

AN EFFECTIVE ALTRUISM PERSPECTIVE ON: WHAT IS EFFECTIVE SYSTEMIC CHANGE FOR CLIMATE?

2020-02-22

Utrecht, NL

For EA Netherlands

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With files from Florian U. Jehn

AGENDA

- Should Climate be a Priority Area?
- Scale of Current Climate Efforts
- Missing Links to Success
- What *is* Systemic Change?



HOW FAMILIAR IS THIS AUDIENCE WITH CLIMATE CHANGE?

Have you read Evan Gaensbauer's [EA forum post](#) on climate change?

IS IT AN IMPORTANT CAUSE AREA?

- Scale?
- Neglected?
- Solvable...?

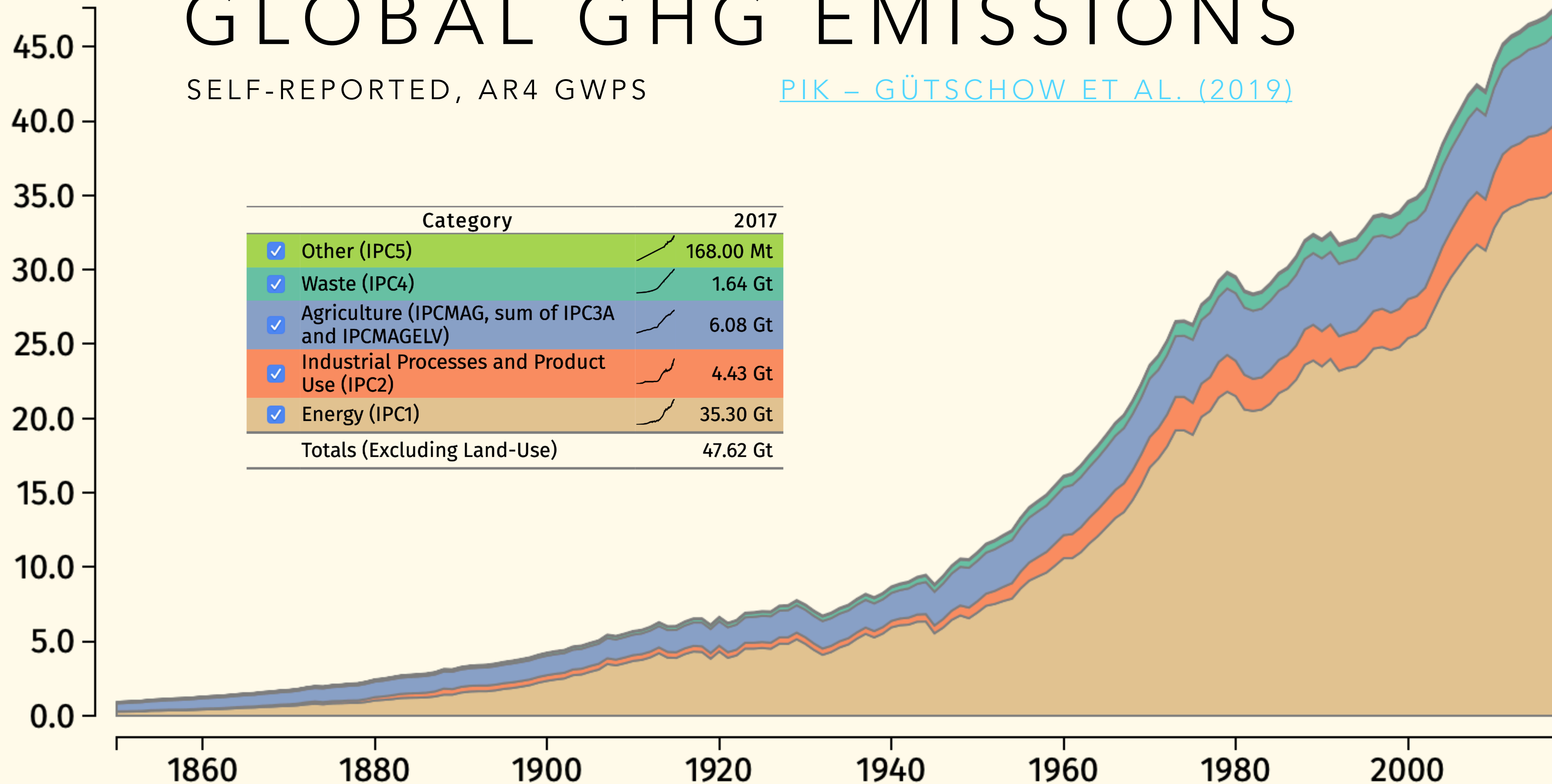


HUMAN GLOBAL^v GHG EMISSIONS

SELF-REPORTED, AR4 GWPS

[PIK – GÜTSCHOW ET AL. \(2019\)](#)

Emissions [Gt CO₂eq]



MAJOR IMPACTS OF CLIMATE CHANGE

Direct

- Warming
- Ice Cap Melting
- Ocean Acidification
- Feedbacks
- Tipping Points



MAJOR IMPACTS OF CLIMATE CHANGE

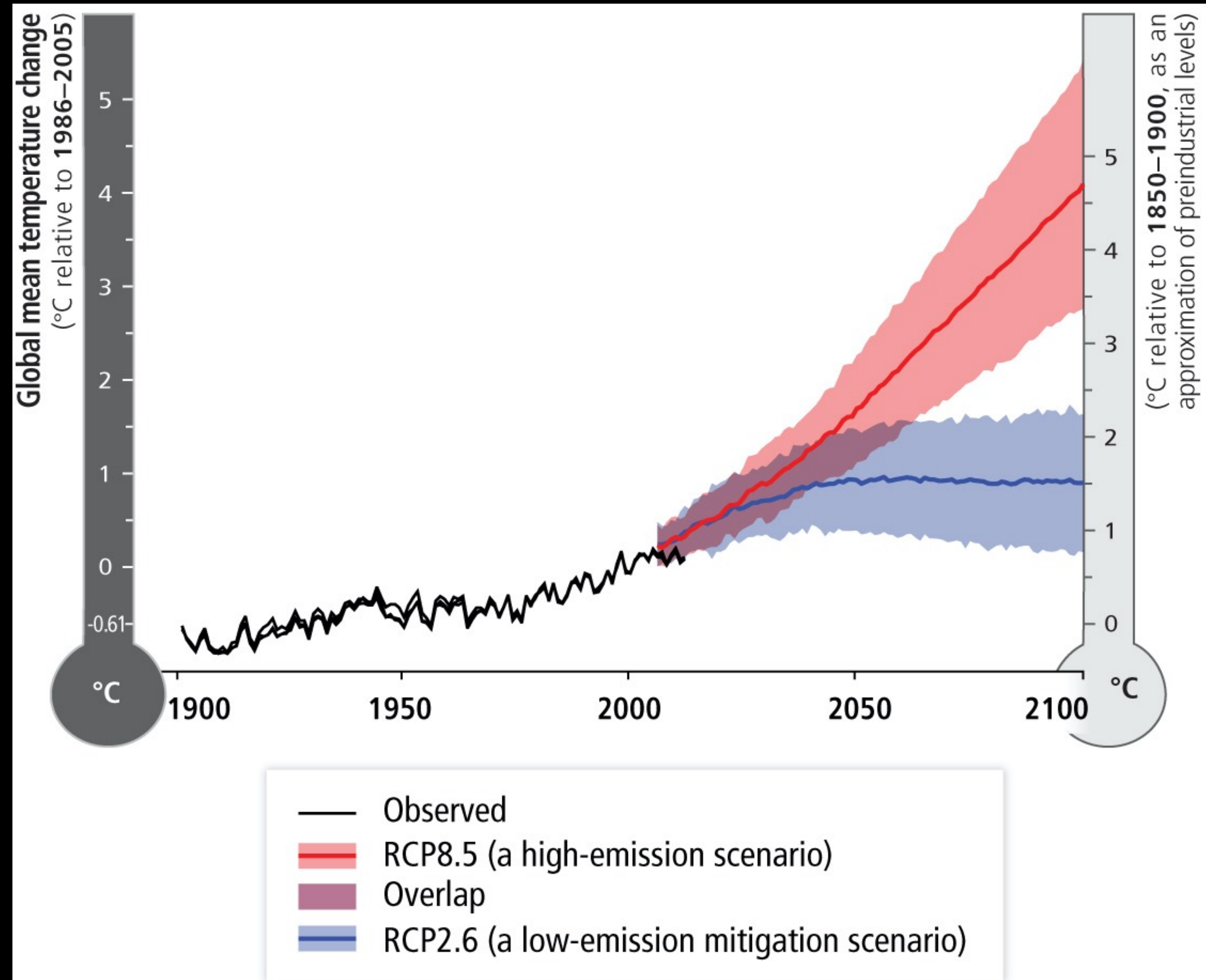
Indirect

- Thermoregulation (heat waves)
- Major relocation
- Supply chain disruptions (food)
- Increased conflict (Hsiang et. al (2013), Breisinger et al. (2013) – Syria)
- Loss of biodiversity/Ecosystem collapse



LIKELIHOODS

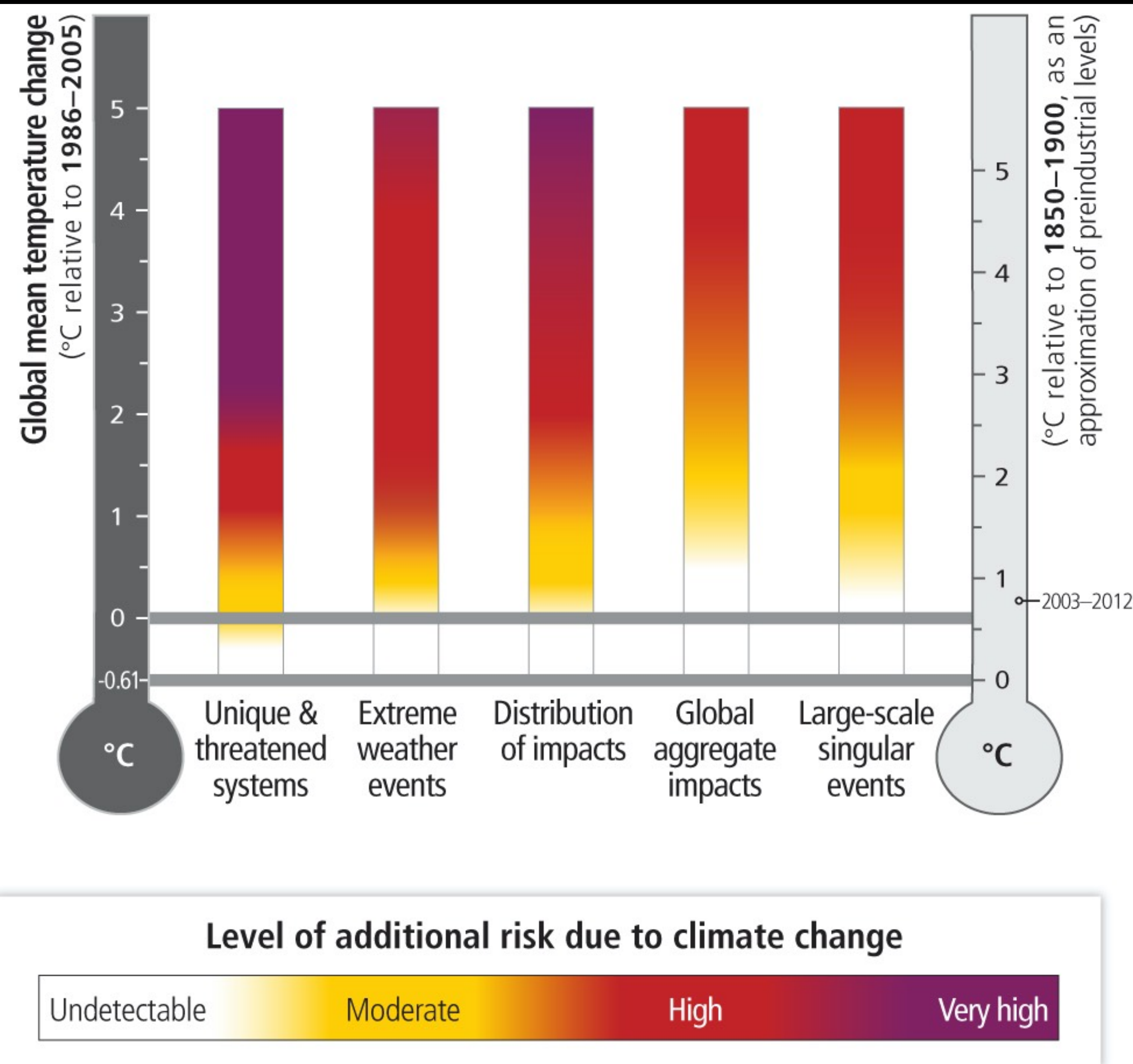
- Pathways
- Climactic Sensitivity to Temperature
- Tipping Points



[IPCC AR5 WG2 BOX SPM.1 FIGURE 1 \(2014\)](#)

