FORE·SCENE

Development of a Forecasting Framework and Scenarios to Support the EU Sustainable Development Strategy

Resource Use and Waste: Policy Goals and Targets, Problems and Driving Forces

Stefan Bringezu

SIXTH FRAMEWORK PROGRAMME PRIORITY 8.1

Science Centre North Rhine-Westphalia
Institute of Work and Technology
Institute for Culture Studies
Wuppertal Institute for Climate, Environment and Energy
Lund University
The University of Nottingham
CEM Centre for Environmental Management
Regional Environmental Center
SERI Sustainable Europe Research Institute

Natural Resources

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Thematic strategy on sustainable use of natural resources (CEC 2003) defines 5 categories of resources:

- raw materials such as minerals, fossil energy carriers and biomass,
- biological resources (gene pools),
- environmental media such as air, water and soil,
- flow resources such as wind, geothermal, tidal and solar energy,
- space, i.e. land used for mineral extraction, agriculture and forestry, infrastructure, industry and human settlements.

Policy Goals and Targets

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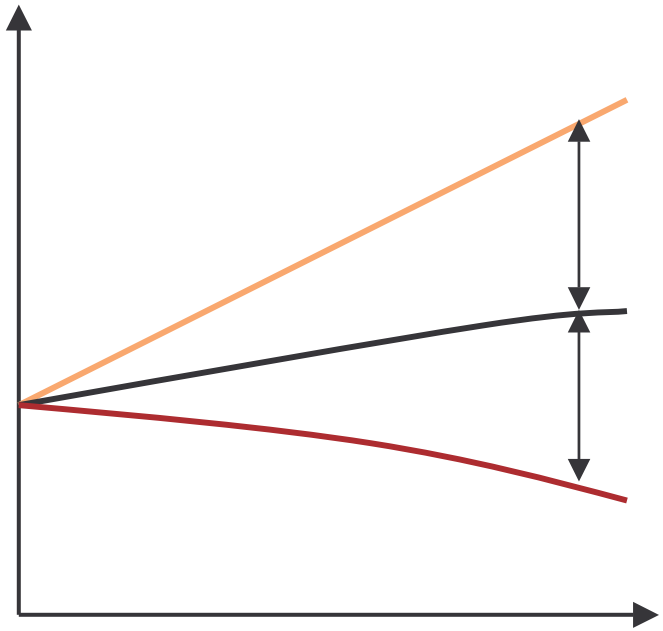
The priority areas for action under the EAP 6 with regard to sustainable use and management of natural resources and waste are as follows:

- consumption of resources should not exceed carrying capacity of the environment;
- decoupling of economic growth and resource use, drastic increase of resource and energy efficiency;
- reduction of volumes of waste generated through waste prevention, better resource efficiency and a shift towards more sustainable production and consumption patterns;
- reduction in quantity of municipal and hazardous waste while avoiding related emissions to air, water, soil;
- increasing recycling rates of wastes generated and reduction of the hazardousness of disposed wastes to a little risk as possible.

