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Global natural resource use: Is the world heading towards a “Green Economy”?

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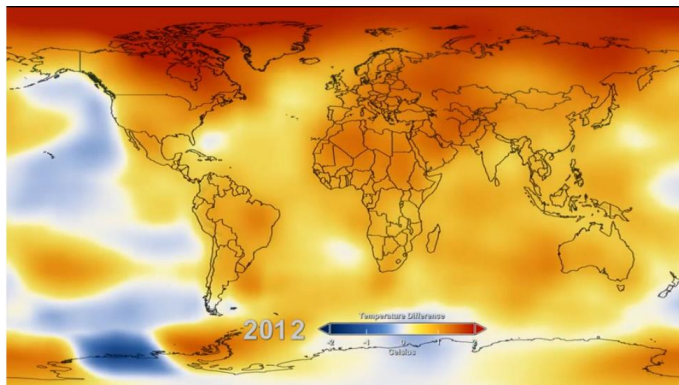
Head of research group „Sustainable Resource Use“
Institute for Ecological Economics

1. Resource use and the “Green Economy”
2. Material Flow Analysis (MFA)
3. Selected global trends
4. Conclusions

Resource use and the “Green Economy”

Natural resource issues: environmental perspectives

Climate Change

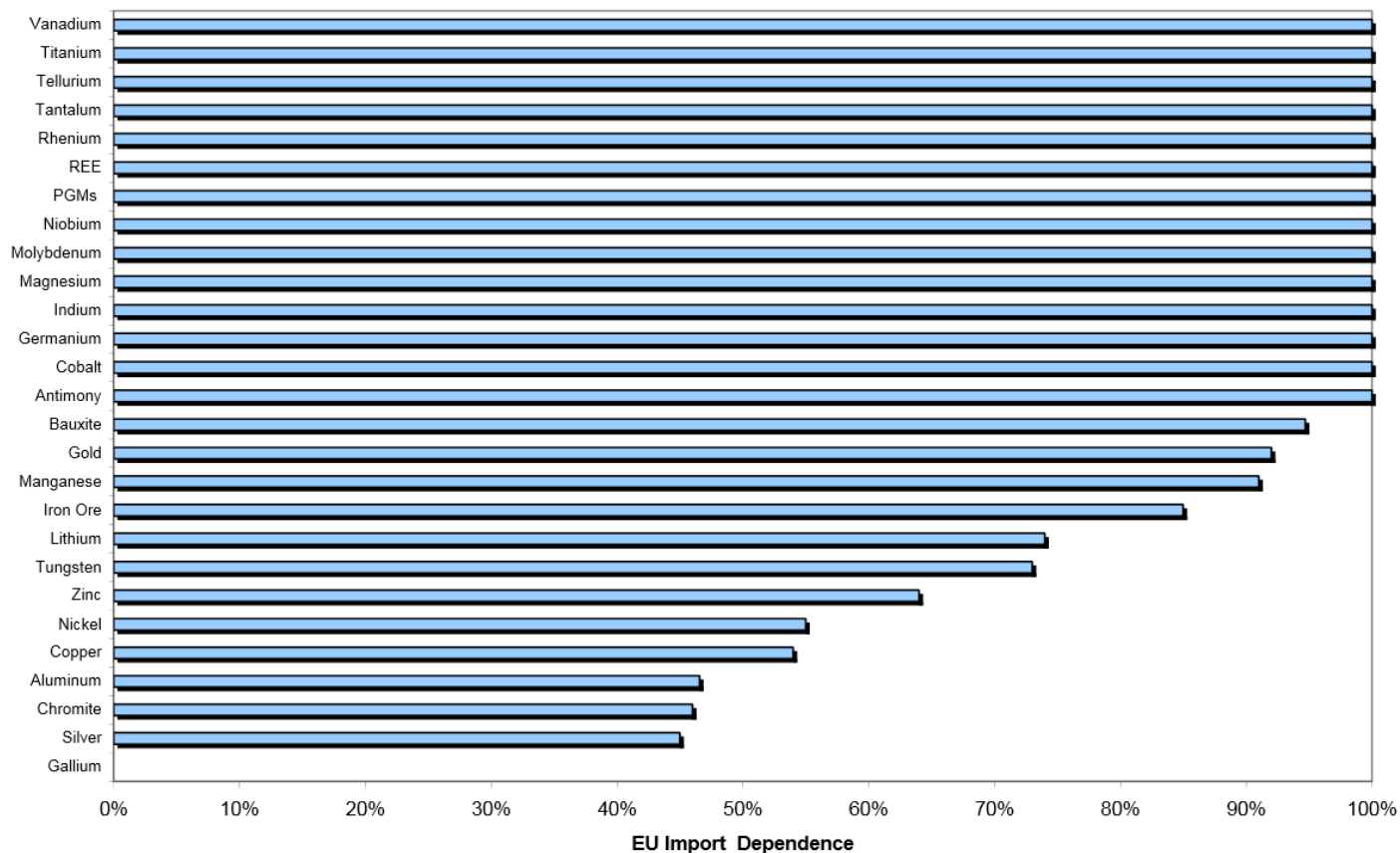


Land use change & biodiversity loss



Natural resource issues: economic perspectives

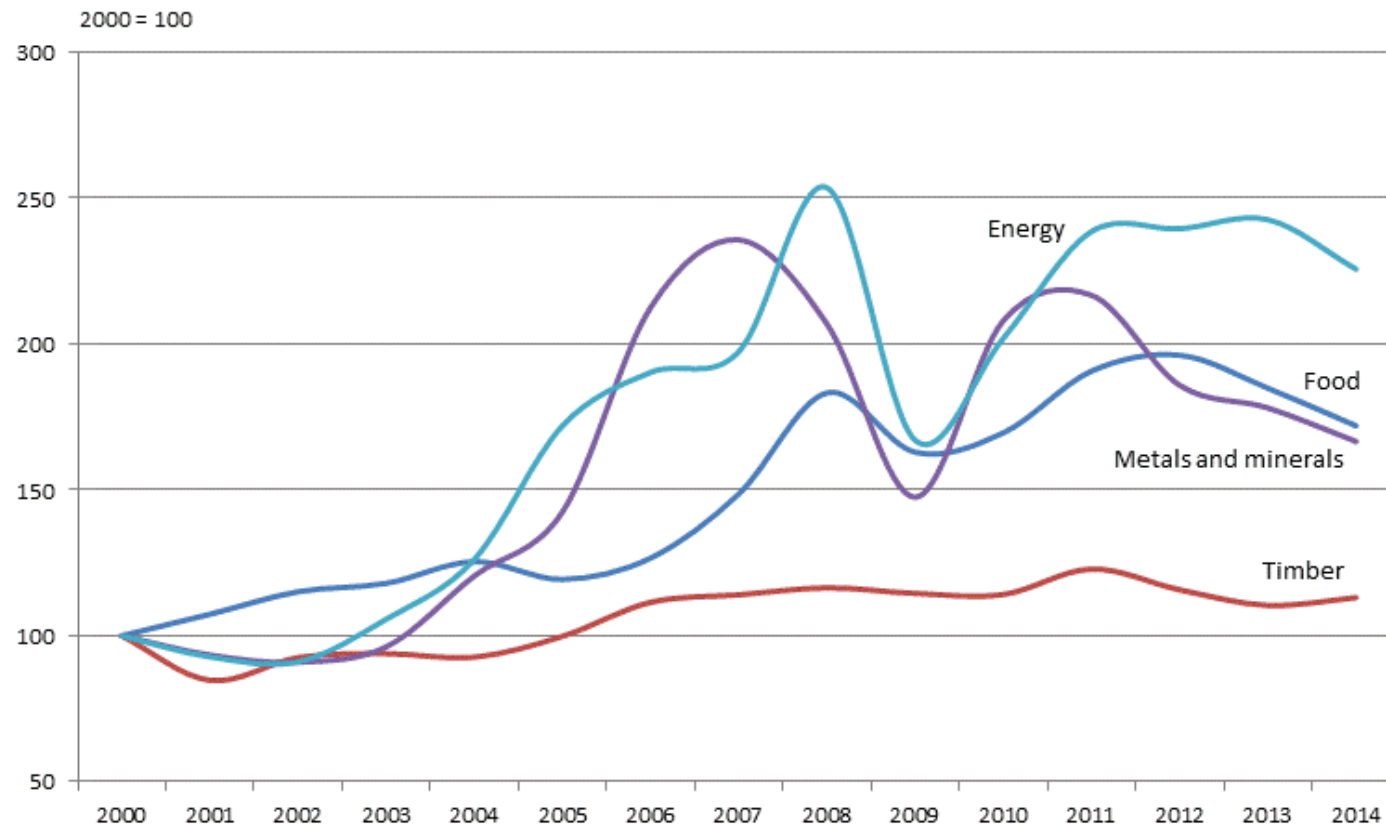
EU import dependence: the case of metal ores



Source: FP7, POLINARES

Natural resource issues: economic perspectives

Fluctuating / rising commodity prices



Source: World Bank, 2015

Resource use/efficiency and the “Green Economy” debate

- “Green” concepts: **Green Economy** (UNEP), **Green Growth** (OECD), **Green Industry** (UNIDO)
- **Europe 2020** (EU): Resource Efficiency Flagship & Roadmap: smart and resource-efficient growth
- Higher economic value per natural resource use
 - **Economic benefits:** decreasing costs; decreasing import dependencies; improving competitiveness; developing new products and markets
 - **Environmental benefits:** de-coupling economic growth from resource use and negative environmental impacts

Material Flow Analysis

The metabolism of societies and industries

Inputs



Stocks



Outputs



Material flow accounting and analysis (MFA)

