

Greenaccord V Media Forum
Rome, 8th. November 2007



Why “limits to growth” won’t hurt

Sustainable development and economic growth in Europe

Friedrich Hinterberger
Thomas Schauer
Paul Weaver

Who I am

Dr. Friedrich Hinterberger

Born 1959 in Schwanenstadt/Upper Austria

Studies 1978-85: economics and statistics, Universität Linz, Austria

PhD 1985-90: Universität Gießen, Germany

Wuppertal Institute 1993-2000: Project leader, later: acting director for Material Flows and Ecological Economics

Since 1999: Founding President of the Sustainable Europe Research Institute

among many other functions: member of the board of the Austrian Chapter of the Club of Rome



Profile

Sustainable Europe Research Institute

PanEuropean Network;

Headquarters in 1090 Wien; currently 15 staff

800.000 Euro annual turnover

other offices in Germany, soon in F, GR, ...?

Themes: Ecological Economics, Production and Consumption, Globalisation, Science, Policy and Society, Quality of Life

Research: Global, European and national Projects

Communication: Public, new Media

Consulting: Politics, NGOs, Business





Content

1. Limits to growth – revisited
2. Measuring sustainability
3. Economic growth and well-being
4. Scenarios towards a sustainable future



Content

1. Limits to growth – revisited
2. Measuring sustainability
3. Economic growth and well-being
4. Scenarios towards a sustainable future

R. Carlson: The silent spring. 1962

K. Boulding: Spaceship earth

**Meadows et al:
Limits to growth 1972**

“Global 2000”

Measuring what?

Achievement of **pre-defined** goals!

Measuring what?

Achievement of **pre-defined** goal!

->

From problems to solutions

Two European strategies

- **Lisbon:**

growth and jobs!

- **EU-SDS:**

well-being and quality of life

-> loads of indicators for both strategies

Resilience: a core concept of sustainable development

- **Sustainability** is about

sustaining natural, social and economic systems

... coping with change

different time scales are important!

Double problem of complexity

- **ecological systems:**
are disturbed by socio-economic systems
through reduction of complexity

- **socio-economic systems:**
are disturbed by human intervention
through reduction of complexity

Is there a Climate “problem”?

NEUER Umwelt-Schock!

twoch, 14/3
anuar 2007 0,50 €

Bild

UNABHÄNGIG · ÜBERPARTEILICH

- 40% unserer Tiere sind vom **AUSSTERBEN** bedroht
- Nie mehr **SCHNEE?**
- Inseln werden **WEGGESPÜLT**

World Oil Demand

By Region

MBD

140

120

100

80

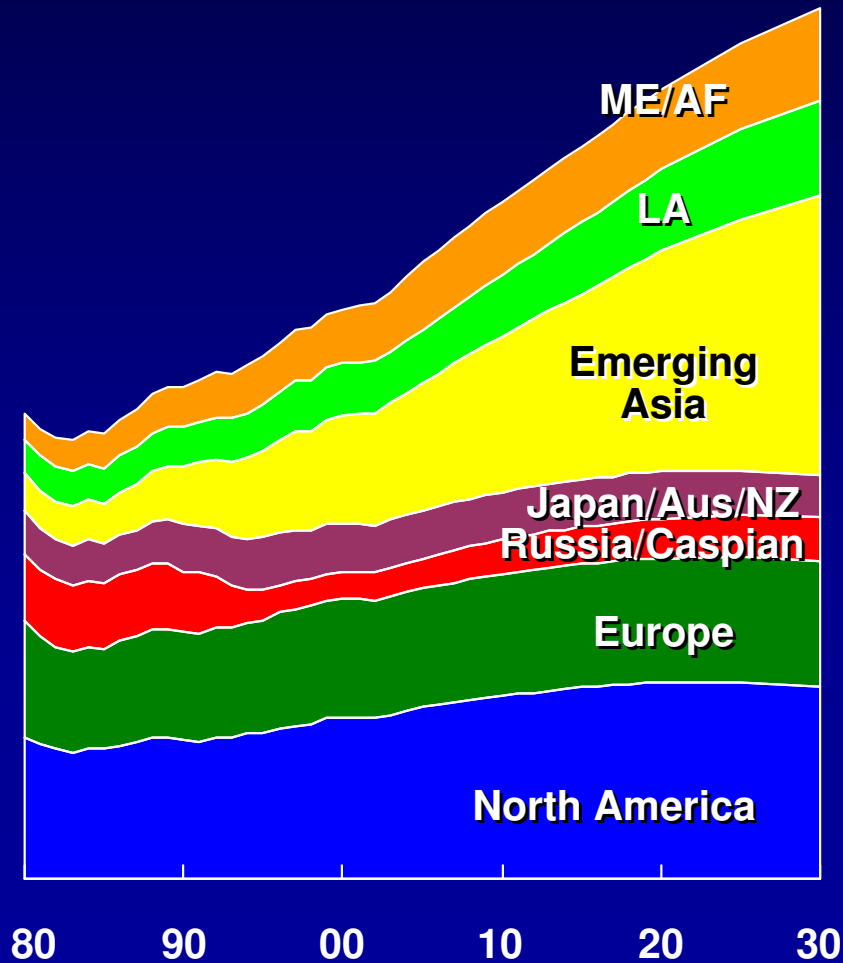
60

40

20

0

The "China" Factor



By Sector

MBD

140

120

100

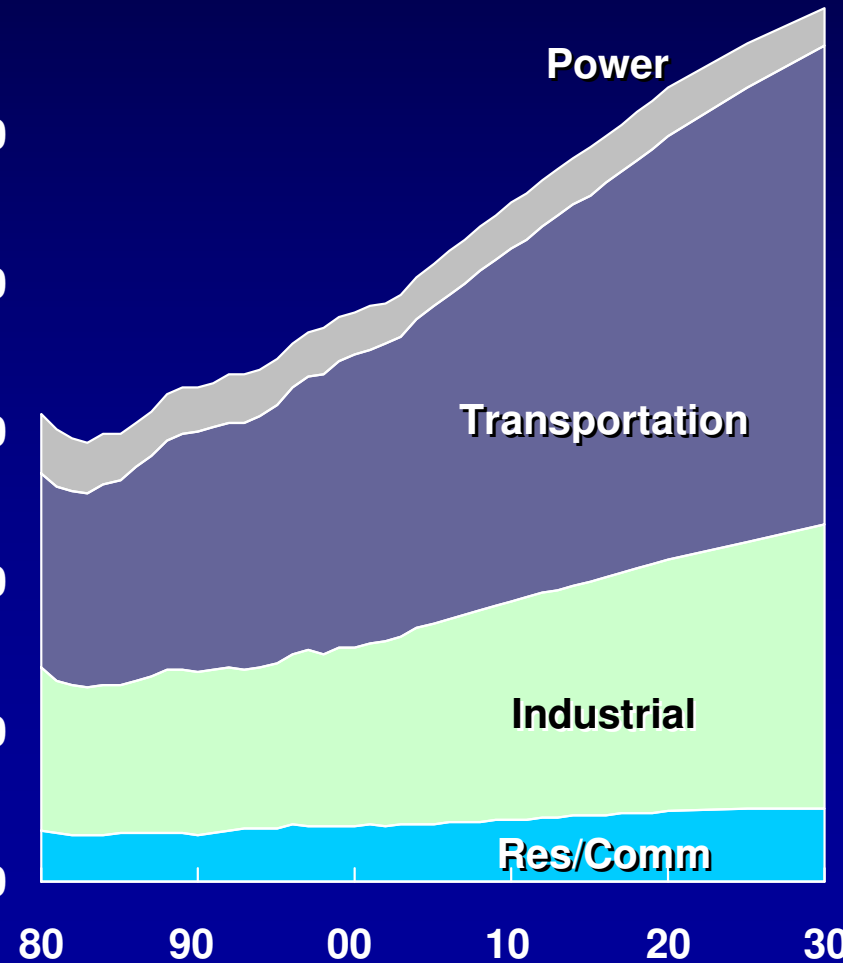
80

60

40

20

0



Der Spiegel:
“A new cold war“

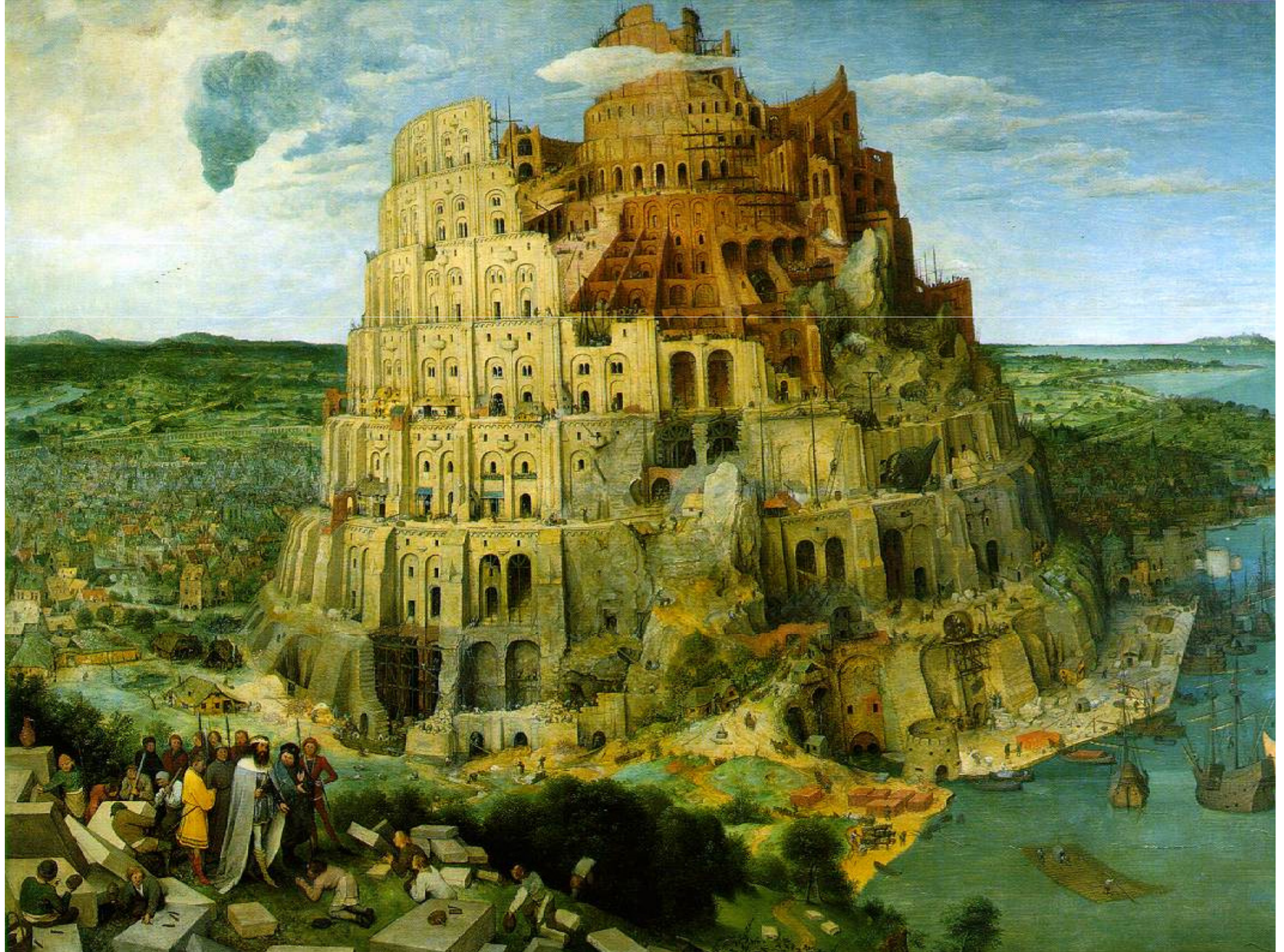


Von kalten Energie- strategien zu heißen Rohstoffkriegen?



Schachspiel der Weltmächte zwischen
Präventivkrieg und zukunftsfähiger
Rohstoffpolitik im Zeitalter des
globalen Treibhauses

Österreichische Post AG Sponsoring Post • ZuluNr. 022030771 • Verfügbar am 7.4.61 Staatsstählung • Erschellungsort: 7.4.61 Staatsstählung • Frieden Forum - Platz zur Friedenslicht • Sondernummer 1 - 2/2007



A comprehensive view on capital

Economic capital

machines, software, patents..

Natural capital

Eco-systems, biodiversity, climate

Human capital

People, education, values

Social capital

Relations, networks, orientation

Why “capital”?

capital „**produces**“ quality of life

Capital should be **preserved**: not to be used up

Investment in capital

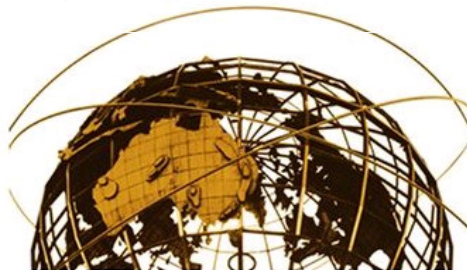
Only partial **substitution**

Indicators

„you can't **manage** ...

