SettimanaAlpina
Le Alpi Rinnovabili
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AlpenWoche
Erneuerbare Alpen
Informationen | Programm

SemaineAlpine
Les Alpes Renouvelables
Informations | Programme

AlpskiTeden
Obnovljive Alpe
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AlpWeek
Renewable Alps
Information | Programme

5.-8.9.2012 | Valposchiavo, Switzerland
www.alpweek.org

Poschiavo, Switzerland, 5 September 2012

Efficiency can protect nature, sufficiency even more so!

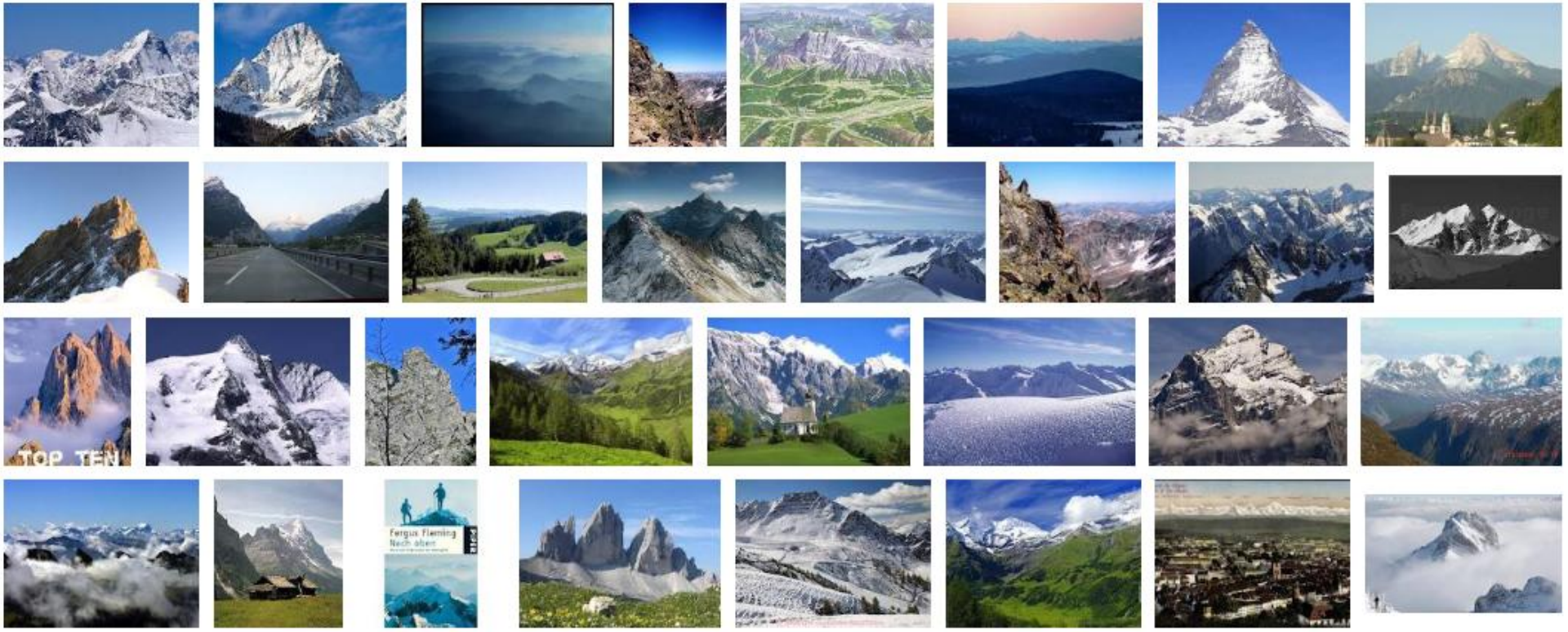
Prof. Ernst Ulrich von Weizsäcker

Co-Chair

UNEP

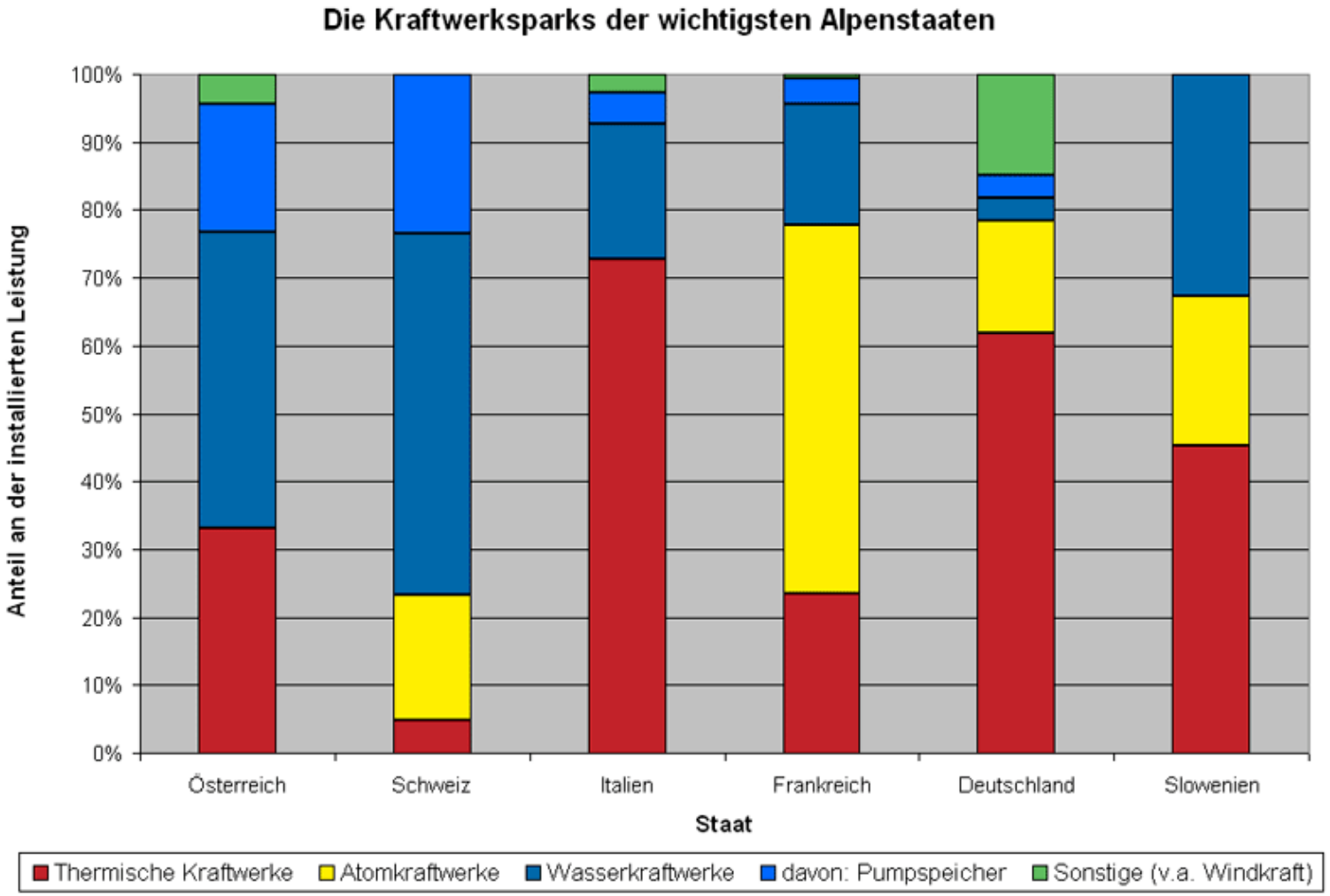
International Resource Panel

Fabulous Alps – they themselves are not renewable. But renewable energy can be harvested from here.



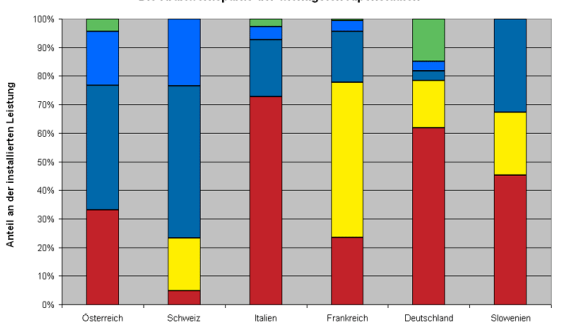
Power plants in major CIPRA countries

hydro **fossil** **nuclear** **wind etc.**

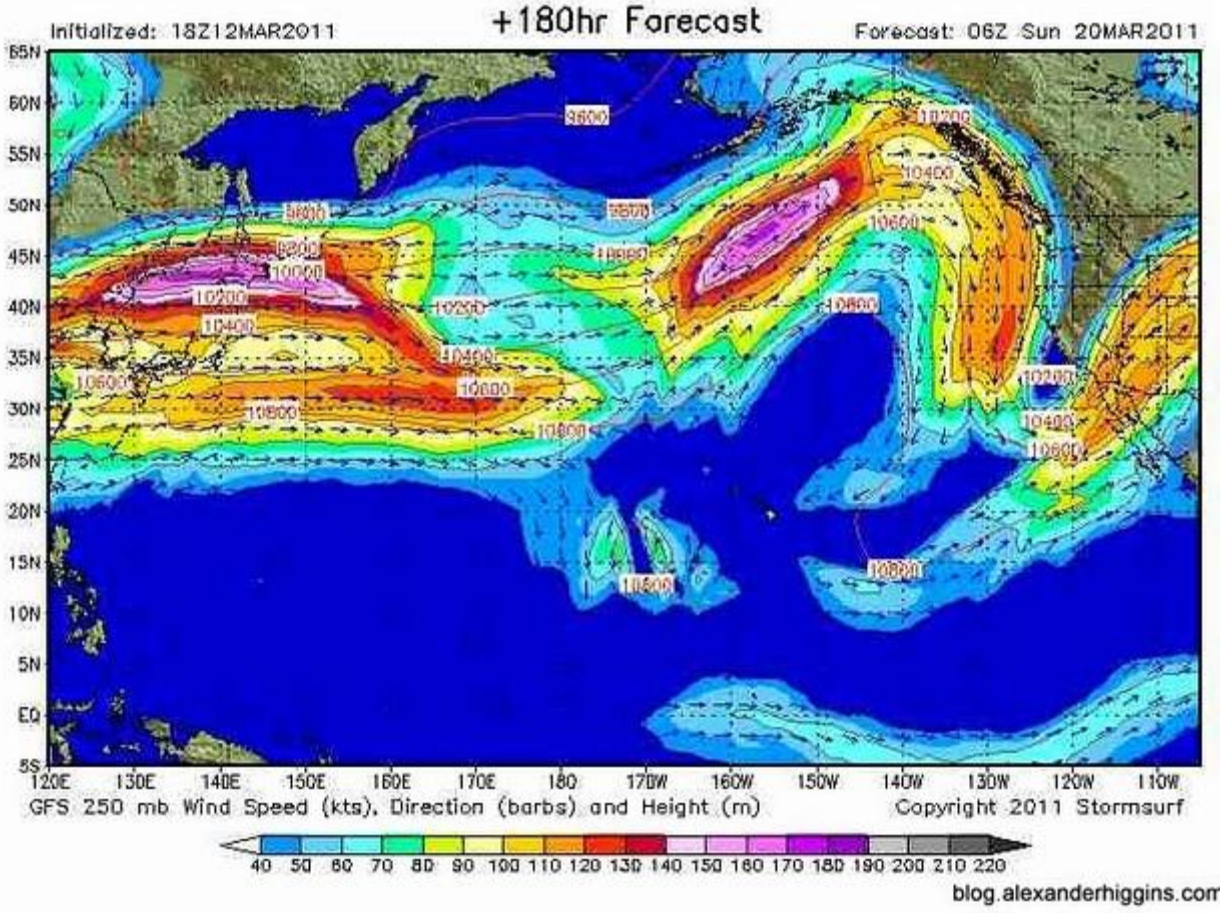


Source: tirolatlas.uibk.ac.at

After the Fukushima disaster much of the yellow bars are bound to disappear.

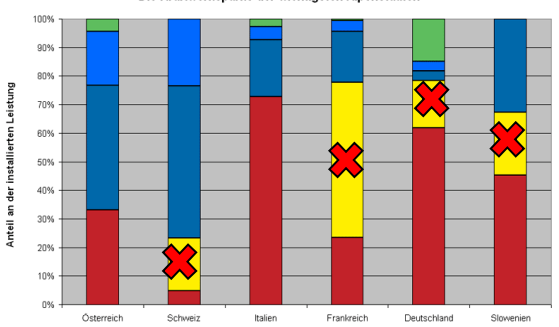


The Tsunami causes a nuclear desaster
(NTV Japan)

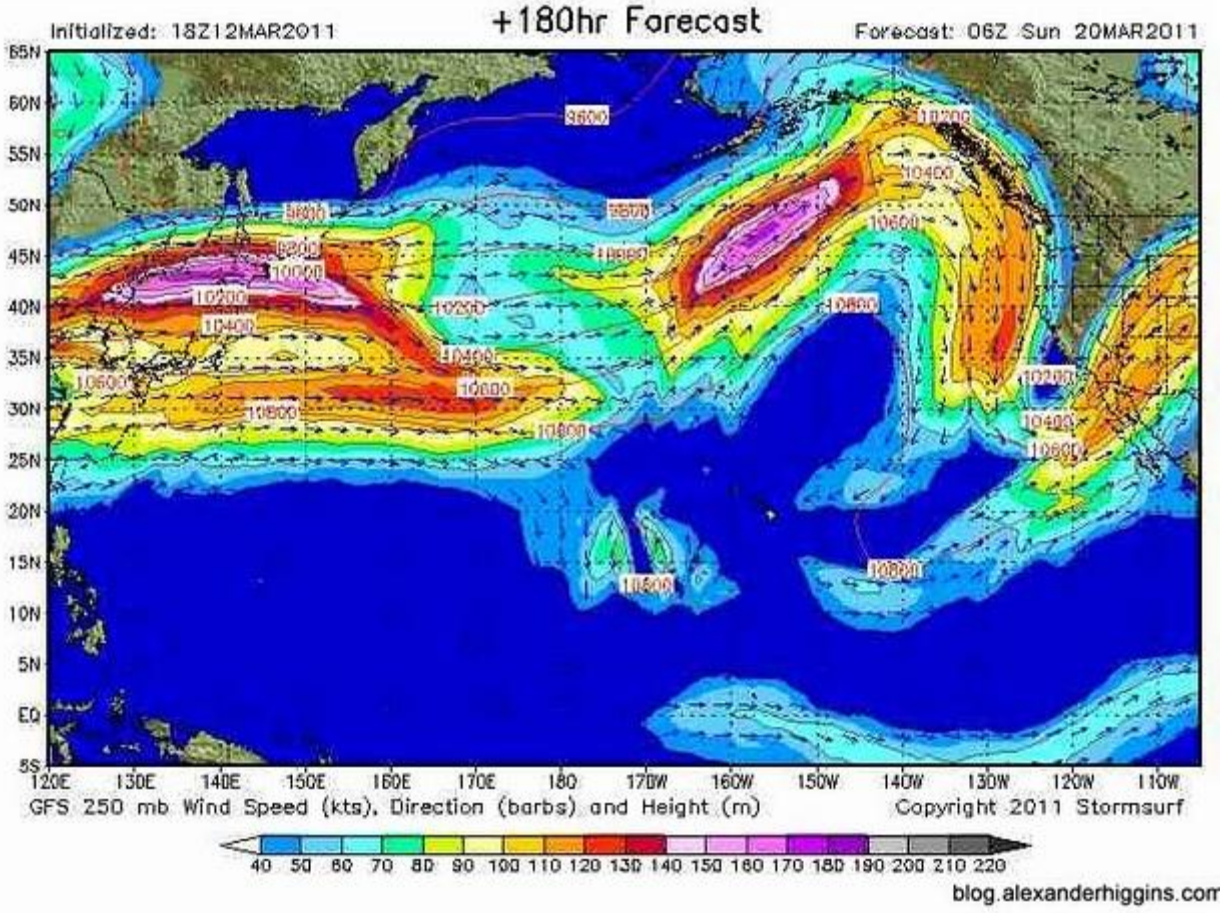


The radioactive cloud after 7 days
(Blog alexanderhiggins.com)

After the Fukushima disaster much of the yellow bars are bound to disappear.



