United Nations Forum on Climate Change Mitigation, Fuel Efficiency and Sustainable Urban Transport

16-17 March 2010 Seoul, Republic of Korea

Perspectives for Reducing Resource Use in Urban Transport

Professor Ernst Ulrich von Weizsäcker, Co-Chair

International Panel
for Sustainable
Resource Management

Korea‘s President Lee Myung-bak in 2008 announced his vision for „low carbon, green growth“. And Korea as the host country of the November, 2010 G20 Summit is preparing a

G20 Seoul Initiative

to establish a

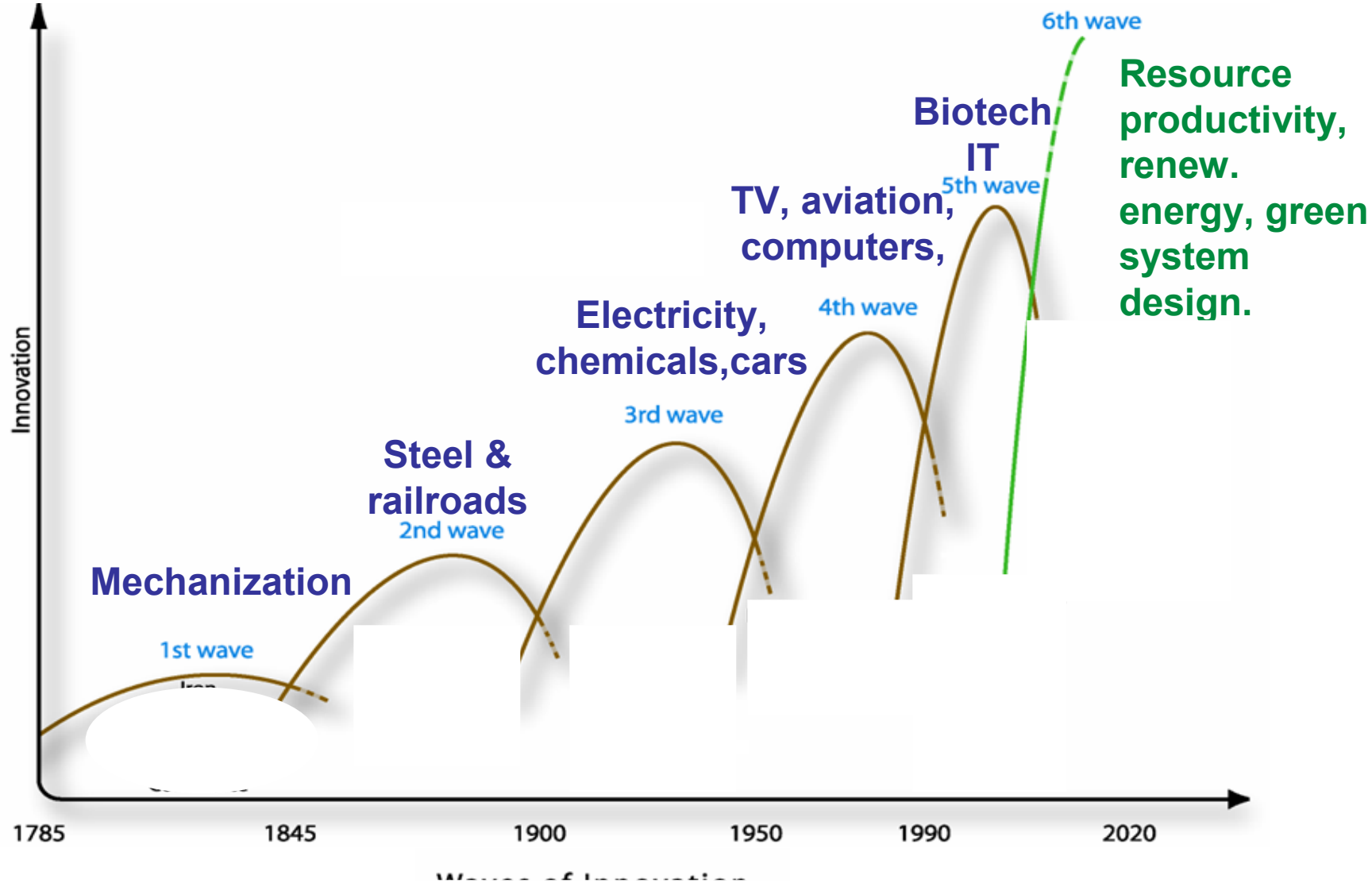
Global Green Order

Source: The Korea Herald, 15 March, 2010, p 4 & 11, „‘G20 Seoul Initiative‘ aims to pave way for global green economic order“, authors: STEPI G20 Research Team, Lim Ki-chul et al.

This is excellent news for Korea and for the world. It resonates well with ideas Charlie Hargroves has put forward five years ago when postulating a „green Kondratiev Cycle“

The next Kondratiev Cycle should be “green”

(after Charlie Hargroves, Brisbane, Australia)



As a matter of fact, we have no other choice. Another expansionist cycle, intending to lead 7 billion people into US lifestyles is bound to ruin the basis of life on earth.

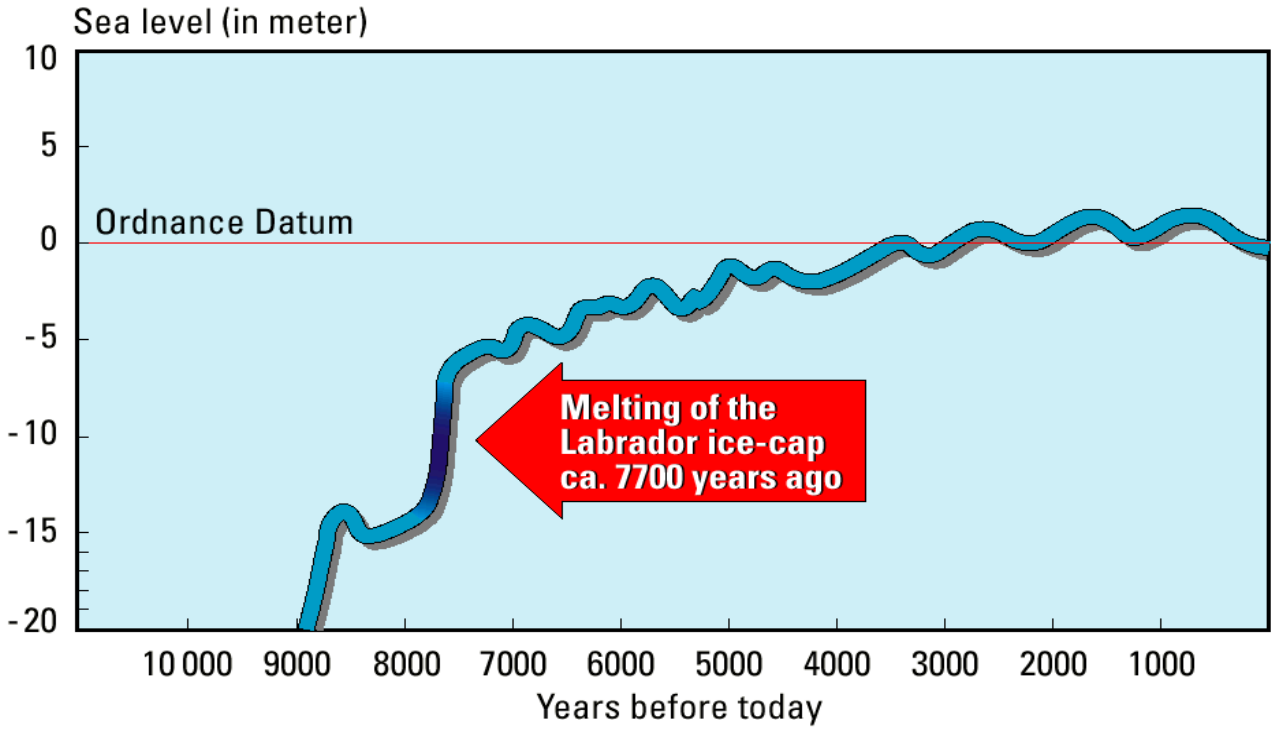
And accelerated carbon burning spells disaster for our coastlines:

Italy during the last ice age (20 000 years ago)

.... and during the last hot period (2 million years ago)

today's coast line

Disintegration of the Labrador ice shield: sudden rise in sea level



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

Are we now doing the same with Greenland?
Fresh-water cover in summers 1992 and 2002

