

The UK's approach to Climate Change

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Overview

- Policy based on sound science
- UK Response –Mitigation and Adaptation
- Strategic Aspirations
- Challenges



Policy based on sound science

- Look to scientific evidence and risks - ensure it underpins policy
- Accept conclusions of IPCC
- Support research to reduce uncertainties
- Uncertainties no reason to defer actions
- Aim for international consensus view of problem



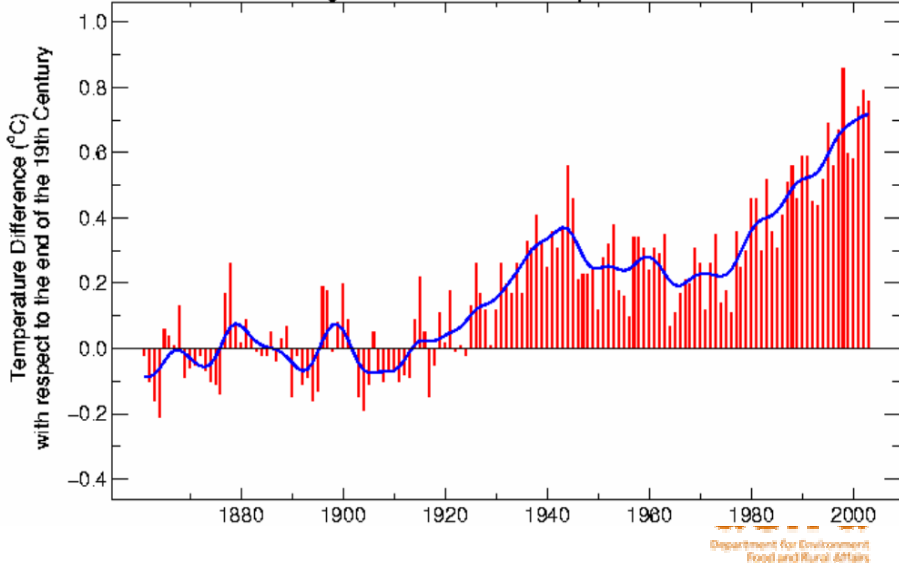
Evidence for climate change

- Observations
 - 0.6C warming over century
 - Cooling of stratosphere
 - 20 cm sea level rise
 - Glacial retreat, ecosystem effects
- Models show warming cannot be explained by natural causes
- Understanding of process
- Physically based modelling predictions

