



DYNAMIX

1st DYNAMIX Policy Platform

“Exploring Opportunities and Challenges
of Resource Efficiency Policy in Europe”

**Decoupling economic growth from natural
resource use – perspectives and challenges**

Prof. Ernst Ulrich von Weizsäcker

Co-Chair



Co-President



Guess where is our „Decoupling“ agenda in the context of your diagram?

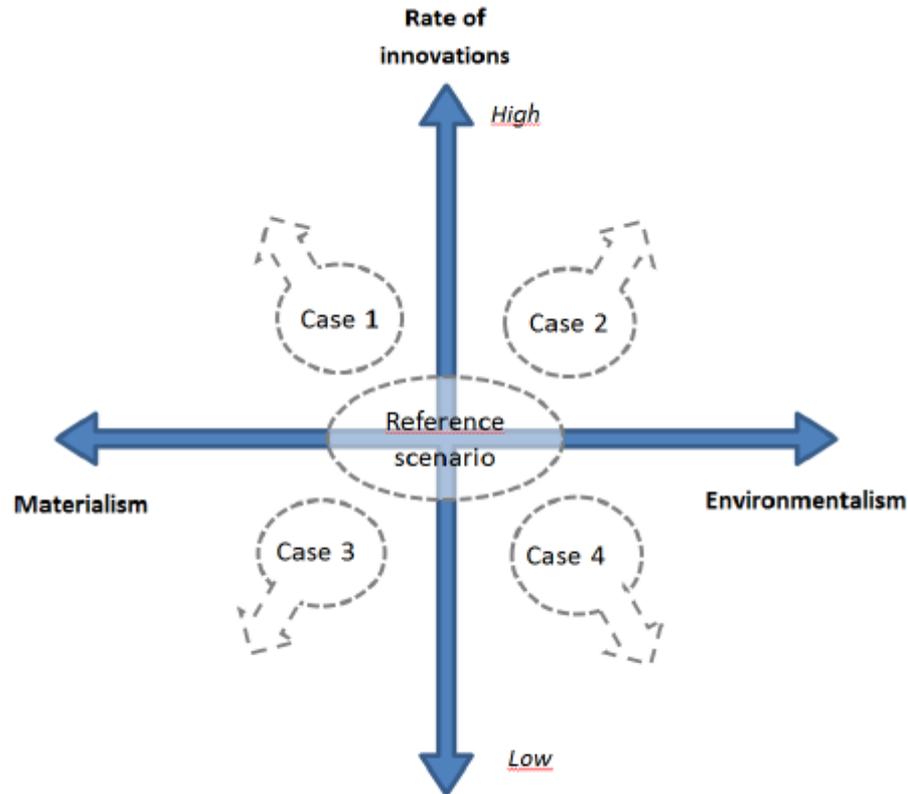


Figure 1: Conceptual model forming four scenario cases

Guess where is our „Decoupling“ agenda in the context of your diagram? Well, clearly, it’s in the upper right corner!

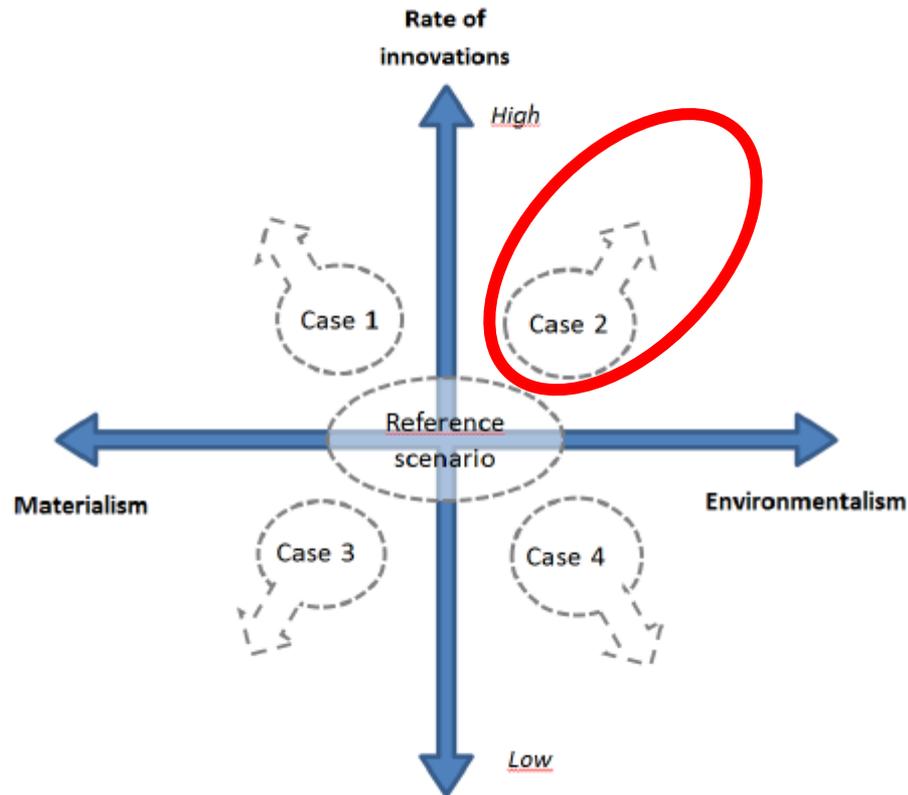


Figure 1: Conceptual model forming four scenario cases

Guess where is our „Decoupling“ agenda in the context of your diagram? Well, clearly, it's in the upper right corner!