- Method to calculate material use and material productivity of products, economic sectors and countries (unit of measurement: tonnes)
- Internationally standardised (Eurostat & OECD)
- Data for EU-27 available through Eurostat
- Several global data bases for all countries world-wide (current harmonisation work in context of UNEP International Resource Panel)

Material flows and environmental impacts

Biomass



Fossil Energy



Minerals



Metal ores



www.materialflows.net

The online portal for material flow data

[Background](#) [Trends](#) [Data](#) [Visualisation Tools](#)

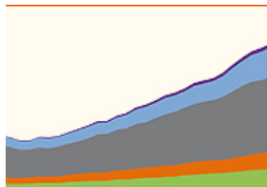
www.materialflows.net is an online portal for material flow data, providing access to material flow data sets on the national level. The website is based on the worldwide unique comprehensive database on global resource extraction - the SERI/WU Global Material Flows Database, set up and administrated by SERI (Sustainable Europe Research Institute) and the Vienna University of Economics and Business (WU Vienna), in cooperation with the Institute for Energy and Environmental Research (IFEU) and the Wuppertal Institute for Climate, Environment, Energy. The database comprises data for more than 200 countries, the time period of 1980 to 2011, and more than 300 different materials aggregated into 12 categories of material flows.

Background



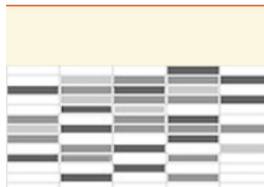
- ▶ Importance
- ▶ Accounting
- ▶ Main applications
- ▶ Policy relevance
- ▶ Objectives
- ▶ Users

Trends



- ▶ Current Analyses
- ▶ Download slides
- ▶ Download fact sheets

Data



- ▶ Datadownload
- ▶ Data purchase
- ▶ Technical Report (pdf)