The Tsunami causes a nuclear desaster
(NTV Japan)



The radioactive cloud after 7 days
(Blog alexanderhiggins.com)

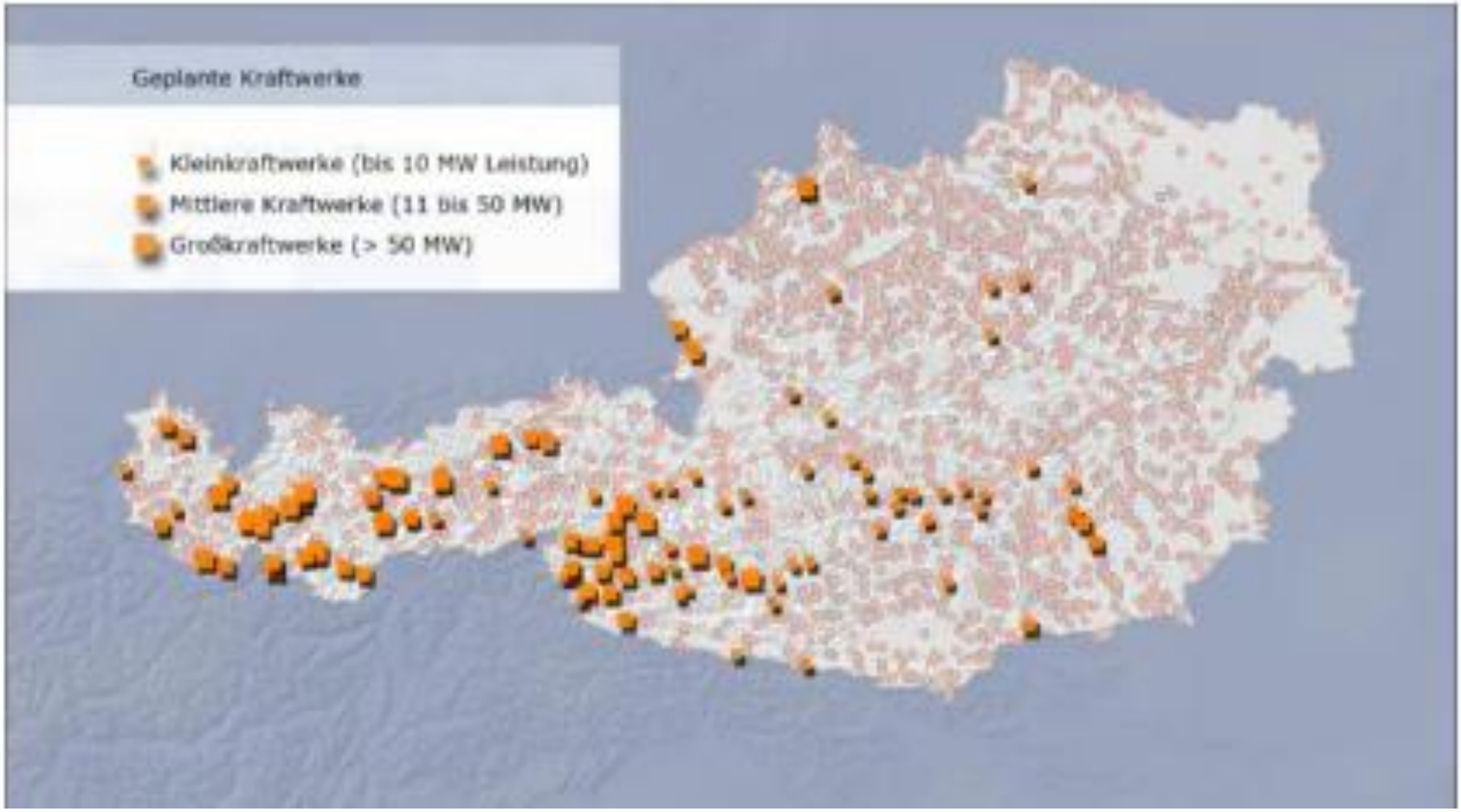
Hydroenergy is the biggest contribution of the Alps. Austria alone has some 3000 hydroelectric plants.

QuelleWWF-Film Österreich und die Wasserkraft 2011

In1999, it looked as if hydro was no longer an option.

Quelle: regioenergy.at

But Fukushima also changed attitudes to hydro. 60 new plants are planned in Austria.



Source : WWF-Film Österreich und die Wasserkraft 2011 (Austria and hydopower)

However, the *Alpenverein* is up in arms, fearing destruction of nature, pleasures, tourism.

Perhaps the last genuine glacier river, the upper *Isel* in East Tyrol is targeted for a big hydro scheme

Die Umbalfälle

Die Umbalfälle in der Nationalparkgemeinde Prägraten am Großvenediger

On the other hand, we absolutely have to deal with global warming and the nuclear risks

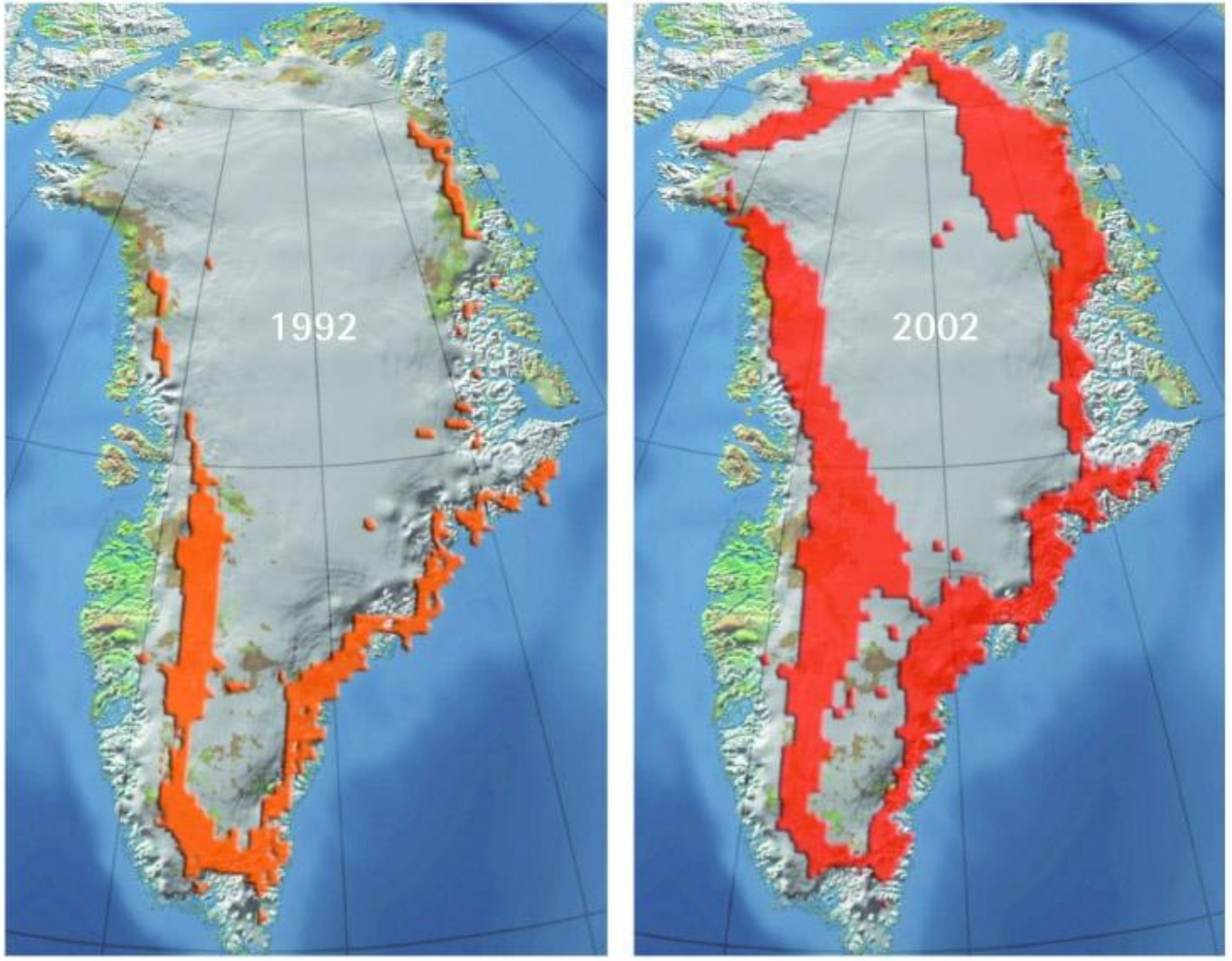
Climate desasters

Floods like in Pakistan:

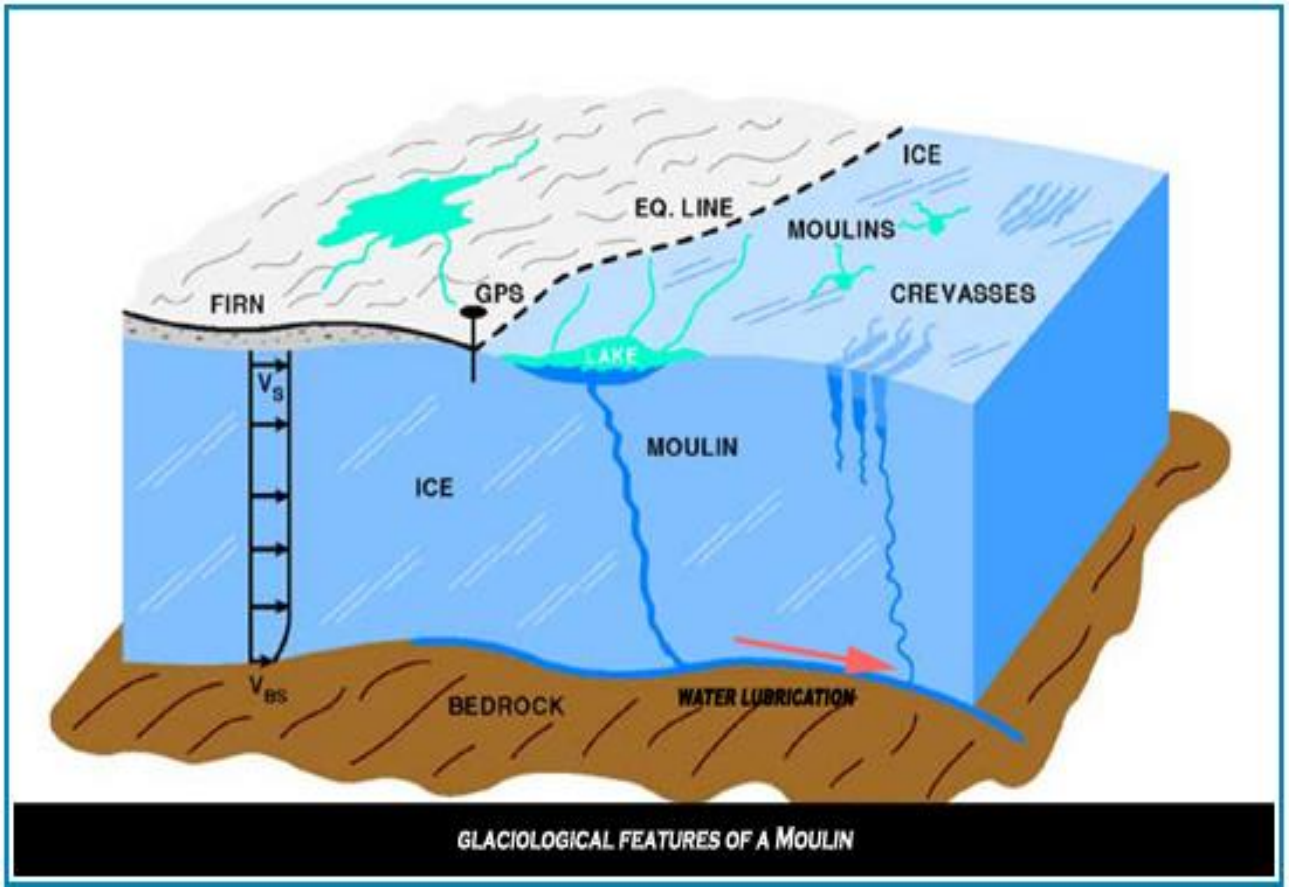
Huge icebergs breaking off Greenland

Wildfires like in Russia or Spain

We seem to be destabilizing Greenland. (Freshwater coverage during Summers 1992 and 2002)



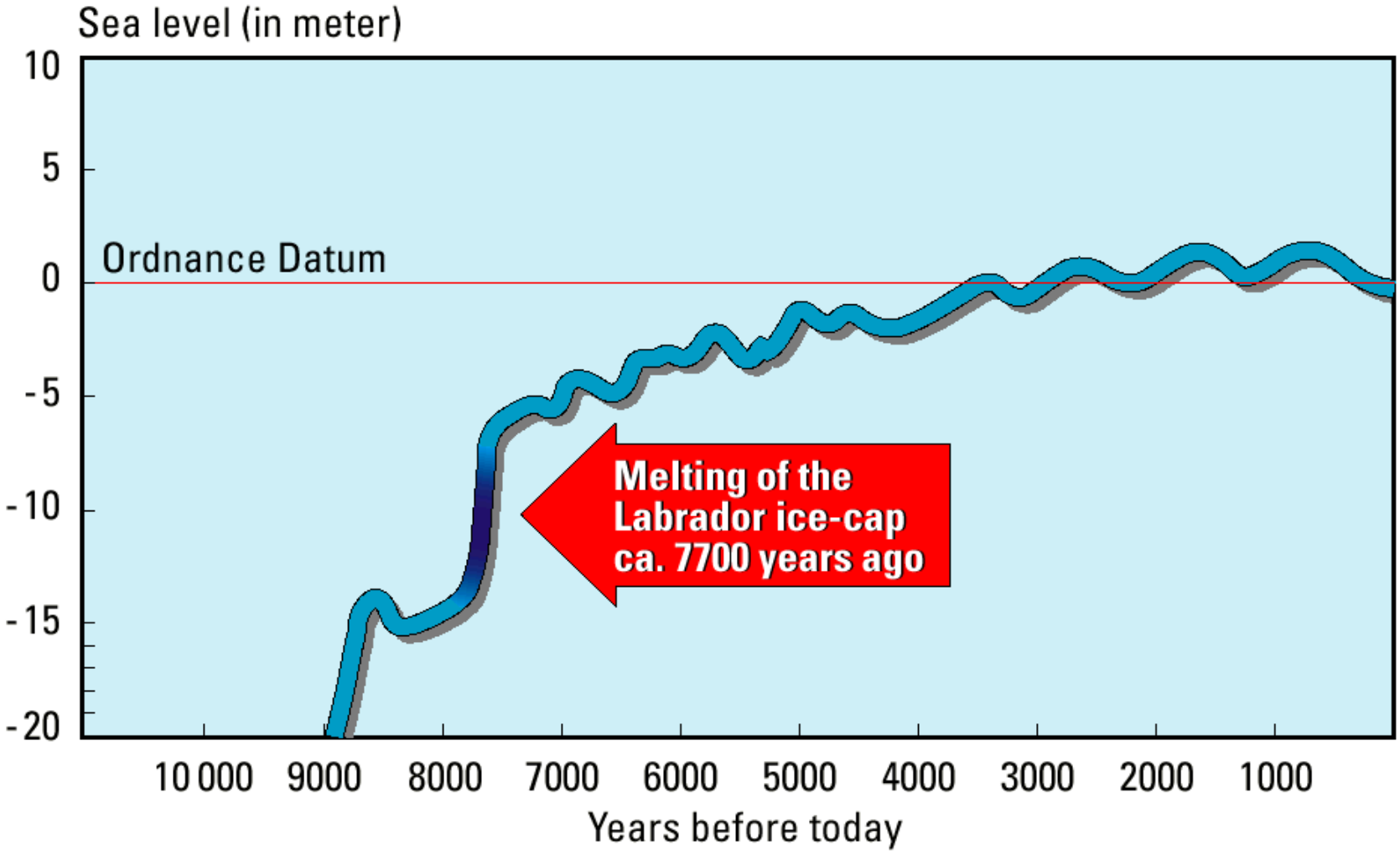
Water runs down in ‚vertical rivers‘, lubricating the rocks under the ice …



