

Attribution – Who needs It?

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August 2010

Key Policy Relevant Questions

- 
- Is human-caused climate change happening?
 - What are the current impacts?
 - How will climate change in the future?
 - What will be the future impacts?
 - How can we avoid dangerous climate change?
 - What emissions pathways are consistent with this goal?

DECC's Goals



-
- The U.K. has committed to reduce our greenhouse gas emissions by 80% by 2050
 - But we need to ensure UK energy security and protect vulnerable members of society
 - Also, we need to look back as well as forward and manage our coal and nuclear energy legacies responsibly
 - And climate change is a global problem, so we need to encourage and drive ambitious action on climate change from over nations

DECC's Priority Evidence Needs



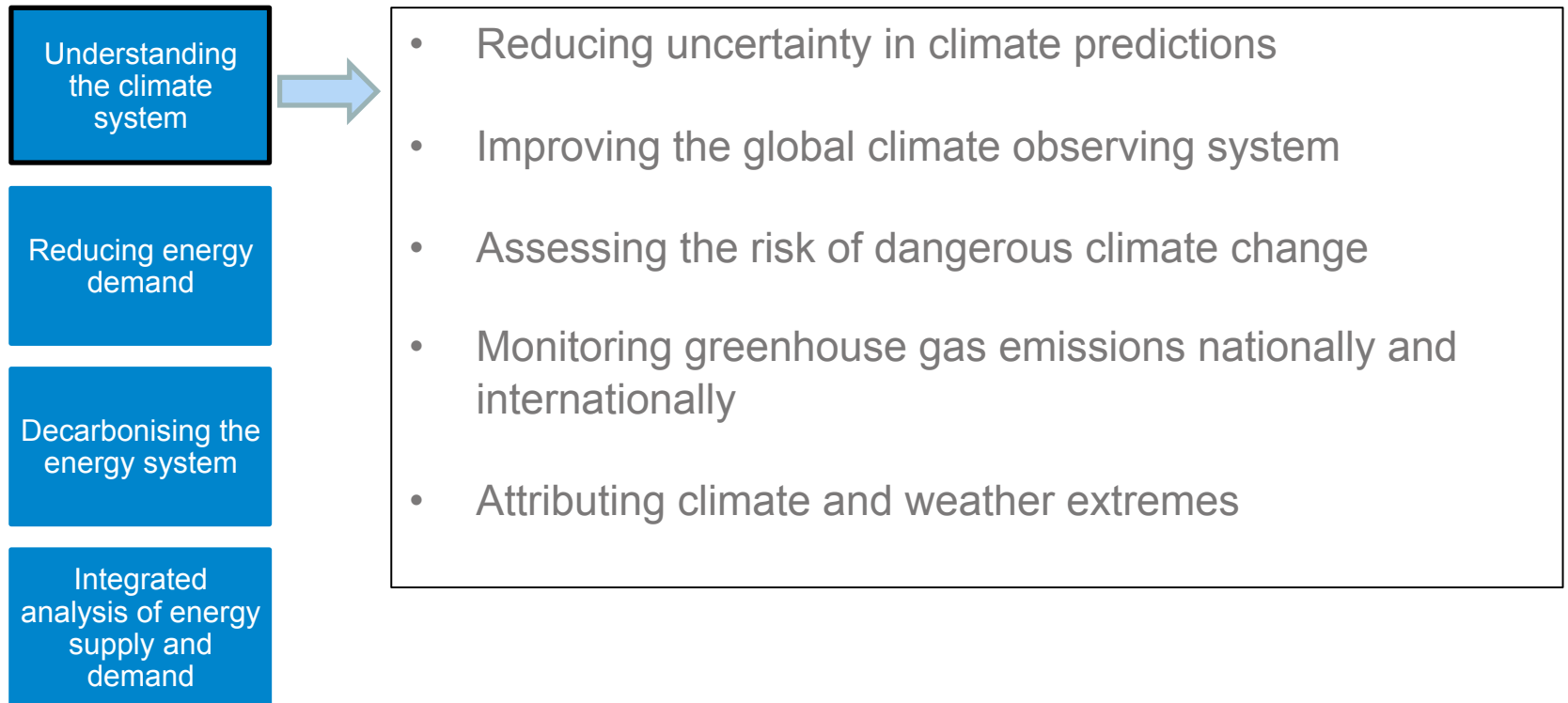
Understanding
the climate
system

Reducing energy
demand

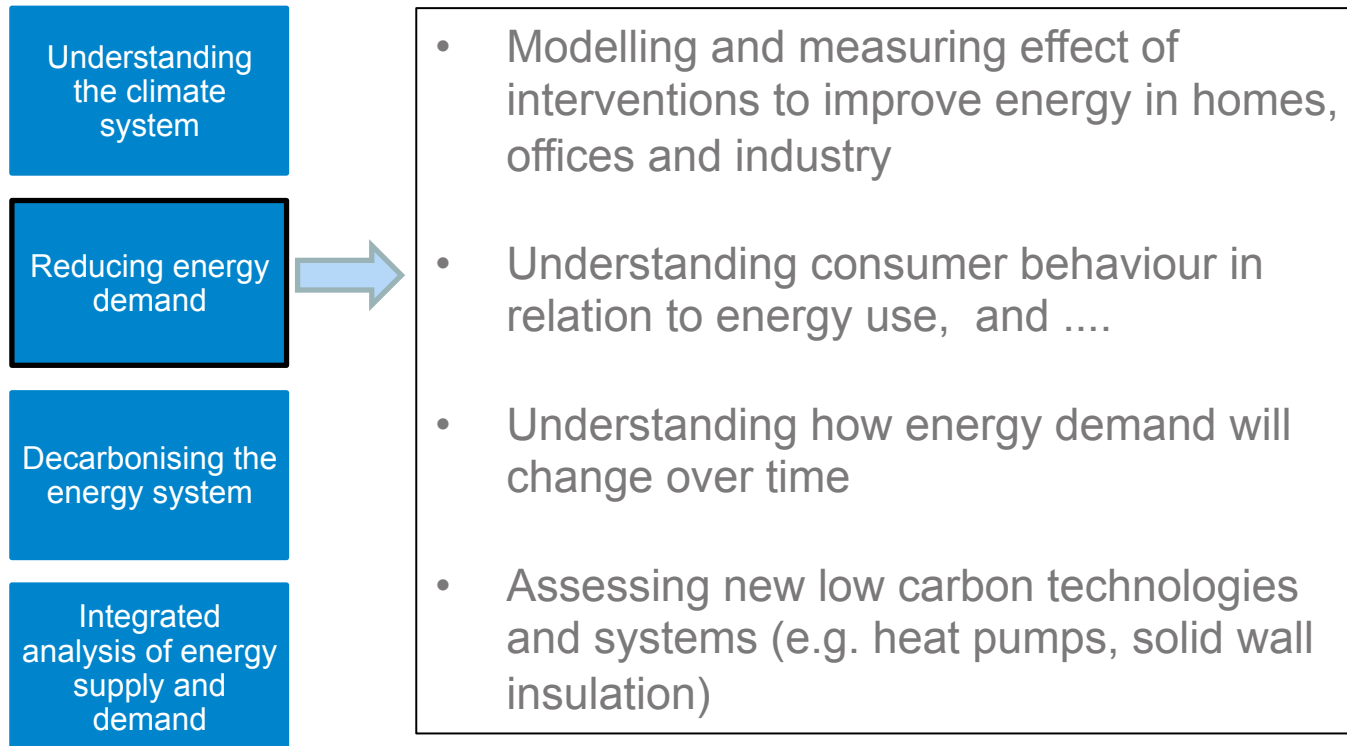
Decarbonising
the energy
system

Integrated
analysis of
energy supply
and demand

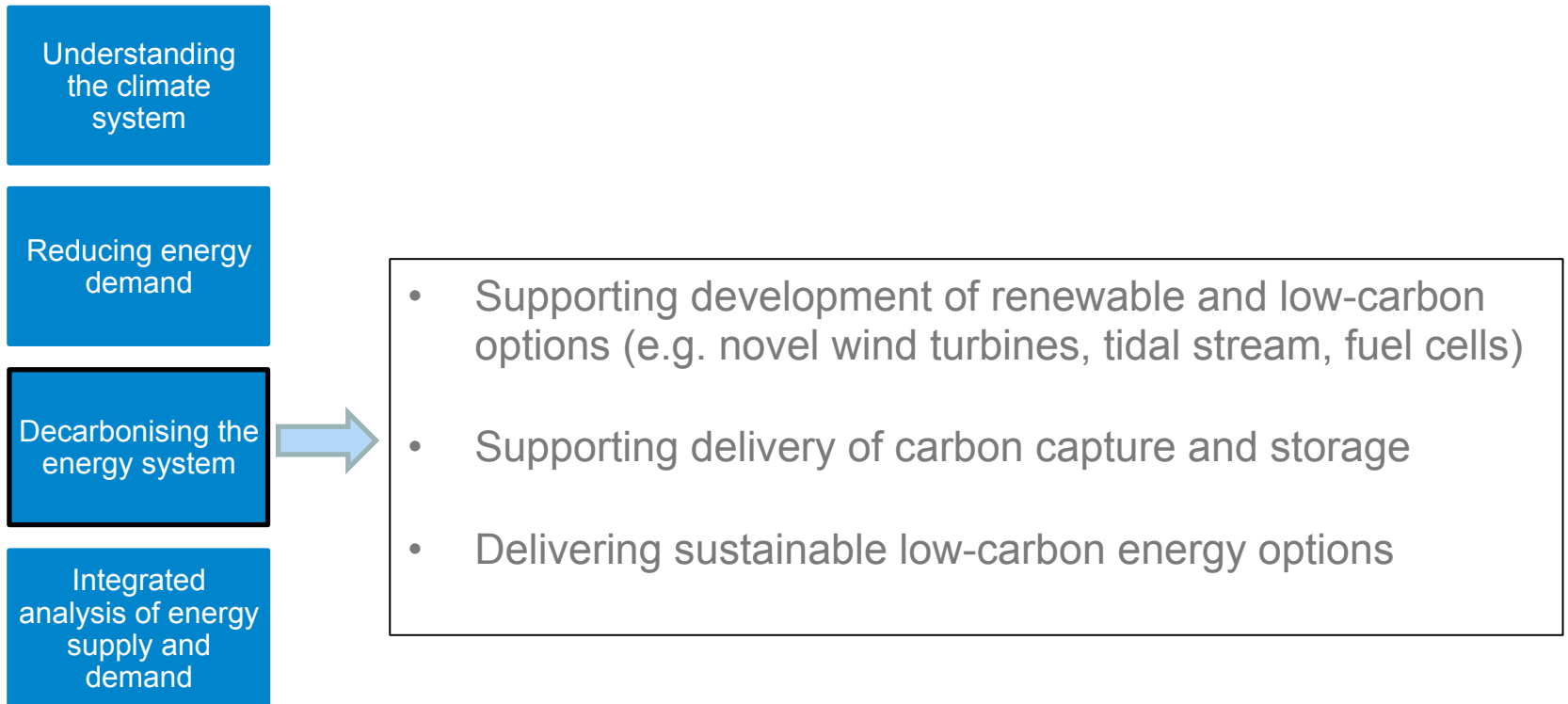
Science and Innovation Objectives in DECC



