UNIVERSITY OF CAMBRIDGE

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NATURAL ENVIRONMENT RESEARCH COUNCIL

Cambridge Centre *for* Climate Science

Some thoughts on the science-policy interchange

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Policy landscape in post-Paris world

Who's policy?

- International & national
- Non-governmental

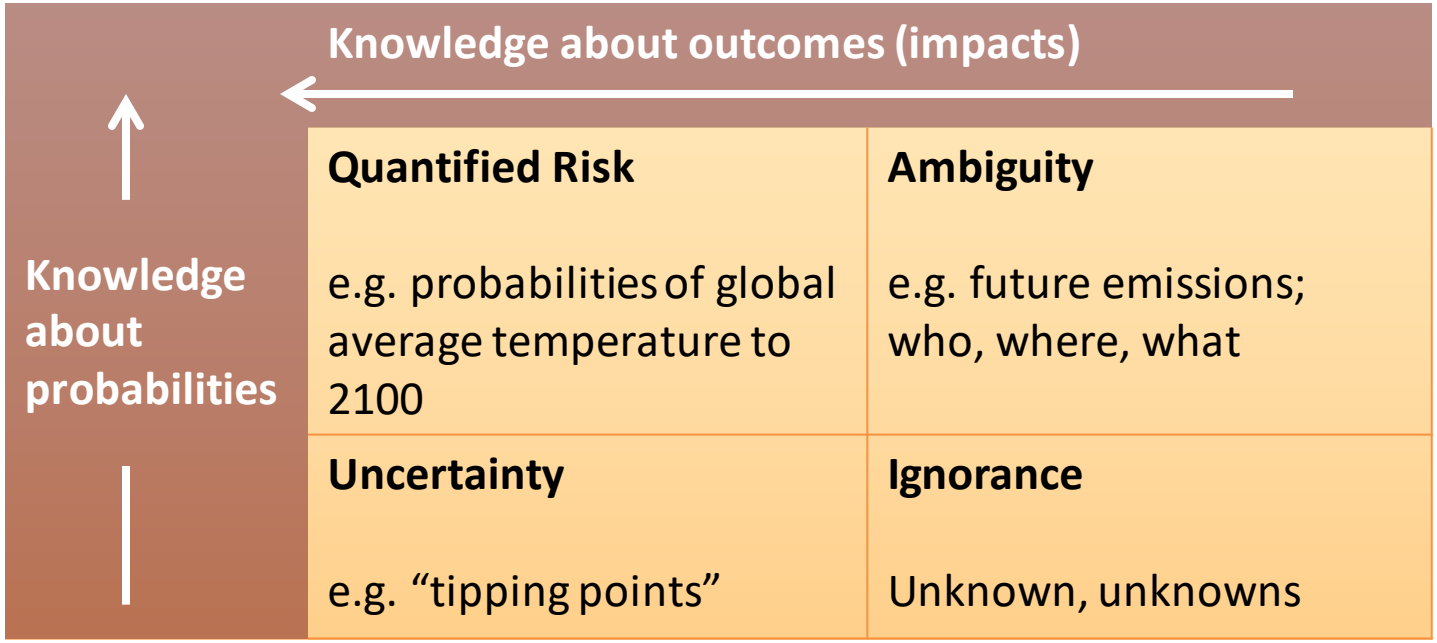
Drivers for change

- Global climate change agreement
- Economics
- Central banks & capital markets
- Liability risk

Key considerations for provision of scientific evidence

1. **Working with scientific uncertainty**
2. **Addressing the right questions**
3. **Providing simple, relevant answers**
4. **Striving to be impartial**
5. **Encompassing a broad range of evidence**