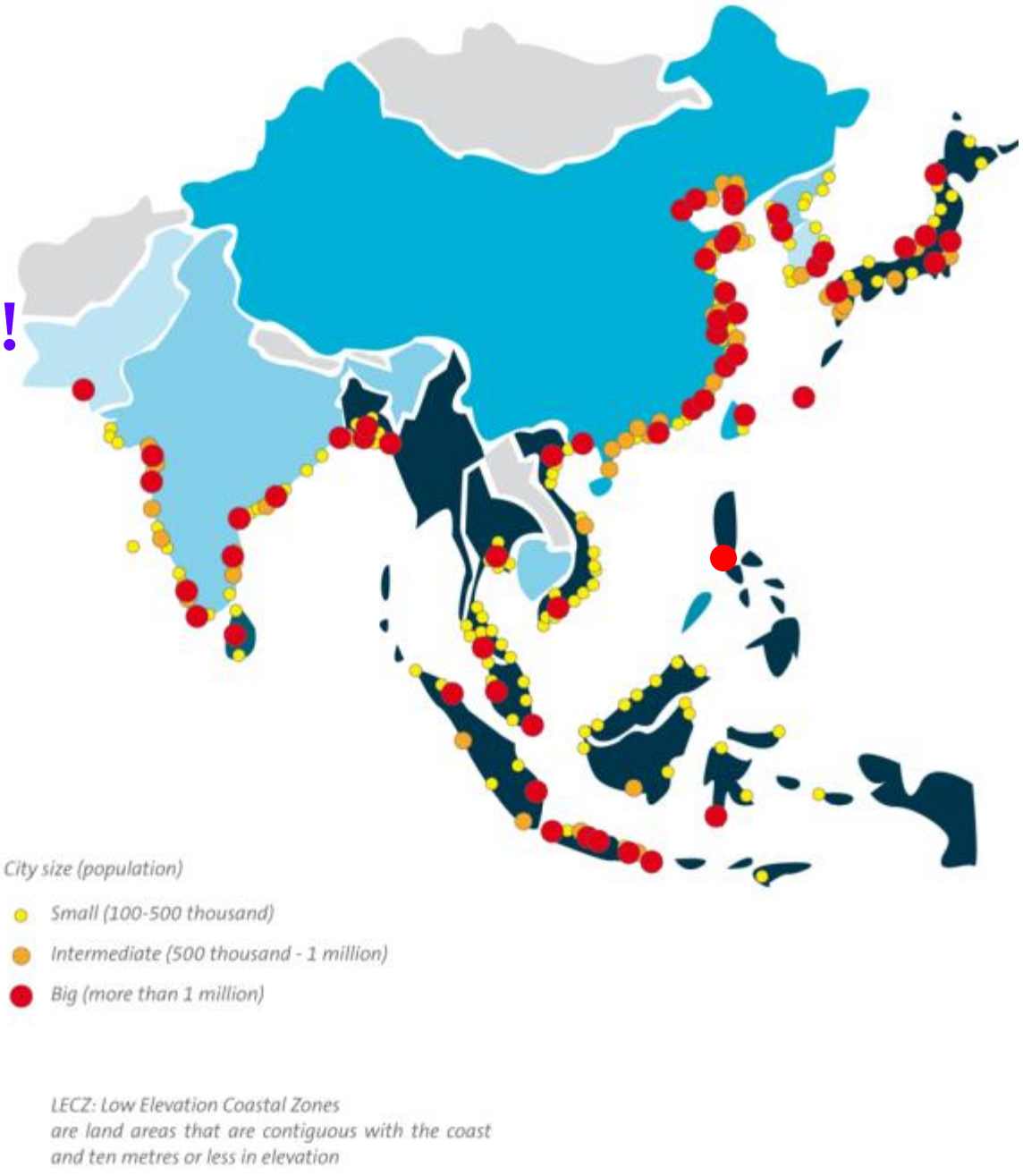
Q: http://www.pnas.org/cgi/reprint/075414105v1 (Timothy Lenton et al), PNAS

Sea level rise can take catastrophic speed!

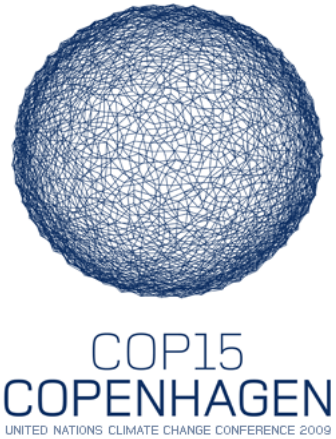
(after Michael Tooley. Global sea-levels: floodwaters mark sudden rise. Nature 342 (6245), p 20 - 21 1989)



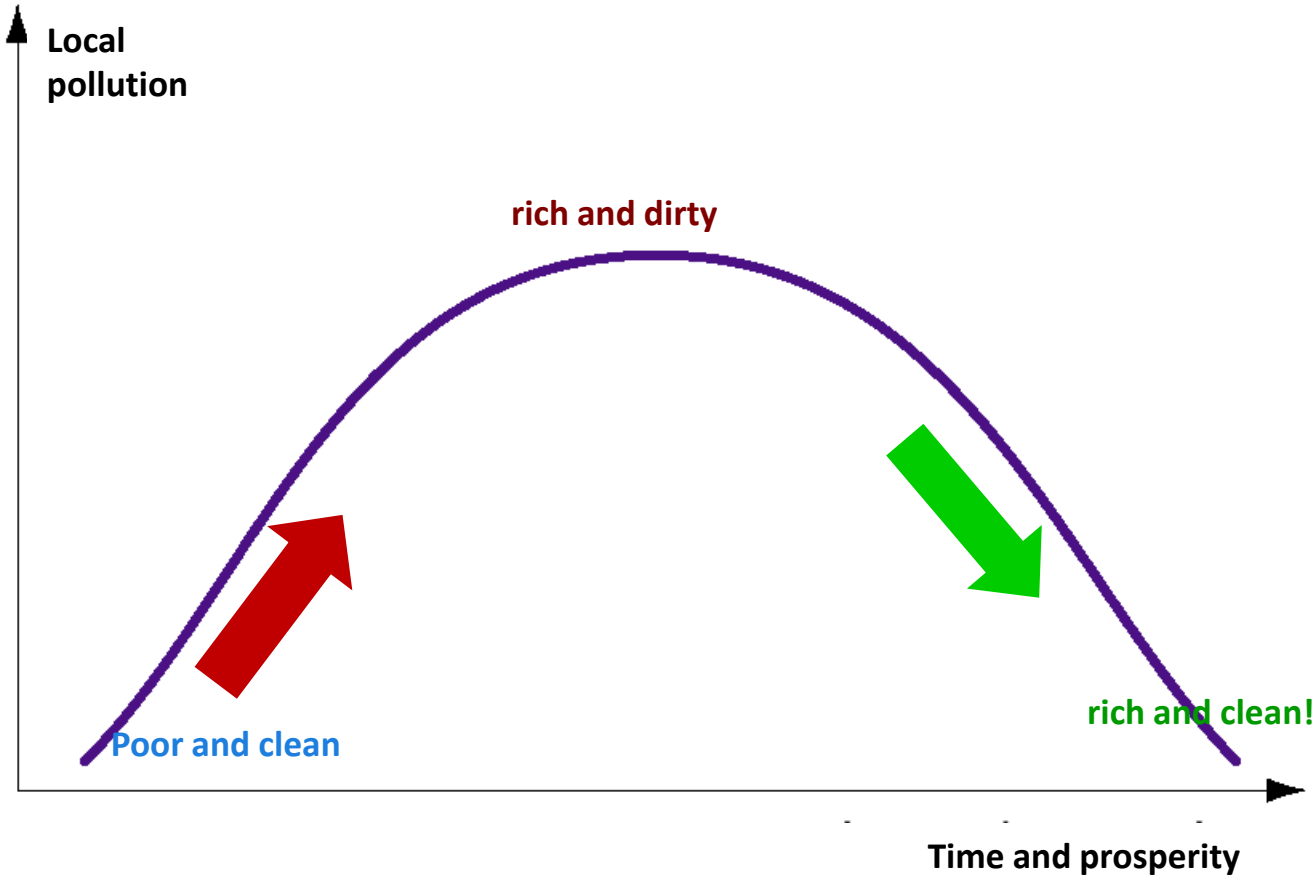
Asia‘s vibrant growth centres are mostly at the coast!



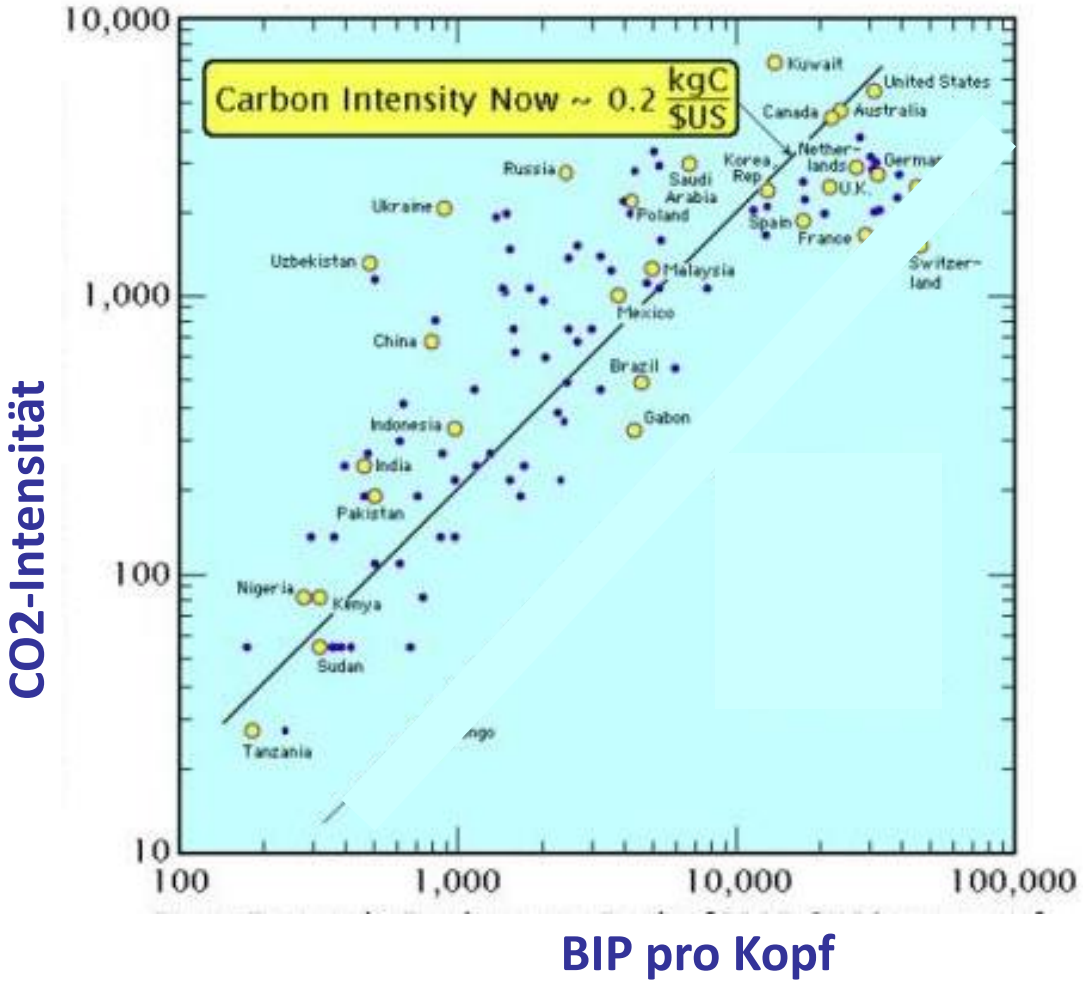
But why is climate policy stagnating?



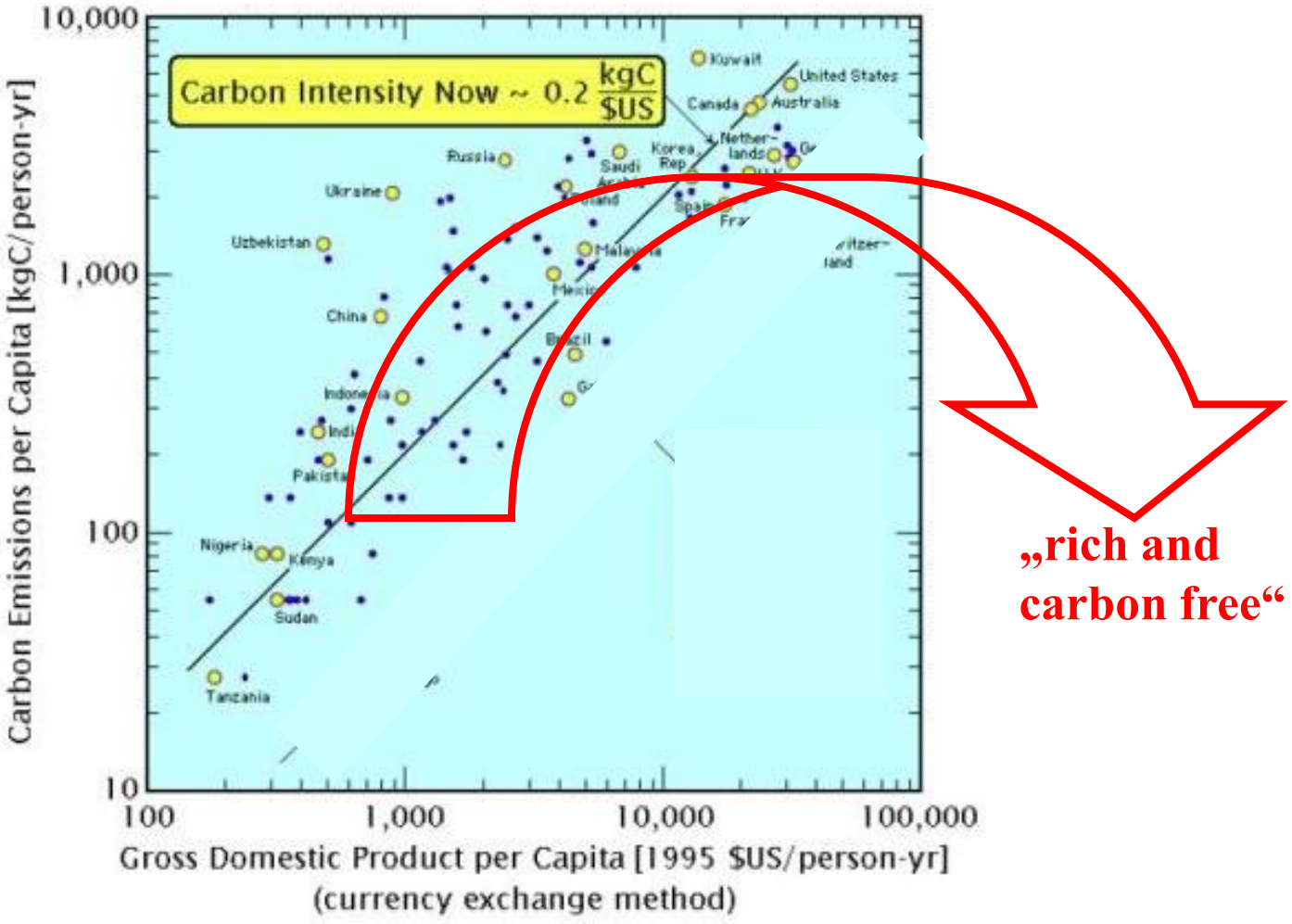
Because of the convenient paradigm of the Kuznets-curve of local pollution.



