Webinar European Environment Agency
January 21, 2015

Decoupling

economic well-being from resource consumption.

Outreach to policy makers

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Member

UNEP

International Resource Panel

Co-President

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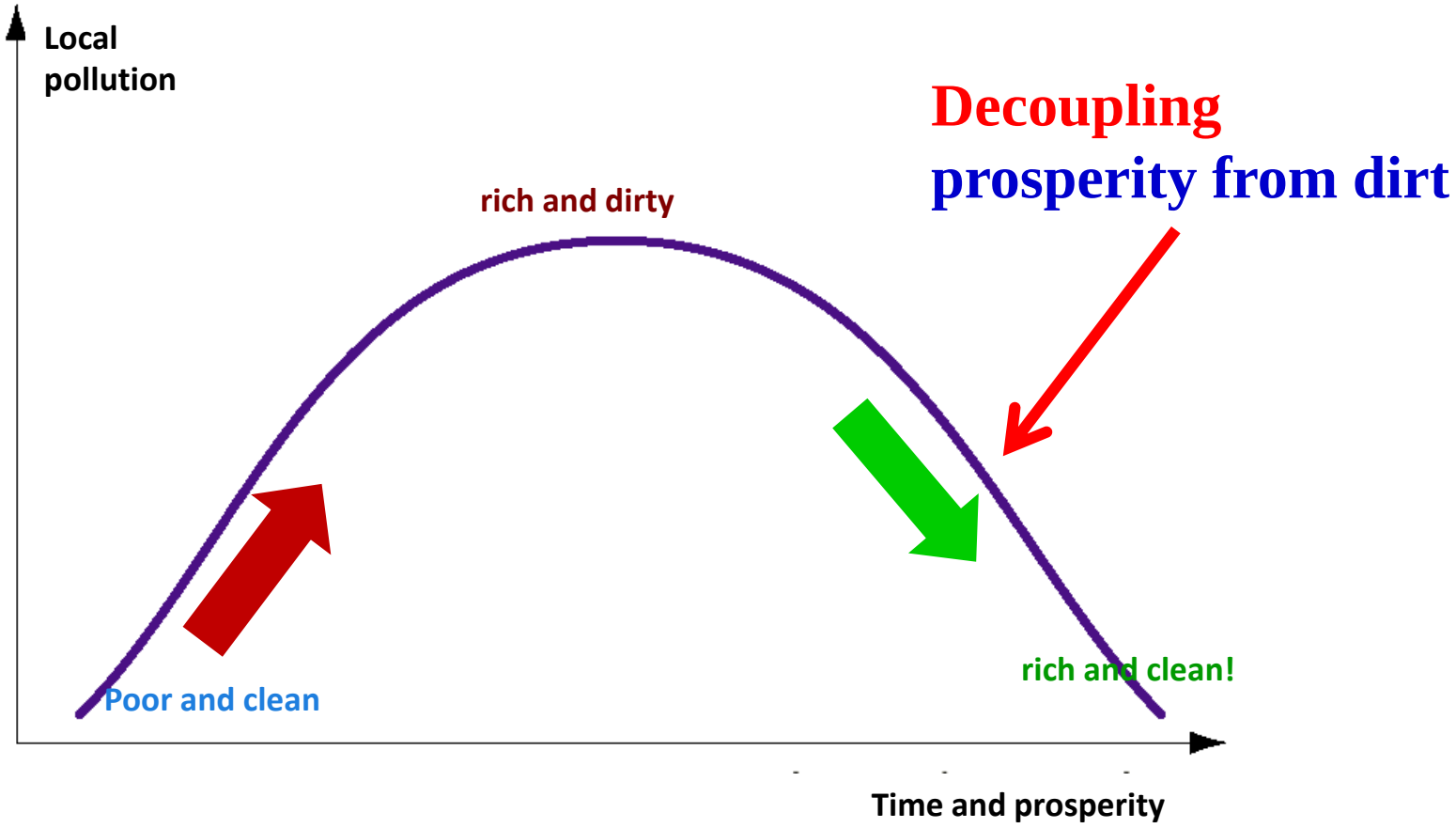
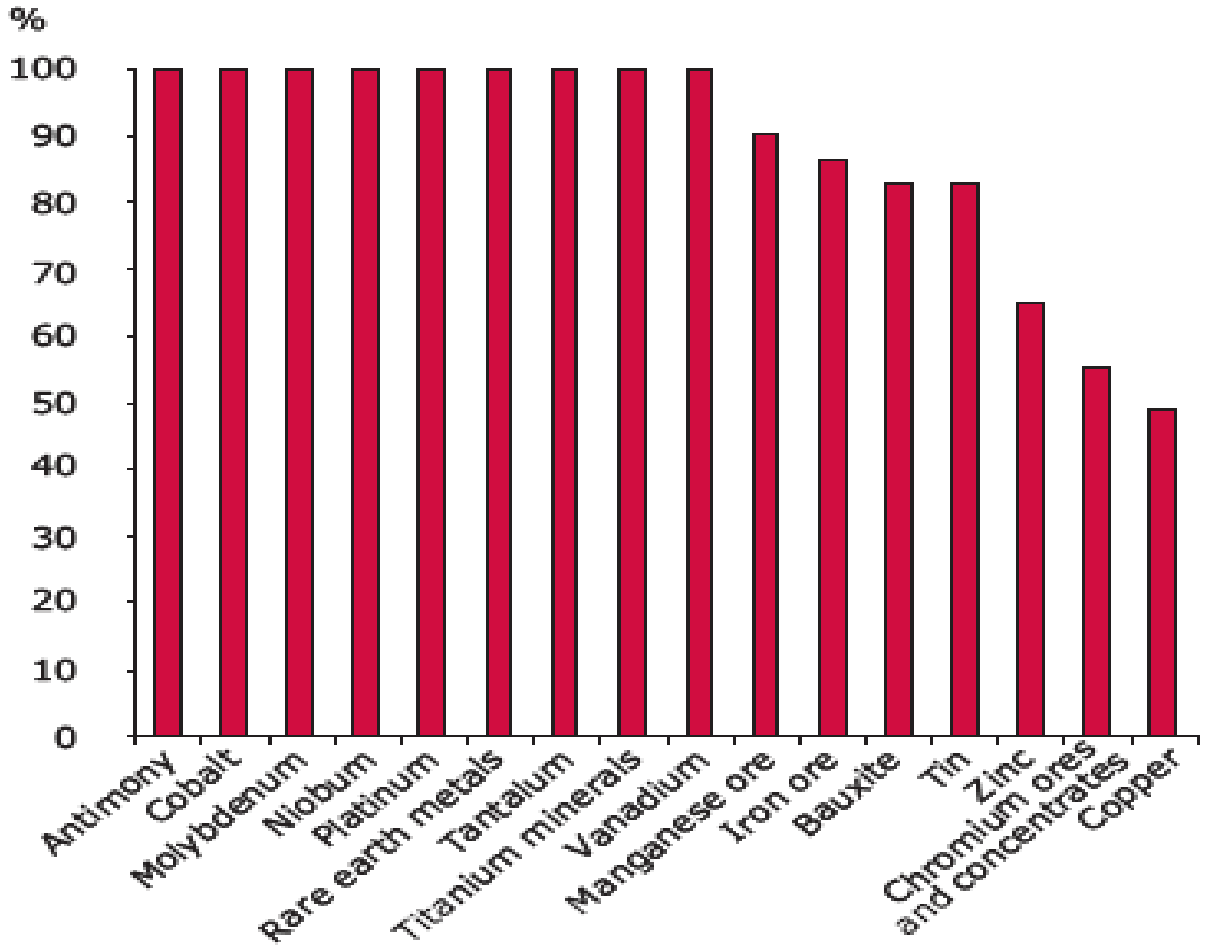
The classical origin of the decoupling idea: The Kuznets-curve of local pollution.

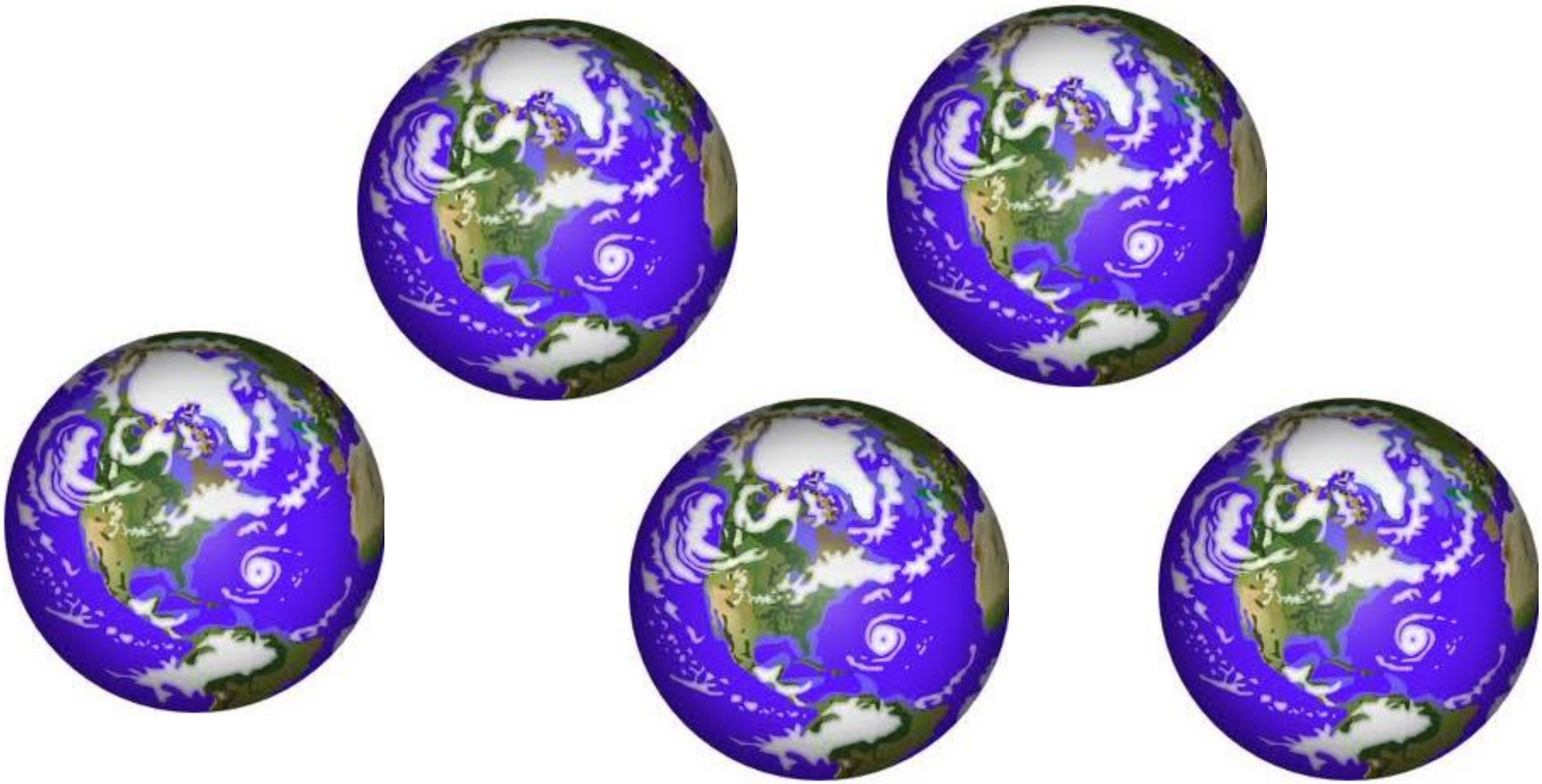


But why decoupling of prosperity from resource use?
Because it reduces import dependency.
Europe (EU 27) is 100% import dependent for several metals!

