 1 May 2016.

<sup>59</sup> Rhodes 2016, pp 97-104.

<sup>60</sup> The Economist 2015c

<sup>61</sup> Washington 2015.

<sup>62</sup> Braun 2012, p 14.

<sup>63</sup> Firestone & Kempton 2007, pp 1584-1598; Firestone et al. 2009, pp 183-202.

---

<sup>64</sup> Van Klaveren 2016.

<sup>65</sup> Van Klaveren 2016.

<sup>66</sup> Michaelowa 2000, pp 277-292.

<sup>67</sup> Levy and Egan 2003, pp 803-829.

<sup>68</sup> Bell et al. 2005, pp 460-477.

<sup>69</sup> Blanco and Rodrigues 2009, pp 2847-2857; Cleary and Kopicki 2009.

<sup>70</sup> Ibid.

<sup>71</sup> Pais 1982.

<sup>72</sup> Blair et al 2008.

<sup>73</sup>

[http://cordis.europa.eu/news/rcn/132388\\_en.html](http://cordis.europa.eu/news/rcn/132388_en.html) Accessed 1 May 2016.

<sup>74</sup> Pfenninger et al. 2014, pp 689-692.

<sup>75</sup> Boyde 2014.

solar power technologies, with the battery capacity to store solar energy improving so rapidly<sup>76,77</sup>. It was calculated that, solar technology could potentially generate enough clean, renewable energy to provide a global supply of energy, provided land, sunlight, and legal permits<sup>78,79</sup>. More recent discoveries and technological advancements have even enabled the first around-the-world solar flight<sup>80</sup>. Moreover, jobs in the sectors such as engineering, industrial machinery mechanics, welding, metal fabrication, electrical equipment assemblies, construction equipment operating, and construction management have actually resulted from development of solar technologies.<sup>81</sup> It becomes also evident that the plummeting prices for solar panels can also be beneficial to both the solar power developers and consumers. The energy generated by the sun and wind can be potentially appealing as aside from harnessing, storage and transfer technology, it is cost-free<sup>82</sup> as the production becomes more advanced and cost competitive.<sup>83</sup> Once a wind turbine or solar farm is set up, the marginal cost of its power output is almost zero<sup>84</sup>. It has been argued by the proponents that sunlight and wind are waste-free<sup>85</sup> as they avoid depletion of resources<sup>86</sup> and safe<sup>87</sup>, as their use does not include potentially hazardous by-products, as

nuclear energy does.<sup>88</sup> Thus, proponents of long-term sustainability have argued against compromises in energy mix and for strict reliance on wind and solar energy.<sup>89</sup>

However, there are still some considerable obstacles to the global use of solar energy. First of all, the demand did not keep pace with increasing supply, partially due to competition from other type of energy sources.<sup>90</sup> There are also significant political and ideological barriers to the use of solar power<sup>91</sup>, with fossil fuel lobbies cleverly placing public and media attacks against measures that would restrict their operations.<sup>92</sup>

### The business of subversion

Prior to the EU Treaty of Lisbon<sup>93</sup> in 2007, EU energy legislation was based on the EU's authority in the area of the common market and environment. The Treaty of Lisbon involved member countries' solidarity in matters of energy supply and changes to the energy policy. In practice, individual European countries still decide on their energy mix.<sup>94</sup> In Britain, Luxembourg, Malta and the Netherlands got less than 5 percent from green sources.<sup>95</sup> Solar energy now satisfies about 2% of the demand in the EU<sup>96</sup>, while supply has grown many-fold in the last few years due to Chinese and American production<sup>97</sup>. Biomass appears to be a source favoured by environmental and energy

<sup>76</sup> Divya and Østergaard 2009, pp 511-520; Teleke et al. 2010, pp 787-794.

<sup>77</sup> Nemet 2006, pp 3218-3232.

<sup>78</sup> Diesendorf 2014.

<sup>79</sup> London 2012.

<sup>80</sup> <http://www.solar-flight.com> 'Solar Flight' Accessed 13 June 2017.

<sup>81</sup> Cleary and Kopicki 2009.

<sup>82</sup> Kopnina and Blewitt 2014.

<sup>83</sup> Kopnina and Blewitt 2014; Kopnina and Shoreman-Ouimet 2015.

<sup>84</sup> The Economist 2015c.

<sup>85</sup> McDonough and Braungart 2002.

<sup>86</sup> Washington 2015.

<sup>87</sup> Delucchi and Jacobson 2011, pp 1154-1169.

<sup>88</sup> Barthelmie and Pryor 2014, pp 684-688; Diesendorf 2014.

<sup>89</sup> Daly 1991; Washington 2015.

<sup>90</sup> Wang 2012.

<sup>91</sup> Geels 2014

<sup>92</sup> Adger et al. 2009, 93:335-354.

<sup>93</sup> Ibid.

<sup>94</sup> Ibid.

<sup>95</sup> Lewis 2015.

<sup>96</sup> EPIA 2016

<http://www.epia.org/news/publications/global-market-outlook-for-photovoltaics-until-2016> 'Global market outlook photovoltaics' Accessed 13 June 2017.

<sup>97</sup> Vaughan 2017.

ministries in Europe<sup>98</sup>, with some of supply coming from American and Canadian forests that are cut to create wood pellets.<sup>99</sup>

Cultivation of biofuels often moves to natural land such as forests or grasslands<sup>100</sup>. Yet, the effects of this include the loss of biodiversity<sup>101</sup>, deforestation and the actual net increase of emissions<sup>102</sup> in Europe and beyond. Applying the C2C and CE frameworks, it is clear that the burning of biomass is a ‘cradle to grave’ process, with energy generation similar to down-cycling, in which valuable materials are ‘reworked’ for a less valuable (and in this case, briefly lasting) product.

Non-renewables are limited in terms of their permanent availability and ability to ‘earn back’ technology investment harnessing and storing their power<sup>103</sup>. By strict definition, the only truly renewable sources of energy are sun, water (tidal waves), geo-thermal and wind.

Yet, closed-loop frameworks can be subverted to the business-as-usual practices. The Ellen MacArthur Foundation website<sup>104</sup> that places some businesses on the ‘best case study’ list of circular economy is replete with companies that focus on conventional business-as-usual sustainability<sup>105</sup>. The companies report their efforts at minimising damage, recycling (thus downcycling) and eco-efficiency in parts of their

operations, without revising the entire business models and supply chains. Circular economy is still advertised as a ‘new engine of growth’, rather than promoting fundamental change. Thus, optimistic ‘simple and easy’ approaches or compromises such as energy mix need to be treated with caution.

The Roadmap to Circular Economy formulated by the European Commission seems to be narrowly focused on economic growth, sustainable development<sup>106</sup> and ‘sustainable and inclusive economic growth’<sup>107</sup>. The recent European energy strategy referred to in the Introduction of this article is replete with ‘economic growth’ objectives<sup>108</sup>. Often, the terms used in the so-called ‘best case’ examples placed on MacArthur Foundation’s website include the terms describing practices of the good old efficiency and recycling (and not infinite reuse)<sup>109</sup>, suggesting, regrettably, green-washing.

Another risk of subversion comes from over-reliance on monumental technological projects to solve climate change, and in the process abandoning the common-sense solutions offered by infinitely reusable energy of wind and sun. An example of this subversion is the Economist’s article<sup>110</sup> in the Special issue titled ‘Clear thinking on climate change’. The editorial states:

<sup>98</sup> EC

<http://ec.europa.eu/energy/en/topics/renewable-energy/biomass> ‘Biomass’ 17 May 2016.

<sup>99</sup> The Economist 2013.

<sup>100</sup> EC

<http://ec.europa.eu/energy/en/topics/renewable-energy/biofuels> ‘Biofuels’ Accessed 17 May 2017.

<sup>101</sup>

<https://www.nature.com/nature/journal/v405/n6783/full/405234a0.html>

<sup>102</sup> Walsh 2014; Steer and Hanson 2015.

<sup>103</sup> WEF 2013

<sup>104</sup> <https://www.ellenmacarthurfoundation.org/>

<sup>105</sup>

<https://www.ellenmacarthurfoundation.org/ce/100/directory/the-coca-cola-company>

<sup>106</sup> EC [http://ec.europa.eu/smart-regulation/impact/planned/ia/docs/2015\\_env\\_065\\_env+032\\_circular\\_economy\\_en.pdf](http://ec.europa.eu/smart-regulation/impact/planned/ia/docs/2015_env_065_env+032_circular_economy_en.pdf) ‘Circular economy’ Accessed 17 May 2017.

<sup>107</sup> EC

[http://ec.europa.eu/environment/ecoap/about-eco-innovation/good-practices/eu/575\\_en.htm](http://ec.europa.eu/environment/ecoap/about-eco-innovation/good-practices/eu/575_en.htm) ‘Eco-innovation at the heart of European policies’ Accessed 17 May 2017.

<sup>108</sup> [http://europa.eu/rapid/press-release\\_IP-16-4009\\_en.htm](http://europa.eu/rapid/press-release_IP-16-4009_en.htm) Accessed 13 June 2017.

<sup>109</sup> EC

[http://ec.europa.eu/environment/circular-economy/index\\_en.htm](http://ec.europa.eu/environment/circular-economy/index_en.htm) ‘Circular economy’ Accessed 17 May 2017.

<sup>110</sup> The Economist 2015b, p. 5.

*Paying for yet more wind turbines and solar panels is less wise than paying for research into the technologies that will replace them. Mankind will also have to think much more boldly... It will have to adapt, in part by growing crops that can tolerate heat and extreme weather, in part by abandoning the worst-affected places. Animals and plants will need help, including transporting them across national and even continental boundaries. More research is required on deliberately engineering the Earth's atmosphere in order to cool the planet.*

It is not entirely clear how humanity is going to engage in such planetary ambitious project, undertaking the Noah's monumental effort to move all species into safety (and what region will be safe?). C2C and CE do not require such apocalyptic (and very possibly dangerous) scenarios. While C2C and CE production systems still has a long way to go in practice, these systems can potentially reach beyond business-as-usual. This can imply that producers and consumers need to draw examples from pre-industrial design. Alternatively, and perhaps more appealingly to those averse to 'retrogressive' products, such production system can be innovative. In fact, a combination of 'ancient' natural materials, such as sun, water and wind, and modern technologies such as photovoltaic panels or wind turbines, illustrate how energy supply can be made sustainable.

In the case of biofuel, the material input (e.g. vegetable matter or garbage) and outputs created from the production process all present reasons for concern. Presently, considering different renewable energy options that are available on the European policy making table<sup>111</sup>, the policy choices do not seem to be

<sup>111</sup>

[https://ec.europa.eu/energy/sites/ener/files/documents/1\\_en\\_act\\_part1\\_v7\\_1.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/1_en_act_part1_v7_1.pdf) Accessed 17 May 2017.

guided by understanding of transformative sustainability frameworks. Citing the case of biofuels, the authors of C2C describe that the 'typical response to industrial destruction has been to find a less bad approach'<sup>112</sup>, particularly as regards those produced by burning trees or garbage<sup>113</sup>. The authors of the Cradle to Cradle book and model have asserted that while the garbage incineration may seem 'green', it is only one step removed from the so-called cradle-to-grave model in which the "Waste to Energy" paradigm fails to consider the high nutrient value of waste.<sup>114</sup> Most significantly, burning mixed garbage that contains valuable biological and technological materials literally makes valuable resources go up in smoke for a short spurt of energy:

*Through incineration, we are throwing away exhaustible raw materials, along with the energy needed to mine natural resources and manufacture them into consumable products. With this approach, not only do we lose valuable nutrients, we also create an aggressive disincentive for materials' reuse.<sup>115</sup>*

Moreover, incinerators must keep being fed garbage for many years to be economical, removing incentives to reuse or recycle materials, or to terminate production of waste substances and toxic materials in the first place<sup>116</sup>. Through the creation of an 'eco-efficient' material, the destructive production process or material is only being slowed down, not halted completely.

## Conclusions

If the EU is to revisit the *Limits to Growth*,<sup>117</sup> transformation based on C2C/CE principles needs to be considered, with political leaders

<sup>112</sup> McDonough and Braungart 2002: 45

<sup>113</sup> <https://materia.nl/article/future-materials-and-being-good/> Accessed 13 June 2017.

<sup>114</sup> McDonough and Braungart 2002.

<sup>115</sup> Braungart 2013.

<sup>116</sup> The Economist 2015a

<sup>117</sup> Meadows et al. 1972.

taking decisive action on environmental problems associated with energy use<sup>118</sup>. The American inventor Thomas A. Edison<sup>119</sup> asserted many years ago: “I’d put my money on the sun and solar energy. What a source of power! I hope we don't have to wait until oil and coal run out before we tackle that”. Will the EU follow this advice? Future projections support this hope as it is predicted that the price of solar power will continue to fall<sup>120</sup>, until it becomes one of the cheapest form of energy. Increasing technical advances lead to the better affordability of wind<sup>121</sup> and solar power<sup>122, 123</sup>. An appropriate decarbonisation of the energy system must involve the three main sectors of heat, electricity and transport. Different renewable sources are differently suitable for each of the sectors, which sometimes overlap, and are sometimes distinct. Renewable electricity resources are often supported by solar and wind, with sources for renewable heat often relying on biomass, and renewable energy use in transport (biofuels). A technological as well as social and economic transition is needed for the transition to Cradle to Cradle and circular economy in energy.

## References

Adger WN, Dessai S, Goulden M, Hulme M, Lorenzoni I, Neslen DR, Naess LO, Wolf J, Wreford A (2009) Are there social limits to adaptation to climate change? *Climatic Change* 93:335-354

Armand M, Tarascon JM (2008) Building better batteries. *Nature*, 451(7179): 652-657

Barthelmie RJ, Pryor SC (2014) Potential Contribution of wind energy to climate change mitigation. *Nature Climate Change* 684-688

<sup>118</sup> Ross 2013.

<sup>119</sup> In Rodgers 2007

<sup>120</sup> Randall 2015.

<sup>121</sup> Neslen 2015.

<sup>122</sup> Norwood 2014.

Bell D, Gray T, Haggett C (2005) The ‘social gap’ in wind farm siting decisions: explanations and policy responses. *Environmental politics* 14(4), 460-477

Blair N, Mehos M, Christensen C, Cameron C (2008) Modelling photovoltaic and concentrating solar power trough performance, cost, and financing with the solar advisor model. *Solar* 2008, American Solar Energy Society

Blanco MI, Rodrigues G (2009) Direct employment in the wind energy sector: An EU study. *Energy policy* 37(8), 2847-2857

Bulow J (1986) "An Economic Theory of Planned Obsolescence" *The Quarterly Journal of Economics*. New York: John Wiley & Sons, Inc. **101** (4): 729–749

Boyde M (2015) Concentrating Solar Power: Prospects and Challenges. Environmental Health Policy Institute.

<http://www.psr.org/environment-and-health/environmental-health-policy-institute/responses/concentrating-solar-power.html>. Accessed 17 January 2017

Braun JF (2011) EU Energy Policy under the Treaty of Lisbon Rules: Between a new policy and business as usual. EPIN Working Papers, p 14

Braungart M (2013) Cradle to Cradle: Transitioning from Waste Incineration to Beneficial Materials.

<http://catalystreview.net/2010/02/cradle-to-cradle-transitioning-from-waste-incineration-to-beneficial-materials/>. Accessed 17 January 2017

Breidhardt A. (2011) German government wants nuclear exit by 2022 at latest. Reuters. <http://uk.reuters.com/article/2011/05/30/us-germany-nuclear-idUKTRE74Q2P120110530>. Accessed 17 January 2017

Breton SP, Moe G (2009) Status, plans and technologies for offshore wind turbines in Europe and North America. *Renewable Energy* 34(3): 646-654

Cleary J, Kopicki A (2009) *Preparing the Workforce for a “Green Jobs” Economy*. Rutgers, NJ: John J. Heldrich Center for Workforce Development

- Daly H (1991) *Steady State Economics*. Island Press, Washington
- Diesendorf M (2014) Sustainable Energy Solutions for Climate Change. *Earthscan*, London
- Delucchi MA, Jacobson MZ (2011) Providing all global energy with wind, water, and solar power, Part I: Technologies, energy resources, quantities and areas of infrastructure, and materials. *Energy Policy* 39, pp 1154-1169
- Divya KC, Østergaard J (2009) Battery energy storage technology for power systems—An overview. *Electric Power Systems Research* 79(4), 511-520
- Duflou, J. R., Sutherland, J. W., Dornfeld, D., Herrmann, C., Jeswiet, J., Kara, S., ... & Kellens, K. (2012) Towards energy and resource efficient manufacturing: A processes and systems approach. *CIRP Annals-Manufacturing Technology*, 61(2), 587-609
- The Economist (2013) Wood: The fuel of the future. Environmental lunacy in Europe. <http://www.economist.com/news/business/21575771-environmental-lunacy-europe-fuel-future>. Accessed 17 May 2017
- The Economist (2015a) Waste disposal: Keep the fires burning. April 25. Pp. 49-50. <http://www.economist.com/news/china/21649540-waste-incinerators-rile-public-are-much-better-landfill-keep-fires-burning> Accessed 17 May 2017
- The Economist (2015b) Hot and bothered. November 28. Pp. 3-5.
- The Economist (2015c) Energy: When the wind blows. November 28. Pp. 7-8.
- Ellen MacArthur Foundation (2014) *Towards the circular economy: Accelerating the scale-up across global supply chains*. MacArthur Foundation, Geneva.
- Ellen MacArthur Foundation <https://www.ellenmacarthurfoundation.org/circular-economy>
- Firestone J, Kempton W (2007) Public opinion about large offshore wind power: underlying factors. *Energy policy* 35(3): 1584-1598
- Firestone J, Kempton W, Krueger A (2009) Public acceptance of offshore wind power projects in the USA. *Wind Energy* 12(2): 183-202
- Geels, F W (2014) Regime resistance against low-carbon transitions: Introducing politics and power into the multi-level perspective. *Theory, Culture & Society*, 31(5), 21-40
- González JS, Lacal-Aránzaga R (2016) A review of regulatory framework for wind energy in European Union countries: Current state and expected developments. *Renewable and Sustainable Energy Reviews* 56: 588-602
- Guarnieri M (2015) The rise of light. In History of High-Technologies and their Socio-Cultural Contexts Conference (HISTELCON), 2015 ICOHTEC/IEEE International, pp. 1-14
- IPCC (2014) Climate Change 2014: Synthesis Report. <http://www.ipcc.ch/report/ar5/syr/>. Accessed 17 January 2017
- IPCC (2011) Special Report on Renewable Energy Sources and Climate Change Mitigation. Prepared by Working Group III of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, pp. 1075
- Johnson, K. (2009) "Is Nuclear Power Renewable Energy," Wall Street Journal, 21 May. <http://blogs.wsj.com/environmentalcapital/2009/05/21/is-nuclear-power-renewable-energy/>. Accessed 17 January 2017
- Kaldellis JK, Zafirakis D (2011) The wind energy (r) evolution: A short review of a long history. *Renewable Energy* 36(7):1887-1901
- Kopnina H, Blewitt J (2014) *Sustainable Business: Key Issues*. Routledge, London
- Kopnina H, Shoreman-Ouimet E (eds) (2015) *Sustainability: Key issues*. Routledge, New York
- Knill C, Liefferink D (2012) The Establishment of EU Environmental Policy. In: Jordan AJ, Adelle C (eds) Environmental Policy in the European Union: Contexts, Actors and Policy Dynamics. *Earthscan*, London and Sterling, VA
- Levy DL, Egan D (2003) A Neo-Gramscian Approach to Corporate Political Strategy: Conflict and Accommodation in the Climate

- Change Negotiations. *Journal of Management Studies* 40(4): 803-829
- Lewis B (2015) EU on track for green energy goal but UK, Dutch lagging. <http://uk.reuters.com/article/2015/02/17/eu-renewables-idUKL5N0VQ45R20150217>. Accessed 17 January 2017
- London J (2012) Of Sunflowers and Solar Plants. <https://slice.mit.edu/2012/02/01/of-sunflowers-and-solar-plants/>. Accessed 17 January 2017
- Manwell JF, McGowan JG, and Rogers AL (2010) *Wind energy explained: theory, design and application*. John Wiley & Son
- McDonough W, Braungart M (2002) *Cradle to Cradle: Remaking the Way We Make Things*. Farrar, Straus and Giroux, New York
- Meadows DH, Meadows DL, Randers J, Behrens III WW (1972) *The Limits to Growth*. Universe Books, New York
- Michaelowa A (2000) The relative strength of economic interests in shaping EU climate policy: A hypothesis. *Energy & Environment* 11(3): 277-292
- Mendonça M (2009) *Feed-in tariffs: accelerating the deployment of renewable energy*. Routledge, New York
- Nemet GF (2006) Beyond the learning curve: factors influencing cost reductions in photovoltaics. *Energy policy* 34(17), 3218-3232
- Neslen A (2015) Dutch government ordered to cut carbon emissions in landmark ruling. <http://www.theguardian.com/environment/2015/jun/24/dutch-government-ordered-cut-carbon-emissions-landmark-ruling>. Accessed 17 January 2017
- Norwood Z, Nyholm E, Otanicar T, Johnsson F (2014) A Geospatial Comparison of Distributed Solar Heat and Power in Europe and the US. *Plos One*. <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0112442>. Accessed 17 January 2017
- Pais A (1982) *Subtle is the Lord: The Science and the Life of Albert Einstein*. Oxford University Press, USA
- Pfenninger S, Gauché P, Lilliestam J, Patt A (2014) Potential for concentrating solar power to provide baseload and dispatchable power. *Nature Climate Change* 689-692
- Randall T (2015) The Way Humans Get Electricity Is About to Change Forever. <http://www.bloomberg.com/news/articles/2015-06-23/the-way-humans-get-electricity-is-about-to-change-forever>. Accessed 17 January 2017
- Rhodes CJ (2016) The 2015 Paris Climate Change Conference: Cop21. *Science Progress* 99(1): 97-104
- Rodgers H (2007) Current Thinking. *The New York Times Magazine*. June 3. <http://www.nytimes.com/2007/06/03/magazine/03wwln-essay-t.html?mcubz=3> Accessed 17 January 2017
- Ross ML (2013) How the 1973 Oil Embargo Saved the Planet. *Foreign Affairs*. <https://www.foreignaffairs.com/articles/north-america/2013-10-15/how-1973-oil-embargo-saved-planet>. Accessed 17 January 2017
- Sandstede G, Cairns EJ, Bagotsky VS, Wiesener K (2010) *History of low temperature fuel cells. Handbook of Fuel Cells*. John Wiley and Sons
- Sathyajith M (2006) *Wind energy: fundamentals, resource analysis and economics*. Springer. [https://www.dolcera.com/wiki/images/Wind\\_power\\_energy.pdf](https://www.dolcera.com/wiki/images/Wind_power_energy.pdf). Accessed 17 January 2017
- Schelly C (2015) Frameworks for Understanding and Promoting Solar Energy Technology Development. *Resources* 4, 55-69
- Seyfang G, Park JJ, Smith A (2013) A thousand flowers blooming? An examination of community energy in the UK. *Energy Policy* 61, 977-989
- Stigka, E. K., Paravantis, J. A., & Mihalakakou, G. K. (2014) Social acceptance of renewable energy sources: A review of contingent valuation applications. *Renewable and Sustainable Energy Reviews*, 32, 100-106.
- Steer A, Hanson C (2015) Biofuels are not a green alternative to fossil fuels. *The Guardian*. <http://www.theguardian.com/environment/2015/jan/29/biofuels-are-not-the-green->

[alternative-to-fossil-fuels-they-are-sold-as.](#)

Accessed 17 January 2017 Accessed 17 January 2017

Teleke S. et al. (2010) Optimal control of battery energy storage for wind farm dispatching. *Energy Conversion*. IEEE Transactions 25(3): 787-794

Van Renssen S (2016) Biofuels are back on the EU agenda. <http://www.energypost.eu/biofuels-back-eu-agenda/>

Van Klaveren M (2016) Don Quichot op de Katwijkse Boulevard. Master thesis. Institute of Cultural Anthropology and Sociology. Leiden University

Vaughan, A. (2017) Solar power growth leaps by 50% worldwide thanks to US and China <https://www.theguardian.com/environment/2017/mar/07/solar-power-growth-worldwide-us-china-uk-europe>

Walker SL (2012) Can the GB feed-in tariff deliver the expected 2% of electricity from renewable sources? *Renewable Energy* 43, 383-388

Walsh B (2014) Even Advanced Biofuels May Not Be So Green. *Time*.

<http://time.com/70110/biofuels-advanced-environment-energy/>. Accessed 17 January 2017

Wang U (2012) Report: 180 Solar Panel Makers Will Disappear By 2015. *Forbes*.

<http://www.forbes.com/sites/uciliawang/2012/10/16/report-180-solar-panel-makers-will-disappear-by-2015/>. Accessed 17 May 2017

Washington H (2015) *Demystifying Sustainability: Towards Real Solutions*. Routledge, London.

WEF (World Economic Forum) (2013) *Energy Harnessing: New Solutions for Sustainability and Growing Demand*

[http://www3.weforum.org/docs/WEF\\_EN\\_EnergyHarnessing\\_Report\\_2013.pdf](http://www3.weforum.org/docs/WEF_EN_EnergyHarnessing_Report_2013.pdf)

Accessed 17 May 2017



## Nachhaltiges Bauen – Herausforderungen in Planerverträgen

Rechtsanwalt Dr. Florian Dressel\*

Zertifizierungen über die Nachhaltigkeit von Bauvorhaben erfreuen sich einer zunehmenden Nachfrage in der Baubranche. Die Gründe für die Bauherren, eine solche Zertifizierung anzustreben, sind vielfältig. Die Erlangung eines Zertifikats gleich welchen Anbieters setzt jedoch voraus, dass die Planungs- und Baubeteiligten hierzu wirksam vertraglich verpflichtet wurden. Den Grundstein für die spätere Zertifizierung legt dabei der Planer – gerade in der diesbezüglichen Vertragsgestaltung zeigen sich allerdings erhebliche Herausforderungen, die in der Praxis nicht zu unterschätzen sind.

### I. Einleitung

National wie international stellt das Thema Nachhaltigkeit eines der wichtigsten Leitbilder für die Zukunft dar.<sup>1</sup> Anlass für die Umsetzung nachhaltiger Ansätze in der Praxis sind beispielsweise die Entwicklungen auf der politischen Ebene, sei es zuletzt die Verabschiedung des Klimaschutzplans 2050

Dressel: Nachhaltiges Bauen – Herausforderungen in Planerverträgen(NZBau 2021, 224)

225

durch die Bundesregierung oder aber die so genannte Taxonomie-Verordnung<sup>2</sup> auf europäischer Ebene. Jenseits der politischen Bühne sehen sich Unternehmen häufig durch Selbstverpflichtungen (zB im Rahmen der environmental, social and governance) zu nachhaltigem Denken und Handeln veranlasst. Nicht zu unterschätzen ist schließlich auch die zunehmende Sensibilisierung in der öffentlichen Wahrnehmung, wie sie etwa in der „Fridays for Future“-Bewegung zutage tritt.

Ziel des nachhaltigen Bauens ist der Schutz allgemeiner Güter wie Umwelt, Ressourcen, Gesundheit, Kultur und Kapital. Üblicherweise werden dabei drei Dimensionen der Nachhaltigkeit benannt: Ökologie, Ökonomie und soziokulturelle Aspekte.<sup>3</sup> Die Ausprägungen nachhaltiger Leitbilder in der Baubranche sind dabei vielseitig. Zu nennen sind hier durchgängige und konsequente Kreislaufwirtschaftsansätze wie das „Cradle to Cradle“-Prinzip.<sup>4</sup> Auf ganz anderer Ebene greifen Siegel für nachhaltige Baumaterialien ein, die weniger das übergreifende Konzept, als vielmehr die konkrete Umsetzung des Bauvorhabens im Blick haben. Als Beispiele zu nennen sind hier die FSC-Siegel, TÜV-ProfiCert oder CSC. In der Baupraxis erlangen daneben die so genannten Zertifizierungssysteme wie beispielsweise DGNB,<sup>5</sup> LEED,<sup>6</sup> BREEAM,<sup>7</sup> BNB<sup>8</sup> oder HQE<sup>9</sup> zunehmend Bedeutung. Derartige Zertifizierungssysteme beziehen sich auf die drei klassischen Aspekte der Nachhaltigkeit und bewerten in unterschiedlicher Gewichtung die technischen Eigenschaften von Standort, Nutzung, Planungs- und Bauprozess. Das in Deutschland vor allem gebräuchliche DGNB-System betrachtet den gesamten Lebenszyklus eines Gebäudes: Von der Planung bis zum Rückbau. Dabei können vier Zertifikate erworben werden: Platin, Gold, Silber und Bronze. Für jedes Kriterium hat die DGNB Zielwerte definiert, die unterschiedlich gewichtet werden.

Der Schlüssel zu erfolgreichen nachhaltigen Bauvorhaben ist jedoch die erfolgreiche Umsetzung der verschiedenen Konzepte und Systeme in der Praxis. Maßgebliche Bedeutung kommt dabei im klassischen Bauablauf aus deutscher Perspektive den Planungsleistungen zu. Hier wird die Grundlage für die Bewertung des zu errichtenden Gebäudes als nachhaltig gelegt. Dem zwischen Bauherrn und Architekten bzw. Fachingenieur (nachfolgend zusammenfassend: Planer) abzuschließenden Vertrag kommt damit eine maßgebliche Bedeutung hinsichtlich des vom Bauherrn angestrebten Erfolgs zu. Nachfolgend sollen exemplarisch einzelne Herausforderungen

## Anlage 29

erarbeitet werden, die sich in der Gestaltung und Abwicklung von Planerverträgen im Zusammenhang mit der Umsetzung nachhaltiger Zertifizierungssysteme stellen. Da es sich zumeist um grundlegende, systematische Fragen handelt, kommt es im Einzelnen nicht darauf an, um welches Zertifizierungssystem es sich handelt. Um die einzelnen Problemstellungen jedoch besser darlegen zu können, wird exemplarisch immer wieder auf das Zertifizierungssystem der DGNB verwiesen.

## II. Vertragliche Vereinbarung und geschuldeter Erfolg

In einem ersten Schritt stellt sich die Frage, wie die Anforderungen der Zertifizierungssysteme überhaupt vertraglich vereinbart werden können.

Die Zertifizierung der Nachhaltigkeit eines Bauvorhabens hat ausschließlich zivilrechtlichen Charakter. Bei den Zertifizierungen handelt es sich nicht um öffentlich-rechtliche Verwaltungsakte.<sup>10</sup> Soweit ein Bauherr demnach ein Bauvorhaben plant, das etwa dem DGNB-Goldstandard genügen soll, muss er den von ihm zu beauftragenden Planer auf zivilrechtlichem Wege zur Einhaltung der entsprechenden Leistungsanforderungen verpflichten. Dies erfolgt gem. § 650 p I BGB durch die Vereinbarung des gewünschten Zertifikats als Leistungsziel, das zur vertraglichen Beschaffenheit zählt. Der Planer wird damit in den weit überwiegenden Fällen (es kommt hier immer auf die konkrete Ausgestaltung im Einzelfall an) einen werkvertraglichen Erfolg schulden. Dieser liegt in der Zertifizierung in der jeweils gewünschten Stufe. Beachtenswert ist allerdings, dass der Planer die Zertifizierung an sich nicht selbst herbeiführen kann. Diese erfolgt ausschließlich durch das zertifizierende Unternehmen. Damit stellt sich allerdings die Frage, worin genau der vom Planer geschuldete Erfolg liegt.

Gerade in Planungsverträgen ergeben sich ähnliche Konstellationen zum Beispiel bei der an die Planung anknüpfenden Baugenehmigung. Auch diese wird durch die zuständige Behörde und nicht durch den Planer selbst erteilt. Auch in Konstellationen, in denen die Architekten und Ingenieure mit Überwachungsleistungen, etwa nach der Leistungsphase 8 des Leistungsbilds Gebäude und Innenräume der HOAI, beauftragt werden, gilt Ähnliches. Hier haben sie nach ständiger Rechtsprechung des *BGH*<sup>11</sup> in bestimmten Grenzen für die Mangelfreiheit des Gebäudes einzustehen, ohne dass sie dies selbst errichten. Die Abhängigkeit des werkvertraglich vereinbarten Erfolgs von Dritten ist dem Planervertrag demnach nicht fremd. Sie steht weder der Einordnung als Werkvertrag, noch dessen Durchführung entgegen. Dies gilt jedenfalls, solange die Beschaffenheit mit hinreichender Klarheit festgelegt wird.

Im Hinblick auf die Erteilung einer Baugenehmigung schuldet der Planer nicht die Genehmigung selbst, sondern lediglich eine genehmigungsfähige Planung.<sup>12</sup> Bei der Überwachung der Ausführung Dritter schuldet der Planer keine Ausführungsleistungen an sich, sondern eine Überwachungsleistung, die objektiv geeignet ist, ein mangelfreies Werk herbeizuführen.<sup>13</sup> Gleiches gilt auch für die Zertifizierung: Der Planer schuldet nicht die Zertifizierung in der vereinbarten Stufe selbst. Er schuldet vielmehr eine zum Zeitpunkt der Abnahme zertifizierungsfähige Planung der vereinbarten Stufe. Darin liegt der üblicherweise von ihm zu erbringende Erfolg. Die Herbeiführung dieses Erfolgs ist durch die Parteien als vertraglich vereinbarte Beschaffenheit hinreichend deutlich zu vereinbaren. Dabei versteht es sich von selbst, dass aus der vertraglichen Vereinbarung hervorgehen muss, für welches Bauvorhaben eine Zertifizierung welchen Anbieters in welcher Stufe geschuldet sein soll. Die Parteien des Vertrags müssen sich auch darüber einig sein, ob sich der

Dressel: Nachhaltiges Bauen – Herausforderungen in Planerverträgen (NZBau 2021, 224)

226

Planer im Sinne einer Garantie oder nur Beschaffenheitsvereinbarung verpflichtet.<sup>14</sup>

Für die konkrete Umsetzung der Beschaffenheitsvereinbarung gibt es verschiedene Möglichkeiten. Hier werden zwei Ansätze diskutiert, die in der Praxis allerdings auch häufig miteinander verbunden werden.<sup>15</sup> Möglich ist es zum einen, dass der Bauherr dem Planer im Vertrag die für die Erreichung des gewünschten Zertifizierungsgrads notwendigen Kriterien und Punktebewertungen verbindlich vorgibt. Diese können als Teilerfolge vereinbart werden. Ein solches Vorgehen setzt allerdings eine erhebliche technische Durchdringung des (im Allgemeinen noch zu planenden) Bauvorhabens voraus, die üblicherweise zum Zeitpunkt der Vertragsunterzeichnung nicht gegeben ist. Darüber hinaus beraubt sich der Bauherr hierdurch auch der Vorzüge, die die Flexibilität einzelner Zertifizierungssysteme in der Punkteverteilung mit sich bringt. Alternativ ist es möglich und jedenfalls in der vertraglichen Umsetzung zunächst deutlich einfacher, die vom Planer geschuldete Leistung funktional zu beschreiben. Hier wird zumeist lediglich vereinbart, dass die seitens des Planers zu erbringende Leistung qualitativ geeignet sein muss, um eine Zertifizierung in einem bestimmten Gesamterfüllungsgrad zu ermöglichen. Eine solche Regelung mag in der praktischen Umsetzung zum Zeitpunkt des Vertragsschlusses zunächst einfacher sein, sie birgt allerdings auch in der Planung an sich einige Schwierigkeiten, worauf nachfolgend gesondert einzugehen sein wird.

### **III. Punkteverteilung im Zertifizierungssystem als Gestaltungsspielraum des Planers**

Zertifizierungssysteme basieren üblicherweise auf einem System der Punkteverteilung. Voraussetzung der jeweiligen Zertifikate ist, dass ein zuvor definierter Gesamterfüllungsgrad der Punktebewertung erreicht wird. Im System der DGNB sind beispielsweise für die höchste Zertifizierung „Platin“ ein Gesamterfüllungsgrad ab 80 % und ein Mindesterfüllungsgrad von 65 % für fünf Themenfelder Voraussetzung.

Der Erfüllungsgrad wird im System der DGNB dadurch bestimmt, dass die Voraussetzungen für die Verteilung von Punkten in den Themenfeldern Ökologische Qualität, Ökonomische Qualität, Soziokulturelle und funktionale Qualität, Technische Qualität, Prozessqualität und Standortqualität definiert werden. Die Themenfelder werden in Kriteriengruppen und diese wiederum in Kriterien unterteilt. Dort werden dann, vergleichbar mit Tatbestand und Rechtsfolge, die Voraussetzungen im Einzelnen definiert (Tatbestand) und die Punktebewertung festgelegt (Rechtsfolge). Das System ist – unabhängig von der Auslegungsbedürftigkeit der Tatbestände im Detail – hinsichtlich der Punktebewertung mehrfach flexibel. So ist jeder Tatbestand zunächst mit einem maximalen Punktwert versehen. Dieser ergibt sich zum Teil durch simples Erfüllen des Tatbestands. Teilweise sind Einzelwerte aber auch zu addieren oder sogar zu interpolieren. Daneben sieht das System auch Boni vor (Bsp.: Agenda 2030-Boni). Diese können in einer Hauptkriteriengruppe angerechnet werden und führen zu einer Übererfüllung in einzelnen Bereichen, die sich positiv auf andere Bereiche auswirkt. Beispielsweise wirkt sich das Kriterium „Ambition beim Erreichen von Klimaneutralität“ mit maximal 30 zusätzlichen Punkten aus (Kriterium ENV 1). Schließlich wirken sich auch die Kriterien in unterschiedlicher Weise auf die Gesamtbewertung aus. So wirkt sich etwa bei einem Bürogebäude die Ökobilanz (Kriterium ENV 1.1) mit 10 % auf die Gesamtbewertung aus, der thermische Komfort nur mit 4,1 % (Kriterium SOC 1.1).

Diese kurze Übersicht der Punktebewertung bei den Zertifikaten der DGNB zeigt, dass die Bewertungsgrundlagen dynamisch sind. Dies führt allerdings nicht nur in der Zertifizierung des Bauvorhabens an sich zu Herausforderungen, sondern stellt auch einen nicht zu unterschätzenden Spielraum für den Planer dar. In Verträgen, in denen die Zertifizierung als Beschaffenheit nur funktional im Sinne der Erreichung eines bestimmten Zertifikats vereinbart wird, bleiben die Einzelheiten der Ausgestaltung dem Planer überlassen. Ihm obliegt es in diesen Fällen bereits, ob der für die vertraglich vereinbarte Zertifizierungsstufe notwendige Gesamterfüllungsgrad nur

gerade eben oder deutlich erreicht wird. Gibt die vertragliche Vereinbarung hier keinen konkreten Gesamterfüllungsgrad vor, so entspricht das Werk der vertraglich vereinbarten Beschaffenheit, wenn es geeignet ist, eine Zertifizierung in der entsprechenden Stufe zu erhalten. Macht der Vertrag keine weitergehenden Vorgaben, so kann der Planer auch durch Schwerpunktsetzung in der Ausgestaltung des Gebäudes Spielräume nutzen – solange die vereinbarte Beschaffenheit insgesamt nicht beeinträchtigt wird.<sup>16</sup> Zwar liegt auf der Hand, dass der Planer dabei keine Planungsvorgaben machen darf, die den Interessen des Auftraggebers offenkundig zuwiderlaufen. Die für den Bauherrn relevanten Einzelfragen bewegen sich jedoch häufig jenseits dieser eindeutigen Grenze.

In der Zertifizierungssystematik der DGNB für Neubauten ist beispielsweise das Themenfeld Prozessqualität (PRO) für die Zertifizierung entscheidend. Dieses unterteilt sich wiederum in die Kriteriengruppen „Qualität der Planung (PRO 1)“ und „Qualität der Bauausführung (PRO 2)“. Aus Sicht des Planers mag es hier von Vorteil sein, die Anforderungen an die Qualität seiner eigenen Leistungen niedrig anzusetzen – um das punktetechnische Defizit bei der Bauausführung wieder auszugleichen. Dort können durch verschiedene Messungen zur Qualitätskontrolle (2.1) zum Beispiel bis zu 60 Punkte erlangt werden – unabhängig von der Frage, ob diese aus streng bautechnischer Sicht überhaupt immer erforderlich sind.

Dieser Gestaltungsspielraum, der immer dann besteht, wenn sich die Parteien lediglich auf ein Zertifizierungsergebnis, nicht aber auf eine konkrete Punktebewertung auf dem Weg dahin geeinigt haben, steht grundsätzlich dem Planer zu. Selbstverständlich hat der Planer bei seiner Leistung auf die Interessen des Bauherrn Rücksicht zu nehmen und insbesondere wirtschaftlich zu planen. Jenseits der offenkundigen Fälle ergibt sich hier jedoch eine Vielzahl von Einzelentscheidungen, bei denen der Bauherr häufig wenige Möglichkeiten haben wird, im Sinne eines Mangelvorwurfs auf die Planung einzuwirken. Auf den ersten Blick mag es hier naheliegen, dem Bauherrn ein diesbezügliches Leistungsbestimmungsrecht zuzubilligen. Auch wenn der Vertrag hierzu keine konkreten Regelungen enthält, liegt es im Interesse des Bauherrn, beraten durch den Auditor, die jeweils zu setzenden Schwerpunkte in der Punkteverteilung definieren zu können. Ein solches Recht des Bauherrn könnte als einseitiges Recht zur Konkretisierung der Leistungsziele in Anlehnung an § 315 BGB vereinbart worden sein.<sup>17</sup> Voraussetzung dafür ist allerdings, dass die Parteien dem Bauherrn zumindest konkludent ein solches Recht einräumen wollten. Bei einer ausschließlich funktionalen Beschreibung erscheint das fraglich. Nicht zu unterschätzen ist zudem die Dispositionsfreiheit des Werkunternehmers.<sup>18</sup> Bis zum Zeitpunkt der Abnahme räumt das BGB dem Werkunternehmer, hier dem Planer, das Recht ein, sein Werk zu gestalten. In dieser Phase hat der Bauherr kaum Möglichkeiten, auf den Werkunternehmer einzuwirken (s. dazu nachfolgend unter VI). Bei funktiona-

Dressel: Nachhaltiges Bauen – Herausforderungen in Planerverträgen(NZBau 2021, 224)

227

len Beschaffenheitsvereinbarungen, die bei Vereinbarungen in einem frühen Projektstadium vorzugswürdig erscheinen, obliegt die konkrete Ausgestaltung der Werks damit im für den Bauherrn ungünstigsten Fall dem Werkunternehmer, hier dem Planer. Der im Zweifel fachkundig beratene Bauherr kann dann auf die Einzelheiten der Planung, die für die Verteilung der Punkte relevant sind, keinen Einfluss nehmen. Dies wäre nur dann möglich, wenn sich der Planer für solche Vorschläge zugänglich zeigt.

#### **IV. Zielkonflikte hinsichtlich der vertraglich vereinbarten Beschaffenheit**

Die Vereinbarung einer bestimmten Zertifizierungsstufe als vertraglich vereinbarte Beschaffenheit stellt häufig nicht die einzige Anforderung an die Leistung des Planers dar. Insofern können sich vielfach Wechselwirkungen, so genannte Zielkonflikte ergeben.<sup>19</sup> Bei Zielkonflikten handelt es sich um Elemente der Leistungsziele wie Qualität, Quantität, Kosten oder Zeit, die nicht miteinander vereinbar sind. Die Problematik zeigt sich beispielhaft an einer weiteren Anforderung an die Leistung des Planers, die in der weit überwiegenden Zahl der Verträge relevant wird.

Für fast alle Planungs- und Bauvorhaben ist die Einhaltung einer bestimmten Kostenobergrenze entscheidend. Diese kann im Vertrag zwischen Bauherr und Planer in unterschiedlichen Formen und Erscheinungen treten. Im Sinne einer Beschaffenheitsvereinbarung sind vertragliche Kostenobergrenzen zu verstehen.<sup>20</sup> Aber auch in Fällen, in denen im Vertrag selbst keine eindeutigen Regelungen enthalten sind, kann der Planer die Grenze der zur Verfügung stehenden Mittel des Bauherrn nicht einfach ignorieren – immerhin hat der *BGH* entschieden, dass auch die einseitige Kostenvorgabe des Bauherrn für den Planer verbindlich ist.<sup>21</sup> Die Einhaltung der Kostenobergrenze tritt damit neben die weiteren qualitativen Anforderungen, wie etwa die Erlangung einer bestimmten Zertifizierung. Hieraus können dann so genannte Zielkonflikte, das heißt Wechselwirkungen, resultieren. So kann die Planung entsprechend der Anforderungen einer bestimmten Zertifizierung beispielsweise die verbindliche Kostenobergrenze überschreiten.

Zunächst ist zu berücksichtigen, dass es sich bei vertraglichen Beschaffenheitsvereinbarungen – wenn sie denn gleichrangig sind – um verbindliche Leistungsversprechen handelt. Widersprechen sich diese dann tatsächlich diametral, so wird die Leistung des Planers gem. § 275 I BGB unmöglich.<sup>22</sup> Gemäß § 326 II BGB entfällt damit der Anspruch des Planers auf Gegenleistung, in diesem Fall Vergütung. In der Rechtsprechung wird versucht, dieses Ergebnis dadurch zu umgehen, dass die Leistungspflicht des Planers aufrechterhalten bleiben soll. Sie richtet sich allerdings auf eine nahezu gleichwertige Art der Leistungserbringung, die nicht unmöglich ist.<sup>23</sup> Das Bauwerk soll in seinen prägenden Grundzügen erhalten bleiben, die geänderte Planung soll dem Planer weiter zumutbar sein.<sup>24</sup> Da der Planer den Konflikt nicht ohne Mitwirkung des Bauherrn auflösen kann, ist dieser zur Kooperation und zur Entscheidung verpflichtet.<sup>25</sup> Der Planer ist jeweils gehalten, den Bauherrn hinreichend über die Unvereinbarkeit und die Alternativen aufzuklären. Es liegt dann am Bauherrn, zu entscheiden, welches der Leistungsziele vorrangig beibehalten werden soll. In den Beispielfällen müsste der Bauherr sich demnach entscheiden, ob die Zertifizierung der Einhaltung der Kosten vorgeht oder nicht.

Ein für den Planer nicht zu unterschätzendes Haftungsrisiko stellen die Sonderfälle dar, in denen sich die Zielkonflikte – erkennbar – schon vor Vertragsschluss aus den zur Verfügung gestellten Unterlagen ergeben. Auch in diesem Fall ist die Leistungserbringung gem. § 275 I BGB unmöglich, der Anspruch auf Honorar entfällt gem. § 326 I BGB. Allerdings droht dem Planer hier ein Schadensersatzanspruch aus § 311 a II BGB.<sup>26</sup> Hier ist allerdings zu prüfen, inwiefern sich der Bauherr ein anspruchsminderndes Mitverschulden entgegenhalten lassen muss.

## **V. Einwirkungen des Auditors**

Zur Erlangung einer Zertifizierung sind in den jeweiligen Systemen in unterschiedlichem Umfang externe Experten in das jeweilige Bauvorhaben einzubeziehen. Im BREEAM-Zertifizierungsprozess wird etwa zwischen dem Assessor, dem Advisory Professional und dem Associate unterschieden. Im DGNB-System sind so genannte Auditoren oder Consultants hinzuzuziehen. Der DGNB-Auditor für Gebäude, Innenräume oder Quartiere ist der Systemanwender, der über das Wissen zum DGNB-System verfügt. Er begleitet und dokumentiert ein Projekt nach Maßgabe des Systems und reicht es zur Zertifizierung ein; er tritt beratend auf, wenn es um die notwendigen nächsten Schritte im

Zertifizierungsprozess geht und unterstützt dabei den Auftraggeber.<sup>27</sup> Neben Hinweis- und Beratungspflichten, insbesondere gegenüber den Planern und dem Bauherrn, gehört es zu den Aufgaben der DGNB-Auditoren, eine Bewertung der Planungsleistungen vorzunehmen. Dabei wird bewertet, ob diese Leistungen für die Anforderungen der Zertifizierung ausreichend und geeignet sind.<sup>28</sup>

Die vertragliche Ausgestaltung des Auditoren-Vertrags hängt vom Einzelfall ab. Denkbar ist, dass der Auditor lediglich im Sinne einer beratenden Funktion als entgeltliche Geschäftsbesorgung vertraglich verpflichtet wird. In den meisten Fällen dürfte der Auditor jedoch mit der kompletten Durchführung des Auditierungsprozesses, mit dem Ziel, eine bestimmte Zertifizierung zu erreichen, beauftragt werden. Dann ist von einem geschuldeten Erfolg und damit einem Werkvertrag auszugehen. Die Eigenschaften des Auditoren-Vertrags und insbesondere seine konkrete Rolle im Verhältnis zu den übrigen Planungs- und Baubeteiligten abzugrenzen, würde die vorliegende Abhandlung überfrachten. Hier kommt es insbesondere auch immer auf die Einzelheiten der vertraglichen Gestaltungen an. Dabei stellen sich aber Einzelfragen mit nicht unerheblichen Auswirkungen – beispielsweise steht dem Bauherrn gegenüber dem Auditor das Änderungsrecht gem. § 650 b BGB nur dann zu, wenn das Vertragsverhältnis auch als Architekten- und Ingenieurvertrag iSd § 650 p BGB verstanden wird.

Ungeachtet der Einzelfragen der Einordnung des Auditoren-Vertrags können folgende Problembereiche gerade im Hinblick auf den Planer identifiziert werden:

### 1. Abgrenzung der Leistungsbereiche

Die Leistungsbereiche des mit der Begleitung der Zertifizierung beauftragten Auditors und des Planers, der eine zertifizierungsfähige Planung vorlegen soll, liegen naturgemäß nahe beieinander. Letztendlich kommt es hier immer auf die konkrete Ausgestaltung im Einzelfall an. Hilfreich kann es dabei sein, auf bereits bestehende (unverbindliche) Leis-

Dressel: Nachhaltiges Bauen – Herausforderungen in Planerverträgen(NZBau 2021, 224)	228
---	-----

tungsbilder zurückzugreifen.<sup>29</sup> Jedenfalls im Leistungsbild der DGNB besteht die Leistung des Auditors aber auch immer darin, die Planungsleistungen zu überprüfen. Die Prüfung beschränkt sich dabei nicht nur auf die Planung an sich – in vielen Fällen bringt sich der Auditor auch in die Ausgestaltung der Leistungsverzeichnisse mit ein. Schließlich ist es auch nicht ungewöhnlich, dass er den Herstellungsprozess an sich begleitet. Die notwendige enge Verbindung mit diesen Abläufen führt dazu, dass im Detail die Grenze zwischen originärer Planungsverantwortung und Beratungsleistung verwischt wird. Eine klare Trennung in der Vertragsgestaltung ist daher erforderlich. Insbesondere die nicht unübliche Praxis, nach der der Auditor nach seiner Beauftragung die Schnittstelle selbst definiert, ist dabei fragwürdig. Nachlaufend zur Beauftragung des Planers kann dies zu dessen Lasten nur mit seiner Zustimmung erfolgen.

### 2. Mangelrügen durch den Auditor

Der Auditor hat in den meisten Fällen die Leistungen des Planers auf Fehler hinsichtlich der avisierten Zertifizierung hin zu untersuchen. Dabei stellt sich die Frage, wie mit Feststellungen des Auditors umzugehen ist, nach denen die Planungsleistungen mangelhaft sind. Dabei ist zunächst sorgfältig zu prüfen, auf welchen Maßstab es zur Bestimmung des Vorliegens eines Mangels ankommt. Liegt nämlich nur eine funktionale Beschaffenheitsvereinbarung in dem Sinne, dass ein bestimmter Gesamterfüllungsgrad erreicht werden soll, vor, so obliegt die Ausgestaltung im Detail wie bereits beschrieben dem Planer. Setzt der Auditor aber in seiner Beratung hinsichtlich der

Verteilung der notwendigen Punkte andere Schwerpunkte als der Planer, so wird dessen Werk dadurch nicht zwangsläufig mangelhaft. Es kommt allein auf den Vertrag des Planers mit dem Bauherrn an. Die hier festgelegte Beschaffenheit ist Anknüpfungspunkt für eine Mangelrüge. Unterstellt, der Vertrag zwischen Bauherr und Planer enthielte konkrete Vorgaben, von denen der Planer abweicht, gilt Folgendes: Zwischen dem Auditor und dem Planer besteht kein Vertragsverhältnis. Die Feststellung der vermeintlichen Mangelhaftigkeit wird damit für den Planer erst dann relevant, wenn sich der Bauherr diese zu eigen macht. Einer Mangelrüge unmittelbar durch den Auditor muss der Planer damit nur dann nachkommen, wenn dieser durch den Bauherrn entsprechend bevollmächtigt ist. Ist der entsprechende Mangelvorwurf berechtigt, so ist der Planer grundsätzlich zur Mangelbeseitigung verpflichtet (vgl. hierzu allerdings nachfolgend unter VI). Erweist sich der Vorwurf als unberechtigt, so kann der Planer die Mangelbeseitigung verweigern, bzw. die Leistungen dem Bauherrn als Nachtrag zusätzlich in Rechnung stellen.

### **3. Änderungswünsche des Auditors**

Aus Sicht des Planers interessanter dürfte die Frage sein, wie mit Änderungswünschen des Auditors umzugehen ist, die nicht aus einer vermeintlichen Mangelhaftigkeit der Planung resultieren. Hier wird dann im Einzelfall zu prüfen sein, ob die von dem Auditor gewünschte Änderung eine Änderung des seitens des Planers geschuldeten Leistungssolls darstellt. Liegt ein solcher Fall vor, so könnten dem Planer Ansprüche auf zusätzliche Vergütung gem. § 650 q II BGB zustehen. Dies setzt allerdings zunächst eine wirksame Anordnung voraus. Hier ist wiederum zu berücksichtigen, dass der Auditor in keinem Vertragsverhältnis zu dem Planer steht. Hier kann wiederum nur der Bauherr entsprechende vergütungspflichtige Anordnungen treffen – es sei denn, dass er den Auditor gegenüber dem Planer zu Anordnungen von geänderten oder zusätzlichen Leistungen bevollmächtigt.