For CO_2-intensity we don‘t even have that Kuznets curve so far!

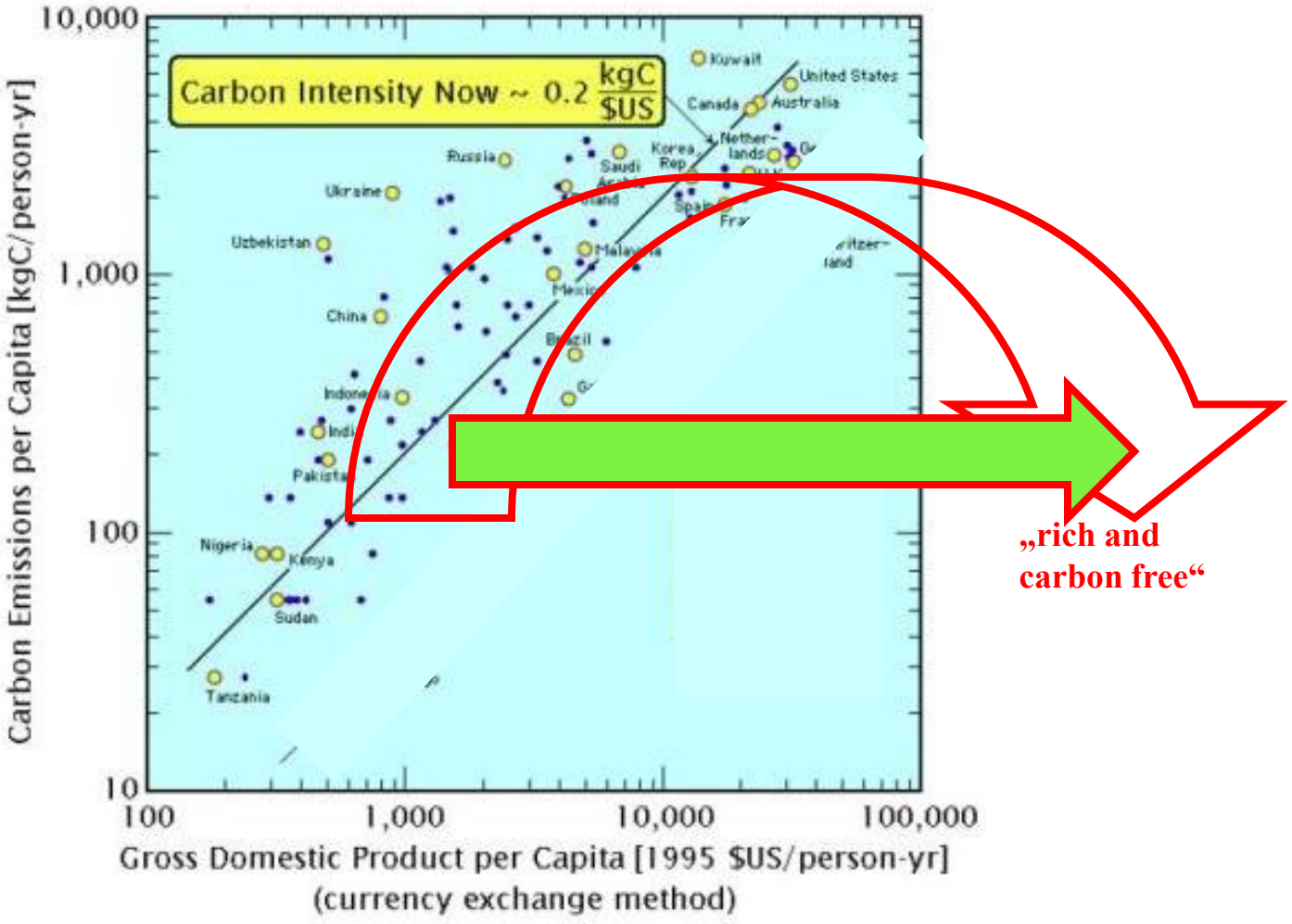


We have to break this correlation, i.e. create a Kuznets Curve of decarbonization.



„rich and carbon free“

And then help poorer countries tunneling through it.



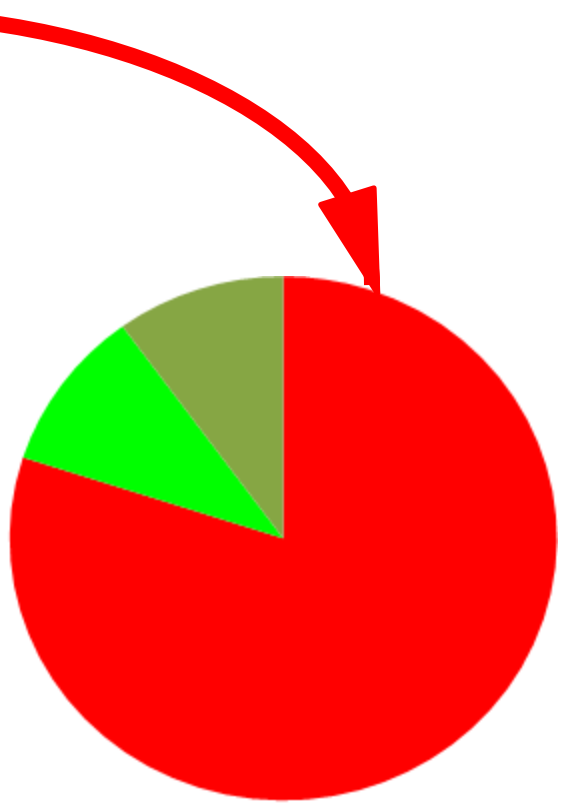
Three methods of decarbonization:

- Less CO_2 in energy
- Less energy in wealth
- Less wealth

Conventional thinking suggests:

- **80%: Less CO_2 in energy**
- **10%: Less energy in wealth**
- **10%: Less wealth**

100%



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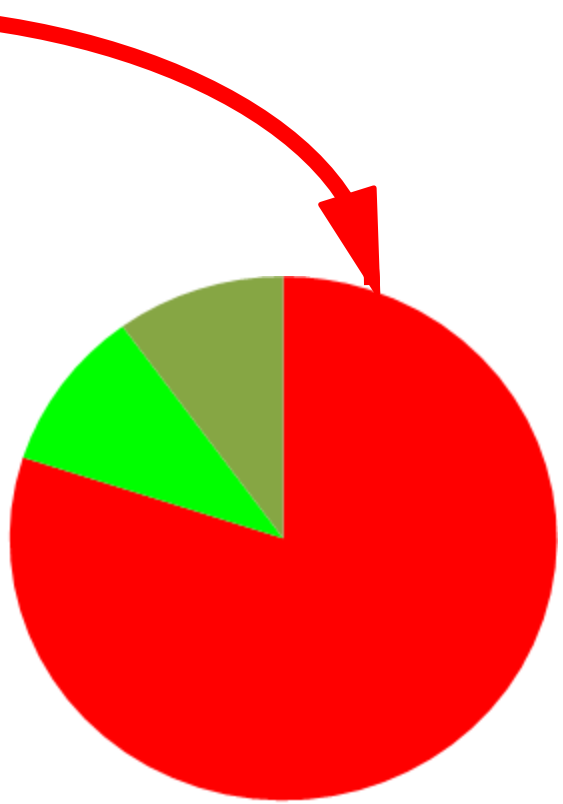


But what is that going to mean?

Endless maize fields

Endless palmoil plantations

„Bio-fuels“?

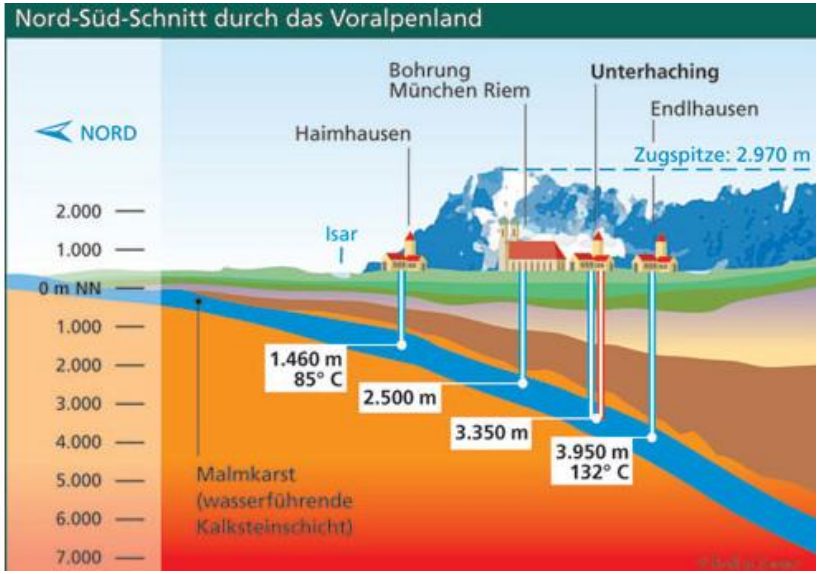
They are becoming an ecological nightmare!

…how about solar, wind, hydro or geothermal? They are fine in small sizes but can be nasty in large quantities.

PV as large as airports? (Saxony, Germany)

Wind turbines,- do you want such neighbours?

Hydrodams? Always big conflicts .



Geothermal? As deep as the Alps are high…

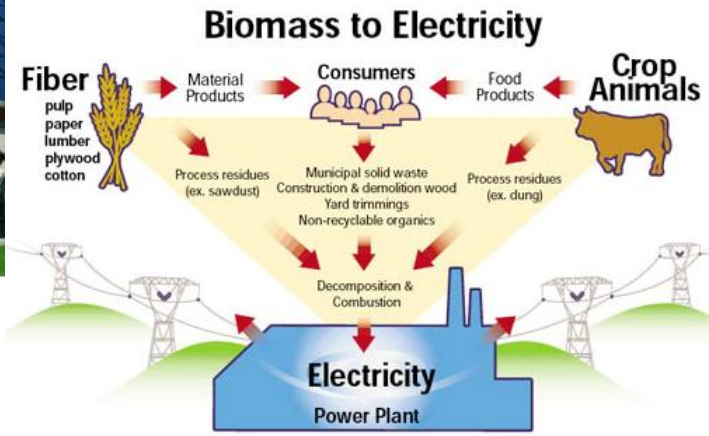
Of course, we need a lot more renewable energies, - but only where they are ecologically benign!

Offshore wind energy

source: siemens.com

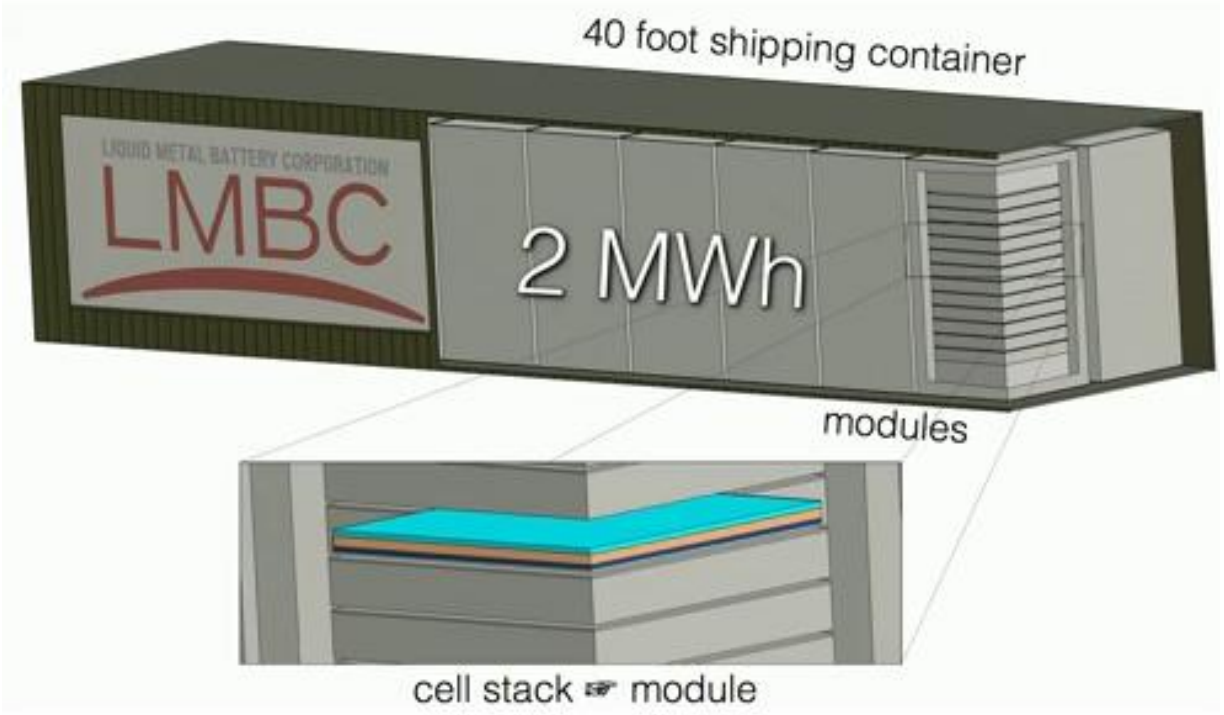
PV on the roof

Source: abendblatt.de



Source: California Energy Commission

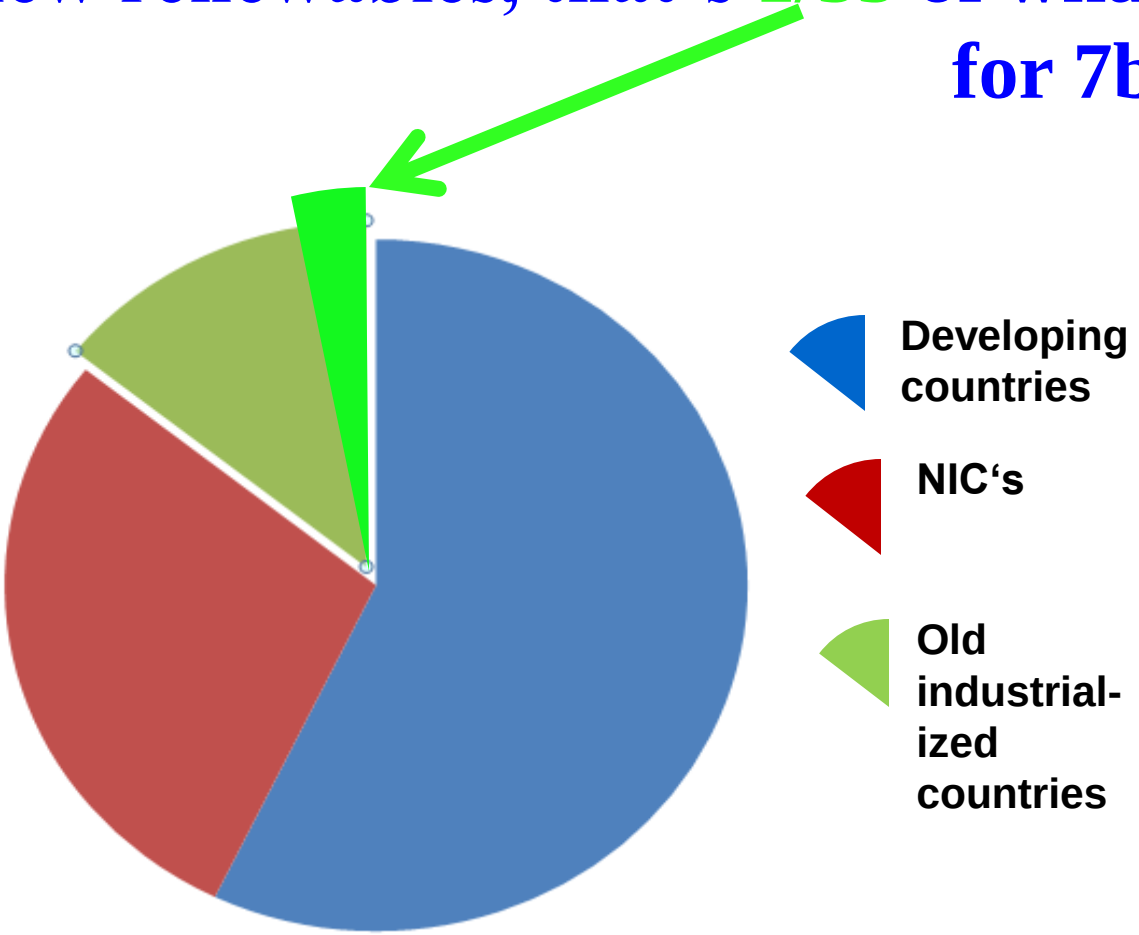
Regarding power storage, pumped storage of hydropower is not the only solution. Donald Sadoway from the MIT developed a mega battery using molten salt and metals.