Source: SOER 2010, EEA, p.7



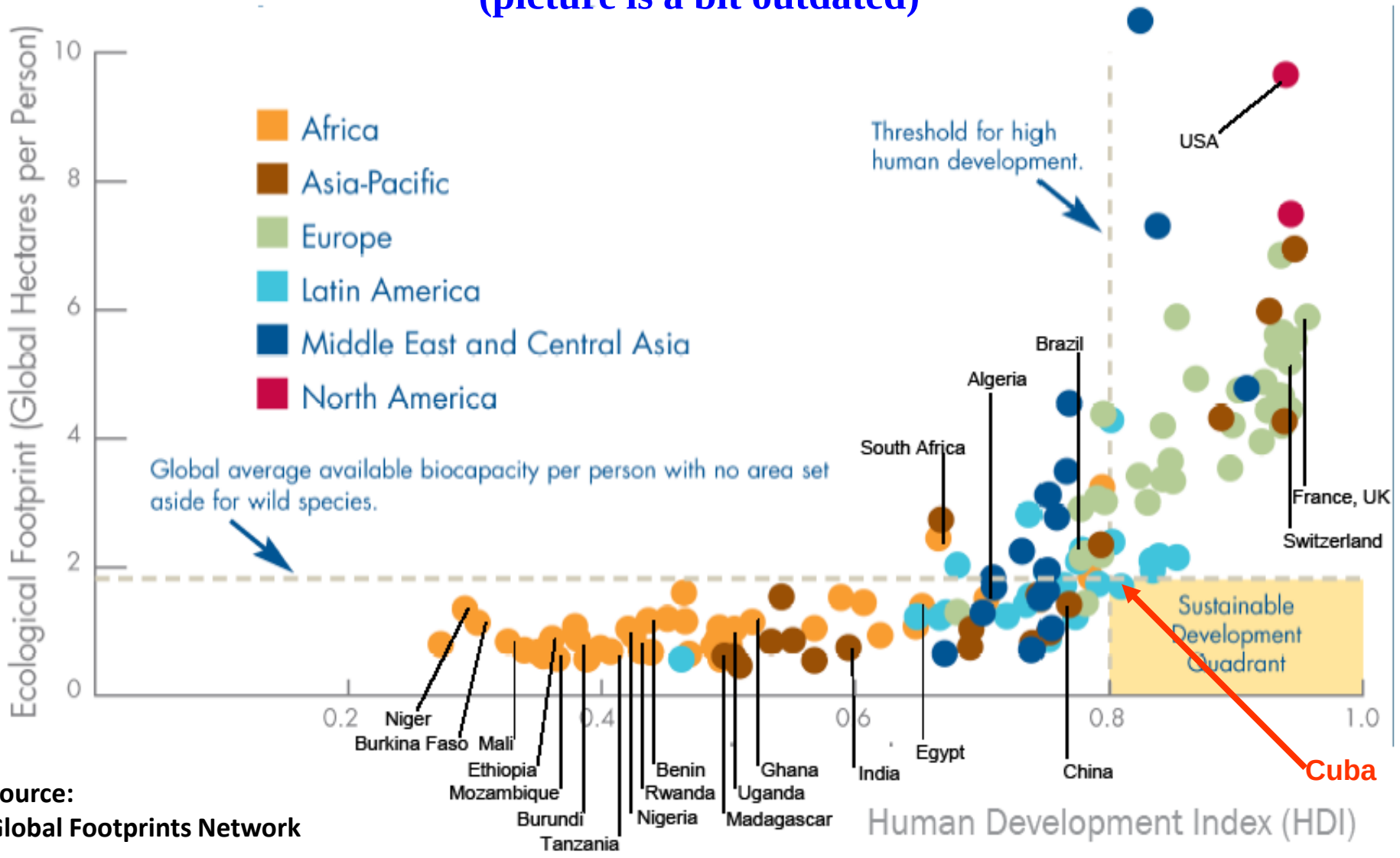
But there are also ecological reasons. Resource use causes big ecological footprints.
The world cannot afford US-American size footprints.
Seven billion people with US footprints would need five Planets Earth!!



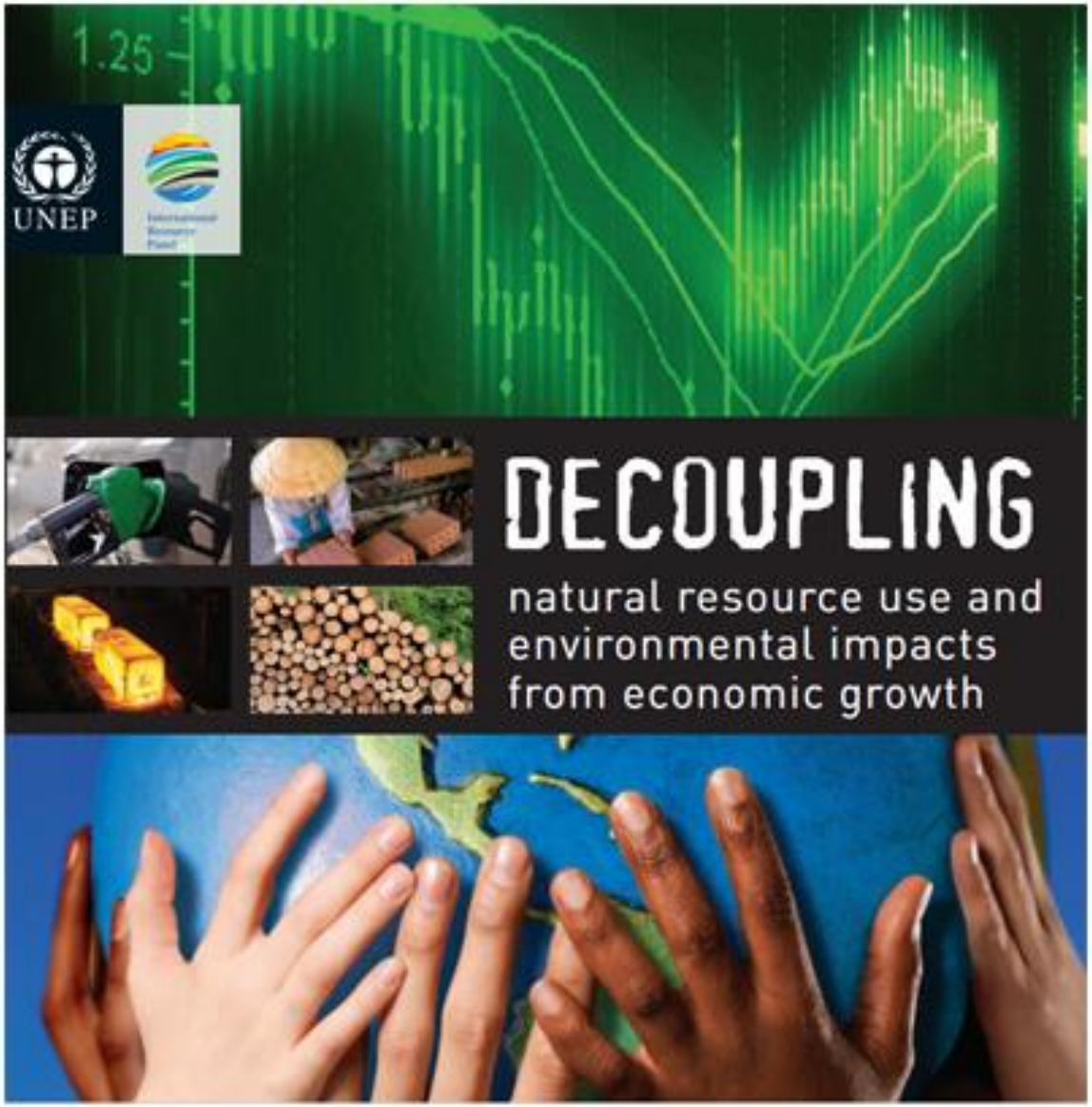
Sustainable Development requires massive decoupling of well-being from resource consumption (from ecological footprints)!

Only one country is „sustainable“. The rich have too large footprints, the poor are too poor!

(picture is a bit outdated)



Source:
Global Footprints Network



Our first (2011)

Decoupling

Report showed that decoupling is hardly happening

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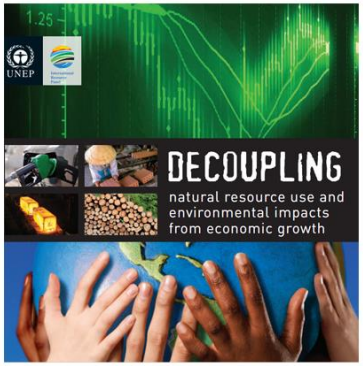
The richer the more resource consumption



