

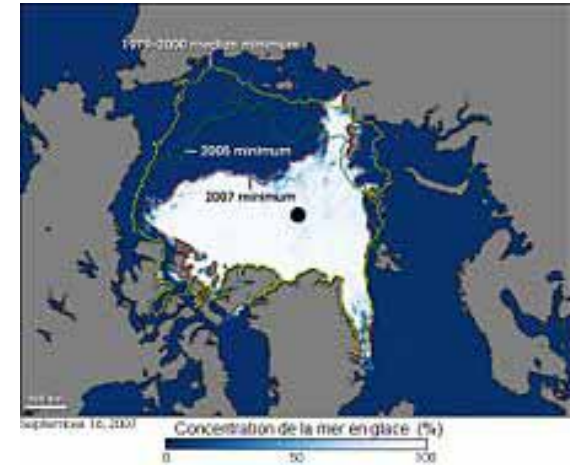
Barriers to a Low-Carbon Society

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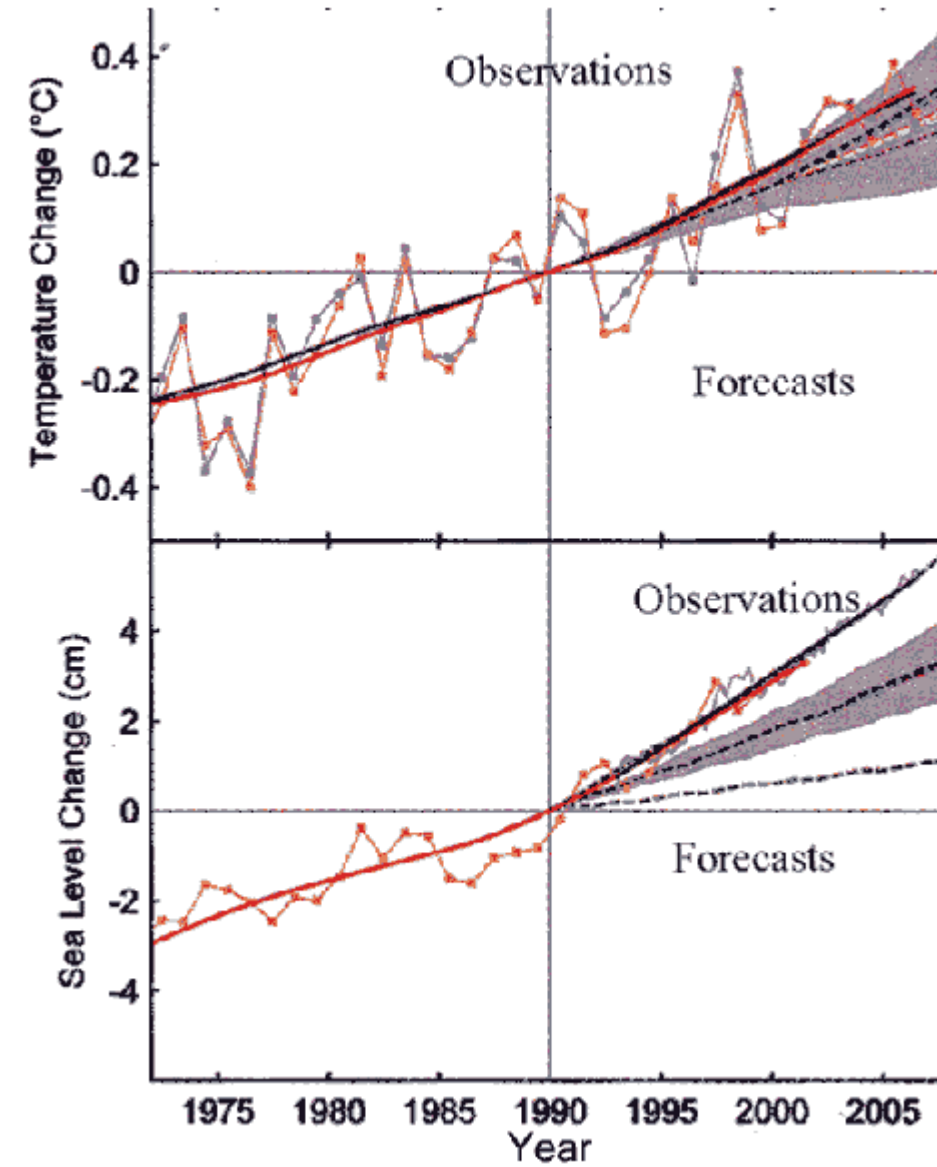
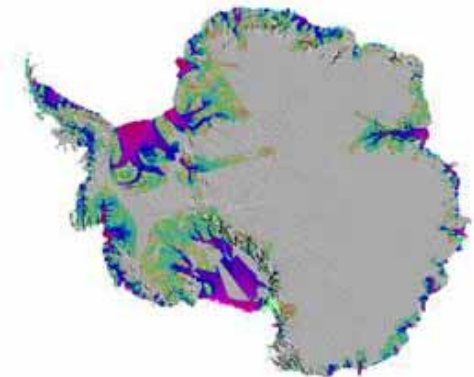
Current Direction/trends

- CO2 emissions accelerating
- Previous international control regime (Kyoto) ineffective
- Fossil Fuel companies (and Gov'ts) yet to engage (Exxon obviously but even BP retrenched back to fossil fuel)
- Deforestation drivers strengthening with biofuel adding to population, soya, beef and timber pressures
- Science looking more ominous
- Means low-carbon society more urgent but more distant!

