WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

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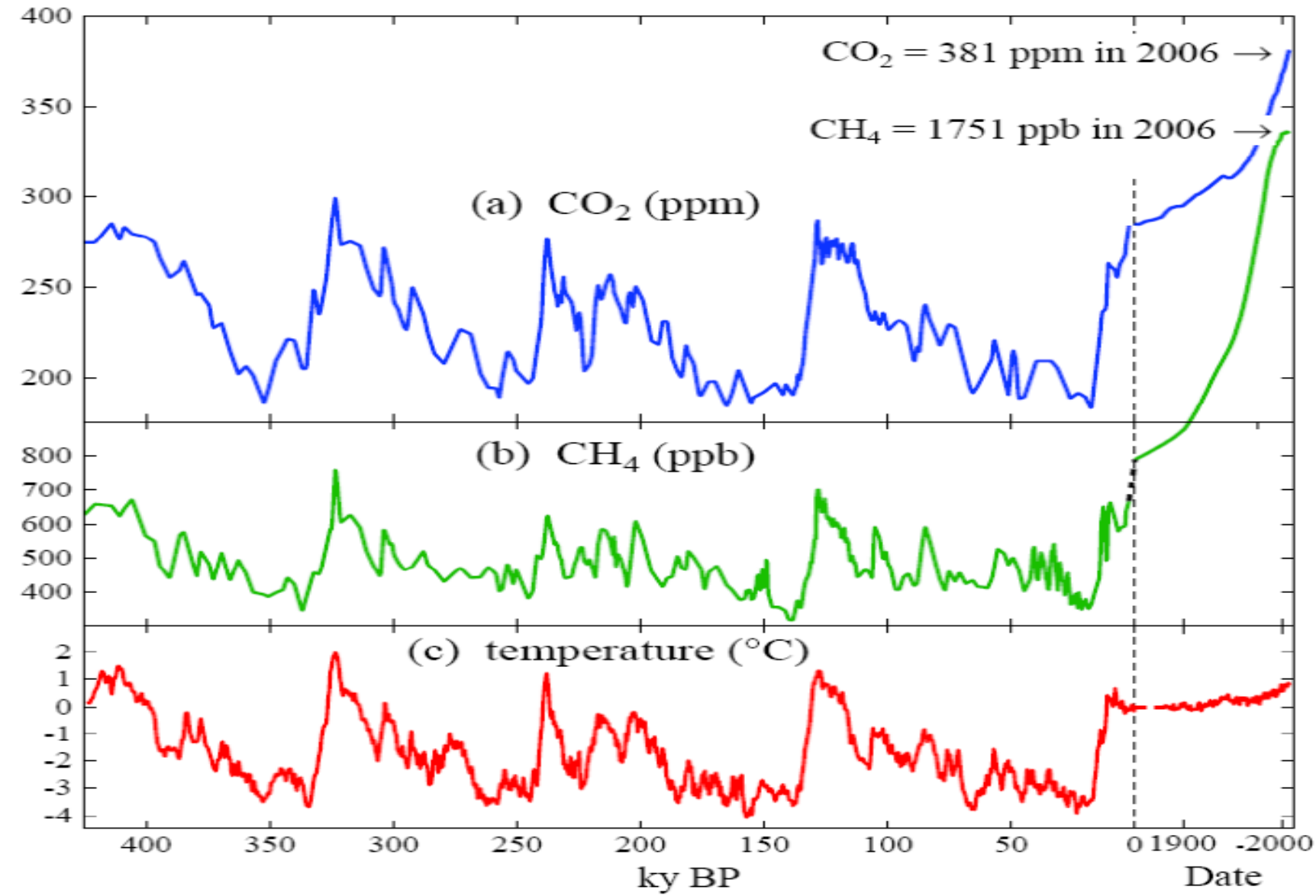
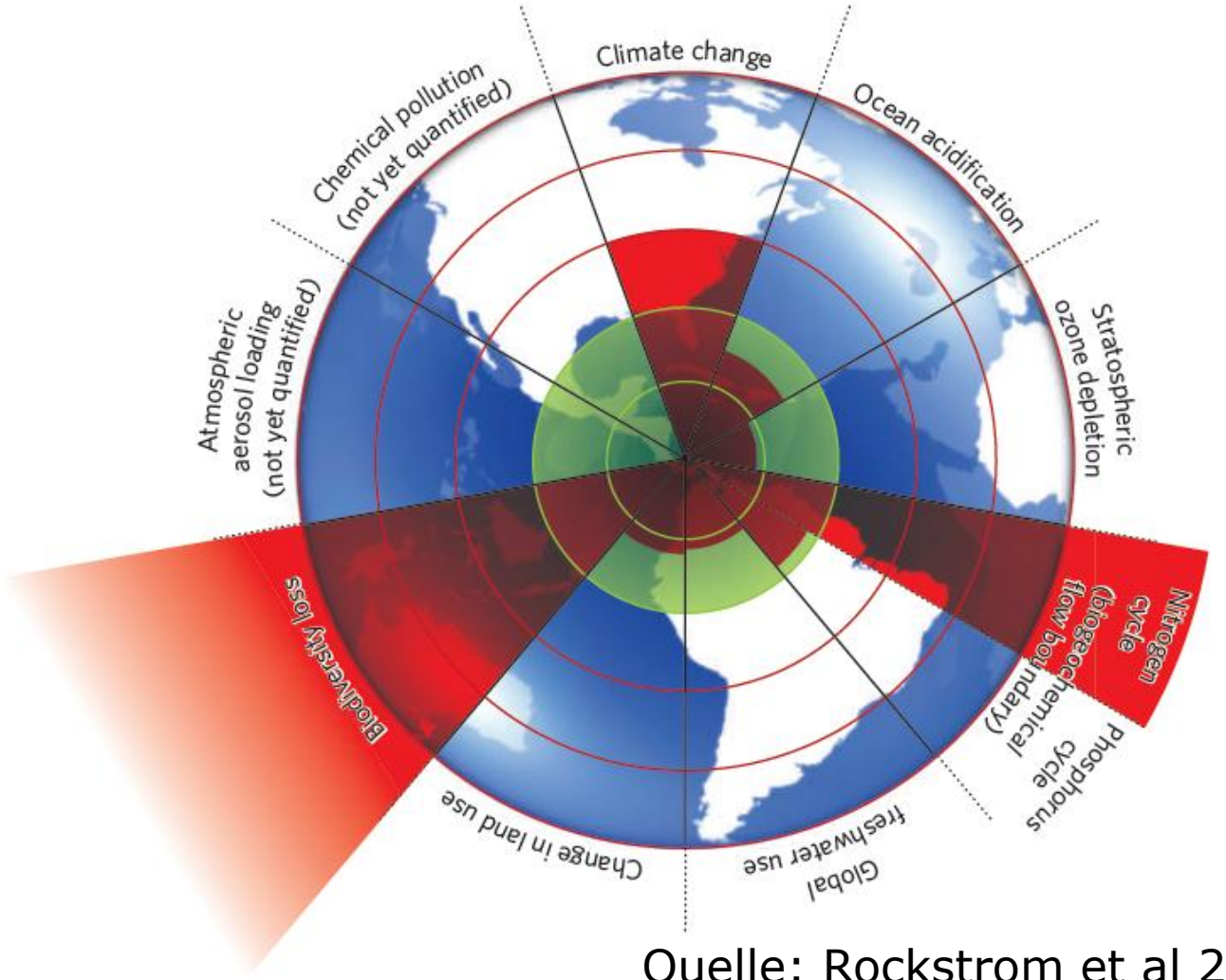
Volkswirtschaftliche Aspekte des Rebound-Effekts