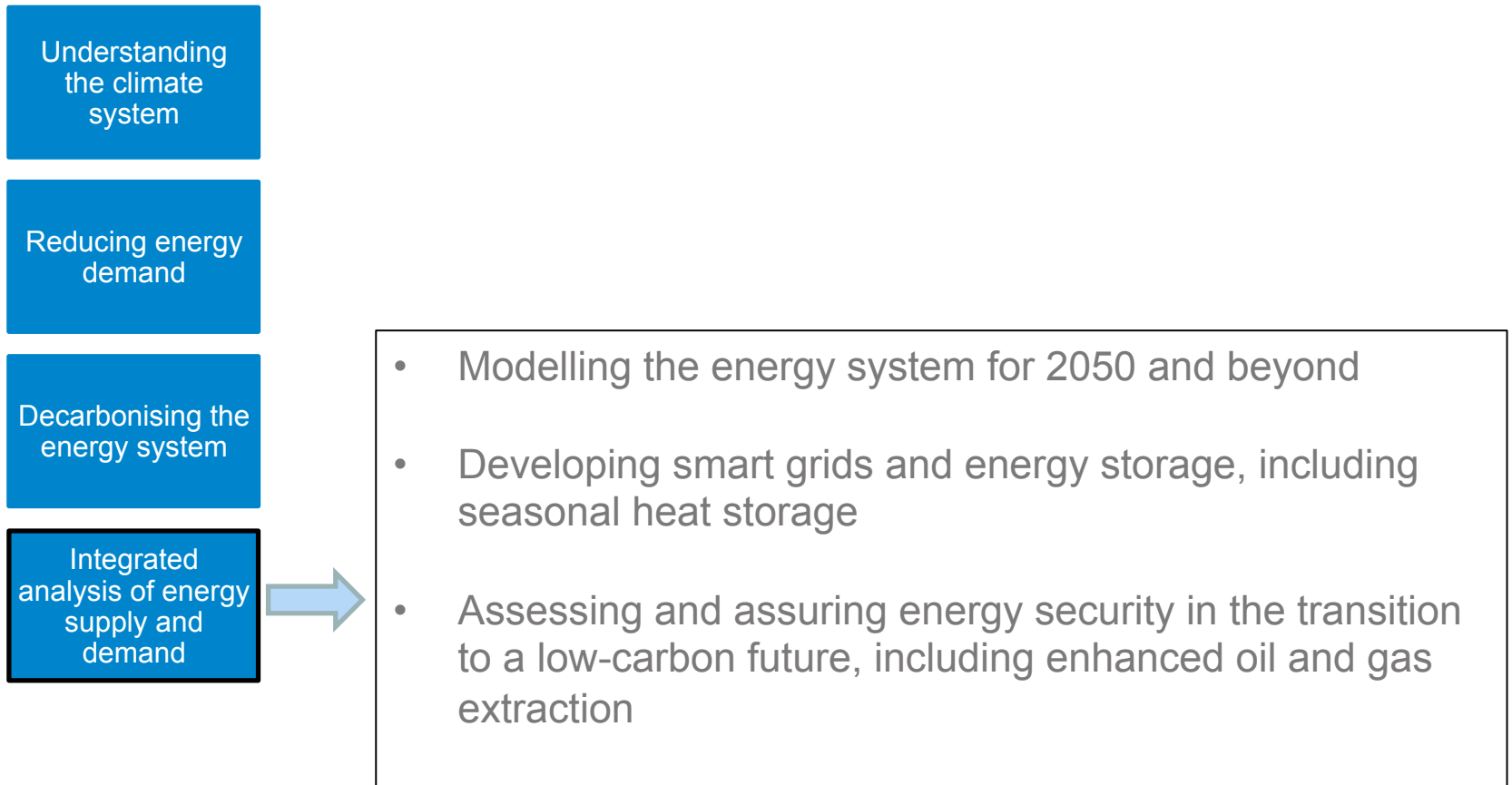
Science and Innovation Objectives in DECC



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Science and Innovation Objectives in DECC



Decision-making when Science is Uncertain



- Science can never provide absolute certainty
- Decisions are always made under conditions of uncertainty and incomplete information
- A number of Government reports have stressed the need for risk-based approaches to decision making

RISK = PROBABILITY OF EVENT x CONSEQUENCES OF EVENT

Our Role



To be effective, we need to have:

- An **'intelligent customer'** capability to commission and interpret research results for policy development
- A **'knowledge broker'** capability to bring external science, engineering and technical innovation to bear on climate and energy policies
- Increased scientific and technical understanding

The Standard 'Bad News'



- No evidence for climate change – it's all a myth
- No evidence for man-made climate change
- Climate change is down to natural processes, we should adapt as best we can
- Climate change is happening but the science is too ***uncertain*** to tell us by how much; and so
- There is no good reason to act ***now***
- Climate change is a slow process and we can engineer solutions when we need to

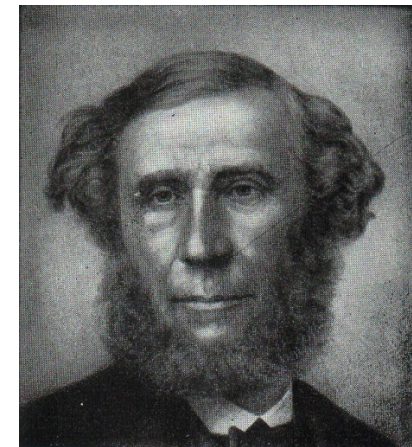
**So, How Do We Try To
Convince the Public & Our
Government Policy Makers?**