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- Pathways
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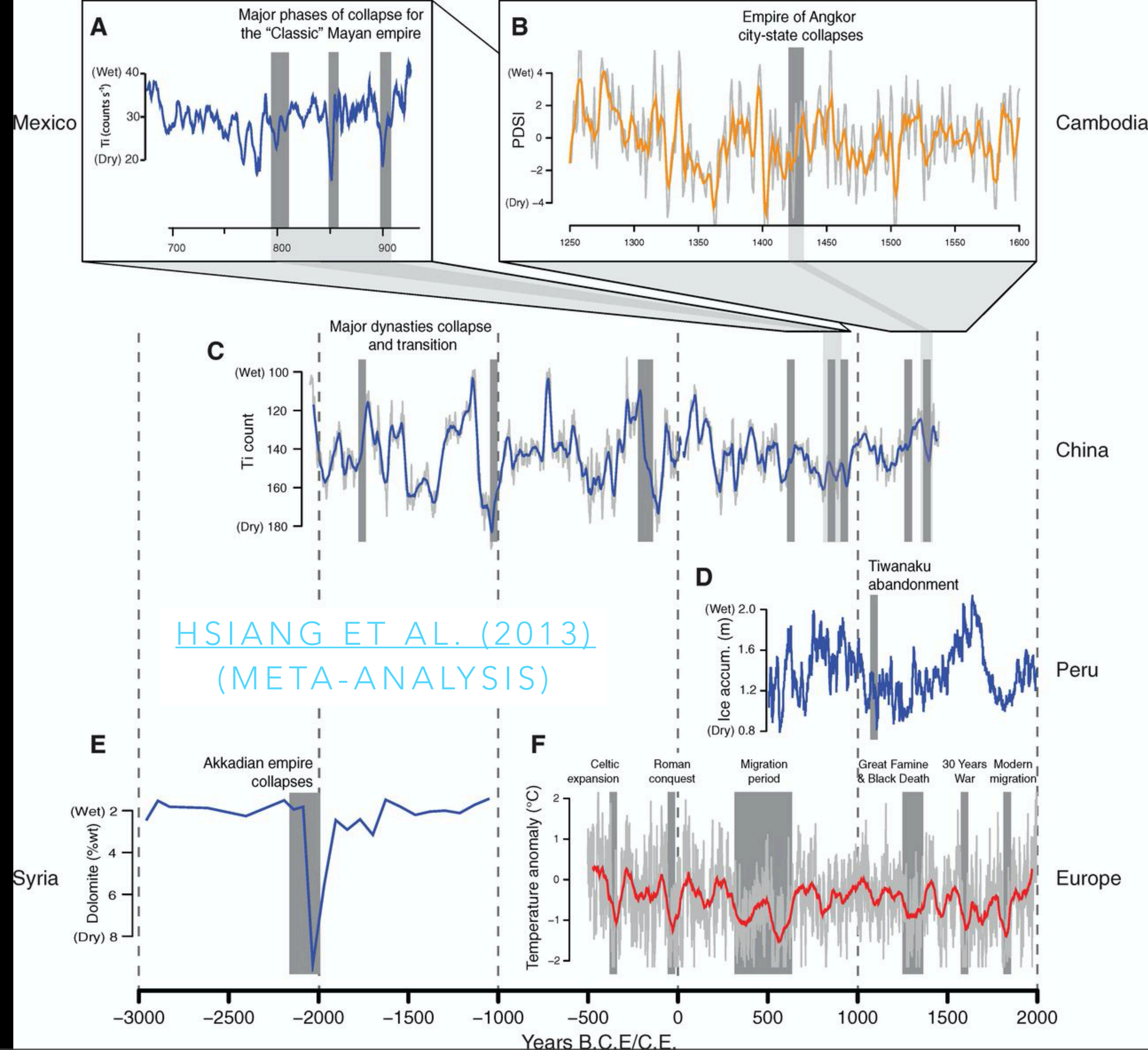
KEY FEEDBACK LOOPS AND TIPPING POINTS

Change in climate system component	Potentially abrupt (AR5 definition)	Irreversibility if forcing reversed	Projected likelihood of 21st century change in scenarios considered
Atlantic MOC collapse	Yes	Unknown	<i>Very unlikely</i> that the AMOC will undergo a rapid transition (<i>high confidence</i>)
Ice sheet collapse	No	Irreversible for millennia	<i>Exceptionally unlikely</i> that either Greenland or West Antarctic Ice sheets will suffer near-complete disintegration (<i>high confidence</i>)
Permafrost carbon release	No	Irreversible for millennia	Possible that permafrost will become a net source of atmospheric greenhouse gases (<i>low confidence</i>)
Clathrate methane release	Yes	Irreversible for millennia	<i>Very unlikely</i> that methane from clathrates will undergo catastrophic release (<i>high confidence</i>)
Tropical forests dieback	Yes	Reversible within centuries	<i>Low confidence</i> in projections of the collapse of large areas of tropical forest
Boreal forests dieback	Yes	Reversible within centuries	<i>Low confidence</i> in projections of the collapse of large areas of boreal forest
Disappearance of summer Arctic sea ice	Yes	Reversible within years to decades	<i>Likely</i> that the Arctic Ocean becomes nearly ice-free in September before mid-century under high forcing scenarios such as RCP8.5 (<i>medium confidence</i>)
Long-term droughts	Yes	Reversible within years to decades	<i>Low confidence</i> in projections of changes in the frequency and duration of megadroughts
Monsoonal circulation	Yes	Reversible within years to decades	<i>Low confidence</i> in projections of a collapse in monsoon circulations

SOURCE: IPCC AR5 WGI CHAPTER 12 TABLE 12.4

IMPACT CONCLUSION

- Likely to happen:
2°C is bad, but probably not an existential crisis. Society will change.
- Possible:
~6°C or higher – tipping elements will cascade unexpectedly, large societal shifts, like mass migration.
- **Low likelihood of existential threat, but possibilities of mass suffering and conflict.**




IS CLIMATE CHANGE NEGLECTED?

- As a physical science, not really.
 - Impacts of large changes very uncertain (biodiversity, tipping points)
- Policy-wise, sort of.
- Economics – yes, but no.



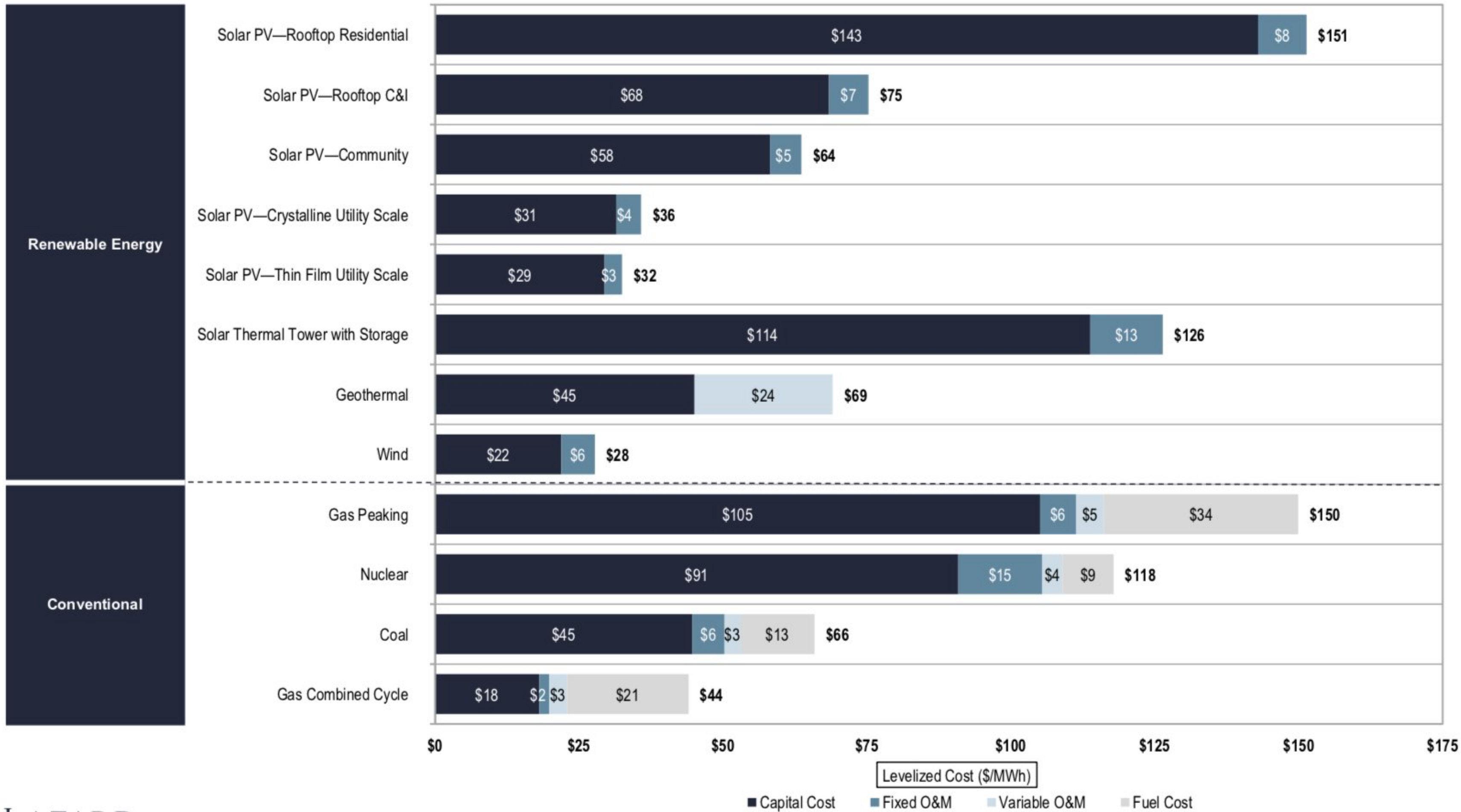
NEGLECT DEPENDS ON OUR DEFINITION OF OUR GOAL(S)

If our goal is to ...

- Decarbonize electricity grids? –  Making some progress, tech innovation doing well

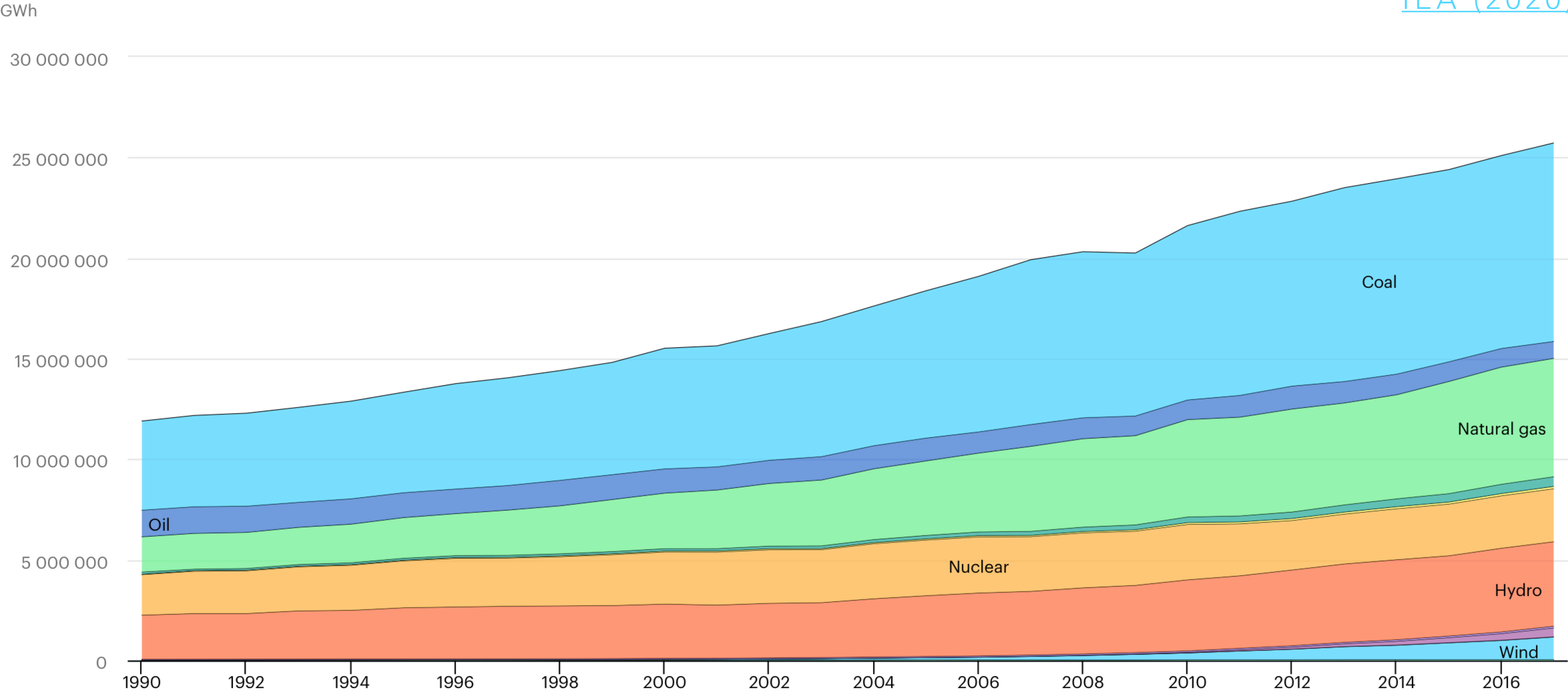
Levelized Cost of Energy Components—Low End

Certain renewable energy generation technologies are already cost-competitive with conventional generation technologies; a key factor regarding the continued cost decline of renewable energy generation technologies is the ability of technological development and industry scale to continue lowering operating expenses and capital costs for renewable energy generation technologies