Sigrid Stagl – 12. Juni 2012 – Energiegespräche

Weltklima ist bereits außerhalb des stabilen Bereichs

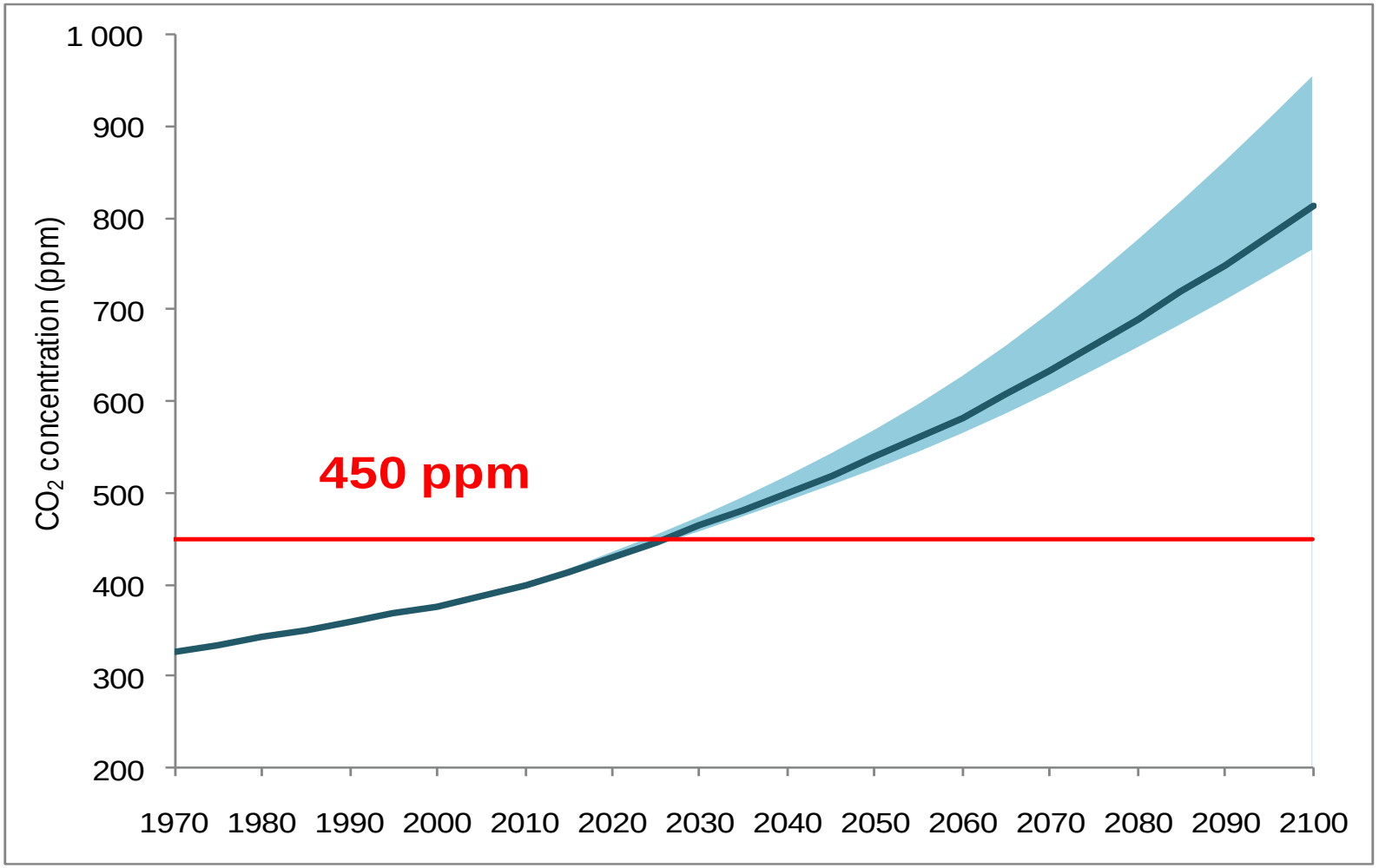


Planetarische Grenzen



Quelle: Rockstrom et al 2009

Klimawandel: Globaler Temperaturanstieg 3-6°C bis 2100



SOURCE: (OECD, 2012) OECD ENVIRONMENTAL OUTLOOK TO 2050, BASELINE PROJECTION USING IMAGE MODEL SUITE

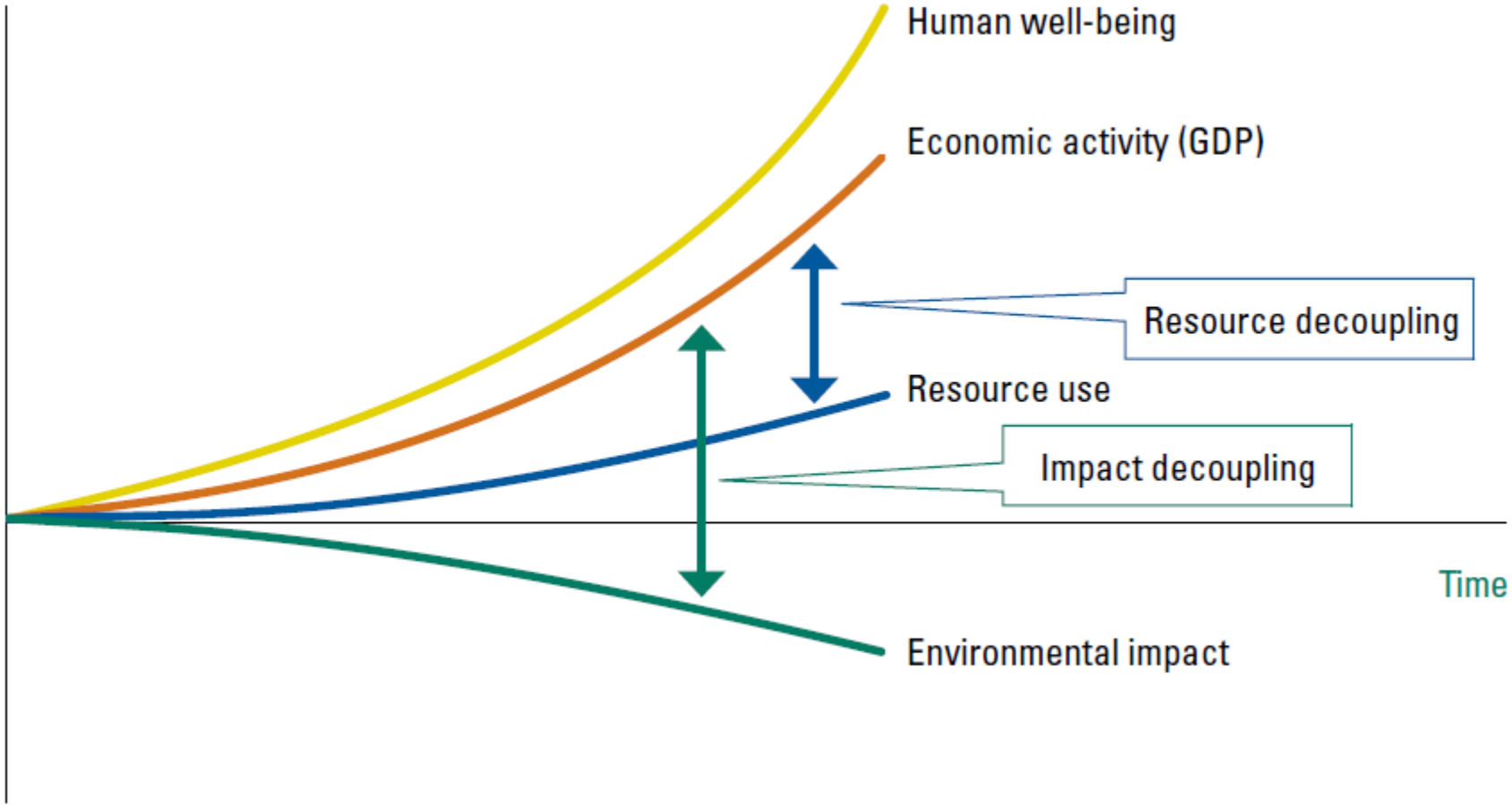
Framing the sustainability debate

$$I \equiv P\ A\ T$$