In den meisten Fällen wird das Vorliegen einer solchen Vollmacht fraglich sein. Auch ist hier häufig die Interessenlage unklar. Zum einen möchte der Bauherr den Auditor sicherlich in vielen Fällen als starken Partner an seiner Seite gegenüber dem Planer mit entsprechenden Durchsetzungsrechten installieren. Geht es aber um die Anordnung von vergütungspflichtigen Zusatzaufträgen, so will sich die überwiegende Zahl der Bauherren diese Entscheidung selbst vorbehalten. Die Ausgangslage ist damit vergleichbar zu der des mit Leistungen der Überwachung beauftragten Architekten im Verhältnis zum Bauherrn. Auch hier ist die Frage der „Architektenvollmacht“ im Detail schwierig zu beantworten und bereits Gegenstand zahlreicher Entscheidungen.<sup>30</sup> Festzuhalten ist jedoch, dass üblicherweise davon ausgegangen wird, dass der mit der Überwachung beauftragte Architekt gegenüber den ausführenden Unternehmen nur solche Anordnungen treffen kann, die den Bauablauf betreffen. Die Anordnung vergütungspflichtiger Nachtragsleistungen bleibt regelmäßig dem Bauherrn vorbehalten.<sup>31</sup>

Ähnlich dürfte der Fall auch im Hinblick auf den Auditor liegen. In den Fällen ausdrücklicher entsprechender Vereinbarungen kann nicht davon ausgegangen werden, dass dieser berechtigt ist, gegenüber dem Planer vergütungspflichtige Anordnungen zu treffen. Der Planer ist insofern gut beraten, sich im Hinblick auf die Anmerkungen des Auditors stets beim Bauherrn rückzuversichern, ob er eine entsprechende zusätzliche Leistung beauftragen möchte. Grundsätzlich muss der Planer allerdings die Änderungsanordnungen auch inhaltlich kritisch hinterfragen. Gefährden sie aus seiner Sicht das Erreichen des geschuldeten Erfolgs, hat er Bedenken anzumelden, um sich von einer potenziellen Haftung zu befreien. Die Wünsche des Auditors sind insofern dem Bauherrn zuzurechnen – wie in anderen Fällen auch ist der Planer verpflichtet, hiergegen Bedenken anzumelden, wenn er das Risiko eines Mangels sieht.

## VI. Die Abnahme als relevanter Zeitpunkt für die Bestimmung der Beschaffenheit

Bei einem Planervertrag, der auch die Zertifizierung des zu planenden Gebäudes als vereinbarte Beschaffenheit enthält, handelt es sich – vorbehaltlich abweichender Vereinbarungen im Einzelfall – um einen Werkvertrag. Die Leistungen des Planers, die zertifizierungsfähig sein sollen, bedürfen daher einer Abnahme. Eine solche erfolgt grundsätzlich nach Fertigstellung und bei im Wesentlichen mangelfreier Leistungserbringung. Übertragen auf die Sonderfragen im Zusammenhang mit den Zertifizierungen ergeben sich hier jedoch einzelne Probleme:

Zuvor (unter V) wurde bereits dargelegt, dass die Leistungen des Planers lange vor Abnahme durch den Bauherrn bzw. durch den Auditor auf ihre Qualität im Hinblick auf die Zertifizierung als vereinbarte Beschaffenheit überprüft werden. Der Bauherr hat hier natürlich ein Interesse daran, frühzeitig auf die Planungsleistungen einzuwirken, um die später

Dressel: Nachhaltiges Bauen – Herausforderungen in Planerverträgen(NZBau 2021, 224)

229

gewünschte Zertifizierung tatsächlich auch zu erreichen. Diesem grundsätzlich nachvollziehbaren Ansinnen steht allerdings die Rechtsprechung des *BGH* aus 2017 entgegen. Hiernach stehen dem Auftraggeber in einem Werkvertrag vor Abnahme keine Gewährleistungsrechte gem. § 634 BGB zu. Vor Abnahme, das heißt im Erfüllungsstadium, sind lediglich die Regelungen des allgemeinen Schuldrechts anwendbar.<sup>32</sup> Das bedeutet, dass dem Bauherrn grundsätzlich ein Erfüllungsanspruch zusteht – dieser ist jedoch nicht auf die Mangelbeseitigung im Einzelnen, sondern vielmehr auf die Erfüllung des Werks insgesamt gerichtet.<sup>33</sup> Weiter ist zu berücksichtigen, dass die konkrete Disposition seiner Leistung bis zur Abnahme allein dem Planer obliegt – theoretisch steht es ihm demnach frei, seine Leistungen zunächst mangelhaft zu erbringen und diese Mängel noch im Nachgang, das heißt vor Abnahme, zu beseitigen.<sup>34</sup>

Das Fehlen eines Mangelbeseitigungsanspruchs vor Abnahme ist für den Bauherrn äußerst nachteilig. Denn insbesondere bei Mängeln, die den Erfolg der Zertifizierung an sich gefährden können, besteht aus seiner Sicht eine erhebliche Notwendigkeit zum Handeln. Das allgemeine Schuldrecht hilft hier jedoch kaum weiter: Gemäß § 323 IV BGB kann der Gläubiger bereits vor Eintritt der Fälligkeit der Leistung zurücktreten, wenn offensichtlich ist, dass die Voraussetzungen des Rücktritts eintreten werden. Sieht der Bauherr also die Zertifizierung durch die mangelhafte Leistung des Planers insgesamt in Gefahr, so steht ihm der Rücktritt vom Planungsvertrag offen. Dabei wird dies allerdings in den allermeisten Fällen überhaupt nicht in seinem Interesse liegen. Dem Bauherrn geht es zumeist nicht darum, den Vertrag zu beenden, sondern den Planer zu einer mangelfreien Leistung anzuhalten und die eigentlichen Vertragsziele, hier die Zertifizierung, zu erreichen. Eine analoge Anwendung von § 323 IV BGB im Sinne eines Anspruchs auf Mangelbeseitigung als Minus zum Rücktritt ist ebenfalls abzulehnen.<sup>35</sup>

In der vertraglichen Gestaltung des Planervertrags ist damit – ganz allgemein, aber insbesondere auch hinsichtlich der Zertifizierungsfragen – dem Bauherrn ein Anspruch auf Mangelbeseitigung vor Abnahme einzuräumen. Etwas anderes könnte nur dann gelten, wenn man die einzelnen Zertifizierungsanforderungen als Teilleistungen verstünde, so dass hierauf bereits § 633 BGB anzuwenden wäre.<sup>36</sup> Maßstab für eine vertragliche Vereinbarung könnten die entsprechenden Regelungen der VOB/B, in der bereits ein Mangelbeseitigungsanspruch vor Abnahme geregelt, sein. Im Einzelnen ist aber auch hier problematisch, ob diese Regeln einer isolierten Inhaltskontrolle standhalten.<sup>37</sup>

Hinsichtlich der Abnahme der Planungsleistungen kann sich in Bezug auf die angestrebte Zertifizierung ein weiteres Problem stellen: Die Zertifizierung setzt häufig einen bestimmten Grad der Fertigstellung des Bauvorhabens voraus.<sup>38</sup> Wird der Planer durch den Bauherrn also



ausschließlich mit Planungsleistungen beauftragt (und nicht auch mit den Leistungen der Ausschreibung und Überwachung), so muss der Bauherr die Planungsleistungen lange vor dem Zeitpunkt der tatsächlichen Zertifizierung abnehmen. Zwar muss die Planung nach Maßgabe der einleitenden Ausführungen eine Zertifizierung ermöglichen – der Bauherr wird es dennoch vorziehen, die für ihn maßgebliche Zertifizierung möglichst vor Abnahme der Leistungen des Planers durchzuführen. Eine Zertifizierung setzt jedoch zumindest eine teilweise Fertigstellung der Bauleistung voraus. Vertraglich lässt sich dieses Problem kaum regeln, da letztendlich der Anspruch des Planers auf Abnahme seiner (Planungs-)Leistungen auf den Zeitpunkt der Fertigstellung des Bauwerks verschoben werden müsste. Der Bauherr muss dieses Risiko damit bei einer isolierten Beauftragung in Kauf nehmen oder den Planer umfassend beauftragen.

## VII. Zusammenfassung

Die fachgerechte Implementierung von Vorgaben hinsichtlich späterer Zertifizierungen in Planerverträgen ist mit Herausforderungen verbunden. Diese beginnen bereits bei der Formulierung der vertraglich vereinbarten Beschaffenheit. Aus Bauherrensicht unerwünschte Entwicklungen können sich allerdings hinsichtlich der notwendigen Flexibilität der Punkteverteilung in den Zertifizierungssystemen ergeben. Zielkonflikte hinsichtlich der vertraglich vereinbarten Beschaffenheit liegen zudem nahe. Die Abwicklung des Vertrags wird weiter erschwert durch die absehbaren Einwirkungen des Auditors, der zwar in keinem Vertragsverhältnis zum Planer steht, auf dessen Leistungen er aber maßgeblich Einfluss haben soll, da hierin der Kern seiner eigenen Tätigkeit besteht. Schließlich wird die Steuerung des Planers durch den Bauherrn dadurch erschwert, dass der *BGH*<sup>39</sup> davon ausgeht, dass es vor Abnahme keine Gewährleistungsrechte gem. § 634 BGB gibt. Der Verweis auf die Regelungen des allgemeinen Schuldrechts führt dazu, dass die Parteien im Planervertrag gesonderte Regelungen zu Mangelgewährleistungsrechten vor Abnahme aufnehmen sollten, um den Erfolg einer Zertifizierung auch frühzeitig abzusichern.

Die Liste der Herausforderungen im Zusammenhang mit der Vertragsgestaltung endet hier jedoch noch nicht. Es stellt sich eine Vielzahl von weiteren Fragen. Beispielsweise müssen sich die Parteien auch auf eine angemessene Vergütung einigen. Auch wenn die HOAI 2021 ihre frühere Verbindlichkeit weitgehend verloren hat, ist doch zu nicht zu unterschätzen, dass die Leistungen im Zusammenhang mit Zertifizierungssystemen etwa im Leistungsbild Gebäude und Innenräume als besondere Leistungen angesehen werden. Weiter stellt sich die Frage, wie sich die in § 650 p II BGB vorgesehene Zielfindungsphase zu Zertifizierungsfragen verhält. Muss der Architekt hierzu beraten? Wo liegen die Grenzen dieser Beratung? Schließlich sind in der vorliegenden Betrachtung auch die Fragen der (internen) Abstimmung zwischen dem Architekten und den Fachplanern nicht näher beleuchtet worden. Ähnlich wie bei einer Kostenobergrenze werde alle Planer ihren Teil zur Erreichung der Zertifizierung als Werkerfolg beitragen müssen – die Frage der Aufteilung der Gesamtzahl der Punkte auf die einzelnen Planungsbereiche, sowie die Koordination der Beteiligten wird dadurch jedoch nicht beantwortet.

In Anbetracht der weiter zunehmenden Bedeutung von Nachhaltigkeits-Zertifizierungen in der Praxis besteht hier aus rechtlicher Sicht Nachholbedarf. Die grundsätzlich förderungswürdigen Ziele des nachhaltigen Bauens müssen in den rechtlichen Grundlagen derart belastbar verankert werden können, dass die Planungs- und Baubeteiligten das gemeinsame Ziel eines nachhaltigen Bauprojektes auch erfolgreich umsetzen können.

---

\* Der Autor ist als Fachanwalt für Bau- und Architektenrecht bei *Kapellmann und Partner Rechtsanwälte mbB* in Mönchengladbach tätig.

- 1 Leitfaden für Nachhaltiges Bauen, BMI, 3. Aufl. 2019, 1.
- 2 VO (EU) 2020/852 des Europäischen Parlaments und des Rates vom Juni 2020 über die Einrichtung eines Rahmens zur Erleichterung nachhaltiger Investitionen und zur Änderung der VO (EU) Nr. 2019/2088.
- 3 Nachhaltige Büro- und Verwaltungsgebäude, Bewertungssystem Nachhaltiges Bauen (BNB) des Bundes Forschung für die Praxis, Bd.17, Stand: März 2020, 12.
- 4 „Von Wiege zu Wiege“, Ende der 1990er-Jahre von dem deutschen Chemiker *Michael Braungart* und dem amerikanischen Architekten *William McDonough* entwickelt.
- 5 Deutsche Gesellschaft für nachhaltiges Bauen, Deutschland.
- 6 Leadership in Energy and Environmental Design, USA.
- 7 Building Research Establishment Environmental Assessment Method, Großbritannien.
- 8 Bewertungssystem Nachhaltiges Bauen des Bundesministeriums für Umwelt, Naturschutz, Bau und Reaktorsicherheit, Deutschland.
- 9 Haute Qualité Environnementale, Frankreich.
- 10 *Schlemminger* NJW 2014, 3185 (3186).
- 11 *BGH* NZBau 2010, 763 = NJW-RR 2010, 1604.
- 12 *BGH* NZBau 2011, 360 = NJW 2011, 1442; NZBau 2003, 38 = NJW 2003, 287.
- 13 *BGH* NZBau 2021, 29 = NJW 2021, 53; *Berger* in *Fuchs/Berger/Seifert*, HOAI, 2. Aufl. 2020, vor § 650 p B. I. Rn. 18; BeckOK Bauvertragsrecht/*Fuchs*, 12. Ed., Stand 31.1.2021, § 650 p BGB Rn. 87 ff.
- 14 *MüKoBGB/Busche*, 8. Aufl. 2020, § 634 Rn. 98.
- 15 *Tschäpe* ZfBR 2012, 130 (135).
- 16 *Schlemminger* NJW 2014, 3185 (3188).
- 17 *Fuchs* in *Fuchs/Berger/Seifert*, HOAI, § 650 p Rn. 102 f.
- 18 Zur Bedeutung der Dispositionsfreiheit *BGH* NZBau 2017, 216 = NJW 2017, 1604 (Rn. 32). Zu den gesetzlichen Möglichkeiten, vor Abnahme „Mangelbeseitigung“ zu verlangen, *Dressel* BauR 2019, 398.
- 19 *Fuchs* in *Fuchs/Berger/Seifert*, HOAI, § 650 p Rn. 112 ff.
- 20 *Fuchs* in *Fuchs/Berger/Seifert*, HOAI, § 650 p Rn. 79 ff.
- 21 *BGHZ* 138, 87 = NJW 1998, 1064.
- 22 *Fuchs* in *Fuchs/Berger/Seifert*, HOAI, § 650 p Rn. 113.
- 23 *OLG München* NZBau 2012, 364 = NJW-RR 2012, 826 .
- 24 BeckOK BGB/*Voit*, § 631 Rn. 38; *BGH* NJW 1963, 94; *OLG München* NJW-RR 2005, 616.
- 25 *BGHZ* 138, 87 = NJW 1998, 1064.
- 26 *BGHZ* 201, 148 = NZBau 2014, 492 = NJW 2014, 3365 = DS 2014, 187.
- 27 Leistungsbild DGNB-Auditor, abzurufen über <https://www.dgnb-system.de/de/zertifizierung/faq/>, S. 2 (zuletzt abgerufen 15.3.2021).
- 28 Leistungsbild DGNB-Auditor, abzurufen über <https://www.dgnb-system.de/de/zertifizierung/faq/>, S. 2 (zuletzt abgerufen 15.3.2021).
- 29 ZB das Leistungsbild DGNB-Auditor der DGNB oder die Leistungen für Nachhaltigkeitszertifizierung, AHO Schriftenreihe Nr. 33, AHO Fachkommission „Nachhaltigkeitszertifizierung“, Stand 2016.
- 30 Umfassend zum Thema *Sonntag* in *Fuchs/Berger/Seifert*, HOAI, vor § 650 p ff. Rn. 1 ff.
- 31 *Sonntag* in *Fuchs/Berger/Seifert*, HOAI, vor § 650 p ff. Rn. 56; *Kapellmann/Schiffers/Markus*, Vergütung, Nachträge und Behinderungsfolgen beim Bauvertrag, Bd. 1, 7. Aufl. 2017, Rn. 902.
- 32 *BGH* NZBau 2017, 216 = NJW 2017, 1604.

33 BGH NZBau 2017, 216 = NJW 2017, 1604 Rn. 38.

34 Die Übertragbarkeit der Entscheidung auf Planer-Verträge in Frage stellend *Fuchs* NZBau 2019, 25 (28).

35 *Dressel* BauR 2019, 398.

36 Zum Verhältnis Teilleistungen/Mängelrechte *Fuchs* NZBau 2019, 25.

37 *Gartz* in *Nicklisch/Weick/Jansen/Seibel*, VOB/B, 5. Aufl. 2019, § 4 Rn. 208.

38 Zu den Anforderungen an den Grad der Fertigstellung im Einzelnen am Bsp. der DGNB: DGNB System Kriterienkatalog Gebäude Neubau, Version 2018, 34, abzurufen über die Homepage der DGNB.

39 BGH NZBau 2017, 216 = NJW 2017, 1604.

## Beschlussvorlage der Verwaltung

Gremium	Sitzung am	Beratung
Rat der Stadt Bielefeld	27.01.2011	öffentlich

### Beratungsgegenstand (Bezeichnung des Tagesordnungspunktes)

**Teilnahme der Stadt Bielefeld am EU-Projekt "Cradle to Cradle Business Innovation & Improvement Zones (C2C-BIZZ)" - Entwicklung von Gewerbeflächen auf der Grundlage der Cradle to Cradle-Philosophie**

### Ggf. Frühere Behandlung des Beratungsgegenstandes (Gremium, Datum, TOP, Drucksachen-Nr.)

StEA am 30.11.10, nichtöffentlicher Teil, TOP 27.4

### Beschlussvorschlag:

1. Der Beteiligung der Stadt Bielefeld an dem EU-Projekt „Cradle to Cradle Business Innovation & Improvement Zones (C2C-BIZZ)“ wird zugestimmt.
2. Die finanziellen Auswirkungen in den jeweiligen Haushaltsjahren werden im Budget des Bauamtes abgebildet.
3. Der Stadtentwicklungsausschuss bittet die Verwaltung im Rahmen einer Informationsveranstaltung über die Cradle to Cradle-Philosophie und die Beteiligung der Stadt Bielefeld zu informieren.

### Begründung:

Der Verwaltungsvorstand wurde am 30.11.2010 über die Anfrage zur Teilnahme der Stadt Bielefeld am EU-INTERREG-IVB-Projekt „Cradle to Cradle Business Innovation & Improvement Zones (C2C-BIZZ)“ informiert, mit dem Konzeptionen zur Entwicklung von Gewerbeflächen nach der Cradle-to-Cradle-Philosophie in Europa erarbeitet werden sollen. Mit einer Teilnahme der Stadt Bielefeld am C2C-BIZZ-Projekt hat sich der Verwaltungsvorstand einverstanden erklärt. Im Stadtentwicklungsausschuss wurde von der Verwaltung am 30.11.2010 unter TOP 27.4 hierzu berichtet.

Die Stadt Bielefeld ist Lead-Partner des EU-INTERREG-IVb-Projekts BAPTS (Boosting Advanced Public Transport Systems), das sich mit der Weiterentwicklung des ÖPNV beschäftigt. Durch die Teilnahme am BAPTS-Projekt konnte Bielefeld wertvolle Kontakte in Europa und zu den EU-Institutionen knüpfen und als engagierter Partner an Ansehen auf europäischer Ebene hinzugewinnen. Vor diesem Hintergrund ist Bielefeld nun zur Teilnahme am INTERREG-IVB-Projekt C2C-BIZZ eingeladen worden. Mit der Teilnahme bietet sich für Bielefeld die Möglichkeit, die aufgebauten Kontakte in Europa zu vertiefen und die Chance, in hervorgehobener Rolle in einem von der EU als wichtig eingestuftem infrastrukturellen Zukunftsthema aus EU-Mitteln gefördert zu werden. Zudem eröffnet Bielefeld die Beteiligung an C2C-BIZZ die strategische Perspektive einer erhöhten Attraktivität als Wirtschaftsstandort und damit einer Steigerung künftiger Einnahmen aus der Gewerbesteuer.

Das Cradle to Cradle ®-Konzept (C2C) ist ein neuer Denk-Ansatz zur Gestaltung intelligenter Produkte, Prozesse und Systeme. Die C2C-Philosophie baut auf drei 3 Prinzipien auf, die weiter gehen als der Ansatz der Nachhaltigkeit:

- Es gibt keinen Abfall, alles ist wie in der Natur wiederverwendbar
- Nutzung erneuerbarer Energien
- Entwicklung von Vielfalt, d.h. vielfältige Nutzung und Einbindung der Umgebung

Ziel des Projekts C2C-BIZZ ist es, die aktuelle Umsetzung der C2C-Methoden in Nordwesteuropa (NWE) und darüber hinaus zu verbessern und die Entwicklung der C2C-Prinzipien auf Gewerbeflächen zu beschleunigen, denn C2C-Gewerbeflächen werden einen positiven Einfluß auf Umwelt, Gesellschaft sowie Wirtschaft haben und sind zukunftssicher. Allerdings spielt die C2C-Philosophie bei Behörden, die für Raumordnung und wirtschaftliche Standorte zuständig sind, noch keine besondere Rolle. Deshalb unterstützt die EU den innovativen Ansatz des Projekts, die C2C-Philosophie bei der Entwicklung von Gewerbeflächen anzuwenden und hat das Projekt Anfang Dezember 2010 unter dem Vorbehalt der Zustimmung der Projektpartner genehmigt. Das Interesse der EU an dem Projekt beruht darauf, dass die Entwicklung von C2C-Standorten einen weiten transnationalen Ansatz erfordert. Mit der Erprobung diverser Aspekte an mehreren Pilot-Standorten in unterschiedlichen geographischen, institutionellen und kulturellen Konstellationen können sich völlig neuartige Modell-Lösungen bzw. Leitlinien für künftige (Wieder-) Erschließungen von Gewerbeflächen und Unternehmensplanungen in Europa und sogar darüber hinaus ergeben.

Der gesamte Projektrahmen konnte abgesteckt werden. An dem Projekt beteiligen sich 10 Partner aus 6 nordwesteuropäischen Ländern. Die Projekt-Partner sind:

- Samenwerkingsverband Regio Eindhoven, Lead Partner (Niederlande)
- Gemeente Venlo (Niederlande)
- Lille Metropole (Frankreich)
- London Thames Gateway Institute For Sustainability (UK)
- University of Wolverhampton (UK)
- Société de Développement pour la Région de Bruxelles Capitale (Belgien)
- Ministère du Développement durable et des Infrastructures (Luxembourg)
- Centre de Recherche Public Henri Tudor, Department: Centre de Ressources des Technologies pour l'Environnement (Luxembourg)
- Ecoparc Windhof GIE (Luxembourg)
- Stadt Bielefeld (Deutschland)

Die Projektpartner werden im Zeitraum 01.01.2011 bis 31.12.2014 bei einem Gesamtbudget von fast 9 Mio. € in folgenden C2C-Arbeitsfeldern zusammenarbeiten:

1) Vielfalt entwickeln: Integrierte C2C-Gewerbeflächen werden von Vielfalt inspiriert sein. Ziel sind Langlebigkeit und Flexibilität des Standortes sowie positive Auswirkungen auf die Umgebung. Entsprechende Konzepte sollen an Pilot-Standorten sowohl auf der "Grünen Wiese" als auch auf Industriebrachen gemeinsam entwickelt werden.

2) Energielösungen: Der Einsatz fossiler Energieträger auf Gewerbeflächen soll beendet werden. Stattdessen sollen Energien aus erneuerbaren Energien produziert und lokale Energiequellen genutzt werden.

3) Geschlossene Kreisläufe: Die Partner entwickeln Gewerbeflächen, auf denen Abfälle durch Entwicklung, Erprobung und Auswertung geschlossener Material- und Abfallkreise beseitigt werden.

4) Darüberhinaus wird im Rahmen der transnationalen Zusammenarbeit die Entwicklung und der Austausch des gesammelten C2C-Wissens verfolgt. Es werden C2C-Standortmanager geschult, die die Anwendung der C2C-Prinzipien vor Ort sicher stellen. So wird eine neue Form des Gewerbeflächen-Managements in Nordwesteuropa eingeführt. Ferner werden finanzielle, planerische, unternehmerische und technische Tools für Planung, Bebauung und Management von C2C-Gewerbeflächen erstellt. Unternehmen werden aktiv mit einbezogen, um ihnen die Vorteile von C2C aufzuzeigen.

Die Schwerpunkte der Aktivitäten Bielefelds in C2C-BIZZ liegen im Bereich der o.g. Ziff.1 und 2. Dabei wird es im Gegensatz zu den Projektpartnern aus Lille oder London nicht darum gehen, für bestimmte Gewerbeflächen konkrete Maßnahmen umzusetzen oder Investitionen vorzunehmen. Vielmehr sollen bei den Projektarbeiten in Bielefeld Studien betrieben werden, die die Grundlage für spätere Planungen darstellen.

Hinsichtlich erneuerbarer Energien wird Bielefeld eine Analyse des Potenzials an erneuerbarer Energiegewinnung auf Gewerbeflächen unter Beurteilung der Ressourcen und Umgebung (z.B. Raumnutzung, geographische Umgebung) vornehmen. Hierbei können je nach Potential gemeinsam mit Unternehmen Strategien entwickelt werden. Gespräche wurden bereits mit den Stadtwerken Bielefeld und der Firma Schüco geführt, um das Projekt inhaltlich und materiell zu unterstützen. Bei der Konzeption von vielfältigen Gewerbeflächen sollen modellhafte Planungen erarbeitet werden, die von Anfang an der C2C-Philosophie entsprechen (z.B. Ideen zur flexiblen Gestaltung von Gebäuden und Raum, Berücksichtigung der Natur, nachhaltiges Bauen, vielfältige Nutzung). Je nach Ausrichtung der konzeptionellen Überlegungen ist neben der Einbindung externer Experten eine Beteiligung Dritter denkbar. Darüber hinaus wird Bielefeld über die transnationale Zusammenarbeit an allen weiteren Arbeitsergebnissen des Projekts partizipieren und von der Kooperation mit den anderen Projektpartnern profitieren können.

Das Interesse der EU an dem Projekt beruht nicht zuletzt darauf, dass die Entwicklung von Standorten nach den C2C-Prinzipien einen umfassenden und neue Wege beschreitenden Ansatz bedeutet, mit dem auch technische Innovationen und wirtschaftliche Vitalität in Europa gefördert werden. Die Teilnahme am Projekt C2C-BIZZ bietet der Stadt Bielefeld damit die Gelegenheit einer strategisch wertvollen Partnerschaft, aus der sich neben dem Vorsprung an Know-How und Imagegewinn auf internationaler Ebene ebenfalls ein Zugewinn an Attraktivität als Wirtschaftsstandort und damit perspektivisch ein Anstieg der Gewerbesteuererinnahmen ergibt.

Die Projekt-Themen für Bielefeld sind so gewählt worden, dass diese laufende Aufgaben der Stadt Bielefeld und der Wirtschaftsentwicklungsgesellschaft mbH aufgreifen und die vorbereitenden Arbeiten sowohl im Gewerbeflächenmanagement als auch in der räumlichen Planung ergänzen. Die Wahrnehmung dieser Arbeiten ist eine Aufgabe der vorausschauenden konzeptionellen Wirtschaftsförderung. Die EU-Förderung kann somit für die Bearbeitung von Aufgaben verwendet werden, die bei der Stadt Bielefeld und der WEGE verfolgt werden.

Die Stadt Bielefeld wird bei C2C BIZZ im Gegensatz zum BAPTS-Projekt nicht Lead-Partner, sondern „einfacher“ Partner sein. Lead-Partner des C2C BIZZ-Projekts ist der Samenwerkingsverband Regio Eindhoven. Die Stadt Bielefeld wird finanziell und fachlich von der WEGE unterstützt.

Das Gesamtbudget des C2C-Projekts beläuft sich auf 8,9 Mio. Euro. Das Budget für Bielefeld beträgt 640.075 € und wird zu 50 % durch EU-Mittel gefördert (s. Anlage). Wegen der Beteiligung aller Projektpartner an den Allgemein-Kosten des Lead-Partners wird sich der Fördersatz auf ca. 45 % verringern.

Die Förderung umfasst auch die Personalkosten für das eigene Personal. Erfahrungsgemäß benötigen die Vorbereitung und Betreuung von Projekten (z.B. Erstellung von Konzeptionen, Informationsaustausch und Kontakt zu Dritten, Auswahl geeigneter Experten, Erarbeitung von

Leistungsbeschreibungen, Berichts- und Abrechnungswesen) den Einsatz eigenen Personals in gewissem Umfang, der hier mit ca. 1,3 Stellen für die Projektlaufzeit veranschlagt worden ist. Dieser Stellenumfang verteilt sich auf unterschiedliche Mitarbeiterinnen und Mitarbeiter aus verschiedenen Dienststellen bei der WEGE, dem Bauamt, dem Amt für Verkehr und dem Umweltamt.

Die Projektarbeiten werden mit den vorhandenen Personalkapazitäten erledigt. Da auch die o.a. Personalkosten zu 50 % förderfähig sind, kann über die Personalkostenförderung der Eigenanteil an den weiteren Projektkosten gedeckt werden. Die Erfahrungen im EU-Projekt BAPTS haben gezeigt, dass in der Anfangsphase des Projekts neben den ohnehin anfallenden Personalkosten und geringfügigen Reisekosten zur Teilnahme an Projektmeetings keine weiteren Kosten entstehen, weil im ersten Jahr des Projekts die konzeptionellen Weichenstellungen intern erarbeitet werden. Da die Abrechnungen und Kostenerstattungen mit der EU halbjährlich erfolgen, werden somit im ersten Jahr des Projekts zunächst die in Bielefeld anfallenden Personalkosten gefördert und entsprechende Einnahmen erzielt, ehe es in der Folgezeit zu Ausgaben für externe Experten, Meetings usw. kommt. Mithin wird durch die von Anfang an laufende Förderung der Personalkosten ein „Finanzstock“ für die späteren Ausgaben aufgebaut. Die zu erwartenden geringfügigen Ausgaben bis zur ersten halbjährlichen Erstattung der EU-Mittel können aus dem Budget des Bauamtes getragen werden.

Der Beschlussvorschlag Nr. 3 wurde aufgrund eines Vorschlags in der Sitzung des Stadtentwicklungsausschusses am 25.01.2011 aufgenommen.

Oberbürgermeister/Beigeordnete(r)

Moss





**C2C –**

**Vision eines perfekten Gewerbegebiets**

Rechtliche Analyse  
im Auftrag der Stadt Bielefeld

Erstellt von:

Rechtsanwälte Streitbörger Speckmann PartGmbB  
im März bis Juli 2014

Telefon: 0521 91414-33  
Telefax: 0521 91414-885  
E-Mail: c.birkemeyer@streitboerger.de  
Adenauerplatz 4, 33602 Bielefeld

Inhaltsverzeichnis

A.	Einleitung/Aufgabenstellung .....	3
B.	Rechtliche Analyse .....	5
Abschnitt 1: Rechtliche Rahmenbedingungen delege lata und delege ferenda.....		5
I.	Instrumente der Bauleitplanung .....	5
1.	Grenzen der Festsetzungsmöglichkeiten .....	6
1.1	Typologie der Festsetzungsmöglichkeiten .....	6
1.2	Städtebauliche Gründe.....	6
2.	Festsetzungsmöglichkeiten.....	9
2.1	Verwendete Materialien.....	9
2.2	Wasserhaushalt, Abwasser .....	10
a)	Versickerung/Versiegelung .....	10
b)	Regenwasserrückhaltung.....	10
c)	Brauchwassernutzung .....	11
2.3	Abfall.....	11
2.4	Mobilität.....	12
2.5	Freiraumplanung.....	13
2.6	Soziales.....	16
2.7	Rückbau.....	18
II.	Schnittstellen der Cradle to Cradle Philosophie mit EU-Rechtsakten .....	19
III.	Schnittstellen der Cradle to Cradle Philosophie mit Landesrecht.....	23
IV.	Zusammenfassung/nicht im Bebauungsplan festsetzbare Ziele der Cradle to Cradle Philosophie .....	25
1.	Nicht im Bebauungsplan festsetzbare Ziele.....	25
2.	Welche Rahmenbedingungen müssen sich für eine Festsetzung der Cradle to Cradle Philosophie im Bebauungsplan ändern?.....	25
Abschnitt 2: Vertragliche Zielverwirklichung .....		28
I.	Rechtssicherheit der Vertragsmuster .....	28
II.	Text: Grundstückskaufvertrag mit Auflassung.....	31
III.	Text (Ausschnitt): Gewerbeparkvertrag .....	40
IV.	Text (Ausschnitt): Vertrag Pflichtangebot .....	42
Abschnitt 3: Freiwillige Selbstverpflichtung .....		43

## **A. Einleitung/Aufgabenstellung**

„Cradle to Cradle“ heißt übersetzt ins Deutsche „Von der Wiege bis zur Wiege“. Hinter diesem Begriff steht die Idee einer neuen und besonderen Nachhaltigkeitsstrategie. In einer Welt knapper werdender Ressourcen zielt diese Strategie auf die weitestgehende Vermeidung von Abfällen. Abfälle sollen allerdings nicht lediglich vermieden und Materialien nicht lediglich recycelt werden, sondern möglichst im Kreislauf wieder eingesetzt werden können – als vollwertige Ressource oder als Bestandteil eines neuen „Bausteins“. Während der Ansatz des nachhaltigen Bauens und der nachhaltigen Planung primär auf die Vermeidung von Abfällen setzt, geht die Cradle to Cradle Philosophie also weiter und versucht, das Entstehen von Abfällen ganz auszuschließen. Ressourcen sollen bereits nicht zu Abfällen werden, sondern vollwertig im Kreislauf verbleiben.

Die vorliegende Analyse ermittelt entsprechend der vorgegebenen Aufgabenstellung mithin,

- welche Mittel das Bauplanungsrecht bereitstellt, um eine Cradle to Cradle Philosophie im Rahmen der Bauleitplanung eines Gewerbegebietes zu verfolgen;
- welche Schnittstellen die Philosophie mit anderen Rechtsvorschriften auf EU- und Landesebene im Bereich der Bauleitplanung aufweist;
- ob und welche Gesetzesänderungen zur effizienteren Verfolgung dieser Ziele geboten erscheinen;
- wie sonstige Ziele, die sich nicht mit Mitteln der Bauleitplanung umsetzen lassen, durch Kaufverträge zwischen der Kommune und Gewerbebetrieben, die sich in einem solchen Gewerbegebiet ansiedeln wollen, realisiert werden können;

- wie sich Instrumente einer freiwilligen Selbstverpflichtung der sich ansiedelnden Unternehmen darstellen lassen.

## **B. Rechtliche Analyse**

### **Abschnitt 1: Rechtliche Rahmenbedingungen *delege lata* und *delege ferenda***

Nachfolgend werden die Möglichkeiten des geltenden Rechts der Bauleitplanung und seine Grenzen im Hinblick auf die Verfolgung von Zielen der Cradle to Cradle Philosophie dargestellt. Hierbei werden zunächst die Vorschriften des etablierten Planungsrechts behandelt, die eine Schnittstelle zur Cradle to Cradle Philosophie aufweisen, so dann die weiteren Schnittstellen im EU-Recht und Landesrecht. Hieraus folgt ein Katalog von Zielen, die sich nicht rechtssicher mit Mitteln des Planungsrechts umsetzen lassen. Für diese wird anschließend erörtert, was ein Gesetzgeber ändern müsste, um auch insoweit eine planerische Steuerung zu ermöglichen.

#### **I. Instrumente der Bauleitplanung**

Zunächst werden die außenverbindlichen Festsetzungen dargestellt, die sich für die Realisierung von Zielen der Cradle to Cradle Philosophie fruchtbar machen lassen. Dies betrifft ausschließlich die Festsetzungen in Bebauungsplänen nach § 9 Abs. 1 bis 4 und 7 BauGB, einschließlich der Festsetzungsmöglichkeiten nach der BauNVO, nicht dagegen Darstellungen in Flächennutzungsplänen oder die Kennzeichnungen und nachrichtlichen Übernahmen i.S.d. § 9 Abs. 5, 6 und 6a BauGB.<sup>1</sup>

Entgegen der Aufgabenstellung wird nicht nach Gewerbegebieten und Industriegebieten unterschieden, weil sich Möglichkei-

---

<sup>1</sup> Vgl. Söfker in: Ernst u.a. BauGB, § 9, Rn. 6.

ten und Anforderungen im Hinblick auf eine Umsetzung der Cradle to Cradle Philosophie gleichen.

## **1. Grenzen der Festsetzungsmöglichkeiten**

Vor einer Darstellung der Festsetzungsmöglichkeiten sind deren allgemeinen Grenzen näher zu beleuchten:

### **1.1 Typologie der Festsetzungsmöglichkeiten**

Der Katalog der Festsetzungsmöglichkeiten in § 9 BauGB ist abschließend, so genanntes Verbot des Festsetzungserfindungsrechts.<sup>2</sup> Die abschließende Typologie der Festsetzungsmöglichkeiten schließt mit anderen Worten zusätzliche Festsetzungen außerhalb des gesetzlichen Katalogs aus. Eine Ausnahme gilt für den vorhabenbezogenen Bebauungsplan.<sup>3</sup> Allein in diesem Bereich darf der Plangeber in gewissen Grenzen von dem begrenzten Katalog abweichen und konkretere Festsetzungen vorsehen (§ 12 Abs. 3 S. 2 BauGB). In diesem Bereich muss die Gemeinde weiterhin die grundlegenden Wertentscheidungen der BauNVO beachten und hinreichend bestimmte Festsetzungen treffen.<sup>4</sup> Da vorliegend ein Gewerbegebiet im Sinne der sogenannten Angebotsplanung ins Auge zu fassen ist, dessen über die Bauleitplanung hinausgehenden Ziele mit Inhalten des Kaufvertrages verfolgt werden, wird von einer eigenen Darstellung der Möglichkeiten des vorhabenbezogenen Bebauungsplans an dieser Stelle abgesehen.

### **1.2 Städtebauliche Gründe**

---

<sup>2</sup> BVerwG, NVwZ 2012, 318; BVerwG, NVwZ 1995, 696, 697.

<sup>3</sup> Jarass/Kment, BauGB, § 9, Rn. 1.

<sup>4</sup> BVerwG, NVwZ 2004, 229, 230 f.

Voraussetzung einer jeden Planung und damit auch jeder wirksamen Festsetzung ist das Vorliegen städtebaulicher Gründe, die eine Planung und damit die einzelnen Festsetzungen rechtfertigen. So verpflichtet § 1 Abs. 3 BauGB, Planungen allein aus städtebaulichem Anlass aufzugreifen, § 9 Abs. 1 BauGB fordert zudem das Vorliegen städtebaulicher Gründe bei der Auswahl der einzelnen Festsetzungen und ist mithin im Bereich der Abwägung verortet.<sup>5</sup>

Vor diesem Hintergrund stellt sich vorliegend also zunächst die Frage danach, ob die Cradle to Cradle Philosophie überhaupt hinreichender Anlass für eine Planung und sodann die Auswahl bestimmter Festsetzungen sein kann.

Im Sinne des § 1 Abs. 3 BauGB erweist sich eine Planung bereits dann als erforderlich, wenn die Gemeinde (auch vorausschauend) städtebauliche Entwicklungen aufgreift und lenken möchte. Dabei kommt der Gemeinde ein sehr weitreichender Gestaltungsspielraum zu. In diesem Sinne sind Bauleitpläne nur dann nicht erforderlich, wenn sie ersichtlich der Förderung von Zielen dienen, für deren Verwirklichung die Bauleitplanung nicht bestimmt ist.<sup>6</sup>

Im Hinblick auf die Verfolgung klimapolitischer Ziele stellt sich diese Frage mitnichten als Selbstverständlichkeit dar. Bis zur Einführung des Klimaschutzes als Leitziel in § 1 Abs. 5 BauGB entsprach es vielmehr allgemeiner Auffassung, dass eine rein umweltbezogene Motivation Festsetzungen nicht rechtfertige, die Bauleitplanung vielmehr auf Aspekte der Bodennutzung begrenzt sei und aus Sicht der Gemeinden insbesondere auf die Angelegenheiten der örtlichen Verwaltung, die über den eige-

---

<sup>5</sup> Vgl. Battis in: Battis u.a., BauGB, § 1, Rn. 26.

<sup>6</sup> Söfker in: Ernst u.a., BauGB, § 1, Rn. 33; BVerwG, NVwZ 1999, 1338.

nen Wirkungskreis nicht hinausgehen dürfen.<sup>7</sup> An Gemeinde- und Bodenrecht bezogenen städtebaulichen Gründen fehlte es regelmäßig.<sup>8</sup> Nachdem durch den Gesetzgeber nunmehr mit dem EAG Bau 2004 in § 1 Absatz 5 S. 2 BauGB auch der allgemeine Klimaschutz als Planungsbelang der Bauleitplanung explizit normiert wurde, kann die planerische Befugnis durch Erwägungen des allgemeinen Klimaschutzes motivierte Festsetzungen allerdings nicht mehr überzeugend in Frage gestellt werden,<sup>9</sup> wenngleich vereinzelt bis heute Stimmen in der Literatur die Begründung von Bauleitplänen und Festsetzungen aus klimapolitischen Gründen für unzulässig halten.<sup>10</sup> Höchstrichterliche Rechtsprechung fehlt, es deutet sich allerdings eine Breite herrschende Meinung an, wonach der zumindest bodenrechtlich motivierte Bebauungsplan umweltrechtlich motivierte Festsetzungen enthalten darf.<sup>11</sup> Insbesondere mit dem Gesetz zur Förderung des Klimaschutzes bei der Entwicklung in den Städten und Gemeinden dürfte klargestellt sein, dass sich der Klimaschutz als Abwägungsbelang in die Erfordernisse der Bauleitplanung einreicht und Festsetzungen rechtfertigen kann.<sup>12</sup>

Insgesamt dürfte die Cradle to Cradle Philosophie als ressourcenschonende Strategie Festsetzungen in Bauleitplänen rechtfertigen können. Ob im Rahmen der Abwägung im Einzelfall eines Bebauungsplans stets sämtliche Instrumente ausgeschöpft werden dürfen, ohne den Rahmen der gerechten Abwägung und damit des Zulässigen zu verlassen, bedarf der Prüfung im jeweiligen Planverfahren. Eine abstrakte Beantwortung dieser Frage verbietet sich.

---

<sup>7</sup> Mitschang, ZfBR 2010, 534, 538.

<sup>8</sup> OVG Münster, Beschluss vom 27. 3. 1998, BauR 1998, S. 981, 983 ff.; Beschluss vom 24. 7. 2000, Aktenzeichen 7 a D 179.98 NE –, BauR 2001, S. 62 f.

<sup>9</sup> Mitschang, ZfBR 2010, 534, 538.

<sup>10</sup> Gärditz, JuS 2008, S. 324, 328.

<sup>11</sup> Mitschang, ZfBR 2010, 534, 538; Sparwasser/Mock, ZUR 2008, 469.

<sup>12</sup> Battis/Krautzberger/Mitschang/Reidt/Stüer, NVwZ 2011, 897, 898.



## 2. Festsetzungsmöglichkeiten

### 2.1 Verwendete Materialien

Als ein grundlegender Ansatz der Cradle to Cradle Philosophie gilt die Verwendung von Materialien, die bestimmten Anforderungen genügen. So sollen sie einem gewissen technischen oder biologischen Kreislauf unterliegen. Hinzu kommen weitere allgemein klimaschützende Aspekte, wie die Gefahrstofffreiheit, die Anforderung an kurze Transportwege, die Energieeffizienz etc.

Die Umsetzung dieses Ziels kann durch § 9 Abs. 1 Nr. 23 BauGB gefördert, aber nicht vollständig realisiert werden:

Die Vorschrift erlaubt zunächst das Verbot bestimmter schädlicher luftverunreinigender Stoffe. Mit anderen Worten kann eine entsprechende Festsetzung den Einsatz bestimmter Materialien verhindern. Voraussetzung ist die Anknüpfung an eine stoffbezogene, nicht anlagenbezogene Sichtweise. Zudem dürfen nur Aspekte der Luftverunreinigung in den Blick genommen werden, keine sonstigen Schadstoffe.

Da die Festsetzung nur aus städtebaulichen Gründen erfolgen darf, muss eine gewisse Schutzbedürftigkeit des Plangebietes vorliegen, allgemeine „gesamtökologische“ Zielsetzungen erlauben eine Festsetzung dagegen nicht.<sup>13</sup>

Nach der ständigen Rechtsprechung sind zudem lediglich Negativlisten, nicht aber Positivlisten zulässig, es dürfen mithin allein Ausschlusskriterien für den Einsatz bestimmter Stoffe

---

<sup>13</sup> Mitschang/Reidt in Battis u.a., BauGB, § 9, Rn. 129; OVG Lüneburg, NVwZ-RR 2003, 174, 175.

festgesetzt werden, keine positiven Anforderungen an die einzusetzenden Materialien.<sup>14</sup>

## 2.2 Wasserhaushalt, Abwasser

Die Cradle to Cradle Philosophie verfolgt zudem das Ziel einer umweltschonenden Wasserbewirtschaftung durch Versickerungen, eine geringe Versiegelung, durch eine Brauchwassernutzung, die Schaffung von Rückhalteräumen etc.

Diese Ziele lassen sich teilweise mit Mitteln des Bauplanungsrechts absichern:

### a) Versickerung/Versiegelung

So lässt sich über § 9 Abs. 1 Nr. 1 BauGB das Maß der Nutzung begrenzen und somit – spätestens über die Festlegung der Grundflächenzahl – auch das Maß der Versiegelung durch die Hauptanlage auf einem Grundstück. § 9 Abs. 1 Nr. 2 BauGB ergänzt diese Wirkung mit der Möglichkeit, die überbaubaren Grundstücksflächen zu limitieren. Auf diese Weise können Flächen für die Versickerung freigehalten werden.

Mit Blick auf § 19 Abs. 4 S. 4 BauNVO kann diese Freihaltfunktion noch ergänzt werden: So könnte die Zulässigkeit der Anlage von Stellplätzen außerhalb der überbaubaren Grundstücksflächen davon abhängig gemacht werden, dass bestimmte Materialien verwendet werden, die die Versickerungsziele fördern (bsp. Rasengittersteine).<sup>15</sup>

### b) Regenwasserrückhaltung

---

<sup>14</sup> OVG NRW, BauR 1998, 981; VGH Mannheim, UPR 2013, 235.

<sup>15</sup> Vgl. Simon/Busse, BayBauO, Art. 47, Rn. 182.

Die Regenwasserrückhaltung lässt sich ausdrücklich über § 9 Abs. 1 Nr. 14 BauGB steuern.

#### c) Brauchwassernutzung

Die Bereitstellung der erforderlichen Flächen und das Führen von erforderlichen Leitungen können gemäß § 9 Abs. 1 Nr. 12 und 13 BauGB verbindlich geregelt werden.

Allerdings erweisen sich diese Möglichkeiten als unzureichend zur Verwirklichung der hier verfolgten Ziele. So können zwar die erforderlichen Flächen freigehalten und so zur Verfügung gestellt werden. Die planungsrechtliche Zulässigkeit bedeutet aber nicht eine Verpflichtung zur Nutzung dieser Anlagen, die ausschließlich über vertragliche Regelungen bzw. über den allgemeinen gemeindlichen Anschluss- und Benutzungszwang erreicht werden kann.<sup>16</sup>

### 2.3 Abfall

Die Cradle to Cradle Philosophie strebt nicht nur eine Abfallvermeidung an, sondern zielt auf einen bestmöglichen Kreislauf der eingesetzten Ressourcen.

Dieses Ziel lässt sich mit Mitteln der Bauleitplanung nicht zwingend vorgeben. Zwar können wiederum erforderliche Flächen abgesichert werden. Der Einsatz bestimmter Materialien ist indes begrenzt (siehe oben Nr. 2.1). Auch ein Zwang zur Nutzung bestimmter Abfallkonzepte kann nicht mit Festsetzungen aus

---

<sup>16</sup> Söfker in: Ernst u.a., BauGB, § 9, Rn. 110a.

dem Katalog des § 9 BauGB begründet werden, sondern allein mit Mitteln des Vertragsrechts (siehe oben Nr. 2.2c).

Gem. § 9 Abs. 1 Nr. 14 BauGB können aber selbstverständlich Flächen für die Abfall- und Abwasserbeseitigung sowie für Ablagerungen vorgesehen werden.

## 2.4 Mobilität

Die hohe Mobilität von Arbeitnehmern, Lieferanten und Waren innerhalb eines Baugebiets bildet ein weiteres Ziel der Cradle to Cradle Philosophie. Auf diese Weise soll die Erreichbarkeit des Unternehmens und damit die Zufriedenheit und Gesundheit der Mitarbeiter und Kunden gefördert werden. Anknüpfungspunkt sind die äußere Erschließung des Areals, aber auch die innere Erschließung innerhalb des Plangebietes und auf dem einzelnen Betriebsgelände.

Als Maßnahmen werden die Einrichtung von Car-Sharing und Car-Pool-Standorten bzw. -plätzen vorgesehen, finanzielle Anreize für die Nutzung des Öffentlichen Personennahverkehrs sowie die innere Erschließung des Baugebietes durch Fahrradwege und das Zurverfügungstellen von Fahrradunterständen bzw. auch darüber hinausgehend von Fahrrädern.

Dieses Ziel lässt sich mit Mitteln der Bauleitplanung nur teilweise erreichen. Auch hier gilt wiederum, dass mit Mitteln der Bauleitplanung die Nutzung des Öffentlichen Personennahverkehrs oder von Fahrrädern nicht vorgeschrieben werden kann, weder innerhalb noch außerhalb des Plangebietes (vgl. oben). Die Bauleitplanung kann aber Vorgaben für die Verkehrsflächen und für Stellplätze vorsehen. So können gem. § 9 Abs. 1 Nr. 4 BauGB Flächen für Garagen und Stellplätze vorgesehen werden. Hierbei handelt es sich – in Abgrenzung zu Abs. 1 Nr. 11 –

nicht um verkehrsbedingte Parkflächen, sondern um Stellplätze und Garagen, die unmittelbar an die Nutzung des Grundstücks anknüpfen.<sup>17</sup> Das lässt allerdings eine Festsetzung auch auf einem anderen Grundstück als auf dem der verursachenden Hauptnutzung zu.<sup>18</sup> Weitergehende Möglichkeiten der inneren Erschließung im Plangebiet bietet § 9 Abs. 1 Nr. 11 BauGB: Die Vorschrift ermöglicht die Festsetzung von Verkehrsflächen, Wegen und Plätzen, insbesondere von Verkehrsflächen für besondere Zweckbestimmungen.<sup>19</sup>

Ausdrücklich lässt die Vorschrift in diesem Sinne auch Regelungen zum Abstellen von Fahrrädern zu. Ergänzend wird auf § 9 Abs. 1 Nr. 21 BauGB hingewiesen, wonach neben der Widmung der Verkehrsflächen diese auch zugunsten der Allgemeinheit mit Geh-, Fahr- und Leistungsrechten belegt werden können. Über § 9 Abs. 1 Nr. 22 BauGB können zudem Gemeinschaftsanlagen für Stellplätze und Garagen eingerichtet werden. Auf diese Weise lässt sich eine gemeinsame Stellplatznutzung für beispielsweise Kfz am Rand eines Plangebietes vorsehen, um die innere Erschließung durch Arbeitnehmer fußläufig oder per Fahrrad zu gestalten.

## 2.5 Freiraumplanung

Zum Ziel der Cradle to Cradle Philosophie zählt auch, mit gut gestalteten Grünflächen eine positive Außendarstellung des Unternehmens, eine Identifikation der Mitarbeiter mit dem Unternehmen, insbesondere eine Erhöhung des Wohlbefindens im Umfeld des Arbeitsplatzes und ein Schutz von Materialien anzustreben.

---

<sup>17</sup> Jarass/Kment, BauGB, § 9, Rn. 48.

<sup>18</sup> OVG Lüneburg, ZfBR 2007, 267, 268; Söfker in u.a., BauGB, § 9, Rn. 54.

<sup>19</sup> Mitschang/Reidt, Battis u.a.; BauGB, § 9, Rn. 57.

Eine Freiraumplanung soll durch attraktive Außenanlagen, begrünte Dachflächen und Fassaden, durch eine Auswahl an standortgerechten Pflanzen und sonstige Begrünungsmaßnahmen erreicht werden. Dieses Ziel lässt sich im Grundsatz weitgehend durch planerische Festsetzungen absichern. Unterhalt und Qualität der Maßnahmen lassen sich planerisch aber nur bedingt steuern. Im Einzelnen:

Über Festsetzungen zum Maß der baulichen Nutzung, der Bauweise und überbaubaren Grundstücksflächen sowie nicht überbaubaren Grundstücksflächen nach § 9 Abs. 1 Nr. 1 und 2 BauGB, flankiert durch Festsetzungen zur Größe und zum Zuschnitt von Baugrundstücken nach § 9 Abs. 1 Nr. 3 BauGB lassen sich zunächst die „harten“ Kriterien zielsicher und verbindlich festsetzen. Über diese Maßnahmen lassen sich nicht überbaubare Grundstücksflächen und damit freizuhaltende Flächen definieren.

Ergänzend kommen Festsetzungen nach § 9 Abs. 1 Nr. 4 BauGB (Nebenanlagen für Spiel-, Freizeit- und Erholungsflächen) in Betracht und nach Nr. 5 als Flächen für Sport- und Spielanlagen. Durch eine Festsetzungsmöglichkeit nach der Nr. 4 kann die Gemeinde den Standort der jeweiligen Fläche verbindlich an einer Stelle vorschreiben und damit von anderen Stellen fernhalten.<sup>20</sup> Wie bei den Verkehrsflächen auch, gilt hier wiederum, dass die Festsetzung nach der Nr. 4 sich nicht auf einen Gemeindarf bezieht, sondern auf Nebenanlagen im Sinne selbständiger baulicher Anlagen, die zu einer Hauptnutzung gehören, die aber nicht zwingend auf dem gleichen Grundstück liegen müssen. Vorliegend geht es mithin um Nebenanlagen, während es sich bei den Festsetzungsmöglichkeiten nach der Nr. 15 und Nr. 22 um Festsetzungen handelt, die dem Haupt-

---

<sup>20</sup> Jarass/Kment, BauGB, § 9, Rn. 48.

zweck der entsprechenden Fläche dienen und im Fall der Nr. 22 als Fläche für den Gemeinbedarf zu verstehen sind, nicht als Nebenanlage zu einer Hauptnutzung auf einem speziellen Grundstück.<sup>21</sup> Auch die Nr. 5 knüpft an eine Fläche für den Gemeinbedarf und nicht an eine Nebennutzung zu einer Hauptnutzung an, sodass auf einen Gemeinwohlbezug im Sinne eines Nutzungsinteresses der Allgemeinheit abzustellen ist.<sup>22</sup> Gem. § 9 Abs. 1 Nr. 10 BauGB lassen sich die vorgenannten Möglichkeiten der Nrn. 1, 2 und 3 ergänzen, indem von Bebauung freizuhaltende Flächen bestimmt werden.