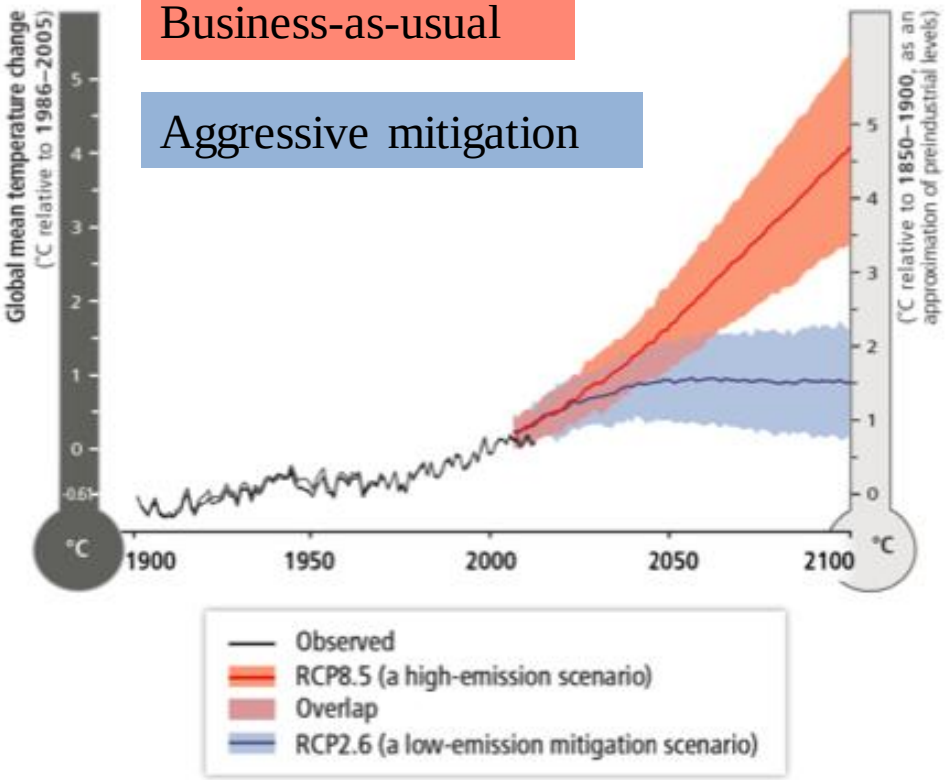
1: Working with scientific uncertainty

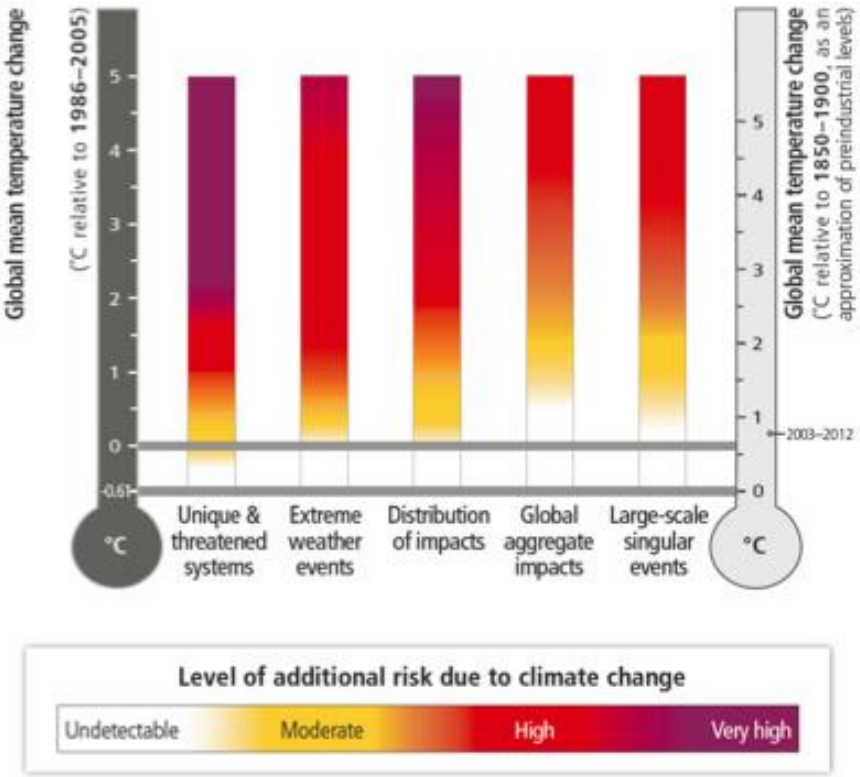


Stirling 2007

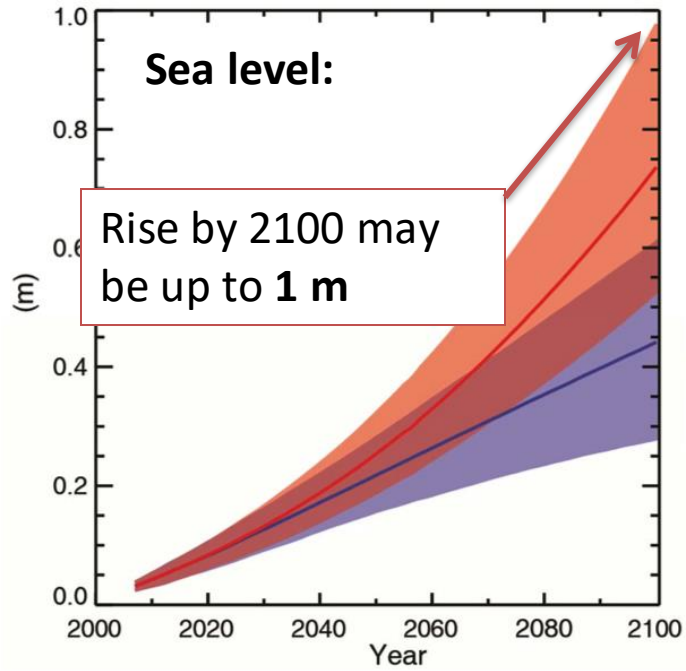
Business-as-usual

Aggressive mitigation





IPCC AR5, WG2

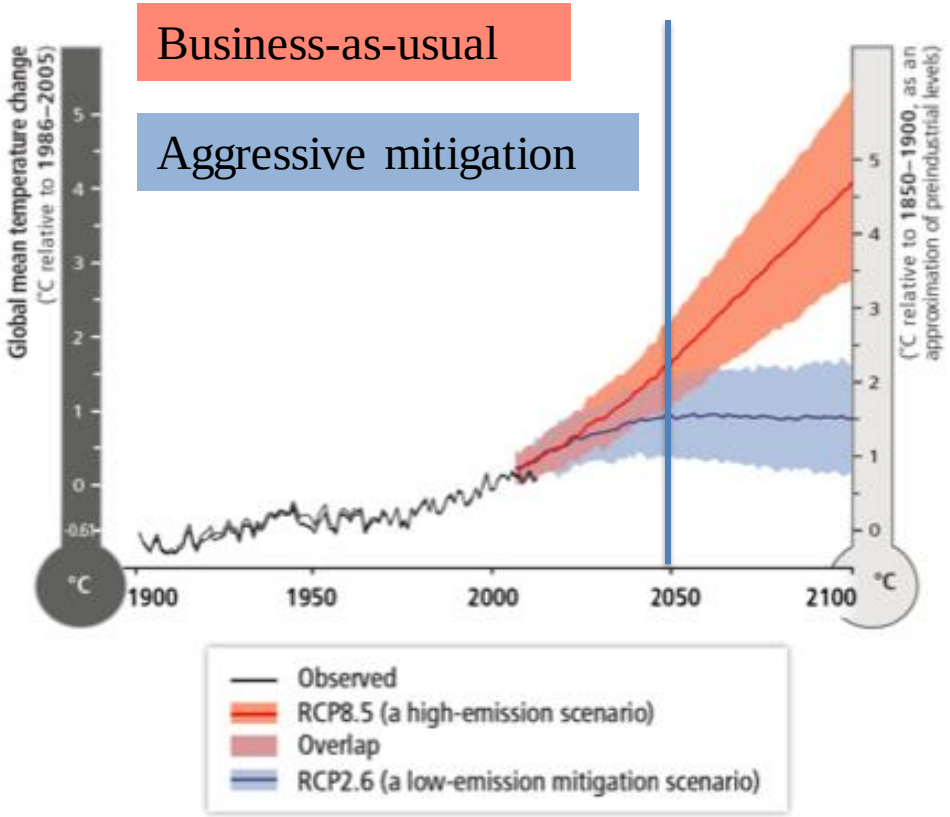


One way of dealing with uncertainty for policy decisions is **flexibility**. Flexible solutions costly, so instead have a **flexible strategy**.

