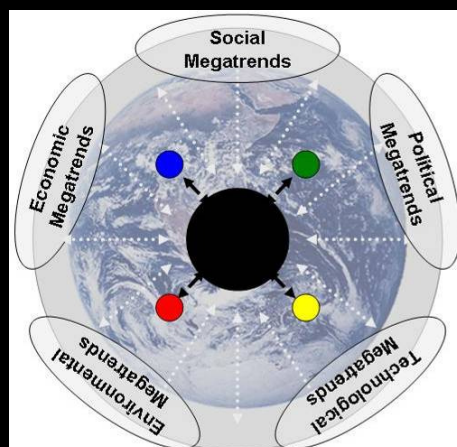


Environmental outlook for Europe: the transport and energy challenges

J.McGlade
European Environment Agency



Global context




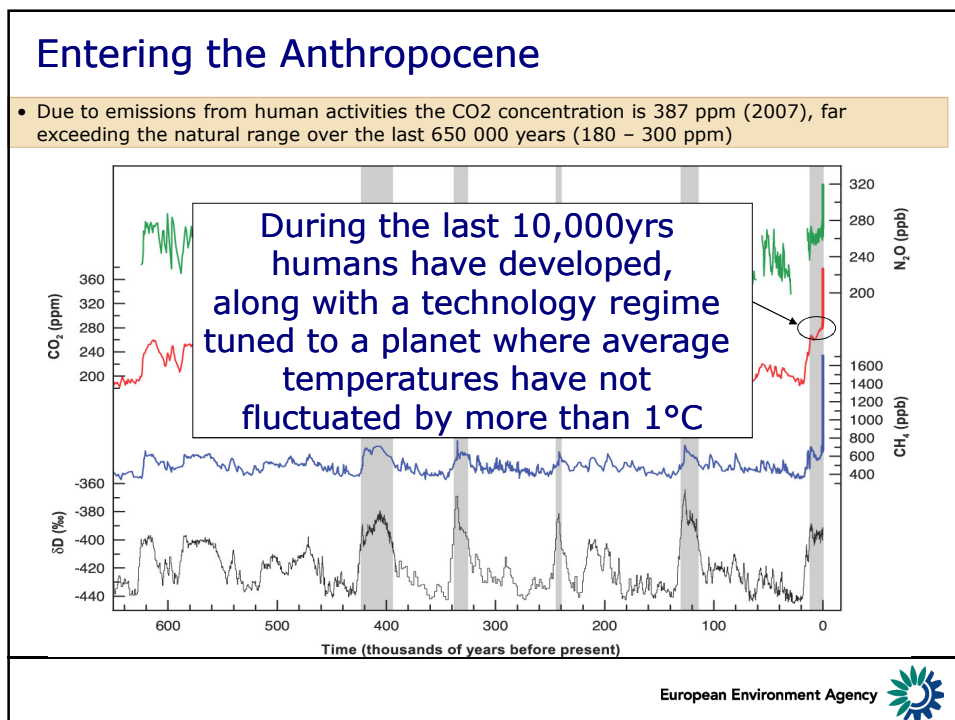
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EU policies 1970s-today

	Nature and biodiversity	Natural resources and wastes
Increasing complexity	70s-80s until today Protect individual species	Improve waste treatment to control hazardous substances in waste; reduce impact from waste disposal ; reduce impacts from landfills & spills
	1990s until today Establish ecological networks ; manage invasive species ; reduce pressures from agriculture, forestry, fisheries and transport	Recycle waste ; reduce waste generation through prevention approach; increase reuse
	2000s until today Accounting for use of natural capital (i.e. water, land, biodiversity, soil); integration of ecosystem services in decisions on sectoral management.	Improve efficiency of resource use and consumption (materials, food, energy, water) in the face of increasing demand, reduced resources and competition; cleaner production ; eco-design ; integrated product policy ; sustainable consumption & production

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Unbearable

European Environment Agency



Safe margins



European Environment Agency





No more water

European Environment Agency



Paradise lost

European Environment Agency

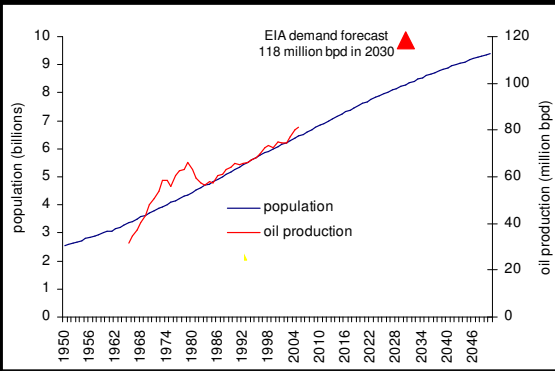




Greening the brown economy

European Environment Agency 

World population to grow by 1.8 billion by 2031



EIA demand forecast
118 million bpd in 2030


population
oil production

Consumption growth since '65:

- total energy 284%
- oil 268%
- gas 435%

Energy demand growth:

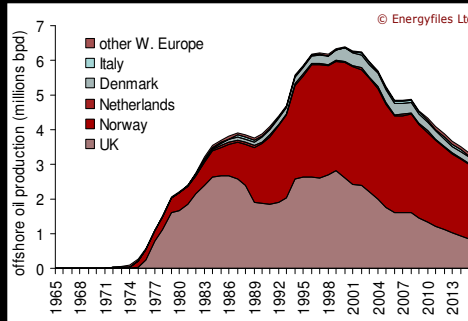
- developed world +111%
- emerging economies +645%



