

The Future

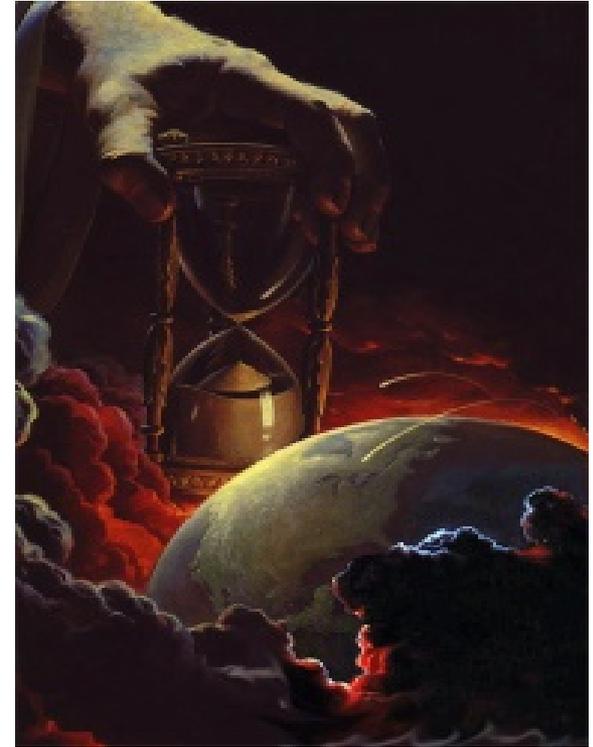
Eco-economy or eco-disaster?



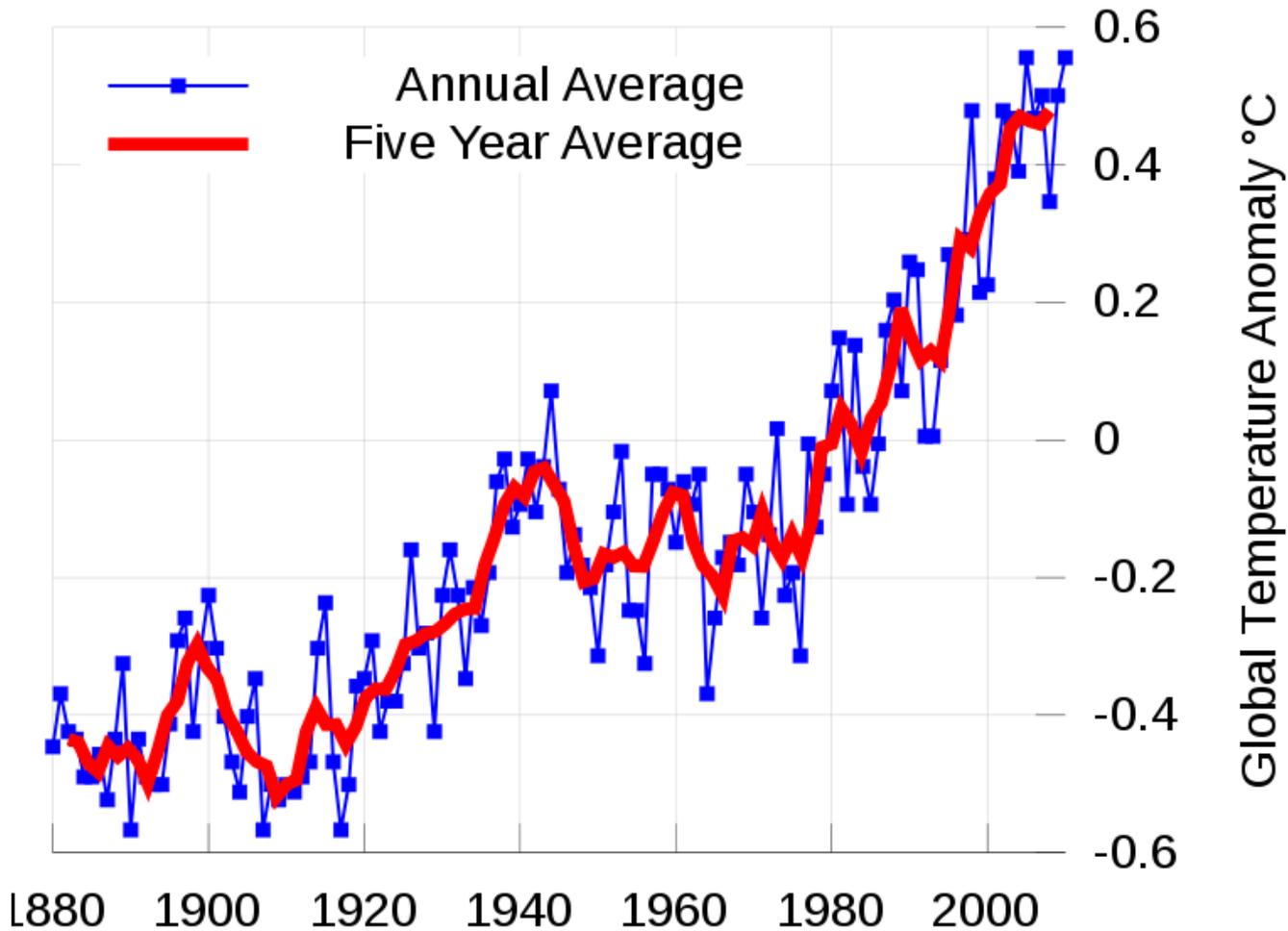
Picture taken locally by Hayley Kopelson, CHEM 321 student, July 2012, CC-BY-SA 3.0 license.

