

Proposed Engagement Process for SCoPEX

Prepared by the Independent SCoPEX Advisory Committee

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Background.

The Stratospheric Controlled Perturbation Experiment (SCoPEX) is a proposed research experiment to release small quantities of calcium carbonate powder, an inert chemical, from a balloon in the stratosphere and see how these particles interact with one another, with the background stratospheric air, and with solar and infrared radiation. The experiment could help assess the impacts or feasibility of the large-scale release of such particles in the atmosphere to reflect sunlight and offset some of the heating caused by the release of heat-trapping (or greenhouse) gases. Because such an experiment raises important ethical issues, Harvard University created the independent SCoPEX Advisory Committee to provide advice on the research and governance of SCoPEX. The Committee is reviewing the legal frameworks that apply to the experiment, scrutinizing the financial support for this work, and overseeing a peer review of the scientific and technical merits of the research. The Advisory Committee has also prepared a process for public engagement. This document is the final draft of that engagement process, and it incorporates responses to several external comments and suggestions provided on the first draft version.

Toward a roadmap for public participation in solar geoengineering experiments.

Solar geoengineering is the intentional effort to modify the global climate system through changing the Earth's reflectivity (albedo). SCoPEX aims to inform the science related to stratospheric aerosol injection (SAI), one type of solar geoengineering where particles are released in the stratosphere. While the intentional modification of local and even regional environments is not new, and we are already in the midst of human influence on global climate from the global energy system and large-scale land-use changes, the intentional modification of global climate to address climate change is unprecedented.

Such intentional efforts are, at present, without any agreed national or international governance. The Advisory Committee and the experimental team agree that any decision to

utilize solar geoengineering should be based on an intentional, deliberative process that is inclusive (especially of the Global South and of those people who are likely to be most impacted by climate change or solar geoengineering), iterative (as decisions will be influenced by local context and changing circumstance), and informed by a continually improving body of evidence. However, it is not evident what the best process is for how to make decisions about experiments and technological developments that may or may not lead to larger scale solar geoengineering. That is the central issue that the Committee is grappling with in thinking about public engagement: What are appropriate and feasible ways to conduct public participation deliberation around an outdoor experiment that may or may not lead to larger scale solar geoengineering research? Outdoor experiments are tangible touchstones for the prospect of solar geoengineering, raising important questions about governance and the future of research.¹ This is clear from the fact that this Committee was assembled specifically to provide governance over SCoPEX.

It is useful to think about research governance over outdoor experiments in two extremes. In one extreme, anyone with the technological capability to do solar geoengineering research would be able to pursue that research without regard to outside governance, as some researchers have done. A danger of this is the blurry line between developing a technology and deploying it: at what scale does solar geoengineering move from an experiment to deployment? Another danger is that the development of capabilities without public oversight increases the potential that those capabilities could be misused or evolve in directions detrimental to many of those people potentially affected. An extremely important consideration is that currently the people with the capability to do the research don't currently represent, and might not take into the account, the interests of the people who are most likely to be impacted by climate change and solar geoengineering.

On the other extreme, we could suppose that all research into solar geoengineering should halt until there is a decision - or at least a process for making a decision - about deploying geoengineering.² A key danger of this approach is that delaying field research in solar geoengineering, potentially for many years, could delay or prevent action if emerging climate conditions make geoengineering deployment desirable or necessary, such that any delay could

¹ Talati, Shuchi, and Peter C. Frumhoff. 2020. *Strengthening Public Input on Solar Geoengineering Research: What's Needed for Decisionmaking on Atmospheric Experiments*. Cambridge, MA: Union of Concerned Scientists.

² The Committee is aware that some organizations view the 2010 decision by the Convention on Biological Diversity as a moratorium on solar geoengineering outdoor experiments. However, this decision states "that no climate-related geo-engineering activities that may affect biodiversity take place, until there is an adequate scientific basis on which to justify such activities and appropriate consideration of the associated risks for the environment and biodiversity and associated social, economic and cultural impacts." As SCoPEX will not affect biological diversity and is meeting the criteria laid out, it is consistent with the 2010 decision.

have significant consequences. In addition, a research delay could also make any deployment decision less informed and potentially more difficult. This approach may also limit discovery and the advance of knowledge, including knowledge that might be useful for other approaches to mitigate or adapt to climate change. Finally, this approach may increase the possibility that a small number of people may operate outside global norms to advance and even deploy solar geoengineering without international agreement.

