

How to give better climate change advice to governments

Simon Sharpe

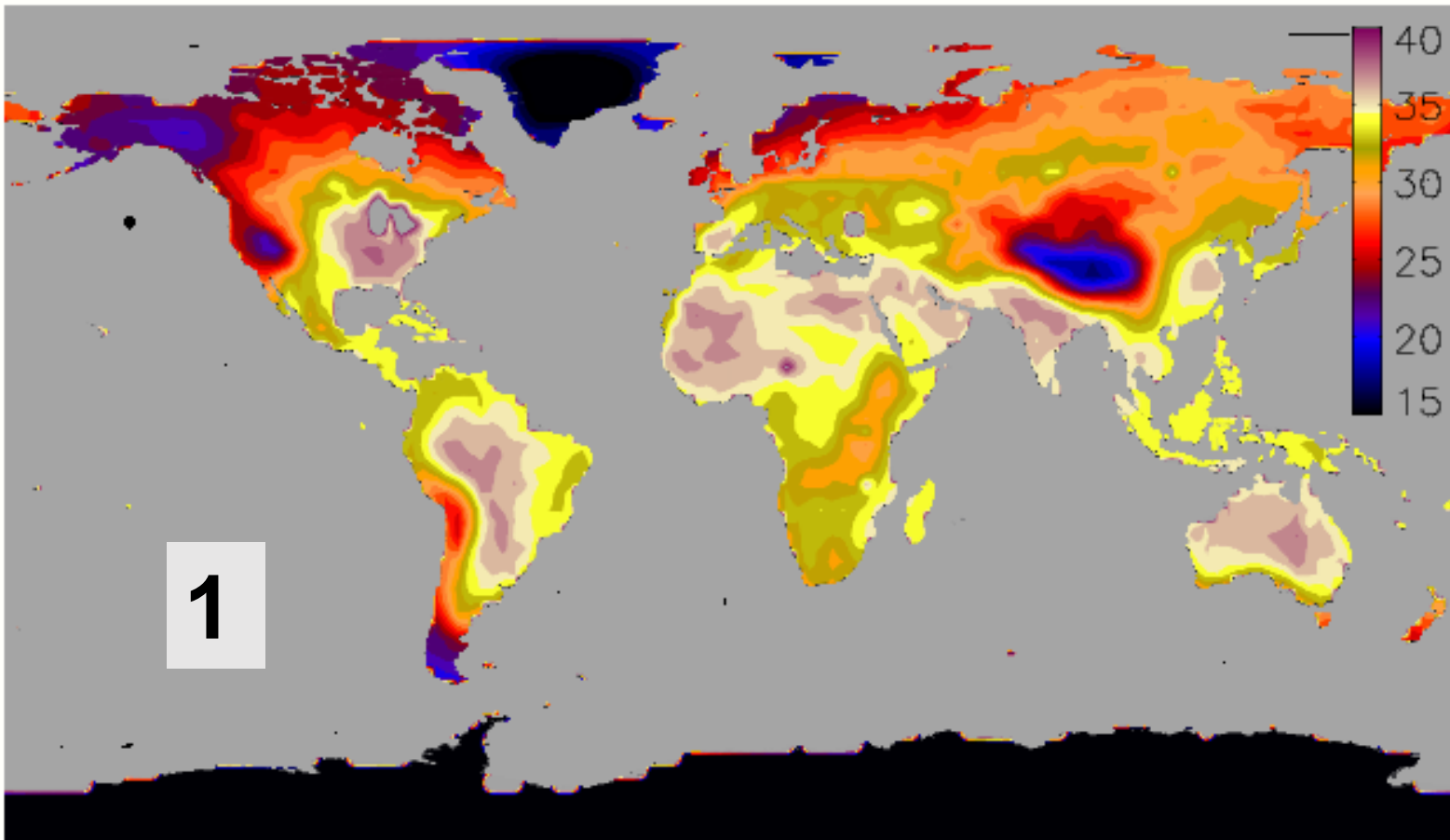
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March 2022