Arctic



- *Nature News* (13.1.08)
- **Antarctic ice loss speeding up**



Towards a Low Carbon Society

- Barriers severe to impossible at all levels:
 - Individual
 - National
 - International
- Do we have time to overcome them??

Individual Barriers

- Global Warming skeptics/ disinformation
 - Highly Effective in UK and US
 - June 2007 Mori poll conducted in the UK found 56% believed scientists were still questioning climate change



- **Human activity is a significant cause of global warming?**

- **BBC Poll (Nov 2007)**

	US	China	UK
Agree	71	87	78
Disagree	24	11	17

- More people in China think that human activity is responsible than in the UK or the US.

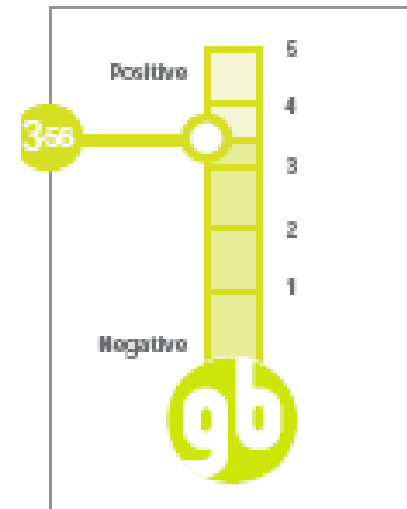
Green Barometer- Quarterly survey

- Attitudes to helping the environment

Apr 2007	July 2007	Nov 2007
3.56	3.42	3.28

- Actions to help the environment

Apr 2007	July 2007	Nov 2007
2.00	0.92	1.96



Significant variability – concern ephemeral?
Bad news tolerance or discounting

Also from Green Barometer

- Willingness to change/make sacrifices
 - Trivial OK; substantive NO!



- 92% not prepared to stop using a patio heater
- Carbon Credit card no/ probably no 70%; yes;5%

SDC Sustainable Consumption Round Table Actions



Practical initiatives as catalysts for behaviour change; e.g.:

- airlines to introduce carbon offsets on an 'opt-out' basis;
- make on-site energy generation a common sight in new homes and public buildings;
- roll out smart meters, to help people get to grips with energy use;
- enabling schools to serve balanced, seasonal, quality food;
- giving serious incentives to low-carbon cars
- Collaborate with business to plot sustainability 'product roadmaps'; e.g.
 - low-carbon cars;
 - low-energy home entertainment;
 - the next generation of energy-efficient lighting.
- Reward households for careful use of energy and water via taxes and tariffs, and penalise excessive consumption.
- Empower and resource local authorities to help people play their part in sustainable communities. Councils should give street-level feedback on recycling and other achievements, reward those who pledge to adopt sustainable behaviours, and support community-level action.

SDC: Individual responsibility – how far?

- Government and business must focus fairly and squarely on mainstream consumers, rather than expecting the heroic minority of green shoppers to shop society's way out of unsustainability.
- Incentives (grants, reduced taxes) more effective than penalties
- But even if recommended measures spread, anticipated reductions in range of 10-30% - hardly enough to offset IEA growth forecasts!

However- Consumer confusion

- **Home wind turbines dealt a blow (Guardian)**

“The energy from some micro power equipment would not operate a lightbulb, says official study. Home wind turbines are significantly underperforming and in the worst cases generating less than the electricity needed to power a single lightbulb, according to the biggest study of its kind carried out in Britain.”

- **Have you got Green Fatigue? (Independent)**

“You recycle and buy local- but the Earth is still warming up. If you’re starting to feel apathy creeping in you’re not alone.”

- **Walking to the shops ‘damages planet more than going by car’ (Times)**

“Walking does more than driving to cause global warming, a leading environmentalist has calculated”

Conclusion

- Can't rely on individual choice for more than trivial contributions to sustainable consumption
- Individual choice has to be steered and rewarded and penalised consistently because it takes time for new norms and habits to form and take root
- Incentives better than penalties because the latter breed resistance and may lead to political costs and loss of societal consensus
- So what incentives are there??

