



Potential and Priorities for Effective Global Action on Climate Change

(and the need for attractive narratives and multiple currencies of action ...)

Steve Hatfield-Dodds

CSIRO Energy Transformed Flagship
Centre for Climate Economics and Policy (CCEP), ANU
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Potential and Priorities for global climate action

OUTLINE:

- The international climate negotiations are not on track to achieve the goals they have set for themselves
 - avoiding ‘dangerous climate change’ (UNFCCC)
 - limiting average global temperature rise to (no more than) 2°C above preindustrial levels (Copenhagen Accord)
- Economists typically focus on:
 - **material interests:** would global action provide net benefits to major countries who would need to participate?
 - **incentive design:** ensuring participation and avoiding free-riding
- These appear necessary but not sufficient, drawing attention to:
 - **geopolitics:** do non-climate issues block collective action on climate change?
 - **narrative:** are forms and descriptions of proposed climate action consistent with various world views and values orientations?
 - **implied priorities** for supporting more ambitious action and outcomes over time

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narratives and ‘currencies of action’

priorities for building momentum

Climate Science

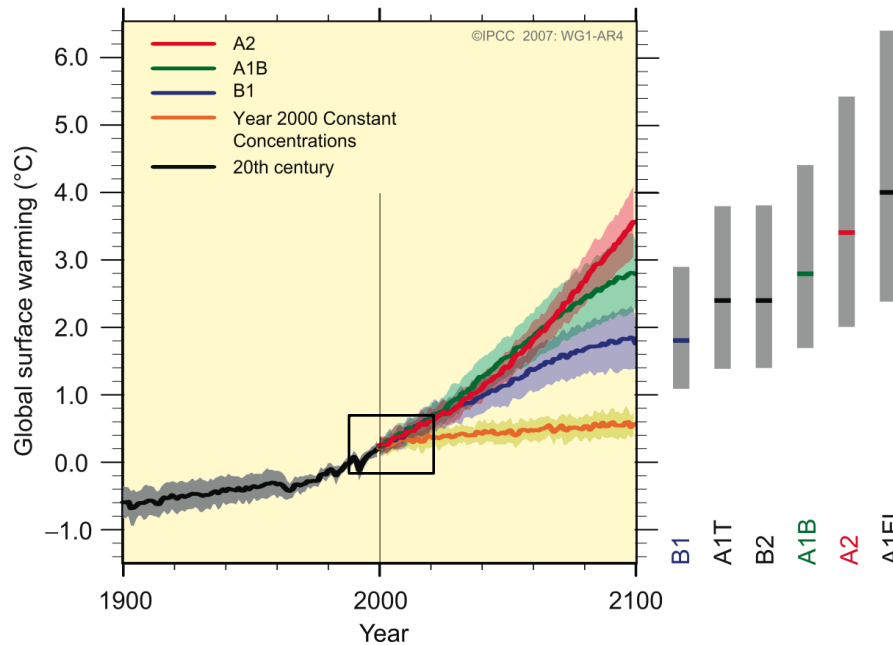
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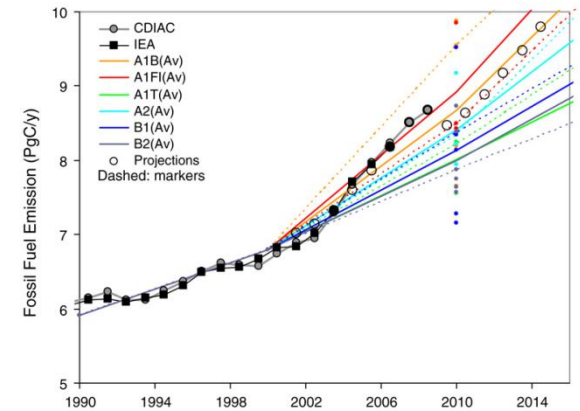
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Temperature outlook



Fossil fuel emissions, actual vs projected

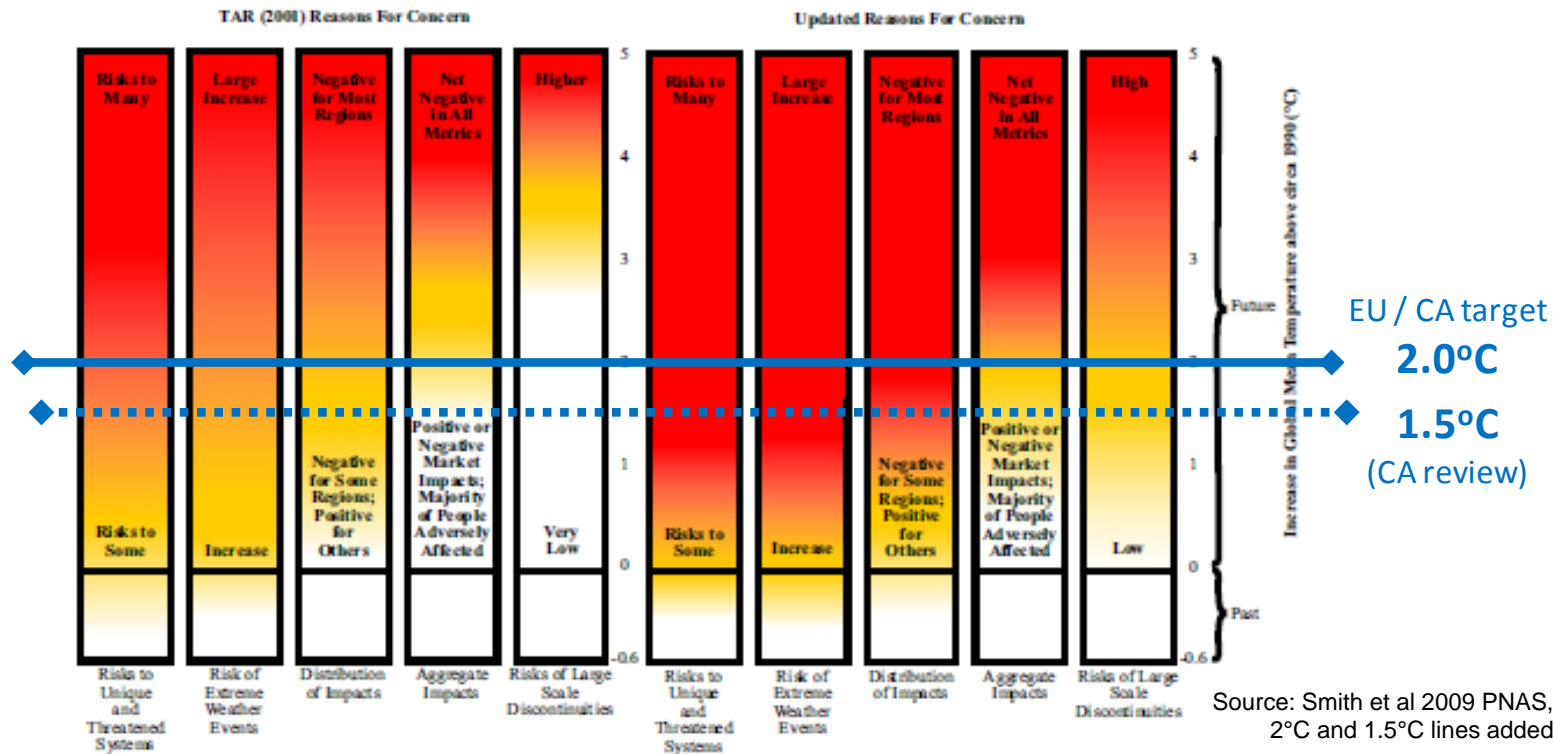


Source: Raupach and Canadel 2010, see Raupach et al 2007 PNAS

- The world is tracking toward temperature increases of more than 4°C
- Energy emissions are close to the A1FI scenario ('high economic growth, fossil fuel intensive')

Climate Science

Assessments of Reasons for Concern, 2001 and 2009



- Scientific consensus that 2°C represents ‘upper limit’ of temperature increase consistent with avoiding dangerous climate change
- Trend for successive assessments to suggest increasingly serious and widespread impacts at lower temperatures

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Climate Science

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are you feeling lucky?