Is it too late?

- Two-thirds of the world's resources already used up.
- The world's population continues to rise.
- Supply of cheap oil is running out.
- Global warming is a reality & getting worse.
- Politicians and investors seem only to think about the next election, not about the long term.



Climate change is real!



instrumental record of global average, as compiled by NASA, [taken from WM Commons](#)

Royal Society Reports (2005 & 2012)

1,360 scientists from 95 countries. Chaired by Robert Watson, the British-born chief scientist at the World Bank and a former scientific adviser to the White House.

- Two-thirds of the world's resources already used up.
- More land has been claimed for agriculture in the last 60 years than in the C18th & C19th centuries combined- 24% of all land.
- Humans now use between 40% and 50% of all available freshwater running off the land.
- "Business services" provided by nature = \$33 trillion, almost twice the global GNP
- Population will reach 9 billion by 2050. The Earth can support this, but only if inequalities are addressed

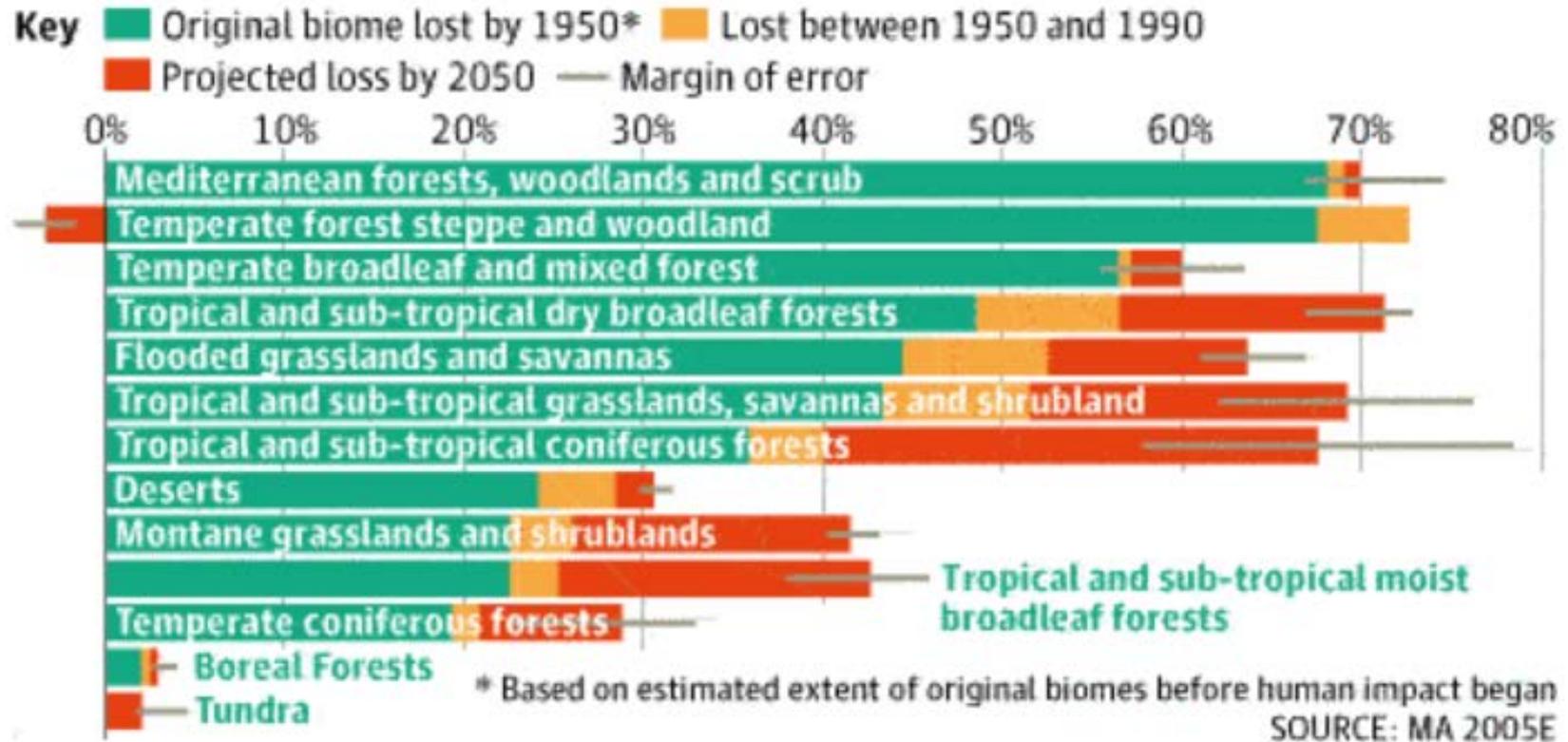
<http://www.guardian.co.uk/life/science/story/0,12996,1447921,00.html>