"Science-first" = climate projections -> impacts -> design of adaptation [ballooning uncertainties]

"Context-first" = adaptation problem -> objectives/constraints (e.g. level of which current barrier fails) -> appraise against climate scenarios

2. Addressing the right questions



IPCC AR5, WG2

ate change wildlife energy pollution

Mark Carney defends Bank of England over climate change study

Governor hits back at Nigel Lawson's description of research into effects of global warming on insurance industry as 'green claptrap'

The Bank of England governor, Mark Carney, has emphasised the risk of climate change to insurance companies. Photograph: WPA Pool/Getty Images

Climate change is one of the biggest risks facing the insurance industry, the governor of the Bank of England has said after a former Conservative chancellor dismissed a study on global warming as "green claptrap".

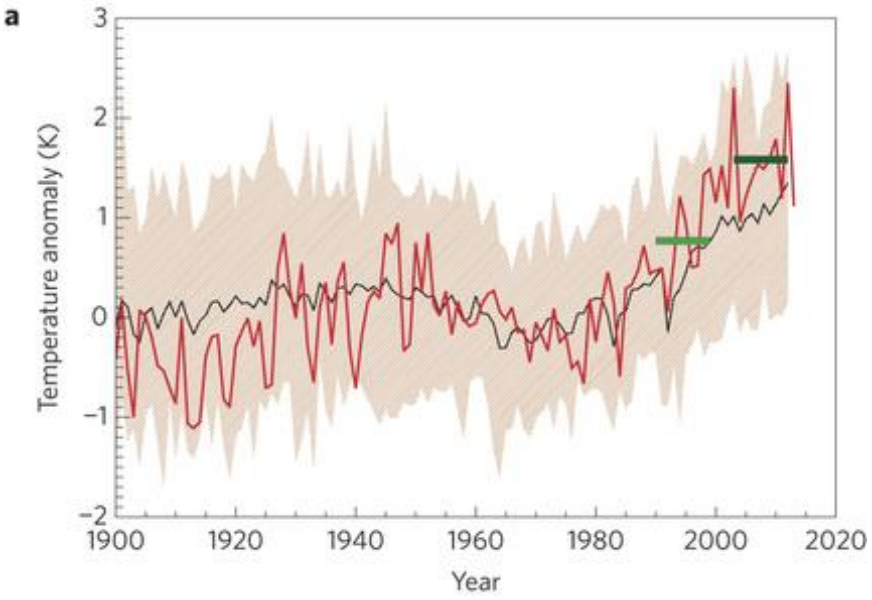
Speaking at the House of Lords, Mark Carney mounted a robust defence of the Bank's work on the impact of climate change on the insurance industry in the face of claims by Nigel Lawson that it had its priorities wrong.

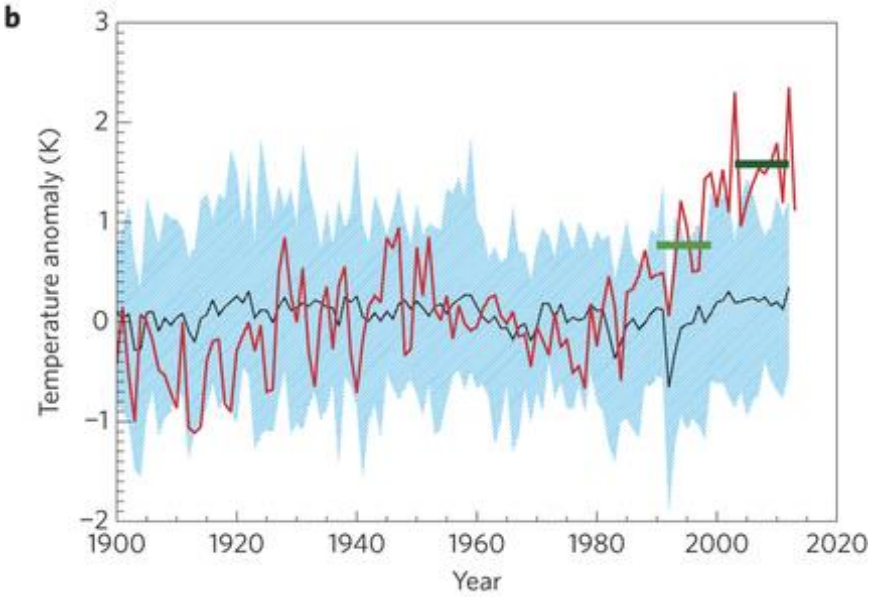
Lawson, who has claimed "there is no global warming to speak of going on at the moment", a view that puts him outside the overwhelming scientific consensus, attacked the bank for "focusing on green claptrap" rather than the remaining problems in the UK's financial sector.

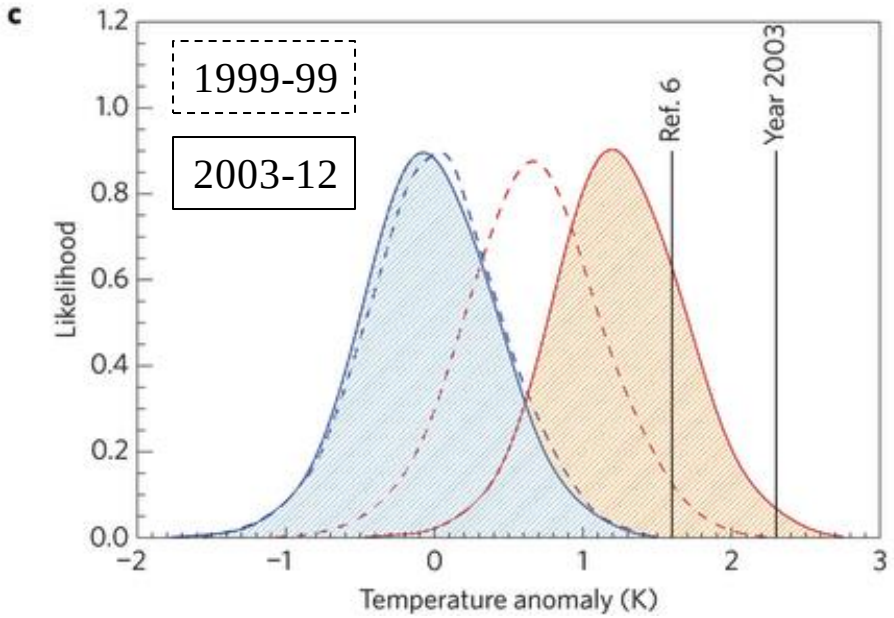
Climate change & risk in insurance / financial sectors

