Net-zero Emissions: the most actionable climate target

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Paris Agreement: 3 mitigation targets

- **Holding** the increase in the global average temperature **to well below 2 °C** above pre-industrial levels and to **pursue efforts to limit** the temperature increase **to 1.5 °C** above pre-industrial levels [*Article 2(1)*]

- In order to achieve the long-term temperature goal set out in Article 2, Parties aim to **reach global peaking** of greenhouse gas emissions **as soon as possible**, […] and to undertake rapid reductions thereafter in accordance with best available science, […] so as to **achieve** a **balance between** anthropogenic emissions by **sources and** removals by **sinks** of greenhouse gases in the **second half of this century** [*Article 4(1)*]

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3 targets: need for prioritization

- **Official answer ('zero emissions by 2099' as operationalization of 2/1.5 °C) unconvincing**

  - ➤ Need for clearly defined emissions pathways, with ranges for global peak years/levels, shorter time frame for reaching 'zero' and specified amount of net negative emissions
  - ➤ Operationalization of temperature targets requires exact 'carbon budgets', something UNFCCC is unwilling to adopt

- **Main criteria for priority target**

  - ➤ Capability to effectively guide policy action
  - ➤ Compatibility with prevalent political rationales/practices (not well represented in current climate policy discourse)

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Perspective: problem vs. actor-centered

■ **Problem-centered approach still dominant**

  ➢ Defining threshold(s) for ‚dangerous anthropogenic interference with the climate system' (2 or 1.5 °C)

  ➢ Policy action to be consistently derived from DAI (budgets)

■ **Actor-centered approach still marginal**

  ➢ Real-world policymaking not primarily concerned about solving problems but dealing with problems

  ➢ Policymaking maintains cultural norm of ‚consistency' but is actually defined by fundamental inconsistency between talk, decisions and actions (e.g. NDCs vs. temperature targets)

  ➢ Climate policymakers are not the most powerful actors within respective political systems, not even in EU
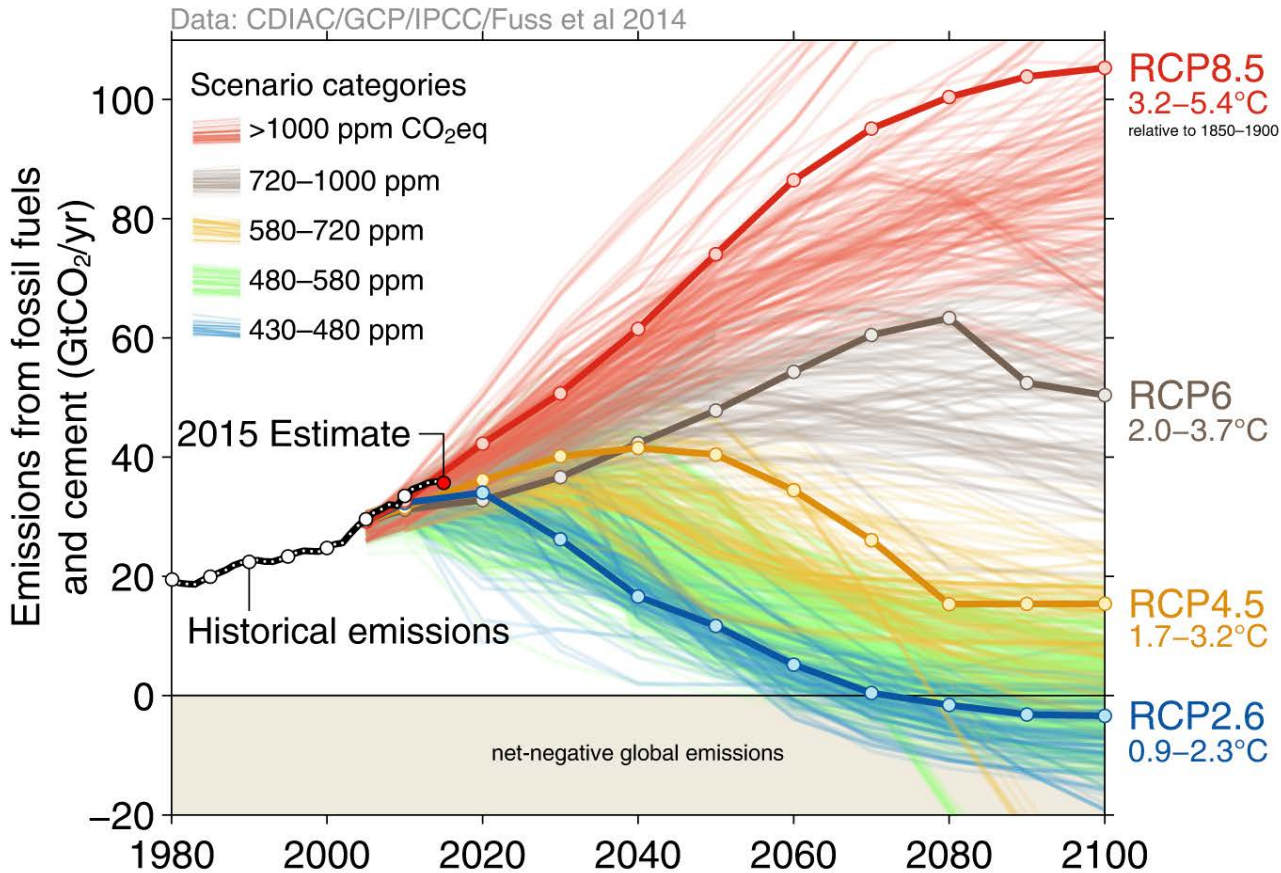
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Climate targets in real-world policymaking