National – Talk and Action

- UK targets 20% reduction by 2010; 60% by 2050
- Meanwhile

FT.com
FINANCIAL TIMES

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Eon clears latest hurdle on plant

By Rebecca Bream, Utilities Correspondent

Published: January 4 2008 02:00 | Last updated: January

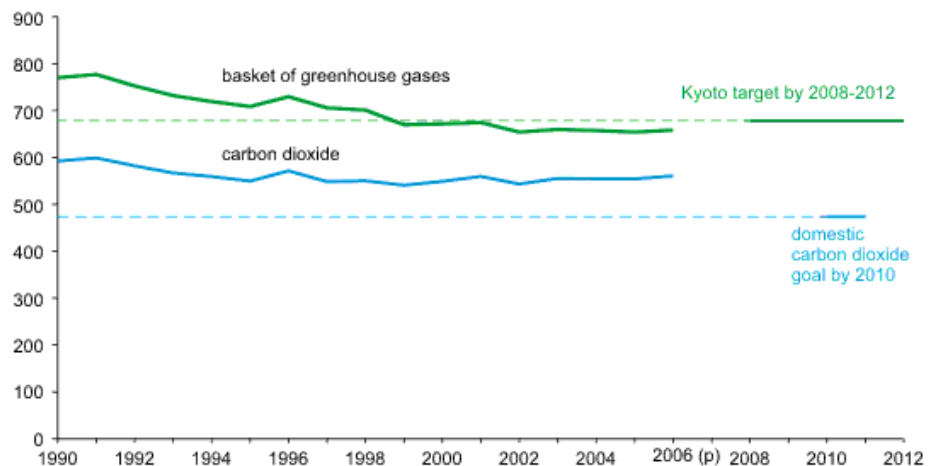
The energy company Eon has passed another UK's first coal-fired power station since the 1970s following fierce criticism from environmental groups.

Eon plans to replace its ageing Kingsnorth power station with a new, 1,600 MW plant on the same site. The company will invest £1bn in the new facility, which could be operational by 2012.

Emissions of greenhouse gases: 1990-2006 (provisional)

million tonnes (carbon dioxide equivalent)

United Kingdom



Source: AEA Energy & Environment

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Anger at Heathrow expansion plans

Proposals for a third runway at Heathrow airport have been criticised by residents and environmentalists.



A Valid Question (Guardian)

- The improvements to the climate change bill that Hilary Benn, the environment secretary, announced yesterday were welcome. But in every major energy sector - aviation, transport, power generation, house building, coal mining, oil exploration - the government is promoting policies that will increase emissions. How will it make the 60% cut that the bill enforces?

Japan- same problem

- Despite industry global leader in low and new energy; carbon intensity not changed since late 80s
- Despite Innovation 25 seeing sustainability as 6th Innovation wave where Japan is well placed to benefit by leading
- Keidanren still sees emissions as threat not opportunity

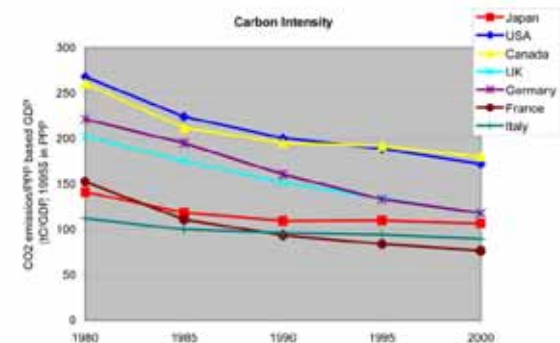


Figure 2. Carbon Intensity in Selected Developed Countries. (Source: Institute of Energy Economics, Japan, 2004.)

Conclusion

- Even where Government has a strong policy and many scientists telling it what to do, hard decisions are very difficult and there is yet no evidence that carbon reduction will have priority over other policies.
- Even Governments well placed to get 'double dividend' acts defensively and do not lead (see <http://www.ft.com/cms/s/0/5f30535c-bf1e-11dc-8c61-0000779fd2ac.html>)

Is the answer the Carbon Price?

Table 2: SPC from 2007 to 2050 (in 2007 prices)

Shadow Price of Carbon in 2007 prices (£/tCO₂)

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SPC in 2007 prices and with 2% pa increase	25.5	26.0	26.5	27.0	27.6	28.1	28.7	29.2	29.8	30.4	31.0	31.6

2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
32.3	32.9	33.6	34.3	34.9	35.6	36.4	37.1	37.8	38.6	39.4	40.1	40.9	41.8	42.6	43.4

2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
44.3	45.2	46.1	47.0	48.0	48.9	49.9	50.9	51.9	53.0	54.0	55.1	56.2	57.3	58.5	59.6