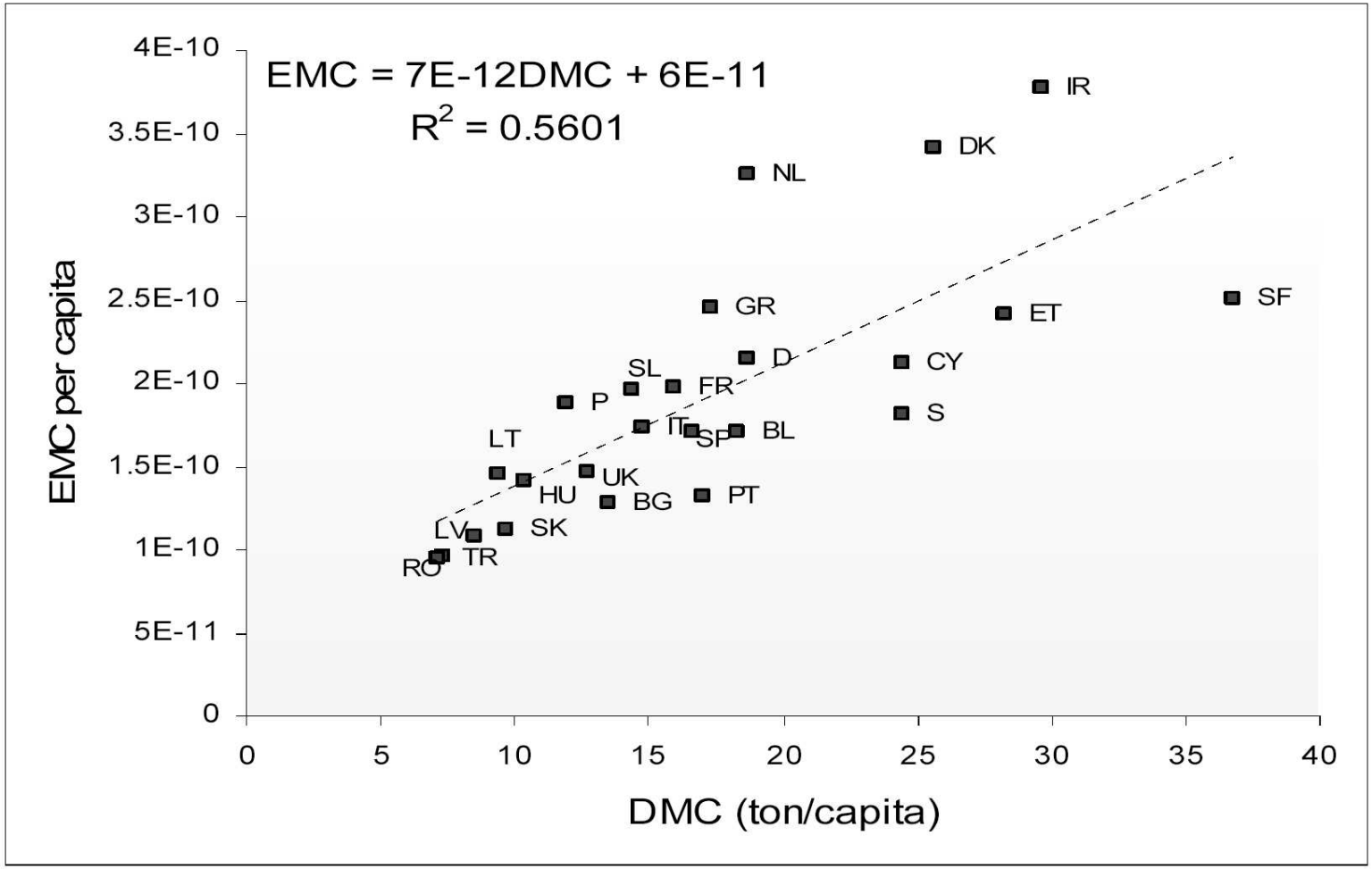
Objectives of EU resource strategy



increase of resource efficiency

eco-efficiency

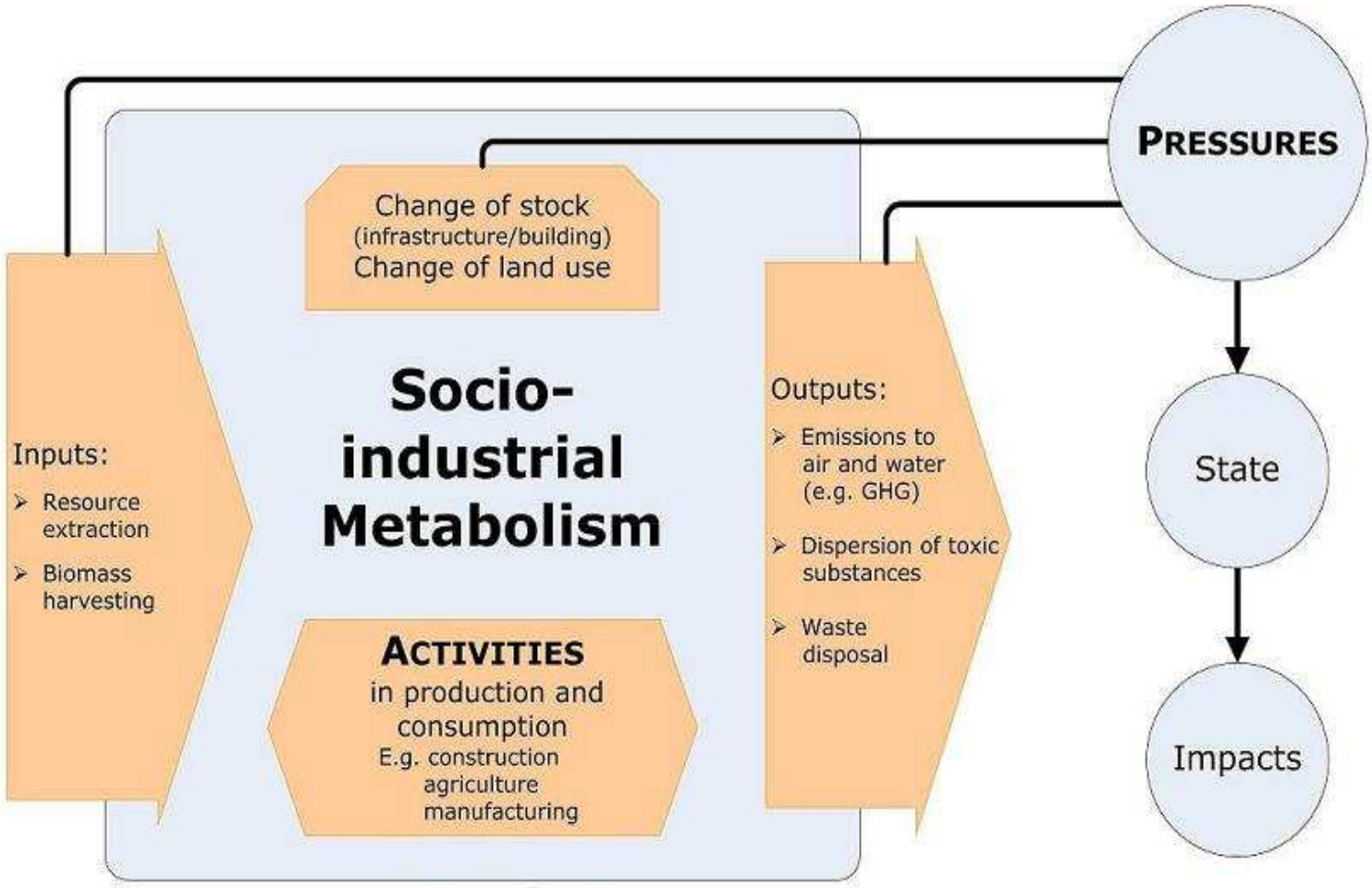
Material consumption determines level of environmental impacts



DMC: Domestic Material Consumption
EMC: Environmentally weighed Material Consumtion

source: van der Voet, E. et al. (2005): policy review on decoupling. CML report no. 166, p. 82

Metabolism, activities and pressures



Socio-industrial metabolism with indicators for EU-15

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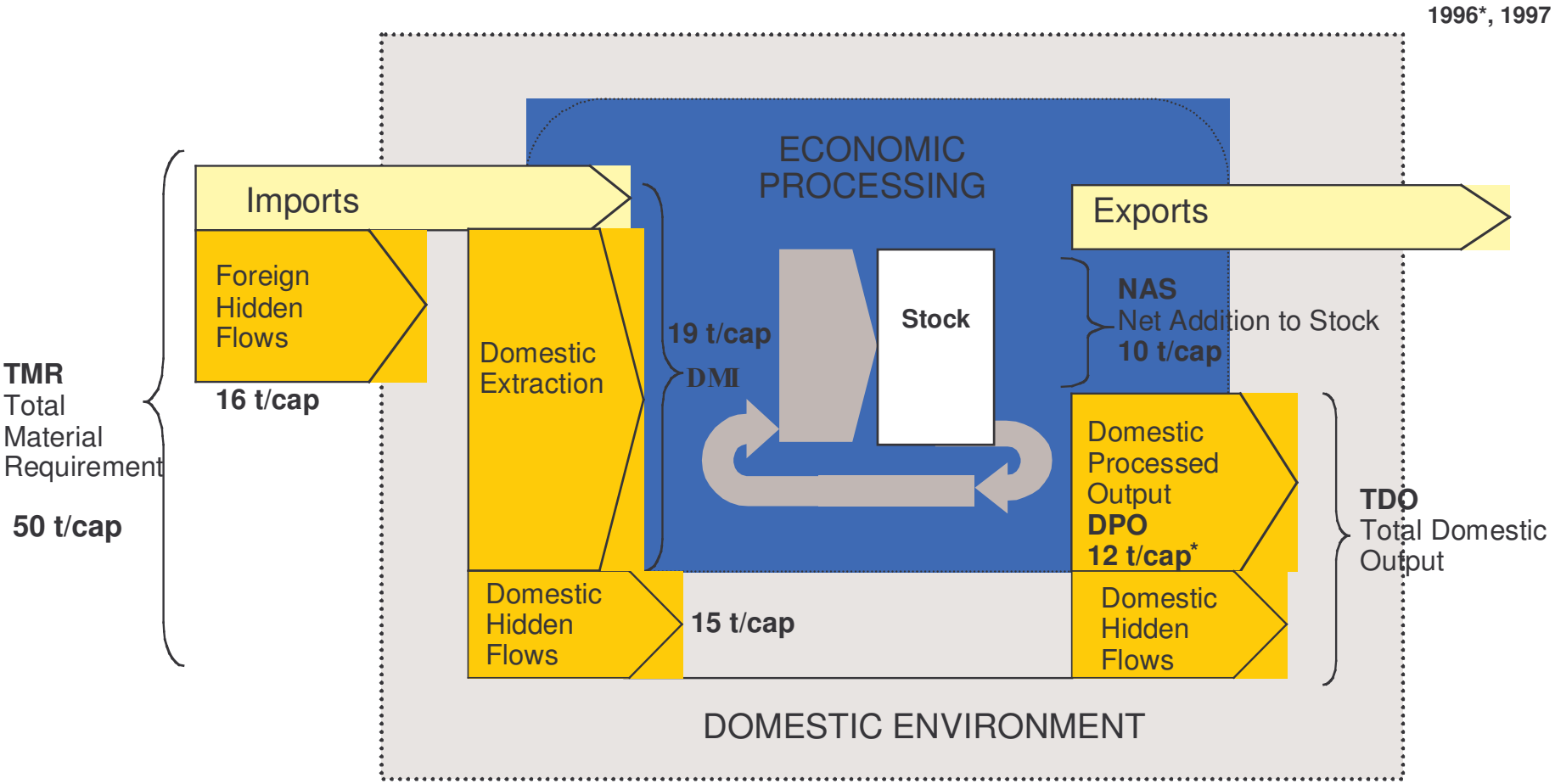
1996*, 1997