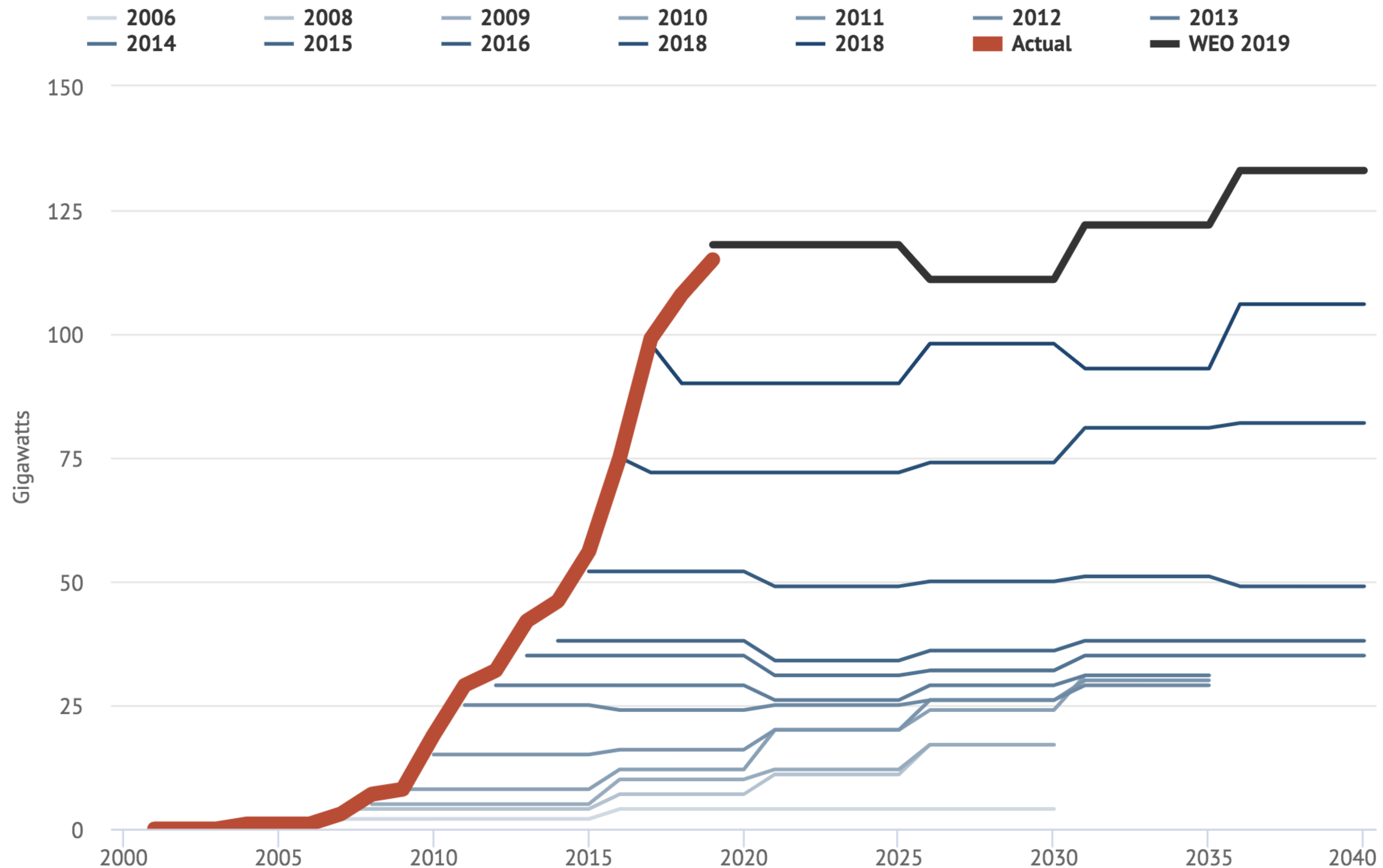
ELECTRICITY GENERATION BY SOURCE (WORLD)

[IEA \(2020\)](#)



The IEA has **consistently underestimated the speed of global solar capacity growth**

This year the WEO's main **stated policies** scenario once again increases the prospects for solar expansion



SOURCE: [@AUKEHOESTRA ON TWITTER](#) AND [CARBON BRIEF \(2019\)](#)

Energy related CO₂ emissions, 1990-2019

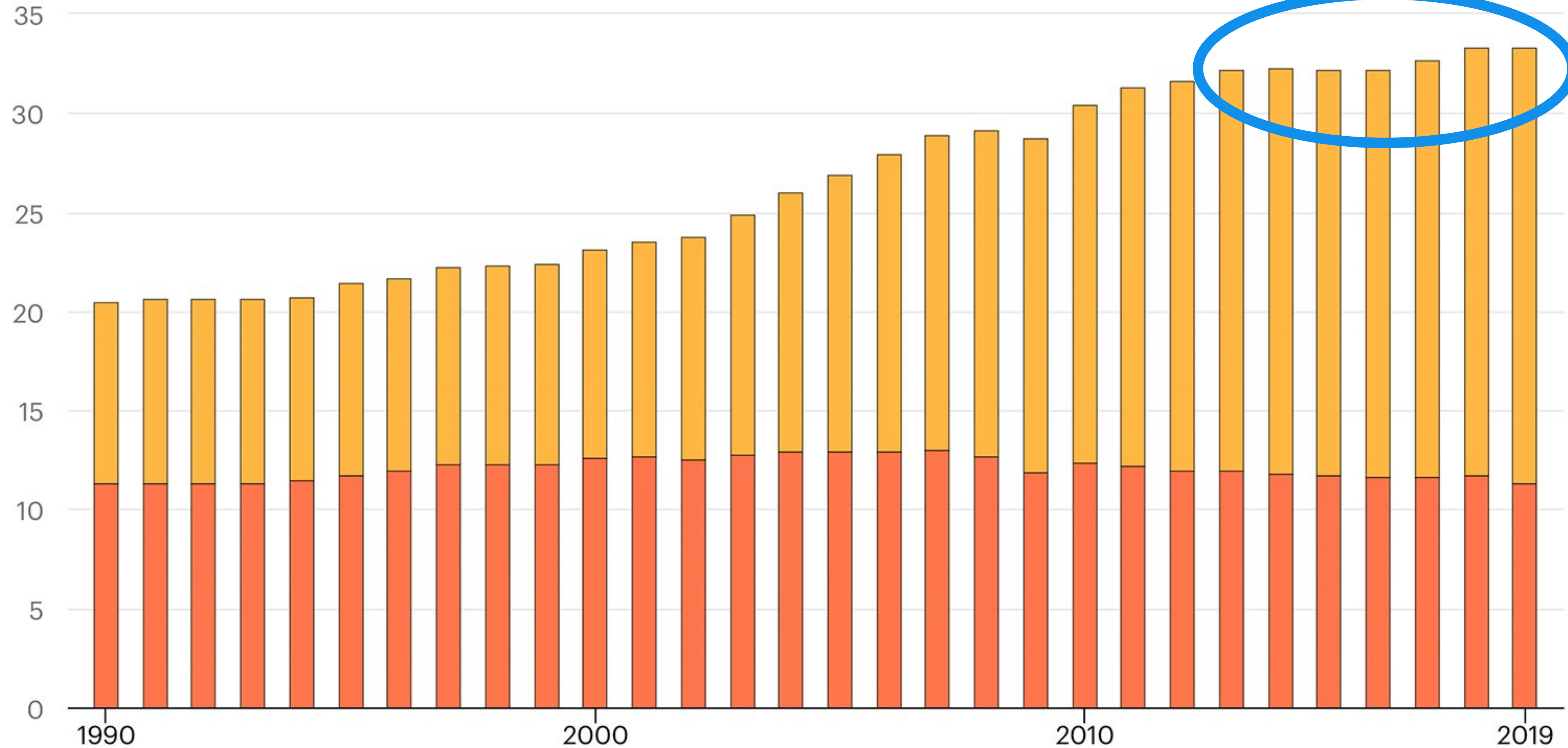
IEA analysis

● Advanced economies

● Rest of the World

[IEA \(2020\)](#)



Gt CO₂



International
Energy Agency

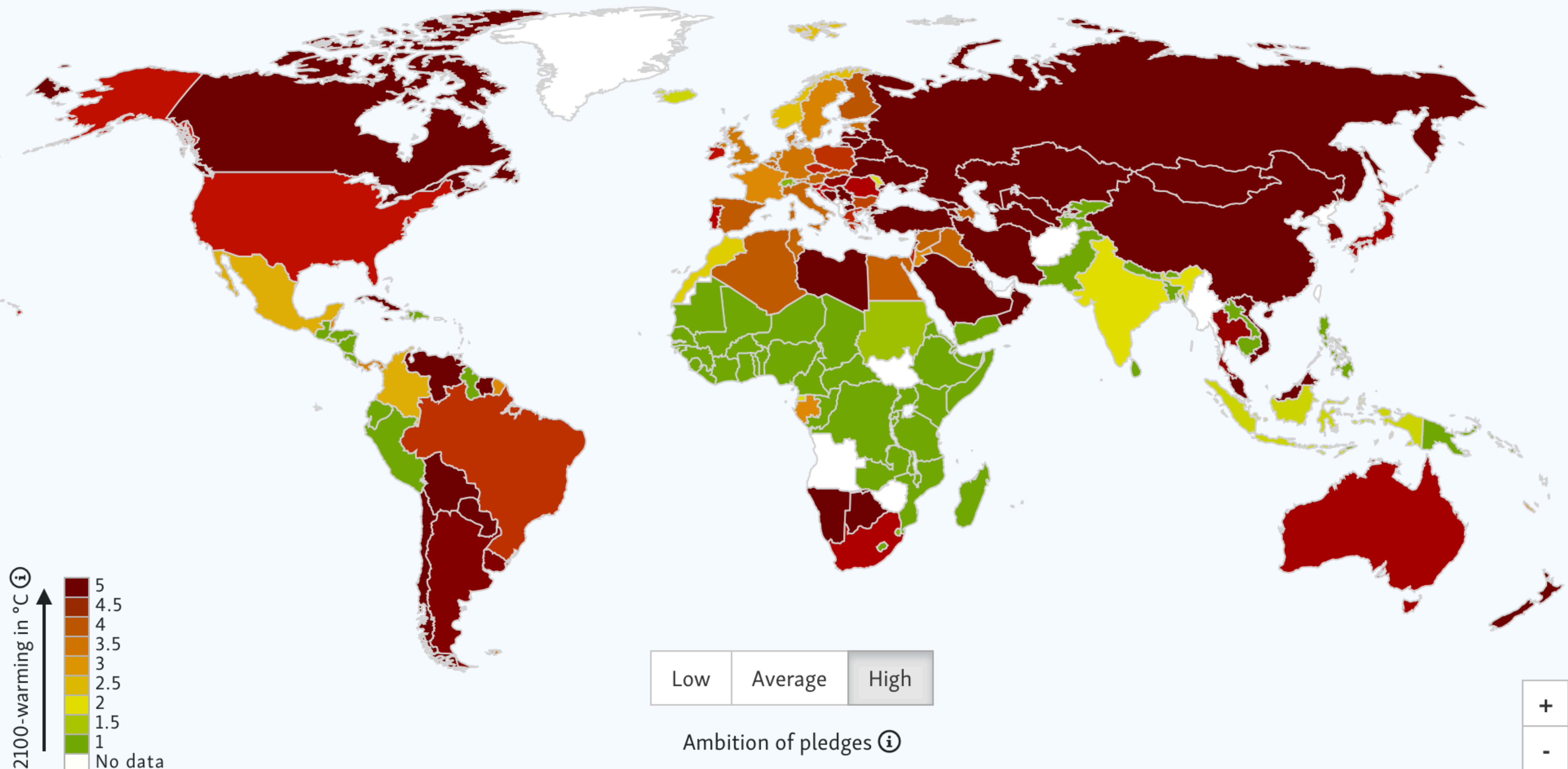
NEGLECT DEPENDS ON OUR DEFINITION OF OUR GOAL(S)

If our goal is to ...

- Decarbonize electricity grids? –  Making some progress, tech innovation doing well
- Reach the Paris Agreement? –  Policy inadequate




How much global warming is each country's pledge leading to? ⓘ

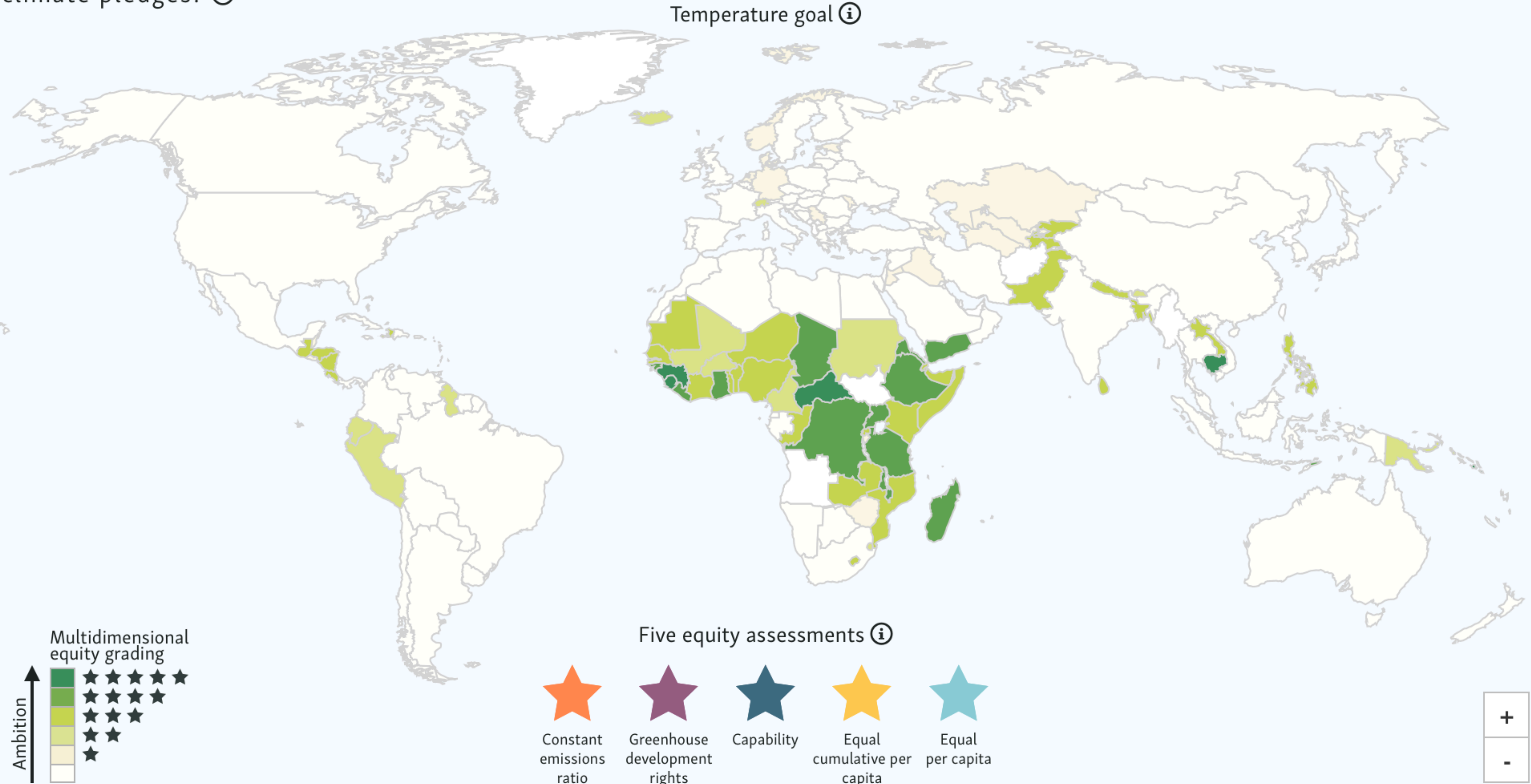
PARIS-EQUITY-CHECK.ORG (2018)



NEGLECT DEPENDS ON OUR DEFINITION OF OUR GOAL(S)

If our goal is to ...