**The Current (Logical) Approach:
A Short and Simple Story**

The Basics

Greenhouse gases warm the Earth

- **1827** – Jean-Baptiste Fourier first recognises warming effect of greenhouse gases
- **1860** – John Tyndall first measures the absorption of infrared radiation by carbon dioxide and water vapour

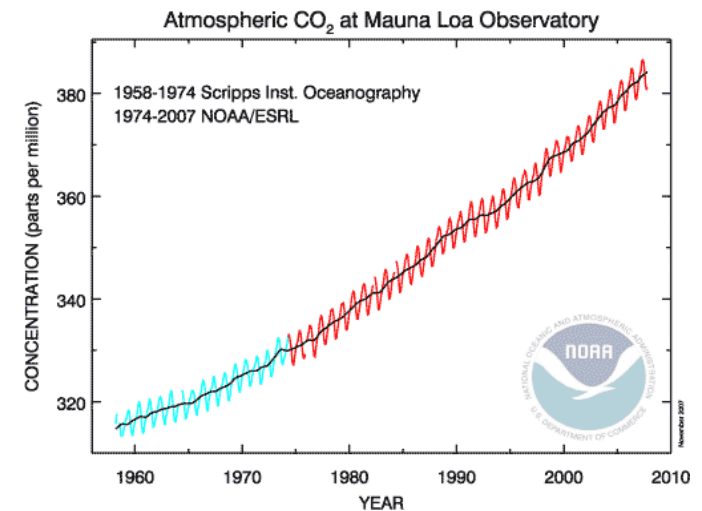
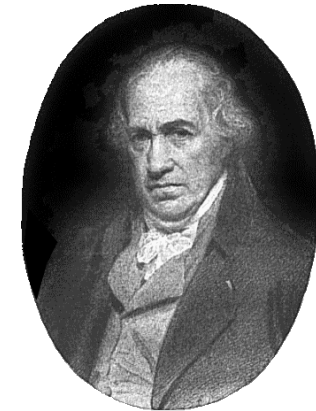


The Basics



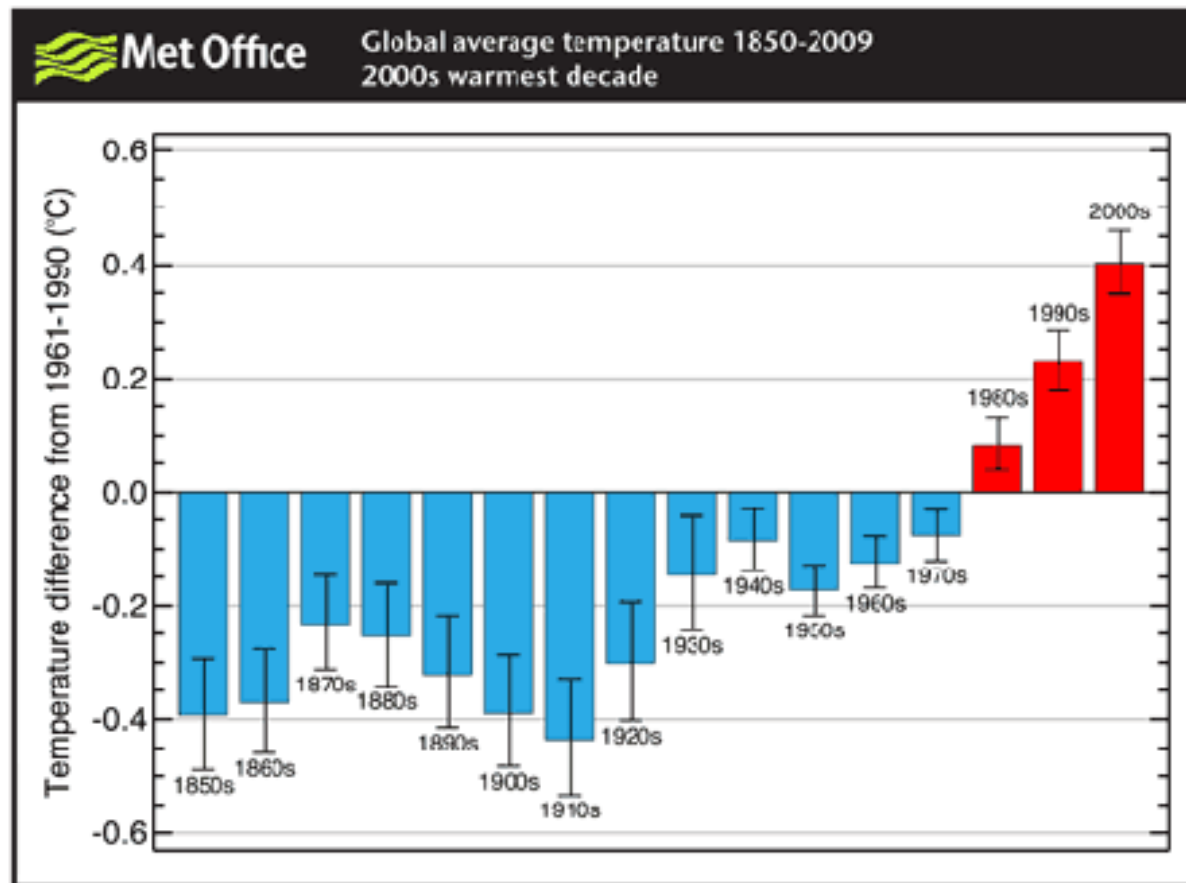
Humans are increasing the concentration of greenhouse gases

