

The Need to Govern Climate-Altering Technologies

C2G AND ITS APPROACH



An initiative of
CARNEGIE
COUNCIL for Ethics in International Affairs

The world is not on track to limit global warming to 1.5°C or 2°C, and the impacts of overshooting those goals are becoming ever more apparent. In 2018, [the IPCC](#) warned that large-scale carbon dioxide removal is now required in all pathways to keep global warming under 1.5°C and that a mix of large-scale carbon dioxide removal was essential to balance remaining emissions in 2050 – that is, to reach net zero, and net negative thereafter.

Scientists and entrepreneurs are exploring a range of methods to remove CO₂. No single approach to removing carbon will suffice, and additional governance will be needed given the massive scale and pace of removals required. Some scientists suggest that additional actions may also be needed, through solar radiation modification, to lower temperatures by reflecting sunlight back into space.

Difficult choices lie ahead. Emerging climate-altering technologies all have different risks and trade-offs, as well as potential benefits, yet many decision makers remain unaware of these challenges. A lack of comprehensive international governance frameworks to implement necessary carbon dioxide removals poses increasing risks for sustainable development. A lack of governance frameworks to facilitate choices in relation to solar radiation modification poses a number of risks, including to global peace and security.

What is C2G?

The [Carnegie Climate Governance Initiative \(C2G\)](#) is a small, foundation-funded initiative of the [Carnegie Council for Ethics in International Affairs](#). It seeks to catalyse the creation of governance frameworks for emerging climate-altering technologies: in particular, for solar radiation modification and large-scale carbon dioxide removal.

C2G's leadership has decades of experience at the highest levels of international diplomacy on climate change and sustainable development and enjoys excellent relationships with senior decision-makers in governments, intergovernmental organisations and civil society.

C2G is impartial regarding the research, testing or potential use of emerging climate-altering technologies. These are choices for society to make. C2G works with influential actors in all sectors of society to raise key questions about if and how these technologies are to be used and governed.

C2G's mission is guided by the precautionary approach and is consistent with the implementation of existing multilateral agreements. It does not replicate the work of the UN, research institutions, norm-setting bodies, or private sector initiatives.

C2G is a time-limited initiative. Its mission will have been achieved once the governance of emerging climate-altering technologies is taken on board by governments, intergovernmental bodies, and society at large. C2G will seek to ensure its activities are integrated into and amplified by appropriate UN or other bodies, and then it will close down, most likely in 2023 or 2024.

Two families of emerging climate-altering technologies

Large-scale Carbon Dioxide Removal (CDR)

aims to remove and durably store massive amounts of CO₂ from the atmosphere. This addresses the major cause of climate change and is part of mitigation. Approaches fall into two broad categories – nature-based and technology-based – which differ significantly, including in their governance needs.

Solar Radiation Modification (SRM)

seeks to reduce temperatures by reflecting more sunlight into space or allowing more infrared radiation to escape. This primarily addresses a symptom of climate change, rather than the cause. Approaches vary widely. Stratospheric aerosol injection in particular would have planetary-scale impacts, posing potentially high risks requiring governance attention.

What is Governance?

C2G sees governance as far more than laws, rules and regulations. It is an amalgam of multiple, often quite diverse processes, some formal, some less so, involving all sectors of society. While definitions vary, C2G takes its cue from the IPCC, which describes governance as a “comprehensive and inclusive concept of the full range of means for deciding, managing, implementing and monitoring policies and measures.”

It is not C2G’s role to determine the outcome of these discussions or provide answers. Its role is to raise awareness of the critical questions that underpin such discussions so that governance decisions are inclusive and well-informed.

Three Big Questions about Governing Climate-Altering Technologies

1. On what basis does the world decide?

Good governance decisions require a shared understanding of the issues, including scientific, political ethical and intergenerational concerns. Much more education and learning are needed to support a precautionary, risk-management approach, in which the risks, unknowns and potential benefits of these technologies – and their impact on sustainable development – are set against the dangers of a warming world.

2. Who decides, how, and where?

We all share one climate, yet no one process is paramount, or sufficient, to govern these powerful, climate-altering technologies. All sectors of society need to be engaged, as all will be affected by their potential use. To strengthen existing governance, stratospheric aerosol injection, which is inherently global in nature, needs to be discussed by all countries in the world’s most universal forum: the UN General Assembly.

3. How are decisions implemented?

If decisions are taken to proceed, safe deployment will likely require significant international governance. International processes are needed to address issues around permanence, transparency, liability, and equity between winners and losers, as well as open access to information and measures to protect public health and safety.

C2G’s strategy

C2G’s overarching goal, and the criteria by which its overall success will be measured, is to put the governance of emerging climate-altering technologies onto the agendas of key intergovernmental and civil society processes. Its approach is catalytic and inclusive: once these issues have been taken up by key actors, C2G steps back so they then take the lead. C2G does not advocate specific solutions.