<http://www.theguardian.com/environment/2012/apr/26/earth-population-consumption-disasters>

From the 2012 report

Loss of natural habitats

Conversion of major terrestrial biomes for human use



Royal Society Report (2005)

- "In many cases, it is literally a matter of living on borrowed time. By using up supplies of fresh groundwater faster than they can be recharged, for example, we are depleting assets at the expense of our children."
- "The ability of the planet's ecosystems to sustain future generations can no longer be taken for granted ."



Reservoir in Košín, Czech Republic.
[Picture](#) from Wikipedia Commons
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Or is this just scaremongering?

- Some, such as [Bjørn Lomborg](#), [argue](#) that global warming and many other environmental issues have been overplayed. Lomborg argues that:
 - We would achieve far more by putting funds into poverty reduction, AIDS prevention, instead of attempting a fruitless fight against global warming.
 - In the long term, helping poor countries develop would do much more for the environment than carbon taxes etc.
 - We are not running out of fossil fuels, and the forests are not disappearing particularly quickly.
- Critics argue that Lomborg's arguments are based on misrepresentations of the science and the environmental movement.



[Picture](#) from
Wikimedia Commons
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Is an eco-economy possible?

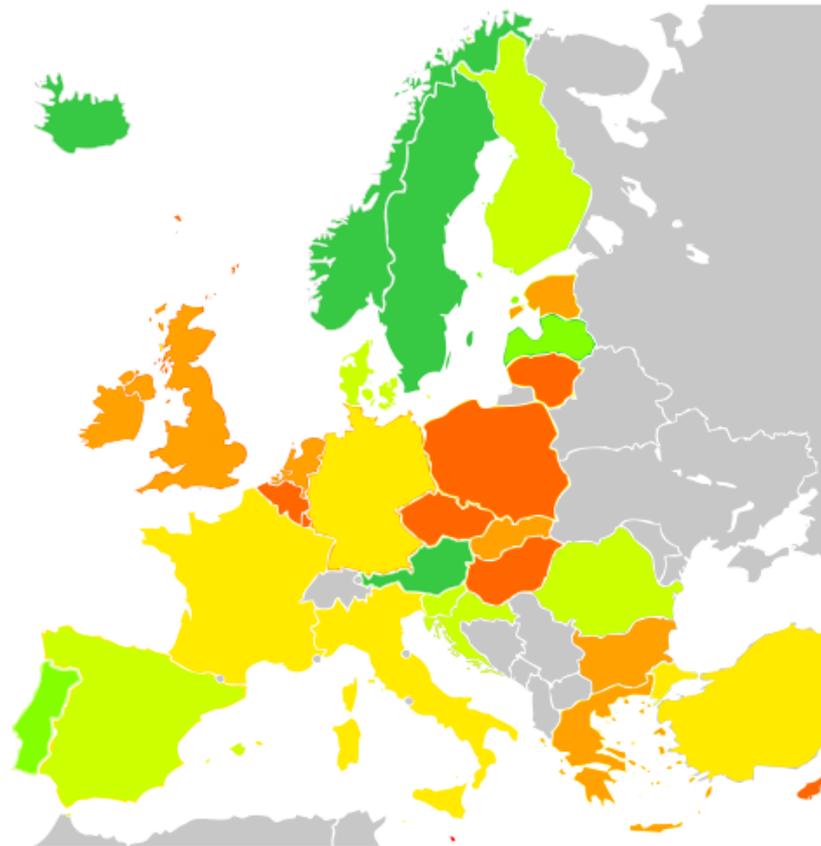
- Would involve completely restructuring the world's economic system.
- Switch from a throwaway consumer ethos.
- Hard to initiate change without a crisis- but will the end of oil provide the crisis? Or will global warming?
- May provide a great investment prospect!

Some progress?

- Much more public attention worldwide.
- Sustainable development now official policy in many countries.
- Localized pollution in developed countries much reduced due to legislation for clean air & water.
- Kyoto protocol, Montreal protocol etc.

Renewable energy, making headway in Europe

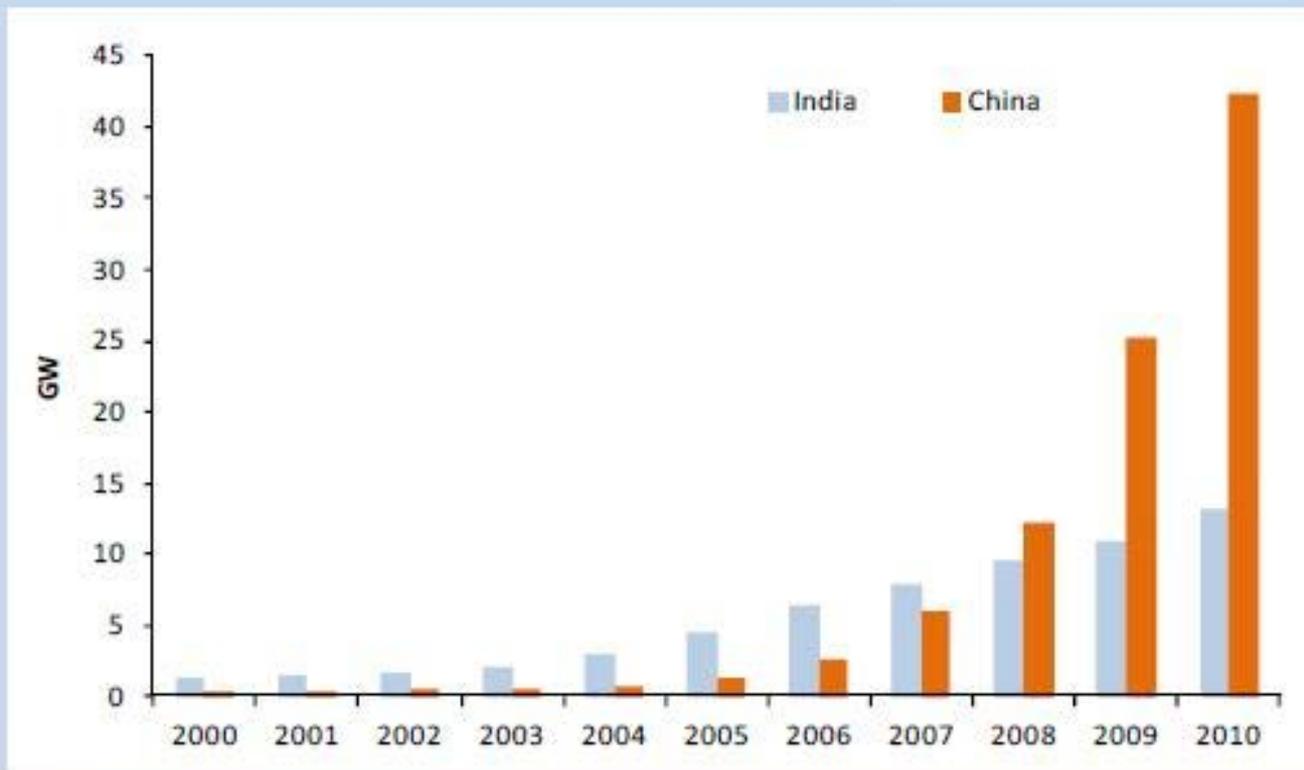
[Chart](#) taken from 2007 data, public domain



