Open letter: Keep Europe at the forefront of responsible novel marine carbon dioxide removal

Dear President,

Dear Executive Vice-President,

Dear Commissioners,

The recent United Nations Environment Programme (UNEP) report makes the challenge clear: **exceeding 1.5°C is unavoidable**, making it increasingly **urgent to limit the magnitude and duration of the overshoot** and preserve **the possibility of returning global temperatures back to 1.5°C above pre-industrial**. Doing so requires **accelerating deep emissions reductions**. It also requires the **rapid development of carbon dioxide removal (CDR) at scale** to enable net zero and transition to net negativity, in line with the EU Climate Law.

Only a **diverse portfolio of CDR methods** can meet these needs in the allotted time. Competition for resources (including geological storage) and limited space on land warrant **exploring the CDR potential of the oceans**. In particular, alkalinity enhancement (directly in oceans - OAE- or in rivers - RAE-) and direct ocean carbon capture and storage (DOCCS) - together referred to as **novel mCDR** - can store carbon permanently and could become **an important part of the necessary CDR portfolio**. A series of open scientific, environmental, monitoring and governance questions, specific to each novel mCDR method, still require further evidence collection before these methods can be rolled out at scale safely. They need to be addressed diligently to understand the conditions in which each method can be deployed, and consequently estimate their verified potential.

Europe is particularly well placed to take the lead and reap the benefits of this emerging field. Its strong marine research base, favourable geography and responsible regulatory frameworks provide the foundations to advance the evidence needed to assess novel mCDR responsibly. Horizon Europe through which the EU has invested over €16 million in targeted mCDR research in the past three years is a demonstration of this capacity. The extensive maritime infrastructure includes existing coastal outfalls at desalination, wastewater, power plants and industrial facilities that could host novel mCDR allowing Europe to spearhead responsible decision making on mCDR governance and potential deployment pathways.

In recent years, **real world scientific and operational evidence has significantly increased the understanding of novel mCDR methods**. This evolution prompted the European Commission to publish technical scoping papers assessing certification readiness of Ocean Alkalinity Enhancement and Direct Ocean Capture within the framework

of the Carbon Removal and Carbon Farming (CRCF) regulation and listing the key areas of uncertainty where more evidence is needed.

The next challenge is to proactively address these questions in a coordinated way. Research, environmental governance, carbon removal policy and ocean policy are progressing across different programmes, institutions and Commission services. Without **a shared agenda** and **a process for translating emerging evidence into policy**, there is a risk of duplicating research efforts, overlooking persistent knowledge gaps, and failing to track progress being made in this rapidly advancing field. At this time, there is considerable uncertainty over how scientific progress will inform upcoming and future regulatory decisions.

We undersigned organisations and individuals call on the European Commission to **establish a European Roadmap for novel mCDR** by the end of 2027. The Roadmap should provide a coordinated process for determining whether, where and under what conditions different mCDR approaches could contribute safely and responsibly to Europe's carbon removal objectives.

We propose four mutually reinforcing pillars:

1. **Establish an overseeing/coordinating body**, in charge of tracking and reporting progress, catalysing the funding and execution of the research needed and advising on priority questions. Rather than creating new structures, this function could sit within the existing expert group on carbon removals, or emulate the format used for Carbon Farming with a coordination and support action (CREDIBLE project).
2. **Adopt and support a shared tactical research and evidence agenda** between the EU, Member States, scientific experts, and the community of practice, to better coordinate ongoing and future research efforts and both private and public funding in achieving progress on the key questions defining the conditions for safe deployment. The EU Ocean R&I strategy can contribute by recognising novel mCDR as an area requiring coordinated research and evidence development. The next Framework Programme is fundamental to fund the research needed, while the OceanEye is highly relevant for baselining and MRV. Furthermore, the research agenda should foster data sharing and seek to define the role of field trials (building on the framework adopted under the London Convention and London Protocol) and larger, stage-gated, demonstration efforts in creating the shared evidence base needed preceding larger scale-activities.
3. **Integrate mCDR into wider European ocean governance**. The ocean is a shared space supporting many different activities and is subject to multiple regulations. Progressing on mCDR requires more coordination across directorates of the

Commission and with the other relevant EU institutions. The Roadmap should clarify how mCDR could comply with existing regulations, and is appropriately and coherently considered in emerging European ocean-policy processes for environmental protection, research, carbon removal policy and maritime governance.

4. **Create a clear process from evidence to policy**. The Commission should commit to periodically reviewing the suitability and readiness of novel mCDR approaches for inclusion in the EU carbon removal portfolio as scientific evidence develops, drawing on the milestones identified through the research agenda. Such a commitment — whether delivered through the CRCF review, a delegated act or another appropriate mechanism — would provide confidence that any future potential marine CDR deployment is based on sound scientific developments, while also preserving momentum among funders, researchers, project developers, and potential buyers, as a multiplier of EU's efforts.

Certification is not an end in and of itself. It can serve as a mechanism through which the European Union can establish robust environmental standards, provide clarity for researchers and investors, and support evidence-based decisions on whether and under which conditions mCDR approaches could be responsibly developed and potentially deployed.

The European Commission has already shown leadership by initiating the discussion on marine CDR certification. **The next step is to establish a coherent European plan for building the scientific evidence, governance structures and policy coordination needed to assess and potentially unlock the ocean's potential in achieving the EU's climate objectives. This should be complementary to marine protection and restoration efforts, while ensuring that it does not deter or delay emission cuts**.

A European Roadmap for novel marine CDR will help Europe strengthen its scientific leadership, support responsible innovation, and set a global benchmark for the scientific assessment and responsible development of emerging marine carbon dioxide removal approaches.

We stand ready to support the Commission in developing this pathway and would welcome the opportunity to discuss these recommendations further.

Signed,

The undersigned organisations



- Jean Pierre Gattuso
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- Bryce Van Dam, Helmholtz-Zentrum Hereon, Germany
- Cale A. Miller, Utrecht University
- Momme Butenschön, Euro-Mediterranean Center on Climate Change (CMCC)
- Andreas Oschlies, GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany
- Mathieu Poupon, CNRS, LOCEAN-IPSL.
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