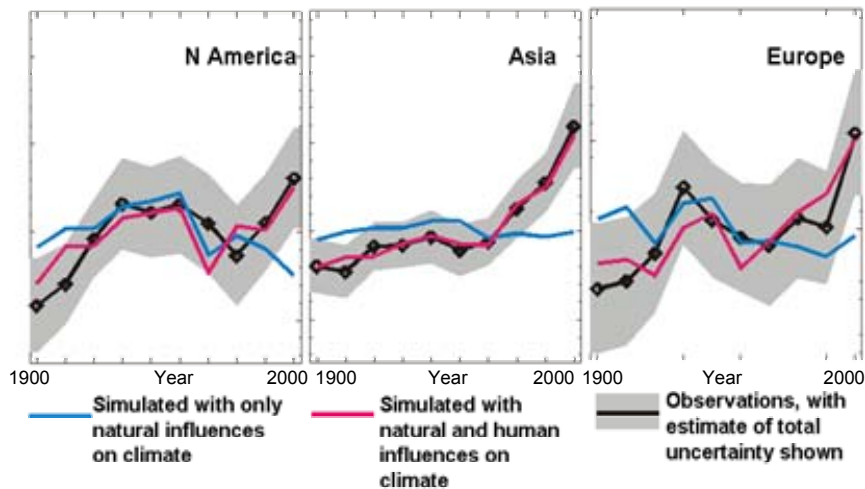


GLOBAL TEMPERATURES 1861-2003

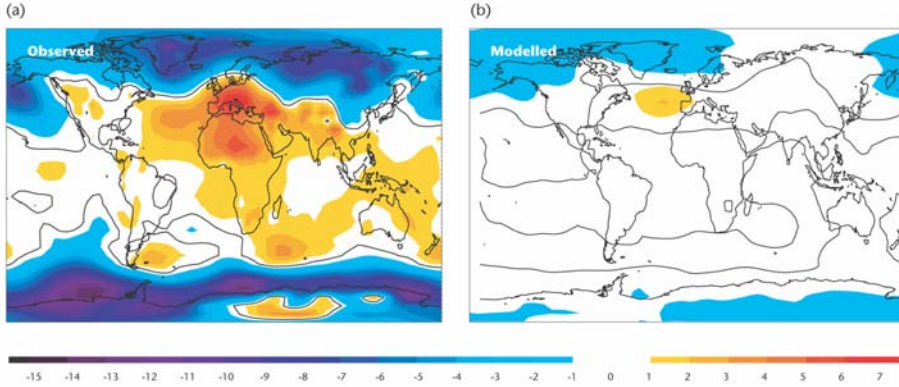
Global Average Near-Surface Temperatures 1861–2003



Human signal seen in climate change over North America, Asia and Europe (HC)



PATTERNS OF CHANGE IN SURFACE PRESSURE 1950-2000

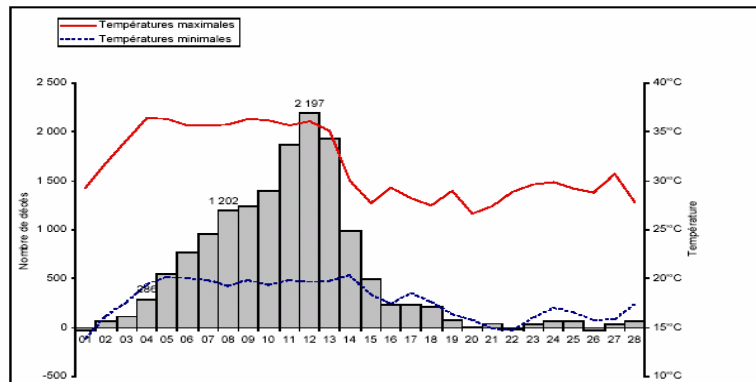


Jamie Kettleborough, RAL, and Peter Stott, Hadley Centre

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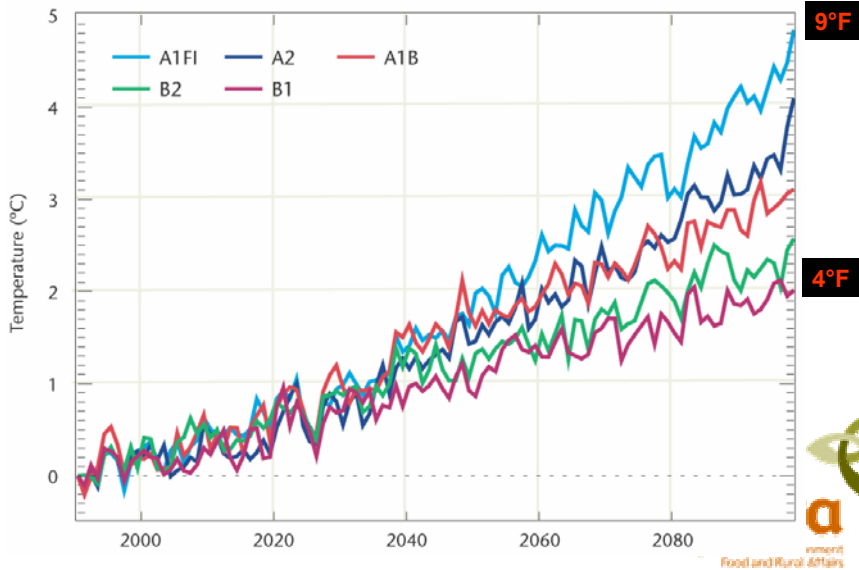
Heat-wave deaths in France, August 2003 (SINERM 2003)

FIGURE III.1 : Excès de décès observés quotidiennement pendant le mois d'août 2003 et relevé des températures extérieures