Visualisation Tools



- ▶ MFA Worldmaps
- ▶ Gapminder
- ▶ Worldmapper

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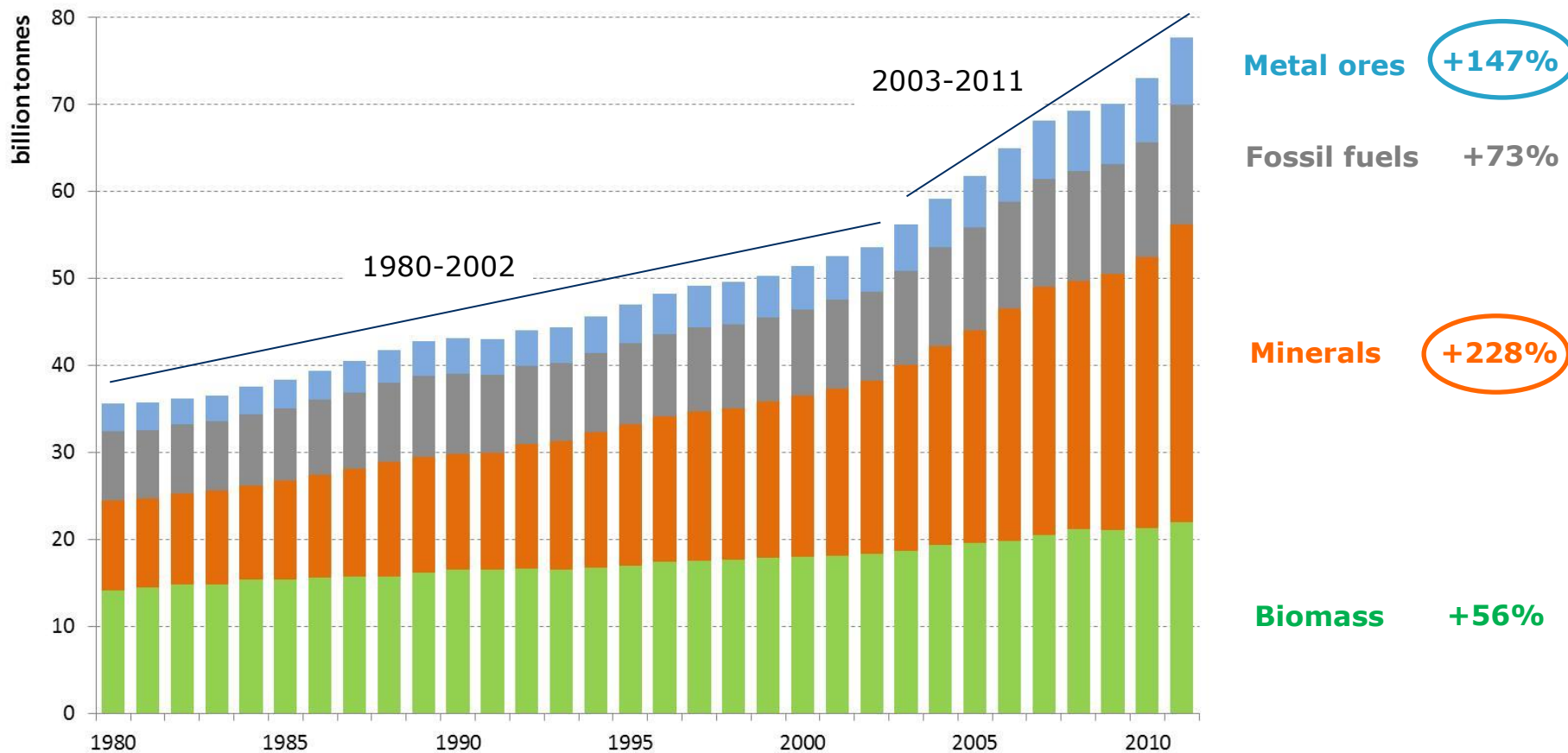
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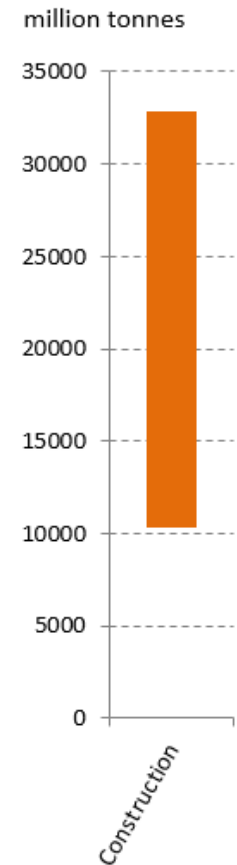
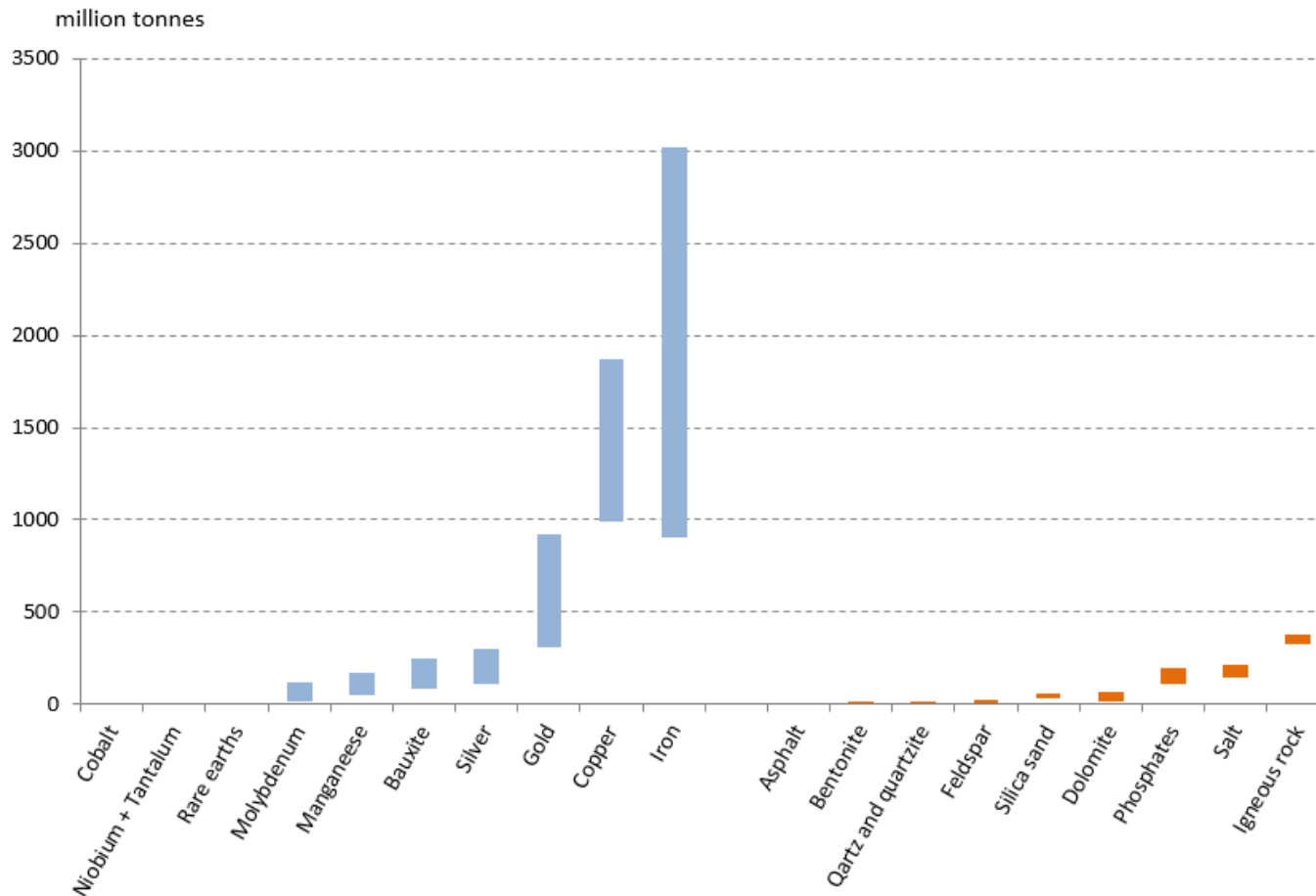
A website set up by SERI and WU Vienna, in cooperation with IFEU, the Wuppertal Institute and the Austrian Ministry for the Environment.