■ Talk, decisions and actions as independent products, to maximize external stakeholder support

■ In climate policy most governments choose a more progressive stance while talking and deciding, but a more modest one when acting

➤ Leads to ‚hypocrisy' by talking/deciding about far-away future, where need for immediate action is relatively limited => climate policy **more about intentions than results**

■ <u>Modest approach:</u> targets *can* guide policymakers' *actions* if they are precise, evaluable, attainable & motivating (and able to minimize inconsistency)
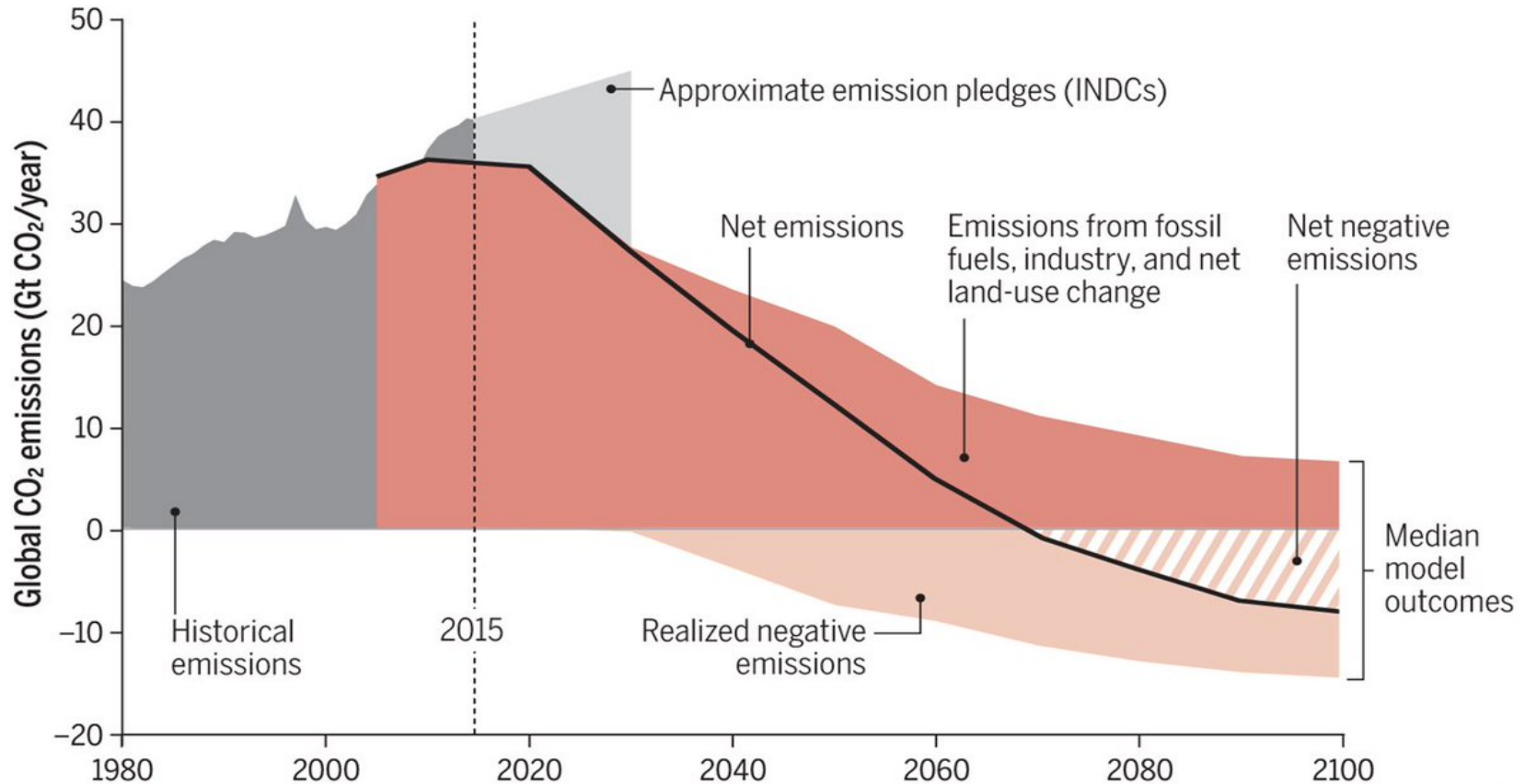
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The case against temperature targets