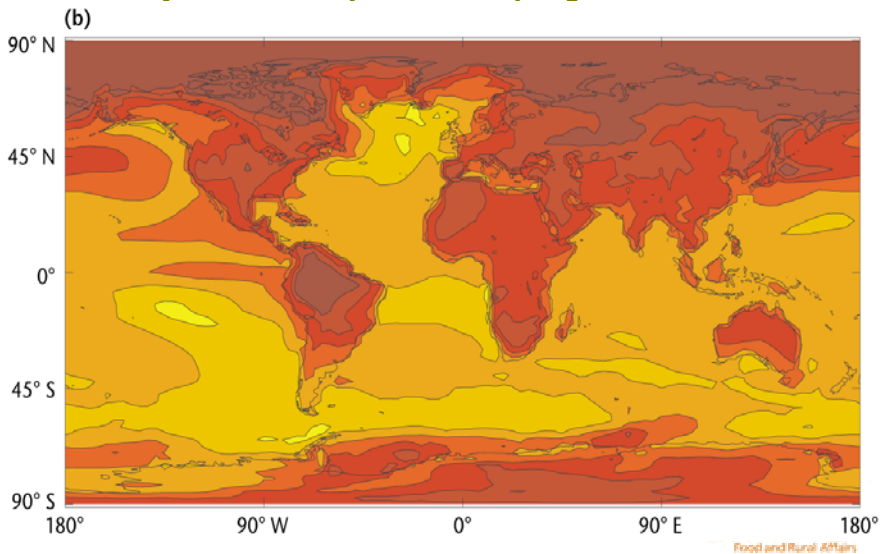


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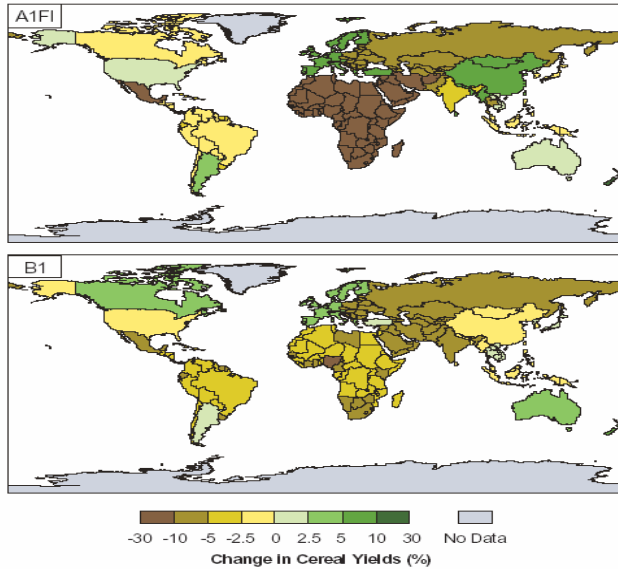
Future Global Temperature from 5 IPCC 2000 emissions scenarios



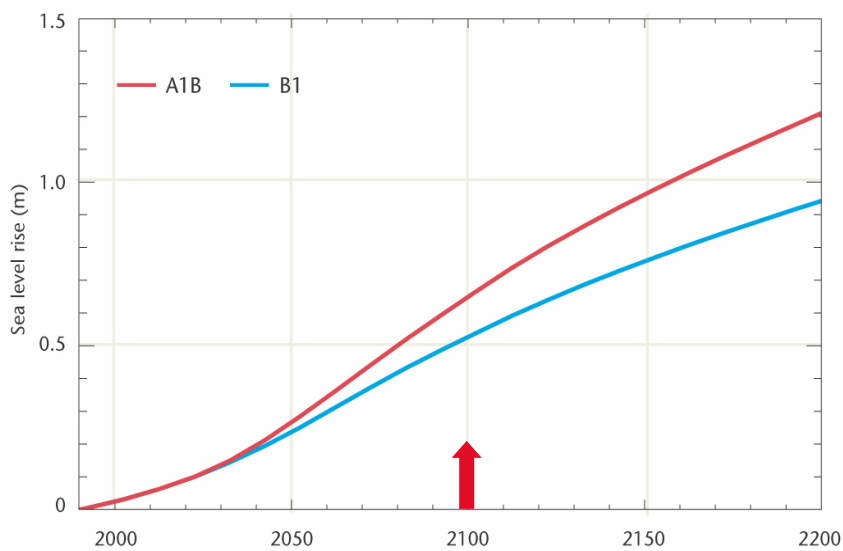
Increase in annual average temperature (IPCCA2) by the 2080s