Lignite mining in Germany
Jänschwalde/Cottbus-Nord

Source : http://www.spreewald-info.com/tour_tagebaue.html 1999-2002 AOD-Media

Goldmining in Peruvian Tropical Rain Forest

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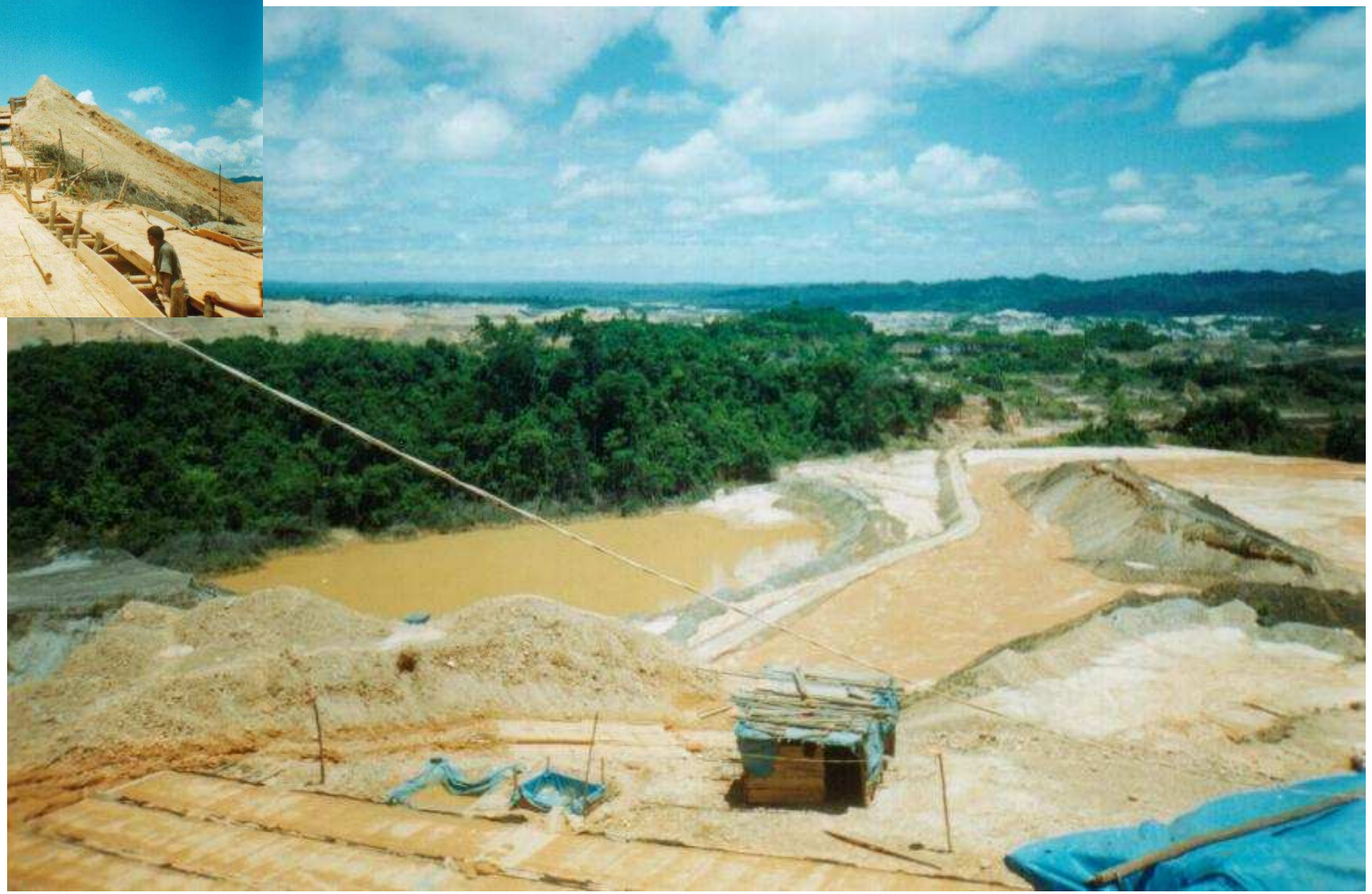
Hidden flow relation 1:(20*10^6)



Mine Madre de Dios

Source: Sonja Valivia (2004), Fotos Edga Llamoca

Structure and volume of TMR unsustainable

Continuous global change through dominance of non-renewables

(t/cap)

Component	EU-15	USA	Japan
	1997	1994	1994
Domestic used extraction	16	23	10
Imports	4	3	6
Sum (=DMI)	19	25	16
Domestic HF	15	57	10
Foreign HF	16	3	20
Sum (=TMR)	51	85	45
Renewable Proportion (%)	12	7	6
Share for energy supply (%)	29	37	28
Domestic share (%)	61	93	44

Global adoption of industrial countries´ resource requirements would increase earth crust transformation 2-5 times

Country	Period	TMR per cap			TMC per cap			TMC as % of T			Source
		Median	Min	Max	Median	Min	Max	Median	Min	Max	
USA	1991	84			74			88			Adriaanse et al.
Germany	1991	90			74			83			Adriaanse et al.
Finland	1970-99	78	64	98	48	40	59	62	47	74	Mäenpää and Juutinen 1999, 2
Netherlands	1975,80,85,90-96	69	62	76	55	48	64	84	68	85	Adriaanse et al.
Denmark	1981,90,97	66	55	70	43	41	48	72	61	75	Pedersen 200
United Kingdom	1970-99	37	34	43	31	27	34	83	72	90	Bringezu and Sc 2001
West Germany	1970,77,80,82 ,87,89-90	67	60	74	45	43	53	69	64	71	Bringezu and Sc 1995