PART 1: SCIENCE

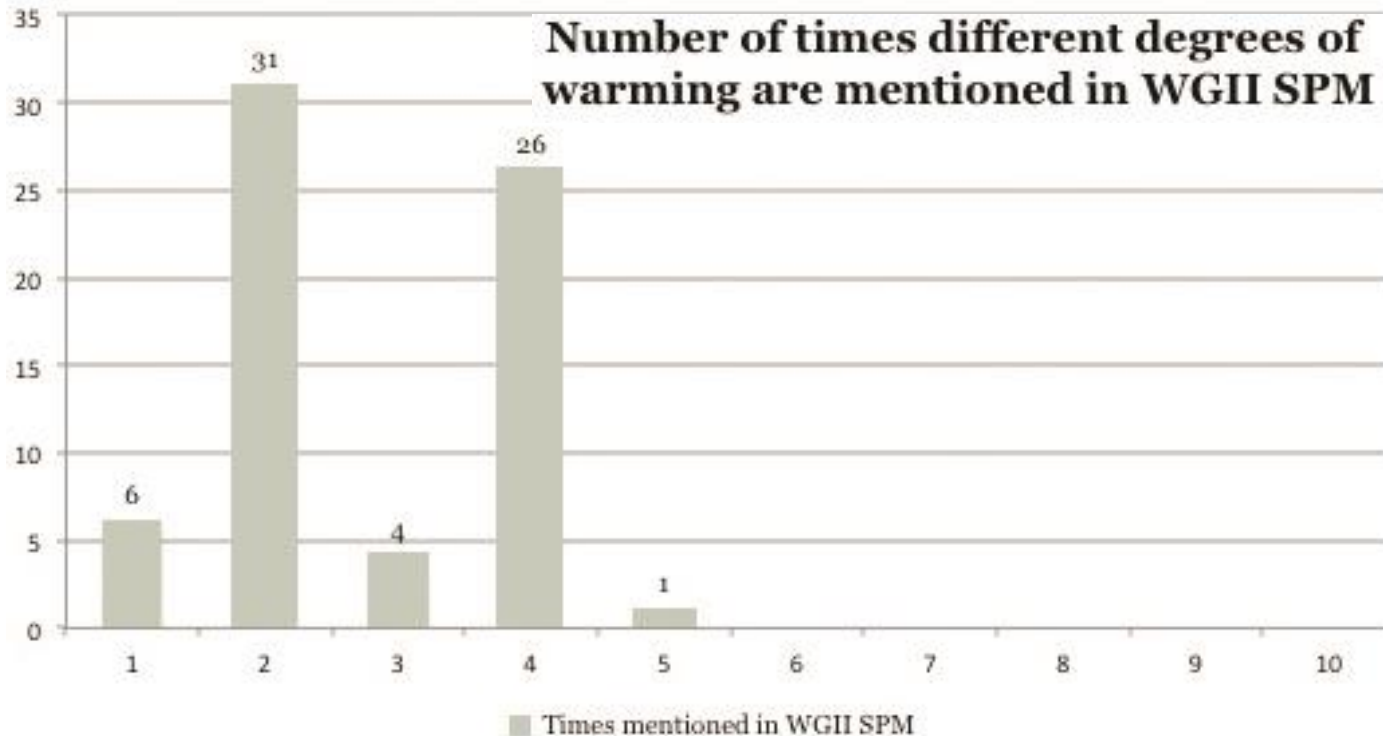
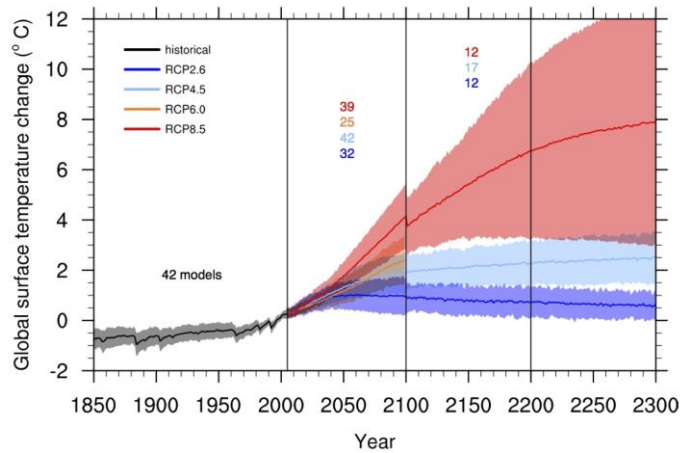
ORIGINALITY VS RELEVANCE

Number of research papers cited in IPCC AR5 WGII on the subjects of: a) heat stress exceeding human tolerance limits; b) impacts on ski resorts; c) impacts on grape-growing in Europe



From sample of
12,000

CONFIDENCE VS RELEVANCE



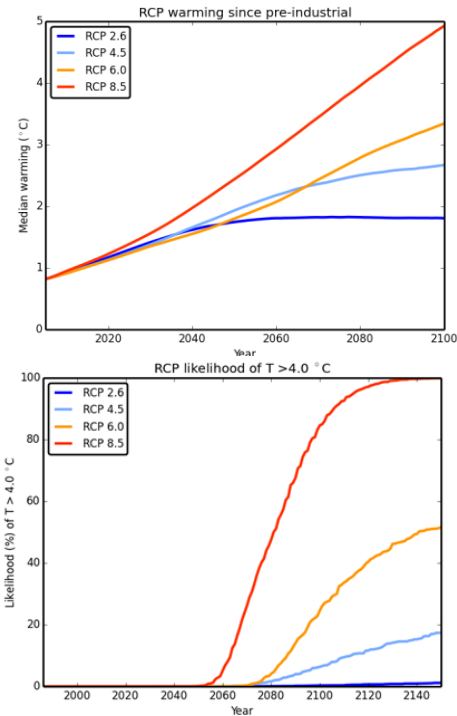
- **Crops:** *Relatively few studies have considered* impacts on cropping systems for scenarios where global mean temperatures increase by **4°C or more**.
- **Ecosystems:** There are *few field-scale experiments on ecosystems at the highest CO₂ concentrations* projected by RCP8.5 for late in the century, and none of these include the effects of other potential confounding factors.
- **Health:** Most attempts to quantify health burdens associated with future climate change *consider modest increases* in global temperature, *typically less than 2°C*.
- **Poverty:** Although there is high agreement about the heterogeneity of future impacts on poverty, *few studies consider more diverse climate change scenarios, or the potential of four degrees and beyond*.
- **Human security:** Much of the current literature on human security and climate change is informed by *contemporary relationships and observation* and hence is limited in analyzing the human security implications of rapid or severe climate change.
- **Economics:** *Little is known about aggregate economic impacts above 3°C*. Impact estimates are incomplete and depend on a large number of assumptions, many of which are disputable.

PREDICTION VS RISK ASSESSMENT

Telling the boiling frog what he needs to know:
<https://gc.copernicus.org/articles/2/95/2019/>

ENTITY OF CONCERN <i>And objective</i>	THRESHOLD OF NON-LINEAR IMPACT	TOLERABLE PROBABILITY	REGULATING AUTHORITY
Insurance firm <i>Profitability</i>	Bankruptcy	Less than 1 in 200 years	EU insurance regulations
Building <i>Safety</i>	Collapse (due to earthquake)	Less than 1 in 500 years	Japanese building codes
Individual <i>Health</i>	Death (in the workplace)	Less than 1 in 1000 in a given year	Guidance of UK Health and Safety Executive

FIGURES IN IPCC AR5 IMPACTS REPORT CONTAINING GRAPHS IN THE FORM OF:	
Impact / time <i>(Prediction: what’s most likely to happen)</i>	>20
Probability / time <i>(Risk assessment: how likely is the thing that we want to avoid?)</i>	1



PART 2:

ECONOMICS

Equilibrium: *‘a situation in which nobody has any immediate reason to change their actions, so that the status quo can continue, at least temporarily’*