FORUM FÜR VERANTWORTUNG 

Jill Jäger
**WAS VERTRÄGT
UNSERE
ERDE NOCH?**
Wege in die Nachhaltigkeit



what you can't **measure**“

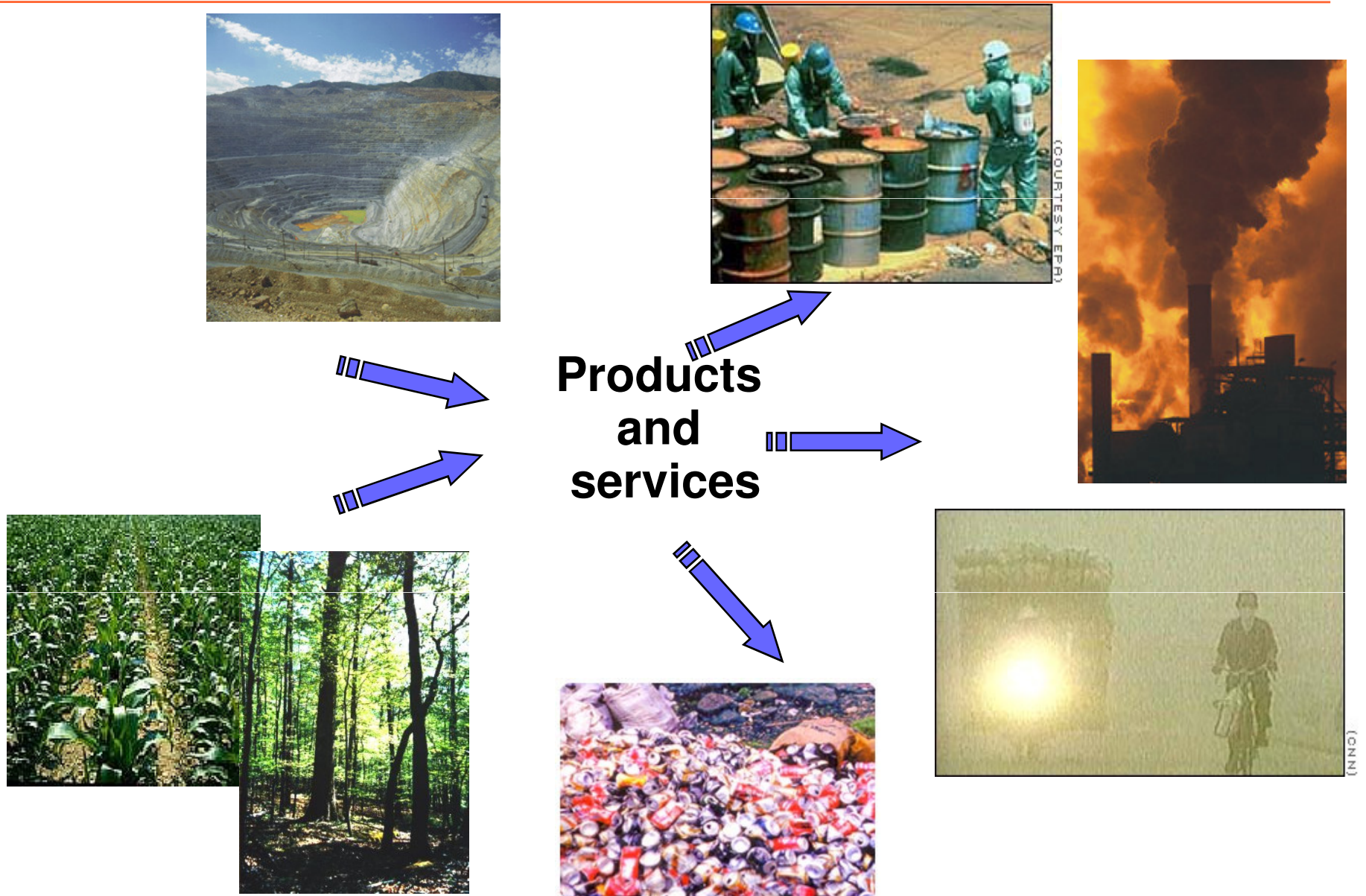
Competition for attention

„Frontpage indicators“

- Economic (GDP) growth
- (Un) employment
- (... environment...) ???



From Inputs to Outputs





Measuring the environment

- Material flows and ecological rucksacks
- Ecological footprints
- CO2 rucksacks
- Water rucksacks

Competition for attention

„Frontpage indicators“

- Economic (GDP) growth
- (Un) employment
- **Total material consumption, ecological footprint etc.**





COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 21.12.2005
COM(2005) 670 final

**COMMUNICATION FROM THE COMMISSION TO THE COUNCIL, THE
EUROPEAN PARLIAMENT, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

Thematic Strategy on the sustainable use of natural resources

{SEC(2005) 1683}
{SEC(2005) 1684}

Resource Strategy

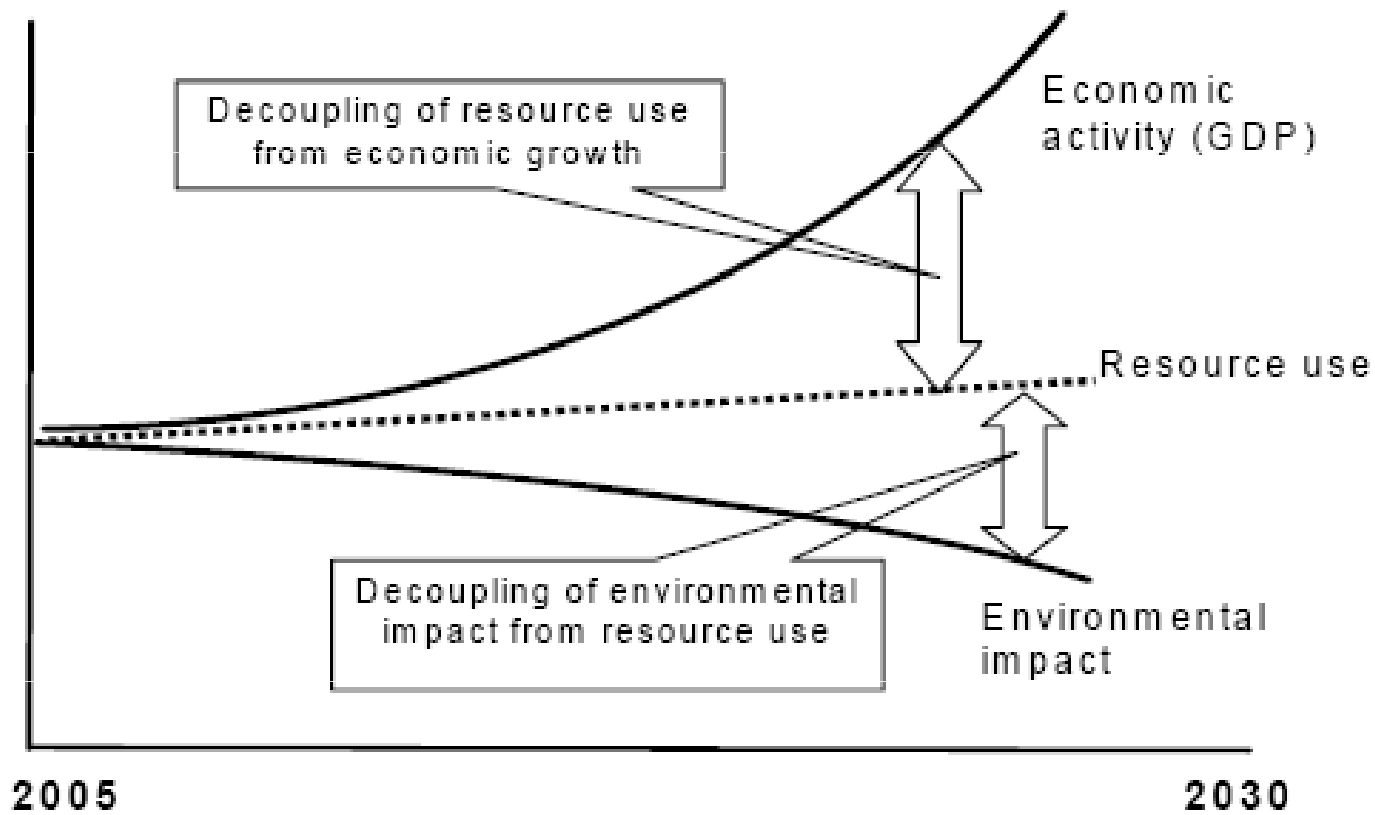


Figure 1

Indicators

– Two decoupling phenomena are shown in Figure 1:

- decoupling of resource use from growing economic activity, which implies a reduction of resource use per unit production (e.g. GDP), and
- decoupling of environmental impacts from resource use, which implies a reduction of environmental impacts per unit of resource use

The first mechanism is an on-going development in the EU since economies tend to shift from manufacturing to services.

Global perspectives

Domestic material extraction in EU-25 (2005)

Global (domestic) material extraction (2005)



EU Total:
7.2 billion t

Per capita:
15.7 t

Per € (EU-12):
0.77 kg

World **58.3** billion t

9.0 t

0.?? kg

www.materialflows.net

The online portal for material flow data



[Background](#)

[Global trends](#)

[Data sets](#)

[Literature](#)

[Links](#)

[Home](#)

www.materialflows.net is an online portal for material flow data, providing links and access to material flow data sets on the national level.

- » [Learn more about the importance and policy relevance of material flows](#)
- » [Explore world-wide trends of natural resource use](#)
- » [Jump directly to the material flow data sets](#)

Featured publication **[September 2006]**

Tracking Europe's Natural Resource Consumption

A Consensus Statement on the Importance of National Material Flow Accounting

The consensus statement was developed by SERI, the Wuppertal Institute, the Global Footprint Network and Friends of the Earth Europe and is so far endorsed by Best Foot Forward, the Charles University Environment Center and the Factor 10 Institute.

In the statement, we emphasise that providing for the well-being of a still growing world population within the limits of a finite planet is the key challenge for our future. Physical



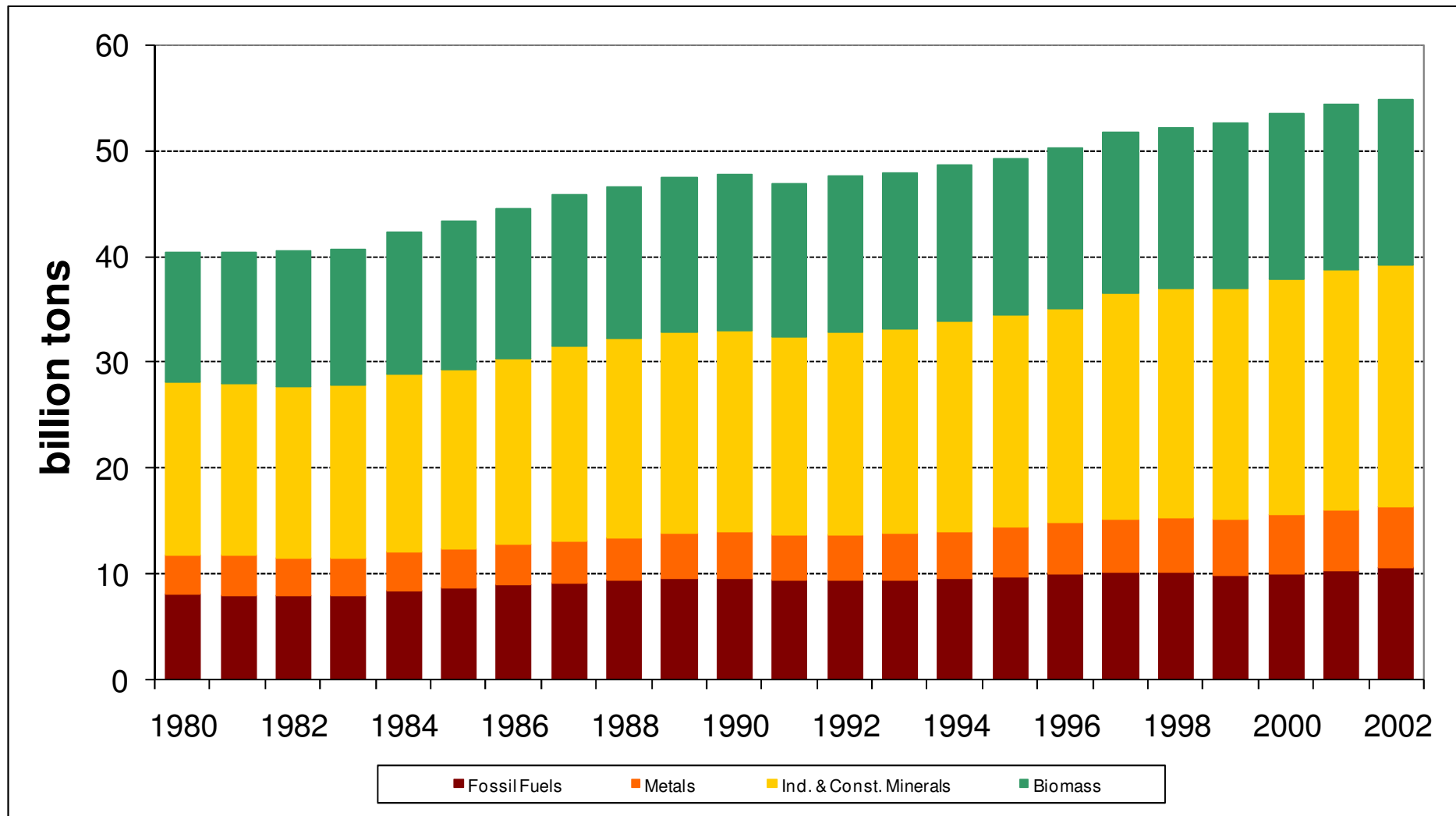
This site is maintained by the Sustainable Europe Research Institute