- Decarbonize electricity grids? –  Making some progress, tech innovation doing well
- Reach the Paris Agreement? –  Policy inadequate
- Minimize suffering? –  Not at all



CAN WE DO ANYTHING?

YES!

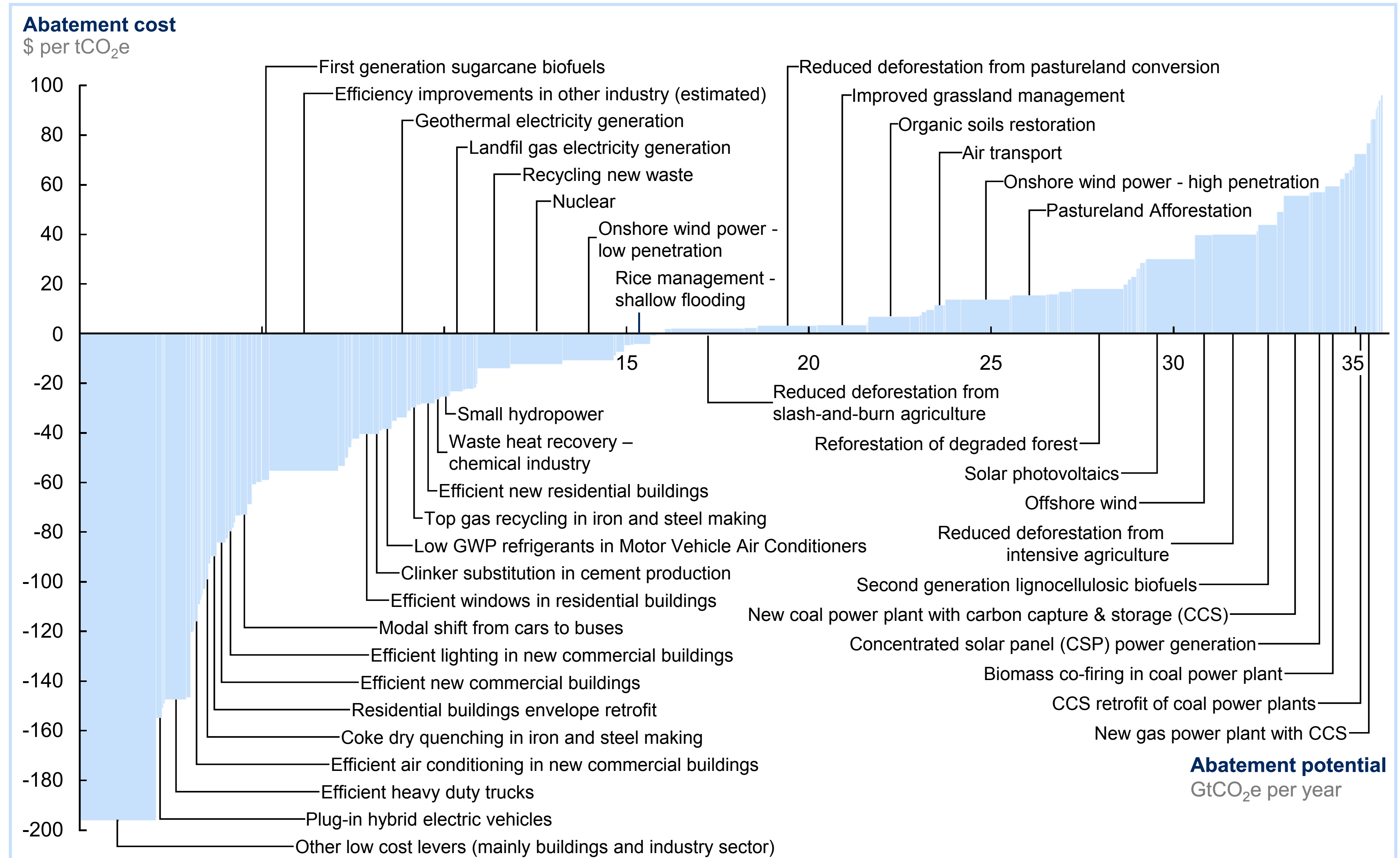
- What are the costs?
- What is the most impactful?
- What is ethical?

2010 MCKINSEY ABATEMENT CURVE

- Y-axis: Cost
X-axis: CO₂
- Context: current emissions are ~35 GtCO₂ and ~55 GtCO₂e per year

[More on 100 actions or technologies for climate on Project Drawdown](#)

Global GHG Abatement Cost Curve beyond BAU: 2030



Note: The curve presents an estimate of the maximum potential of technical GHG abatement measures below \$100 per tCO₂e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.

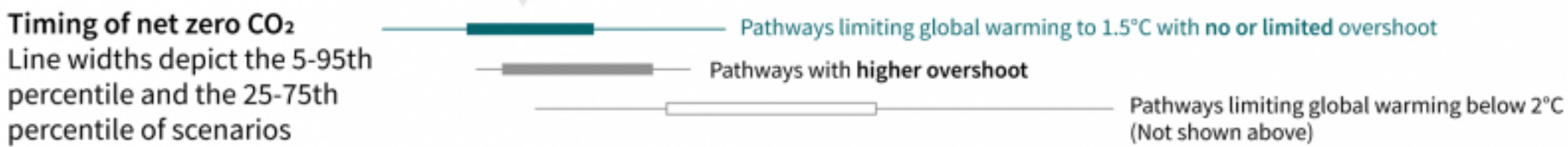
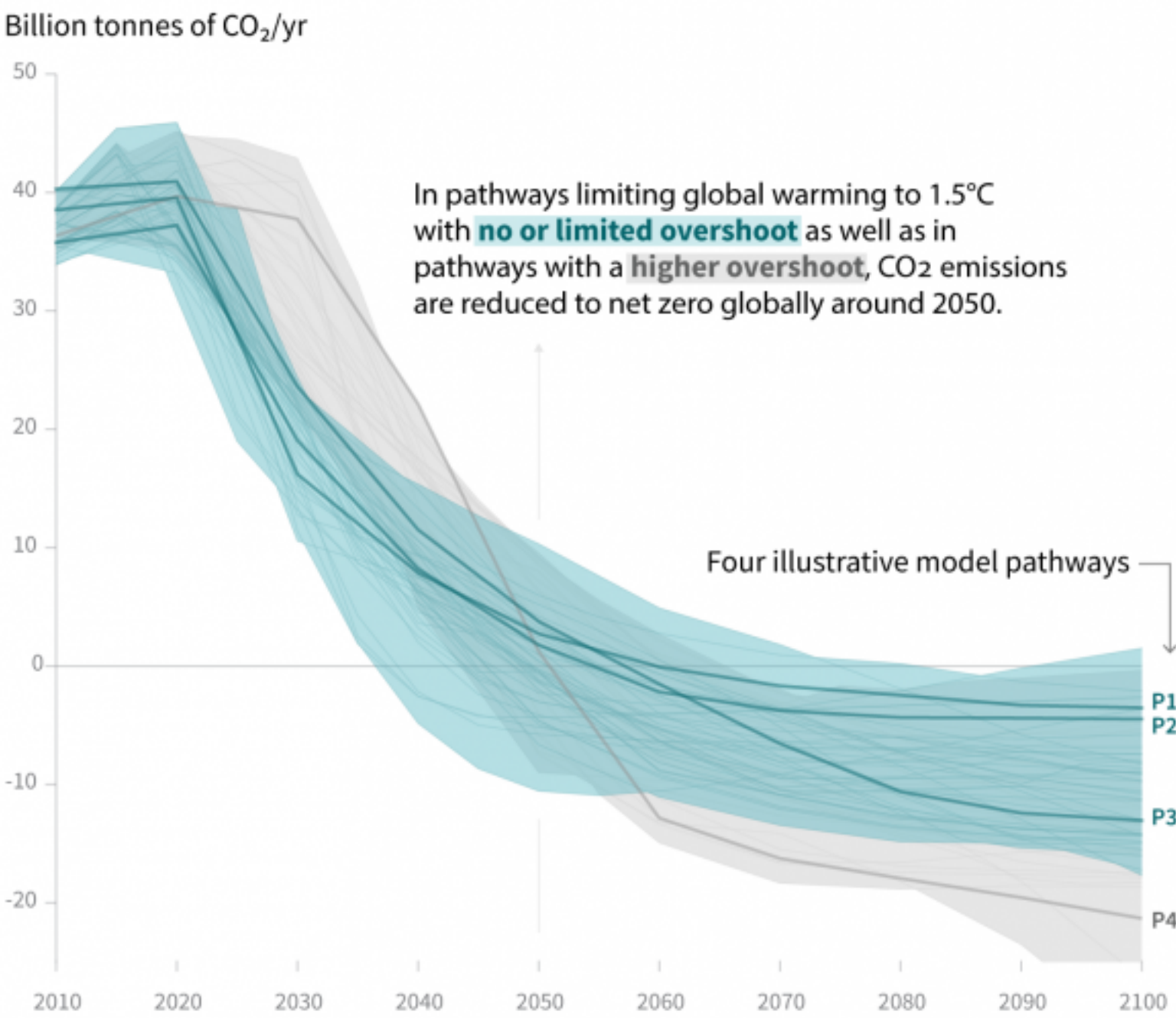
SOURCE: McKinsey's Global GHG Abatement Cost Curve v3.0; BAU building on International Energy Agency
World Energy Outlook 2010

WHEN TO ACT?

Global emissions pathway characteristics

General characteristics of the evolution of anthropogenic net emissions of CO₂, and total emissions of methane, black carbon, and nitrous oxide in model pathways that limit global warming to 1.5°C with no or limited overshoot. Net emissions are defined as anthropogenic emissions reduced by anthropogenic removals. Reductions in net emissions can be achieved through different portfolios of mitigation measures illustrated in Figure SPM.3b.

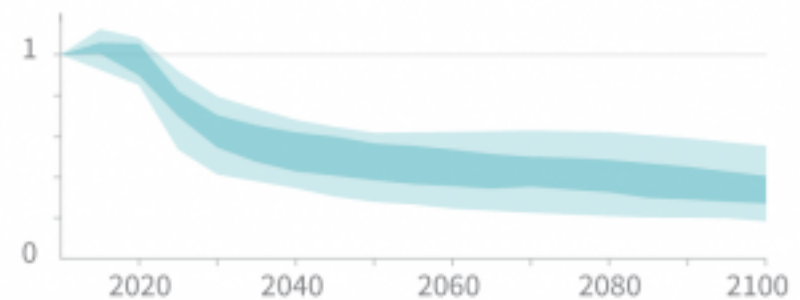
Global total net CO₂ emissions



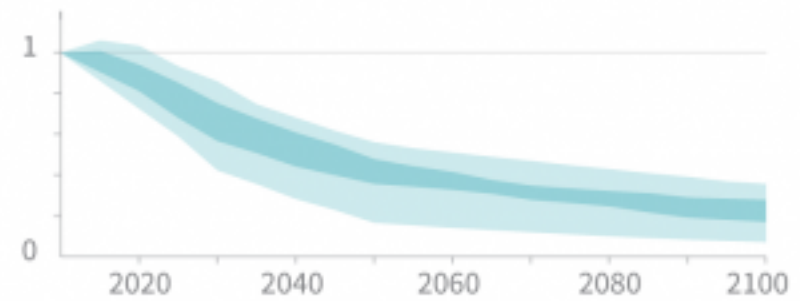
Non-CO₂ emissions relative to 2010

Emissions of non-CO₂ forcers are also reduced or limited in pathways limiting global warming to 1.5°C with **no or limited overshoot**, but they do not reach zero globally.