Change in emissions relative to 1990:

High income

World

Chance of avoiding temperature increase >2 C

450ppm
CO2-e

- 80~95%

- 50~85%

48%

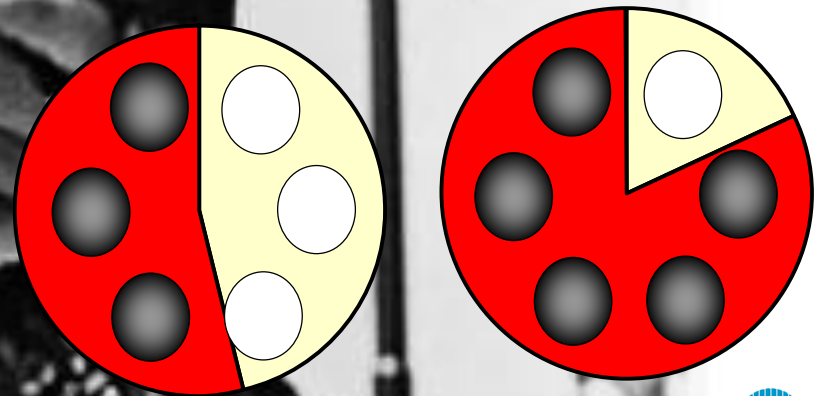
550ppm
CO2-e

- 40~90%

+5% to -30%

18%

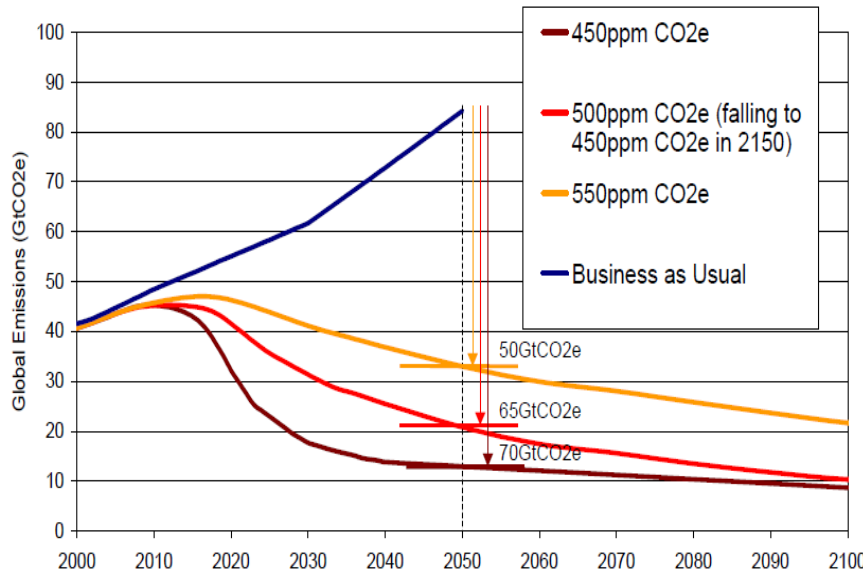
Source: Hatfield-Dodds et al 2007



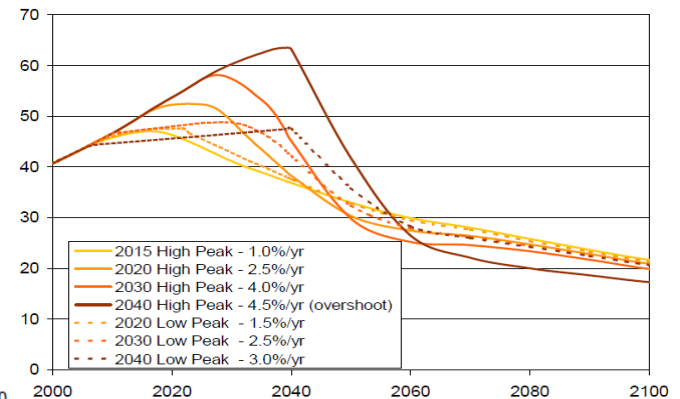
Emerging economic consensus

Global emission trajectories

stabilisation levels (stock)



six pathways to 550ppm CO2e stabilisation (flow over time)



- A small number of economists use integrated assessment models (IAMs) to estimate the costs and benefits of emissions trajectories
 - Assessment of climate impacts is a multidisciplinary effort
- Traditional focus on optimal emissions trajectory (stabilisation level and pathway)
 - *given* abatement costs, climate sensitivity, damage function, economic trends and assessment parameters (such as discount rate)
 - IAM analysis is shifting towards exploring a wider range of issues

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Emerging economic consensus

- **All the major economic studies:**
 - find that reducing global emissions is welfare enhancing, and **support significant global action**;
 - find that an early peak and steady emissions reductions has lower overall costs, for a given stabilisation trajectory
- **Most support stabilisation at 500ppm or below**
 - Stern (2008), Garnaut (2008), Weitzman (2009)

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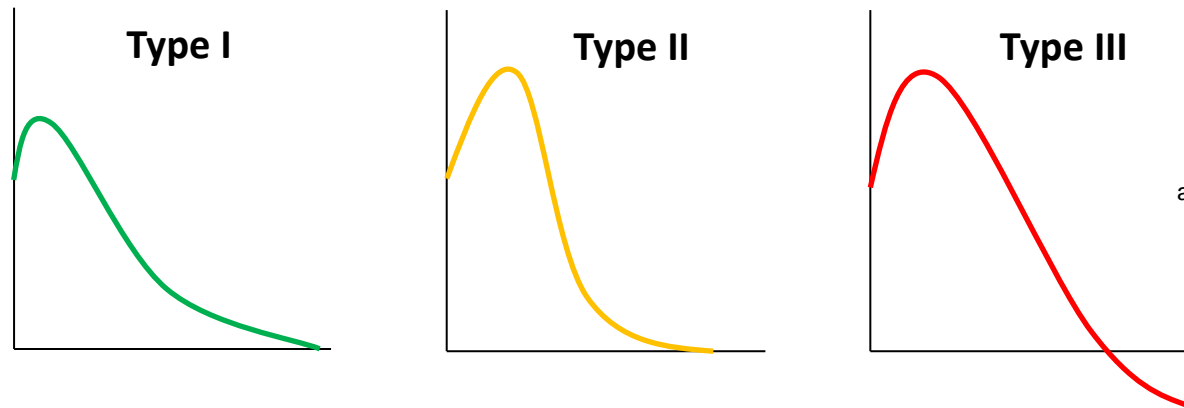
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Trajectory choices influence policy costs and climate risks (for a given long term stabilisation outcome)



