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Energy Security and Climate Security: shifting investment into the future

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March 2007

Temperature and Climate



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Summary of Lines of Evidence

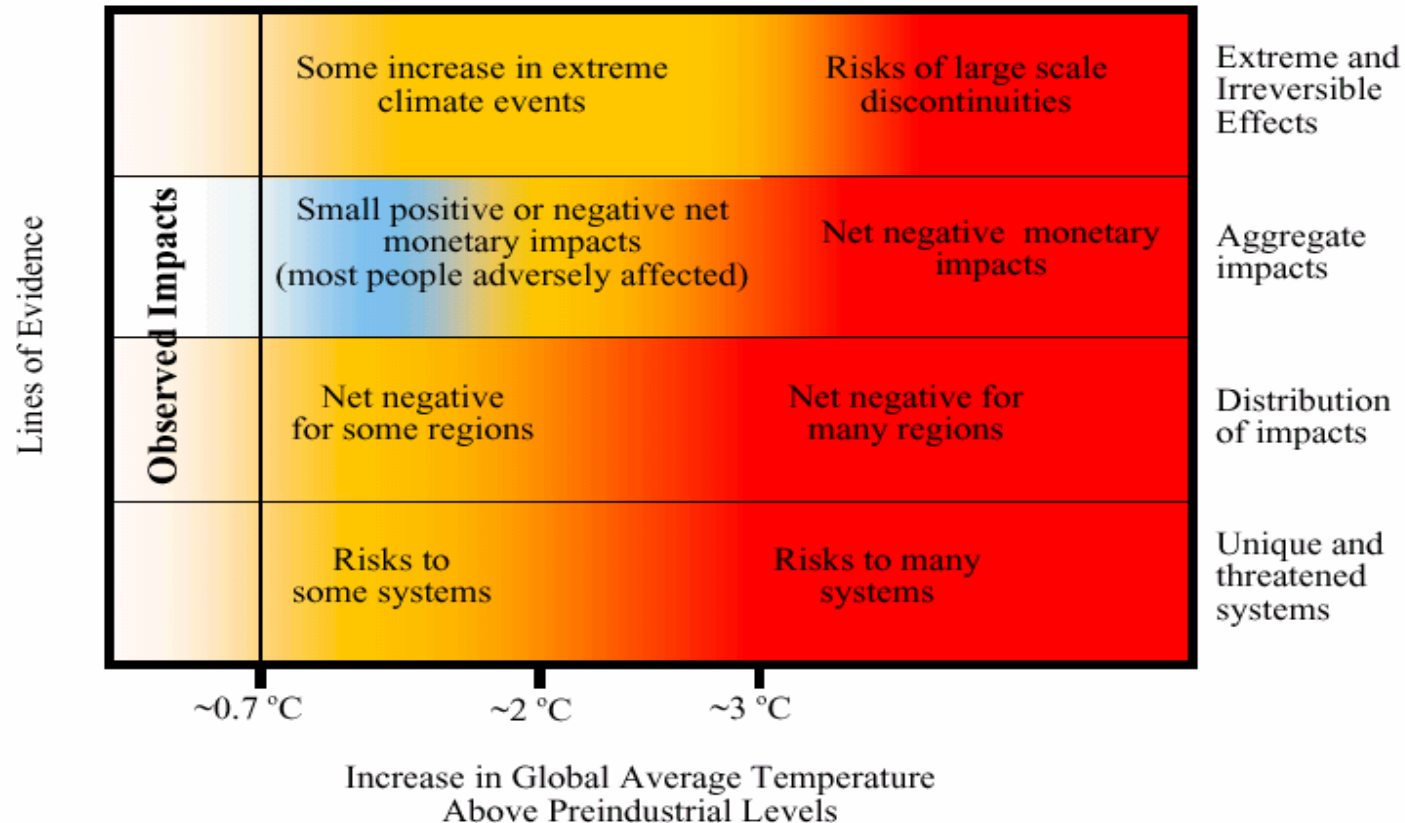
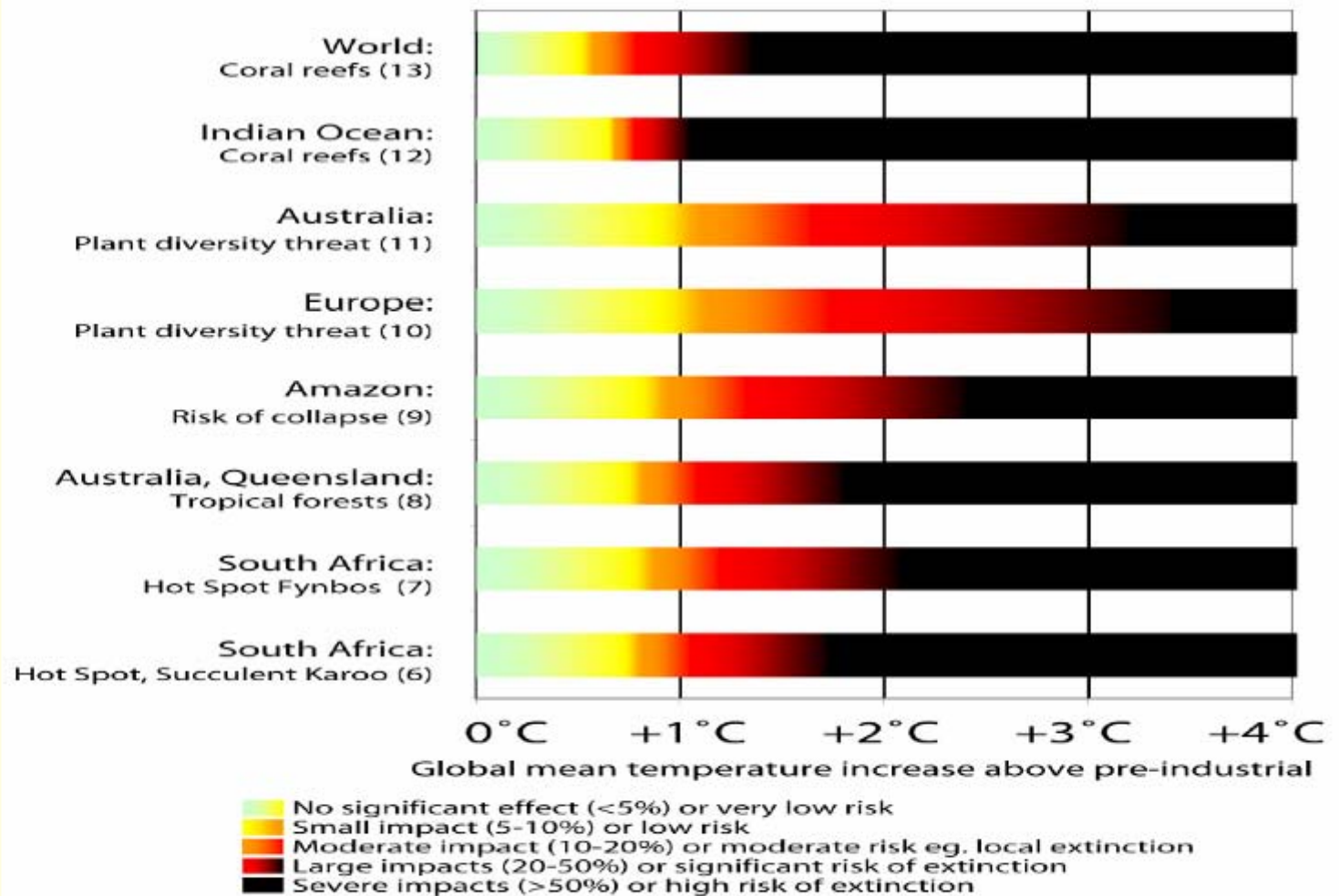