Source: Different sources and Bringezu und Schütz 2001

Decoupling of resource use and environmental pressures in EU-15

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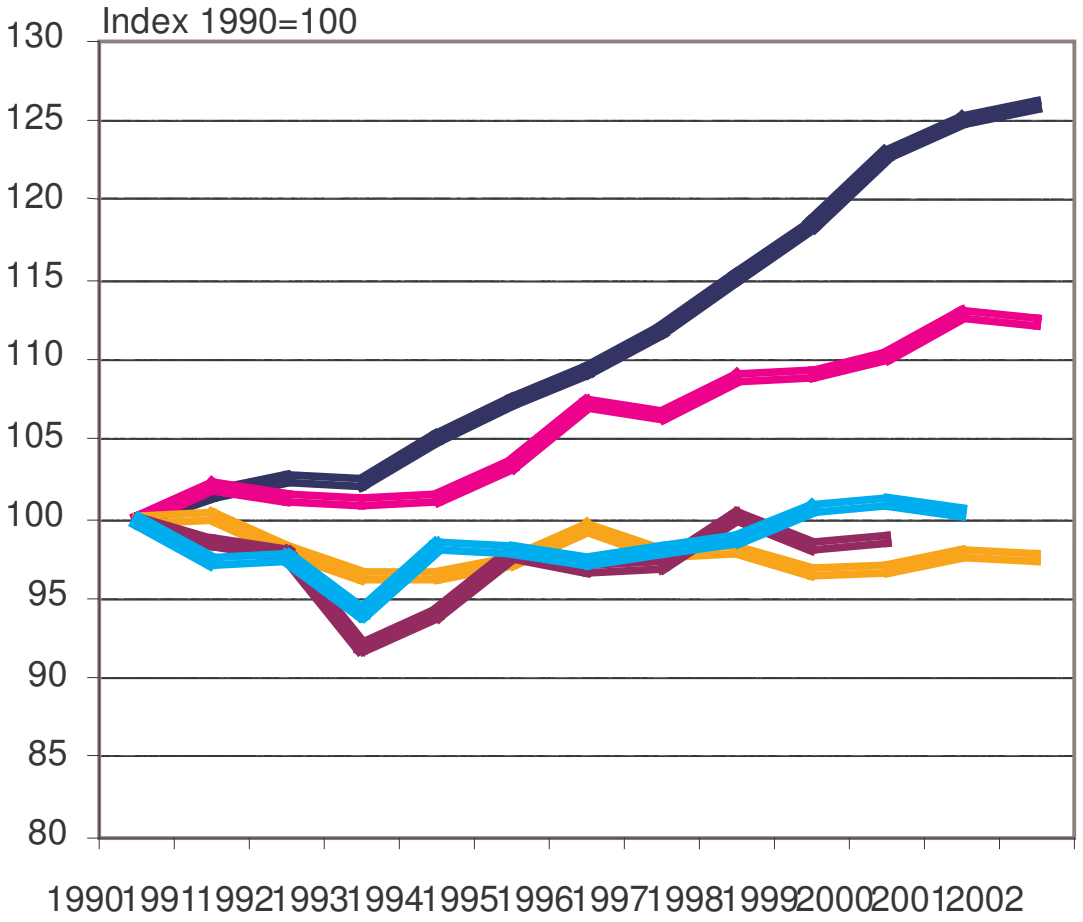


Gross domestic product at market prices [Millions of euro (at 1995 prices and exchange rates)]

Gross inland energy consumption [Thousands tonnes of oil equivalent (TOE)]

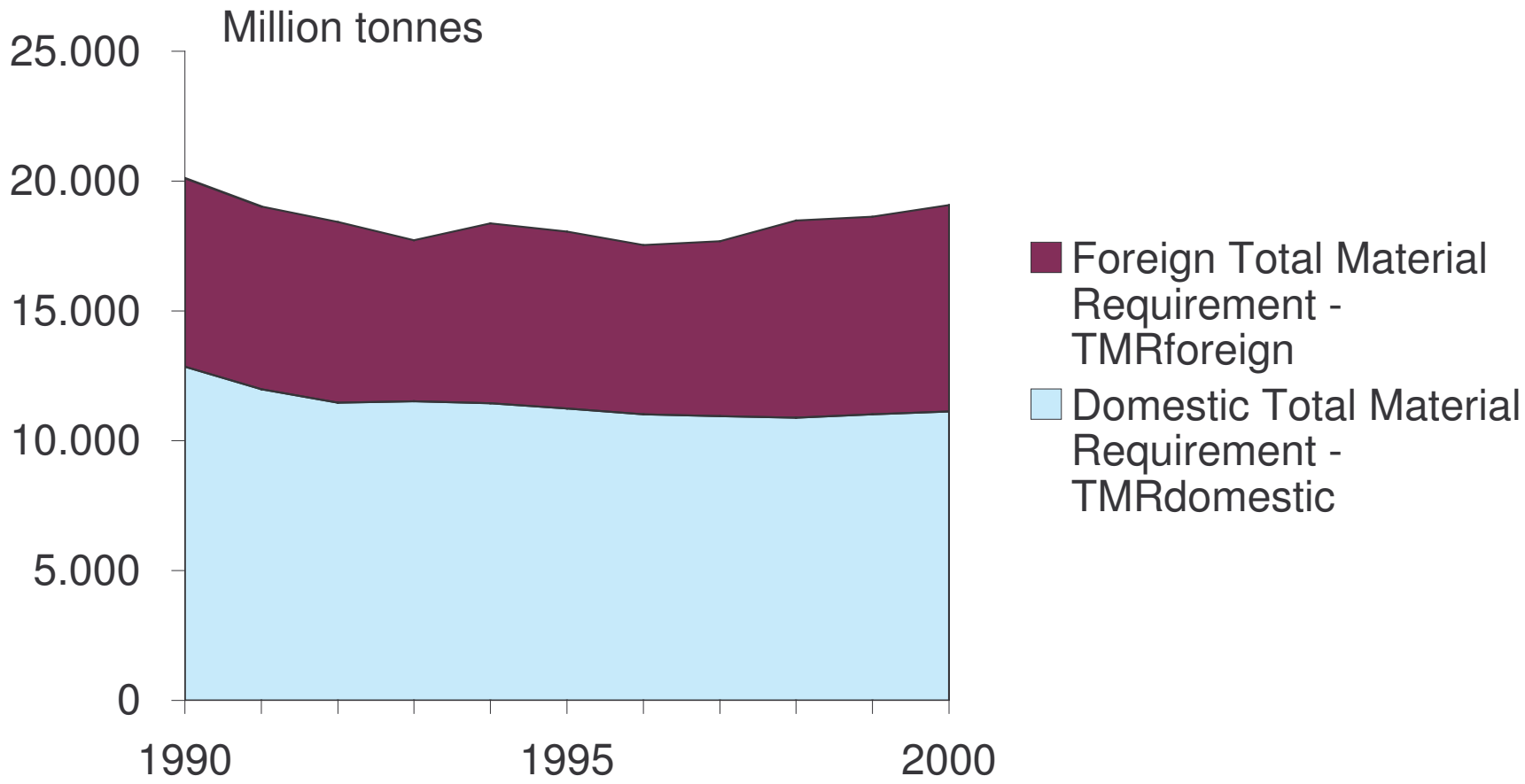
Emission of greenhouse gases [Global warming potential, CO2 equivalent, 1000 tonnes]

EMC (environmentally weighted material consumption) [Normalised (World 95) and equally weighted scores]

DMC [1000 tonnes]

