

Solar Radiation Modification: Governance gaps and challenges

Summary

March 2022

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Publishing information

This report was commissioned and funded by the Carnegie Climate Governance Initiative (C2G) which is an initiative of the Carnegie Council for Ethics in International Affairs (CCEIA). Any views expressed in this report are solely those of its authors, and do not reflect any official positions of the authors' organisations, nor those of C2G, CCEIA, reviewers, or other contributors.



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Suggested citation

Reynolds, J., Ghosh, A., Harihar, N., Jain, P. (2022). *Solar Radiation Modification: Governance gaps and challenges - Summary*. Carnegie Climate Governance Initiative (C2G), March, New York, NY: www.c2g2.net

Acknowledgements

The authors thank the contributions of time and insight from the C2G team and external reviewers Kerry Brent, Senior Lecturer, Adelaide Law School, University of Adelaide and Deputy Director, Australian Forum for Climate Intervention Governance; and Ying Chen, Senior Research Fellow and Deputy Director of Research Centre for Sustainable Development, Chinese Academy of Social Sciences (CASS).

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Key insights

- 1. Solar radiation modification is being explored as a potential approach to reduce climate change impacts in addition to emissions reductions, removals, and adaptation.** Progress toward reducing the emissions of greenhouse gases that cause climate change remains insufficient, and emissions are on track to cause global warming to significantly overshoot the Paris Agreement's temperature goals. In this context, researchers are exploring additional approaches to reduce climate change impacts, beyond aggressive emissions reductions, carbon removals and adaptation. One such additional approach is solar radiation modification (SRM), a group of proposed techniques that would typically entail reflecting a small portion of incoming sunlight to cool the planet. SRM appears to have the potential to reduce—but not eliminate—some climate change impacts but could pose other risks, which would depend on the specifics of how it were implemented. Nevertheless, much remains uncertain.
- 2. SRM may be able to reduce some climate risks but would also introduce new and novel risks of its own, so effective governance, especially at the international level, will be essential to minimise overall risk.** The research and potential use of SRM presents high-stakes risk-risk trade-offs with significant uncertainties. As such, governance—the full range of means for deciding, managing, implementing, and monitoring policies and measures—of SRM's research, evaluation, and possible use, is important. The governance of SRM has many dimensions, that arise at various stages. Key governance decisions include whether or not to undertake research of SRM's expected impacts, techniques, and more, and/or whether or not to consider or undertake deployment. Specific governance dimensions relating to indoor research include ensuring scientific quality and reliability and preventing SRM research and evaluation from undermining efforts to reduce greenhouse gas emissions. Among governance dimensions that manifest in relation to outdoor research are managing higher demands for transparency and legitimacy and regulating physical and environmental risks. Specific governance dimensions relating to consideration of SRM deployment include developing norms, objectives and institutions that could guide decision-making and prevent its use contrary to any international consensus. Finally, in the event of SRM deployment, further governance challenges would likely emerge, such as responding to claims of attribution, unfair impacts and sharing costs and burdens equitably.
- 3. Some governance relevant to SRM exists but is limited.** The current governance landscape for SRM is limited but not vacant. Existing non-state, national, and international governance instruments, institutions, and processes partially address the governance dimensions to varying degrees. Non-state actors can provide some governance, particularly of small-scale SRM research and in the absence of action by countries and intergovernmental organisations. Indeed, several collections of scholars and others have put forth nonbinding principles for SRM research and possible use. These notably have several commonalities, among which are the research and governance of SRM for the wider public good, a role for the public in decision-making, transparency, cooperation, independent monitoring and assessment, governance before deployment, and the primacy of emissions reduction. National governance is diverse, but generally provides basic regulation of environmental risks through impact assessment, pollution, endangered species protection, and more. A handful of countries have issued official reports regarding SRM and/or publicly funded its research. Currently, there are no international legal instruments with binding obligations that are specific to SRM. Some international governance rules, processes, and norms are directly applicable, while other multilateral environmental agreements could be adapted to govern SRM.
- 4. Many governance gaps exist around SRM, and one of the most salient issues is the current absence of comprehensive international governance frameworks.** This includes key questions on how decisions on any potential deployment would be made, by whom, and

in which forum or intergovernmental process. We identify numerous governance gaps that remain, and present examples of potential means by which decision-makers could address them. Through these, any research, evaluation, and possible use of SRM could be better aligned with widely held principles and objectives, such as the Sustainable Development Goals. As examples: If SRM research is to proceed (and this is itself a governance challenge), then governance could facilitate it and ensure responsibility. If outdoor tests and experiments are to take place and be perceived as legitimate, then the public could be engaged in some way. Some widespread and influential concerns about SRM could be addressed by integrating its governance with that of emissions reductions, removals, and adaptation to reduce climate change impacts. Commercial actors' interests could be balanced with those of the wider public. Finally, policymakers can consider how to resolve potential future international disputes.

5. **Conversations about SRM governance are needed sooner rather than later.** Governance gaps will likely evolve in the context of a rapidly warming world in which the risks faced are both known and unknown at this point. SRM is not yet available as a deployable technique and its research is still at an early stage, so it could be another decade or more before it could be ready to deploy. Similarly, although the high-stakes decisions surrounding whether to implement SRM remain distant, near-term steps could be taken so that future, highly consequential decisions are more likely to be relatively legitimate, effective, and less conflictual. Given that multilateral diplomacy takes time to develop, if governance gaps are to be addressed in time, then conversations between policymakers should begin now, not later.