Impacts on global agriculture by the 2080s



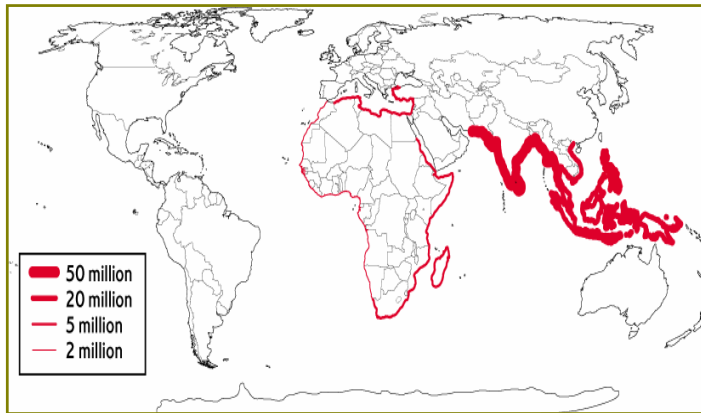
GLOBAL SEA LEVEL RISE following stabilisation of greenhouse gas concentrations by 2100



Jason Lowe, Hadley Centre



Number of people at risk from coastal flooding by the 2080s



Responses – mitigation and adaptation

- Unrestrained climate change presents unacceptable risks
- Global control of greenhouse gas emissions essential to stabilise concentrations at a safe level
- Kyoto the first step
- But some climate change is unavoidable so essential to develop adaptation strategies (local)

Impacts and adaptation in the UK

- UK Climate Impacts Programme
- Development of adaptation strategies by Government Departments
- Case Studies
- Working with developing countries
- Assessment of global impacts and dangerous levels

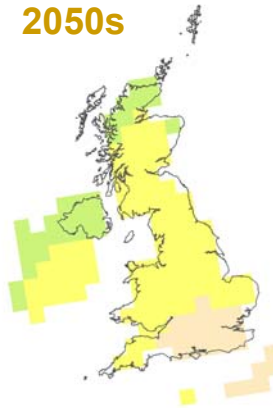


Change in annual average daily temperature under a medium-high emissions scenario

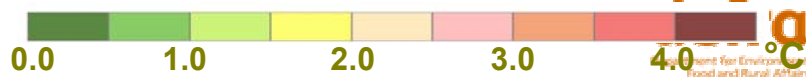
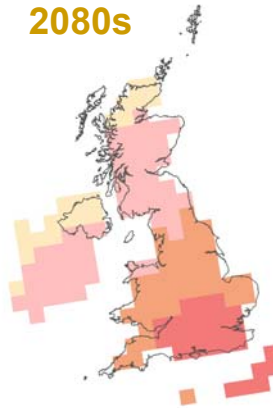
2020s