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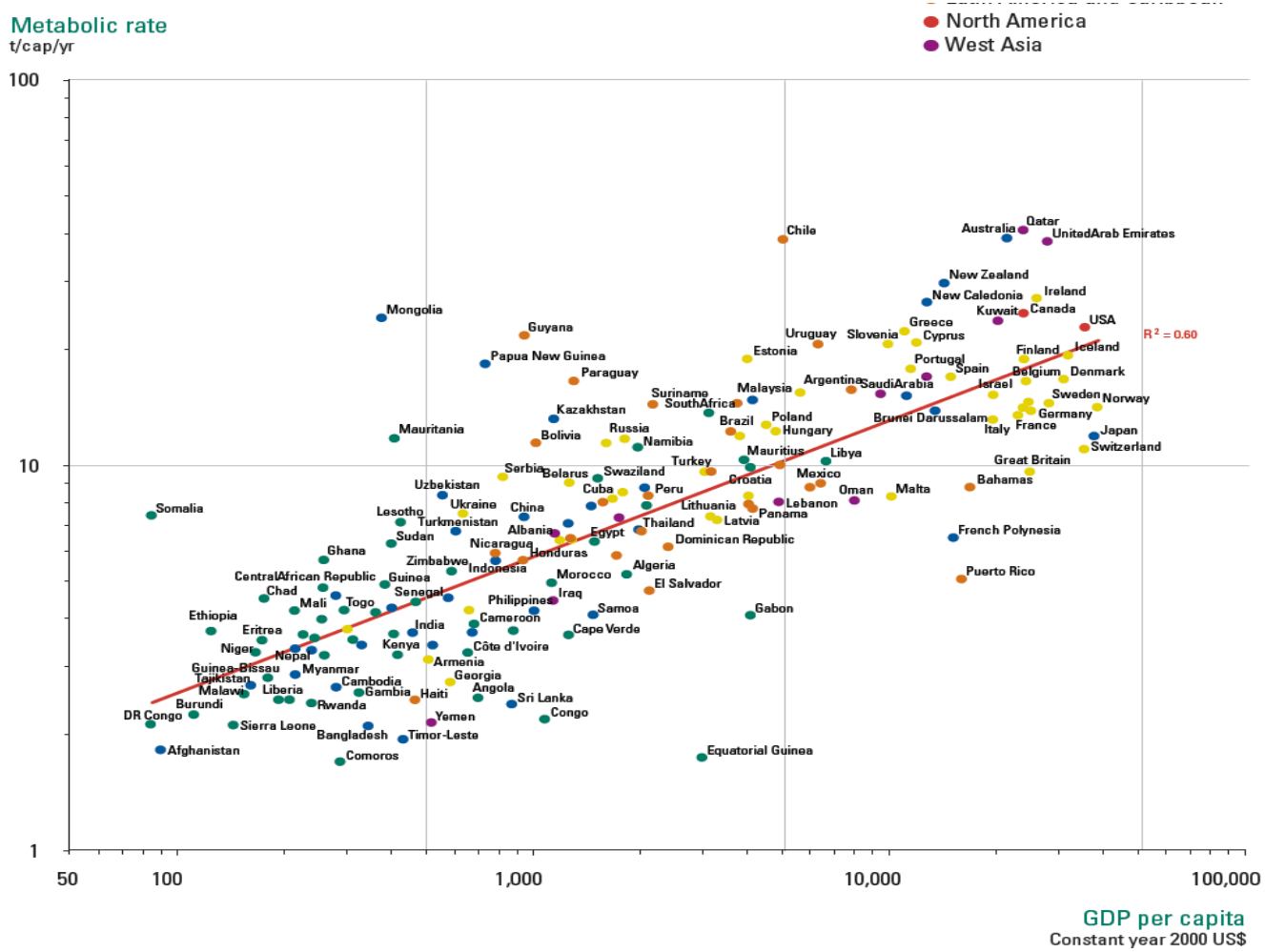
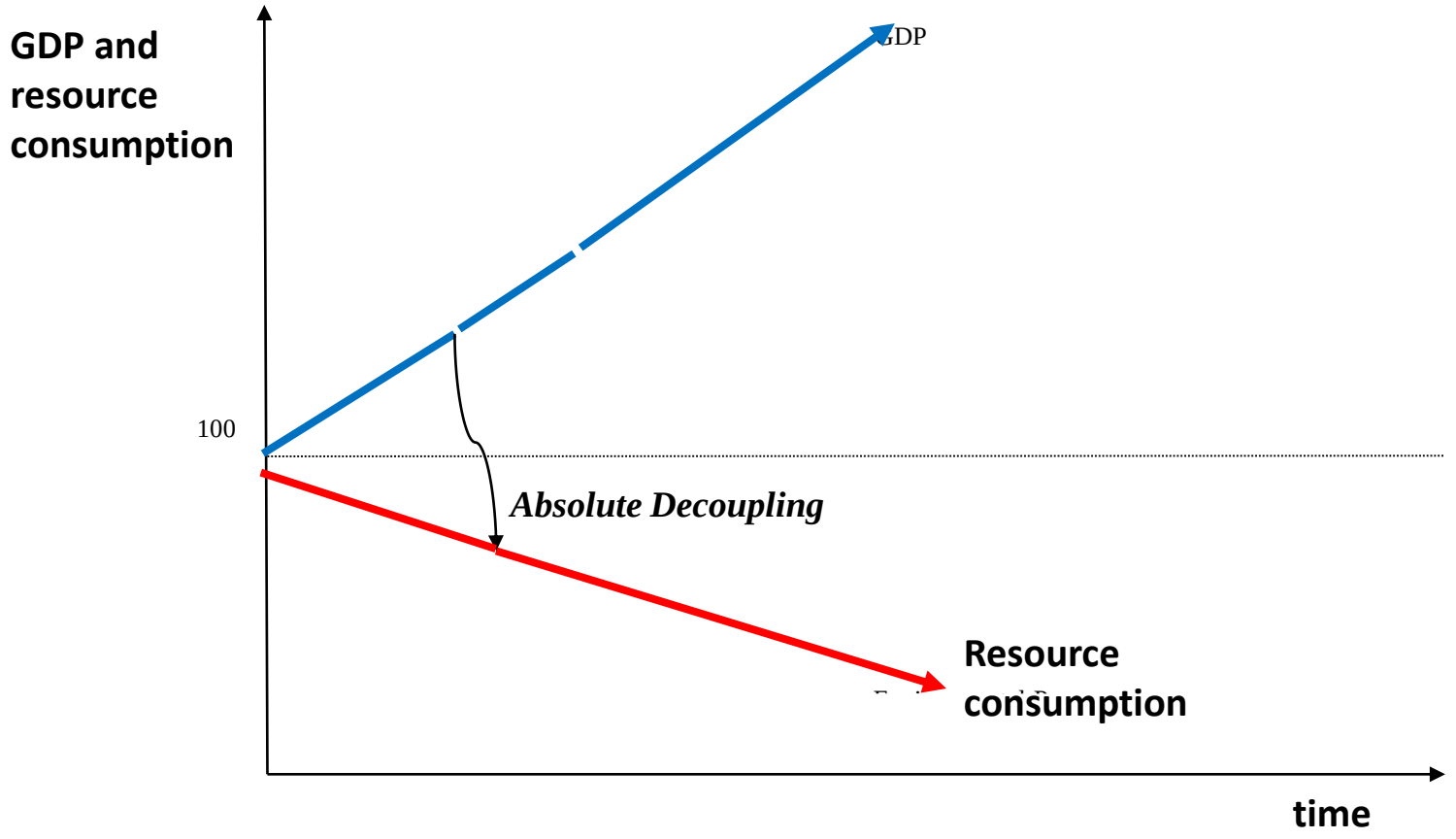
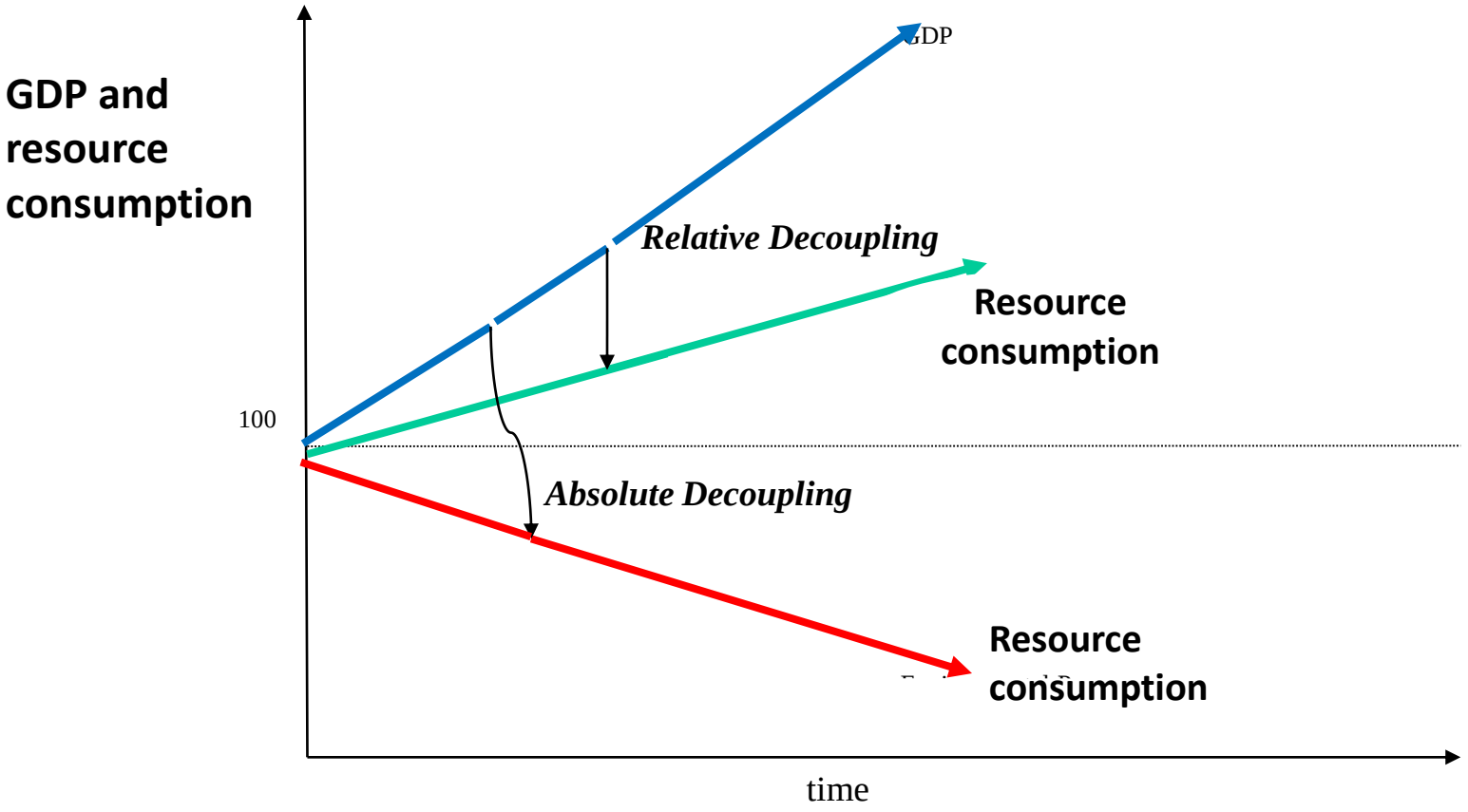
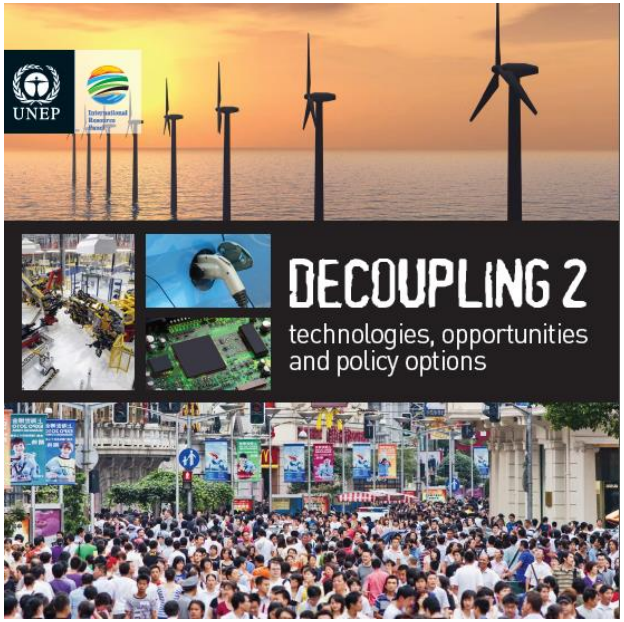


Absolute decoupling means a real reduction of resource consumption while the GDP may grow further.



Relative decoupling is what happens in all countries: a little less growth of resource use than of GDP





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distinguishes between

1. **Decoupling by maturation**
   (overcoming initial clumsiness, saturating infrastructures)