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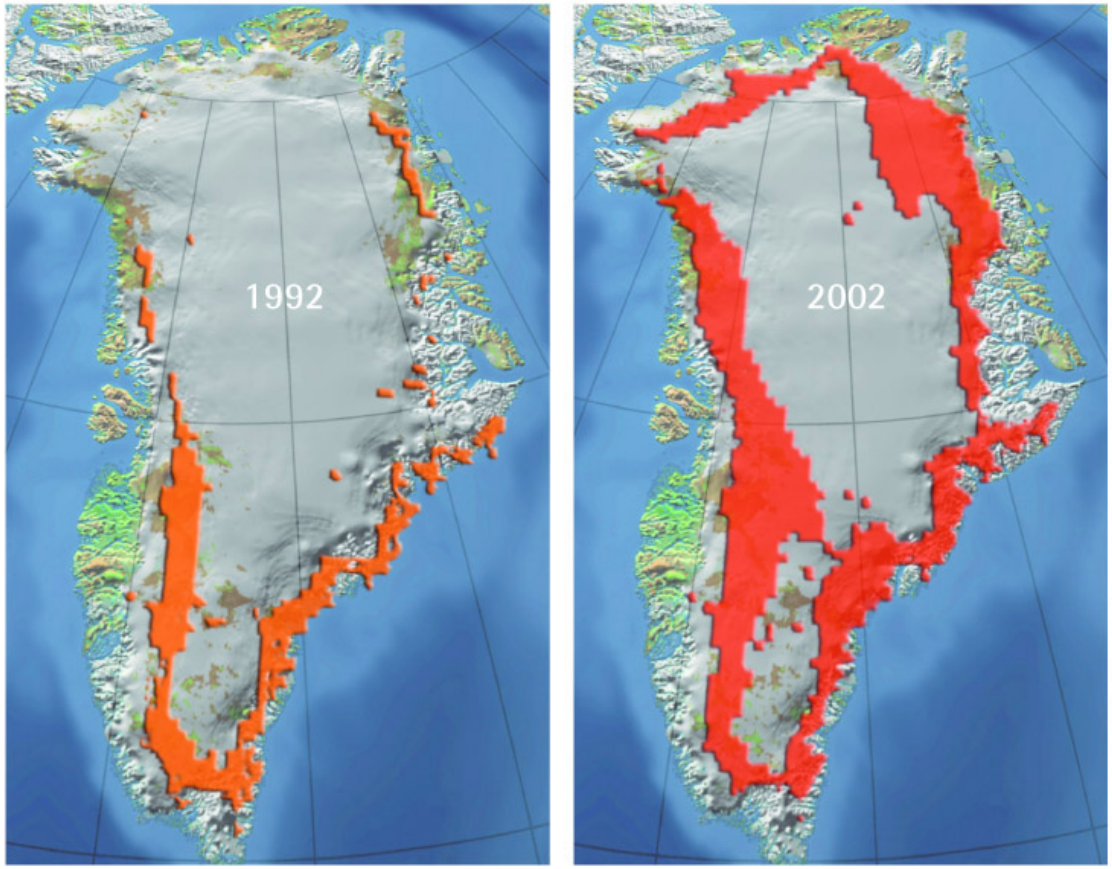
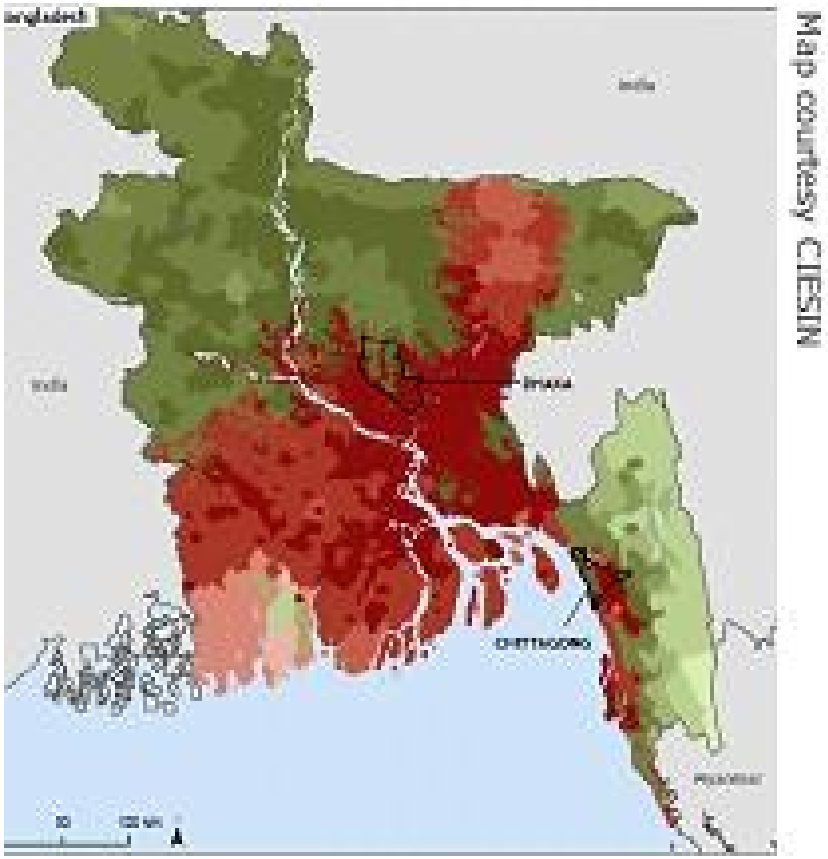
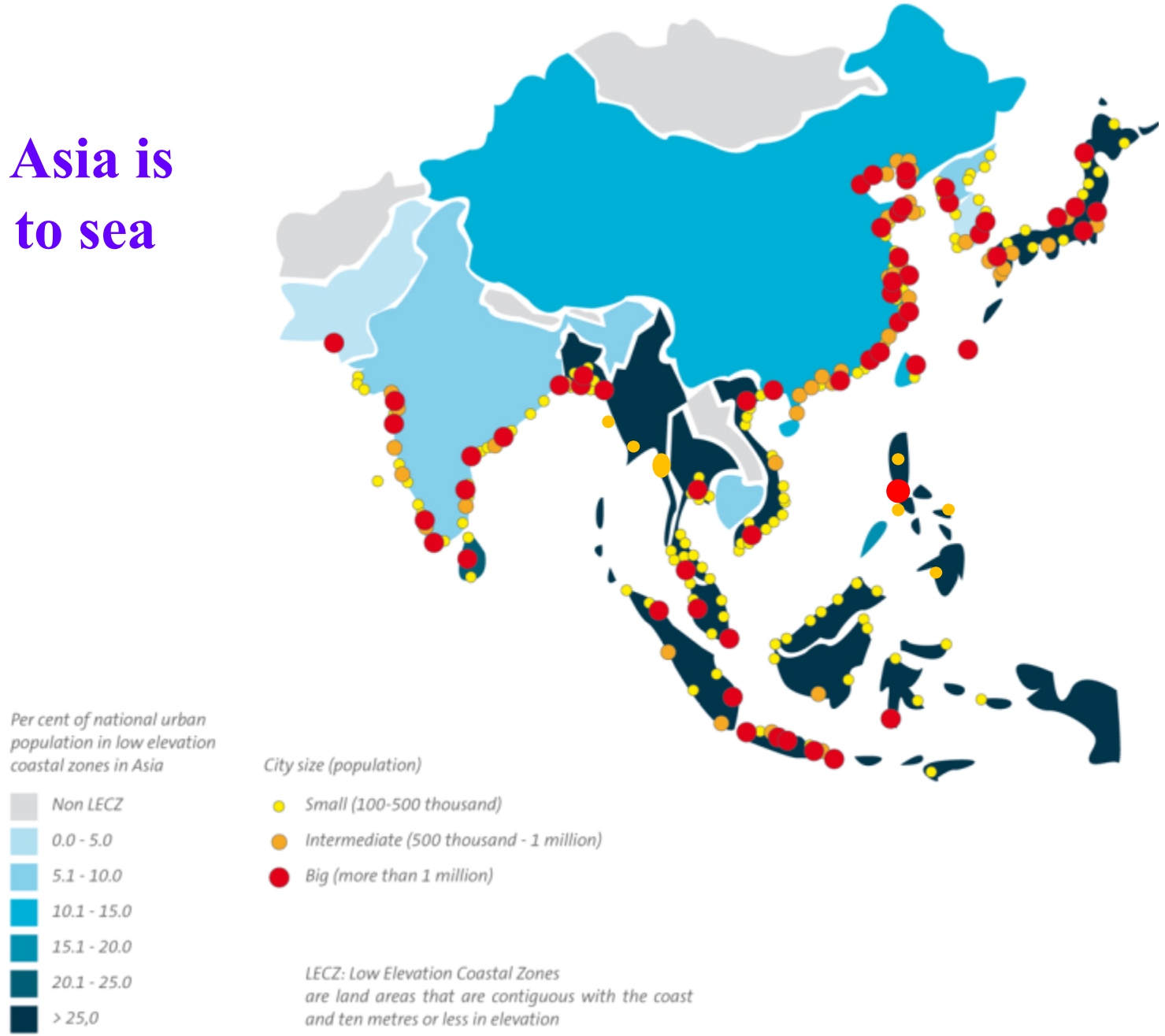


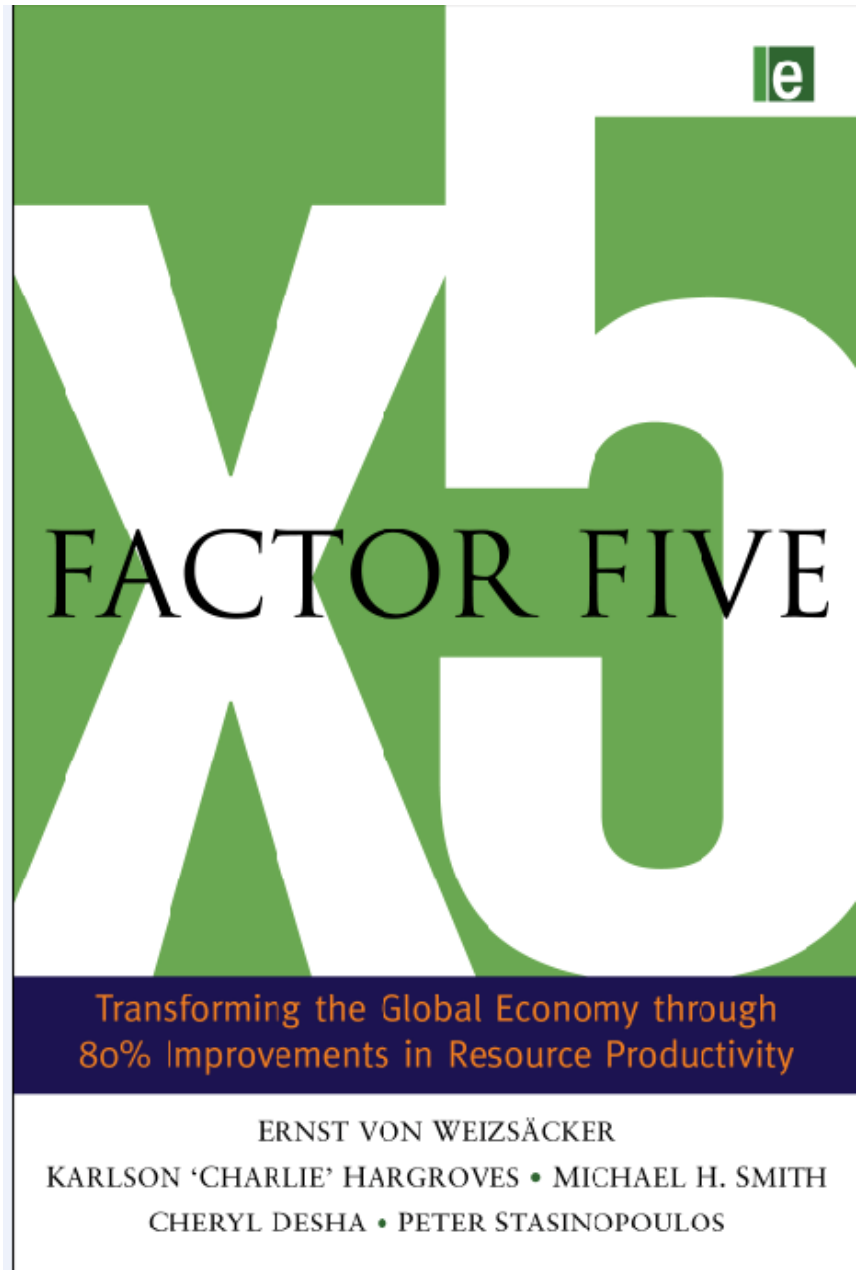
If the Greenland ice disintegrates, half of Bangladesh would be gone



Map courtesy CIESIN

Generally, Asia is vulnerable to sea level rise





The Kondratiev picture became a centrepiece of „Factor Five“, published in December 09. The book also contains a major chapter on transport, written by Charlie Hargroves and his TNEP team from Brisbane.

An updated German edition came out last week, and the Chinese edition is due in August 2010.

Charlie Hargroves will cover the technical side and some planning aspects while I shall mostly address

the policy side.

As an intro to policies, let me offer an interpretation of the origins of the 2008 Wall Street meltdown.

