



The Economics of Climate Change

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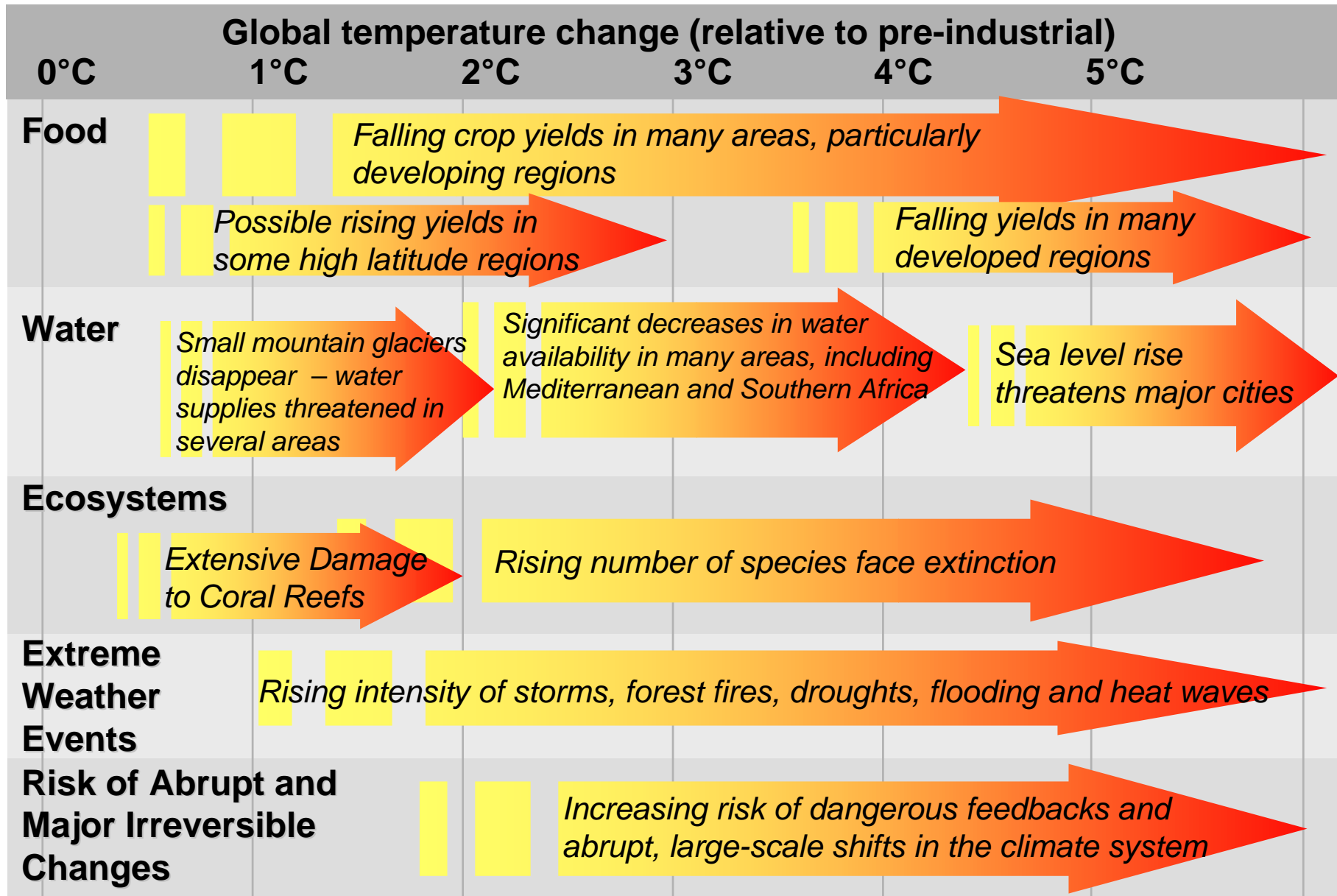
What is the **economics of climate change** and how does it depend on the **science**?