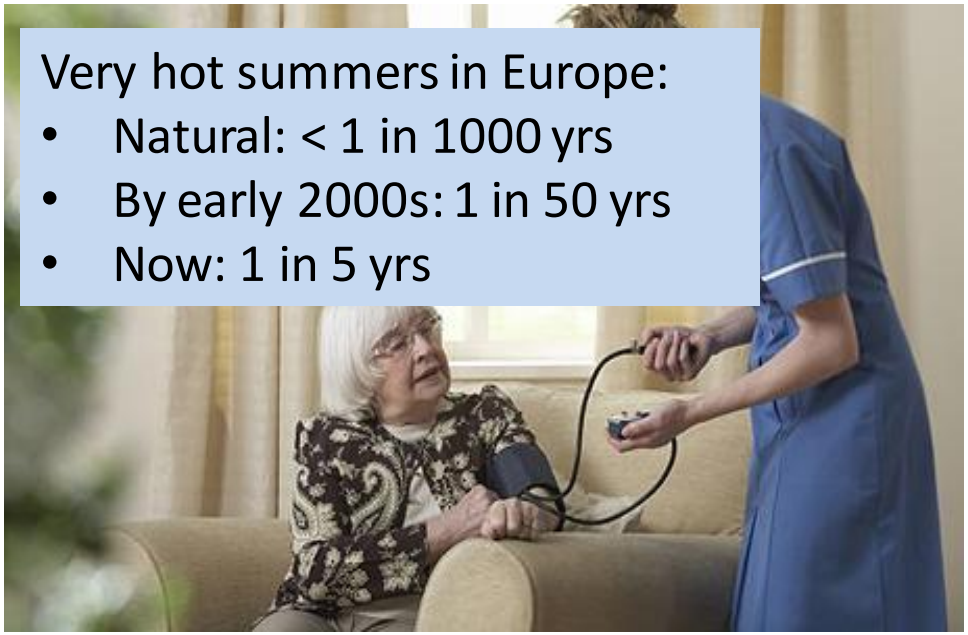
- "What will future global average temperature be?" isn't most relevant question
- Extreme events (e.g return times)
- Correlated risks (as in US subprime)

Can get very different results in terms of timescale & magnitude of risk





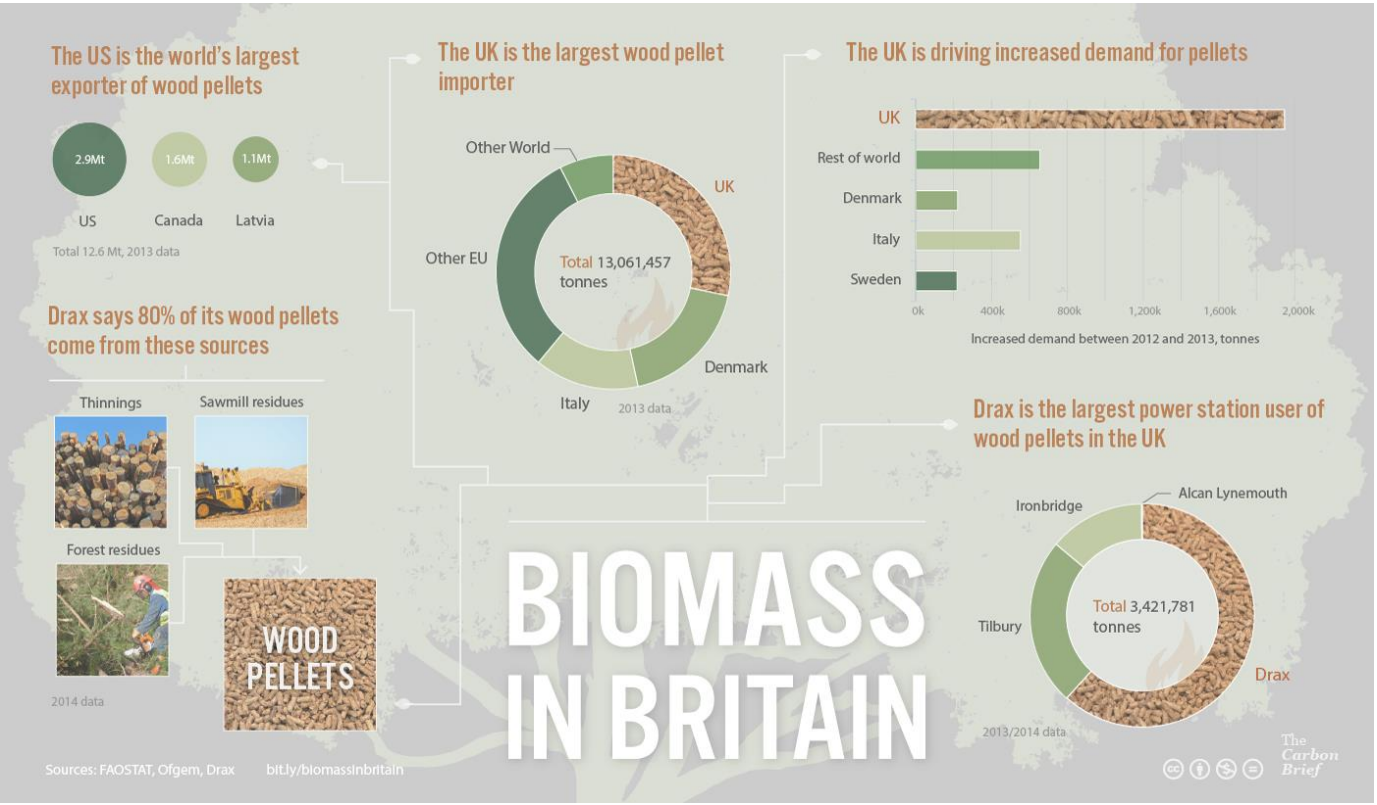




Very hot summers in Europe:

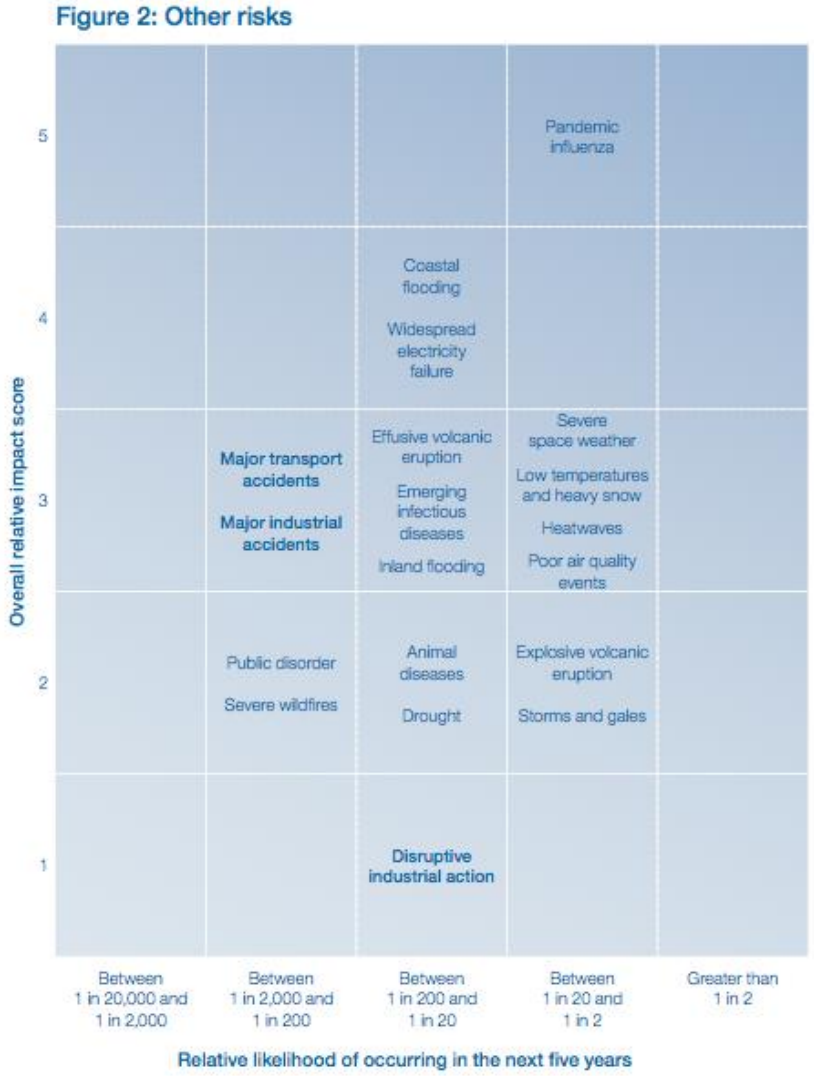
- Natural: < 1 in 1000 yrs
- By early 2000s: 1 in 50 yrs
- Now: 1 in 5 yrs

Source: Christidis et al 2014



Source: Carbon Brief

3. Providing simple, relevant answers



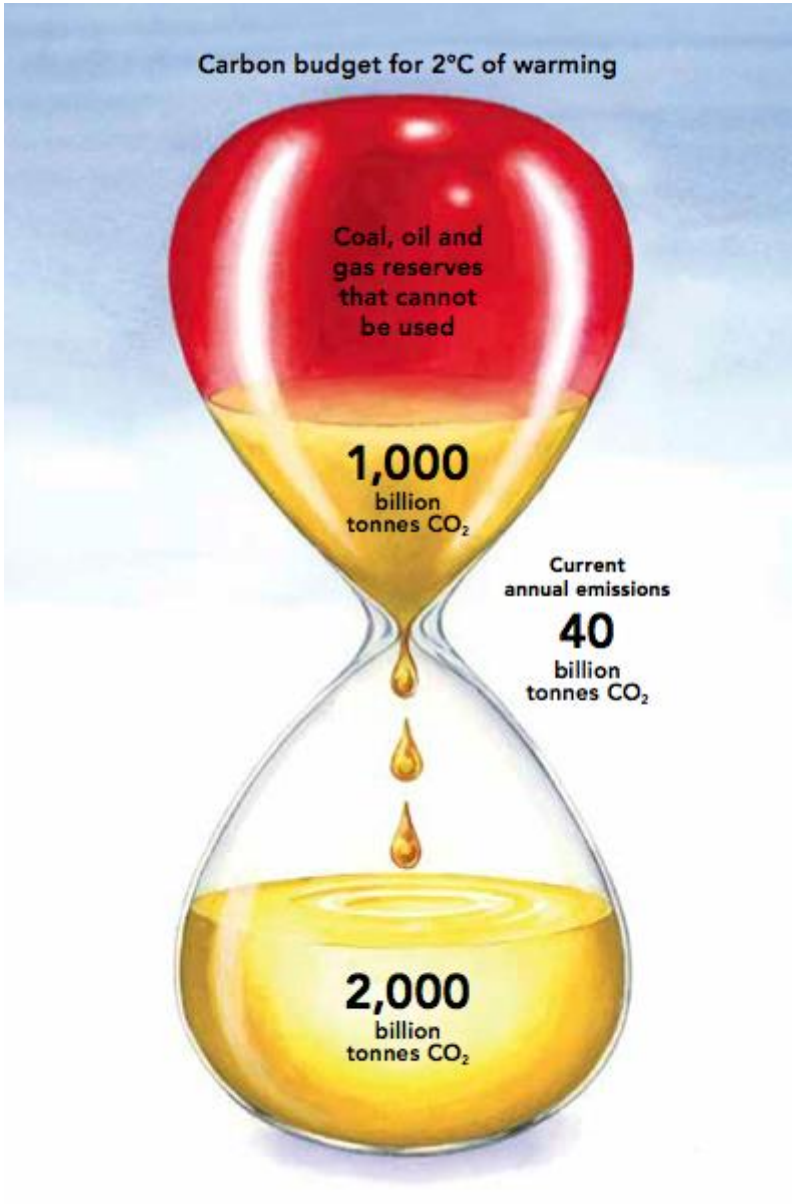
UK risk register, 2015

Preference for simple formats in policy

The climate and energy package is a set of binding legislation which aims to ensure the European Union meets its ambitious climate and energy targets for 2020.