Source:
adapted from
UNEP/den
Elzen 2010

	Type I	Type II	Type III
Strategy	Earlier lower peak, gradual reductions	Later higher peak, very rapid reductions	Later higher peak, moderate reductions, net negative emissions (sequestration) prior to 2100
Policy impacts for same climate outcome	Lowest average abatement costs (but politically difficult)	Lower near term costs, higher future abatement costs	Lower near term costs moderate future abatement costs, significant uncertainty
Climate risks	Lowest of three options	Higher, due to potential positive climate feedbacks	Highest of the three options

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	Preferred stabilisation level, and peak) CO ₂ e	Likely long term temperature °C above 1900	Support for temperature < 2°C
Stern (2006)	450-550ppm 'but stabilisation at 450ppm already almost out of reach'	2.0-2.9	Yes
Stern (2008)	500ppm or lower '550ppm is the upper limit of what should be contemplated'	2.5 or lower	Yes
Garnaut (2008)	450ppm (or lower)	2.0	Yes
Weitzman (2009)	as low as possible	na	Yes
Nordhaus (2008) DICE-2007	>850ppm	4.9+	No
Nordhaus (2010) RICE-2010	550ppm, after peaking over 700ppm	3.0*	Yes

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- What underlies these differences ?
 - Discount rates [Nordhaus]
 - Treatment of risk and uncertainty
 - ‘fat tailed distributions’, catastrophic impacts [Weitzman]
 - ‘singularities’ and tipping points (including at modest temperature increases) [Garnaut]
 - Methods, particularly emphasis given to formal quantitative modelling [Stern, Garnaut]
 - Ethical approach [Stern and others]
 - Climate damage function, plus risk [Ackerman et al 2010]
 - Relative prices [Sterner and Perrson 2008]
- Differences in results underpinned by a combination of factors
- Plausible treatment of risk, climate damages or relative prices can give ‘Stern-like’ trajectories using Nordhaus discount rates

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Emerging economic consensus

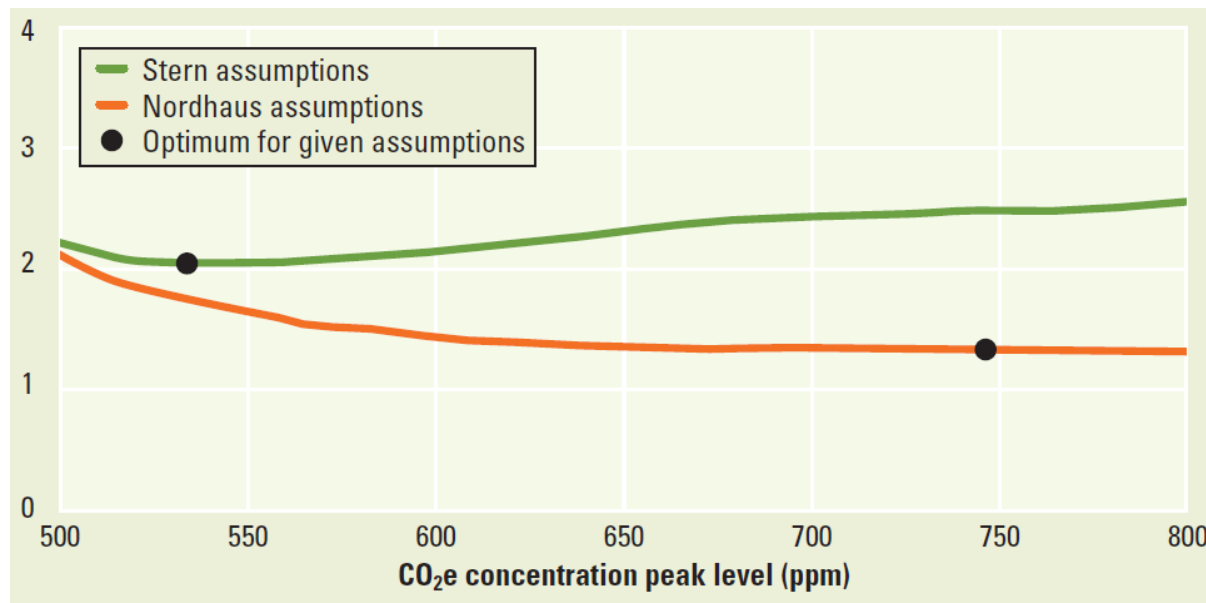
- Focus on 'optimality' also conceals wide range of 'near optimal' solutions:
 - 'insurance premium' for precautionary abatement very small

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Stern Review findings simulated using PAGE

DICE-2007 simulated using PAGE

Source: World Bank 2010:8 (box 3), adapted from Hof, den Elzen, and van Vuuren 2008 (figure 10).

Emerging economic consensus

- **All the major economic studies:**
 - find that reducing global emissions is welfare enhancing, and **support significant global action**;
 - find that an early peak and steady emissions reductions has lower overall costs, for a given stabilisation trajectory
- **Most support stabilisation at 500ppm or below**
 - Stern (2008), Garnaut (2008), Weitzman (2009)
 - general trend to revise down preferred stabilisation levels over sequential studies (Stern and Nordhaus), mirrors science
- **All now find that limiting temperatures to 2°C (or lower) would provide net benefits**
 - ‘overlapping consensus’ on this point is very recent

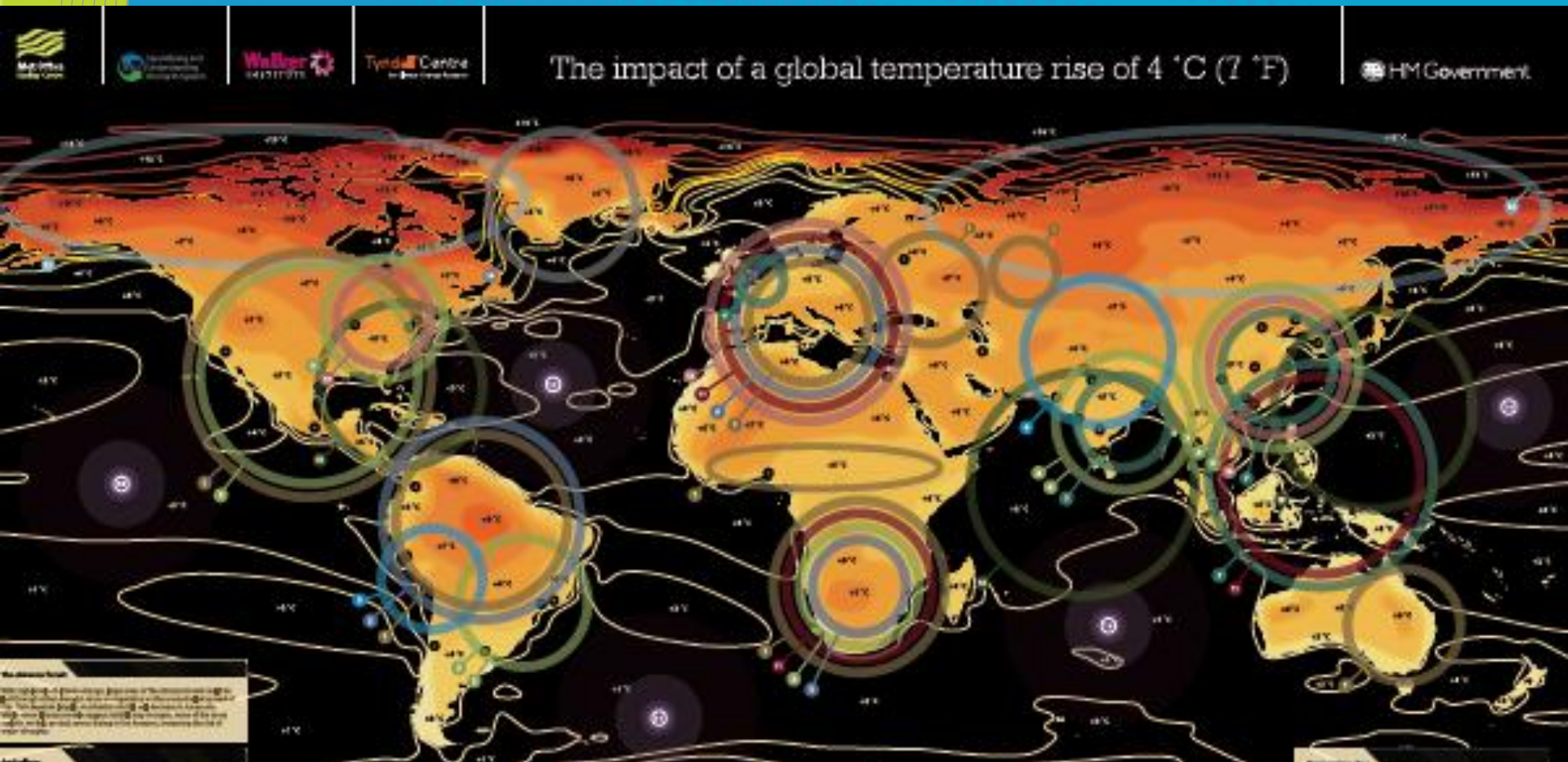
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Country-level assessments