Analytic foundations

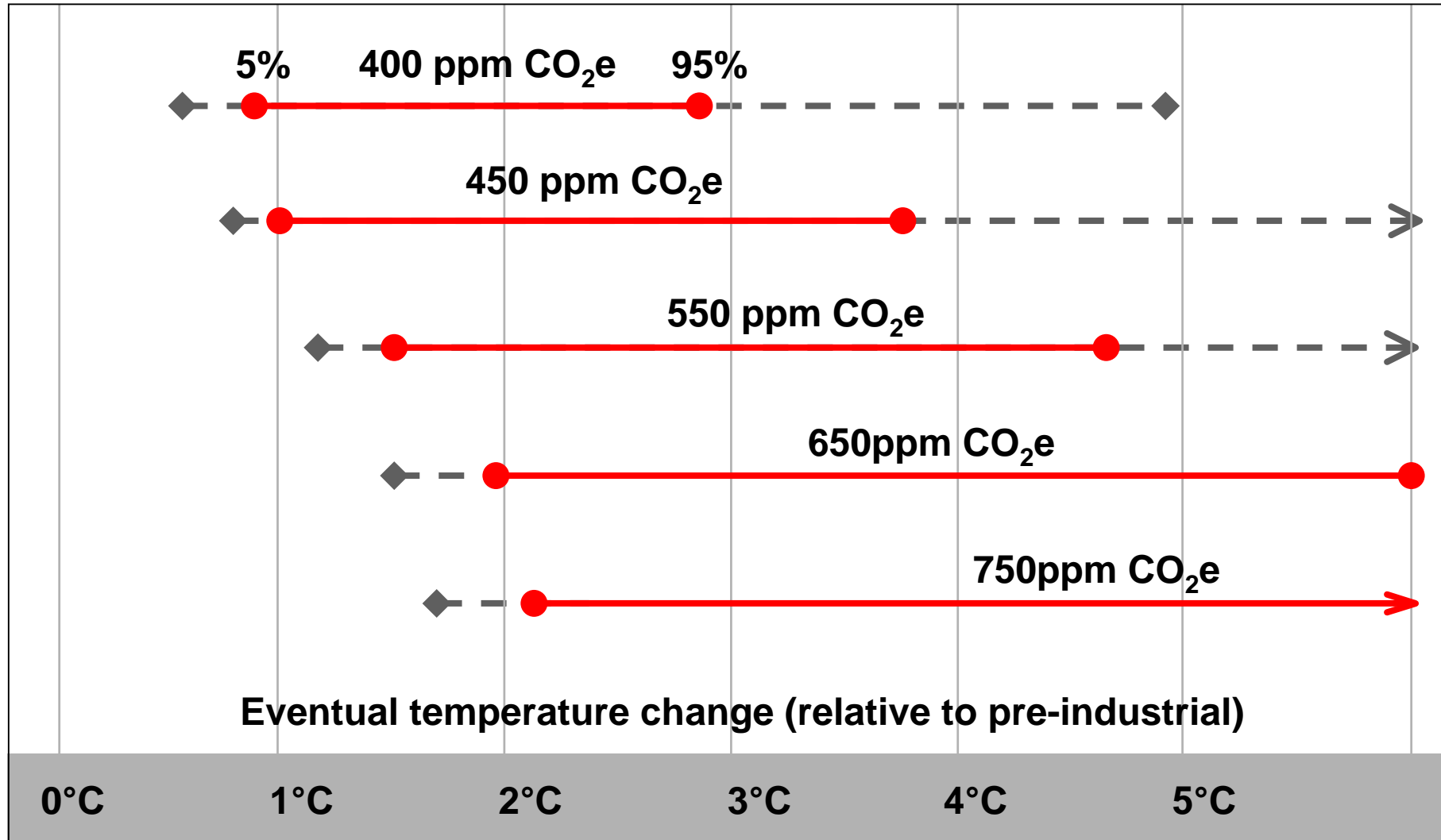
Climate change is an externality with a difference:

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

Projected impacts of climate change



Stabilisation and commitment to warming



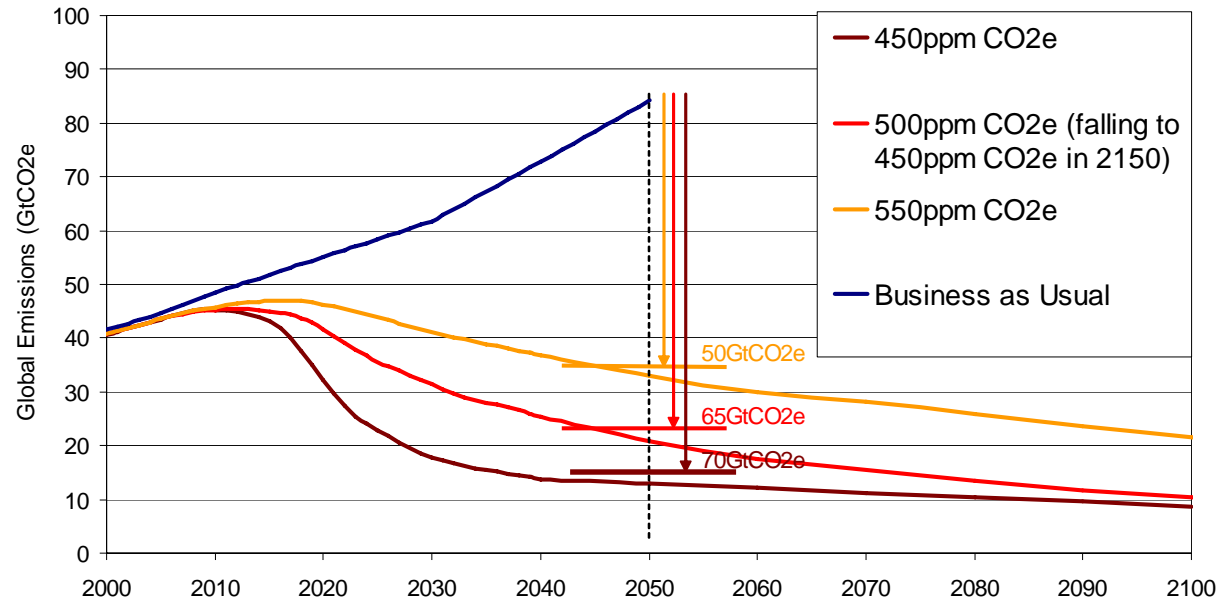
Aggregate estimates of impacts

- Essential to take account of risk and uncertainty
- Models do not provide precise forecasts
- Models embody a relationship between temperature and economic damage
- Assumptions on discounting and risk aversion affect the results

	Base climate	High Climate
Market impacts	5%	7%
Broad impacts	11%	14%

Adjusting for income inequality raises estimates by at least one quarter

Delaying mitigation is dangerous and costly



Stabilising below 450ppm CO₂e would require emissions to peak by 2010 with 6-10% p.a. decline thereafter.

If emissions peak in 2020, we can stabilise below 550ppm CO₂e if we achieve annual declines of 1 – 2.5% afterwards.

A 10 year delay almost doubles the annual rate of decline required.

Given the costs of impacts, taking urgent action is good economics

Expected cost of cutting emissions consistent with a 550ppm CO₂e 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%.

Costs will not be evenly distributed:

- Competitiveness impacts can be reduced by acting together.

There will be opportunities and co-benefits:

- New markets will be created: worth over \$500bn a year by 2050
- Climate policy consistent with energy access, energy security, air quality.

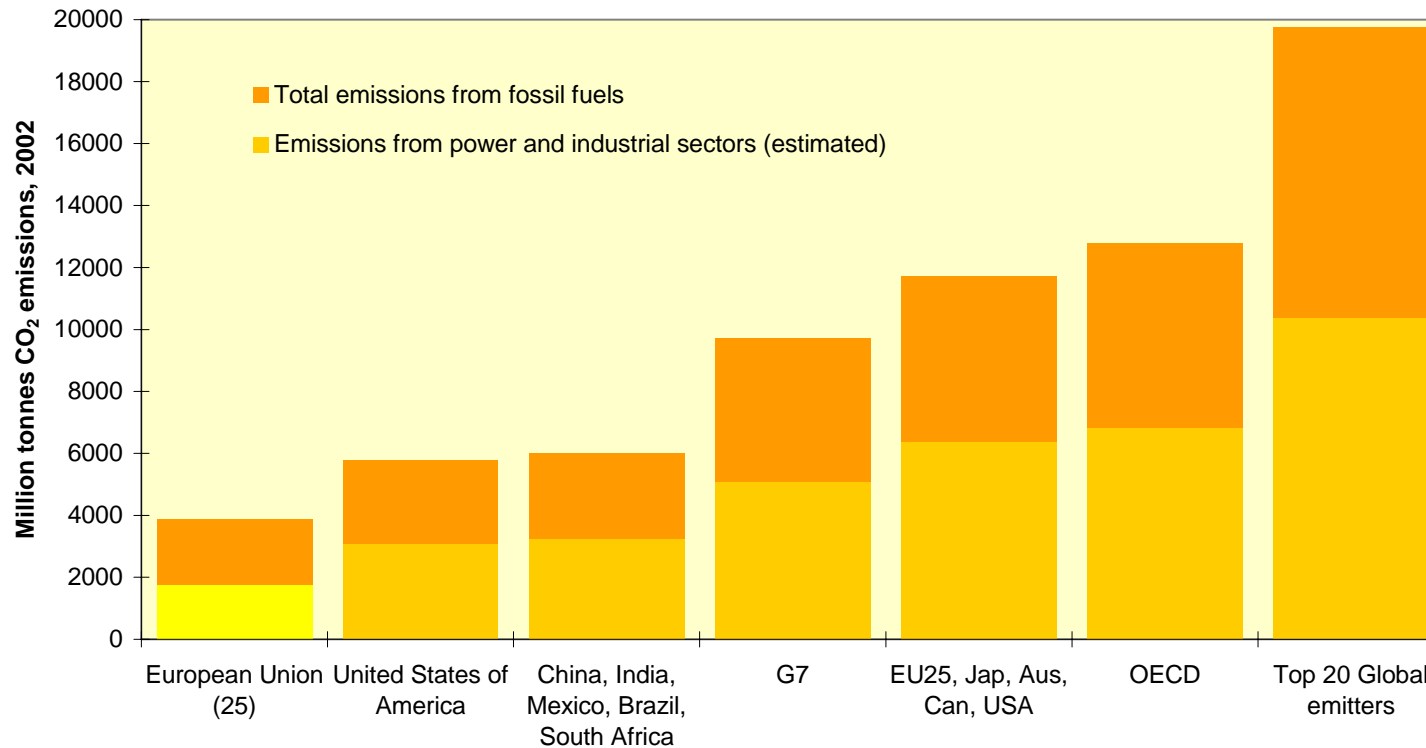
Strong mitigation is fully consistent with the aspirations for growth and development in poor and rich countries.