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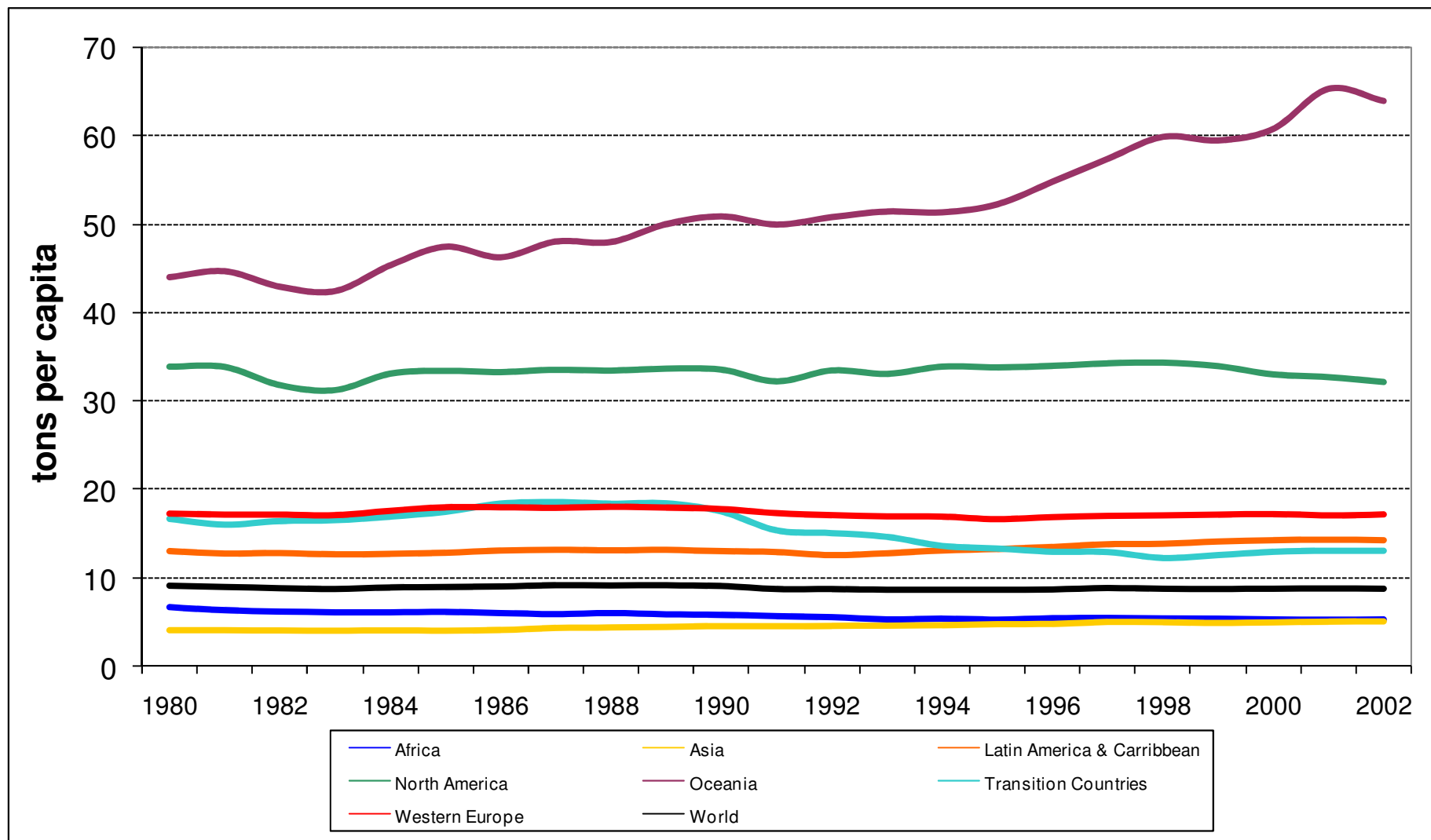


This site is supported by the Austrian Federal

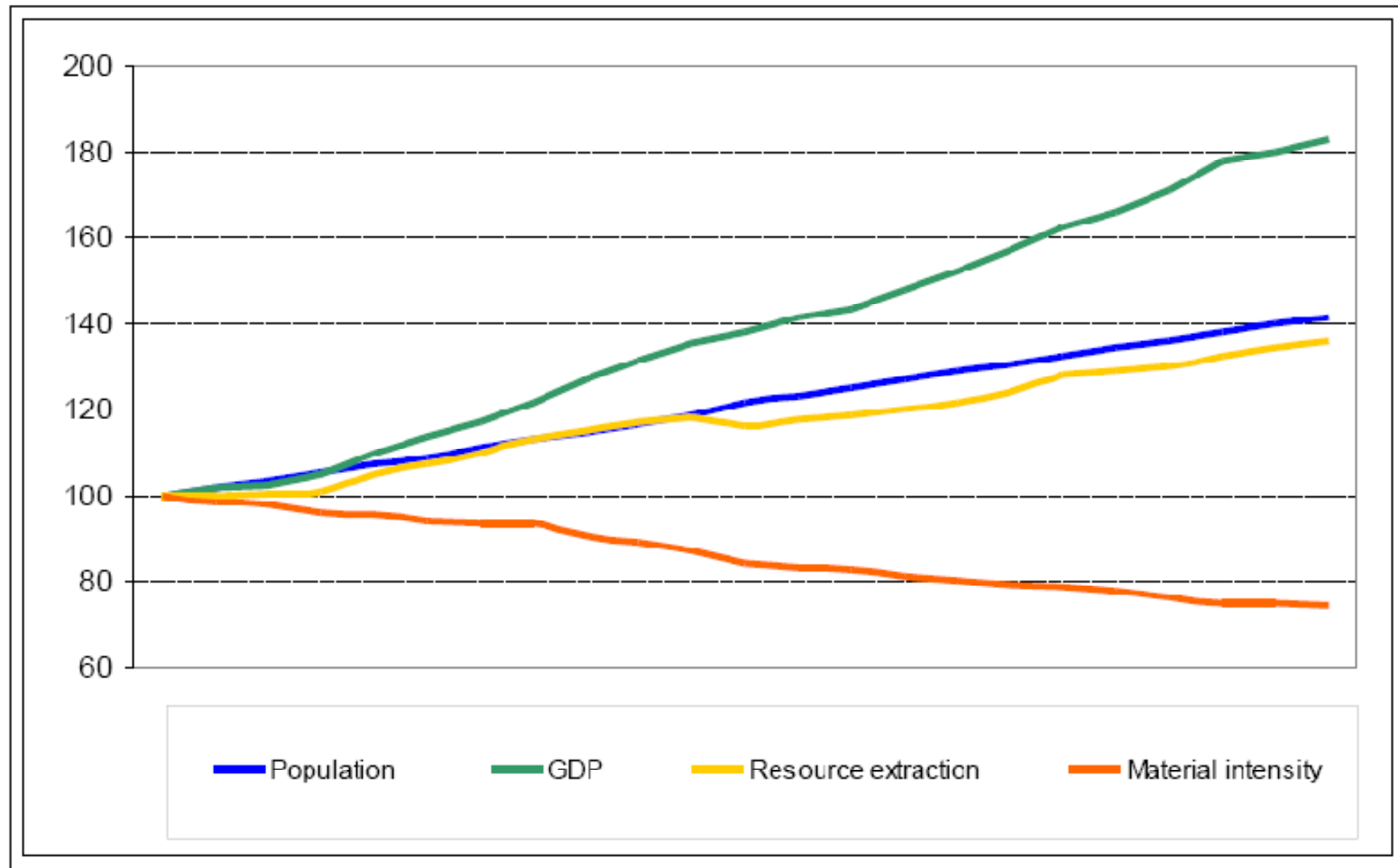
Global Used Extraction by Material Category



Domestic Extraction per Capita per World Region

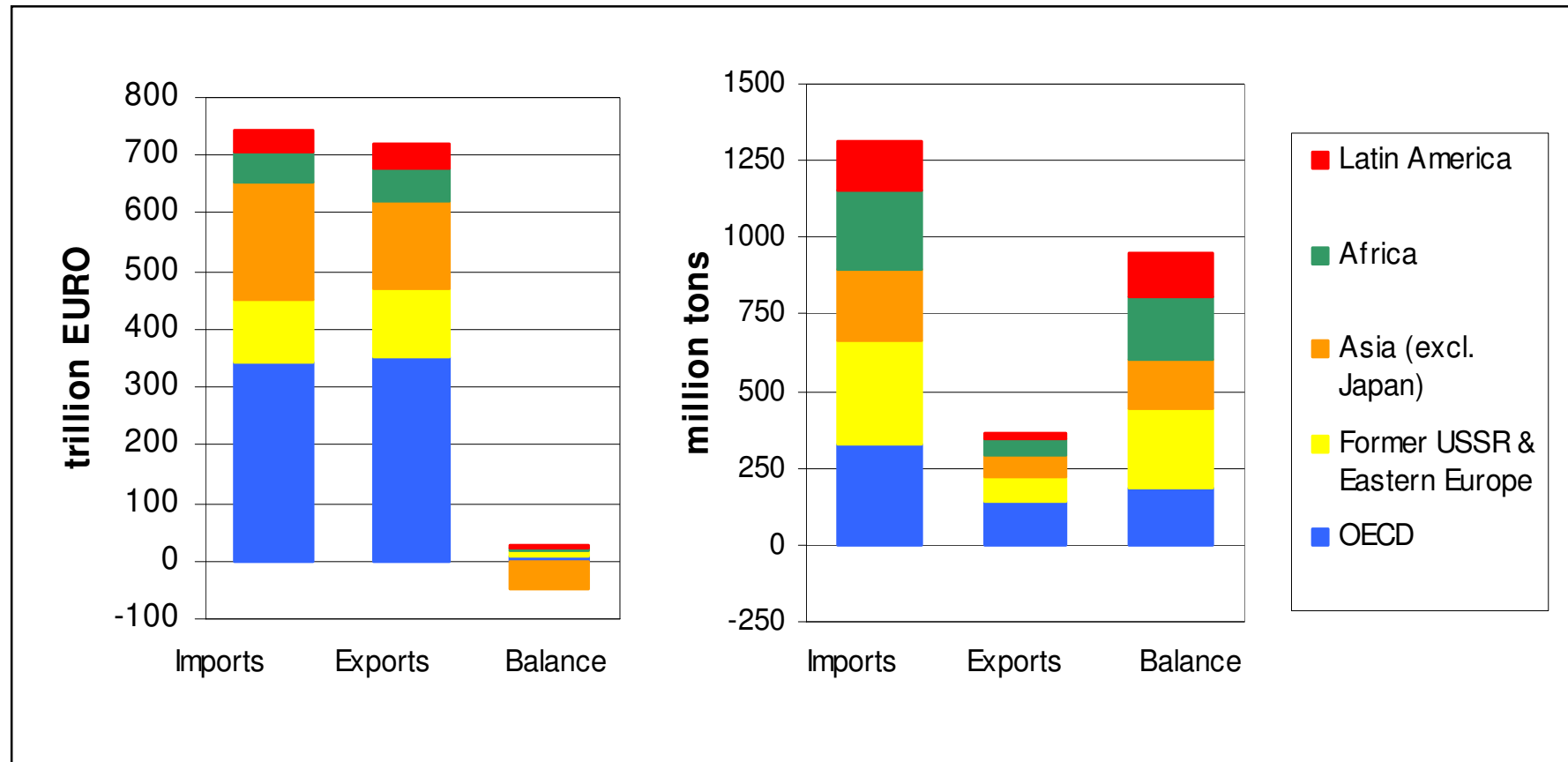


De-coupling of GDP and resource extraction (1980 = 100)