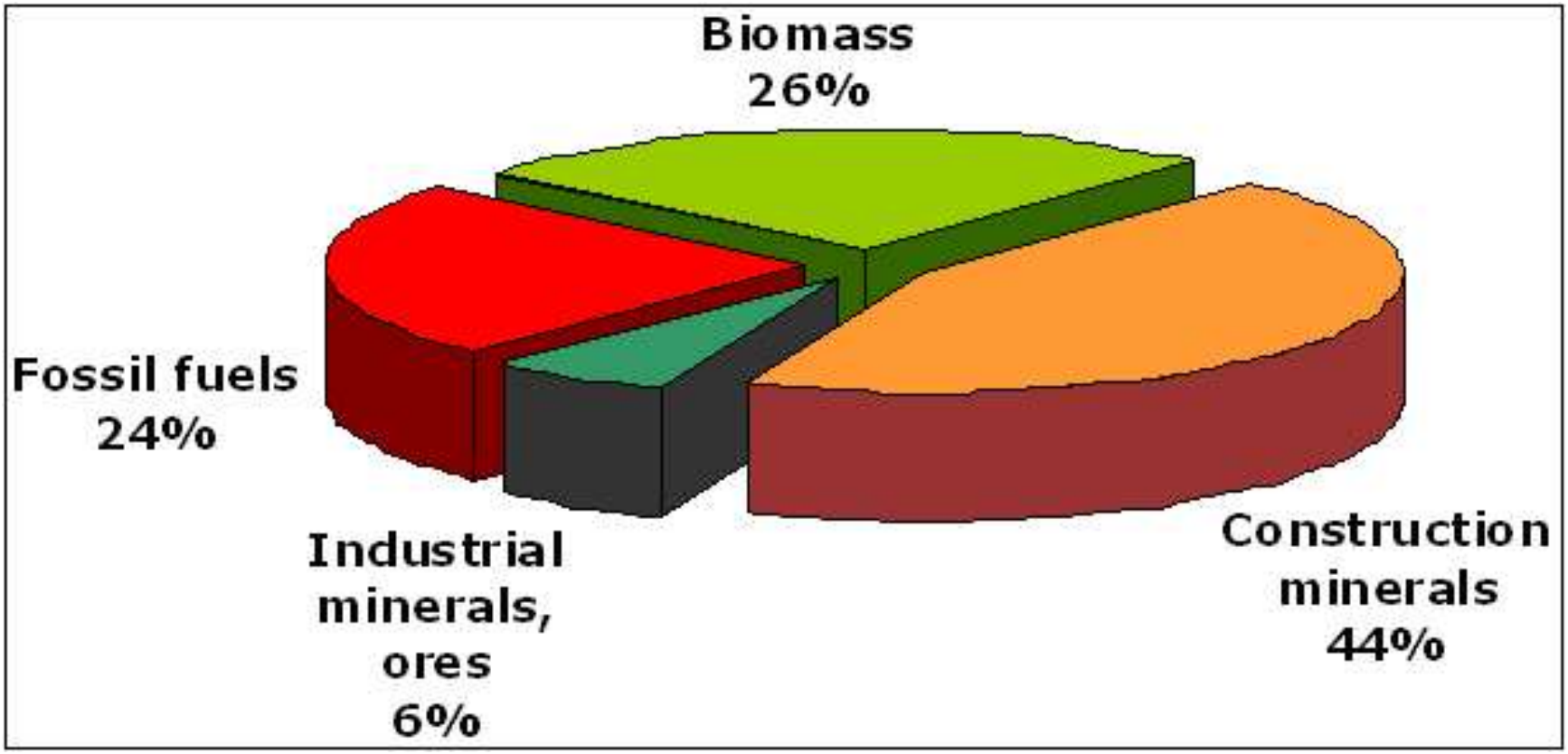
Source: Eurostat NewCronos online database (GDP, energy, greenhouse gas emissions); van der Voet et al. 2004 (EMC); Eurostat/IFF 2004 (DMC); see also EEA Report no. 9/2005: Figure 3.3, p. 20

Domestic vs. foreign resource requirements of EU-15



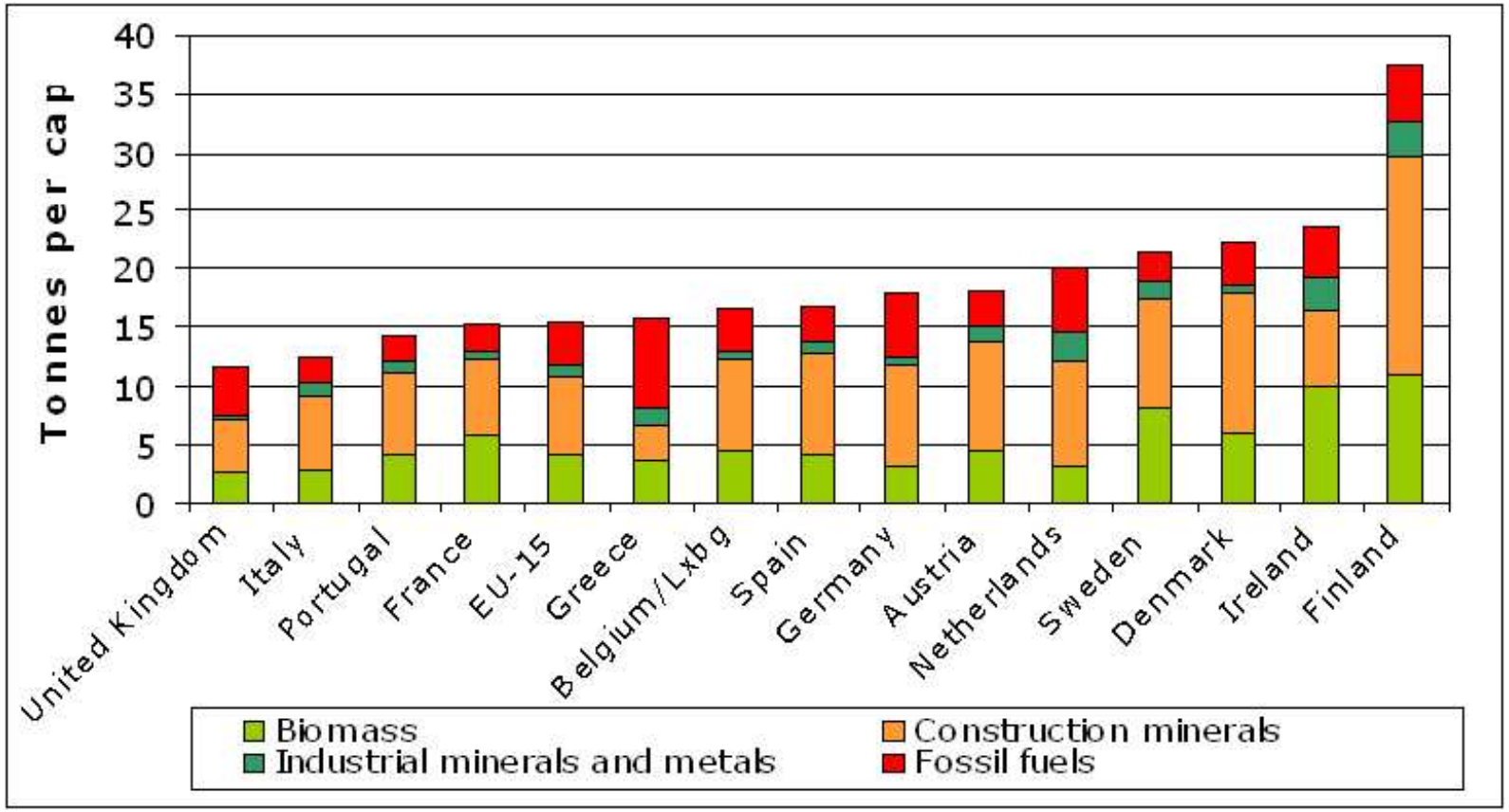
Source: Wuppertal Institute

Composition of Domestic Material Consumption of the EU-15 in 2000



(Source:Eurostat, IFF, 2002; data set B)