- 1769 James Watt patents his steam engine, marking onset of the Industrial Revolution
- 1957 – Keeling starts to measure atmospheric CO₂ concentration in Hawaii
- 2000s – Isotope analysis shows CO₂ in the air carries the signature of fossil fuels




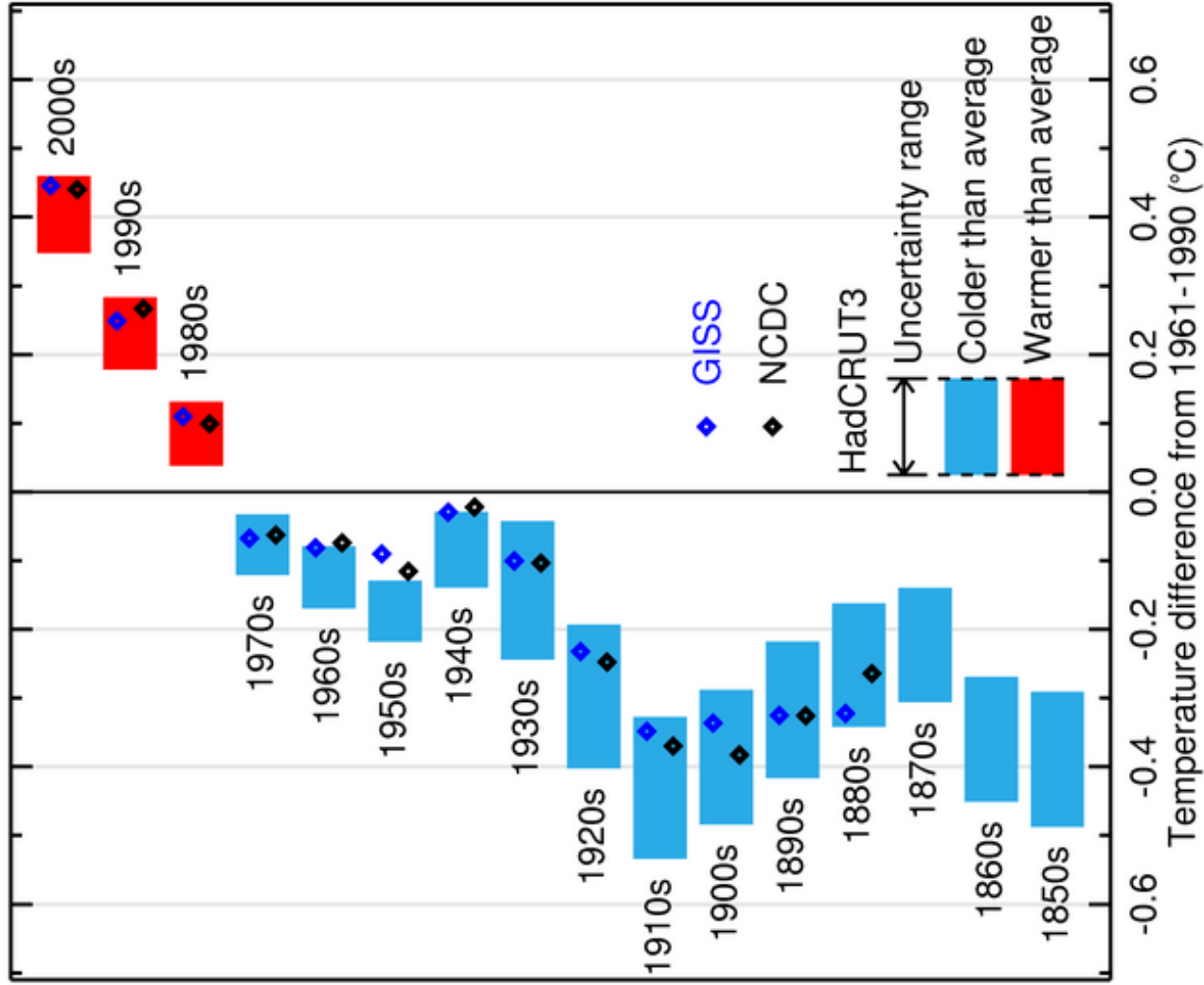
The Basics

We've observed the warming, noted the evidence....