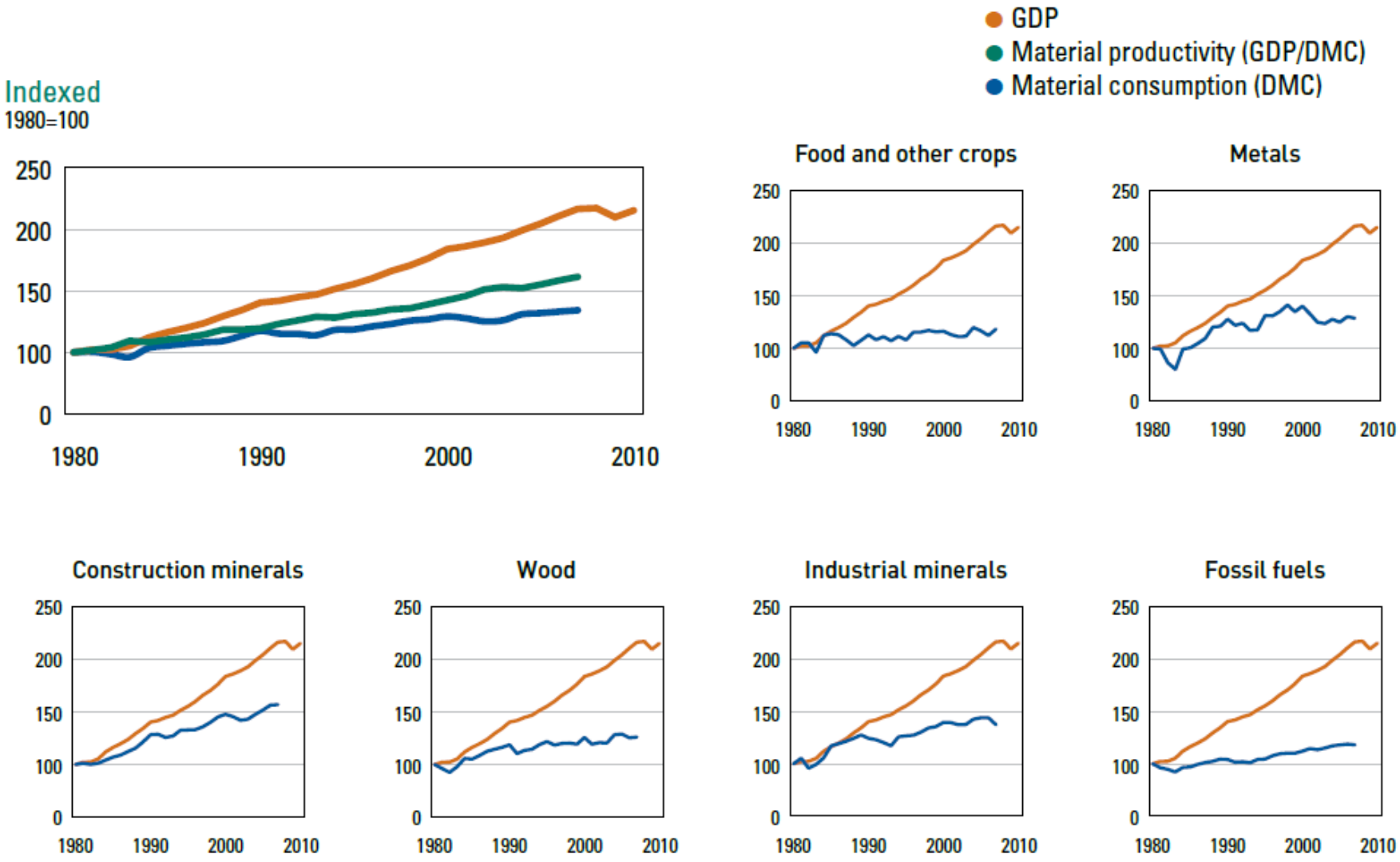
where

- I … impact; extraction from the environment or insertion into the environment; measured in various units - tonnes, litres, cubic feet etc
- P … population; number of people
- A … affluence; economy's total output of goods and services (GDP) divided by population; in currency units
- T … technology; a particular extraction from or insertion into the environment, per currency unit of GDP