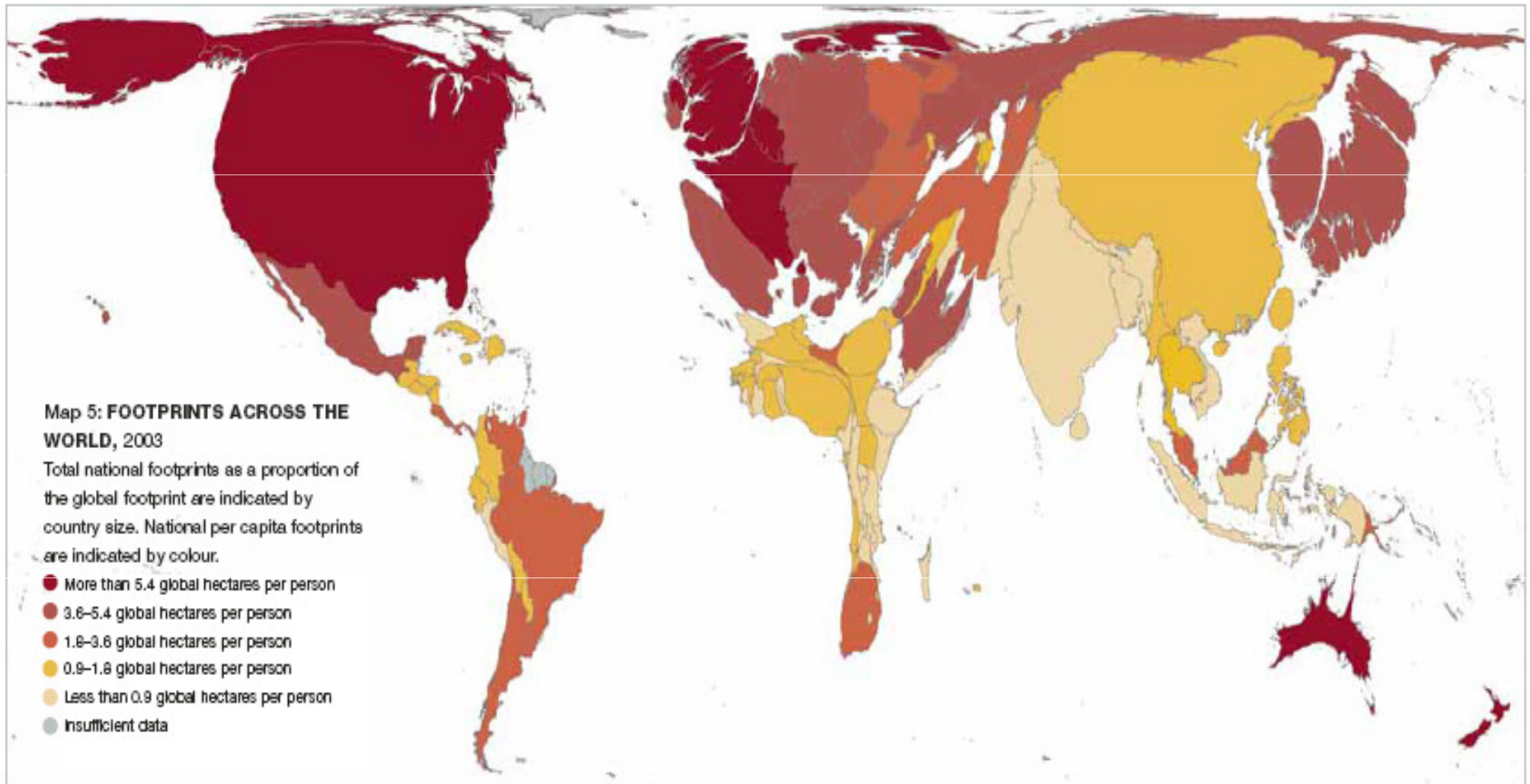
Quelle: Giljum et al. 2004

EU-15 external trade: monetary and physical (1999)



Quelle: Giljum und Hubacek 2001

Extraction – Production/Trade – Consumption



Consensus Statement

Motivation

- Bringing together the MFA and ecological footprint community to sign a joint statement on the importance of solid national material flow accounts
- Bringing together institutions demanding the establishment of one MFA-based headline indicator in EU indicator sets (in particular, EU structural indicators)



Consensus Statement

The statement demands to

1. strengthen national material flow accounting as the data basis for the calculation of a number of key environmental sustainability indicators.
 - MFA is the core information base for research and policy analysis related to natural resource use and resource productivity
 - A solid and harmonised data system on national material flows is of key importance for our work:
 - GHG accounting
 - **Ecological Footprinting (more than 80% of EF calculation with MFA data!)**
 - Environmental Space
 - MIPS/LCA
 - Etc.



Consensus Statement

The statement demands to

2. adopt Total Material Consumption (TMC) as an EU headline indicator.

Signing institutions (Auswahl)

<http://www.materialflow-consensus.net/>

Best Foot Forward; UK

Charles University Environment Center
Czech Republic

Factor 10 Institute; France

Friends of the Earth Europe; Belgium

Global Footprint Network; USA

Sustainable Europe Research Institute; Austria

Wuppertal Institute for Climate,
Environment, Energy; Germany



Best Foot
Forward



Factor Ten Institute



Friends of
the Earth
Europe



Global Footprint Network
Advancing the Science of Sustainability



Wissenschaftszentrum
Nordrhein-Westfalen

Institut Arbeit
und Technik



Kulturwissenschaftliches
Institut

Wuppertal Institut für
Klima, Umwelt, Energie
Gesundheit

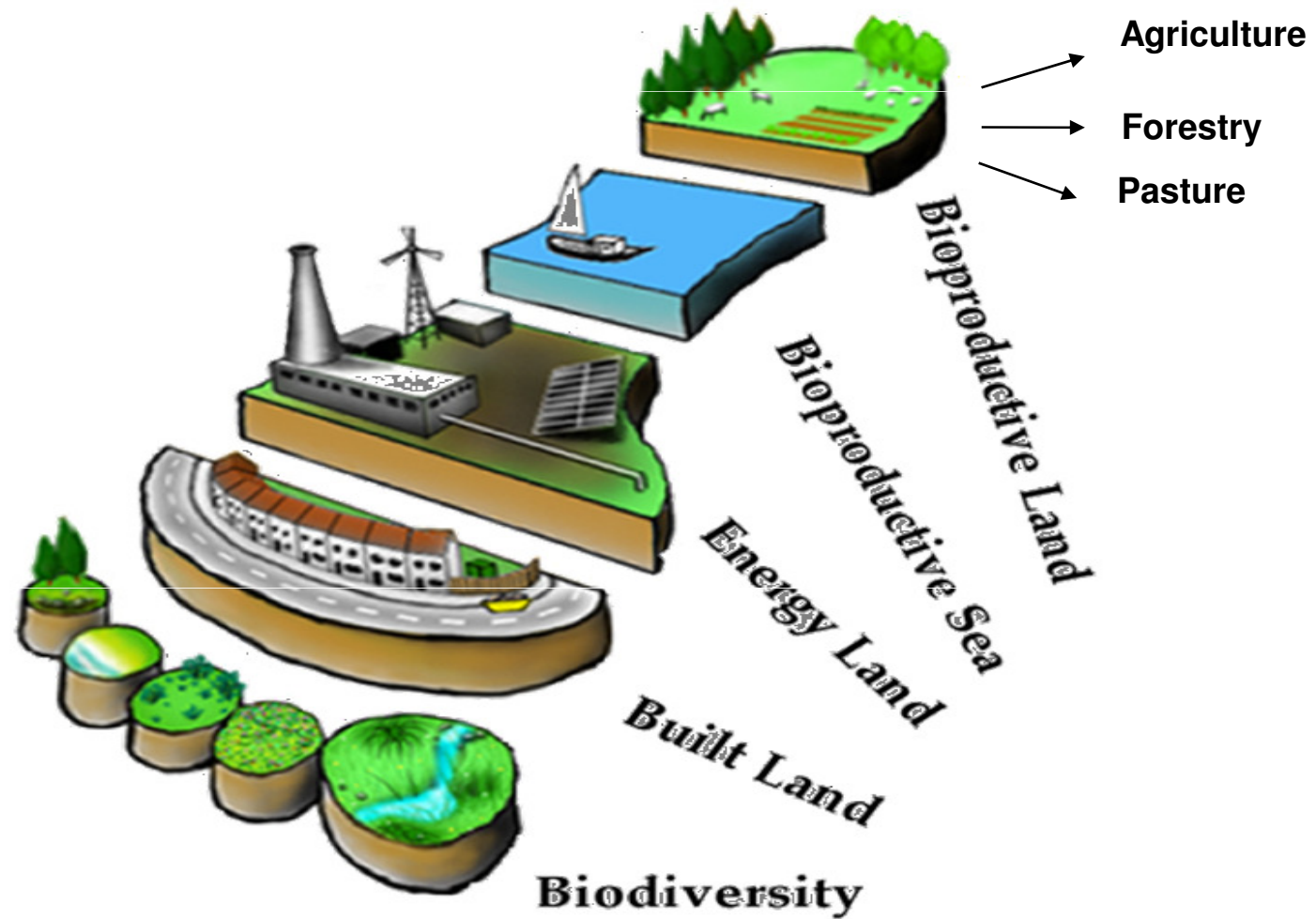
Ecological Footprint

- Mathis **Wackernagel** and William **Rees** (1992)
- Sum of all impacts on the biocapacity through the human use of natural resources
- Scale: product, city, region, national and global level
- **Calculation Unit: Area**
Physical limits of the Planet!
- Material and Energy Use converted into Area