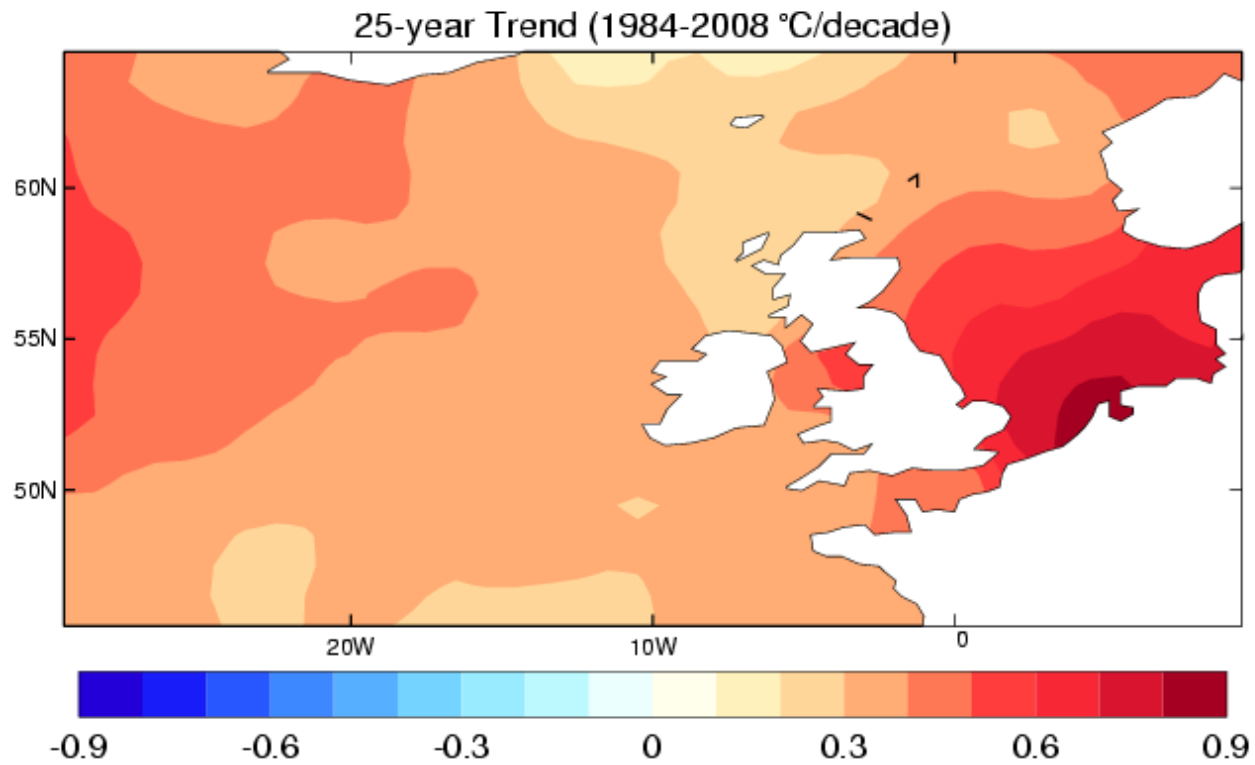
The Basics

 Global-average Temperature 1850-2009
Decadal averages

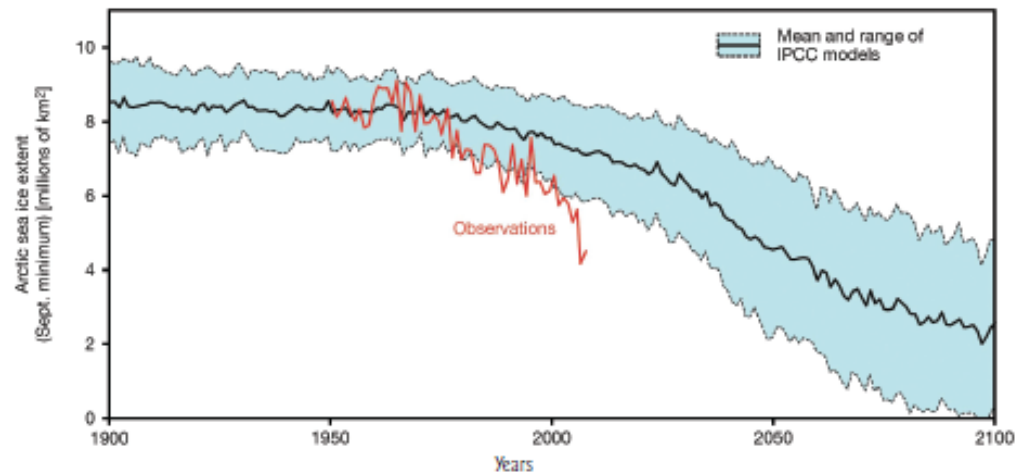
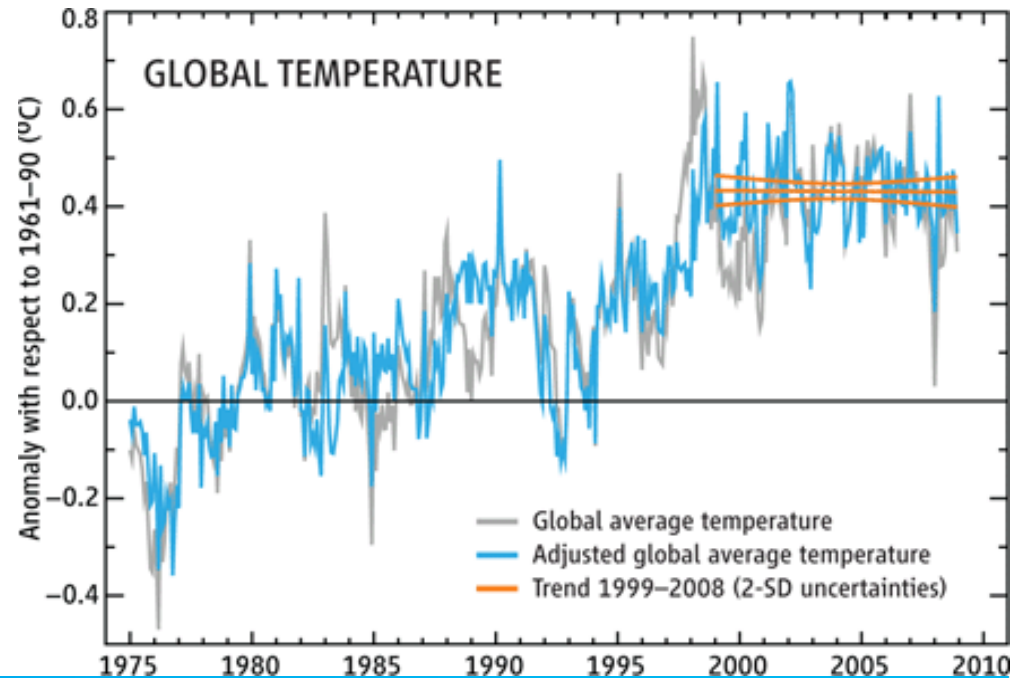
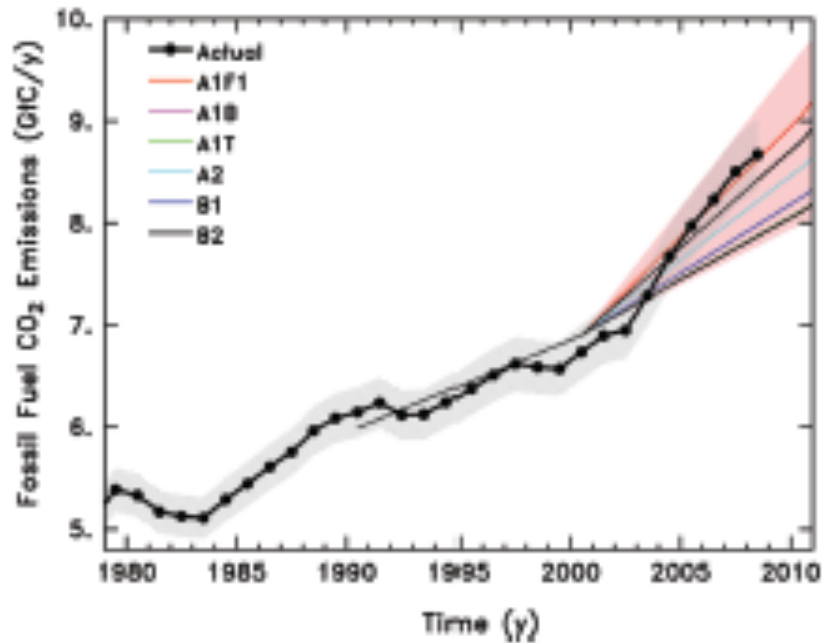