10 such batteries could do the job of a medium sized lake!

TIME, on 30. April 2012: named Sadoway among the 100 most influential people living!

Let‘s calculate: if 1b people (the rich) achieve 20% new renewables, that‘s 1/35 of what you would need for 7b people on earth.

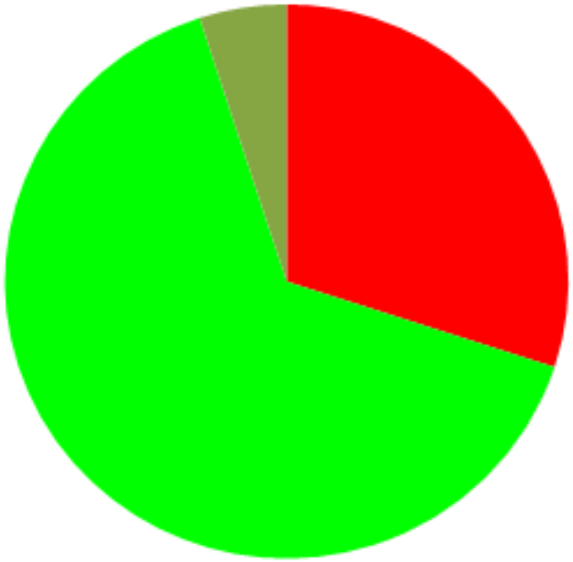


And now imagine a 35fold increase of today‘s biofuels plantations, wind power, hydropower, solar power. It‘s an ecological nightmare!

Avoiding such nightmares could mean:

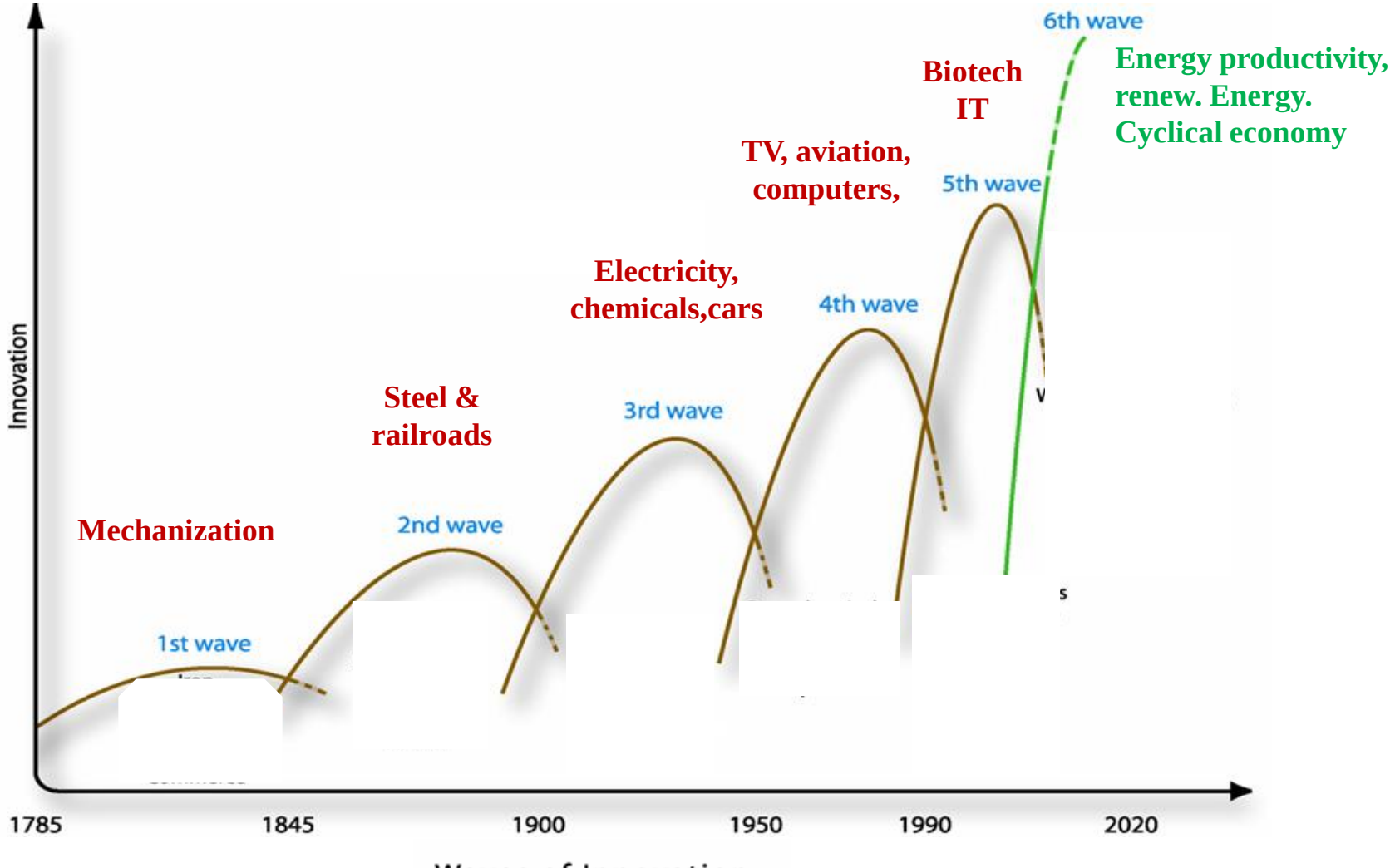
- **30% Less CO_2 in energy**
- **65%: Less energy in wealth**
- **5%: Less wealth**

100%



That is still a 5 – 10-fold increase of renewables, but at the core it's a new technological revolution! That's what we should go for!

In other words: a Green Kondratiev Cycle, after five brown Cycles.



Is „big efficiency“ possible?

Yes, it is

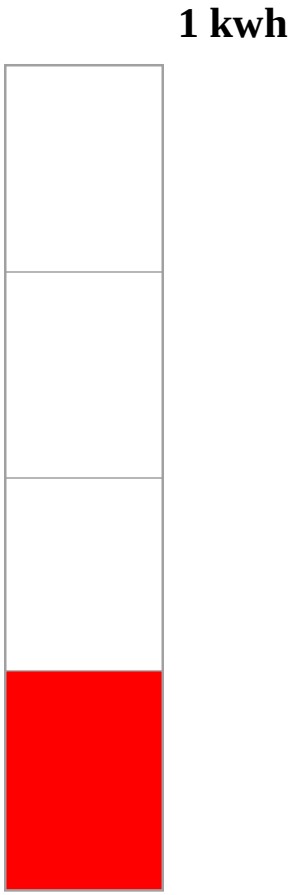
Imagine a bucket of water of 10 kg weight

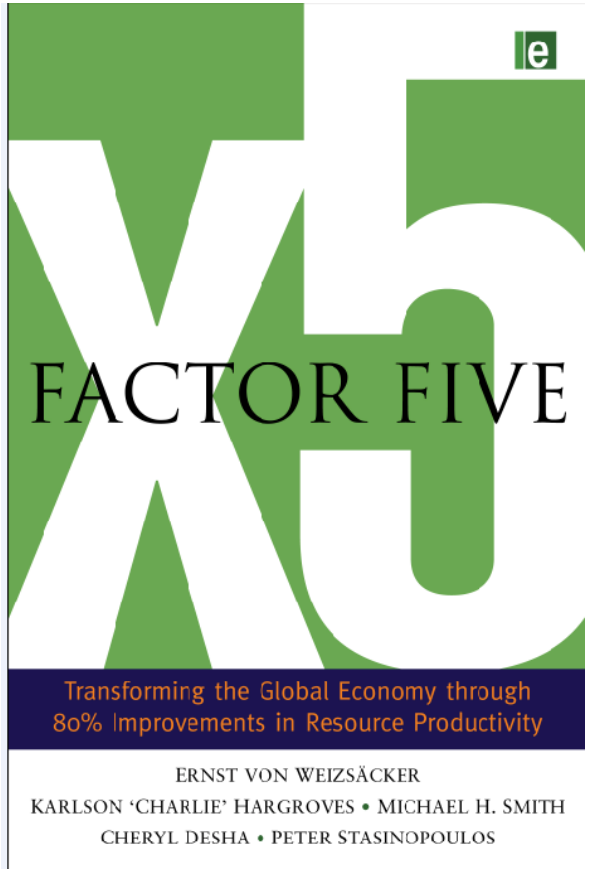
How many Kilowatt-hours

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

The answer is:
One quarter of a kilowatthour!

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





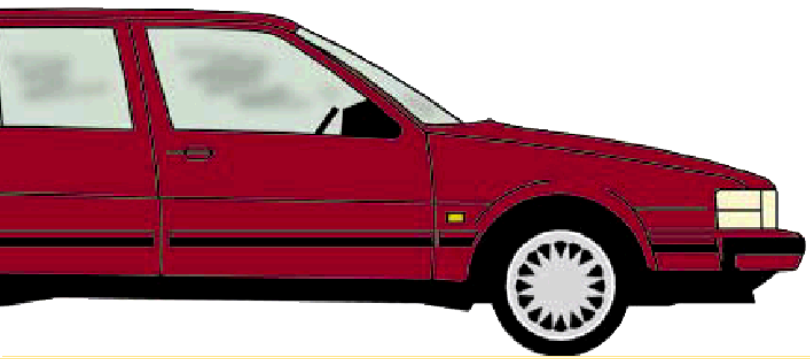
December 2009 **March 2010** **October 2010**

That‘s behind the philosophy of„Factor Five“

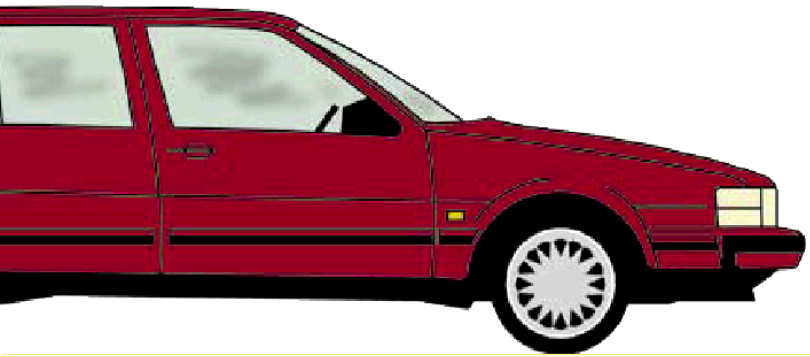
Superefficient cars

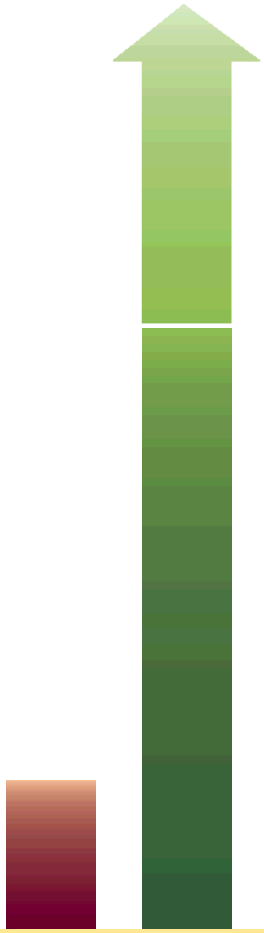
Amory Lovins' "Hyper-car"
< 1,5 l/100km

Today's fleet
6-12 l/100km



CO_2-reduction: electric cars fueled by wind power.





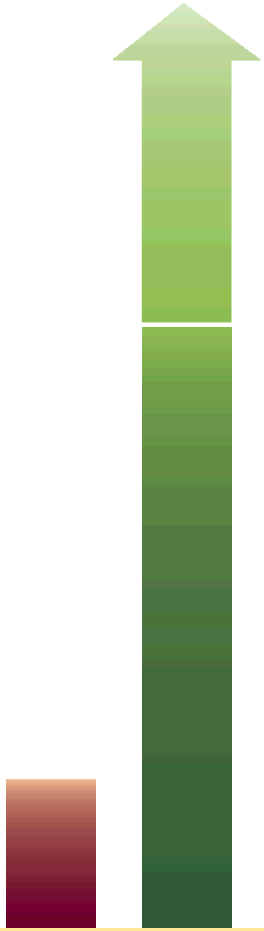
CO_2-Efficiency

…or use „pedelecs“ for city transport

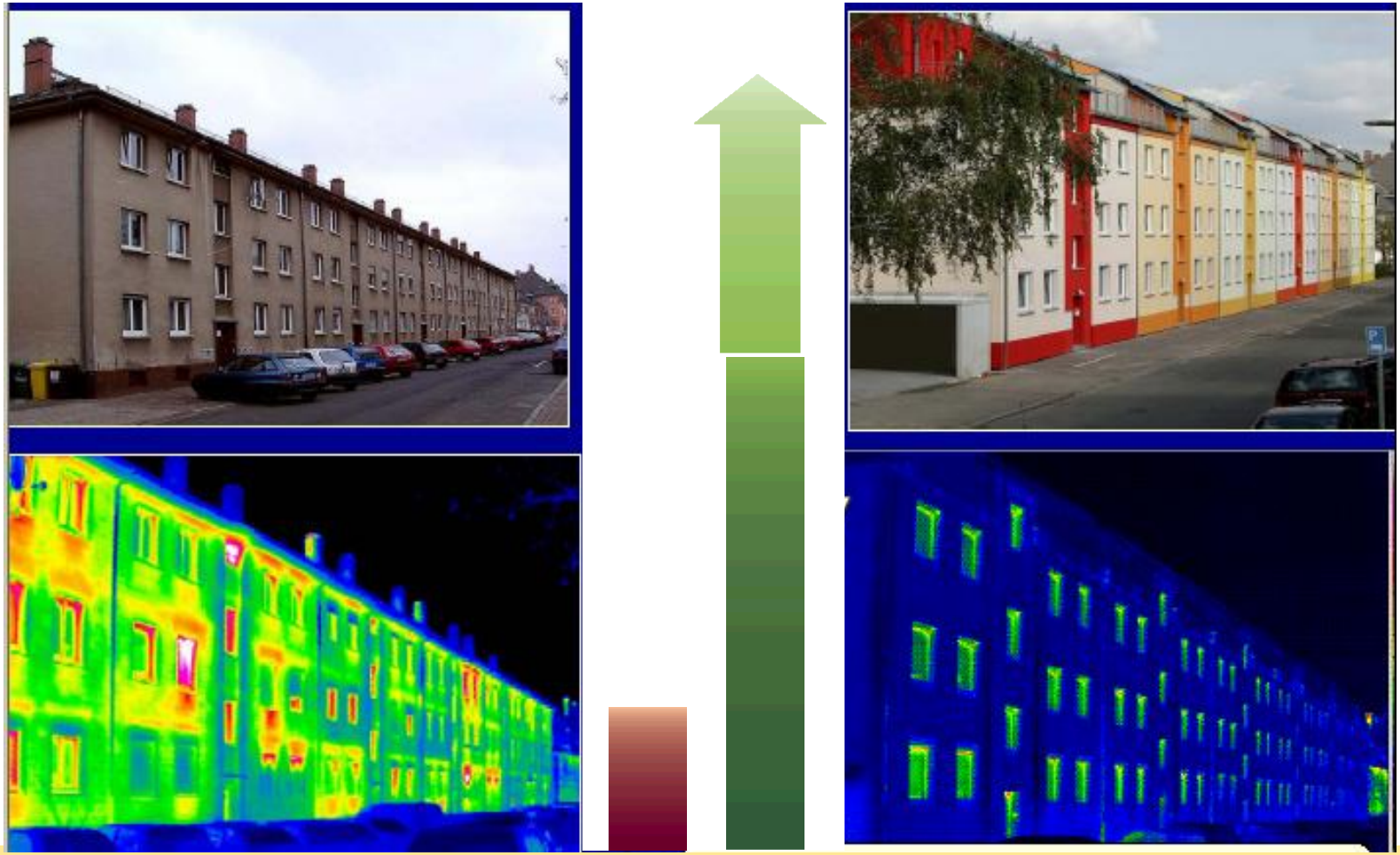
(like Tübingen‘s Lord Mayor Boris Palmer does)