Selected global trends

Global material consumption is constantly increasing

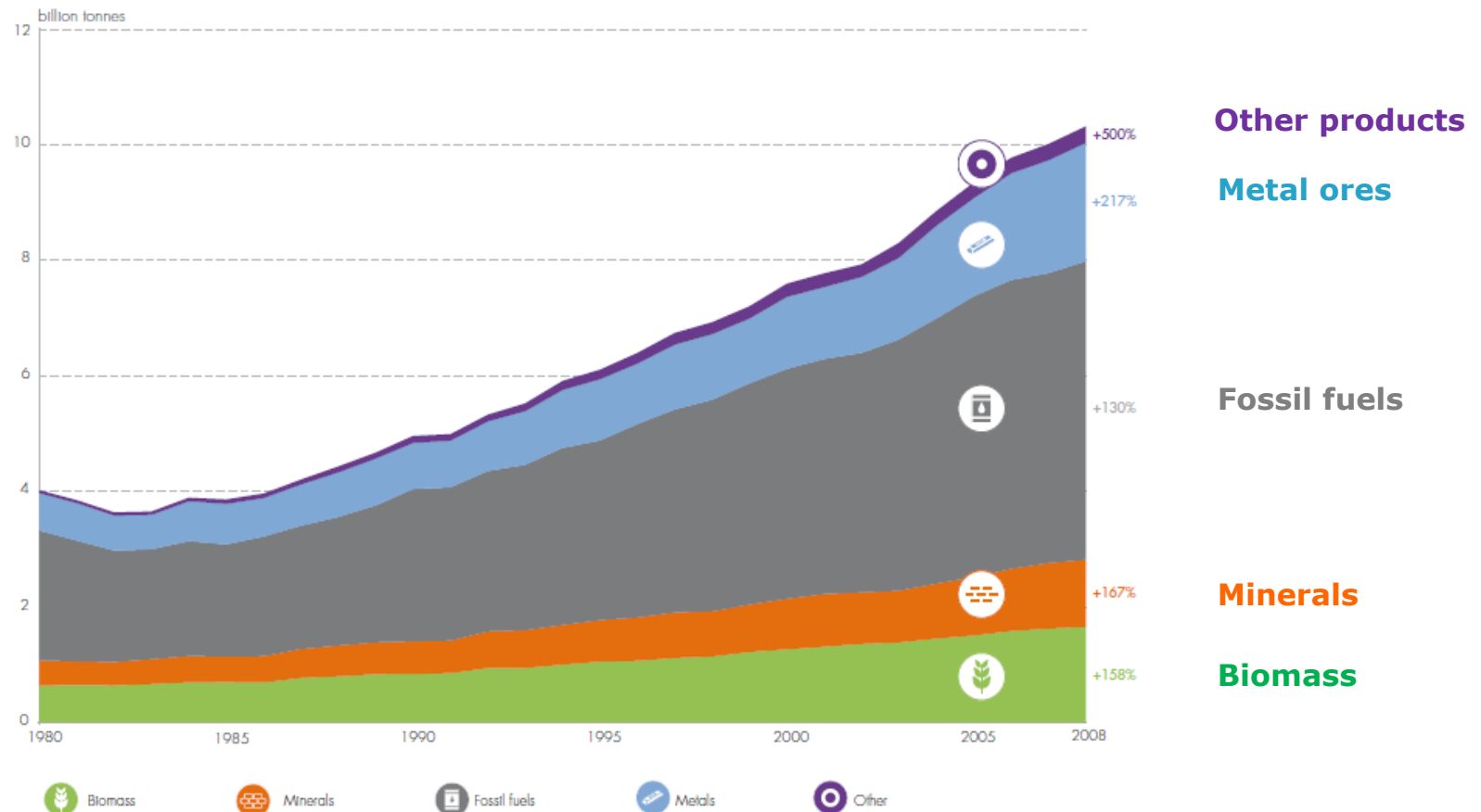


Global material consumption of metals and minerals



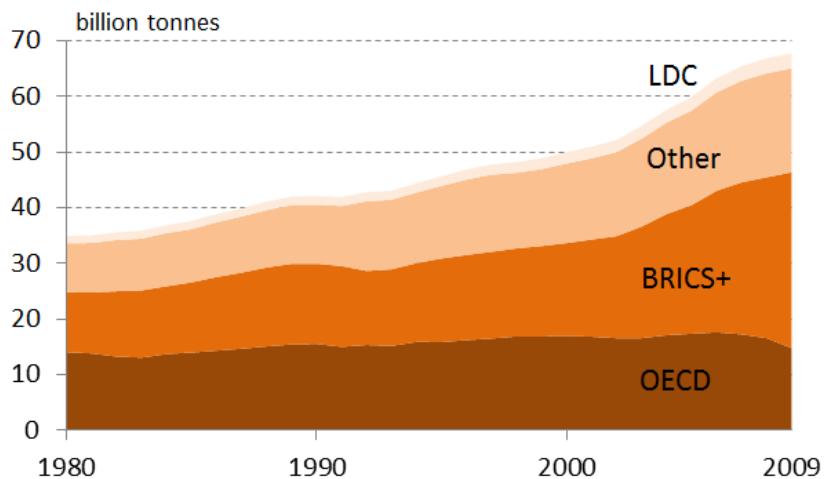
International trade is growing even more rapidly

Global physical trade volumes and growth rates of main material categories
1980–2008



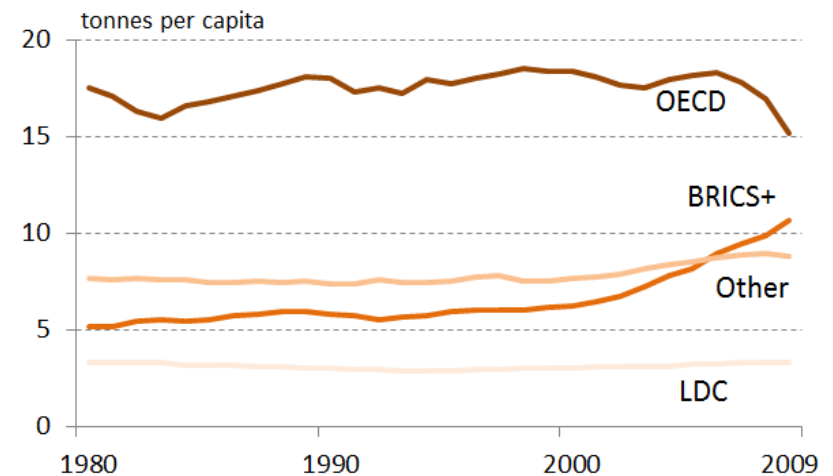
Domestic Material Consumption (DMC) per country groups