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The Basics



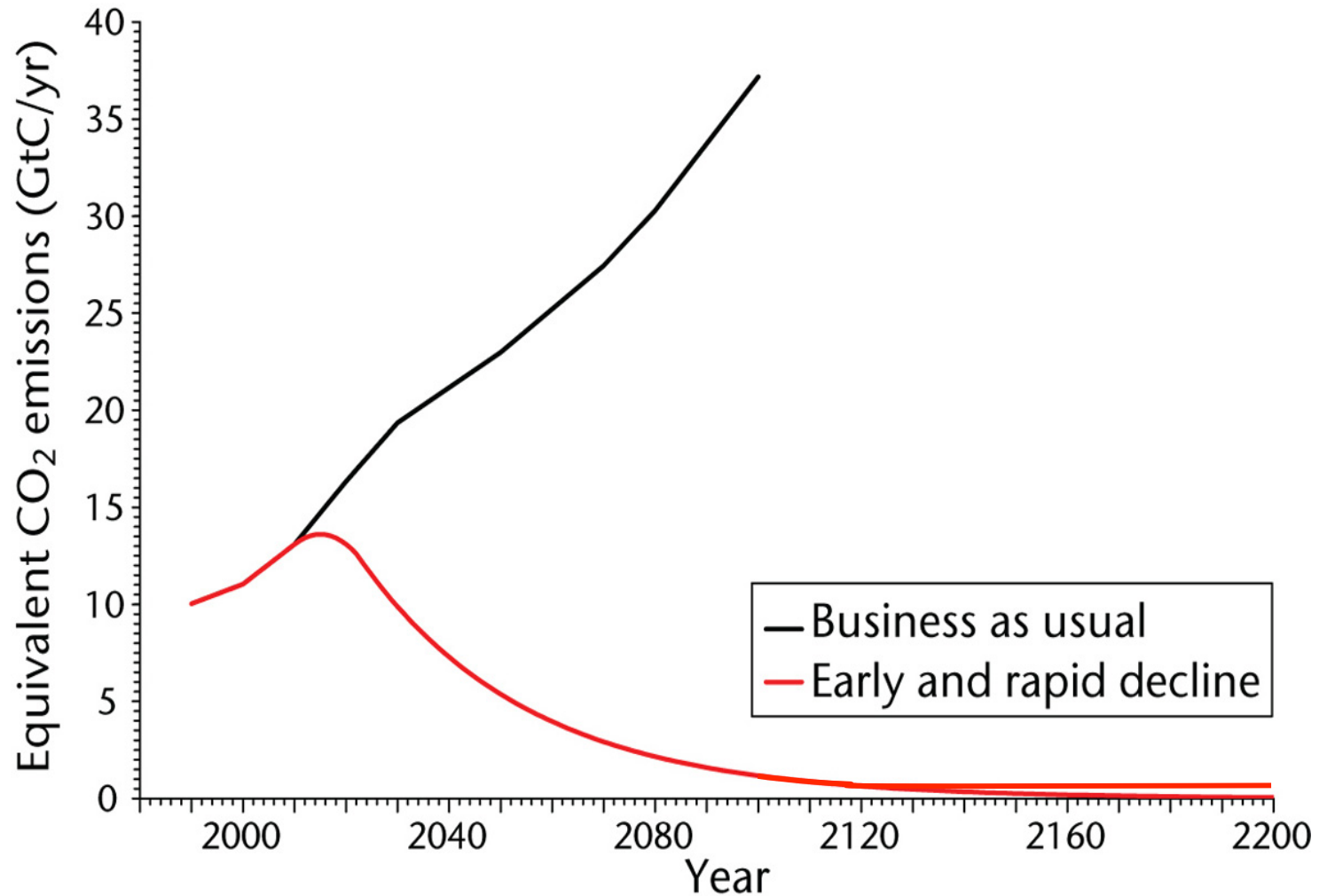
What has happened ...