Ausweg Entkopplung



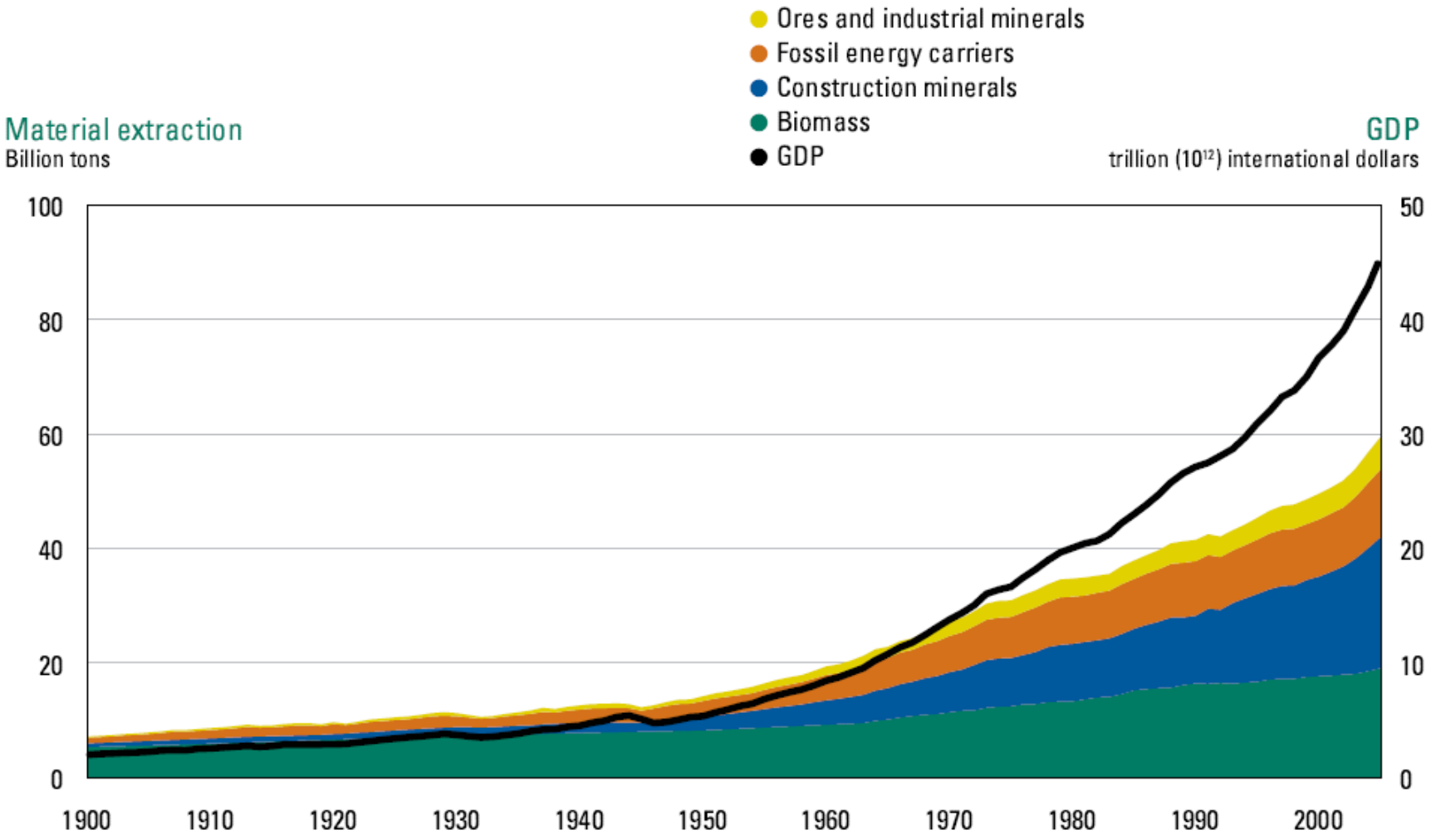
Quelle: UNEP 2011



Source: OECD, 2008b. Data update provided by OECD on 1 April 2011, http://www.oecd.org/dataoecd/55/12/40464014.pdf

Deutschland ist es z.B. in den vergangenen Jahren gelungen, die CO2-, Energie- und Ressourcenintensität seiner Wirtschaft deutlich zu reduzieren (OECD 2012).

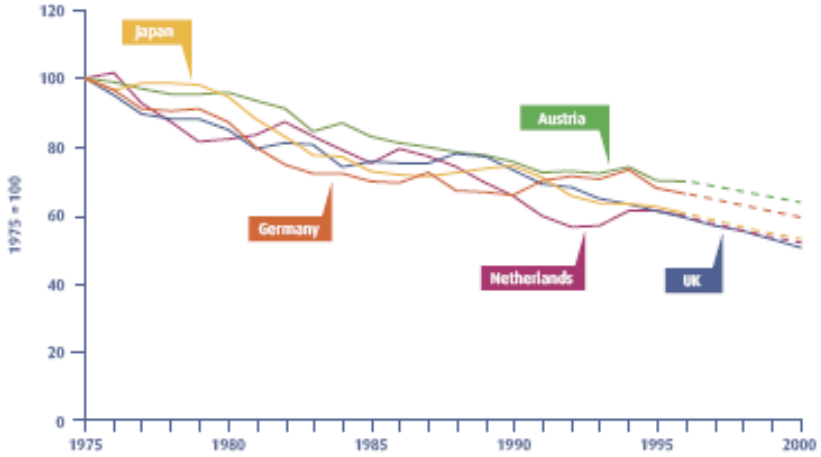
Globale Ressourcenextraktion in Mrd t, 1900-2005

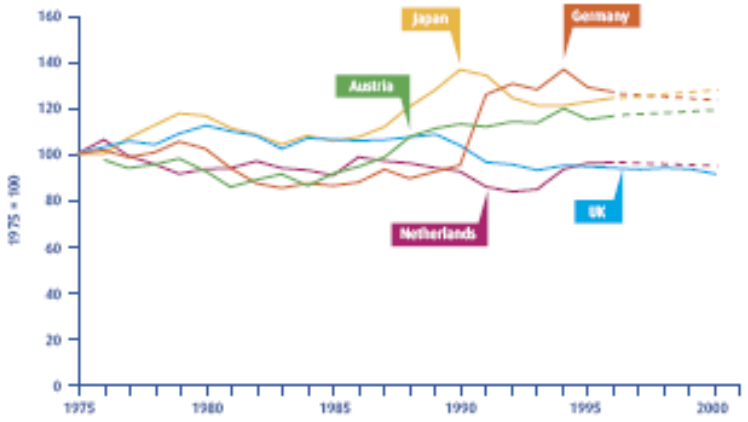


Source: Krausmann *et al.*, 2009

Ökologisch ökonomische Kritik an relativer Entkopplung

H Daly (1991) definiert eine Steady-State Economy durch: "constant flow of throughput at a sustainable (low) level, with population and capital stock free to adjust to whatever size can be maintained by the constant throughput beginning with depletion and ending with pollution."