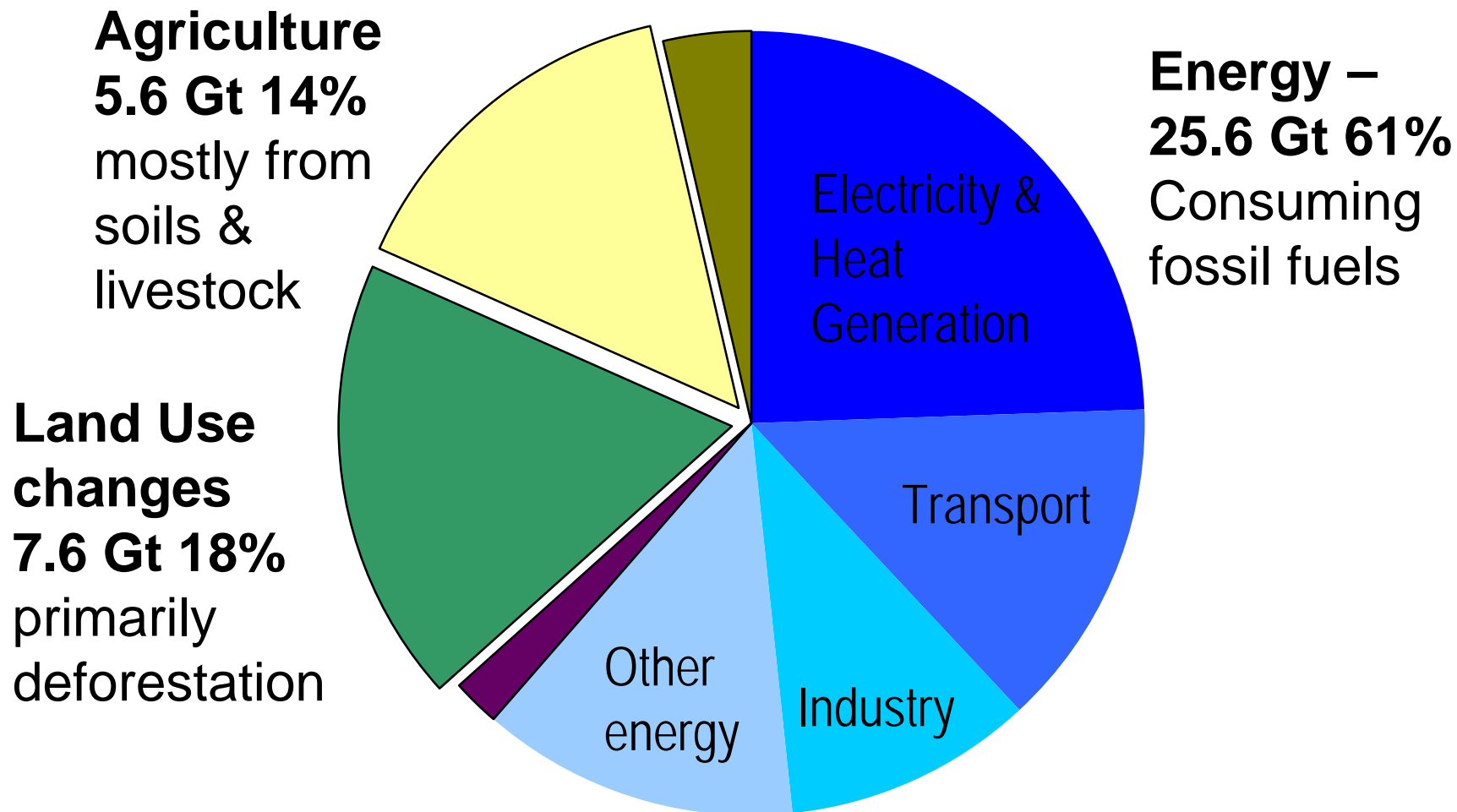
(Actual prices under the ETS have varied from 1-18/teCO₂)

<http://www.defra.gov.uk/Environment/climatechange/research/carboncost/index.htm>

International Barriers

- Climate Change denial activities
- Self-interest (Global warming winners)
- Oil/coal/gas Industry dominated countries
- Developing/ Developed country responsibility allocation
- Free-riders, trade and competition

1. Global emissions of GHG



Source: World Resources Institute. 2000 estimate.