- Country assessments strongly support participation by major countries
For example: 4°C average results in 7-15°C increase in most of Russia and Canada

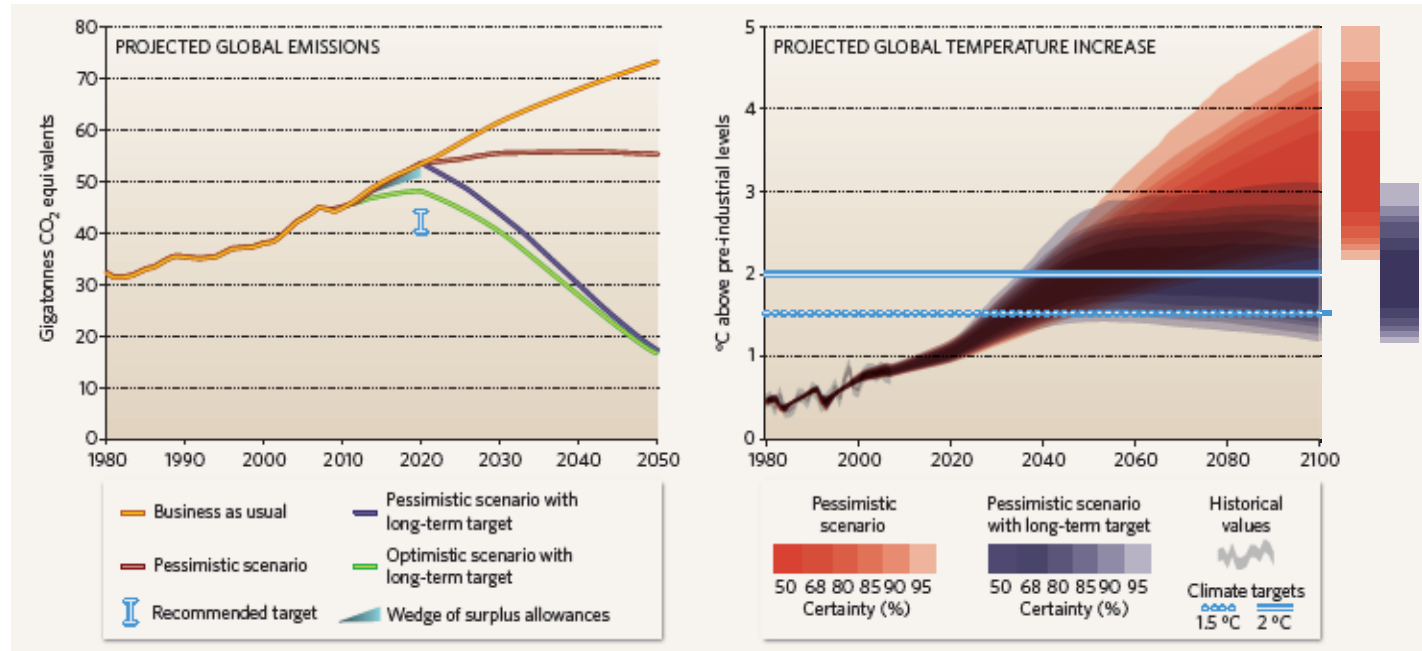
The goal-commitment gap in the negotiations

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Source: Rogelj et al 2010 Nature

- Copenhagen and Cancun not on track to limit warming to 2°C
50% chance of exceeding 3.0°C; 80% chance of exceeding 2.5°C
- **With a 2050 term target to halve global emissions from 1990 levels: 50% chance of staying under 2°C; but near certain to exceed 1.5°C**

Geopolitics

- **Geopolitics both drives engagement** – as climate change is too important to ignore – **and slows potential agreement**
 - most issues relate to the form of an agreement, and relative effort or burden-sharing
 - low levels of comfort and trust weaken the substance of the agreement, both in terms of the integrity of the rules and the level of collective ambition
- Issues of form likely (but not certain) to be resolved over time
- **No major country or group is providing leadership on increasing collective ambition**
 - ‘Early mover’ incentives very weak (or negative)
 - EU targets relatively modest for their circumstances
- Best hope may be stronger bottom-up commitments informed by top-down analytics, with weak legal regime

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Geopolitics

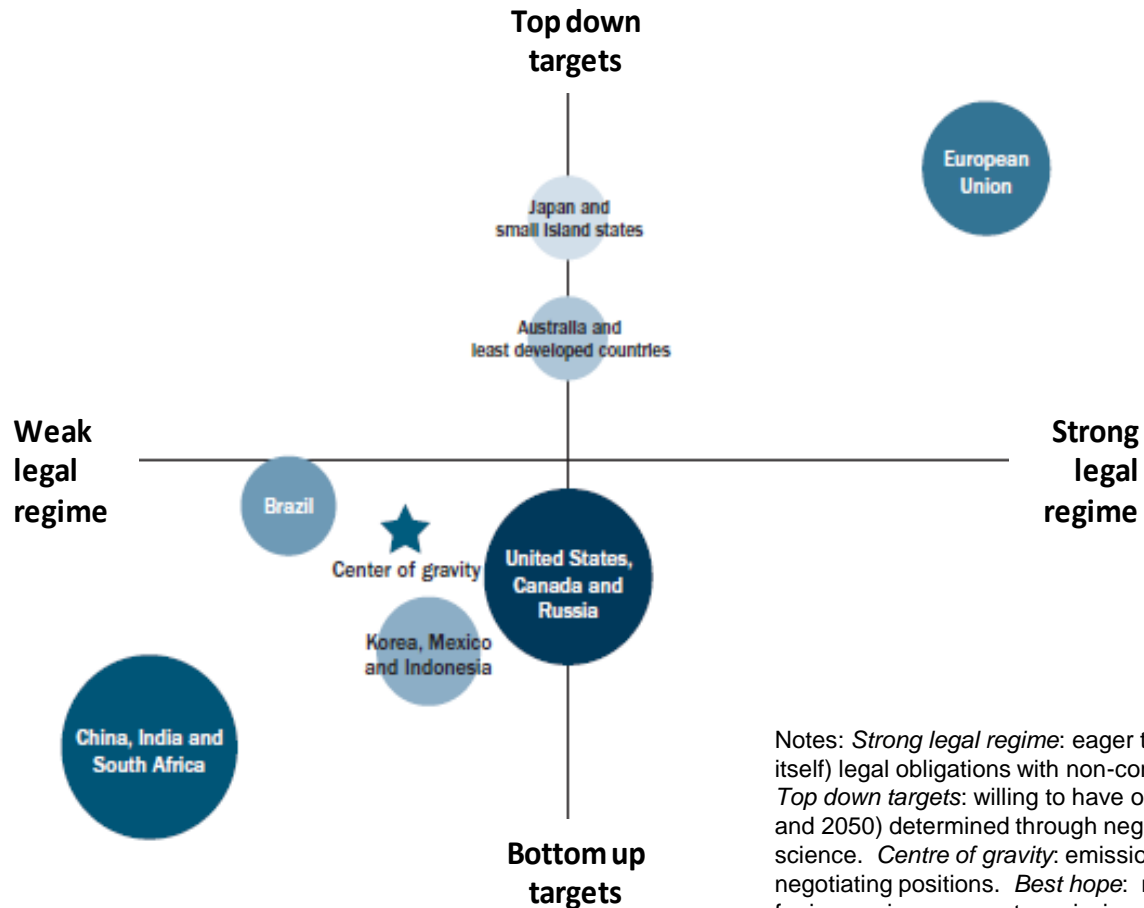
Summary of country positions on the form of international climate action