Absolute DMC



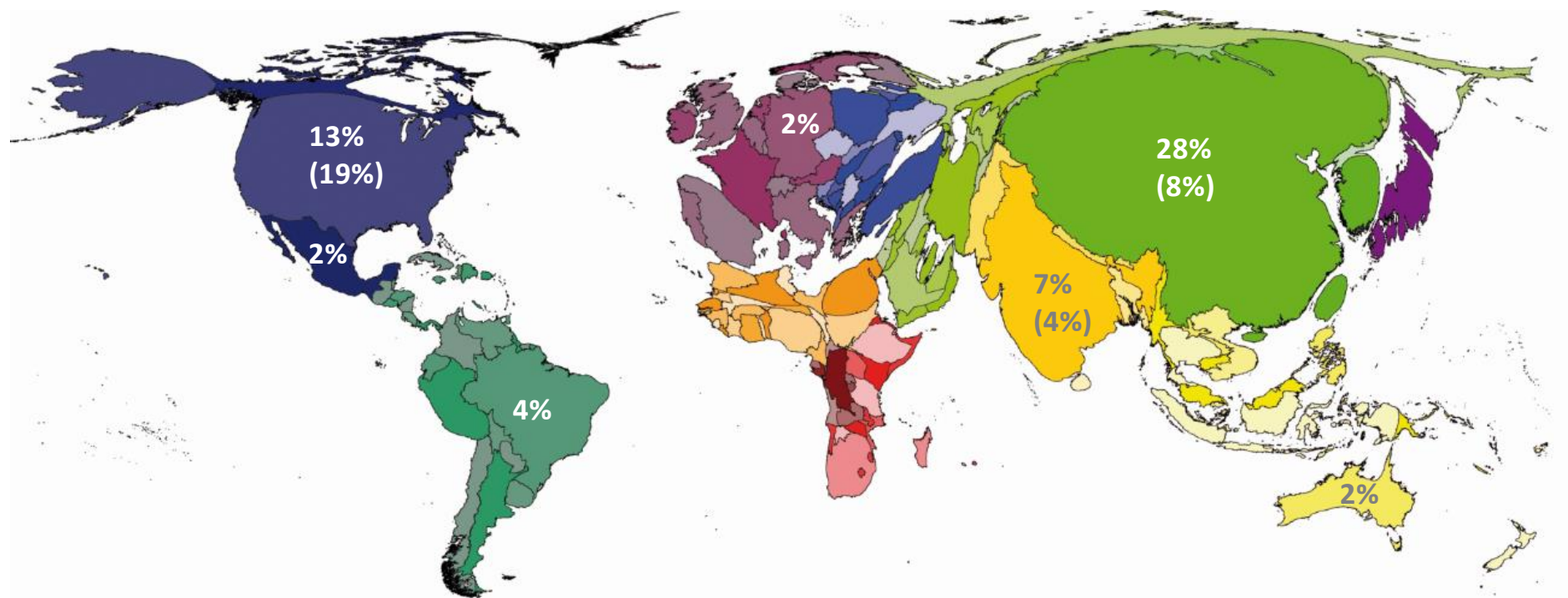
OECD members 1980; BRICS+: BR, RU, IN, CN, ZA, KR, SG, MX; LDC according to UN

DMC / capita



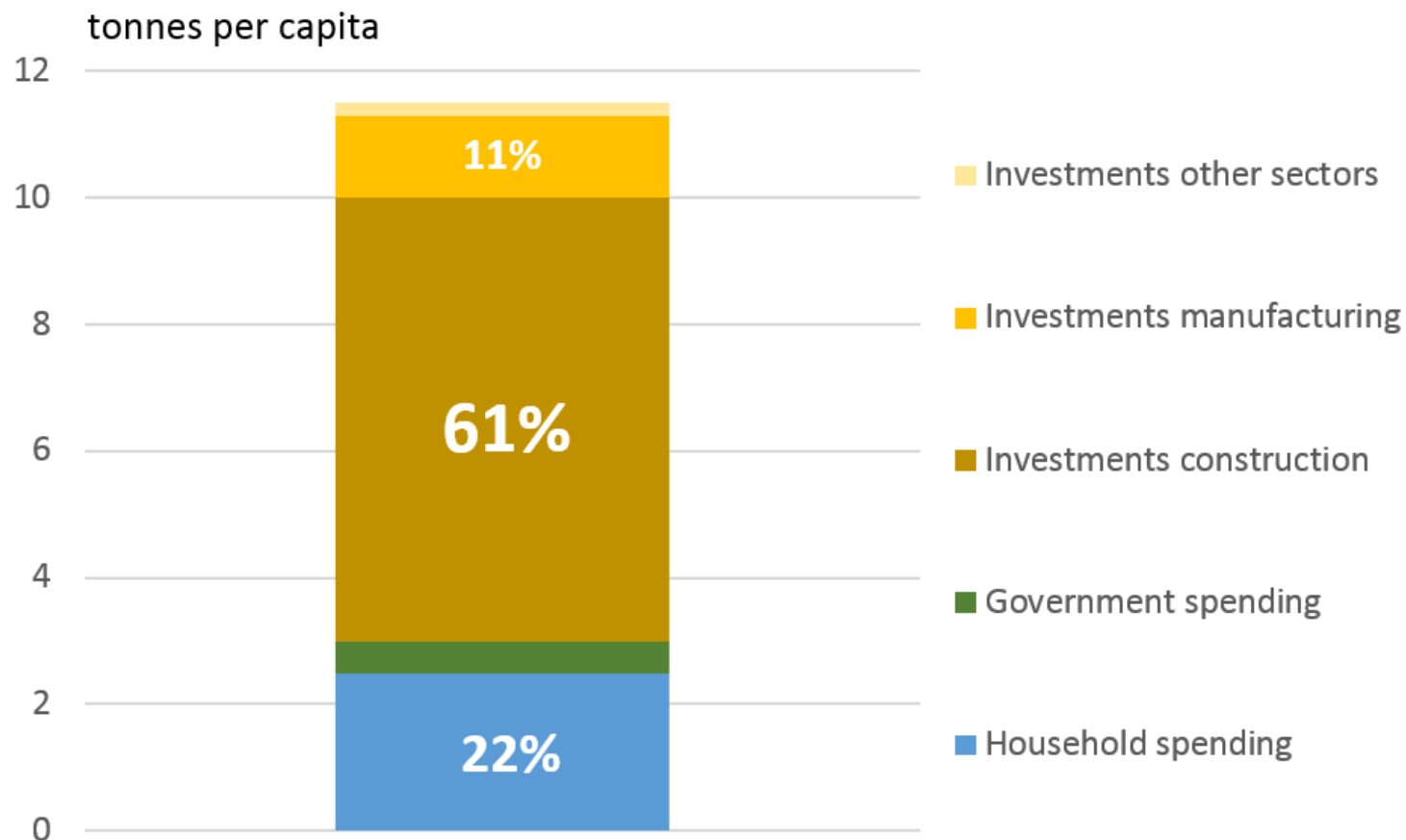
Uneven contribution of countries and regions, 2008 (1980)