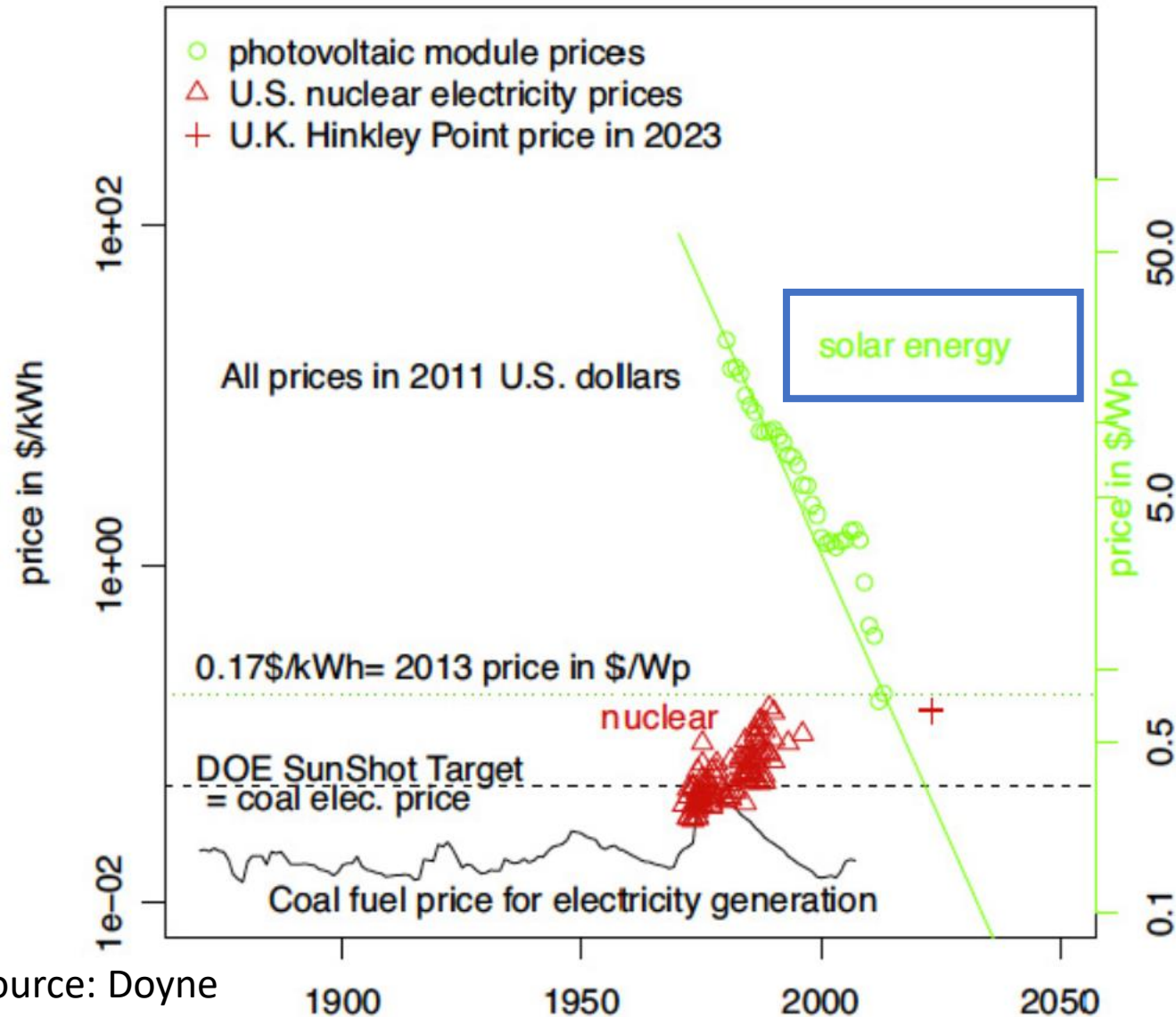
(Oxford dictionary of economics)

Meeting climate goals requires...

*‘rapid and far-reaching systems transitions...
unprecedented in terms of scale’*

Intergovernmental Panel on Climate Change (2018)

Targeted investment vs tax



“Today, renewable energy is cheaper than coal in many places in the world, all major car manufacturers are working on several electric car models, and cities are starting to switch to electric buses.

All of this was achieved with policies focussed on new investments, not with carbon taxes.”

Stephane Hallegatte & Julie Rozenberg

<https://blogs.worldbank.org/climatechange/all-hands-deck-mobilizing-all-available-instruments-reduce-emissions>

Investment in clean tech

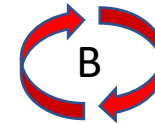
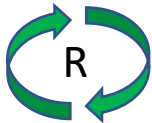


5%

Price on carbon

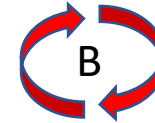
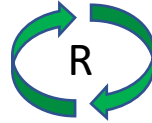
95% of the market

Learning by doing



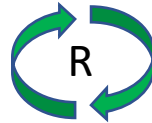
More efficient, more demand
(Jevons' paradox)