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Notes: *Strong legal regime*: eager to create (for others and itself) legal obligations with non-compliance consequences. *Top down targets*: willing to have own mitigation (by 2020 and 2050) determined through negotiations, on the basis of science. *Centre of gravity*: emission weighted midpoint of negotiating positions. *Best hope*: most prospective strategy for increasing aggregate emissions reduction commitments.

Source: Purvis and Stevenson 2010, with modifications

The need for attractive narratives

- **Dominant international narratives** are ‘government pollution reductions’, redressing inequalities in per capita emissions, promoting sustainable development
 - resonates with communitarian and egalitarian worldviews
 - alienates individualist worldviews (who associate it with restrictions on industry, and a rejection of ‘progress’)
- **Reduces support** in US, risks narrower EU support for 30% target
 - risks reinforcing developing country concerns that international action just imposes costs (without creating opportunities or providing co-benefits)
- **Triggers confirmatory bias** and ‘protective cognition’, reducing chance of information being assessed in open minded way
 - can contribute to perceptions that science is biased or politically aligned

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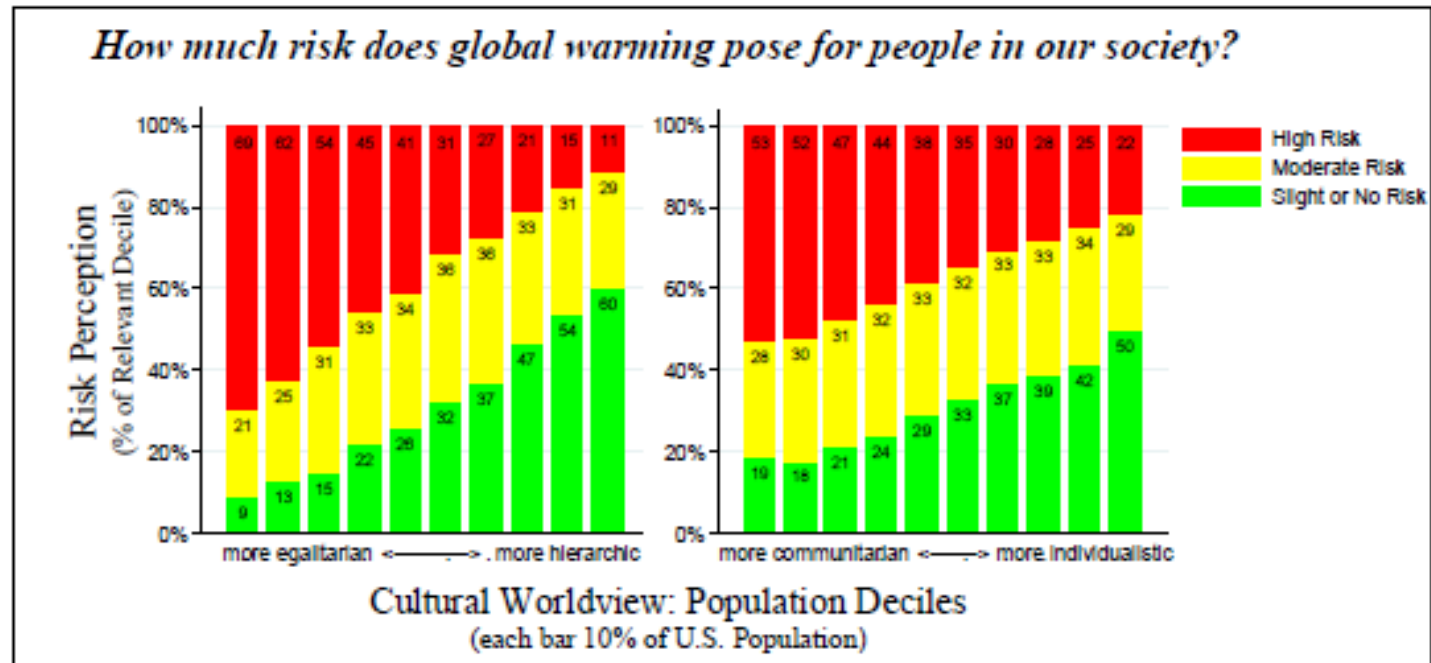
The need for attractive narratives

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Source: Kahn et al 2007, see Kahn 2010 *Nature*

The need for attractive narratives

view of the impact of emissions reductions on average incomes (US respondents, 2006)