The approach of the Advisory Committee regarding SCoPEX is to steer between these two extremes. We believe that public engagement in SCoPEX is an opportunity to engage multiple, diverse publics in these and related issues so that we can learn more about how to do public engagement in solar geoengineering research. This will contribute knowledge toward a process that is commensurate with the unprecedented potential impact and opportunity of solar geoengineering.

SCoPEX is a small-scale, early experiment with sufficient funds to implement the research and to support a governance process. It has the opportunity to “pay it forward” by asking SCoPEX engagement participants about what they think ideal research governance should look like for future field experiments and publicly sharing the findings. This will increase knowledge relevant to global governance and help build norms consistent with the development of global governance. We believe that if every small experiment conducted a public engagement process similar to or better than what is described here, then both science and global governance of that science would be advanced.

Scope and Outcome of Public Engagement.

The focus of the public engagement in SCoPEX has dimensions that are well-informed by existing experiences as well as dimensions that are unprecedented. The former consists of a fairly narrow and focused discussion on the particulars of the experiment: whether it is acceptable to local residents for Harvard researchers to launch a balloon and release a small quantity of inert chemicals in the atmosphere over their geographic region. Our process embodies the principles of meaningful public engagement that provide for community input into decision making, and there are existing protocols for this that we can build from. From this engagement process, the Committee hopes to gain a sense of the overall perspectives of the local community. Based on this information, along with other aspects of our review (legal, financial, and scientific), the SCoPEX advisory group will recommend whether or not the experiment can proceed.

The unique and unprecedented part of the engagement is focused on the issues associated with solar geoengineering research governance. As outlined above, and after considerable feedback

on the draft engagement plan, the advisory group has decided to focus this aspect of the public engagement plan on the following question: *What would an ideal form of research governance (oversight, transparency, & public engagement) for solar geoengineering experiments look like?* While the feedback on this question will not inform the decision making for SCoPEX, it will deeply affect future research governance for outdoor experiments. We will make this feedback public and share it with academics, policymakers, and research teams that can build formal governance processes as early as possible into future experiments. Learning what ideal engagement looks like to those that have an understanding of solar geoengineering and SCoPEX will provide invaluable feedback on what legitimacy means to external stakeholders.

To deal with the inherent, large, and systemic ethical issues around solar geoengineering, the world needs a large-scale, multinational governance system for solar geoengineering research. It is beyond the scope of SCoPEX, or this Committee, to set up such a global governance process, though we point out that there are emergent efforts underway.³ Nevertheless, Harvard and SCoPEX have the responsibility to contribute to such a process and have the opportunity and influence to advance these processes. Given Harvard's early work in solar geoengineering, their prestige, and access, we strongly urge them to take a catalytic and cooperative role.

A Process for Engaging the Public.

The engagement process will focus on the particle release portion of the SCoPEX experiment, not the engineering test of the balloon and platform. The Committee will contract an independent and experienced engagement group to recruit citizens in and around the region where SCoPEX research experiment might occur to participate in deliberative dialogue about the experiment itself as well as governance of solar geoengineering research. Our intent with this process is not to engage all local stakeholders in the larger issues of solar geoengineering research or deployment, but to investigate a process for engagement around this research that can be used in multiple places to engage a larger, more globally representative, set of publics. The Committee will additionally contract an external group to conduct and oversee a larger-scale, global engagement process. These processes would include the following elements:

- 1) A briefing book
- 2) Framing the dialogue
- 3) Local deliberative dialogue
- 4) Global engagement and dialogue

³ Examples of such efforts include the Carnegie Climate Governance Initiative, the Solar Radiation Management Governance Initiative, and additional work of environmental non-government organizations.

- 5) Developing recommendations
- 6) Sharing the lessons learned.

