



# **The economics of climate change: The Stern Review**

Prague, 23<sup>rd</sup> April 2007

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# What is the **economics of climate change** and how does it depend on the **science**?

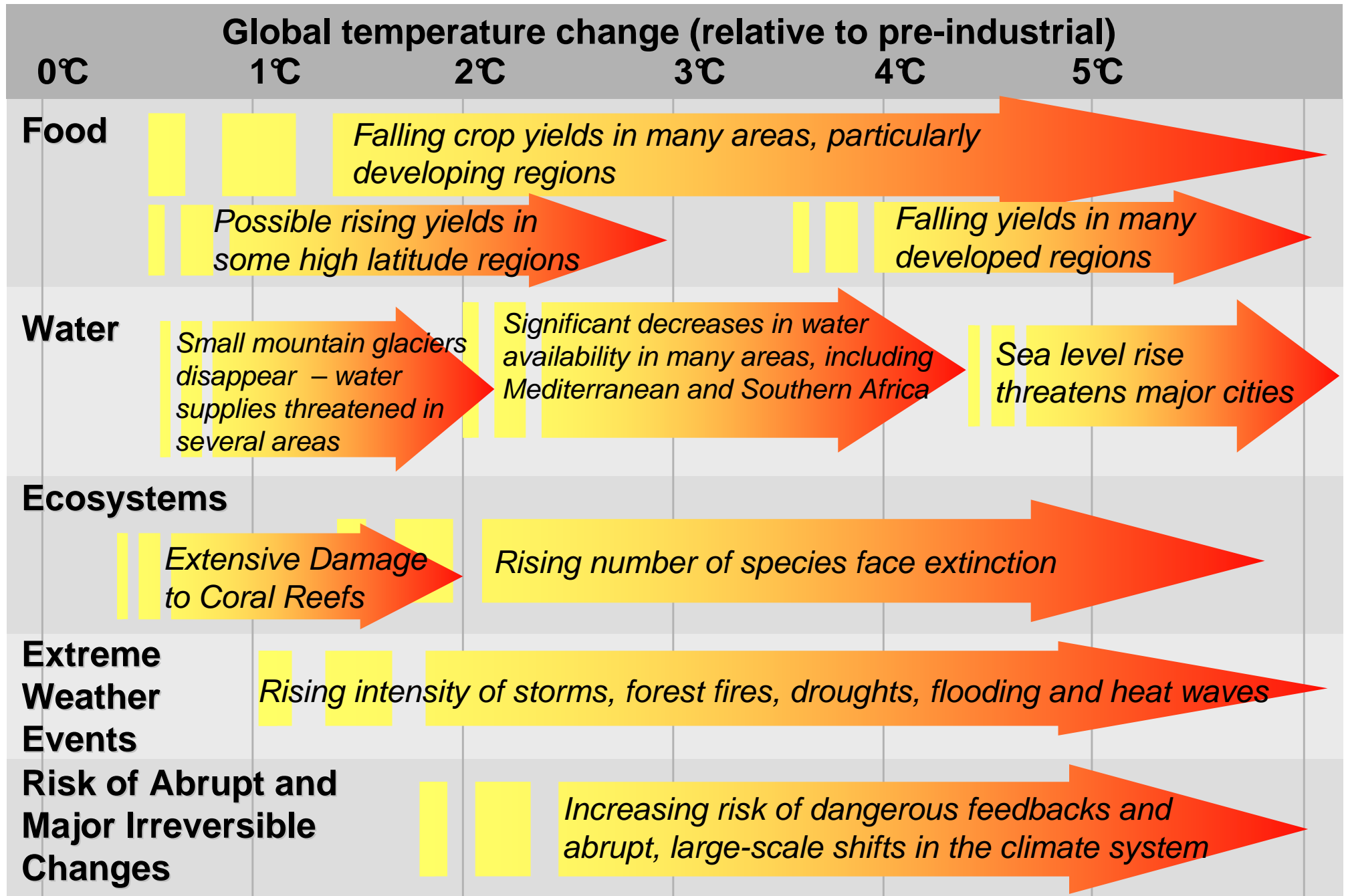
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## *Analytical foundations*

