



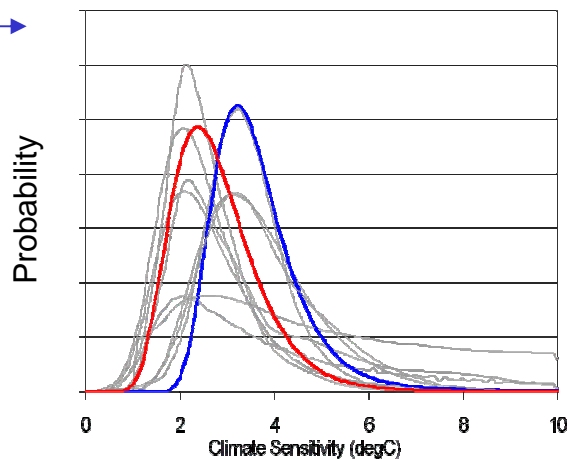
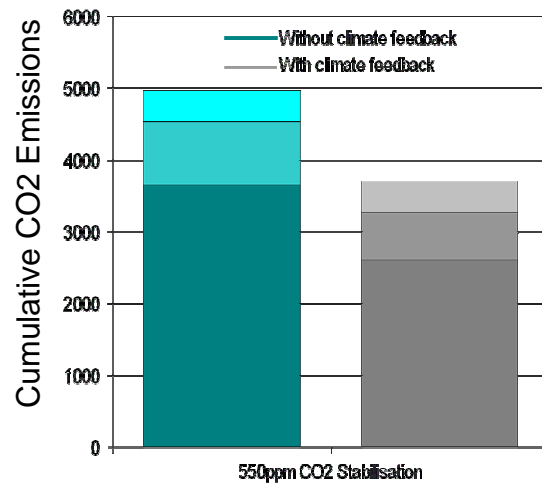
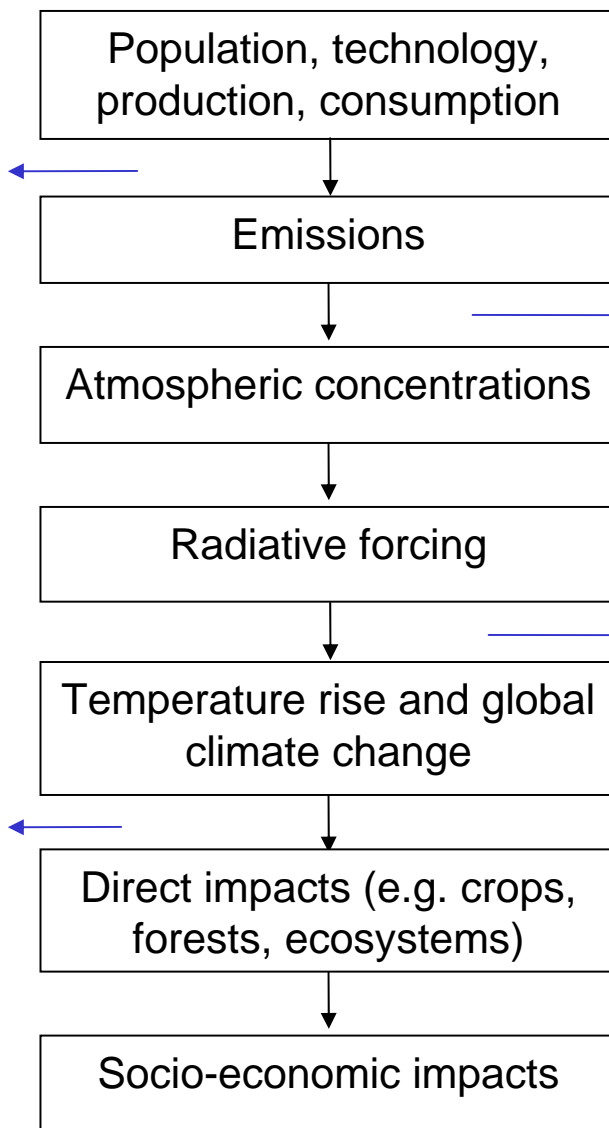
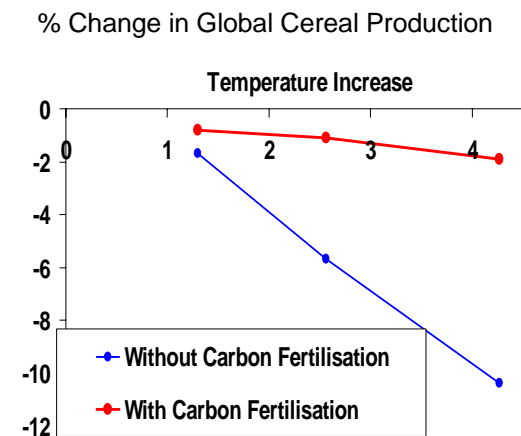
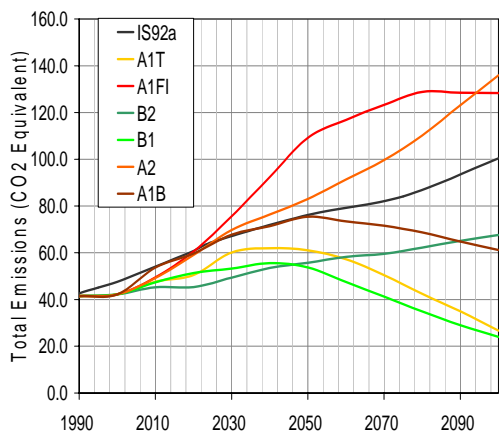
STERN