Eurostat, 2007

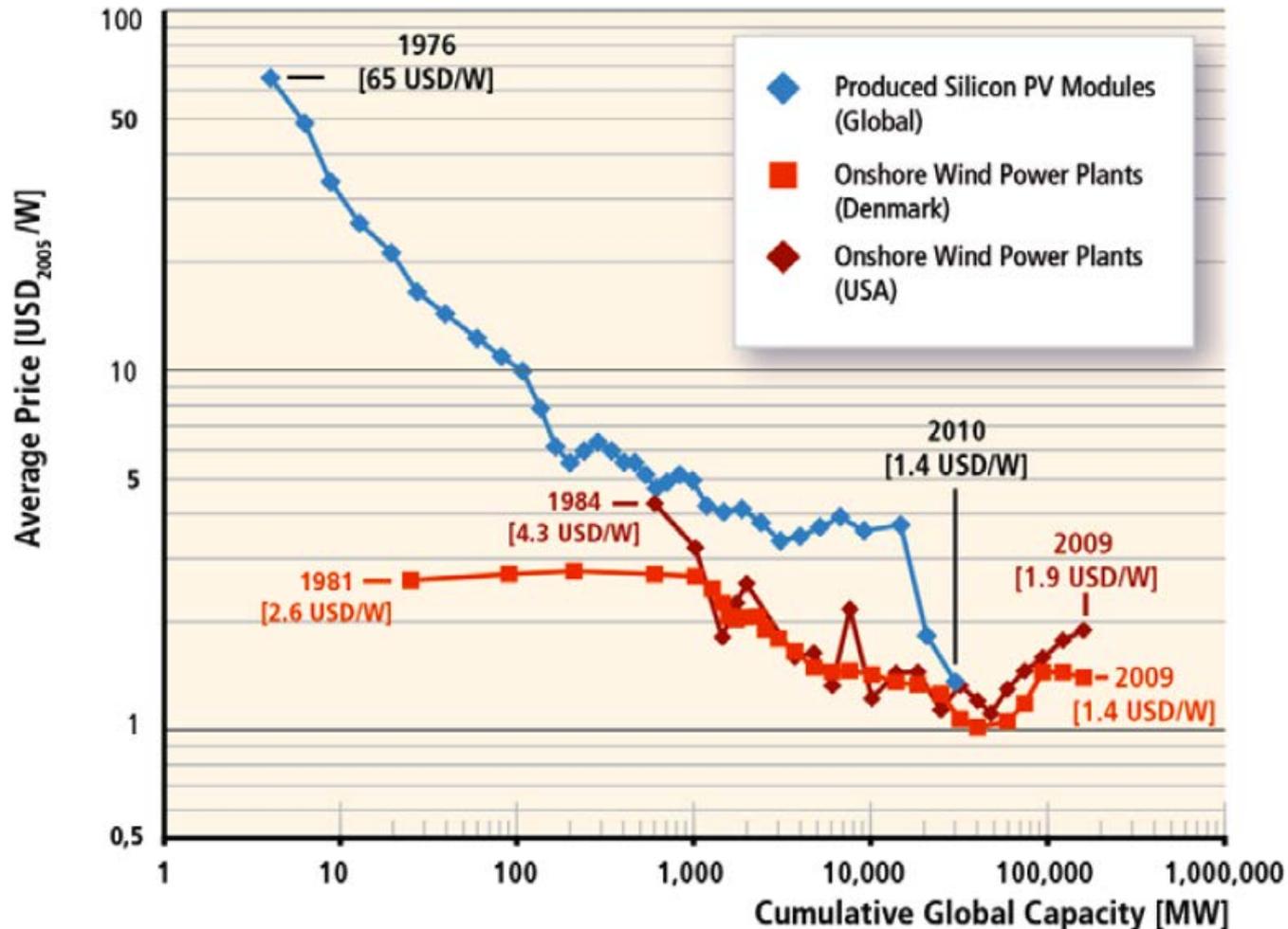
Now India & China are investing heavily

Figure 3. China and India's growth in wind power capacity



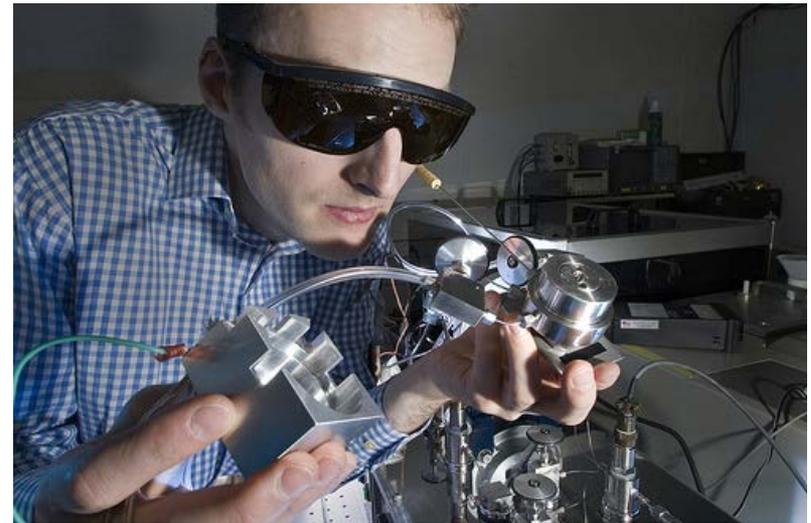
Source: Global Wind Energy Council (GWEC) and country submission.

And prices are coming down – very quickly, that’s a logarithmic scale!



Data from [IPCC 2011 report](#), as interpreted at [SkepticalScience](#)

Not just energy – also sustainable materials are having an impact



Use of bioplastics continues to grow rapidly.
Graph from environmentalleader.com

Use of supercritical CO₂ to replace chlorinated solvents is now mainstream – from decaffeination of coffee to dry cleaning of clothes. [Picture](#) by Brookhaven National Labs CC-NC license.

Table 11-1. *Shifting Taxes from Income to Environmentally Destructive Activities*

Country, First Year in Effect	Taxes Cut on	Taxes Raised on	Revenue Shifted ¹ (percent)
Sweden, 1991	personal income	carbon and sulfur emissions	1.9
Denmark, 1994	personal income	motor fuel, coal, electricity, and water sales; waste incineration and landfilling; motor vehicle ownership	2.5
Spain, 1995	wages	motor fuel sales	0.2
Denmark, 1996	wages, agricultural property	carbon emissions from industry; pesticide, chlorinated solvent, and battery sales	0.5
Netherlands, 1996	personal income and wages	natural gas and electricity sales	0.8
United Kingdom, 1996	wages	landfilling	0.1
Finland, 1996	personal income and wages	energy sales, landfilling	0.5
Germany, 1999	wages	energy sales	2.1
Italy, 1999	wages	fossil fuel sales	0.2
Netherlands, 1999	personal income	energy sales, landfilling, household water sales	0.9
France, 2000	wages	solid waste; air and water pollution	0.1

¹Expressed relative to tax revenue raised by all levels of government.
Source: Adapted from David Malin Roodman, "Environmental Tax Shifts Multiplying,"
in Lester R. Brown et al., *Vital Signs 2000* (New York: W. W. Norton & Company,
2000), pp. 138-39.

Manufacturing

- Society will still need goods to be manufactured.
 - Is sustainable manufacturing feasible?
 - Full cost accounting – will it become the norm?
 - Life Cycle Analysis and ISO 14000: Window dressing or a sea change?
 - Remanufacturing, green chemistry – are these realistic & viable, or just environmental dreaming?



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What do you think?