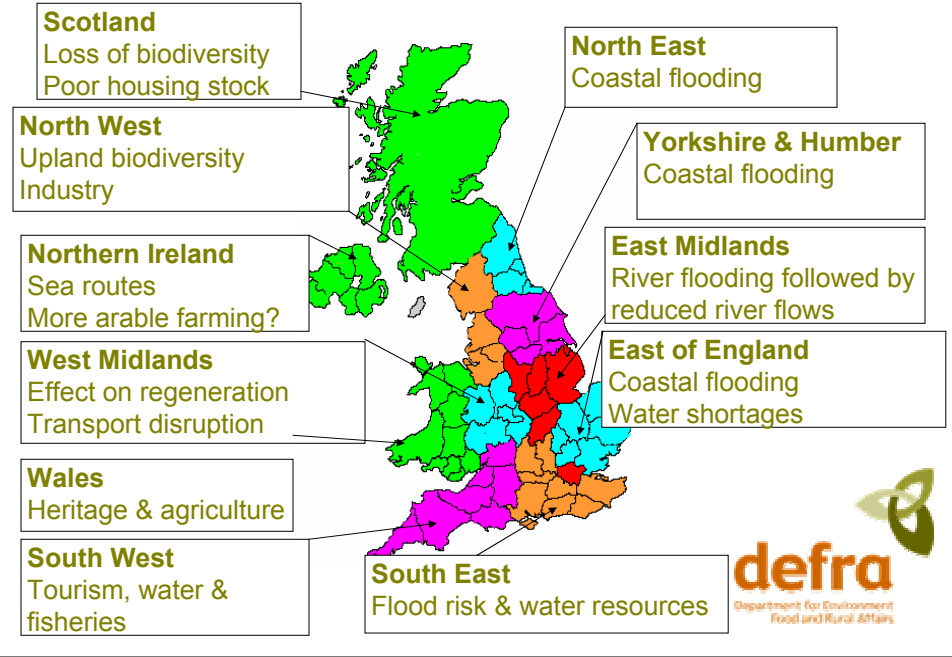
2050s



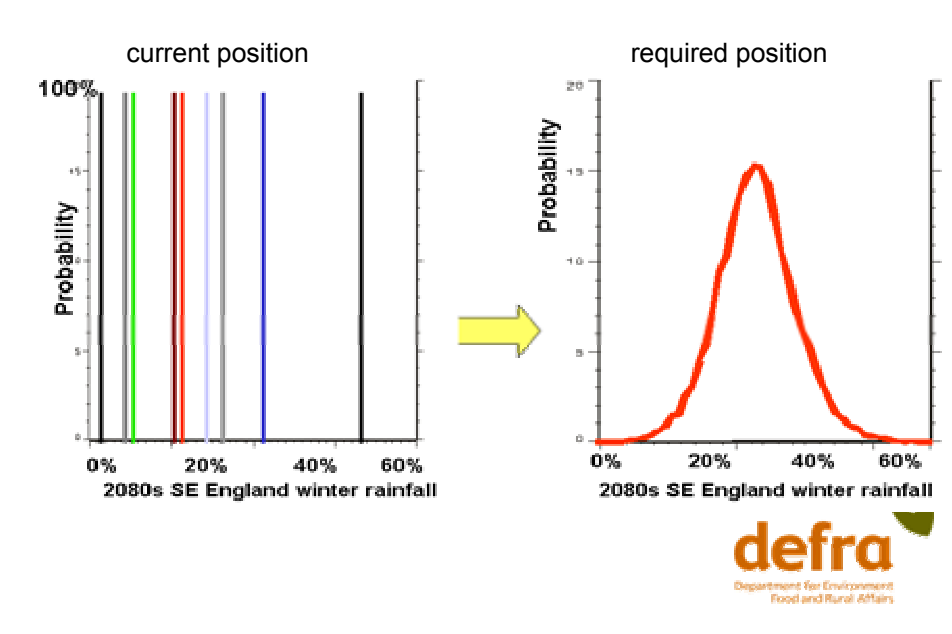
2080s



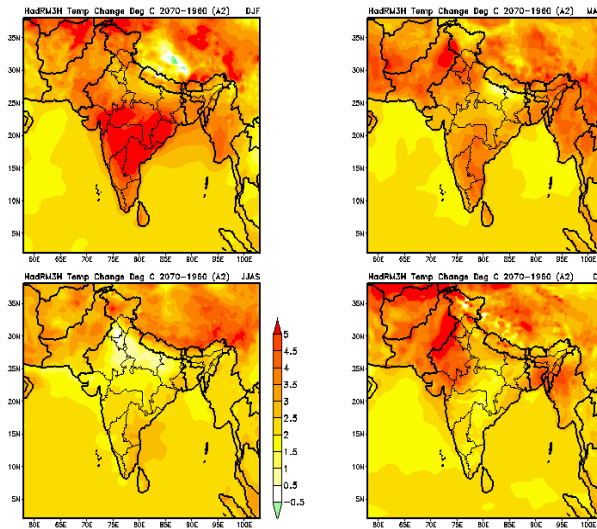
Greater stress on water resources by 2050