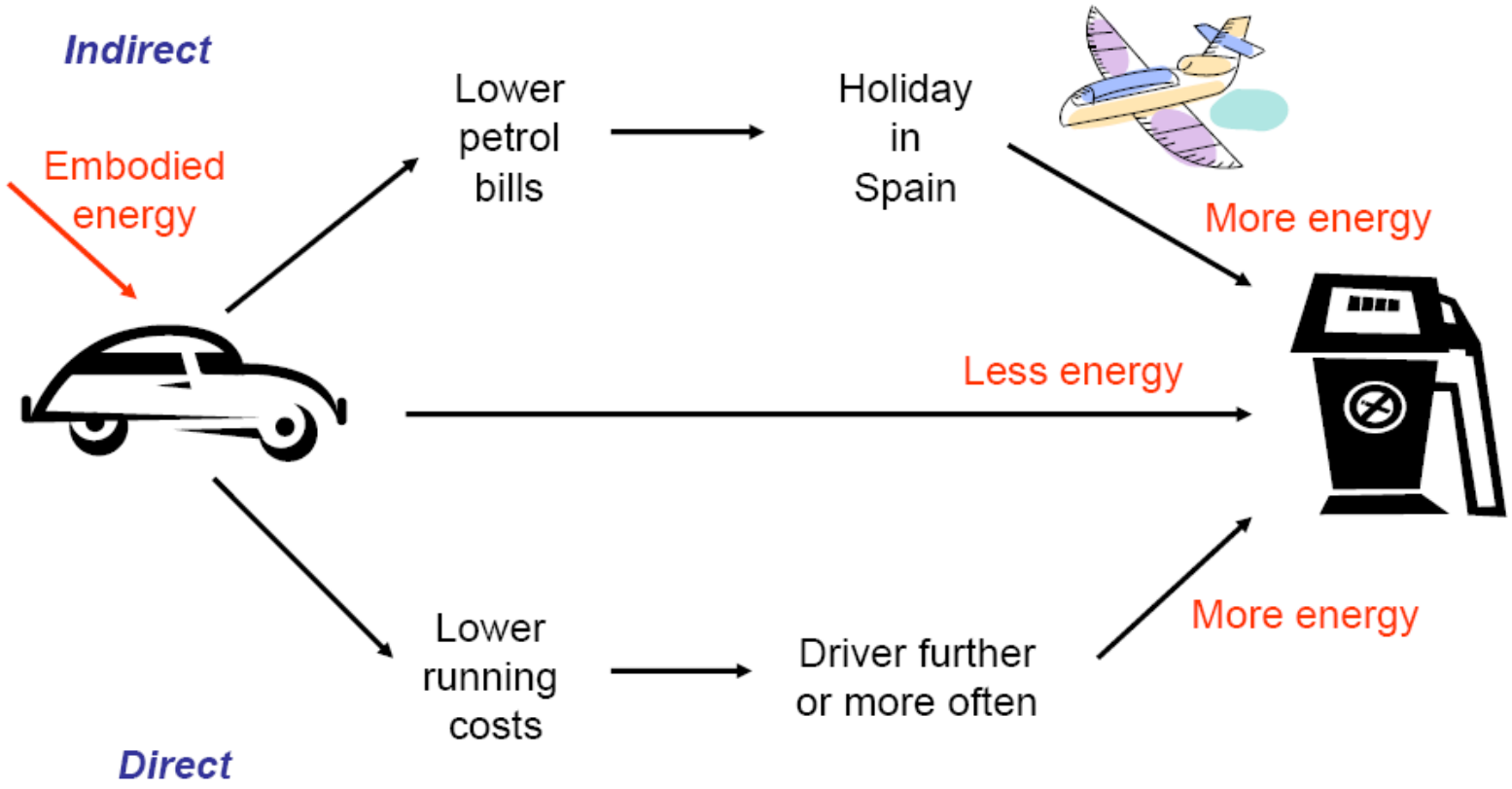
Relative Entkoppelung vs. Absolute Entkoppelung

Quelle: Jackson, T. 2009

Rebound Effekte

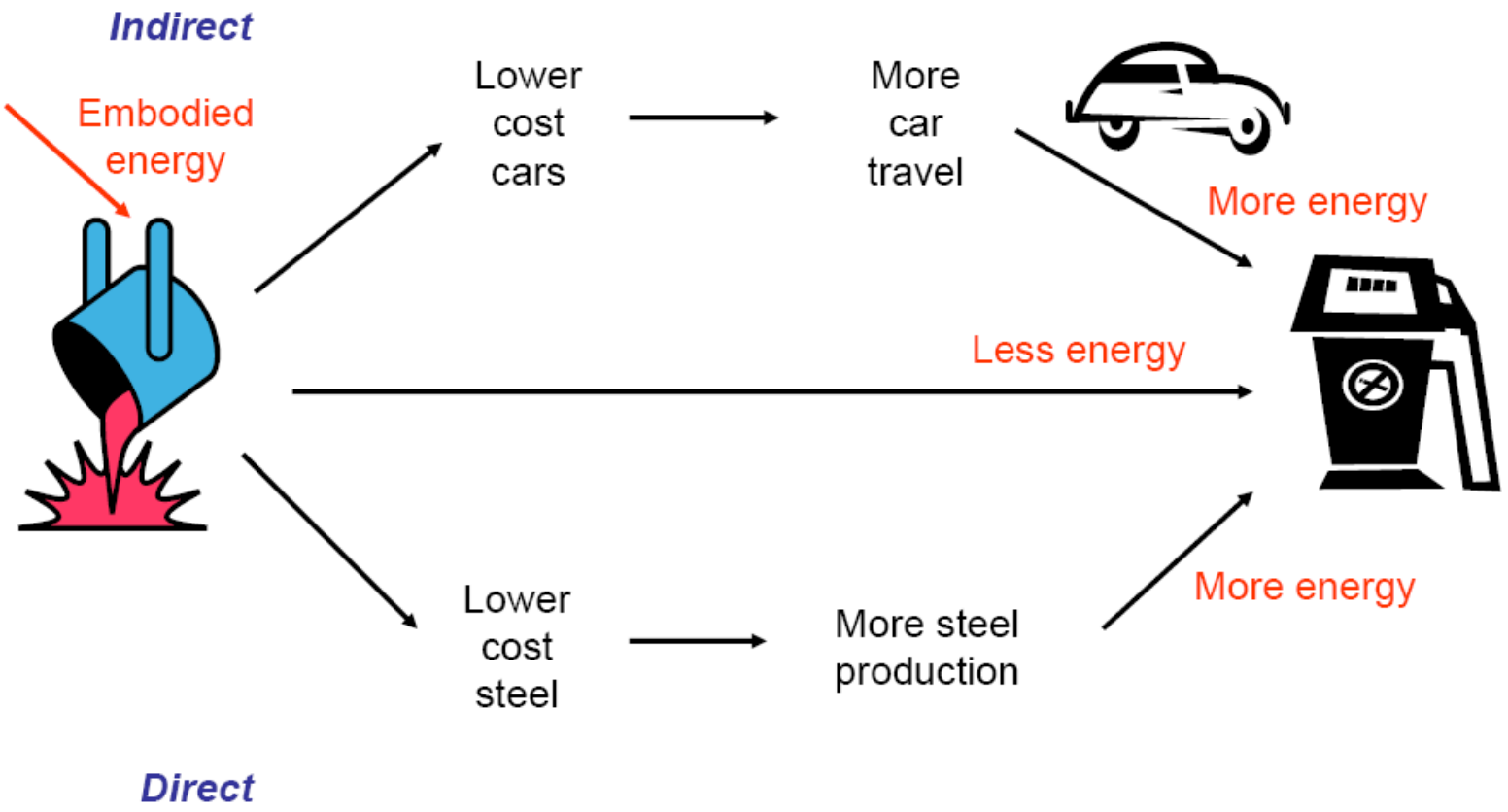
- Wird eine 20%ige Verbesserung der thermischen Effizienz eines Heizsystems zu einer 20%igen Reduktion des Energieverbrauchs führen? Nein, weil
  - direkte Reboundeffekte
  - indirekte Reboundeffekte
  - makroökonomische Reboundeffekte wirken.
- Rebound Effekt für Zeit
- In EconLit 59 hits; inkl. ‚Jevons Paradox': 69