1) Briefing Book

Working with the Advisory Committee the independent engagement experts will develop a briefing book designed to help members of the public consider a) local scale impacts of the small scale SCoPEX experiment; b) the larger set of impacts associated with deploying, or not deploying, solar geoengineering; and c) the moral and ethical issues associated with the large scale deployment of solar geoengineering, and with the lack of such deployment.

For the local scale impacts, the briefing book will focus on the specifics of the SCoPEX research and any risks and potentials for harm from that research. As mentioned earlier, this will be situated around the idea that communities deserve the right to review and contribute to the decision of whether open-air experiments should occur in the places they live.

For the larger set of deployment impacts, the briefing book will present a summary of the impacts (both benefits and risks) of both solar geoengineering as well as global warming according to the best available science. This will include consideration of potential risks to local communities and ecosystems of both global warming and solar geoengineering, including information about which regions may experience disproportionate impacts. This will include descriptions of the regional outcomes and impacts that could result from global warming and from large-scale solar geoengineering based on research thus far, and where key uncertainties still remain.

For the moral and ethical issues, the briefing book will also provide information on the multiple dimensions of the ethical issues and uncertainties around solar geoengineering research.

The Committee will review the information in the briefing book and invite external reviewers as well. This includes scholars who have studied these issues as well as passionate and informed thought leaders with diverse perspectives. We will also review this book for accessibility and test our findings with focus groups. The goal is accessible, neutral information that invites consideration of SCoPEX and its governance (and, by extension, future solar geoengineering experiments and governance).

2) Framing the Dialogue

The Committee and external engagement group will design a set of questions to first prompt consideration of the multiple dimensions of SCoPEX, including consideration of any known and potential risks to local communities and ecosystems. A second set of questions will focus on what ideal research governance for outdoor experiments might look like, including what measures should be in place for oversight, transparency, and engagement, when these processes should occur, and who should lead them.

3) Local Deliberative Dialogue

The external engagement team will lead the local deliberative dialogue. This team must include trusted local partners who help find and select stakeholder groups and encourage people to participate. Using information on where the experiment will occur, they will identify and recruit groups of local stakeholders and publics to participate in deliberative dialogues. The stakeholder groups will reflect the diversity of the region in which the experiment takes place (including the launch and landing sites). The Committee will direct the team to strive for inclusivity and representation of communities. Importantly, the team will be required to make extra effort to include people who are from communities that are historically underserved or climate-vulnerable, or currently and historically hold less power. Using the briefing book as the reference source, the team will lead and facilitate deliberative dialogues. In these dialogues, members of the stakeholder groups will offer their perspectives about the SCoPEx experiment. As stated previously, these dialogues will also consult the participants on ideal research governance processes for future outdoor experiments.

The external team will subsequently prepare an analysis and summary of the dialogue, and a synthesis of the main points raised.

4) Global Engagement and Dialogue

The Committee will supplement this local engagement with engaging and gathering input from members of the global public who reside outside of the region of the experiment. As noted earlier, the Committee will engage a separate external team to oversee this process, which will proactively invite input from people from the research, advocacy, social equity, and other communities with interest in the research. The Committee will also offer open comments on their website so that any member of the public can participate in a discussion related to the briefing materials.

5) Developing Recommendations from Deliberation

In addition to the analysis and synthesis provided by the team that leads the local engagement, the Committee will analyze and synthesize the outcomes from the dialogues and the global engagement. This synthesis will include reflections on stakeholder perspectives and the Committee's analysis of the processes and outcomes. Based on this and completion of other elements of the review process, the Committee will make a recommendation to the SCoPEx team and Harvard on whether the experiment should proceed. This recommendation, and the materials on which it was based, will be made public and all work will occur prior to a potential particle release flight.

6) Sharing Lessons Learned

Based on our experience and outputs with this engagement process, the Committee will make revisions to the process and the guides and then share them for others to use. Our hope is that the process we develop and feedback we receive will be adapted to engage various and distributed publics for future experiments and help shape future research governance. We hope this will build awareness of solar geoengineering, engage the broad set of publics that are commensurate with the global nature of solar geoengineering, and engage publics and regions that stand to be disproportionately impacted by solar geoengineering and by climate change.