But it's also meant to improve people's material well-being

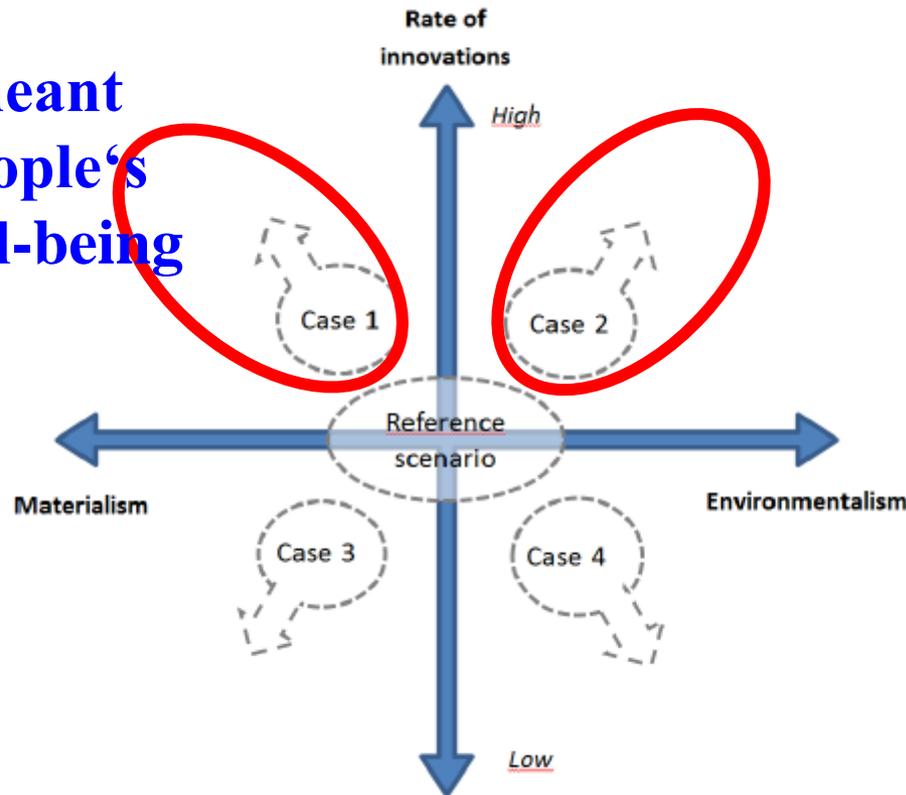
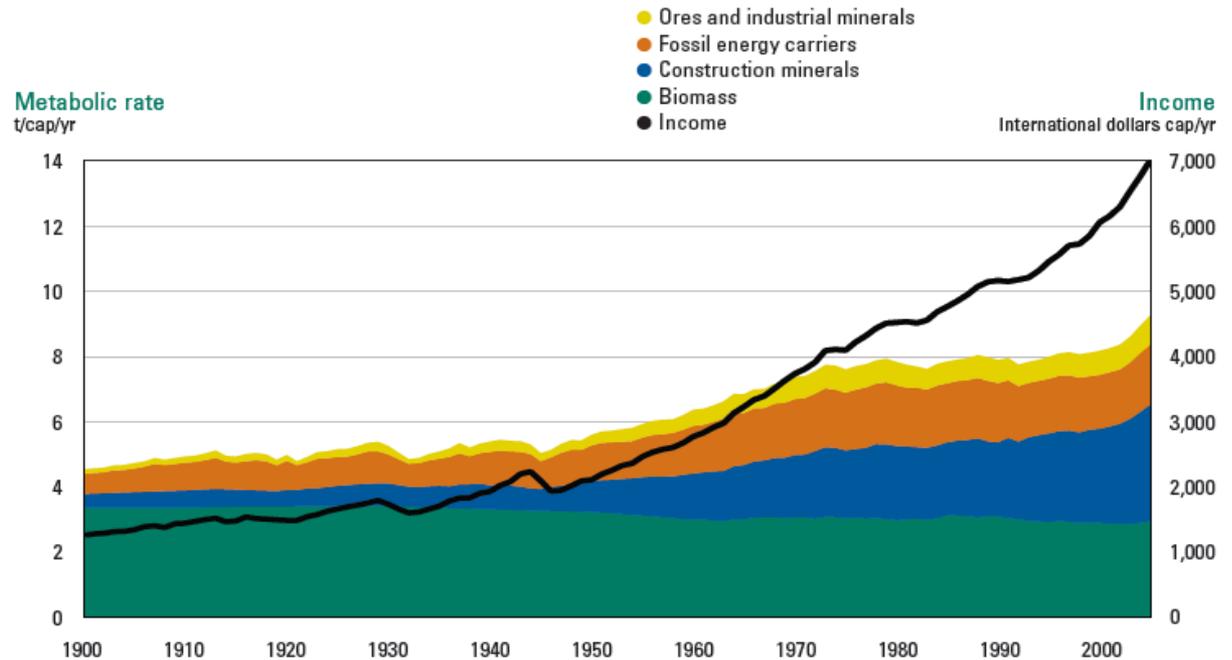
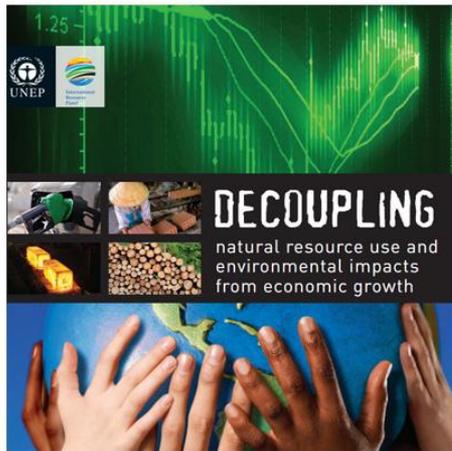


Figure 1: Conceptual model forming four scenario cases

Decoupling 1 documented *relative* decoupling for most resources

Figure 2.2. Global metabolic rates 1900–2005, and income

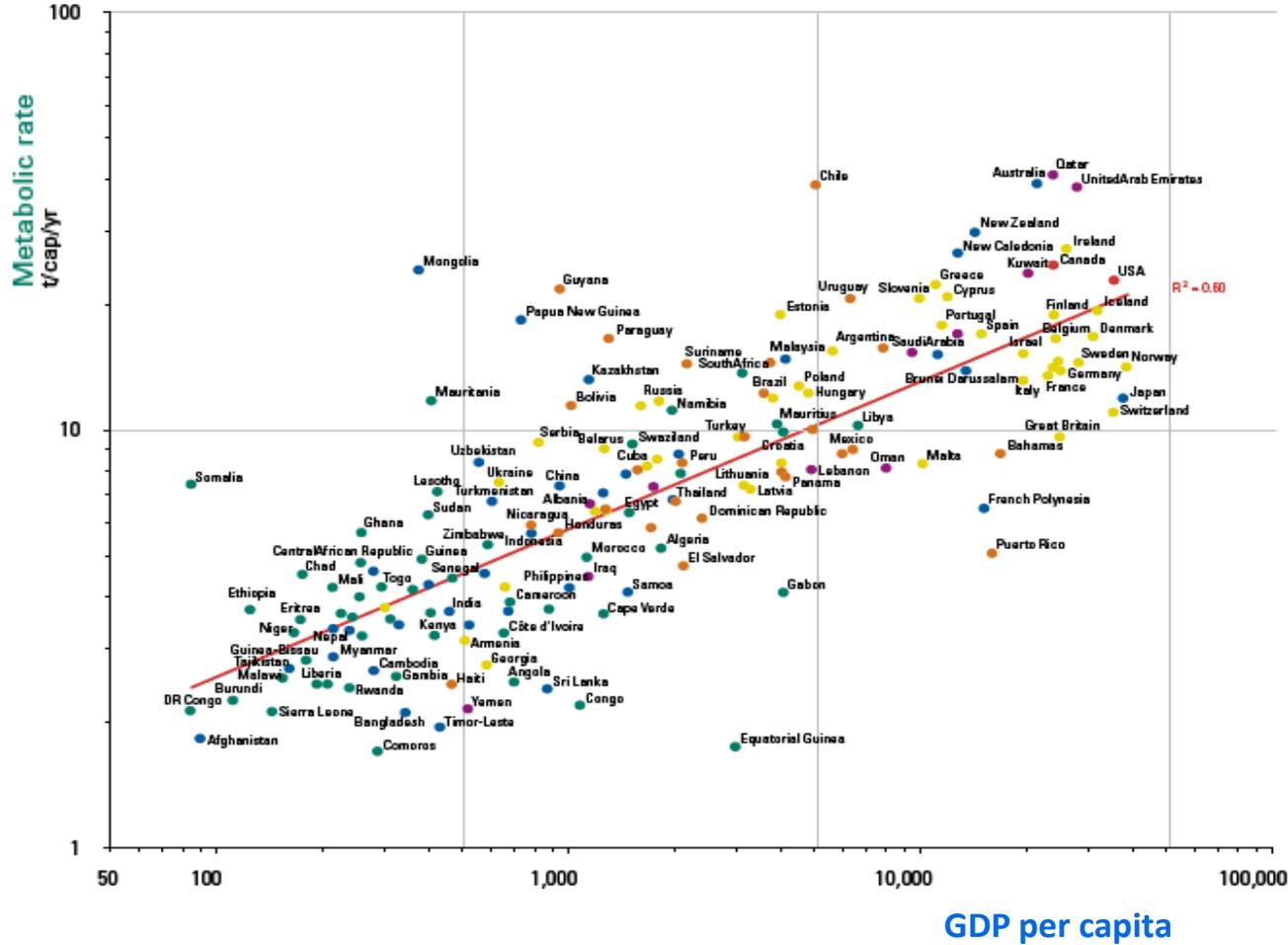


Source: Krausmann *et al.*, 2009; based on SEC Database 'Growth in global materials use, GDP and population during the 20th century', Version 1.0 (June 2009): <http://uni-klu.ac.at/socec/inhalt/3133.htm>