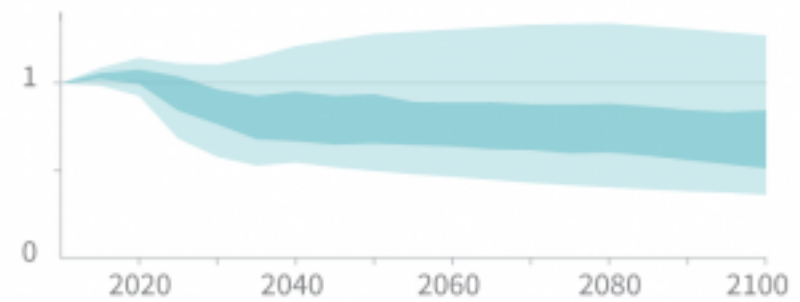
Methane emissions



Black carbon emissions



Nitrous oxide emissions



Source: IPCC Special Report on Global Warming of 1.5°C

COST

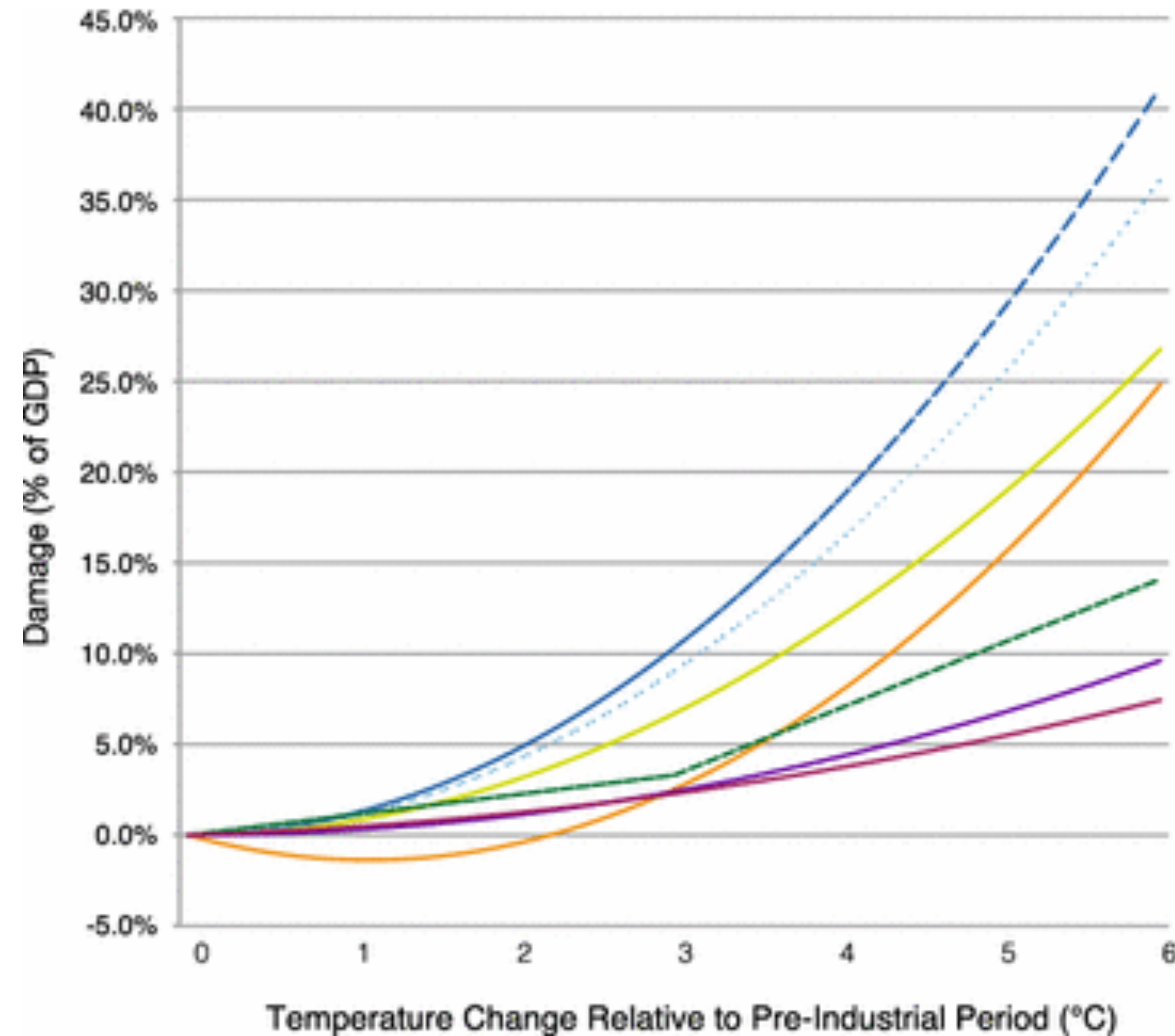
- Global Apollo Programme: **2% of global GDP/yr**
- “If we utilized all of our <€60 per tonne abatement opportunities to their full potential (which is an important assumption), McKinsey estimates the total global cost to be €200-350 billion per year by 2030. This is less than **one percent of the forecasted global GDP in 2030**... The *upfront capital investment* needed is €530 billion per year by 2020 and €810 billion by 2030.” – Our World in Data (2017) (emphasis mine)

WHO IS PAYING

CLIMATE POLICY INITIATIVE (2019)

- ~\$600 bn /yr in 2018
- Governmental (~45%; ~\$250 bn/yr):
 - GCF (\$9.8 bn; goal \$100 bn/yr)
- Non-Governmental (~55%; \$325 bn/yr):
 - Private actors (Gates, Bezos, etc.)
 - Foundations
 - Companies

COST IN DAMAGES



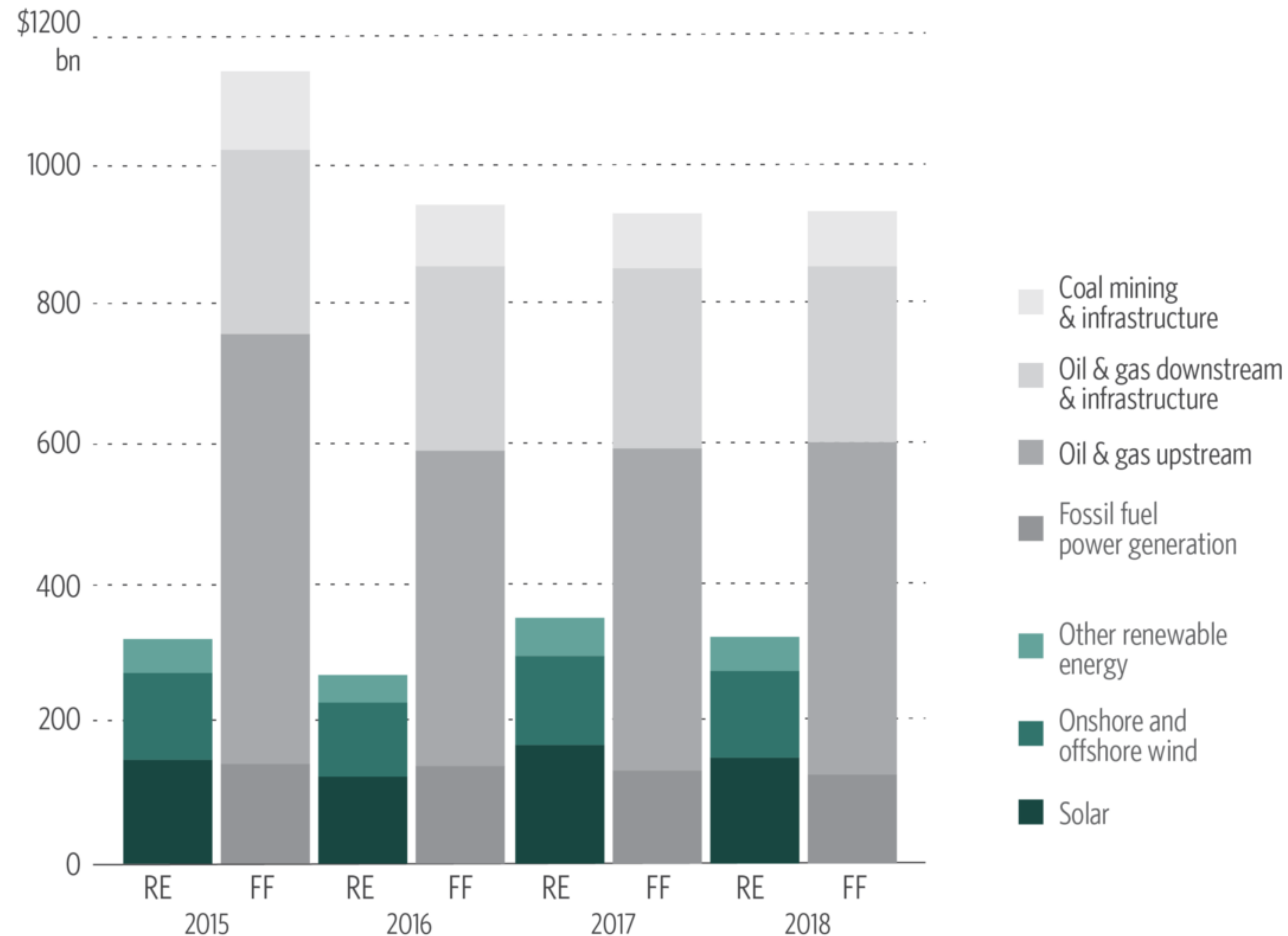
[HOWARD AND STERNER \(2017\)](#)
(META-ANALYSIS)

- Depends what you count... health care costs, migration, infrastructure?
- "At least \$360 bn annually" for just US by 2030 from weather – [Nat Geo \(2017\)](#)
- 5-20% of GDP – Stern (2006)

SO WHAT'S THE PROBLEM THEN?

- Must fight lock-in/stranded assets
- Adaptation is underplayed
- Technology-reliant
- Mental Models/Political Support
- Deep Uncertainty

Global renewables and fossil fuel investment, billion USD, 2015-2018



Source: Climate Policy Initiative

DISRUPTION

- Spending must displace old infrastructure *and* build new ones faster
- Lock-in: institutional or technological inertia
- WICKED! – Rittel and Webber (1972)

TECHNOLOGICAL INNOVATION

“Large technological uncertainties ... and radical innovation needed is beyond the capacities of even very large firms.” – Storm and Schröder (2018) citing *Mazzucato and Semieniuk (2018)*.

- What technologies or innovations?
 - Renewables, storage, CCS, biofuels (aviation)
 - Big bets and unproven!
 - Future lock-in: avoid regret (BECCS is bad bad bad)

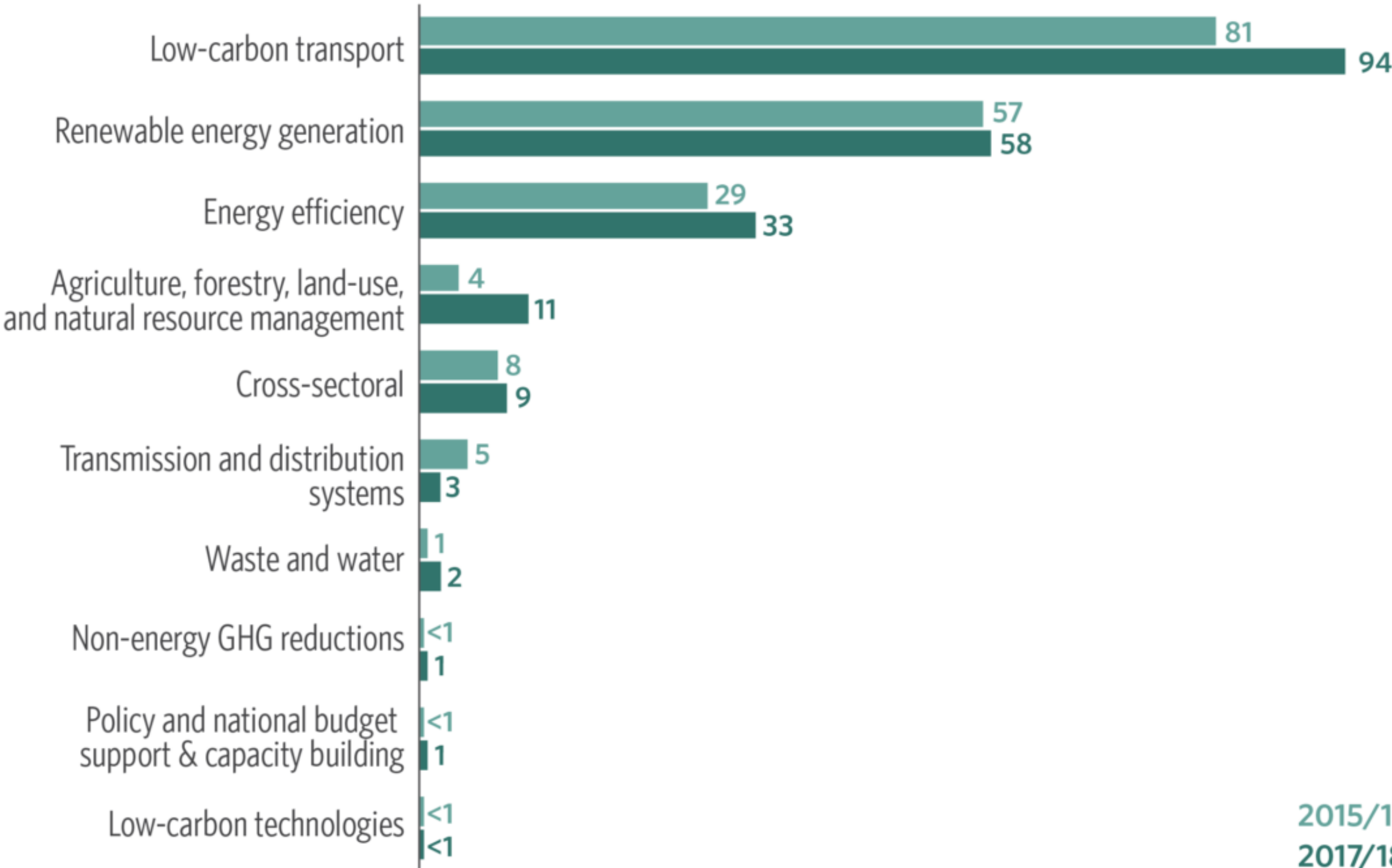
TECHNOLOGICAL INNOVATION

“A deep overhaul of energy systems and production and consumption structures cannot be done through small incremental steps, but requires disruptive system-wide re-engineering.” – Storm and Schröder (2018)

- How are innovations funded?
- Mazzucato: missions!