review

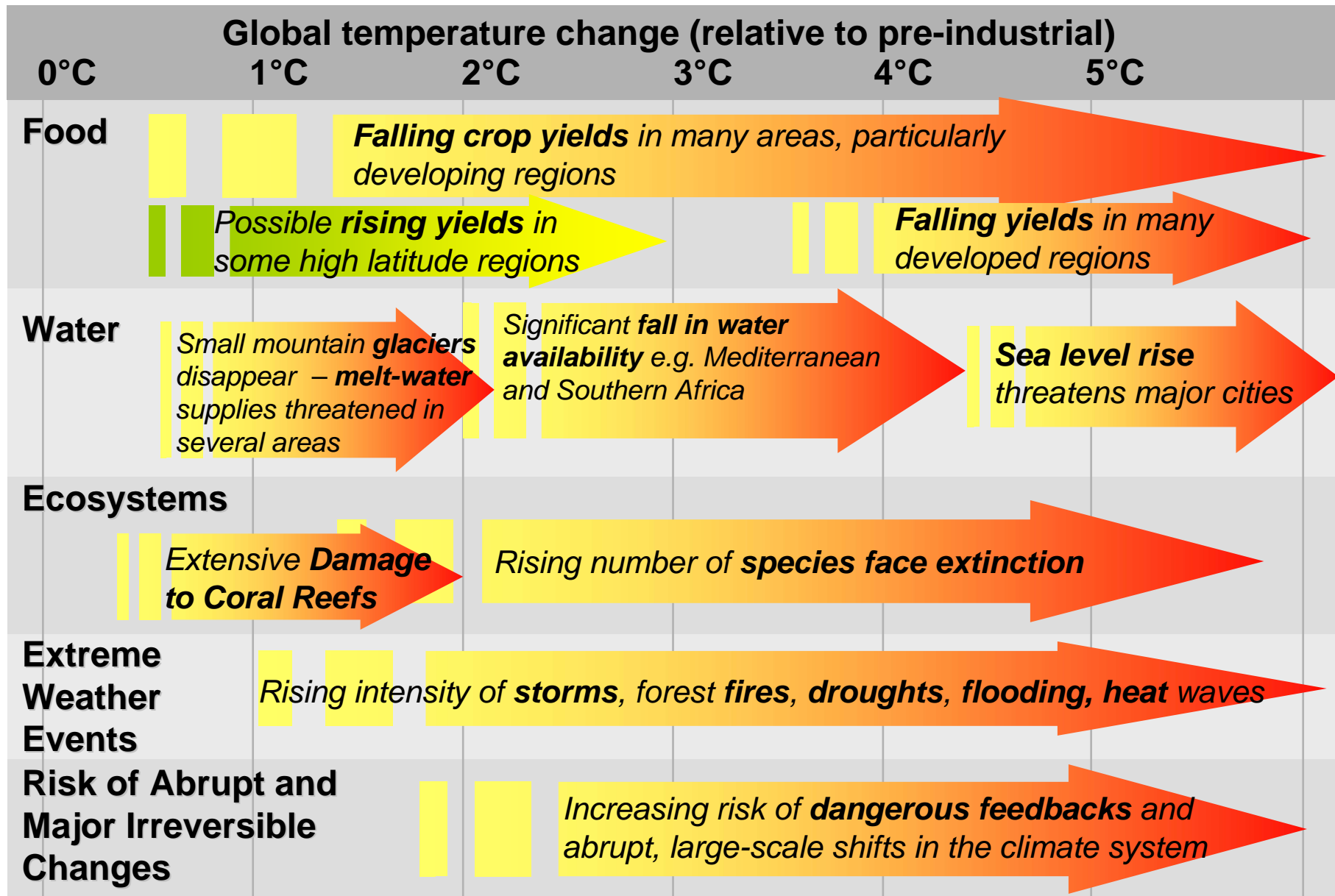
ON THE ECONOMICS
OF CLIMATE CHANGE

DIMITRI ZENGHELIS

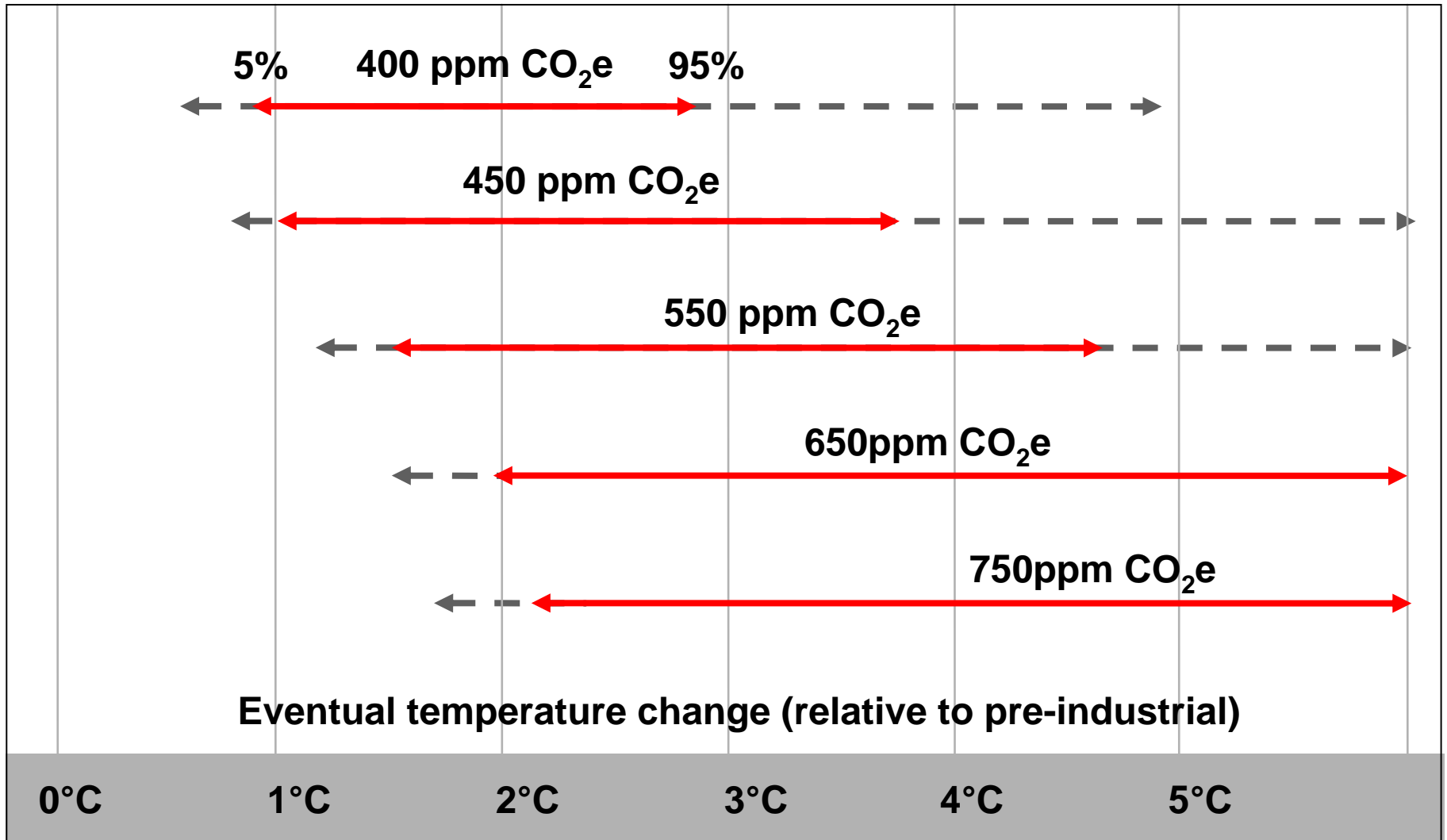
Working with Uncertainty