Probabilistic climate predictions



Temperature change by 2070: Hadley Centre PRECIS model results for southern Asia



IPCC SRES
A2 Scenario

Krishna Kumar,
Indian
Institute of
Tropical
Meteorology,
Pune, India

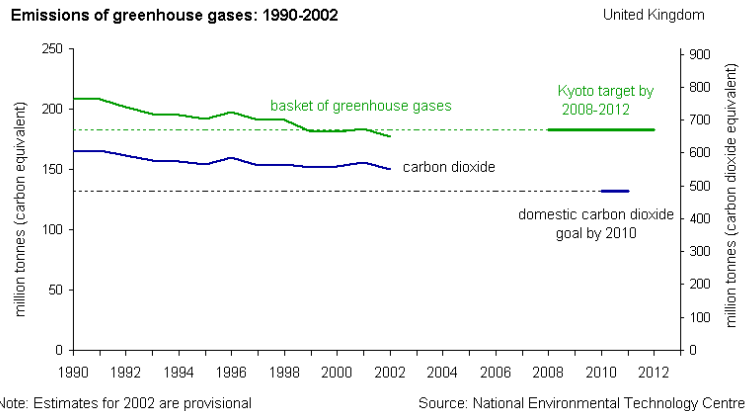


Mitigation in the UK

- UK on track to meet Kyoto commitments and a domestic 20% target for CO₂
- Comprehensive programme of policies and measures, including emissions trading
- Energy White Paper – long term view



UK GHG emissions 1990 – 2002

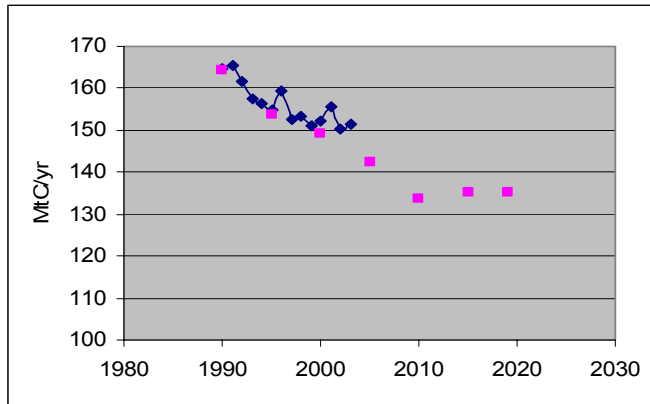


Source of emission changes in UK from 1990 to 2002

- **Carbon dioxide (- 8.7%)** liberalisation of energy market & dash for gas
- **Methane (- 43%)** increased methane recovery at landfill sites, decreased fugitive emissions from coal mines and livestock trends.
- **Nitrous oxide (- 40%)** fertiliser usage and (- 90%) adipic acid production. Offset by 3-way catalytic converters in vehicles.
- **HFC (- 33%)**
- **PFC (- 16%)** aluminium industry
- **SF6 (+ 23%)** magnesium smelting & electrical insulation



Latest UK CO₂ trends



Summary and prospects to 2010

- Annual UK emissions down 13.2% and CO₂ down 7.5% by 2000 from 1990 levels
- All greenhouse gas emissions expected to be down by 23% and CO₂ by 20%, by 2010.
- The economy grew by 49% between 1990 and 1999.
- GHG emission intensity fell by about 30%.