The real reasons go far beyond greedy bankers‘ mischief. They have to do with transport, chiefly urban transport, in the United States of America

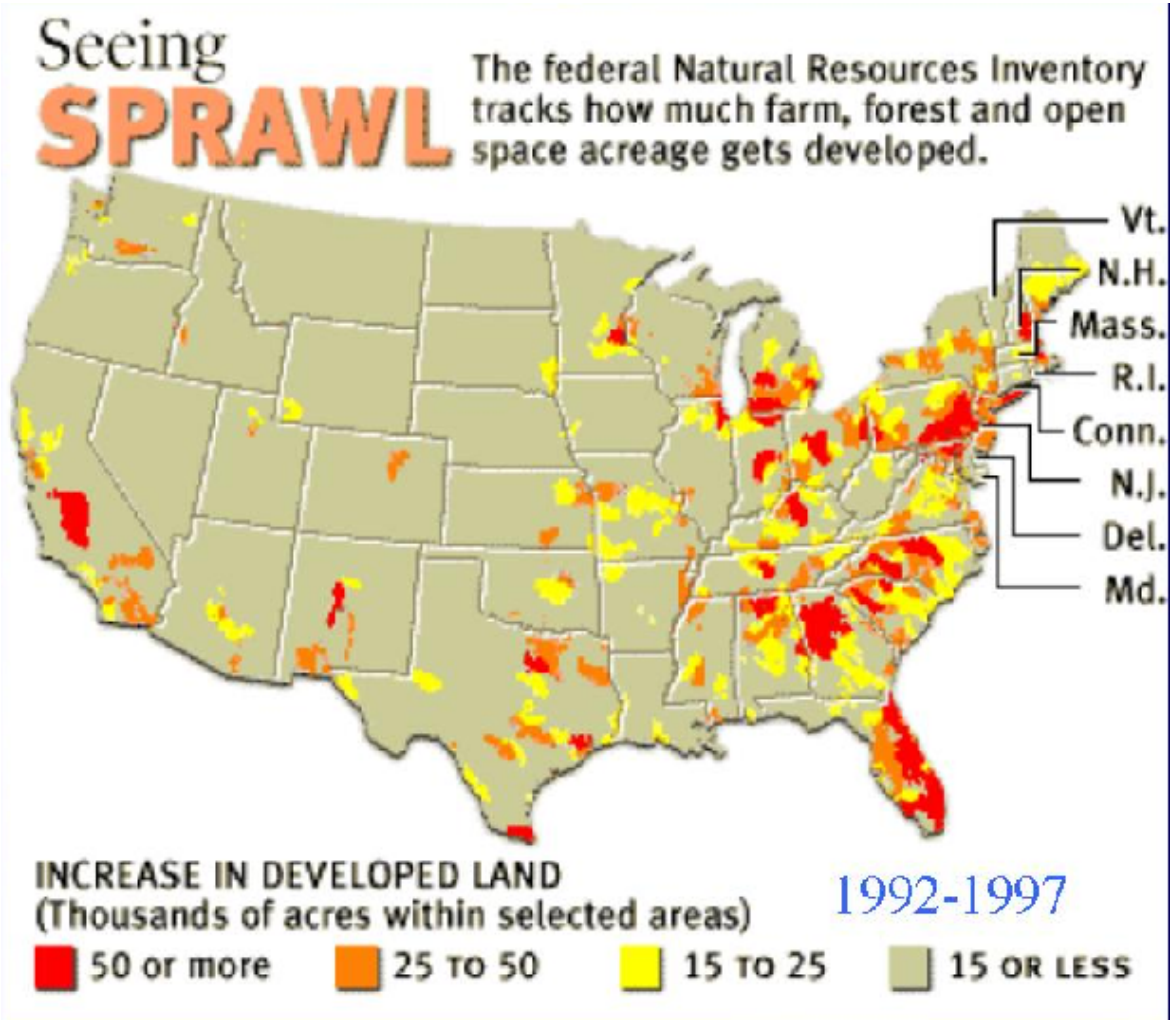
Mid 1980s: Tumbling oil prices and opposition in the USA to gas taxes created an optimistic feeling of ‚cheap gas forever', leading to

• the creation of a new car fleet, the gas guzzling SUV's, and Hummers;

• accelerated urban sprawl and a near doubling of typical commuter distances.

The Hummer H1, a fortress on wheels, and a gas guzzler

5 out of 25 years of aggressive urban sprawl



Source: Anand Prasad, US Forest Service, 2002
aprasad@fs.fed.us

And then came 2007. Oil prices skyrocketed.

Long distance commuting became a nightmare

Houses lost value

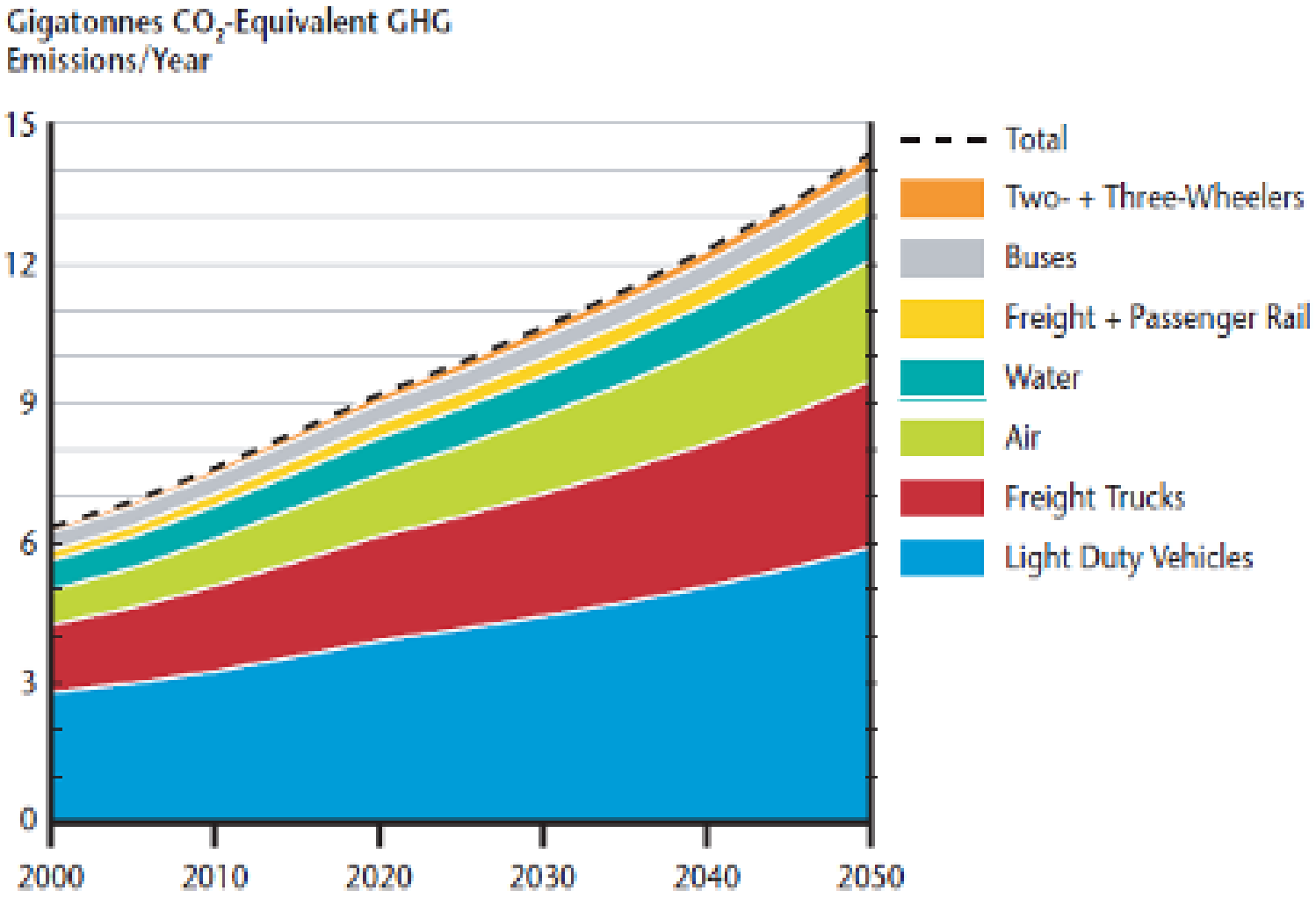
Mortgage loans above home values got non-performing

Collapse or nearly of Fannie Mae, Freddie Mac, Countrywide and later Bear Stearns, Lehman Bros., Merryll Lynch, AIG, General Motors etc.

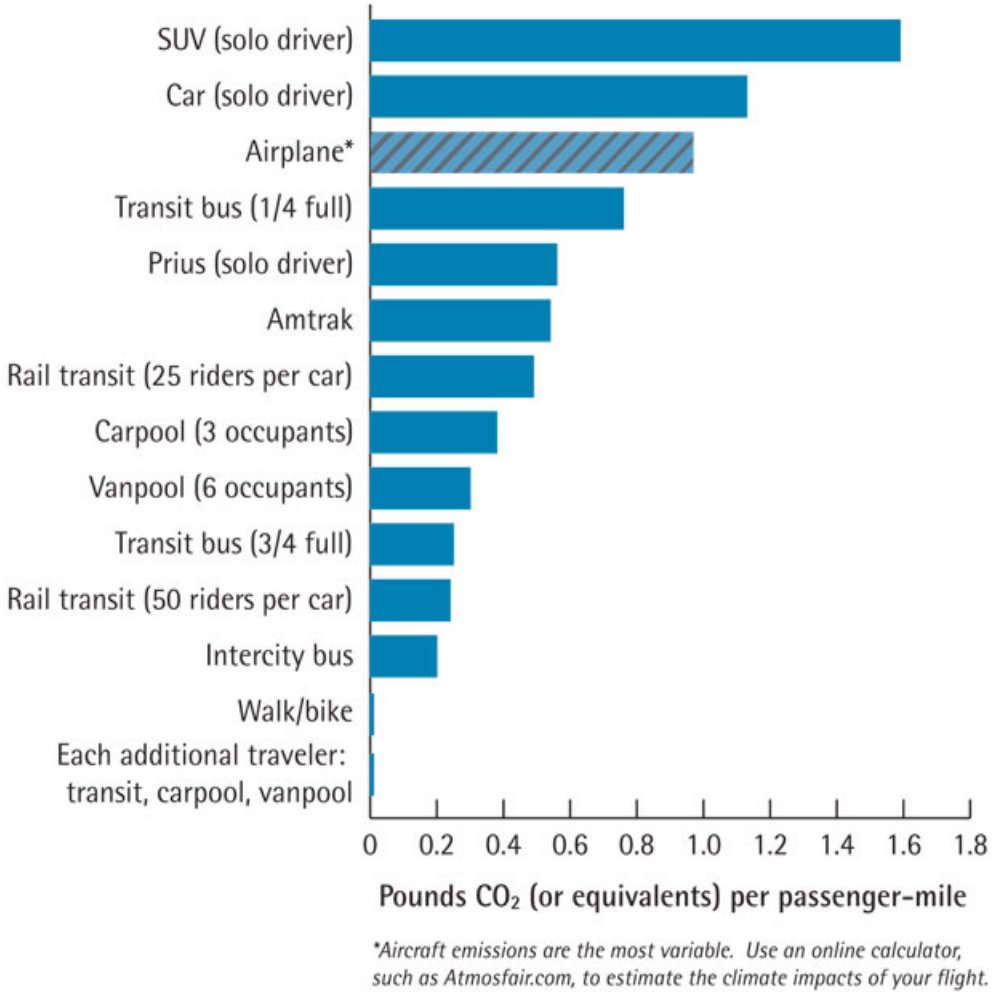
Countries such as Japan and Denmark that maintained high gas prices using taxes hardly had a problem with soaring oil prices.