These targets, known as the **"20-20-20" targets**, set three key objectives for 2020:

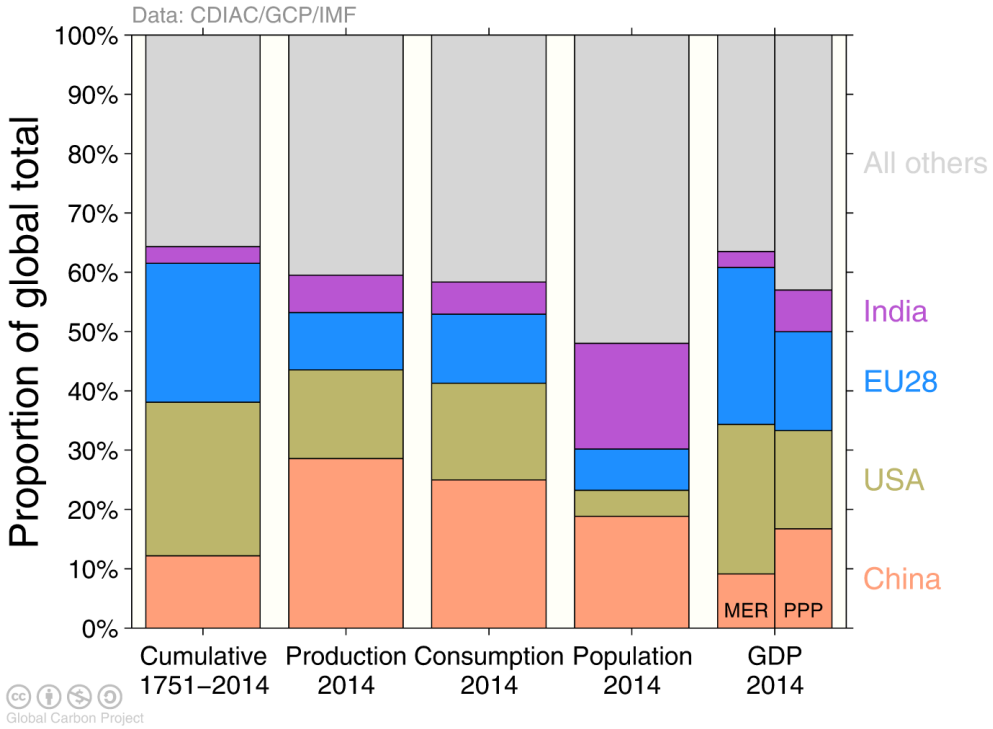
- A **20% reduction in EU greenhouse gas emissions** from 1990 levels;
- Raising the share of EU energy consumption produced from **renewable resources to 20%**;
- A **20% improvement** in the EU's **energy efficiency**.



CarbonTracker: unburnable carbon valued at $20 trillion.

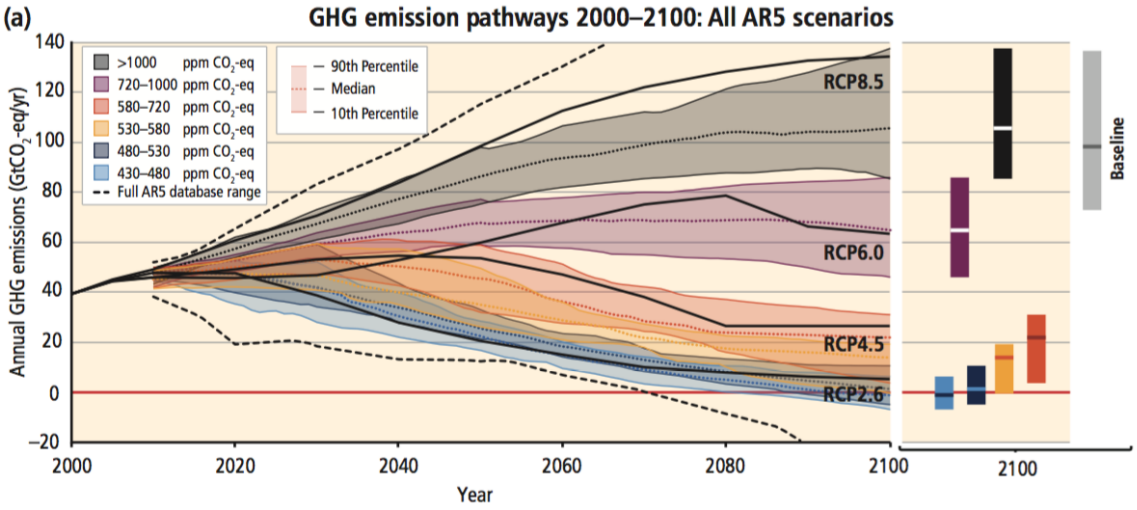
Governments & global markets are treating as assets reserves that are "unburnable"

4. Striving to be impartial



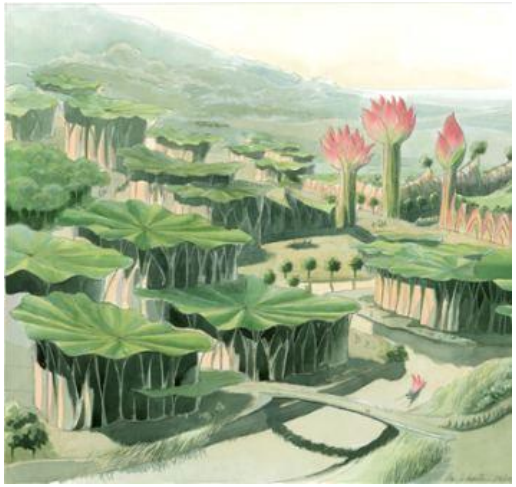
Different calculations give different impressions of national contributions

Should we worry about assumptions that go into scenarios, e.g. BECCs?