Composition of aggregated material resource consumption (DMC), 2000



(Source:Eurostat, IFF, 2002; data set B)

Fossil Fuels

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Pressures

- GHG emissions
- Landscape change
- Hydrological impacts
- Habitat disruption

Trends

- Growth in the transport, household and service sectors:

  Rising consumption of fossil fuels
- Decoupling of emissions and energy use
- Increasing imports
- Decreasing domestic extraction

Metals & Industrial Minerals

FORE·SCENE

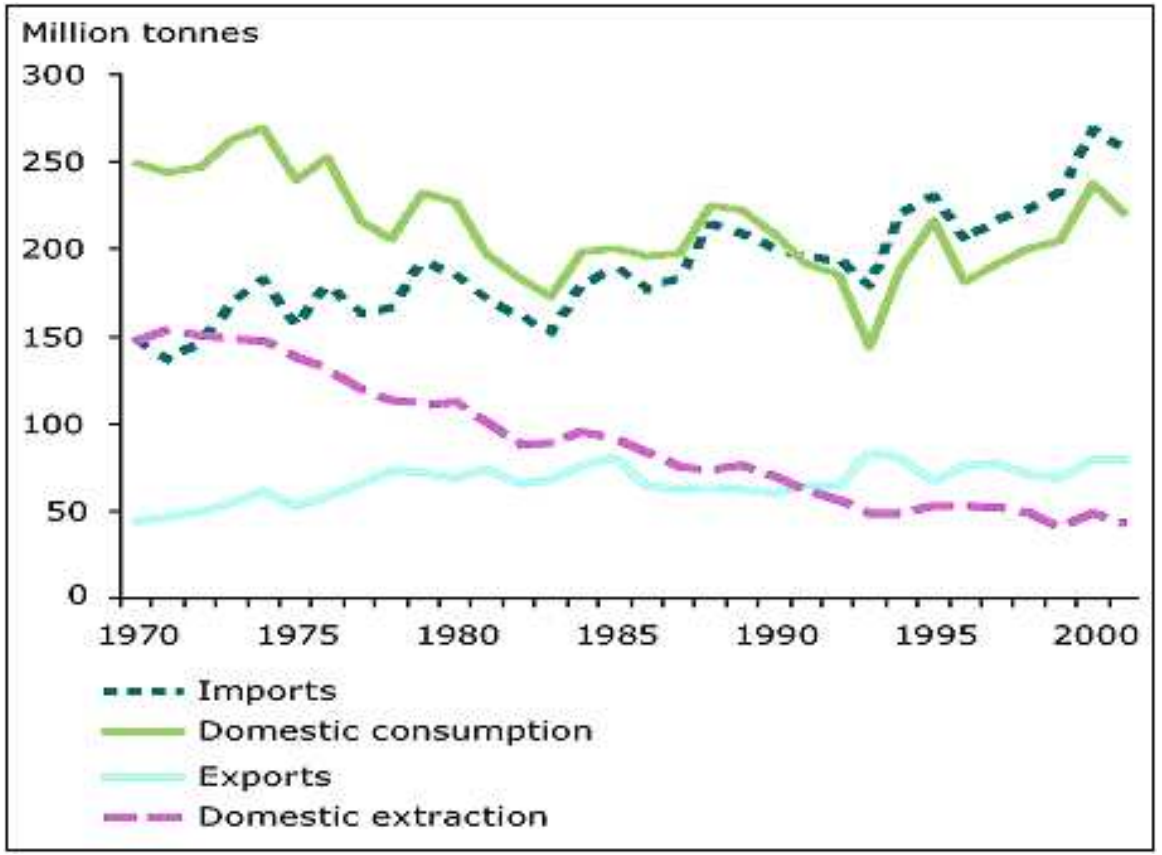
Pressures

- *Inflows*-side:
  - Landscape disruptions
  - Hydrological impacts
  - Habitat disruption
  - Pollution of soil and water
- *Outflows*-side:
  - Polluting emissions

Trends

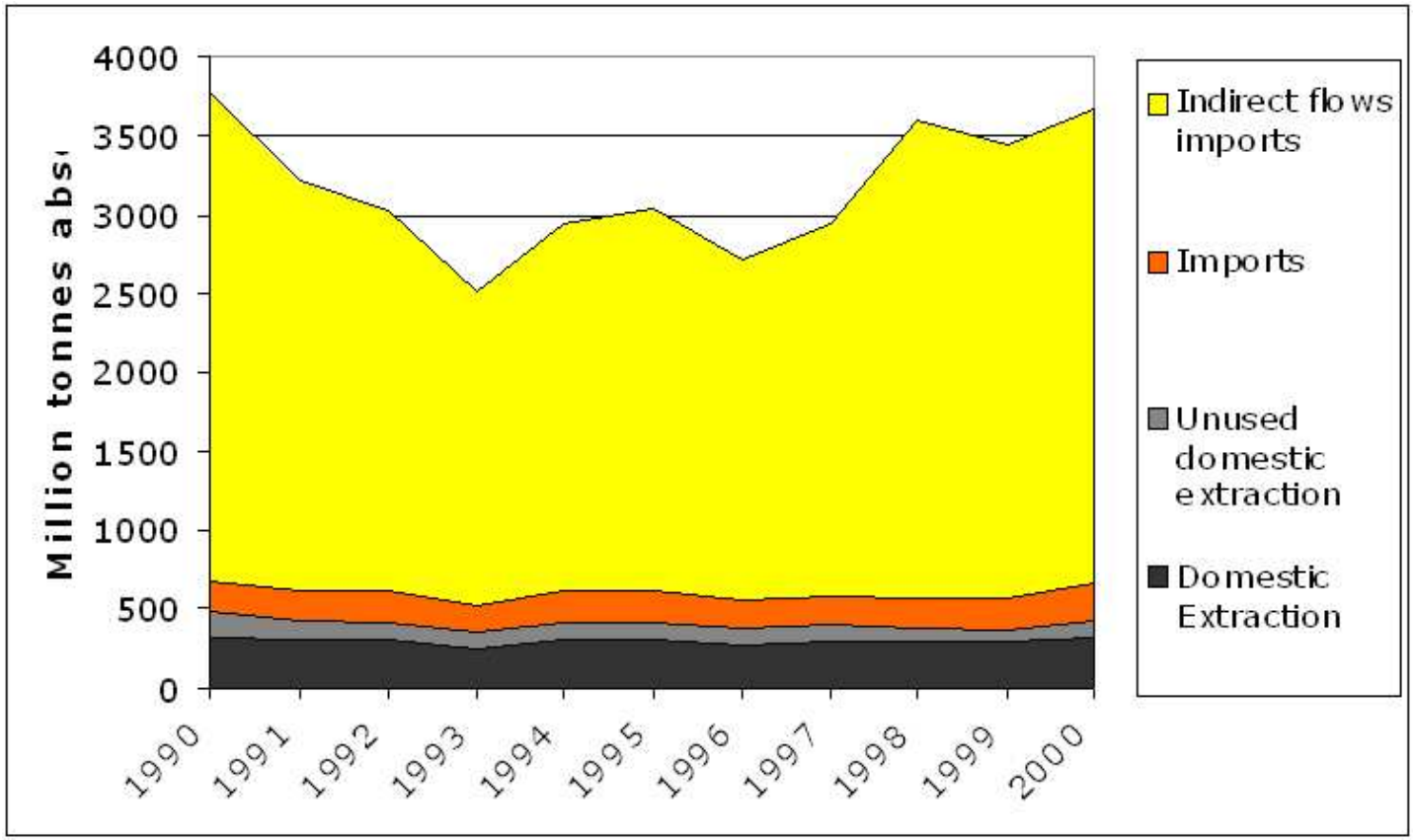
- Industrial countries:
  Rising import of raw materials, growing exports of final products
- Developing countries:
  Rising exports of raw materials
- Growing disparity wrt economic gains vs. environmental burden
- Rising resource requirements for rare metals