Size of country equals its contribution to **global material consumption**

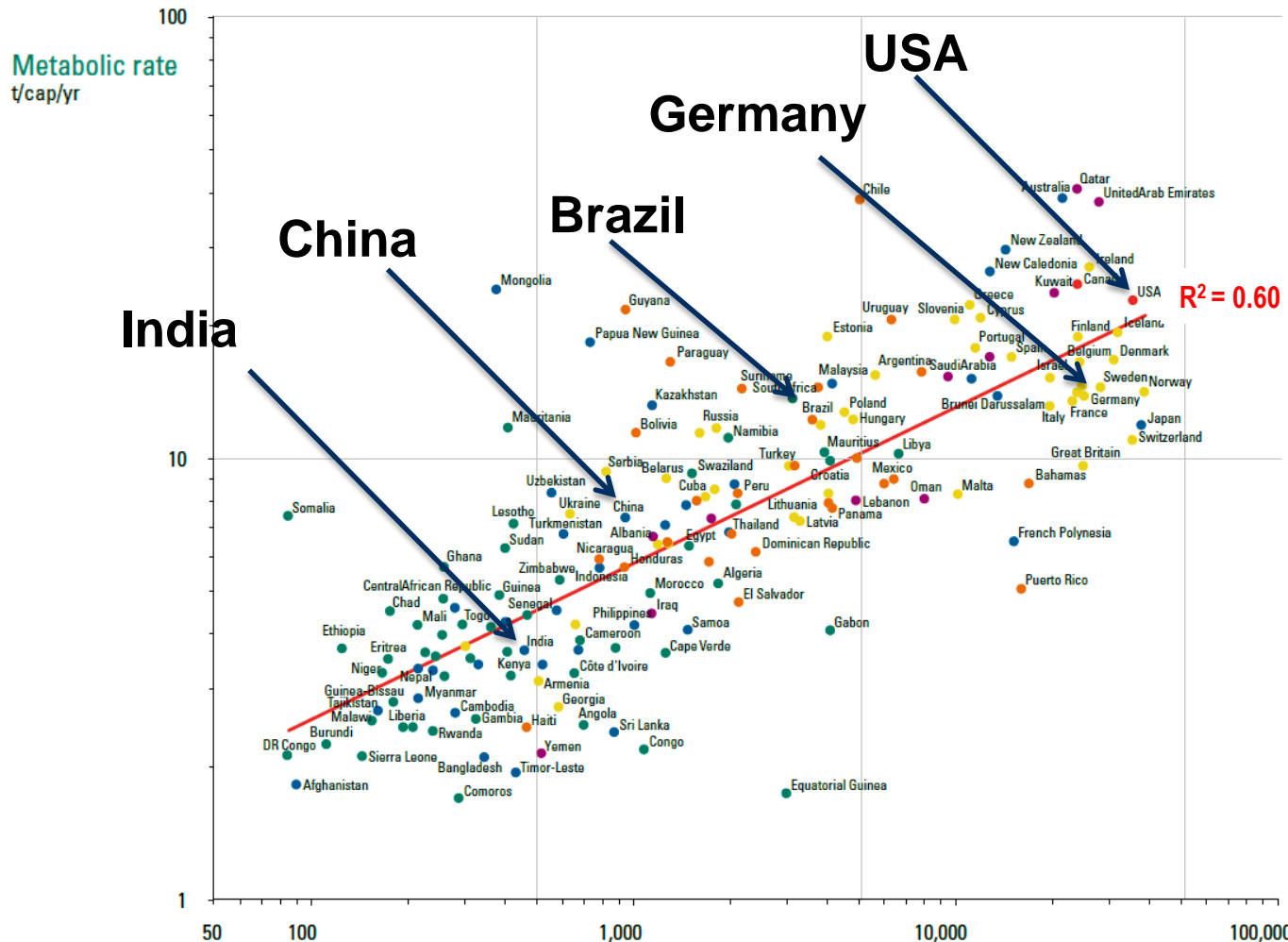


China and the role of infrastructure investments

China's global material footprint: 11.5 tonnes per capita (2007)