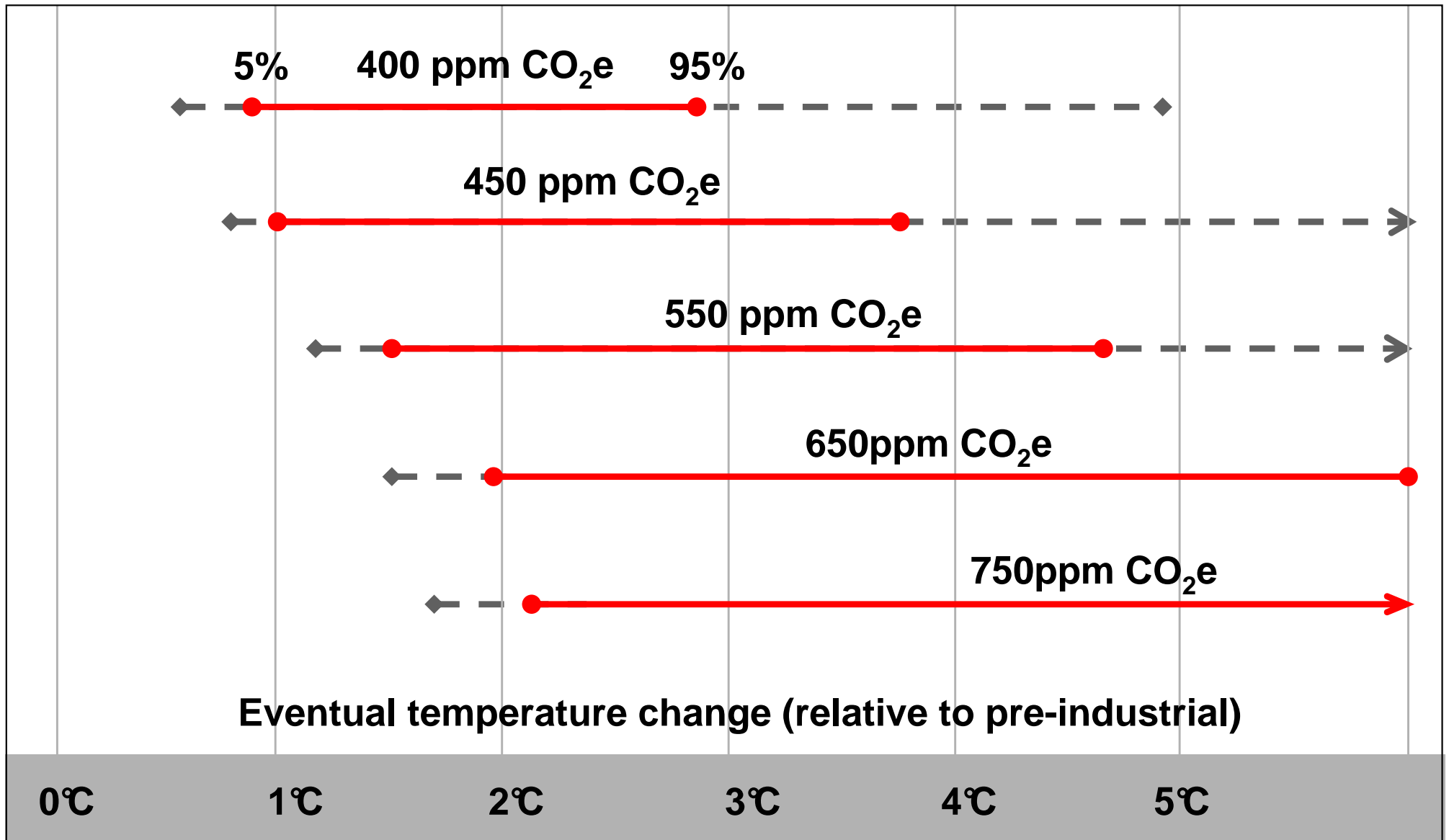
Climate change is an externality with a difference:

- Global
- Long-term
- Uncertain
- Potentially large and irreversible

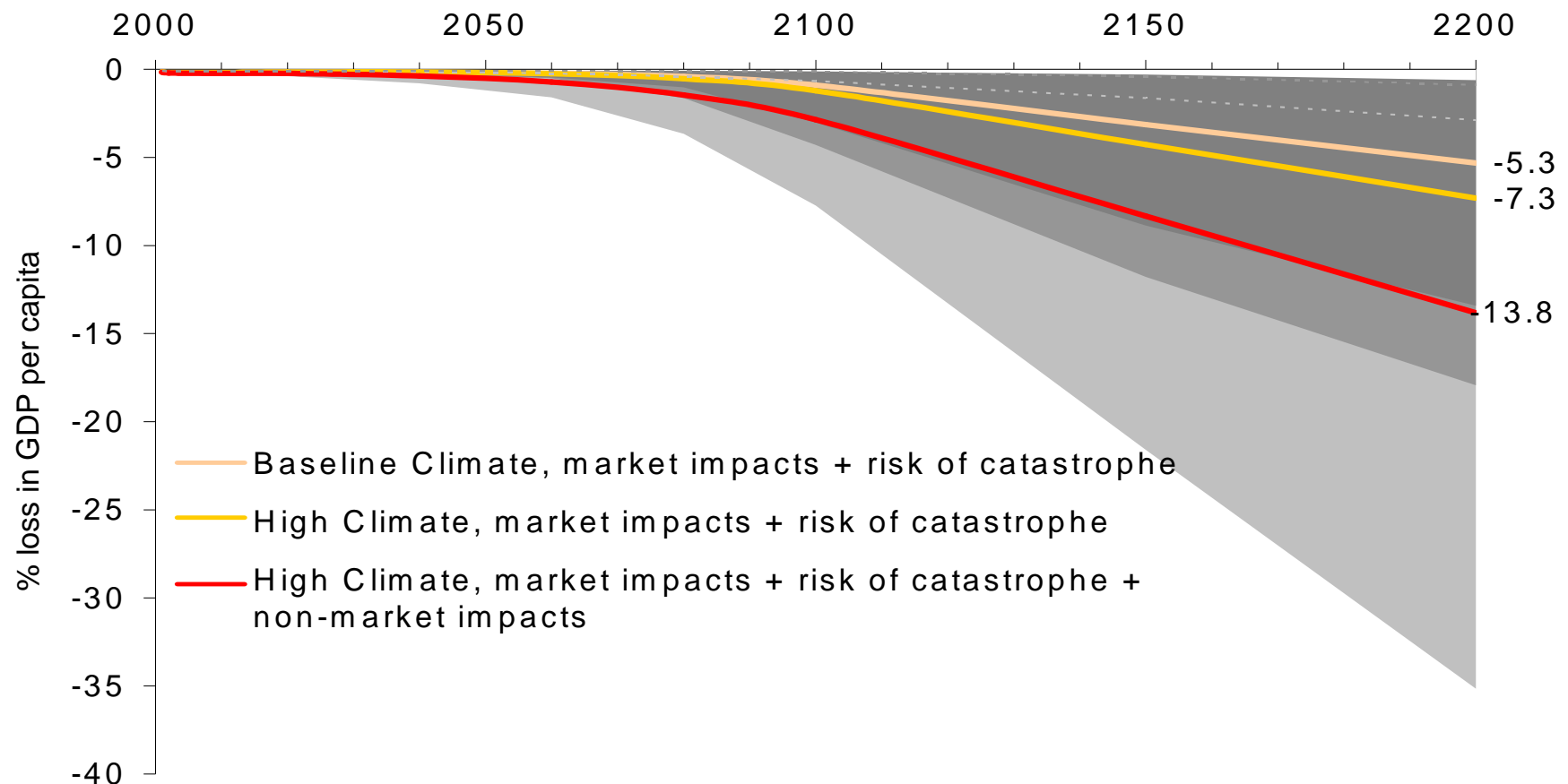
# Projected impacts of climate change



# Stabilisation and Commitment to Warming



# Mean losses in income per capita from scenarios of climate change



- Essential to take account of risk and uncertainty
- Models do not provide precise forecasts
- Assumptions on discounting, equity, and risk aversion affect results

# Given the costs of impacts, taking urgent action makes good economics

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Expected cost of cutting emissions consistent with a 550ppm CO<sub>2</sub>e stabilisation trajectory averages 1% of GDP per year.

