



Carnegie Climate
Governance Initiative

An initiative of
CARNEGIE
COUNCIL for Ethics in
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POLICY BRIEF

Governing Emerging Marine Climate Techniques

Current commitments made under the 2015 Paris Agreement on climate change are insufficient to keep global warming to 'well below' 2°C, and according to the Intergovernmental Panel on Climate Change (IPCC), much greater ambition is necessary.

In response to the risks posed by climate change, some are considering the viability of Solar Radiation Modification (SRM) and large-scale Carbon Dioxide Removal (CDR) techniques. SRM would aim to reflect more solar radiation back into space or allow more heat to escape Earth's atmosphere, whilst CDR would aim to reduce atmospheric concentrations of carbon dioxide. With more than two thirds of Earth covered by water, numerous potential CDR/SRM techniques might be considered for deployment in the marine environment in the future.

The Need for Governance

Marine CDR/SRM techniques are for the most part theoretical, but if ever deployed, some could create large and potentially long-term risks and governance challenges. We do not yet know enough about the risks, costs and potential benefits, or governance requirements, to understand if marine CDR/SRM techniques could be viable, or – if so – whether, when or how to deploy them.

How to Govern Marine CDR/SRM

CDR/SRM deployments could occur within recognised exclusive economic zones, territorial seas or the global commons. Each raises different sets of governance issues. In addition, there are potential transboundary impacts of deployment. Therefore, a level of international governance will be essential. Fora, processes and communities which do, or could contribute to this include

- Governments at all levels
- Convention on Biological Diversity (CBD)
- London Protocol to the London Convention on the Prevention of Marine Pollution (LC/LP)
- UN Convention on the Law of the Sea (UNCLOS)
- UN Framework Convention on Climate Change (UNFCCC)
- UN General Assembly (UNGA)
- Civil Society Organizations
- Research communities
- Commercial sector
- Regional bodies like the Arctic Council
- Other interested and affected publics



Effective governance would likely include broad participation in decision-making; transparency and access to information; as well as regulation at the international, national, and subnational levels, and would apply to research, testing, deployment and monitoring. Some key governance challenges for consideration include

- Ensuring appropriate codes for conduct, safeguards and policy direction for research
- How to include interested and affected parties in meaningful discussion about the techniques
- Understanding the balance between the potential for harm, loss and benefits of deployment
- Resolving who decides when/if/under what conditions to move from research to deployment
- Issues around intellectual property and commercialisation
- Monitoring and attribution of impacts
- Assessing wider impacts, including on the Sustainable Development Goals
- How to align governance frameworks

The Techniques

The techniques under discussion include

- Crop residue oceanic sequestration
- Enhancing ocean alkalinity
- Macroalgal cultivation for sequestration
- Marine cloud brightening
- Methane capture & processing
- Mineralisation of injected CO₂
- Ocean carbon capture & storage
- Ocean fertilization
- Ocean upwelling & down welling
- Placing liquid CO₂ in the mid/deep oceans, on the seabed & in sediments
- Surface albedo modification

More detailed information about the techniques and their governance is available in the



C2G Policy Brief: Governing Marine CDR

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*This briefing is based on the latest literature. Please notify contact@c2g2.net of any suggested corrections.
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