UK Strategic approach

- Stabilisation framework needed
- Energy White Paper

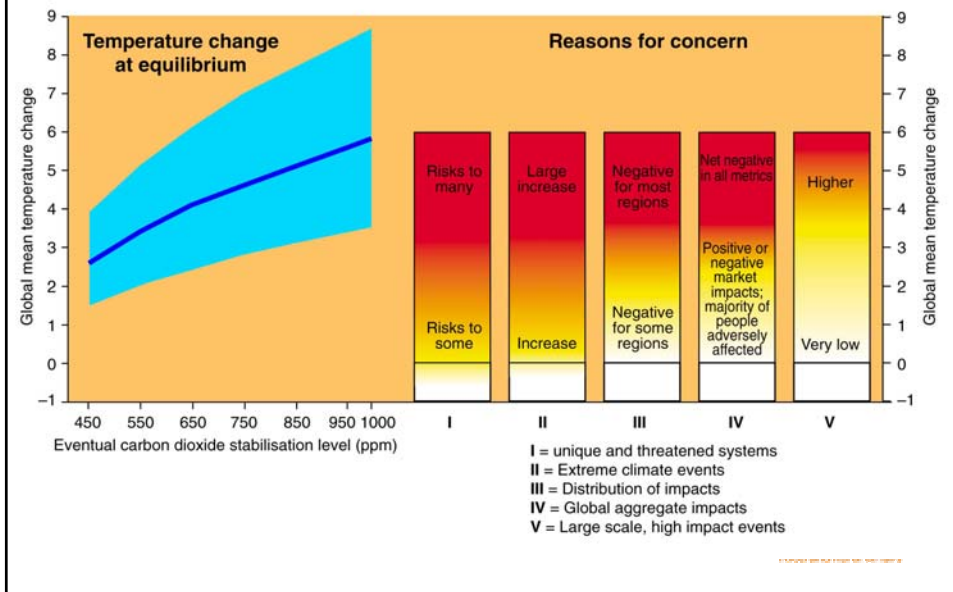


Objective: stabilisation at safe levels

- The ultimate objective of the UNFCCC is to stabilise greenhouse gases in the atmosphere at levels which avoids *dangerous* anthropogenic change to the climate system



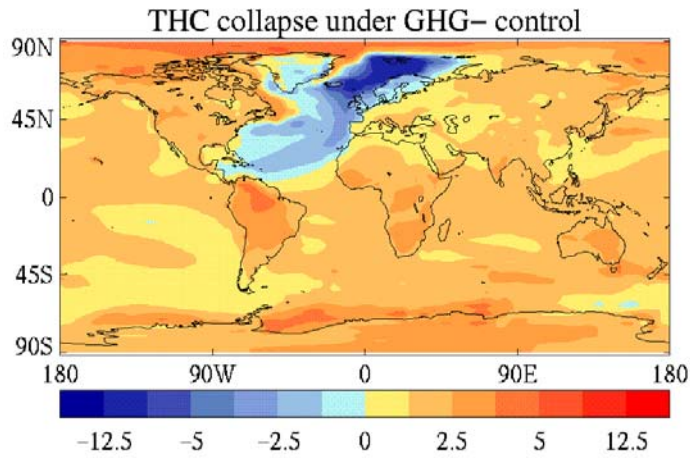
Defining dangerous levels



Stabilisation Impact Categories

- **Climate system disruption – non-linear effects, catastrophic change (e.g. ocean circulation, ice sheets, positive feedbacks, gas hydrates and carbon cycle)**
- **Ecosystem loss (e.g. coral reefs)**
- **Direct effects on human society (e.g. water resources, food security, health, land degradation and loss, economic activity)**

Surface temperature change if THC collapses whilst world warms (Hadley Centre)

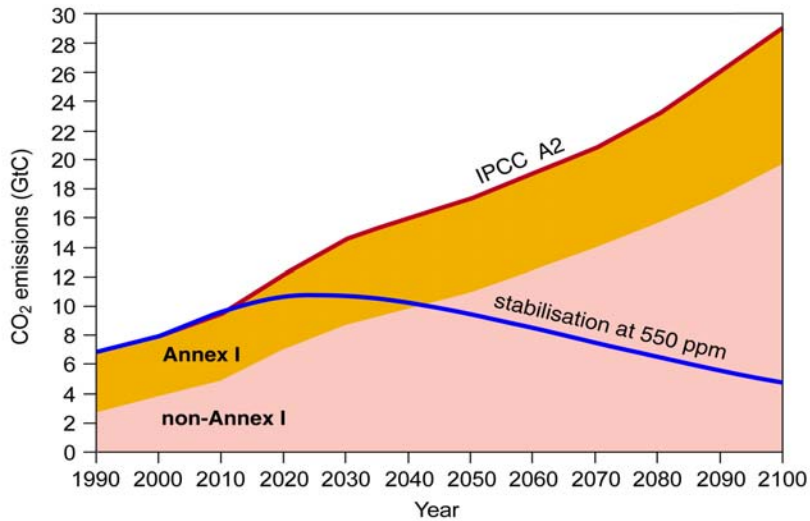


Ecological thresholds

More than a million species committed to extinction by 2050?



The mitigation challenge



How do we get to stabilisation?