Figure 19-9-1: Risks are summarized by line of evidence with each row corresponding to a line of evidence and compared to changes in global average temperature above preindustrial levels by 2100. The color transition from blue to yellow to red corresponds to increasing risk.



Ecosystems I



Water, Food and Energy Security



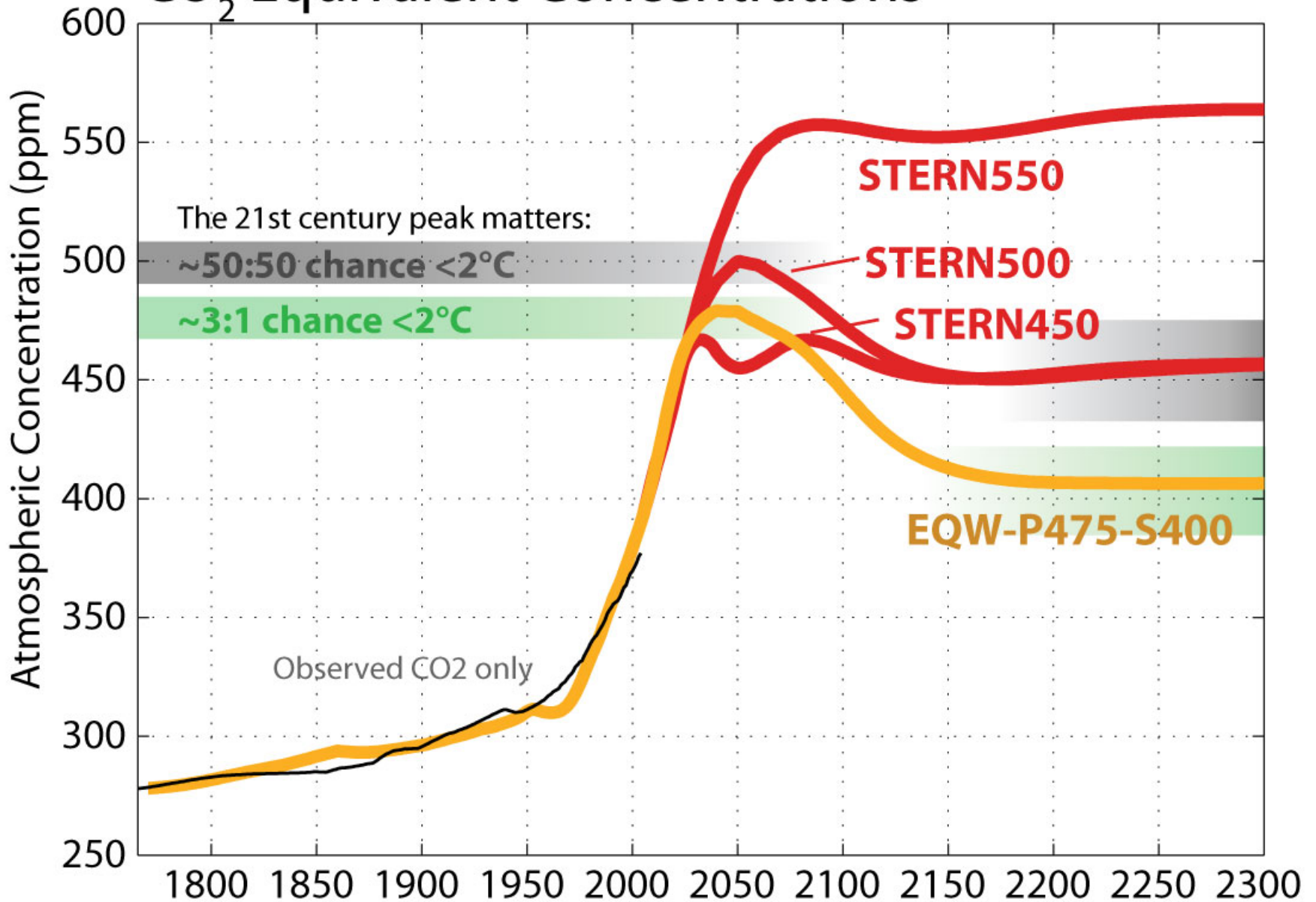
- Access to water: Under Business as usual assumptions, 2 out of 3 persons will live in water-stressed conditions by the year 2025
- Food security: Studies suggest that temperature rises of just 2-3 degrees will see crop yields in Africa, the Middle East and South Asia fall by as much as 30 to 40 per cent. It's a similar story in China.
- Energy security – vital not just for keeping the economies of the developed world running but also – crucially – for giving the developing world the means to lift itself out of poverty. An increase in the frequency and severity of extreme weather events will threaten port and energy infrastructures across the world. Danger of increased instability in key producing regions like the Middle East.

