Climate policy:
A risk-seeking future

The 2014 IPCC Assessment expresses doubt that global surface temperature increase will remain within the 2°C target without deploying risky carbon-capturing or solar radiation-deflecting technologies. New behavioral research suggests that, if the IPCC is right, citizens and policymakers will support such risk-taking.

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Futuristic geoengineering techniques for managing and reversing climate change, such as those that reflect sunlight back into space, capture greenhouse gases from the air and store them underground, or manipulate the weather are notoriously controversial for the high uncertainty surrounding their effectiveness and the real possibility of unintended irreversible environmental damage. Yet, many years into global climate negotiations, the IPCC has expressed skepticism toward our ability to remain below 2°C warming of global surface temperatures without deploying riskier technologies[1]. Will our natural human aversion to high-risk gambles and uncertainty betray us if the IPCC proves right? Writing in *Nature Climate Change*, Talbot Andrews[2] and colleagues provide evidence that, despite our usual distaste for chance, we'll roll the dice under such circumstances.

Discussions of climate change often revolve around how countries across the globe can manage collective risks. Risks associated with flooding, heat stress, infectious disease outbreaks, species extinction, coral reef collapse, sea level rise, mass migration, food security, and human conflict confront a significant portion (if not all) of humankind. The risk of 'runaway climate change'—surpassing a tipping point beyond which a new and potentially uninhabitable climate system becomes inevitable—constitutes the largest of them all. How we choose to communicate and tackle these risks—as individuals, cultures, and nation-states—will radically determine the future of the planet.

Economists and psychologists have investigated behavior and cooperation when facing such a tipping point using games modeling the climate change dilemma played among individuals in experimental settings. Evidence from these games shows that successful cooperation positively correlates with the communicated risk of bad outcomes (such as runaway climate change)[3,4] , threshold certainty (e.g., a set restriction on future emissions to avoid damages)[5], and homogeneity of parties coming to the table[6,7], with mixed evidence on the effectiveness of non-binding pledges (such as the 174 Nationally Determined Contributions submitted to date under the Paris Agreement)[6,8]. What these studies have not yet revealed is whether and when contributing to solutions that themselves carry inherent risk—such as investing in technologies that interfere with the planet's natural systems—become attractive. That is, as the window closes on our ability to meet climate goals using 'safe' mitigation policies, at what point do our actions tilt from altruistic and preventive to obligatory and desperate, or might we plead ignorant to the necessity of risk-taking altogether?

In the four lab-based and online experimental studies by Andrews and coauthors, participants were tasked with contributing enough as a group to avert climate disaster, which would lead to a loss of 90% of end-of-game earnings. They found that as risky 'double or nothing' contributions become necessary to meet imposed targets, more group members were likely to deploy this high-risk-high-reward strategy over a certain though likely ineffectual contribution or defecting altogether. This finding may be reassuring for some: if policymakers

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simply cannot avoid runaway climate change without deflecting solar radiation or capturing and scrubbing carbon from the air, we may see a surge in investment toward such risky technologies. For many others who believe such technologies are too precarious to touch, such reversal in willingness to engage in risk-taking may be quite unsettling, and the credible threat of their use may perhaps strengthen the urgency of drastic mitigation measures.

In the last few years, while Europe began forming research programs around geoengineering and China poured significant funds into assembling one of the largest federally funded research programs in this space, US climate engineering researchers struggled to secure federal funding for similar programs. However, under the current US administration, which notoriously reneged on its commitments under the 2015 Paris Agreement, climate engineering may suddenly emerge as the country's preferred climate change strategy. Whether this apparent one-eighty stems from acknowledgment of the increasingly dangerous emissions trajectory and tighter carbon budget the planet is facing—as in Andrews et al.'s study—or instead represents an inexpensive insurance policy against an environmental agenda that abdicates the US's mitigation commitments, risky techno-fix policies are now set to emerge center stage amongst the three most powerful players in the global climate arena.

So what should we expect? Failing the rapid decarbonization that many scientists and environmental groups continue to advocate, policymakers now and in the coming decades will expand their toolkits to include interventions into the planet's natural systems that evoke science fiction. The physical risks may then be overtaken by political and ethical risks (which country will deploy the technologies, on what scale, and under whose terms?). The study by Andrews and colleagues[2] suggests that depending on the evolution of climate risk and whether (and how) it is communicated to citizens, exploration of diamond-particle-spewing drones and carbon hoovers could become widely accepted, even supported. Given historically slow UNFCCC progress and unambitious mitigation targets, we may have no choice.

References

[1] *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (IPCC, 2014).
[2] Andrews, T. M., Delton, A. W., & Kline, R. *Nature Climate Change* **8**, XX-XX (2018).
[3] Milinski, M., Sommerfeld, R. D., Krambeck, H.-J., Reed, F.A. & Marotzke, J. *Proc. Natl. Acad. Sci.* **105**, 2291-2294 (2008).
[4] Farjam, M., Nikolaychuk, & O., Bravo, G. *Clim. Change* **149**, 147-158 (2018).
[5] Barrett, S. & Dannenberg, A. *Proc. Natl. Acad. Sci.* **109**, 17372-17376 (2012).
[6] Tavoni, A., Dannenberg, a., Kallis, G. & Löschel, al. *Proc. Natl. Acad. Sci.* **108**, 11825-11829 (2011).
[7] Burton-Chellew, M. N., May, R. M. & West, S. A. *Clim. Change* **120**, 815-830 (2013).
[8] Barrett, S. & Dannenberg, A. *Clim. Change* **138**, 339-351 (2016).