Reboundeffekt – Konsument/innen



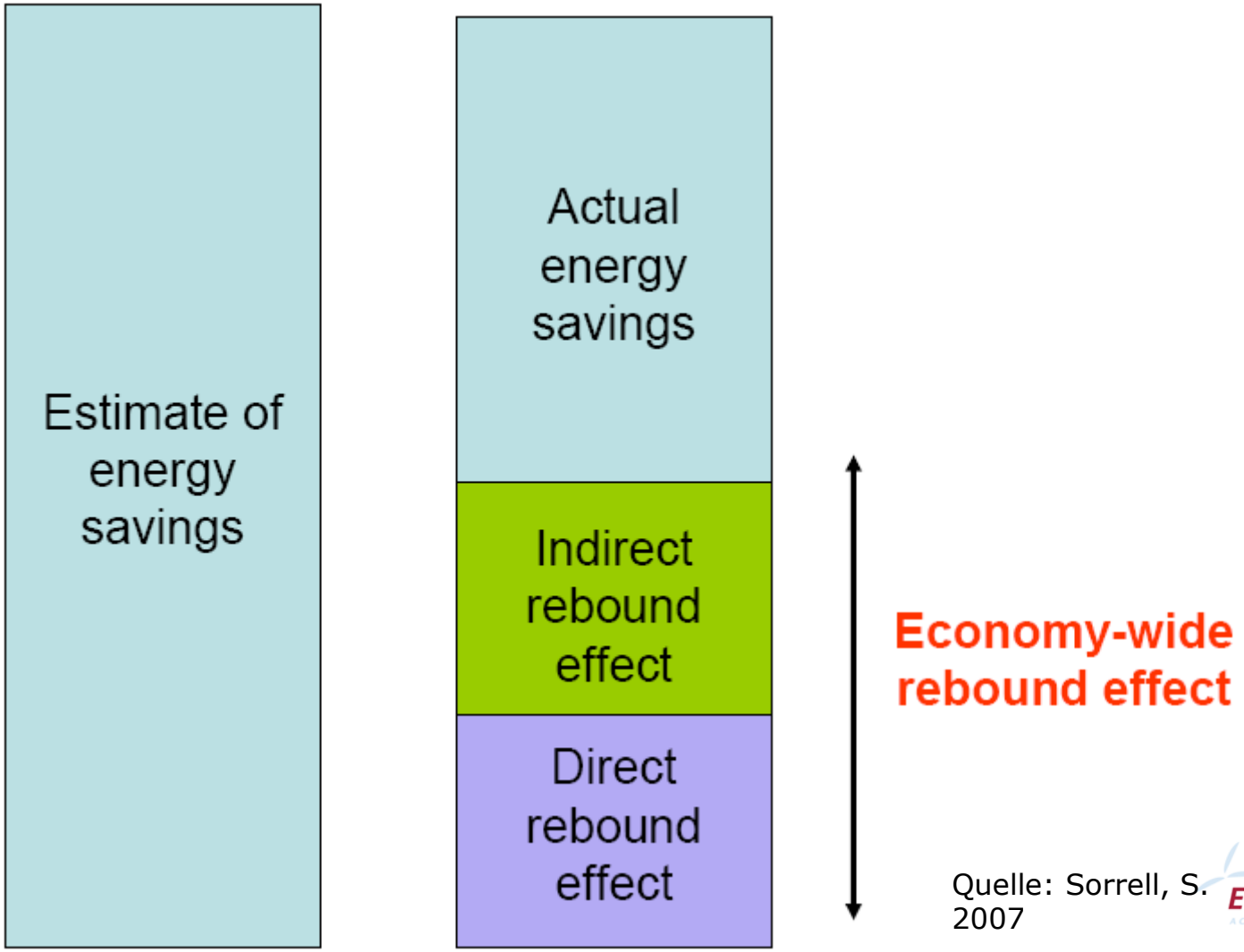
Quelle: Sorrell, S. 2007

Reboundeffekt – Produzent/innen



Quelle: Sorrell, S. 2007

Reboundeffekt - Makro



Quelle: Sorrell, S. 2007

Smarte Getränkeautomaten – eine Erfolgsgeschichte?

1. Studies in the 1990s found that vending machines – in particular for soft drinks – were using a relevant amount of electric energy and that there were **unused efficiency potentials** of roughly 50%.
2. In 2003, there were 7.7 million vending machines in USA, 5.5 Million in Japan **(using 6.0 TWh/yr)** and 4.0 million in the EU.
2. Governments created incentives for industry to produce smarter, energy-efficient vending machines (USA: Energy Star Label since 2004, Japan: Toprunner since 2002, targeting 2005)
3. Energy consumption per average machine dropped by 37% 2000-2005 and again by 27.5% 2005-2009. One brand claims **to save 46 % of operating costs**.
5. In 2008, a study in obesity research found that the number of soft drink vending machines **at US schools had doubled since 1990.**
6. In 2010, a Japanese manufacturer claims that a new vendig machine which recommends drinks to customers based on facial recognition has **tripled sales**.
7. Within two decades, the **per-machine energy consumption** of beverage vending machines came down from 10 kWh/day in 1993 to less than 4 kWh/day.

ENERGY STAR

Quelle: Hilty 2012

In "Thy Myth of Resource Efficiency" Joseph A. Tainter berichtet über einen Mann und dessen Unternehmen

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"His specialty was to place the machines in **small offices** where only a few people work. How, one might wonder, could one profit from placing these machines in small offices?

With reduced energy consumption, the machines can now be operated at a profit even in places where only a handful of people per day might purchase a soft drink."