Energy insecurity is threatening global stability and democracy



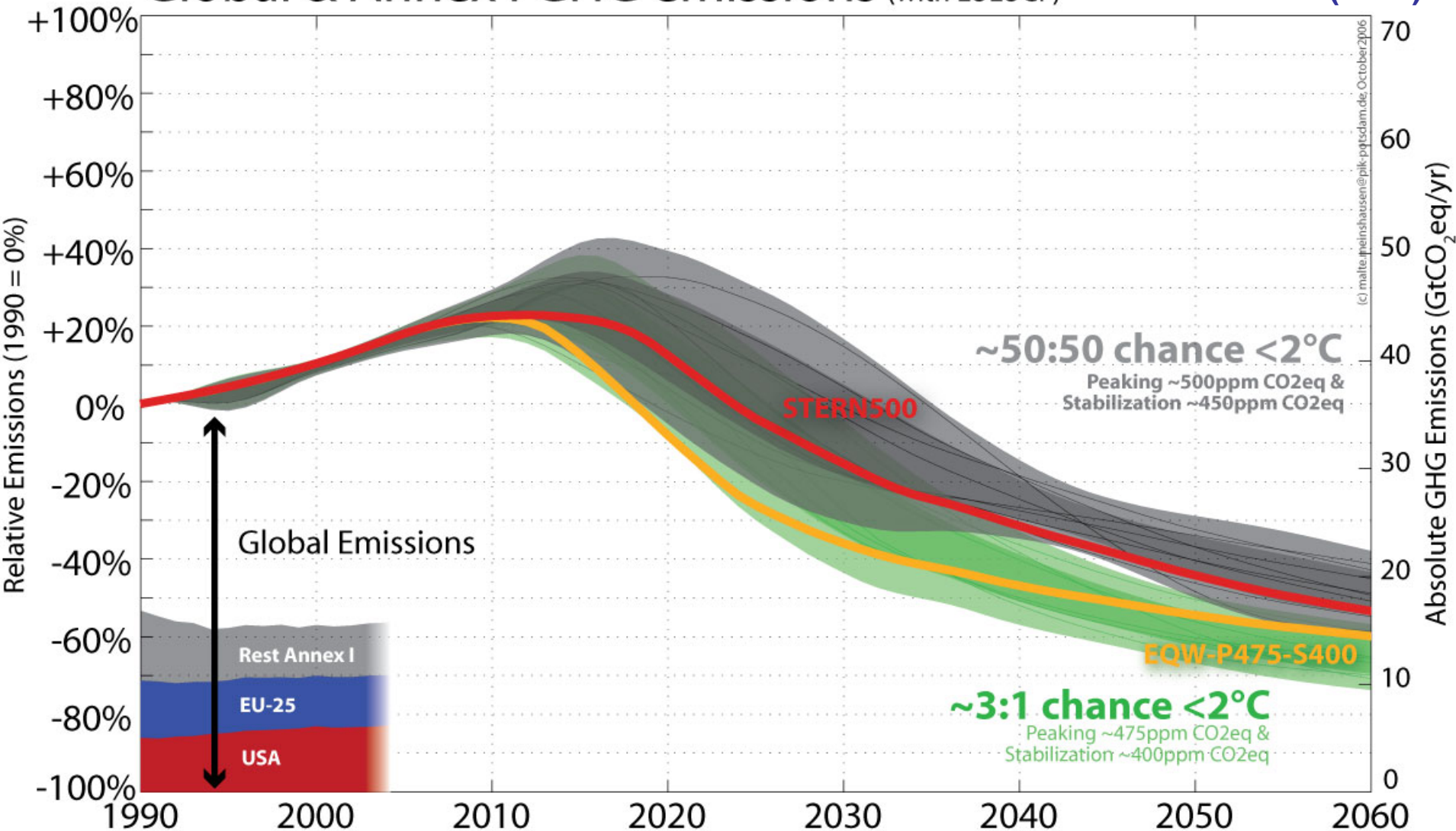
- Competition for resources, both between and within countries, is likely to rise in an increasingly resource-constrained world
- This will lead to a growing temptation for countries to secure access to resources at any cost, and increase financial flows to totalitarian regimes
- This may increase the 'resource curse' whereby resource-endowed countries, particularly those enjoying oil and mineral resources, are more prone to economic stagnation or decline, regime instability and financing of conflicts
- The continued pursuit of resources regardless of its impact on democracy and human rights would risk a breakdown in the multilateral system and the rise of hard power competition between new 'great powers'