- 2 °C has worked well as a focal point for *policy formulation*, but not for appropriate *action*

- Not particularly *actionable*, inviting inconsistency

  - Adressing Earth system, not telling individual governments precisely what they have to deliver (e.g. NDCs)
  - Evalution of target attainement only globally, no government can be held responsible for missed target (hypocrisy)

- Creating 'either/or' situation

  - Fear that likely failure of ambitious temp targets would reduce motivation for stringent mitigation action
    => stretching carbon budgets by introducing *negative emissions* & *temperature overshoot* (masking policy inaction)
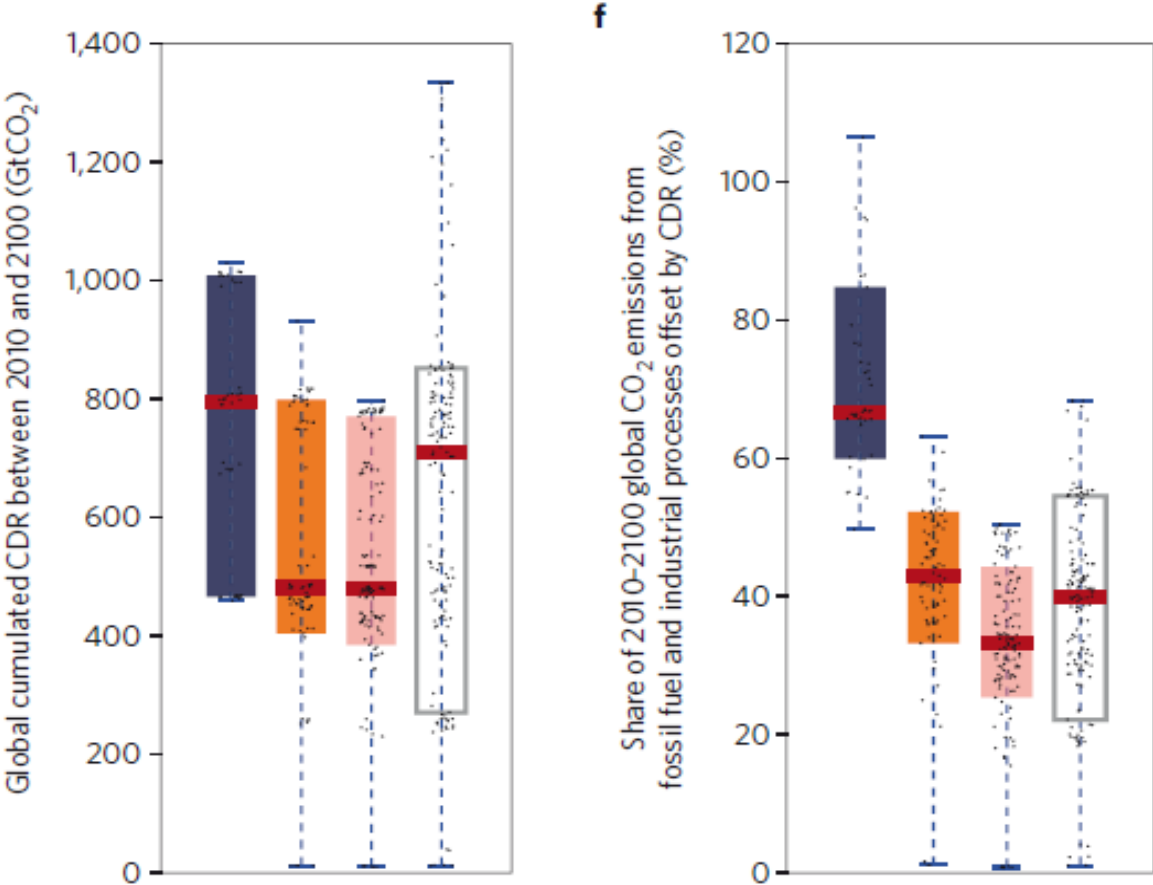
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IPCC AR5 scenarios