Source: J. M. Polimeny et al., The Myth of Resource Efficiency. Earthscan London 2009

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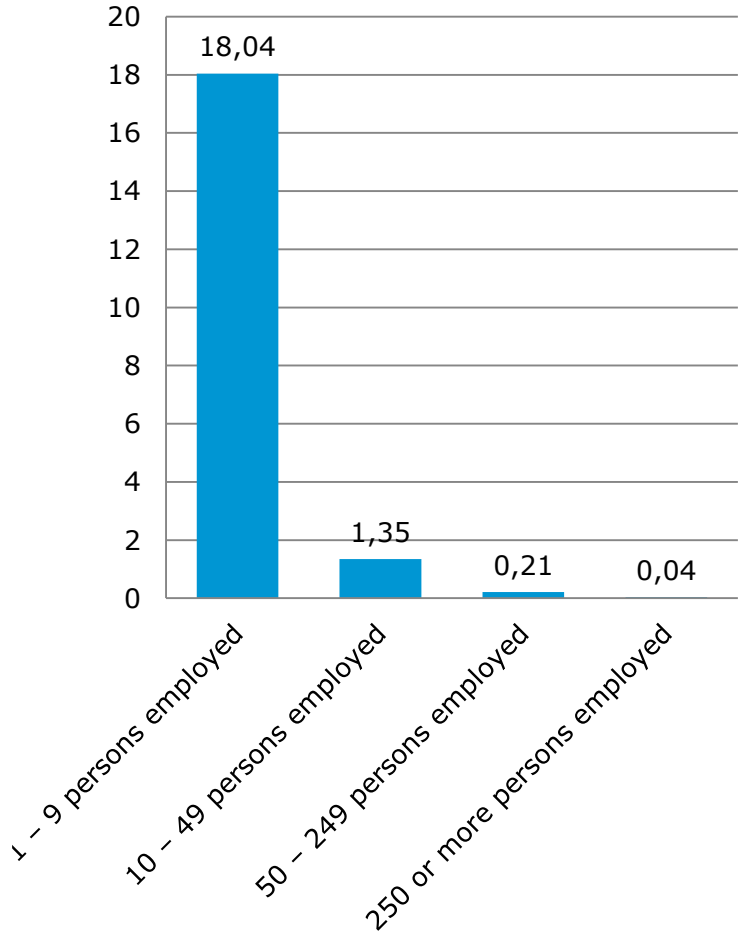
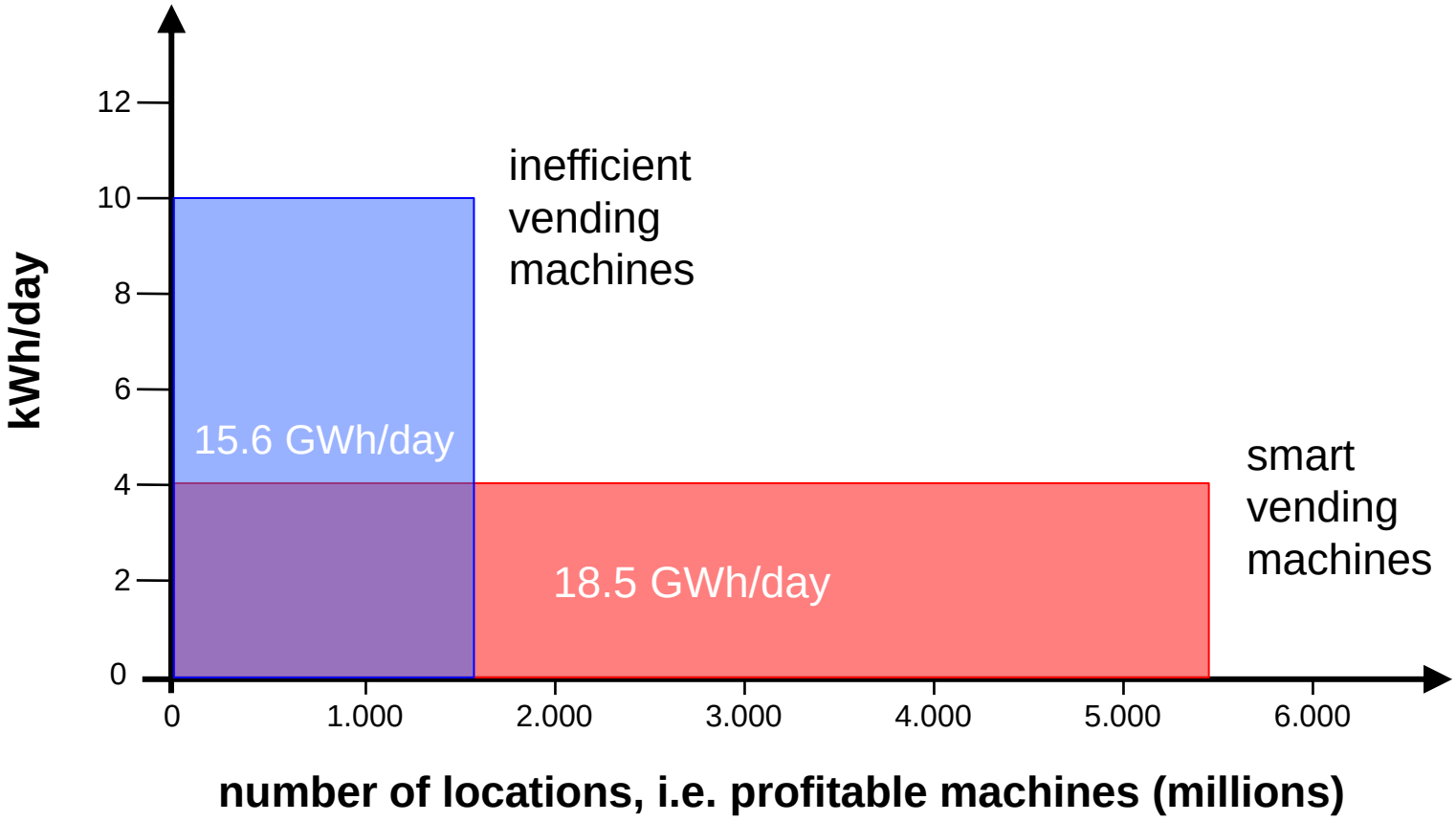
Anzahl der Unternehmen in Mio nach Größe (EU-27, 2005)