Japan went on modernizing her railway system and Toyota developed the Prius.

No saturation visible or foreseen in transport CO_2



Public transport clearly better than cars in terms of CO_2



Reducing CO_2 can be done in 3 ways:

Reducing the carbon content of energy

Reducing the energy content of wealth

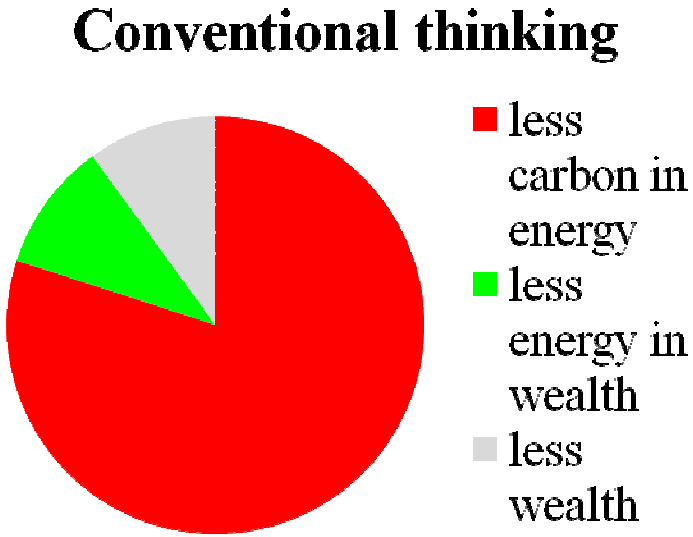
Reducing wealth

Conventional views on decarbonization:

80% less carbon per unit of energy

10% less energy per GDP

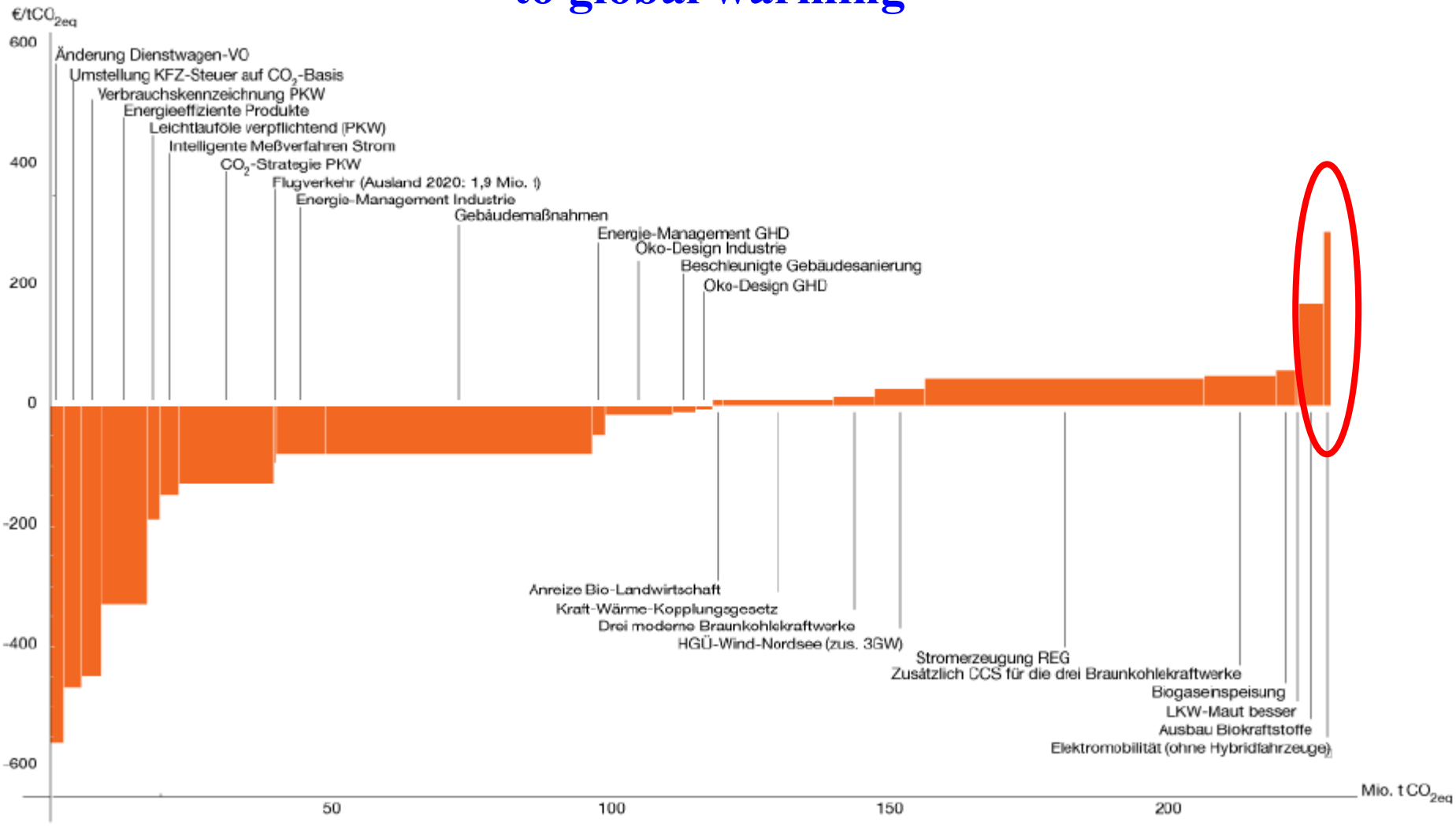
10% less wealth.



In the transport sector, the typical answers are biofuels and electric vehicles.

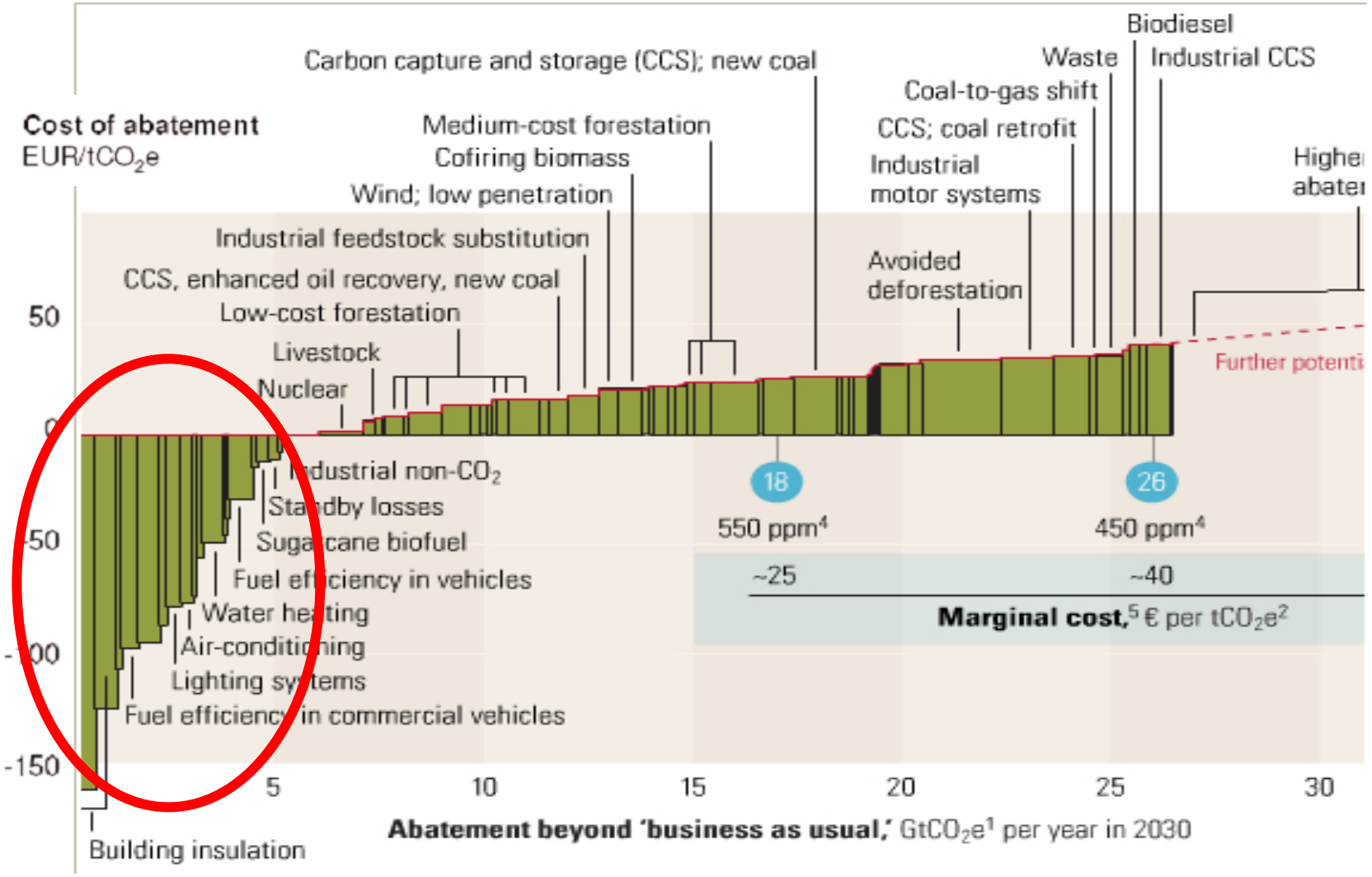
Biofuels have been largely discredited since two years.