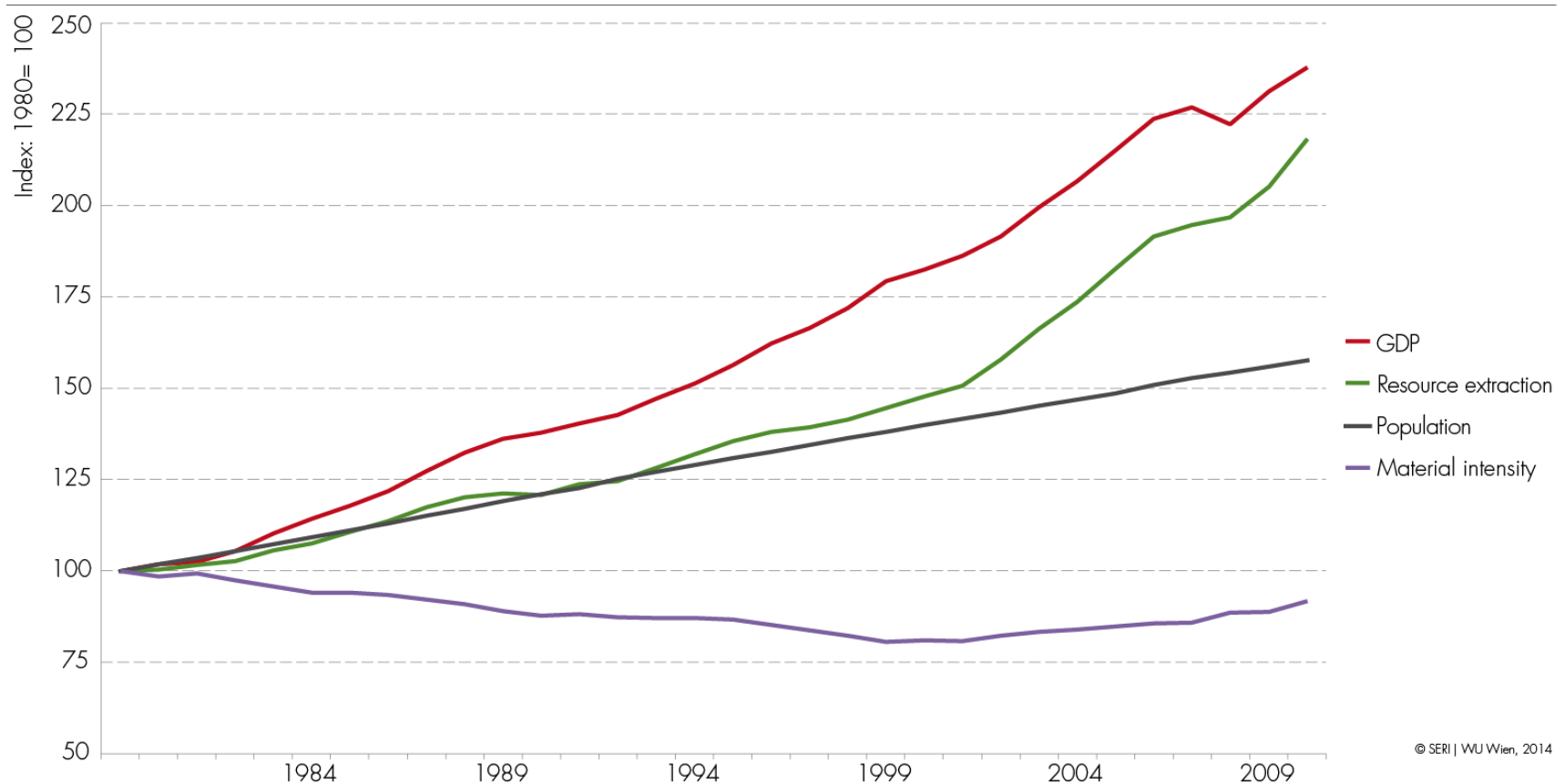
Income and material consumption, 2000



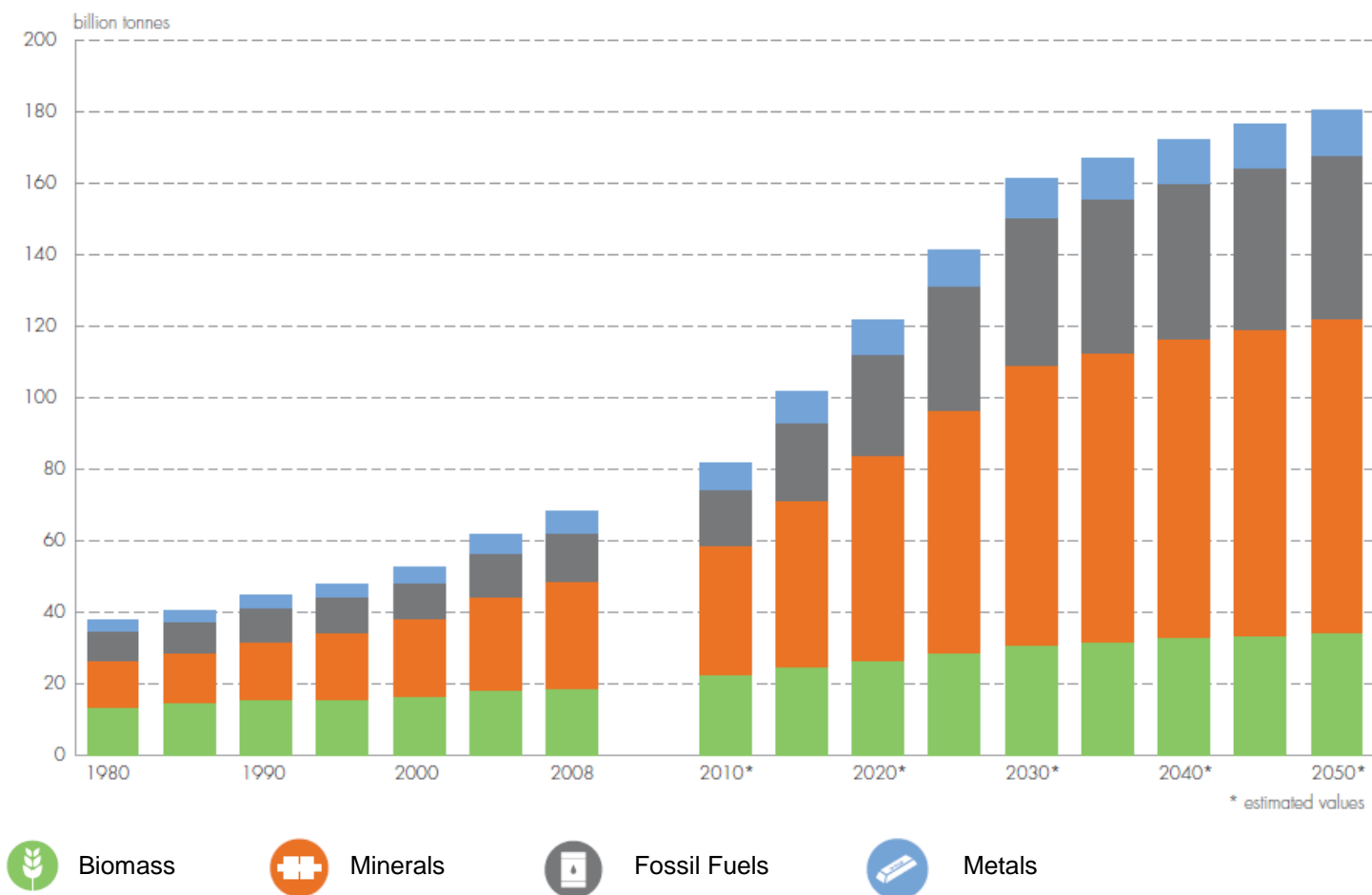
Income is key driver for increasing resource consumption