Oil is the real problem - it is the fuel of transportation



picture courtesy Transfuture.net

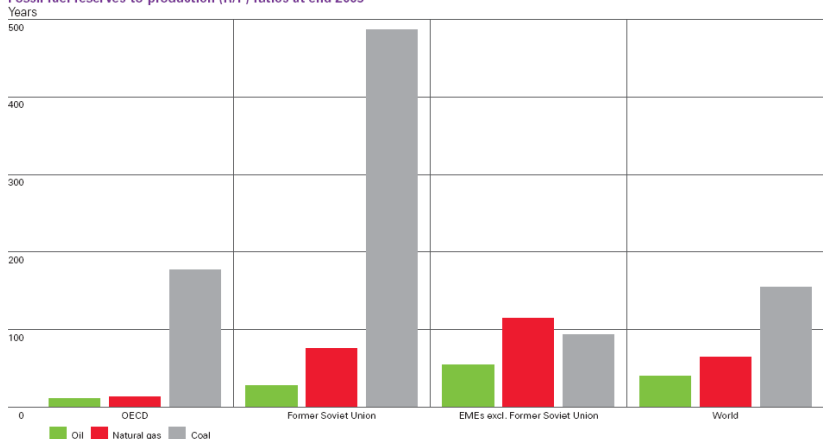


European offshore oil production forecast

- Oil accounts for 32% of global energy consumption
- Demand is growing
- Non-Opec production is declining
- Major politically-induced constraints

Fossil fuel reserves-to-production ratios

Fossil fuel reserves-to-production (R/P) ratios at end 2005



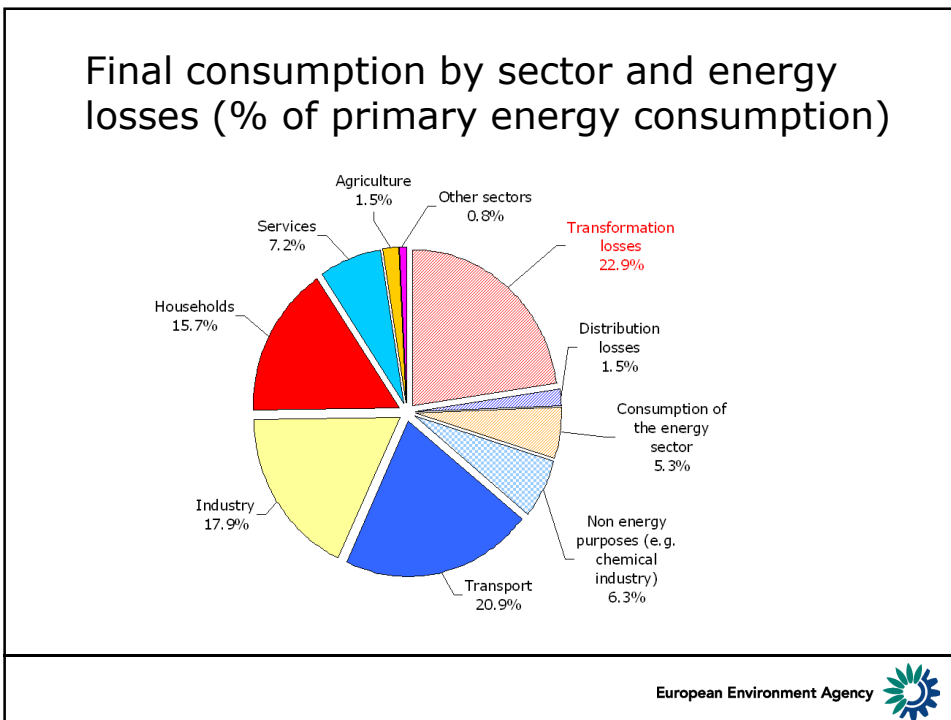
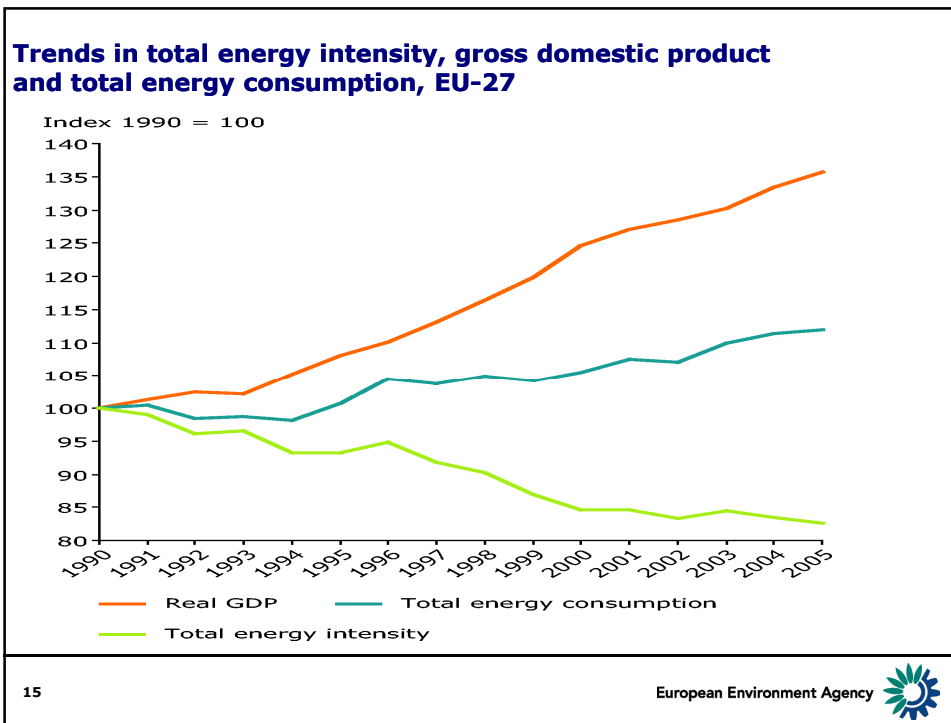
The world's R/P ratio for coal in 2005 was nearly four times that for oil and 2.5 times that for gas. Regionally, coal was even more dominant in the OECD and Former Soviet Union, while gas reserves were more abundant relative to production elsewhere.