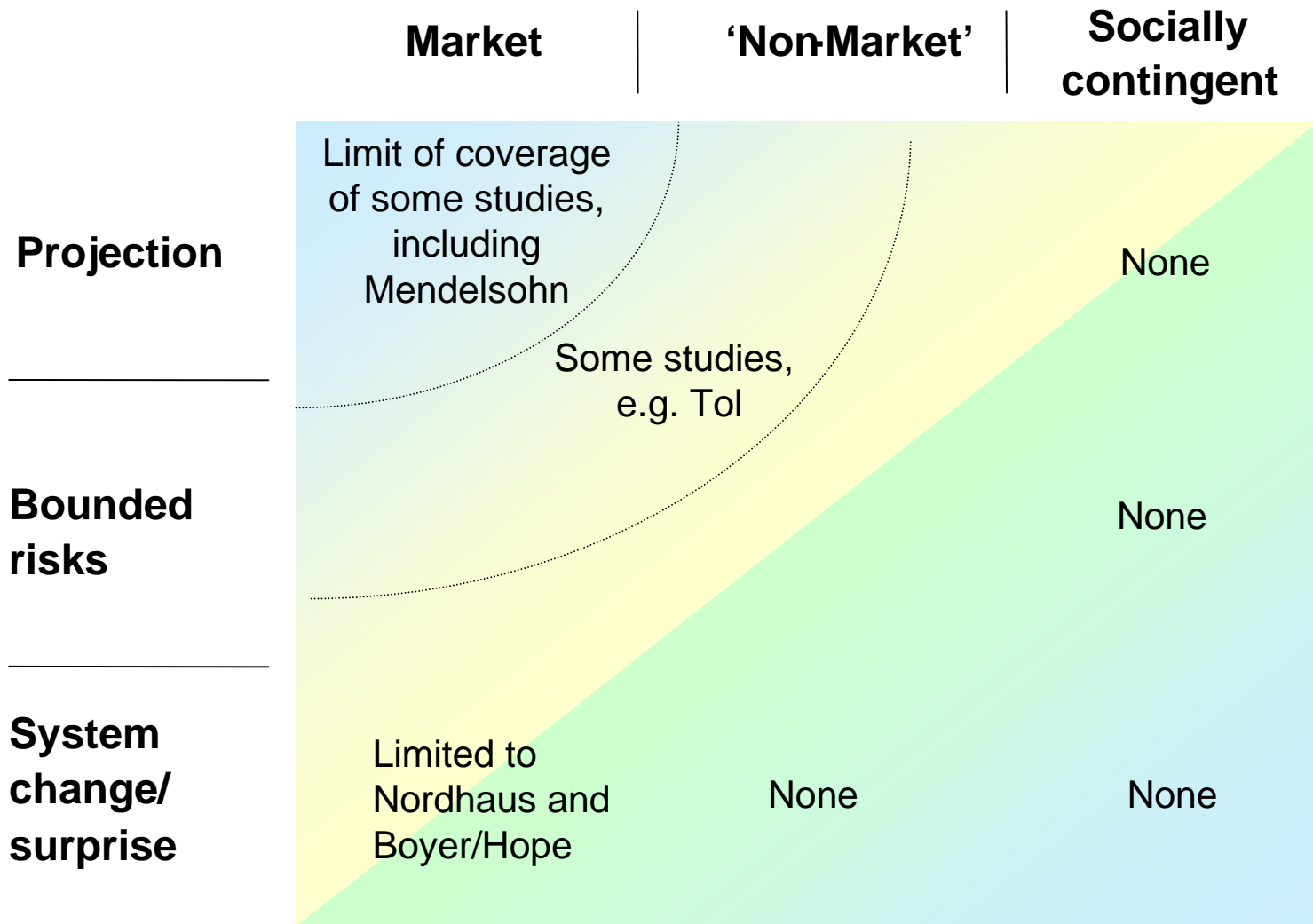


Projected impacts of climate change



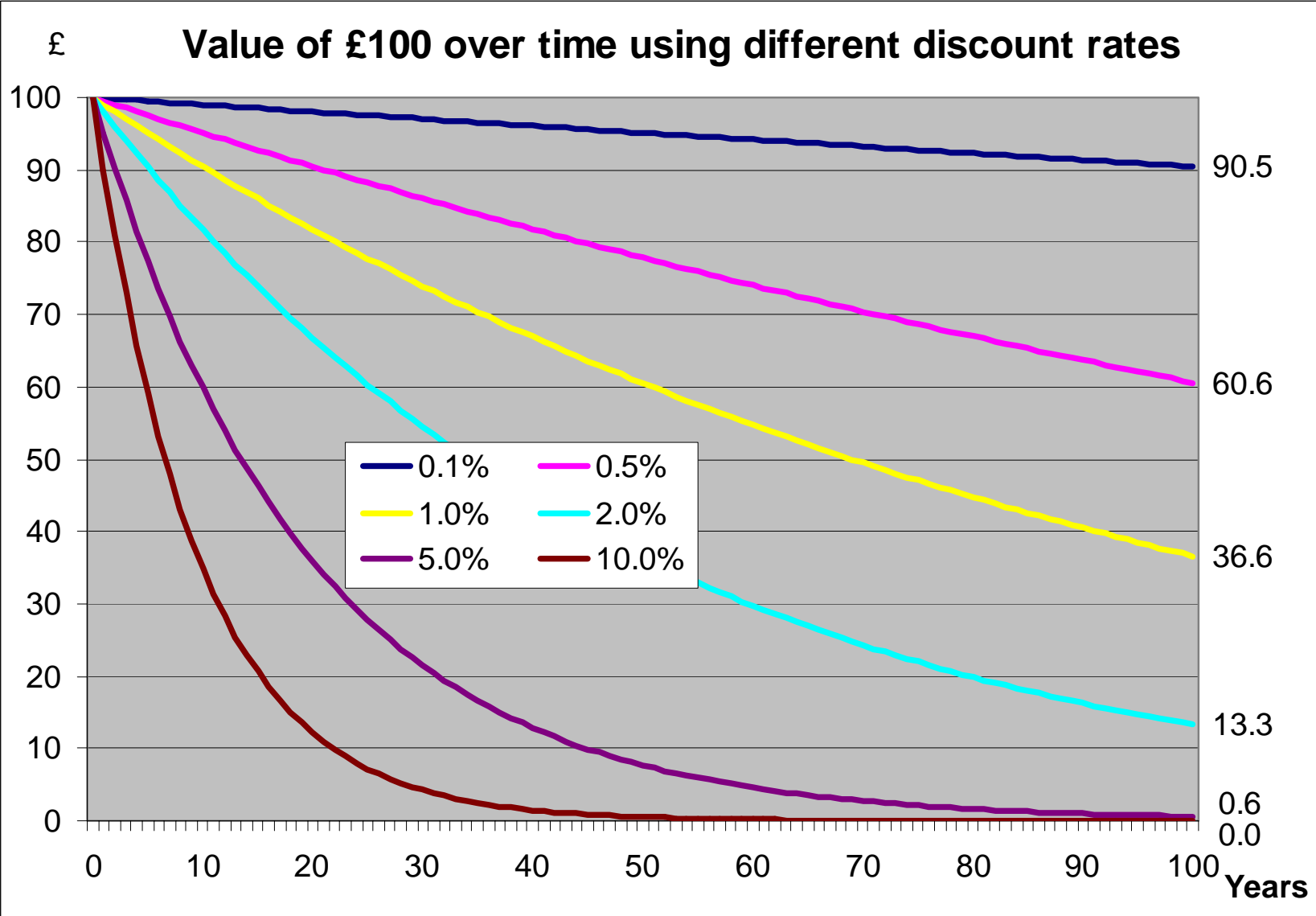
Stabilisation and Commitment to Warming



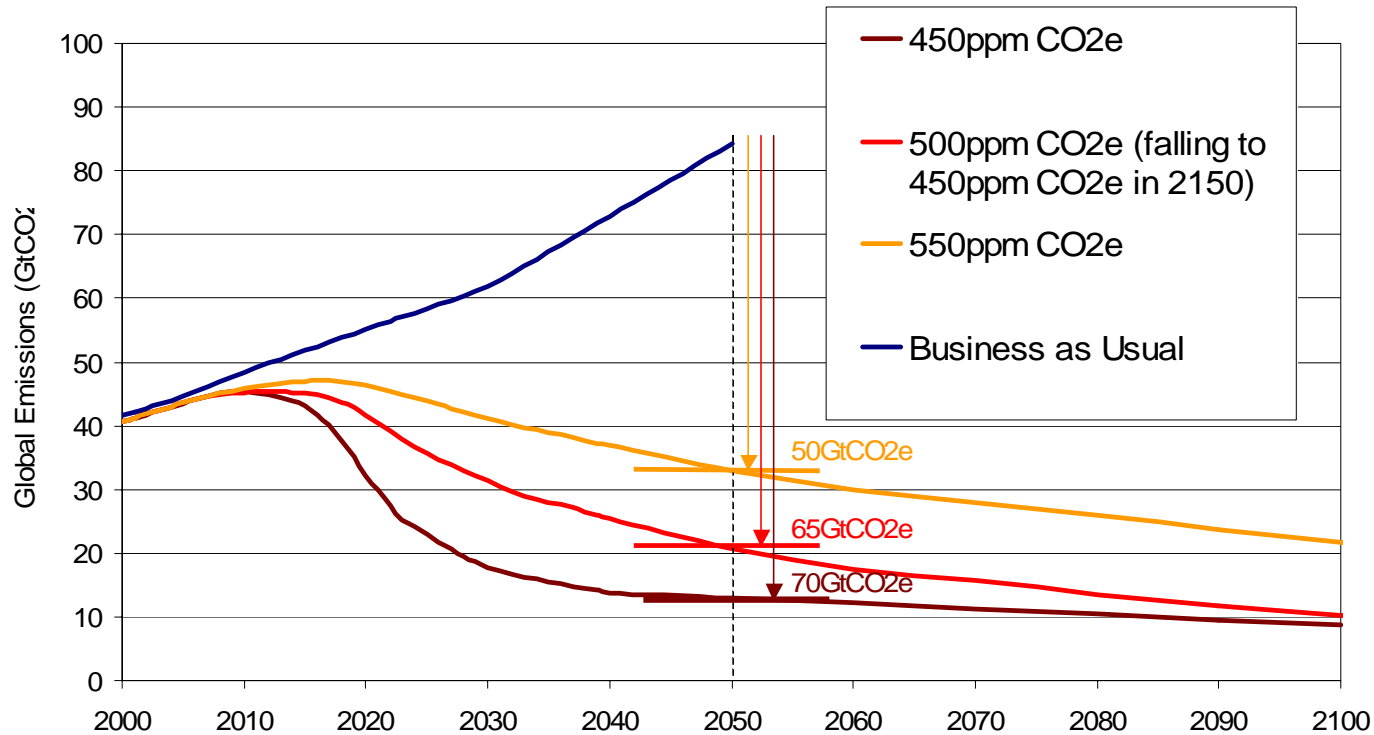