Energy and space efficiency

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

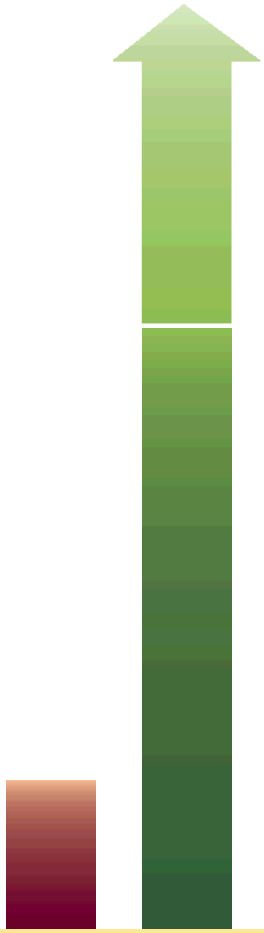


Refurbishing existing buildings



Above photos
Below: thermographs

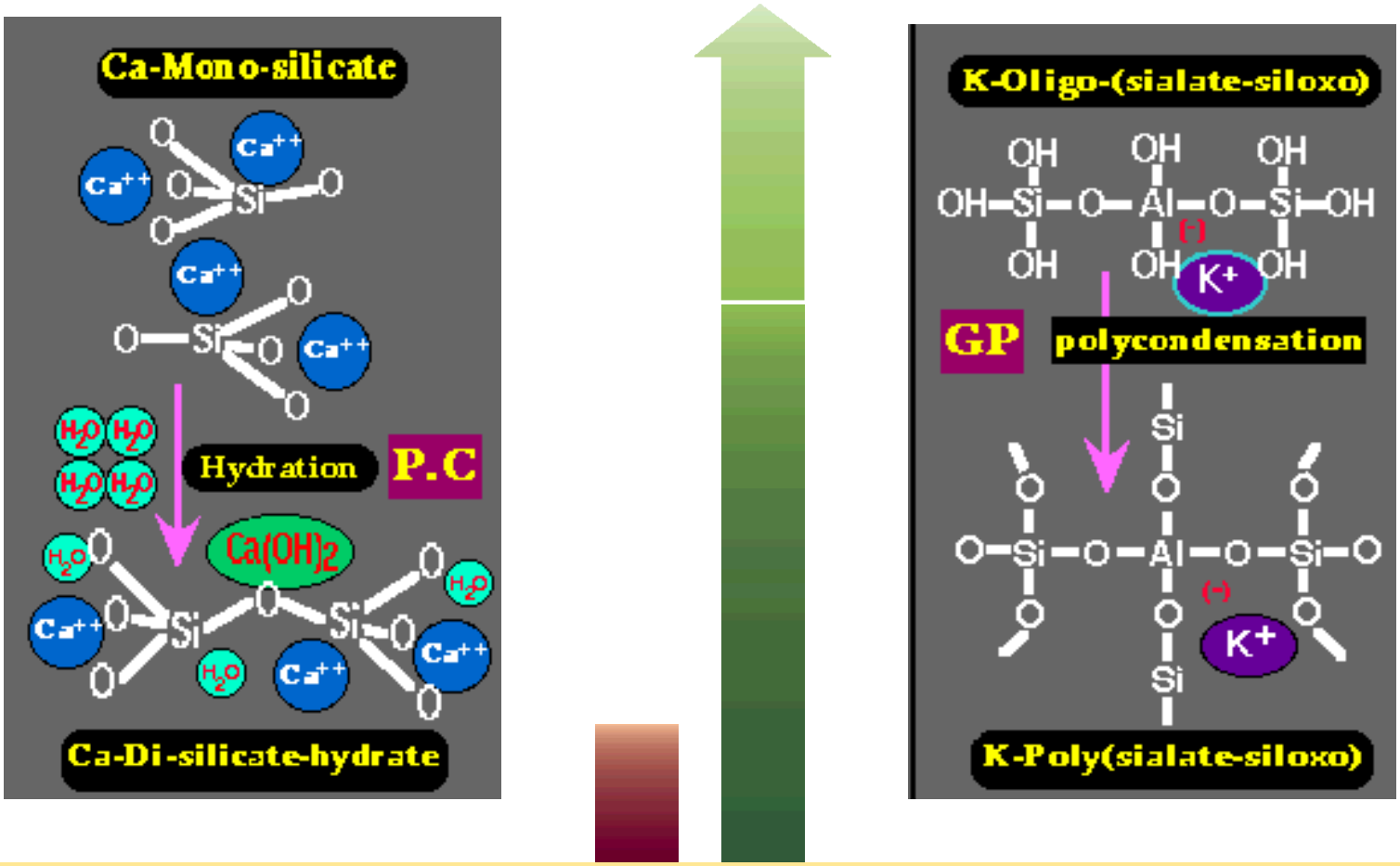
LED replacing incandescent bulbs: a factor of 10



Philips 7W Master LED

Energy efficiency

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



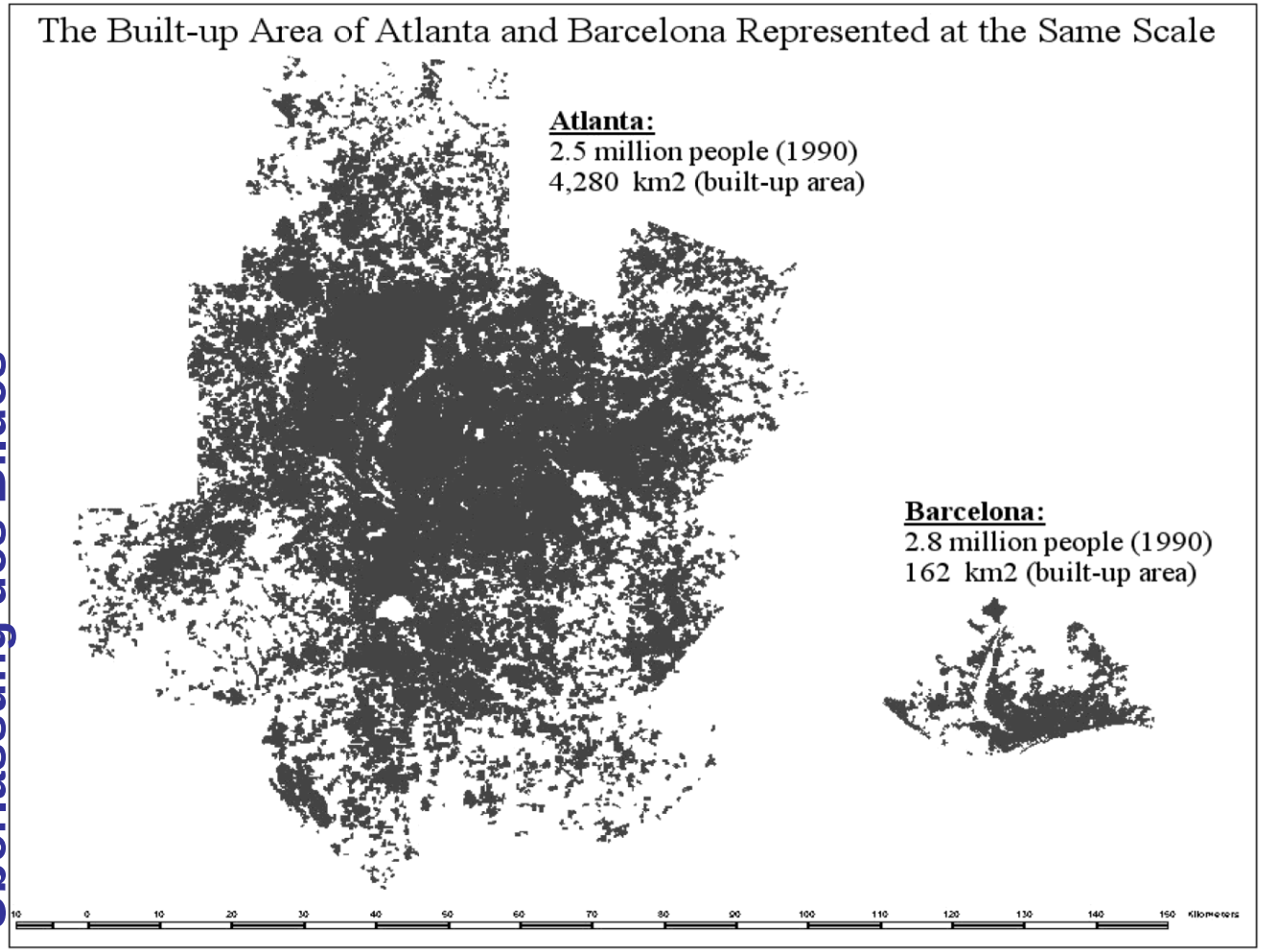
City structure

USA

Energy and space efficiency

Copenhagen (above)
Freiburg , Vauban (below)

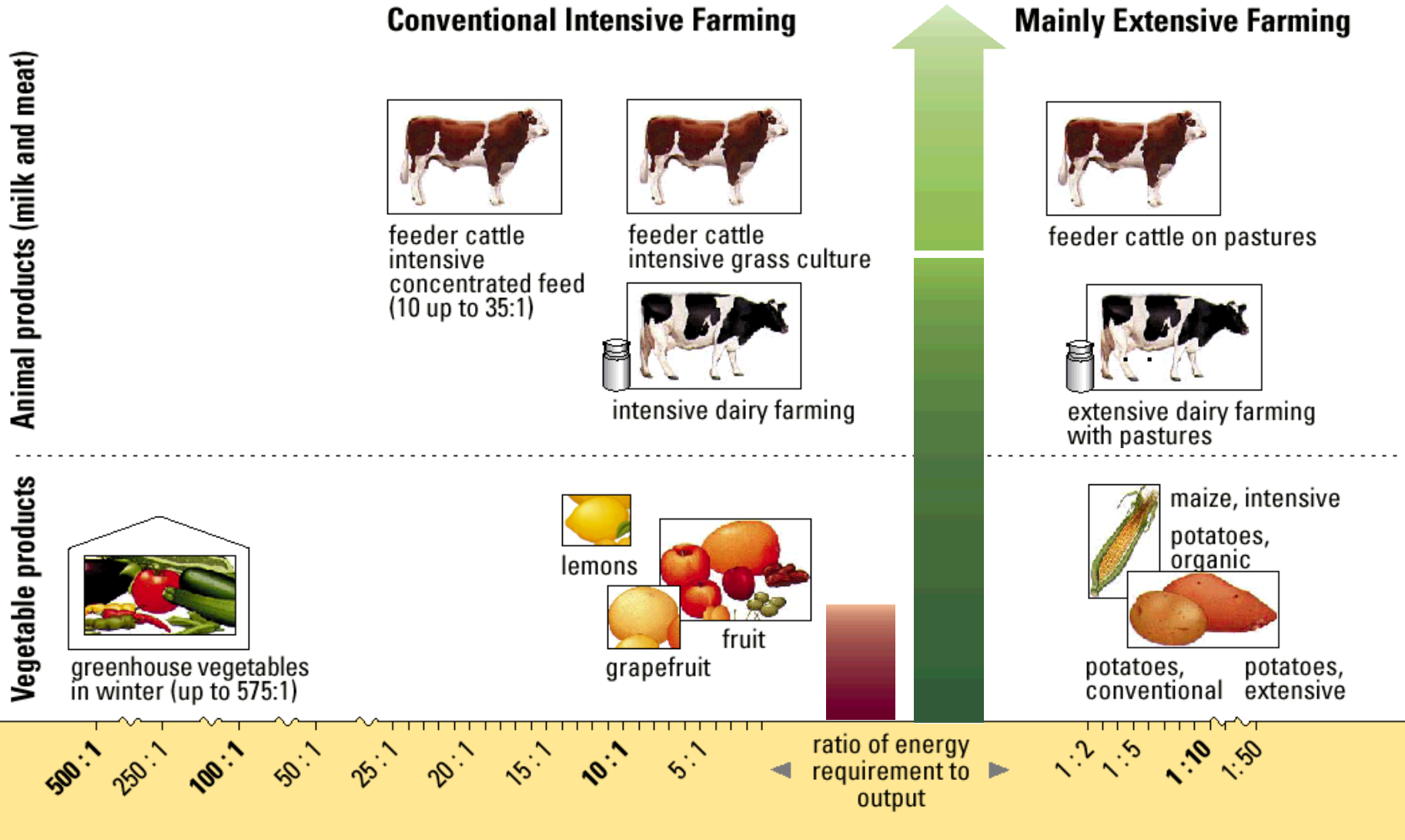
Atlanta is 25 times larger than Barcelona, but has a smaller population