Economies of scale

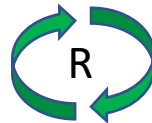


Political opposition

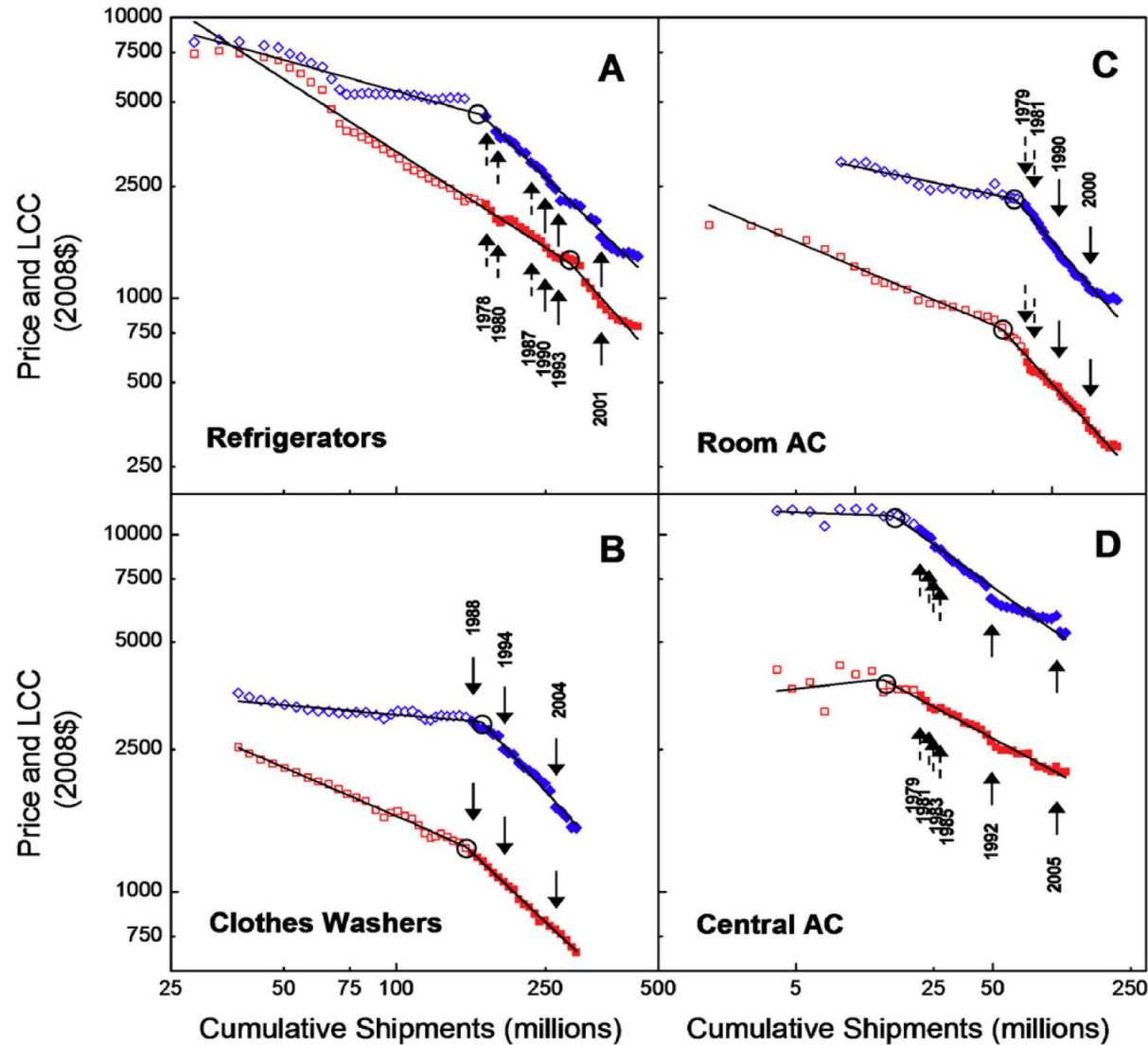
Complementary
technologies



Investment,
innovation, and
market growth



Market fixing vs market shaping

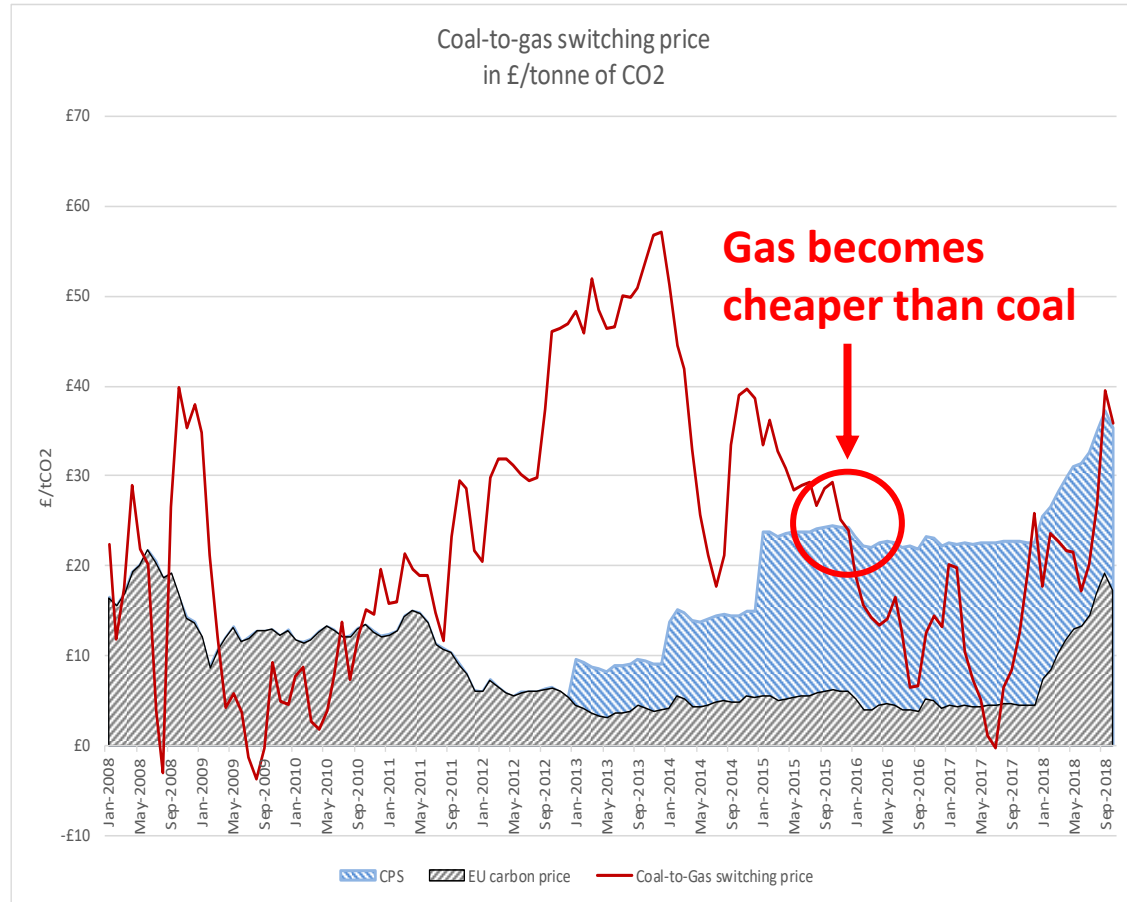


“In contrast to the classical picture of the impact of efficiency standards, the introduction and updating of appliance standards is not associated with a long-term increase in purchase price; rather, quality-adjusted prices undergo a continued or accelerated long-term decline.”