The Arctic - the next frontier

The composite image includes three main components: 1) A photograph of a large, illuminated dome structure underwater, possibly a research station or habitat. 2) A bathymetric map of the Arctic Ocean showing depth contours in various colors (red, yellow, green, blue, purple). 3) A map of the Arctic region with a legend: 'Agreed borders' (solid blue line), 'Equidistant border' (dashed blue line), '200-mile line' (dotted red line), 'Russian-claimed territory' (hatched area), and 'Lomonosov Ridge' (brown area). The map labels include USA, CANADA, GREENLAND, NORWAY, RUSSIA, Summer ice extent 2005, Arctic Ocean, North Pole, Lomonosov Ridge, FRANZ JOSEF LAND, and Disputed area. It also notes 'All locations approximate' and 'SOURCE: University of Durham, UN, Marum'. A small credit 'Picture: NOAA' is visible at the bottom of the bathymetric map.

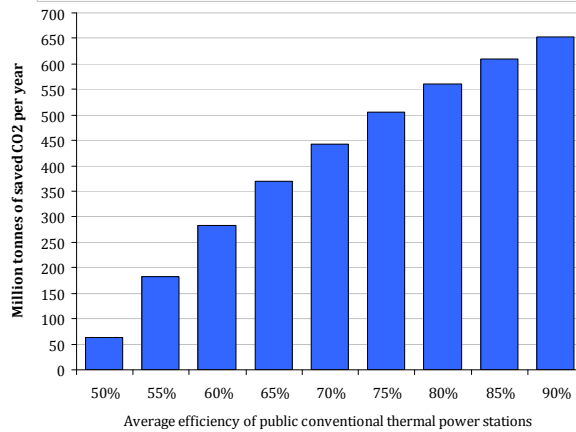
Unstable

European Environment Agency

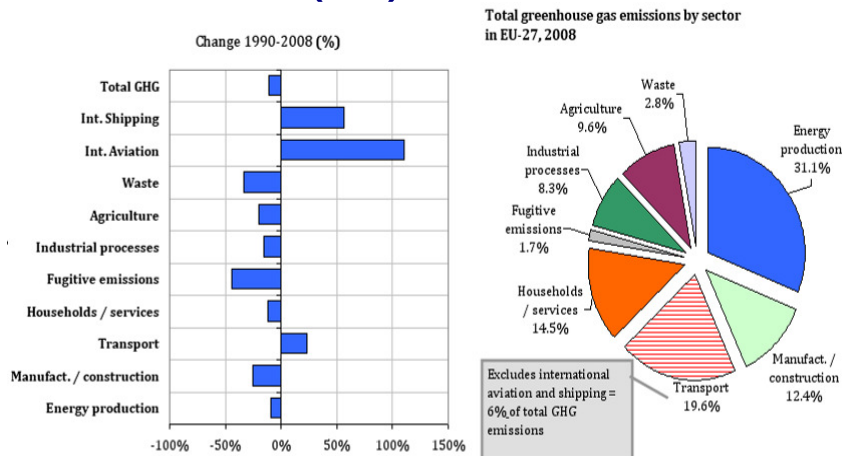


Projected EU-27 annual CO2 emission savings assuming improved transformation efficiencies

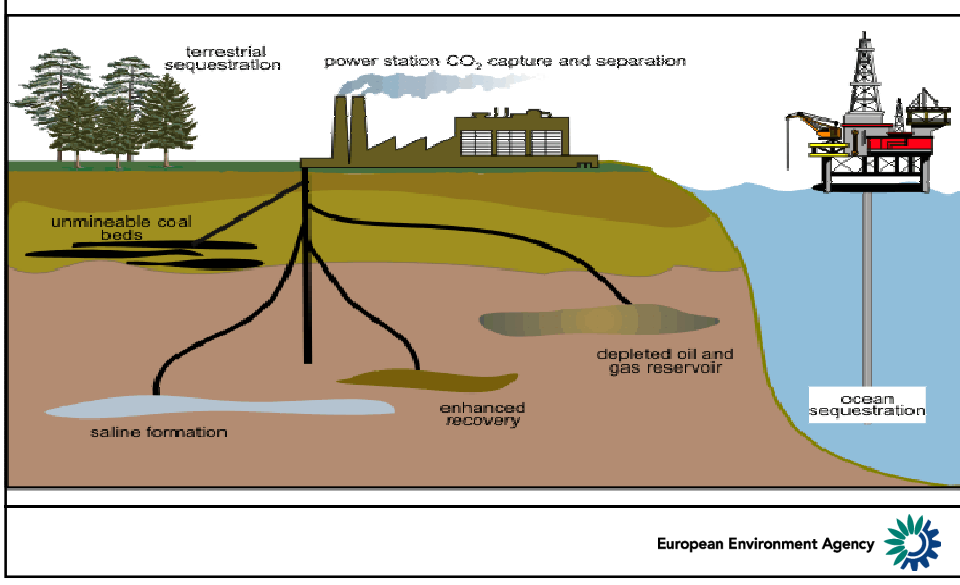
Current EU average efficiency of all conventional thermal power stations = 48.0%
 [Includes electricity-only, heat-only, and combined heat and power plants]



