

## **The Carnegie Climate Geoengineering Governance Initiative (C2G2): Our Approach**

### **What is Climate Geoengineering?**

- Climate geoengineering is intentional, large-scale human interference in the Earth's climate system in order to reduce the negative impacts of climate change.
- There are two general types of technologies: 1) those that address the source of human-caused climate change by drawing out carbon from the atmosphere, often called Carbon Dioxide Removal (CDR) technologies or Negative Emissions Technologies (NETs), as referred to in the many scenarios of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC); and 2) those that address one of the key effects of climate change, warming of the Earth's temperatures, by reflecting solar radiation away from the Earth and thereby cooling the planet. For a brief, but more detailed description see the [Briefing Paper](#).
- CDR techniques are being developed and some are now in use, but not yet at the scale or speed that, together with existing mitigation plans could restrict the rise in global mean temperatures to less than 2 degrees Celsius above the pre-Industrial level.
- Solar Radiation Management (SRM) technologies have not yet been tested *in-situ* nor deployed at planetary level. Research is actively taking place, however, through computer modelling and laboratory experiments. A few, small scale outdoor *in-situ* experiments are in development; plans for one in-situ experiment have been publicly announced, with the intention of undertaking the experiment in the coming year (Harvard's SCoPEX).
- Interest in climate geoengineering is growing as global temperatures continue to climb and the political will needed for an immediate, more ambitious response remains woefully insufficient. Some consider solar radiation management technologies as ways to 'buy time' while more strenuous mitigation measures can be scaled up.
- The Fifth Assessment Report of the IPCC noted that geoengineering techniques have been proposed, but "limited evidence precludes a comprehensive quantitative assessment".

### **Why Are We Focusing Now on the Governance of Climate Geoengineering?**

- At present, there is no comprehensive, multilateral framework[s] to govern the research, testing or possible use of climate geoengineering technologies. Some elements of domestic and intergovernmental governance are in place, which can be the starting point for further work.
- To date, discussions about climate geoengineering have taken place primarily in academic circles. However, with interest in these technologies quickly growing, it is time that governments, international institutions, policymakers, and civil society engage in a

thoughtful, transparent and inclusive discussion on how to govern climate geoengineering technologies.

- The risk of *not* discussing the governance of geoengineering is significantly greater than the risk of doing so.
- CDR techniques could address the cause of climate change by reducing atmospheric concentrations of greenhouse gases, but they come with environmental, social and economic risks. These technologies are currently insufficiently addressed at the policy level, even though they are included in the IPCC scenarios for a below 2 degrees temperature rise pathway, and are indirectly referenced by the Paris Agreement. The discussion of negative emissions technologies now needs to move from the scientific to the policy community, including at the international, national and sub-national level, given that use of these technologies could become part of a country's offer or "determined national contribution" to the implementation of the Paris Agreement.
- Many scientists say that solar radiation management technologies could reduce the increase in global temperatures, but they pose potentially profound risks – both known and unknown – that transcend borders and raise significant ethical, socio-economic, political and governance challenges.
- These technologies have planetary-wide consequences, and hence need to be discussed by national governments and intergovernmental institutions, including the United Nations. Large-scale outdoor testing and deployment of solar radiation management would put all countries at risk should any one country – or non-state actor – decide to test or deploy solar radiation management unilaterally.

## **C2G2 Guiding Principles**

The Carnegie Climate Geoengineering Governance Initiative (C2G2) started its public work in January 2017 based on the following principles:

### *Impartiality*

- We take an **impartial approach: we are not for or against** the research, testing or potential use of climate geoengineering technologies. That is a choice for society to make.
- Hence our focus is on catalysing transparent, inclusive policy discussions at the international, national and sub-national level on the risks posed by these technologies and on how to govern them.

### *Risk Management Approach*

- The world faces an increasingly precarious future due to the growing impacts of climate change, coupled with other environmental, resource scarcity, equity and demographic challenges. Any response to climate change must be seen through a risk management lens.
- Inaction is itself a high-risk option. The world is currently headed toward a more than 3-degree Celsius temperature rise by the end of this century, which would be catastrophic for the survival and well-being of all species, including our own.

- Radical, urgent mitigation efforts at all levels, from the local to the global, coupled with adaptation, are essential to reduce the risks of climate change. This is the safest, no-regrets option available to reduce risks and build healthier, more equitable and prosperous societies.
- Under no circumstances can climate geoengineering technologies be considered alternatives to, or technological substitutes for, the greenhouse gas emissions reductions needed to lower the risk of severe, pervasive and irreversible climate change impacts caused by human activities, including the burning of fossil fuels and carbon-intensive land use.
- While climate geoengineering technologies vary widely, each presents potential benefits as well as risks (both known and unknown) and trade-offs – environmental, developmental, political and ethical – that society must weigh carefully in the context of an overall response.
- This is especially true for solar radiation management, which has numerous serious known and unknown risks, including for future generations. It also raises profound governance challenges, including whether the international community --and society at large-- will deem it acceptable to use as a potential response to climate change, and if so, manage the deployment over many decades and potentially much longer. .
- *Ad hoc* governance mechanisms currently applied to climate geoengineering research need to evolve into formal governance frameworks.
- We recognize the risks posed by these technologies if left ungoverned, and in particular, the profound global risk posed by a potential unilateral deployment of solar radiation management technologies.
- Under no circumstances should deployment of solar radiation management proceed without the necessary governance in place.

#### *Inclusive Approach*

- All sectors of society should be encouraged to participate in thoughtful, transparent and inclusive discussions of whether or not climate geoengineering should be researched, developed and potentially deployed.
- It is vital that young people be a part of this dialogue, as they, along with future generations, will live with the consequences of climate impacts and of climate geoengineering depending on whatever governance is created – or fails to be created – for it.

#### **Objectives of the C2G2 Initiative**

- The purpose of the C2G2 initiative is to catalyze the creation of effective governance for these technologies by increasingly shifting the conversation from the scientific and research community to the global policy-making arena, and by encouraging a broader, society-wide discussion about the potential risks and benefits of climate geoengineering.
- C2G2 will encourage dialogues, convene and provide a neutral platform for government, intergovernmental and non-state actor policymakers to consider the governance of these technologies.

- Ultimately it is society's decision whether climate geoengineering technologies – in particular, solar radiation management - should be developed and used, and if so, under what circumstances.
- However, we recognize the risks posed by these technologies if left ungoverned, and in particular, the profound global risk posed by a potential unilateral deployment of solar radiation management technologies.
- C2G2 believes that now is the time for a proactive, transparent, and inclusive conversation about climate geoengineering and how it might be governed, before these technologies are fully developed and potentially ever used.
- C2G2 believes it is far more dangerous to ignore this discussion than it is to engage with it now.

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