What Scale of Change is Required?



Each 10 year delay could add up to 0.5°C to the temperature rise



Engaging Policy is All About Delivering Clear Messages



Are These Clear Enough?

1990 ... 'Global temperature has increased by between 0.3° and 0.6°C over the last hundred years ... this warming is **broadly consistent with** predictions of climate models, but it is also of the same magnitude as natural climate variability.'

1996 ... 'The **balance of evidence suggests** that there is a discernible human influence on global climate'

2001 ... 'Most of the observed warming over the last fifty years is **likely to have been due** to the increase in greenhouse gas emissions'

2007 ... 'Most of the observed increase in global average temperatures since the mid-twentieth century is **very likely due** to the observed increase in anthropogenic greenhouse gas concentrations.'

At What Point Would You Act?

But These Are Not 100% Effective



Sensible, but

In my opinion, this is not working well at the moment

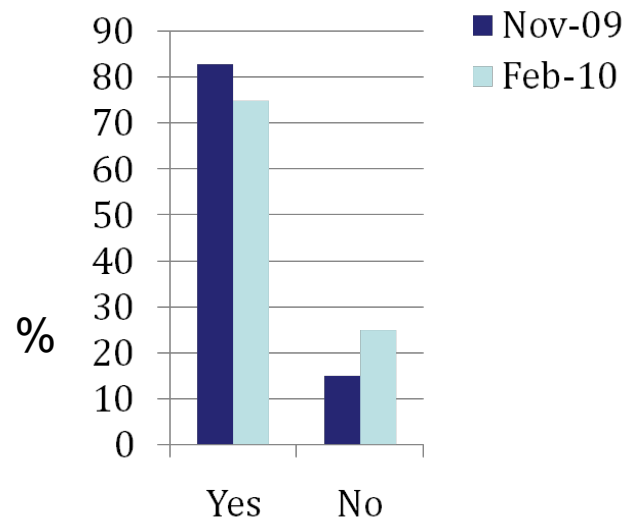
**Humans aren't rational creatures,
there'll always be committed, well organised sceptics,
and there'll always be '*events*'**

.... Climategate, IPCC 'errors', unpronounceable volcanoes,
cold winters, blizzards, ...

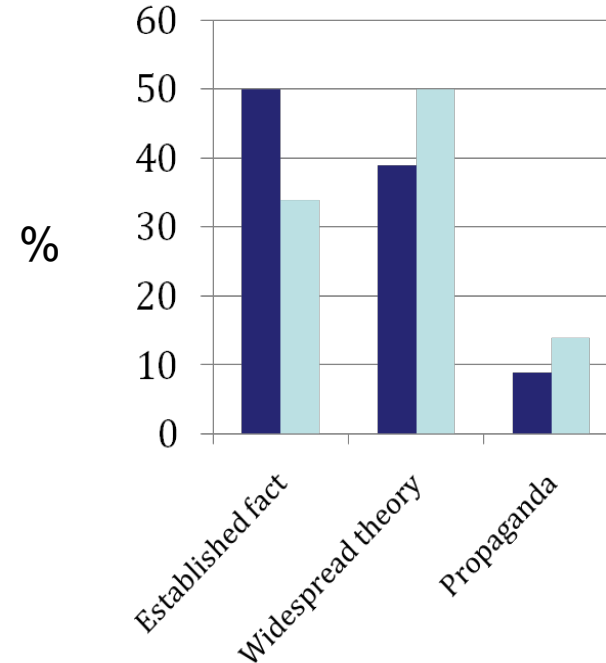
Polls Show Declining Confidence



Is climate change happening?



That climate change is 'largely man-made' (of those who agreed it is happening)



Two U.K. Polls

- In February, people were more likely to say climate change was not happening (25%, only 17% before)
- Of those who accepted climate change was happening, fewer believed it was man made. The number saying that it's 'established fact' that climate change is mostly man made dropped from 50% to 34%.
- More were likely to say 'it's a widespread theory, but not conclusively proven – that's column two – up from 39% to 50%

Climate Science in the Media



**Climate sceptics claim
leaked emails are
evidence of collusion
among scientists**
(The Guardian, 11/2009)

**100 Reasons why global
warming is natural**
(Daily Mail, 12/2009)

**New errors in IPCC
climate change report**
(The Telegraph, 2/2010)

**NASA Data Worse Than
Climate-Gate Data,
Space Agency Admits**
(Fox News, 3/2010)

- Exceptions and Rules (Economist, 4th August)
 - The Horns of a Dilemma
- The 2009 – 2010 ‘Cold Winter’
 - Used to downplay evidence of global warming and argue that it ‘wasn’t happening’
 - In response climate scientists, the news media and policy advisers said that ‘individual events aren’t evidence of overall climate trends’
 - But globally, the 2009 – 2010 NH winter was warm, not cold
 - However, a Media consensus was formed
 - Don’t talk about individual events evincing global warming
 - Now, after the ‘heat wave summer’; are we hoist with our own petard
 - *The Economist* concluded that the Media and the Public:
 - ‘lack the subtlety to do any better’*
 - We still rely on Scientists and Policy Makers to educate the Media

Conclusion

People see climate change only when it's in their own back yard

Our lack of robust near-real time event attribution is a
mote in the eye of climate change action