Source: IRP, 2011

Global economy (1980-2011): growth > productivity gains

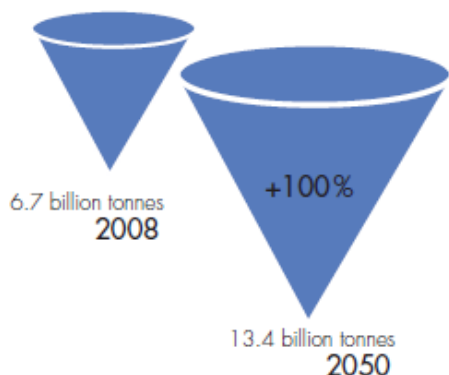


Business-as-usual scenario (from 2030: all on OECD level)

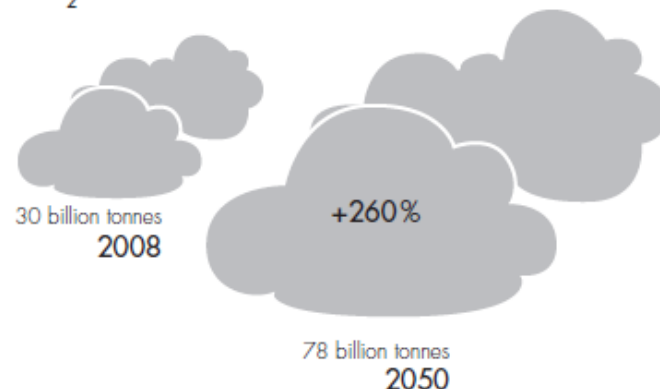


Environmental impacts of business-as-usual

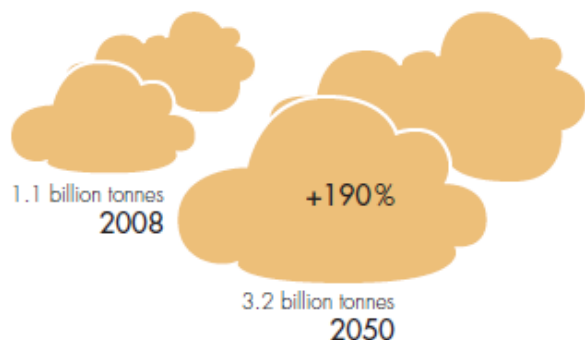
Unused material extraction related to metal mining



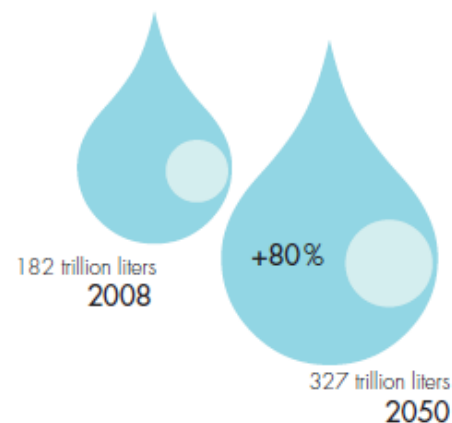
CO₂ emissions from fossil fuel combustion



CO₂ emissions from cement production

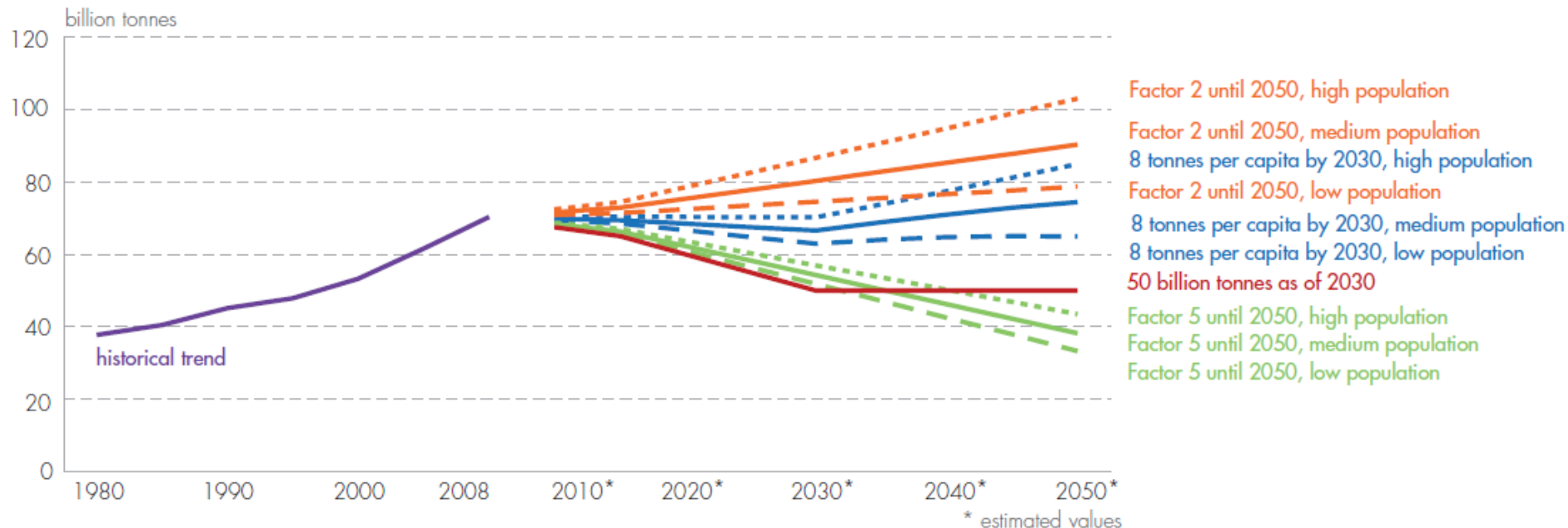


Water requirements for agricultural production



Scenarios for sustainable resource use

Factor 2 8 tonnes per capita 50 billion tonnes Factor 5



Conclusions

Conclusions

- Current trends of global resource use are alarming:
 - rapidly growing levels of resource use on global level (material, water, energy, ...)
 - continued high levels of consumption in industrialised countries
 - rapid growth of per-capita resource use in emerging economies
 - resource efficiency improvements are overcompensated by economic growth

Conclusions

- Realisation of a truly “Green economy”
 - Industrialised countries:
 - Absolute reduction / absolute de-coupling
 - Definition of clear (policy) targets
 - Policy frameworks and instruments
 - Introduction of resource taxes
 - Fading out environmentally harmful subsidies
 - Increasing research & innovation

Conclusions

- Realisation of a truly “Green economy”
 - Developing countries:
 - Will require material growth to tackle poverty
 - Relative de-coupling
 - Focus on infrastructure (buildings, energy, transport, ...), as infrastructure largely determines volumes of resource use (and of mineral resources in particular)

Thank you for your attention!



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