Models only have partial coverage of impacts
Values in the literature are a sub-total of impacts

Sensitivity analysis: discounting



Economics of Stabilisation



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

Estimating Costs of Mitigation

Expected cost of cutting emissions consistent with 550ppm CO₂e stabilisation trajectory averages 1% of GDP per year.

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

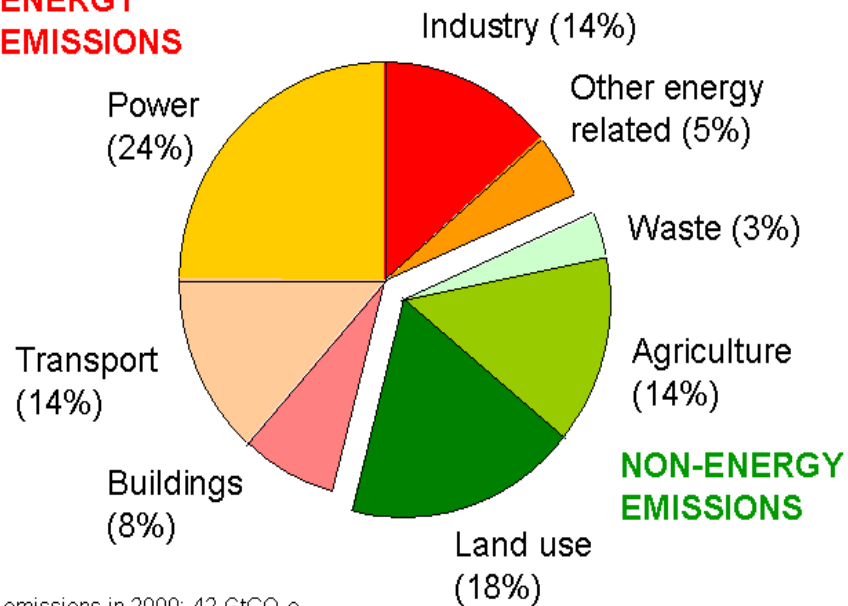
Costs will not be evenly distributed:

- 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.