… and electric cars are among the most expensive answers to global warming



Source: Rudolf Petersen et al, 2010

… following the general observation by McKinsey that efficiency measures are the most cost effective



Source: MacKinsey & Vattenfall 2007

Hence my own suggestion:

30% less carbon per unit of energy

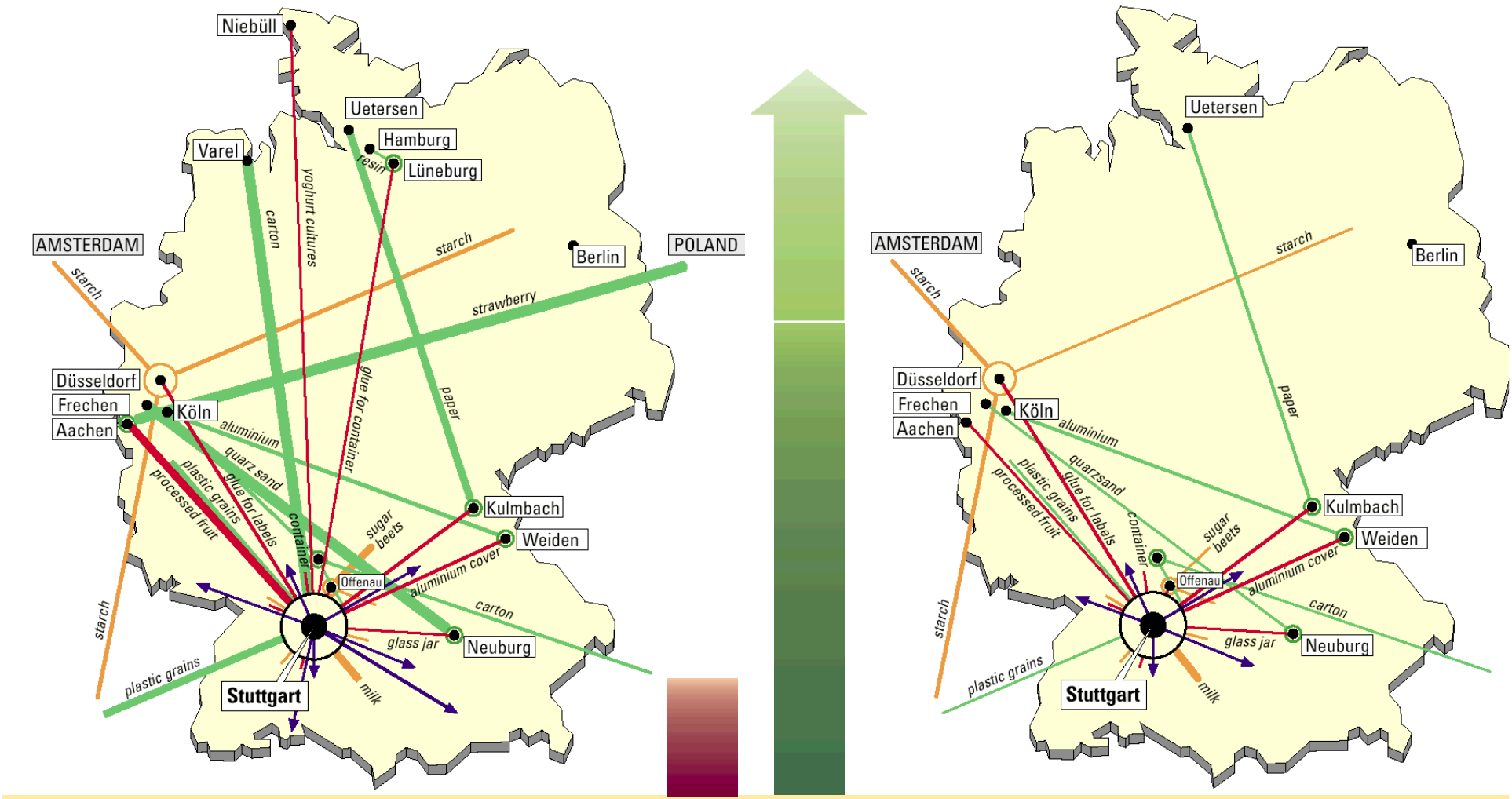
65% less energy per GDP

Perhaps 5% less GDP

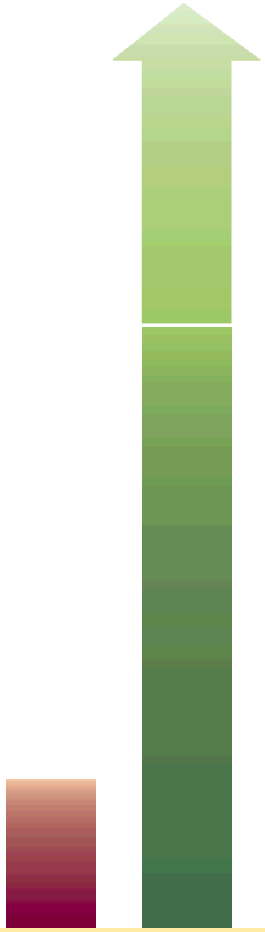
From today's inefficient fleet to Amory Lovins' "Hypercar"

From rotten trains to high speed trains

Strawberry yoghurt: from crazy to elegant logistics



From unsustainable sprawl to high density cities



The city centres of Atlanta and Kopenhagen: carbon intensity of mobility differs by a factor of 5.

From endless business travel to telepresence meetings

That was just a little window opened into the „Factor Five“ world.

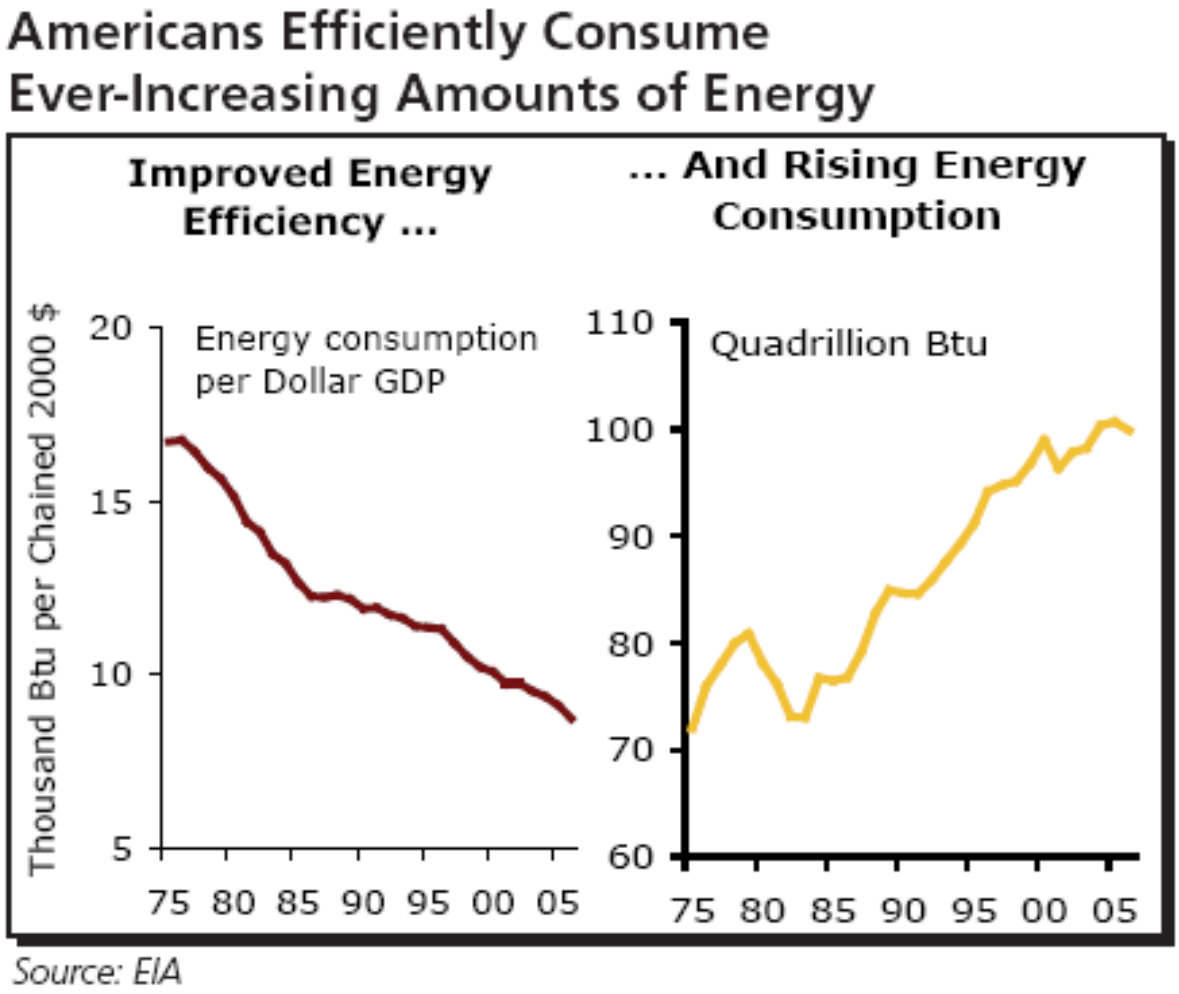
It may look as if everythings was fine as soon as we make efficient vehicles.

Alas, this is not the case. There is another dragon looming, the Rebound Effect.

Rebound effect in the USA:

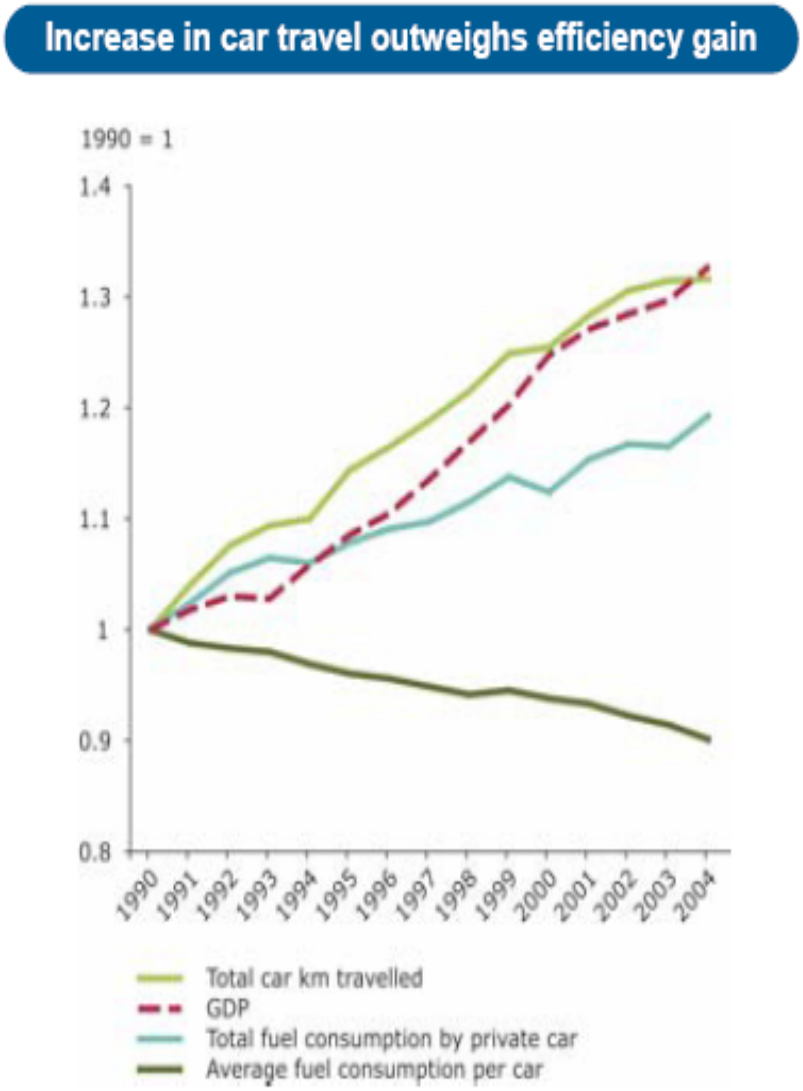
Energy intensity down, total energy consum-ption up.