CO₂ Equivalent Concentrations



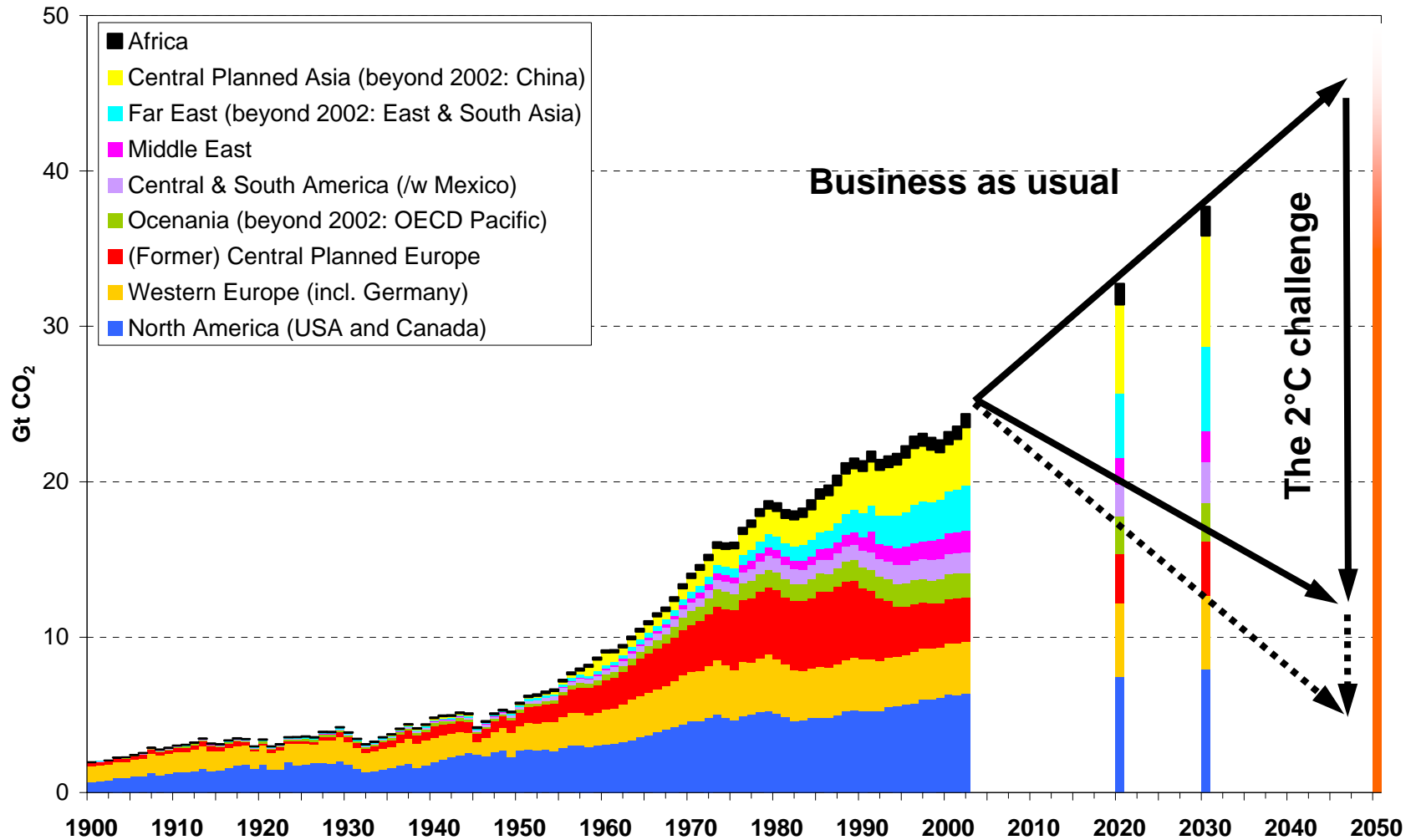
Source: M. Meinshausen (2006)

Global & Annex I GHG emissions (with LULUCF) **M. Meinshausen (2006)**



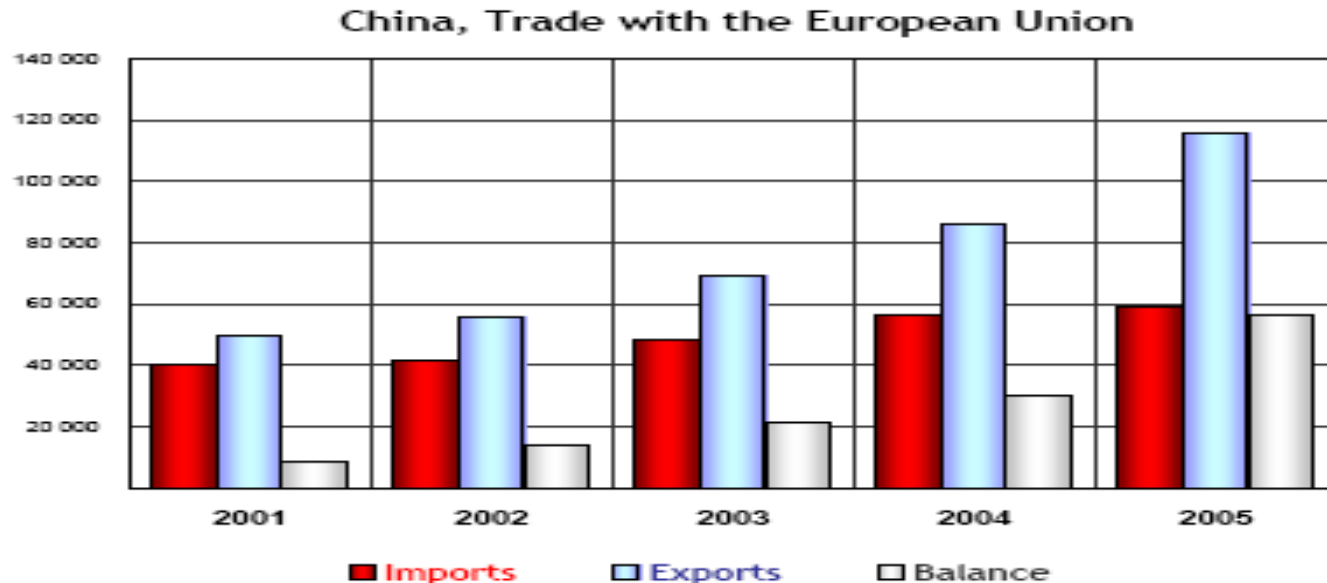
Notes: (a) Historic 1990-2003 GHG emissions including LUCF/LULUCF for Annex I country groups based on Table II-7 in UNFCCC (2005) "Key GHG Data"; (b) Shown are various multi-gas FAIR-SiMCAp (den Elzen & Meinshausen, 2006) and EQW pathways (Meinshausen et al. 2006) relative to 1990 for peaking at approximately 500 ppm and stabilizing at 450 ppm CO₂eq (grey pathways) and peaking at 475 with subsequent stabilization at 400 ppm CO₂eq (green pathways). (c) The here shown pathways comprise the SRES country groups OECD90 and REF (Economies in Transition). Note that the absolute GHG emission data is (~15%) higher compared to absolute Annex I emissions reported to the UNFCCC, partially due to non-reported sources, as landuse related emissions, and slight differences in countries (Turkey, some REF). (d) The probabilities are given to stay below 2°C global-mean warming relative to preindustrial levels, assuming an IPCC consistent climate sensitivity pdf with a 90% confidence that climate sensitivity lies between 1.5°C and 4.5°C (for details see Chapter 28 in Schellnhuber et al. "Avoiding Dangerous Climate Change", 2006). (e) The light and dark patches show the mean plus / minus one and two standard deviations, respectively, for the set of analysed FAIR-SiMCAp and EQW pathways. (f) The calculations imply default MAGICC carbon cycle feedbacks, comparable to approximately the mean across the C4MIP studies (Friedlingstein et al. 2005).