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

Strategies for Emission Reduction

ENERGY EMISSIONS



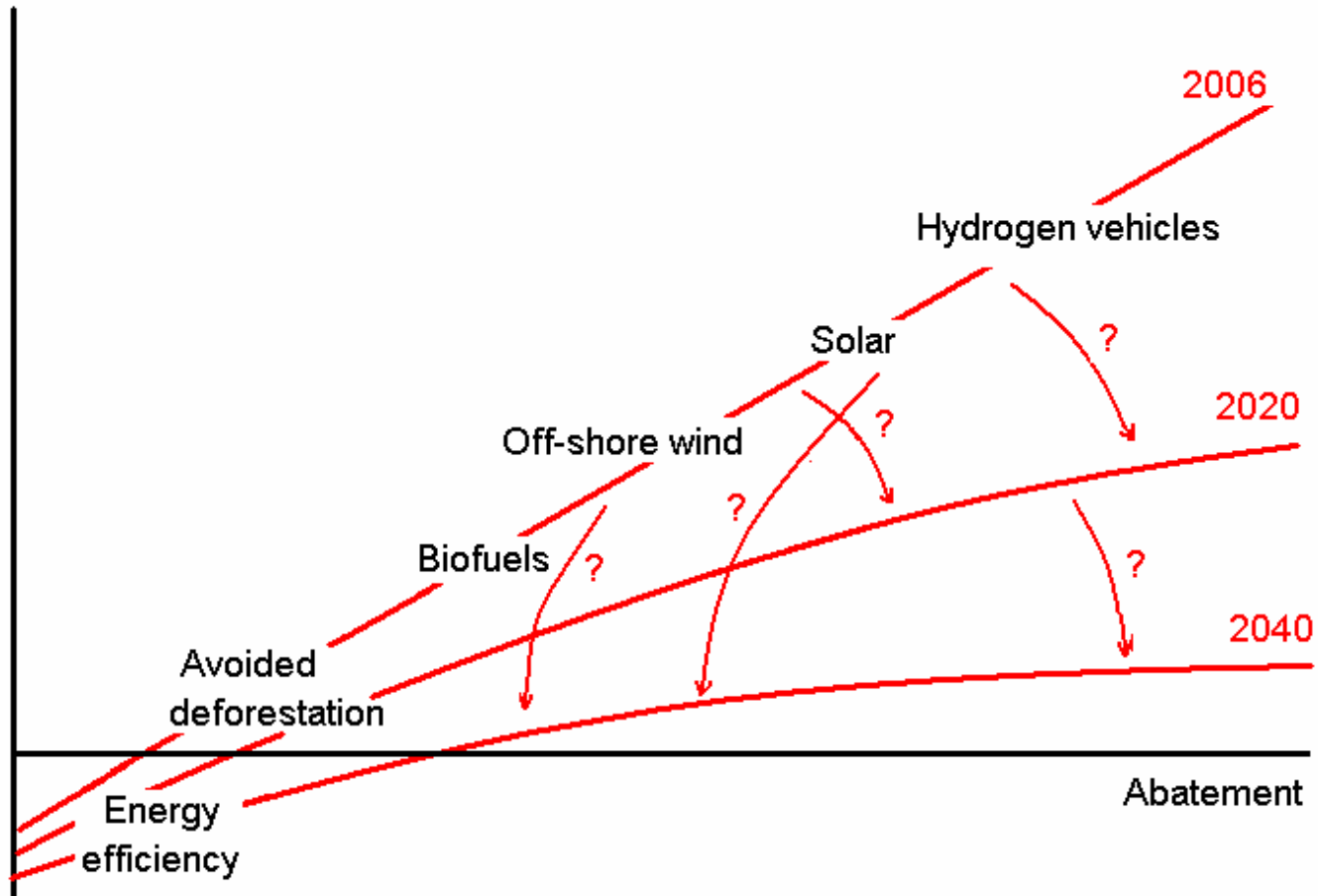
Total emissions in 2000: 42 GtCO₂e.

Four ways to cut emissions:

- reducing demand
- improving efficiency
- lower-carbon technologies
- non-energy emissions

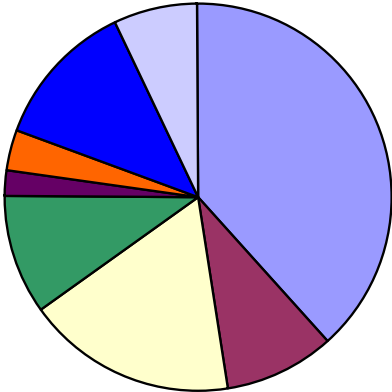
Illustrative Marginal Abatement Option Cost Curve

Marginal
cost per unit
GHG
abated \$



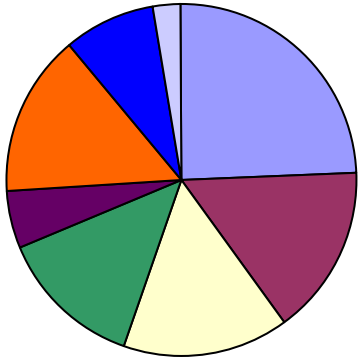
Illustrative Distribution of Emission Savings by Technology