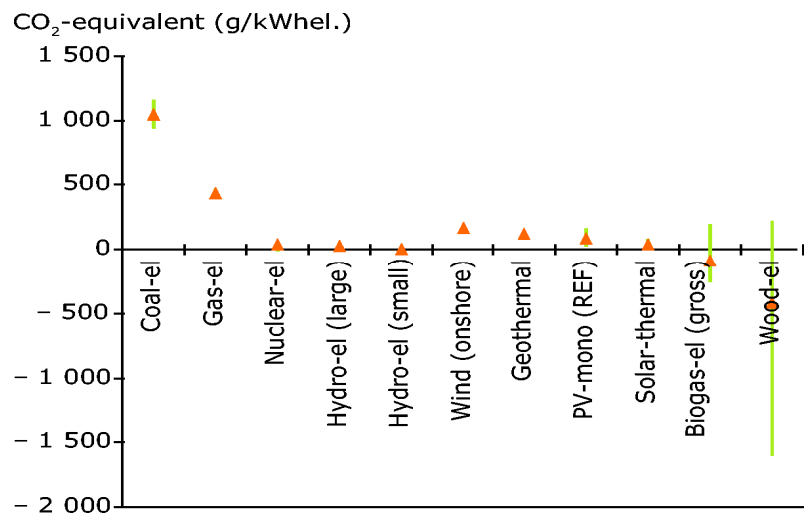
Greenhouse gas emissions in the EU-27 by sector in 2008 (right), and changes between 1990 and 2008 (left)



Carbon capture and sequestration



LCA GHG emissions of energy systems (EEA 2008)



Energy Efficiency



- Major drive in Europe and elsewhere
- EU targeting 9% improvement in energy efficiency over next 9 years
- New EC Directive on Energy Performance of Buildings
- Global energy efficiency technology market currently worth \$450bn

'Achieving the 80 % reduction means nothing less than a transition to a new energy system both in the way energy is used and in the way it is produced.'

European Climate Foundation
Roadmap 2050



Vast untapped indigenous energy sources



Scale of Market

- Renewables currently provide 13% of world energy needs
 - Dominated by geothermal, hydro and biomass
- Rapid growth in other technologies
 - Solar 41% per year
 - Wind 18% per year
- Prices dropping with technological developments and economies of scale

Solar Power PVs and SCP with storage

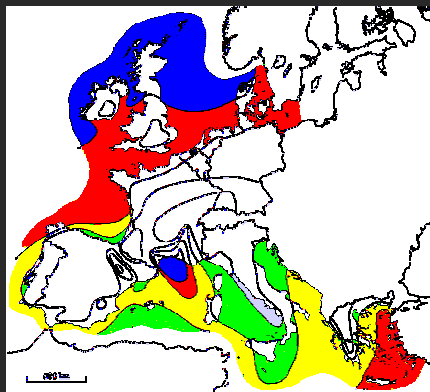


- Costs dropping rapidly with new technologies and economies of scale (\$0.7/watt by 2010)
- Market growing rapidly (projected at \$40bn by 2010)

European Environment Agency



Offshore wind energy potential in Europe



- UK has very large offshore wind energy potential – largest in Europe

© Risø

Decentralisation of power via new grid infrastructure



Imaginative capital



*Smart grids can cut demand by 15 %,
simply as a result of consumers learning
more about their usage.*

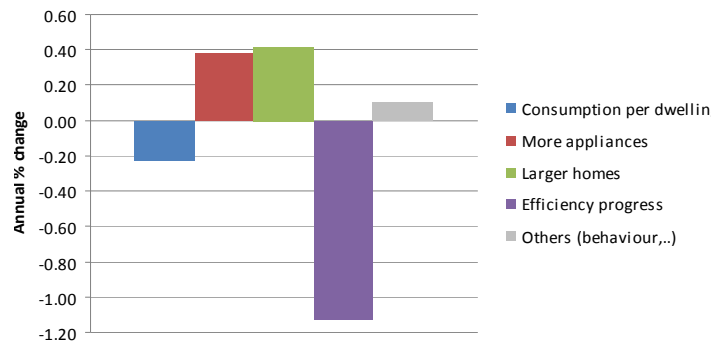


29

Power to the people



Improved efficiency is offset by changing behaviour



Key factors to take into account in designing the next steps

- Limits on exploitable fossil fuel resources
- Energy security concerns around non-indigenous sources
- Fiscal and legislative instability
- Incorrect price signals via subsidies
- Climate change policies and impacts on using indigenous sources

EEA Report | No 2/2010

Towards a resource-efficient transport system

TERM 2009: indicators tracking transport and environment in the European Union

ISSN 1725-9177



'...if ambitious targets are to be achieved, policymakers will need to employ all measures rather than just picking the best ones.'