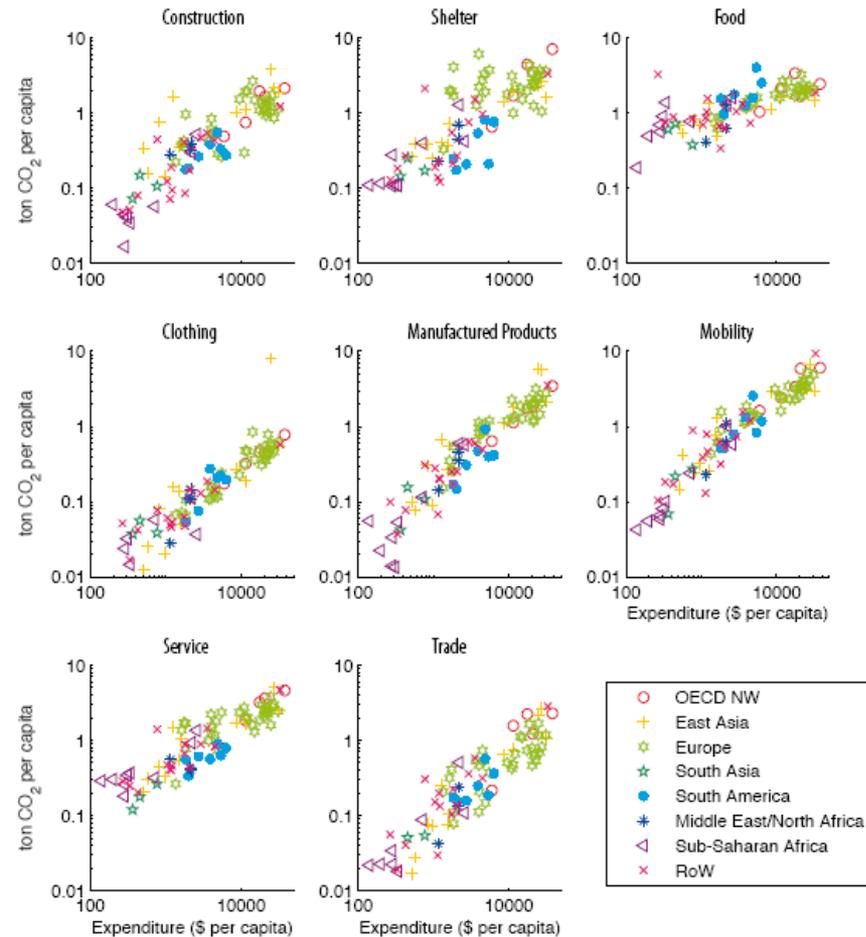
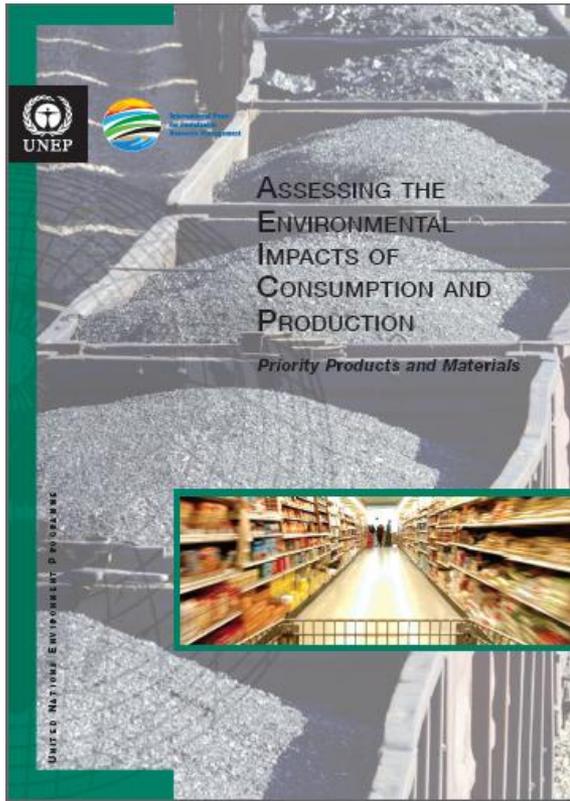
GDP goes with material intensity!

(you saw this from Anke)

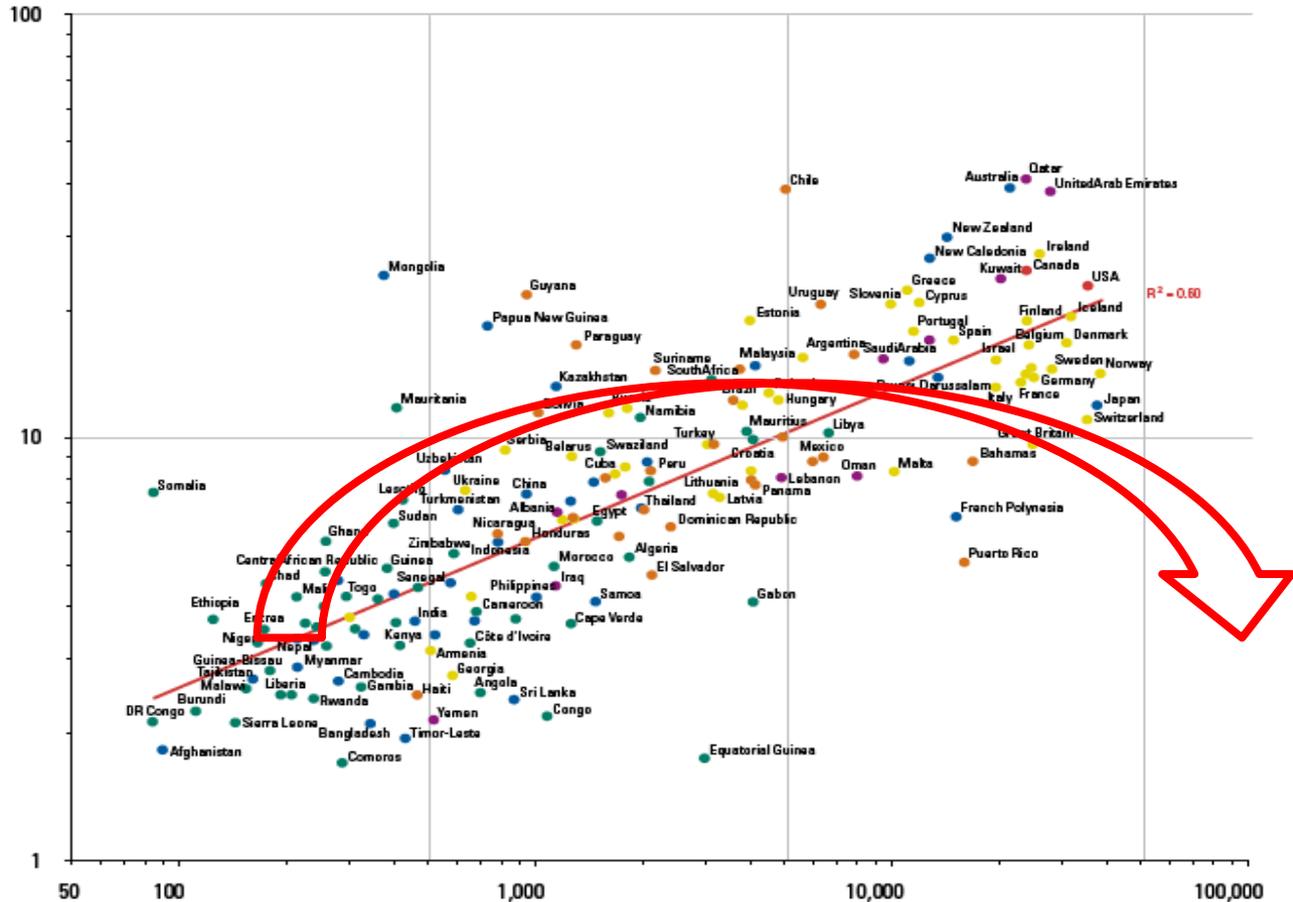


Q: Steinberger et al, 2010

Our *Impacts* report showed that consumption in all sectors goes with carbon intensity: **almost no decoupling**



