

# Feasibility concerns

 Check for updates

**The feasibility of certain climate actions needs to be carefully examined to address concerns over their practicality. Researchers across different climate change research fields are increasingly working on this topic.**

Long-term mitigation pathways are the cornerstone for evaluating the climate impact of decarbonization efforts and assessing whether the current actions are consistent with temperature targets. Over the past decades, with continuing efforts, the climate change community now has a better understanding of what is required if the potential catastrophic outcomes of climate change are to be avoided. There are rich discussions about, for example, the necessary share of renewable sources in the energy mix, the scale of deployment of carbon dioxide removal and the carbon price in the emissions trading market, as well as the related uncertainties.

Although there is consensus that we need more ambitious pledges and ratcheted-up action plans, another focus is emerging: feasibility. In other words, beyond what we should do, the question of whether we can actually do it is beginning to receive increasingly more attention. It is essential to understand the implementation potential for proposed mitigation and adaptation options. Multimodel assessments have shown, for most countries, that there are several unavoidable feasibility concerns, meaning that stated national short- or long-term ambitions could, in fact, be unachievable<sup>1</sup>.

These concerns relate to various aspects, including, for example, economic costs, rates and scales of low-carbon technologies and behavioural change. Among these concerns,



institute or governmental factors are often overlooked because it can be challenging to incorporate these factors into emissions scenarios. One recent study<sup>2</sup> shows that when accounting for institutional feasibility constraints, even the most ambitious scenarios have a high likelihood of overshooting the 1.5 °C warming limit. Without determination to improve institutional capacity to enact fast decarbonization, the risk of missing the Paris Agreement target will be even higher. These findings demonstrate the relationship between government effectiveness and feasible mitigation plans.

The rapid development and large-scale deployment of new technologies are also critical for the green transition. For example, carbon capture and storage (CCS), especially novel methods such as direct air carbon capture and storage (DACCs) and bioenergy with carbon capture and storage (BECCS), is seen as an important part of mitigation pathways, although their feasibility is under active debate. Writing in this issue of *Nature Climate Change*, using historical growth of CCS and other policy-driven technologies, Kazlou et al. identify key constraints on accelerated CCS deployment, which would largely

reduce the feasible space of mitigation pathways. At the same time, rapid phasing out of carbon-intensive energy sources, such as coal-fired power plants, also faces multiple challenges that could undermine the feasibility of related emissions pathways. For example, previous work found that to limit warming to 1.5 °C, about 50% more mitigation from coal power in the global north is needed if considering the socio-political feasibility constraints<sup>3</sup>.

At the individual level, many behavioural changes could also lead to substantial emissions reductions, and demand-side solutions are seen as an effective approach alongside supply-side measures. However, whether certain behavioural shifts are feasible is also in question, with economic and psychological hurdles to be overcome<sup>4</sup>. Beyond mitigation, the feasibility of different adaptation options also needs to be carefully examined<sup>5</sup>. It is important to understand the synergies and trade-offs between different options, which could then help to overcome barriers under certain local contexts and enable the successful implementation of commitments.

Overall, researchers across different climate change research areas are paying attention to feasibility. This trend reflects the emerging call for more relevant real-world studies, and the need for practical and implementable climate actions. Innovative and diverse approaches are needed to carefully examine the proposed solutions, and to make sure that they can be applied on the ground.

Published online: 7 October 2024

## References

1. van de Ven, D.-J. et al. *Nat. Clim. Change* **13**, 570–578 (2023).
2. Bertram, C. et al. *Nat. Clim. Change* **14**, 954–960 (2024).
3. Muttitt, G. et al. *Nat. Clim. Change* **13**, 140–147 (2023).
4. Nielsen, K. S. et al. *One Earth* **3**, 325–336 (2020).
5. Singh, C. et al. *Climatic Change* **162**, 255–277 (2020).