Domestic material consumption of metals the EU-15



(Source:Eurostat, IFF, 2002; data set B)

Material flows associated with metals in the EU-15



(Source: Bringezu, S., Schütz, H., 2001)

Construction Minerals

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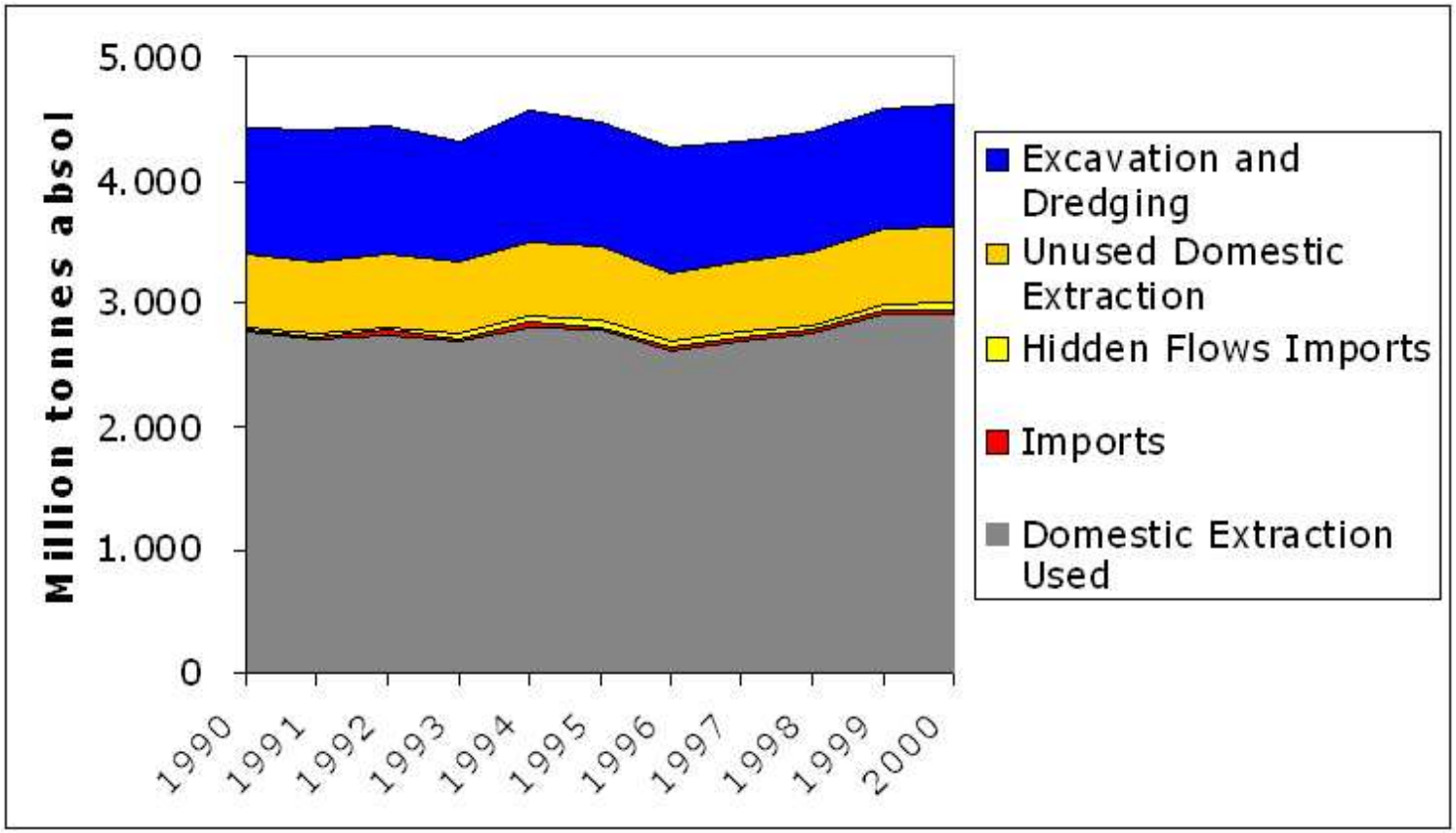
Pressures

- Extraction phase:
  - Unused extraction deposition
  - Noise
- Extraction and use phase:
  - Loss of natural habitats
  - Disintegration effect
- End of life:
  - Waste generation

Trends

- Growing demand due to:
  - physical growth of the economy (additional buildings and infrastructures)
  - low recycling (high variation in industrial countries)
- Rising demand for the maintenance of existing infrastructures

Material flows associated with construction minerals and excavation



(Source: Bringezu, S., Schütz, H., 2001)