SUV‘s, urban sprawl, electronics boom.

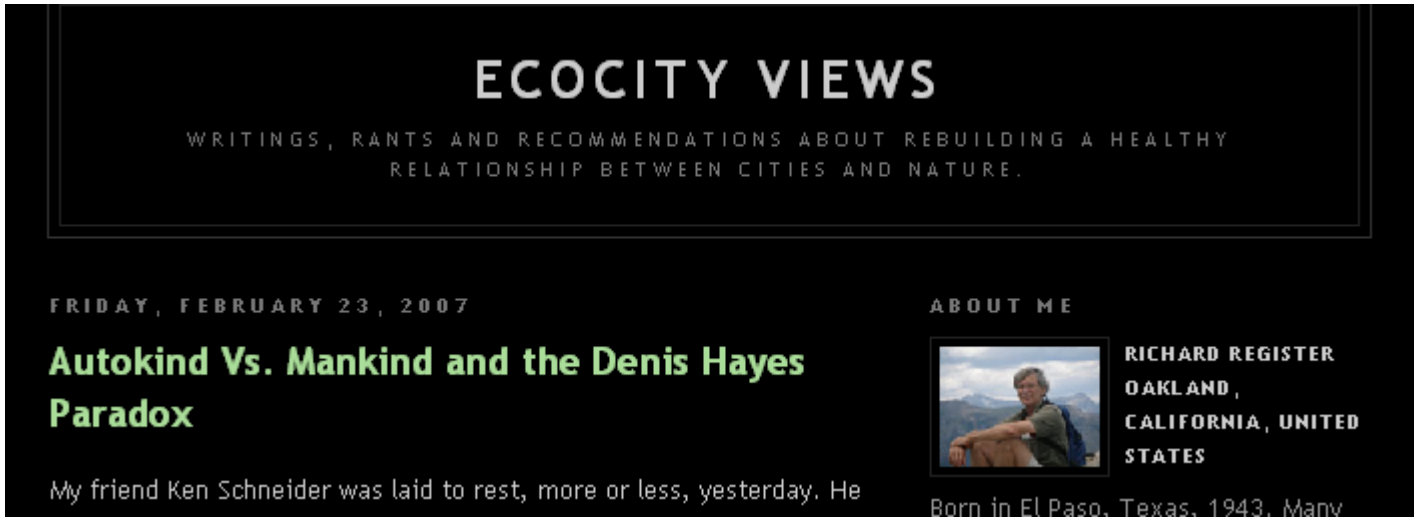


Transport increases far outweigh any efficiency gains.

This is one of the dramatic evidences for the „rebound effect“



(EEA, 2007c)



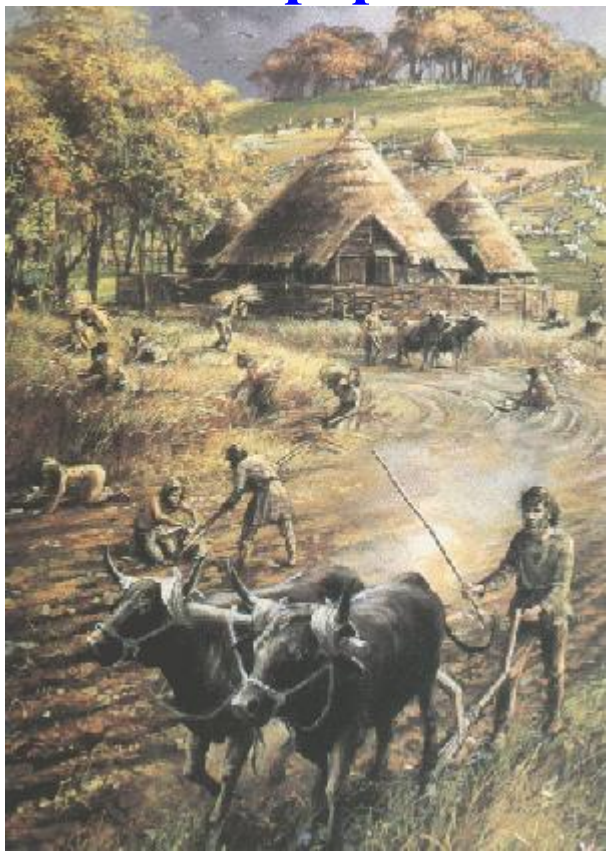
Richard Register complains:

„How could we be winning so many environmental battles and still be losing the war? I call this the Denis Hayes Paradox (and the answer is: it‘s transport and automobiles)“

The rebound effect

is also called the "Jevons Paradox" after William Stanley Jevon's 1865 book, the Coal Question. He observed that England's consumption of coal *soared* after James Watt introduced his coal-fired steam engine, which improved coal efficiency by a factor of four.

The rebound effect is actually a very old phenomenon!
The Neolithic Revolution: a hundredfold increase of ‚land efficiency', - followed by a hundredfold increase of population!



But how can we fight and beat the rebound effect?

I see two options:

(1) Idealistic sufficiency, or

(2) Raising energy prices.

The idealistic approach:
Richard Register, founder and Chairman of Ecocity Builders

ECOCITY BUILDERS

Ecocities
An ecocity is a human settlement that enables its residents to live a good quality of life while using minimal natural resources.

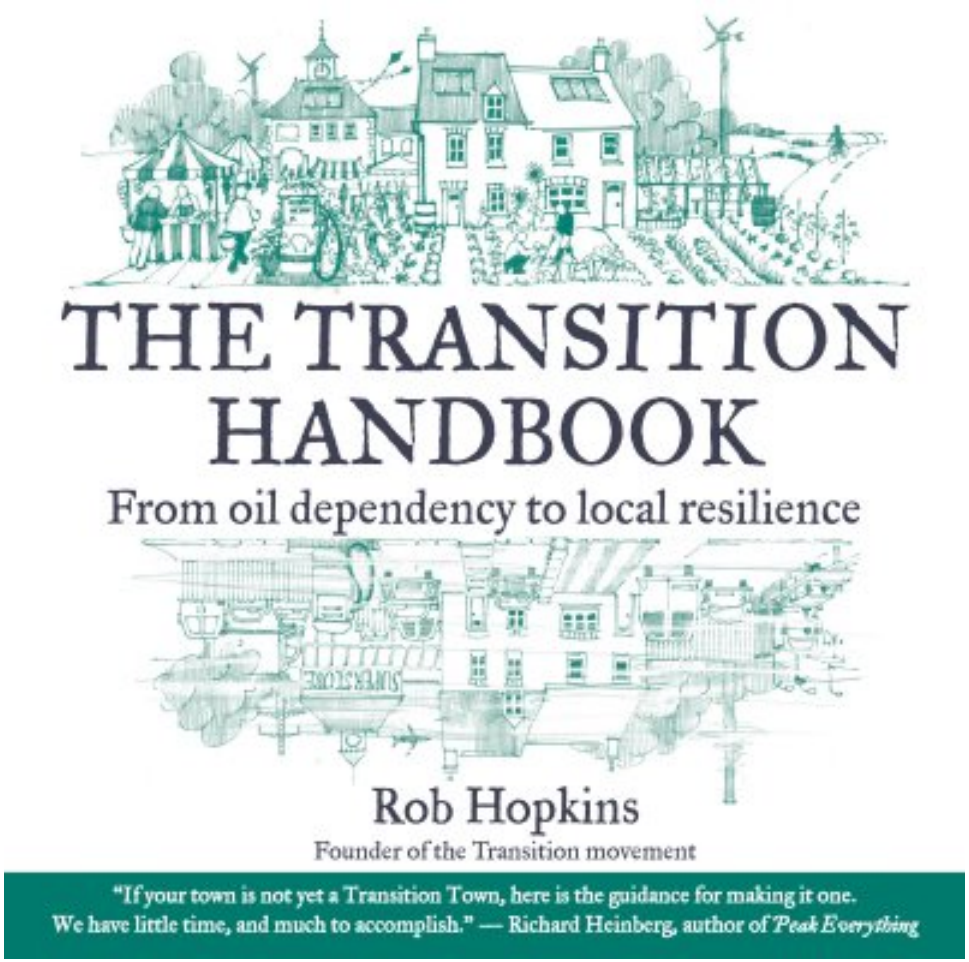
Buildings
Its buildings make best use of sun, wind and rainfall to help supply the energy and water needs of occupants. Generally multistory to maximize the land available for greenspace.

Biodiversity
It is threaded with natural habitat corridors, to foster biodiversity and to give residents access to nature for recreation.

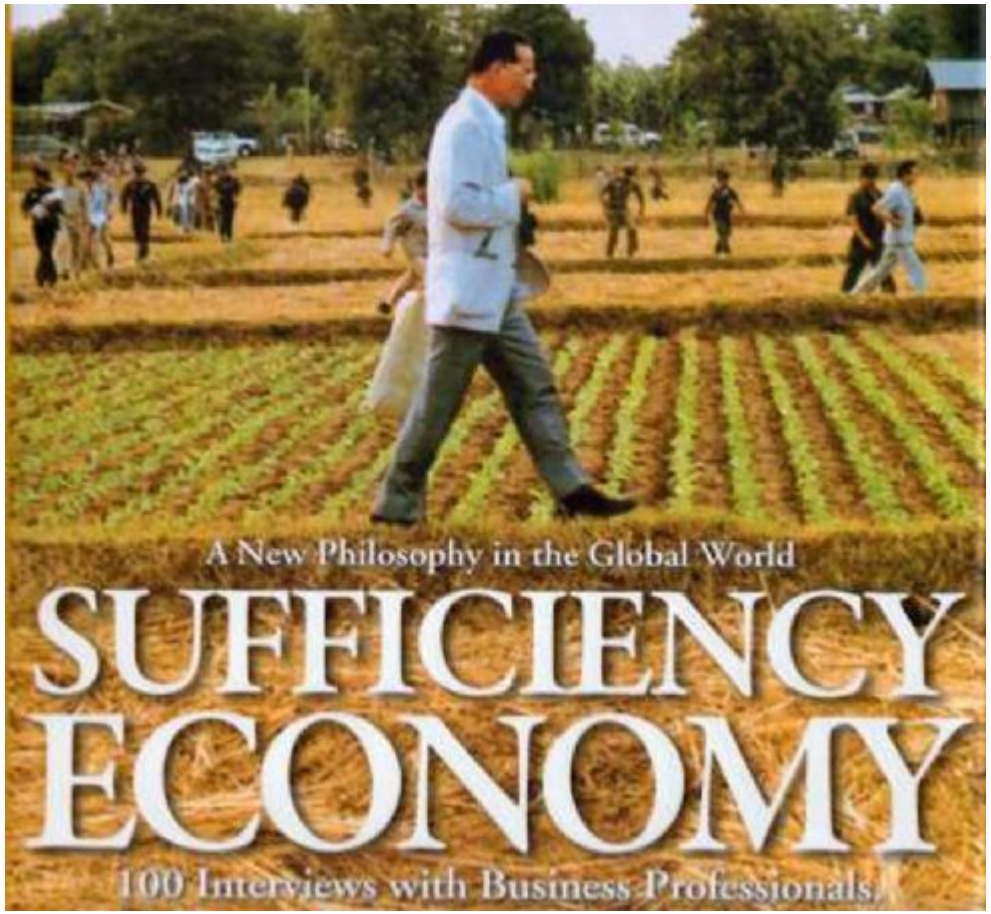
Transport
Its food and other goods are sourced from within its borders or from nearby, in order to cut down on transport costs.