Decoupling means Kuznets curves of dematerialization and decarbonization



A new Decoupling Report is currently under peer review, due for publication in Summer, 2013.

It's going to address decoupling technologies & policies.



Decoupling 2 will distinguish

1. Decoupling through maturation.
2. Decoupling through trade (*burden shifting*).
3. Decoupling through intentional productivity increase.

1 maturation is happening “naturally”.

2 burden shifting does not help the environment.

3 is the exception but is what we really need and is therefore the main focus of the Decoupling 2.

**Three areas (at least)
are hopeful for decoupling efforts:**

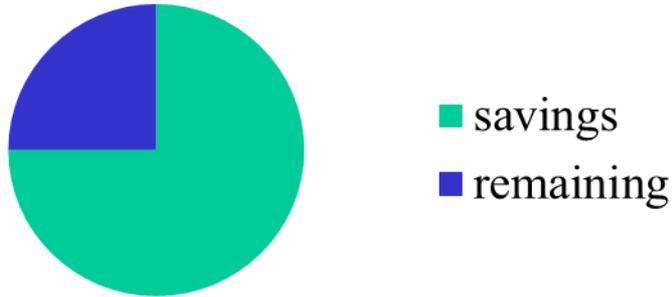
Reduce greenhouse gas emissions: synergies with reducing import dependency; renewable energies enjoy sympathies; energy efficiency opportunities are huge;

Reduce freshwater extraction: coincides with water purification (good for public health); can modernize farms; technologies are readily available.

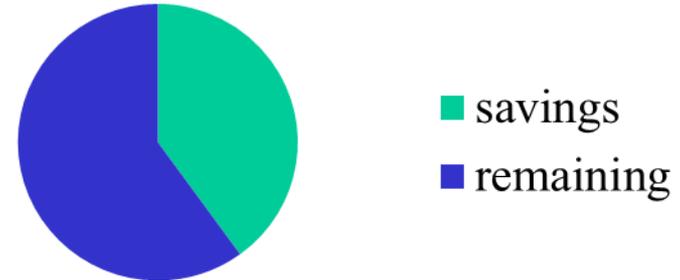
Waste reduction: facilitates waste management and clean city, synergies with recycling; tends to be commercially profitable.

But opportunities exist all over the place!

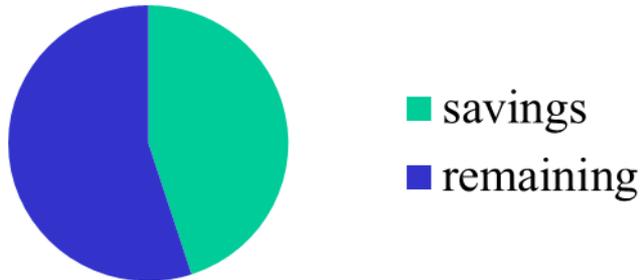
Freight transport



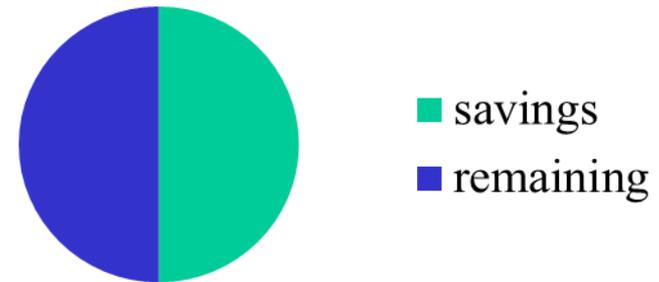
Rail transport



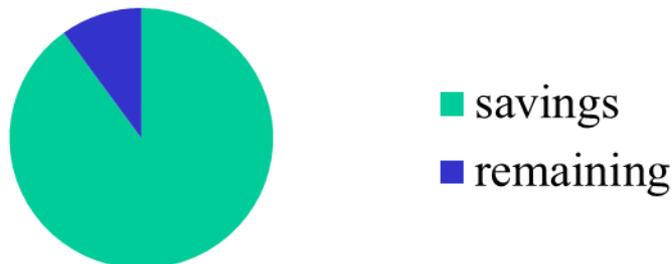
Aircraft fuel efficiency



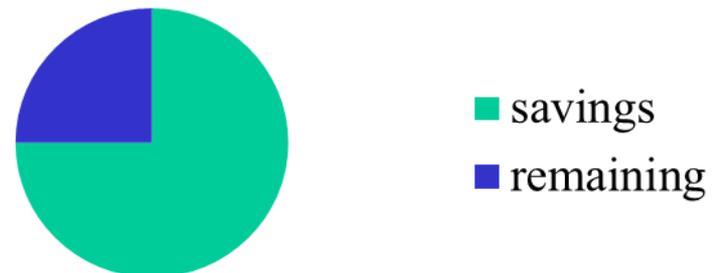
Shipping



lighting

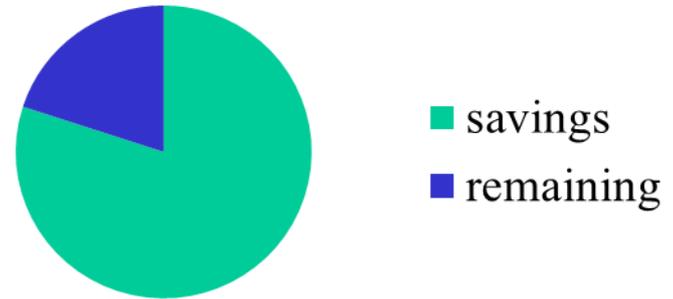


Trigeneration (of heat, cooling & power)

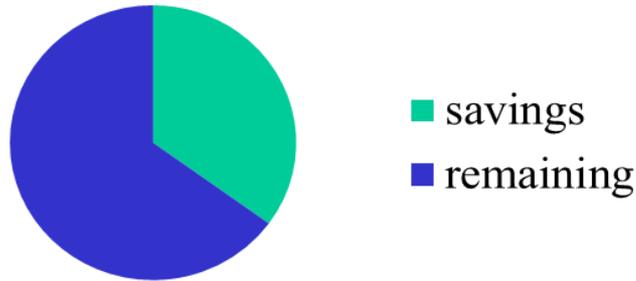


...and more ...