A retrospective investigation of energy efficiency standards: policies may have accelerated long term declines in appliance costs
R D Van Buskirk, C L S Kantner, B F Gerke and S Chu

Tipping points vs social cost of carbon

UK: world's fastest power sector decarbonization

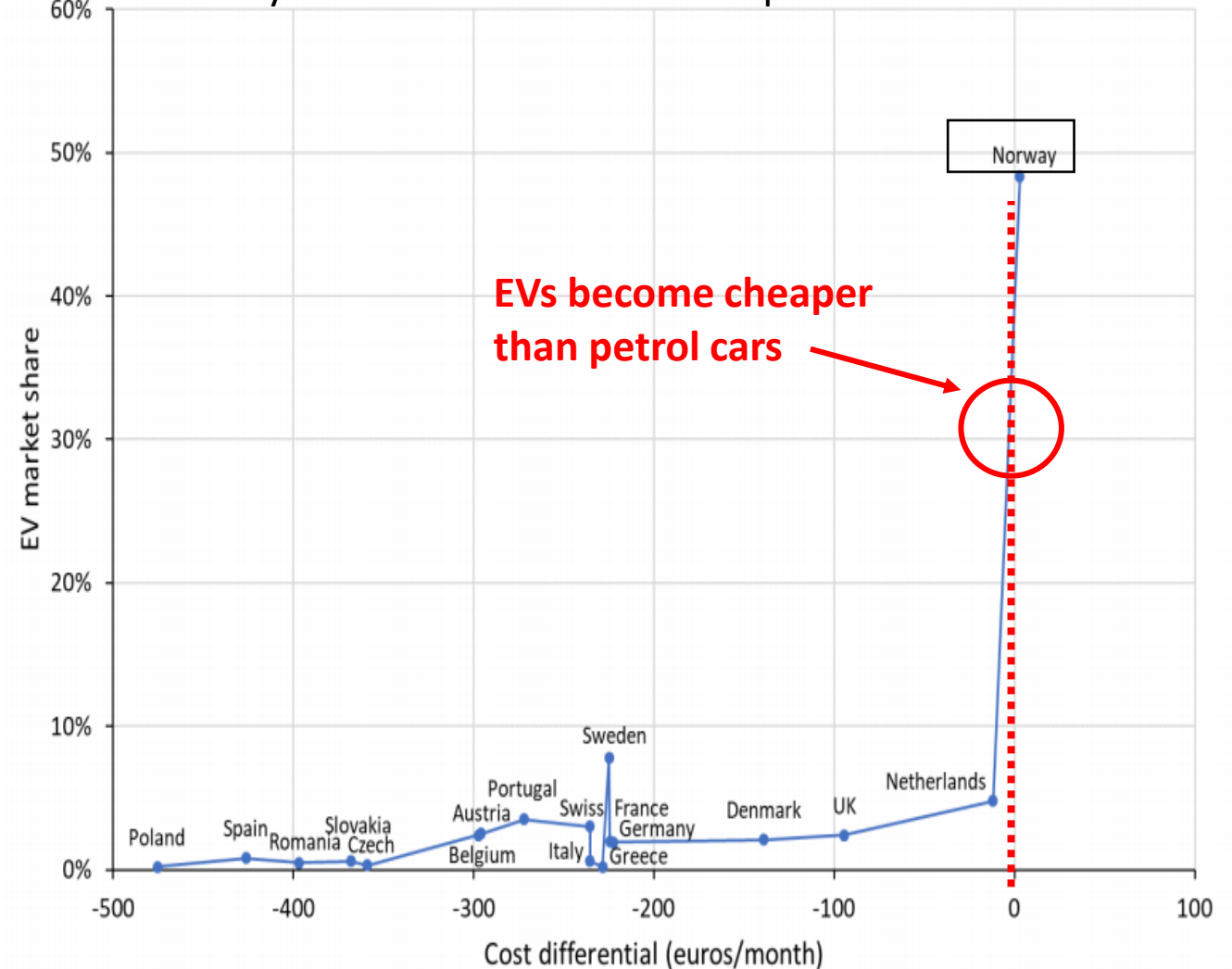


Grey shading: EU emissions trading carbon price

Blue shading: UK carbon price floor

Red line: coal-to-gas switching price

Norway: world's fastest road transport transition



Sharpe & Lenton (2021) *Upward-scaling tipping cascades to meet climate goals: plausible grounds for hope*
<https://www.tandfonline.com/doi/abs/10.1080/14693062.2020.1870097?journalCode=tcpo20>