Die vorstehenden Festsetzungsmöglichkeiten sind aber lediglich als ergänzende Maßnahmen zu sehen. Die eigentlichen Festsetzungsmöglichkeiten zur Verfolgung des vorstehenden Ziels ergeben sich aus dem Nachfolgenden: So können gem. § 9 Abs. 1 Nr. 15 BauGB öffentliche und private Grünflächen, wie Parkanlagen, Sport- und Spielplätze festgesetzt werden. Neben der Abwägung auch der privaten Eigentümerinteressen ist bei der Festsetzung nach der Nr. 15 insbesondere zu beachten, dass es sich vorliegend regelmäßig anbieten wird, eine bestimmte Zweckbestimmung zu konkretisieren, was zumindest dann verlangt wird, wenn dies für die städtebauliche Entwicklung erforderlich ist.<sup>23</sup> An dieser Stelle ist im Zusammenhang zugleich auszuführen, dass die Festsetzung als Grünfläche, insbesondere als Parkanlage gleichzeitig einer Festsetzung als Ausgleichsfläche für Eingriffe in Natur und Landschaft dienen kann.<sup>24</sup>

Während die vorstehenden Festsetzungen nur Flächen zur Verfügung stellen bzw. freihalten, regeln sie indes nicht die Umsetzung des Planungsziels und seine Qualität. In diesem Zusam-

---

<sup>21</sup> Mitschang/Reidt in Battis u.a., BauGB, § 9, Rn. 36.

<sup>22</sup> Söfker in: Ernst u.a.; BauGB, § 9, Rn. 56, 58.

<sup>23</sup> BVerwG, 21.07.2011, BauR 2011, 1941.

<sup>24</sup> OVG Münster, 17.12.1998, NVwZ-RR 1999, 561.

menhang kommt als Festsetzung im Bebauungsplan allerdings die Möglichkeit nach § 9 Abs. 1 Nr. 25 BauGB in Betracht. Die Vorschrift ermöglicht Festsetzungen über das Anpflanzen von Bäumen, Sträuchern und sonstigen Bepflanzungen sowie für Bindungen für Bepflanzungen und die Erhaltung von bestimmten Bepflanzungen und zwar für einzelne Flächen sowie insbesondere für Teile baulicher Anlagen. Dies lässt beispielsweise auch eine Festsetzung zur Begrünung von Hauswänden, Mauern und Dächern zu.<sup>25</sup> Die Festsetzung darf mit der Verbesserung des Ortsbildes sowie der Verbesserung des lokalen Klimas städtebaulich gerechtfertigt werden.<sup>26</sup> Die Festsetzung von bestimmten Bepflanzungen kann effektiviert werden durch ein Pflanzgebot nach § 178 BauGB oder durch eine Nebenbestimmung in der Baugenehmigung.<sup>27</sup> Im Rahmen der städtebaulichen Erforderlichkeit und unter Beachtung der gerechten Abwägung lässt sich mithin eine gewisse Begrünungspflicht von den einzelnen Eigentümern mit Mitteln der Bauleitplanung durchgesetzt. Eine darüber hinausgehende Anforderungen an die Qualität, insbesondere an überobligatorische Gestaltungen von Grünzügen etc. ließe sich nur im Bereich der Gemeinbedarfsflächen durch den Hoheitsträger mit Steuermitteln realisieren oder aufgrund privatrechtlicher Verträge im Rahmen der Angemessenheit mit den Investoren vor Ort. Solche Elemente können insbesondere im Kaufvertrag mit abgesichert werden (siehe dazu und den Grenzen auch unten).

## 2.6 Soziales

Im Rahmen der Gebäudeplanung und Ausführung zielt die Cradle to Cradle-Philosophie weiterhin darauf ab, durch eine

---

<sup>25</sup> Söfker in: Ernst u.a., BauGB, § 9, Rn. 219, 220.

<sup>26</sup> Mitschang/Reidt, in Battis u.a., § 9, Rn. 153.

<sup>27</sup> Mitschang/Reidt in Battis u.a., § 9, Rn. 156.



hohe Raumqualität das Wohlbefinden der Mitarbeiter zu steigern und durch Innenausstattung, Farbgebung und Materialauswahl den Komfort in jeder Hinsicht zu erhöhen, so den thermischen, hygienischen, akustischen oder optischen Komfort.

Beispielsweise verbessert die Anbringung von Sonnenschutzelementen das Raumklima. Weiter fördern bestimmte bauliche Maßnahmen den akustischen Zustand oder die optimale Tageslichtnutzung.

Dieses Ziel der Cradle to Cradle Philosophie lässt sich nahezu nicht mit Mitteln des Bauplanungsrechtes verwirklichen. Maßnahmen der reinen Innenausstattung lassen sich von vornherein nicht mit Mitteln des Bauplanungsrechts über einen Bebauungsplan lenken. Der Bebauungsplan dient der Steuerung der Bodennutzung. Jede Festsetzung muss städtebaulich ausgerichtet sein (siehe oben). Maßnahmen der Möblierung und Anordnung von Nutzungseinheiten im Gebäude zählen dazu nicht.

Die Barrierefreiheit des Gebäudes ist bereits über das Bauordnungsrecht hinreichend abgesichert. Darüber hinausgehende Maßnahmen, beispielsweise für nicht öffentliche Bereiche etc., die nicht im Bauordnungsrecht bereits abgesichert sind, können lediglich über städtebauliche Verträge bzw. Kaufverträge gelenkt werden.

Da das Bauplanungsrecht an die Bodennutzung anknüpft, sieht § 9 BauGB auch keine Festsetzungsmöglichkeiten zur Gestaltung von Gebäuden vor – mit Ausnahme von Festsetzungen zum Maß der baulichen Nutzung. In diesem Rahmen kann bestenfalls über Gestaltungssatzungen erreicht werden, dass bestimmte Anforderungen zur Außengestaltung über § 9 Abs. 4

BauGB Eingang in den Bebauungsplan finden. Im Übrigen gilt aber auch hier, dass vertragliche Regelungen erforderlich sind. Bei diesen ist wiederum sorgsam auf die Angemessenheit der Regelung zu achten.<sup>28</sup>

Das einzige bauplanungsrechtliche Einfallstor bildet § 9 Abs. 1 Nr. 23 b BauGB: Gem. dieser Vorschrift sind Festsetzungen möglich, die zu Maßnahmen verpflichten, die dem Einsatz erneuerbarer Energien oder Kraftwärme-Kopplung dienen. Der Anwendungsbereich der Festsetzungsmöglichkeit ist aber darauf beschränkt, bestimmte bauliche und sonstige technische Maßnahmen für genau diesen Einsatz der erneuerbaren Energien vorzusehen. Andere, darüber hinausgehende technische Anforderungen, lassen sich über diese Vorschrift nicht regeln.<sup>29</sup>

## 2.7 Rückbau

Zentraler Gegenstand der Cradle to Cradle Philosophie ist der geordnete Rückbau nach Beendigung der Nutzung. Das Gebiet soll nach Abschluss der Nutzung und des Lebenszyklusses einer baulichen Anlage unberührt zurückbleiben. Zudem sollen Baustoffe wieder und weiter verwertet werden, bevor sie einer stofflichen oder energetischen Verwertung zugeführt werden.

Dieses Ziel ist mit Mitteln der Bauleitplanung nicht zu erreichen: Der Gesetzgeber hat eine Rückbauverpflichtung ausschließlich im Fall des § 35 Abs. 5 S. 2 für Vorhaben gem. § 35 Abs. 1 Nr. 2 bis 6 vorgesehen. Es entspricht allgemeiner Auffassung, dass diese Vorschrift als Ausnahmenvorschrift so eng gefasst ist, dass

---

<sup>28</sup> siehe dazu im Einzelnen Birk, Städtebauliche Verträge, S. 347 ff. 354 ff.

<sup>29</sup> Söfker in: Ernst u.a., BauGB, § 9, Rn. 197 b.

sie sich nicht auf andere Vorhaben übertragen lässt.<sup>30</sup> Bestenfalls bei Außenbereichsvorhaben kann über eine Vereinbarung zu einer Rückbauverpflichtung nachgedacht werden, wenn dadurch eine Beeinträchtigung öffentlicher Belange im Sinne des § 35 Abs. 3 BauGB ausgeräumt werden kann.<sup>31</sup>

## **II. Schnittstellen der Cradle to Cradle Philosophie mit EU-Rechtsakten**

Auf der Ebene des Unionsrechts unterscheidet Art. 288 AEV die Verordnung, die Richtlinie, Beschlüsse, Empfehlungen und Stellungnahmen. Bei der Verordnung handelt es sich um unmittelbar in jedem Mitgliedstaat in allen Teilen verbindliches Recht, Art. 288 Abs. 1 AEUV. Bei der Richtlinie handelt es sich um Vorgaben, die hinsichtlich des Ziels gegenüber den Mitgliedstaaten verbindlich sind, die aber von den Mitgliedstaaten in das nationale Recht umgesetzt werden müssen, um dort wirksames Innenrecht zu schaffen.<sup>32</sup>

Ein eigener spezieller Kompetenztitel zur Befassung der EU mit dem Planungsrecht fehlt und so bleibt das Planungsrecht originär in der Zuständigkeit der Mitgliedstaaten. Gleichwohl wird das nationale Städtebaurecht zunehmend durch Regelungen der Europäischen Union beeinflusst.<sup>33</sup>

Schnittstelle bilden vor allen Dingen die Regelungen zum Umweltrecht auf Grundlage des Titels XX Umwelt, Art. 191 ff. AEUV. Hier galt es bereits am 27.06.1965, die UVP-Richtlinie umzusetzen und damit auch für einen Teil von Bebauungsplänen eine Umweltverträglichkeitsprüfung vorzuschreiben. Es

---

<sup>30</sup> Mitschang/Reidt in Battis u.a., BauGB, § 35, Rn. 108; Jarass/Kment, BauGB, § 35, RN. 106.

<sup>31</sup> Mitschang/Reidt in Battis u.a., BauGB, § 35, Rn. 180.

<sup>32</sup> Nettesheim in: Grabitz u.a., Das Recht der Europäischen Union, AEUV, Art. 288, Rn. 104.

<sup>33</sup> Koch/Händler, BauR, S. 157.

folgte die Richtlinie 2001, 42/EG vom 27.06.2001 über die Prüfung der Umweltauswirkungen bestimmter Pläne und Programme, sog. Plan-UP.<sup>34</sup> Mit dem Europarechtsanpassungsgesetz Bau 2004 und weiteren Änderungen in 2005 und 2006/2007 sowie des Gesetzes zur Förderung des Klimaschutzes bei der Entwicklung in den Städten und Gemeinde und schließlich auch mit der Änderung 2013 wurden die zwingenden Vorgaben der sog. Plan-UP-Richtlinie sowie auch der Richtlinie 2003/35/EG vom 26.05.2003 über die Beteiligung der Öffentlichkeit bei der Ausarbeitung bestimmter umweltbezogener Pläne und Programme, sog. Öffentlichkeitsbeteiligungsrichtlinie umgesetzt.<sup>35</sup>

Neben den „Verfahrens-Richtlinien“ existiert aber auch eine Reihe Vorgaben, die auf Inhalte von Bebauungsplänen Einfluss nehmen. Allen voran ist die Richtlinie 92/43/EWG, sogenannte FFH-Richtlinie zu nennen. Zusammen mit der Richtlinie 2009/147, der sogenannten Vogelschutzrichtlinie, deckt sie die wesentlichsten Teile des Artenschutzregimes ab und wurde in nationales Recht umgesetzt, insbesondere durch die §§ 18, 44 BNatSchG und § 1a BauGB, dem sogenannten baurechtlichen Eingriffsbegriff.

Insgesamt existieren unmittelbar in den Mitgliedstaaten für die planenden Kommunen geltende Vorschriften des EU-Rechts mit einem direkten Bezug zur Bauleitplanung so gut wie nicht. EU-Richtlinien wurden in das nationale Recht umgesetzt, sodass insoweit eine Darstellung der Inhalte von Richtlinien entbehrlich bleibt. Hier ist der Blick vielmehr auf das nationale Recht der Bauleitplanung zu richten.

---

<sup>34</sup>Koch/Händler, BauR, S. 157.

<sup>35</sup> vgl. insbesondere Entwurf eines Gesetzes zur Anpassung des BauGB an EU-Richtlinien, Kabinettsbeschluss Beck-Online IBR MAT Nr. 111; Söfker in: Ernst u.a., BauGB, Rn. 6 a ff.

Löst man dagegen den Blick von der unmittelbaren bauleitplanerischen Regelung und richtet ihn auf allgemeine Belange, die im Rahmen der Bauleitplanung zu berücksichtigen sind, finden sich verschiedene Rechtsakte der EU, die Schnittstellen zur Cradle to Cradle Philosophie aufweisen könnten. Eine abschließende Aufzählung ist aufgrund der Vielfältigkeit der mittelbaren Verknüpfungen mit Aspekten der Cradle to Cradle Philosophie unmöglich. Beispielhaft sollen folgende Regelungen aufgeführt werden:

- Verordnung (EU) Nr. 305/2011 vom 09.03.2011 zur Festlegung harmonisierter Bedingungen für die Vermarktung von Bauprodukten, ABLEU Nr. L88 vom 04.04.2011, S. 5.

Die Bauprodukteverordnung ist am 01.07.2013 in Kraft getreten. Sie betrifft die Bedingungen für die Vermarktung von Bauprodukten und deren CE-Kennzeichnung. Als Verordnung gilt sie unmittelbar in allen Mitgliedstaaten und regelt letztlich, unter welchen Voraussetzungen eine CE-Kennzeichnung erfolgt und verhindert, dass solche Produkte beim Inverkehrbringen und dem Wechsel zwischen den Mitgliedstaaten benachteiligt werden dürfen.<sup>36</sup> Die neue Fassung enthält bereits einen Grundgedanken der C2C Philosophie, indem Bauwerke so zu errichten sind, dass die eingesetzten natürlichen Ressourcen nach einem Abriss wiederverwendet werden können. Diese Pflicht wird zukünftig in allen Mitgliedstaaten zu beachten sein (Nr. 7 Anhang 1 zur Verordnung).

- Richtlinie 2000/60/EG vom 23.01.2000 zur Schaffung eines Ordnungsrahmens für Maßnahmen der Gemeinschaft im Bereich der Wasserpolitik.

---

<sup>36</sup> Abend, EuZW 2013, 611.

Die sog. Wasserrahmenrichtlinie zielt insbesondere auf eine wirksame Gewässerbewirtschaftung, betrifft im Wesentlichen mithin Wasserstraßen und den Umgang hiermit. Im Zusammenhang mit der Einleitung von Oberflächenwasser in Vorfluter sind Einflüsse des EU-Rechts in diesem Zusammenhang nicht ausgeschlossen und können auch Schnittstellen mit der Cradle to Cradle Philosophie aufweisen.

– Abfallrecht.

Auch das Abfallrecht erfuhr eine Prägung durch zahlreiche europäische Rechtsakte. Zu nennen ist im Wesentlichen die Abfallrahmenrichtlinie (2008/98/EG). Sie trifft zahlreiche Bestimmungen, die in das deutsche Abfallrecht übernommen wurden. So definiert sie den Abfallbegriff. Bezug zur Cradle to Cradle Philosophie besteht beispielsweise mit Art. 6, wonach die Abfalleigenschaft und damit das Regime des Kreislauf-, Wirtschaft- und Abfallgesetzes für bestimmte Abfälle endet, wenn diese ein Verwertungsverfahren durchlaufen haben und der resultierende Stoff oder Gegenstand nach allgemeiner Auffassung für bestimmte Zwecke verwendet wird, die zur Erfüllung der Zweckbestimmung des Stoffes notwendigen technischen und rechtlichen Anforderungen erfüllt sind und seine Verwendung insgesamt nicht zur schädlichen Umwelt- und Gesundheitsfolgen führen kann.<sup>37</sup> Bereits diese Beispiele zeigen, dass der Bezug zur Cradle to Cradle Philosophie soweit reicht, dass eine aussagekräftige Auflistung solcher Rechtsakte aus dem EU-Recht kaum zielführend ist, solange es sich nicht um

---

<sup>37</sup> Zu den Einzelheiten Petersen, NVwZ 2009, 1063, 1065 ff.

unmittelbar geltende und verbindliche Vorschriften handelt, die direkt auf das Planungsrecht Einfluss nehmen.

### **III. Schnittstellen der Cradle to Cradle Philosophie mit Landesrecht**

Schnittstellen zwischen Landesrecht und der Cradle to Cradle Philosophie im Bereich der Bauleitplanung existieren im Bereich des Landesplanungsrechts, insbesondere im Feld der Raumordnung und soweit das Recht der Landesbauordnung Schnittstellen mit der Bauleitplanung aufweist.

Eine Berücksichtigung der Landesraumordnung gewährleisten § 1 Abs. 4 BauGB und § 4 Abs. 1 ROG. Danach sind Ziele der Raumordnung verbindlich und zwingend im Rahmen der Planung zu beachten.<sup>38</sup> Grundsätze der Raumordnung enthalten dagegen gemäß § 3 Abs. 1 Nr. 3 ROG Vorgaben für nachfolgende Abwägungsentscheidungen, sind also letztlich Abwägungsmaterial.<sup>39</sup>

Im Bereich der Grundsätze zu nennen sind § 10 LEPro NRW, wonach im Rahmen der angestrebten Siedlungsstruktur die Standortvoraussetzungen für einen Strukturwandel, die Schaffung von Arbeitsplätzen und das wirtschaftliche Wachstum fördernde umweltverträgliche Entwicklung der Erwerbsgrundlagen erhalten, verbessert oder geschaffen werden sollen und § 11 LEPro NRW, der bestimmt, dass die Ausstattung eines Gebietes mit Verkehrsanlagen sowie Ver- und Entsorgungseinrichtungen und die Bedienung mit Verkehrs-, Ver- und

---

<sup>38</sup> Jarass/Kmet, BauGB, § 1, Rn. 31.

<sup>39</sup> Jarass/Kmet, BauGB, § 1, Rn. 31.

Entsorgungsleistungen auf die für dieses Gebiet angestrebte Entwicklung unter Berücksichtigung der Erfordernisse des Umweltschutzes auszurichten und miteinander in Einklang zu bringen sind.

Bei den Zielen lassen sich insbesondere die §§ 33-35 LEPro NRW als Schnittstellen der Cradle to Cradle Philosophie fruchtbar machen. Sie bestimmen, dass die Belange der Wasserwirtschaft im Rahmen der Bauleitplanung zu berücksichtigen sind, dass Abfall möglichst vermieden und bestmöglich einer Verwertung oder Entsorgung zuzuführen ist und schließlich, dass Maßnahmen so zu planen sind, dass hieraus möglichst keine neue Immissionsbelastung folgt.

Im Bereich des Bauordnungsrechts existieren eine Reihe von Vorschriften zur Qualität von Baustoffen und insbesondere zur Vermeidung von Gefahren für die Gesundheit der Nutzer baulicher Anlagen. Eine direkte Verbindung zum Planungsrecht existiert aber im Grunde allein in § 6 Abs. 1 BauO NRW, wonach das Planungsrecht dem Bauordnungsrecht hinsichtlich der Bestimmung notwendiger Abstandflächen vorgeht. Insofern lassen sich echte Schnittstellen hier nicht ausmachen, sondern nur ergänzende Regelungen, die im Rahmen der Bauphase zu beachten sind, die aber nicht bereits Eingang in die planerische Steuerung finden.

Maßgeblichen Einfluss zur Verwirklichung der Ziele der Cradle to Cradle Philosophie nimmt aber § 86 BauO NRW. Auf dieser Grundlage können die Kommunen Satzungen erlassen zur äußeren Gestaltung und Begrünung baulicher Anlagen. Mit diesen Satzungen können optische Faktoren im Baugebiet gesteuert werden.



#### **IV. Zusammenfassung/nicht im Bebauungsplan festsetzbare Ziele der Cradle to Cradle Philosophie**

##### **1. Nicht im Bebauungsplan festsetzbare Ziele**

Insgesamt lässt sich festhalten, dass ein umfassendes Cradle to Cradle Prinzip nicht durch Mittel des Bauplanungsrechts abgesichert werden kann. Verbindliche Festsetzungen sind auf die städtebauliche Erforderlichkeit und auf die Typologie der Festsetzungsmöglichkeiten beschränkt. Bauleitplanerische Festsetzungen knüpfen an die Ausnutzung des Baugrundstückes durch eine bauliche Anlage an und sind dabei auf eine rein städtebauliche Ausrichtung beschränkt. So gelingt mit der Bauleitplanung lediglich die Vorgabe des äußeren Rahmens über die Zuweisung bestimmter Flächen für bestimmte Nutzungen.

Regelmäßig nicht umsetzen lassen sich über das Bauleitplanungsrecht grundsätzlich

- besondere Nutzungspflichten zur Förderung der Cradle to Cradle Philosophie
- bestimmte Verhaltensweisen der Nutzer der Gebäude im Sinne der Cradle to Cradle Philosophie
- Gestaltungsanforderungen und Materialanforderungen (zu Ausnahmen siehe oben).

Diese Ziele sind dem System des Bauleitplanungsrechts als Steuerung der Bodennutzung fremd.

##### **2. Welche Rahmenbedingungen müssen sich für eine Festsetzung der Cradle to Cradle Philosophie im Bauplanungsrecht ändern?**

Forderungen an den Gesetzgeber auf europäischer oder deutscher Ebene ergeben sich im Rahmen der Bauleitplanung nach Auffassung der Verfasser nicht. Besondere Nutzungspflichten können auf gesonderter Grundlage vereinbart werden (dazu sogleich: Teil II „Vertragliche Zielverwirklichung“.). Anforderungen an Materialien und die technische Baugestaltung außerhalb des Bauplanungsrechts sind bereits bekannt, so die Regelungen zu Bauprodukten, die Anforderungen der Energieeinsparverordnung etc. Was die Wiederverwertbarkeit von Baustoffen angeht, ließen sich als politisches Ziel ergänzende Regelungen fordern. Im Übrigen sind steuerliche Anreize denkbar.

Wollte der Gesetzgeber demgegenüber die Ziele der Cradle to Cradle Philosophie in bauleitplanerischen Festsetzungen verankerbar sehen, müsste folgender gesetzlicher Rahmen neu bestimmt werden: Gegenüber der bisherigen Angebotsplanung, die dadurch gekennzeichnet ist, dass sie den Eigentümern in einem festgesetzten Rahmen Möglichkeiten eröffnet, müssten Nutzungs- und Gestaltungspflichten zur Verfolgung der Cradle to Cradle Philosophie eingeführt werden. Konkret müsste also eingeführt werden, dass – auf Grund solcher (neu einzuführender) Festsetzungen –

- bestimmte Baumaterialien zu verwenden sind,
- bestimmte Abfallkonzepte zu befolgen sind,
- bestimmte Infrastrukturangebote geschaffen und zu nutzen sind
- bestimmte Gestaltungselemente zu verwirklichen sind.

Bei diesen Vorgaben handelt es sich allerdings nicht um Anforderungen, die dem Kompetenztitel des Rechts der Bauleitplanung (Steuerung der Bodennutzungen – siehe oben, Abschnitt 1.1.1.) unterzuordnen sind. Vielmehr wären im Bereich der Baumaterialien energiepolitische Kompetenzen gefragt, im Be-

reich der Nutzungspflichten zumeist umweltpolitische. Hier könnte der Bundesgesetzgeber also nach dem bisherigen Verständnis der Bauleitplanung nur allgemeine und für alle Baugebiete geltende Vorgaben schaffen. Eine Festsetzungsmöglichkeit stieße auf erhebliche verfassungsrechtliche (kompetenzrechtliche) Bedenken. Die Gestaltungselemente lassen sich traditionsgemäß allein dem landesrechtlichen Ordnungsrecht zuordnen. Hier wäre der Landesgesetzgeber gefragt, der grundsätzlich wiederum nur eine allgemeingültige gesetzliche Grundlage schaffen könnte. Allerdings könnte er eine weitergehende Grundlage für Gestaltungssatzungen schaffen, die Ziele der Cradle to Cradle Philosophie umsetzen. Der Ortsgesetzgeber könnte dann für bestimmte Ortsteile oder Plangebiete entsprechende Vorgaben neben dem Bauleitplan auf der Grundlage des § 86 BauO NRW beschließen.

## **Abschnitt 2: Vertragliche Zielverwirklichung**

Die vertragliche Zielverwirklichung erfolgt durch drei Instrumente. So sieht der Vertrag die Aufnahme bestimmter „direkter“ Pflichten vor (Nummer 6b.). Diese werden ergänzt durch ein Punktesystem (Nummer 6c). Dieses schafft Anreize zur Umsetzung weiterer Maßnahmen, indem den Maßnahmen Punktwerte zugeordnet werden. Bei Erreichen bestimmter Punktwerte erfolgt eine nachträgliche Kaufpreisreduzierung. Schließlich kann eine Kombination des Kaufvertrages mit dem Abschluss eines Gewerbeparkvertrages vorgesehen werden. Letzterer enthält weitergehende Pflichten sämtlicher Nutzer des Gewerbeparks, so zur Nutzung einer Biogasanlage im Beispiel, aber auch Pflichten des Parkbetreibers, so beispielsweise zur Einrichtung einer Fahrradsharing-Anlage. Im Kaufvertrag wird der durchgehende Bestand des Gewerbeparkvertrags abgesichert, indem die Stadt als Verkäufer einen Rückgewähranspruch erhält, sollte der Gewerbeparkvertrag unwirksam sein oder werden. Zudem erhält die Stadt ein Rückkaufsrecht zur Sicherung gegen eine Veräußerung an Dritte. Vertragsstraferegelungen ergänzen die Absicherungen.

### **I. Rechtssicherheit der Vertragsmuster**

Auftragsgemäß wird ein rechtssicherer Textentwurf für einen Kaufvertrag im nachfolgenden Textverlauf präsentiert, der sich auf die Umsetzung einzelner Beispiele der Cradle to Cradle Philosophie beschränkt. Sofern gem. der Aufgabenstellung ein rechtssicherer Entwurf vorzulegen ist, ist zur Klarstellung auf Folgendes hinzuweisen: Immer sind solche Verträge der individuellen Situation anzupassen. Hierbei handelt es sich um eine

individuelle Betrachtung der konkreten Vertragsverhandlungssituation, die im Rahmen eines Vertragsmusters nicht antizipiert werden kann. Insofern ersetzt das Muster keine Rechtsprüfung im Einzelfall.

Hinzukommt ein Rechtsrisiko, das im Rahmen einer abstrakten Darstellung nicht abschließend bewertet werden kann, sondern im Rahmen einer Gesamtbetrachtung des tatsächlichen vollständigen Vertrages zu beachten ist: Während im reinen Zivilrecht die Vertragsfreiheit vorherrscht und die Kommune als Grundstückseigentümer bestenfalls über die Grundrechte mitgebunden ist, im Übrigen aber weitestgehend Freiheit bei der Vertragsgestaltung für sich beanspruchen kann, werden die Möglichkeiten in öffentlich-rechtlichen Verträgen, insbesondere städtebaulichen Verträgen im Sinne des § 11 Absatz 1 BauGB begrenzt. Das gilt einmal hinsichtlich des Gegenstandes der Vereinbarungen, vor allen Dingen aber über § 11 Abs. 2 BauGB hinsichtlich der Angemessenheit und des Sachbezuges zwischen Leistung und Gegenleistung. Soweit Regelungen der Cradle to Cradle Philosophie, beispielsweise eine Rückbaupflicht, in einen Kaufvertrag Eingang finden, lässt sich vertreten, dass der Kaufvertrag insoweit ein städtebauliches Element und damit ein Element des städtebaulichen Vertrages enthält.<sup>40</sup> In diesen Fällen ist der Vertrag insgesamt daraufhin zu prüfen, ob es sich um einen öffentlich-rechtlichen Vertrag oder um einen privatrechtlichen Vertrag handelt, wobei nach der herrschenden Rechtsprechung und Literatur bei einem zivilrechtlichen Kaufvertrag auf den Schwerpunkt der inhaltlichen Regelungen abzustellen ist.<sup>41</sup> Behandeln diese wie bei der Bodenfreilegung und –sanierung überwiegend öffentliche Aspekte, dürfte es sich um einen öffentlich-rechtlichen Vertrag handeln.<sup>42</sup> Weiter sollte bei jeder einzelnen Regelung geprüft werden, ob es sich um

---

<sup>40</sup> vgl. dazu und zur Abgrenzung: Birk, Städtebauliche Verträge, S. 29 ff.

<sup>41</sup> BVerwG, DBVI 1993, 654 ff.

<sup>42</sup> Birk, Städtebauliche Verträge, S. 30 ff.

eine Regelung handelt, die städtebaulich motiviert ist, wie beispielsweise bei Rückbauverpflichtungen oder energetischen Nutzungen.

Im Ergebnis sind für verschiedene vertragliche Elemente möglicherweise die Grenzen zu beachten, die für städtebauliche Verträge gelten. Dann stehen Rückbaupflichten, energetische Pflichten, Pflichten zum Einsatz bestimmter Baustoffe auf einem kritischen Prüfstand und halten im Einzelnen oder in einer Gesamtbetrachtung nicht. So unterliegen energetische Anforderungen, die über die Standards nach EnEV hinausgehen, einer kritischen Betrachtung.<sup>43</sup> Die Rechtsprechung stellt zur Beurteilung auf eine Gesamtschau des geschlossenen Vertrages ab, auf die Wirkung sämtlicher Pflichten insgesamt auf der einen Seite und dem Nutzen für den Belasteten auf der anderen Seite.<sup>44</sup> Aus diesem Grund lässt sich ebenso wenig wie bei der Bewertung der Festsetzungsmöglichkeiten im Bebauungsplan abstrakt die Frage der Wirksamkeit beantworten, ohne dass sämtliche Regelungen eines Vertrages und der Vorteile für einen Käufer berücksichtigt werden.

Da die Absicherung der Ziele des Cradle to Cradle-Systems über einen Kaufvertrag mithin erhebliche Unsicherheiten im Einzelfall birgt und überdies eine Verpflichtung der Käufer im Sinne eines repressiven Systems als zu einengend und teuer empfunden werden mag, dürfte es sich regelmäßig anbieten, über die Kaufverträge lediglich das Grundgerüst einer Infrastruktur für einen C2C-Gewerbepark zur Verfügung zu stellen und statt der Verfolgung einer vollständigen Umsetzung der Philosophie eine Optimierung anzustreben über ein System der Selbstverpflichtung, das durch bestimmte Anreize gefördert werden kann (dazu Teil III).

---

<sup>43</sup> Vgl. Birk, Städtebauliche Verträge, S. 347 ff, 354 ff.

<sup>44</sup> BVerwG, ZfBR 2009, 472.

## II. Text: Grundstückskaufvertrag mit Auflassung

### 1. Grundbuchstand

Der Erschienenene zu 1. – nachstehend „**Verkäufer**“ genannt – ist Eigentümer des folgenden, im Grundbuch von – Amtsgericht – Blatt eingetragenen Grundstücks Gemarkung Flur Flurstück , Freifläche, , groß qm.

Das Grundstück ist in Abteilung II des Grundbuchs wie folgt belastet: / nicht belastet .

Das Grundstück ist in Abteilung III des Grundbuchs wie folgt belastet: / nicht belastet .

### 2. Verkauf, Kaufpreis, Fälligkeit

Der Verkäufer verkauft das in Ziffer 1. bezeichnete Grundstück – nachstehend „**Kaufgegenstand**“ genannt – an den Erschienenen zu 2. – nachstehend „**Käufer**“ genannt.

Der Kaufpreis beträgt EUR (in Worten: Euro ).

Der Kaufpreis muss innerhalb von zehn Tagen gutgeschrieben sein, nachdem der Vollzug dieses Vertrages dadurch gesichert ist, dass

- a) zugunsten des Käufers eine Vormerkung zur Sicherung des Anspruchs auf Übertragung des Eigentums in das Grundbuch eingetragen wurde, der nur die in Ziffer 1. bezeichneten Rechte sowie von dem Käufer bestellte Grundpfandrechte im Range vorgehen und hinsichtlich derer keine gleichrangigen Rechte bestehen,
- b) dem Notar ohne oder mit einem aus dem Kaufpreis erfüllbaren Treuhandauftrag alle Unterlagen vorliegen, um den verkauften Grundbesitz von Rechten freizustellen, die im Grundbuch bereits vor oder gleichzeitig mit der vorgenannten Vormerkung eingetragen wurden und vom Käufer nicht übernommen werden,  
und
- c) die Erklärung der Gemeinde ohne Bedingungen und Auflagen vorliegt, dass sie auf die Ausübung eines Vorkaufsrechtes nach dem Baugesetzbuch verzichtet bzw. erklärt hat, ihr stünden keine Vorkaufsrechte zu.
- d) Weitere Fälligkeitsvoraussetzung ist, dass der Verkäufer den Kaufgegenstand vollständig geräumt hat. Diese Voraussetzung wird nicht vom Notar überprüft. Der Verkäufer verpflichtet sich zur Räumung bis zum .

Der Notar soll den Beteiligten das Vorliegen der vorstehend zu a) bis c) genannten Fälligkeitsvoraussetzungen und den Inhalt

von Zahlungsaufgaben durch Einwurf-Einschreiben mitteilen. Die 10-Tage-Frist beginnt, wenn die Mitteilung des Notars dem Käufer zugeht oder der Käufer auf andere Weise Kenntnis erlangt.

Soweit der Kaufpreis nicht zur Freistellung des verkauften Grundbesitzes von eingetragenen Belastungen zu verwenden ist, sind Zahlungen bei Fälligkeit auf das Konto des \_\_\_\_\_ Nr. \_\_\_\_\_ bei der \_\_\_\_\_ (BLZ \_\_\_\_\_) zu überweisen.

Um die Lastenfreistellung sicherzustellen, wird Folgendes vereinbart:

Käufer und Notar brauchen nicht nachzuprüfen, ob Auflagen, von denen die Lastenfreistellung abhängt, berechtigt sind. Soweit solche Auflagen reichen, kann der Kaufpreis nur durch ihre Erfüllung, nicht durch sonstige Leistungen an den Verkäufer oder an Dritte bezahlt werden. Der Notar wird bevollmächtigt, die Unterlagen zur Lastenfreistellung für alle am Vertrag oder an der Kaufpreisfinanzierung Beteiligten entgegenzunehmen und zu verwenden. Alle Rechte und Ansprüche des Verkäufers, die mit den zu beseitigenden Belastungen zu tun haben, werden hiermit sicherungshalber auf den Käufer übertragen. Diese Übertragung wirkt, sobald der Kaufpreis bezahlt ist und entfällt, sobald die Lastenfreistellung durchgeführt ist.

### 3. Sach- und Rechtsmängelhaftung

Der Kaufgegenstand wird verkauft frei von im Grundbuch eintragbaren Rechten, von Miet- und Pachtverhältnissen und von rückständigen öffentlichen Abgaben, soweit nicht Rechte ausdrücklich in diesem Vertrag übernommen werden. Eine weitergehende Haftung für Rechtsmängel wird – vorbehaltlich anderer Vereinbarungen – ausgeschlossen. Der Verkäufer garantiert, dass ihm von im Grundbuch nicht eintragbaren Rechten sowie von Abstandflächenübernahmen oder Baulasten nichts bekannt ist.

Der Käufer hat den Kaufgegenstand genau besichtigt und kauft ihn wie er steht und liegt. Alle Ansprüche und Rechte wegen Sachmängeln am Kaufgegenstand werden hiermit vollumfänglich ausgeschlossen, ausgenommen eine Haftung bei Vorsatz oder Arglist. Der Verkäufer garantiert, dass ihm nicht erkennbare Mängel nicht bekannt sind.

Weitergehende Garantien werden nicht abgegeben.

In Bezug auf Schadensersatzansprüche bleibt die Haftung für vorsätzlich oder grob fahrlässig verursachte Schäden und für Schäden aus der Verletzung des Lebens, des Körpers oder der Gesundheit, die auf einer fahrlässigen Pflichtverletzung des Verkäufers, seines gesetzlichen Vertreters oder Erfüllungsgehilfen beruhen, unberührt.

Der Notar belehrte insbesondere den Käufer darüber, dass er damit weitestgehend auf eine mögliche Sachmängelhaftung des Verkäufers verzichtet.

Der Verkäufer haftet für Verschlechterungen des Kaufgegenstandes von heute bis zum Besitzübergang, es sei denn, sie



sind auf den gewöhnlichen Gebrauch zurückzuführen.

Der Kaufgegenstand ist nicht vermietet.

Die Vertragschließenden beantragen die Löschung der in Abteilung III des Grundbuchs eingetragenen Grundschuld lfd. Nr. . Die Rechte in Abteilung II werden ohne Anrechnung auf den Kaufpreis von dem Käufer übernommen .

4. Übergabe

Die Übergabe erfolgt am Tage der vollständigen Kaufpreiszahlung.

Von diesem Tage an gehen Gefahren, Lasten und Nutzungen des Kaufgegenstandes sowie die Verkehrssicherungspflicht vom Verkäufer auf den Käufer über.

5. Erschließung

Der Verkäufer verkauft das Grundstück als erschlossen und versichert, dass alle erhobenen öffentlichen Lasten im Sinne des § 436 BGB entsprechend dem Ausbauzustand der Straße ..... gezahlt sind. Kosten, die die erstmalige Erschließung betreffen, trägt der Verkäufer auch insoweit, als eine Abrechnung zu einem späteren Zeitpunkt erfolgen sollte. Kosten für zukünftige Ausbaubeiträge, also für sämtliche Maßnahmen, die nicht der erstmaligen Erschließung des Grundstücks dienen, trägt dagegen der Käufer.

Der Notar wies darauf hin, dass derartige Kosten und Beiträge dem jeweils im Grundbuch eingetragenen Eigentümer in Rechnung gestellt werden und das Grundstück für eventuelle Rückstände haftet.

6a. Teilnahme am „Gewerbepark C2C Bielefeld“, Bedingung, Rückverkauf, Vorkaufsrecht

(Anmerkung: Die Beteiligung an einem Gewerbeparksystem soll eine Möglichkeit darstellen, um verschiedene durch einen Parkbetreiber unterhaltene Einrichtungen dauerhaft und unabhängig von den angesiedelten Unternehmen anzubieten, hier beispielsweise eine Biogasanlage. Wenn das nicht gewünscht ist, entfällt dieser Teil Nr. 6a., ebenso der nachfolgende Teil 3 „Ausschnitt Gewerbeparksystem. Dann werden allein die nachfolgend in den Nr. 6b und Nr. 6c behandelten direkten Pflichten bzw. sonstigen Regelungen zum Kaufpreis Vertragsbestandteil)

**Dem Käufer ist bekannt, dass sich der Kaufgegenstand innerhalb des Gewerbeparks C2C Bielefeld befindet, der von dem Verkäufer betrieben wird. Der vorliegende Kaufvertrag wird nur wirksam (aufschiebende Bedingung), wenn der Käufer den als Anlage ... beiliegenden Vertrag zum Beitritt in den Gewerbepark C2C Bielefeld mit dem Verkäufer wirksam abschließt.**

**Für den Fall, dass der beiliegende Vertrag zum Beitritt in den Gewerbepark C2C Bielefeld nach seinem Abschluss als unwirksam gilt oder unwirksam wird, erhält der Verkäufer das Recht, den Kaufgegenstand zurück zu erwerben.**

**Dieses Recht kann innerhalb von sechs Monaten geltend gemacht werden, nachdem der Verkäufer von der Unwirksamkeit Kenntnis erlangt. Zur Rechtzeitigkeit genügt die Anzeige des Anspruchs in Textform.**

**Der Verkäufer schuldet in diesem Fall einen Kaufpreis, der dem Marktwert der Immobilie, einschließlich Gebäude und Zubehör entspricht. Können sich die Parteien nicht über den Kaufpreis einigen, bestimmt ihn ein von der IHK zu benennender Sachverständiger für die Bewertung von Immobilien für beide Parteien nach billigem Ermessen verbindlich. Das Recht aus § 315 Abs. 3 BGB steht beiden Seiten offen. Die Kosten des Sachverständigen tragen beide Seiten je zur Hälfte. Wird der Gewerbeparkvertrag durch den Käufer aufgelöst oder verursacht ein schuldhafter Verstoß des Käufers gegen Pflichten aus dem Gewerbeparkvertrag eine Kündigung aus wichtigem Grund, ist der so zu bildende Kaufpreis um einen Abschlag von zehn Prozent zu verringern.**

**Der vorstehende Anspruch auf eine Rückveräußerung der Immobilie wird durch eine Auflassungsvormerkung zugunsten des Verkäufers abgesichert. Der Verkäufer verpflichtet sich aber, einen Rangrücktritt gegenüber zukünftigen Grundschuld- und Hypothekengläubigern des Käufers zu erklären, soweit diese Sicherungsrechte den Wert der Immobilie nicht übersteigen. Im Fall des Rückkaufs ist der Käufer zur lastenfreien Übertragung verpflichtet. Gelingt ihm die Lastenfreistellung nicht und beansprucht der Verkäufer dennoch den Rückkauf, sind die Belastungen mit ihrer tatsächlichen wirtschaftlichen Belastung auf den Kaufpreis anzurechnen.**

**Der Notar hat ausgiebig über diese Regelung und die Bedeutung eines Rangrücktritts belehrt.**

**Der Käufer verpflichtet sich weiter, den Kaufgegenstand an Dritte nur weiter zu veräußern, wenn der Dritte die Pflichten aus dem beiliegenden Vertrag zum Beitritt in den Gewerbepark C2C Bielefeld durch Abschluss eines Vertrags mit dem Verkäufer übernimmt und wenn der Verkäufer dieser Übernahme durch Abschluss des Vertrags zustimmt.**

**Der Verkäufer erhält ein Rückkaufsrecht, das im Fall des Verstoßes gegen die vorstehende Pflicht binnen sechs Monaten nach Kenntnis ausgeübt werden kann. Zur Rechtzeitigkeit genügt der Zugang der Erklärung bei dem Käufer in Textform.**

**Für die Bildung des Kaufpreises gilt Absatz 3, einschließlich Satz 5 entsprechend, wobei der Abschlag in diesem Fall 25% beträgt.**

**Der Käufer bewilligt und der Verkäufer beantragt bereits jetzt die Eintragung einer Vormerkung zur Sicherung der beiden vorstehenden Ansprüche des Verkäufers auf Rückübertragung des Eigentums an dem Kaufgegenstand in das Grundbuch.**

**Die vorstehenden Beschränkungen des Käufers gelten für zwanzig Jahre seit dem Wirksamwerden dieses Vertrags.**

**Nach Ablauf dieser Frist ist der Verkäufer verpflichtet, die Löschung der nach dieser Nr. 6a einzutragenden dinglichen Belastungen des Kaufgegenstandes zu bewilligen.**

**6b. Pflichten in Bezug auf die auf dem Grundstück zu errichtende bauliche Anlage; Vertragsstrafe**

**Der Käufer verpflichtet sich, bei der Errichtung der beabsichtigten baulichen Anlage eine Beratung zu dem Konzept der cradle to cradle Philosophie bei der ... in Anspruch zu nehmen und zumindest folgende Aspekte umzusetzen:**

- **der Käufer ist verpflichtet, ausschließlich Baumaterialien gemäß Anlage ... zu verwenden;**
- **der Käufer muss mindestens folgenden Energiestandard bei der Errichtung geplanter baulicher Anlagen auf dem Grundstück wahren: ...**
- **der Käufer sagt zu, bei der Gestaltung der Außenanlagen Oberflächenversiegelungen soweit zu vermeiden, wie es seine betrieblichen Abläufe zulassen. Mindestens wird er bezogen auf die Grundstücksgröße ... Prozent der Fläche nicht versiegeln und auf dem Grundstück mindestens folgende Bäume anpflanzen und unterhalten ...**
- **Der Käufer ist verpflichtet, mindestens ... Prozent seiner Fassade mit Grünbepflanzungen zu versehen.**

...

**Diese Pflicht gilt auch für spätere Umbau- und Erweiterungsmaßnahmen. Nach Fertigstellung der jeweiligen Anlage zeigt der Käufer dies dem Verkäufer an und gibt Gelegenheit zu einem gemeinsamen Begehungstermin auf dem Gelände und – soweit erforderlich – in dem Gebäude, um die Erfüllung der vorstehenden Pflichten prüfen zu können.**

**Verletzt der Käufer schuldhaft eine seiner Pflichten aus dieser Nr. 6b. verwirkt er eine Vertragsstrafe. Im Fall einer Verletzung der Pflichten aus den Spielstrichen 1 und 2 beträgt die Vertragsstrafe ... EUR. In den übrigen Fällen setzt der Verkäufer nach billigem Ermessen eine Vertragsstrafe in Höhe von ... bis ... fest.**

**Der Käufer hat die aus der Nr. 6b. folgenden Pflichten bei einer Weiterveräußerung an seinen Käufer weiterzugeben, einschließlich der Regelungen zur Vertragsstrafe. Unterlässt er dies, verwirkt der Käufer unabhängig von einem etwaigen Verschulden eine Vertragsstrafe in Höhe von ...**

**6c. Freiwillige Leistungen des Erwerbers in Bezug auf die auf dem Grundstück zu errichtende bauliche Anlage**

**Der Kaufpreis (oben Nr. 2) verringert sich, wenn der Käufer folgende freiwillige Maßnahmen bei der Errichtung der (ersten) baulichen Anlage auf seinem Grundstück umsetzt, nach einem Punktesystem:**

- **errichtet der Käufer seine bauliche Anlage in Passivhausstandard erhält er hierfür 50 Punkte**
- **Beim Einbau von Photovoltaikanlagen erhält der Käufer je ... installierter Leistung 10 Punkte, bis maximal 30 Punkte**
- **Beim Einbau von Solarkollektoren erhält der Käufer je ...**

- |  |                   |
|--|-------------------|
| <i>installierter Leistung</i>  | <b>10 Punkte,</b> |
| <i>bis maximal 30 Punkte</i>   |                   |
| - <i>Für die Nutzung von Erdwärme erhält der Käufer</i>  | <b>10 Punkte</b>  |
| - <i>Für die Installation einer Pelletheizung, die für die Beheizung des zu errichtenden Betriebsgebäudes ausreichend dimensioniert ist, erhält der Käufer</i> | <b>10 Punkte</b>  |
| - <i>Für den Einbau einer Lüftungsanlage mit Wärmerückgewinnung erhält der Käufer</i>  | <b>10 Punkte</b>  |
| - <i>Für eine Regenwassernutzung für WC und Außenanlagen mit einer Speicherung von mindestens ... Litern erhält der Käufer</i>                                 | <b>10 Punkte</b>  |
| - <i>Für die Verwendung von wasserdurchlässigen Belegen gemäß Anlage ... erhält der Käufer</i>   | <b>10 Punkte</b>  |
| - <i>Für die Einrichtung eines Gründachs (mindestens 85 Prozent der Dachfläche) erhält der Käufer</i>  | <b>10 Punkte</b>  |
| - ...  |                   |

**Nach Fertigstellung der (ersten) baulichen Hauptanlage zeigt der Käufer dies dem Verkäufer an und lädt zu einem gemeinsamen Begehungstermin ein, der innerhalb von 14 Tagen nach der Anzeige stattfinden soll. Weist der Käufer die Umsetzung einer oder mehrerer Maßnahmen nach dieser Nr. 6c nach, reduziert sich der Kaufpreis und zwar**

- |   |                |
|---|----------------|
| - <i>Bei Erreichen von 30 Punkten in Höhe von</i> | <b>... EUR</b> |
| - <i>Bei Erreichen von 50 Punkten in Höhe von</i> | <b>... EUR</b> |
| - <i>Bei Erreichen von 70 Punkten in Höhe von</i> | <b>... EUR</b> |
| - <i>Bei Erreichen von 90 Punkten in Höhe von</i> | <b>... EUR</b> |

(Anmerkung: der Nachlass sollte unter Berücksichtigung sonstiger Zuwendungen und Förderungen nicht über die im Zeitpunkt des Abschlusses geltende de minimis Grenze hinausgehen, weil ansonsten ein Verstoß gegen das Beihilferecht droht)

**Der Kaufpreis wird innerhalb von 14 Tagen ab diesem gemeinsamen Begehungstermin durch den Verkäufer neu berechnet. Ergibt sich hiernach eine Überzahlung, erstattet er innerhalb dieser 14 Tage den sich ergebenden Differenzbetrag auf eine von dem Käufer noch anzugebende Bankverbindung.**

**Nach Ablauf von zwei Jahren seit dem Kaufdatum entfällt die Möglichkeit zur Reduzierung des Kaufpreises nach dieser Nr. 6c. Die Frist ist eingehalten, wenn der Käufer innerhalb dieser Frist die Maßnahmen technisch abschließend hergestellt und dies dem Verkäufer schriftlich angezeigt hat. Maßgebend für die Fristwahrung ist der Eingang der Anzeige beim Verkäufer.**

7. Auflassung, Auflassungsvormerkung

Sodann erklärten die Erschienenen die

**Auflassung**

wie folgt:

*Wir sind uns darüber einig, dass das Eigentum an dem Kaufgegenstand von dem Verkäufer auf den Käufer übergeht.*

*Die erklärte Auflassung enthält noch nicht die für die Eigentumsumschreibung notwendige Eintragungsbewilligung des Verkäufers und keine Einwilligung zu Weiterverfügungen durch den Käufer.*

*Der Verkäufer bevollmächtigt unwiderruflich den Notar, die Eintragungsbewilligung für ihn abzugeben. Die Beteiligten weisen den Notar an, von seinen Vollmachten nur Gebrauch zu machen, nachdem ihm entweder der Verkäufer den Empfang des Kaufpreises schriftlich oder per E-Mail bestätigt oder ihm der Käufer die Zahlung mittels inländischer Bankbestätigung nachgewiesen hat. Der Verkäufer verpflichtet sich, dem Notar die Kaufpreiszahlung unverzüglich mitzuteilen. Der Notar wird angewiesen, die Eintragungsbewilligung unabhängig davon abzugeben, ob der Kaufpreis fristgerecht gezahlt wurde. Der Eintragungsantrag ist für den Käufer zu stellen. **Die Eintragungsbewilligung darf ferner nur abgegeben werden, sofern der Abschluss des Gewerbeparkvertrags (...) durch Vorlage einer einfachen Kopie des unterschriebenen Exemplars nachgewiesen ist.***

*Der Verkäufer bewilligt und der Käufer beantragt die Eintragung einer Vormerkung zur Sicherung des Anspruchs des Käufers auf Übertragung des Eigentums an dem Kaufgegenstand in das Grundbuch.*

*Der Käufer bevollmächtigt den beurkundenden Notar, alle zur Löschung der vorstehend bewilligten Auflassungsvormerkung erforderlichen Erklärungen und Anträge abzugeben, insbesondere die Löschungsbewilligung gegenüber dem Grundbuchamt. Die Vollmacht des Notars ist im Außenverhältnis unbeschränkt. Im Innenverhältnis darf er die Löschung der Vormerkung nur beantragen, wenn*

a) *der Käufer als Eigentümer eingetragen wurde, es sei denn, es sind Zwischeneintragungen erfolgt oder beantragt, an denen der Käufer nicht mitgewirkt hat,*

*oder*

b) *der Käufer den Kaufpreis nicht fristgerecht gezahlt hat und der Verkäufer deshalb den Rücktritt vom Kaufvertrag erklärt hat. Wird dem Notar nach Fälligkeit des Kaufpreises ein Rücktrittsschreiben des Verkäufers vorgelegt, so wird er den Käufer auffordern, binnen 10-Tagen durch inländische Bankbestätigung nachzuweisen, dass der Kaufpreis gezahlt wurde. Nach fruchtlosem Ablauf dieser Frist darf der Notar von der Vollmacht Gebrauch machen, ohne dass er weitere Prüfungen zur Berechtigung des Rücktritts durchführen muss.*

*Bei Nachweis einer teilweisen Zahlung darf der Notar erst dann von der Vollmacht Gebrauch machen, wenn der Verkäufer den entsprechenden Betrag unwiderruflich auf Notaranderkonto hinterlegt hat mit der Weisung, diesen Betrag unter Abzug von Hinterlegungskosten an den Käufer bzw. dessen Finanzierungsgläubiger nach Löschung der für den Käufer eingetragenen Auflassungsvormerkung und Sicherstellung der Löschung von von dem Käufer zur Eintragung gebrachten Finanzierungsgrundpfand-*

*rechten auszuzahlen.*

*Vor vollständiger Kaufpreiszahlung kann der Käufer seine Ansprüche aus diesem Vertrag weder abtreten noch verpfänden.*

#### 8. Belehrungen

*Der Notar hat das elektronische Grundbuch von am einsehen lassen und den Grundbuchstand mit den Erschienenen erörtert.*

*Der Notar hat das elektronische Grundbuch nicht eingesehen. Bei Beurkundung liegt jedoch ein unbeglaubigter Grundbuchauszug vom vor. Trotz Belehrung über die mit einer nicht zeitnahen Einsichtnahme verbundenen Gefahren bestanden die Beteiligten auf sofortiger Beurkundung.*

*Der Notar belehrte die Erschienenen darüber, dass*

- a) *er das Baulastenverzeichnis nicht eingesehen habe,*
- b) *der Käufer erst mit seiner Eintragung als Eigentümer im Grundbuch das Eigentum an dem Kaufgegenstand erwirbt,*
- c) *die Eintragung des Käufers in das Grundbuch erst erfolgt, wenn dem Grundbuchamt*
  - (1) *die Erklärung der Gemeinde über das Nichtbestehen bzw. die Nichtausübung eines Vorkaufsrechtes nach dem Baugesetzbuch und*
  - (2) *die Unbedenklichkeitsbescheinigung des Finanzamtes wegen der Grunderwerbsteuer,**vorgelegt werden,*
- d) *Verkäufer und Käufer unabhängig von der in diesem Vertrag getroffenen Regelung gesamtschuldnerisch für die Zahlung der Grunderwerbsteuer gegenüber dem Finanzamt haften,*
- e) *er steuerliche Fragen nicht geprüft habe*  
*und*
- f) *alle Vereinbarungen richtig und vollständig beurkundet sein müssen, alle nicht beurkundeten Abreden nichtig sind und die Wirksamkeit des ganzen Vertrages in Frage stellen können.*

#### 9. Belastungsvollmacht

*Für den Fall, dass der Käufer zur Finanzierung des Kaufpreises Fremdmittel benötigt und zu deren Sicherung die Eintragung von Grundpfandrechten erfolgen muss, bevollmächtigt der Verkäufer hiermit den Käufer unwiderruflich, in seinem Namen bereits vor der Eigentumsumschreibung die Eintragung von Grundpfandrechten in beliebiger Höhe nebst beliebiger Zinsen und Nebenleistungen in das Grundbuch zu bewilligen und zu beantragen und den jeweiligen Eigentümer dabei der sofortigen dinglichen Zwangsvollstreckung, § 800 ZPO, zu un-*

terwerfen. Die Grundpfandrechte dürfen aber nur zugunsten einer deutschen Bank, Sparkasse, Bausparkasse oder Versicherung bestellt werden.