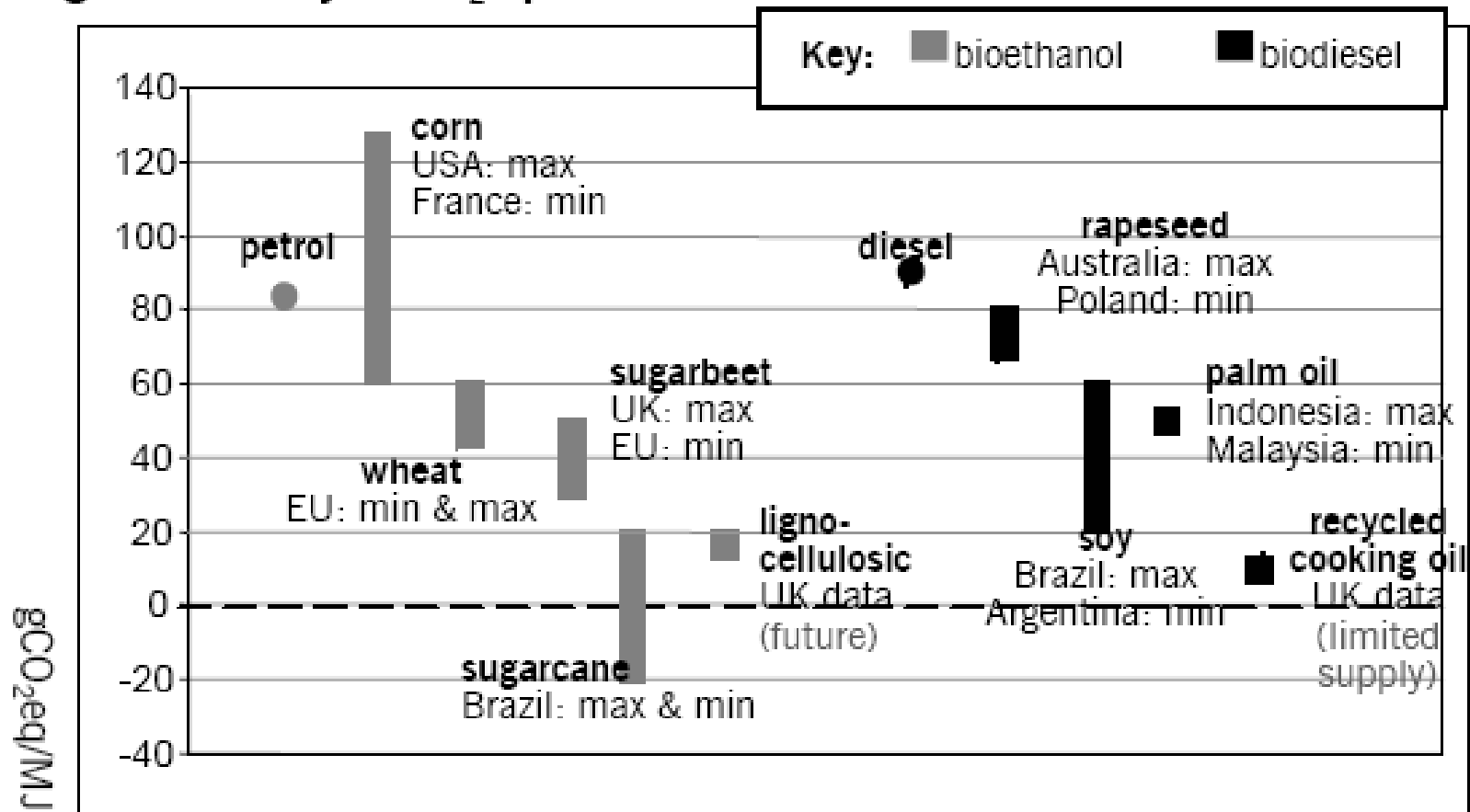
All GHG in CO2 equivalent

Brazil, Indonesia Etc.

- Deforestation emissions dominate
- This is related to demands for food and biocrops and cannot be disentangled from wider trade and energy policies including those of the World Bank
- There is a conflict between market forces responding to consumer, market and government pressures and protection of remaining forests
- Responsibility not just forest clearers but the chain of production that buys from them as well. The big soya companies, the meat storage plants that have set up there (with WB support)
- Trends of increasing world population, increasing per-capita meat consumption (especially beef) are increasing the pressures for deforestation
- Biofuels are adding an additional pressure

Biofuel Carbon

Figure 1. Life cycle CO₂eq emissions of fossil fuels and biofuels



Source: Values for all data from: Carbon reporting - default values and fuel chains, *E4Tech*, 2007, except wheat: Well-to-wheels analysis, *Concawe* 2006, and cooking oil/lignocellulosic: Carbon & energy balances, *Sheffield Hallam*, 2003. (See refs 2 & 3)

Innovation and Energy

- For every energy saving there is an opportunity to use more!

Energy saving kettle, fridge etc



Heat your toilet seat!



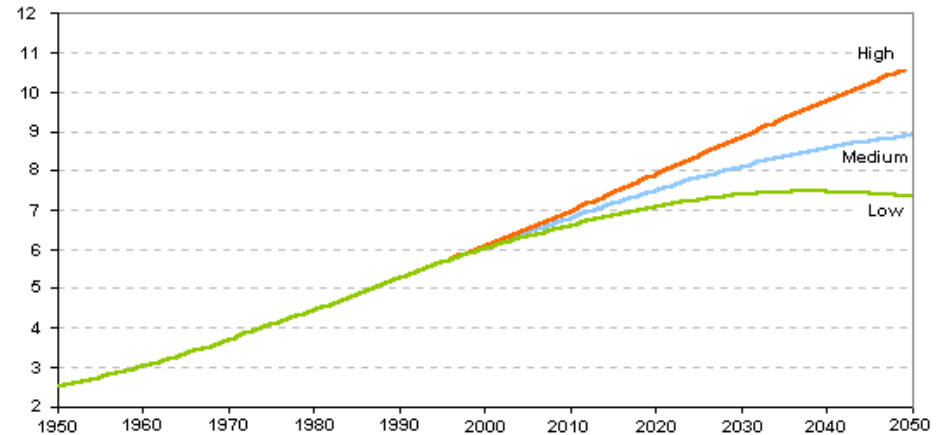
Switch to Plasma

Digital TV Set top Box



And...Growth Drivers

- Global Population



- Cars

- efficiency potential - + 30-50%
- Market expansion (2020) – x 4-5 (more??)