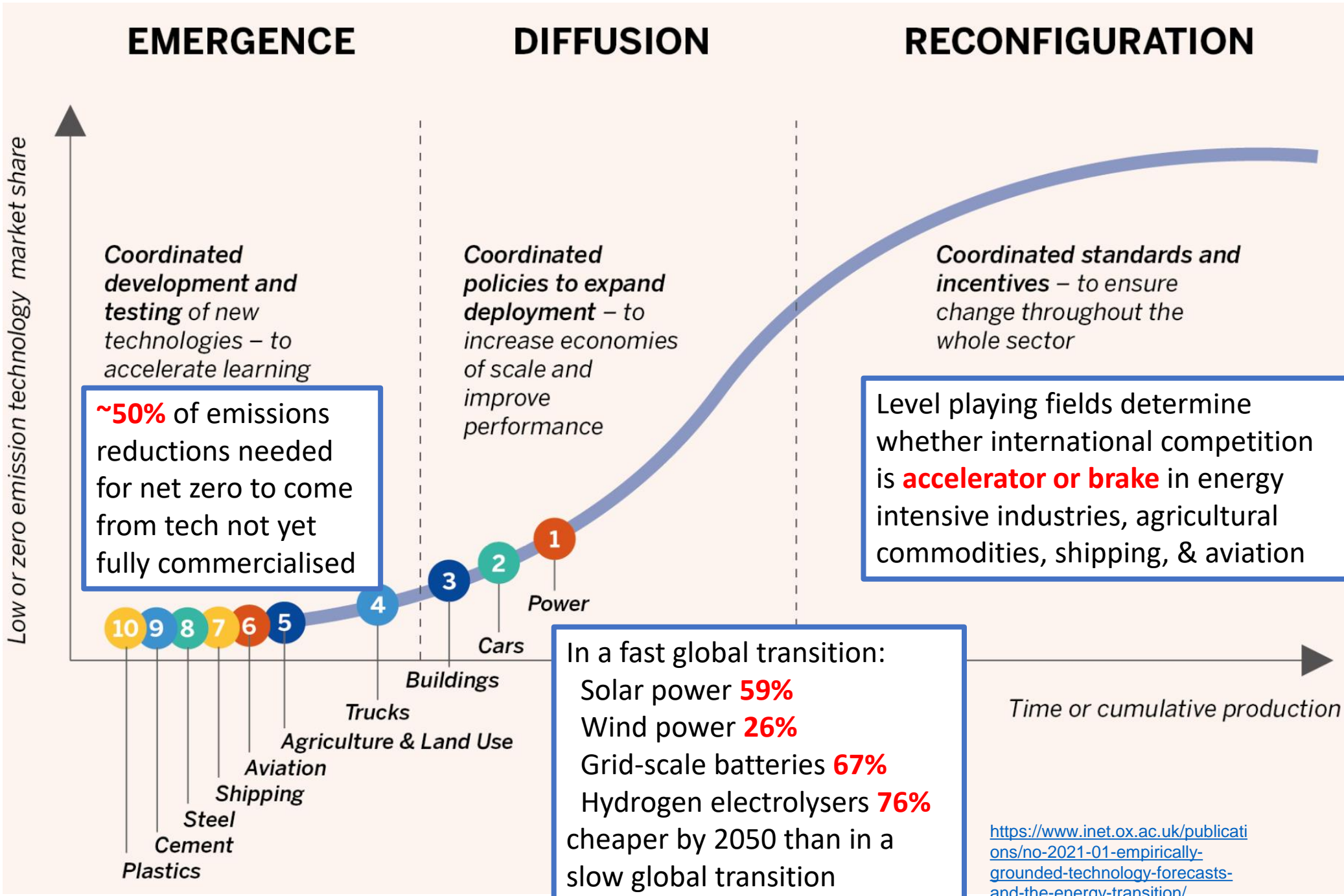
Policies critical to the most outstanding successes so far in low carbon transitions in China, India, Brazil, the UK and EU were generally implemented 'despite, not because of, the predominant economic analysis and advice.'

The New Economics of Innovation and Transition
Grubb et al, 2021
eeist.co.uk

PART 3:

DIPLOMACY

POSITIVE SUM VS NEGATIVE SUM



<https://www.energy-transitions.org/publications/accelerating-the-low-carbon-transition/>

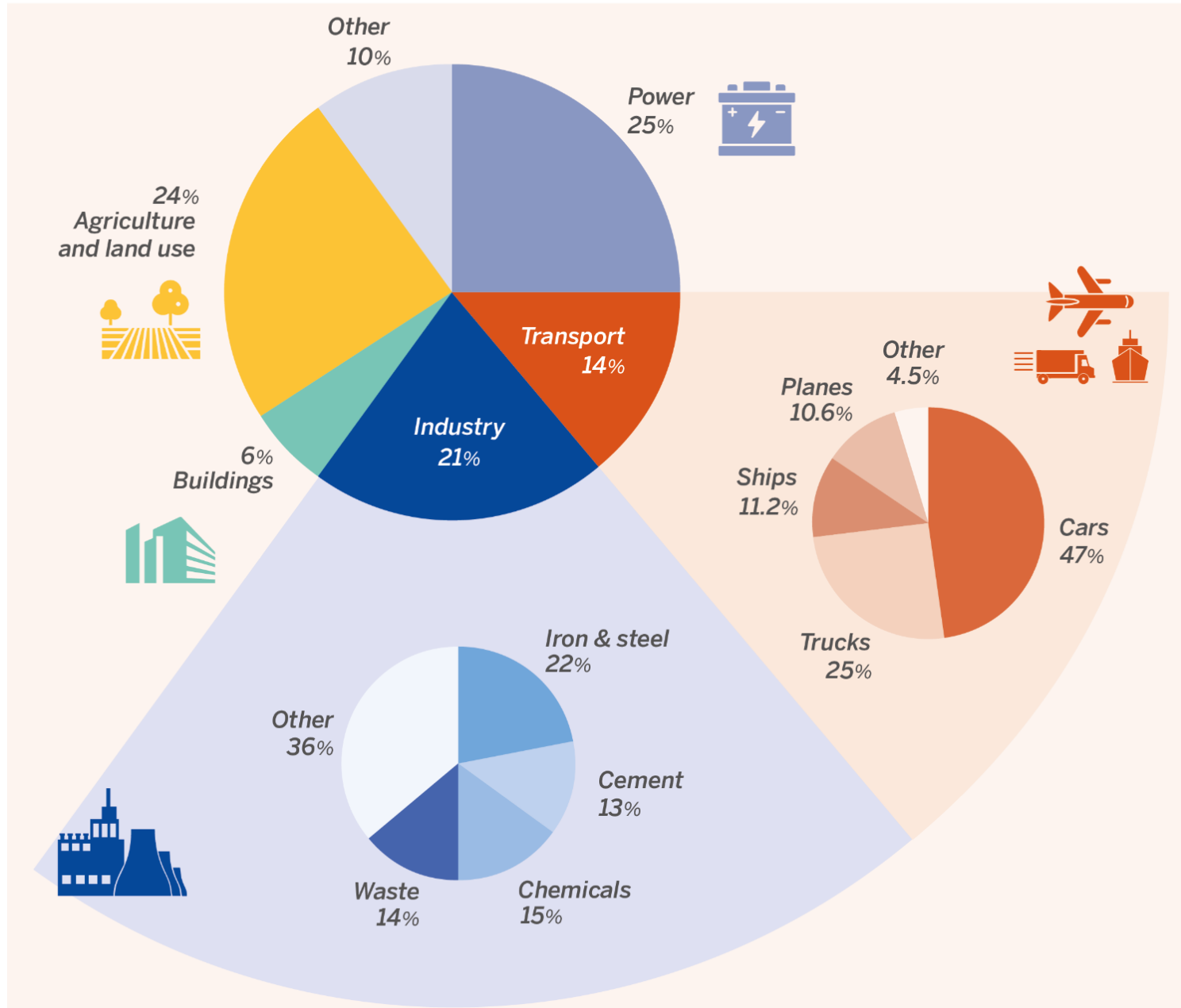
<https://www.inet.ox.ac.uk/publications/no-2021-01-empirically-grounded-technology-forecasts-and-the-energy-transition/>