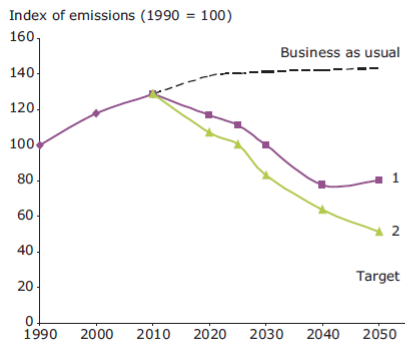


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Transport: 19% of EU-GHG emissions

- Freight transport growing slightly faster than the economy, with road and air freight largest increases
- Share of rail and inland waterways has declined
- Passenger transport continues to grow but at a slower rate than the economy
- Air travel within the EU remained the fastest growth area
- Car journeys remained the dominant mode of transport, accounting for 72 % of all passenger kilometres in the EU
- Germany and Sweden are on track to meet their 2010 indicative targets for biofuels use
- Road transport was the largest emitter of nitrogen oxides and the second largest contributor of pollutants forming particulate matter
- Road traffic remains by far the largest source of exposure to transport noise.

Effect of a combination of 'improve', 'avoid' and 'shift' measures



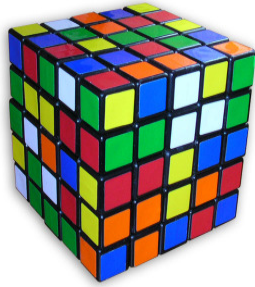
Each curve shows the additional effect of adding further instruments.

- 1 'Improve' package: improved engine and vehicle design, electric cars, low-carbon fuels and technologies encouraging behavioural change. These measures lead to a 44 % reduction in transport CO₂ emissions.
- 2 'Avoid and shift' package: road pricing, car clubs, increasing population density in cities, travel planning. These measures lead to a 20 % reduction in transport CO₂ emissions.

Green technology & urban living

European Environment Agency 

Complex systems ... some attributes



- **Multiplicity of legitimate perspectives**
- **Non-linearity**
- **Emergence:** “the whole is more than the sum of its parts”
- **Multiplicity of scales**
- **Irreducible uncertainty**
- **Relevance, not precision, is often more useful**

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Liveable landscapes



European Environment Agency

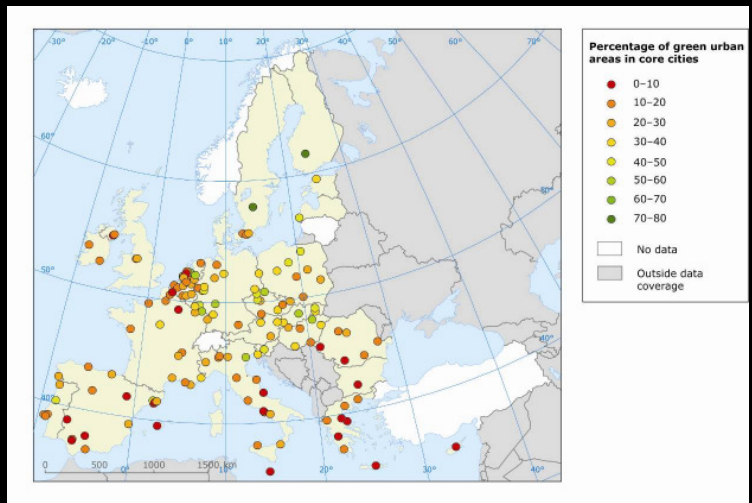




...a fast cropping concept!



Green cities



European Environment Agency



Europe's global environmental footprint has increased by a third in the last 40 years

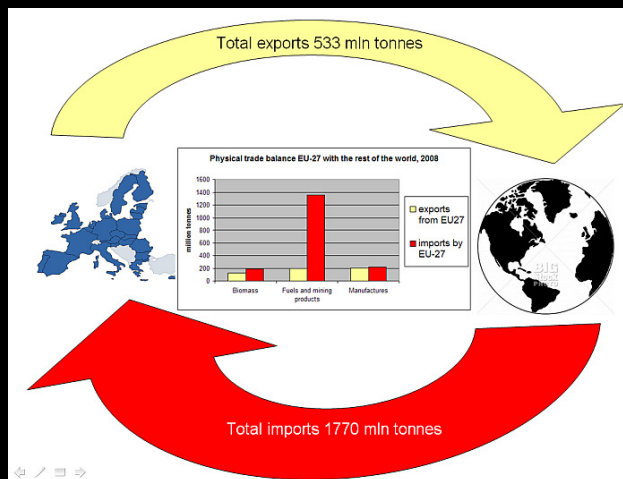
Current rates of depletion of Europe's stocks of natural capital and flows of ecosystem services will undermine Europe's economy and erode social cohesion unless addressed



European Environment Agency



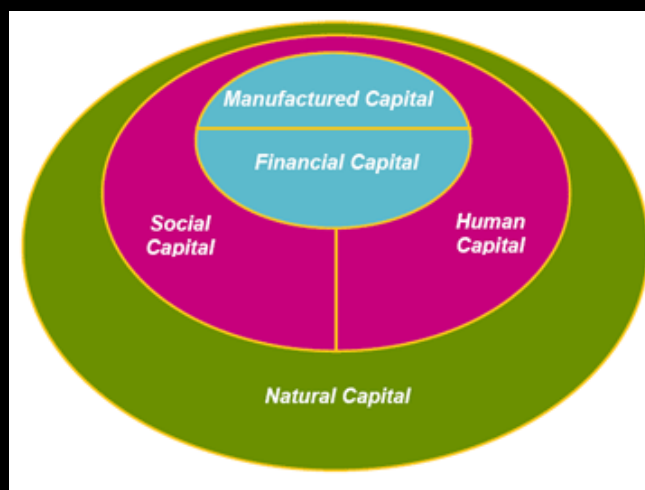
Europe's physical trade balance with rest of the world