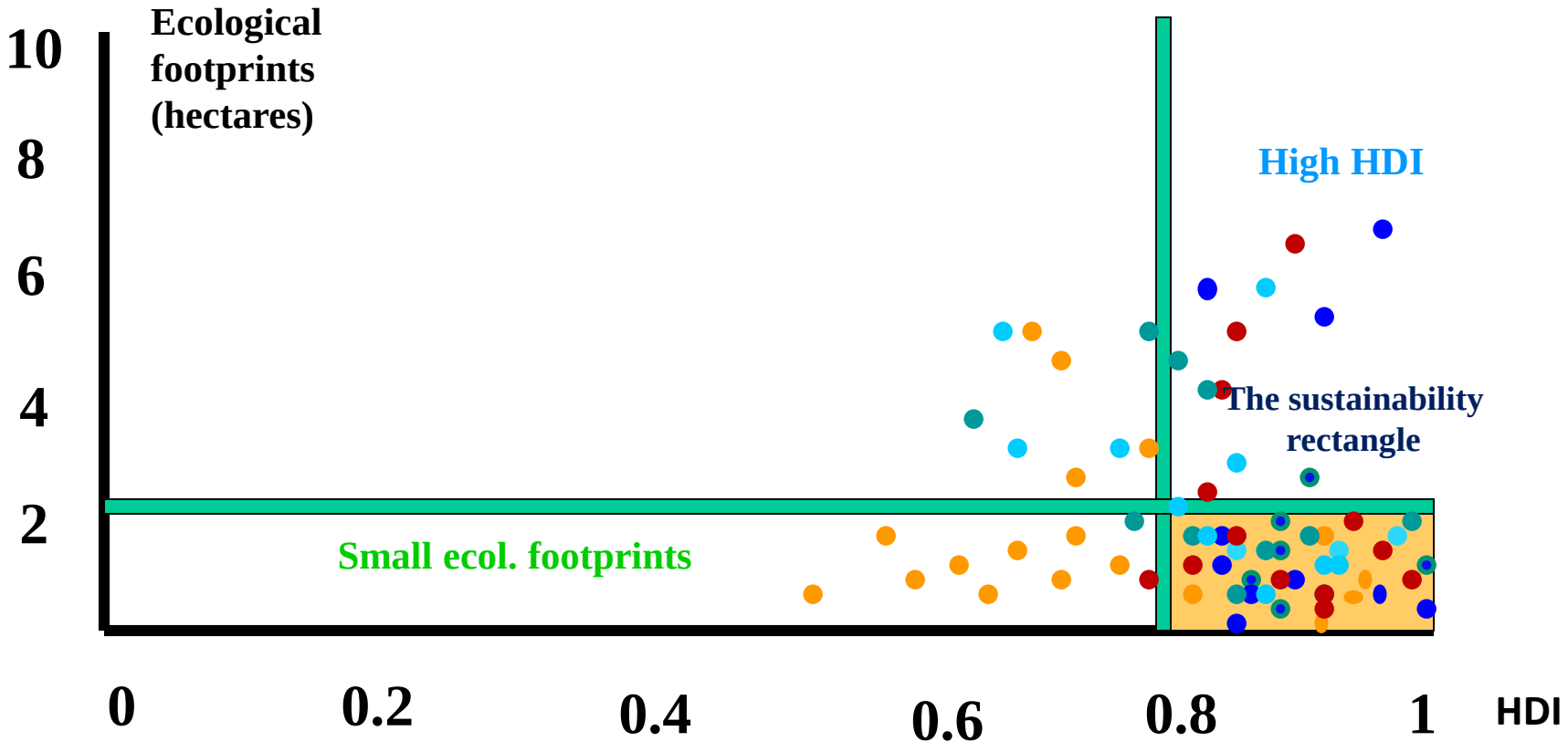
2. **Decoupling by trade**
   (problem shifting)

3. **Decoupling by intentional increase of resource productivity**

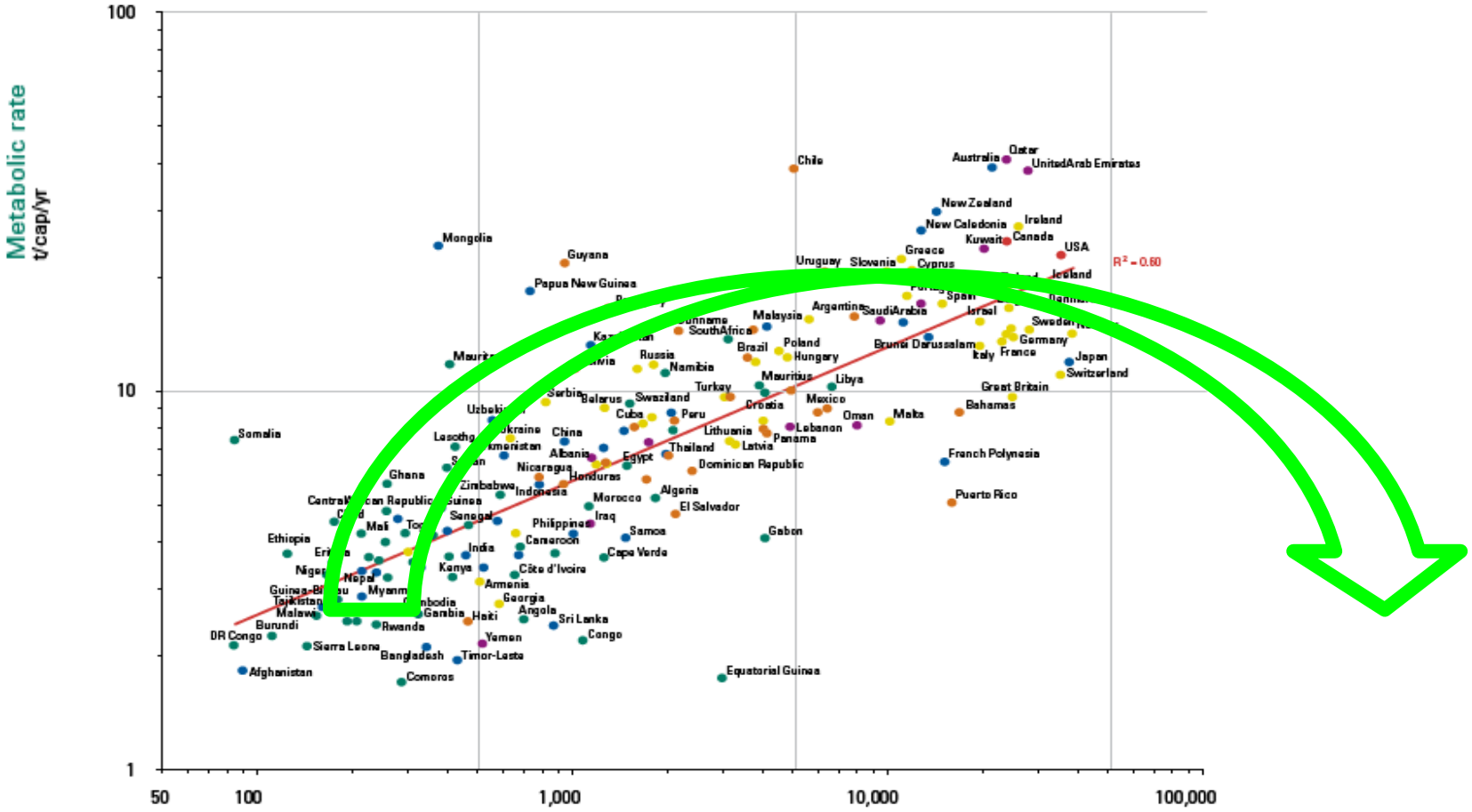
Relative decoupling

Absolute decoupling

A fivefold increase of resource productivity could re-populate the sustainability rectangle!

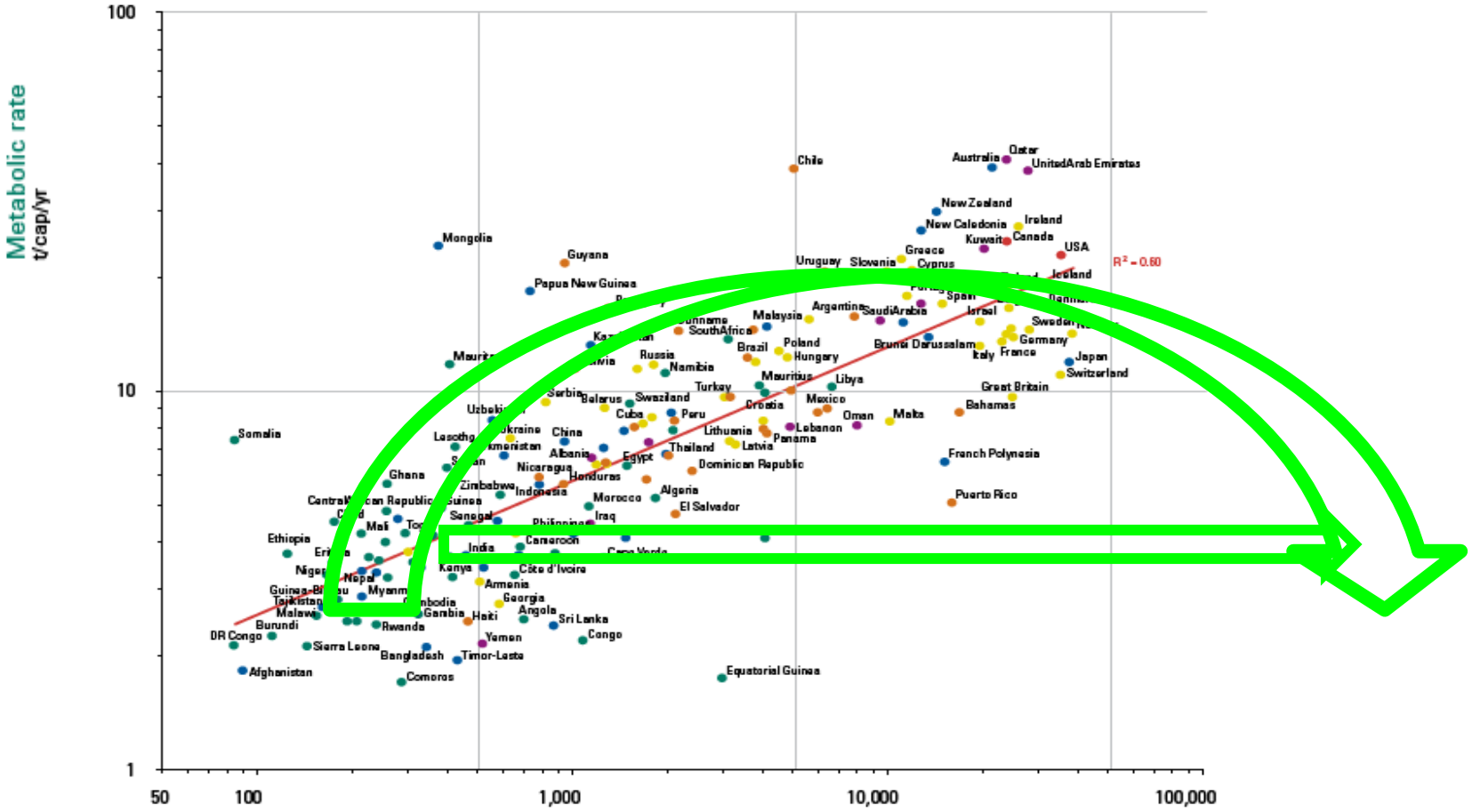


If limited resources are a problem (they are!), we should create a „Kuznets Curve“ of dematerialization!