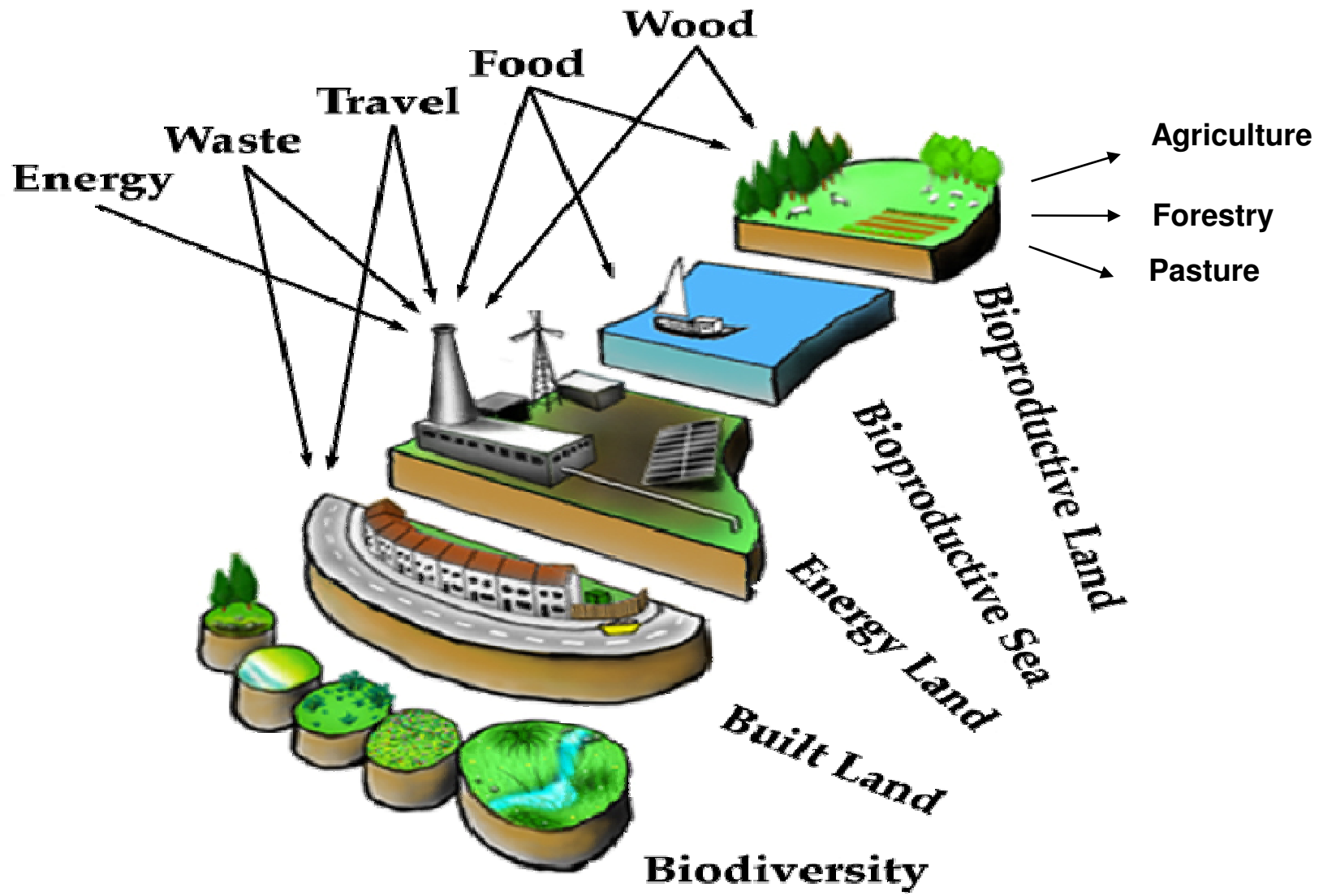
• **www.seri.at/footprint**



Ecological footprint



Ecological footprint



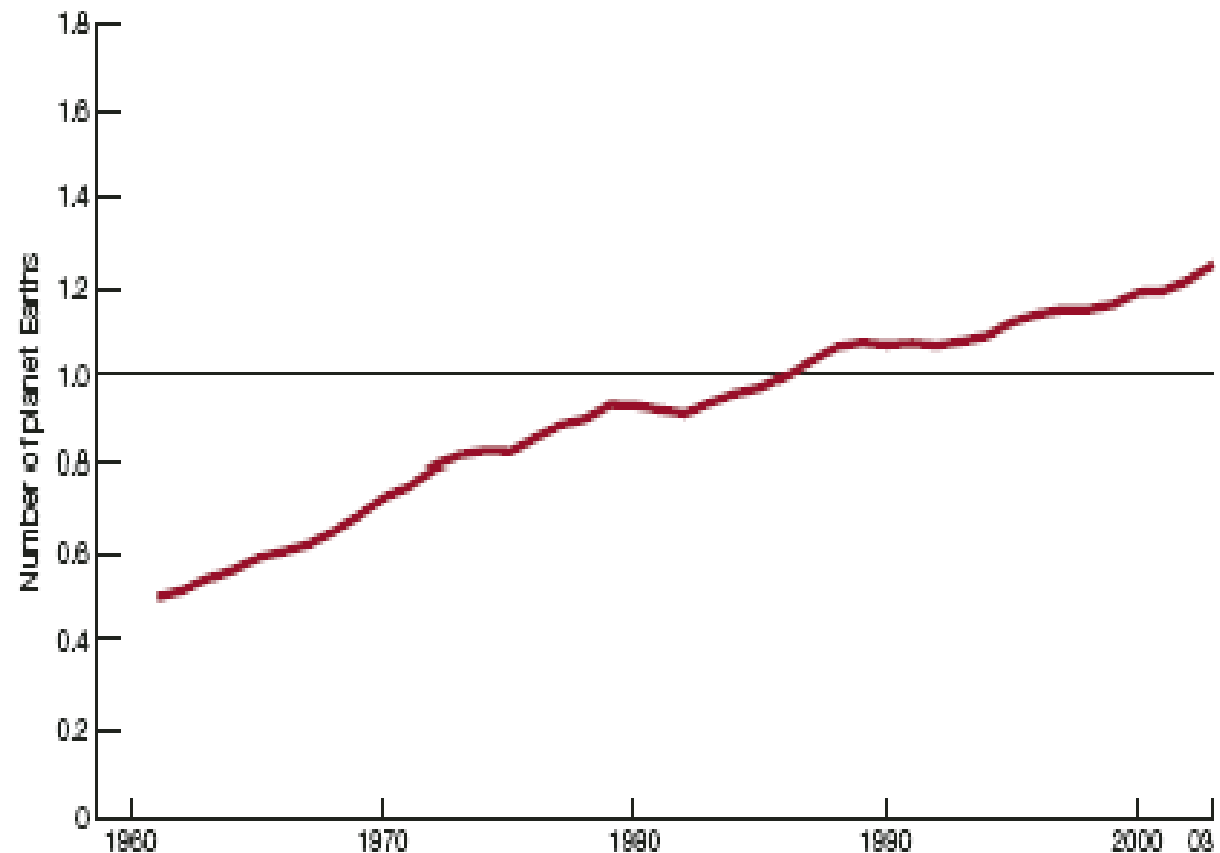
Global Overshoot

Growth of > 80%
from 1960 to 2003

2003: 25%
Overshoot (1,25
Planets)

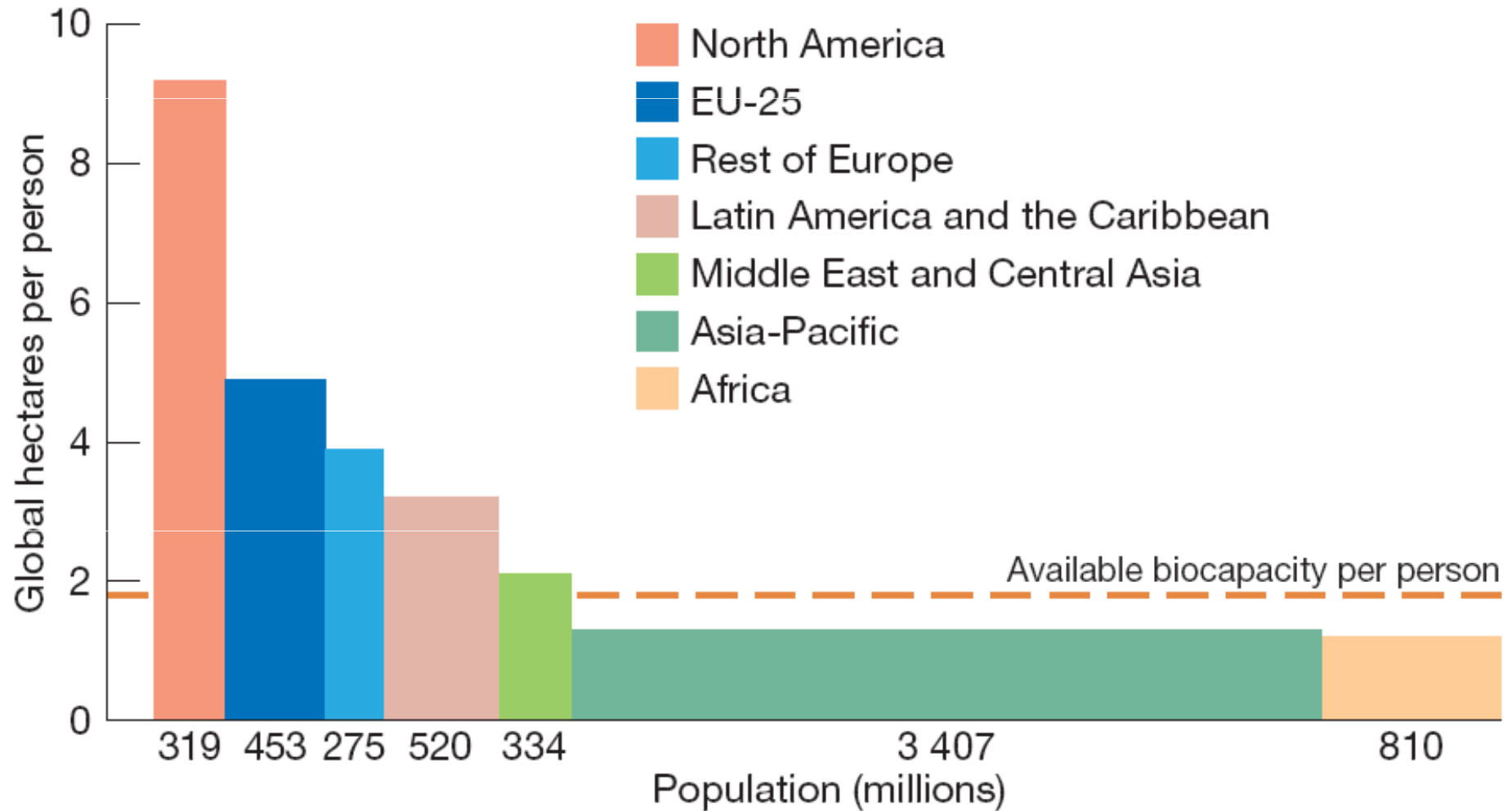
long term
destruction of
“natural capital”

**Global Ecological Footprint,
1960-2003**



Source: WWF et al., 2006

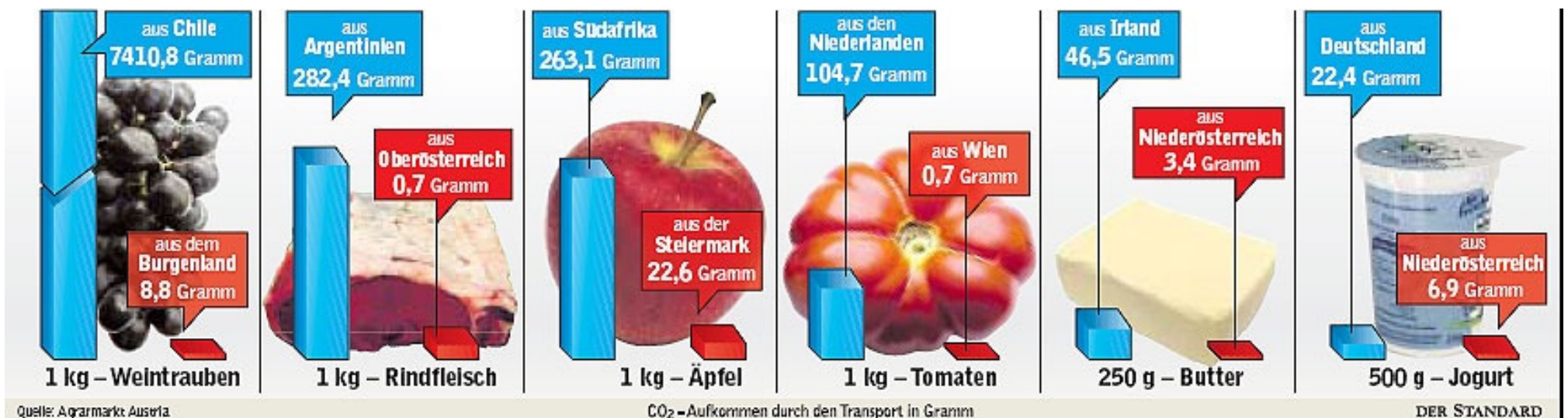
Ecological Footprint and Biocapacity by Region (2001)



Source: WWF et al., 2006

CO2 rucksack of food

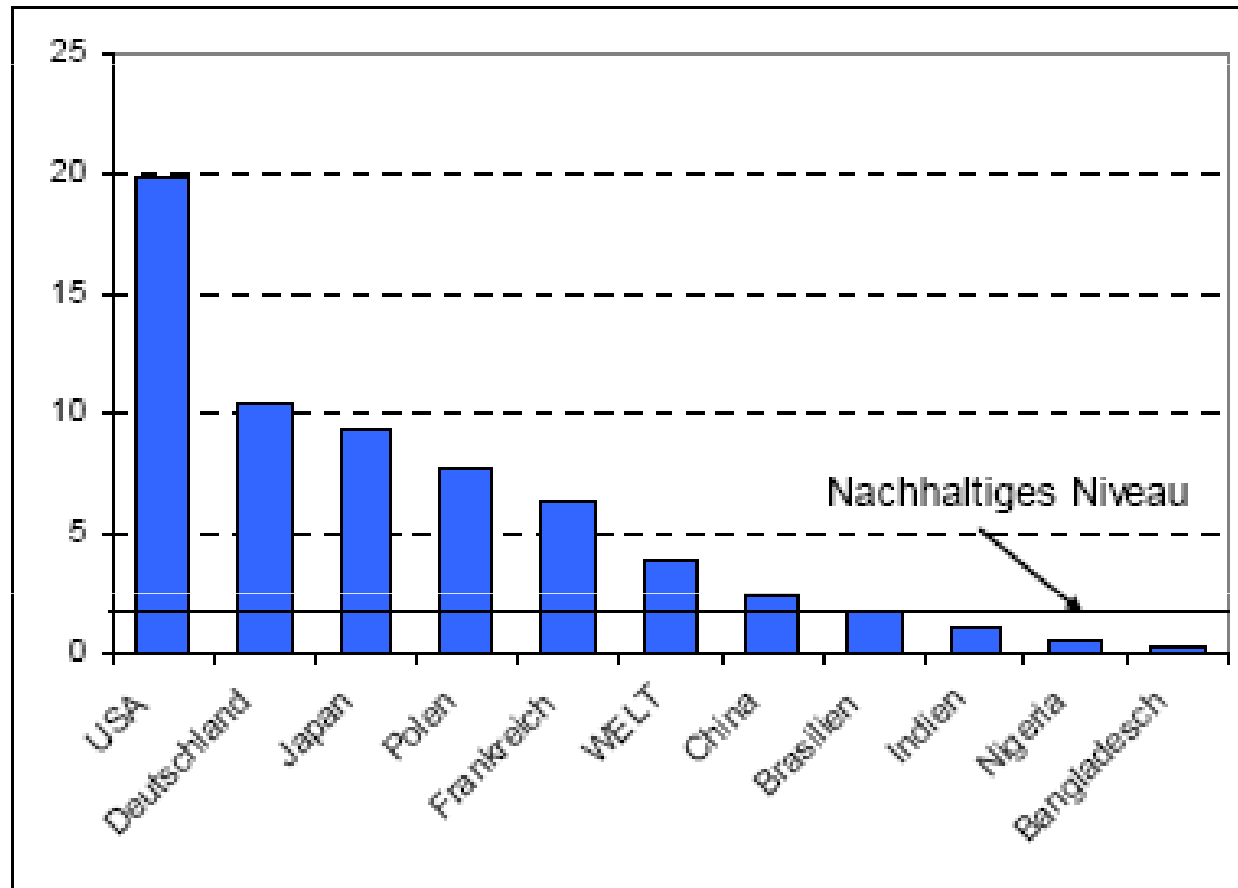
CO2 emitted by transport of food
(imported vs. domestic production)