Emissions trends



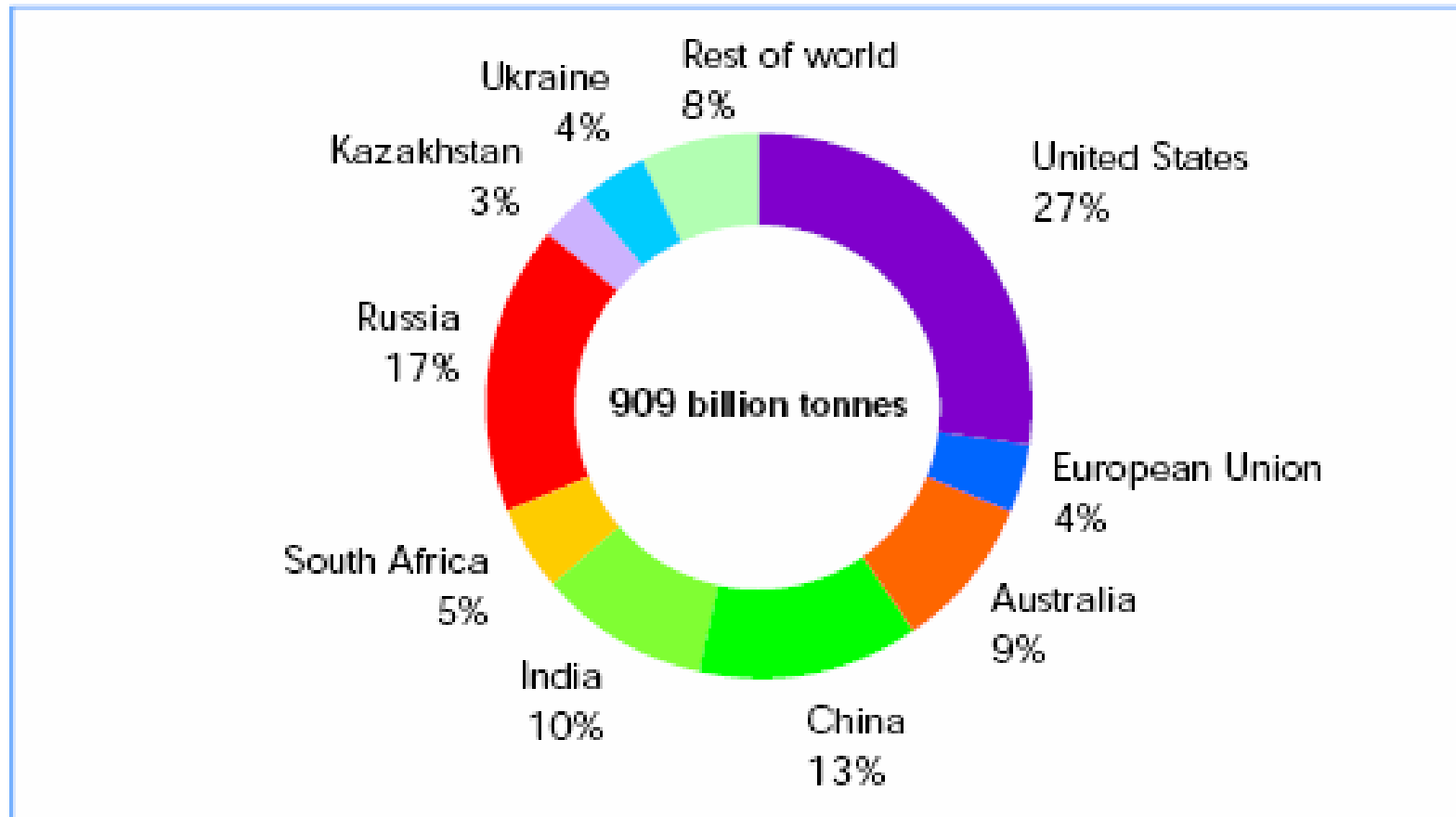
Interdependencies of economies is great

- Industry and manufacturing account for two thirds of China's total energy consumption.
- China's economy is export driven. Around 70% of China's GDP is for export and goes to satisfy the US and the EU markets. It is our consumption which is shaping China's energy demand.
- China's export to the EU is steadily increasing