- Aircraft

- efficiency potential - + 20% by 2020
- Market expansion potential – x 2 by 2017

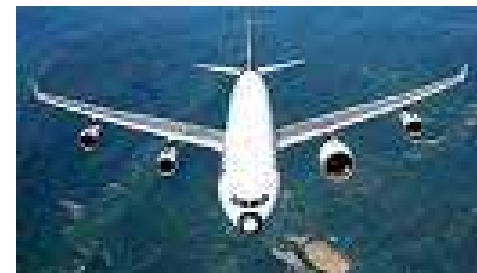
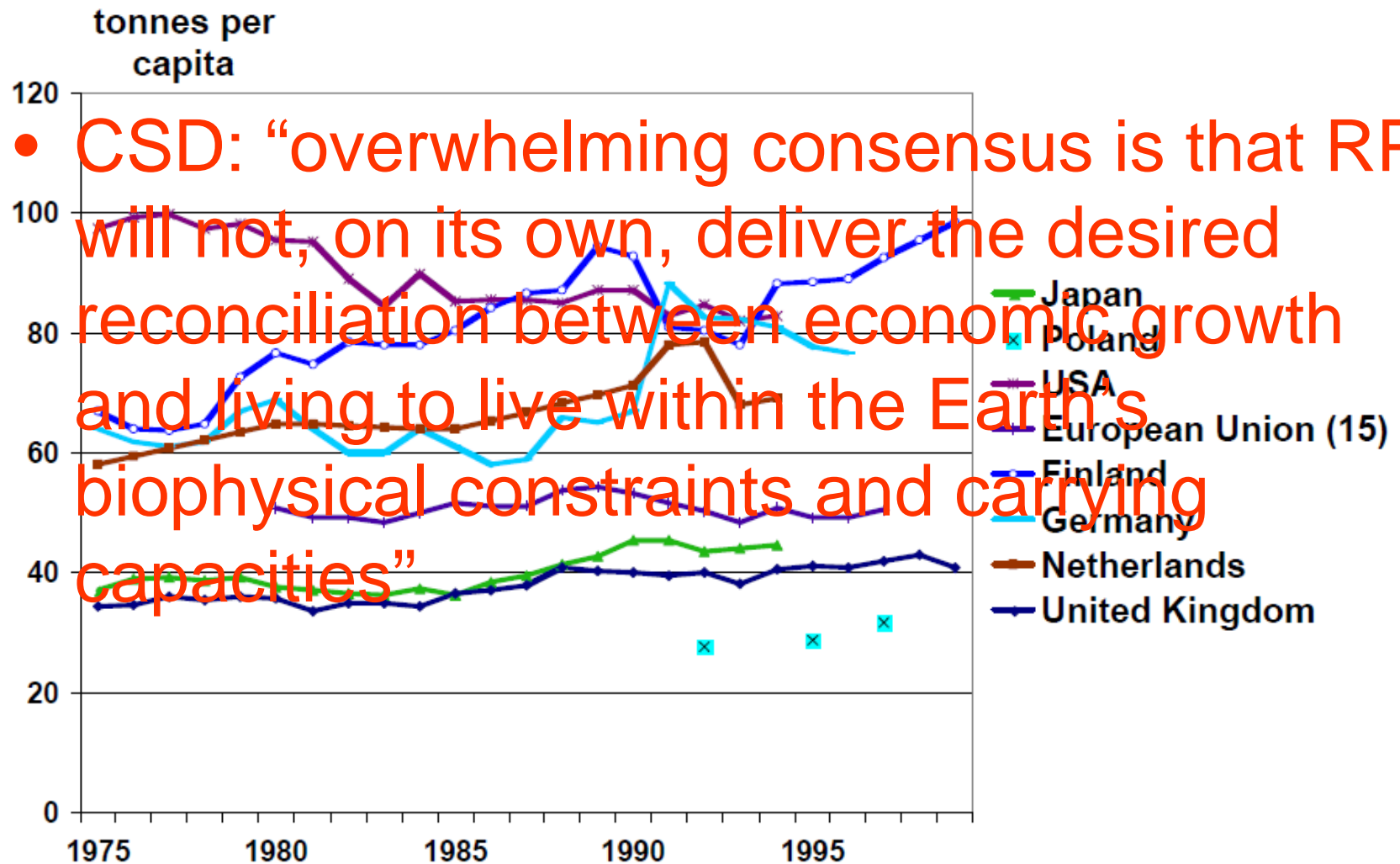
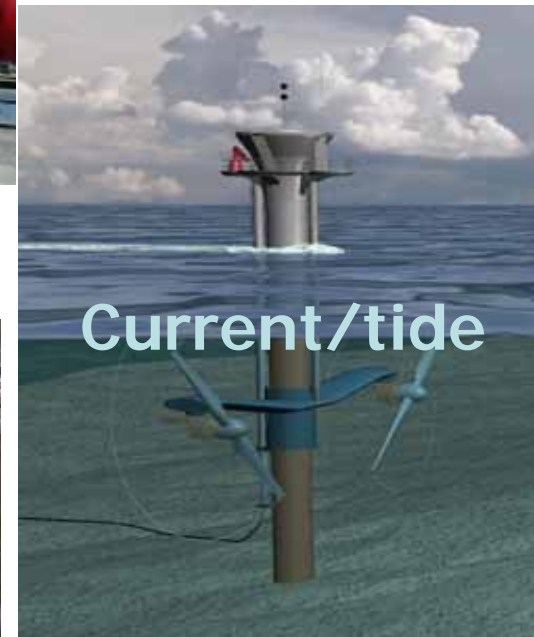
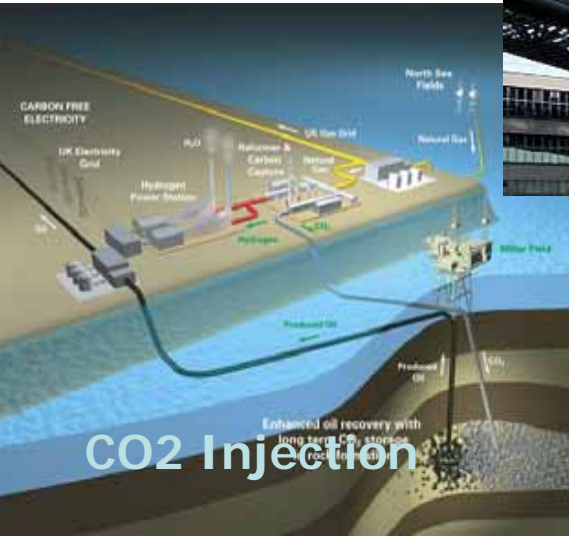