Would you prefer a game in which you had a 10% chance of winning, or one with a 90% chance of losing?

nightmare



dream

See also, Morton et al, Glob. Env. Change, 2011

Very difficult (impossible) to make a truly independent, relevant statement

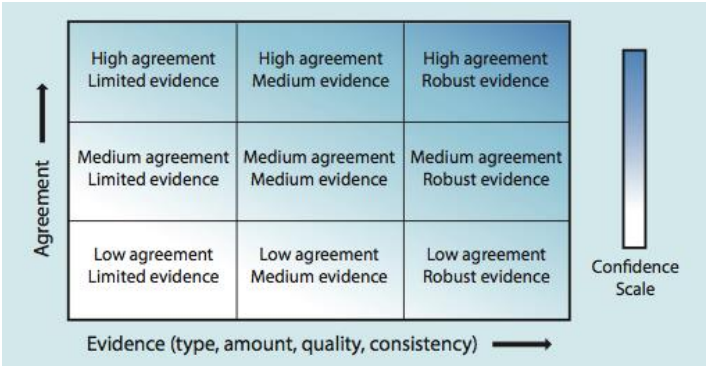
Level of certainty:

The following terms have been used to indicate the assessed likelihood, and typeset in italics:

Term*	Likelihood of the outcome
Virtually certain	99–100% probability
Very likely	90–100% probability
Likely	66–100% probability
About as likely as not	33–66% probability
Unlikely	0–33% probability
Very unlikely	0–10% probability
Exceptionally unlikely	0–1% probability

* Additional terms (*extremely likely*: 95–100% probability, *more likely than not*: >50–100% probability, and *extremely unlikely*: 0–5% probability) may also be used when appropriate.

Level of confidence:



Budescu et al, Psych. Sci., 2009

‘‘average Northern Hemisphere temperatures during the second half of the 20th century were *very likely* higher than during any other 50-year period in the last 500 years’’ (IPCC AR4).

What does “very likely” mean here?

A quarter of people thought it meant less than 70% chance [IPCC means 90% or higher]

- Choice of what question to answer can influence the outcome

- Choice of how the answer is presented can influence the outcome
- Where to draw the line between impartiality & advocacy?

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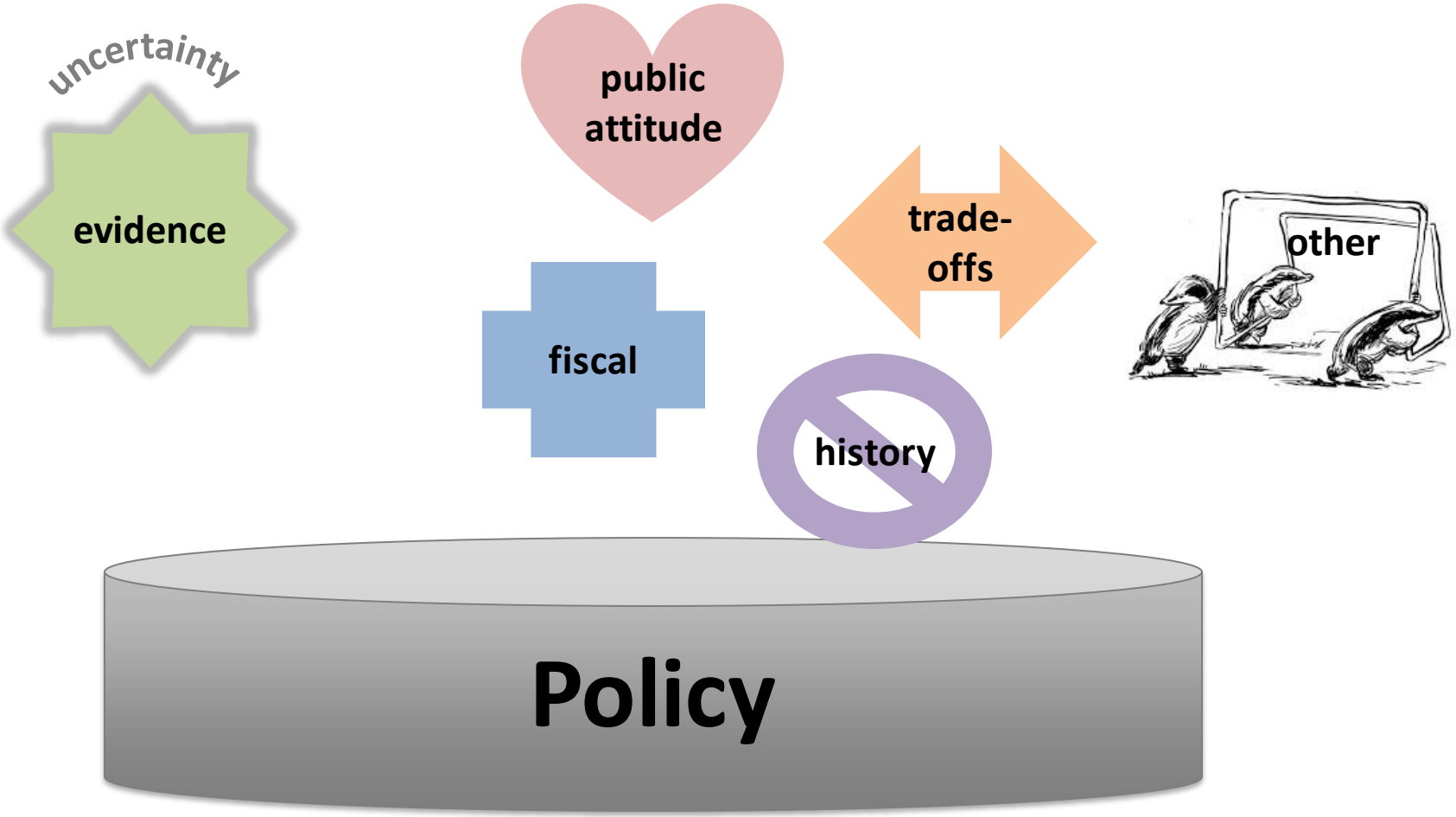
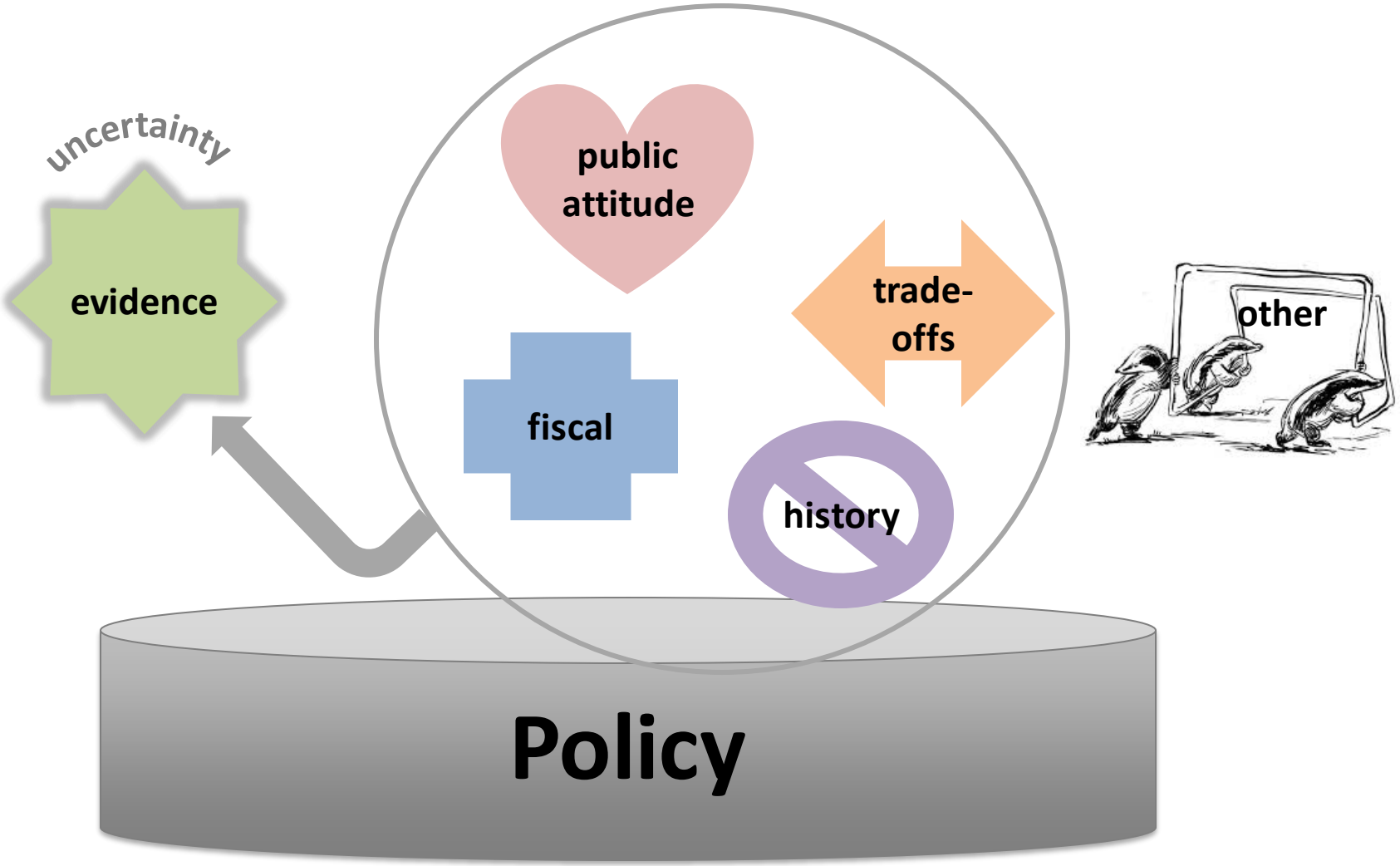
Scientists must speak up on fossil-fuel divestment