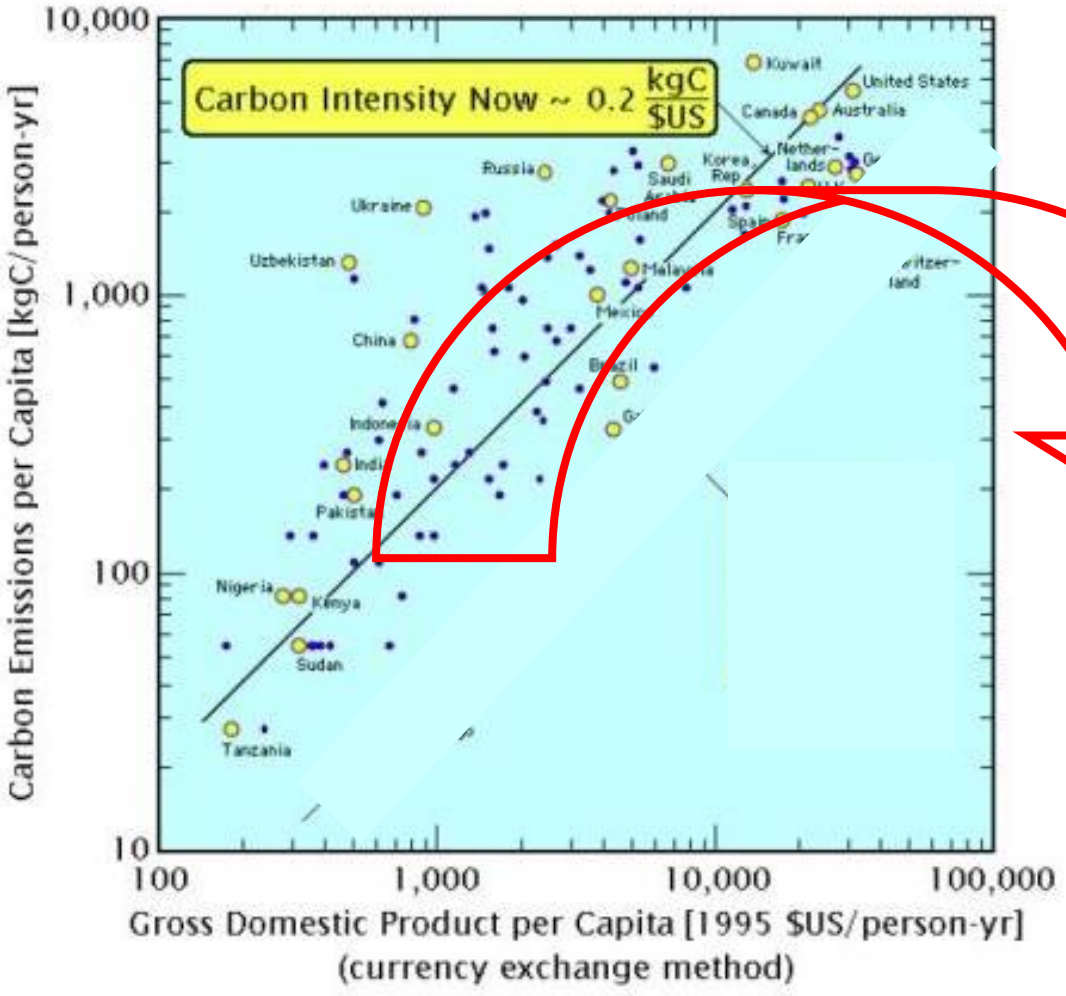
Source: Steinberger et al, 2010

… and encourage and assist developing countries tunneling through …



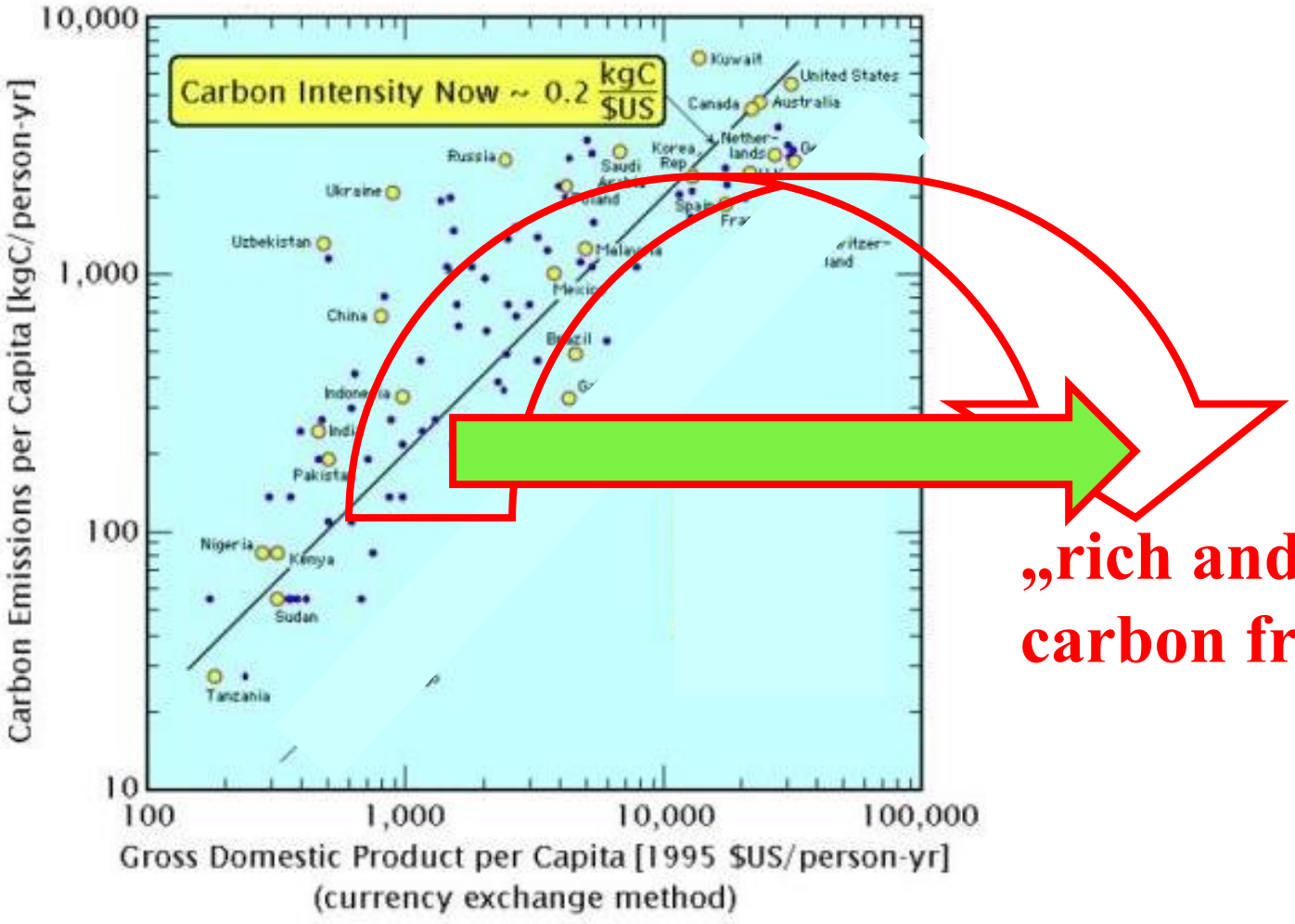
Source: Steinberger et al, 2010

Likewise: If CO_2 emissions are a problem, (they are!) then we need a Kuznets Curves of decarbonization!



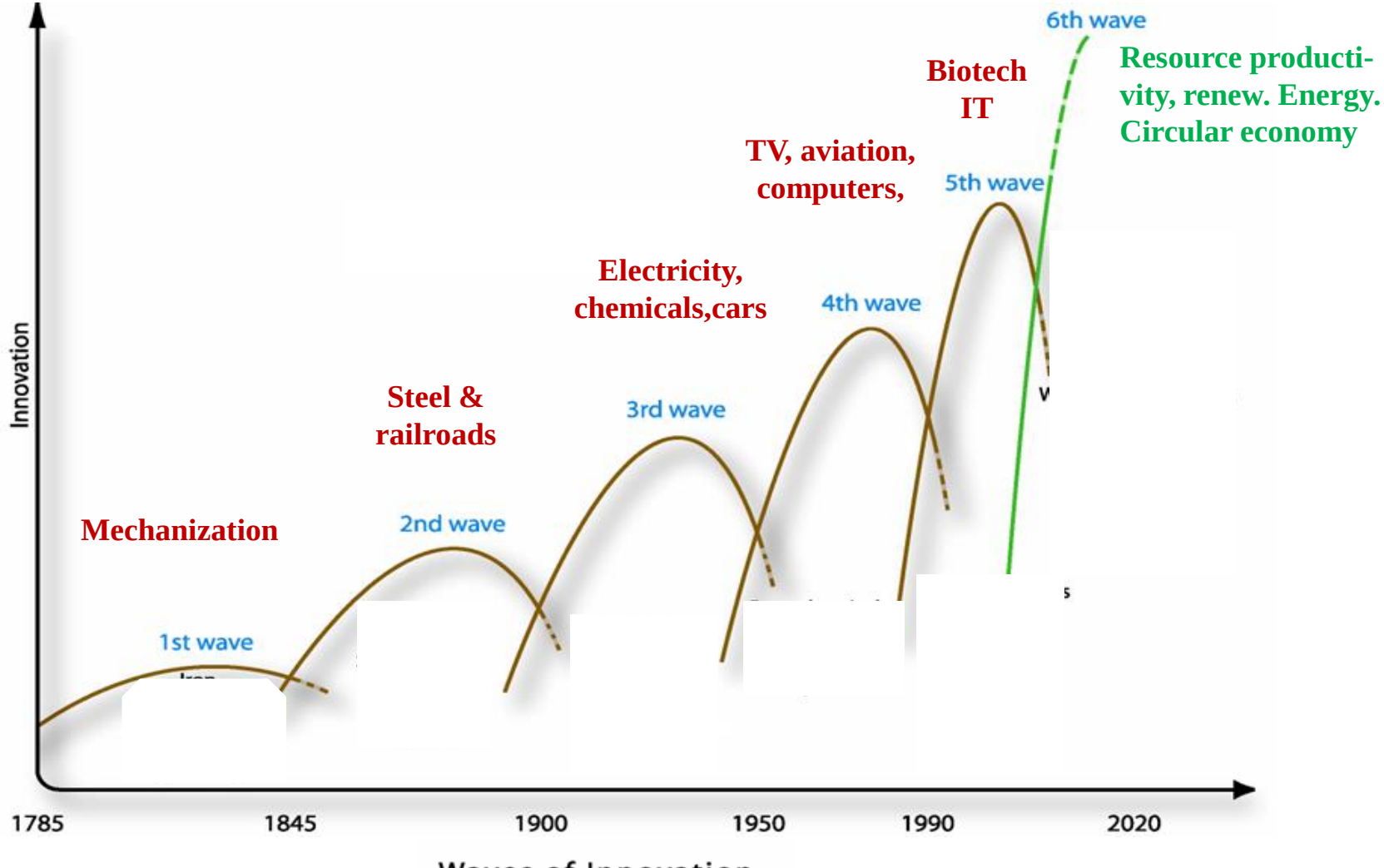
„rich and carbon free“

… and induce poorer countries tunneling through!



„rich and carbon free“

Ambitious efficiency increases means a Green Kondratiev Cycle, after five brown Cycles.



People tend to believe that this is just a utopian dream. Well, let us then look at a suprising fact from physics…

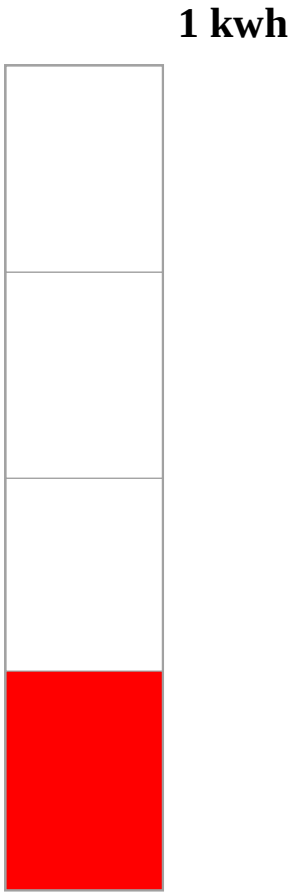
Imagine a bucket of water of 10 kg weight

How many kilowatt-hours

do you need to lift it from sea level to the top of Mount Everest?

The answer is stunning:
One quarter of a kilowatthour!

(knowing that one watt-second is one Joule or one Newton-meter; ¼ kwh is 900.000 watt-seconds)



2009 2010 2010 2012 2013 2014

We can prove that a five-fold increase in resource productivity is *technologically* available.

Let us run through some Factor Five examples.