European Environment Agency



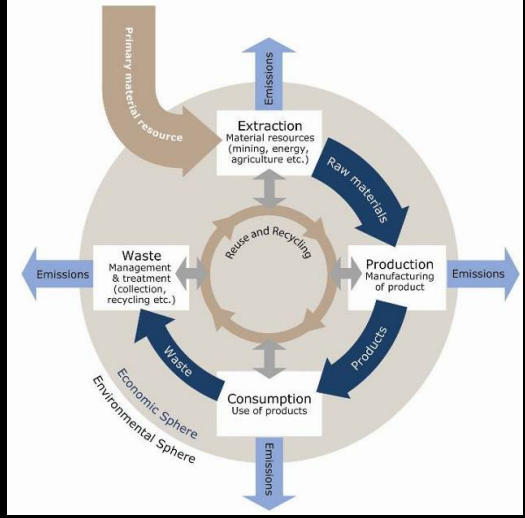
Natural capital underpins our economies & wellbeing



European Environment Agency

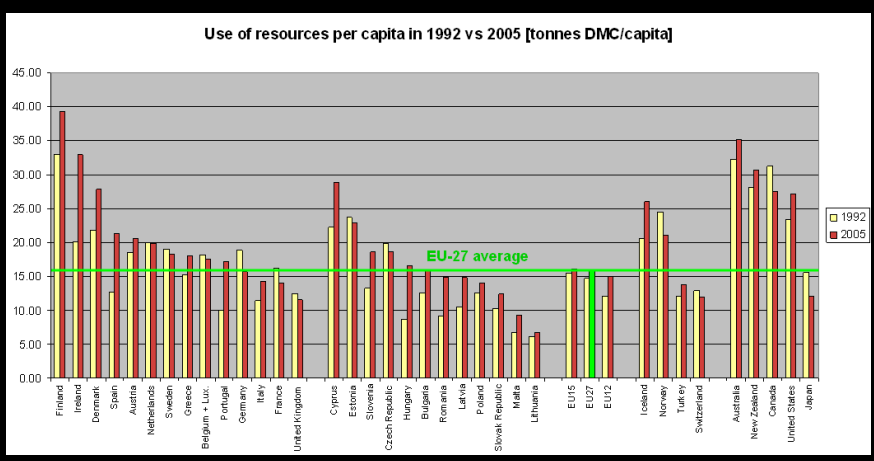


Life cycle perspective extraction-production-consumption-waste



European Environment Agency 

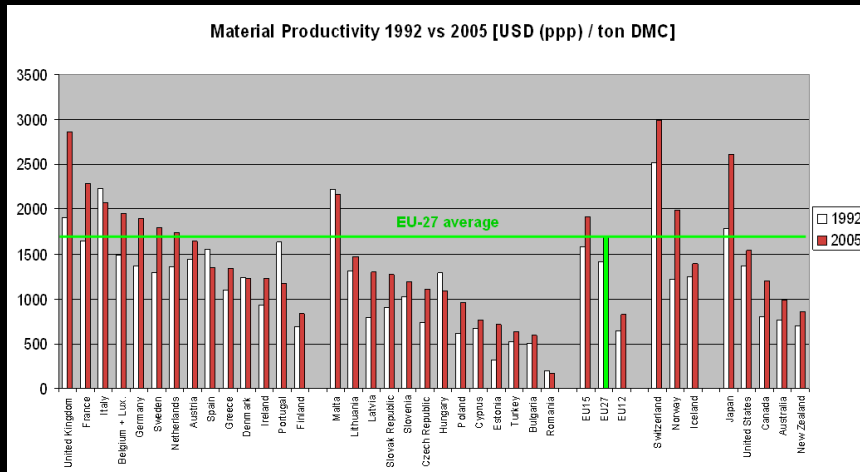
Material resource use is rising across Europe



Domestic material consumption = EU sustainable development indicator

European Environment Agency 

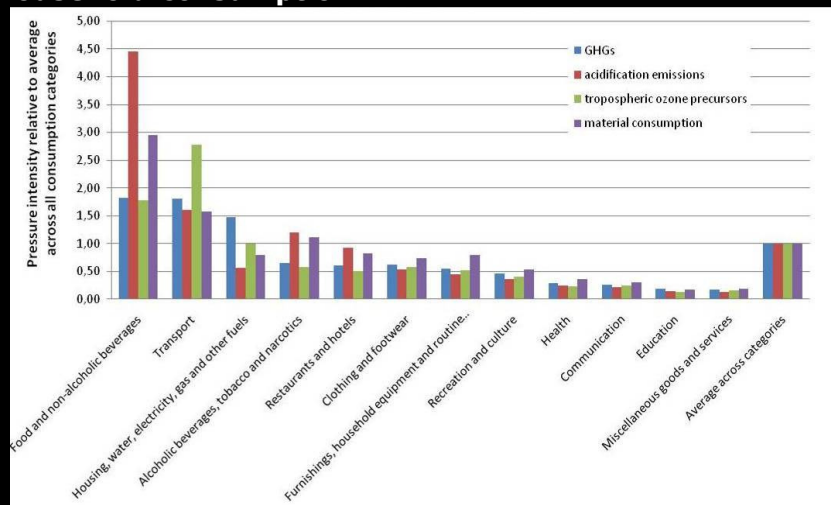
Average material productivity has increased in Europe some countries are performing better than others



European Environment Agency



Efficiency measures have led to a relative decoupling of resource use, emissions and waste generation but absolute decoupling remains a challenge especially for household consumption



European Environment Agency



Europe is particularly vulnerable regarding access to water and rare-earth metals