Economic principles for international action

Effective action requires:

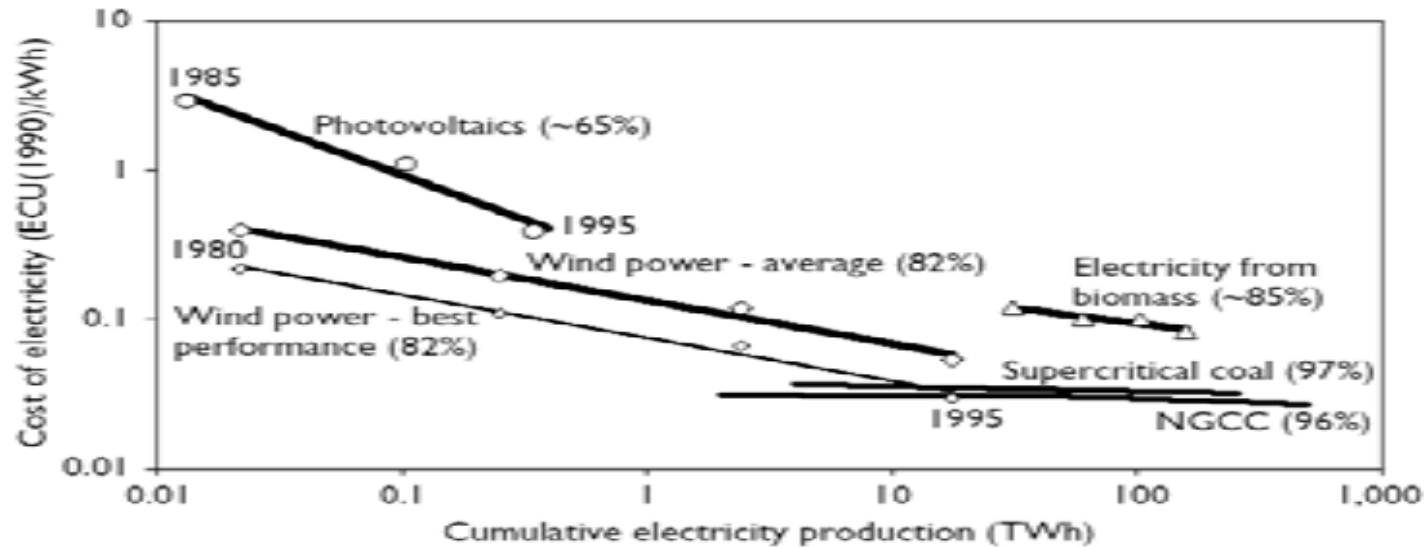
- Long-term quantity goals to limit risk; short-term flexibility to limit costs
- A broadly comparable global price for carbon
- Cooperation to bring forward technology
- Regulation, standards and persuasion
- Equitable distribution of effort
- Transparency and mutual understanding of actions and policies

Global carbon markets can be expanded



- Increasing the size of global carbon markets – by expanding or linking schemes globally – and ambitious global emissions reductions goals can drive large flows across countries and promote action in developing countries