C2G takes a 3-step approach to implement its strategy:

Steps to Catalyse Others to Address the Governance of Climate-Altering Technologies

1. **Raise Awareness and Inspire** policymakers and their advisors, as well as other key actors in society, by expanding conversations to learn about these technologies and why they need to be governed;
2. **Convene and Collaborate** with a diverse range of actors to develop a shared understanding of governance needs based on impartial, evidence-based information;
3. **Catalyse Action** in relevant UN and other intergovernmental processes and encourage governments to fill critical governance gaps.



Timeline and Key Audiences

C2G will continue to raise these issues with key constituencies and encourage them to consider placing them on the international agenda by 2022/2023:

- 1. Intergovernmental:** An evolving list currently including the Office of the UN Secretary-General, UNEA, UNFCCC, CBD, IPCC, WMO, the Commonwealth, G20, Arctic Council, the AU and its Commission, the EU and its Commission, UN regional commissions, IUCN;
- 2. National governments:** Decision-makers and their advisors in key government positions;
- 3. Non state actors:** Civil society organisations, faith groups, think tanks, humanitarian organisations, sub-national actors, youth and the private sector;
- 4. Influential individuals:** from the international policy world, academia, media.



C2G's Contribution to Catalysing Governance

2017:

- Launched extensive global outreach to governments, non-state actors and secretariats of intergovernmental bodies; identified governance priorities, including ethical, social and intergenerational concerns.
- Formed [Advisory Group](#) of globally diverse, highly respected climate and governance experts.

2018:

- Participated in dozens of briefings, talks and global meetings. [Developed information materials](#) highlighting governance gaps, including in relation to sustainable development.
- Catalysed California Governor's office to hold first meeting on governance of solar radiation modification research.
- Intensified direct outreach to governments, intergovernmental secretariats, and CSOs.
- Engaged in activities at CBD and UNEA.

2019:

- Following C2G's catalytic work, Switzerland proposed UNEA resolution on the governance of geoengineering.
- Briefed UN Secretary-General's office on the need to govern emerging climate-altering technologies.
- Changed the name of the Initiative by removing the word 'geoengineering' [as explained here](#).
- Launched work in the Arctic and high mountain areas (e.g. Himalayas).
- Catalysed learning by organising a conference in Africa for CSOs. Conducted educational outreach via UN regional events on climate and sustainable development in Africa, Asia and the Pacific and Latin America.
- Developed further [information materials](#) in multiple language versions including evidence and policy briefs on emerging policy themes.

The way ahead 2020-2022

Carbon Dioxide Removal governance

- **Work with and catalyse governments to address gaps in governance of large-scale carbon dioxide removal within the UNFCCC process.**
- **Engage with relevant actors to connect carbon dioxide removal with the broader sustainable development agenda, especially biodiversity, including through “nature-based solutions”.** C2G, building on work undertaken under the CBD and UNEA, will engage with governments for the CBD Conference of the Parties in 2020.
- Continue to encourage and support governments, the private sector and CSOs to create **a forum to exchange practical experience on implementing (or seeking to implement) carbon dioxide removal activities**, and to advance concrete ideas on the governance of risks, costs and incentives needed for global scale-up.
- **Conclude C2G’s work on the governance of carbon dioxide removal** once the UNFCCC begins to address governance gaps.

Solar Radiation Modification governance

- **Catalyse global discussions on the need for the comprehensive governance of solar radiation modification, in particular for potentially high-risk approaches such as stratospheric aerosol injection.** C2G anticipates growing political pressure to discuss these technologies, due to their potential rapid global impact as well as their potential global risks, including for peace and security.
- **Increase diplomatic and educational work with governments and intergovernmental bodies.** C2G will produce reports on the challenges of research, testing, and potential deployment (or absence thereof) of these technologies. This includes the international security implications of ungoverned use, and how multilateral governance might address these risks.
- **Catalyse involvement of actors from developing, in particular, least-developed and climate-vulnerable countries**, who would likely be affected the most by the use (or non-use) of these technologies. It is therefore critical to increase the awareness and involvement of people from these countries in international governance discussions.
- **Catalyse discussions in regional and other decision-making fora.** C2G will work with UN and regional bodies, including scientific groups or networks working in the Arctic, in high mountain areas, and in other regions where research on solar radiation modification is being discussed.
- **Catalyse global research to address gaps** in the governance of climate-altering technologies. C2G will identify and engage with key research networks, stakeholders and funders around the world.
- **Catalyse climate youth networks** to engage in governance discussions on solar radiation modification. The use (or non-use) of these technologies would have serious intergenerational consequences. It is therefore critical to educate and involve young people in governance discussions about these climate-altering technologies.
- **Catalyse**, by engaging directly with governments and other relevant actors, **the ability of the international community to consider in the UN General Assembly in 2022 the conclusions on the governance of solar radiation modification to be conveyed in the 6th Assessment Report of the IPCC.**