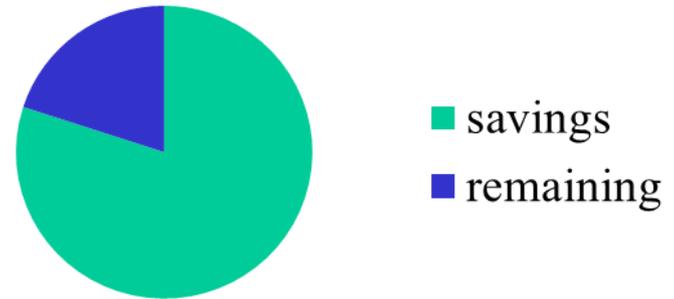
CO2 per ton of steels



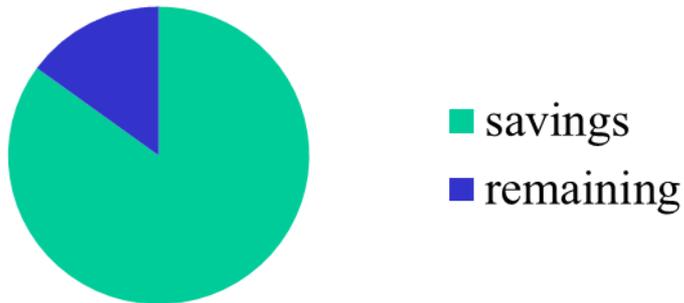
energy per ton of chemicals



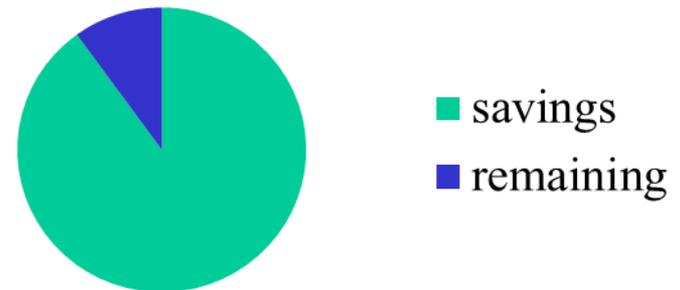
CO2 per ton of cement



electric motors

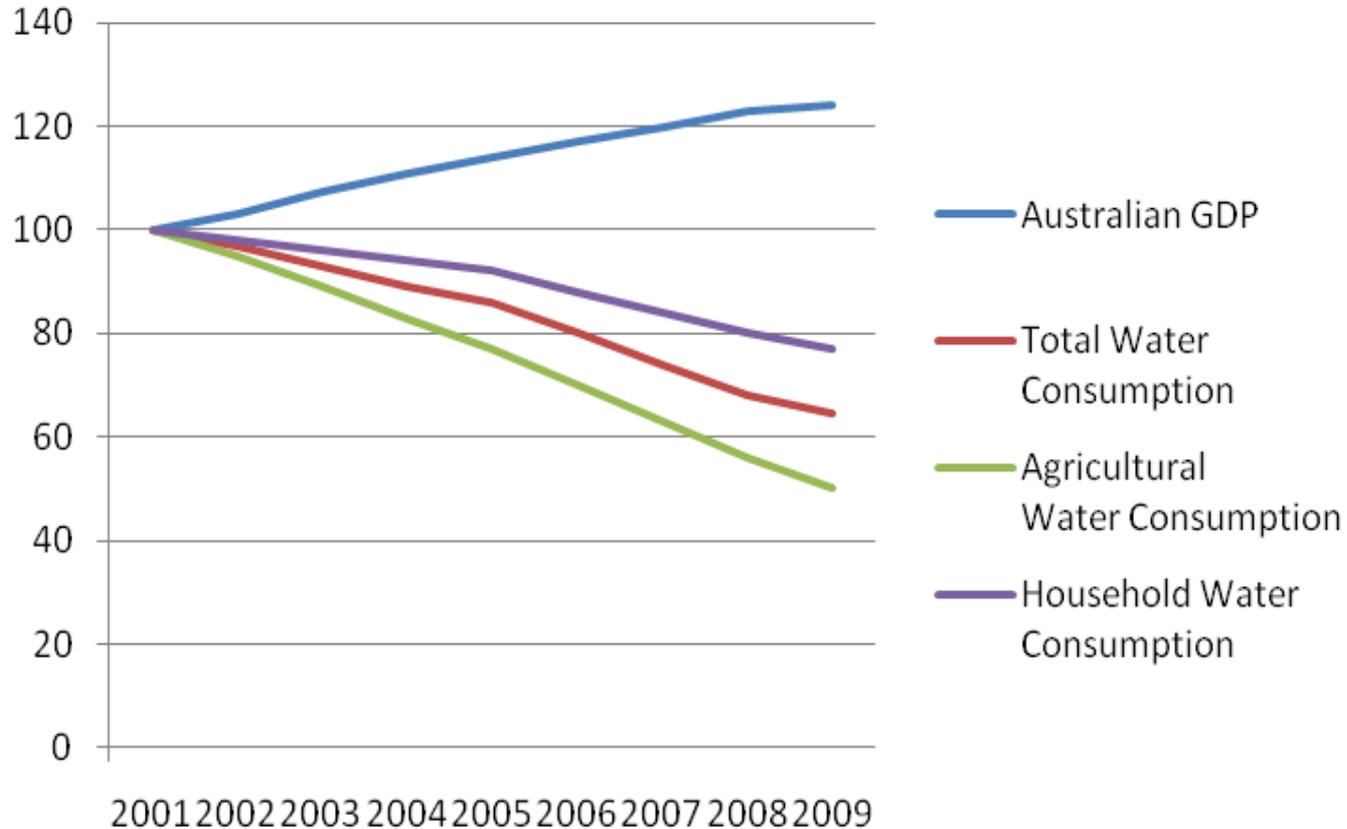


Water per ton of paper



Stunning example of absolute decoupling: water *consumption* in Australia.

(For water *extraction* the situation is, of course, even better.)



Source: Michael Smith et al, 2010, and *Decoupling 2*

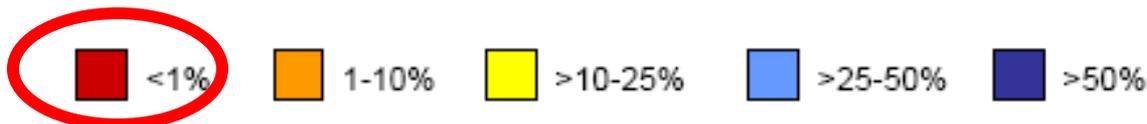
Recycling rates of metals vary widely – but are often below 1%!!

(Int. Resource Panel: Graedel et al, 2011)



1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	*	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	**	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Uub	113 Uut	114 Uuq	115 Uup	116 Uuh	(117) (Uus)	118 Uuo

* Lanthanides	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
** Actinides	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr



A new Report (in the print) gives first answers.