Contributions to Carbon Abatement 2025



Abatement 11 GtCO2

Contributions to Carbon Abatement, 2050



Abatement 43 GtCO2

Average Cost of Reducing Fossil Fuel Emissions to 18 GtCO₂ in 2050

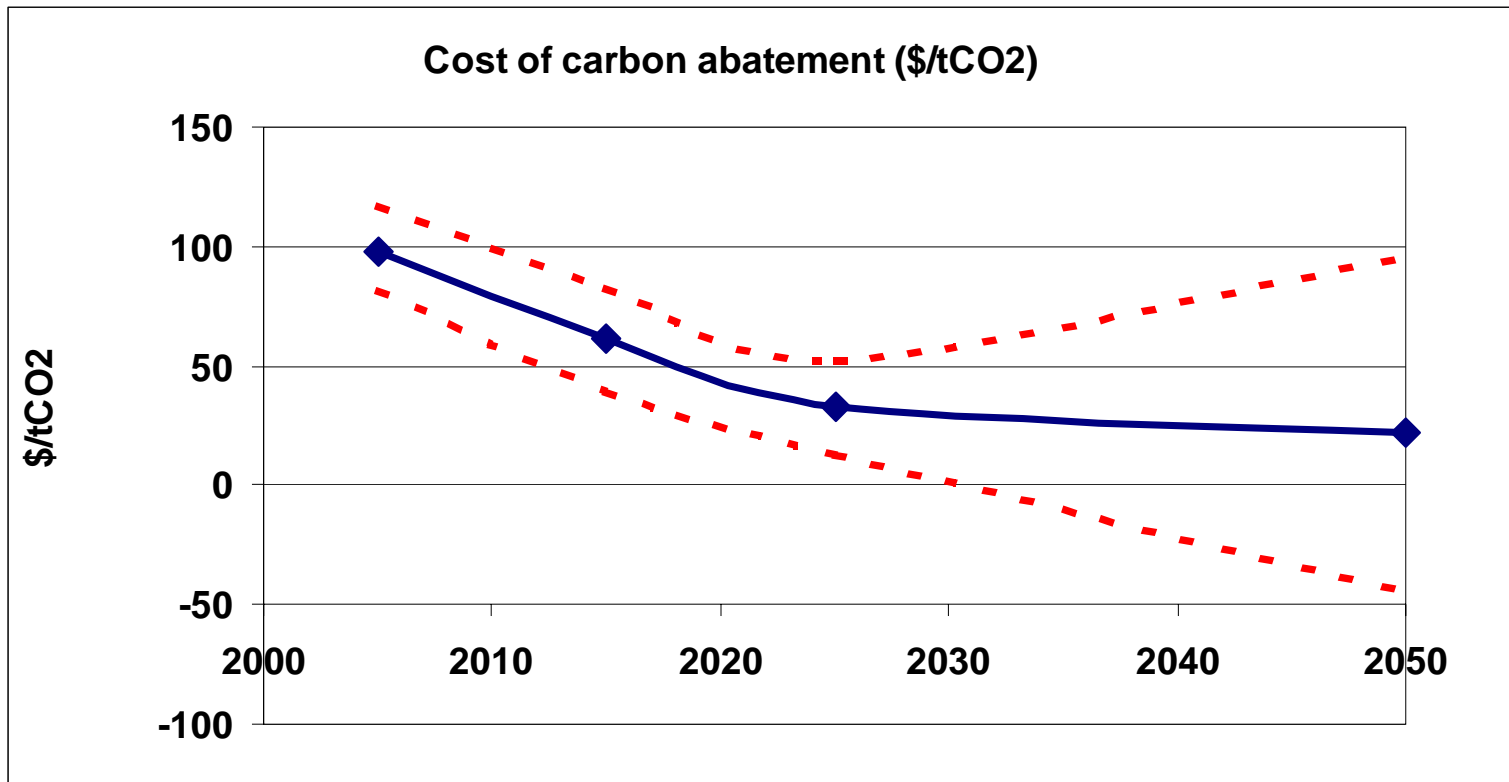


Table 9.1 Annual total costs of reducing fossil fuel emissions to 18 GtCO ₂ in 2050			
	2015	2025	2050
Average cost of abatement, \$/t CO ₂	61	33	22
Emissions Abated GtCO ₂ (relative to emissions in BAU)	2.2	10.7	42.6
Total cost of abatement, \$ billion per year:	134	349	930

Key principles of policy

Climate change policy:

- Carbon pricing
- R,D&D
- Related market failures and behavioural change

Consistency with other policy goals – growth and energy security

Conclusion from Stern analysis

- Our understanding of the **risks** of climate change has advanced strongly.
- We understand the **urgency and scale** of action required.
- We know that the **technologies and economic incentives for effective action are available or can be created**
- We are in a much better position now to use our **shared understanding** to agree on what goals to adopt and what action to take.



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