Quelle: Der Standard, nach Berechnungen von SERI, 2007

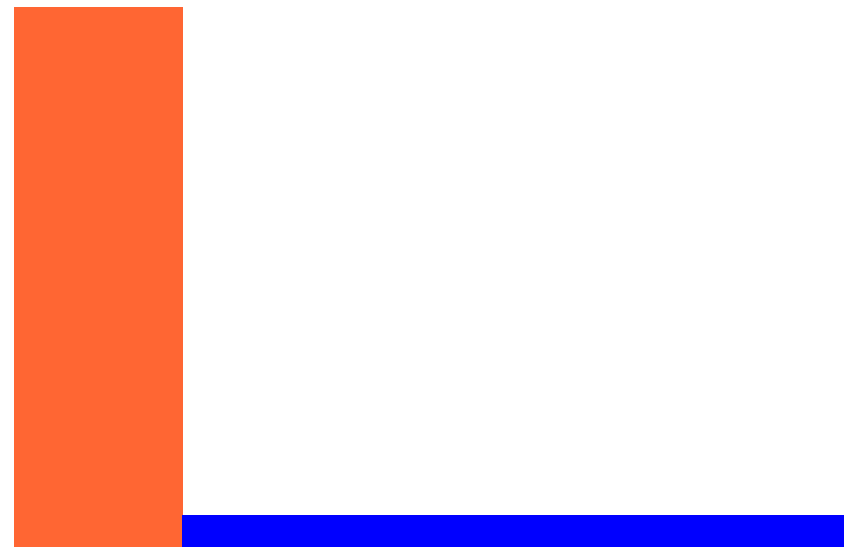
CO₂-Emissions

CO₂-Emissions (in tons) per capita, 2001



Quelle: Internationale Energieagentur, 2004

Today: unequal distribution

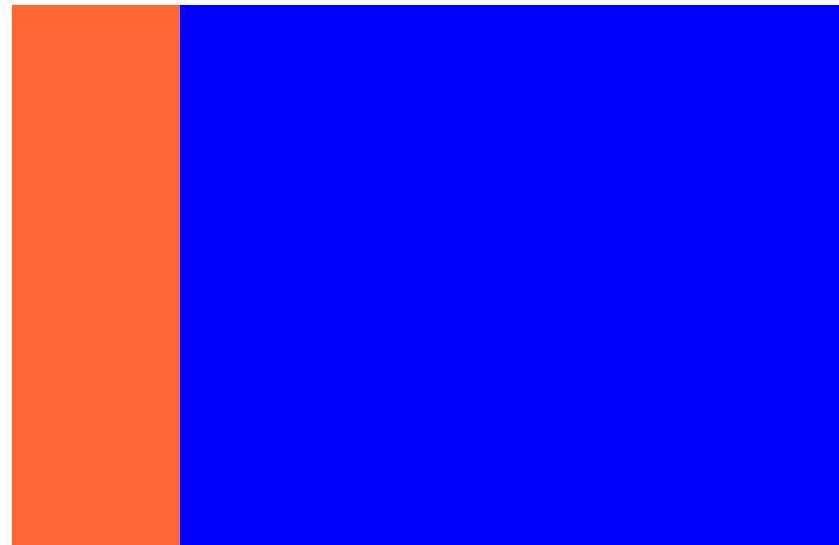


20% „reiche“
Verbrauchen
80% der
Ressourcen

80% „arme“
Verbrauchen 20% der Ressourcen

Resource use today: 60 Mrd t

Fair share - unsustainable



20% „reiche“
Verbrauchen
20% der
Ressourcen

80% „arme“
Verbrauchen 80% der Ressourcen

Equal resource use: 240 Mrd t

Fair share - sustainable



20% „reiche“
Verbrauchen
20% der
Ressourcen

80% „arme“
Verbrauchen 80% der Ressourcen

Equal resource use: 30 Mrd t

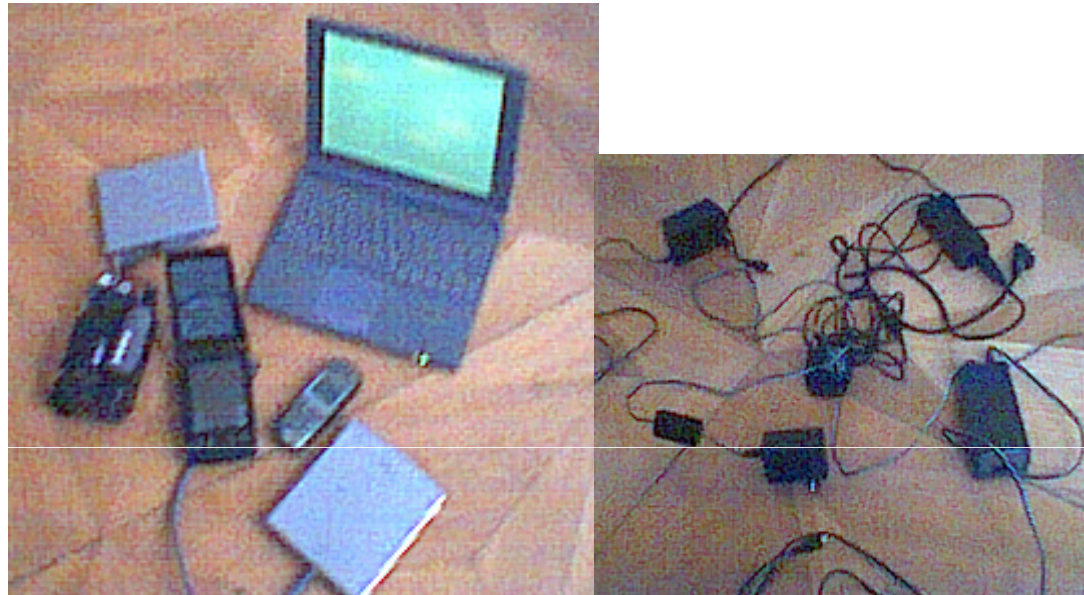
eco-efficiency

More **well-being**...



... less **resource use**!

Does technology save the environment?



All in one





Would technological innovation be enough to reduce resource use?

Worldwide and in Europe in recent decades resource and energy use became more efficient, largely because of the use of new technologies.

However, this did not reduce overall pressures on the environment, because we produced increasingly more goods (rebound effect)

Questioning the „growth paradigm“

- Economic growth is, together with population growth, an important driver of global environmental change
- While the poorer parts of the world clearly need significantly more income to improve their standard of living, more income in Europe, America and Japan makes less people „happy“
- Stress and loneliness increase, consumption looks more and more like an addiction, illness is increasingly a result of excess (obesity, heart disease etc) and not of lack.

Eco-sufficiency

While eco-efficiency aims to improve the effectiveness of material, energy, and land use, eco-sufficiency aims at reducing negative environmental consequences through a **reduction of the demand for consumer goods**. Eco-sufficiency or *strong* sustainable consumption requires changes in infrastructures and choices as well as a questioning of the levels and drivers of consumption.

For example...

While eco-efficiency could mean driving a car that will use 3 litres rather than 10 litres of gasoline per 100 kilometres, strong sustainable consumption (eco-sufficiency), in contrast, can mean going by train rather than by car or travelling less far or less frequently

European policy: why – and what for?

US constitution: **the „pursuit of happiness“ as a fundamental goal**

GoSD approach: **„The overarching objective of sustainable development (SD) (is) to secure and increase the quality of life for all people as a precondition for individual happiness.“**



GoSD
GOVERNANCE FOR SUSTAINABLE
DEVELOPMENT

or

Sustainable development is
a development that **allows for happiness** of the present
generation without compromising the ability of future
generations to **be happy**.

EU SDS 2006

Sustainable development is
a development that **allows for happiness** of the present generation
without compromising the ability of future generations to **be happy**.

The renewed **European Strategy for Sustainable Development**
(achieved under the Austrian Presidency):

A first step!

EU SDS 2006

Europeans value quality of life

Well-being and quality of life as an overarching principle

various references throughout the document... (eg. on public health)

Some elements

Meat requires 10x more resources, emissions, ...

Durable products ...

Simplify your life!

Slowfood

**Regional
products**

More leisure, less stress

1 Euro „buys“ 3 kg of nature

Beyond GDP

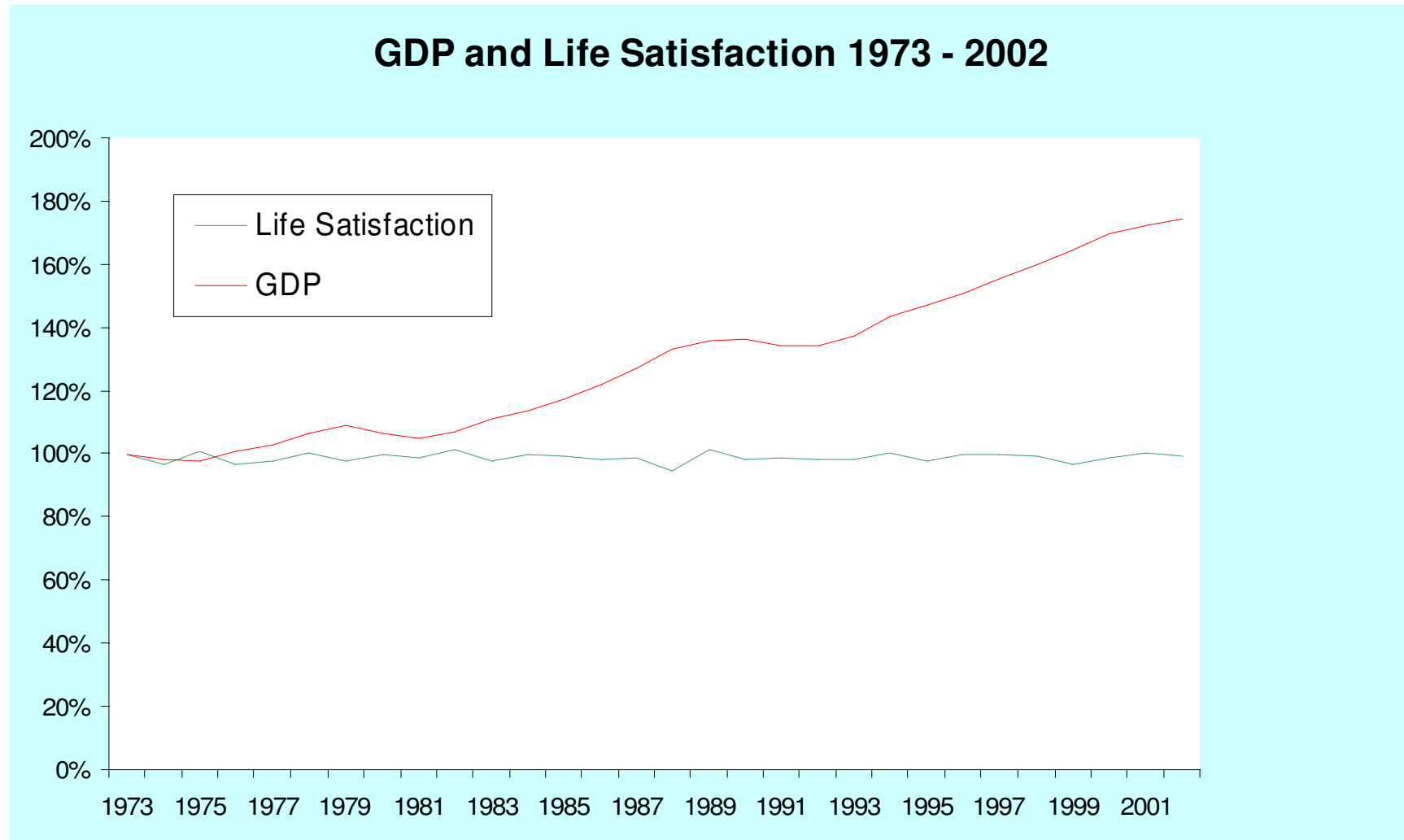
- Correcting GDP -> **towards a „Green GDP“**
- Long lists of **indicators**
- Combined indicators
- **DIRECT measurement of quality of life/well-being/happiness**
- Relate these figures to environmental indicators