Figure 2: Total Material Requirement (TMR) per person in the UK 1975 to 1999, and international comparison



Note: for reasons of international comparability, here the TMR per capita of the UK is inclusive of soil erosion.

Innovation and Global Warming

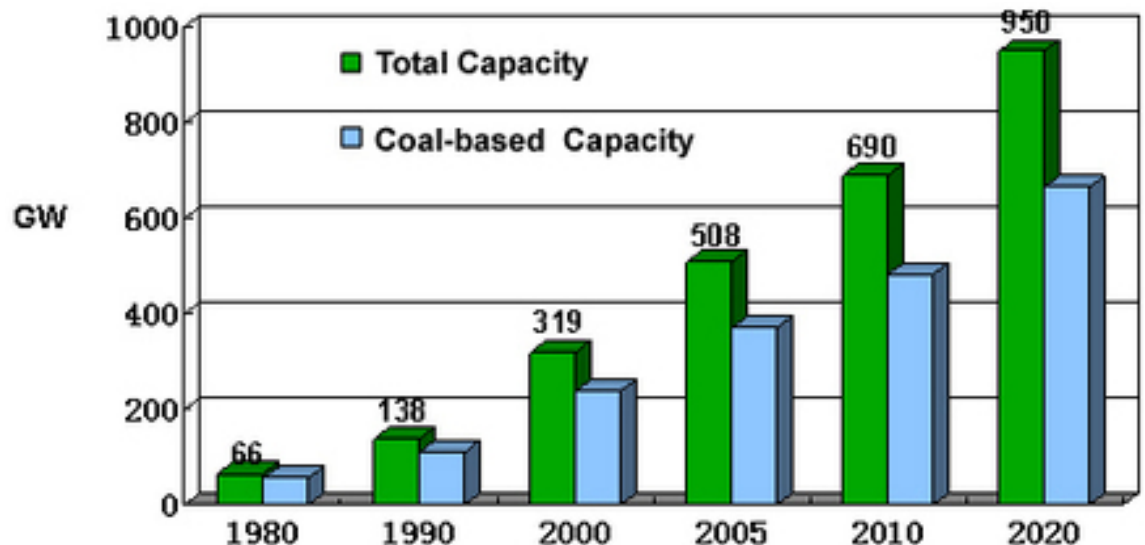


IEA Energy Perspectives

- Tools
 - Strong energy efficiency gains in the transport, industry and buildings sectors.
 - Electricity supply becoming significantly decarbonised as the power-generation mix shifts towards nuclear power, renewables, natural gas and coal with CO₂ capture and storage (CCS).
- Policies
 - Energy Efficiency priority
 - Well-focused R&D
 - R&D to Technology deployment critical
 - New stable policy environment to incentivise low-C energy
 - Non-economic barriers
 - Developed and developing Country collaboration

