



Buyer Principles for Responsible Procurement of Marine Carbon Dioxide Removal

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Context

Marine carbon dioxide removal (mCDR) represents a promising frontier in the fight against climate change. By leveraging the vast potential of our oceans, mCDR techniques aim to draw down atmospheric CO₂ at climate-relevant scales. However, with great potential comes great responsibility.

The ocean is a complex and vital ecosystem, and any large-scale intervention must be approached with the utmost caution and scientific rigor. As early buyers and supporters of this emerging market, we recognize the responsibility we have to set the standard for careful stewardship of marine environments.

Marine carbon dioxide removal (mCDR) is a category encompassing a variety of different approaches to use riverine or ocean systems to draw down atmospheric CO₂. These include (but are not limited to) ocean alkalinity enhancement (both mineral and electrochemical), river or wastewater alkalinity enhancement, direct ocean removal, and terrestrial biomass sinking.

It is important that buyers strike the right balance between enabling progress and mitigating risks. We believe that carefully controlled, research-focused projects in lower risk approaches are the key to unlocking the potential of mCDR while safeguarding our oceans. By supporting scientifically rigorous, transparently monitored, and responsibly scaled initiatives, we aim to catalyze the necessary R&D work that will determine whether mCDR can become a viable tool in our climate mitigation toolkit.

The following principles outline our commitment to responsible procurement of marine carbon dioxide removal, ensuring that our support advances scientific understanding, prioritizes ecosystem safety, and engages local communities in a meaningful way.

Principles for Responsible Procurement of Marine Carbon Dioxide Removal

1. Adopt a Research-Driven Approach

- Projects should be designed to help advance the science of mCDR and answer valuable scientific questions about the efficacy and safety of mCDR techniques. This includes investigating technical efficacy, ecosystem impacts, and long-term carbon storage potential. We also recognize that projects can fulfill scientific and commercial goals at the same time.



- Findings from supported projects should be reported publicly to advance collective understanding of mCDR. This includes both positive and negative results, as well as any unexpected observations or outcomes.

2. Rigorous Measurement, Reporting, and Verification (MRV)

- MRV methods must include conservative discounts for [uncertainty factors](#) identified by the scientific community. This ensures that we do not overestimate the carbon removal impact of any project.
- Projects must accurately quantify pathways and timescales of atmospheric CO₂ removal, accounting for factors such as air-sea gas exchange. We recognize that there may be a lag time between ocean intervention and atmospheric impact, and we should generally count tons when atmospheric removal occurs rather than at the time of the ocean intervention.
- For mineral-based approaches (e.g., mineral ocean alkalinity enhancement) we should require that projects either use ultra-reactive minerals like calcium oxide or magnesium oxide, pre-dissolve minerals before release, or employ scientifically-accepted methods for directly measuring dissolution progression with high levels of precision.
- Biomass sinking projects must provide strong evidence for long-term carbon storage. This includes demonstrating that storage occurs in highly durable environments like anoxic basins and that the chosen [biomass source is sustainably managed](#) and optimally used.
- Buyers should not support projects where uncertainty factors are large enough (and cannot be effectively mitigated or measured) as to potentially jeopardize overall net negativity.

3. Clear Regulatory Oversight

- Projects must comply with all relevant local and international regulations. This includes laws governing water processing activities and ocean dumping/placement regulations.
- In cases where regulatory guidance is unclear, projects must demonstrate minimal substantive risk and a pathway to regulatory clarity. Buyers may support such projects if we determine that the potential benefits of accelerating regulatory resolution outweigh the risks of regulatory backlash.
- All projects must occur within the Exclusive Economic Zone of countries with strong marine governance. Buyers should not support projects in international waters unless and until a robust regulatory framework for relevant mCDR activities in the high seas is in place, or in areas with historically weak oversight of marine industrial activities.
- We believe the “commercial nature” of CDR projects alone does not put them in violation of international law. As long as projects are responsibly scaled in accordance with local regulations, their inclusion of commercial components should be permissible.

4. Operational Integrity and Community Engagement



- Buyers should only purchase mCDR from organizations demonstrating the highest standards of operational responsibility and transparency. This includes a track record of responsible operations and robust governance systems.
- Projects must involve local scientists and community representatives in meaningful roles. At minimum, each project must have at least one local scientific or community representative as an employee, advisor, or collaborator with meaningful influence and oversight of the project.
- Projects should demonstrate ecological or economic benefits to local communities. Examples of economic benefits are job creation, profit sharing, significant tax revenue, or direct investment in local initiatives.
- Projects must provide a Community Benefits Plan detailing how they will engage with and support local communities throughout the project lifecycle.

5. Ecosystem Safety as a Top Priority

- Rigorous ecosystem safety assessments are required before any deployment. This includes:
 - Standard Operating Procedures (SOPs) for safe handling and spill prevention
 - Comprehensive hazard analysis and disaster management plans
 - A decommissioning plan
 - A list of potential ecosystem impacts and thresholds for action
- Ongoing third-party monitoring of ecosystem impacts is mandatory throughout the project lifecycle. This monitoring will be conducted by a respected third party selected by the buyer(s), with the authority to require a project pause if impact thresholds are exceeded.
- Clear thresholds for action and project pause/termination must be established and adhered to. These thresholds will be based on the best available science and may be updated as our understanding evolves.
- All ecosystem impact data must be made available to researchers, NGOs, and local stakeholders upon request. This commitment to transparency ensures that the broader scientific community can learn from and scrutinize project outcomes.
- Projects must have a plan for mitigating identified ecosystem risks and a summary of parameters that will be monitored, shared publicly prior to project start.

These principles reflect our commitment to advancing mCDR research, and responsible development and deployment. We believe that by adhering to these guidelines, buyers can help unlock the potential of marine carbon dioxide removal while safeguarding the health and biodiversity of our oceans.

As the field evolves and our understanding grows, we remain committed to refining these principles in collaboration with scientists, regulators, and community stakeholders. Our goal is to



ensure that we use this decade to develop the knowledge and tools necessary to make informed decisions about the much larger-scale deployment of mCDR techniques in future decades. Now is the time to evaluate safety and efficacy to assess whether and how to scale up.