Favourable factors for coal: cheap, abundant and absence of technological barriers

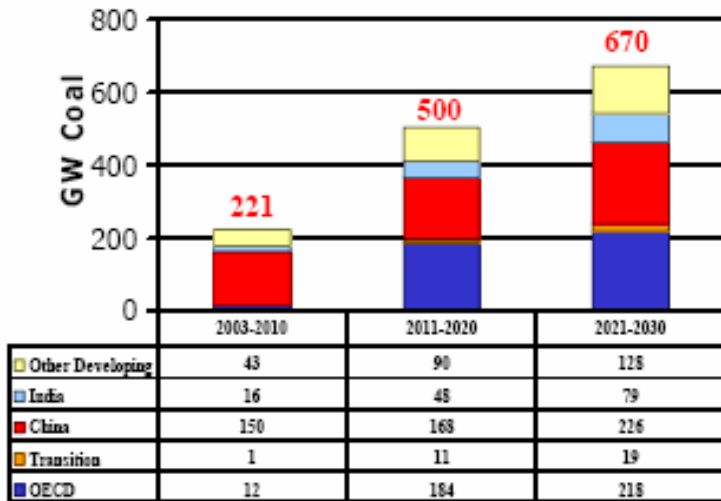
Proven Coal Reserves by Country (end-2005)



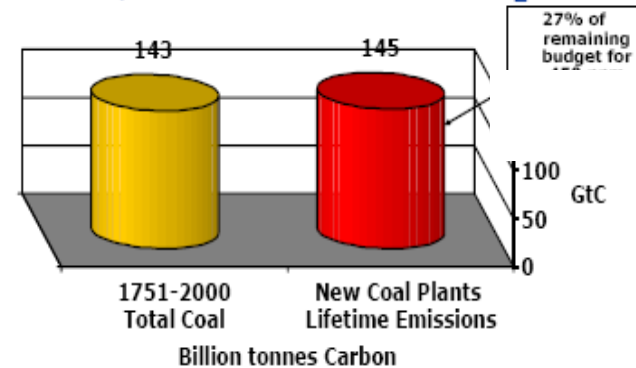
Source: BP (2006).

The number of new coal power stations is expected to increase dramatically, especially in developing countries

New coal build by decade



New coal plant emissions equal all historic coal CO₂

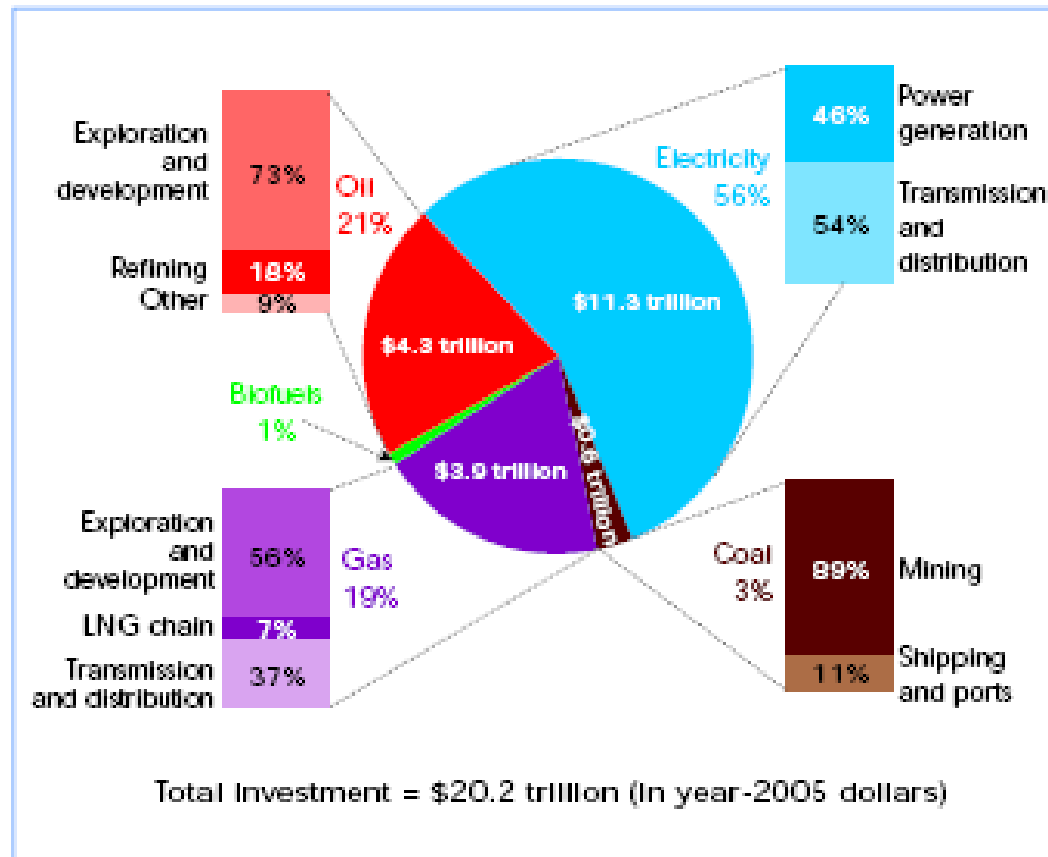


- Coal consumption is expected to rise very fast, especially in developing countries such as China
- Coal remains cheap, widely available and technologically simple to use
- Coal is the most polluting source of energy