- All stabilisation levels require deep cuts in global emissions.
- The stabilisation level attained is dependent on how fast reductions are put in place.
- Some climate change will be inevitable so we will need to adapt.
- Less action on emissions = more damage and adaptation required.
- Q What is acceptable?

Our energy future: creating a low carbon economy

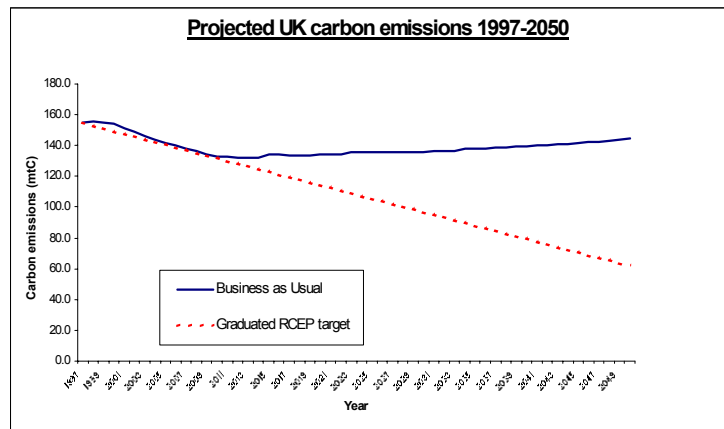
www.dti.gov.uk/energy/whitepaper

- “The UK should put itself on a path towards a reduction in carbon dioxide emissions of some 60% from current levels by 2050”
- “Our new energy policy will ensure that energy, the environment and economic growth are properly and sustainably integrated”



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The carbon challenge



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Overall Strategy

- **Strong emphasis on renewables and energy efficiency**
- **Coal has a future, if clean**
- **No commitment to new nuclear build now, but don't rule it out later if necessary to meet our carbon goals**



Why 60% ?

- **Assumes CO2 stabilisation at 550ppm**
- **Assumes similar action by all Annex-1**
- **Requires some developing country action in 2020 – 2030 timeframe**
- **Accepted the RCEP recommendation**



Costs of 60% CO2 reduction

- provided wider international engagement, costs of order of ½ - 2 % of GDP in 2050
- approximately 0.01-0.02 percentage points reduction on assumed GDP growth rate of 2.25% a year



Stabilisation Summary

- Safe level to avoid dangerous change is uncertain
- Even 550ppm may carry large risks.
- Stabilisation requires deep global emission reductions - Annex-1 some 60% by 2050 needed.
- Developing countries need to curb emissions by around 2010 to 2030.
- Review actions frequently as science and technology develops

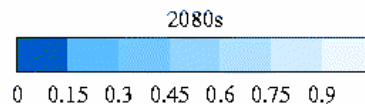
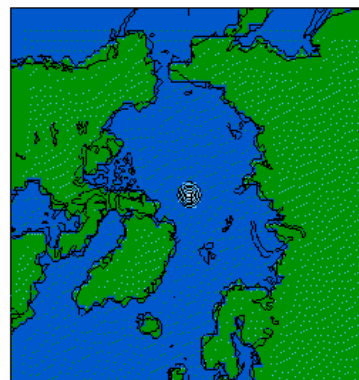
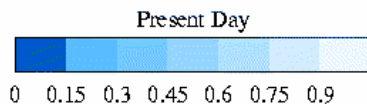
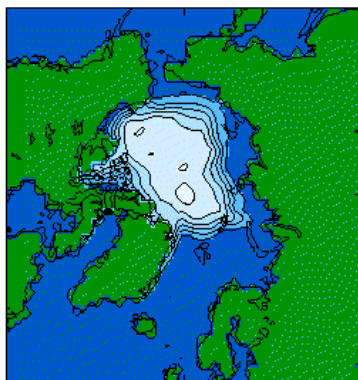


Science-Policy Issues

- Climate system uncertainties
- Global air pollution and climate
- Impact assessment / risk analysis
- Cost of damage and responses
- Safe limits to climate change
- Pathways to stabilisation
- Aviation (50% of emissions - 2050?)
- Hydrogen and new technologies



Extent of Arctic summer sea-ice under high emissions scenario (HC)





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