Beyond **GDP**

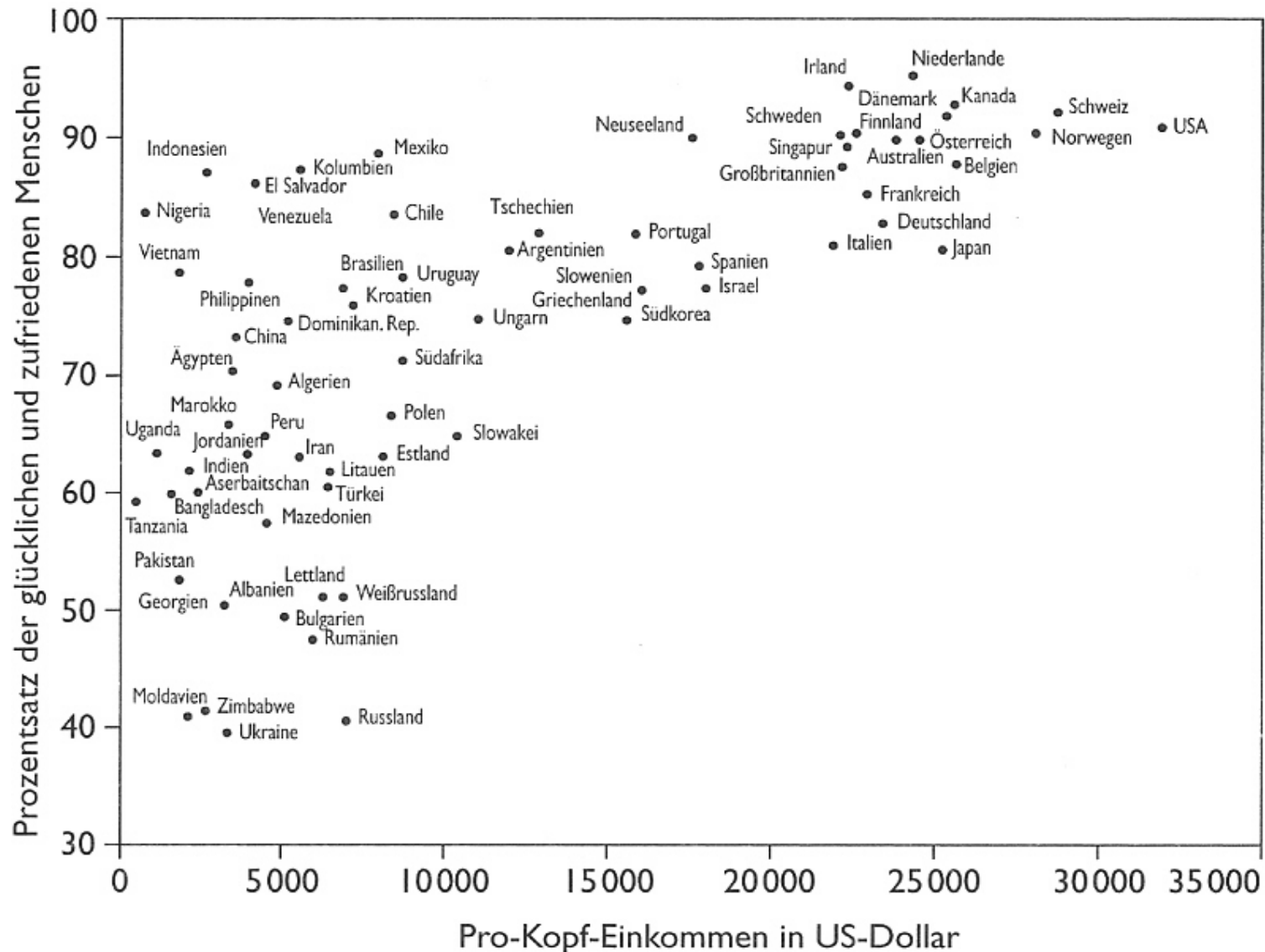
Measuring progress, true wealth, and the well-being of nations

International Conference, 19 & 20 November 2007, Brussels

GDP and well-being (1)



GDP and well-being (2)



Measuring Well-being and Sustainable Development

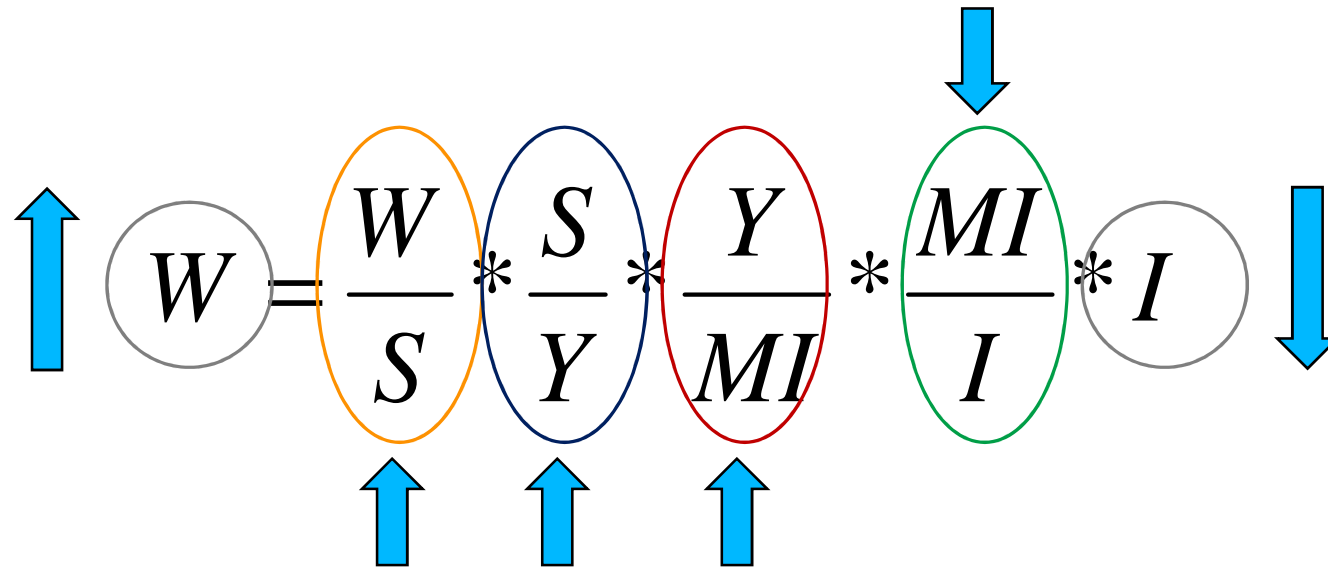
Well-being intensity of services Material productivity

$$W = \frac{W}{S} * \frac{S}{Y} * \frac{Y}{MI} * \frac{MI}{I} * I$$

Service intensity Environmental impact intensity of MI

- W ... Wellbeing
- I ... Environmental impact
- S ... Service provided by economic production
- Y ... Production / Aggregated Income
- MI ... Material input

Measuring Well-being and Sustainable Development



- W ... Wellbeing
- I ... Environmental impact
- S ... Service provided by economic production
- Y ... Production / Aggregated Income
- MI ... Material input

Definitions: Life Satisfaction / Well-being

		Subjective satisfaction	
		good	bad
Objective life conditions	good	Well-being	Dissatisfaction (dissonance)
	bad	Satisfaction paradox (adaptation)	Deprivation

- Subjective satisfaction:
 - Subjective perception of life conditions and situation
 - Personal valuation of satisfaction, happiness, hope and fears
- Objective life conditions:
 - Material conditions of living, housing, work, health, education
 - Social relationships, standing, participation

Measuring Well-being

1. GDP adjustments and further developments
 - Account only activities which really contribute to welfare
 - Consider factors like
 - resources depletion
 - state of the environment
 - non-market labor (housework, elderly and child care)
 - foreign dependencies
 - public infrastructure
 - crime

- Prominent Examples
 - Index of Sustainable Economic Welfare (ISEW)
 - Genuine Progress Indicator (GPI)

Measuring Well-being

2. Quality-of-life Indicator Systems

- Many categories of indicators (wealth, health, family, society, etc.)
 - Weighting of each category
 - Combining objective life conditions and subjective well-being
-
- Examples:
 - Quality-of-life Index
 - Calvert-Henderson Quality of Life Indicators
 - Canadian Index of Wellbeing
 - Indicator System of the German Centre for Survey Research and Methodology
 - Indicator System of the Swiss Statistics

Measuring Well-being

3. Other attempts to calculate an indicator:

- UN Human Development Index (HDI)

- Formula containing of

- Life expectancy at birth
 - Literacy rate
 - GDP

- Happy Planet Index (HPI)

$$\text{HPI} = \frac{\text{Life satisfaction} \times \text{Life expectancy}}{\text{Carbon Footprint} + \alpha} \times \beta$$



www.mosus.net

Is Europe sustainable? Modelling opportunities and limits for restructuring Europe towards sustainability

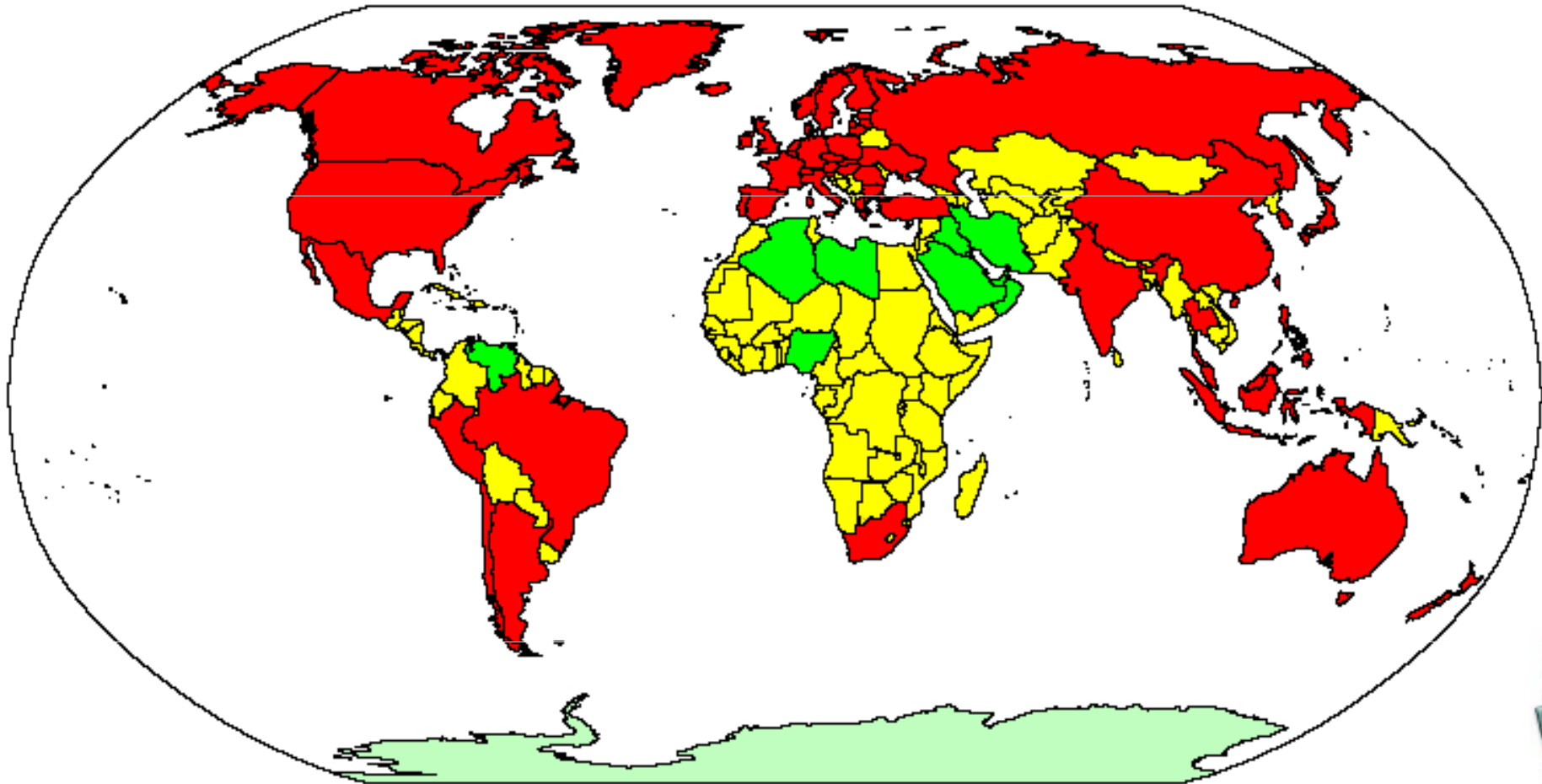
- Funded by the 5th Framework Programme of the European Union (sub-programme environment and sustainable development)
- Endorsed by the Industrial Transformation Project of the International Human Dimensions Programme (IHDP-IT)



Key research questions

- What are the effects of **environmental policy measures** oriented towards higher resource and energy efficiency on **economic policy goals** such as growth, competitiveness and employment?
- How **effective** are different **policy measures** to reduce environmental pressures (natural resource use / energy and climate)?
- What are the **impacts** of the implementation of these policy measures for **other world regions**?

◆ country coverage



country models

OPEC ex. Indonesia

ROW



Scenario results from the MOSUS project (www.mosus.net)

“win-win-win” is possible!

- reduced environmental pressure
- increased economic growth
- more jobs

Note: Large differences between countries!