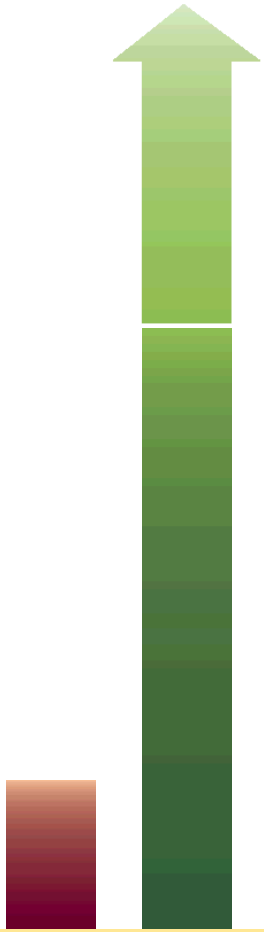
Volkswagen‘s concept car XL1 is five times more fuel efficient than today‘s fleet

Volkswagen XL1
0.9 l/100km

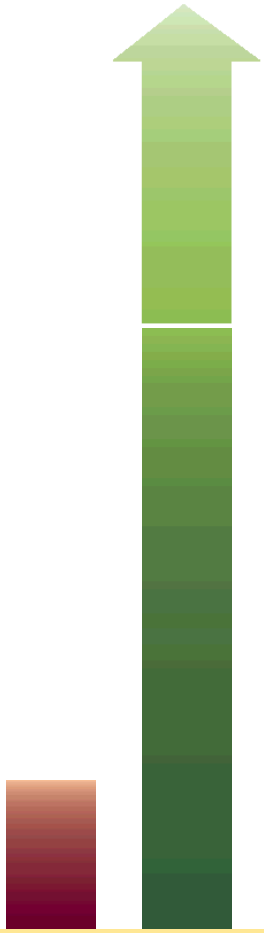
Today‘s fleet
5-10 l/100km

Energy efficiency

“Passive houses”: a factor of ten more heat efficient



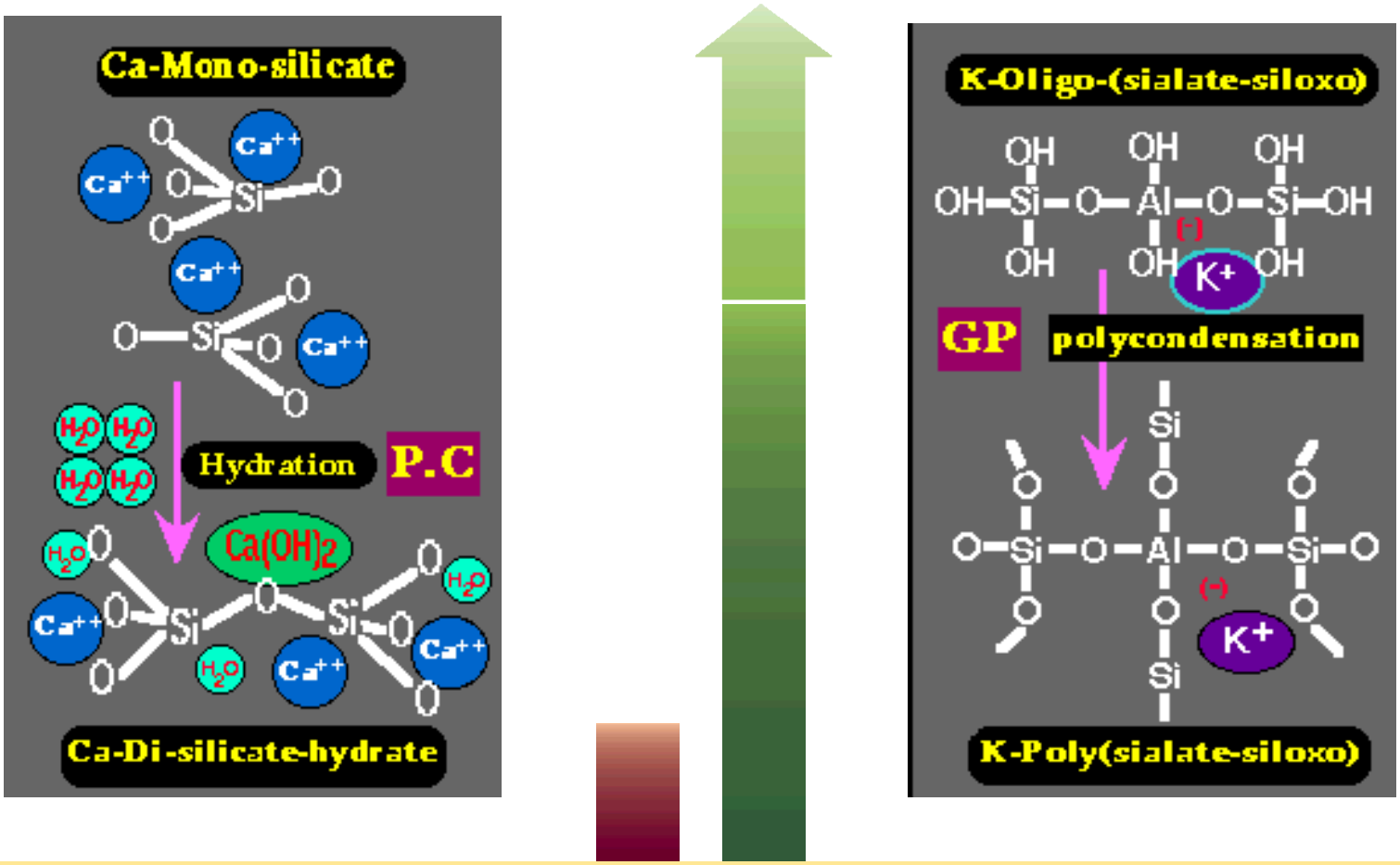
LED replacing incandescent bulbs: a factor of 10



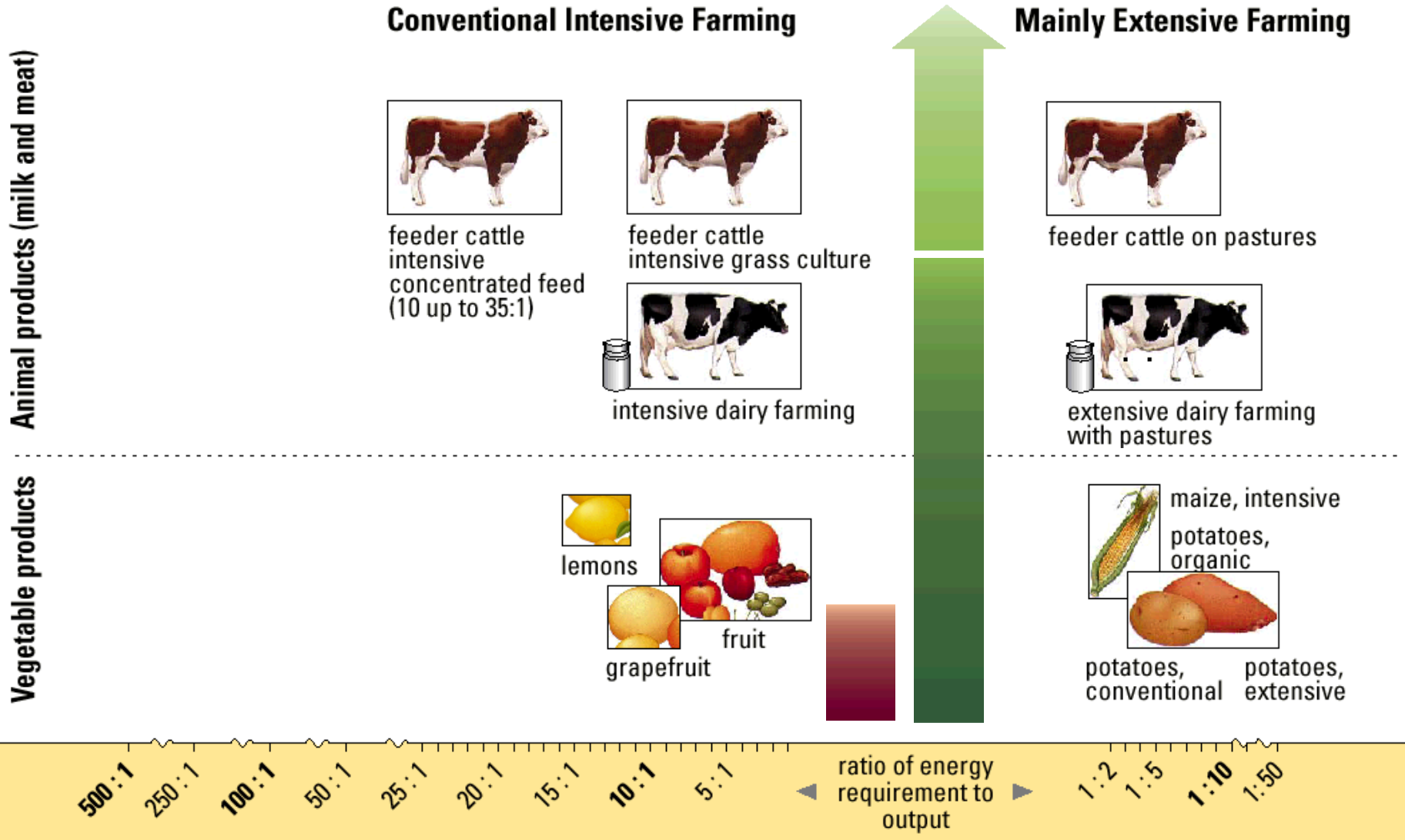
Philips 7W Master LED

Energy efficiency

From Portland cement to geopolymer cement (e.g. fly ashes from coal power plants).

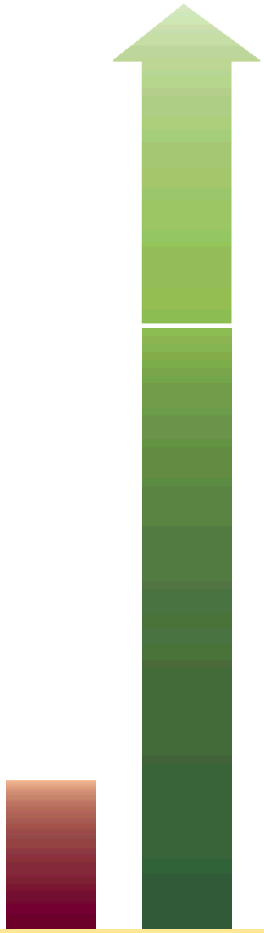


A little less beef, organic farming, more local and seasonal food …



From car-centered to human-centered cities

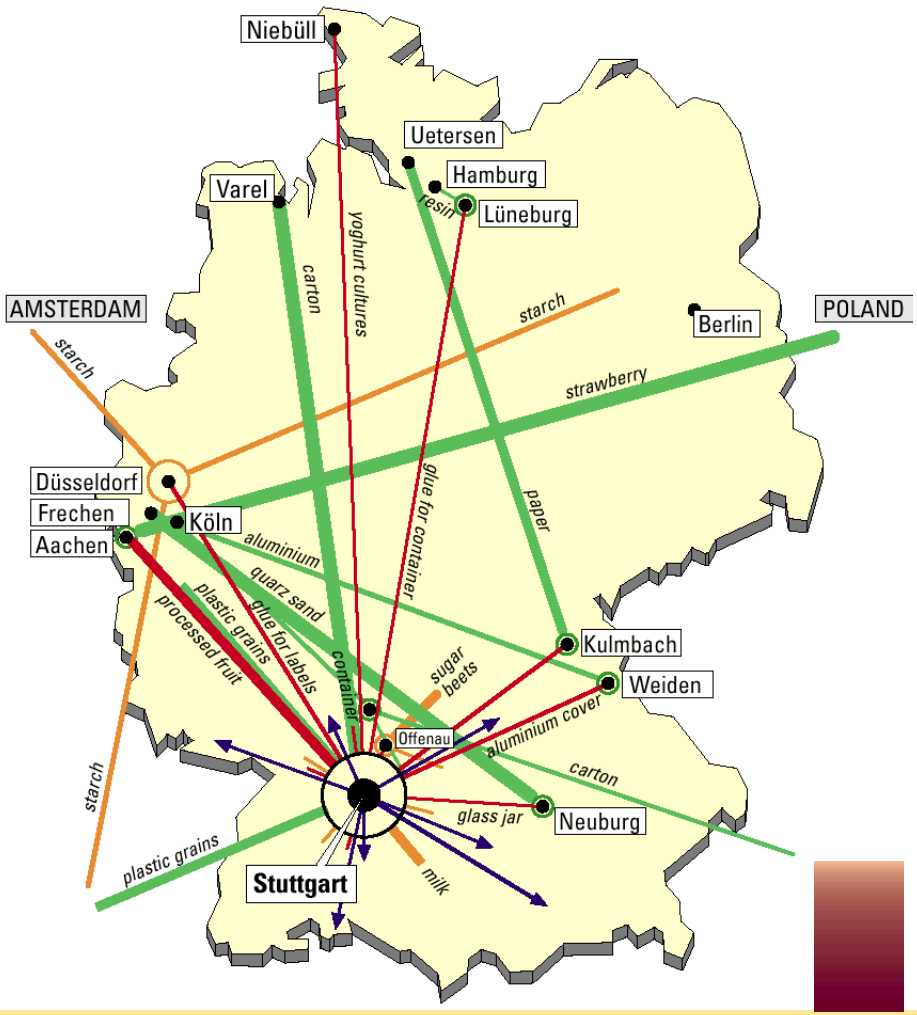
Atlanta, Georgia



Energy and space efficiency

Copenhagen (above)
Freiburg, Vauban (below)