Der Käufer ist ferner befugt, im Namen des Verkäufers Zweck- und Rangerklärungen abzugeben.

Grundpfandrechte können aufgrund dieser Vollmacht nur vor dem beurkundenden Notar oder einem Notar seiner Sozietät bestellt werden.

Die Vollmacht gilt außerdem nur dann, wenn die Folgenden von den Vertragsschließenden getroffenen Vereinbarungen in den Bestellungsurkunden für die Grundpfandrechte wiedergegeben werden:

- a) Die Grundpfandrechtsgläubigerin darf die Grundschuld bzw. Hypothek nur insoweit als Sicherheit verwerten oder behalten, als sie tatsächlich Zahlungen mit Tilgungswirkung auf die Kaufpreisschuld des Käufers geleistet hat.

Alle weiteren Zweckbestimmungserklärungen, Sicherungs- und Verwertungsvereinbarungen innerhalb oder außerhalb dieser Urkunde gelten erst, nachdem der Kaufpreis vollständig bezahlt ist, in jedem Fall ab Eigentumsumschreibung. Ab diesem Zeitpunkt gelten sie für und gegen den Käufer als neuen Sicherungsgeber.

- b) Bis zur vollständigen Tilgung des Kaufpreises sind Zahlungen, soweit zur Lastenfreistellung erforderlich, direkt an die dinglich Berechtigten, im Übrigen ausschließlich auf das Konto des Verkäufers zu leisten.
- c) Der Verkäufer übernimmt im Zusammenhang mit der Grundpfandrechtsbestellung keinerlei persönliche Zahlungspflichten. Der Käufer verpflichtet sich, den Verkäufer von allen Kosten und sonstigen Folgen der Grundpfandrechtsbestellung freizustellen.
- d) Das bestellte Grundpfandrecht darf auch nach der Eigentumsumschreibung auf den Käufer bestehen bleiben. Alle Eigentümerrechte und Rückgewähransprüche, die mit ihm zu tun haben, werden hiermit mit Wirkung ab Bezahlung des Kaufpreises, in jedem Fall ab Eigentumsumschreibung, auf den Käufer übertragen. Entsprechende Grundbucheintragung wird bewilligt.

#### 10. Vollmachten

- a) Die Vertragsschließenden bevollmächtigen und beauftragen hiermit den beurkundenden Notar mit dem Vollzug dieses Vertrages. Insoweit soll er alle erforderlichen Erklärungen und Genehmigungen einholen und entgegennehmen.
- b) Die Vertragsschließenden bevollmächtigen außerdem die Mitarbeiter des beurkundenden Notars

...

alle in Bielefeld, jeweils einzeln und unter Befreiung von

den Beschränkungen des § 181 BGB, alle zur Durchführung dieses Vertrages, zur Eintragung von Grundpfandrechten zur Kaufpreisfinanzierung und zur Behebung eventueller Verfügungen des Grundbuchamtes erforderlichen Ergänzungen und Änderungen vorzunehmen, Eintragungen und Löschungen zu bewilligen und zu beantragen und insoweit alle Erklärungen abzugeben, die die Vertragschließenden abgeben können.

Die Vollmacht ist nach außen hin unbeschränkt. Im Innenverhältnis sind die Bevollmächtigten verpflichtet, die Erklärungen vorher mit dem Vollmachtgeber abzustimmen.

Die Bevollmächtigten können von dieser Vollmacht nur vor dem beurkundenden Notar, seinem Vertreter oder einem Mitglied seiner Sozietät Gebrauch machen.

11. Vollmacht für den Notar

Soweit in dieser Urkunde Vollmachten für den Notar erteilt wurden, gilt die Vollmacht im gleichen Umfang für seinen Vertreter und Nachfolger im Amt sowie für andere Notare seiner Sozietät. Die Bevollmächtigten sind berechtigt, Untervollmacht zu erteilen und sind von den Beschränkungen des § 181 BGB befreit.

12. Kosten

Die Kosten dieses Vertrages und seiner Durchführung sowie die Grunderwerbsteuer trägt der Käufer.

Die Kosten der Lastenfreistellung trägt jedoch der Verkäufer.“

### III. Text (Ausschnitt): Gewerbeparkvertrag

”

1. Gewerbeparksystem

1.1

Die Parteien verpflichten sich zur gemeinsamen Förderung des Gewerbeparkkonzepts (Anlage ... „Gewerbeparkkonzept“) unter Berücksichtigung der Interessen der weiteren Nutzer. Dazu zählen insbesondere sämtliche Belange, die der gemeinsamen Nutzung des Gewerbeparks unter der Geltung des in der Präambel und der Anlage ... „Gewerbeparkkonzept“ beschriebenen C2C-Konzepts dienen.

1.2

Das Gewerbeparkmanagement obliegt der Parkbetreiberin. Zu ihren Aufgaben zählt insbesondere die Überwachung der Einhaltung der von sämtlichen Nutzern übernommenen Verpflichtungen, der wechselseitigen Rücksichtnahme und der Beachtung gesetzlicher und behördlicher Pflichten. Zu ihren Aufgaben zählt weiterhin die Aufrechterhaltung und Fortentwicklung



des Gewerbeparks sowie seine Verwaltung.

#### 1.2.1

*In diesem Rahmen obliegt der Parkbetreiberin insbesondere*

*- die Unterhaltung einer Fahrradsharing-Anlage. Der Standort ist im beiliegenden Plan, Anlage ..., verzeichnet. Es sind Fahrräder in ausreichender Zahl im Verhältnis zur Nutzung vorzuhalten, mindestens ...*

*- die Unterhaltung einer Sammelanlage für Firmenhinweisschilder im Eingangsbereich des Gewerbegebietes. Jedes Unternehmen erhält darauf ein Feld gleicher Größe mit folgender Abmessung ...*

....

#### 1.3

*Der Parknutzer verpflichtet sich, die als Anlage ... beiliegende Gewerbeparkordnung zu beachten. Anpassungen der Gewerbeparkordnung sind im Rahmen des billigen Ermessens des Parkbetreibers einseitig zulässig, soweit hierdurch keine zusätzlichen Kosten zulasten der Parknutzer ausgelöst werden und soweit keine wesentlichen Interessen der Parknutzer berührt werden. Darüber hinausgehende Anpassungen bedürfen der Zustimmung sämtlicher Parknutzer. Der Parknutzer hat durch entsprechende Arbeitsverträge und Weisungen sicherzustellen, dass seine Arbeitnehmer die Gewerbeparkordnung beachten. Er hat zudem sicherzustellen, dass Besucher, Dienstleister und Lieferanten die Gewerbeparkordnung beachten.*

#### 1.4

*Der Parknutzer verpflichtet sich zur Errichtung und zum Betrieb seiner Gewerbeimmobilie unter Beachtung des C2C-Konzepts (Anlage ...). Dazu zählt insbesondere die Pflicht, Baustoffe mit den nachfolgenden Eigenschaften einzusetzen, soweit dies bautechnisch und wirtschaftlich zumutbar ist:*

...

#### 1.5

*Der Parknutzer verpflichtet sich zur Nutzung der nachfolgend aufgeführten Pflichtangebote auf der Grundlage dazu gesondert abzuschließender Einzelverträge, gemäß der Anlagen ... bis ...*

*- Stellplätze: Für die Mitarbeiter des Parknutzers werden außerhalb des Gewerbeparks Stellplätze zur Verfügung gestellt. Die Anzahl vereinbaren die Parteien gesondert. Das monatliche Entgelt je Stellplatz wird in der Vereinbarung gesondert geregelt, ebenso wie eine Preisanpassung. Der Parknutzer ist verpflichtet, diese Stellplätze ausschließlich in Anspruch zu nehmen und ein anderweitiges Abstellen von PKWs von Mitarbeitern im Bereich des Gewerbeparks zu unterlassen.*

*- Biogasanlage: Der Parkbetreiber unterhält eine Biogasanlage. Der Parknutzer ist verpflichtet, Abfälle, die in dieser Anlage aufgenommen werden können, anzudienen und Abwärme der Biogasanlage zu nutzen. Er ist berechtigt, erzeugten Strom zu beziehen. Die Einzelheiten regelt ein gesondert abzuschließender Vertrag.*

## 2. Haftung

*Der Parkbetreiber haftet nicht für auf Grund leichter Fahrlässigkeit seiner gesetzlichen Vertreter, Arbeitnehmer, Mitarbeiter, Beauftragten, Verrichtungs- oder Erfüllungsgehilfen verursachte Schäden. Dies gilt nicht für Ansprüche wegen Verletzung von Leben, Körper oder Gesundheit und für die Verletzung wesentlicher Vertragspflichten, deren Erfüllung die ordnungsgemäße Durchführung dieses Vertrags erst möglich machen und auf deren Erfüllung der Vertragspartner daher regelmäßig vertrauen darf (Kardinalpflichten).*

*Im Fall der leicht fahrlässigen Verletzung von Kardinalpflichten ist die Haftung begrenzt auf den vertragstypischen, vorhersehbaren Schaden.*

*Die Vorstehende Regelung gilt entsprechend zugunsten der gesetzlichen Vertreter, Arbeitnehmer, Mitarbeiter, Beauftragten, Verrichtungs- oder Erfüllungsgehilfen des Parkbetreibers.*

## 3. Laufzeit

...

## 4. Vergütungen

...

# IV. Text (Ausschnitt): Vertrag Pflichtangebot

## Biogasanlage

### 1.1

*Der Parkbetreiber unterhält im Gewerbepark eine Biogasanlage. Diese befindet sich auf dem Grundstück ... Die Biogasanlage ist nach ihrer Konstruktion in der Lage, folgende Stoffe aufzunehmen:*

...

### 1.2

*Der Parknutzer verpflichtet sich, die vorstehenden Stoffe, soweit sie in seinem Betrieb als Abfälle zur Entsorgung oder Verwertung anfallen, getrennt von anderen Stoffen zu erfassen und dem Parkbetreiber in regelmäßigen Abständen anzudienen. Die genauen Modalitäten werden durch eine Ordnung zur Nutzung der Biogasanlage bestimmt. Die aktuelle Fassung liegt diesem Vertrag anbei. Im Rahmen des billigen Ermessens ist der Parkbetreiber zur Änderung der Ordnung berechtigt, sofern betriebliche Erfordernisse dies als geboten erscheinen lassen.*

### 1.3

*Der Parkbetreiber ist zur Annahme der Stoffe verpflichtet, soweit eine sachgerechte Verarbeitung nach Material und Menge im Rahmen eines ordnungsgemäßen Betriebs der vorhandenen Anlage möglich ist. Kann der Parkbetreiber Stoffe dementsprechend nicht annehmen, teilt er dies dem Parknutzer rechtzeitig*

formlos mit. Der Parknutzer ist dann gehalten, diese Stoffe anderweitig im Rahmen des rechtlich Zulässigen zu entsorgen.

1.4

Die Überlassung der Stoffe ... erfolgt kostenlos. Für die Annahme der Stoffe ... zahlt der Parknutzer dem Parkbetreiber folgende Entgelte ...

1.5

Die Parteien beabsichtigen den Abschluss eines gesonderten Vertrags, nach dem der Parkbetreiber dem Parknutzer aus der Biogasanlage gewonnene Energie zur Verfügung stellt. Eine Pflicht zum Abschluss dieses Vertrages besteht nicht.

1.6

Die durch den Betrieb der Biogasanlage erzeugte Abwärme stellt der Parkbetreiber dem Parknutzer zur Verfügung. Der Parkbetreiber übernimmt keine Gewähr für eine bestimmte Versorgungsmenge an Abwärme und weist den Parknutzer darauf hin, dass dieser voraussichtlich zusätzliche Vorkehrungen treffen muss, um sein Gebäude ausreichend zu beheizen. Die Abwärme wird vergütet. Die Einzelheiten regelt ein gesondert abzuschließender Fernwärmeversorgungsvertrag gemäß der Anlage ...

## 2. Berechnung

Die Rechnungsstellung für die Abnahme der angedienten Stoffe durch den Parkbetreiber erfolgt monatlich.

## **Abschnitt 3: Freiwillige Selbstverpflichtung**

”

*Vertrag über eine Selbstverpflichtung*

...

*Präambel:*

*Das Unternehmen hat von ... (nachfolgend Stadt) das Grundstück ... erworben. Das Grundstück liegt im Gewerbegebiet ... In diesem Gewerbegebiet streben die Stadt und die angesiedelten Unternehmen an, gewerbliche Unternehmen nach der Cradle to Cradle Philosophie zu betreiben. Dazu sehen der Bebauungsplan der Stadt und der Kaufvertrag zwischen dem Unternehmen und der Stadt verschiedene Regelungen vor. Das Unternehmen plant, eine Selbstverpflichtung zu erklären, um die Ziele der Cradle to Cradle Philosophie darüber hinaus zu fördern. Die Stadt fördert die Abgabe der Erklärung nach den nachfolgenden Bedingungen.*

1. *Das Unternehmen gibt hiermit folgende Selbstverpflichtungserklärung ab:*

*Selbstverpflichtung*

*... fühlt sich gegenüber zukünftigen Generationen im Hinblick*

*auf den Umgang mit natürlichen Ressourcen verpflichtet. In diesem Sinne bekennt sich das Unternehmen zur Cradle to Cradle Philosophie. Diese steht für einen besonders nachhaltigen Umgang mit Ressourcen. Abfälle sollen nach Möglichkeit nicht nur vermieden und umweltschonend aufbereitet werden, vielmehr sollen Ressourcen möglichst im Kreislauf als solche wieder und weiter verwendet werden.*

*In Umsetzung dieses Bekenntnisses unterhält das Unternehmen im Gewerbepark ... der Stadt ein Betriebsgelände, das unter weitgehender Beachtung der Ziele der Cradle to Cradle Philosophie errichtet wurde und unterhalten wird. Demzufolge wurde das Gebäude unter Beachtung folgender Standards errichtet:*

...

*Über die das Unternehmen bindenden Vorgaben aus Gesetzen, dem einschlägigen Bebauungsplan und dem Kaufvertrag der Immobilie hinaus verpflichtet sich das Unternehmen im Rahmen einer Selbstbindung zu folgenden weitergehenden und freiwilligen Maßnahmen nach der Cradle to Cradle Philosophie:*

- *das Unternehmen stellt jedem Mitarbeiter ein Monats-ticket für den öffentlichen Nahverkehr bis zu einer Entfernung von ... km und einem Betrag von ... kostenfrei zur Verfügung.*
- *das Unternehmen hat das „papierlose Büro“ eingeführt, um Papierabfall und damit die Inanspruchnahme natürlicher Ressourcen zu vermeiden*
- ...

*Das Unternehmen ist berechtigt und wird ermutigt, diese Selbstverpflichtungserklärung in Medien, beispielsweise auf der eigenen Unternehmenshomepage oder in Imagebroschüren zu veröffentlichen.*

2. *Die Stadt unterhält eine Internet-Seite, auf der die Cradle to Cradle Philosophie erläutert und das Gewerbegebiet ... beworben wird. Sie verpflichtet sich gegenüber dem Unternehmen hierzu für die Dauer der Wirksamkeit dieses Vertrages und der Aufrechterhaltung der Selbstverpflichtung (oben, Nummer 1) durch das Unternehmen.*
3. *Die Stadt verpflichtet sich, auf der Internetseite (oben, Nummer 2) in einem eigens hierfür eingerichteten Bereich auf das Unternehmen als der Cradle to Cradle Philosophie besonders verpflichtet hinzuweisen. Die Stadt wird in diesem Bereich auf weitere Unternehmen werbend hinweisen, die eine vergleichbare Selbstverpflichtung abgegeben haben und aufrechterhalten.*
4. *Das Unternehmen ist berechtigt, das nachfolgende Zeichen im Geschäftsverkehr einzusetzen*

...

*Die Stadt wird auf der Internetseite (oben, Nummer 2) das Zeichen und die Voraussetzungen für das Führen dieses Zeichens erläutern. (Anmerkung: Die Verwendung neben beste-*

*henden anerkannten und geschützten Zeichen ist im Vorfeld abzusichern).*

5. *Die Pflichten der Stadt nach den Nummern 2 bis 4 entfallen, das Recht des Unternehmens nach der Nummer 4 entfällt, wenn der Vertrag wirksam beendet wird oder wenn das Unternehmen trotz schriftlicher Mahnung (Textform) durch die Stadt und nach Ablauf von einem Monat nach Versendung dieser Mahnung gegen eine der sich aus der Selbstverpflichtung ergebenden Pflichten verstößt.*
6. *Dieser Vertrag endet zum 31.12.2035. Er kann gekündigt werden durch schriftliche Erklärung (Textform) mit einer Frist von einem Monat zum Ende des darauf folgenden Monats.*

*...“*

# ENABLING A CIRCULAR BUILDING INDUSTRY



## WHAT WE DO

BAMB is creating ways to increase the value of building materials. Dynamically and flexibly designed buildings can be incorporated into a circular economy – where materials in buildings sustain their value. That will lead to waste reduction and the use of fewer virgin resources.

1. WHAT WE DO

2. ABOUT BAMB

3. HORIZON 2020

LEARN MORE

CIRCULAR BUILT ENVIRONMENT

BLUEPRINT

MATERIALS PASSPORTS

REVERSIBLE BUILDING DESIGN

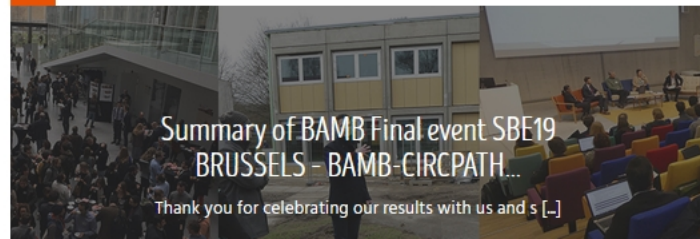
CIRCULAR BUILDING ASSESSMENT

BUSINESS MODELS

POLICIES AND STANDARDS

## ACTIVITIES

See what's happened in the project.



Summary of BAMB Final event SBE19 BRUSSELS – BAMB-CIRCPATH...  
Thank you for celebrating our results with us and s [-]

### MATERIALS PASSPORTS - BEST PRACTICE

Matthias Heinrich, Werner Lang

BAMB publication: Materials Passports – Best Practice

Materials Passports – Best Practice Innovative Sol...

### PUBLICATIONS/E-BOOKS

#### Creating Buildings with Positive Impacts



# ENABLING A CIRCULAR BUILDING INDUSTRY



## BAMB - BUILDINGS AS MATERIAL BANKS

The EU funded BAMB project brings 15 parties throughout Europe together for one mission – enabling a systemic shift in the building sector by creating circular solutions.

1. WHAT WE DO

2. ABOUT BAMB

3. HORIZON 2020

LEARN MORE

CIRCULAR BUILT ENVIRONMENT

BLUEPRINT

MATERIALS PASSPORTS

REVERSIBLE BUILDING DESIGN

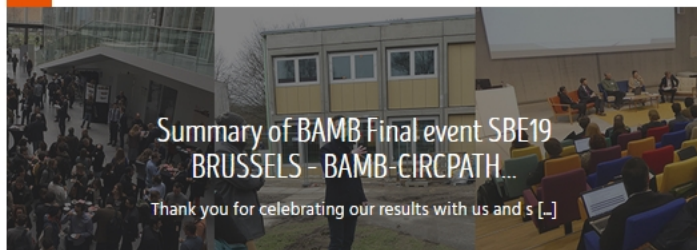
CIRCULAR BUILDING ASSESSMENT

BUSINESS MODELS

POLICIES AND STANDARDS

## ACTIVITIES

See what's happened in the project.



### MATERIALS PASSPORTS - BEST PRACTICE

Mathias Heinrich, Werner Lang

BAMB publication:  
Materials Passports - Best Practice

Materials Passports – Best Practice  
Innovative Sol [...]

### PUBLICATIONS/E-BOOKS

#### Creating Buildings with Positive Impacts

CREATING BUILDINGS WITH POSITIVE IMPACTS



# ENABLING A CIRCULAR BUILDING INDUSTRY



## HORIZON 2020

The BAMB project is funded by the European Commission within Horizon 2020 – the biggest EU Research and Innovation programme ever. Horizon 2020 aims to drive development in Europe, to create a sustainable economy and growth.

1. WHAT WE DO

2. ABOUT BAMB

3. HORIZON 2020

LEARN MORE 

CIRCULAR BUILT  
ENVIRONMENT

BLUEPRINT

MATERIALS  
PASSPORTS

REVERSIBLE  
BUILDING DESIGN

CIRCULAR BUILDING  
ASSESSMENT

BUSINESS MODELS

POLICIES AND  
STANDARDS

## ACTIVITIES

See what's happened in the project.



### MATERIALS PASSPORTS - BEST PRACTICE

Matthias Heinrich, Werner Lang

BAMB publication:  
Materials Passports -  
Best Practice

Materials Passports – Best Practice  
Innovative Sol [...]

## PUBLICATIONS/E-BOOKS

### Creating Buildings with Positive Impacts

CREATING BUILDINGS  
WITH  
POSITIVE IMPACTS





SUBMENU



## THE PATH TO A CIRCULAR BUILT ENVIRONMENT

The transition towards a circular and dynamic built environment will require a holistic and transdisciplinary approach.

The first step in changing a system is understanding it. The elements of a sound system description include a determination of the relevant players and their interrelations, key system functions, the institutions and regulations, flows and barriers and so forth.

A path to a more sustainable society or system is initiated mainly by an appealing and inspiring vision, a clear visual or non-visual "image" of a desired system based on shared principles (of a sustainable development). Truly inspiring visions of the future should be seen as a basket of diversity:

multiple 'end images' or narratives complying with established basic principles, leaving room for individual choice in the quest for a shift towards a sustainable future.

From an inspiring and clear vision, different pathways to the desired system can be outlined. This 'back-casting' exercise (returning to the present from an image of the future) results in a number of strategic paths that can be followed to co-establish the new system. These pathways constitute a portfolio of options, which comprises diversity and choice, a highly significant characteristic of stable and resilient systems.

Within BAMB, the system will be investigated and described in a [state-of-the-art overview](#). A vision and the desired system will be described in a [blueprint](#) for the dynamic and circular built environment, focused on Reversible Building Design and Materials Passports.

[Agenda 2030](#)

[Agenda 2030 and BAMB](#)



# Neues Europäisches Bauhaus

Positionen zum  
Beginn des Dialogs  
in Deutschland

(Mai / Juni 2021)

# Inhalte

Worum geht es?	6
Erste Erkenntnisse	14
Neun Handlungsfelder	16
1 Umbau als Leitbild	18
2 Qualität vor Quantität	24
3 Quartier als Bezugsgröße	30
4 Von der Energie-zur Ressourcenwende	36
5 Neue Systematik der Wirtschaftlichkeits- betrachtung	42
6 Neujustierung der Regeln	46
7 Interdisziplinarität und Ko-Kreation	50
8 Diskurs, Experiment und Vermittlung	56
9 Kulturelles Wissen aus Gegenwart und Vergangenheit nutzen	64
Ausblick	68
Programm	72

# Worum geht es?

Unter dem Titel „**Neues Europäisches Bauhaus**“ (NEB) wurde im September 2020 von der EU-Kommission (KOM) durch Kommissionspräsidentin Ursula von der Leyen ein ambitionierter und weitreichender Prozess eingeleitet, der einen Beitrag zur Umsetzung der Renovierungswelle, der Zielstellung des europäischen *Green Deals*, leisten soll. Als zentrale Aspekte des Neuen Europäischen Bauhauses werden Nachhaltigkeit, Ästhetik und Inklusivität adressiert.

So präsentiert sich die Initiative als ökologisches, wirtschaftliches und zugleich kulturelles Projekt und versteht sich als Kreativitätsinitiative, mit der die Grenzen zwischen Wissenschaft und Technologie, Kunst, Kultur und sozialer Inklusion überwunden und mithilfe von interdisziplinärem Handeln neue Lösungen für Alltagsprobleme erarbeitet werden sollen.

## Am Prozess beteiligte Ministerien:

**Bundesministerium des Innern, für  
Bau und Heimat (BMI)**

**Auswärtiges Amt (AA)**

**Beauftragter der Bundesregierung  
für Kultur und Medien (BKM)**

**Bundesministerium für Bildung  
und Forschung (BMBF)**

**Bundesministerium für Ernährung  
und Landwirtschaft (BMEL)**

**Bundesministerium für Umwelt,  
Naturschutz und nukleare  
Sicherheit (BMU)**

**Bundesministerium für Wirtschaft  
und Energie (BMWI)**

Vor dem Hintergrund der aktuell laufenden Findungsphase zum NEB fand auf Einladung des BMI – federführend innerhalb der Bundesregierung, in Zusammenarbeit mit AA, BKM, BMBF, BMEL, BMU und BMWI – am 6. Mai 2021 ein erstes nationales Dialoggespräch als Auftakt zu einem innovativen und partizipativen Prozess in Deutschland statt.

Dies geschah auf Betreiben der Bundesregierung, um sich mit den nationalen Partnern – Dachverbänden, Stiftungen, wissenschaftlichen Einrichtungen, interessierten Kreisen etc. – zu den Zielen der Initiative zu verständigen. Darüber hinaus sollte der EU-Kommission das Verständnis der beteiligten Kreise übermittelt und damit zur Schärfung der Inhalte – nicht zuletzt hinsichtlich beabsichtigter Pilotprojekte im Rahmen der NEB-Initiative – beigetragen werden. Im Weiteren soll auch die Nichtfachöffentlichkeit aktiv beteiligt werden.

Das vorliegende Positionspapier ist eine erste Zwischenbilanz der bisherigen Diskussion. Diese fand und findet in einem Kontext statt, der weit über das unmittelbare Bauwesen hinausreicht. Die Herausforderungen sind groß:

- Nach Anwendung des Quellprinzips des Bundes-Klimaschutzgesetzes entfallen etwa 14% der direkten Emissionen auf den Gebäudesektor. Wird jedoch das Verursacherprinzip angewendet, ist das gesamte Handlungsfeld Gebäude für etwa **40% der gesamten Treibhausgasemissionen** in Deutschland verantwortlich.
- Der Gebäudesektor hat das im Bundes-Klimaschutzgesetz festgelegte **Emissionsbudget** für das Jahr 2020 verfehlt.
- Die **Transformation des Gebäudebestands** und der Wertschöpfungskette Bau in Richtung Klima- und Treibhausgasneutralität 2050 bzw. 2045 erfordert immense Anstrengungen.
- Die prognostizierte **Zunahme von Extremwetterereignissen** wie überdurchschnittlich heiße Tage, Stürme oder Starkregen in Deutschland wird Städte und Gebäude zunehmend fordern.
- Die **Bezahlbarkeit des Bauens und Wohnens** als bedeutsames gesellschaftspolitisches Thema darf nicht in problematische Konkurrenz zu Fragen des Klimaschutzes und der Klimaanpassung gestellt werden.

Damit wird deutlich, dass es eine neue Strategie und ein neues Handeln braucht. Denn der scheinbar unüberwindbare Konflikt zwischen unseren ressourcenverbrauchenden Gewohnheiten, einer wachstumsorientierten Wirtschaft (mit großteils negativen Klimaauswirkungen) und dem nachvollziehbaren gesellschaftlichen Grundbedürfnis, auch in Zukunft gut leben zu können, ist aufgrund der knappen Zeit für die Erreichung der festgeschriebenen Klimaziele nur durch ein Umdenken in Richtung nachhaltige Entwicklung zu entschärfen. In Anbetracht der Klima- und Treibhausgasproblematik muss „Fortschritt“ neu definiert werden. Doch wie kann dieses Umsteuern gelingen? In Forschung und Teilen der Praxis wird die nachhaltige und damit auch klimagerechte Entwicklung des Bauwesens seit vielen Jahren auf unterschiedlichen Ebenen vorangetrieben. Dieses gewonnene Wissen sowie die neu gesetzten Anreize und Rahmenbedingungen müssen genutzt werden, um das Planen, Bauen und Betreiben von Gebäuden in seiner Gesamtheit grundlegend zu verändern oder gar zu erneuern. Die Initiative adressiert die Transformation des Bauwesens als eine Gemeinschaftsaufgabe, die von einem neuen Narrativ als Treiber und Wegweiser getragen

wird. Ziel ist, den Entwicklungsprozess gesellschaftlich zu verankern, eine neue Haltung gegenüber der Gestaltung von Lebensräumen zum Ausdruck zu bringen und den Umgang mit dem Bestehenden in den Mittelpunkt zu rücken. Denn es geht um nicht weniger als einen Kulturwandel.

Der Rekurs auf das historische Bauhaus kann ein Garant dafür sein, dass der *Green Deal* und der erforderliche Paradigmenwechsel keine technokratische oder rein ökonomische Angelegenheit sind, sondern ein integrativer und ganzheitlich gedachter Ansatz, der die sektoral beschrittenen Entwicklungspfade zusammenführt.

Der Blick auf das Bauhaus zielt nicht auf eine Verklärung von dessen Wirkungsgeschichte. Vielmehr geht es dabei exemplarisch um das Narrativ des Aufbruchs und der Innovation zugunsten eines ganzheitlichen kreativen Gestaltungswillens für eine neue Gesellschaft. Deshalb muss der Begriff „Bauhaus“ adäquat ins Heute übersetzt werden. In diesem Sinne schafft das NEB ein interdisziplinäres kreatives Denk- und Umfeld. Es fördert und fordert einen Perspektivenwechsel, um die Gestaltung

der Lebensräume der Zukunft durch neue Organisationsformen, veränderte Regeln und Strukturen ebenso wie neue Formen der Zusammenarbeit als Grundvoraussetzungen voranzutreiben, damit eine *Bauwende* überhaupt gelingen kann.

# Erste Erkenntnisse

Der im Mai 2021 geführte Dialog ist der Auftakt zu einem langfristigen iterativen Prozess. Dabei zeichnen sich folgende Handlungsschwerpunkte ab:

- **Auf den Bestand fokussieren** und damit auf das enorme Transformationspotenzial der bereits gebauten Umwelt – die „Elefantenherde im Klimaraum“. Deren für die Wirtschaft positive energetische Optimierung muss mit Rücksicht auf die Bezahlbarkeit für die Menschen, etwa hinsichtlich der Mieten, aber auch auf das kulturelle Erbe erfolgen.
- **Im Quartier handeln** in der Nachbarschaft, mit Blick auf urbane Grün- und Freiräume in Verbindung mit gebautem Stadtraum und mit Rücksicht auf die Perspektive der Menschen sowie ihre Teilhabe am gesamten NEB-Prozess.
- **Emissionen und den Verbrauch kostbarer Ressourcen im Lebenszyklus denken** durch die Etablierung eines klimaneutralen oder emissionsnegativen Bauens. Dies kann gelingen durch einen hohen Grad an Wiederverwendung von Baustoffen und/oder durch nachwachsende Materialien, wie zum Beispiel Holz aus nachhaltiger Waldbewirtschaftung, und eine hohe Anpassungsfähigkeit mittels der ganzheitlichen Betrachtung der Ökobilanz.
- **Kulturelles Wissen und Praktiken aus der Vergangenheit sowie von anderen Orten anwenden und weiterentwickeln**, um neue Lösungsansätze aus der besonderen Rolle der Kulturschaffenden, der Kreativen sowie der Akteure des Denkmalschutzes und der Denkmalpflege bei diesen Transformationsprozessen zu nutzen.



# Neun Handlungs- felder

Im Folgenden werden übergeordnete Optionen für das Gelingen der notwendigen großen Transformation sowie wichtige Positionen, die bislang in die Diskussion eingeflossen sind, gebündelt und thesenhaft wiedergegeben. Die Zitate entstammen der Veranstaltung.

Dabei handelt es sich nicht zwingend um Positionen der Bundesregierung. Vielmehr wird der gemeinsame Dialog mit den beteiligten Stakeholdern hier dokumentiert und diskutierte Handlungsdimensionen wiedergegeben.

# 1 Umbau als Leitbild

Bislang wurden energie- und CO<sub>2</sub>-reduzierende Konzepte und normative Vorstellungen vornehmlich in Bezug auf den Neubau fokussiert. Im Brennpunkt des Geschehens steht jedoch der **Gebäudebestand**, der den deutlich überwiegenden Teil der gebauten Umwelt in Deutschland ausmacht. Eine soziokulturell und ökonomisch behutsame Entwicklung des Gebäudebestands unter Berücksichtigung von Zielen der Baukultur und der ökologischen Rahmenbedingungen wird einen wesentlichen Beitrag zur Erreichung der Klimaschutzziele leisten müssen.

**„An erster Stelle muss die Bestandsnutzung stehen, danach die Bestands-umnutzung und erst, wenn beides nicht möglich ist, der Neubau.“**

Um die gesetzten klimapolitischen Ziele über die Sektorengrenzen des Klimaschutzgesetzes hinweg, aber speziell im Gebäudesektor zu erreichen, muss im Hinblick auf die graue Energie der Erhalt des Bestands vor dem Neubau ein Ziel sein und die **Modernisierungsquote deutlich erhöht werden.**

Während im Neubau der aktuelle technische Standard zur Erreichung der baupolitischen Ziele weitestgehend umgesetzt werden kann, sind im Umgang mit dem Bestand deutlich mehr Herausforderungen und Randbedingungen zu berücksichtigen.

Grundvoraussetzung für das Sanieren oder Bauen im Bestand ist ein ausreichendes Wissen über die Substanz, die Bauweise und die Materialien. Je größer die Kenntnis über ein Bestandsgebäude ist, desto gezielter und wirtschaftlicher können bauliche und energieeinsparende Maßnahmen geplant und ausgeführt werden. Auch die Einbeziehung der Nutzer und Nutzerinnen ist dabei entscheidend, da deren Verhalten wesentlich zur Wertschätzung, Erhaltung und Suffizienz eines Gebäudes beiträgt.

Entscheidend ist ebenso eine gerechte **Verteilung der finanziellen Lasten**, auch im Hinblick auf die Bezahlbarkeit des Wohnens. Die Nutzer und Nutzerinnen – zur Miete oder im Eigentum – müssen mitgenommen werden, Klimaschutz muss erlebbar gemacht werden. Dabei spielen Fragen nach dem gerechten Umgang mit etwaigen Investitionskosten für Optimierungsmaßnahmen am Eigenheim oder an Mietobjekten, aber auch der ab-

gewogene Einsatz von Anreizsystemen, die zu einer höheren Akzeptanz und damit Zahlungsbereitschaft führen, eine essenzielle Rolle. Vor dem Hintergrund der sektorenübergreifenden Bedeutung des gesamten Handlungsfelds Gebäude muss aber auch immer die Wechselwirkung von Sanierungsaktivitäten mit den Dekarbonisierungsstrategien der übrigen Sektoren (Energiesektor, Industriesektor im Bereich Baustoffindustrie) bedacht und austariert werden.

**„Die Herausforderung ist der klimagerechte Umbau des Bestands.“**

**„Wir müssen die Utopie eines neuen Bauens und einer Umbaukultur und -ordnung entwerfen.“**

**„Wir brauchen eine neue klimakulturelle Vielfalt des Bauens und Gestaltens!“** Bei der Bestandsentwicklung kann es keine Standardlösungen geben, sondern die Identität, die historischen und baukulturellen Werte, Heimat sowie der Charakter bestehender Orte müssen bei der Gestaltung Beachtung finden.

Die Leitgedanken jeder Wahrung und Weiterentwicklung des kulturellen Erbes und des historisch gewachsenen Bestands sind inhärenter Bestandteil

der europäischen Stadt. Der beispielhafte Bezug auf Venedig, dessen 1.600-jähriges Bestehen nach wie vor ein lebendiges Bild der Verschränkung von Baukultur, Ästhetik und Nachhaltigkeit vermittelt, steht sinnbildlich für diese Qualitäten.

Die Hinwendung zum Bestand, in der dichten Stadt sowie auch im ländlichen Raum, kann als konsequente Weiterentwicklung des europäischen Selbstverständnisses

verstanden werden und steht unweigerlich im Zentrum des neuen Narrativs. Die Abkehr vom bedingungslosen Neu-Bauen bzw. Abreißen, als Lehre aus der Moderne, ist der Treiber einer neuen Umbaukultur. In diesem Kontext hat der Neubau dann nur noch eine ergänzende Rolle – als Ultima Ratio nach Bestandsertüchtigung und Bestandserweiterung.

# 2 Qualität vor Quantität

Um einen Kulturwandel beim Bauen zu befördern, der andere Werte betont und andere Modelle hervorbringt als die bestehenden mit ihren oft dysfunktionalen Auswirkungen auf das Klima und die Umwelt, braucht es ein neues Bewusstsein für Qualität und das Wesentliche.

Im Fokus der Initiative NEB steht die Erkenntnis der Endlichkeit von Ressourcen, im Gegensatz zur Vorstellung des endlosen Wachstums. Damit stellt sich jedoch die Frage, wie man mit dieser Endlichkeit und der Verteilung dessen, was uns zur Verfügung steht und was daraus erwirtschaftet wird, umgehen soll. Es braucht für diese Verhandlungen neue Werkzeuge, Technologien, Formate und Leitbilder. Ein relevanter Aspekt kann unter dem Begriff **Suffizienz** gefasst werden.

Suffizientes, aber qualitätsvolles Wohnen statt übermäßigem Flächenverbrauch wäre ein Anfang. Die beanspruchte Wohnfläche pro Person ist in Deutschland in der Vergangenheit lange Zeit konstant gestiegen und verharrt auf einem hohen Niveau. Maßnahmen zur Reduzierung der Wohnfläche pro Kopf können den Neubaubedarf senken, die **Flächeninanspruchnahme** verringern und damit einen Beitrag zum nachhaltigen und zugleich bezahlbaren Bauen leisten. Dazu

bedarf es flächeneffizienter und flexibler Wohnungsgrundrisse, die sich an die wandelnden Anforderungen anpassen und die eine angemessene Wohnqualität sicherstellen, um das Weniger an Fläche zu kompensieren.

**„Wir müssen die Standards infrage stellen, um das Bauen zu vereinfachen.“**

Die durchschnittliche wirtschaftliche Nutzungsdauer von neu errichteten Wohngebäuden liegt zwischen 60 und 100 Jahren, diejenige von Büro- und Handelsgebäuden lediglich zwischen 30 bis 60 Jahren. Um diese Zahlen langfristig zu erhöhen, müssen die

gebauten Strukturen im Hinblick auf die Nutzungsbedürfnisse künftiger Generationen resilient gestaltet und zugleich Anreize für ihren Erhalt geschaffen werden. Auch eine **robuste Gebäudetechnik** und eine **hohe Anpassungsfähigkeit** führen in der Regel zu einer **längeren Nutzungsdauer** und sind damit nachhaltiger – in ökonomischer Hinsicht, beim Ressourcenverbrauch und auch bei der ökobilanziellen Bewertung. In diesem Zusammenhang spielen Stichworte wie „Einfachheit“ und „Lowtech“ im Qualitätsbegriff eine bedeutende Rolle. Zugleich ist beim klimaangepassten Bauen die Resilienz gegenüber den Folgen des Klimawandels (zum Beispiel Wetterereignissen, Hitzeperioden) wichtig.

In den vergangenen Jahren wurde viel erreicht. Jedoch nutzt ein Großteil der Menschen die technisch erreichten Einsparungen nicht zur theoretisch möglichen Verkleinerung ihres ökologischen Fußabdrucks. Viele wohnen auf mehr Fläche, mit mehr technischen Geräten, fahren größere Autos, reisen häufiger und zu weiter entfernten Zielen, sodass die Gesamt-Ressourcenverbräuche nicht wesentlich gesunken sind (der sogenannte Rebound-Effekt). Technische Optimierung allein hilft also nicht weiter, wenn das Bewusstsein und **Verhalten der Menschen** selbst sich nicht ändert.

**„Ein Blick in die Schweiz zeigt: Wer Boden versiegeln will, muss an anderer Stelle in der Schweiz adäquat entsiegeln.“**

Bleibt man bei der besitzorientierten Wahrnehmung, dann ist Suffizienz immer ein „Weniger“ – und damit wohl für einen großen Teil der Gesellschaft wenig attraktiv. Verschiebt man den Qualitätsbegriff und legt den Schwerpunkt auf die Nutzung von Eigen-

tum, kann Suffizienz zum guten Tauschgeschäft für alle Beteiligten inklusive der Umwelt werden: Kleinere Wohnungen führen zu weniger Versiegelung von Boden, zu höherer Dichte und damit zu kürzeren Wegen, zu verringertem Verkehrsaufkommen, reduziertem Ressourcenverbrauch für Erstellung und Betrieb und letztendlich

zu finanziellen Einsparungen. Weniger kostet weniger, eine messbare Größe. Als Beispiel hierfür kann die Stadt Zürich mit ihrer Selbstverpflichtung zur „2000-Watt-Gesellschaft“ genannt werden.

In diesem Zusammenhang sind auch vor dem Hintergrund der Pandemie die Auswirkungen von **Digitalisierung** und Homeoffice zu betrachten. Einerseits dürfen diese nicht eine weitere Vergrößerung von Wohnflächen legitimieren. Andererseits bergen sie die Chance, die Lagegunst von Stadt und Land neu zu bewerten. Im besten Fall können durch eine entsprechende hochwertige Gestal-

tung von Räumen mit hoher Aufenthaltsqualität attraktive und lebenswerte Wohnorte geschaffen werden, das Pendleraufkommen reduziert, der Wohnungsmangel in Ballungsräumen gelindert und im Gegenzug der ländliche Raum aufgewertet werden.

Schließlich hat qualitativ hochwertiges, nachhaltiges Bauen und Instandsetzen auch eine ästhetische sowie eine (bau)kulturelle Kom-

**„Notwendig sind flächeneffiziente Wohnungsgrundrisse, die jedoch eine angemessene Wohnqualität bieten, damit sie nicht als Verschlechterung wahrgenommen werden.“**

ponente. Für die Weiterentwicklung des gebauten Bestands stellt sich die Frage, welchen Beitrag jedes Gebäude für das Stadtbild, das Stadt- oder Raumgefüge und die lokale Erinnerungskultur leistet. Planen, Bauen und Wohnen haben über technische, ökonomische und ökologische Aspekte hinaus auch gesellschaftlichen und sozialen Ansprüchen zu genügen – dem Wunsch nach einer lebenswerten, gut gestalteten Umwelt mit einem hohen baukulturellen Wert.

# 3 Quartier als Bezugsgröße

Beim klimagerechten Bauen muss der Blick über das Gebäude hinausgehen – auf das Quartier, die Gemeinde und die Gesamtstadt.

Durchmischte Quartiere sind nicht nur für die gesellschaftliche Entwicklung bedeutsam, sondern im Zusammenspiel von Mensch, gebauter Umwelt und Natur auch ein zentraler Ausgangspunkt für treibhausgasmindernde Maßnahmen.

Neben der energetischen Sanierung von Gebäuden sollte die Verknüpfung von Bauen, Entwicklung von Grünräumen und Mobilität (dreifache Innenentwicklung) und

damit die Verbesserung der Lebensqualität in Quartier, Stadt und Stadtregion im Zentrum stehen. Gemischt genutzte, verdichtete historische Quartiere können Modelle für Stadträume der Zukunft sein. „Für den ganzheitlichen Ansatz sowie das integrierte Denken von sozialen, ökonomischen und ökologischen Faktoren des Städtebaus sollte die Neue Leipzig-Charta als strategischer Kompass dienen.“ Je nach soziokulturellen Gegebenheiten und Identitäten entfalten diese Ansätze neue Kreativitäts- und Innovationspotenziale für eine nachhaltige Zukunft.



Der Quartiersansatz ist auch im Rahmen der notwendigen Erweiterung der Bilanzierungsgrenzen interessant, weil hier die integrierte Planung deutlich leichter umzusetzen ist als in Bezug auf das singuläre Einzelgebäude. Integrierte Planungsansätze für Stadt- und Quartiersentwicklungen können zudem wichtige Grundlagen und Erfahrungsschätze für die Gebäudeplanung sein. Nimmt man das Quartier oder andere kommunale Strukturen bzw. übergeordnete Raumebenen als Bezugsgröße, dann bietet eine **aktive soziale Bodenpolitik** der öffentlichen Hand einen politischen Hebel, um die Kosten auf Gebäudeebene zu beeinflussen. Öffentliche Förderprogramme, wie die Städtebauförderung und deren

Ausbau, stoßen mit ihrer Hebelwirkung weitere Investitionen auch privater Dritter auf der Quartiersebene an. So können Grundstücke im unbeplanten Innenbereich zur Schaffung von bezahlbarem Wohnraum herangezogen und die Kosten der Infrastrukturen umverteilt werden. Auch die stärkere Einbindung der **gemeinwohlorientierten Wohnungswirtschaft** (kommunale Unternehmen, Genossenschaften etc.) kann hier einen wichtigen Beitrag leisten.

**„Stadtgrün und Gewässer liefern einen wertvollen und messbaren Beitrag zur Erreichung von Klimaschutzzielen und für ein gutes, sicheres und gesundes Leben in der Stadt.“**

Auch eine **Neuausrichtung der Wohnungsbauförderung** ist in diesem Zusammenhang ein relevantes Thema. Die Frage, welche Chancen die Kombination einer Objektförderung im Sinne einer Grundförderung (mit angemessenen Rahmenseetzungen für Wohnungsgrößen und Baukosten) und einer ergänzenden Subjektförderung (orientiert an den verfügbaren Haushaltseinkommen) bietet, müsste unter wohnungswirtschaftlichen und rechtlichen Blickwinkeln diskutiert werden.

Neben dem (Um)Bauen muss der Blick auch auf die Erhaltung und den Ausbau der blau-grünen Infrastrukturen in den Stadtquartieren gelegt werden. **Stadtgrün und Gewässer** liefern einen wertvollen und messbaren Beitrag zur Minderung der Klimafolgen und sichern ein gutes und gesundes Leben in der Stadt. Daher sollten gesetzliche, planerische und finanzielle Maßnahmen erarbeitet werden, um diese blau-grünen Infrastrukturen in urbanen Räumen zu erhalten, zu entwickeln und an die

Herausforderungen des Klimawandels anzupassen. Die kommunalen Planungen und Konzepte hierfür sollten gefördert werden.

Extremereignisse wie Starkregen und Dürre stellen Infrastrukturen und Wasserwirtschaft vor gewaltige Herausforderungen. Lösungsansätze dazu sind die Flächenumverteilung, Dach- und Fassadenbegrünung, klimaresiliente Stadtbäume sowie die funktionale und gestalterische Einbindung von Wasser. Auch hier muss das Denken und Planen auf der Quartiersebene oder sogar in städtischen Zusammenhängen die Regel werden.

Die **Verkehrswende** ist ebenfalls mit der Verbesserung der Lebensqualität in Quartieren, Stadt und Stadtregion verbunden. Beispielsweise können Flächen neu verteilt werden, vom Individualverkehr zu einer Nutzung für die Allgemeinheit als Freiflächen für die Erholung.

Dies führt auch zu einer Reduzierung von Lärm und Abgasen. Für den ländlichen Raum steht die Erarbeitung von spezifischen Konzepten im Fokus, um eine Erreichbarkeit der notwendigen Infrastruktur auch ohne eigenes Auto zu ermöglichen.

Es müssen neue Ansatzpunkte für ein reibungsloses Ineinandergreifen der Kriterien und Abläufe auf den unterschiedlichen Maßstabsebenen von Planung und Bau sowie zur Bestimmung und Realisierung einer optimalen Relation von Dichte, Stadtgröße, Baukultur, Umwelt- und Lebensqualität gefunden werden.

# 4 Von der Energie- zur Ressourcen- wende

Für die Erreichung der Ziele des *Green Deals* ist es unabdingbar, dass bei der Errichtung, beim Betrieb und beim Rückbau von Gebäuden die Treibhausgasemissionen radikal reduziert oder sogar vermieden werden. Neben dem Betrieb von Gebäuden entstehen Emissionen vor allem durch den Ressourcenverbrauch für Material, Konstruktionen, Baustelleneinrichtungen und -prozesse sowie beim Rückbau von Gebäuden. Nur die Betrachtung des gesamten Lebenszyklus erfasst die Potenziale des Wandels von der Energie- zur Ressourcenwende.

**„Im Bestand müssen die Fragen von Emissionsreduktion und Energieeffizienz getrennt voneinander betrachtet werden, die Bezahlbarkeit der Emissionsreduktion muss im Mittelpunkt stehen.“**

Es geht daher weniger um Energieeinsparung oder energiepolitische Maßnahmen für die Nutzungsphase von Gebäuden, sondern vielmehr um emissionspolitische Weichenstellungen, die eng mit der Ressourcenfrage verknüpft sind. Nur wenn es gelingt, den Ressourcenverbrauch insgesamt deutlich zu reduzieren, gibt es auch eine Chance, die Energiewende im Gebäudebereich weg von fossilen und hin zu erneuerbaren Energien zu

„Die ordnungs- und förderrechtlichen Regelungen sind hinsichtlich der Begrenzung der Treibhausgasemissionen kontraproduktiv.“

schaffen und den CO<sub>2</sub>-Ausstoß in diesem sektorenübergreifenden Bereich nachhaltig und dauerhaft zu senken.

Die Überführung der bisherigen linearen, verbrauchsorientierten Wirtschaftsweise in ein **Kreislaufprinzip** ist ein Schlüssel für diese Transformation. Im Mittelpunkt steht die Frage nach den Strategien, die für Wiederverwendung bzw. Kompostierung aller zum Bauen benötigter Materialien denkbar sind. Rezyklate

lassen sich im Neu- und Umbau mit gestalterischem Anspruch einsetzen und werden so nach Ablauf ihres ersten Lebens in einem neuen Gebäude wieder zur Ressource. Auf der Suche nach Modellen lassen sich die denkmalpflegerischen Prinzipien und die Praxis der Substanzbewahrung auf andere Bestandsgebäude übertragen: Reparatur vor Austausch, Adaption der eingebrachten Materialien und Konstruktionen an den Bestand, Reversibilität der Maßnahmen. Ziel ist die

„Schaffung eines neuen Bildes für einen verantwortungsvollen Ressourcenumgang mit goldener Energie statt grauer Energie“.

Das Bauen mit **nachwachsenden Rohstoffen**, ohne Abfall, mit Rezyklaten sowie **recyclinggerechtes Bauen** sind Leitprinzipien für die Zukunft. Es gilt, sie durch entsprechende struktur-, steuer- und förderpolitische Maßnahmen optimaler im allgemeinen Handeln zu etablieren. Der Ressourcenschutz sowie die Abfall- und CO<sub>2</sub>-Vermeidung sind dabei als oberste Schutzziele zu

verfolgen. Regelwerke für die Wiederverwendung von gebrauchten Bauteilen und für die Nutzung von bestehenden Gebäuden als Materialdepot und urbane Minen müssen weiter ausgebaut werden. Downcycling wie die thermische Verwertung von gebrauchten Bau- und Abfallstoffen, z.B. Holz, ist zugunsten einer Wiedernutzung zu überdenken. Vor allem regionale und nachwachsende Baustoffe sind zu fördern, aber auch die Grenzen der

„Die Initiative zum **Neuen Europäischen Bauhaus schafft eine europäische Plattform, um gemeinsam darüber nachzudenken, wie wir in Zukunft unsere Emissions- und Ressourcenprobleme lösen wollen.**“

Regeneration auszuloten. Dazu müssen technische Regelwerke und strukturpolitische Rahmenbedingungen überprüft und gegebenenfalls angepasst, aber auch die Forschung zu nachwachsenden Rohstoffen weiterentwickelt werden. Gute gebaute Beispiele sind das beste Mittel, um Investoren als Partner zu gewinnen und damit neue Bauformen zu stärken. Dabei gilt es auch, die europäischen Standards für den Umwelt- und Gesundheitsschutz bei Bauprodukten weiterzuentwickeln. Gleiches gilt für die Frage des Einsatzes von rückbau- und recyclingfähigen Bauprodukten in einer kreislaufwirtschaftsgerechten Bauwirtschaft. Die **Regionalisierung der Baustoffproduktion** kann auch im Kontext

historisch gewachsener Bauweisen einen wichtigen Beitrag leisten.

Die **Wechselwirkungen zwischen der Angebotsseite** – der Baustoffindustrie – **und der Nachfrageseite** – den Gebäude- und Infrastrukturen – müssen sektorenübergreifend gedacht werden. Ohne eine Stärkung der Rahmenbedingungen, die eine Nachfrage nach treibhaus-

„Sortenreines Bauen ist machbar.“

gasarmen Bauprodukten befördern, wird es keinen Markt für diese Produkte geben. Ebenso muss die Problematik der Verteilung von

notwendigen Modernisierungskosten (zwischen Mietern und Vermietern) gelöst werden, um entsprechende Kräfte für den klimagerechten Umbau freizusetzen. Hier müssen gesellschaftlich und wirtschaftspolitisch entsprechende Voraussetzungen geschaffen werden.