Technology needs more than a carbon price

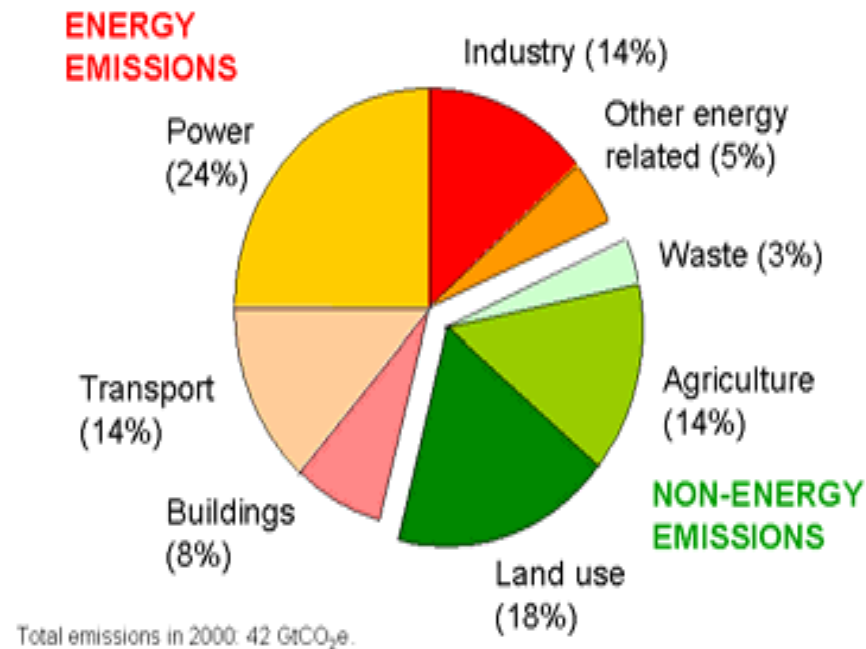


Carbon price alone not enough to bring forward the technologies we need

International co-operation on technology can take many forms:

- Global public R&D funding should double, to around \$20 bn
- Co-ordination and increase of deployment incentives
- Product standards eg for appliances, vehicles

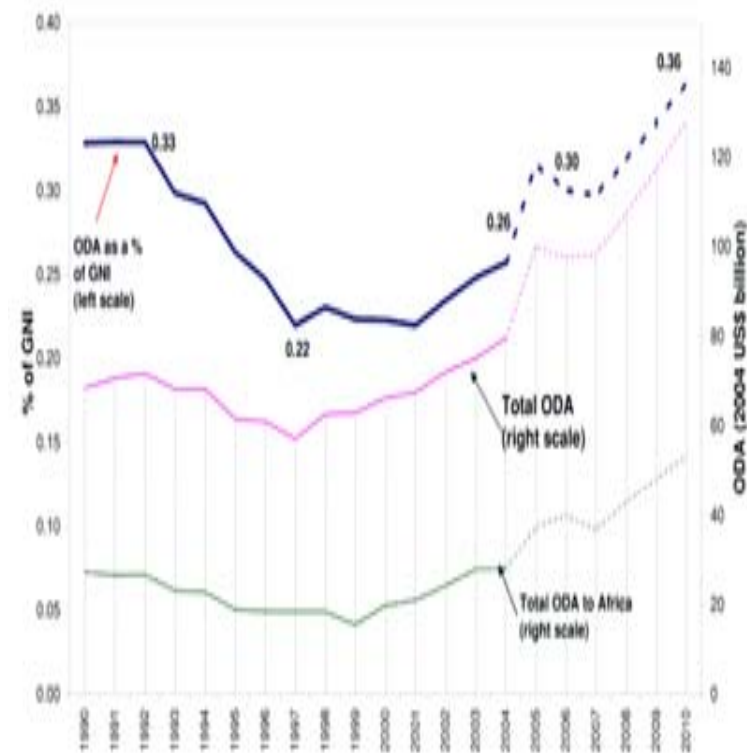
Avoiding deforestation



- Curbing deforestation is highly cost-effective
- 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

- Development increases resilience
- International action also has a key role in supporting global public goods for adaptation
 - Disaster response
 - Crop varieties and technology
 - Forecasting climate and weather
- Adaptation will put strong pressure on developing country budgets and ODA: essential to meet 2010 and 2015 commitments



Conclusions

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

- Concentrations of 550ppm CO₂e and above are associated with high risks of serious economic impacts
- Concentrations of 450ppm CO₂e and below will be very 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, and consistent with growth.

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



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