Metal Recycling

Opportunities, Limits, Infrastructure



Contributors

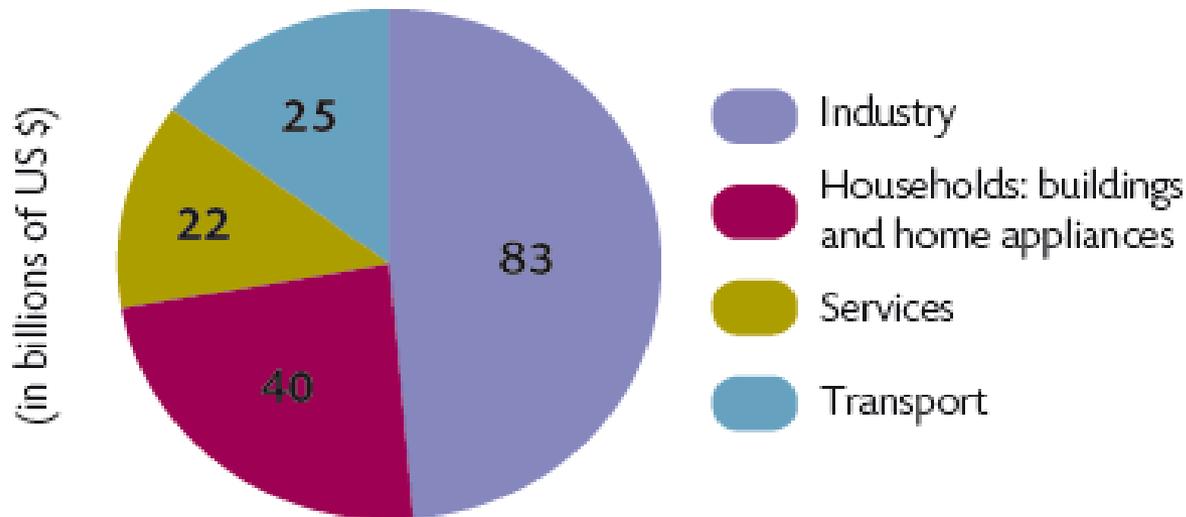
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**The Report distinguishes
„big metals“: *go by recycling*
from
„spice metals“: *go by design.***

McKinsey speaks of huge business opportunities in energy efficiency...

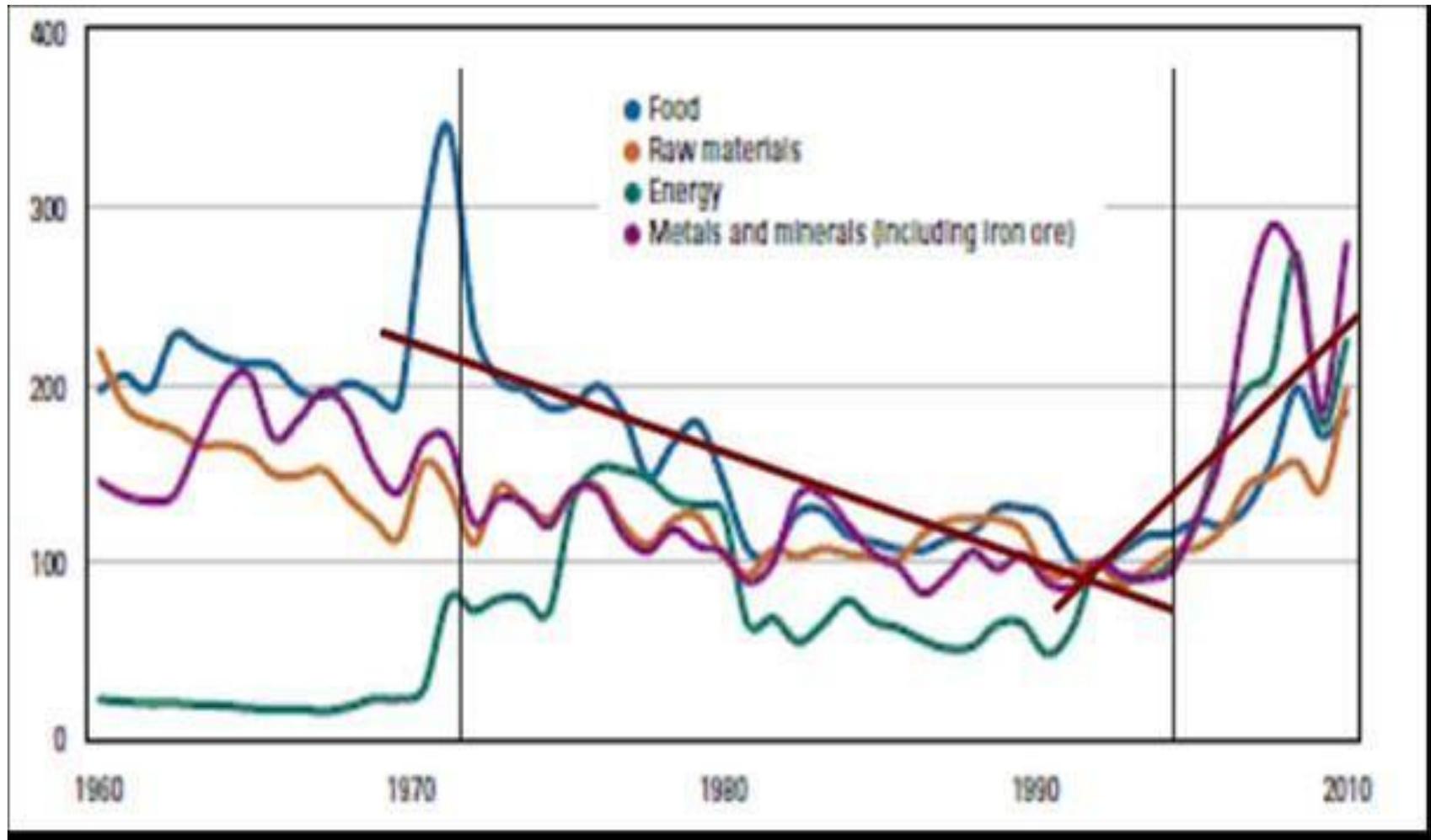
The global potential for profitable investments in energy efficiency (US\$170bn p.a.)



Source: McKinsey. 2011

... more or less the same holds for material efficiency!

... notably as resource prices go up.



Source: McKinsey and IRP Decoupling 1 Report

Policies: A very large variety, - but most work at the margins of the problem.

<i>Type</i>	<i>Category</i>	<i>Examples</i>
Economic Instruments	Subsidies	Gasoline subsidies Feed-in tariffs Fiscal incentives Direct subsidies to R&D Loan softening/guarantees Subsidies for public transport for the poor
	Taxes	Gasoline taxes R&D tax credits Carbon taxes
	Permit trading	Carbon trading market Renewable energy credit trading
	Public procurement/ investments	Green procurement Public investment in R&D infrastructure Government funding of demonstration projects Government-sponsored R&D, national laboratories National/State-funded or -run venture capitalism Public investment in education and training Government investments in science and technology parks
Command-and-control measures	Standards and regulations	Standards for biofuel blending Energy-efficiency standards Renewable energy obligations Cooking stove standards
	Goals and targets	Sectoral energy intensity targets Greenhouse gas mitigation targets Energy access targets
Cooperation	Domestic	Promotion of collaborative RD&D Public-private partnerships and knowledge exchange
	International	Official development assistance (ODA) for energy access and clean technologies Trade preferences for specific technology clusters Bilateral and plurilateral agreements on technology cooperation