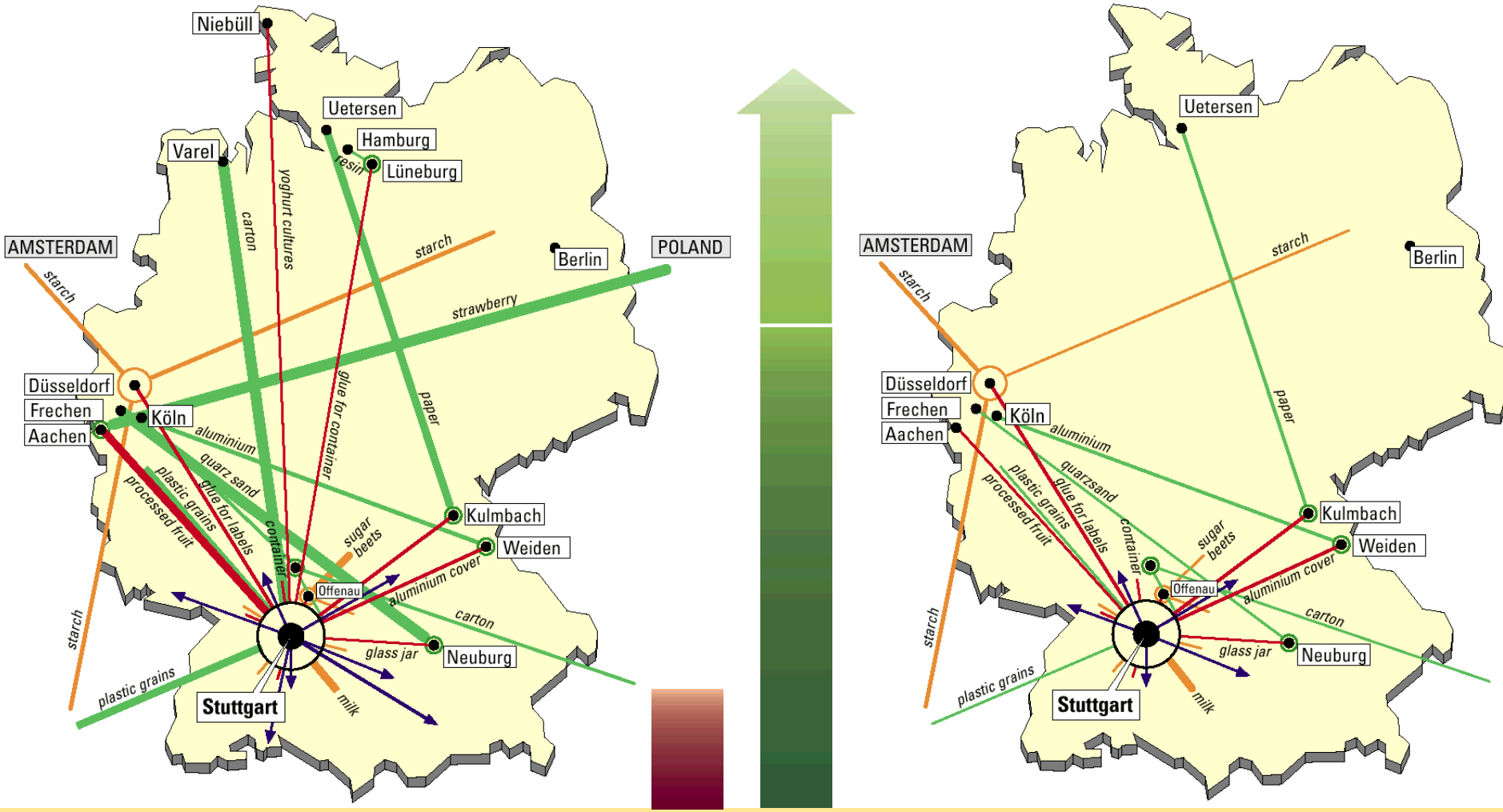
Ich danke Geoffrey Heal für die Überlassung des Bildes

From endless business travel to telepresence meetings

Seasonal diets, organic farming, a little less beef



Overcoming crazy logistics (e.g. for strawberry yoghurt)



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

Aluminium recycled instead of from bauxite

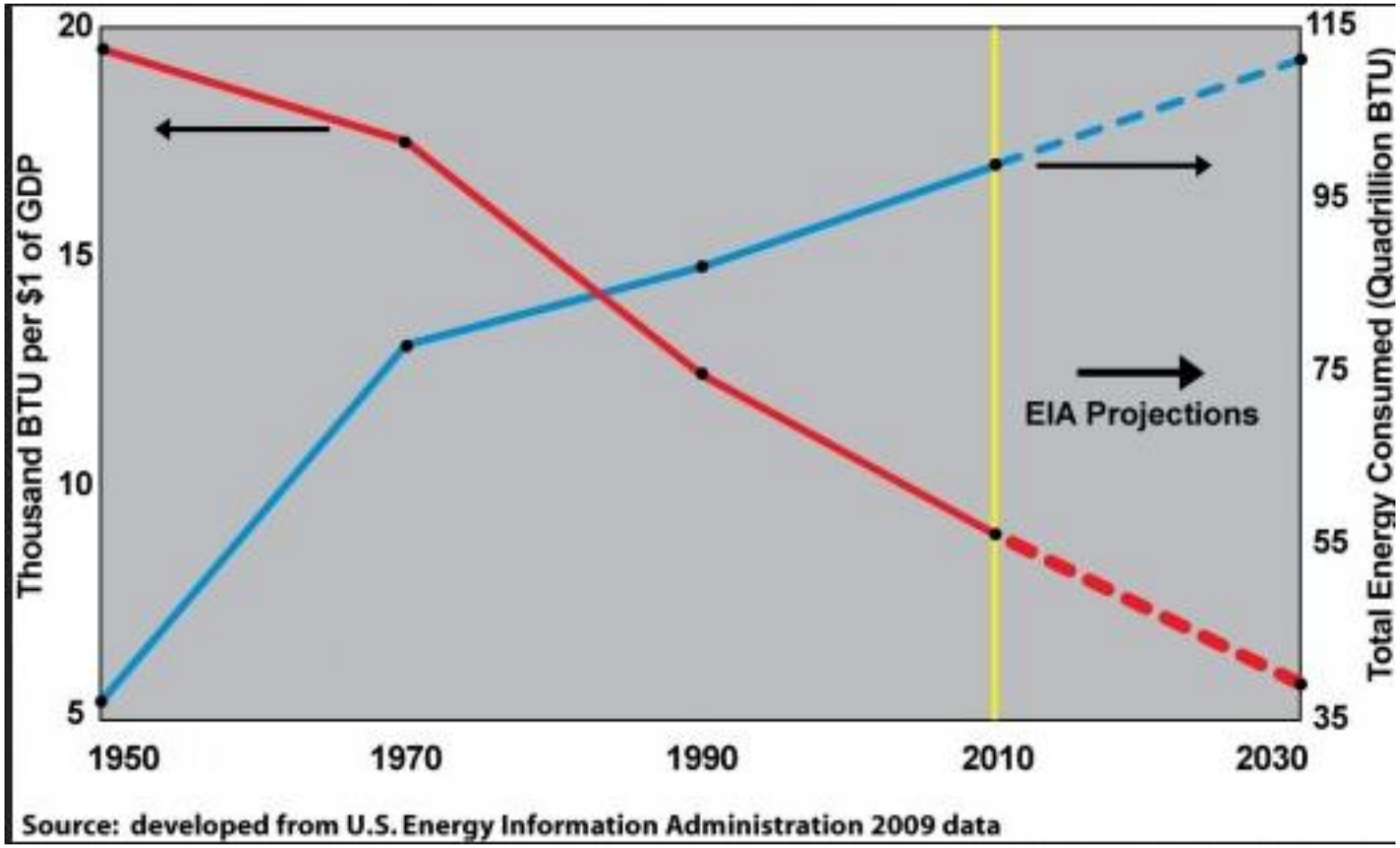
Source: www.pitoipa.de

Energy & material efficiency

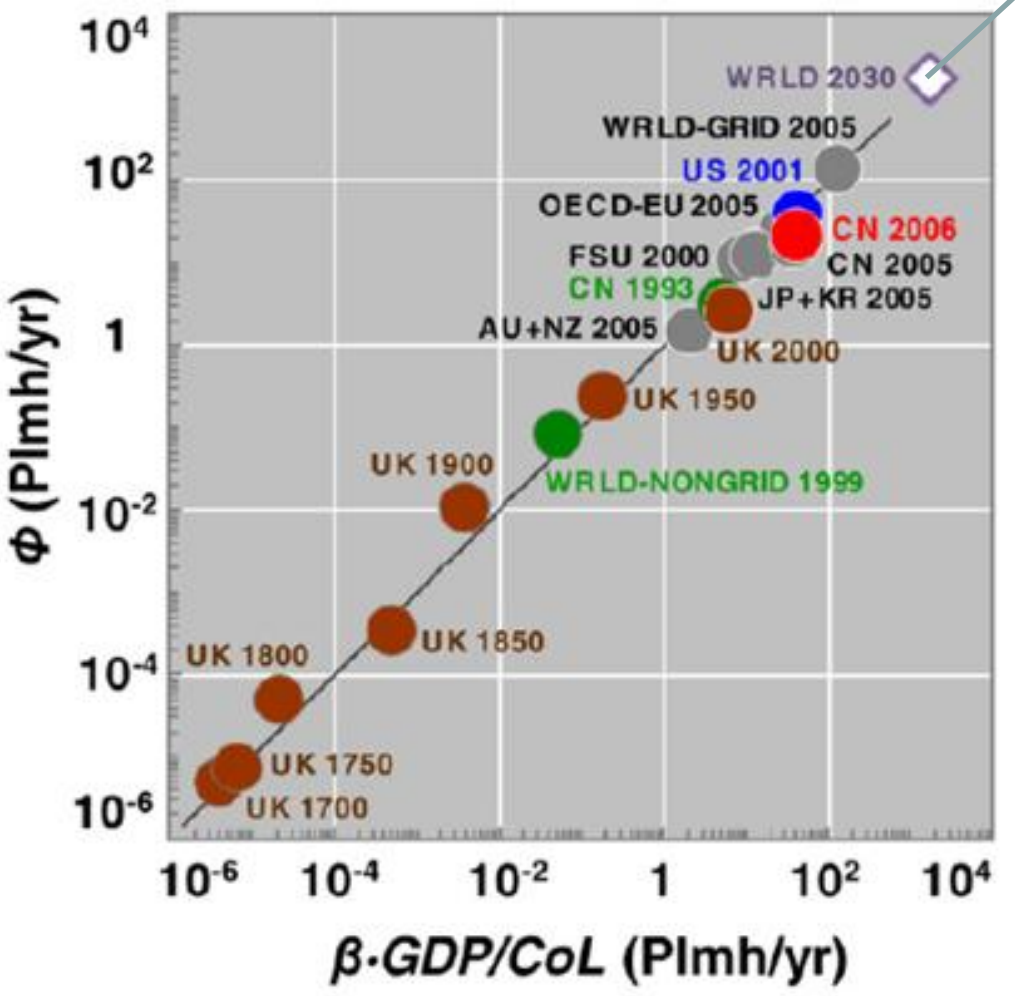
Efficiency alone will never solve climate and resource problems. Remember the Jevons Paradox

William Stanley Jevons in The Coal Question (1865) showed that coal consumption skyrocketed after the discovery and introduction of the then superefficient steam engine by James Watt. (Naively, one would have expected a decline of demand for coal.)

Jevons Paradox is everyday experience in the field of energy. Below are US figures and projections of energy intensity and consumption.



300 year of the rebound effect at lighting

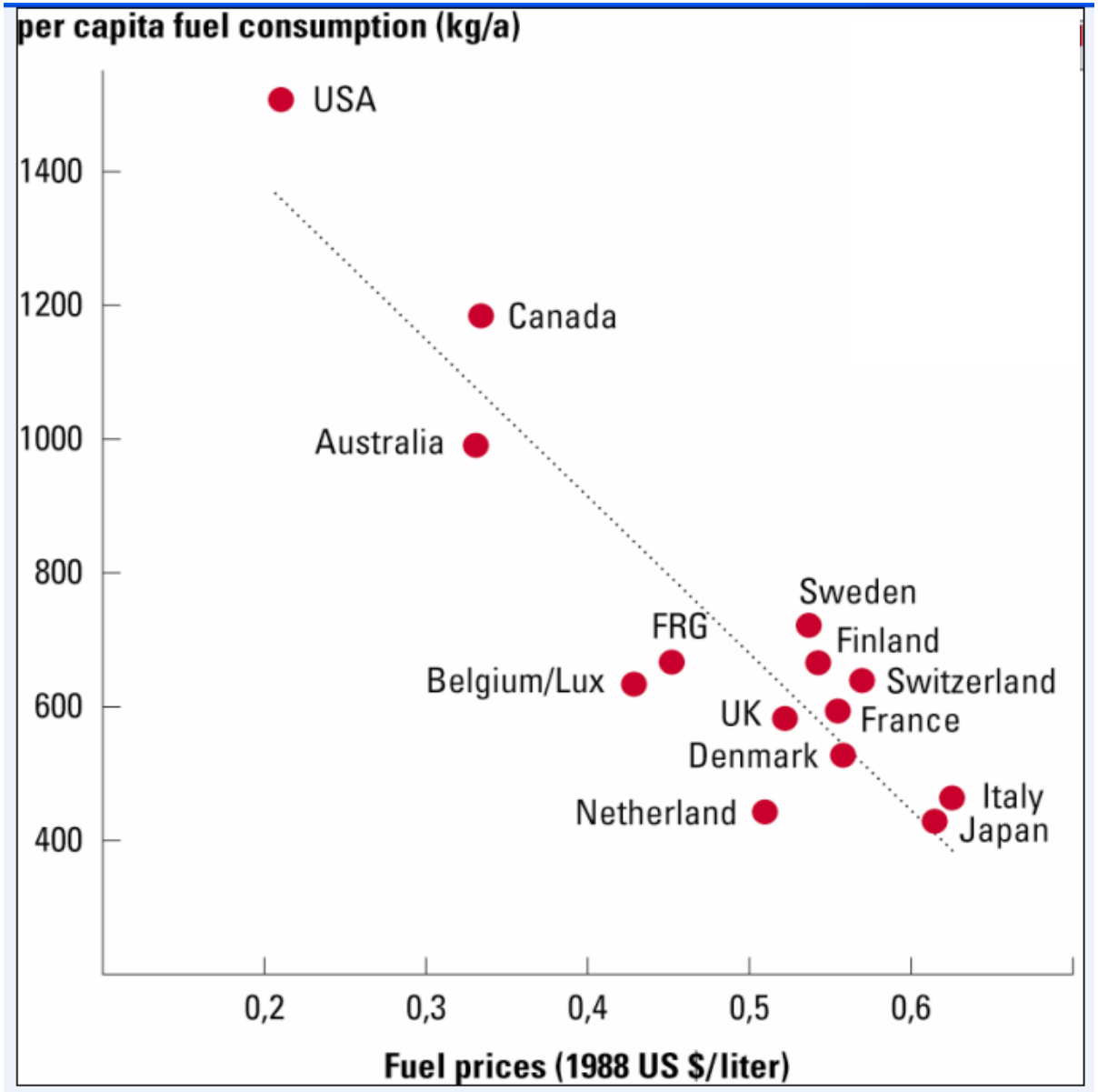


As light gets cheaper (mostly through efficiency), more is consumed!

Source: Tsao et al, 2010

Jevons Paradox (the rebound effect) forces us to think fresh about regulation. Let prices speak, - that‘s the unavoidable conclusion.

Long term price elasticity e.g. of fuel consumption is very high!