Strawberry yoghurt logistics, mad or reasonable



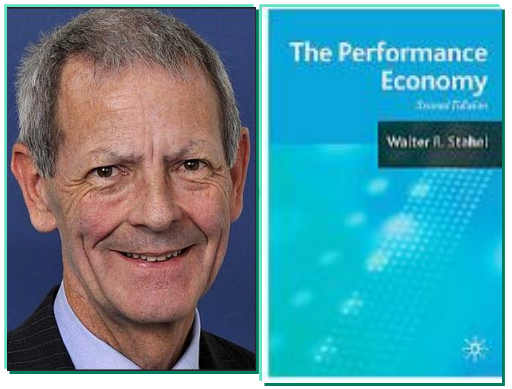
manufacturer's supplies
supplier's supplies
catchment area
manufacturer – distribution places
from – to
supplies
catchment area
distribution area

Aluminium from bauxite or from scrap

Energy efficiency

A major step is changing the business model from selling goods to leasing, sharing, repairing.

From: The Lightbulb Conspiracy:
The Untold Story of Planned Obsolescence
documentarystream.com



Walter Stahel
Pict: Geneva Association

Also Walter Stahel is now a member of the Club of Rome

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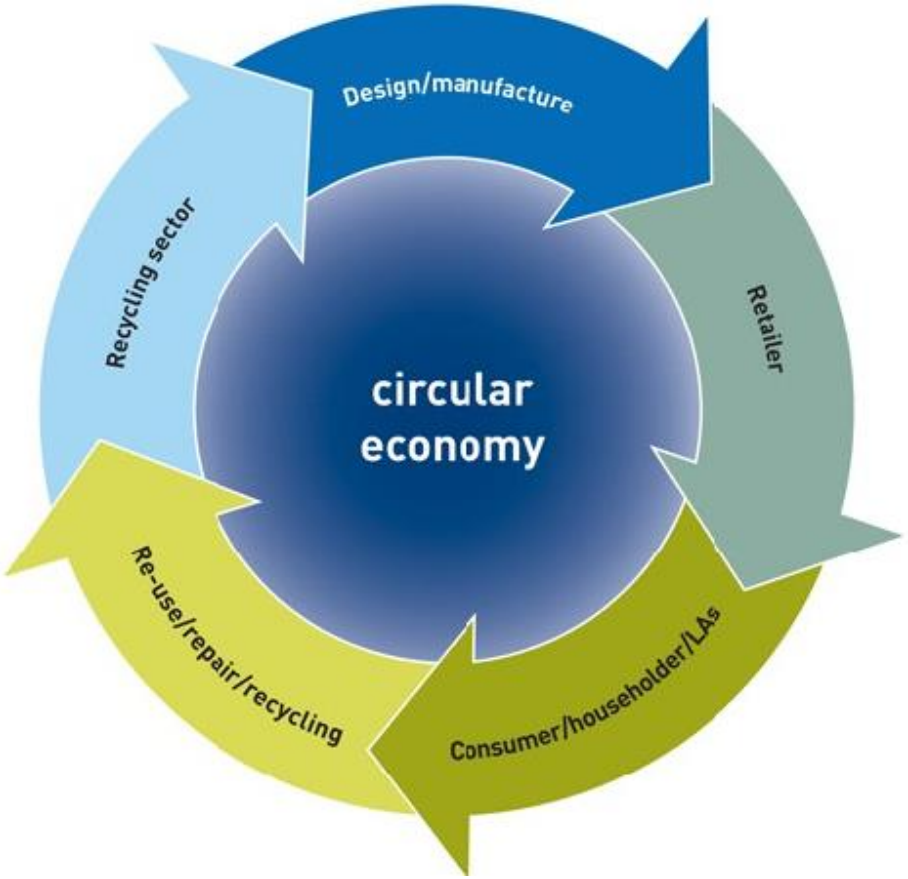
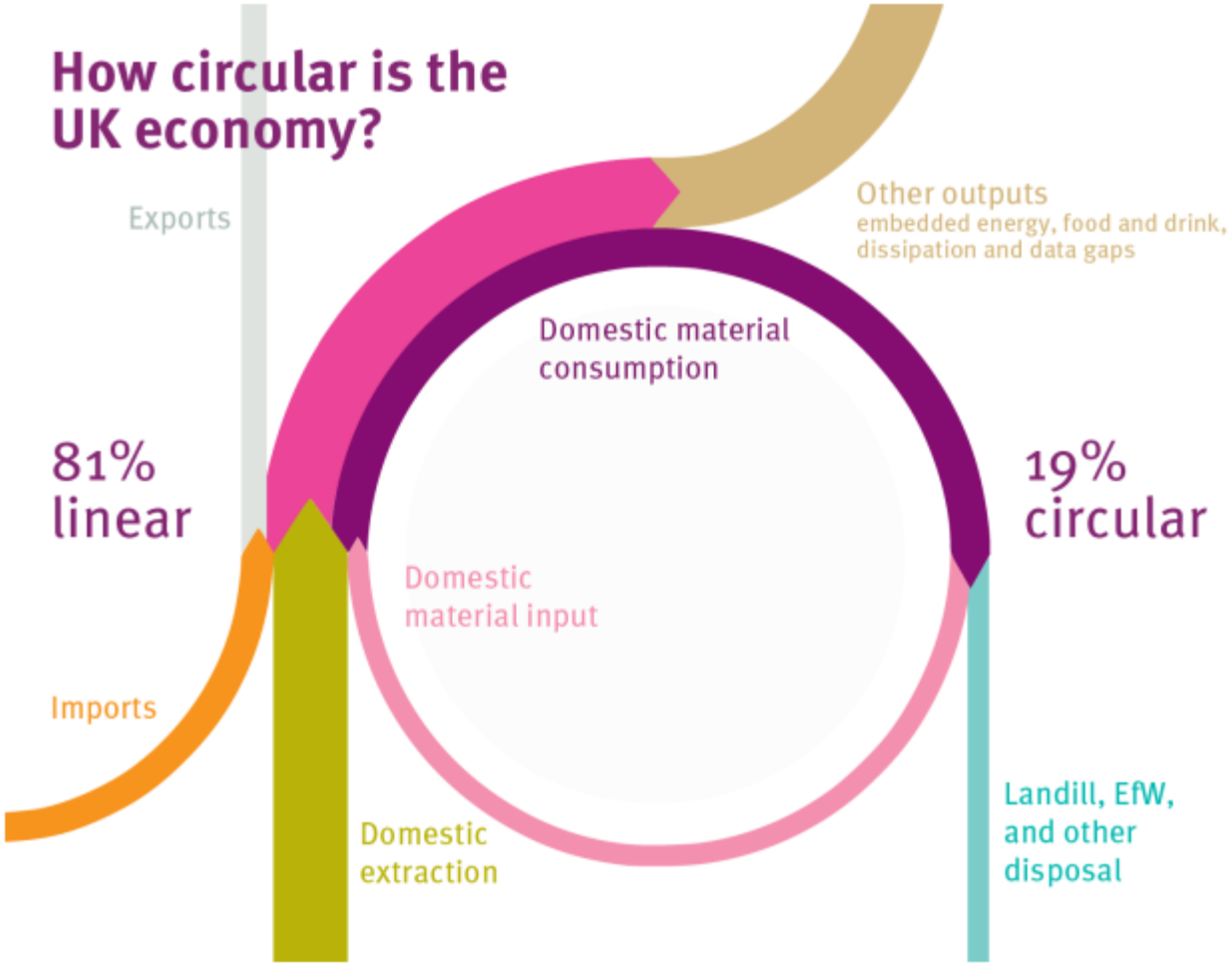
The concept of a circular economy is gaining traction. And Walter Stahel's ideas will be part of it.



euronews.com

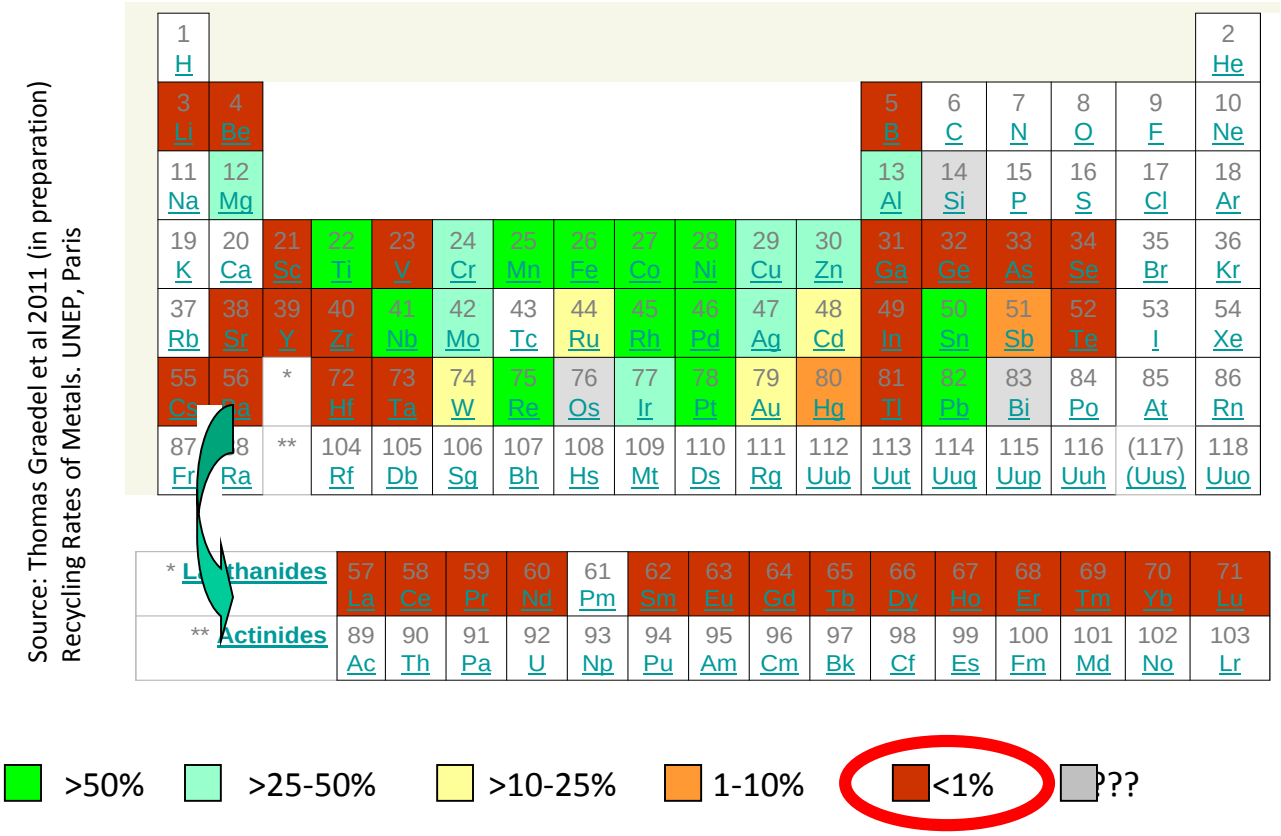
The EllenMacArthur Foundation.
is at the vanguard of the Circular Economy.
Ellen has accepted membership
in the Club of Rome.