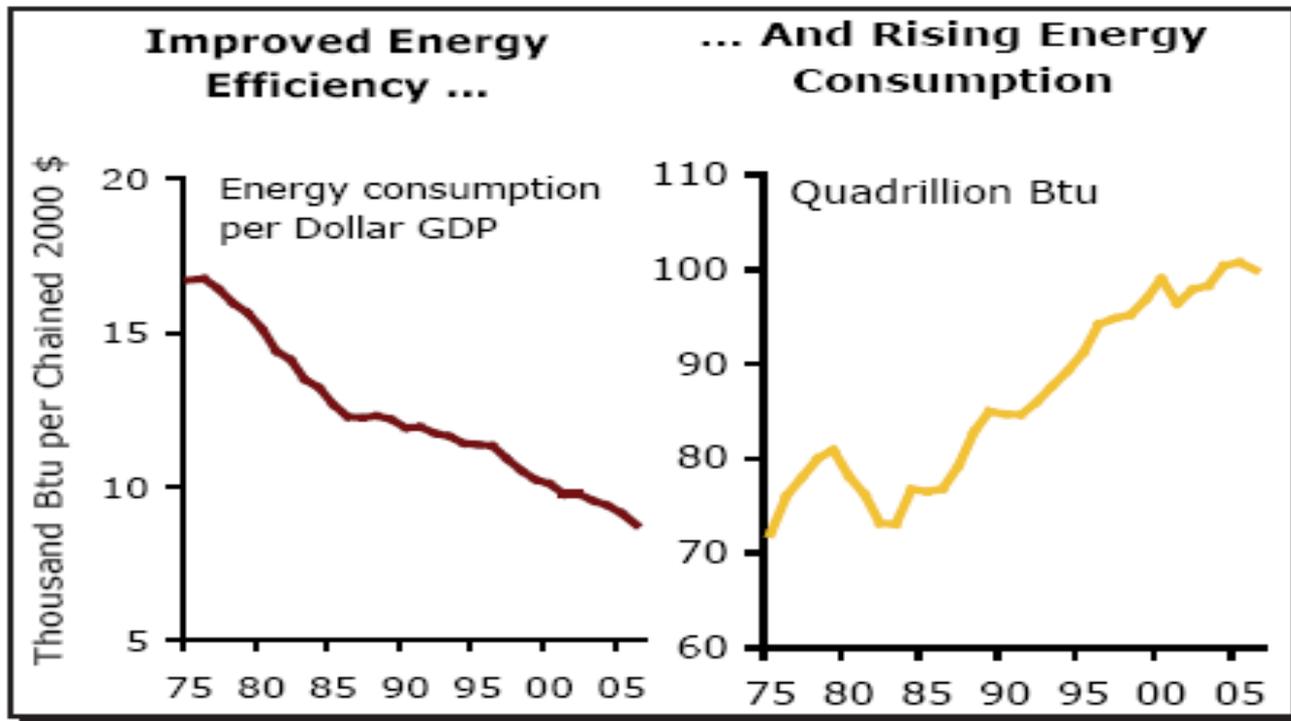
At the core of the problem: Taxes, tradable permits, subsidy reduction – basically equivalent in theory.

In reality, what the economy likes best is predictability, which can be achieved by taxes, not by trade.

Efficiency in the past was overcompensated by added consumption: The Jevons Paradox, or „rebound effect“.

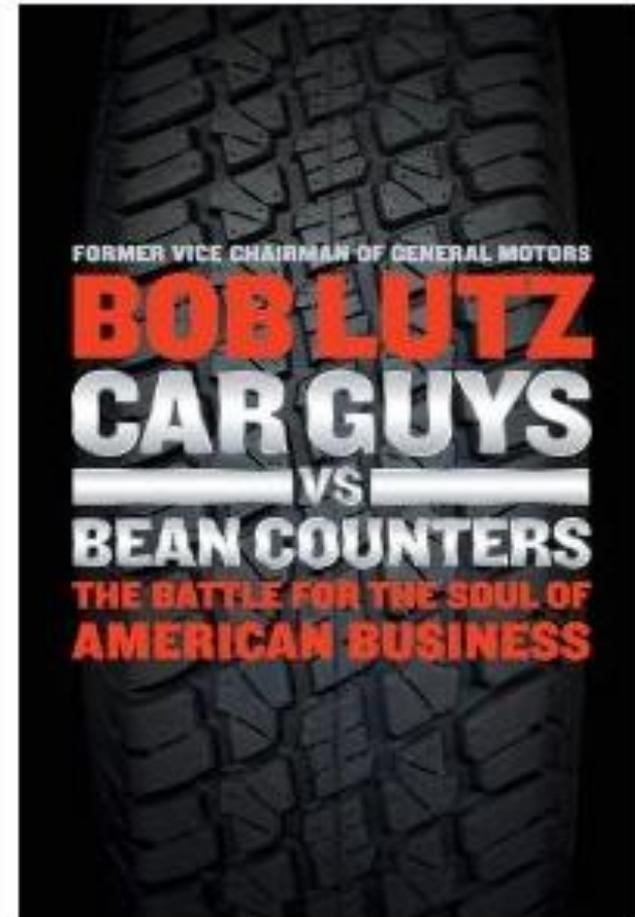
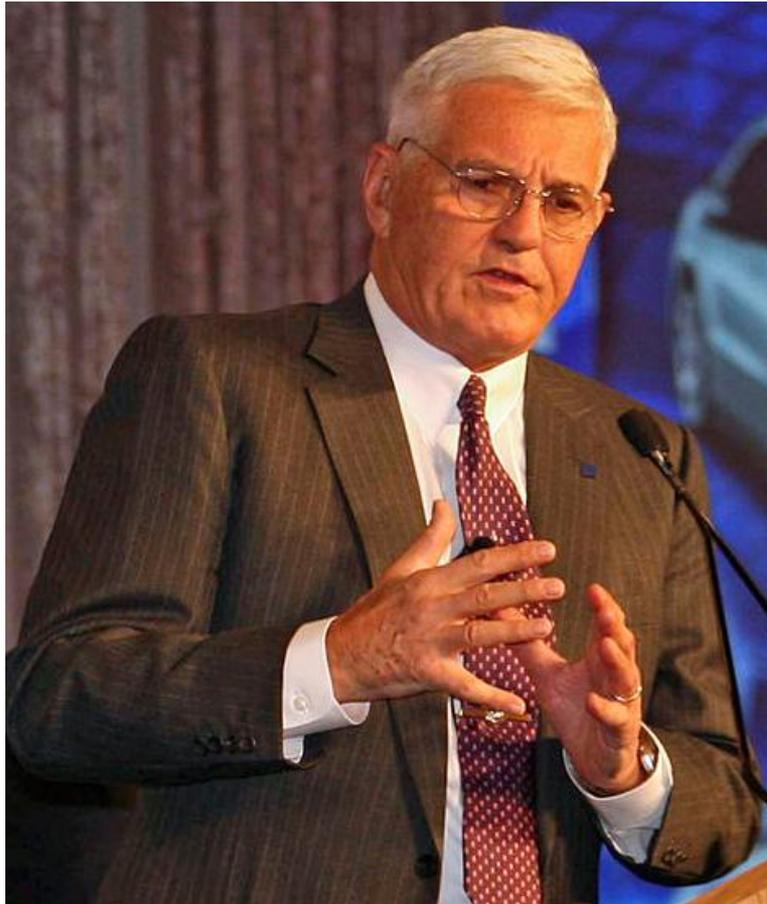
Chart 1