Biomass

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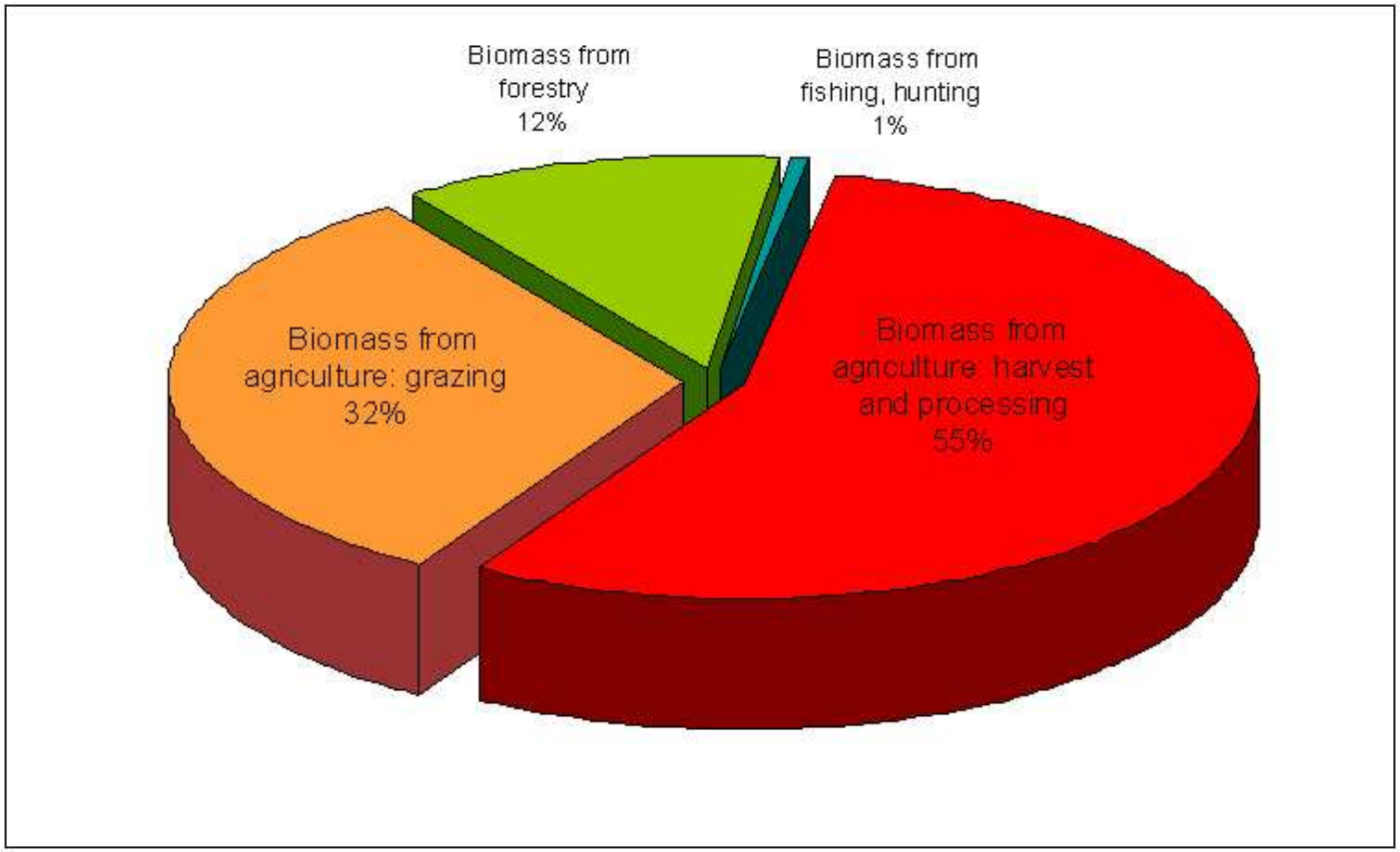
Pressures

- Overexploitation
- Water pollution
- Degradation of fertile soil
- Extension of arable land at the expense of natural ecosystems

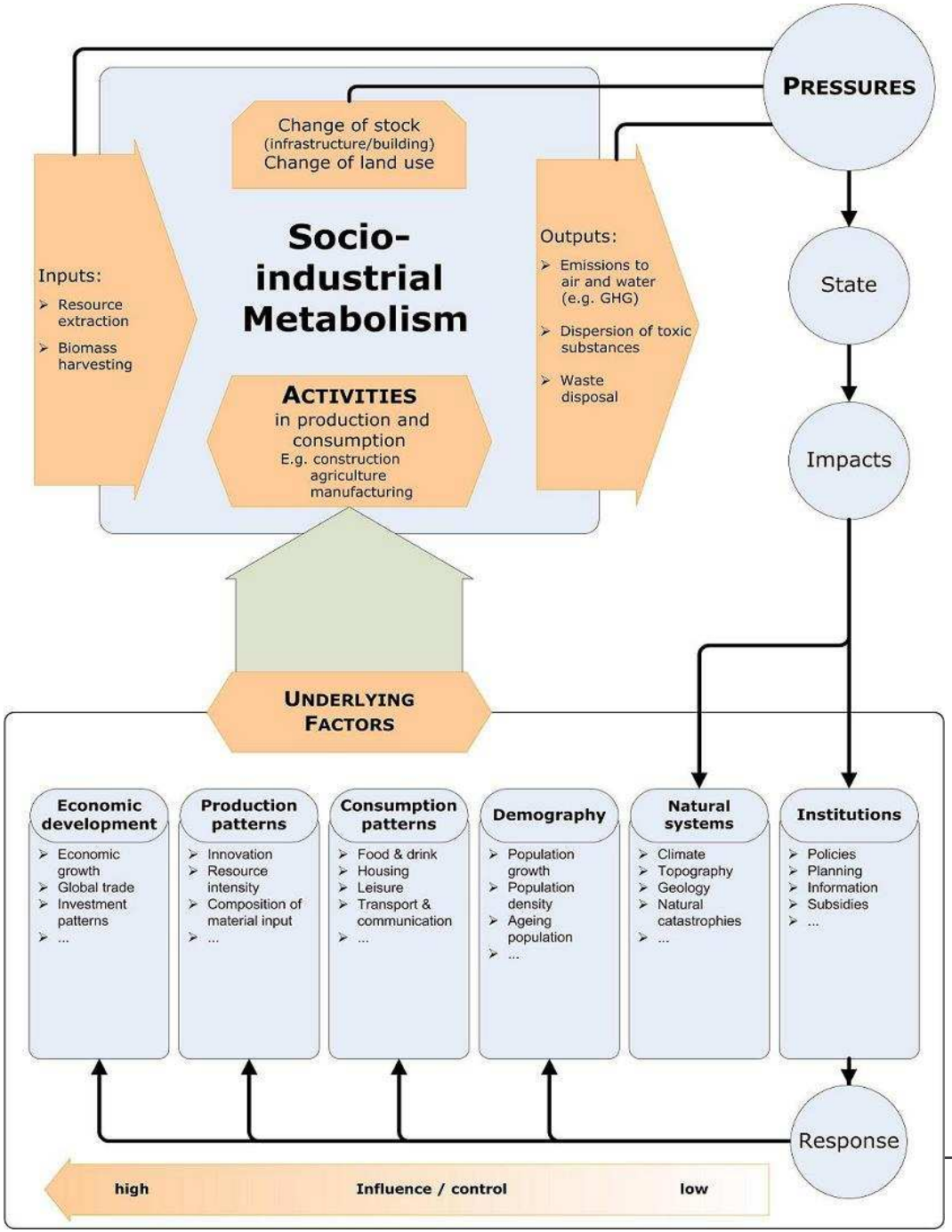
Trends

- Slow orientation towards sustainable production standards
- Dichotomy between extensification and intensification of agricultural production
- Increasing demand for non-food biomass (biofuels)

Material flows associated with biomass in the EU-15



(Source: Moll et al. 2003)



FORE·SCENE

Activities
and
underlying factors
in the
socio-industrial
metabolism

Underlying factors