Source: IEA, WEO 2004, ORNL, CDIAC

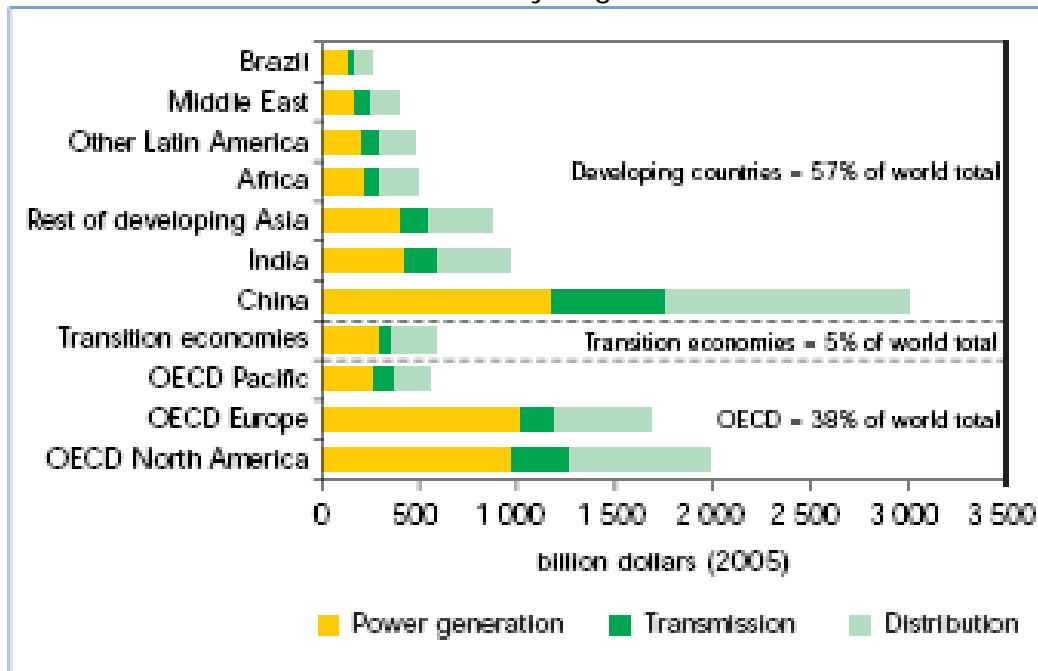
Higher investments in energy infrastructures will be needed, with an emphasis on power generation and distribution

Cumulative Investment in Energy Infrastructure in the Reference Scenario by Fuel and Activity, 2005-2030 (in year-2005 dollars)



Higher investments will be needed in middle-income countries in particular

Cumulative Power-Sector Investment by Region in the Reference Scenario, 2005-2030



- A large part of all the energy investment needed worldwide is in middle-income countries, where demand and production increase most quickly.
- China alone needs to invest about \$3.7 trillion – 18% of the world total. Russia and other transition economies account for 9% of total world investment and the OECD for the remaining 37%.