MITIGATION

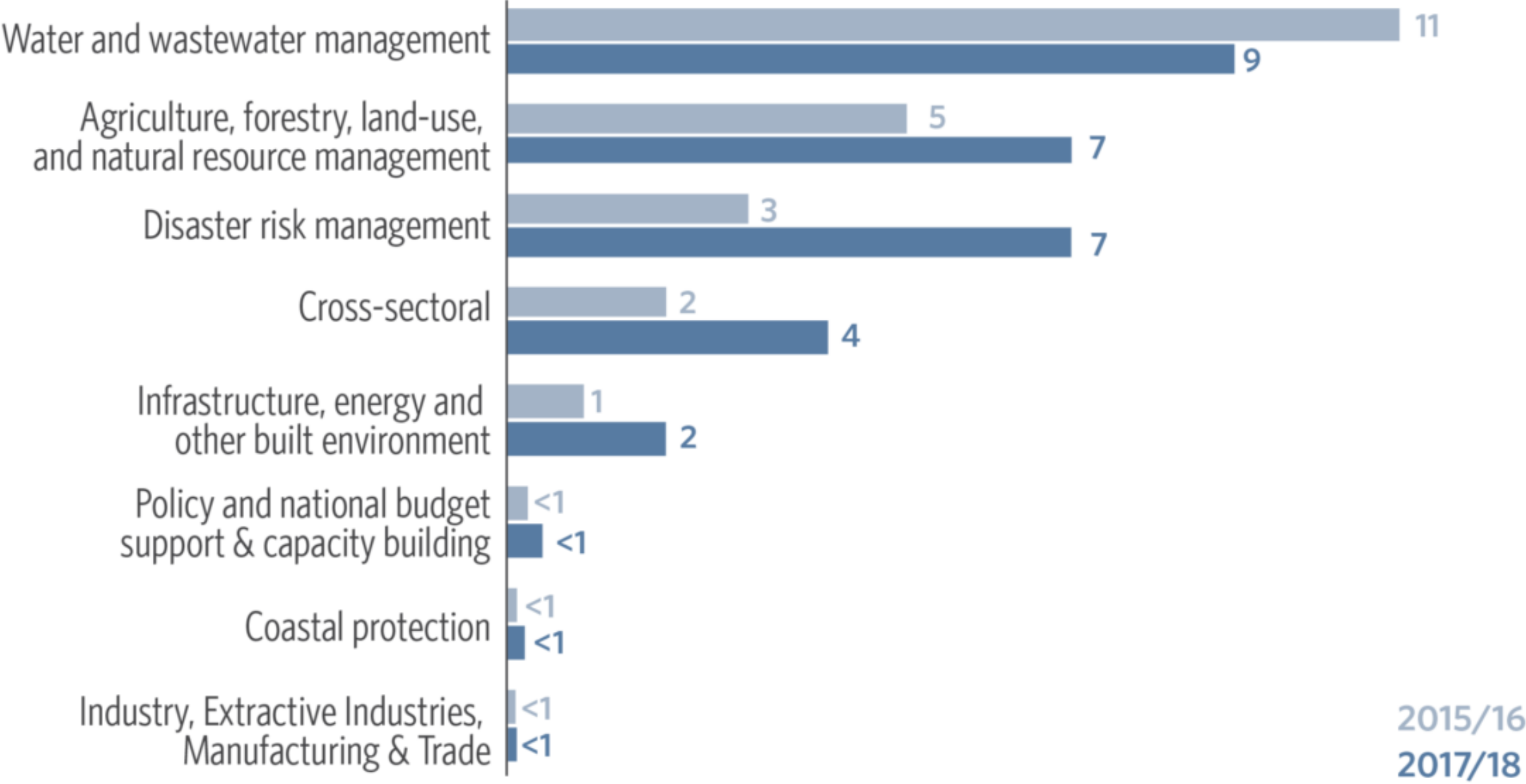
Average annual public mitigation finance 2015-2018, billion USD



Source: Climate Policy Initiative

ADAPTATION

Public Adaptation Finance by Sector, in USD billion

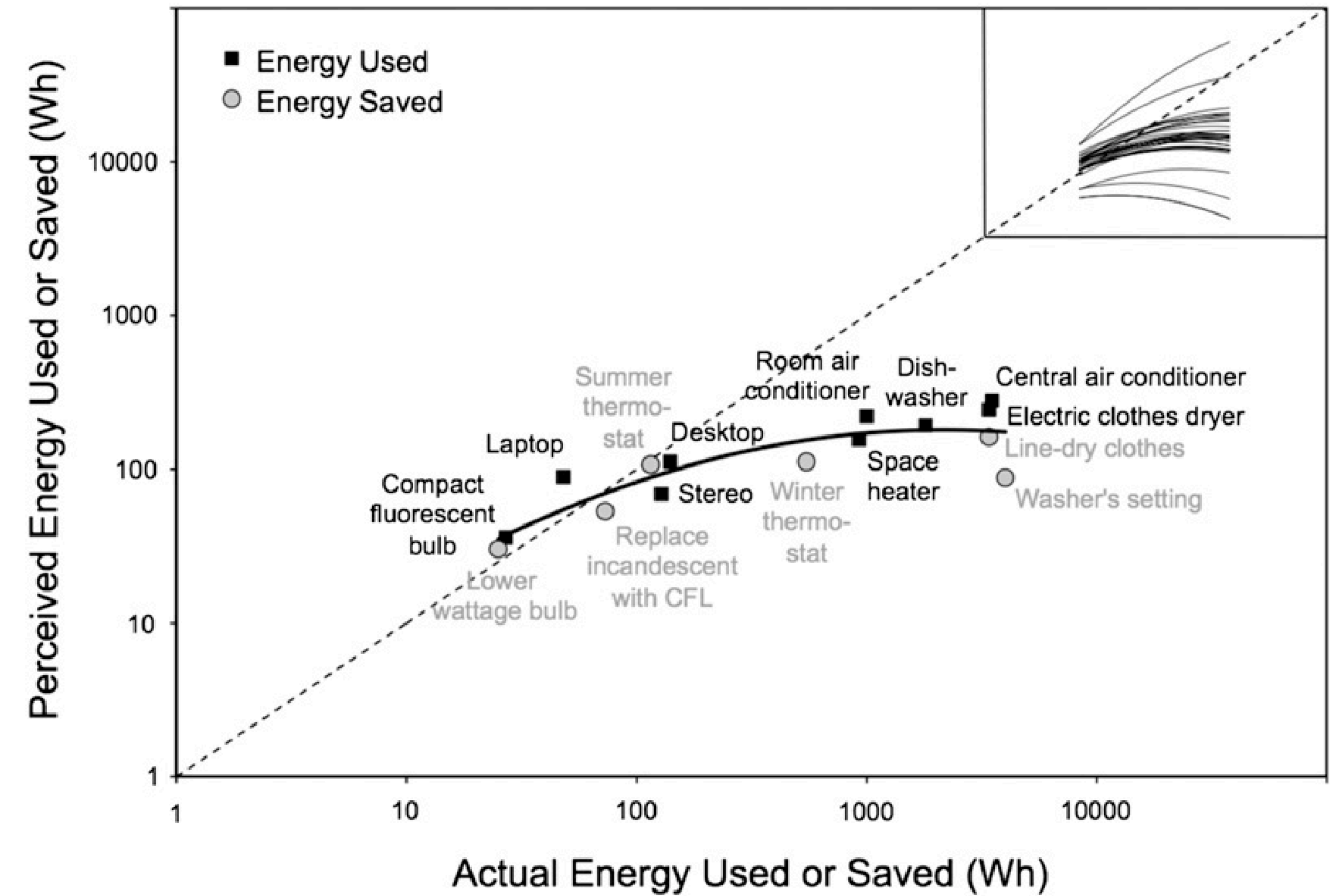


Source: Climate Policy Initiative

More: [How Adaptation is Ignored – WRI \(2015\)](#)

PERCEPTIONS OF CLIMATE AND ENERGY

- Social factors limit policy and political ambition
- SUPER hard to think about!
- Abstract, long-term



[ATTARI ET AL. \(2010\)](#)

HUMAN CHOICES

“The valuation of centennial climate damage is highly unknowable” – Pezzey (2018)

- Social cost of carbon estimated from **13.36–2386.91**\$/tCO₂ (mean of 54.70 and 30.78 with 3% discount) – Wang et al. (2019) (meta-analysis)

Discount factor:

Stern: 0.1, Nordhaus: 3, Trump: 7



OPINION | Open Access |

Why the social cost of carbon will always be disputed

John C. V. Pezzey

First published: 12 November 2018 | <https://doi.org/10.1002/wcc.558> | Citations: 7

Edited by Stéphane Hallegatte, Domain Editor, and Mike Hulme, Editor-in-Chief

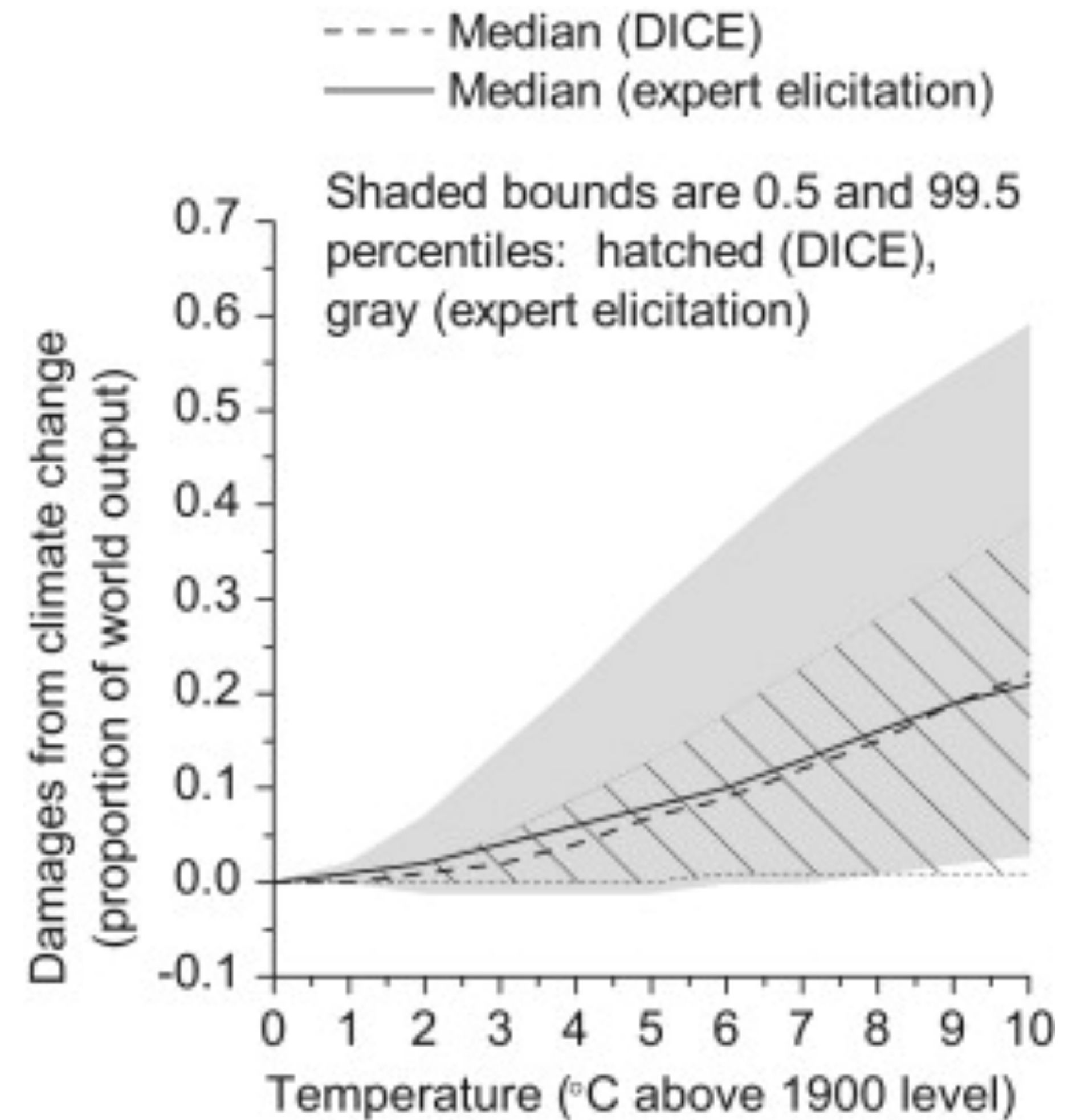
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[GERST ET AL. \(2010\)](#)