Results: HIGH scenario

REAL GDP

8318 Bill. €
(2005)



11763 Bill. €
(2020)

+ 41%

+4% above base

UNEMPLOYMENT

22.9 Mio.
(2005)



19.7 Mio.
(2020)

Results: HIGH scenario

CO₂-EMMISSIONS

3.77 Mio. t
(2005)



3.33 Mio. t
(2020)
-12%

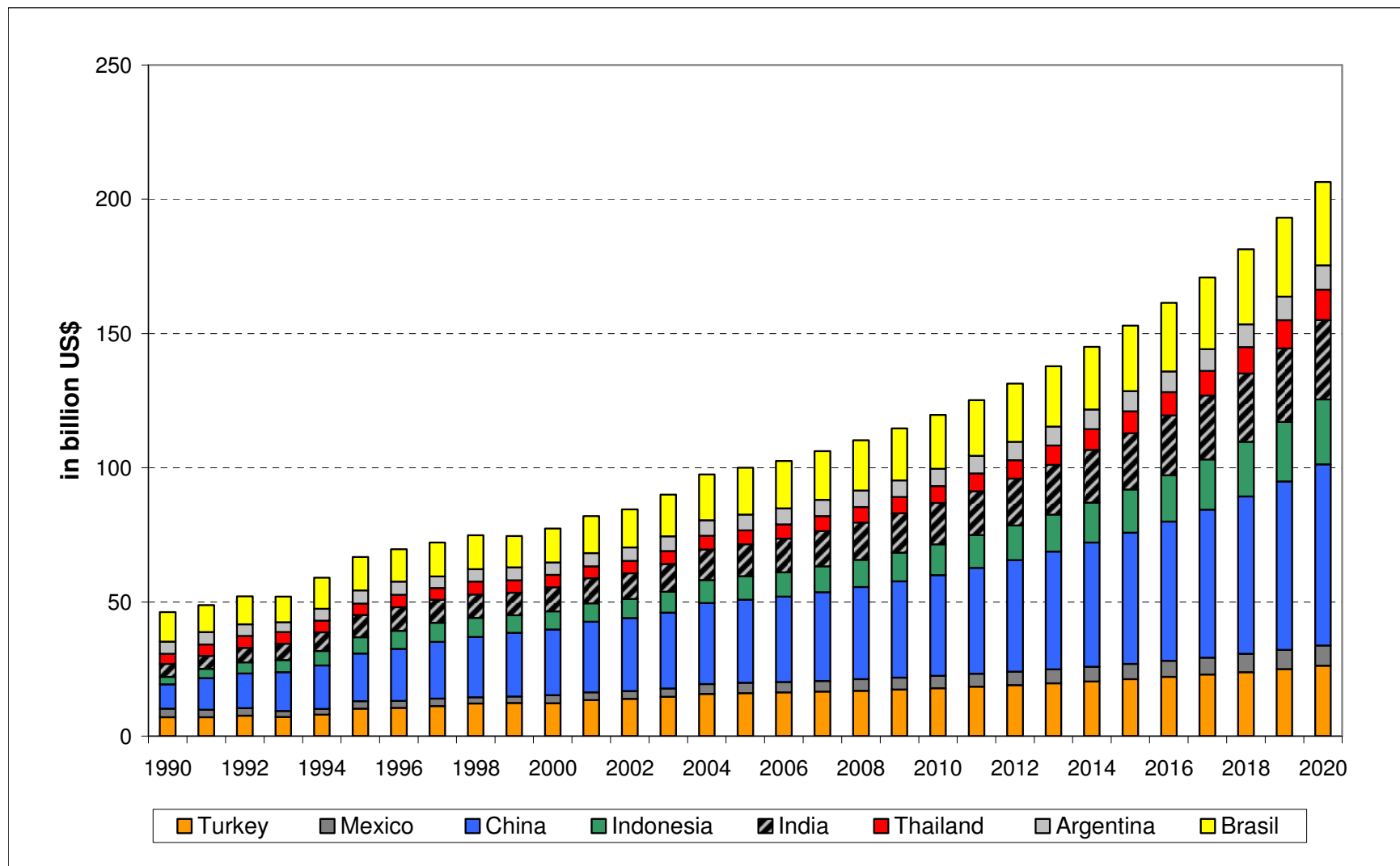
**RESOURCE
PRODUCTIVITY
(DE)**

1160 € / t
(2005)

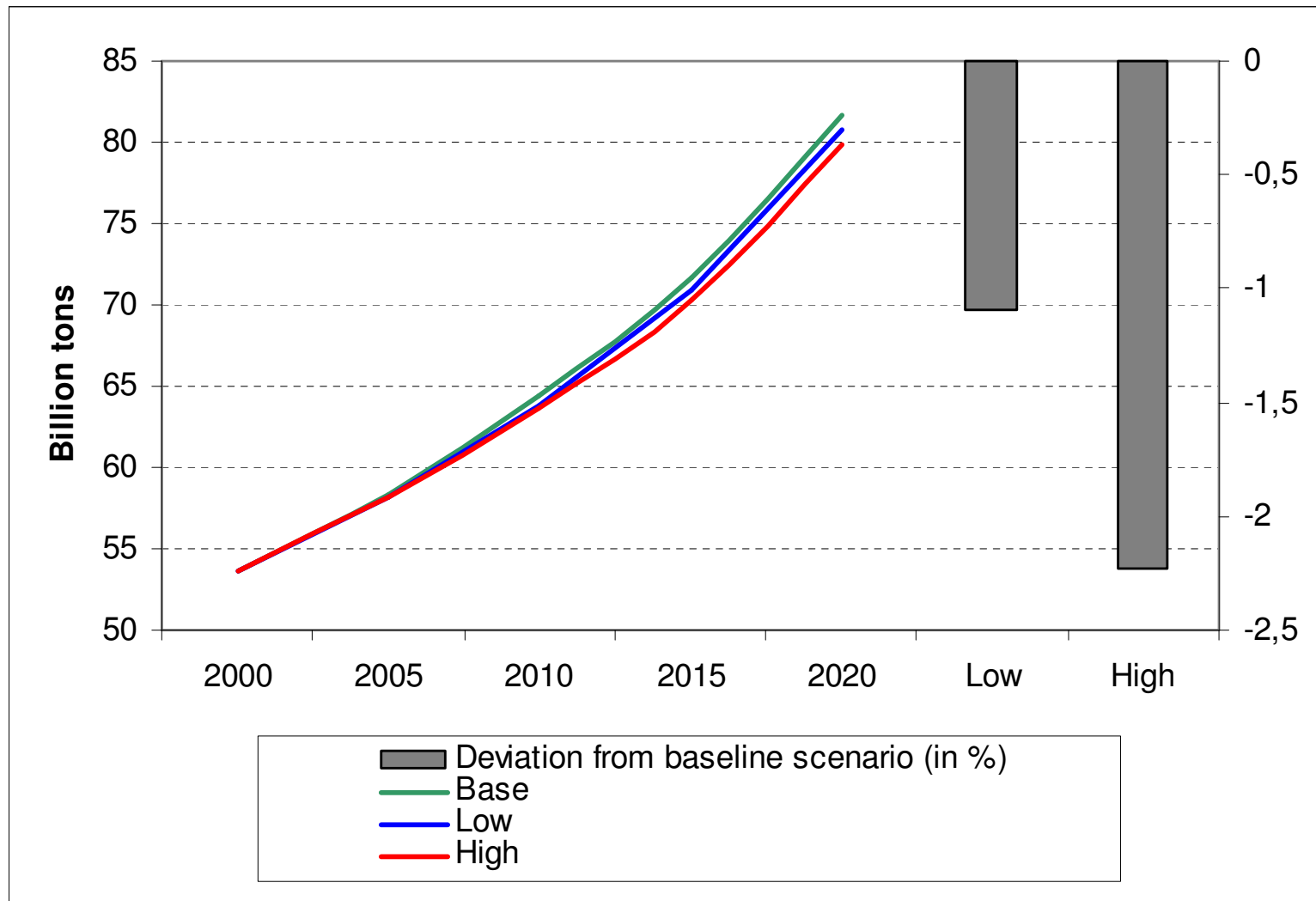


1727 € / t
(2020)
+49%

Resource-intensive imports from “Anchor countries”



Worldwide resource extraction, three scenarios



But

Rebound effects!

- **GDP** increases by **41** %
- Resource **productivity** increases by **49** %
- Domestic **extraction** reduces only by **5** %

This might give room for **further** decrease of environmental impacts



Sustainability problems

Overconsumption?

(in highly industrialized parts of the world)

How to avoid
rebound effects?

Integrated policies

UNEMPLOYMENT and SOCIAL SECURITY

Reduction of annual working times and increased flexibility

Social security through “**negative income tax**” (basic income)

ENVIRONMENTAL CHANGE and PUBLIC FINANCE

Replace income tax (partly) by material input **tax**, **CO2 tax**

subsidy-shift, regulations



Quelle: www.a-und-oe.de

A Scenario

UNEMPLOYMENT

10,5 %



3,1 %

GOVERNMENT-DEFICIT

+/- 0

WORKING TIME

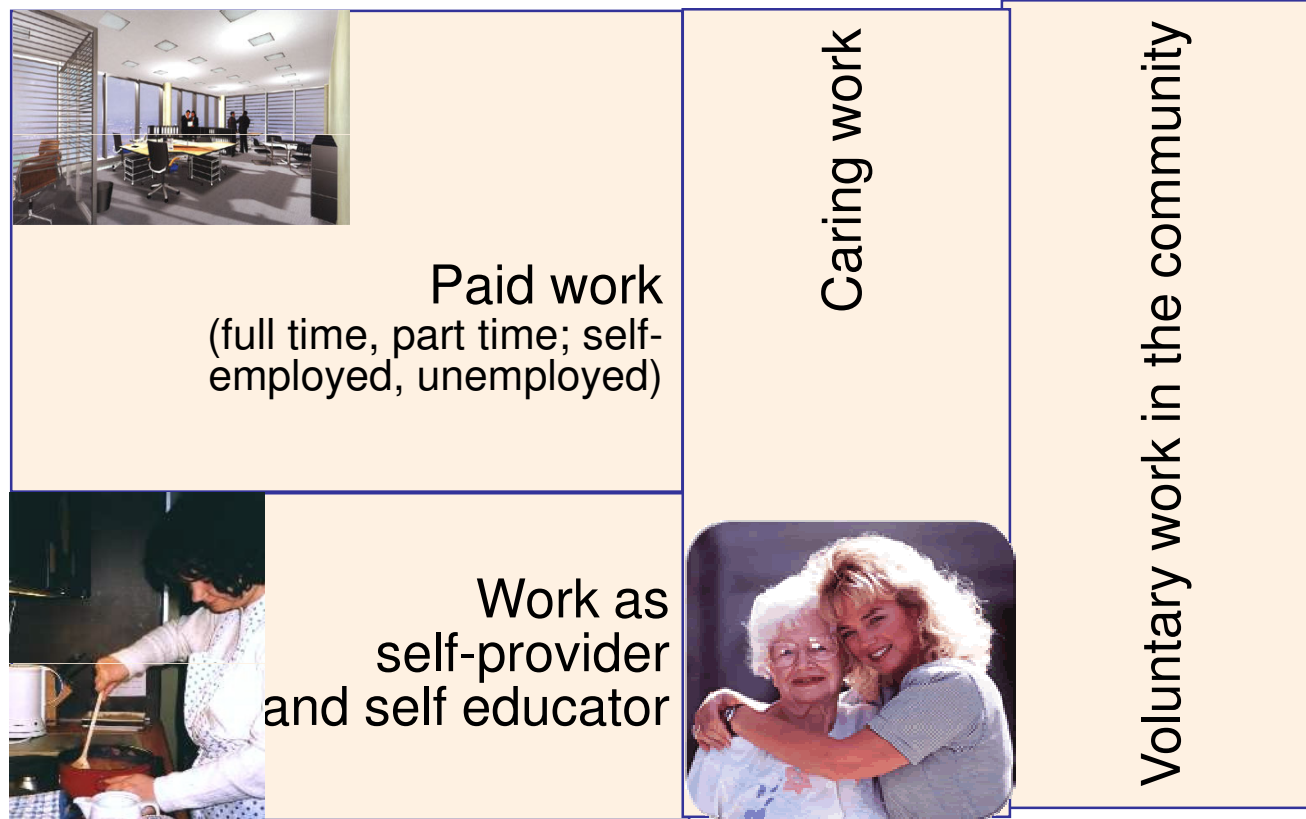
37,5 h



30 h



“mixed work” mixed qualifications, income mixes



Less paid work

= less income

= less (material) consumption



Beyond GDP

- **Reduce** our **Environmental Space**
- **Increase** our **Well-Being / quality of life !**
- **Gross Domestic Product (GDP) ???**

What do we need for all this?

- Policy and business action
- Civil society's and individual responsibility
- Communication and education
- Cultural creativity
- **And the right facts and figures (measuring SD!)**

Grazie!



Thank you for your attention!

Presentation will be available for download at
www.seri.at/measuringprogress