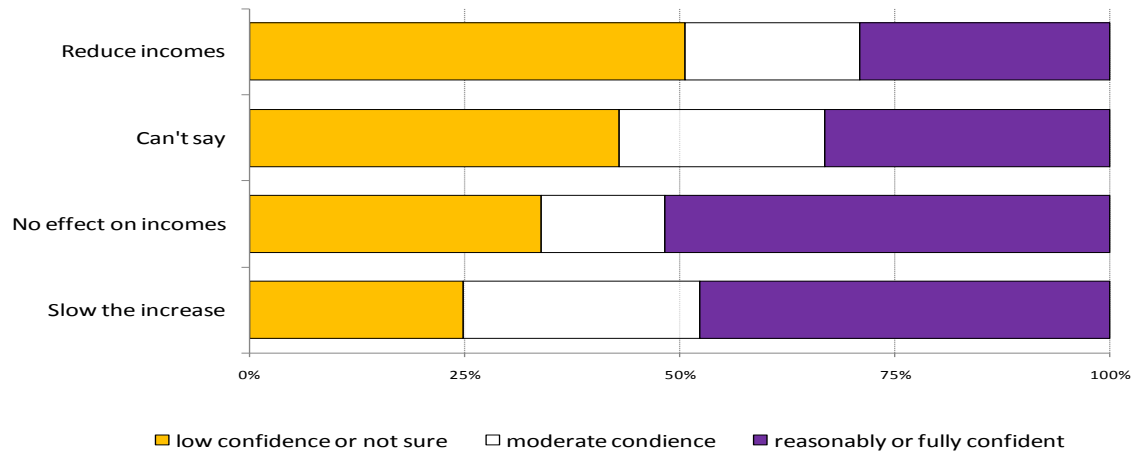
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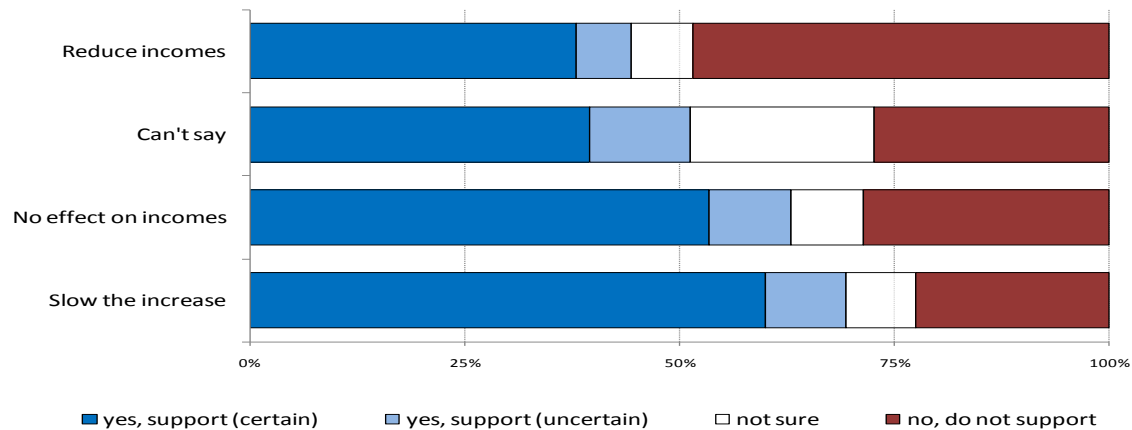
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Confidence in climate science by prior view



Support for emissions reductions by prior view

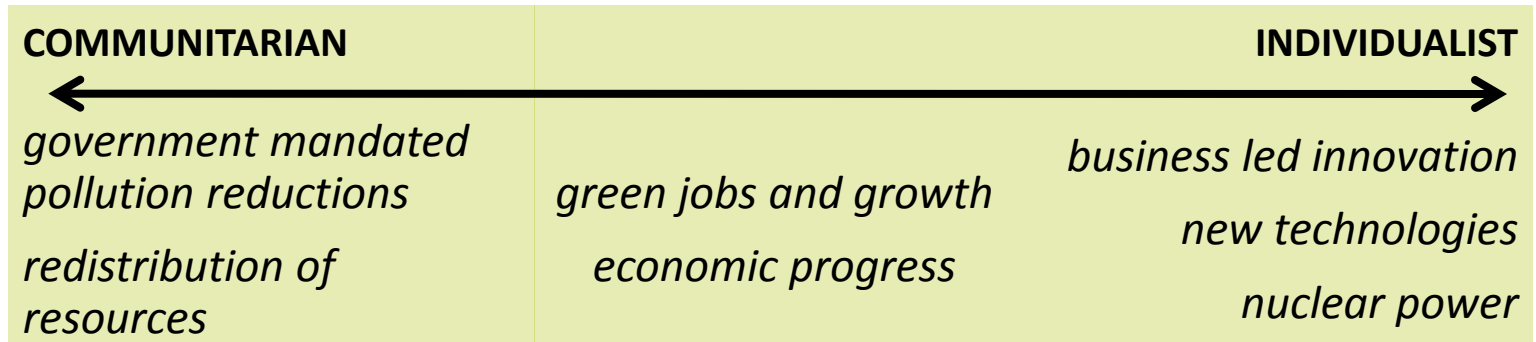


Source: Hatfield-Dodds and Morrison 2010



Implied priorities for building momentum

- Articulate a more inclusive set of narratives
 - including associated policy *mechanisms* and *outcomes*



Scientific Panel Recommends Anti-Pollution solution to Global Warming

Fossil fuels such as coal, natural gas and oil have been a leading cause of global warming ...

Scientific Panel Recommends Nuclear solution to Global Warming

Fossil fuels such as coal, natural gas and oil have been a leading cause of global warming ...

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Implied priorities: *attractive narratives*

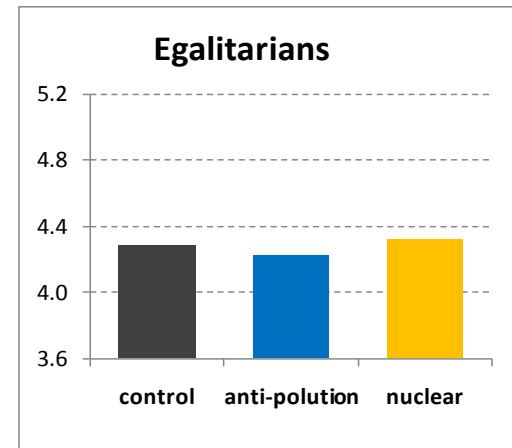
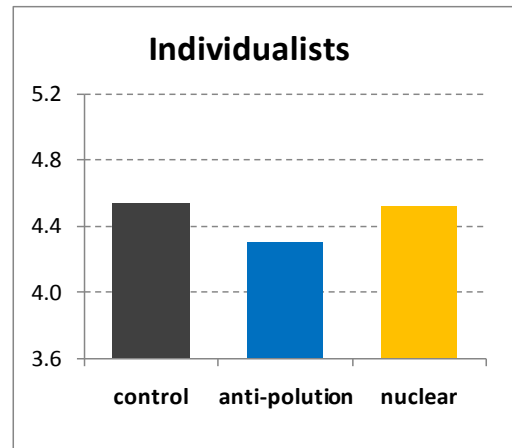
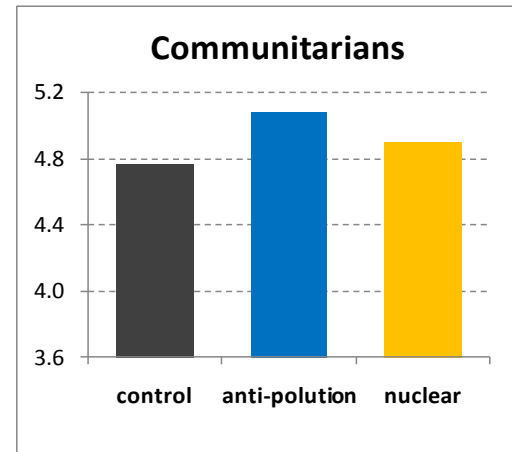
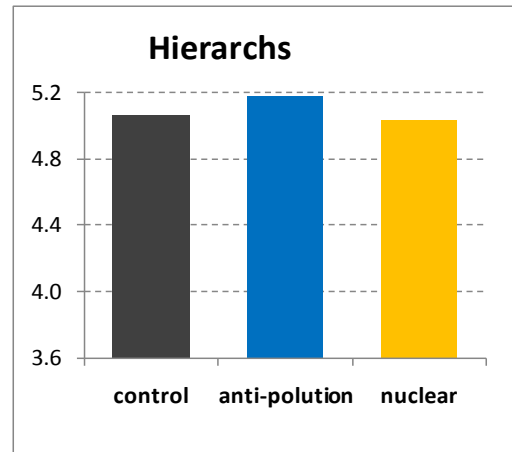
Perception of climate change risks by world view and policy association