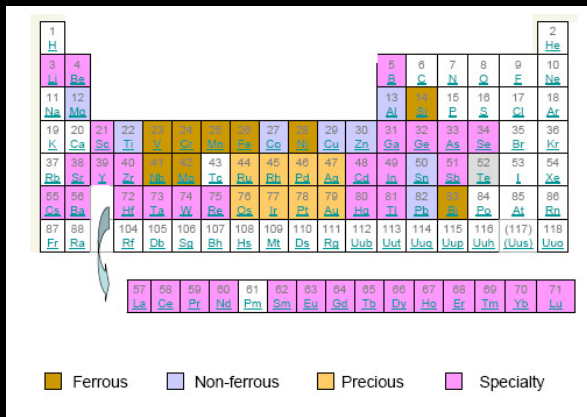


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Anthropogenic metals:

it contains rare-earth metals if it flies or you talk into it



La Lanthanum
batteries, camera lenses

Ce Cerium
glass polishing

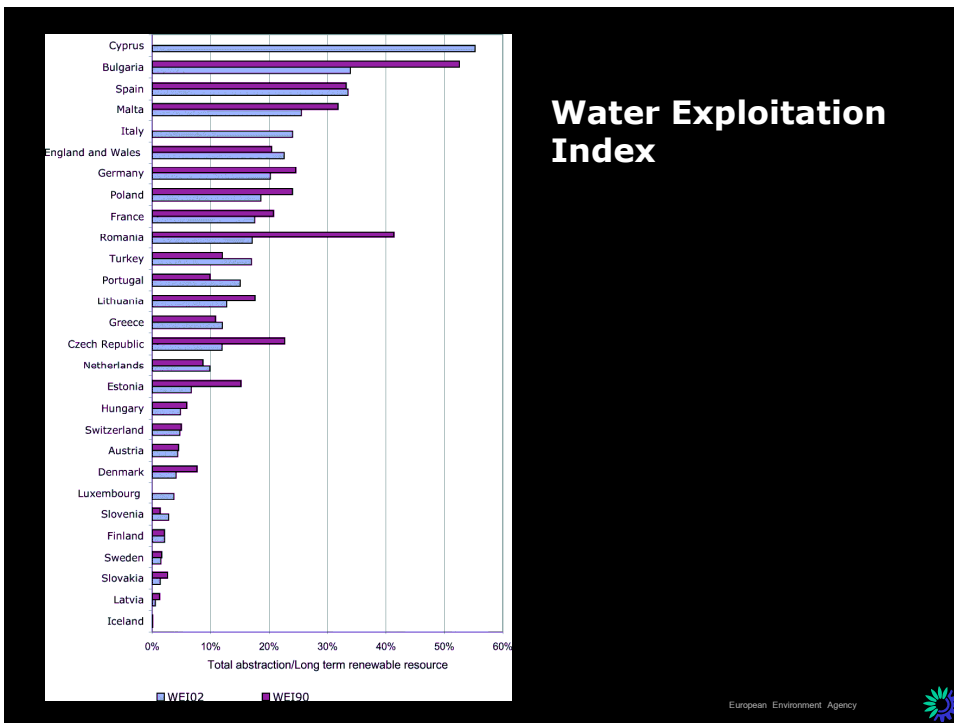
Pr Praseodymium
lasers, magnets, ceramics

Tb Terbium
PC memory

Lu Lutetium
petroleum catalysts

European Environment Agency





Resource pricing and regulatory structures must align consumer and producer incentives in favour of sustainable resources management

Multi-sectoral, volume based approaches supported by metering and accounting



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Broad collaboration is essential because actions in one sector impose costs elsewhere

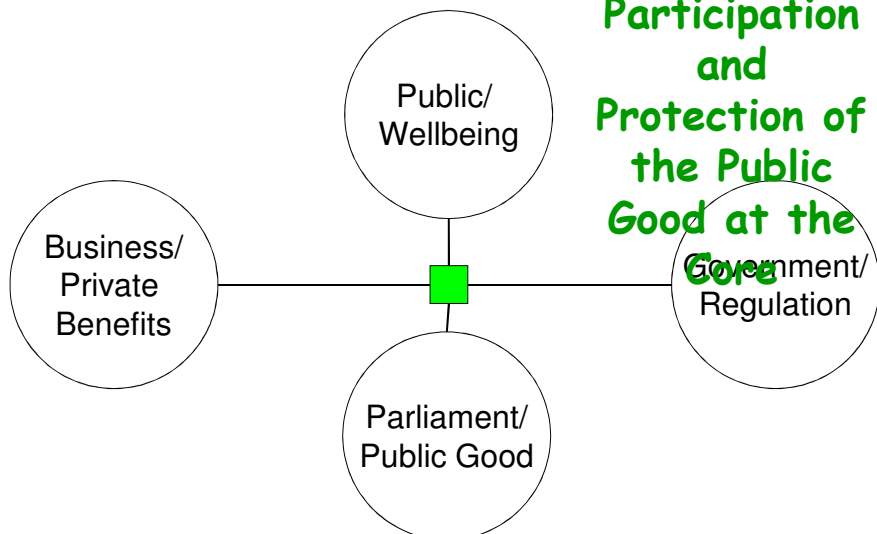


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Green Economy

Public Participation and Protection of the Public Good at the Core



European Environment Agency



Shifting to biofuels will affect water use and soil productivity



To guarantee food security and meet the increasing demand for biomass to achieve the EU bioenergy targets, intensely farmed systems will need ecological infrastructure to enhance the landscape complexity combined with agricultural practices such as long and diverse rotations, more heterogeneous regional distribution of crops and better adjustment to the natural soil fertility

European Environment Agency



Eye On Earth — Citizen observatory on air and bathin...