ECONOMY-WIDE VS SECTOR- SPECIFIC

Because each emitting sector is distinct in its:

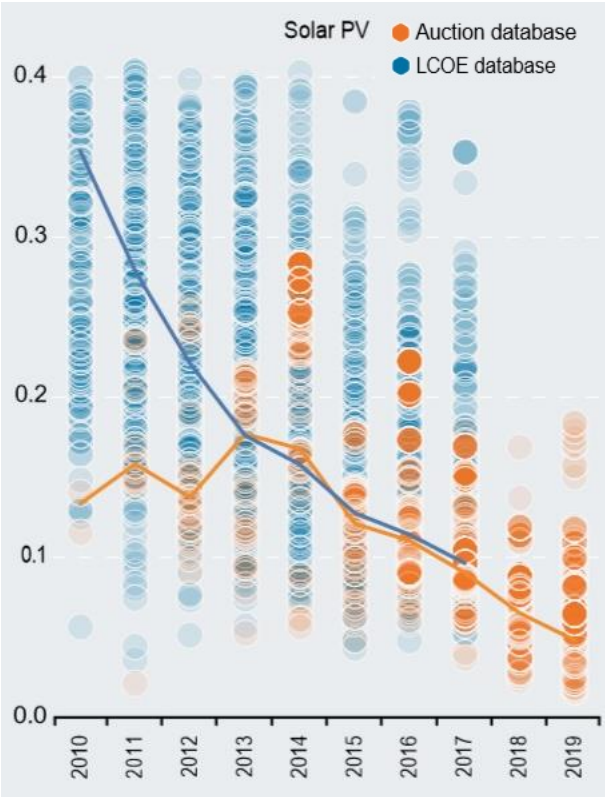
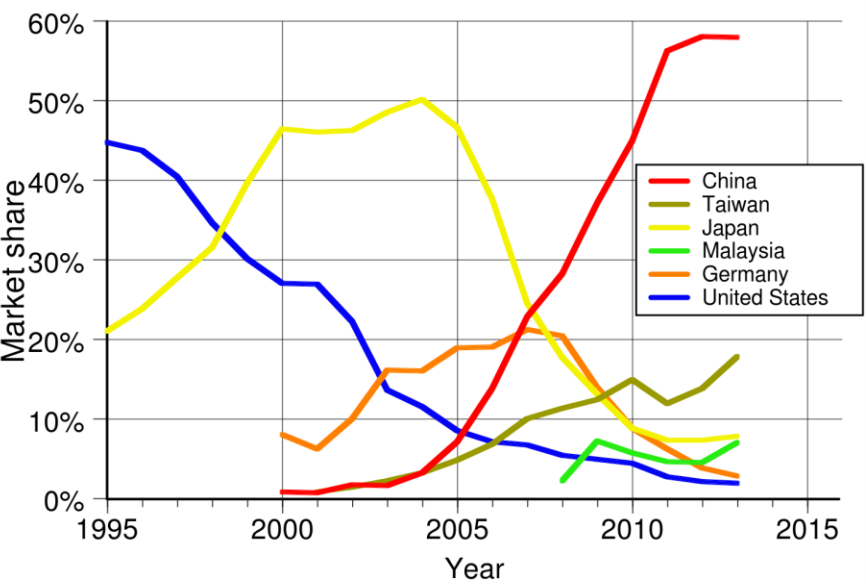
- influential countries
- political economy
- high and low emission technologies
- financing structures
- industrial composition
- nature and extent of international connections