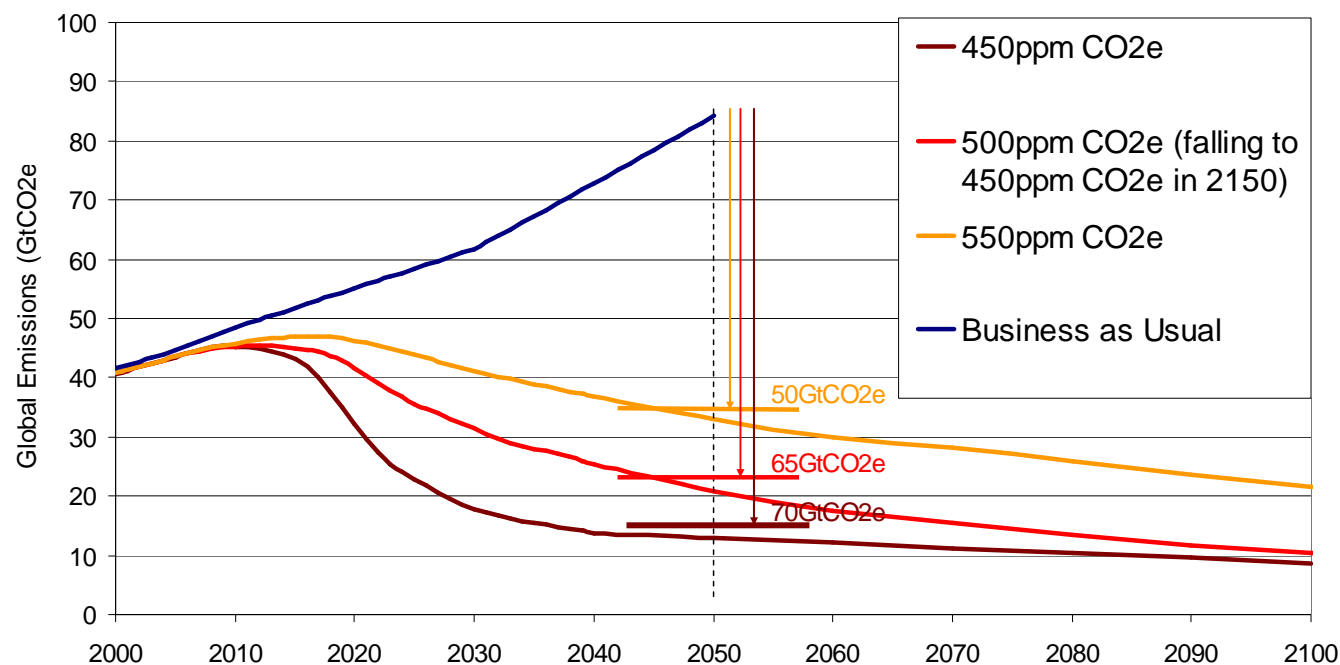
- Resource cost: 1% of GDP in 2050, in range –1% to +3.5%.
- Macroeconomic models: 1% of GDP in 2050, in range +/- 3%.

Strong mitigation is fully consistent with the aspirations for growth and development in poor and rich countries

Costs will not be evenly distributed:

- Competitiveness impacts can be reduced by acting together.
- New markets will be created. Investment in low-carbon electricity sources could be worth over \$500bn a year by 2050.

# Delaying mitigation is dangerous and costly



Stabilising below 450ppm CO<sub>2</sub>e would require emissions to peak by 2010 with 6-10% p.a. decline thereafter.

If emissions peak in 2020, we can stabilise below 550ppm CO<sub>2</sub>e if we achieve annual declines of 1 – 2.5% afterwards. A 10 year delay almost doubles the annual rate of decline required.