China and Coal

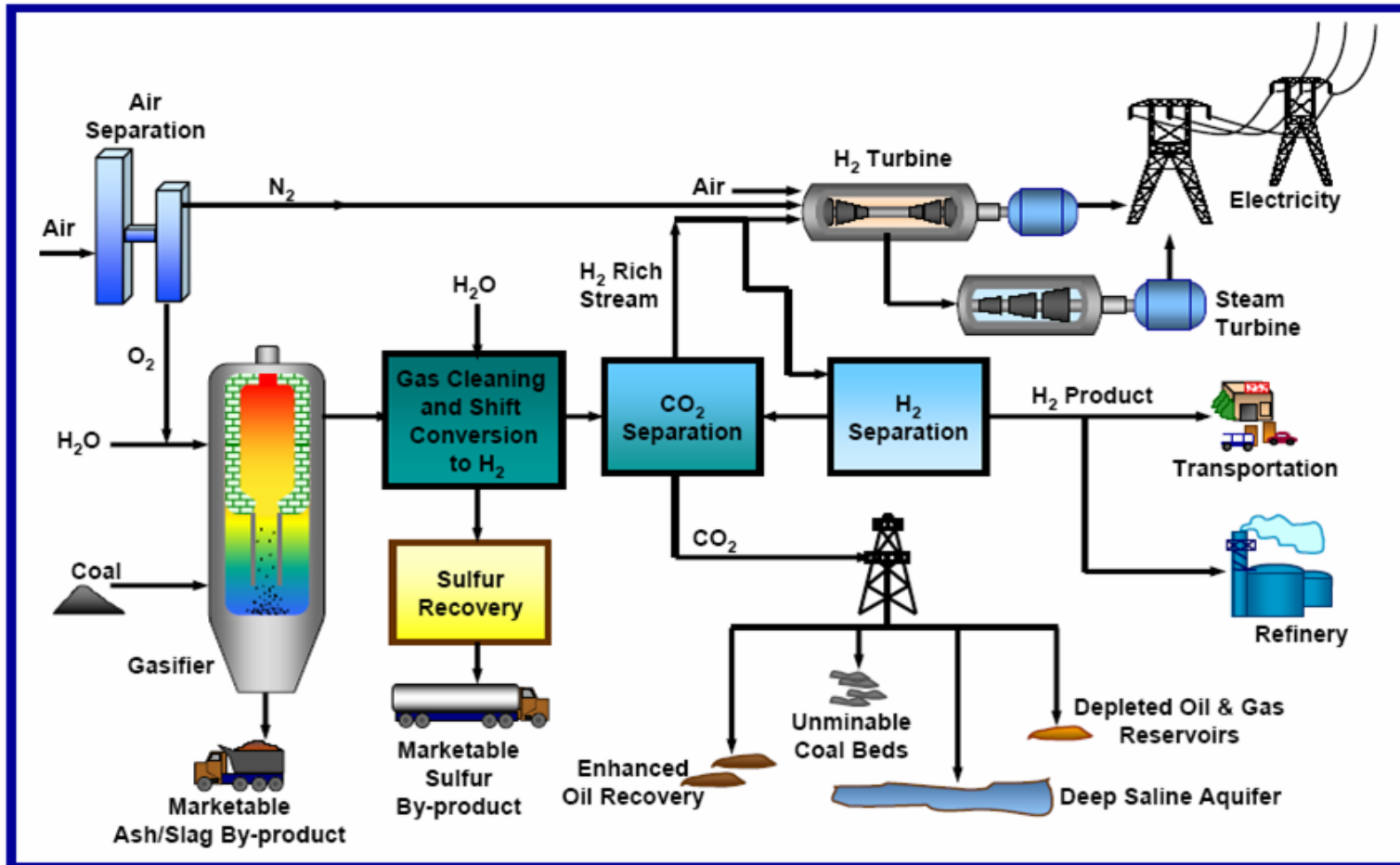
- Led by managing partner China Huaneng Group, the GreenGen Company will design, develop and operate an integrated gasification combined cycle (IGCC) power plant near Tianjin, southeast of Beijing. A 250MW plant will be built initially, expanding to 650MW in later phases.





Above all, CCS

Futuregen



The Inconvenient truth

- Our whole economic system is driving towards increased C emissions and reducing C emissions is like pushing water uphill.
- Must engage the system so it can work for rather than against LC and change the slope to downhill by:
 - Carbon price – universal and unavoidable
 - Reduce growth drivers (inc population)
 - Tackle mindset to include a limiting environment
 - Make sustainability and carbon reduction (or emissions avoidance) central aims of World Bank etc and in trade (WTO)
 - Apply PPP to Energy Companies
- Manhattan project- style urgency to CCS and new energy
- Deforestation policies

Possible 5 Key Messages

1. Engage the whole of industry by incentives – especially the PPP on FF companies and support for env industry
2. Reward green consumption – rebalance the economic playing field by carbon being included into the price of goods
3. Urgent coal decarbonisation programme funded by levy on coal
4. Governments implement cross-departmental carbon pricing into policy formulation
5. Restrict International development agencies to low-carbon development.