Data: CDIAC/GCP/IPCC/Fuss et al 2014

Scenario categories
- >1000 ppm CO₂eq
- 720–1000 ppm
- 580–720 ppm
- 480–580 ppm
- 430–480 ppm

2015 Estimate

Historical emissions

net-negative global emissions

Emissions from fossil fuels and cement (GtCO₂/yr)

RCP8.5
3.2–5.4°C
relative to 1850–1900

RCP6
2.0–3.7°C

RCP4.5
1.7–3.2°C

RCP2.6
0.9–2.3°C

Global Carbon Project

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Net vs. gross CO$_2$ removal

Anderson/Peters (2016), The trouble with negative emissions,
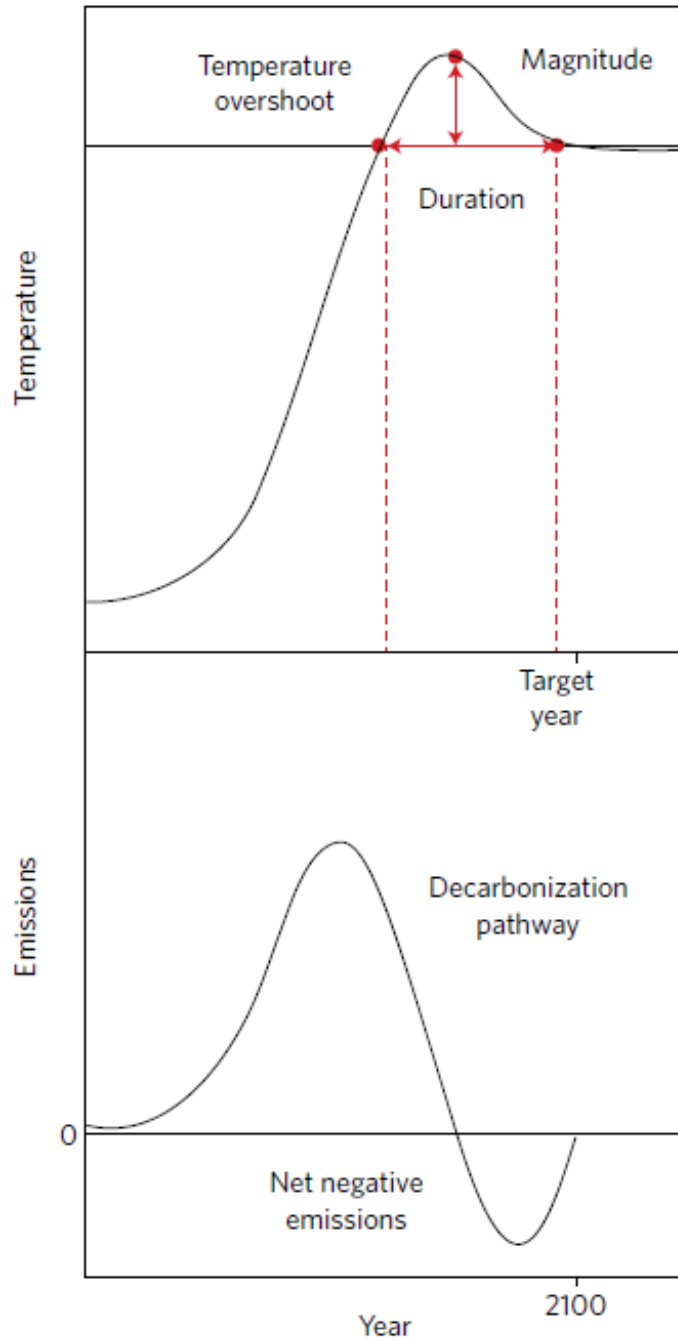*Science*