# 5 Neue Systematik der Wirtschaftlichkeits- betrachtung

Wichtig für die flächendeckende Implementierung des Ansatzes eines nachhaltigen Bauens sind Transparenz und Akzeptanz für die Begrenzung der Treibhausgasemissionen, die mit dem Bauen und Betreiben von Gebäuden einhergehen, sowie für die damit verbundenen Kosten. Der Fokus muss sich vom Primat der rein kostenorientierten Wirtschaftlichkeit hin zu einer ganzheitlichen Anforderungssystematik wandeln, die eine Stabilisierung und Erhaltung der natürlichen Umwelt zum Ziel hat. Neben Herstellungs- und Betriebskosten müssen sowohl **Lebenszykluskosten** als auch **Klimafolgekosten** eingepreist werden. Möglichkeiten zum **emissionsnegativen Bauen durch den Einsatz organischer Materialien** (etwa Holz aus nachhaltiger Forstwirtschaft, aber auch die Prüfung einer breiten Nutzung anderer Materialien wie Lehm, Stroh oder Pilzmyzel etc.) sind zu etablieren. Ebenso müssen der ressourcenbasierte Wert vorhandener Bausubstanz und die Folgekosten durch potenzielle

„Wir haben kein Erkenntnis-, sondern ein Umsetzungsproblem.“

Schadstoffsanierungen, Entsorgungskosten etc. berücksichtigt und transparent gemacht werden. Durch diese Ausweitung der Betrachtung über den gesamten Gebäudelebenszyklus wird die Begrenzung auf die Nutzungsphase durchbrochen und über die Ökobilanzierung die Gesamtwirkungen des Gebäudes in den Mittelpunkt gerückt.

Insgesamt bedarf es einer neuen Systematik der Wirtschaftlichkeitsbetrachtung

im Bauwesen und einer **Reform der vorhandenen Bewertungen zur Erhöhung der Messbarkeit**. Komplementär zu den drei Dimensionen der Nachhaltigkeit (Ökologie, Ökonomie und Sozio-Kulturelles), innerhalb derer mitunter nur Formelkompromisse gefunden wurden und werden, könnte eine Definition zu **„Effizienz – Konsistenz – Suffizienz – Resilienz“** hier neue, zukunftsfähige Ansätze bieten.

Im Gebäudebereich sind die erforderlichen Grundlagen für klimagerechtes, nachhaltiges, ressourcenschonendes und bezahlbares Bauen bekannt und weitreichend erforscht. Dieses Wissen zu nutzen und in die Breite zu tragen, ist eine der drängenden Aufgaben der Gegenwart und Schlüssel für das Gelingen der *Bauwende*.

# 6 Neujustierung der Regeln

Die Komplexität der Konstruktionen und der Gebäudetechnik steigt seit Jahrzehnten stetig. Dies führt zu wachsenden Anforderungen an Standsicherheit, Wärme-, Feuchte-, Brand- und Schallschutz, Hygiene und Gesundheit sowie auch an den allgemeinen Nutzerkomfort.

Qualitäts- und Ausstattungsstandards treiben die Baukosten in die Höhe, und zwar unabhängig davon, ob sie durch gesetzliche oder nutzerspezifische Anforderungen ausgelöst werden. Die **laufende Prüfung und gegebenenfalls eine Reduzierung der Regelwerke** können dazu beitragen, die Komplexität des Bauens zu verringern.

„Förderprogramme  
neu ausrichten –  
jede Entscheidung  
muss gut für das  
Klima sein.“



„Abbau umwelt-schädlicher Subventionen.“

Ein Diskussionspunkt ist die Forderung nach mehr Mut – zu Innovationen, zu Experimenten und zum Scheitern. Es sollte weniger der Status quo mit Normen und Regeln abgesichert werden, sondern dynamisch aufgebaute Regelwerke, die offen für Zukunftsentwicklungen und neue Ansätze sind, etabliert werden. Ein Weg hierzu könnte sein, die vorgegebenen Maßnahmenschritten in Regelwerken zu reduzieren, und stattdessen Regeln zu etablieren, die mit weitreichenden Innovationsklauseln und einer

Konzentration auf Zielformulierungen verbunden sind. Die Fokussierung des **Ordnungsrechts** auf die Begrenzung des Energiebedarfs eines Gebäudes in der Nutzungsphase ist nicht (mehr) zielführend. Hier sind andere Ansätze (z.B. auf Quartiersebene) zu entwickeln. Flexible Folgenutzungen von Beginn an mitzudenken, unabhängig von der unmittelbaren Bauaufgabe, ist die Herausforderung.

Das Wettbewerbs- und Vergaberecht schafft einen fairen Zugang zum europäischen Binnenmarkt. Durch die Festlegung auf Produkte zeigt sich aber, dass insbesondere das **Vergaberecht** im Hinblick auf integrierte und ko-kreative Ansätze hemmend oder gar ver hindernd

wirken kann. Es ist zu prüfen, inwieweit Anpassungen erforderlich sind, um die Intentionen des NEB und ihr Innovationspotenzial besser und schneller erfüllen zu können.

„CO<sub>2</sub>-Bepreisung realistisch setzen“

# 7 Inter- disziplinarität und Ko-Kreation

Eine entscheidende Lehre aus dem Bauhaus-Ansatz ist es, integrierte, ganzheitliche Arbeits- und Betrachtungsweisen zu stärken und in die Breite der Gesellschaft zu vermitteln. Dafür stehen neben planenden und künstlerischen Disziplinen auch das Handwerk und eine verstärkte regionale Zusammen-

arbeit. Dies kann im besten Fall auch Raum für **neue Geschäftsmodelle** sowie „wilde“ **kreative Allianzen** schaffen. Die zunehmende Verfügbarkeit digitaler Technologien und Anwendungen bietet die Chance, bisherige Prozesse und Rollenverteilungen in der Wertschöpfungskette zu hinterfragen und neu zu justieren.

Eine der Grundvoraussetzung, um die eingeforderte gesamtgesellschaftliche Verantwortung und die ambitionierten Anforderungen des *Green Deals* erfüllen zu können, ist die Integration der Gesellschaft in die Bau- und Planungsprozesse – nach dem Motto: nicht mehr für die Nutzenden zu bauen, sondern mit ihnen. Das erfordert eine transdisziplinäre Ausrichtung des Bauens, eine Stärkung der Ko-Kreation – auch mit integrativem Einbezug aller Disziplinen – sowie vor allem die stärkere

Berücksichtigung der **Interessen der Nutzer und Nutzerinnen**. Im Mittelpunkt steht dabei, die Bedürfnisse zu ergründen und mit neuen adäquaten Ansätzen etablierte Strukturen und Bilder aufzubrechen. Der hierzulande vorherrschende Fokus auf das Einfamilienhaus ist dabei

ein Kernthema und ist im Kontext mit den Qualitäten von Geschosswohnungsbau, dem Bestand, den Nutzungsoptionen und vor allem auch der Absicherung und Bezahlbarkeit von verschiedenen Lebensperspektiven zu diskutieren. Mit dem Wissen aller Disziplinen müssen Konzepte erarbeitet werden, die das gesellschaftliche Gedächtnis und die tradierten Wertvorstellungen in neue Dimensionen heben.

„Eine Lösung kann nur gelingen, wenn die Anforderungen des Umwelt- und Klimaschutzes, der Energie- und Ressourceneffizienz, der Bezahlbarkeit, der Baukultur inklusive der Denkmalpflege, des Nutzerkomforts und der demografischen Entwicklung in Einklang gebracht werden. Eine sektorale Zergliederung erhöht zwar die Handhabbarkeit von Ansätzen und Maßnahmen, geht aber häufig zulasten der Ganzheitlichkeit.“

Partizipation muss gelebt werden. Im Kontext der klimapolitischen Anstrengungen sollten die Wohn- und Lebenswünsche der Gesellschaft in einer „neuen Form des **wissen-**

**schaftlich begleiteten Partizipationsprozesses**“ herausgearbeitet werden. Dabei darf Partizipation keine Leerformel sein. Je nach Fragestellung geht es um eine Verknüpfung von Bottom-Up- und Top-Down-Ansätzen, um bestmögliche Lösungen und Argumente auszutarieren. Bottom-Up-Strategien sind essenziell, um die Vielfalt an Bedürfnissen und Vorstellungen zu erfassen, Bewusstsein und Akzeptanz zu fördern. Aber auch Top-Down-Ansätze können die notwendigen Rahmen setzen, um die Nutzenden hinreichend aufzuklären und zu befähigen, sich an Entscheidungsprozessen zu beteiligen.

Die Ziele des *Green Deals* lassen sich nur erreichen, wenn ein Diskurs mit allen im Gebäudebereich beteiligten Kreisen, mit allen Mitwirkenden der Wertschöpfungskette Bau sowie auch mit der Gesellschaft initiiert wird und die Anforderungen nachvollziehbar sind. Dabei ist die kulturelle Vielfalt unterschiedlicher Akteure moderner Gesellschaften einzubeziehen: Wissen, Werte und Praktiken von Akteuren aus Zivilgesellschaft, Politik,

Verwaltung und Wirtschaft müssen neu zusammengedacht und regelmäßig ausgehandelt werden, um jeweils passfähige Lösungen für spezifische Orte zu finden. Eine Partnerschaft mit **Kunst- und Kultureinrichtungen** sowie mit der Kreativ- und Bauwirtschaft, Architektur, Design, Kunst, Denkmalschutz und -pflege, Bauunternehmen, Handwerk, Wohnungswirtschaft, Entsorgungs- und die Rückbaubranche sowie öffentliche Kultur- und Bildungseinrichtungen, (etwa Museen, Bibliotheken, Archive, Volkshochschulen) spielt hier neben der Wissenschaft eine bedeutende Rolle. Für die Vermittlung von neuartigen Ansätzen in die Breite wird die kulturelle Dimension als entscheidend angesehen. Dies beinhaltet die ästhetische Komponente – die Formensprache, das Design bzw. den Gestaltungswillen sowie bauhistorische und baukulturelle Vermittlung. Darüber hinaus müssen Ideen und Formate entwickelt werden, die die Gesellschaft unmittelbar erreichen und motivieren, einen Kulturwandel anzustoßen. Dieser Diskurs sollte auch durch die Transformationsforschung wissenschaftlich begleitet und vorangebracht werden.

Eine besondere Rolle spielen auch die **Einbindung junger Menschen** und das Aufgreifen vorhandener Bewegungen, um transdisziplinär sowie generationsübergreifend einen ganzheitlichen Gesellschafts-

Wirtschafts-, Kultur- und Lebensbegriff zu formen. Damit einhergehen sollte eine Transformation in der Aus- und Weiterbildung – hin zu einem **interdisziplinären und lebenslangen Lernen**.

Die immensen Herausforderungen und gleichzeitig die Bedeutung des Bauwesens erfordern von Regierungen und **Verwaltungen eine Stärkung ihrer Kompetenzen**. Zudem kann Interdisziplinarität und Ko-Kreation nur gelingen, wenn auch Verwaltungen sich neu orientieren – und weniger als ein staatliches Gegenüber, sondern mehr im Sinne eines kreativen Akteurs agieren. Dazu bedarf es

einer Kompetenzerweiterung, damit Verwaltungen über die rein rechtliche Beurteilung hinaus ihre abwägende Gestaltungs- und Gemeinwohlkompetenz einbringen können. Der ganzheitliche Blick sollte zudem durch zentrale Anlaufstellen gestärkt werden.

„Durch einen **transdisziplinären, ebenen-, ressort- und generationen-übergreifenden Arbeitsprozess** kann ein **ökologischer Gesellschafts-, Wirtschafts-, Kultur- und Lebensbegriff entstehen**.“

# 8 Diskurs, Experiment und Vermittlung

Der Weg der Veränderung ist ein gesellschaftlicher und kultureller Prozess, der einer proaktiven Vermittlungsarbeit bedarf: Eine kulturelle Transformation für eine qualitativ voll gestaltete Umwelt muss angestoßen und konsequent wissenschaftlich begleitet und unterstützt werden („Kulturwandel“). Dies ist kein linearer Prozess, sondern eine gemeinsame, interdisziplinäre und visionäre Reise in eine bessere Lebenswelt, die für alle wünschenswert ist.

Neben dem Erfordernis, die Weichen im Sinne des *Green Deals* zu stellen, wird eine Kultur des Experimentierens befördert, um das Denken zu befreien (thinking outside the box) und den Ideenreichtum schlüssig zusammenzuführen. „Die Kultur des Experimentierens, angelehnt auch an die historische Bauhausbewegung, ist ein spannender Ansatz für die lebenswerte Gestaltung der Städte.“

Im 21. Jahrhundert gilt es, die ganze Bandbreite (klima-) kultureller Vielfalt zu berücksichtigen. Nicht jede Lösung wird überall funktionieren. Versuch und Irrtum müssen möglich sein. Je nach kulturellem Kontext gilt es, Suffizienz-, Effizienz- und/oder Konsistenzstrategien anzuwenden oder in neuen Kombinationen miteinander zu implementieren.

Kommunikation, Information und Wissensvermittlung müssen wesentliche Bestandteile des weiteren Prozesses sein. Der stetige Diskurs mit Bevölkerung, Bauherren, Planern und Baudurchführenden gehört dazu. In Netzwerken – etwa zwischen Kommunen – steckt großes

Potenzial. Damit können Vorurteile, z.B. gegenüber Kosten des nachhaltigen Bauens, ausgeräumt und die notwendigen Veränderungsprozesse erleichtert werden.

**„Wie verhalten sich Ziele der Ressourcenschonung und Reduktion des CO<sub>2</sub>-Ausstoßes zum Aspekt Gemeinwohl? Wie geht man mit den konfligierenden Interessen um (Wohnflächenbedarf versus Flächeneffizienz; Grün versus Verdichtung; Sanierung versus Bezahlbarkeit etc.)?“**

Ausprobieren und Experimentieren, das Zusammenbringen von Wissen und Praktiken aus der gesamten Breite der Gesellschaft muss gefördert werden, um klimagerechte Lösungen durch soziale und technische Innovationen ermöglichen zu können. Dabei gilt es, das volle innovative Potenzial unterschiedlicher Akteure aus Zivilgesellschaft, Wirtschaft, Kultur, Politik und

Verwaltung auszuschöpfen. Ein Jeder ist angesprochen sich zu beteiligen, Wertschätzung schafft Akzeptanz.

Bei der Generierung und Transformation von Wissen und Praktiken zur Lösung der Herausforderungen der Gegenwart ist es wichtig, die Bedeutung der Kultur und der Kreativwirtschaft sowie die der

Medien für den Diskurs und den gesellschaftlichen Zusammenhalt zu erkennen. So setzen sich Künstler und Künstlerinnen seit jeher auch mit dem **Spannungsverhältnis zwischen Kultur und Natur** auseinander. Die Natur dient dabei als Motiv und Inspirationsquelle zugleich. Aus Sicht der Kunst werden die Verletzlichkeit und Schutzwürdigkeit der Natur thematisiert, provoziert, emotionalisiert, Missstände angeprangert und damit Entwicklungen spielerisch-kritisch beleuchtet und Korrekturen ermöglicht. Auf diese Weise werden Wissen und Praktiken transformiert und andere inspiriert. Es gilt daher, Kultur- und Bildungseinrichtungen als Plattformen für Experimente, für die Wissensbildung und den Wissenstransfer aktiver einzubinden und wertzuschätzen.

Damit ist verbunden, spezialisiertes Wissen und meist ingenieurtechnische und technologische Innovationen

in eine interdisziplinäre Kultur des Experimentierens zu überführen. Die Vielzahl der bestehenden städtebaulichen und baulichen Förderprogramme und Initiativen sollten konzertiert ausgerichtet und gefasst sowie mit neuen transdisziplinären Kreativräumen und Quartieren ergänzt werden. Für das in Deutschland hervorgebrachte Format der „Internationalen Bauausstellungen“ als Inkubatoren architektonischer, städtebaulicher und regionalplanerischer Innovationen lässt sich in den letzten Jahren eine verstärkte Nachfrage beobachten, die auch in die europäischen Nachbarländer ausstrahlt. Innovationsfördernde und qualitätsorientierte Formate wie dieses, die sich nicht nur auf das Planen und Bauen, sondern auch auf den gesellschaftlichen und kulturellen Wandel beziehen, müssen in den Diskurs zum Neuen Europäischen Bauhauses einbezogen und als wichtige Impulse verstärkt werden.

Auch können neuartige, sich im Aufbau befindende Initiativen die Transformation im Gebäudebereich begleiten und befördern, in dem sie Technologie, Wirtschaft und Gesellschaft zusammenbringen. Neue Wettbewerbsformate wie *Living Labs Europe Competition LLEC* haben zum Ziel, ausgezeichnete Ideen zu generieren, und

**„Paradigmenwechsel kann man nicht verordnen, man muss verführen.“**

neugierig auf nachhaltige Renovierungen zu machen und sie regen dazu an, herausragende Projekte europaweit umzusetzen. Das Wettbewerbsformat schafft Aufmerksamkeit und steigert durch die Spannung des Spiels die Motivation der Teilnehmenden. Die entwickelten Ideen für die Transformation ihres Quartiers übernehmen eine Vorreiterrolle im Sinne des Neuen Europäischen Bauhauses und setzen neue Maßstäbe: So entstehen attraktive Quartiere, nachhaltig saniert, in einem gemeinsamen, interdisziplinären Projekt von Wissenschaft und Technologie mit Kunst und Kultur. Die weite Strahlkraft der teilnehmenden Projekte stimuliert andere, die eigenen Gewohnheiten zu überdenken und verfügbare Potenziale zu nutzen.

Innovationen und Denken in neuen Ansätzen brauchen aufgrund der steigenden komplexen Zusammenhänge eine gestalterische und räumliche Freiheit, daher sind Experimentierräume unabdingbar. In Analogie zum Instrument der Sonderwirtschaftszonen sollte geprüft werden, inwieweit **„Sonderbau- oder Sonderplanungszonen“** ausgewiesen werden können.



**Integrierte, anwendungsorientierte Forschung** ist ebenso ein wichtiger Motor für die Gestaltung der *Bauwende*. „Finanzmittel sollen nicht nur in das Bauen selbst fließen, sondern insbesondere auch in Forschung und Entwicklung und in Innovationen. Diese stellen ein Potenzial für zukünftigen Wissensexport aus der Bundesrepublik bzw. EU dar.“ Doch nach wie vor gerät der Transfer von Erkenntnissen aus der Forschung in die Praxis aufgrund einiger Herausforderungen ins Stocken. Oft fließen erhebliche Forschungsgelder namentlich in die Technologieforschung, jedoch lassen sich kaum Patenschaften für den Transfer in die Praxis gewinnen. Es ist notwendig, den Sprung von wissenschaftlich erfolgreichen Ansätzen in die Praxis schneller zu vollziehen und zugleich in der Breite zu platzieren. Hier muss die Transformationsforschung deutlich ausgebaut und weiterentwickelt werden.

Grundvoraussetzung für die Erforschung und wissenschaftlich begleitete Etablierung neuer Ansätze ist ein niederschwelliger und zielgruppengerechter Zugang zu Wissen sowie der Austausch von Daten zwischen Wissenschaft, Praxis und Gesellschaft (**Wissens- und Technologietransfer**). Auch die Rolle von Kunst, Kultur und bauges-

„**Klimaschutz erlebbarer machen.**“

schichtlicher Expertise für die Erarbeitung neuer Lösungsansätze und zur Wissensvermittlung in unterschiedliche Bevölkerungsgruppen ist angemessen zu berücksichtigen.

Als Ort für einen solchen offenen, trans- und interdisziplinären Austausch bietet sich die Einrichtung eines nationalen, vom Bund organisierten Experimentier- und Zukunftscampus an. Im Hinblick auf die anstehende Transformation des Gebäudebestands im Sinne der Nachhaltigkeit wird eine flexible bzw. erweiterbare Forschungsplattform im Rahmen eines Ensembles aus Bestandsgebäuden entwickelt und realisiert, um neue Wege beim Erhalten, Sanieren sowie An-, Aus-, Um- und Weiterbauen zu testen. Diese Forschungsplattform könnte als Reallabor mit entsprechender Infrastruktur fungieren, in dem transdisziplinär und offen zugänglich für alle geforscht und experimentell unter vereinfachten Haftungsklauseln – gebaut wird. Hier könnten sowohl Forschung, Planung, Kultur und Medien, Handwerk, Industrie, Verwaltung sowie Zivilgesellschaft zusammengeführt als auch Forschungs- und Kooperationsnetzwerke auf nationaler und europäischer Ebene verortet werden.



# 9 Kulturelles Wissen aus Gegenwart und Vergangenheit nutzen

Globaler Wandel und damit verbundene Erscheinungen wie Klimawandel, die Intensivierung globaler Kommunikation durch Medien und Migrationsprozesse haben die natürliche, gebaute und soziale Umwelt europäischer Städte und Gemeinden in den vergangenen Jahrzehnten bereits umfassend verändert. Vielfach eingespielte Praktiken bei der Gestal-

tung von Städten und Quartieren verlieren dadurch zunehmend an Nutzen oder werden obsolet. Im Hinblick auf den Klimawandel müssen innovative Lösungen für Klimaschutz und -anpassung gefunden werden. Nicht immer muss dabei „das Rad neu erfunden werden“.

**Historisches Wissen oder das kulturelle Wissen von anderen Orten** kann hierfür (wieder-) entdeckt und genutzt werden.

Konzepte des Bauens vor dem 20. Jahrhundert bzw. vor dem fossilen Zeitalter waren bereits vielfach auf Beständigkeit und damit Nachhaltigkeit ausgerichtet. Doch zahlreiche dieser Praktiken gerieten im Laufe des 20. Jahrhunderts zunehmend in Vergessenheit. Das Wissen lagert

jedoch in Archiven und Bibliotheken weltweit. Für die postfossile Gestaltung unserer Städte und Gemeinden kann dieses Wissen in interdisziplinären Projekten (u.a. unter Einbezug von Bauhistorie, Bauforschung, Architektur, Design und Bauindustrie) erneut gefunden, an die Bedürfnisse und Rahmenbedingungen der Gegenwart angepasst und genutzt werden.

Nicht nur der Blick in die Vergangenheit, auch der Blick auf die unterschiedlichen klimatischen Zonen in Europa ist lohnenswert.

Hitzeangepasstes Bauen, Arbeiten und soziales Leben gehört an vielen Orten der Welt seit Jahrhunderten zur selbstverständlichen Praxis. Diesbezügliche Wissensbestände und Praktiken sind heute vielerorts verfügbar. Die Erreichung der Klimaziele im Gebäudebereich ist eine Gemeinschaftsaufgabe, bei der der länderübergreifende Austausch und der gemeinsame Lernprozess über Landesgrenzen hinweg, innerhalb und auch außerhalb von Europa, von zentraler Bedeutung ist.

# Ausblick

Die ersten Diskussionen haben gezeigt, dass das NEB eine große Chance bietet, uns in einen gemeinsamen europäischen Dialog zu begeben, in dem wir die Verhältnisse zwischen Stadt, ländlichen Räumen und Bauen neu denken.

Es geht um den Gesamtprozess – Planen, Bauen, Bewahren, Nutzen, Rückbauen und Verwerten – und um Gebäude, die nicht mehr mit der Schlüsselübergabe abgeschlossen sind, sondern darüber hinaus in Zyklen die verschiedenen „Leben“ danach und die Auswirkungen auf diese Leben mitdenken. Womöglich muss man von einem binären und reflexiven System zu einem rekursiven System kommen, das einen Kreislauf bildet. Wie bei einem Ökosystem, in dem alles Teil dieses Systems ist und kein Einzelner bestimmen kann, was passiert.

Letztlich geht es um den Schutz und die Bewahrung unserer Möglichkeiten für ein gutes, sicheres und gesundes Leben auch für kommende Generationen auf der Basis einer nachhaltigen Entwicklung, aber auch basierend auf der klugen Nutzung unserer vorhandenen und

heimischen nachwachsenden Ressourcen in Europa. Diesen Auftrag hat im Mai 2021 nachdrücklich das Bundesverfassungsgericht in Deutschland in Bezug auf das Klimaschutzgesetz bekräftigt. Der Auftrag ist klar. Wir müssen einen Gesellschaftsvertrag für eine generationengerechte Klima- und Baupolitik verhandeln. Mit diesem Auftakt zur Bündelung der Positionen, Initiativen und Beteiligten soll der Dialog zum NEB weiter vorangetrieben werden. Als Initiatoren unterstützen das Bundesministerium des Innern, für Bau und Heimat (BMI) und das Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) den Diskussionsprozess auch in Zukunft und laden alle ein, sich weiterhin aktiv zu beteiligen.

# Programm

# Neues Europäisches Bauhaus im Dialog

6.5.2021

## Grußwort und Einführung

**Anne Katrin Bohle**

Staatssekretärin im Bundesministerium des Innern, für Bau und Heimat (BMI) zuständig für Stadtentwicklung, Wohnen sowie Bauwesen, Bauwirtschaft und Bundesbauten

## Impulsvorträge

**Prof. Hans Joachim Schellnhuber**

Direktor Emeritus des Potsdam-Instituts für Klimafolgenforschung (PIK)  
Gründer Bauhaus der Erde

**Ruth Reichstein**

EU-Kommission  
Neues Europäisches Bauhaus (NEB) –  
Leitungsstab Kommissionspräsidentin  
Ursula von der Leyen

**Prof. Werner Sobek**

Universität Stuttgart, Institut für Leichtbau  
Entwerfen und Konstruieren (ILEK)

## Podiumsdiskussion mit

**Lothar Fehn Krestas,**  
Unterabteilungsleiter Bauwesen  
und Bauwirtschaft im BMI

**Barbara Ettinger-Brinckmann,**  
Präsidentin Bundesarchitektenkammer (BAK)

**Dr. Christian Lieberknecht,**  
Geschäftsführer Bundesverband deutscher  
Wohnungs- und Immobilienunternehmen (GdW)

**René Hagemann-Miksits,**  
stellv. Hauptgeschäftsführer Hauptverband  
der Deutschen Bauindustrie (HDB)

**Claudia Warnecke,**  
Städte- u. Gemeindebund (DStGB) /  
Stadt Paderborn

**Prof. Christa Reicher,**  
Internationale Bauausstellung (IBA) Expertenrat /  
RWTH Aachen, Institut für Städtebau und  
Entwerfen

**Prof. Dirk Hebel,**  
Karlsruher Institut für Technologie (KIT)  
Institut Entwerfen und Bautechnik /  
Nachhaltiges Bauen

## Arbeitsgruppen zusammen mit Referierenden und Podiumsteilnehmenden

**AG 1**  
Nachhaltig Bauen

**AG 2**  
Baukultur und Design

**AG 3**  
Bezahlbarkeit von Bauen und Wohnen

**AG 4**  
Öffentlichkeitsarbeit, Partizipation, Vermittlung,  
Neue Allianzen

# Impressum

## Herausgeber

Bundesministerium des Inneren, für Bau und Heimat (BMI)  
Alt-Moabit 140  
10557 Berlin

Bundesinstitut für Bau-, Stadt und Raumforschung (BBSR)  
im Bundesamt für Bauwesen und Raumordnung (BBR)  
Deichmanns Aue 31–37  
53179 Bonn

## Redaktion

Bundesinstitut für Bau-, Stadt und Raumforschung (BBSR)  
Dr. Robert Kaltenbrunner  
Helga Kühnhenrich  
Lars-Christian Uhlig  
Andreas Rietz  
Verena Kluth

Bundesministerium des Inneren, für Bau und Heimat (BMI)  
Lothar Fehn Krestas  
André Hempel  
Alrun Porkert  
Stephan Mayer  
Jan Schultheiß

ARGE Kommunikation  
Eva Herrmann

## Lektorat

ARGE Kommunikation  
Eva Herrmann, Sandra Leitte

## Kontakt

BBSR Referat WB 3 – Forschung im Bauwesen  
Helga Kühnhenrich  
Tel +49 22899 401 2730  
helga.kuehnhenrich@bbr.bund.de

BMI BW I 5 Alrun Porkert  
Tel +49 18681 16889/ 0175 5788420  
BWI5@bmi.bund.de

## Gestaltung / Barrierefreies PDF

[www.sans-serif.de](http://www.sans-serif.de)

## Vervielfältigung

Alle Rechte vorbehalten.

Die Herausgeber übernehmen keine Gewähr für die Richtigkeit, die Genauigkeit und Vollständigkeit der Angaben sowie für die Beachtung privater Rechte Dritter. Die geäußerten Ansichten und Meinungen müssen nicht mit denen der Herausgeber übereinstimmen.

Berlin/ Bonn Juni 2021

# NETZWERK C2C REGIONEN

**Kommunen der Zukunft gestalten.**

C2C Städte und Kommunen prägen florierende, lebenswerte und widerstandsfähige Regionen.

MEHR ERFAHREN

## Warum brauchen wir Cradle to Cradle in Städten und Kommunen?

### Anlage 34

Städte und ihr direktes Umfeld benehmen schon heute





Städte und ihr direktes Umfeld beheimaten schon heute mehr als die Hälfte aller Menschen. Im Jahr 2100 — wenn die **weltweite Bevölkerung auf rund 11 Milliarden** gestiegen ist — werden **etwa 85% aller Menschen** in Städten oder ihrer unmittelbaren Nähe leben. Gleichzeitig zeigen Klimawandel, Naturzerstörung sowie politische und soziale Spannungen, dass unser linearer Umgang mit Ressourcen auch im Kontext urbaner Entwicklung keine Zukunft hat.

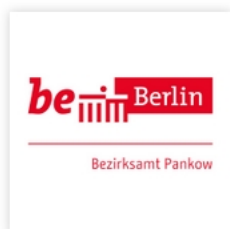
Mit einer innovativen Infrastruktur können wir Licht ins ökologische Dunkel von Städten und Gemeinden von Morgen bringen. Denn urbane und suburbane Siedlungsformen bieten beste Voraussetzungen für eine positive Ökobilanz: kurze Arbeits- und Transportwege, die gemeinsame und effektive Nutzung von Wärme, große Potenziale für die Sharing- und Leasing-Economy sowie den Bau von Gebäuden, die gesunde Innenluft bieten, Feinstaub und CO<sub>2</sub> binden und mehr Energie produzieren, als sie benötigen.

Der Schlüssel zu solch gesunden Siedlungsstrukturen ist eine konsequente und kreative Kreislaufwirtschaft, in der alles aus gesunden und geeigneten Materialien besteht und endlos wiederverwendet werden kann. Überspannt von einem positiven Menschenbild und der Überzeugung, dass wir nicht nur weniger schlechte, sondern richtig gute Lösungen für Mensch und Umwelt schaffen können — Cradle to Cradle, kurz: C2C.

Um die Rahmenbedingungen dafür zu schaffen, haben wir das Netzwerk C2C Regionen etabliert. Hier treffen Kommunal- und Stadtverwaltungen auf innovative Unternehmen, Forschungsinstitute und zivilgesellschaftliche Organisationen — alle mit dem Ziel, gemeinsam einen positiven ökologischen Fußabdruck zu hinterlassen.



## Unsere Mitglieder



Bezirk Pankow



Gemeinde Haar



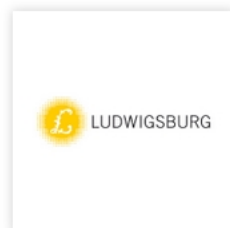
Gemeinde Straubenhardt



Landschaftsverband  
Rheinland



Stadt Eppelheim



Stadt Ludwigsburg



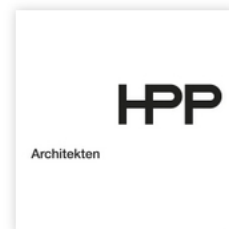
Stadt Nettetal



3D Visualisierung Dresden



EPEA GmbH – Part of Drees &  
Sommer



HPP Architekten



PMCon



Serielle Sanierung von Reihenhäusern in Arnhem (Niederlande). Foto: Energiesprung International

## Energetisches Bauen

# Was ist serielles Sanieren?

**Eine kostengünstige Sanierung von Mehrfamilienhäusern in nur wenigen Tagen? Das klingt unglaublich, ist aber das Ziel der Initiative „Energiesprung Deutschland“, die hierzulande das serielle Sanieren voranbringen möchte. Unter Federführung der Deutschen Energie-Agentur entwickeln Bau- und Immobilienunternehmen vorgefertigte Standard-Elemente, die effektive Komplett-sanierungen ermöglichen sollen.**

Über den Trend zum seriellen *Bauen* haben wir auf [baustoffwissen.de](https://www.baustoffwissen.de) bereits in einem eigenen Beitrag informiert. Zur Erinnerung: Anstatt dass man jeden Wohnneubau als Unikat plant und ihn auf der Baustelle „Stein für Stein“ errichtet, werden bei der seriellen Bauweise Gebäude oder Gebäudeteile zunächst als Prototypen entworfen und zugelassen, um sie dann später in Serie bauen. Einzelne Module können dabei im Werk vorgefertigt und auf der Baustelle nur noch zusammengefügt werden. Ziel ist ein schneller, günstiger Neubau, um den Mangel an bezahlbarem Wohnraum zu beseitigen.

Während sich der serielle Neubau hierzulande schon langsam von der bloßen Theorie zur Praxis entwickelt – bei vielen Praxisbeispielen handelt es sich bisher übrigens um Flüchtlingsunterkünfte – schwappt nun bereits der nächste Trend nach Deutschland: das serielle Sanieren von Bestandsgebäuden. Dadurch soll endlich der Sanierungsstau im Hausbereich aufgelöst werden.

## Vorbild Niederlande

Der Trend stammt aus den Niederlanden. Dort wurden in den letzten Jahren zahlreiche Reihenhäuser innerhalb weniger Tage nach dem so genannten „Energiesprung“-Konzept saniert (auf Deutsch: Energiesprung). Die Deutsche Energie-Agentur (dena) nimmt nun dieses niederländische Vorbild zum Anlass, um zu prüfen, ob serielles Sanieren nicht auch in Deutschland funktionieren könnte. Dafür hat die dena zusammen mit Bauunternehmen, Wohnungsgesellschaften, den Experten der Non-Profit-Organisation Energiesprung und dem Bundeswirtschaftsministerium die Initiative „Energiesprung Deutschland“ gegründet.



Hoher Vorfertigungsgrad: Fassadenelemente für eine serielle Sanierung. Foto: dena

Im Rahmen des gemeinsamen Projekts „Serielle Sanierung von Mehrfamilienhäusern“ wollen die Partner in den nächsten Jahren unterschiedliche Gebäude-Prototypen mithilfe von vorgefertigten Elementen sanieren. Ziel ist es nicht zuletzt, den bei Sanierungen bisher sehr hohen Anteil handwerklicher Arbeit auf der Baustelle zu reduzieren.

Das soll zu deutlichen Kostenreduzierungen führen. Außerdem soll der zeitliche und finanzielle Aufwand für Gebäudesanierungen besser planbar werden. Dadurch könnten Hausbesitzer künftig eher bereit sein, in die Modernisierung ihrer Immobilie zu investieren.

## Dreijähriges Projekt

Die dena will mit dem auf drei Jahre angelegten Projekt nach eigener Aussage „innovative Wohnungsgesellschaften mit smarten Bauunternehmen verbinden“. Sie sollen gemeinsam serielle Sanierungslösungen für Mehrfamilienhäuser entwickeln und erproben, die sich nicht nur durch vergleichsweise niedrige Kosten und eine kurze Sanierungsdauer von bisherigen Angeboten abheben, sondern darüber hinaus auch eine langfristig hohe Qualität und ein ansprechendes Design garantieren.



*Impression von einer Energiesprong-Baustelle im niederländischen Zoetermeer. Foto: dena*

Geplant ist, dass die Gebäude nach der Sanierung den energetischen Standard eines Nullenergiehauses erreichen. Sie müssen dann also im Jahresdurchschnitt genauso viel Energie erzeugen – zum Beispiel durch Solarmodule – wie die Bewohner für Raumwärme, Warmwasser und Strom verbrauchen. Die angestrebten seriellen Sanierungslösungen sollen so funktionieren, dass die Arbeit auf der Baustelle selbst nur noch drei bis maximal zehn Tage dauert. Erreichen will man das durch einen hohen Vorfertigungsgrad bei den eingesetzten Sanierungselementen. Für Mieter soll die Sanierung zudem nicht zu höheren Warmmieten führen. Stattdessen sollen sich die Maßnahmen komplett durch Einsparungen bei den Heiz- und Stromkosten refinanzieren.

Das alles klingt nach einem sehr anspruchsvollen Konzept. Man darf also gespannt sein auf die Lösungen, die Energiesprong Deutschland in den nächsten Jahren für die serielle Sanierung von Mehrfamilienhäusern entwickelt. Mut machen die bisherigen Erfahrungen in den Niederlanden. Dort wird bei Energiesprong-Sanierungen mittlerweile regelmäßig der Nullenergiestandard erreicht. Zugleich sind die Sanierungskosten deutlich gesunken und die Maßnahmen-Dauer sank von anfangs etwa zwei Wochen auf mittlerweile nur noch wenige Tage.

---

## Mehr zum Thema Massivbau findest du in der Übersicht

---



**Über den Autor** Roland Grimm ist seit Februar 2013 freier Journalist mit Sitz in Essen und schreibt regelmäßig Fachwissen-Artikel für *BaustoffWissen*. Zuvor war er rund sechs Jahre Fachredakteur beim Branchenmagazin *BaustoffMarkt* und außerdem verantwortlicher Redakteur sowie ab 2010 Chefredakteur der Fachzeitschrift *baustoffpraxis*. Kontakt: [freierjournalist@rolandgrimm.com](mailto:freierjournalist@rolandgrimm.com)



Bundesamt  
für Wirtschaft und  
Ausfuhrkontrolle

---

## Bundesförderung Serielles Sanieren

*Mit dem Programm „Förderung der Seriellen Sanierung“ verfolgt das Bundesministerium für Wirtschaft und Energie (BMWi) das Ziel, die Gesamtenergieeffizienz im Gebäudebereich weiter zu steigern.*



Quelle: © Energiesprung Foundation/dena

### Förderprogramm im Überblick

Um die Klimaschutzziele der Bundesregierung zu erreichen, muss der Gebäudebestand bis 2050 umfassend energetisch saniert werden. Das stellt auch viele Wohnungsunternehmen vor große Herausforderungen.

Hier setzt die Idee der Seriellen Sanierung an, die neue technische Möglichkeiten zur industriellen Vorfertigung nicht nur einzelner Produkte, sondern vollständig aufeinander abgestimmter Sanierungselemente sowie die Möglichkeiten der Digitalisierung in Sanierungsprozesse integrieren soll.

Angereizt durch das Förderprogramm sollen technische und konzeptionelle Innovationen zur Seriellen Sanierung entstehen, indem Bauunternehmen, Zulieferunternehmen oder handwerkliche Betriebe neue Lösungen anbieten, weiterentwickeln und eine Kostendegression u. a. durch Stückzahlen und automatisierte Vorfertigung erzielen.

Seriell Sanieren bedeutet demnach die energetische Sanierung von bestehenden Gebäuden unter Verwendung abseits der Baustelle vorgefertigter Fassaden- bzw. Dachelemente einschließlich damit verbundener Anlagentechnik (z. B. Wärmepumpenmodule) sowie deren Montage an bestehende Gebäude. Die abseits der Baustelle vorgefertigten Elemente weisen dabei einen so hohen Vorfertigungsgrad auf, dass sich im Vergleich zur herkömmlichen Sanierung der zeitliche Aufwand vor Ort deutlich reduziert.

Ziel des Förderprogramm ist es, Investitionen in Serielle Sanierung anzureizen. Dazu zählen insbesondere die Entwicklung neuartiger Verfahren und Komponenten zur Seriiellen Sanierung sowie die Etablierung neuer Sanierungsverfahren am Markt.

## Was wird gefördert?

Die Förderung erfolgt in drei Modulen, wobei für jedes Modul hinsichtlich des Stands der Technik die in den Anlagen zur Richtlinie Bundesförderung effiziente Gebäude (BEG) festgelegten technischen Mindestanforderungen erfüllt sein müssen.

### Modul I: Durchführbarkeitsstudien

---

Im Rahmen der Durchführbarkeitsstudien können für konkrete Liegenschaften und Gebäude die technische, rechtliche und wirtschaftliche Machbarkeit einer Seriiellen Sanierung untersucht und die Ergebnisse in einer schriftlichen Studie zusammengefasst werden. Diese Studien sind förderfähig gemäß Artikel 49 [AGVO](#). Zu untersuchende Fragestellungen können sich z.B. auf Zugänglichkeit, Befestigungsmöglichkeiten oder Lastabtrag beziehen; juristische Aspekte umfassen beispielsweise Themen wie Grundstücksgrenzen, Bebauungspläne oder andere Satzungen. Das beinhaltet auch Vertragsregelungen, wie etwa der Umgang mit PV-Stromerträgen sowie energetische Fragen zu Einsparungen, Erneuerbare-Energien (EE)-Stromerzeugung, Speicherung, etc.

Im Rahmen der Vorbereitung der in Modul II förderfähigen Entwicklungsvorhaben können Durchführbarkeitsstudien nach Artikel 25 [AGVO](#) bezuschusst werden, in denen der Forschung- und Entwicklungsaufwand (F&E) quantifiziert und eine Abschätzung der hierfür notwendigen Kosten durchgeführt wird. Hier sind ausschließlich Fragestellungen zu untersuchen, die sich auf die Durchführbarkeit der Entwicklungsarbeit von Komponenten der Seriiellen Sanierung beziehen. Eine Untersuchung der Anwendung von Verfahren und Komponenten der Seriiellen Sanierung an einem konkreten Pilotprojekt ist im Rahmen einer solchen Studie nach Artikel 25 [AGVO](#) nicht förderfähig.

---

### Modul II: Entwicklung und Erprobung serieller Sanierungskomponenten für individuelle Pilotprojekte

---

In Modul II soll die konkrete Forschungs- und Entwicklungsarbeit für serielle Sanierungskomponenten gefördert werden (Artikel 25 [AGVO](#)). Dies beinhaltet:



- die konzeptionelle und praktische Entwicklung der Vorfertigung oder auch die Optimierung von Abläufen auf Hersteller-, Verarbeiter- und Nutzerseite

und/oder

- die Herstellung von Muster- und Prototypelementen und deren in-situ Erprobung am Gebäude, sofern hierdurch weiterer Erkenntnisgewinn für die Entwicklung der Komponenten der Seriellen Sanierung erwartet wird.

Die zu entwickelnden Lösungen sollen serientauglich, leicht adaptier- und skalierbar sein. Das bedeutet, dass sich die entwickelten Komponenten und Verfahren zukünftig auf andere Maßnahmen übertragen lassen und so zu einer marktgetriebenen Kostendegression beitragen können. Förderfähig sind hier Kosten der Komponentenhersteller, die einen konkreten Bezug zur Entwicklung des Produkts selbst oder dessen Vermessung während der Monitoringphase haben.

Entscheidend ist dabei, dass der Vorfertigungsgrad der abseits der Baustelle gefertigten Elemente, auf die die geförderten Leistungen abzielen, so hoch ist, dass sich im Vergleich zur herkömmlichen Sanierung der finanzielle Aufwand vor Ort deutlich reduziert, fehleranfällige Schnittstellen vermieden oder optimiert werden und Baustellenzeiten durch eine kurze Montage- bzw. Installationszeit deutlich verkürzt werden. Besonders dienlich ist diesem Ziel auch die Integration mehrerer Bauteile bzw. Funktionen. Dazu zählen unter anderem die Integration von PV in Dachmodule sowie integrierte Anlagentechnikmodule, die die Haustechnik möglichst vollständig bündeln.

Vorraussetzung für die Förderung nach Artikel 25 AGVO ist die Durchführung eines Monitorings der entwickelten Komponenten über eine Dauer von zwei Heizperioden. Die hierfür notwendige Ausstattung der mittels Prototypen sanierten Gebäude mit digitaler und vernetzter Mess-, Steuer- und Regelungstechnik (MSR) ist förderfähig. Neben dem Monitoring des Energieverbrauchs ist auch die Betrachtung des gesamten Gebäudebetriebes zur Untersuchung der eingesetzten Komponenten förderfähig.

Kosten für die erprobende Anwendung von Komponenten der seriellen Sanierung in Pilotprojekten sind gemäß Artikel 38 AGVO und Artikel 41 AGVO förderfähig. In diesen Fällen ist auch in Konsortien nicht der Hersteller der Komponenten selbst Antragsteller.

Voraussetzung für die Förderung in Modul II ist neben dem Nachweis der wirtschaftlichen Verwendung der Fördermittel

- der Nachweis von der technischen und rechtlichen Umsetzbarkeit durch die vorherige Durchführung einer Durchführbarkeitsstudie entsprechend der Anforderung der Nummer 5.1

oder

- ein mindestens gleichwertiger Nachweis der technischen und rechtlichen Umsetzbarkeit durch alternative Nachweismethoden für dieses Pilotprojekt, welcher die Anforderungen an eine Durchführbarkeitsstudie erfüllt.

---

## Modul III: Ergänzende Investitionsbeihilfen zum Aufbau von Produktionskapazitäten serieller Sanierungskomponenten

---

In Modul III wird der Aufbau von Produktionskapazitäten zur industriellen Herstellung von Fassaden- und Dachelementen und damit verbundener Anlagen- und Gebäudetechnik, gefördert, welche als Komponenten die Definition der Seriellen Sanierung erfüllen.

Als Aufbau von Produktionskapazitäten gilt die Errichtung einer neuen Betriebs-/Produktionsstätte, die Erweiterung einer bestehenden Betriebsstätte oder die Anpassung einer Betriebsstätte an neue Produkte. Förderfähig sind hierbei der Erwerb von Sachanlagen wie Bauten, technische Anlagen, Maschinen und anderer Anlagen, Betriebs- und Geschäftsausstattung. Geförderte Betriebsstätten müssen eindeutig abgrenzbare Produktionsprozesse vorweisen, welche für die Komponenten zur Seriellen Sanierung notwendig sind.

Die geförderten Produktionskapazitäten sind mindestens fünf Jahre zweckentsprechend zu nutzen. Innerhalb dieses Zeitraums ist bei der Veräußerung einer geförderten Produktionsstätte der Erwerber auf die Förderung und die Nutzungspflicht hinzuweisen. Die Nutzungsänderung oder die Nutzungsaufgabe und der Abriss einer geförderten Produktionsstätte innerhalb dieses Zeitraums sind dem Durchführer, der die Förderung gewährt hat, durch den Antragssteller, bzw. im Falle einer Veräußerung durch den Erwerber, unverzüglich anzuzeigen. Dies kann in der Konsequenz eine Rückforderung der Förderung bedeuten.

---

## Häufige Fragen

### Allgemeine Fragen

---

Was ist das Ziel der Förderrichtlinie?

---

Durch das Förderprogramm soll erreicht werden, dass neue technische Wege der industriellen Vorfertigung nicht nur einzelner Produkte, sondern vollständig aufeinander abgestimmter Sanierungselemente entwickelt und realisiert werden.

---

Wie soll dieses Ziel durch das Förderprogramm erreicht werden?

---

Das Ziel soll über die drei Fördermodule erreicht werden:



- Die Förderung von Durchführbarkeits- und Machbarkeitsstudien (Modul I)
- Die Förderung der Forschung und Entwicklung serieller Sanierungskomponenten und die Förderung der Erprobung serieller Sanierungskomponenten für individuelle Pilotprojekte (Modul II)
- Die Förderung des Aufbaus / der Erweiterung von Produktionskapazitäten serieller Sanierungskomponenten (Modul III)

---

Wer kann einen Antrag stellen?

---

Antragsberechtigt für die Module I und II sind

- Unternehmen
- gemeinnützige Organisationsformen
- eingetragene Genossenschaften
- Konsortien
- Contractoren

Antragsberechtigt für das Modul III sind ausschließlich Kleinst- sowie kleine und mittlere Unternehmen (KMU).

---

Wer gilt als Unternehmen im Sinne der Förderrichtlinie?

---

Als Unternehmen gilt jede rechtlich selbstständige Einheit, die eine auf Dauer angelegte wirtschaftliche Tätigkeit ausübt. Wirtschaftlich handelt, wer auf einem Markt Güter und Dienstleistungen anbietet. Eine Gewinnerzielungsabsicht ist nicht zwingend erforderlich. Auch Unternehmen mit gemeinnützigen, mildtätigen oder kirchlichen Zwecken können grundsätzlich wirtschaftlich tätig sein.

---

Was sind KMU?

---

KMU sind Kleinunternehmen sowie kleine und mittlere Unternehmen im Sinne der Empfehlung 2003/361/EG der Kommission von Mai 2003. Die hiervon nicht erfassten Unternehmen gelten als Nicht-KMU.

Einen Benutzerleitfaden zur Definition von KMU finden Sie [hier](#).

---

Was sind Konsortien?

---

Konsortien sind, im Sinne der Förderrichtlinie, ein Unternehmenszusammenschluss mehrerer rechtlich und wirtschaftlich selbstständig bleibender Unternehmen zur zeitlich begrenzten Zusammenarbeit im Rahmen einer Durchführbarkeitsstudie und/oder eines Pilotprojekts. Innerhalb eines Konsortiums behält jedes Unternehmen seinen Status als KMU oder Nicht-

KMU und die Förderquote berechnet sich entsprechend nach dem jeweiligen Status.

---

Was sind Contractoren?

---

Contractoren sind Dienstleister, die die in der Förderrichtlinie genannten Maßnahmen im Rahmen eines Contractingvertrags für einen Antragsberechtigten durchführen.

---

Wie ist der Antrag zu stellen?

---

Der Antrag ist über das auf der Website des BAFA zur Verfügung gestellte Online-Antragformular zu stellen. Das Antragsformular muss elektronisch ausgefüllt, anschließend ausgedruckt und unterschrieben werden, bevor es dem BAFA per Upload-Bereich übermittelt wird.

Das Online-Antragformular finden Sie **hier**.

Den Upload-Bereich finden Sie hier.

---

Wann ist der Antrag zu stellen?

---

Der Antrag muss vor Beginn der Maßnahme gestellt werden. Als Maßnahmenbeginn gilt dabei der Abschluss eines der Ausführung zuzurechnenden Liefer- oder Leistungsvertrags.

Kein vorzeitiger Maßnahmenbeginn liegt vor, wenn zwar ein Vertrag abgeschlossen wird, aber ein eindeutiges Rücktrittsrecht für den Fall der Versagung der beantragten Zuwendung vereinbart ist. Dem Rücktritt steht gleich, wenn der Vertrag mit auflösenden oder aufschiebenden Bedingungen der Bewilligung der Zuwendung abgeschlossen wird.

---

Wann darf mit der Maßnahme begonnen werden?

---

Sie dürfen erst ab Erhalt des Zuwendungsbescheids mit der Maßnahme beginnen.

Sie können in begründeten Fällen eine Ausnahme von dem Verbot des vorzeitigen Maßnahmenbeginns beantragen (Antrag auf unverbindliche Inaussichtstellung).

---

Was ist die Vorkalkulation?

---

Im Rahmen der Antragstellung sind die erwarteten Kosten in einer Vorkalkulation aufzustellen, welche einerseits die förderfähigen Kosten und andererseits die Finanzierung in Teilkomponenten aufschlüsselt. Bitte verwenden Sie für die Vorkalkulation die unter Informationen zum Thema / Publikationen bereitgestellten Formulare „Vorlage

Kostenkalkulation“. Damit das BAFA die angegebenen Kosten nachvollziehen kann, sind die entsprechenden Angebote oder andere geeignete Nachweisunterlagen der Vorkalkulation beizulegen (z. B. eine Aufschlüsselung der Personalkosten).

---

Was ist der Bewilligungszeitraum?

---

Der Zeitraum, für den nach positiv erfolgter Antragsprüfung die Fördermittel für den Antragsteller reserviert sind. Der Bewilligungszeitraum beträgt 24 Monate und kann durch einen formfreien Antrag unter Angaben der Verzögerungsgründe um bis zu 12 Monate verlängert werden.

---

Was ist der Verwendungsnachweis?

---

Nach Durchführung der zu fördernden Maßnahme hat das BAFA von dem Zuwendungsempfänger den Nachweis der Verwendung der Fördermittel entsprechend den Nebenbestimmungen zu verlangen. Die sachgerechte Erstellung, rechtzeitige Vorlage und Prüfung des Verwendungsnachweises sind im Rahmen des Zuwendungsverfahrens von zentraler Bedeutung. Hierdurch werden die Erreichung des Zuwendungszwecks, die Wirtschaftlichkeit der Mittelverwendung und die Ordnungsmäßigkeit des Verfahrens nachgewiesen. Der Verwendungsnachweis dient ebenfalls der Erfolgskontrolle und ist ein Teil der Rechnungslegung.

---

Woraus besteht der Verwendungsnachweis?

---

Der Verwendungsnachweis ist über das vom BAFA bereitgestellte Online-Formular abzugeben.

Dem Onlineformular zum Verwendungsnachweis sind folgende Unterlagen beizulegen:

- der Sachbericht (sowie die abgeschlossenen Lieferungs- und Leistungsverträge) und
- die Nachkalkulation (sowie die tabellarische Belegliste).

---

Was ist der Sachbericht?

---

Mit dem Sachbericht soll im Einzelnen Auskunft über das Förderprojekt gegeben werden. Er dient dazu, dem BAFA die Prüfung zu ermöglichen, was zur Erfüllung des Zuwendungszwecks unternommen wurde und ob der angestrebte Erfolg als erfüllt anzusehen ist. Für das BAFA ist es wichtig, dass der Zuwendungsempfänger den Ablauf der Verwendung der Fördermittel in Verbindung mit den getroffenen Maßnahmen im Rahmen des Projekts und ggf. die Folgewirkungen darlegt.

Der Sachbericht soll inhaltlich drei Themenfelder abdecken: Erstens ist in ihm die Verwendung der Zuwendung darzustellen. Zweitens ist in ihm auf die wichtigsten Positionen

des zahlenmäßigen Nachweises einzugehen. Drittens ist die Notwendigkeit und Angemessenheit der geleisteten Arbeit zu erläutern. Darüber hinaus ist anzugeben, in welcher Art und Weise, bspw. in welchen Schritten und ggf. unter welchen Abweichungen von der Planung, der Verwendungszweck erfüllt und dabei die Zuwendung verwendet wurde. Abweichungen von der Planung sind besonders zu begründen. Die Darstellung im Einzelnen erfordert, dass der Zuwendungsempfänger ausführlich und detailliert berichtet.