Road Aerial Labels Views

my location sms about help

COPENHAGEN, DENMARK

Change

<p>OUR RATING 2 GOOD</p> <p>400 130 40 10 0</p> <p>CO NO_x PM10</p>	<p>YOUR RATING 2 GOOD</p> <p>Irritating Non-irritating Non-clear Clear Clean Odourless Dirty Smelly</p> <p>82 Ratings</p>
<p>OUR RATING 1 GOOD</p> <p>nearest station Langebro, 1553, Denmark</p>	<p>YOUR RATING MODERATE</p> <p>Polluted Scenic Equipped Crowded Safe Clean Unsafe Dirty</p> <p>9 Ratings</p>

SMS mc

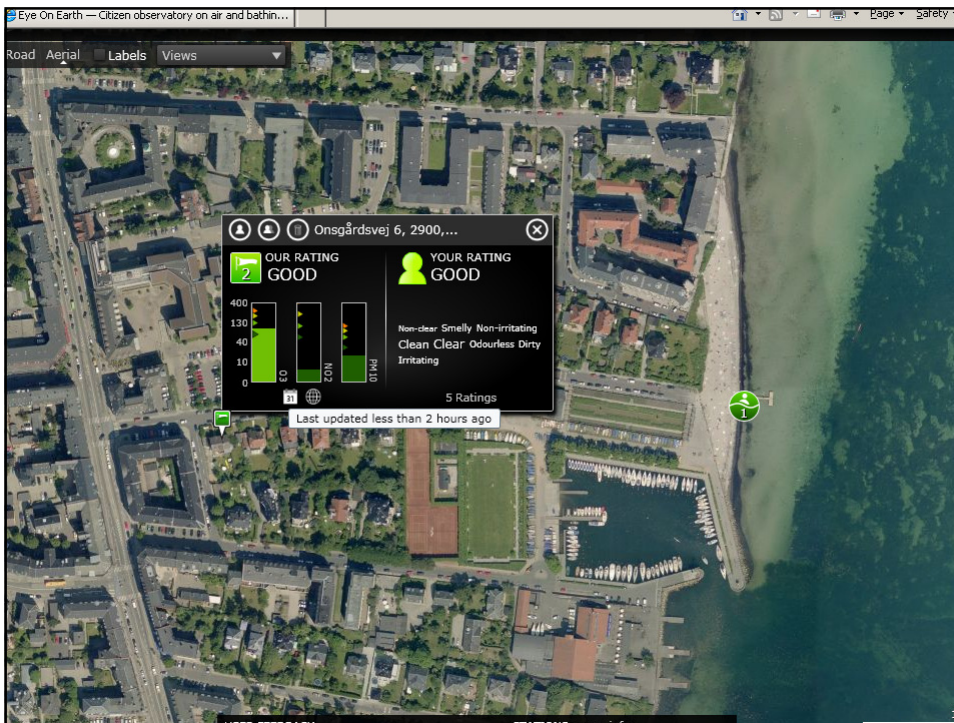
AIR [location name] OR WATER [location name]

+44 7786 201 106

EEA HEADLINES

How will the Western Balkans shape its environmental futu
Economic development in the Western Balkan countries is putt...

Europe to exceed air pollutant emission limits – NO_x in particular
In 2010, around half of the European Union's Member States e...



Right to life

Asbestos

10 microns (0.0004")

Joe Darabant died from asbestosis in 1990.

You'd think... a substance that kills 10,000 Americans each year would be banned.

You'd think... that Congress would do everything possible to help those afflicted with asbestos diseases.

Think again.

Photograph of Joe Darabant
Copyright Bill Ravanesi | About the photographer

[click for next page]

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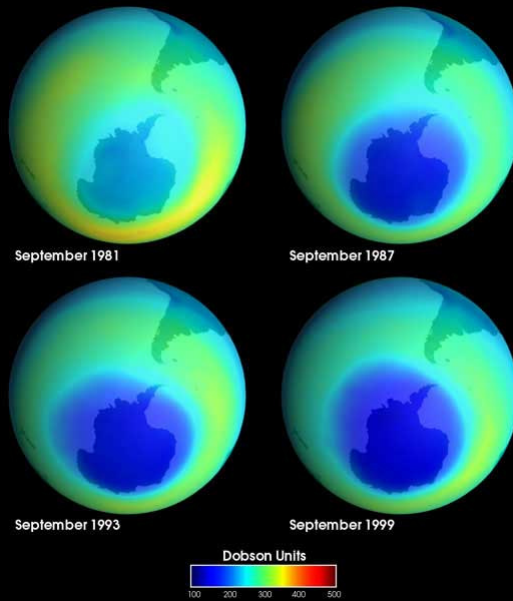
CFCs



European Environment Agency



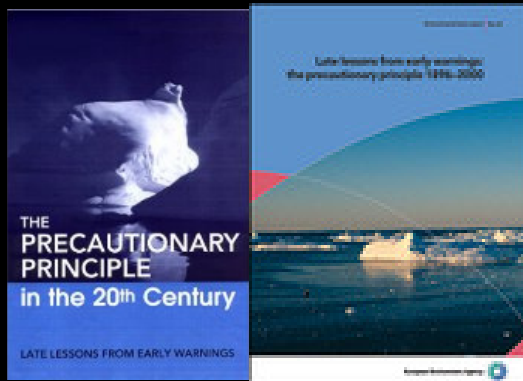
End of life?



an Environment Agency



Late lessons from early warnings



European Environment Agency



Absence of evidence of harm is not evidence of no harm



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