Americans Efficiently Consume Ever-Increasing Amounts of Energy



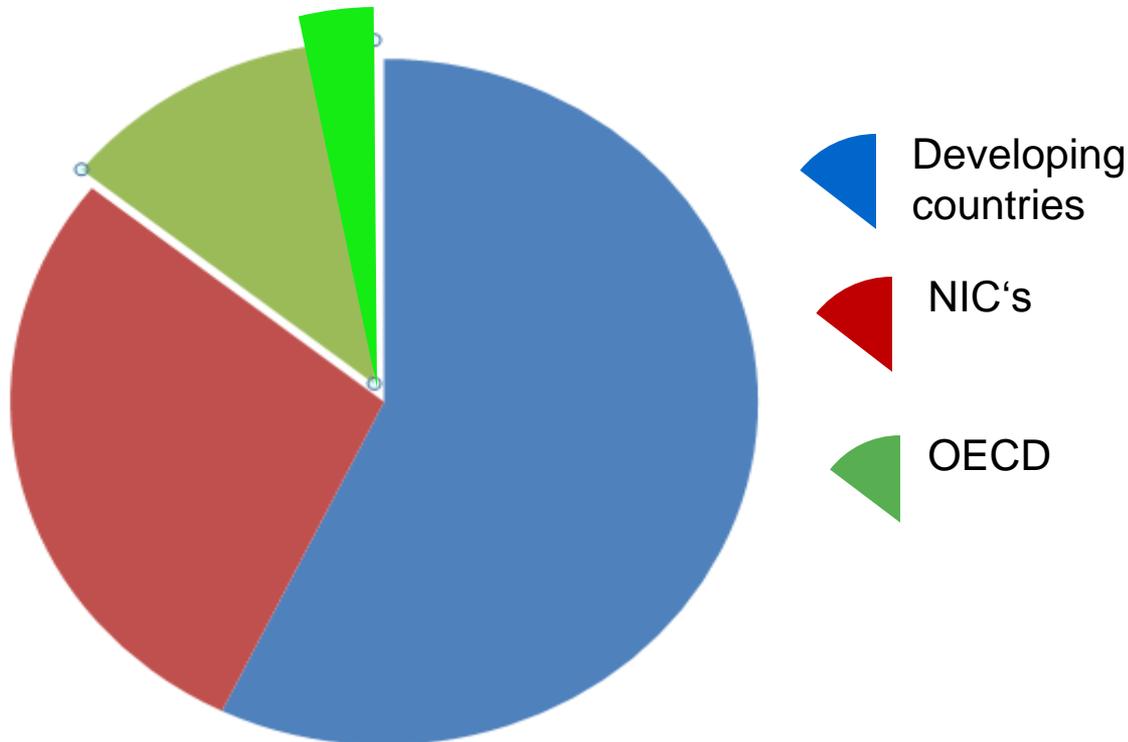
Source: EIA

One condition may be a new mindset: forget about the MBA's, let engineers run the show. That's the message of Bob Lutz, the guru of Detroit.

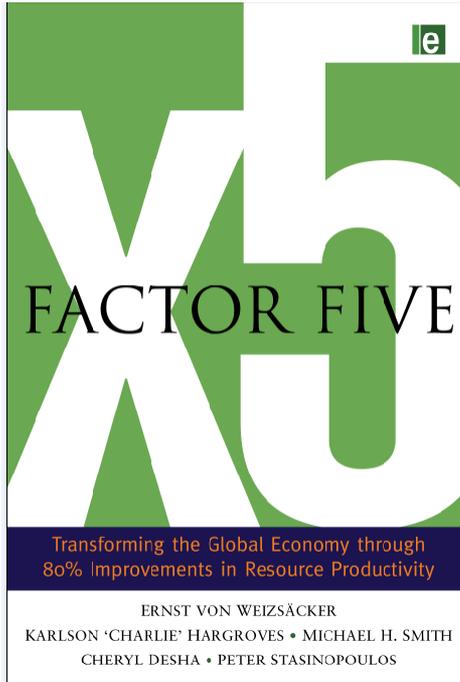


**„To get the US economy growing again, we need to fire the MBA's and let engineers run the show“
(cf. Rana Foroohar, TIME July 18, 2011, p 16)**

Don't overestimate the role of renewable energies! If one billion people in the OECD countries achieve 20% RE's, only **1/35 of the world problem is solved.**



And then imagine a 35-fold increase of renewables. It's *ecological nightmares!*



December 2009



March 2010



October 2010



November 2012

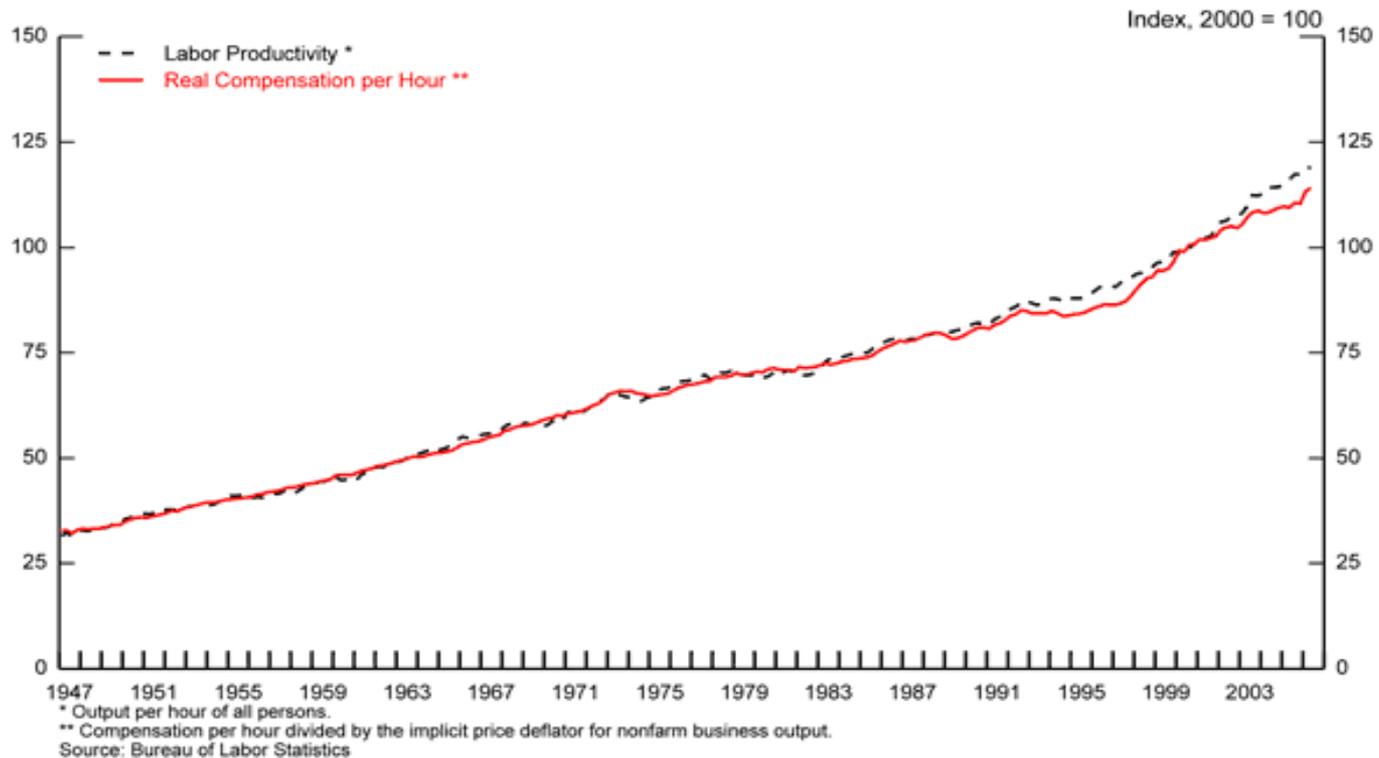
Think truly bold. Think of resource productivity gains by at least a **Factor of Five!**

A bold policy option at the end – also addressing the rebound effect:

Make energy and resource prices rise in proportion to the documented average efficiency increases .

The benign paradigm: wages rose with labour productivity, causing a ping-pong between the two.

Labor Productivity and Real Compensation per Hour
(Nonfarm Business Sector)



The new ping-pong will cause a steady increase, perhaps five-fold, of average resource productivity, in 40 years.

To avoid social hardship and de-industrialization, two conditions should be considered:

- 1. Life-line tariffs for the poor (South African model);**
- 2. Recycle energy taxes to vulnerable industries, - but not a per kilowatt-hour but per job.**