Es sind die wichtigsten Stationen im Fortgang des Förderprojektes – beispielsweise den Zeitpunkt der Vergabe von Aufträgen, den der Rechnungsstellung, den der Zahlung, etc. – zu benennen.

Dem Sachbericht sind sämtliche abgeschlossenen Lieferungs- und Leistungsverträge beizulegen.

---

### Was ist die Nachkalkulation?

---

Während die Vorkalkulation zum Antrag die geplanten Kosten und Einnahmen einander gegenüberstellt, stellt die Nachkalkulation im Verwendungsnachweis die tatsächlichen Kosten und Einnahmen einander gegenüber.

In der Nachkalkulation sind Einnahmen und Kosten in zeitlicher Folge und voneinander getrennt entsprechend der Gliederung der Vorkalkulation auszuweisen.

Da sämtliche Einnahmen und Ausgaben einbezogen werden müssen, ergibt sich aus der Nachkalkulation auch die Gesamtfinanzierung des Vorhabens. Die Nachkalkulation ist eine wesentliche Grundlage zur Beurteilung der Frage, ob der Zuwendungsempfänger noch Ansprüche aus dem Zuwendungsbescheid hat oder ob von Seiten des BAFA Rückforderungsansprüche geltend zu machen sind.

Es ist unbedingt darauf zu achten, dass in der Nachkalkulation keine

- Kosten abgerechnet werden, die dem Zuwendungsempfänger nicht im Zusammenhang mit dem Verwendungszweck entstanden sind,
- Kosten angegeben werden, die nicht mit Belegen übereinstimmen und
- fingierte Kosten abgerechnet werden.

---

### Wie stellt man einen zulässigen Widerspruch?

---

Ein Widerspruch kann nur **innerhalb eines Monats**, nachdem der Verwaltungsakt dem Beschwerden bekanntgegeben worden ist, bei der ausführenden Behörde (hier das BAFA) erhoben werden. In dem Widerspruchsschreiben muss mindestens erkennbar sein, von wem es stammt, gegen welchen Bescheid es sich richtet und dass eine Nachprüfung begehrt wird.

Der Widerspruch muss zwingend schriftlich (**per Post, per Fax**) erhoben werden, begründet sein und muss mit einer Unterschrift des Beschwerden versehen sein. Alle anderen Formen der Übermittlung eines Widerspruchs (z. B. per E-Mail oder in unangemessener Form) sind nicht zulässig.

---

## Fragen zu Modul I

---

Was ist eine Durchführbarkeits- bzw. Machbarkeitsstudie?

---

Nach AGVO definiert sich eine Durchführbarkeits- bzw. Machbarkeitsstudie als „Bewertung und Analyse des Potenzials eines Vorhabens mit dem Ziel, die Entscheidungsfindung durch objektive und rationale Darlegung seiner Stärken und Schwächen sowie der mit ihm verbundenen Möglichkeiten und Gefahren zu erleichtern und festzustellen, welche Ressourcen für seine Durchführung erforderlich wären und welche Erfolgsaussichten das Vorhaben hätte“.

---

Was wird gefördert?

---

- Gefördert werden Durchführbarkeits- bzw. Machbarkeitsstudien nach Artikel 49 AGVO für konkrete Gebäude, Liegenschaften oder Quartiere mit ihren bestehenden Gebäuden, die die technische, rechtliche und wirtschaftliche Machbarkeit einer Serielles Sanierung an dieser untersuchen und die Ergebnisse in einer schriftlichen Studie zusammenfassen.
  - Im Rahmen der Vorbereitung der in Modul II förderfähigen Entwicklungsvorhaben können auch Durchführbarkeits- bzw. Machbarkeitsstudien nach Artikel 25 AGVO bezuschusst werden, in denen der Forschungs- und Entwicklungsaufwand quantifiziert und eine Abschätzung der hierfür notwendigen Kosten durchgeführt wird. Hier sind ausschließlich Fragestellungen zu untersuchen, die sich auf die Durchführbarkeit der Entwicklungsarbeit von neuen Komponenten der Serielles Sanierung beziehen.
- 

Welche Unterlagen sind mit dem Antrag einzureichen?

---

- ein vollständig ausgefülltes Antragsformular,
  - eine Projektbeschreibung,
  - eine Vorkalkulation auf Kostenbasis und
  - einen Zeit- und Ressourcenplan.
- 

Was ist eine Projektbeschreibung?

---

Die Projektbeschreibung ist eine Kurzbeschreibung der Durchführbarkeits- bzw. Machbarkeitsstudie und sollte auf 10 DIN-A4 Seiten begrenzt sein. Sie soll Aufschluss darüber geben, welches Vorhaben Gegenstand der Durchführbarkeitsstudie ist und in welchem Zeitraum diese durchgeführt und abgeschlossen sein soll.

---

Was ist eine Vorkalkulation auf Kostenbasis?

---

Im Rahmen der Antragstellung sind die erwarteten Kosten in einer Vorkalkulation aufzustellen, welche einerseits die förderfähigen Kosten und andererseits die Finanzierung in Teilkomponenten aufschlüsselt. Generell ist eine Kostenrechnung zu führen, die geeignet ist, die förderfähigen Kosten des beantragten Vorhabens separiert von anderen Kosten zu erfassen.

Die obligatorische Vorkalkulation besteht gemäß Nr. 1.2.1 ANBest-P-Kosten aus zwei Teilen:

- einer aufgedichteten Berechnung der voraussichtlichen mit dem Zuwendungszweck zusammenhängenden Kosten und
- einer Übersicht über die beabsichtigte Finanzierung dieser Kosten.

Bitte verwenden Sie im Rahmen der Antragstellung das vom BAFA zur Verfügung gestellte Formular der Vorkalkulation (siehe unter Informationen zum Thema / Publikationen / Vorlage Kostenkalkulation).

---

Was ist der Zeit- und Ressourcenplan?

---

Im Zeit- und Ressourcenplan sind alle relevanten Ausführungszeiträume und Meilensteine des Projektes grafisch und tabellarisch darzustellen. Es ist darauf einzugehen, wann welche Ressourcen (personelle sowie finanzielle) für das Projekt benötigt werden.

---

Welche Kosten sind förderfähig?

---

- Nach Artikel 49 AGVO: Die Kosten der Studie, die sich auf den Einsatz von Komponenten der Seriellen Sanierung beziehen.
  - Nach Artikel 25 AGVO: Die Kosten der Studie, die sich auf die Entwicklung von Komponenten der Seriellen Sanierung beziehen.
- 

Welche Kosten sind nicht förderfähig?

---

- Kosten, soweit diese nicht zwingend für die Durchführbarkeits- bzw. Machbarkeitsstudien erforderlich sind;
  - Studien für auf Öl-Heizkesseln, Kohleheizungen, Nachtstromspeicherheizungen sowie Einzelfeuerstätten (Kamine, Kachelöfen, Kaminöfen, etc.) basierende Konzepte.
- 

Wie hoch ist die Förderung?

---

- 50 % der förderfähigen Kosten für alle sonstigen Antragsberechtigten, die nicht KMU sind
- 60 % der förderfähigen Kosten für KMU

Der maximale Förderbetrag beträgt 150.000,00 Euro.

---

Wann wird die Förderung ausgezahlt?

---

Auszahlungen an den Antragsteller erfolgen nach Abschluss der Verwendungsnachweisprüfung auf Basis der nachgewiesenen Kosten.

Nach Feststellung der tatsächlich angefallenen Ausgaben im Rahmen des Verwendungsnachweisverfahrens werden Sie über die auszahlende Förderung mit einem Festsetzungsbescheid informiert. Sobald dieser bestandskräftig wurde, werden die Fördermittel auf das von Ihnen angegebene Konto überwiesen.

---

## Fragen zu Modul II

---

Was wird gefördert?

---

Gefördert wird:

- Die konkrete Forschungs- und Entwicklungsarbeit für serielle Sanierungskomponenten (Antragsteller = Hersteller)
- Die erprobende Anwendung von Komponenten der Seriellen Sanierung in Pilotprojekten (Antragsteller = Gebäudeeigentümer)

---

Was ist ein Pilotprojekt?

---

Ein Pilotprojekt der Seriellen Sanierung ist eine individuelle, auf eine konkrete Liegenschaft bezogene Sanierungs- bzw. Modernisierungsmaßnahme, die mindestens alle nachfolgenden Kriterien erfüllt:

- Lösungen sind so zu konzipieren, dass damit gemäß BEG mindestens ein Effizienzhaus/Effizienzgebäude 55 Standard erreicht wird oder mindestens die BEG-Anforderungen (Technische Mindestanforderungen) für die entsprechenden Einzelmaßnahmen erfüllt werden;
- Nutzung von vorgefertigten Dach- und/oder Fassadenelementen aus industrieller Vorfertigung;
- Nutzung von vormontierten Gebäudetechnikmodulen aus industrieller Fertigung, die als sog. „Plug-and-Play“-Lösungen einfach in den Gesamtprozess integriert werden können;
- Konzept zu Energieversorgung und Optimierung des Heizungsverteilsystems der sanierten Gebäude, auch unter Einbindung der selbst erzeugten erneuerbaren Energie (Wärme und/oder Strom, inkl. Speichermöglichkeiten), inkl. Nutzung von vorhandenen Energie-/Wärmeversorgungspotentialen, auch von Quartiers- und/oder Wärmenetzinfrastrukturen;

- Konzept für minimalinvasiven Bauablauf (z. B. Realisierung ohne temporären Auszug der Bewohner, bzw. im laufenden Betrieb);
- Nutzung von Dach- und/oder Fassadenflächen für Eigenwärme- und/oder Eigenstromversorgung (Solar- und/oder Photovoltaik (PV)-Module) des Gebäudes oder Quartiers;
- Ausstattung der sanierten Gebäude mit digitaler und vernetzter Mess-, Steuer- und Regelungstechnik (MSR), die eine Optimierung der Betriebsphase und ein Energie-Monitoring erlaubt (inkl. Monitoring-Konzept).

---

Welche Voraussetzungen sind zu erfüllen?

---

Voraussetzung für die Förderung in Modul II ist

- der Nachweis von der technischen und rechtlichen Umsetzbarkeit durch die vorherige Durchführung einer Durchführbarkeits- bzw. Machbarkeitsstudie entsprechend Modul I

oder

- ein mindestens gleichwertiger Nachweis der technischen und rechtlichen Umsetzbarkeit, welcher die Anforderungen an eine Durchführbarkeitsstudie erfüllt.

---

Welche Unterlagen sind mit dem Antrag einzureichen?

---

Anträge auf die Förderung der Entwicklung und Erprobung serieller Sanierungskomponenten für individuelle Pilotprojekte umfassen folgende Unterlagen:

- ein vollständig ausgefülltes Antragsformular,
- eine Projektbeschreibung,
- vollständige Durchführbarkeitsstudie bzw. vergleichbare Untersuchungsstudien,
- eine Vorkalkulation auf Kostenbasis
- einen Zeit- und Ressourcenplan.

---

Was ist eine Vorkalkulation auf Kostenbasis?

---

Im Rahmen der Antragstellung sind die erwarteten Kosten in einer Vorkalkulation aufzustellen, welche einerseits die förderfähigen Kosten, und andererseits die Finanzierung in Teilkomponenten aufschlüsselt. Generell ist eine Kostenrechnung zu führen, die geeignet ist, die förderfähigen Kosten des beantragten Vorhabens separiert von anderen Kosten zu erfassen.

Die obligatorische Vorkalkulation besteht gemäß Nr. 1.2.1 ANBest-P-Kosten aus zwei Teilen:



- einer aufgegliederten Berechnung der voraussichtlichen mit demwendungszweck zusammenhängenden Kosten und
- einer Übersicht über die beabsichtigte Finanzierung dieser Kosten.

Bitte verwenden Sie im Rahmen der Antragstellung das vom BAFA zur Verfügung gestellte Muster der Vorkalkulation.

---

Was ist der Zeit- und Ressourcenplan?

---

Im Zeit- und Ressourcenplan sind alle relevanten Ausführungszeiträume und Meilensteine des Projektes grafisch und tabellarisch darzustellen. Es ist darauf einzugehen, wann welche Ressourcen (personelle sowie finanzielle) für das Projekt benötigt werden.

---

Welche Kosten sind förderfähig?

---

- Personalkosten: Kosten für Forscher, Techniker und sonstiges Personal, soweit diese für das Vorhaben eingesetzt werden;
- Kosten für Instrumente und Ausrüstung, soweit und solange sie für das Vorhaben genutzt werden. Wenn diese Instrumente und Ausrüstungen nicht während ihrer gesamten Lebensdauer für das Vorhaben verwendet werden, gilt nur die nach den Grundsätzen ordnungsgemäßer Buchführung ermittelte Wertminderung während der Dauer des Vorhabens als beihilfefähig;
- Kosten für Gebäude, soweit und solange sie für das Vorhaben genutzt werden. Bei Gebäuden gilt nur die nach den Grundsätzen ordnungsgemäßer Buchführung ermittelte Wertminderung während der Dauer des Vorhabens als beihilfefähig;
- Kosten für Auftragsforschung, Wissen und für von Dritten direkt oder in Lizenz erworbene Patente sowie Kosten für Beratung und gleichwertige Dienstleistungen, die ausschließlich für das Vorhaben genutzt werden;
- sonstige Betriebskosten (unter anderem für Material, Bedarfsartikel und dergleichen), die unmittelbar durch das Vorhaben entstehen.

Die Kosten müssen dabei einen direkten Vorhabenbezug aufweisen und zwingend für die Entwicklung der Komponenten der Seriellen Sanierung erforderlich sein.

---

Welche Kosten sind nicht förderfähig?

---

- Investitionen in Gebäude und technische Anlagen, soweit diese nicht zur Durchführung der Maßnahme zwingend erforderlich sind;
- Grunderwerbskosten einschließlich Nebenkosten;
- Investitionen in Öl-Heizkessel, Kohleheizungen, Nachtstromspeicherheizungen sowie Einzelfeuerstätten (Kamine, Kachelöfen, Kaminöfen, etc.) sowie darauf basierenden Konzepte;

- Kosten für routinemäßige oder regelmäßige Änderungen an bestehenden Produkten, Produktionslinien, Produktionsverfahren, Dienstleistungen oder anderen laufenden betrieblichen Prozessen, selbst wenn diese Änderungen bzw. Verbesserungen darstellen sollten;
- eine Mehrfachförderung der gleichen Maßnahmen bei Zulieferern, Generalübernehmern.

---

Wie hoch ist die Förderung?

---

Die Grundförderung beträgt für die Entwicklung und Erprobung serieller Sanierungskomponenten für individuelle Pilotprojekte als experimentelle Entwicklungsvorhaben 25 % der förderfähigen Kosten, bei KMU-Antragstellern bis zu 35 %.

Die Grundförderung kann sich um einen Bonus von 15 % erhöhen. Details dazu finden Sie in unserem Merkblatt zu Modul II. Die maximale Förderquote nach Artikel 25 AGVO beträgt insgesamt 40 % bzw. für KMU 50 % der förderfähigen Kosten.

---

Sind BHKW förderfähig?

---

BHKW sind im Rahmen eines Pilotprojektes grundsätzlich förderfähig, allerdings besteht ein Kumulierungsverbot, wenn die Anlage im Rahmen der Bundesförderung für effiziente Gebäude (BEG) bezuschusst wird.

---

Wann wird die Förderung ausgezahlt?

---

Auszahlungen an den Antragsteller erfolgen nach Abschluss der Verwendungsnachweisprüfung auf Basis der nachgewiesenen Kosten.

Nach Feststellung der tatsächlich angefallenen Ausgaben im Rahmen des Verwendungsnachweisverfahrens werden Sie über die auszahlende Förderung mit einem Festsetzungsbescheid informiert. Sobald dieser bestandskräftig wurde, werden die Fördermittel auf das von Ihnen angegebene Konto überwiesen.

In Modul II gilt die Pflicht der Vorlage eines Zwischennachweises, sofern die Umsetzung der Maßnahmen länger als ein Jahr dauert. In diesen Fällen kann nach einem Jahr erstmal nur der Förderbetrag auf die bis dato angefallenen Kosten ausgezahlt werden.

---

## Fragen zu Modul III

---

Was wird gefördert?

---

Gefördert wird der Aufbau von Produktionskapazitäten zur industriellen Herstellung von

Fassaden- und Dachelementen und damit verbundener Anlagen- und Gebäudetechnik, welche als Komponenten die Definitionen der Seriellen Sanierung erfüllen.

Als Aufbau von Produktionskapazitäten gilt

- die Errichtung einer neuen Betriebs-/Produktionsstätte,
- die Erweiterung einer bestehenden Betriebsstätte oder
- die Anpassung einer Betriebsstätte an neue Produkte.

---

Welche Unterlagen sind mit dem Antrag einzureichen?

---

Anträge auf Förderung des Aufbaus von Produktionskapazitäten serieller Sanierungskomponenten umfassen folgende Unterlagen:

- ein vollständig ausgefülltes Antragsformular,
- eine Projektbeschreibung,
- eine Vorkalkulation auf Kostenbasis und
- einen Zeit- und Ressourcenplan.

---

Was ist eine Projektbeschreibung?

---

Die Projektbeschreibung ist eine Kurzbeschreibung des Vorhabens und sollte auf 10 DIN-A4 Seiten begrenzt sein. Sie soll Aufschluss darüber geben, welche Investitionen zum Aufbau von Produktionskapazitäten serieller Sanierungskomponenten unternommen werden und in welchem Zeitraum diese durchgeführt und abgeschlossen sein sollen.

Die Projektbeschreibung soll folgende Themen grob skizzieren:

- Lage/Standort der Betriebs-/Produktionsstätte
- Art der Investition (Errichtung/Erweiterung/Diversifizierung/grundlegenden Änderung des gesamten Produktionsprozesses einer bestehenden Betriebsstätte/Erwerb der Vermögenswerte einer Betriebsstätte)
- Zeitplanung

Bereits vorliegende Unterlagen der Vorplanung sind der Projektbeschreibung beizulegen.

---

Was ist eine Vorkalkulation auf Kostenbasis?

---

Im Rahmen der Antragstellung sind die erwarteten Kosten in einer Vorkalkulation aufzustellen, welche einerseits die förderfähigen Kosten, und andererseits die Finanzierung in Teilkomponenten aufschlüsselt. Generell ist eine Kostenrechnung zu führen, die geeignet ist, die förderfähigen Kosten des beantragten Vorhabens separiert von anderen Kosten zu

erfassen.

Die obligatorische Vorkalkulation besteht gemäß Nr. 1.2.1 ANBest-P-Kosten aus zwei Teilen:

- einer aufgegliederten Berechnung der voraussichtlichen mit dem Verwendungszweck zusammenhängenden Kosten und
- einer Übersicht über die beabsichtigte Finanzierung dieser Kosten.

Bitte verwenden Sie im Rahmen der Antragstellung das vom BAFA zur Verfügung gestellte Muster der Vorkalkulation.

---

Was ist der Zeit- und Ressourcenplan?

---

Im Zeit- und Ressourcenplan sind alle relevanten Ausführungszeiträume und Meilensteine des Projektes grafisch und tabellarisch darzustellen. Es ist darauf einzugehen, wann welche Ressourcen (personelle sowie finanzielle) für das Projekt benötigt werden.

---

Welche Kosten sind förderfähig?

---

- Eine Investition in materielle und/oder immaterielle Vermögenswerte zur Errichtung einer neuen Betriebsstätte, zur Erweiterung einer bestehenden Betriebsstätte, zur Diversifizierung der Produktion einer Betriebsstätte durch neue, zusätzliche Produkte oder zu einer grundlegenden Änderung des gesamten Produktionsprozesses einer bestehenden Betriebsstätte oder
- der Erwerb der Vermögenswerte einer Betriebsstätte, sofern folgende Voraussetzungen erfüllt sind:
  - die Betriebsstätte wurde geschlossen oder wäre ohne diesen Erwerb geschlossen worden,
  - die Vermögenswerte werden von Dritten, die in keiner Beziehung zum Käufer stehen, erworben und
  - das Rechtsgeschäft erfolgt zu Marktbedingungen.

---

Welche Kosten sind nicht förderfähig?

---

- Die Erneuerung bereits geförderter Betriebsstätten oder von Betriebsstätten, die bereits Komponenten der Serielles Sanierung herstellen
  - Die Grunderwerbskosten einschließlich Nebenkosten, Personalkosten für die Errichtung und den Betrieb der Betriebsstätte, Betriebsstoffe sowie Betriebs- und Geschäftsausstattung, welche für die in 1. und 2. genannten Fördergegenstände nicht notwendig ist, wie bspw. Kosten für eine Kantine.
-

Wie hoch ist die Förderung?

---

Die Förderung beträgt für kleine Unternehmen 20 % und bei mittleren Unternehmen 10 % der förderfähigen Kosten. Die Kosten für ein Förderprojekt sind bis zu 10 Mio. Euro förderfähig. Der maximale Förderbetrag bei kleinen Unternehmen beträgt somit zwei Mio. Euro, bei mittleren Unternehmen 1 Mio. Euro.

---

Wann wird die Förderung ausgezahlt?

---

Auszahlungen an den Antragsteller erfolgen nach Abschluss der Verwendungsnachweisprüfung auf Basis der nachgewiesenen Kosten.

Nach Feststellung der tatsächlich angefallenen Ausgaben im Rahmen des Verwendungsnachweisverfahrens werden Sie über die auszahlende Förderung mit einem Festsetzungsbescheid informiert. Sobald dieser bestandskräftig wurde, werden die Fördermittel auf das von Ihnen angegebene Konto überwiesen.

In Modul III gilt die Pflicht der Vorlage eines Zwischennachweises, sofern die Umsetzung der Maßnahmen länger als ein Jahr dauert. In diesen Fällen kann nach einem Jahr nur der Förderbetrag auf die bis dato angefallenen Kosten ausgezahlt werden.

---

## Formulare

[Antrag auf Förderung einer Durchführbarkeitsstudie – Modul 1](#)

[Kostenkalkulation Modul 1 – Durchführbarkeitsstudien \(XLSX, 39KB, Datei ist nicht barrierefrei\)](#)

[Upload-Bereich](#)

---

[Antrag auf Förderung von Entwicklung und Erprobung serieller Sanierungskomponenten für individuelle Pilotprojekte – Modul 2](#)

[Kostenkalkulation Modul 2: Entwicklung und Erprobung serieller Sanierungskomponenten \(XLSX, 46KB, Datei ist nicht barrierefrei\)](#)

[Kostenkalkulation Modul 2: Erprobung serieller Sanierungskomponenten für Pilotprojekte \(XLSX, 37KB, Datei ist nicht barrierefrei\)](#)

[Upload-Bereich](#)

---

[Antrag auf ergänzende Investitionsbeihilfen zum Aufbau von Produktionskapazitäten serieller Sanierungskomponenten – Modul 3](#)

[Kostenkalkulation Modul 3: Ergänzende Investitionsbeihilfen zum Aufbau von Produktionskapazitäten serieller Sanierungskomponenten \(XLSX, 46KB, Datei ist nicht barrierefrei\)](#)

[Upload-Bereich](#)

---

## Informationen zum Thema

[Merkblatt Modul 1 – Durchführbarkeitsstudien \(Stand: 22.06.2021\) \(PDF, 263KB, Datei ist nicht barrierefrei\)](#)

[Merkblatt Modul 2 – Entwicklung und Erprobung serieller Sanierungskomponenten für individuelle Pilotprojekte \(Stand: 22.06.2021\) \(PDF, 293KB, Datei ist nicht barrierefrei\)](#)

[Merkblatt Modul 3 – Investitionsbeihilfen \(Stand: 07.05.2021\) \(PDF, 216KB, Datei ist nicht barrierefrei\)](#)

---

[Richtlinie für die Förderung von Pilotprojekten der Seriellen Sanierung und flankierenden Maßnahmen \(Bundesförderung Serielle Sanierung\) \(Fundstelle: \[BAnz AT 07.05.2021 B1\]\(#\)\)](#)

[Allgemeine Gruppenfreistellungsverordnung \(AGVO\)](#)

[Allgemeine Nebenbestimmungen für Zuwendungen zur Projektförderung auf Kostenbasis \(ANBest-P-Kosten\)](#)

[Bundshaushaltsordnung \(BHO\)](#)

[Allgemeine Nebenbestimmungen für Zuwendungen zur Projektförderung an Gebietskörperschaften und Zusammenschlüsse von Gebietskörperschaften \(ANBest-Gk\)](#)

---

[Empfehlung der Kommission betreffend die Definition der Kleinstunternehmen sowie der kleinen und mittleren Unternehmen](#)

[Richtlinie für die Bundesförderung für effiziente Gebäude – Einzelmaßnahmen \(BEG EM\) vom 20. Mai 2021 \(Fundstelle: \[BAnz AT 07.06.2021 B2\]\(#\)\)](#)

[Gesetz zur Einsparung von Energie und zur Nutzung erneuerbarer Energien zur Wärme- und Kälteerzeugung in Gebäuden \(Gebäudeenergiegesetz - GEG\)](#)

---

## Kontakt

---

## Bundesförderung Seriellles Sanieren

Bundesamt für Wirtschaft und Ausfuhrkontrolle  
Referat 514 – Energieaudit, Wärmenetze, Einsparzähler  
Frankfurter Straße 29 – 35  
65760 Eschborn

### Erreichbarkeit

Montag bis Donnerstag: 08:30 Uhr – 16:00 Uhr  
Freitag: 08:30 Uhr – 15:00 Uhr

[Zum Kontaktformular](#)

---

---

Sie sind hier: [Startseite](#) > [Energie](#) > [Energieeffizienz](#)  
> [Seriellles Sanieren](#)

---

---

© 2021 Bundesamt für Wirtschaft und Ausfuhrkontrolle



Soweit nicht anders gekennzeichnet, stehen unsere Texte auf dieser Seite unter einer

Creative Commons

Namensnennung - Keine Bearbeitung 3.0 Deutschland Lizenz.



# LEITVISION FÜR DIE C2C MODELLGEMEINDE STRAUBENHARDT



STRAUBENHARDT



**NETZWERK  
CRADLE TO CRADLE  
REGIONEN**

Kommunen der Zukunft gestalten



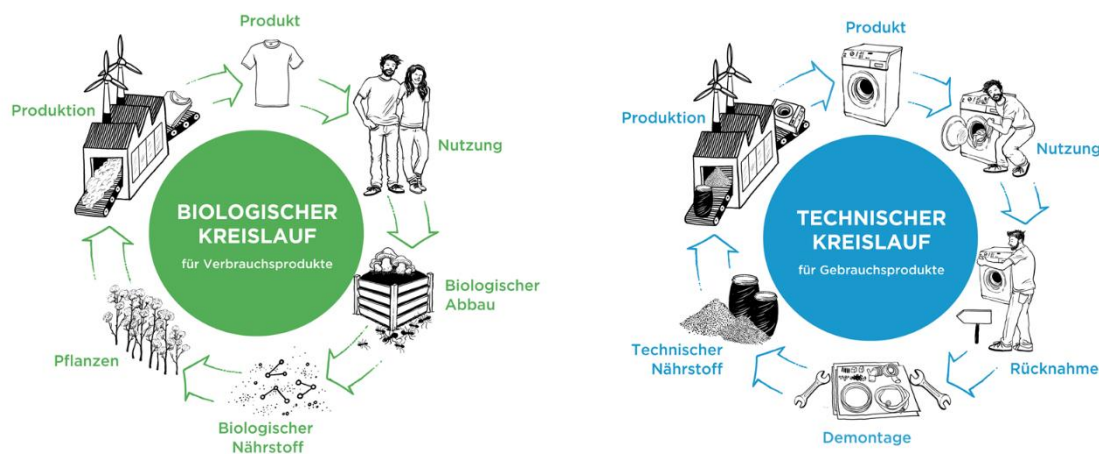
# Cradle to Cradle

## – Kurz gesagt

Cradle to Cradle, kurz C2C, ist ein umfassendes ökologisches Konzept zur Schaffung **endloser Materialkreisläufe** — von der Wiege zur Wiege. Nach dem Vorbild der Natur gelten für uns alle Verbrauchsmaterialien als Nährstoffe der Biosphäre. Sämtliche Gebrauchsmaterialien der Technosphäre können in **gleichbleibender Qualität** wiederverwendet werden — so wird „Müll“ zum Fremdwort. Mit C2C können wir Menschen ein gutes Leben führen und zugleich **Nützlinge für das Ökosystem Erde** sein.

Unsere **C2C DENKSCHULE** vermittelt ein positives Menschenbild: Als Teil der Natur sind wir Nützlinge und hinterlassen einen positiven Fußabdruck. Umdenken und neue Pfade beschreiten — wir Menschen haben das Potenzial dafür.

Unser **C2C DESIGNKONZEPT** basiert auf den drei Prinzipien **Nährstoff bleibt Nährstoff – regenerative Energie – Vielfalt gestalten**. Für jedes Produkt und jede Dienstleistung definieren wir passende Nutzungsszenarien. Erst dann können gesunde und geeignete Materialien ausgewählt werden, die in biologischen und technischen Kreisläufen kontinuierlich zirkulieren.



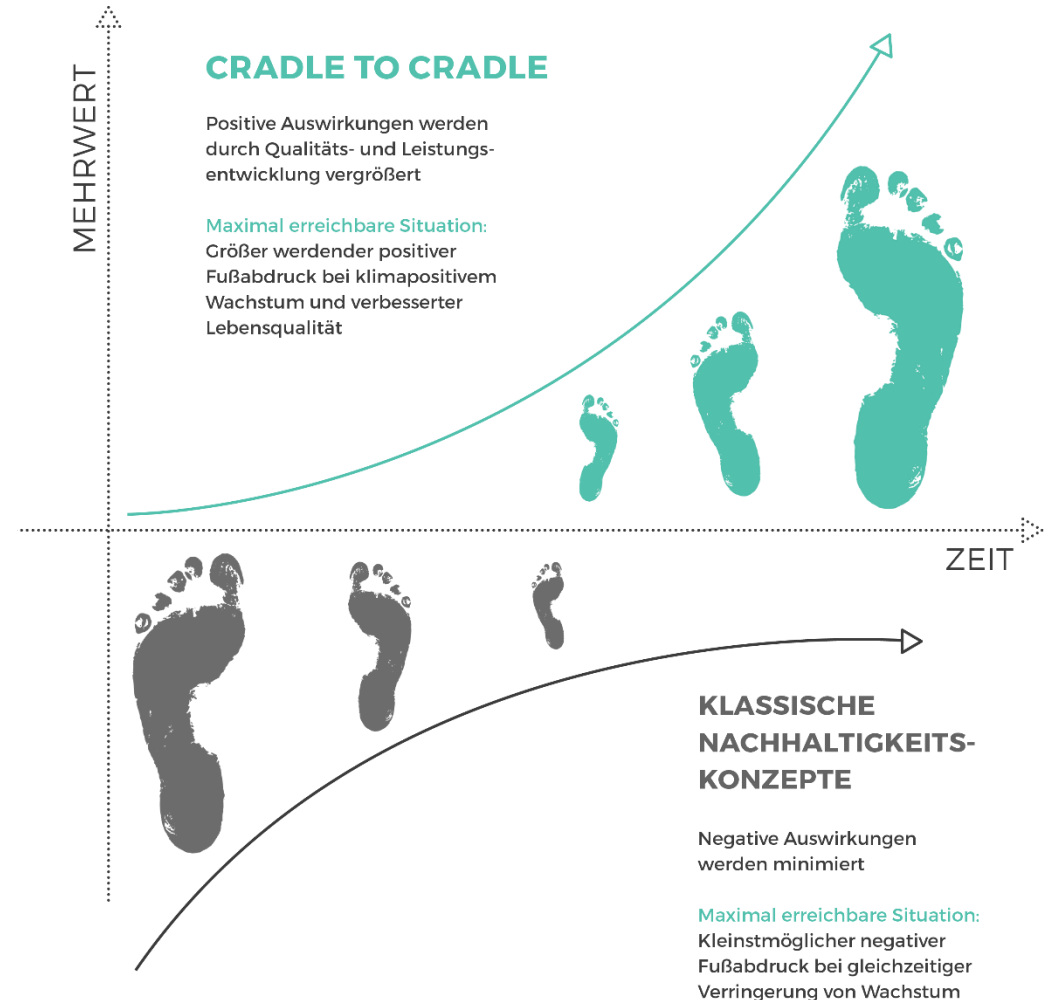

CRADLE TO CRADLE  
 NGO

[www.c2c.ngo](http://www.c2c.ngo)

[www.c2c-regionen.org](http://www.c2c-regionen.org)

# Gemeinde mit Zukunft

Straubenhardt möchte zeigen, dass eine **innovative und gesunde Wirtschaftsweise** in Partnerschaft mit der Natur möglich und erstrebenswert ist. Deshalb hat der Gemeinderat beschlossen, als positives Beispiel voran zu gehen und **die erste Cradle to Cradle (kurz: C2C)-Modellgemeinde Baden-Württembergs** zu werden. Als Vorreiter ist Straubenhardt Teil des „Netzwerk C2C Regionen. Kommunen der Zukunft gestalten“ und steht darüber im Austausch mit anderen Kommunen und C2C-Akteuren, die C2C im kommunalen Kontext aktiv umsetzen wollen. So kann die Gemeinde erheblichen Beitrag zur **nachhaltigen Entwicklung** des Enzkreises im Sinne der Agenda 2030 der Vereinten Nationen leisten. Die folgende Vision beschreibt, wie Straubenhardt im Jahr 2035 aussehen kann. Der Gemeinderat wird die hier festgelegten Ziele bei Entscheidungen mitberücksichtigen, denn C2C kann an vielfältigen Stellen **sozial-ökologische Transformationen** vom Kleinen in die Welt bewirken und zu einer nachhaltigen Entwicklung des Enzkreises beitragen.



## Bildung & Soziales

Die Gemeinde Straubenhardt versteht sich als **Reallabor für C2C-inspirierte Projekte** und so sollen Entwicklungen und Maßnahmen im Idealfall wissenschaftlich begleitet und öffentlich wirksam dokumentiert werden. Zur Förderung des Umweltbewusstseins der Bürger\*innen Straubenhardts richtet die Gemeinde **Bildungsangebote** für alle Bevölkerungsgruppen ein. Eine erfolgreiche Transformation kann nur gelingen, wenn die jeweiligen Maßnahmen **im Einklang** mit den Bedürfnissen aller Bürger\*innen sind. Deshalb werden zusätzlich Formate zur **Bürger\*innenbeteiligung** organisiert und Entwicklungskonzepte gemeinsam erarbeitet. Auch wird großer Wert auf die Kooperation mit lokalen Firmen, Landwirt\*innen und Vereinen gelegt.

„**Vielfalt feiern**“ bedeutet in Straubenhardt, auch auf Inklusion und Integration zu bauen und alle Menschen an der Gesellschaft teilhaben zu lassen. So ist in Straubenhardt 2035 **Barrierefreiheit** selbstverständlich und Selbstständigkeit im Alter wird durch neue Wohnkonzepte aktiv gefördert. Auch wird durch gezielte Maßnahmen langzeitarbeitslosen Menschen der Arbeitseinstieg erleichtert.

## Verantwortung & Nahrungsmittelproduktion

Die **Vielfalt der Natur** wird für ein intelligentes Zusammenwirken zwischen Pflanzen- und Tierarten genutzt und damit der Ertrag gesteigert. Die lokale Landwirtschaft fördert diese Vielfalt, hält natürliche Stoffkreisläufe intakt, den Boden fruchtbar und das Wasser trinkbar.

Als Teil **der Bio-Musterregion Enzkreis** möchte die Gemeinde die Vorteile einer vielfältigen und **ökologischen Landwirtschaft** für Verbraucher\*innen und Landwirt\*innen deutlich machen. Gemeinsam werden Strategien für die Zukunft entwickelt und die direkten Beziehungen zwischen Verbraucher\*innen und Landwirt\*innen gestärkt.

In diesem Leitmotiv nehmen wir auch Bezug auf die 17 Ziele für Nachhaltige Entwicklung der Vereinten Nationen.



## Umwelt & Gesundheit

2035 wird Strom und Wärme in Straubenhardt zu **100% aus erneuerbaren Energien** bezogen. Langfristiges Ziel ist es, **klimapositiv** zu sein, also weiterhin mehr sauberen Strom und 2035 auch mehr Wärme in Straubenhardt zu produzieren als verbraucht wird.

Straubenhardt setzt sich für **sauberes Grundwasser** ein und fördert zirkuläres, dezentrales Wassermanagement bei neuen Bauvorhaben und Bestandssanierungen. Die konsequente Kreislaufführung von Materialien und eine vielfältige Landwirtschaft verhindern Einträge von Schadstoffen in heimische Gewässer.

**Das Wiederverwerten und Wiederverwenden** steht im Fokus **der lokalen Abfallwirtschaft** im Enzkreis. Abfall wird nicht mehr zwecks Energiegewinnung verbrannt, sondern wird konsequent getrennt und verarbeitet.

Gesunde Materialien in der **öffentlichen Beschaffung**, eine artenreiche Natur, saubere Mobilität und die Nutzung erneuerbarer Energien sorgen in Straubenhardt für **eine gesunde Umgebung für alle Bürger\*innen**.

## Nachhaltige Mobilität & Infrastruktur

Straubenhardt sieht sich als Labor für **klimapositive Mobilität** im ländlichen Raum, indem gemeinsam mit Bürger\*innen neue Lösungen getestet werden. Im Jahr 2035 gibt es neben dem Automobil viele attraktive und saubere Alternativen, wodurch nicht jeder Haushalt auf ein eigenes Auto angewiesen ist. So wird Fahrradfahren sicher durch entsprechende Infrastruktur und attraktiv für die gesamte Familie, Lastenräder und Car-Sharing Fahrzeuge stehen für die gemeinsame Nutzung zur Verfügung und der ÖPNV ist ausgebaut.



## Wirtschaft, Arbeiten und Wohnen

2035 ist Straubenhardt eine **Innovationsplattform** für Cradle to Cradle und lokale Unternehmen kennen finanzielle und ökologische Vorteile einer C2C-inspirierten Wirtschaftsweise. Mit dem Bauprojekt Mostklinge entsteht in der Gemeinde eine neue innovative Ortsmitte. Zudem ist ein C2C-Gewerbegebiet angedacht, das als attraktiver Standort weitere C2C-Unternehmen nach Straubenhardt lockt.

Weiterhin fördert Straubenhardt auch im Jahr 2035 in Zusammenarbeit mit den beteiligten Unternehmen aktiv eine C2C-inspirierte Wirtschaftsweise und Infrastruktur, die das **Zirkulieren von Materialien und das Schließen von Stoffkreisläufen ermöglicht**. Als erster Schritt auf diesem Weg wird die kommunale Beschaffung nach C2C-Kriterien ausgerichtet.

2035 sind C2C-Kriterien baurechtlich verankert und Neubauten sowie Sanierungen werden unter Berücksichtigung dessen durchgeführt. Die Gebäude können selbst Energie erzeugen, nutzen Wasser in geschlossenen Kreisläufen und Biodiversität wird aktiv, etwa durch Begrünungen, gefördert. Die verwendeten Materialien sind gesund und die Gebäude sind nach langjähriger Nutzung wieder rückbaubar.

Die Nutzung von Flächen wird in Straubenhardt neu gedacht: Eine Fläche soll so genutzt werden, dass vielfältige Funktionsmöglichkeiten parallel ausgeschöpft werden, wie etwa Wohnen, Arbeiten, Erholung, Natur, Transport, Nahrungsmittelproduktion und gesellschaftliche Teilhabe. So kann auch der **Flächenverbrauch der Gemeinde reduziert werden**.

Für die Bürger\*innen von Straubenhardt gibt es im Jahr 2035 **C2C-Förderung und Beratung**, damit auch Firmen und Privatpersonen moderne, gesunde und kreislauffähige Gebäude bauen können.





# Mit positivem Fußabdruck voran!

Schon heute ist Cradle to Cradle in Straubenhardt gelebte Realität. Hier vor unseren Haustüren können wir etwas verändern! Wir gehen im Jahr 2035 in Straubenhardt mit einem **positiven Fußabdruck** voran und setzen uns heute ehrgeizige Ziele, um im in einem **zukunftsfähigen und resilienten Straubenhardt** mit gesunden und zufriedenen Bürger\*innen zu leben. Wir setzen in Baden-Württemberg die Messlatte für eine **sozial-ökologische Transformation** und schaffen mit C2C eine gesunde Lebensgrundlage für die jetzige und künftige Generationen. Immer mehr Gemeinden schließen sich uns als C2C Modellregionen an und werden Teil des wachsenden **C2C Netzwerks**. Gemeinsam entwickeln wir neue Ideen und Visionen – und wer weiß, wo wir in 50 Jahren stehen? Vielleicht in einer Cradle to Cradle Welt...



## Anlage 38

📅 19. Dezember 2019

# aus 6 mach 1: Die Gründe

Fortsetzung der Inforeihe zum Feuerwehrhaus

Eine Feuerwehrabteilung in jedem Ortsteil? Nach über 40 Jahren war das nicht mehr zeitgemäß. Warum der Neubau eines zentralen Straubenhardter Feuerwehrhauses notwendig wurde, welche Alternativen und Vorgaben es gab und ob die Feuerwehrangehörigen für eine Fusion waren, erklärt Feuerwehrkommandant Martin Irion.

### Fehlende Tagesverfügbarkeit

Die Straubenhardter Verwaltung wurde in den Jahren nach der Gemeindereform 1973 auf drei Häuser reduziert, bei der Freiwilligen Feuerwehr Straubenhardt blieben die sechs Abteilungen lange bestehen – jede mit seinem Team und Haus. Die Gebäude kamen in die Jahre, entsprachen in Größe und Ausstattung nicht mehr den heutigen Anforderungen. Der Raumbedarf, die Größe der Stellplätze, vieles hat sich massiv geändert. Ein Anbau wäre nur in Langenalb möglich gewesen, an allen anderen Standorten wäre dafür kein Platz gewesen. Vor allem aber gab es immer mehr Engpässe beim Personal. Die Tagesverfügbarkeit der Feuerwehrleute war seit 2001 nicht mehr gewährleistet, auch nicht nachts und während des Wochenendes. Viele müssen zu ihren Arbeitsplätzen außerhalb der Gemeinde pendeln, zudem machte sich der demografische Wandel




In unserer Inforeihe informieren wir über das Projekt Feuerwehrhaus, im Teil 3 geht es darum, was dazu geführt hat. Fotos: Gemeinde



Feuerwehrleute war seit 2001 nicht mehr gewährleistet, auch nicht nachts und während des Wochenendes. Viele müssen zu ihren Arbeitsplätzen außerhalb der Gemeinde pendeln, zudem machte sich der demografische Wandel bemerkbar. „Wir haben das mehrere Jahre durch eine parallele Alarmierung von Einsatzabteilungen kompensiert“, sagt Irion. Doch dann stand die Beschaffung neuer Feuerwehrfahrzeuge an, ebenso die Sanierung der Gebäude.







*Feuerwehrkommandant Martin Irion vor dem Banner zum Bauprojekt, das durch die Gemeinde wandert und zurzeit in Schwann steht.*

## **Unzeitgemäße Ausstattung**

Vier von sechs Löschfahrzeugen seien über 20 Jahre alt. Ersatzteile zu bekommen, wurde immer schwieriger. Es hätte enorm in die Technik der einzelnen Abteilungen investiert werden müssen. Im Rahmen der Feuerwehrbedarfsplanung ist die Feuerwehr daher 2014 auf Gemeinde und Gemeinderat zugegangen. In den Abteilungen hatte es Workshops gegeben, bei denen etwa Vor- und Nachteile einer Zusammenlegung überlegt wurden. 90 Prozent der Feuerwehrangehörigen hätten sich dabei für eine zukunftsweisende Strukturänderung ausgesprochen. Ein Jahr später wurde diese beschlossen. „Durch die Fusion kann zum Beispiel auf Fahrzeuge verzichtet werden“, erklärt der Kommandant. So gebe es künftig drei Löschfahrzeuge an einem Standort – zwei werden mitgenommen, ein neues wurde beschafft, vier fallen weg. Der Mehrwert: „Im Gesamtkonzept ergeben sich Synergien“, sagt Irion. Das neue Fahrzeug biete mit 14 Tonnen (statt bisher 7,5 Tonnen) mehr Equipment. So könne etwa mehr Löschwasser und Schlauchmaterial mitgeführt werden. Was das Personal betrifft, wird es künftig eine schlagkräftige Einsatzabteilung geben, zudem eine Jugend-, Alters- und Musikabteilung.

## **Einhalten der Zehn-Minuten-Frist**

Um das neue Feuerwehrhaus auf den Weg zu bringen, waren viele Vorgaben zu erfüllen. Ein geeigneter Standort musste ermittelt, der 100-seitige Feuerwehrbedarfsplan verabschiedet und die Zustimmung des Landratsamtes als Fachaufsicht für das Feuerwehrwesen eingeholt werden. Auch Förderanträge mussten gestellt, ein Ingenieurbüro beauftragt und eine Baukommission mit Vertretern der Gemeinde, Feuerwehr und des Gemeinderats gebildet werden.

Entscheidend für die Wahl des Standorts an der Langenalber Straße war etwa die Zehn-Minuten-Frist, die das Eintreffen der Wehr von der Alarmierung bis zum Einleiten der ersten Maßnahmen meint. Diese werde dort als „realistisch erreichbar“ erfüllt. Zur „Leistungsfähigkeit einer Feuerwehr“, die der Landesfeuerwehrverband und das Innenministerium 2008 festgelegt haben, gehören drei Faktoren: die besagte Eintreffzeit von zehn Minuten, die Einsatzkräfte und die Einsatzmittel, sprich Personal und Fahrzeuge mit entsprechender Ausbildung und

sich Synergien“, sagt Irion. Das neue Fahrzeug biete mit 14 Tonnen (statt bisher 7,5 Tonnen) mehr Equipment. So könne etwa mehr Löschwasser und Schlauchmaterial mitgeführt werden. Was das Personal betrifft, wird es künftig eine schlagkräftige Einsatzabteilung geben, zudem eine Jugend-, Alters- und Musikabteilung.

### **Einhalten der Zehn-Minuten-Frist**

Um das neue Feuerwehrhaus auf den Weg zu bringen, waren viele Vorgaben zu erfüllen. Ein geeigneter Standort musste ermittelt, der 100-seitige Feuerwehrbedarfsplan verabschiedet und die Zustimmung des Landratsamtes als Fachaufsicht für das Feuerwehrwesen eingeholt werden. Auch Förderanträge mussten gestellt, ein Ingenieurbüro beauftragt und eine Baukommission mit Vertretern der Gemeinde, Feuerwehr und des Gemeinderats gebildet werden.

Entscheidend für die Wahl des Standorts an der Langenalber Straße war etwa die Zehn-Minuten-Frist, die das Eintreffen der Wehr von der Alarmierung bis zum Einleiten der ersten Maßnahmen meint. Diese werde dort als „realistisch erreichbar“ erfüllt. Zur „Leistungsfähigkeit einer Feuerwehr“, die der Landesfeuerwehrverband und das Innenministerium 2008 festgelegt haben, gehören drei Faktoren: die besagte Eintreffzeit von zehn Minuten, die Einsatzkräfte und die Einsatzmittel, sprich Personal und Fahrzeuge mit entsprechender Ausbildung und Ausrüstung. „Alle drei Bemessungswerte müssen gleichzeitig erfüllt sein, um dem Begriff ‚leistungsfähig‘ gerecht zu werden“, heißt es in den Grundlagen.

## **aus 6 mach 1: Die Inforeihe zum Projekt Feuerwehrhaus**

Wer an der Langenalber Straße in Straubenhardt vorbeikommt ahnt, dass hier etwas Großes entsteht. Die Bauarbeiten für das neue Feuerwehrhaus sind in vollem Gange, die [Grundsteinlegung](#) wurde mit großem Interesse verfolgt. Alle sechs Abteilungen der Feuerwehr werden dort künftig ihr Domizil finden. In einem Gebäude, das technisch und nachhaltig auf dem neusten Stand stehen wird. Doch warum ist dieser Bau überhaupt notwendig? Wie soll das Haus aussehen? Und wie kommt es der Bevölkerung zugute? Solche und andere brennende Fragen stellen und beantworten wir in unserer neuen Inforeihe, die in unregelmäßigen Abständen im Mitteilungsblatt und auf der Homepage [www.straubenhardt.de](http://www.straubenhardt.de) veröffentlicht wird. Verschiedene Gesprächspartner werden darin zu Wort kommen und Hintergründe sowie Wissenswertes zum Bauprozess aufdecken.

## Anlage 39

📅 29. April 2020

# aus 6 mach 1: Das Konzept (II)

Fortsetzung der Inforeihe zum Projekt Feuerwehrhaus (Teil 5)

Das Leben auf der Baustelle steht nicht still. Wenn auch die Arbeiten Corona-bedingt etwas stocken, so hat sich in den vergangenen zwei Monaten etwas getan. Wir möchten daher unsere Inforeihe fortsetzen – mit dem zweiten Teil des Interviews mit Architekt Ingmar Menzer zum Konzept und Thema Cradle to Cradle.

**Kreislauffähiges Bauen, was sind die Voraussetzungen, was muss beachtet werden?**

Cradle to Cradle (C2C) ist das Gesamtkonzept für ein nachhaltiges Gebäude. Alle verwendeten Materialien und Produkte können gänzlich und ohne Rückstände in biologische oder technische Kreisläufe zurückgeführt werden – sollte das Gebäude einmal rückgebaut werden. Die Herausforderung beginnt also bereits bei der Planung und der Entscheidung der zu verwendenden Baustoffe. Wir lassen uns zum Thema C2C von dem Stuttgarter Büro Drees & Sommer beraten, das unter anderem die Materialpässe für das Gebäude erstellt. Diese geben detailliert Auskunft darüber, welche Materialien verbaut wurden.



Im Teil 5 unserer Inforeihe zum Feuerwehrhaus gibt Architekt Ingmar Menzer weiter Antworten auf Fragen zum Konzept.  
Fotos: Gemeinde



Sommer beraten, das unter anderem die Materialpässe für das Gebäude erstellt. Diese geben detailliert Auskunft darüber, welche Materialien verbaut wurden.

### **Ist es schwierig, das „Cradle to Cradle“-Prinzip in die Realität umzusetzen?**

Es ist eher ungewohnt, weil man bislang eine andere Bauweise gewohnt war. Im Moment müssen wir noch nach vielen Materialien suchen. Aber einige Hersteller haben den Bedarf an solchen Materialien erkannt und bieten inzwischen Produkte an, die einen Recyclinganteil aufweisen oder aber später rezyklierbar sind. Je mehr Projektbeteiligte für Rezyklierbarkeit und Materialkreisläufe sensibilisiert sind und sich dafür begeistern, desto besser und reibungsloser wird uns auch die Umsetzung gelingen. Es wird irgendwann kaum mehr gesundheitsschädliche Produkte geben. Das ist die Zukunft des Bauens.

### **Wo konkret ist die C2C-Bauweise sichtbar?**

Der Ansatz steckt im ganzen Haus. Zum einen ist die bebaute Grundfläche dank der Nutzung der Hanglage und der Stapelung der Nutzflächen so weit wie möglich minimiert. Zum anderen wird jede Materialentscheidung vor diesem Hintergrund getroffen: Ist es frei von Giftstoffen? Ist es recyclefähig? Wo sind positive Effekte? Der dazu erstellte Materialpass gibt darüber Auskunft, welche Produkte und Materialien verbaut wurden und zählt sämtliche Inhaltsstoffe auf. Ein „gutes“ Haus ist ein Speicher „guter“ Materialien, die auch später wieder weiter verwendet werden können.

### **Welche Materialien werden eingesetzt, welche nicht?**

Wir suchen nach „guten“ Materialien, die zu einem gesunden Raumklima beitragen und unsere Gesundheit nicht beeinträchtigen. Wir suchen nach nachhaltigen Materialien, die sich bei einem Rückbau einfach trennen und danach wieder verwenden lassen. Wir setzen zum Beispiel keine ausdünstenden Farben ein, keine Kunststoffbeschichtungen und Verbundmaterialien. Das ist Sondermüll, den man später nicht mehr trennen kann. Die Bodenplatte in der Fahrzeughalle zum Beispiel ist aus veredeltem Beton – einem homogenen, recyclebaren Material. Wir setzen viel Metall und unbehandeltes Holz ein. Die in das Material geflossene Energie ist auch noch nach Jahren erhalten. Und nutzbar. Zudem realisieren wir eine Dachbegrünung, mit der eine hohe Artenvielfalt erreicht werden soll. Das Regenwasser, das auf dem Grundstück versickert, wird aufgefangen und für

Material. Wir setzen viel Metall und unbehandeltes Holz ein. Die in das Material geflossene Energie ist auch noch nach Jahren erhalten. Und nutzbar. Zudem realisieren wir eine Dachbegrünung, mit der eine hohe Artenvielfalt erreicht werden soll. Das Regenwasser, das auf dem Grundstück versickert, wird aufgefangen und für Feuerwehrrübungen gespeichert.

### **Ist es teurer, so zu bauen?**

Vergleicht man die Gesamtkosten zu einem „herkömmlich“ gebauten Gebäude, also die Summe der Bereitstellungskosten (Grundstück), die Herstellungs-, Bewirtschaftungs- und Abbruchkosten, dann ist ein C2C-Gebäude vermutlich eher günstiger. Eventuelle Mehrkosten der Herstellung holt man später im Nutzungsprozess wieder rein. Der Mehraufwand des Projektes steckt vor allem in der Intelligenz der Planung. So lassen sich wertvolle Ressourcen einsparen und wir erzielen einen Gewinn, von dem die gesamte Gesellschaft profitiert.

### **Gibt es Gewinne, die den zunächst höheren Aufwand rechtfertigen?**

Wie wollen wir in Zukunft bauen? Welche Erwartungen stellen wir langfristig an unsere Gebäude? Bei einem zukünftigen Rückbau des Gebäudes ist das neue Feuerwehrhaus keine problematische Schadstoffimmobilie, sondern ein wertvoller Rohstofflieferant. Es ist als künftige Materialressource zu betrachten, und nicht als Sondermüll. Die Gewinne stecken außerdem in den geringeren Bewirtschaftungskosten des Gebäudes, in der Mehrfachnutzung der Parkplatzfläche und im vergleichsweise geringen Flächenverbrauch und damit auch geringeren Flächenkauf. Mit diesem Gebäude geben wir also auch eine Antwort auf die Frage nach dem zukünftigen Bauen.