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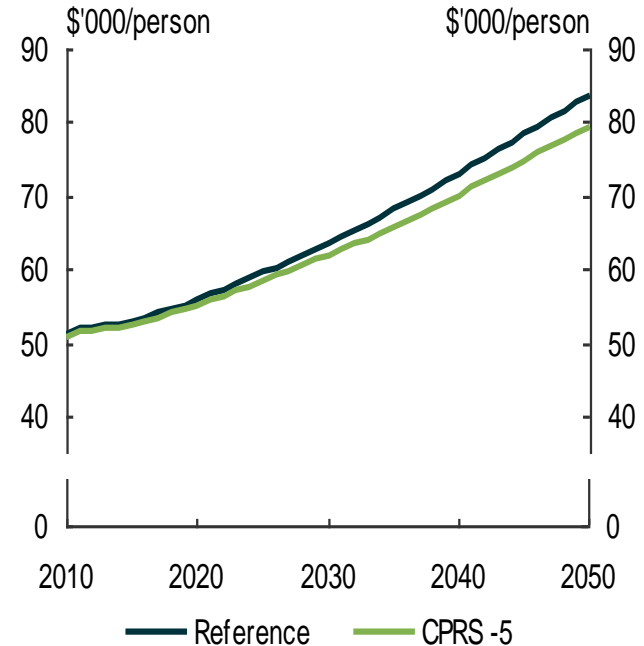
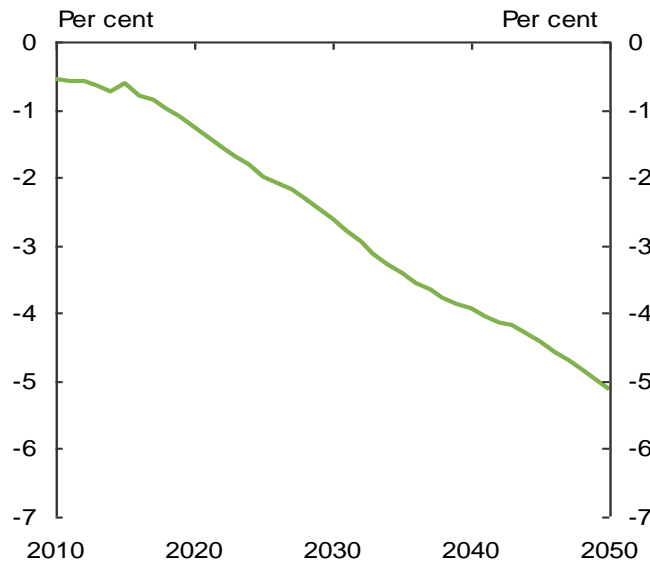
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Source: redrawn from Kahn et al 2007

Implied priorities: *attractive narratives*

two views of economic modelling results



Source: Australian Government 2008

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There is an opportunity cost

- GDP and GNP are 2-4% lower in 2050 than without action
- Trend growth is 0.1% lower per year

Real income grows strongly

- GDP per capita more than doubles by 2050
- Trend growth is 2.8% rather than 2.9% per year due to policy action

Implied priorities: *attractive narratives*

Predicted support for emissions reduction policy, forgone gain vs apparent loss framings

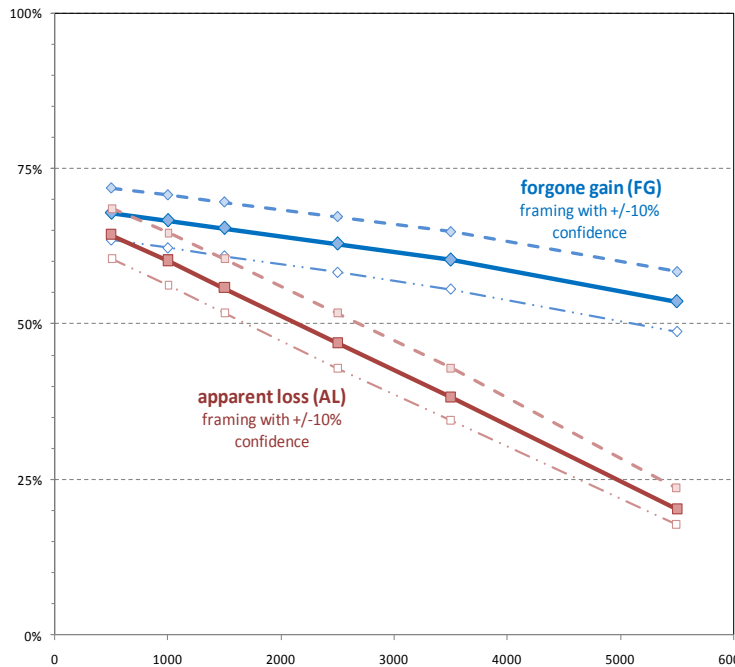
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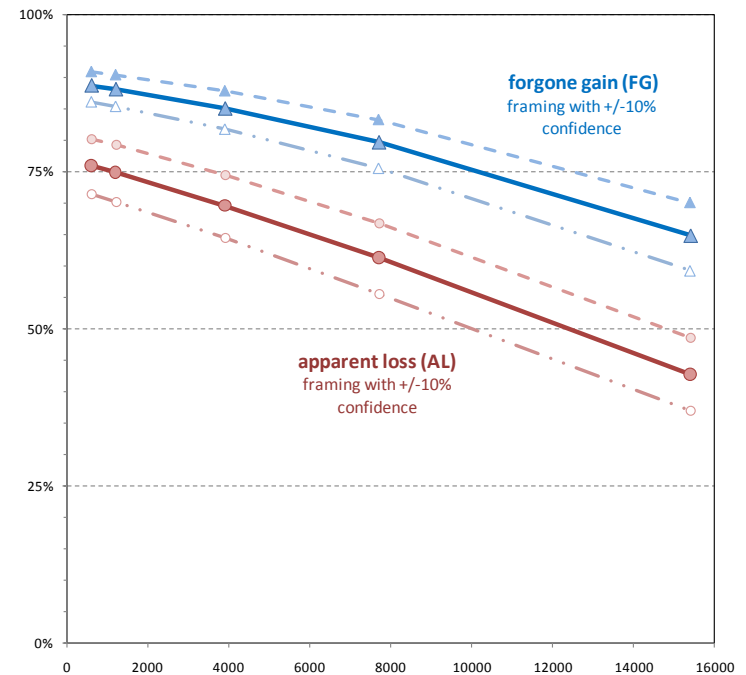
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Australia (2006)