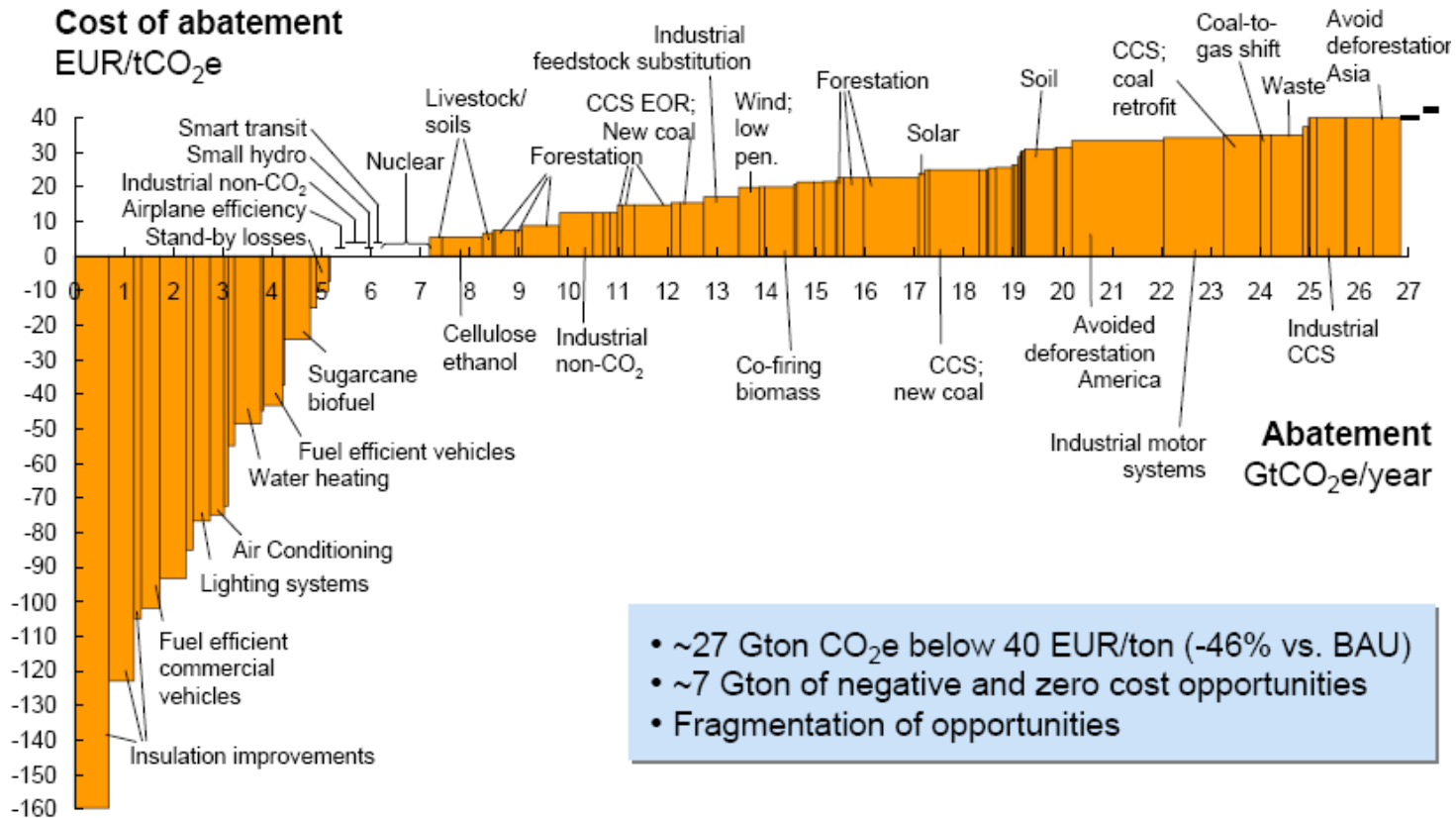
Source: IEA, WEO 2006

Opportunities for achieving climate and energy security

- ➔ Reduce demand – massive potential
- ➔ Diversify supply – renewables
- ➔ Make coal climate compatible if you want it to be part of the future
 - Carbon capture and storage
 - Especially important when look at projections – and Coal to Liquid trends

Many opportunities exist to meet energy and climate security goals

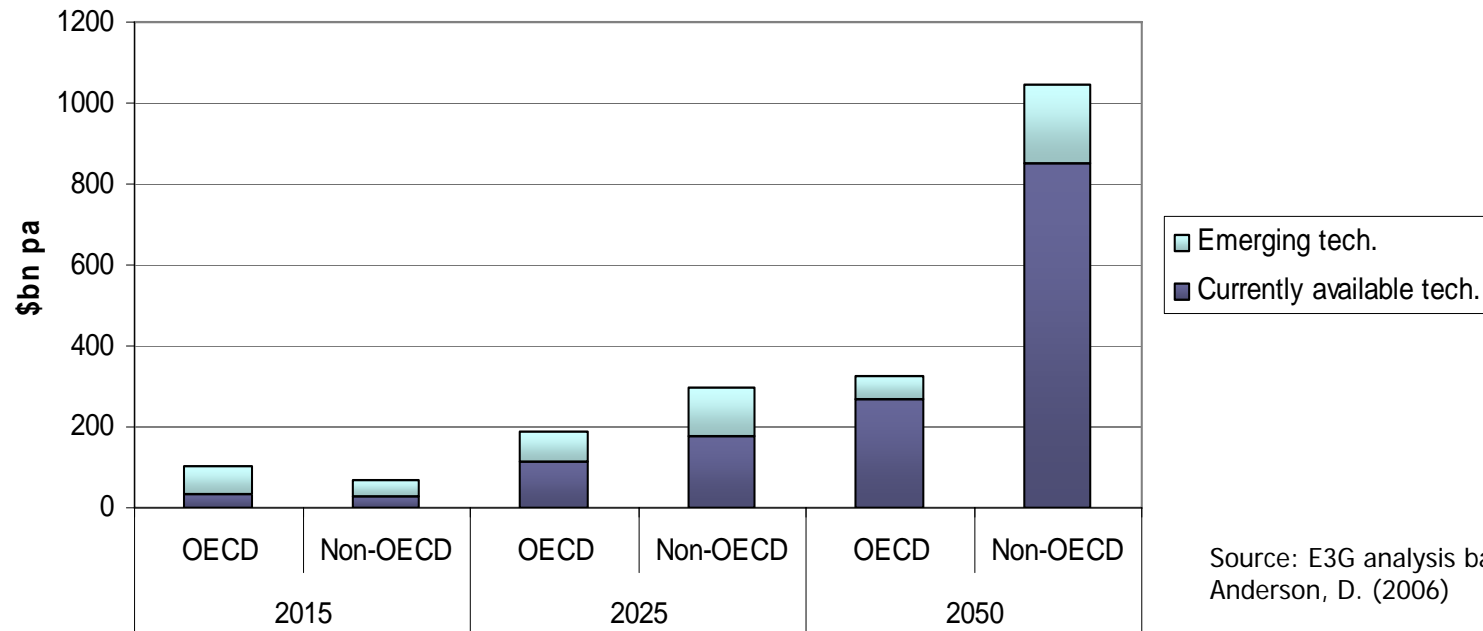
Global cost curve of GHG abatement opportunities beyond business as usual



Source: Vattenfall 2007

Action to mitigate climate change will require a step-change in investment for current and emerging low-carbon technology

Additional cost of climate stabilisation at 550ppme



- There will be a need to radically increase the markets for renewables and energy efficiency
- But additional emerging technologies such as climate compatible coal and solar thermal power will also be important

Scale of investments

Non-OECD \$bill/year 50% OECD support	2015	2025	2050
Currently available (carbon price)	12	87	433
Emerging component (beyond carbon price)	23	61	87
Total	35	147	520

SOME RESPONSES THUS FAR

- Strategic Energy Review's Integrated climate and energy package is the right way to go
 - At 20% by 2020 unilateral GHG emissions,
 - - 30% in cooperation with others
 - 20% energy efficiency by 2020
 - 20% by 2020 mandatory renewables target
 - Significant steps to a near zero emission power sector – carbon capture and storage

- 10% reduction in total pollutants
- 20% reduction in energy consumption per unit of GDP
- diversifying energy resources and increase energy-efficiency till 2020 (in order to cover rising energy demand)
- China's **Renewable Law** which came into force on 1 January 2006 seeks to increase the share of renewable energy in China's **energy mix** to 15% by 2020.
- New targets aim to obtain 6 GW of power from **wind energy** by 2010, and 30 GW by 2020, a boost that would leapfrog China to nearly twice the level of the installed capacity of the current world leader, Germany.

Ways forward

- Shift of investment into “cleaner energy” with support mechanisms for emerging economies, transforming the carbon markets + additional instruments for emerging technologies
- National policy frameworks with mandatory approaches to increase efficiency and renewables
- Launch next round of climate negotiations in Bali to be completed in 2009, deepening and extending the carbon markets
- G8+5 must address both energy and climate security



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Thank you!

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