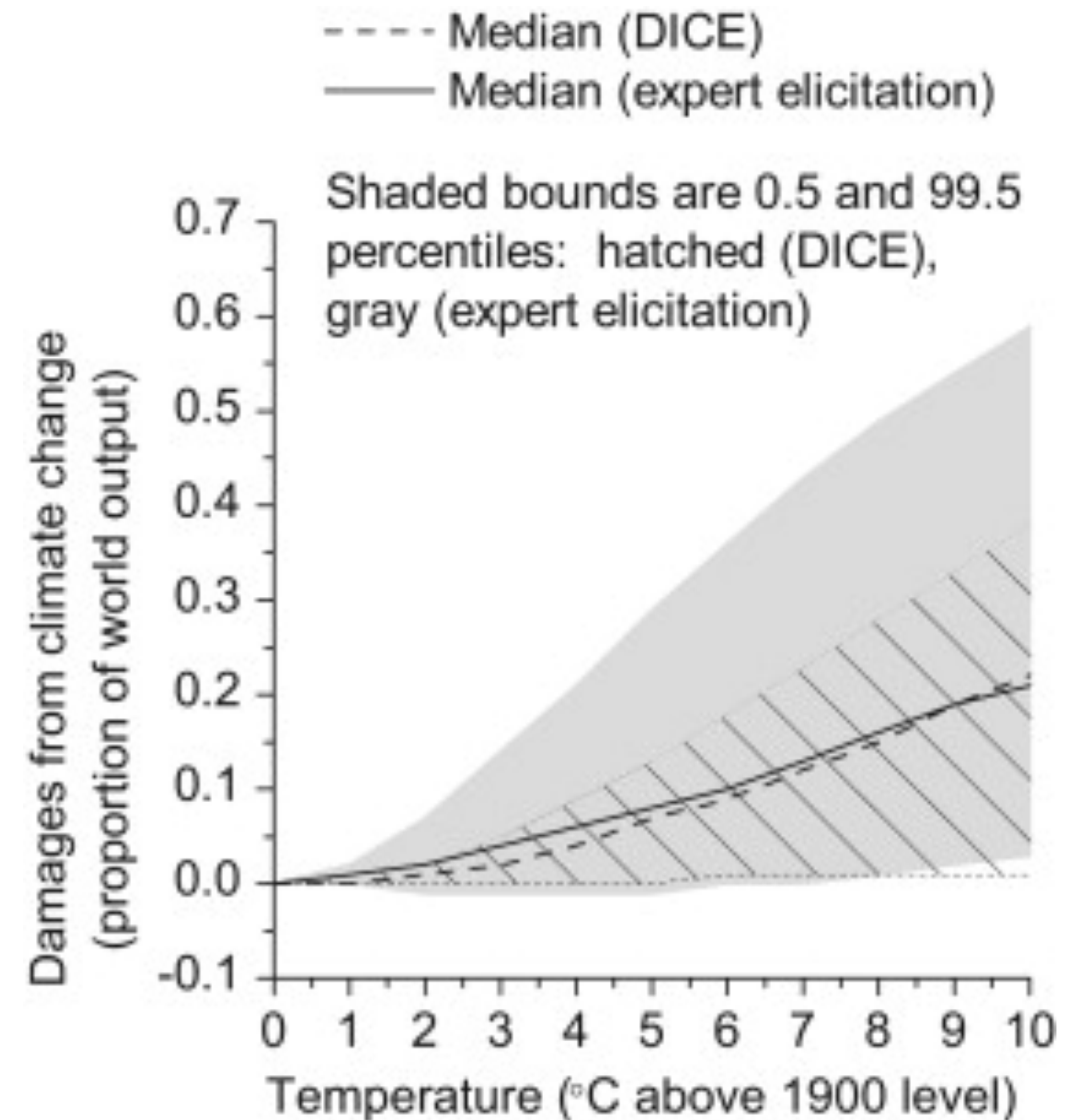
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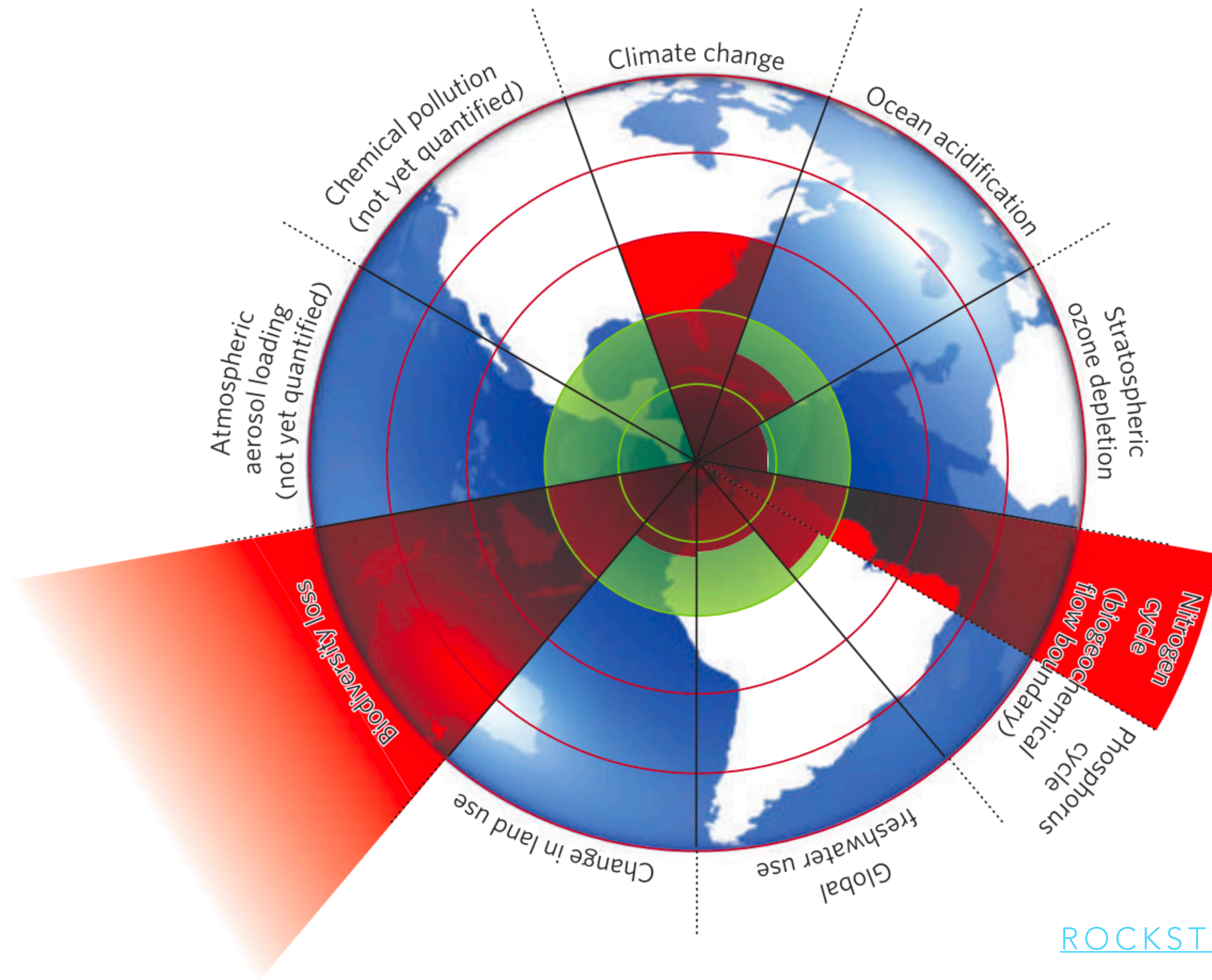
[GERST ET AL. \(2010\)](#)

Many, many articles and discussions exist online on this topic

[Carbon Brief \(2017\) Overview](#)

WHAT ARE OUR GOALS?

THE PLANET IS MORE THAN CLIMATE CHANGE



[ROCKSTRÖM ET AL. \(2009\)](#)

BETWEEN CHOICES, WHAT CAN WE DO?

- Climate and environmental crises have common denominators: economic policy
- Stern (2006): great market failure ever...
- Mental models of our role on the planet

ECONOMIC POLICY FAILURE

SO FIX THE MARKET?

Nordhaus: we are moving in the right direction. No need to change systems.

Price Carbon.– New Republic

(ECONOMIC) SYSTEMIC CHANGE

- (European) Green New Deal?
- Degrowth?
- Circular Economy?
- Social Tipping Points

MENTAL MODELS; SYSTEMIC CHANGES NEEDED

- Hard vs soft sustainability
- Degrowth as a serious idea
- Circular economy
- Ecological economics
- Relative emissions decoupling has been happening ... in only Global North – Hickel (2019)
- Degrowth not fast enough because *coupling*; grow clean-tech at 1.5% – Pollin (2018)
- Maximum 0.45% global GDP growth – Storm and Schröder (2018)

How climate and economic models consider money creation (equilibrium or non-equilibrium) and innovation leads to completely opposite recommendations – Mercure et al. (2019)

Ray Taylor on EA Forum:

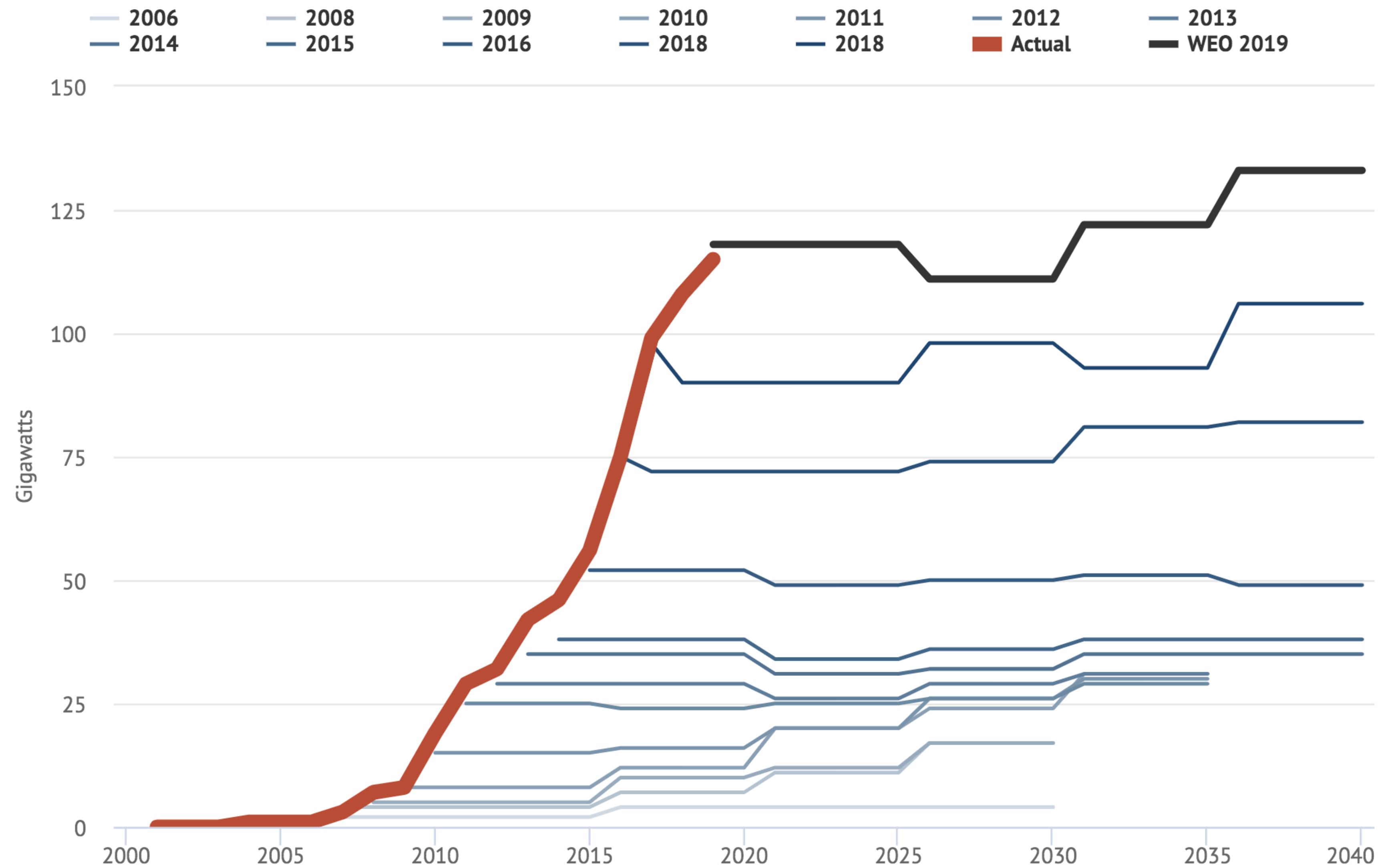
naivete of idealists in relation to power, realities of
implementation, finance and effectiveness of lobbying, denialism,
media/mass psychology strategies, post-factual socio-political
realities
western cultural blind spots / lack of awareness of own hypocrisies
lack of awareness of just how much we are a minority
poor communication and psychology awareness and strategies
the things I've missed

FORECASTING AND UNCERTAINTY

- Robustness needs to become core
- Future is *deeply uncertain* (tipping...)

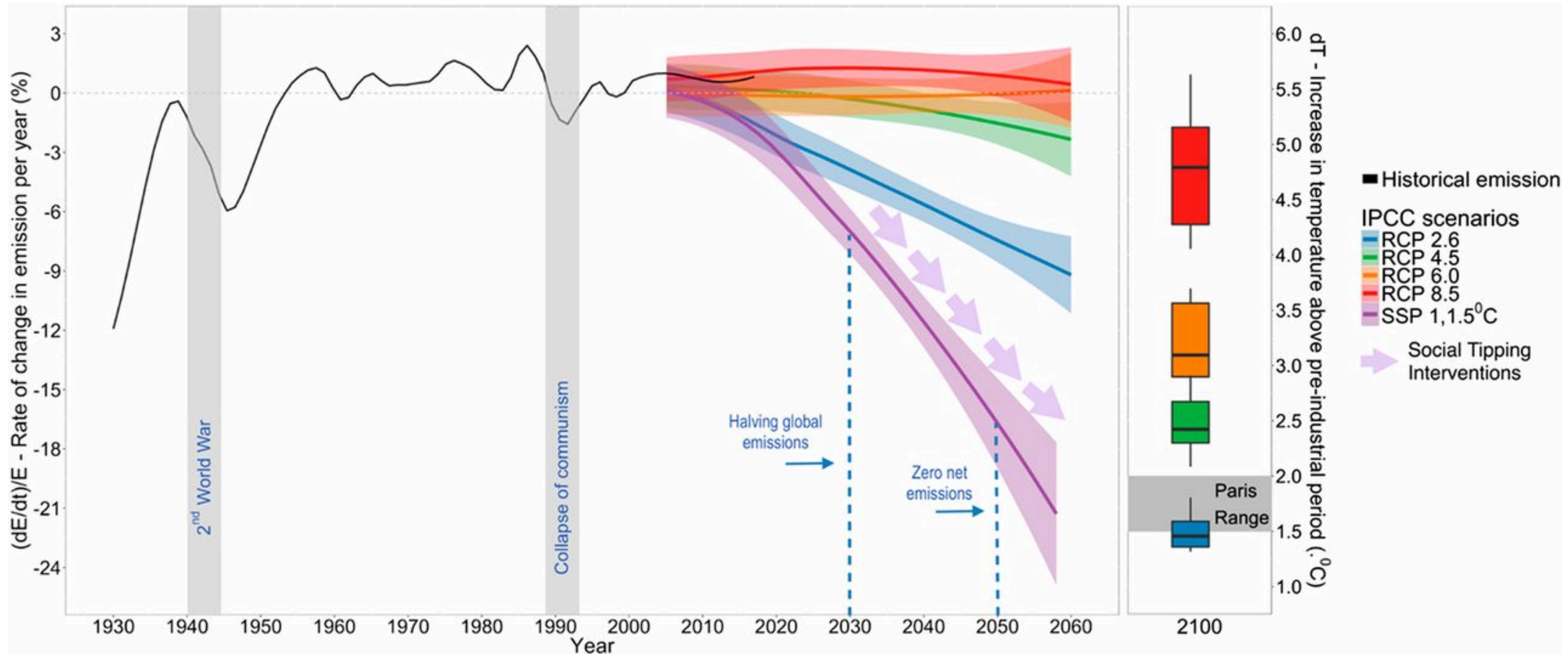
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SOURCE: [@AUKEHOESTRA ON TWITTER](#) AND [CARBON BRIEF \(2019\)](#)

Theorized Impact of Social Tipping Effects



Source: [Otto et al. 2020](#)

INSTITUTIONAL CHANGES

- Track resource flows directly and systems of power within economics – Pirgmaier and Steinberger (2019)
- Focus on measuring well-being! – Hickel (2019)
- Dynamic adaptive policy – Kwakkel (2015)
- Participatory change-making – Weaver (2013)

CONCLUSION

- Should Climate be a Priority Area?
 - Scale, Neglectedness, Solvability
- Scale of Current Climate Efforts
 - Amount of government and private spending; what spending does (or is supposed to do)
 - Argument that spending on the right things matter too
 - Argument that spending isn't enough – we can't actually "buy" our way out of the problem
- Missing Links to Success
 - Lock-in, stranded assets, economics views... HUMAN aspects
 - Disagreements in when we should spend the money and how
 - Argument that social systems are fundamental to this discussion and economics issues in mental models
- What is Systemic Change?
 - Theorized effectiveness of different economic and social policy proposals (incl. past empirical results)
 - Outstanding questions about aspects of systems that need to change



CONCLUSION – EA

- What can EAers do?
 - Domain experts – start companies
 - Others – support entrepreneurs
 - Influence niches (vote with your wallet)
 - Call and write to people in positions of power
 - **VOTE, STRIKE**

APPENDIX

WE ARE ON TRACK FOR 3°C –
BREAKTHROUGH INSTITUTE (2019)

JUST TRANSITION

Speed of transition will leave people
behind.