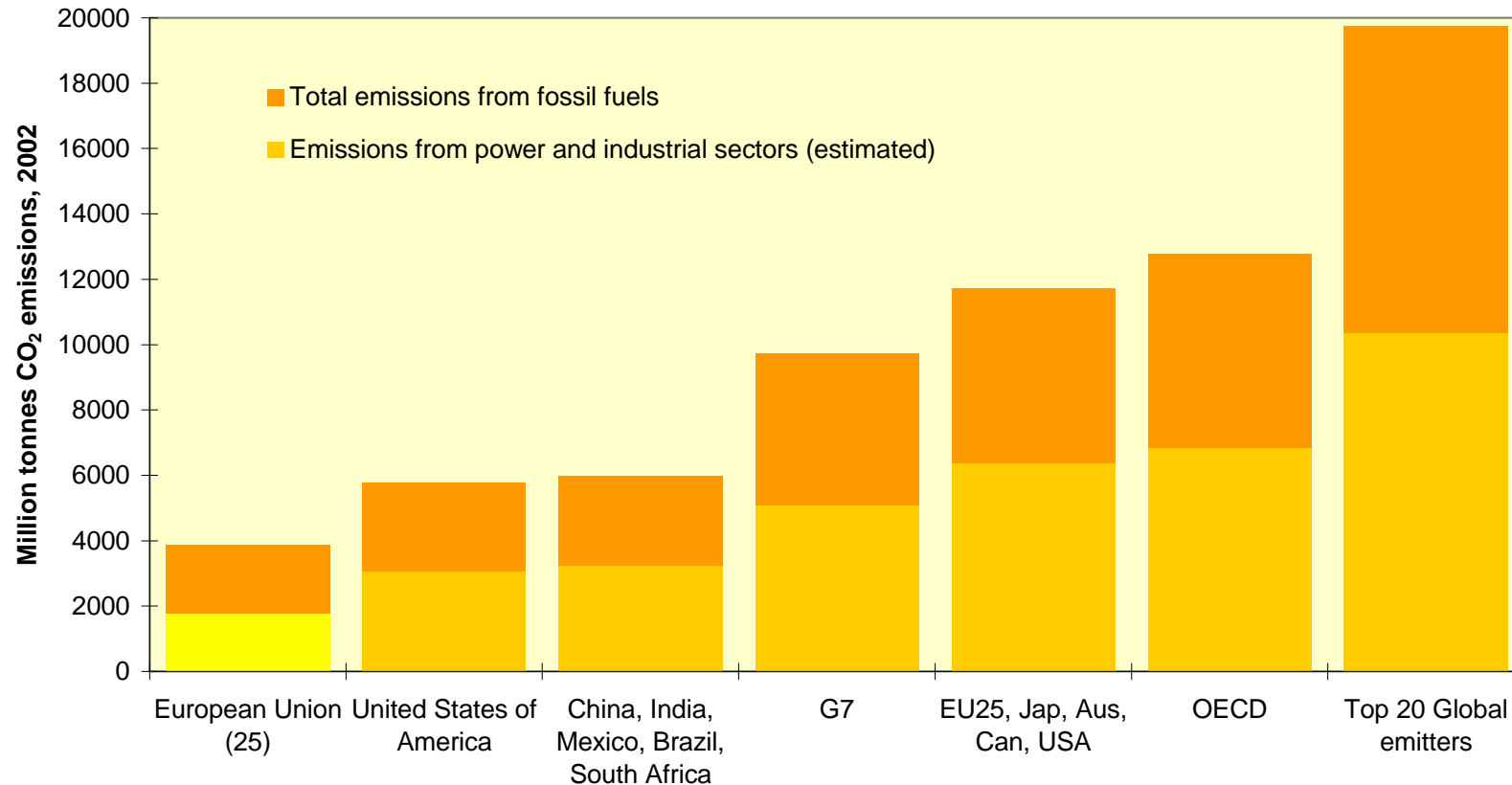
# Economic principles of international action

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## Effective action requires:

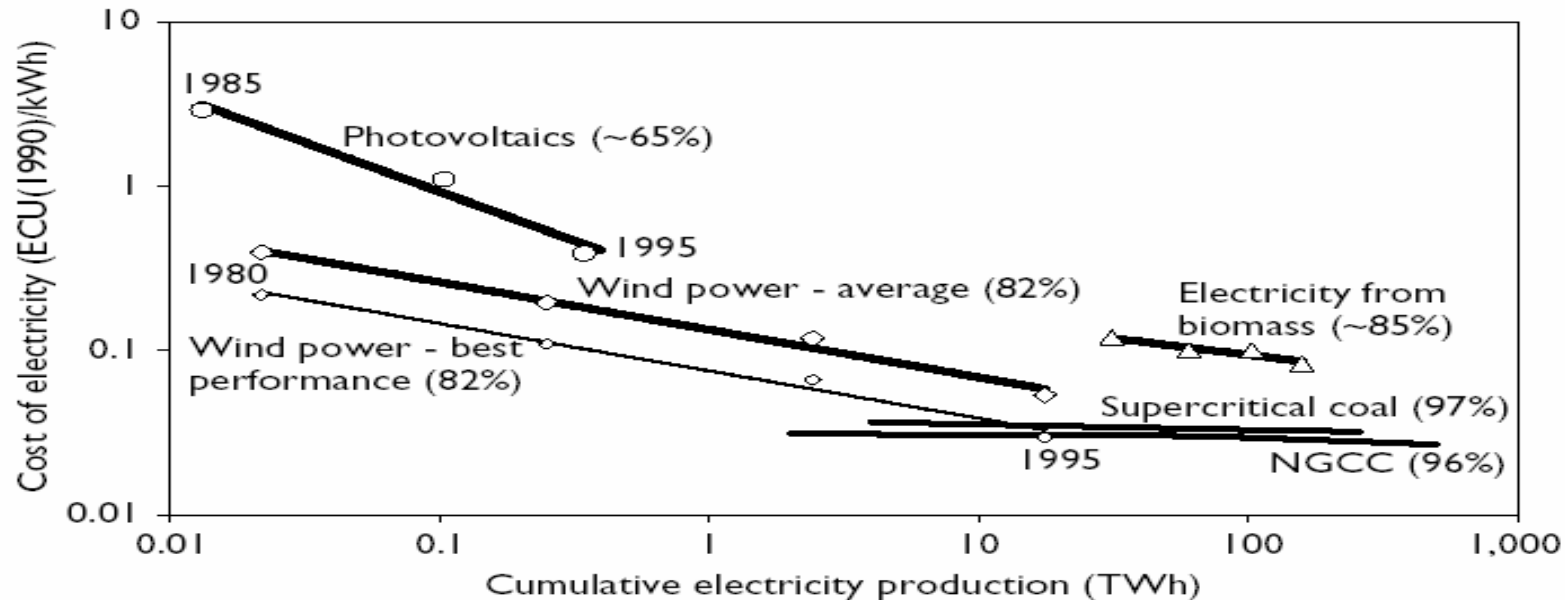
- Long-term quantity goals to limit risk; short-term flexibility to limit costs
- A broadly comparable global price for carbon
- Cooperation to bring forward technology
- Moving beyond sticks and carrots
- Equitable distribution of effort
- Transparency and mutual understanding of actions and policies

# Global carbon markets can be expanded



- Increasing the size of global carbon markets – with ambitious global goals and expansion and linking of schemes – can drive large flows across countries and promote action in developing countries

# Technology needs more than a carbon price



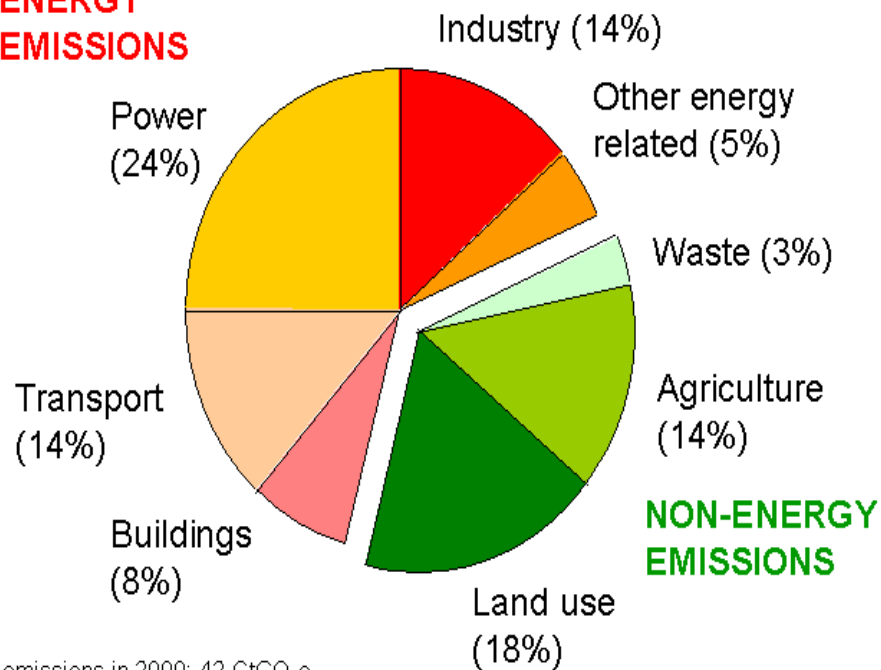
Carbon price alone is not enough to bring forward the technologies we need