The majority of its residents

Or, more radical: Rob Hopkins and the self-sufficient Transition Towns

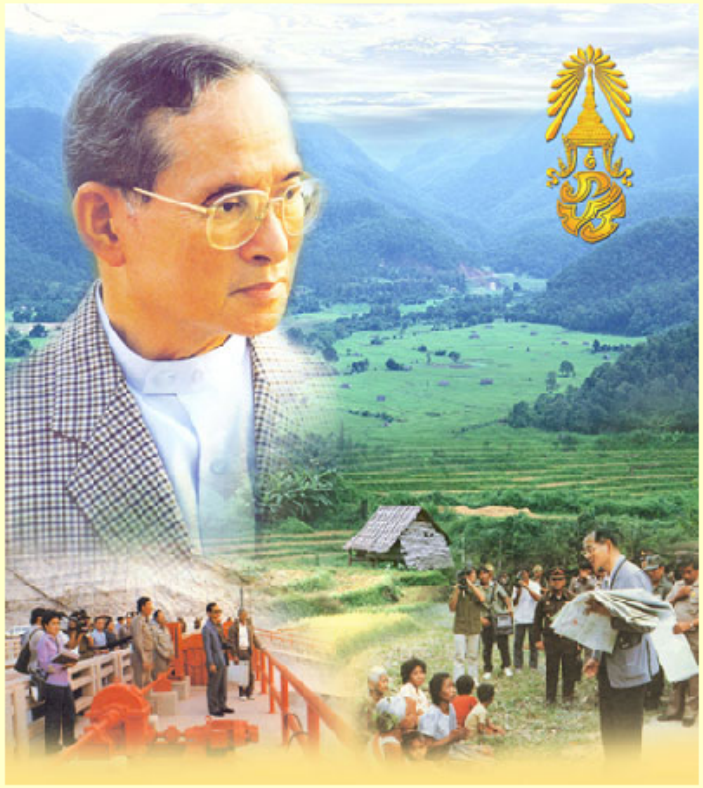


Or the Sufficiency Economy, published by Thailand's King Bhumibol.



This is the front page of King Bhumibol‘s website on the Sufficiency Economy

The Royal Concept of Sufficiency Economy



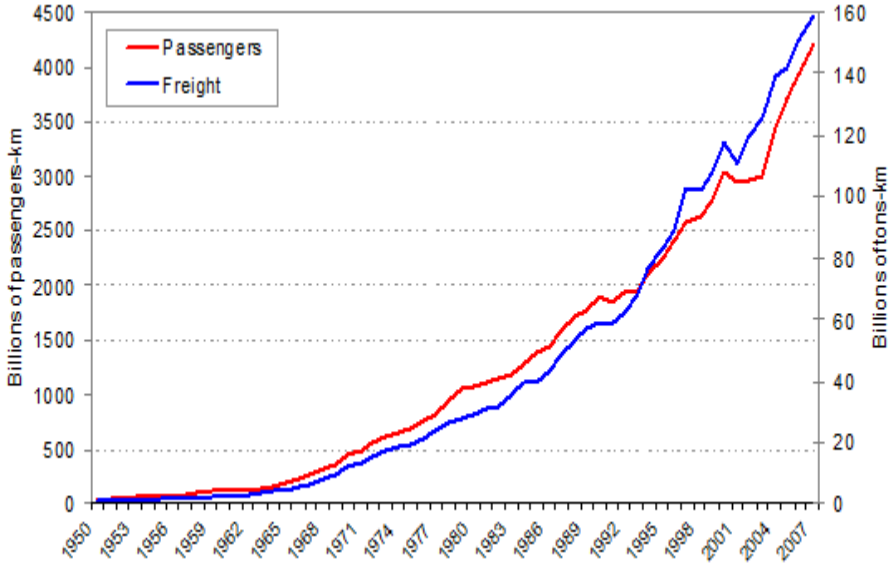
I. Preamble

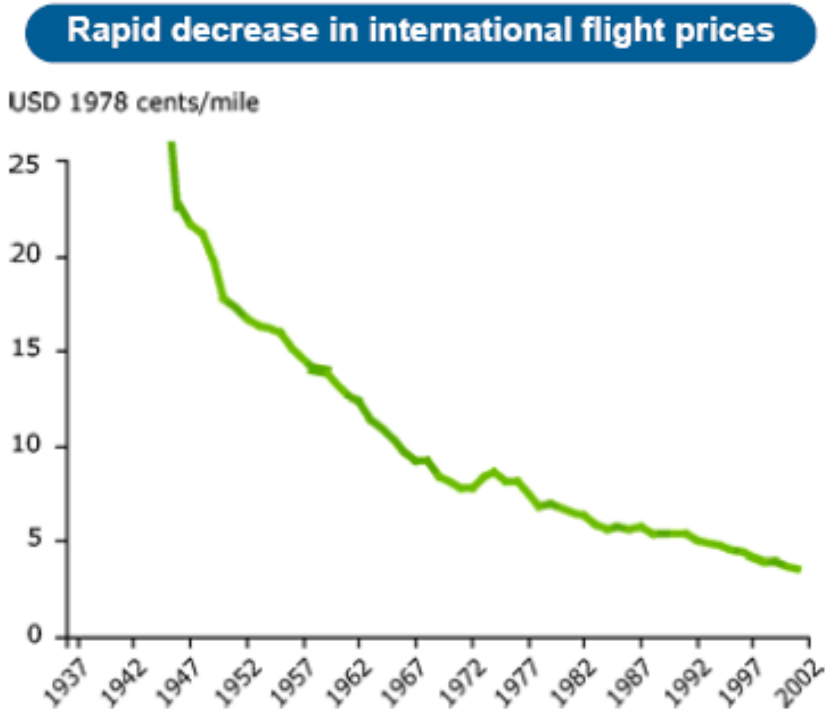
This webpage and all of its contents are to be both dedicated to and reflected on His Majesty King Bhumibol Adulyadej’s Royal Concept and Applications of the Sufficiency Economy, as well as to celebrate the propitious occasion of His Majesty the King’s 81st Birthday Anniversary on December 5th, 2008.

I suppose that notorious Bangkok congestions helped make the King‘s sufficiency appeal quite popular

The second strategy: prices

Prices matter: Air traffic explodes as prices collapse

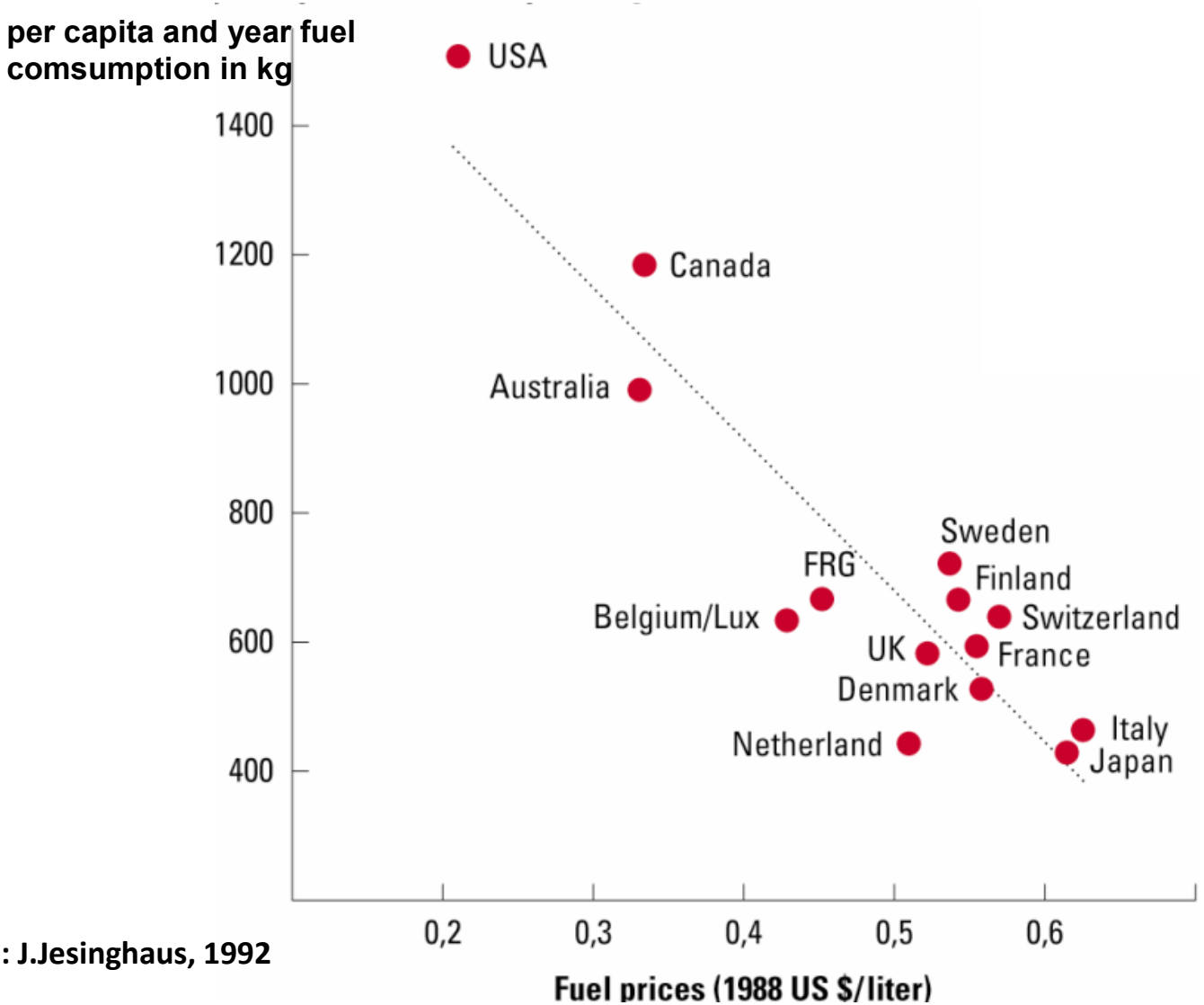




Note: Yields of US airlines in international traffic.
Domestic figures show similar trends.