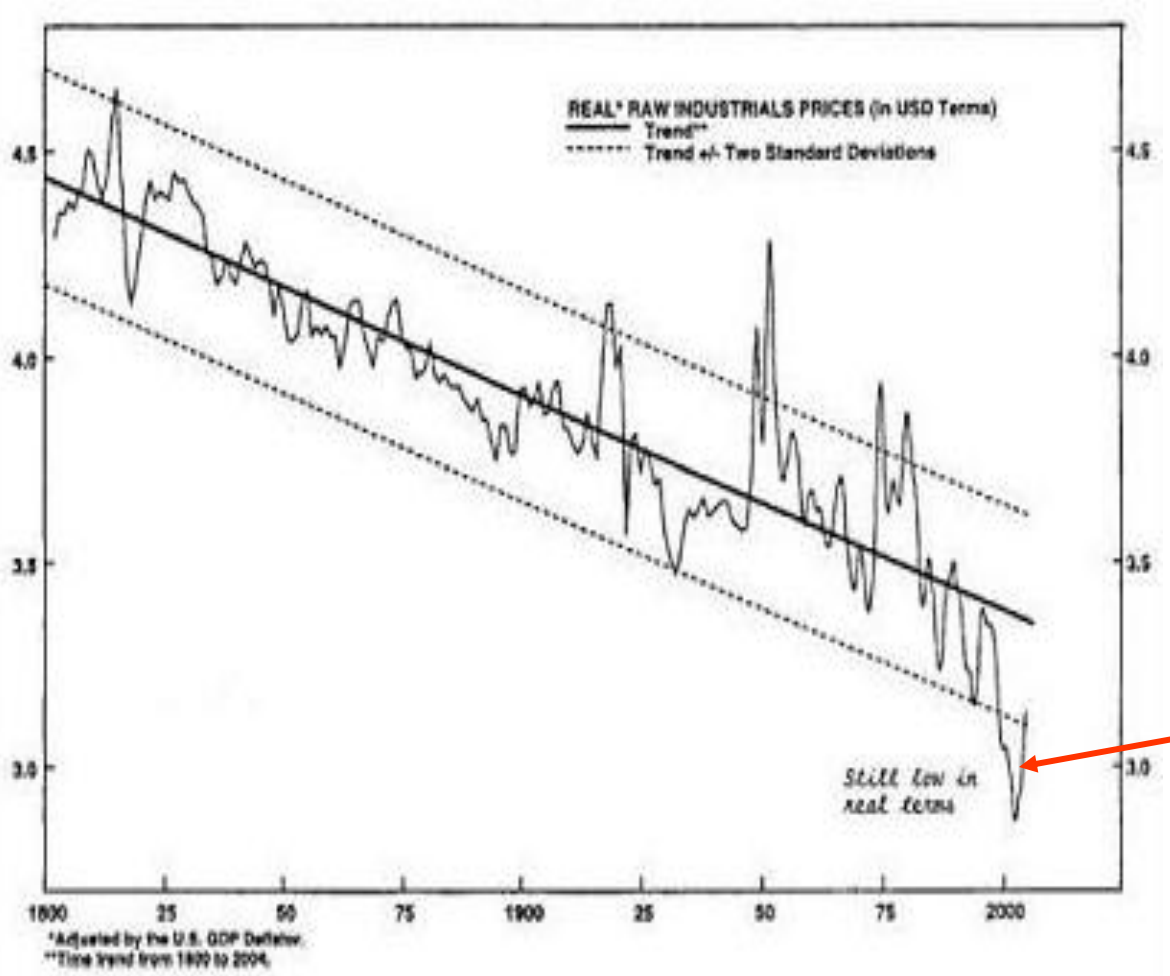
Source: Jesinghaus, in Weizsäcker & Jesinghaus, 1992

What I am proposing, is a political decision to artificially raise energy prices. And do that in parallel with documented efficiency increases, so that average expenses for energy services would remain stable.
(Some low „life-line“ prices can be accepted for the poor.)

That was the „machine“ that moved the Industrial Revolution: Wages rose with labour productivity.

Gross labour cost and labour productivity in the US from 1910 to 1960

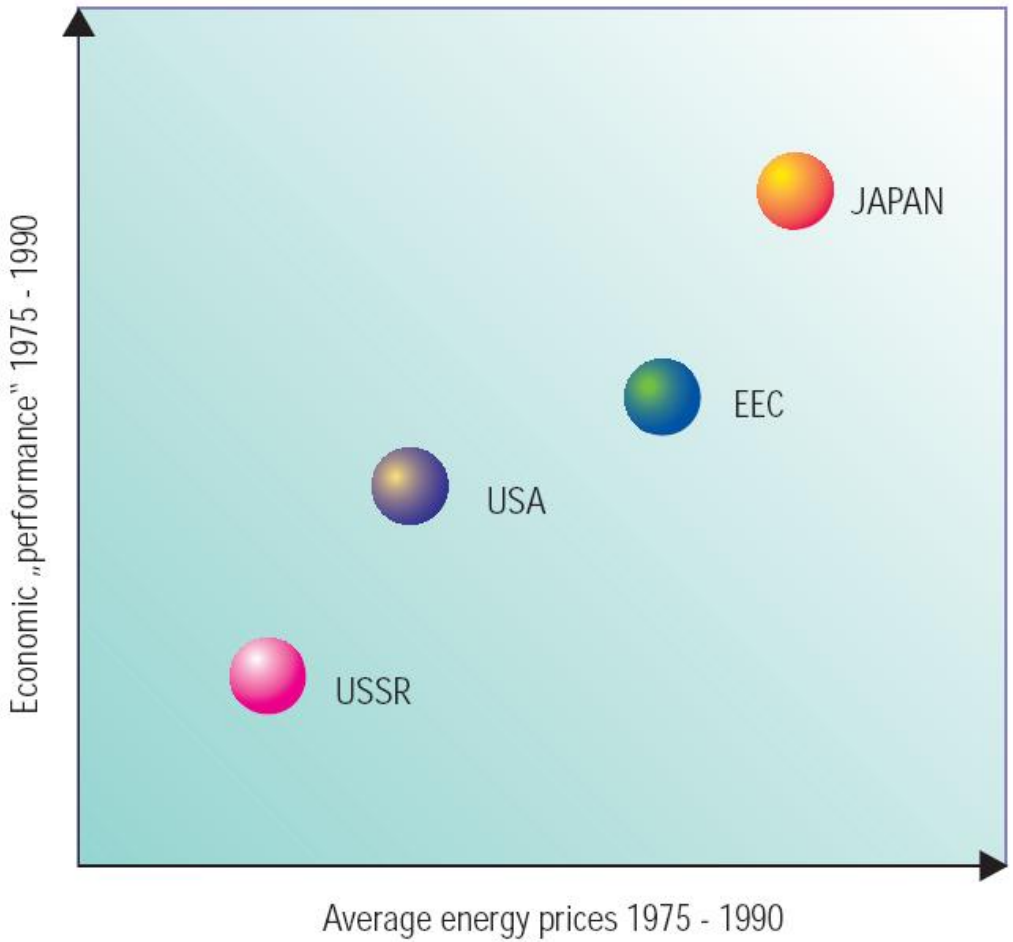
Conversely, energy and mineral cost have been falling over 200 years! Don‘t complain too much about the twelve years after 2000.



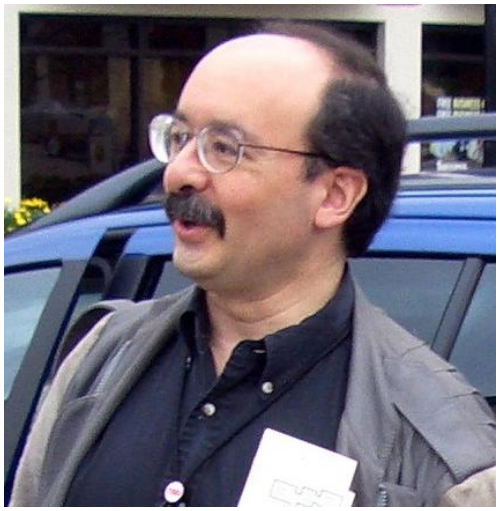
2000-2005

Source: The Bank Credit Analyst

High energy prices need not hurt the economy. Japan blossomed during the 15 years of highest energy prices!



A slightly less controversial idea is Least Cost Planning:



Amory Lovins in the 1970s proposed to make the building of new power plants dependent on the proof that no cheaper solution existed to fill the diagnosed power „gap“. To please the utilities, they would be allowed to take higher prices on a kwh as long the monthly bills were falling.

Stadtwerke Hannover AG

enercity

positive energie

It flourished in California and is now copied worldwide, e.g. at the municipal utility of Hannover („enercity“).

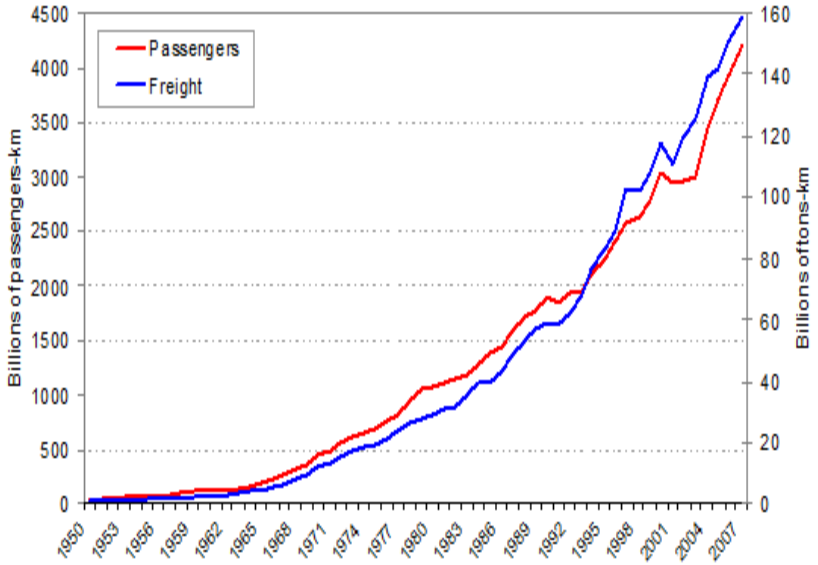
Let us finally turn to sufficiency. Self-sufficiency is mostly seen as an ethical option.

But if economic signals invite you to consume more, you will forget about all ethical vows.

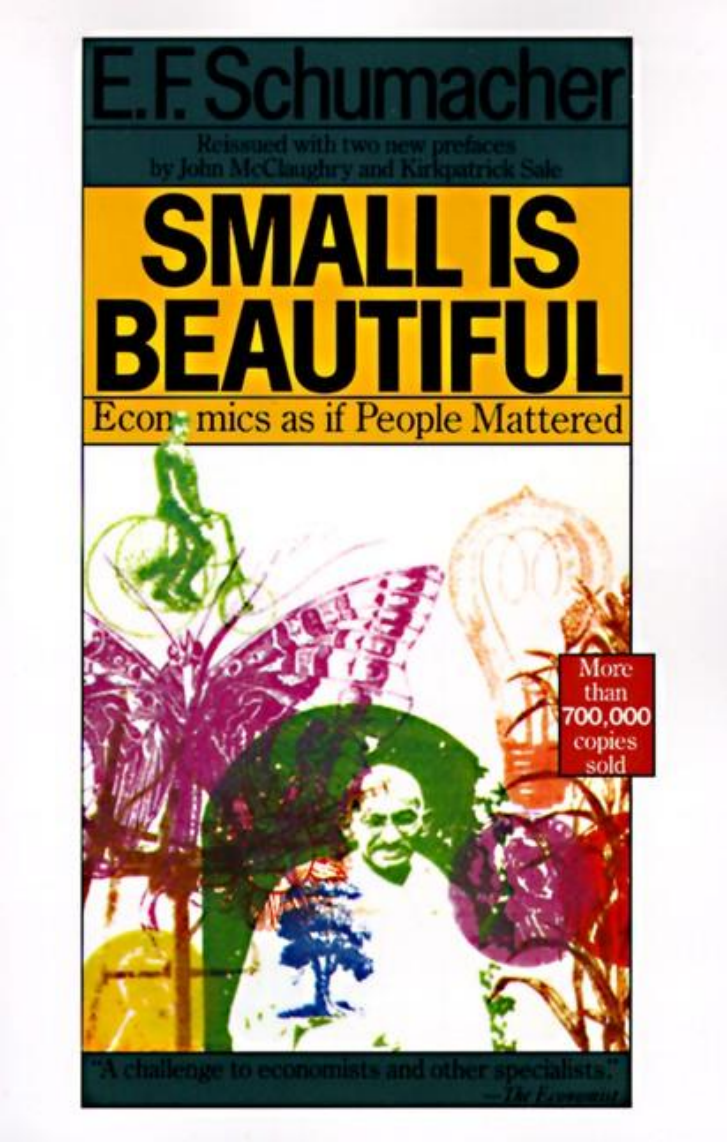
Look at air traffic. It became a mass phenomenon (right) when prices collapsed (left)

Note: Yields of US airlines in international traffic. Domestic figures show similar trends.

(EEA, 2005)



The big suffiency debate started in the 1960s with *Small is Beautiful*



Ernst F Schumacher 1911 - 1977

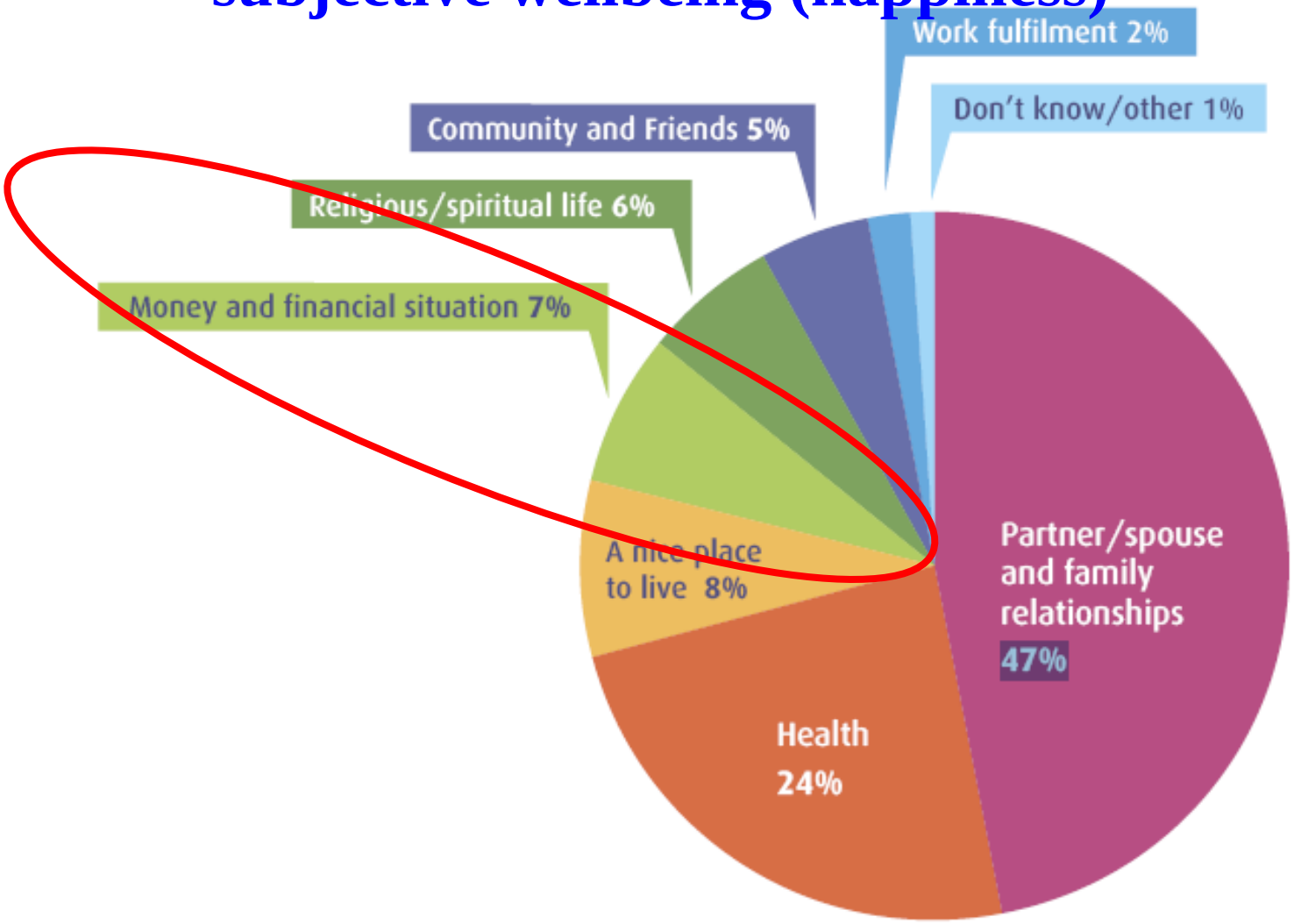
Small is not only beautiful – it‘s tasty!

Growth and size can be dubious yardsticks.

Self-sufficiency literature is booming.

And here is a brand new Swiss compendium of ideas on sustainable households and a sustainable financial order.

Anyway, money is rather a minor factor influencing subjective wellbeing (happiness)



Source: Sustainable Development Commission (Tim Jackson). Prosperity without growth. The transition to a sustainable society. London, 2009. p.31

Let me conclude:

The Alps are georgeous but need protection.

Renewable energies are fine but limited.

A dramatic increase of efficiency is available.

Prices should make efficiency truly profitable.

Sufficiency is great – and will also follow the price signal.

Thank you !