

The C2G2 Approach Summary, 20 August 2018

The Challenge

Almost three years after the Paris Agreement on climate change, recognition is growing that without a rapid acceleration in action, limiting global average temperature rise to 1.5-2°C might not be achieved through emissions reductions or existing carbon removal practices alone. Scientists have begun exploring the additional use of large-scale Carbon Removal and Solar Geoengineering to limit climate impacts, including keeping temperature rise down. These technologies are sometimes defined collectively as geoengineering.

Limited rules and guidelines exist at the national or international level to govern how geoengineering technologies might be tested or used, and policymakers have low awareness about their risks and potential benefits. A global conversation is needed before they are developed and potentially deployed.

Carbon Removal aims to address the human-induced cause of climate change (increased atmospheric concentrations of greenhouse gases) by removing CO₂ and other greenhouse gases for long-term isolation from the atmosphere. Also known as greenhouse gas removal, or negative emissions technologies (NETs), its large-scale use this century is assumed in the vast majority of scenarios by the Intergovernmental Panel on Climate Change (IPCC) which limit global temperature rise to 1.5-2°C.

International governance of large-scale Carbon Removal technologies is needed to address a range of issues, including responsibility, accounting, monitoring, reporting and verification, environmental and social impacts, liability, and international cooperation.

Solar Geoengineering is a family of proposed technologies that would reflect more sunlight back into space, or allow more infrared radiation to escape, in a way that changes the earth climate system in order to 'buy time'. This would address a symptom of climate change, by reducing the Earth's temperature.

Also known as solar radiation management or albedo modification, none of these technologies are currently deployed; most are at an early stage of development. There are, however, plans for outdoor experiments. The world needs guardrails in place before the science runs too far ahead of what society is willing to accept.

The risk of not discussing the governance of either large-scale Carbon Removal and Solar Geoengineering is greater than the risk of doing so. To ignore the need for a portfolio of such technologies, and the possibility they may one day be used, increases the risk they will not be properly governed, posing risks to development, health, peace and security.

C2G2's goals

C2G2 aims to catalyse the creation of effective international governance of Solar Geoengineering and large-scale Carbon Removal at every stage of their development. This includes research, testing, and any potential consideration of deployment by governments or other actors.

C2G2 is broadening the conversation about these technologies from the scientific and research community to the global policy-making arena. It is encouraging an inclusive society-wide discussion about the risks, potential benefits, ethical and governance challenges raised by Carbon Removal and Solar Geoengineering technologies.

C2G2 is impartial. It serves no commercial or political interest and receives no private sector funding. It does not have a position on which, if any, geoengineering technologies are needed. That is for society to decide.

C2G2's Theory of Change

Effective governance involves many processes and communities coming together. In the 21st century, action involves a multiplicity of processes and centres of power and influence, rather than one paramount command and control process. This is because no one international forum is sufficient to create global governance alone; each has specific responsibilities and powers. Different multilateral institutions can, if they work together, address different aspects of governance.

Governance for Solar Geoengineering and Carbon Removal should be inclusive, involving broad and diverse participation in decision making, public policy guidance and regulation, transparency, liability, consideration of winners and losers, open access to information and regulation to protect public health and safety. It needs to take place at the international, national, and subnational levels, and should apply to research, testing and deployment. Specific governance measures will depend on the technology in question.

Good governance needs to take a precautionary, deliberative and evidence-based risk management approach in the context of the sustainable development agenda, which weighs potential outcomes against the reality of a warming world. It must take account of different perceptions of risk by different stakeholders.

C2G2's initial work focused on raising awareness amongst key influencers and bringing the geoengineering conversation to a broad range of policymakers at the global, national and sub-national levels. C2G2 is now taking this further by actively engaging with senior officials and opinion-leaders worldwide on three priorities: governance of Solar Geoengineering, of geoengineering research, and of large-scale Carbon Removal.

- C2G2 is catalysing international agreements to **prevent the deployment of Solar Geoengineering unless the risks and potential benefits are sufficiently understood** to allow decision making, and **international governance frameworks are already agreed.**
- C2G2 is working with international processes such as the UN Environment Assembly and the Convention on Biological Diversity, as well as national governments, **to catalyze informed discussion, dialogue and learning about the need for Solar Geoengineering governance.**
- C2G2 is working with international bodies, in particular the UN Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD), **to assess and enhance, as needed, existing international governance structures around large-scale Carbon Removal.** C2G2 encourages discussions about the governance of large-scale Carbon Removal technologies at the appropriate sub-national, national and global levels.
- C2G2 is working with governments, multilateral entities and national and international research councils to catalyze the **development of geoengineering research frameworks.** This includes the Convention on Biological Diversity, which in 2016 called for "more trans-disciplinary research". C2G2 also encourages the wider use of "codes of conduct" for geoengineering research.
- C2G2 works with non-state actors, including subnational governments, NGOs, religious groups, and private sector organisations in order to catalyze a broader, diverse, and inclusive society-wide discussion of these technologies.

Through this engagement, C2G2 aims to catalyse a series of landmark decisions, resolutions, programmes, statements and other interventions that collectively create a multilateral, comprehensive approach to effective international governance of large-scale Carbon Removal and Solar Geoengineering.

Figure 1: Catalysing the learning process



C2G2's Three Priorities

Priority One: Governance of Solar Geoengineering

C2G2 is catalysing international agreements to prevent the deployment of Solar Geoengineering unless (i) the risks and potential benefits are sufficiently understood, and (ii) international governance frameworks are agreed.