GLOBAL EMISSIONS BY SECTOR



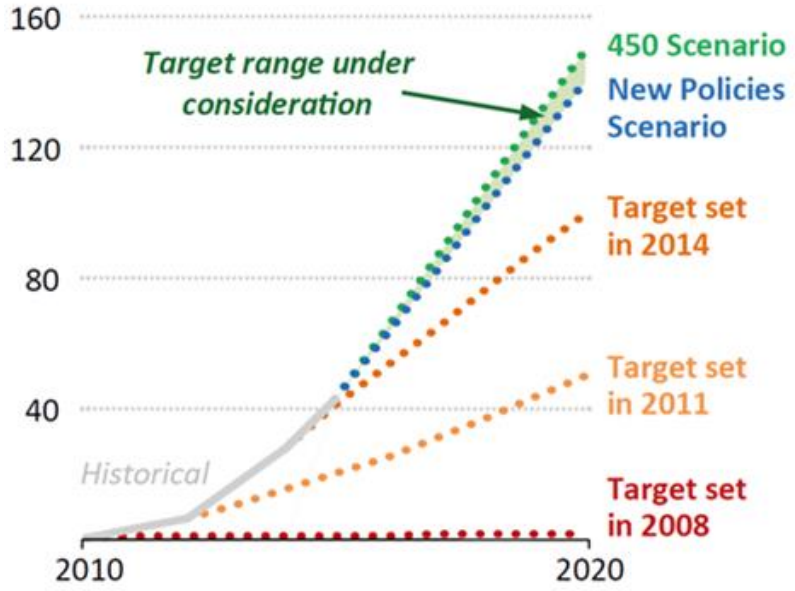
TARGETS VS ACTIONS

Market Share of Photovoltaic Cells



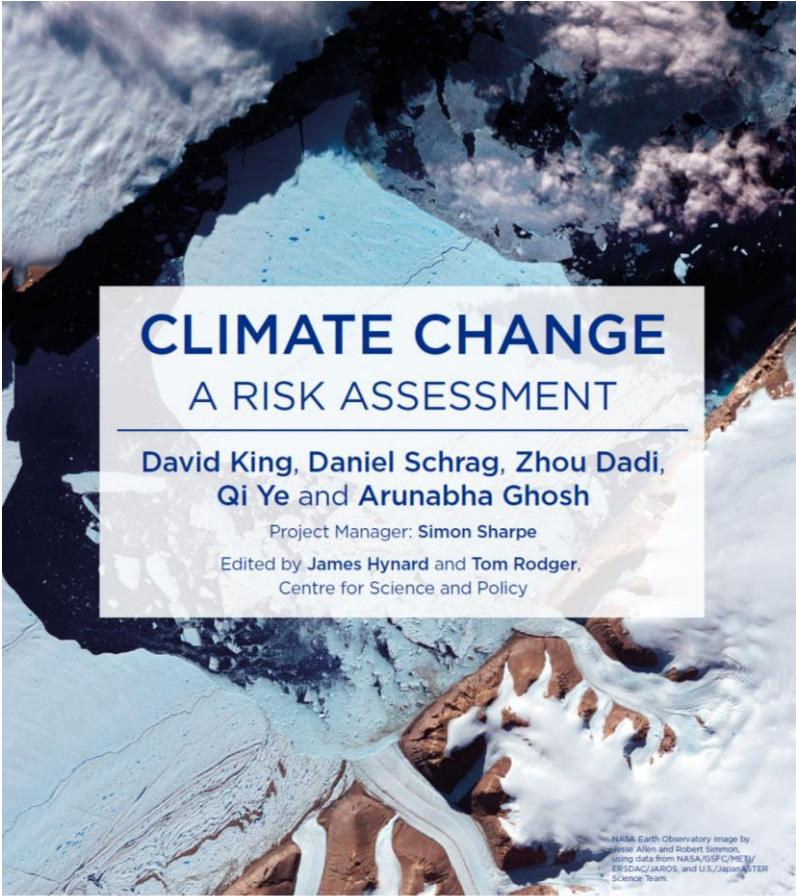
Source: IRENA Renewable Cost Database and Auctions Database.
Note: Each circle represents an individual project or auction result, while the solid line is the capacity-weighted average from each database.

China solar PV deployment targets



Source: IEA

<https://www.ucl.ac.uk/bartlett/public-purpose/simon-sharpe>



Hosts of the project workshops



CENTRE FOR THE STUDY OF EXISTENTIAL RISK

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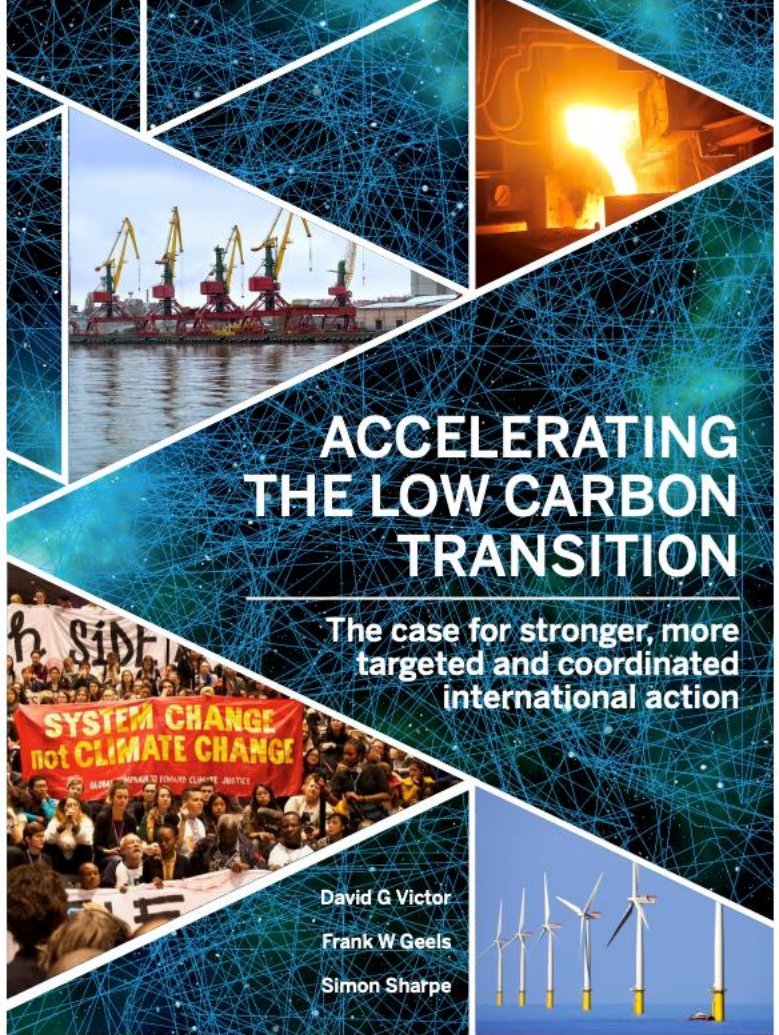
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