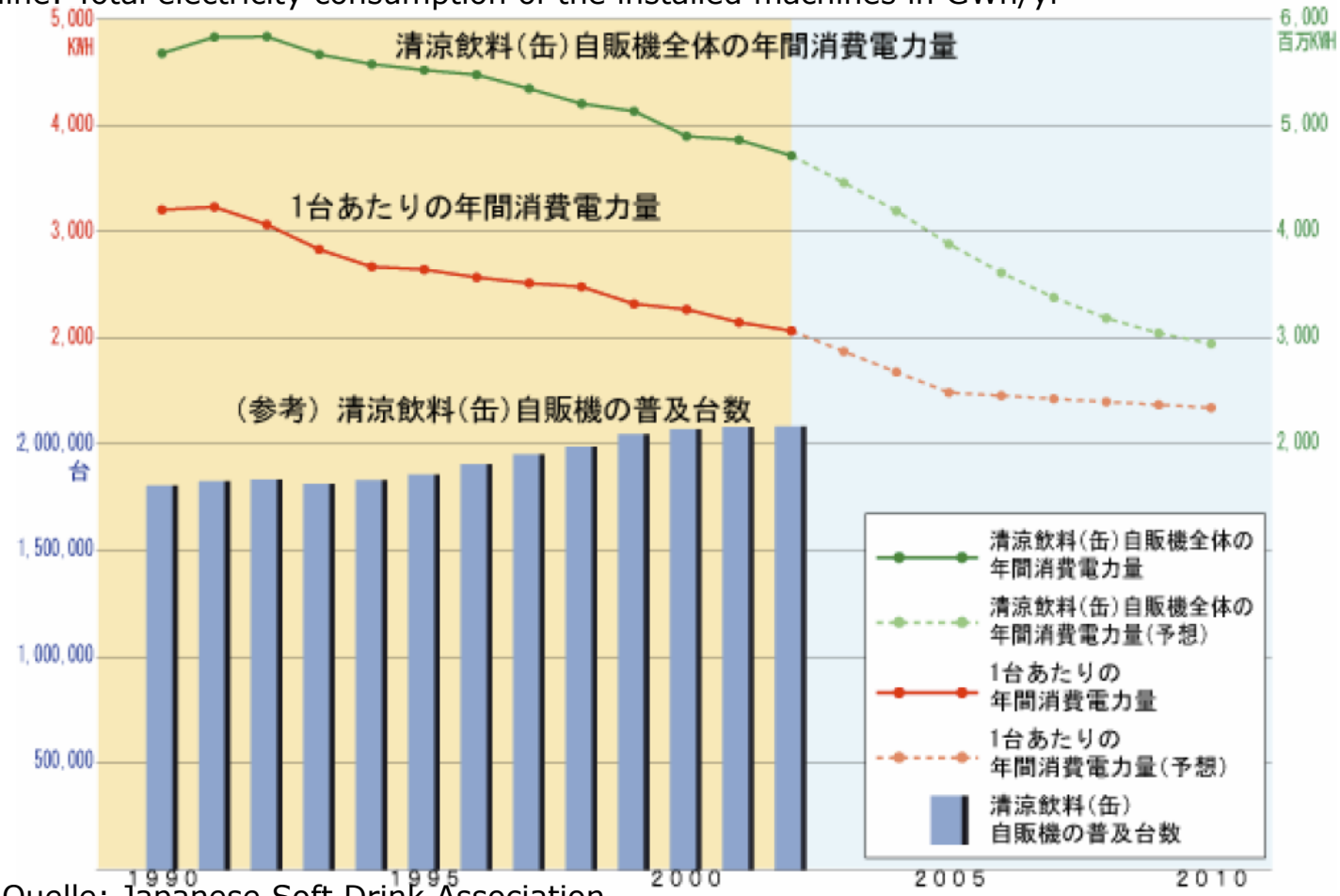
Quelle: Schmiemann, M. (2008). *Enterprises by size class - overview of SMEs in the EU.* EUROSTAT. Statistics in focus, 31/2008, pp. 1. (non-financial business economy)

Gesamter Energieverbrauch (idealisiertes Bsp)



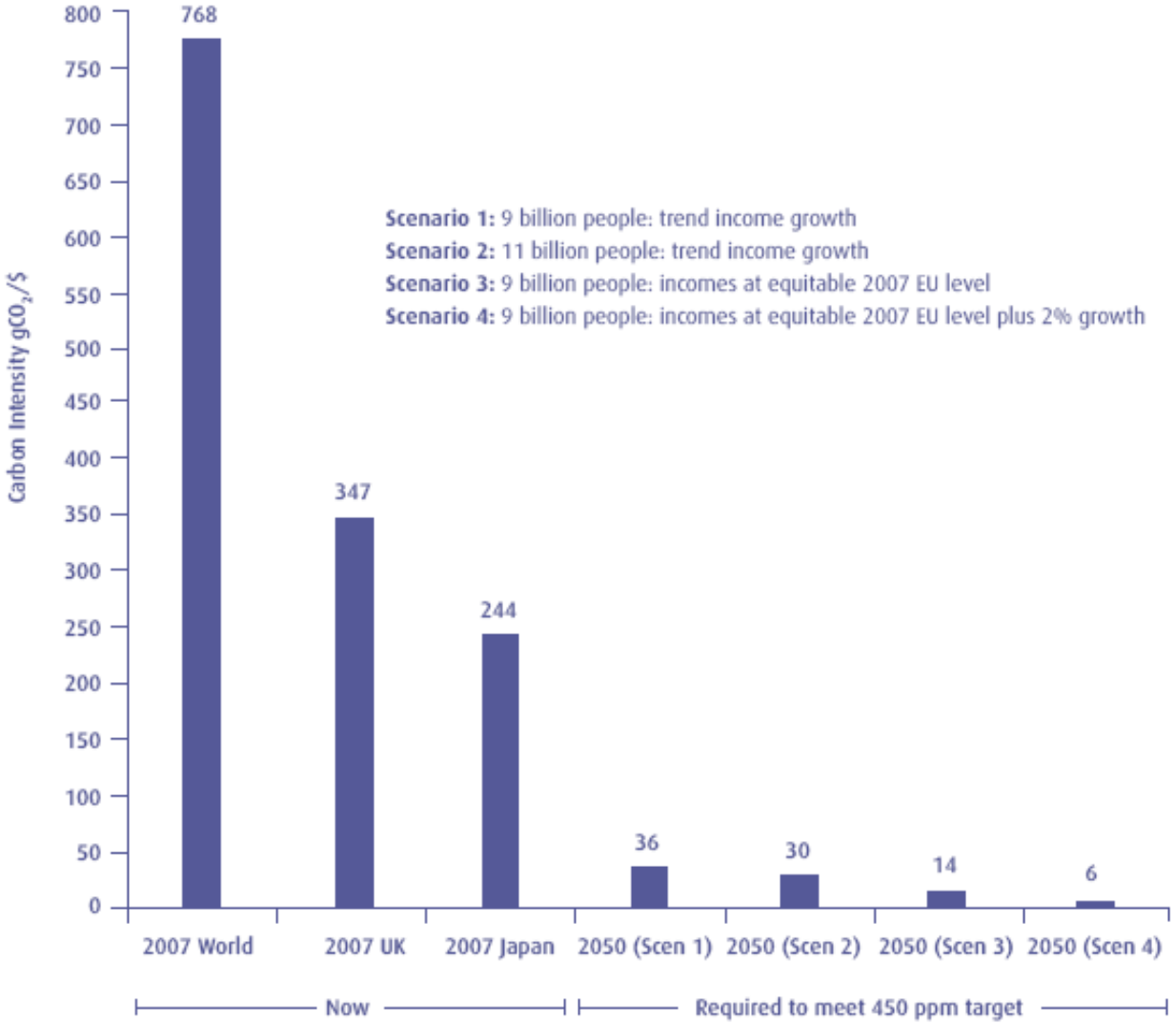
Entwicklung des Elektrizitäts-verbrauchs von Getränke-automaten 1990-2010 in Japan

Blue bars: Number of installed machines in 1000
Red line: Electricity use per machine in kWH/yr
Green line: Total electricity consumption of the installed machines in GWh/yr



Quelle: Japanese Soft Drink Association

Kohlenstoffintensität



Quelle: Jackson 2009

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