Alan Rusbridger wants researchers to help convince powerful philanthropic organizations to set an example and stop propelling carbon emissions.

15 April 2015

5. Encompassing broad range of evidence



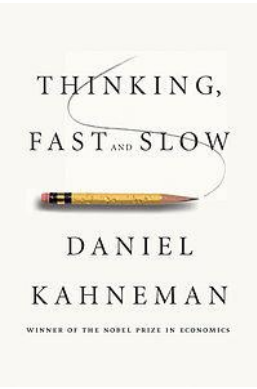

uncertainty
evidence
public attitude
fiscal
trade-offs
history
other
Policy

"If there were global temperatures more than 2℃ or 3℃ above the current average temperature, this would take the climate outside of the range of observations which have been made over the last several hundred thousand years'' (Nordhaus, 1977)

Cited in Jaeger & Jaeger, 2011

Catastrophe justification, Cost-benefit justification or Focal Point in a Coordination Game?

Perceptions of risk influenced by all kinds of things that are logically irrelevant



- Deliberative thinking (e.g. cost-benefit analysis)
- Intuitive thinking (e.g. gut reaction)

Emotional response conditioned by personal past experience, social context & cultural factors (tends to favour status quo)

Do you believe the climate is changing? **81%**

Would you change your behaviour? **68%**

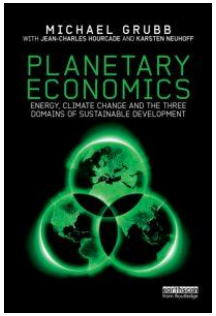
Are you concerned about climate change? **63%**

perceived risk

7 bn people & rising = lots of decision-makers – hence attitudes matter

Decision makers often rely on **intuitive thinking** processes rather than undertaking a **systematic analysis** of options in a deliberative fashion.

With the help of formal methods, policy design can be improved by taking into account **risks and uncertainties in natural, socio-economic, and technological systems as well as decision processes, perceptions, values and wealth.**



IPCC AR5, WG3

Tiered framework: Three pillars of policy aligned to risk perception

Risk conception	Scale	Decision framework	Field of economics	Opportunity	Policy response
Ignore/satisfice	Short term/local	Indifferent/disempowered	Behavioural & organisational	Efficiency	Standards & engagement
Compensate/ optimise	Medium term/regional	Costs/impacts	Neoclassical & welfare	Cleaner substitutes	Markets & pricing
Secure/transform	Long term/ global	Risks/ opportunities	Evolutionary & institutional	Innovation & infrastructure	Strategic investment

Summary

1. Identify specific questions that need addressing
2. Provide simple, relevant answers
3. Ensure traceable to detailed & robust peer-reviewed science
4. Navigate grey areas between science & politics
5. Take care with framing of evidence (it matters!) & accounting for inherent uncertainty
6. Recognise that many climate policy issues are complex, non-linear, multi-dimensional & diffuse
7. Allow evidence to shape structure as well as detail of policy