LANDSCAPE OF CLIMATE FINANCE IN 2017/2018

Global climate finance flows along their life cycle in 2017/2018. Values are average of two years' data, in USD billions.

579 BN USD ANNUAL AVERAGE



SOURCES AND INTERMEDIARIES

Which type of organizations are sources or intermediaries of capital for climate finance?

INSTRUMENTS

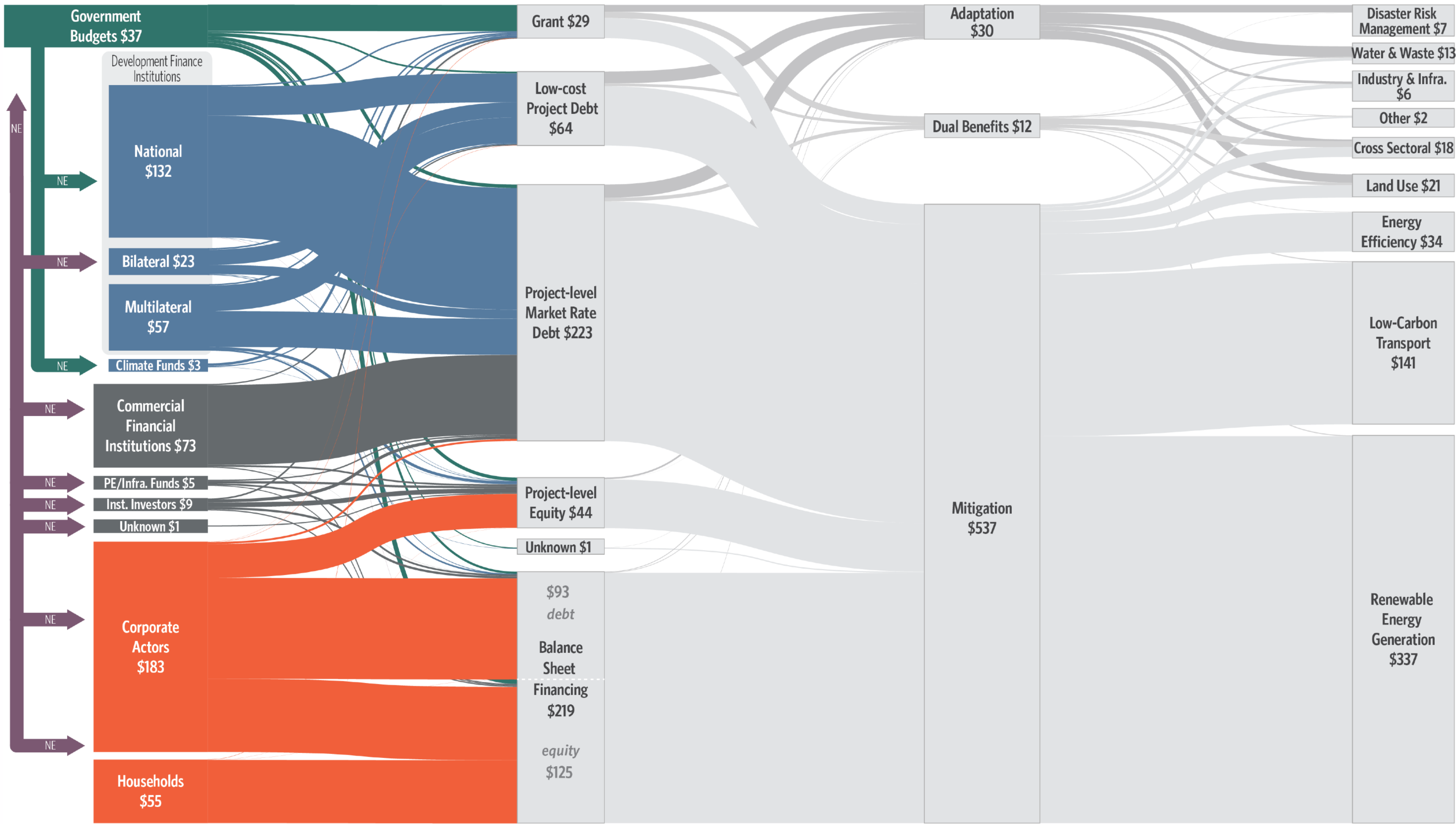
What mix of financial instruments are used?

USES

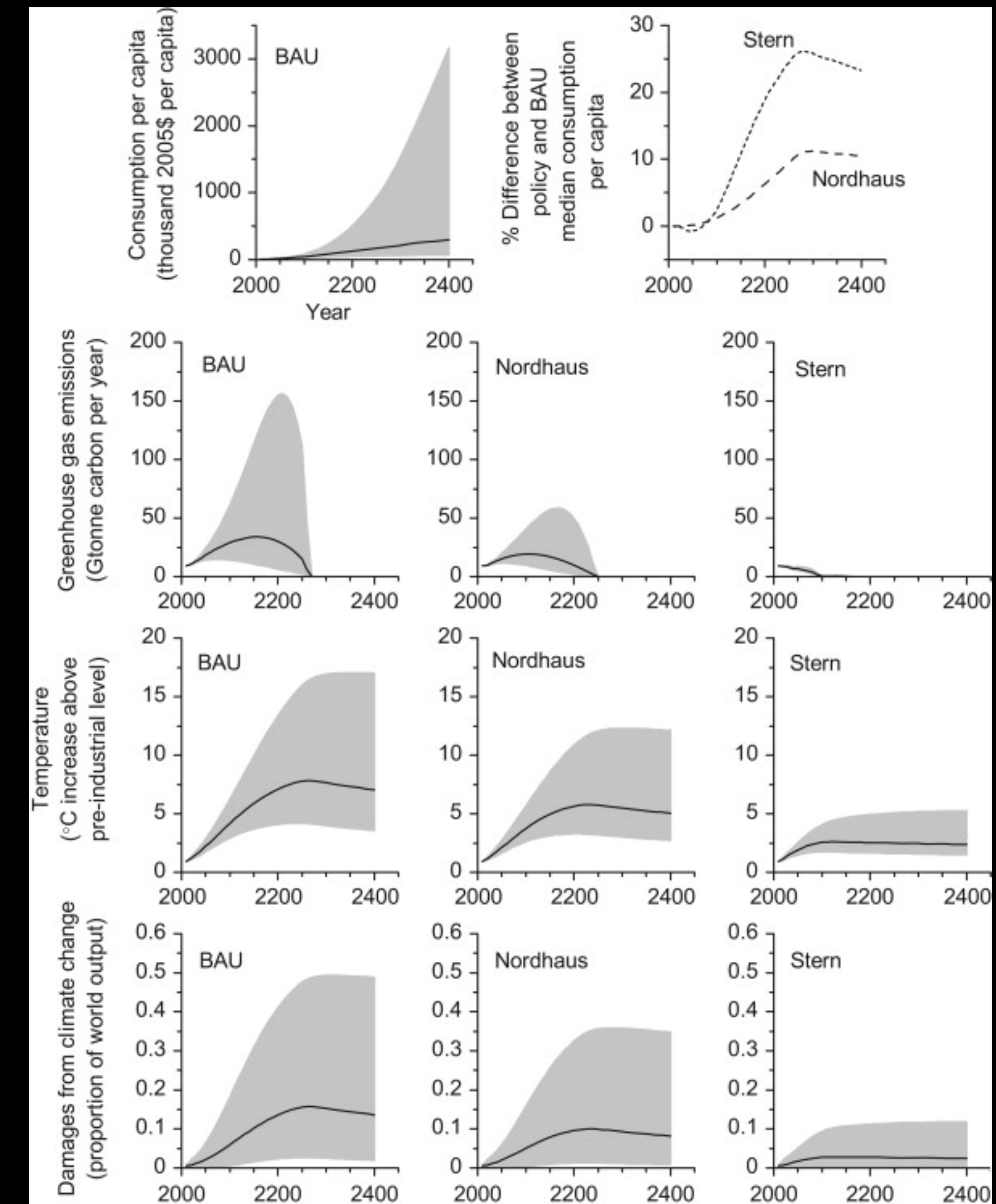
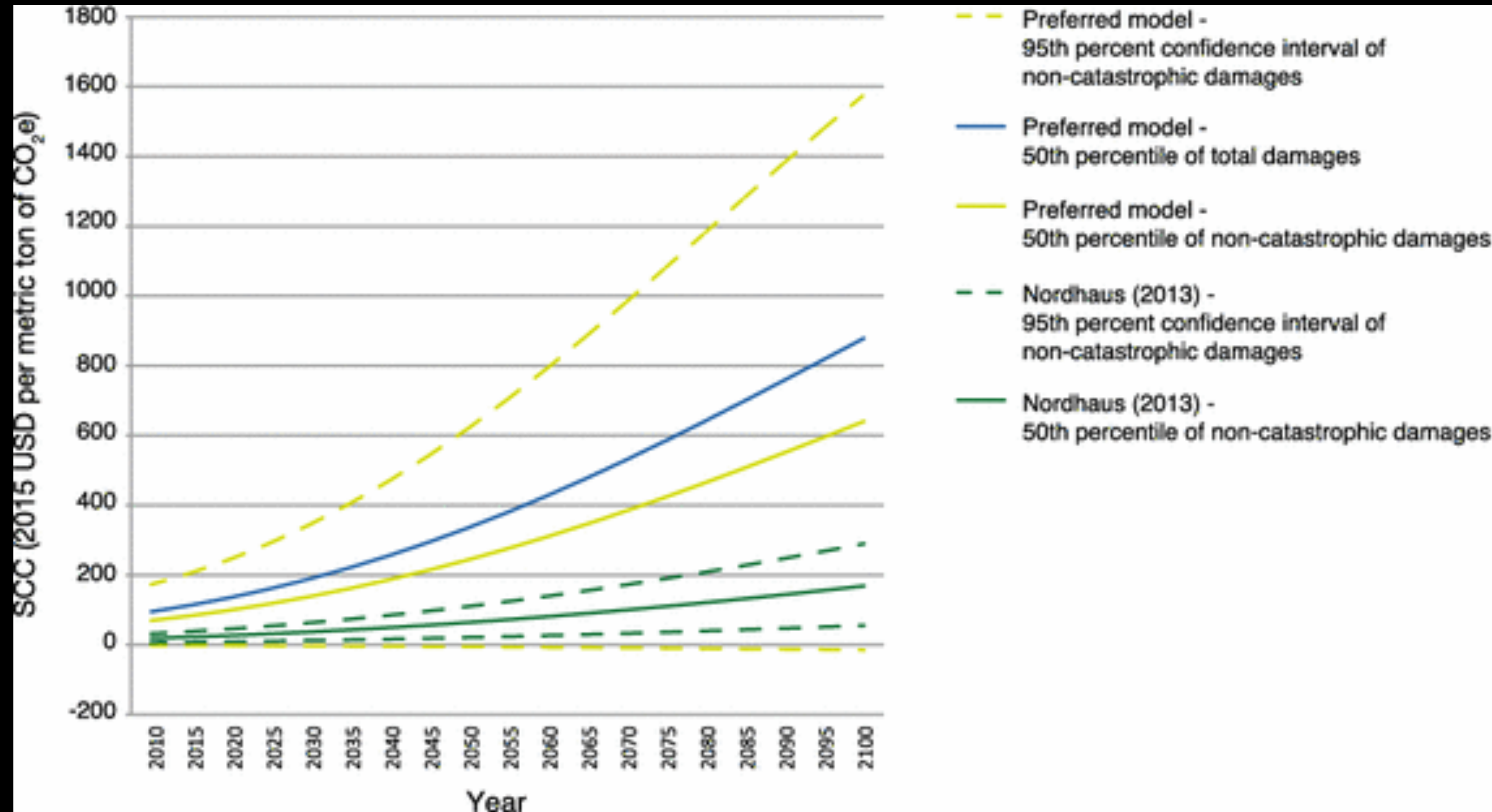
What types of activities are financed?

SECTORS

What is the finance used for?



PROBLEMS WITH CARBON PRICING



HOWARD AND STERNER (2017) (META-ANALYSIS)

GERST ET AL. (2010)

CLIMATE DAMAGES

[HSIANG ET AL. \(2017\)](#)

Hsiang and collaborators have many publications on the impact of temperature of many types of conflict globally and within regions.