### **Was bedeutet das?**

Wir bauen ein Gebäude, das durchweg positive Einflüsse auf die Gesundheit der Nutzer, aber auch auf sein gesamtes Umfeld haben wird. Dieses Gebäude wird darüber hinaus eine Strahlkraft über die Gemeinde Straubenhardt hinaus entwickeln, das öffentliche und private Interesse auf die Gemeinde ziehen und dadurch weitere Vorteile generieren, die sich vielleicht erst Jahre nach dem Bau genau beziffern lassen.

## **Aktuelle Bilder von der Baustelle:**

weitere Vorteile generieren, die sich vielleicht erst Jahre nach dem Bau genau beziffern lassen.

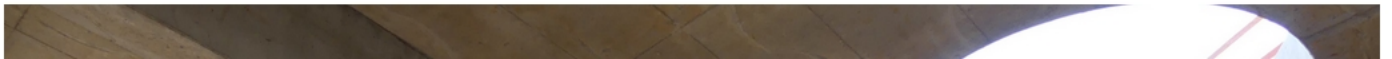
## Aktuelle Bilder von der Baustelle:







*Blick in die Fahrzeughalle*





*Teil der Alarmparkplätze*



*Teil der Alarmparkplätze*



*Blick auf das Treppenhaus*



*Blick auf das Treppenhaus*

© Copyright 2021 Straubenhardt

[Kontakt](#)

[Impressum](#)

[Datenschutz](#)



**NETZWERK  
CRADLE TO CRADLE  
REGIONEN**  
Kommunen der Zukunft gestalten



Wir sind Teil der Initiative

**KLIMAPOSITIVE  
STÄDTE UND GEMEINDEN**

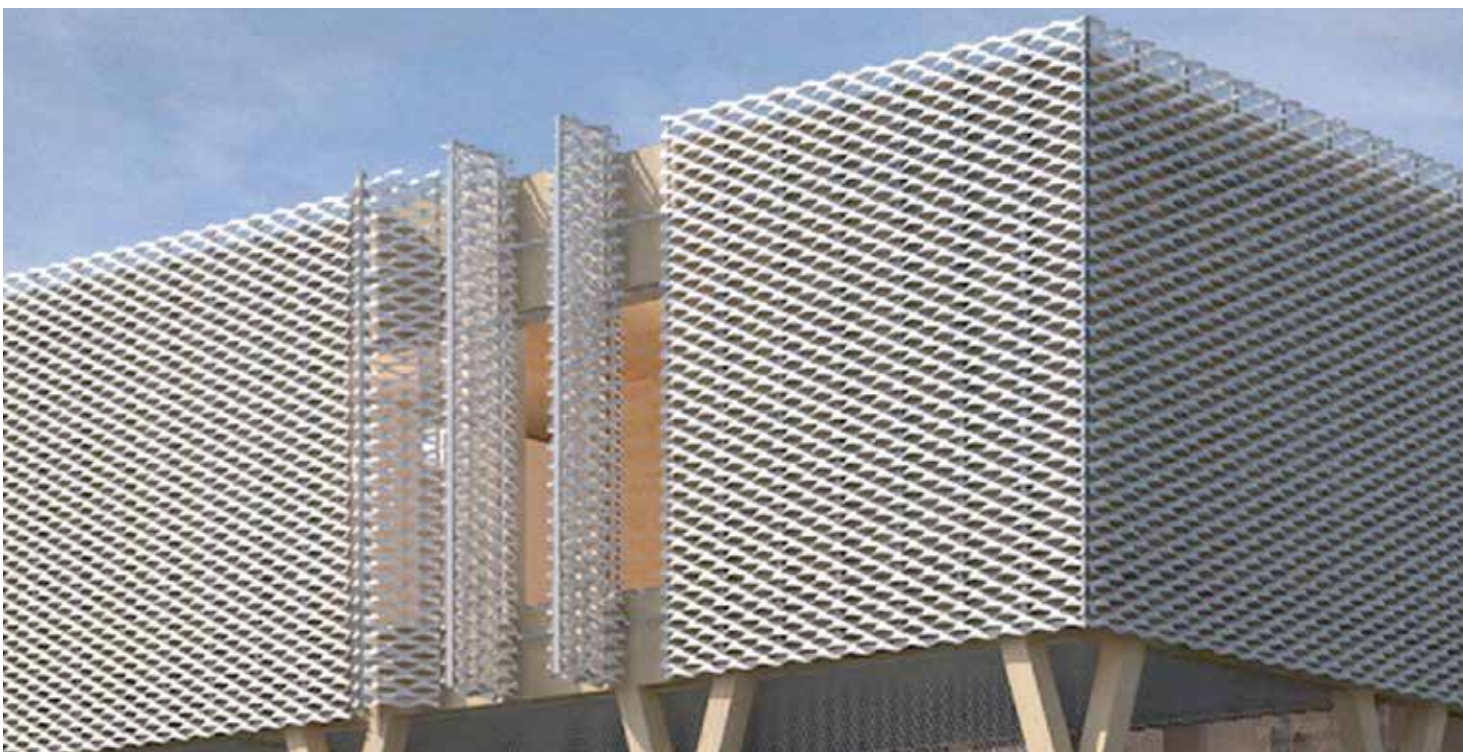
Erklärung zur Barrierefreiheit





# Vorbild Natur: Innovative Kreislauf- wirtschaft in der Region Straubenhardt

Der Cradle to Cradle®-Leitfaden  
für Immobilienprojekte



# Cradle to Cradle: für die Umwelt, für die Menschen, für den Standort



Helge Viehweg, Bürgermeister

Straubenhardt als lebens- und liebenswerte Gemeinde zu erhalten und auszubauen ist das zentrale Ziel unserer Gemeinde-Agenda. Bei der Bebauung und Weiterentwicklung unserer Gewerbegebiete und Wohnquartiere stellen wir deshalb zukünftig den Gedanken der Kreislaufwirtschaft entsprechend des Cradle to Cradle-Prinzips in den Mittelpunkt. Pate dafür steht die Natur: Sie kennt keinen Abfall, alles wird in einem geschlossenen Kreislauf wiederverwertet.

In diesem Leitfaden stellen wir Ihnen die Grundzüge von Cradle to Cradle vor und welche Vorteile das für unsere Bürger und die Gemeinde, aber auch für Wirtschaft und Investoren bringt. Außerdem finden Sie hier eine Übersicht der für ein Cradle to Cradle-Projekt wichtigen Maßnahmen und Grundzüge der Umsetzung.

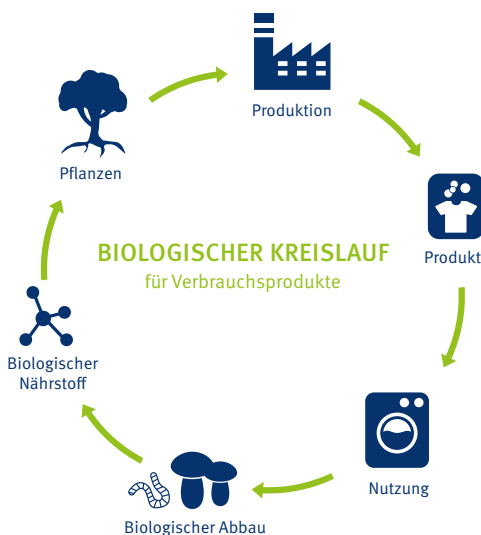
Wenn Sie mehr über Cradle to Cradle in der Region Straubenhardt erfahren oder Bürgern und Investoren einen Ansprechpartner vermitteln wollen, wenden Sie sich bitte direkt an unseren Fachbereich Bauen und Wohnen unter Telefon 07082/948-520.

# In Kreisläufen denken: das Cradle to Cradle-Prinzip®

„Cradle to Cradle“ (abgekürzt C2C) bedeutet zu Deutsch „von der Wiege bis zur Wiege“. Dieses Gestaltungs- und Wirtschaftsprinzip nimmt sich die Natur als Vorbild und verfolgt das Ziel, eine sichere und potenziell unendliche Nutzung von Materialien zu ermöglichen. Über die reine Nachhaltigkeit hinaus will C2C auch einen positiven Beitrag für Mensch, Umwelt und Wirtschaft leisten.

Dabei müssen zwei Formen von Kreisläufen unterschieden werden: Im biologischen Kreislauf werden Produkte vollständig von der Natur „zurückgenommen“, wenn z. B. Produkte kompostiert und so in Nährstoffe für Pflanzen umgewandelt werden. Im technischen Kreislauf muss diese Aufgabe der Mensch übernehmen. Hergestellte Produkte werden im Idealfall so zerlegt und aufbereitet, dass sie möglichst vollständig als Basis für die Produktion gleichwertiger Produkte genutzt werden können.

Hintergrund ist die Erkenntnis, dass unsere bisherige lineare Durchlaufwirtschaft an ihre Grenzen gekommen ist. Abgesehen von der Belastung durch Schadstoffe und Abfälle werden auch die verfügbaren Rohstoffe immer knapper. Daher wird schon in naher Zukunft unsere gebaute Umwelt eine wichtige Ressourcenquelle darstellen. So werden wir unter dem Stichwort „Urban Mining“ einen wesentlichen Teil unserer Rohstoffe durch das Recycling von Gebäuden, Maschinen und Gebrauchsgütern gewinnen. Gerade die recyclinggerechte Konstruktion von Gebäuden wird deshalb immer wichtiger.



Quelle: EPEA GmbH

# Der Bausektor: besonders rohstoffhungrig und abfallintensiv

Schätzungen der Vereinten Nationen zufolge verursacht allein das Bauwesen europaweit fast 50% des Rohstoffverbrauchs. Gleichzeitig steht die Bauindustrie in Deutschland für nahezu 60% des Abfallaufkommens. Und alle Prognosen gehen von einer weiteren Verschärfung des Wettlaufs um Rohstoffe aus.

Das C2C-Prinzip kann daher in der Baubranche besonders viele Vorteile generieren: Wenn das spätere Recycling bereits bei der Konstruktion eingeplant wird, entstehen weder Abfälle, noch werden zusätzliche Rohstoffe benötigt.

# 60%



## **Innenräume im Fokus: Schadstoffbelastung minimieren**

In gängigen Bauprodukten werden immer noch eine Reihe gesundheitsschädlicher Chemikalien verwendet. Denn während die Schadstoffbelastung der Außenluft durch eine Reihe gesetzlicher Grenzwerte geregelt wird, gibt es für Schadstoffe im Innenraum nur sehr wenige Richtwerte. Das erschwert nicht nur das spätere Recycling, sondern kann unsere Wohn- und Arbeitsqualität schon heute stark beeinträchtigen: Wir verbringen durchschnittlich über 90% unseres Lebens in geschlossenen Räumen.

Die Verwendung möglichst schadstoffarmer Bauprodukte ist daher eine weitere Kernforderung an C2C-Projekte in der Region Straubenhardt.

# 90%



# Cradle to Cradle in Straubenhardt: Mehrwert für alle!

Das C2C-Prinzip bedeutet zwar zuerst einmal mehr Aufwand vor allem bei der Planung. Unterm Strich profitieren aber alle Beteiligten.

## **Mehr Lebensqualität: Vorteile für die Bürger**

Schutz der Umwelt: Gesunder Lebens- und Arbeitsraum für die Bewohner und die Region.

Zukunftsorientiertes Umfeld: Attraktive Wohnräume und sichere Arbeitsplätze durch verbesserte Qualität von Produkten, Systemen und Dienstleistungen.

Positive Energiebilanz: Nutzung von Sonnenenergie und erneuerbaren Energien.

## **Attraktiver Standort: Vorteile für die Kommune**

Qualität als Wettbewerbsvorteil: Cradle to Cradle®-Konzepte zur Erschließung von Wohnquartieren und Gewerbeflächen kurbeln die Wirtschaft an.

Wertsteigerung der Immobilien: Attraktives, nachhaltiges Gewerbegebiet ermöglicht gezielte Ansiedlung moderner, leistungsfähiger Unternehmen.

Einsparung von Ressourcen: Gemeinnützige und integrierte Konzepte verringern Flächenverbrauch, die Ausstattung der Gebäude mit Solarpanels ermöglicht Einspeisung und ggf. Verkauf von Solarenergie.

## **Positive Bilanz: Vorteile für die Investoren**

Mehr Effizienz: Über den gesamten Lebenszyklus inklusive Nachnutzung und Wiederverwendung betrachtet, rechnen sich Cradle to Cradle-Projekte sehr gut.

Umfangreiche Förderprogramme: Für Cradle to Cradle-Projekte stehen Förder-tools und Programme von staatlichen Institutionen und seitens der Gemeinde Straubenhardt zur Verfügung (siehe nebenstehender Kasten).

Innovatives Image: Engagement für Nachhaltigkeit und C2C-Konzepte werden für Investoren, Arbeitnehmer und Verbraucher immer mehr zum Entscheidungsfaktor.

### **Cradle to Cradle-Anreize für Investoren in Straubenhardt**

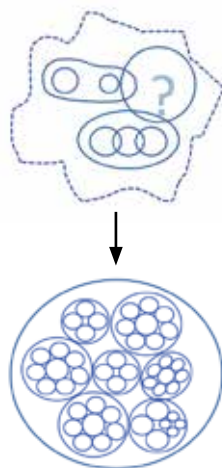
- Austausch in der Cradle to Cradle-Gemeinde
- Vergünstigte Grundstücke in Straubenhardt
- Nutzung von E-Mobilität in Straubenhardt
- Teil einer guten Idee, Partner in Außenauftritten

# Cradle to Cradle konkret: Grundsätze und Leitlinien der Projektplanung

Ein C2C-Konzept ist mehr als die Addition einzelner Maßnahmen. Die Gemeinde Straubenhardt erwartet von interessierten Investoren ein integriertes ökologisches Gesamtkonzept. Das erfordert eine umfassende Analyse und Bedarfsermittlung in unterschiedlichen Dimensionen und Skalierungen. Wir empfehlen daher, für die Konzeptplanung einen Experten hinzu zu ziehen.

## Wichtige Grundsätze bei der Entwicklung und Realisierung von C2C-Projekten

- Keine Standards: Es gibt keinen Masterplan und keine definierten Kriterien - jedes C2C-Projekt ist eigenständig.
- Umdenken einplanen: Klassische und bereits bestehende Projekte können selten in ein C2C-Konzept überführt werden.
- „Out of the Box“ denken: Es sollte eine innovative Leitidee entwickelt werden, die alle Beteiligten inspiriert.
- Themenübergreifendes Team: Bei der Projektentwicklung sollten neben den Fachverantwortlichen und Entscheidungsträgern auch Lieferanten und ggf. Betreiber integriert werden.



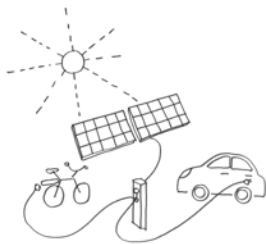
## Die wichtigsten Leitlinien eines C2C-Projekts

- Abfall ist Rohstoff: Jede eingesetzte Ressource soll nach ihrer Nutzung wiederum als Ressource für eine andere Aufgabe verwendbar sein.
- Keine fossilen Energien: In C2C-Projekten sollten nur erneuerbare Energien eingesetzt werden.
- Vielfalt fördern: C2C-Projekte sollen konzeptuelle, soziale und biologische Diversität vorantreiben.



# Anforderungskatalog: Wichtige C2C-Maßnahmen

Alle hier vorgestellten Maßnahmen sollten im Rahmen der Projektplanung berücksichtigt und in einem integrierten Gesamtkonzept gebündelt werden. Je nach Anforderungen und Zielen des Projekts können einzelne Maßnahmen in unterschiedlichem Ausmaß berücksichtigt werden oder auch ganz entfallen. In diesem Fall sollten gleichwertige Ausgleichsmaßnahmen vorgeschlagen werden. Zusätzliche und weitere Maßnahmen sind selbstverständlich möglich und gerne gesehen.



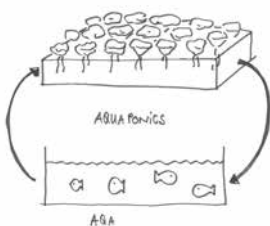
## Das Gebäude als Kraftwerk

- Solararchitektur
- Strom aus PV/Solarthermie erzeugen
- Nachweis der CO<sub>2</sub>-Neutralität
- E-Tankstellen zur Verfügung stellen
- E-Bikes/E-Autos zur Verfügung stellen



## Wasserschutz und Reinigungsfunktion

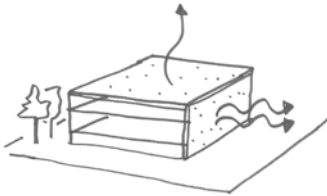
- Wassersparende Armaturen/WC-Spülungen
- Wassersparende Geräte
- Regenwassernutzung für Toilettenspülung und Bewässerung der Außenanlagen/Grauwassernutzung
- Retentionsflächen im Außenbereich
- Naturnahe Regenwasserbewirtschaftung



## Integrierte Biodiversität

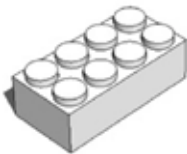
- Maßnahmen zum Erhalt und Schutz des Bodens
- Geringe Erdbewegungen
- Förderung der Artenvielfalt
- Urban Farming/Office Farming
- Innenraumbegrünungen





### Gesunde Luft

- Dachbegrünungen mit einer standortgerechten Bepflanzung zur Förderung der Artenvielfalt
- Fassadenbegrünungen
- Luftreinigende Materialien im Innen-/Außenbereich
- Innenraumbegrünungen
- Biotope im Außenbereich



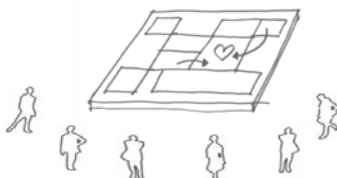
### Gesunde Materialien

- Minimierung der Materialvielfalt
- Verwendung von nachweislich gesunden und emissionsarmen Materialien
- Materialien mit hoher Qualität und Lebensdauer
- Materialmenge minimieren in der Planung
- Umsetzung von Vorhangfassaden (kein WDVS!)
- Regionale Verfügbarkeit und Verwendung
- Geringe Transportwege, geringer Transportaufwand
- Erstellung eines Material Passports



### Flexibilität, Trennbarkeit und Rückbaufähigkeit

- Reparatur- und reinigungsfreundlich konstruieren
- Standardisierte Größen und Module
- Sortenreine Trennbarkeit durch reversible Verbindungsmittel
- Flexibilitätskonzept für den Innenraum



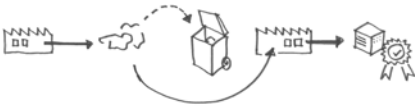
### Gemeinsame Flächennutzung und soziokulturelle Einrichtungen

- Gemeinsame Nutzung von Flächen/Gebäuden
- Gemeinsame Nutzung von Dienstleistungen
- Wohngebietsverträgliche Arbeitsplätze
- Soziale Mischung und Integration
- Autofreie und familienfreundliche Konzepte



Folgende Maßnahmen sind zusätzlich für Gewerbegebiete umzusetzen:

### Wiederverwendung von Ressourcen aus anderen Bereichen



- Stoffstromanalysen für erzeugte Güter und Waren
- Stoffstromanalysen für Gebrauchsartikel
- Stoffstromanalysen Mobilität
- Stoffstromanalysen Abfälle, welche zu Rohstoffen werden können



## Werden Sie Teil unserer Cradle to Cradle-Modellregion Straubenhardt!



### Cradle to Cradle-inspiriertes Feuerwehrhaus Straubenhardt

Wulf Architekten, Stuttgart mit Drees & Sommer  
Advanced Building Technologies GmbH, Stuttgart



STRAUBENHARDT

Herausgeber  
Gemeindeverwaltung Straubenhardt  
Ittersbacher Str. 17  
5334 Straubenhardt

Datum: 01/2020

Autoren:  
Drees & Sommer Advanced Building Technologies GmbH,  
Stuttgart  
Daniela Schneider, Gregor Grassl

Gestaltung: Drees & Sommer Unternehmenskommunikation

## **Dienstanweisung der Stadt Ludwigsburg zur Nachhaltigen Beschaffung**

### **Präambel**

Eine Vielzahl von Umwelt- und Gesundheitsproblemen werden durch unser Kaufverhalten und den Gebrauch von Produkten verursacht. Hier sei z.B. die große Menge an Verpackungsmüll durch häufig eingesetzte Einwegverpackungen, die Verwendung von umweltschädlichem Büromaterial oder die Belastung von Gebäuden mit schadstoffhaltigen Materialien genannt. Um die negativen Folgen in der Zukunft zu vermeiden, hat die Stadt Ludwigsburg entschieden, die öffentliche Beschaffung an den Cradle-to-Cradle (C2C)-Prinzipien auszurichten.

Bei Produkten, die nach den C2C-Prinzipien hergestellt werden, müssen alle verwendeten Substanzen bekannt und auf ihre Umweltwirkung überprüft sein. Zudem sind diese Produkte so gestaltet, dass nach deren Nutzung alle darin enthaltenden Materialien wieder in Kreisläufe zurückgeführt und / oder für neue Produkte eingesetzt werden können. Weitere Prinzipien sind die Einhaltung der sozialen Standards, der Einsatz von erneuerbarer Energie, die Reduzierung der CO<sub>2</sub> Emission und der Schutz des Wasserhaushalts.

Damit ist die nachhaltige Beschaffung auf Basis von C2C ein wichtiger Baustein der nachhaltigen Stadtentwicklung der Stadt Ludwigsburg. Sie unterstützt die Klimaschutzziele, verbessert die Lebensqualität in der Stadt und trägt dazu bei, unsere natürlichen Lebensgrundlagen zu erhalten. Ausführliche Informationen finden Sie im Leitfaden zur Dienstanweisung.

### **§1 Geltungs- und Anwendungsbereich**

**(1)** Diese Dienstanweisung gilt für die Beschaffung aller Bau-, Liefer- und Dienstleistungen der Stadt Ludwigsburg.

#### Stufenplan

Die Erfahrungen aus den Pilotprojekten haben gezeigt, dass es sinnvoll ist, anhand von konkreten Beschaffungen Erfahrungen zu sammeln und die Umstellung stufenweise anzugehen.

Mit Inkrafttreten dieser Dienstanweisung müssen einzelne Beschaffungsvorgänge zu Bau-, Liefer- und Dienstleistungen, die in einem Stufenplan festgelegt sind, nach den Regeln der nachhaltigen Beschaffung durchgeführt werden. Der detaillierte Stufenplan ist im Leitfaden zur Dienstanweisung zu finden. Für alle anderen Beschaffungen gilt die Dienstanweisung als Empfehlung.

Ab 01.01.2019 ist die Dienstanweisung für alle Bau-, Liefer- und Dienstleistungen anzuwenden und bindend.

**(2)** Diese Dienstanweisung gilt für alle städtischen Organisationseinheiten wie Dezernate, Fachbereiche, Eigenbetriebe, Stabstellen, Referate, Projektgruppen.

Werden bei Beschaffungen Mittel des Bundes, des Landes oder anderer Körperschaften/Institutionen von der Stadt verwendet, so ist diese Dienstanweisung zu beachten, soweit ihr nicht Richtlinien dieser Körperschaften/Institutionen entgegenstehen.

An diese Dienstanweisung sind auch nicht im städtischen Dienst stehende Personen schriftlich zu binden, soweit sie in den unter Abs. 1.1 genannten Bereichen für die Stadt tätig sind oder soweit sie über Finanzmittel der Stadt zu verfügen berechtigt sind.

Diese Dienstanweisung trifft Regelungen zur Umsetzung der nachhaltigen Beschaffung innerhalb der Stadtverwaltung Ludwigsburg, aus der Dritte keine Rechte und Ansprüche herleiten können.

## **§2 Ziel**

Das Ziel dieser Dienstanweisung ist es, alle Bau-, Liefer- und Dienstleistungen bei der Stadt Ludwigsburg unter Einhaltung folgender Grundsätze zu beschaffen:

- C2C-Kriterien (Nachhaltigkeitskriterien auf Basis der C2C-Prinzipien)
- ILO-Kernarbeitsnormen (siehe Anlage 1).

Bei der Vergabeentscheidung sind neben der Wirtschaftlichkeit im gesamten Lebenszyklus und der Erfüllung der funktionalen Anforderungen, die Qualität sowie die C2C-Kriterien zu berücksichtigen.

Da noch nicht in allen Bereichen ausreichende Produkte mit C2C-Kriterien verfügbar sind, können diese derzeit noch nicht bei allen Beschaffungsvorgängen als Mindestkriterien umgesetzt werden. In solchen Fällen sollte alternativ ein möglichst gesundes und nachhaltig gestaltetes Produkt/Leistung zum Einsatz kommen, z.B. Produkte / Leistungen, die die Kriterien des Blauen Engel erfüllen. Damit die C2C-Kriterien in die Vergabeentscheidung einfließen können, muss auch in diesen Fällen die Bewertungsmatrix auf Basis der Bietererklärung zu Nachhaltigkeitskriterien angewendet werden. (siehe auch § 4 (2)).

## **§3 Zulässigkeit von Nachhaltigkeitskriterien**

Unabhängig vom Auftragswert ist es im Vergabeverfahren grundsätzlich möglich, Anforderungen an die Nachhaltigkeit der beschafften Güter oder Dienstleistungen zu stellen, solange die Grundsätze der Gleichbehandlung, der Transparenz, des freien Warenverkehrs, der Niederlassungsfreiheit und des freien Dienstleistungsverkehrs eingehalten werden.

Nach dem Vergaberecht können neben Eigenschaften wie Qualität, Preis oder Ästhetik auch soziale und umweltbezogene Aspekte als Mindest- und Zuschlagskriterien festgelegt werden (§ 58 Abs. 2 Satz 1 Verordnung über die Vergabe öffentlicher Aufträge (VgV), § 67 VgV, § 43 Abs. 2 Unterschwellenvergabeverordnung (UVgO)).

Auch das Gesetz gegen Wettbewerbsbeschränkungen (GWB) erlaubt es ausdrücklich, soziale und umweltbezogene Aspekte in das Vergabeverfahren einzubeziehen (§97 Abs. 3 GWB).

Wesentlich ist, dass die sozialen oder umweltbezogenen Anforderungen an den Leistungsgegenstand Einfluss auf die Beschaffenheit des Produkts oder die Dienstleistung einschließlich des Produktions- bzw. Lieferprozesses haben. Die Zuschlagskriterien müssen also mit dem Auftragsgegenstand in Verbindung stehen (§ 127 Abs. 3 GWB).

Die Bevorzugung von Waren oder Erzeugnissen aus regionaler Produktion oder die Vorgabe, Bau- oder Dienstleistungen durch ortsansässige Anbieter durchführen zu lassen, verstößt gegen das Diskriminierungsverbot und ist nicht zulässig. Auch eine mittelbare Diskriminierung, z. B. die Bevorzugung kurzer Transportwege, ist nicht zulässig. In Einzelfällen kann Regionalität als Vorgabe für funktionale Anforderungen, wie z.B. über Reaktionszeiten oder Warmhaltezeiten in die Bewertung mit einfließen.

## **§4 Vorgehen bei der Beschaffung**

### **(1) Vorbereitung**

Vor der Beschaffung jeglicher Bau-, Liefer- und Dienstleistungen ist vom beschaffenden Fachbereich zu prüfen, ob die Weiterverwendung alter Produkte und ggf. deren Überarbeitung/Nachrüstung Teil einer nachhaltigen Gesamtlösung sein kann.

Die darauf folgende Marktrecherche durch den Fachbereich soll ermitteln, ob und welche nachhaltigen Produkte am Markt verfügbar sind:

- Gibt es Produkte am Markt, die die C2C-Kriterien erfüllen?  
Einen hilfreichen Link hierzu finden Sie im Leitfaden zur Dienstanweisung.
- Wenn keine oder nur ein C2C-Produkt(e) verfügbar sind/ist, soll geprüft werden, welche anderen nachhaltigen Produkteigenschaften / Siegel als Mindestkriterien gefordert werden können (z.B. Kriterien des Siegels Blauer Engel, Fair Trade-Siegel etc.)

Aufgrund der durch die Marktrecherche vorliegenden Kostenschätzung wird die entsprechende Vergabeart festgelegt.

Bei einer Direkt- oder Verhandlungsvergabe (formlose Vergaben) sind die C2C-Kriterien bei der Produktauswahl zu berücksichtigen.

### **(2) Vorgabe von Kriterien bei förmlichen Vergabeverfahren**

Abhängig von den Ergebnissen der Marktrecherche wird entschieden, welche Kriterien als Mindestkriterien (Mindestanforderungen an das Produkt bzw. Ausschlusskriterien) und/oder als Zuschlagskriterien (Kriterien, anhand derer die Vergabeentscheidung getroffen werden soll) verwendet werden können. Sollte eine Marktrecherche ergeben, dass mehrere Bieter die gewünschten Nachhaltigkeitskriterien erfüllen, können diese als Mindestkriterien für die Ausschreibung definiert werden. Ein Bieter kann dann nur anbieten, wenn das Produkt die Mindestkriterien erfüllt.

- Kriterien in der Leistungsbeschreibung

In der Leistungsbeschreibung werden alle erforderlichen Eigenschaften und Kriterien für die Bau-, Liefer- und Dienstleistungen angegeben, unter anderen auch die Nachhaltigkeitskriterien. Hierbei



werden zum einen Mindestkriterien aufgenommen, zum anderen sind auch die Zuschlagskriterien hier zu nennen.

Siegel und Zertifizierungen können entweder als Mindestkriterium oder als Zuschlagskriterium verwendet werden, jedoch immer mit dem Zusatz „oder gleichwertig“. Umweltsiegel dürfen nicht direkt gefordert werden (zulässige Formulierung: „... erfüllt die Anforderungen des Blauen Engel.“). Kann ein Bieter das Siegel nicht vorweisen, muss er die Erfüllung nachweisen (z.B. durch Prüfberichte).

- Kriterien für die Auftragsausführung

Nachhaltigkeitskriterien können als Mindestkriterien auch in die Vertragsbedingungen zur Auftragsausführung aufgenommen werden (Produktionsanforderungen, z.B. CO<sup>2</sup> neutral).

- Kriterien in der Bewertungsmatrix

Die im Folgenden beschriebenen Nachhaltigkeitskriterien bilden die Grundlage dafür, dass das formulierte Ziel einer Beschaffung von möglichst nachhaltigen Produkten im Sinne der nachhaltigen Beschaffung umgesetzt werden kann.

Zusätzlich zu den funktionalen und / oder ästhetischen Anforderungen werden Nachhaltigkeitskriterien in der Bewertungsmatrix als Zuschlagskriterien vorgegeben:

- Materialgesundheit (Positiv definierte gesunde Materialien)
- Kreislauffähigkeit (biologischer oder technischer Kreislauf)
- Energiemanagement (Energieverbrauch und Treibhausgasemissionen)
- Wasserhaushalt (Auswirkungen auf den Wasserhaushalt)
- Soziale Verantwortung (Soziale Standards / Fairer Handel)

Vorlagen und Erläuterungen zur Bewertungsmatrix sind im Leitfaden zur Anwendung dieser Dienstanweisung enthalten.

Die vom Anbieter auszufüllende „Bietererklärung zu Nachhaltigkeitskriterien“ (Anlage 2) ist immer ein Teil der Ausschreibung / Vergabe. Sie basiert im Wesentlichen auf den Kriterien für eine Cradle-to-Cradle®-Basic-Zertifizierung. Anhand der Angaben in der Bietererklärung werden in der Bewertungsmatrix Punkte für die Erfüllung der Kriterien vergeben. Zusätzlich werden Punkte für den Preis und evtl. für qualitative / funktionale Anforderungen vergeben. Das Angebot mit der höchsten Gesamtpunktzahl erhält den Zuschlag.

Die Bieter füllen im ersten Schritt nur die Erklärung aus und bestätigen die Richtigkeit der Angaben mit ihrer Unterschrift. Wenn ein Bieter den Zuschlag erhalten soll, sind vom Fachbereich die entsprechenden Nachweise anzufordern und auszuwerten. Wenn dieser unrichtige Angaben gemacht hat, wird er von dieser und weiteren Vergaben ausgeschlossen.

Bei der Beschaffung von investiven Gütern mit einer Nutzungsdauer von mehr als drei Jahren, die wartungs- und/oder verbrauchsintensiv sind (sowohl Energie als auch Verbrauchsmaterial wie Toner) müssen nicht nur der Anschaffungspreis, sondern auch die Lebenszykluskosten bewertet werden. Zur Berechnung der Lebenszykluskosten wird die Vorlage des Umweltbundesamtes (Link siehe Leitfaden zur Dienstanweisung) empfohlen.

Folgende Gewichtungen für die Zuschlagskriterien sind einzuhalten:

- Preis brutto und/oder Lebenszykluskosten mindestens 30%
- Nachhaltigkeit mindestens 20%



Weitere qualitative Zuschlagskriterien (z.B. Reaktionszeiten, Ästhetik) sind je nach Beschaffungsgegenstand möglich.

Wenn Nachhaltigkeitskriterien bereits als Mindestkriterien definiert sind, entfällt deren Gewichtung als Zuschlagskriterien.

▪ Kriterien in der Eignungserklärung:

Nach § 49 VgV darf zum Nachweis der technischen Leistungsfähigkeit des Bewerbers/Bieters geprüft werden, ob dieser über ein Umweltmanagementsystem im Unternehmen verfügt. Als Nachweis der technischen Leistungsfähigkeit kann eine Zertifizierung nach dem europäischen Umweltmanagementsystem EMAS oder nach anderen europäischen oder internationalen Normen wie der DIN EN ISO 14001 verlangt werden. Eine Eigenerklärung des Bieters ist kein ausreichender Nachweis.

Falls das zu beschaffende Produkt in der Produktliste der Anlage 1 aufgeführt ist, dann ist zusätzlich die Einhaltung der Mindeststandards zur Einhaltung der Kernarbeitsnormen der Internationalen Arbeitsorganisation der Vereinten Nationen mittels Verpflichtungserklärung (Anlage 1) vom Bieter zu bestätigen und/oder aussagekräftig nachzuweisen (z. B. ein Fair-Handels-Siegel oder Umweltsiegel).

### **(3) Auswertung der Angebote**

Erfüllt der Bieter die geforderten Mindestkriterien und/oder die Eignungskriterien nicht, scheidet das Angebot aus.

Die Ermittlung des wirtschaftlichsten Angebots erfolgt über eine Bewertungsmatrix. Darin wird der Erfüllungsgrad der Zuschlagskriterien der einzelnen Angebote bewertet.

Bieterfirmen, die bestrebt sind, nachhaltig zu agieren, können durch die differenzierte Wertungsmethode eine höhere Punktzahl erzielen. Das bietet den Firmen die Möglichkeit und den Anreiz, durch umweltfreundliche Bau-, Liefer- und Dienstleistungen ggf. höhere Preise kompensieren zu können und damit eine höhere Chance auf den Zuschlag zu haben.

### **§5 Leitfäden**

Um die Anwendung der vorliegenden Dienstanweisung zu erleichtern, wurde ein Leitfaden erstellt.

Zusätzlich sind für die Beschaffung einzelner Bau-, Liefer- und Dienstleistungen entsprechende Leitfäden durch die Fachbereiche zu erstellen. Diese Leitfäden sollen die Beschaffer bei künftigen Beschaffungen unterstützen. Sie beinhalten Informationen zu den Produkten und Leistungen, die z.B. bei der Recherche oder aus den Erfahrungen früherer Beschaffungen heraus gemacht wurden. Sie müssen in regelmäßigen Abständen an Veränderungen bzgl. des Marktangebots oder bzgl. der Nachhaltigkeitskriterien und Siegel angepasst werden. Alle Leitfäden sind nach einem einheitlichen Muster aufgebaut.

Das Muster, der Leitfaden zur Dienstanweisung und die Leitfäden zu einzelnen Produkten können im Intranet abgerufen werden.

## §6 Sonderregelungen

- Bei formlosen Vergaben und bei Bauvergaben

Wenn in Ausnahmefällen die Vorgaben zur Berücksichtigung der Nachhaltigkeitskriterien nicht erfüllt werden können, muss dies schriftlich begründet werden. Dazu muss das Formular (Anlage 3) ausgefüllt, vom Fachbereichsleiter unterschrieben und den begründenden Unterlagen zur Rechnungsstellung beigelegt werden.

- Bei förmlichen Vergabeverfahren von Liefer- und Dienstleistungen

Bei Anmeldung eines förmlichen Vergabeverfahrens von Liefer- und Dienstleistungen bei der Zentralen Vergabestelle (ZVS) ist das Anmeldeformular/Checkliste (vgl. Dienstanweisung für Vergaben von Liefer- und Dienstleistungen) auszufüllen. Darin ist anzugeben, ob die Nachhaltigkeitskriterien entsprechend dieser Dienstanweisung berücksichtigt werden.

Bei Nichtberücksichtigung ist das Formular (Anlage 3) ausgefüllt und mit der Unterschrift des zuständigen Fachbereichsleiters beizulegen.

## §7 Zuständigkeiten

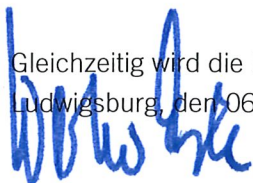
Zentrale Anlaufstelle für allgemeine Fragestellungen zur nachhaltigen Beschaffung innerhalb der Stadtverwaltung Ludwigsburg ist die Abteilung Zentrale Dienste im Fachbereich Organisation und Personal. So ist diese Abteilung Ansprechpartner für alle Querschnittsprodukte, also Beschaffungen die dezernatsübergreifend getätigt werden (Büromaterial, Büroausstattung, usw.)

Kompetente Ansprechpartner für spezifische produktorientierte Fragestellungen sollen in den jeweiligen Fachbereichen, zumindest eine Ansprechperson innerhalb der Dezernate, installiert werden. Diese erteilen im Einzelfall Auskünfte zur qualifizierten Erstellung von Leistungsverzeichnissen.

## §8 Inkrafttreten

Diese Dienstanweisung tritt am 01.04.2018 in Kraft.

Gleichzeitig wird die DA zum Kauf fair gehandelter Waren (Verf. Nr. 065/14) aufgehoben.  
Ludwigsburg, den 06.03.2018



Werner Spec  
Oberbürgermeister

- Anlage 1 Erklärung zur Einhaltung der ILO-Kernarbeitsnormen
- Anlage 2 Bietererklärung zu Nachhaltigkeitskriterien
- Anlage 3 Begründung für die Nichtanwendung der Nachhaltigkeitskriterien





LUDWIGSBURG

# Nachhaltige Beschaffung

## Stadt Ludwigsburg





LUDWIGSBURG



# Klimawandel





LUDWIGSBURG

# Umweltverschmutzung





# Ausbeutung der Natur



A collection of cleaning supplies including spray bottles, brushes, and a dustpan. The items are arranged on a wooden surface. There are two clear spray bottles with pink and green liquid, a blue brush, a white brush with yellow bristles, a blue dustpan with a brown brush, and a white bottle with a yellow cap. A blue container with a red cap is also visible.

# Menschliche Gesundheit

















# Soziale Gerechtigkeit



# Umwelt und Kostenentlastung durch eine nachhaltige Beschaffung

Produkt oder Dienstleistung	Effekte	Einsparung prozentual	Einsparung pro Bezugsgröße	Veränderung
Computer 	Kosteneinsparung Treibhausgasminderung	7 % 32 %	13 €/a (pro Stück) 41 kg CO <sub>2</sub> e/a (pro Stück)	
Multifunktionsgeräte 	Kosteneinsparung Treibhausgasminderung	6 % 47 %	50 €/a (pro Stück) 120 kg CO <sub>2</sub> e/a (pro Stück)	
Büroleuchten 	Kosteneinsparung Treibhausgasminderung	19 % 22 %	15 €/a (pro Arbeitsplatz) 21 kg CO <sub>2</sub> e/a (pro Arbeitsplatz)	
Straßenbeleuchtung 	Kosteneinsparung Treibhausgasminderung	33 % 45 %	533 €/a (pro Leuchte) 956 kg CO <sub>2</sub> e/a (pro Leuchte)	
PKWs 	Kosteneinsparung Treibhausgasminderung	6 % 17 %	198 €/a (pro Kleinwagen) 240 kg CO <sub>2</sub> e/a (pro Kleinwagen)	
Kühl- und Gefriergeräte 	Kosteneinsparung Treibhausgasminderung	8 % 48 %	7 €/a (pro Stück) 40 kg CO <sub>2</sub> e/a (pro Stück)	

Quelle: Öko-Institut e.V.



500 Milliarden Euro  
für öffentliche Beschaffung  
in Deutschland pro Jahr

# Sustainable Development Goals (SDGs) der Vereinten Nationen







LUDWIGSBURG





## **Dienstanweisung der Stadt Ludwigsburg zur Nachhaltigen Beschaffung**

### **Präambel**

Eine Vielzahl von Umwelt- und Gesundheitsproblemen werden durch unser Kaufverhalten und den Gebrauch von Produkten verursacht. Hier sei z.B. die große Menge an Verpackungsmüll durch häufig eingesetzte Einwegverpackungen, die Verwendung von umweltschädlichem Büromaterial oder die Belastung von Gebäuden mit schadstoffhaltigen Materialien genannt. Um die negativen Folgen in der Zukunft zu vermeiden, hat die Stadt Ludwigsburg entschieden, die öffentliche Beschaffung an den Cradle-to-Cradle (C2C)-Prinzipien auszurichten.

Bei Produkten, die nach den C2C-Prinzipien hergestellt werden, müssen alle verwendeten Substanzen bekannt und auf ihre Umweltwirkung überprüft sein. Zudem sind diese Produkte so gestaltet, dass nach deren Nutzung alle darin enthaltenden Materialien wieder in Kreisläufe zurückgeführt und / oder für neue Produkte eingesetzt werden können. Weitere Prinzipien sind die Einhaltung der sozialen Standards, der Einsatz von erneuerbarer Energie, die Reduzierung der CO<sub>2</sub> Emission und der Schutz des Wasserhaushalts.



## Dienstanweisung der Stadt Ludwigsburg zur Nachhaltigen Beschaffung

### Präambel

Eine Vielzahl von Umwelt- und Gesundheitsproblemen werden durch unser Kaufverhalten und den Gebrauch von Produkten verursacht. Hier sei z.B. die große Menge an Verpackungsmüll, auch häufig eingesetzte zwei- und dreifache Verpackungen, die Verwendung von umweltschädlichen Büromaterialien oder die Belastung von Gebäuden mit schadstoffhaltigen Materialien genannt. Um die negativen Folgen in der Zukunft zu vermeiden, hat die Stadt Ludwigsburg entschieden, die öffentliche Beschaffung an den Cradle-to-Cradle (C2C)-Prinzipien anzuknüpfen.

Bei Produkten, die nach den C2C-Prinzipien hergestellt werden, müssen alle verwendeten Substanzen bekannt und auf ihre Umweltwirkung überprüft sein. Zudem sind diese Produkte so gestaltet, dass nach deren Nutzung alle darin enthaltenden Materialien wieder in Kreisläufe zurückgeführt und / oder für neue Produkte eingesetzt werden können. Weitere Prinzipien sind die Einhaltung der sozialen Standards, der Einsatz von erneuerbarer Energie, die Reduzierung der CO<sub>2</sub> Emission und der Schutz des Wasserhaushalts.

# 1. Bindend für alle Beschaffungen der Stadtverwaltung





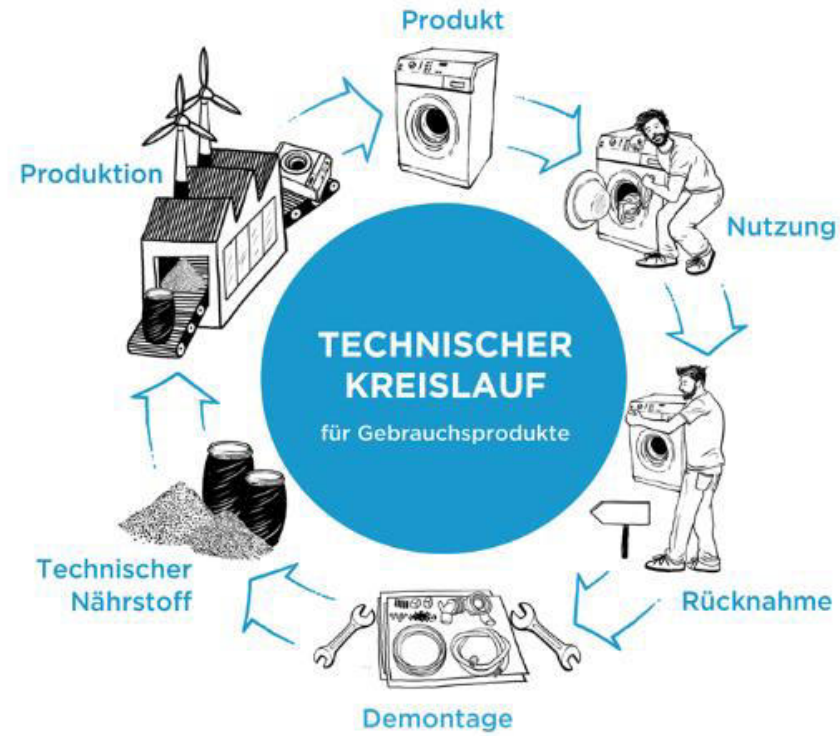
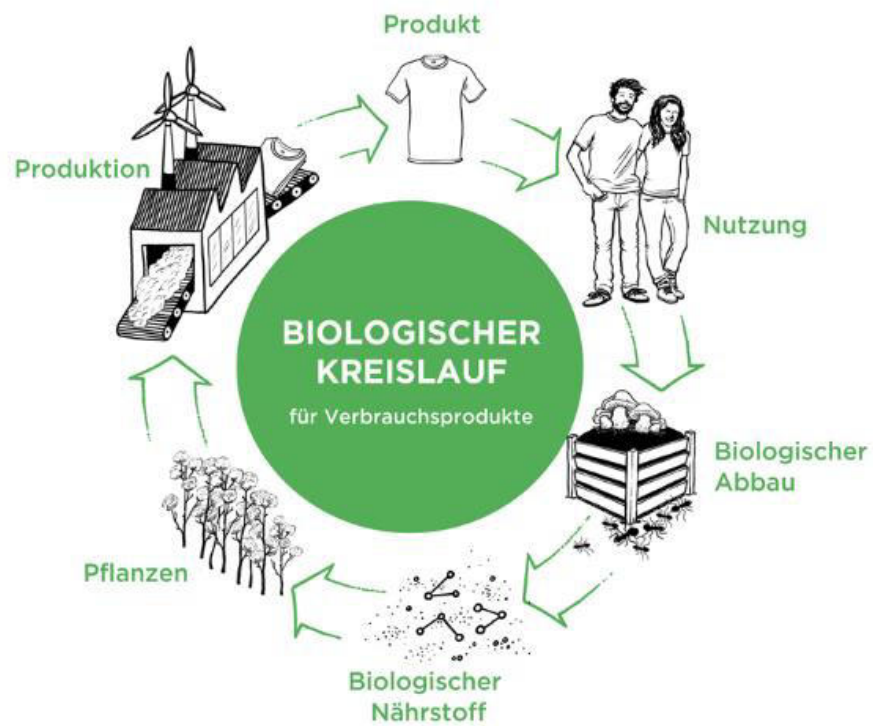
## Dienstanweisung der Stadt Ludwigsburg zur Nachhaltigen Beschaffung

### Präambel

Eine Vielzahl von Umwelt- und Gesundheitsproblemen werden durch unser Kaufverhalten und den Gebrauch von Produkten verursacht. Hier sei z.B. die große Menge an Verpackungsmüll durch häufig eingesetzte Einwegpackungen, die Verwertung von Umweltschadstoffen im Bürohaushalt oder die Belastung von Gebäuden mit schadstoffhaltigen Materialien genannt. Um die negativen Folgen in der Zukunft zu vermeiden, hat die Stadt Ludwigsburg entschieden, die öffentliche Beschaffung an den Cradle-to-Cradle (C2C)-Prinzipien auszurichten. Bei Produkten, die nach den C2C-Prinzipien hergestellt wurden, müssen alle verwendeten Substanzen bekannt und auf ihre Umweltwirkung überprüft sein. Zudem sind diese Produkte so gestaltet, dass nach deren Nutzung alle darin enthaltenden Materialien wieder in Kreisläufe zurückgeführt und / oder für neue Produkte eingesetzt werden können. Weitere Prinzipien sind die Einhaltung der sozialen Standards, der Einsatz von erneuerbarer Energie, die Reduzierung der CO<sub>2</sub> Emission und der Schutz des Wasserhaushalts.

# 2. Cradle-to-Cradle als Definition einer nachhaltigen Leistung

# Exkurs: Cradle-to-Cradle® Kreisläufe



Quelle: C2C e.V.



## Exkurs: Cradle-to-Cradle® Designkonzept

### ■ C2C Prinzipien:

- Kreislauffähigkeit
- Materialgesundheit
- Erneuerbare Energien
- Wasserkreisläufe
- Soziale Gerechtigkeit



Vielfalt feiern!!!

Quelle: C2C e.V.



## Dienstanweisung der Stadt Ludwigsburg zur Nachhaltigen Beschaffung

### Präambel

Eine Vielzahl von Umwelt- und Gesundheitsproblemen werden durch unser Kaufverhalten und den Gebrauch von Produkten verursacht. Hierzu sind Bsp. die große Menge an Verpackungsmüll durch häufige Einwegverpackungen, die Verwendung von Umweltschadstoffen in Büromaterialien, die Belastung von Gebäuden mit schadstoffhaltigen Materialien genannt. Um die negativen Folgen in der Zukunft zu vermeiden, hat die Stadt Ludwigsburg entschieden, die öffentliche Beschaffung an den Cradle-to-Cradle-Prinzipien auszurichten. Bei Produkten, die nach den Cradle-to-Cradle-Prinzipien hergestellt werden, müssen alle verwendeten Substanzen bekannt und auf ihre Umweltwirkung überprüft sein. Zudem sind diese Produkte so gestaltet, dass nach deren Nutzung alle darin enthaltenden Materialien wieder in Kreisläufe zurückgeführt und / oder für neue Produkte eingesetzt werden können. Weitere Prinzipien sind die Einhaltung der sozialen Standards, der Einsatz von erneuerbarer Energie, die Reduzierung der CO<sub>2</sub> Emission und der Schutz des Wasserhaushalts.

# 3. Mindestens 20 % Nachhaltigkeit in der Bieterbewertung



## Herausforderungen

Anschaffungskosten minimieren

Mehraufwand minimieren

## Strategische Ansätze

- Produktgruppen bündeln
- Rahmenverträgen ausschreiben

- Digitalisierung (eProcurement System)
- Standardisierte Beschaffungsprozesse





# Kopier- und Geschäftspapier

- **Papieratlas 2019: 91,09% Recyclingpapier Stadt Ludwigsburg**
  - 1.662.212 Liter Wasser = täglichen Trinkwasserbedarf von 13.737 Einwohnern
  - 342.316 kWh Energie = jährlichen Stromverbrauch von 97 Drei-Personen-Haushalten
- **78 Treffer für Recyclingpapier mit dem Blauen Engel**
- **Max. Weißegrad von 100% nach DIN ISO 2470 und max. CIE Weiße von 135 nach ISO Norm 11475**

Quelle: AdobeStock 14558383 Oliver Le Moal



LUDWIGSBURG

# Büromaterial





Umweltzeichen



(68)



(26)



(20)



(16)

(6)



(5)



(5)

+ mehr anzeigen



**memo**



memo FSC-zertifizierter  
Kugelschreiber

ab 1,49 €



**memo**



memo Bleistift "Natural Graphite"  
12 Stk.

ab 2,29 €



**STABILO**



STABILO Filzstift "GREENpoint"

ab 0,95 €







## Büromöbel

- Holz aus nachhaltiger Forstwirtschaft
- Ausschluss für umwelt- und gesundheitsgefährdende Stoffe (z.B. Formaldehyd, Chrom-VI, Weichmacher, PVC, brommierte Flammschutzmittel, halogen- und schwermetallhaltige Verbindungen)
- Nicht verklebte Konstruktion
- Einfache Demontage mit Standardwerkzeug
- Rezyklateinsatz für Kunststoffe
- Energieverbrauch im Standby Betrieb



INDOOR ADVANTAGE GOLD  
BUILDING MATERIALS





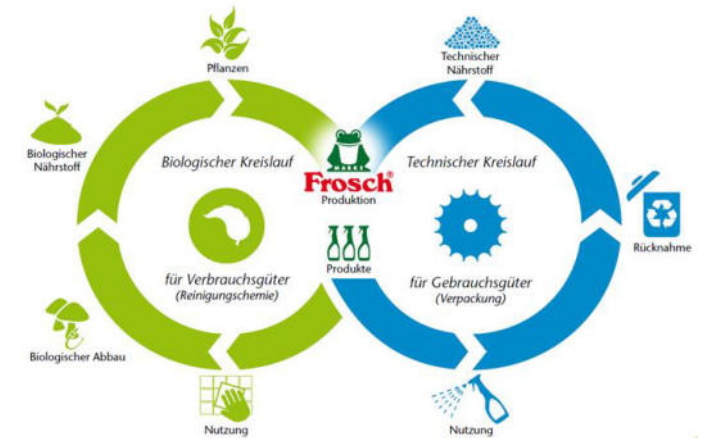
# (Multifunktions-) Drucker



- Ca. 1500 Treffer für Geräte mit dem Blauen Engel
- ILO-Kernarbeitsnormen (SA 8000, RBA VAP Audit Recognition Program platinum/gold, TCO Certified, amfori BSCI)



# Reinigungsmittel / -dienstleistungen



# Dienstkleidung

				
<p><b>MEDIZIN &amp; PFLEGE</b></p>	<p><b>HANDWERK &amp; INDUSTRIE</b></p>	<p><b>GASTRONOMIE</b></p>	<p><b>ARBEITSSCHUTZ</b></p>	<p><b>LEBENSMITTELINDUSTRIE</b></p>
<p>» Damen</p>	<p>» Damen</p>	<p>» Berufsbekleidung Gastronomie</p>	<p>» Kategorie Hosen</p>	<p>» Kategorie Hosen</p>
<p>» Herren</p>	<p>» Branchen</p>	<p>» Kochkleidung</p>	<p>» Thema Warnschutz</p>	<p>» Tragekomfort durch extra Baumwolle</p>
<p>» Berufswelten</p>	<p>» Kollektion</p>	<p>» Gastronomiebekleidung nach Einsatz</p>	<p>» Kollektion BP HI-Vis Comfort</p>	<p>» Risikoklassen</p>







LUDWIGSBURG



# Werbegegenstände



# 3 einfache Tipps für den Einstieg

1. Mit einfachen Produktgruppen anfangen
2. Auf glaubwürdige Gütezeichen setzen
  - Produktebene: <https://www.siegelklarheit.de/>
  - Unternehmensebene: Umweltmanagementsystem (EMAS, ISO 14001), Sozialstandard (SA 8000, UN Global Compact)
3. Vertragspartner auf Nachhaltigkeit ansprechen



LUDWIGSBURG



## **Patrick Scholz**

---

Kompetenzstelle für Nachhaltige Beschaffung

**Team:** Zentrale Beschaffung und Vergabe

**Abteilung:** Zentrale Dienste und Repräsentation

**Fachbereich:** Organisation und Personal

Stadt Ludwigsburg

---

### **Kontakt**

Adresse

Wilhelmstraße 13

71638 Ludwigsburg

Telefon

07141 910-3616

E-Mail

[p.scholz@ludwigsburg.de](mailto:p.scholz@ludwigsburg.de)



## #VERGABEVERFAHREN

17. August 2020

# Nachhaltig einkaufen nach dem Cradle to Cradle-Prinzip in der öffentlichen Beschaffung



Im Rahmen einer aktuell laufenden Fallstudienanalyse [der Universität der Bundeswehr München](#) konnten bisher sechs öffentliche Einkäufer für Reinigungsmittel und Reinigungsdienste zur Einführung einer ökologisch nachhaltigen Beschaffung befragt werden. Vier der Befragten arbeiten bisher insbesondere mit Eco-Labels, allen voran der „Blaue Engel“. Allerdings bescheinigen die meisten der verwendeten Eco-Labels nur, dass das Produkt weniger umweltschädliche Materialien beinhaltet oder mit weniger Ressourcenverbrauch

hergestellt wurde und somit unterm Strich weniger negative Umweltauswirkungen nach sich zieht. Das allein reicht jedoch noch nicht aus, damit ein Produkt wirklich ökologisch nachhaltig ist. Denn um es mit den Worten des Chemikers Michael Braungart auszudrücken: „Weniger schlecht ist nicht gut“.