Solar Geoengineering technologies include Stratospheric Aerosol Injection (SAI), Marine Cloud Brightening and Cirrus Cloud Thinning. They may also include some additional albedo modification technologies, for example efforts to refreeze the Arctic, depending on scope and impact.

Solar Geoengineering technologies are not a solution to climate change. If ever considered deployable, Solar Geoengineering could only be seen as a complement to the accelerated reduction of emissions, and the removal of accumulated carbon dioxide from the atmosphere.

Any deployment of Solar Geoengineering would require unprecedented governance structures to address issues such as decision-making authority, inter-regional and inter-generational justice, security risks emanating from deployment, and the threat of premature termination, which could cause massive environmental consequences.

The lack of governance surrounding the potential deployment of some Solar Geoengineering technologies, such as SAI, poses a critical global risk. It is unlikely but plausible that actors could deploy a crude version of SAI within the foreseeable future, with serious geopolitical and environmental consequences.

Building international governance for Solar Geoengineering is C2G2's top priority. A well understood and governable Solar Geoengineering deployment may be a decade or more away, but international agreements takes time. **We must start now to be ready to take informed and inclusive decisions whether or not to make use of Solar Geoengineering.**

International fora and processes which could contribute to addressing the Solar Geoengineering challenge include the UN Environment Assembly (UNEA), the Convention on Biological Diversity (CBD), the UN General Assembly (UNGA), and regional bodies such as the European Commission (EC), the African Union (AU), and others. C2G2's work follows three tracks:

1. **Intergovernmental track:** C2G2 is working with representatives of UNEA, UNFCCC, CBD, the IPCC, and the Executive Office of the UN Secretary-General. C2G2 will also explore work with representatives to the UN Security Council, the G20 and G7, the Commonwealth, the Arctic

Council, the Arctic Circle, the African Union, the European Commission, as well as other regional bodies.

2. **National governments track:** C2G2 will encourage 25 or so “key countries” to support our approach and governance priorities. C2G2 will seek “friends of geoengineering governance” groups in cities where relevant intergovernmental organizations have their headquarters.
3. **Non-state actors track:** C2G2 is working with civil society organizations, faith groups, think tanks, humanitarian organizations, and sub-national actors to build support for geoengineering governance. These can build bottom-up momentum to spur action.



Figure 2: A potential timeline towards multilateral governance of geoengineering

Priority Two: The Governance of Research

C2G2 is promoting the development of international governance of geoengineering research, particularly for Solar Geoengineering.

C2G2 believes governments need more evidence before they can take decisions about the potential deployment or not of large-scale Carbon Removal and Solar Geoengineering technologies. Timely and effective research governance is essential to minimize risks – both known and unknown – and to provide assurances to the public that safety, transparency, accountability and liability issues inform decision making and are addressed in advance.

Any form of research must be well governed. While most research governance takes place nationally, international governance is needed to address the transboundary impacts of research into large-scale Carbon Removal and Solar Geoengineering. In particular, there must be safeguards to ensure that Solar Geoengineering research does not head down a slippery slope towards testing and deployment. Genuine international public consultation must allow for the possibility that research may be stopped.

C2G2 is focused on the international dimensions of research, and is working with governments, multilateral entities and national and international research councils to develop frameworks. This includes work with the **Convention on Biological Diversity**, which in 2016 called for “more trans-disciplinary research”, and exploring how to create a similar research framework for Carbon Removal under UNFCCC processes. Research and research governance should evolve in parallel, with the one informing the other.

Public policy can take the form of suggestions about areas of focus, or more prescriptive inputs with regards to impacts and safeguards. Transdisciplinary and geographically diverse research is also required on the interconnections between Carbon Removal or Solar Geoengineering and delivery of Sustainable Development, which may include development of common assessment principles or metrics.

Priority Three: Governance of Carbon Removal Technologies

C2G2 is encouraging discussions about the governance of large-scale Carbon Removal technologies at the sub-national, national and global levels, including at the UNFCCC.

Proposed Carbon Removal include nature-based approaches, such as Afforestation, technical approaches, such as Direct Air Capture, and hybrid approaches, such as Bioenergy with Carbon Capture and Storage. Its large-scale use is part of in the vast majority of 2°C-compatible scenarios in the 2014 Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), as well as in the majority of modelling studies to date.

Removing greenhouse gases at the necessary scale entails significant governance challenges, which are only now becoming fully apparent. International governance would need to address a range of issues, including: coming to terms with the responsibility for Carbon Removal, strengthening existing frameworks for accounting, monitoring, reporting and verification; addressing the environmental and social impacts (e.g., loss of biodiversity, impacts on land-use and consequently food security), liability, and international cooperation.

An appropriate international body for governance of Carbon Removal is the UNFCCC, which has developed numerous elements which could form the basis of a future governance framework. C2G2 will be contributing to discussion amongst Parties to the UNFCCC and is leveraging opportunities provided by the September 2018 Climate Action Summit, the release of the IPCC's 1.5°C Special Report, the UNFCCC Talanoa Dialogue at COP24, and the CBD COP14, to advance the governance of Carbon Removal.

KEY MESSAGES FOR GOVERNMENTS AND CIVIL SOCIETY

1. **The time for leadership is now.** Early entrants to this discussion will play a defining leadership role, on a critical issue of global governance.
2. **We need to learn more.** The world does not know enough about the risks, unintended consequences and potential benefits of solar geoengineering. Well-governed research will be vital to make decisions on whether or not to deploy.

For more information, please visit www.c2g2.net or write to us via: contact@c2g2.net