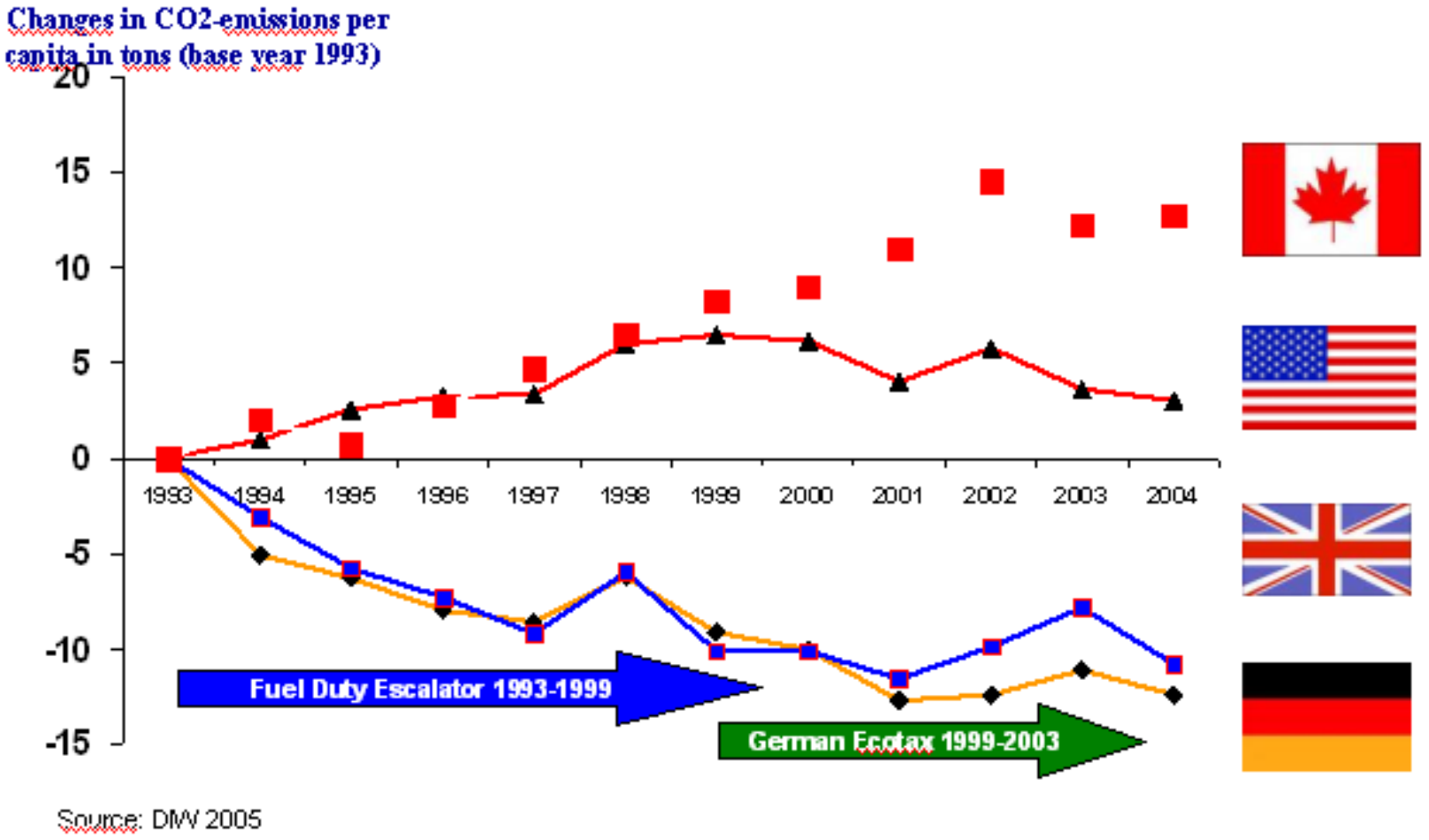
(EEA, 2005)

High price elasticity for petrol



Source: J.Jesinghaus, 1992

Fuel taxes in Britain and Germany helped reduce fuel consumption



Source: DMV 2005

This experience was just a tame beginning. Eventually, we have to create a new paradigm of productivity

Old paradigm:

Increasing labour productivity

New paradigm:

Increasing resource productivity

Labour productivity has increased twentyfold since 1850. It is not utopian to think of resource productivity increasing tenfold in 100 years and fivefold in 50 years!

Labour poductivity rose in parallel with labour costs

This suggests a strategy of actively elevating energy prices in parallel with energy productivity increases

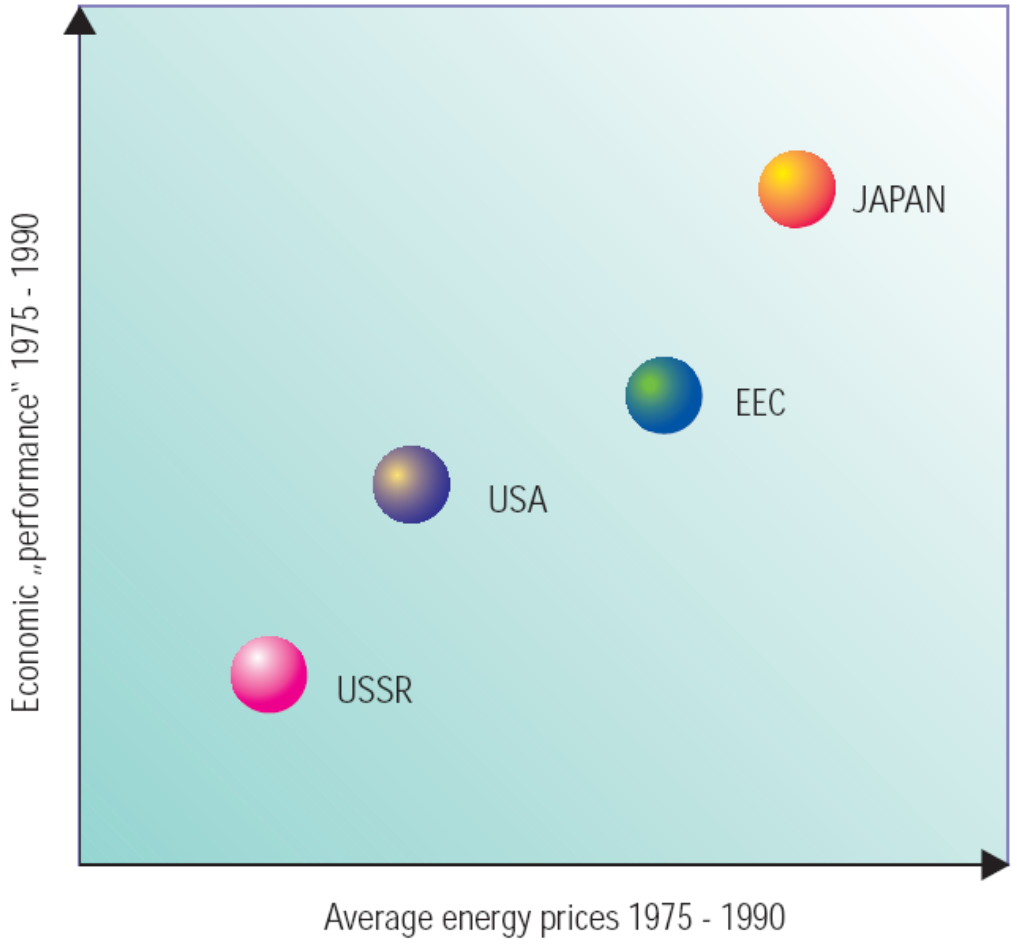
The idea then is to let energy prices, notably fuel prices increase annually, in small steps corresponding to the increase of energy efficiency. If that is done for fifty years or so, all urban planning and urban reality would look completely different.

A Factor of Five makes it possible that no reduction in wealth and welfare occurs, and the quality of life in cities would greatly improve.

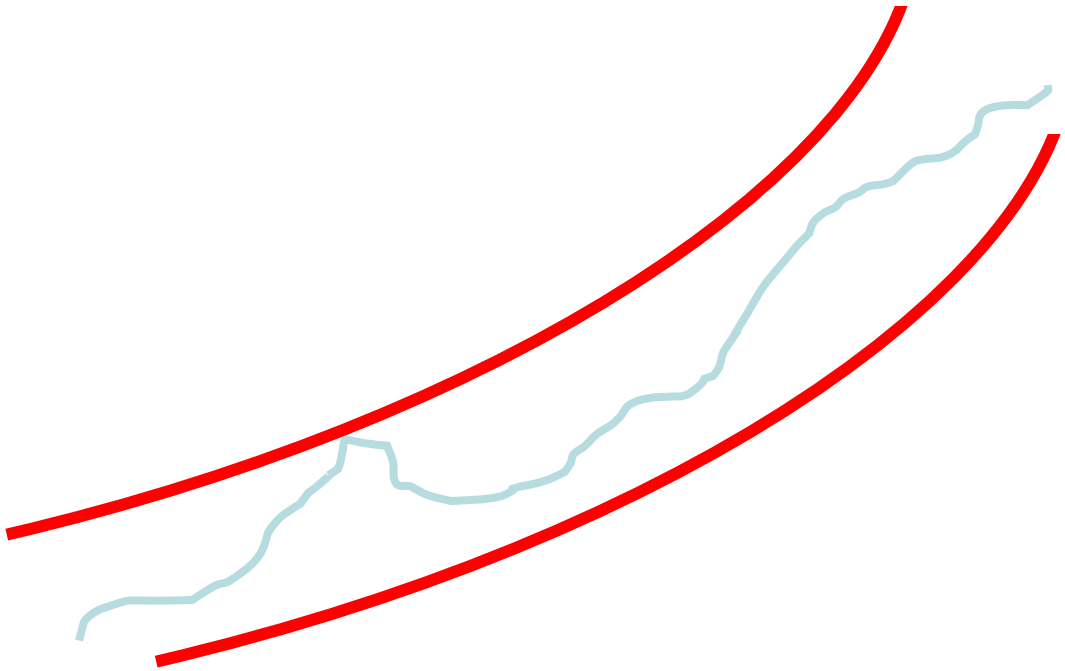
Raising energy prices is a big political challenge. It can be done if we more or less guarantee that no social hardship and no capital destruction follows.

If energy prices rise *in pace with efficiency gains*, that is a safe bet!

High energy prices need not hurt the economy. Japan blossomed during the 15 years (1975 – 1990) of highest energy prices.



A corridor of increasing energy prices may be agreed, within which market fluctuations may occur.



This is the end of my story,

So please now listen to Charlie Hargroves.

Thank you!