Deshalb hat dieser mit dem US-amerikanischen Architekten William McDonough das Cradle to Cradle-Prinzip entwickelt. Bei diesem innovativen Konzept wird Nachhaltigkeit ganzheitlich betrachtet, sodass negative Umweltauswirkungen nicht nur einfach verringert, sondern komplett vermieden werden sollen.

Weiterführende Informationen zur Problematik der ganzheitlichen Nachhaltigkeit von Umweltsiegeln finden Sie auch in unserem Beitrag [„Welches Umweltlabel ist wirklich nachhaltig“](#).

## Was bedeutet Cradle to Cradle?

Die Idee nimmt sich die Natur zum Vorbild und basiert auf zyklischen Nährstoffkreisläufen, die keine Abfälle erzeugen. Das bedeutet, dass die verwendeten Materialien entweder in einem biologischen Kreislauf bleiben und nach Gebrauch biologisch abgebaut werden können oder in einem technischen Kreislauf verbleiben und dabei ohne Wertverlust wiederverwendet werden können.<sup>[2]</sup> Daher auch der Name Cradle to Cradle (C2C), übersetzt: von der Wiege zur Wiege. Alles bleibt im Kreislauf und es entstehen keine Abfälle im herkömmlichen Sinne. Stattdessen wird Abfall vielmehr zu einer wertvollen Ressource.

Dieses innovative Kreislaufsystem steht dem sonst üblichen linearen Wirtschaftsprinzip des Cradle to Grave, übersetzt: von der Wiege zur Bahre, gegenüber. Bei diesem werden Konsumgüter nach dem Gebrauch weggeworfen und dann verbrannt oder mit hohem Materialwertverlust für ein Produkt mit geringerer Qualität verwendet. Letzteres wird auch als „downcycling“ bezeichnet. Problematisch dabei ist, dass die Qualität bei dieser Form des Recyclings von Mal zu Mal sinkt und

deshalb zum einen weitere Primärrohstoffe mit hohem Aufwand hinzugefügt werden müssen und die Wiederaufbereitungsmöglichkeiten zum anderen auch nur begrenzt möglich sind. Das heißt: Der Kreislauf endet hier meist sehr früh.

Auf diese Weise beträgt die jährliche Entnahme natürlicher Ressourcen weltweit etwa 60 Mrd. Tonnen. Einer Rechnung von Braungart zufolge entspricht dies einem Ressourcenabbau von 112 Empire State Buildings pro Tag. Auf diese Weise würden etwa ab dem Jahr 2035 zwei Planeten benötigt, um den Bedarf an Ressourcen weiterhin decken zu können.<sup>[3]</sup> Dem kann mit dem nachhaltigen Einkaufen nach dem Cradle to Cradle-Prinzip entgegengewirkt werden.

## Die Cradle to Cradle-Zertifizierung für umfassende Nachhaltigkeit

Anbieter, die ihre Produkte nach dem Cradle to Cradle-Prinzip herstellen, können diese entsprechend zertifizieren lassen. Das Cradle to Cradle-Siegel betrachtet dabei fünf Nachhaltigkeitsaspekte:

1. die Materialgesundheit bzw. die Auswirkungen auf Gesundheit und Umwelt
2. die Möglichkeiten der Wiederverwendung des Materials
3. den Einsatz erneuerbarer Energien bzw. den Energieverbrauch als Ganzes
4. den verantwortungsvollen Umgang mit Wasser
5. die soziale Verantwortung.

Im Gegensatz zu anderen Ökosiegeln verfolgt das Cradle to Cradle-Siegel also einen ganzheitlichen Ansatz bei der Bewertung von Produkten und Herstellungsprozessen.<sup>[4]</sup>

Die Zertifizierung „Cradle to Cradle Certified<sup>CM</sup>“ gibt es in fünf verschiedenen Stufen (Basic – Bronze – Silber – Gold – Platin). Sie ist zwei Jahre gültig und wird vom



Cradle to Cradle Products Innovation Institute (C2CPII) in Kalifornien/USA vergeben, der von Michael Braungart gegründeten Organisation für Normung und Zertifizierung von Cradle to Cradle-Produkten.<sup>[5]</sup> Eine Produktliste von nach C2C-zertifizierten Materialien (aktuell 600 Zertifizierungen) findet man beim Cradle to Cradle Products Innovation Institute: [www.c2ccertified.org/products/registry](https://www.c2ccertified.org/products/registry)

## Wie sich nachhaltiger Einkauf nach dem Cradle to Cradle-Prinzip umsetzen lässt

Nach dem Vergaberecht ist es unabhängig vom Auftragswert grundsätzlich möglich, im Vergabeverfahren Anforderungen an die Nachhaltigkeit von Gütern und Dienstleistungen zu stellen. So lassen sich neben dem Preis auch soziale und umweltbezogene Aspekte als Zuschlagskriterien festlegen (§ 58 Abs. 2 Satz 1 (VgV), § 67 VgV, § 43 Abs. 2 (UVgO)). Voraussetzung dafür ist lediglich, dass die Grundsätze der Gleichbehandlung, Transparenz, der Niederlassungsfreiheit, des freien Warenverkehrs und des freien Dienstleistungsverkehrs eingehalten werden.

Außerdem müssen die Nachhaltigkeitsanforderungen an den Leistungsgegenstand Einfluss auf dessen Beschaffenheit haben. Das bedeutet, dass die Zuschlagskriterien mit dem Auftragsgegenstand in Verbindung stehen müssen (§ 127 Abs. 3 GWB).

## Konkretes Vorgehen beim Einkaufen nach dem Cradle to Cradle-Prinzip

Ein Vorreiter bei der Umsetzung des Cradle to Cradle-Prinzips im öffentlichen Einkauf ist die Stadt Ludwigsburg. Diese hat folgenden Stufenplan zur Implementierung des Cradle to Cradle-Prinzips in der öffentlichen Beschaffung entwickelt, der seit Januar 2019 für sämtliche Bau-, Liefer- sowie Dienstleistungen bindend ist.<sup>[6]</sup> Nach diesem Vorbild ist das Einkaufen nach dem Cradle to Cradle-Prinzip in folgenden Schritten durchführbar:

1. Vor der Beschaffung sollte überprüft werden, ob ggf. alte Produkte weiterverwendet oder überarbeitet bzw. nachgerüstet werden könnten.
2. Im nächsten Schritt sollte eine Marktrecherche ermitteln, ob Produkte oder Dienstleistungen verfügbar sind, welche über eine Cradle to Cradle-Zertifizierung verfügen. Sollte dies nicht der Fall sein, muss erwogen werden, welche nachhaltigen Produkteigenschaften oder Zertifizierungen stattdessen als Mindestkriterien gefordert werden sollen.
3. Nach der Recherche kann entschieden werden, welche der gewünschten Kriterien als Mindestkriterien und/oder Zuschlagskriterien verwendet werden sollen. Werden die Nachhaltigkeitskriterien von mehreren Bietern erfüllt, können diese als Mindestkriterien in der Ausschreibung definiert werden. Ist dies nicht der Fall, lassen sich die gewünschten Kriterien als Zuschlagskriterien definieren.
4. Die definierten Mindest- und Zuschlagskriterien werden in die Leistungsbeschreibung aufgenommen. Hier kann das Cradle to Cradle-Siegel mit dem Zusatz „oder gleichwertig“ als Mindestkriterium oder Zuschlagskriterium integriert werden. Darüber hinaus ist es auch möglich, die definierten Nachhaltigkeitskriterien als Mindestkriterien in die Vertragsbedingungen zur Auftragsausführung aufzunehmen.
5. Die Cradle to Cradle-Aspekte zur Materialgesundheit, Kreislauffähigkeit, Energiemanagement, Wasserhaushalt und sozialen Verantwortung können als Zuschlagskriterien in der Bewertungsmatrix eingegliedert werden. Sind diese Aspekte jedoch bereits als Mindestkriterien definiert, entfällt deren Gewichtung bei den Zuschlagskriterien. Zudem können Nachweise der technischen Leistungsfähigkeit, bspw. in Form des EMAS-Zertifikats im Rahmen der Bieterreignung eingefordert werden.
6. Bei der Angebotsauswertung können Bieter, die bestrebt sind, nachhaltig zu agieren, durch die differenzierte Wertungsmethode eine höhere Punktzahl erreichen und damit höhere Preise kompensieren.


Auf diese Weise haben Vorreiter unter den Bieterunternehmen echte Chancen auf den Zuschlag und Anreize für eine nachhaltige Produktion bzw. Dienstleistung. Nach diesem Vorbild ist es das nachhaltige Einkaufen nach dem Cradle to Cradle-Prinzip für öffentliche Vergabestellen gut umsetzbar.


---

[1] Braungart, M. (2014). *Cradle to Cradle: Ressourceneffektive Produktion*. In: Neugebauer, R. (Hrsg.). *Handbuch Ressourcenorientierte Produktion*. Carl-Hanser-Verlag, S. 141-149

[2] Braungart, M. (2014). *Cradle to Cradle: Ressourceneffektive Produktion*. In: Neugebauer, R. (Hrsg.). *Handbuch Ressourcenorientierte Produktion*. Carl-Hanser-Verlag, S. 141-149

[3] Braungart, M. (2014). *Cradle to Cradle: Ressourceneffektive Produktion*. In: Neugebauer, R. (Hrsg.). *Handbuch Ressourcenorientierte Produktion*. Carl-Hanser-Verlag, S. 141-149

[4] Cradle to Cradle Products Innovation Institute. *What is Cradle to Cradle Certified™?* Link:   
<https://www.c2ccertified.org/> (abgerufen am 14.08.2020).

[5] Kompetenzstelle für nachhaltige Beschaffung (2014). *Kennen Sie „Cradle to Cradle“?* Link:   
[http://www.nachhaltige-beschaffung.info/SharedDocs/Kurzmeldungen/DE/2014/140616\\_Cradletocradle.html](http://www.nachhaltige-beschaffung.info/SharedDocs/Kurzmeldungen/DE/2014/140616_Cradletocradle.html)  
(Abgerufen am 14.08.2020)

[6] Stadt Ludwigsburg (2018). *Dienstanweisung der Stadt Ludwigsburg zur nachhaltigen Beschaffung*. Link:   
[https://www.kompass-nachhaltigkeit.de/fileadmin/user\\_upload/KK-Dokumente/Ludwigsburg\\_Dienstanweisung\\_Nachhaltige\\_Beschaffung\\_2018-04-01.pdf](https://www.kompass-nachhaltigkeit.de/fileadmin/user_upload/KK-Dokumente/Ludwigsburg_Dienstanweisung_Nachhaltige_Beschaffung_2018-04-01.pdf) (Abgerufen am 14.08.2020)

---

**#STRATEGISCHE BESCHAFFUNG**

12. März 2021

Wer sind die Stakeholder der öffentlichen Beschaffung?

Beitrag lesen

**#STRATEGISCHE BESCHAFFUNG**

12. April 2021

Nähere Betrachtung der Stakeholder in der öffentlichen Beschaffung – Teil  
2

Beitrag lesen

**#STRATEGISCHE BESCHAFFUNG**

22. Juli 2021

Analyse der laufenden öffentlichen Ausschreibungen im Reinigungs-  
sektor – Ergebnisse Teil 3

Beitrag lesen

**#STRATEGISCHE BESCHAFFUNG**

8. Juli 2021

Analyse der laufenden  
öffentlichen Ausschreibungen im Reinigungssektor – Ergebnisse Teil 2

Beitrag lesen



» Impressum » Datenschutz

» FOLGEN SIE UNS AUF:

Partner des Vergabe-Insiders:





Neubau

## Fuchshofschule

Fuchshofstraße 53, 71638 Ludwigsburg

### Bauherrin

Stadt Ludwigsburg

### Projektsteuerung

Fachbereich Hochbau und  
Gebäudewirtschaft

### Entwurf, Planung, Bauleitung

VON M GmbH, Stuttgart

**Baukosten** 29,5 Mio €

**Bauzeit** 05/2020 – 08/2022



Investition in Ihre Zukunft.

Baden-Württemberg



Der Schulbau ist das erste Gebäude, das im Neubaugebiet Fuchshof errichtet wird.

Das dreigeschossige Schulhaus ist für insgesamt 616 Grundschüler\*innen ausgelegt. In den oberen beiden Stockwerken befinden sich auf vier Lerncluster aufgeteilt insgesamt 22 Unterrichts-, 3 Mehrzweckräume, 6 Kleingruppen- bzw. Kursräume, sowie 8 Betreuungsräume, eine Therapiebereich und Nebenräume.

Zur freien Möblierung und uneingeschränkten Nutzung der Flure für Unterrichtszwecke erhalten die beiden Regelgeschosse umlaufende Fluchtbalkone, die den zweiten baulichen Rettungsweg sicherstellen. In der großen multifunktionalen Mensa im Erdgeschoss erhalten die Schüler\*innen ein warmes Mittagessen. In Nähe des Hauptzugangs sind der Verwaltungs- und Lehrerbereich angeordnet. Im Westen schließt ein großzügiger Pausenhof an. Der Freibereich gliedert sich in einen

stillen naturnahen Bereich im Südwesten und einen zum Bewegen, Toben und Spielen im Nordwesten.

Das Schulgebäude wird dringend benötigt und soll spätestens zum Schuljahresbeginn 2022/23 in Betrieb gehen.

Zur Optimierung des Bauablaufs wurde das Gebäude als Holzbau mit hohem Vorfertigungsgrad konzipiert. Während vor Ort die Rohbaufirma noch am Untergeschoss, der Bodenplatte, den Sanitärkernen und den Fluchttreppenhäusern arbeitet, können die Außenwände und Decken im Werk der Holzbaufirma witterungsunabhängig gefertigt und anschließend auf die Baustellen geliefert und montiert werden.

Die für das Gebäude verwendeten Baustoffe wurden nach dem Kreislaufprinzip des Cradle-to-Cradle ausgewählt. Dementsprechend können die Werkstoffe demontiert und wiederverwendet bzw. recycelt werden.





LUDWIGSBURG

## Fuchshof

*Aktueller Planungsstand*

SHL

**05.11.2020**




# Rahmenbedingungen und Inhalt

## 1. Ziel der Mitteilungsvorlage:

- Gesamt-Überblick über aktuellen Stand
- Zwischenbericht vor Entwurfsbeschluss Bebauungsplan

## 2. Inhalt des Vortrags

- 
1. Bebauungsplan und städtebaulicher Entwurf
  2. Gestaltleitfaden
  3. Energiekonzept
  4. Freiraumplanung
  5. Erschließungs- und Entwässerungsplanung
  6. Sportpark
  7. Mobilität und Machbarkeitsstudie Parkhaus
  8. Zeitlicher Ausblick





The image is a detailed site plan of a city district, likely in Göttingen, Germany. A prominent dashed black line outlines a specific area of interest. Within this area, the 'Ludwig-Jahn-Stadion' is clearly visible. The map shows a dense network of streets, including 'Alter Obweiler Weg', 'Fuchshofstraße', 'Rebenhäuser Straße', and 'Hindenburgstraße'. Other notable features include the 'Stadionbad' and the 'Äusserer Sold'. The map uses grey shading to represent buildings and green circles for trees. A text box in the lower-left corner provides the title and date of the plan.

**Lageplan zum Aufstellungsbeschluss  
(27.09.2020)**

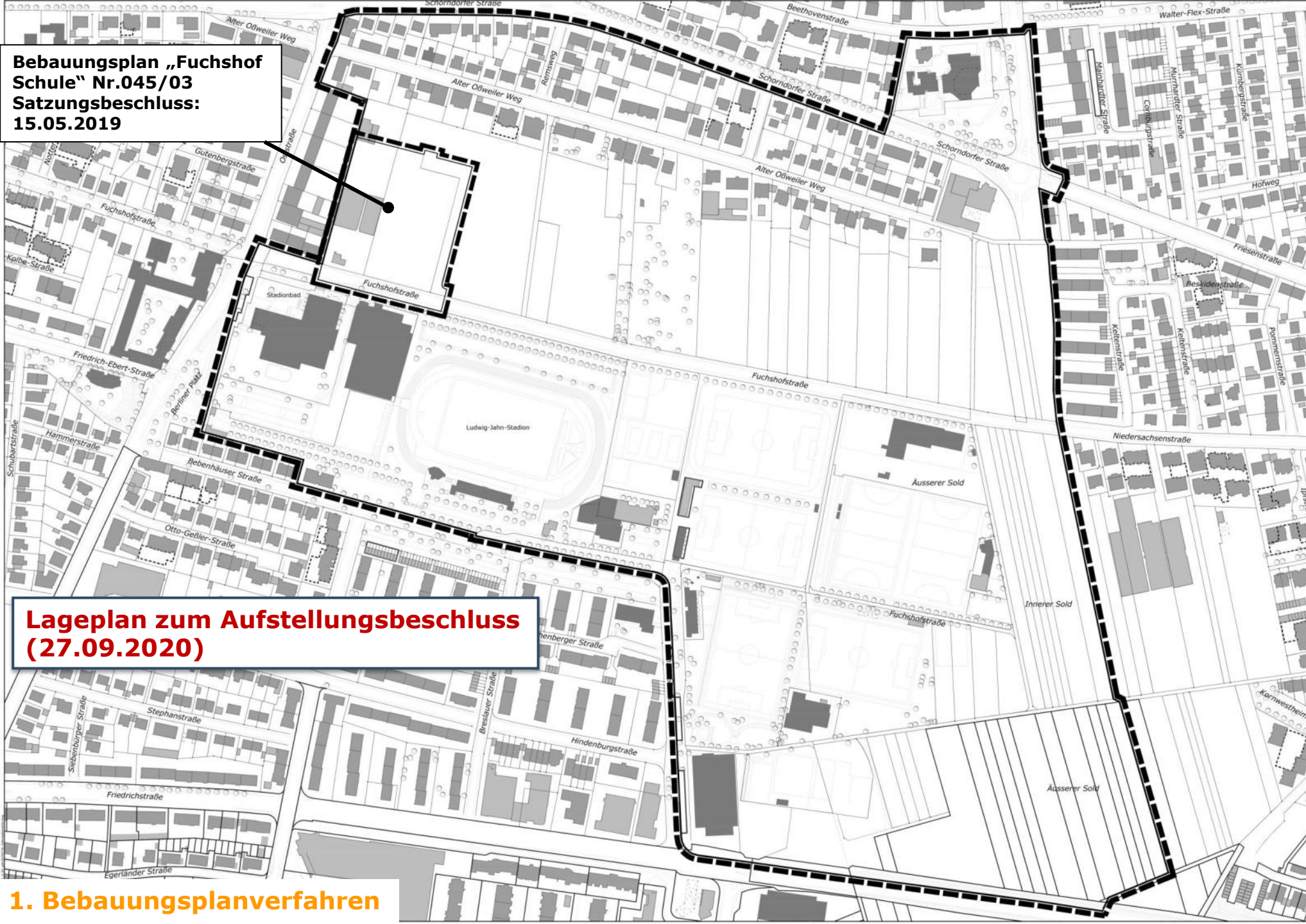
**1. Bebauungsplanverfahren**



**Bebauungsplan „Fuchshof  
Schule“ Nr.045/03  
Satzungsbeschluss:  
15.05.2019**

**Lageplan zum Aufstellungsbeschluss  
(27.09.2020)**

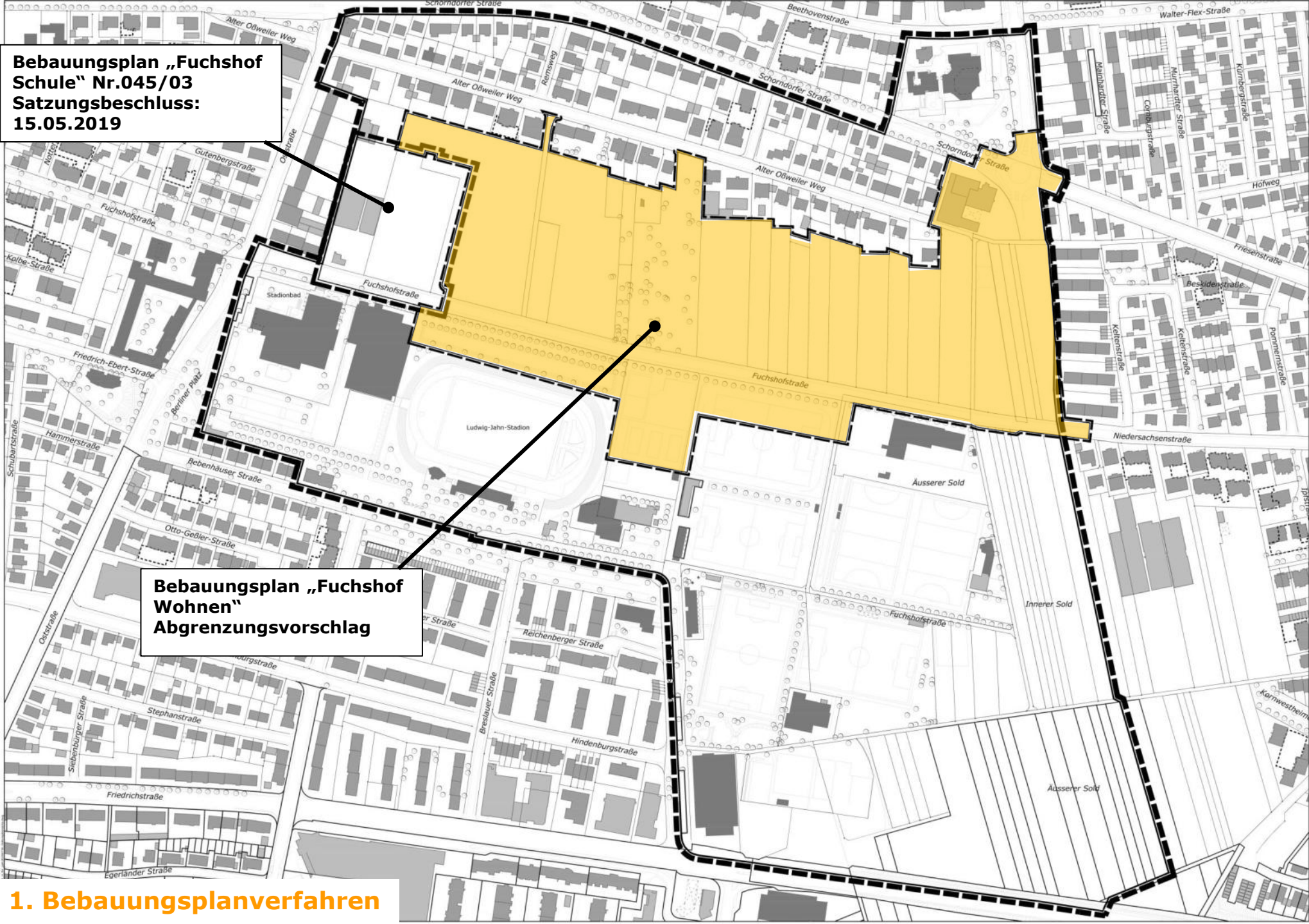
**1. Bebauungsplanverfahren**





**Bebauungsplan „Fuchshof Schule“ Nr.045/03  
Satzungsbeschluss:  
15.05.2019**

**Bebauungsplan „Fuchshof Wohnen“  
Abgrenzungsvorschlag**



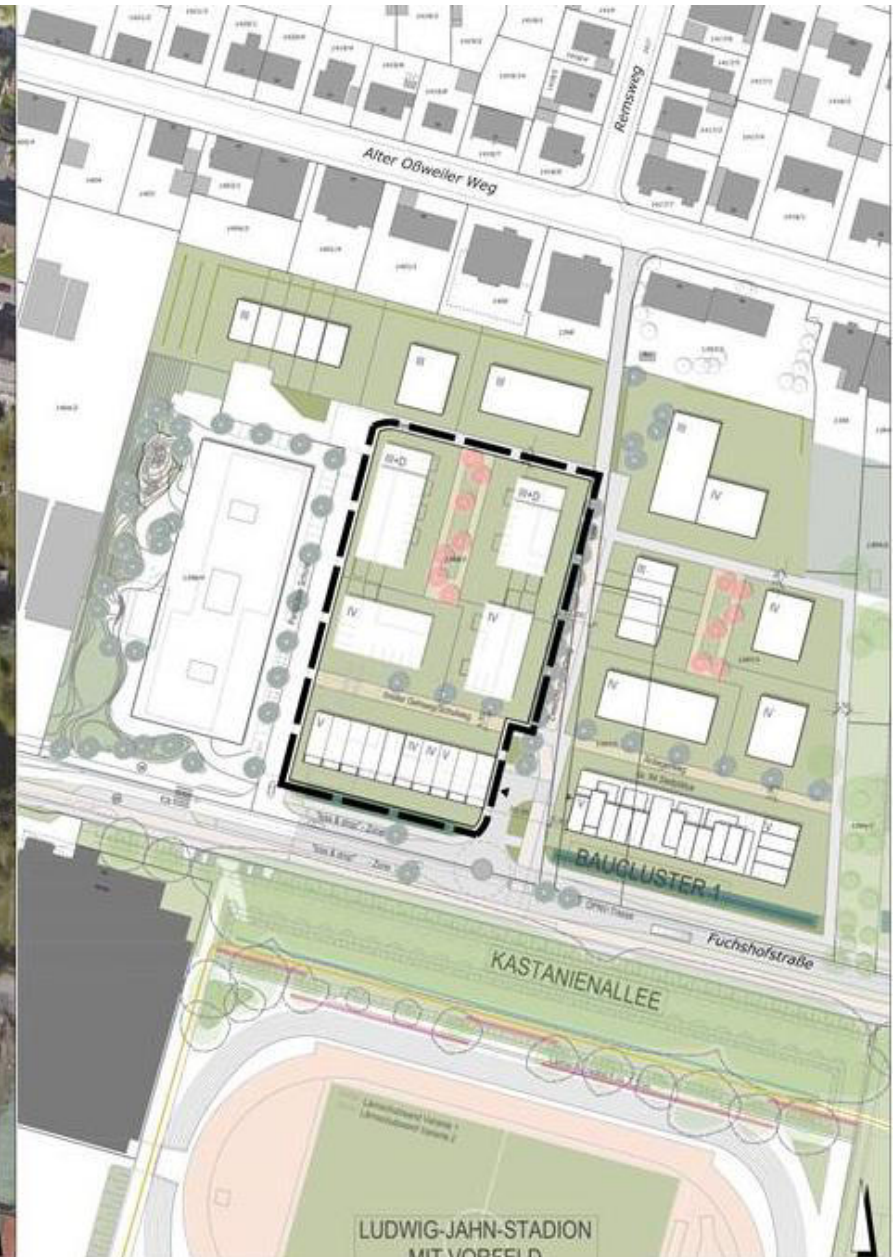
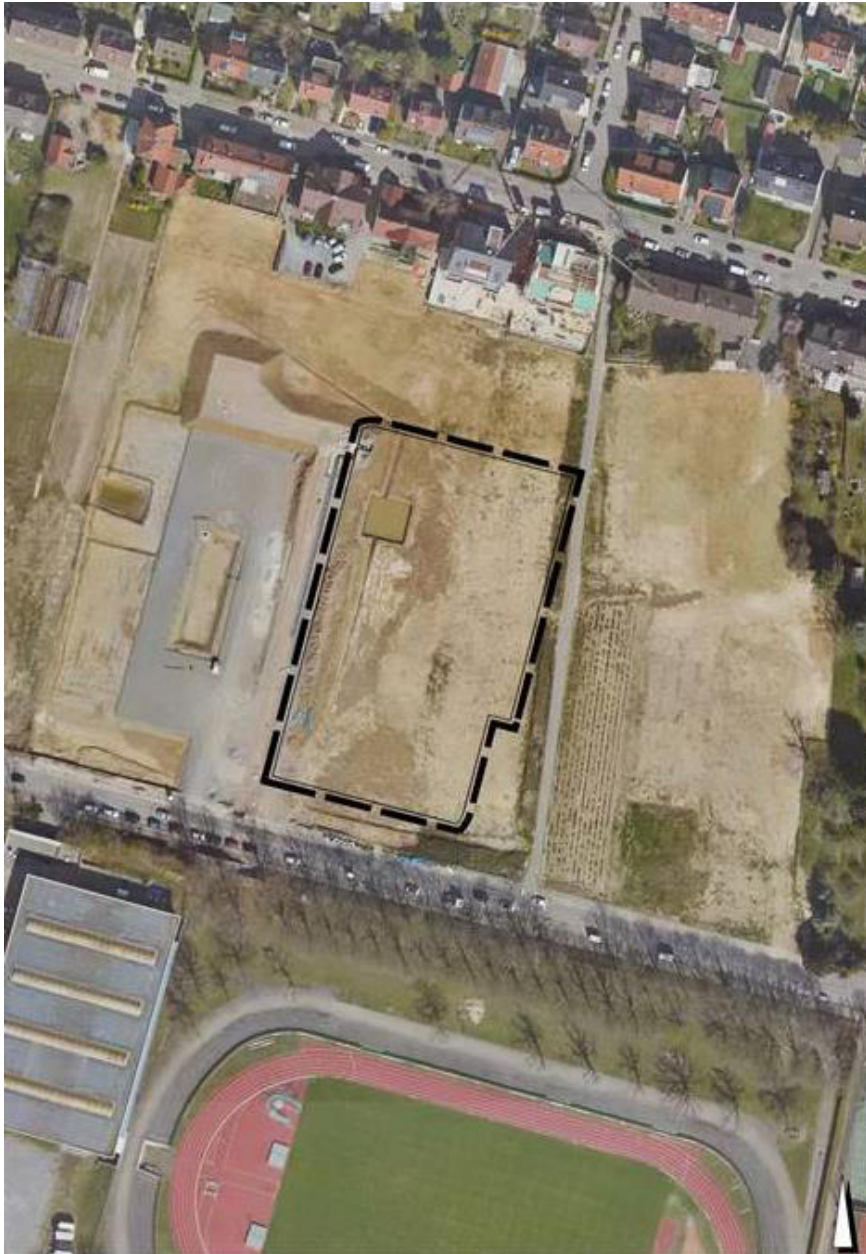
## 1. Bebauungsplanverfahren



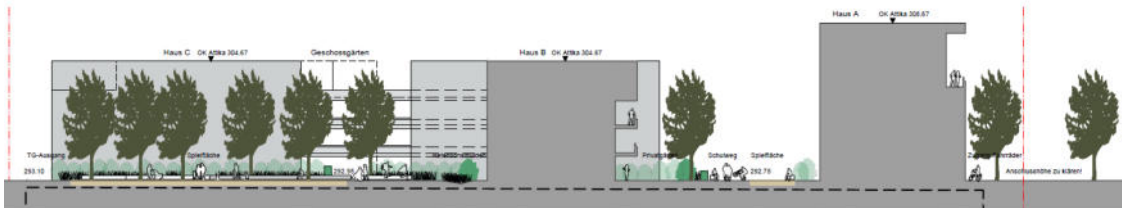




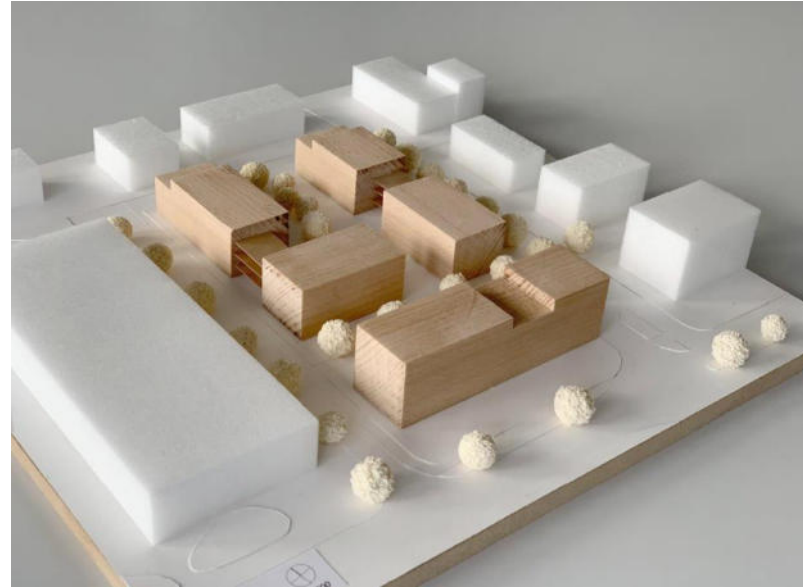
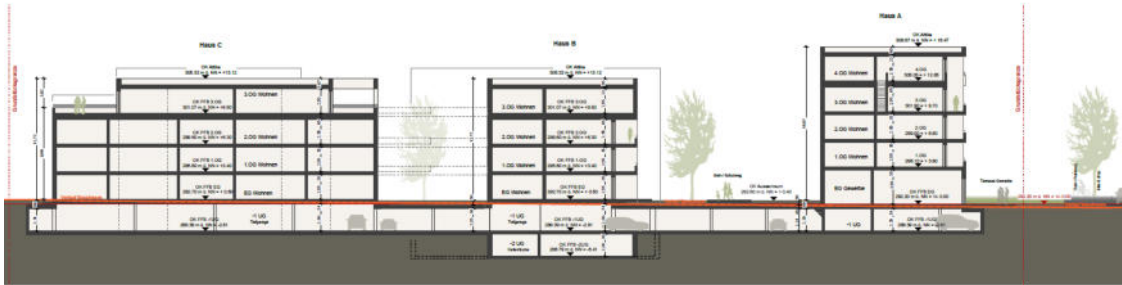
# 1. Städtebaulicher Entwurf – Projektgrundstück Fa. Bonava



# 1. Städtebaulicher Entwurf – Projektgrundstück Fa. Bonava



Aussenanlagen





# 2. Gestaltleitfaden

VORABZUG

Stadt Ludwigsburg | Fuchshof Gestaltleitfaden

28.07.2020



## Wozu ein Gestaltleitfaden?

Bsp. Modernes Stadtbild: Ludwigsburg, Hartenecker Höhe  
Ruhe durch Einheit



Bsp. historisches Stadtbild: Herengracht, Amsterdam



Bsp. Modernes Stadtbild: Karlsruhe  
Lebendige und vielfältige Fassaden



## Aussagen zu:

- Baukörper
- Dachform / Dachbegrünung
- Dachaufbauten, Solaranlagen
- Antennen
- Fassade /  
Schutzeinrichtungen
- Balkone und Loggien
- Etc.

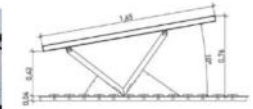
### 3. Energiekonzept

Zur Erreichung der Klimaneutralität wird eine Maßnahmenkombination aus regenerativer Wärmeversorgung, lokaler erneuerbarer Stromerzeugung und einer ressourcenschonenden Bauweise empfohlen.

Daraus resultieren folgende, zwingend einzuhaltende **Maßnahmen:**

- **Photovoltaikanlagen auf 60%** der Bruttodachflächen inklusiver Dachbegrünung.
- Regenerative Wärmerzeugung durch **Anschluss an die ökologische Fernwärme**. Die Fernwärmeversorgung erfolgt größtenteils über die Rücklaufauskopplung.
- Bauweisen mit niedrigem Einsatz von grauer Energie (**Neubau in Holz-, Hybridbauweise**).
- Gebäudehülle verbessern auf (mind.) **KfW Effizienzhaus 55-Standard**.

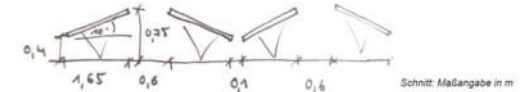
#### PV Aufständerung Ost/West auf Flachdach aufgeständert als Gründachvariante



Modulmaße: 1 m x 1,65 m (hochkant)  
Modulineigung: 10°  
Gesamthöhe PV-Anlage: ca. 0,80 m

Projektbeispiel EGS

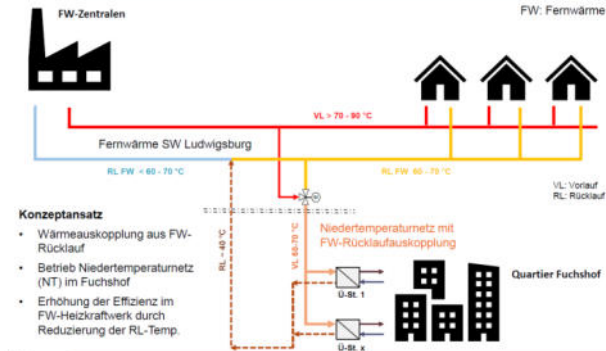
Aufständerung hoch mit Ost-West Ausrichtung  
darunter extensive Dachbegrünung möglich



© EGS plan www.egs-plan.de Überarbeitung Energiekonzept „Fuchshof“ 12.10.2020

6

#### Wärmeversorgung Ansatz FW-Rücklaufauskopplung



© EGS plan www.egs-plan.de Überarbeitung Energiekonzept „Fuchshof“ 12.10.2020

13

#### Variante B.1, Stand 2019 Variante 1: Möglicher Trassenverlauf Fernwärme I (Fuchshofstraße)



© EGS plan www.egs-plan.de Überarbeitung Energiekonzept „Fuchshof“ 12.10.2020

14



## 4. Freiraumplanung



**Grüne Fuge Süd**



**Grüner Ring Nord**



**Grüne Fuge Nord**



**Lärmschutzwand**

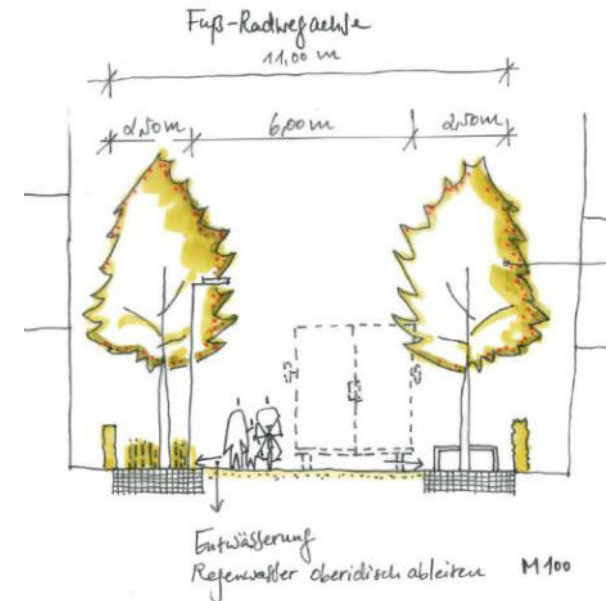


# 5. Erschließungs- und Entwässerungsplanung



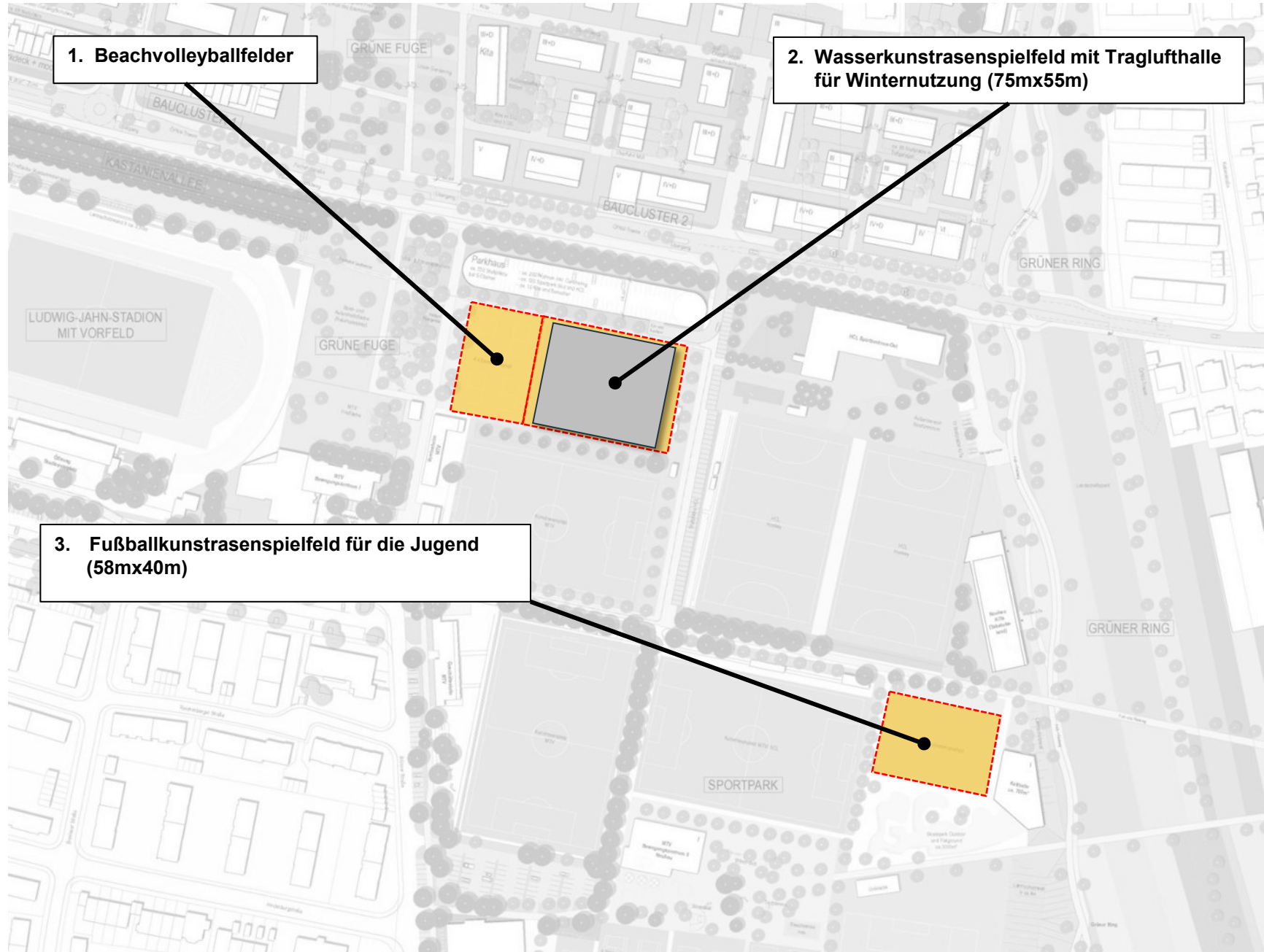
## Schwammstadt-Prinzip

- Entlastung Kanäle
- Regenwasser lokal aufnehmen, speichern, verdunsten
- Versickerungsfähige Verkehrsflächen
- Tiefbeete, Mulden, Rigolen
- Optimierung Stadtklima
- Klimagerechte Stadtbäume
- Minderung Überflutungsgefahr





## 6. Sportpark Ausgleichsmaßnahmen



# 7. Mobilität

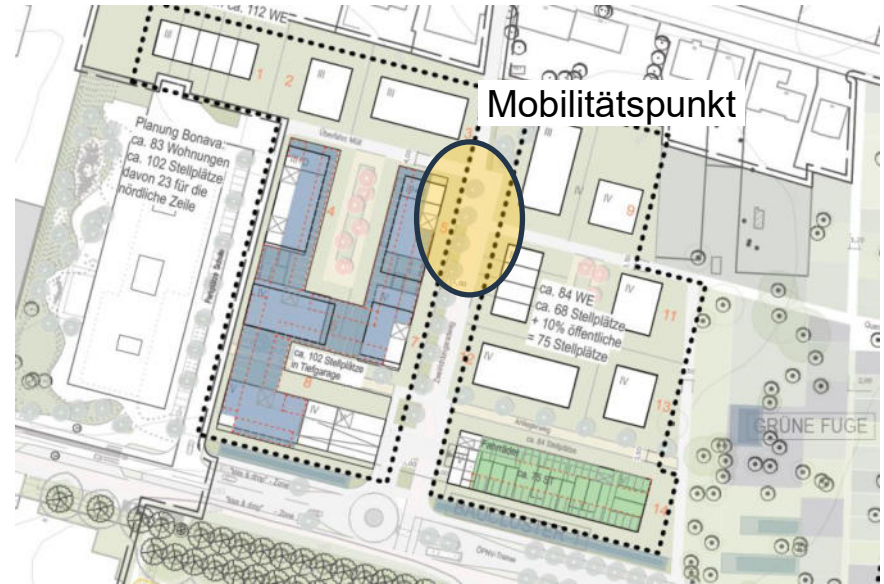
## Umsetzung des Mobilitätskonzepts in den weiteren Planungen durch

- Vorgaben an die Bauträger
- Berücksichtigung von Flächen für Mobilitätsangebote in der Freiraumplanung
- Vertiefung der Planungen für die Quartiersgarage
- Flankierender Maßnahmen (z.B. Parkraumbewirtschaftung)

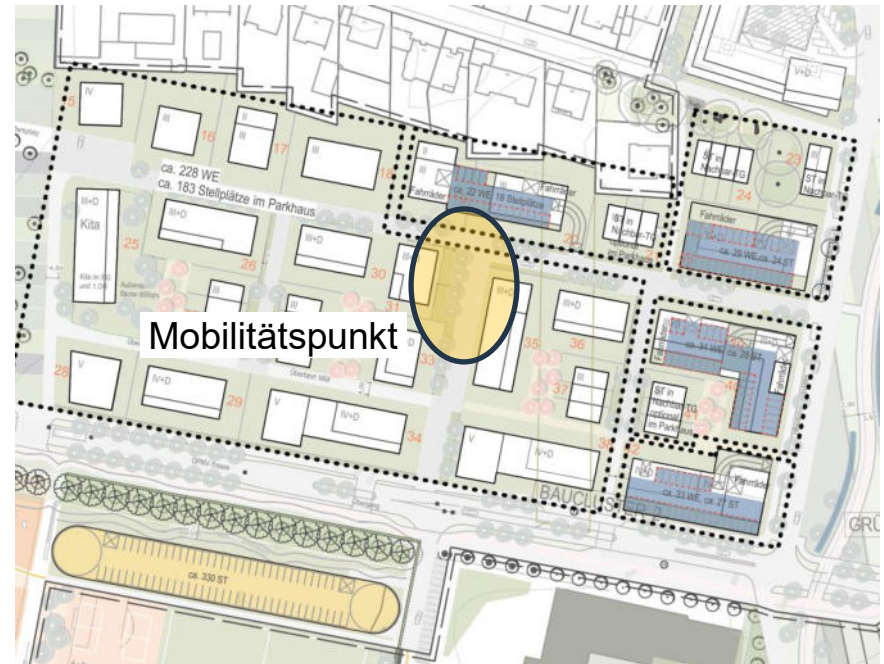
Beispiel eines Mobilitätspunktes in Bremen



<https://mobilpunkt-bremen.de/app/uploads/2020/03/mobilpunkt-ggroening.jpg>



Parkierung in den Bauclustern 1 (oben) und 2 (unten)



## 7. Mobilität

### Vorgaben an die Bauträger zur Mobilität (Vergabekonzept):

- Attraktive und großzügige Radabstellanlagen in ausreichender Zahl
- Abstellmöglichkeiten für Lastenräder, Fahrradanhänger etc.
- Sharingmodelle für unterschiedliche Fahrzeuge
- Förderung der E-Mobilität durch entsprechende Ladeinfrastruktur

Beispiel einer Mobilitätsstation im Parkhaus



[https://www.apcoa.de/fileadmin/user\\_upload/DE/Newsletter/Newsletter\\_2-19/park-up.png](https://www.apcoa.de/fileadmin/user_upload/DE/Newsletter/Newsletter_2-19/park-up.png)



# 7. Machbarkeitsstudie Parkhaus

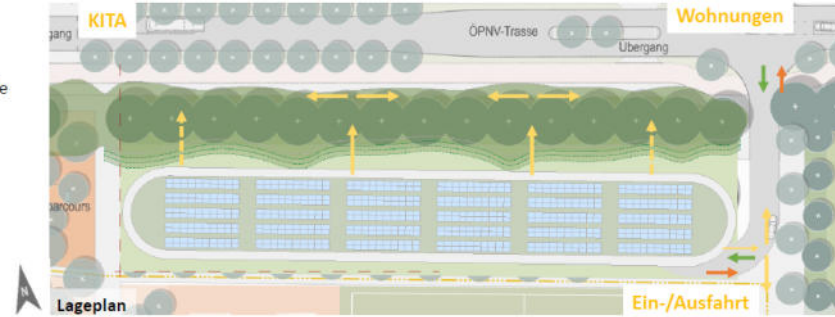
## Machbarkeitsstudie für Parkhaus (Quartiersgarage) des Baucluster 2

### Ziele:

- Entwicklung von mehreren Planvarianten und Festlegung auf eine oder mehrere Vorzugsvarianten
- Kostenschätzung
- Wichtige Grundlage für die Entwurfs- und Ausführungsplanung

#### Lageplan / Dachaufsicht

- Dachfläche ca. 2100m<sup>2</sup>
- Ein-/ Ausfahrt Südostecke
- BHKW Zugang Nordwestecke
- PV-Anlagen und/oder Dachbegrünung



#### Ansichten

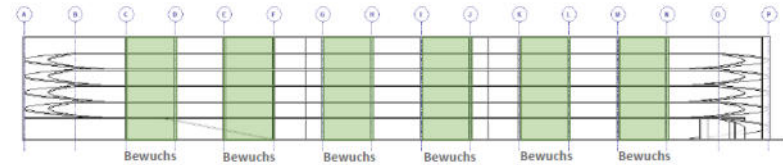
##### Nordseite (Fassadengliederung)

- Treppenräume
- Wendelrampen
- geschlossen (Lärm-/Lichtschutz)



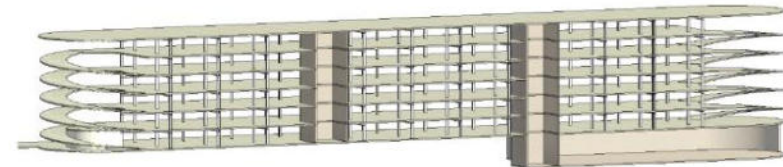
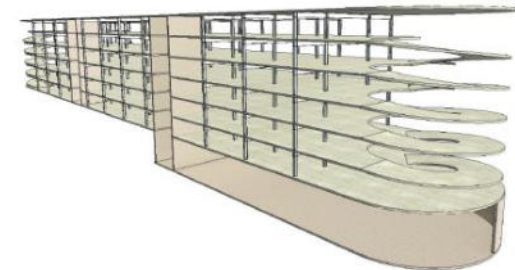
##### Südseite

- offen (teilweise begrünt)
- Unterteilung auch hier möglich



#### Vorteile

- optimaler Verkehrsfluss
- Höhere Stellplatzanzahl
- gleichmäßige Fassadengestaltung
- flexible BHKW Größe
- Kurzzeitparker näher an KITA
- einheitliches
- Raster/Tragwerkssystem
- Geringere Kosten pro Stellplatz
- Mögliche geringere Kosten durch einheitliches System



## 8. Zeitlicher Ausblick

### **Bebauungsplanverfahren**

- Frühjahr 2021: Entwurfsbeschluss
- Sommer 2021: Satzungsbeschluss

### **Erschließung der Baucluster 1+2**

- Frühjahr 2021: Bau- und Entwurfsbeschluss
- Ab Herbst 2021: Realisierung

### **Fuchshofstraße**

- Frühjahr 2021: Bau- und Entwurfsbeschluss
- Ab Herbst 2021: Realisierung

### **Quartiersgarage und Ausgleichsmaßnahmen**

- Bis Ende 2020: Fertigstellung der Studie
- Ab Herbst 2020: Entwurfsplanung für Ausgleichsmaßnahmen
- Ab Frühjahr 2021: Entwurfsplanung für Quartiersgarage

### **Grüne Fuge und Grüner Ring**

- Frühjahr 2021: Bau- und Entwurfsbeschluss

### **Sportpark Süd-Ost**

- Nov. 2020: Fertigstellung der Entwurfsplanung
- 2021: Bau- und Entwurfsbeschluss