One way of doing this is through global public funding for technologies:

- R&D funding should double, to around \$20 bn
- Deployment incentives should increase 2 to 5 times, from current level of \$34 bn

# Reducing emissions from deforestation

## ENERGY EMISSIONS

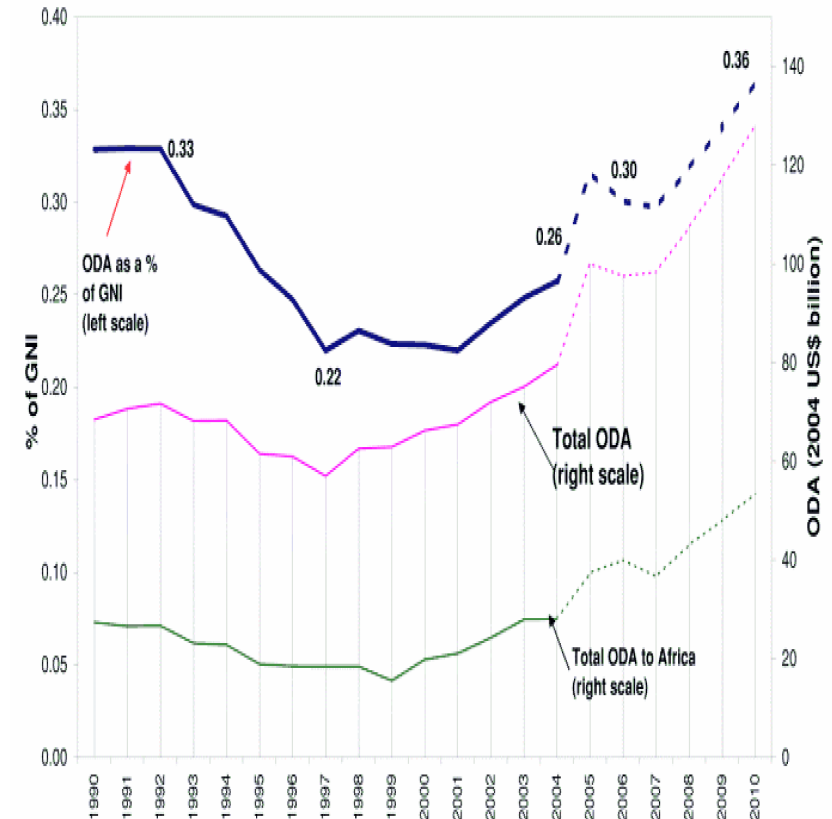


Total emissions in 2000: 42 GtCO<sub>2</sub>e.

- Curbing deforestation is highly cost-effective, and significant
- Forest management should be shaped and led by nation where the forest stands
- Large-scale pilot schemes could help explore alternative approaches to provide effective international support

# Adaptation

- Adaptation will put strong pressure on developing country budgets and ODA: essential to meet commitments made to double aid flows by 2010
- International action also has a key role in supporting global public goods for adaptation
  - Disaster response
  - Crop varieties and technology
  - Forecasting climate and weather



# Conclusions from Stern analysis

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Unless emissions are curbed, climate change will bring high costs for human development, economies and the environment

- Concentrations of 550ppm CO<sub>2</sub>e and above are associated with very high risks of serious economic impacts
- Concentrations of 450ppm CO<sub>2</sub>e and below will be extremely difficult to achieve given where we are now and given current and foreseeable technology

Limiting concentrations within this range is possible. The costs are modest relative to the costs of inaction.

Decisive and strong international action is urgent: delay means greater risks and higher costs



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