Carbon removal for 1.5/2 °C

Rogelj, J. et al (2015): Energy system transformations,
Nature Climate Change

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Deliberate temperature overshoot

Geden, O./Löschel, A. (2017): Define limits for temperature overshoot targets, *Nature Geoscience*

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Targeting human activity

- *Net Zero* as a relatively new policy approach (in PA also to avoid *decarbonization* & *climate neutrality*)

- More *actionable*, hedging inconsistency

  - Adressing every single actor, telling precisely what they all have to deliver eventually

  - Transparent system for evaluating national governments, cities, economic sectors & companies

  - Possibly creating a new cultural norm, encouraging competition to get to the finish line first

- Creating *sooner/later* or *faster/slower* situation

  - Providing a clear direction while not dictating a strict/detailed timetable, avoiding hubris

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Differentiated tasks

- *Net Zero* can support choosing entry points for profound mitigation efforts now (but: target gaming)

- Temperature thresholds should be treated as long-term *environmental quality objectives*

  - Indicating desirable goals, serving as long-term bechmarks
  - Accompanied by a range of *planetary vital signs*, to avoid merging a multitude of factors into one single indicator
  - Enabling scientists to avoid pragmatic policy concessions

- Sequential political strategies

  - *Decarbonization first, enhanced CO_2 removal later* as integral part of a climate recovery (2/1.5 °C) strategy

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Net Zero: more ambitious & more pragmatic

- *Net Zero* as conceptual challenge for OECD countries

  - Today's long-term reduction targets (e.g., 80-95% by 2050 in the EU) allow many companies & governments to think they are only partially affected by future climate policies

  - Mainstream environmentalists feel comfortable focusing their proposals on expanding renewables and increasing efficiency, avoiding unpopular & costly measures (e.g., CCS for industrial processes, nuclear power, synthetic fuels, limited CO_2 removal)

Reduction target of 100% would push all sides out of their comfort zones and greatly increase the level of seriousness in climate policy

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Thank you very much for your attention!

An actionable climate target

Oliver Geden

The Paris Agreement introduced three mitigation targets. In the future, th
temperature targets such as 2 or 1.5 °C, but on the target with the greates
policy: net zero emissions.

Prior to the Paris climate summit, the United Nations had one single target for mitigating climate change, based on a decision adopted at the 2010 UN Climate Change Conference in Cancun: to limit the

report is unlikely to inspire more mitigation action. Climate researchers might find the situation unsatisfactory, but the post-Paris constellation can be seen as an opportunity to rethink climate targets and to better assess

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Define limits for temperature overshoot targets

Temperature overshoot scenarios that make the 1.5 °C climate target feasible could turn into sources of political flexibility. Climate scientists must provide clear constraints on overshoot magnitude, duration and timing, to ensure accountability.

Oliver Geden and Andreas Löschel

To the surprise of many, achieving consensus between industrialized nations, emerging economies and developing countries did not result in

0.3 °C, peaking at 1.8 °C)[6]. But there was — and still is — insufficient knowledge about the geophysical climate responses to such pathways. For example, it is unclear

technologies at the assumed scale of 670–810 gigatonnes by 2100[7]. The assumptions in current integrated assessment models regarding carbon dioxide

The Paris Agreement and t inherent inconsistency of climate policymaking

Oliver Geden*

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Since the adoption of the Paris Agreement, the actual meaning of many crucial aspects of that agreement still remains fairly unclear. This has lead to extensive framing efforts, for example on the 5-year review mechanism. What has been largely overlooked, however, are the decisions on quantified climate stabilization

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