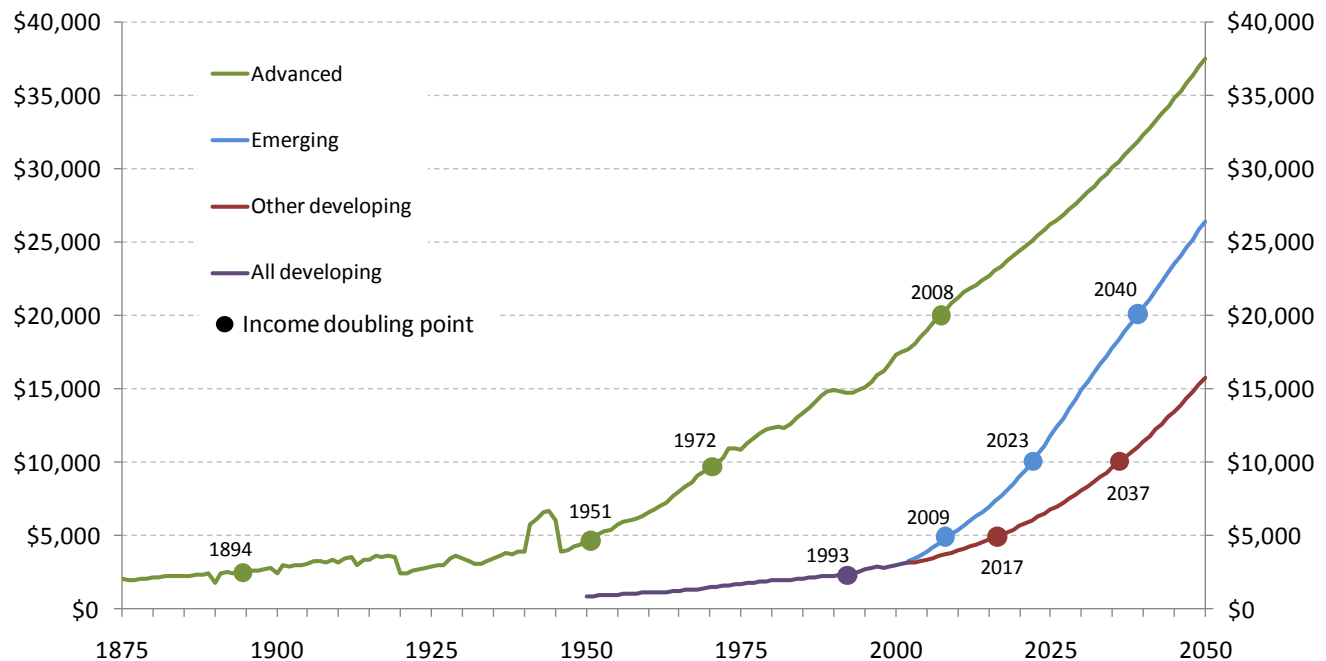
United States (2008)



Source: Hatfield-Dodds and Morrison 2010

Implied priorities: *attractive narratives*

Illustrative projection of global income growth with 450ppm CO₂e stabilisation (GDP per capita 1875-2050, US\$(1990)PPP)



Notes: Calculated using historical estimates from Maddison (www.ggdc.nl/maddison) and data from Australian Government (2008) for the 450ppm Garnaut scenario. This scenario is based on a contraction and convergence approach with increases in emissions entitlements for emerging and other developing countries to 2020 and then convergence to uniform per capita emissions entitlements by 2050.

Source: Hatfield-Dodds, 2009, unpublished.

Implied priorities for building momentum

- Articulate a more inclusive set of narratives
 - including associated policy *mechanisms* and *outcomes*
- **Demonstrate the benefits of international carbon markets through bringing forward action**
 - provide win-win economic outcomes for participants while improving environmental outcomes
 - reward and support early movers (in contrast to current negotiating dynamics)
 - build institutional incentives for high volume low transaction cost supply by discriminating based on abatement quality

(note deep global carbon markets are fundamental to effective global action)

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Implied priorities for building momentum

- Articulate a more inclusive set of narratives
 - including associated policy *mechanisms* and *outcomes*
- Demonstrate the benefits of international carbon markets through bringing forward action
- **Encourage offers of more ambitious action by key nations** ... *expressed in diverse 'currencies of action'*
 - more stringent targets for national or domestic emission reductions
 - funds or targets for 'purchasing' abatement in low and middle income nations (complementing domestic emissions reduction commitments)
 - limiting loopholes and the use of surplus emissions units
 - promoting private low carbon investment and financing (such as through reducing sovereign risk)
 - reducing country-level subsidies to fossil fuels
 - developing low carbon growth plans that integrate mitigation and adaptation, and facilitate public and private investment

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Potential and Priorities for global climate action

Conclusions:

- Science and economic analysis suggests decisive global action on climate change would be in the interests of all major emitters
- The pace of international climate negotiations and action appear constrained by geopolitics and a lack of attractive narratives
- Priorities to address this include:
 - Articulating a more diverse and inclusive set of narratives, and associated policy approaches ... including that deep cuts in emissions are consistent with strong trend economic growth
 - Bring forward carbon markets to demonstrate benefits and provide incentives for deep and efficient supply
 - Encouraging key nations to offer more ambitious commitments, expressed in diverse currencies of action

Full paper available soon at ANU Centre for Climate Economics and Policy: ccep.anu.edu.au

steve.hatfield-dodds@csiro.au



Steve Hatfield-Dodds

Visiting Scientist, CSIRO Energy Transformed Flagship
Adjunct Professor, Crawford School, ANU

steve.hatfield-dodds@csiro.au

steve.hatfield-dodds@anu.edu.au

full paper available soon at

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There is no wealth but life

John Ruskin

Contact Us

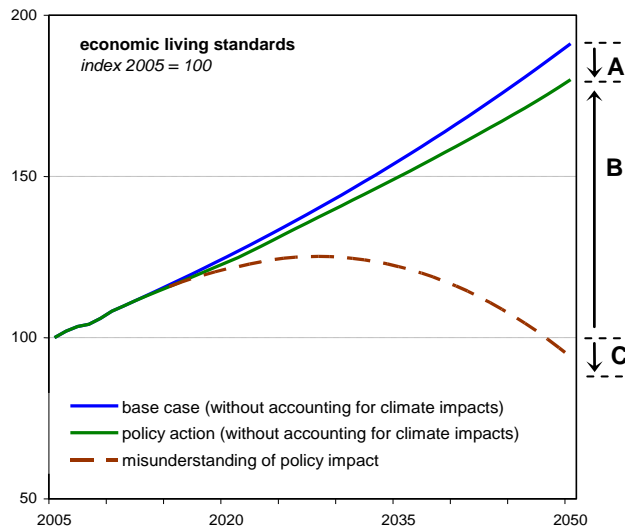
Phone: 1300 363 400 or +61 3 9545 2176

Email: enquiries@csiro.au Web: www.csiro.au



Framing and communication

Stylised impacts of emissions reductions



Framings for assessing reference point bias

Difference in income with policy action
in 2020 relative to:

<i>income without policy action in 2020</i> (‘A’ in Figure 1)	<i>current income</i> (‘B’ in Figure 1)
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Forgone gain	LOWER	INCREASE
Opportunity cost	LOWER	NOT STATED
Apparent loss	NOT STATED	LOWER

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Source: Hatfield-Dodds and Morrison 2010

Framing and communication

Assessing reference point bias in communicating climate policy impacts

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		Difference in income with policy action in 2020: <i>relative to income without action in 2020</i> (‘A’ in Figure 1)		<i>relative to current income</i> (‘B’ in Figure 1)
Framing and impact levels		A	B	
<i>Forgone gain</i>	FG	\$500-\$5500 lower (US) 2%- 24% and \$1,200-\$15,400 lower (Aus)	\$500-\$8500 higher (US) 3%-32% and \$1200-\$15400 higher (Aust)	
<i>Opportunity cost</i>	OC		not stated	
<i>Apparent loss</i>	AL	not stated	\$500-\$5500 lower (US) 2%-24% and \$1200-\$15400 lower (Aus)	
Benchmark modelling results				
<i>Actual impacts and implied income or consumption levels</i>		up to 0.2% lower and up to \$170 lower (US) 1-2% and \$4,300-8,300 lower (Aus)	28-32% and \$16,300-20,900 higher (US) 9-23% and \$4,300-\$10,900 higher (Aus)	

Source: Hatfield-Dodds and Morrison 2010