In reality, however, we are far away from circular. In Britain it was calculated that the economy is still to 81% linear!

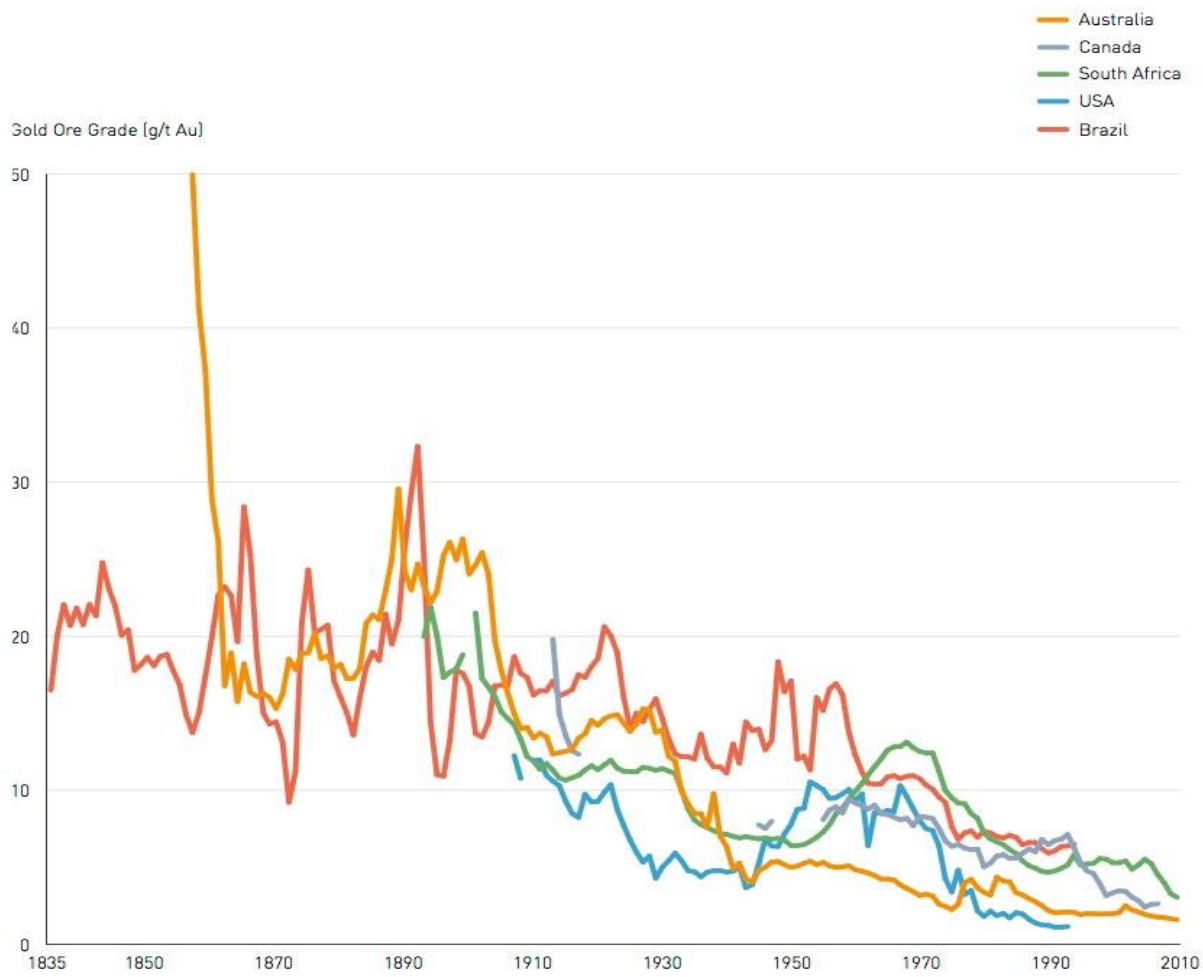


greenallianceblog.org

… but the International Resource Panel found out that high tech metals typically enjoy recycling rates below 1%!!



Less gold per ton of gold ores. In the 19th century, ‚finding' gold was the symbol of luck. Today, gold mining is the symbol of a messy, poisonous, and socially disgusting industry!



From UNEP (2013) Recycling Opportunities. (Lead author: Markus Reuter) Nairobi.

A new, 2013, report is on Metal Recycling Opportunities, Limits, Infrastructure. It proposes to recycle the big metals as usual, and the small ones by careful design.

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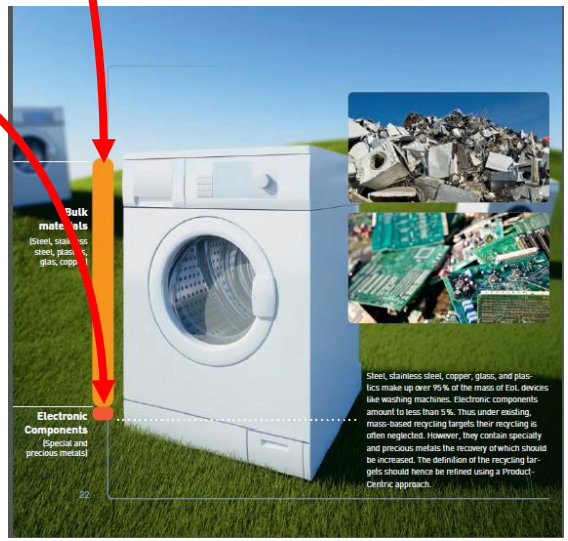


www.unep.fr/scp/rpanel

The next step for the Panel is looking at Remanufacturing.

Classically, products live longer that their components. Then you need maintenance and repair.

But today it‘s often the other way round: components live longer than the product. Then you better design components as modules that can be reused many times, thus especially conserving the precious rare metals.

Sue Weisler, Rochester Inst. of Tech.

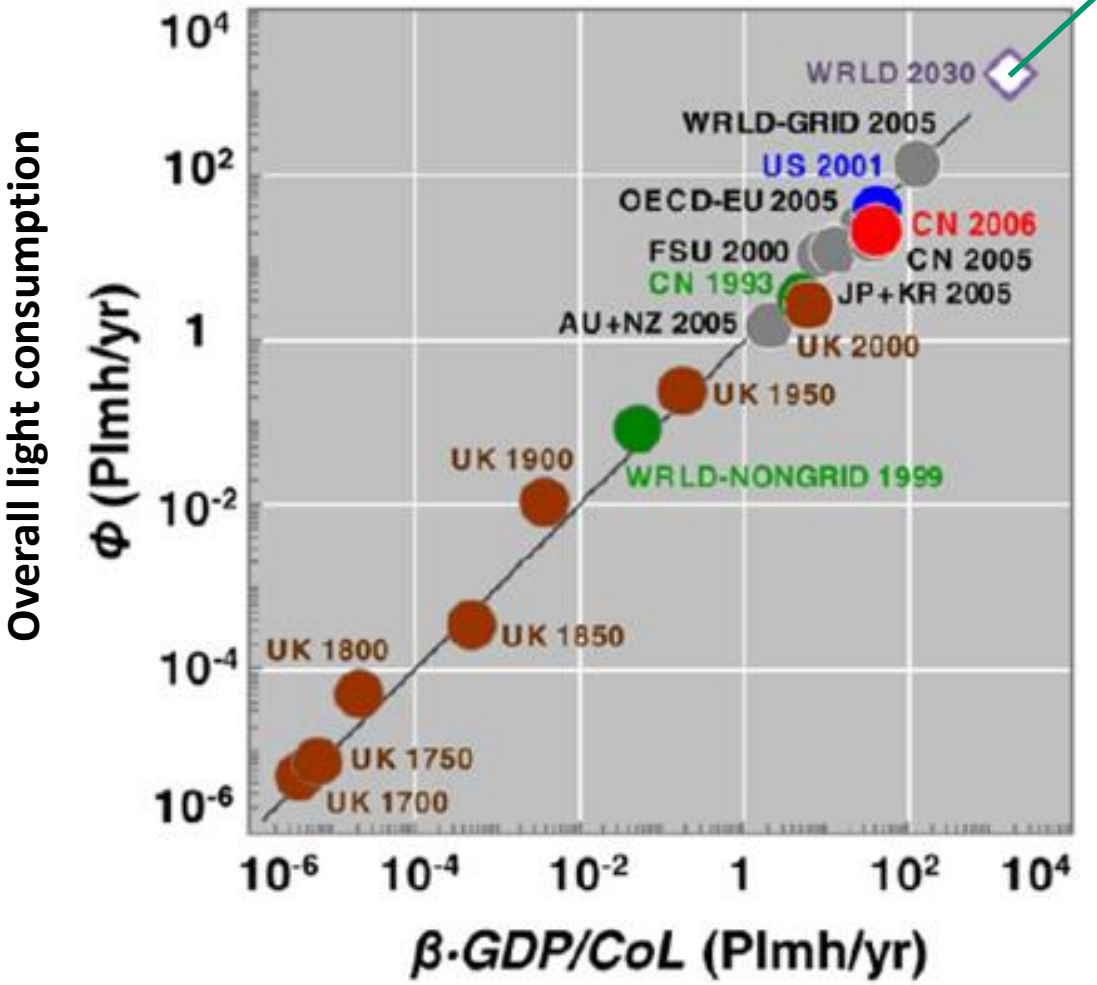
We were lucky winning Prof. Nabil Nasr, world leader of remanufacturing as a new Panel member!

To sum up this brief story about efficiency:

Potentials for Decoupling are absolutely huge!

But much of it remains sleeping! And much is eaten up by the ‚rebound effect‘.

The ‚rebound‘ effect is the biggest dragon: .Efficiency is eaten up by additional consumption-



Projection 2030

Lighting got ever more efficient – and cheaper. So the demand for power from lighting is steadily rising.

Source: Tsao et al, 2010

Leading us finally to policy questions.
Basically we have 3 options:

Command and control **<including bans, focusing mostly on toxicity>**

Tradable permits **<worked for some air pollutants, water extraction, land use, but not so well on CO_2>**

Direct pricing **<the underestimated, sleeping giant!>**

My preference relating to resource efficiency is direct pricing.

But we must avoid capital destruction, industry emigration, and social injustice.

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

What I am suggesting is a ping-pong, similar to the one we had in the Industrial Revolution

Labour productivity rose roughly twentyfold in 150 years, - and so did wages!

Example from the USA from 1910 – 1960 showing how wages followed labour productivity

The new „resource ping-pong“ could trigger a steady increase, perhaps five-fold, of average resource productivity, in 40 years.

It would massively reduce wastefulness, much of the rebound effect, and most of Europe‘s import dependency!

Two corrections to the price avenue:

1. **Life-line tariffs for the poor;**

2. **Revenue neutrality for endangered branches: like with the Swedish NOx tax of 1992.**

Clearly, I am not expecting the paradigm shift to happen very soon.

But if Europe and other pioneering countries and companies enjoy first mover advantages, the others will follow.