

Analyzing the feasibility, risks, and cobenefits of ocean-based negative emission technologies for stabilizing the climate

Humanity cannot limit global warming to 1.5 °C unless much more action is taken. In addition to the primary effort of reducing greenhouse gas emissions to nearly zero, society must also actively remove CO₂ from the atmosphere. However, our understanding of Carbon Dioxide Removal (CDR) or Negative Emissions Technology (NET) potentials, feasibilities, and risks is limited. Up to now the research focus has mostly been on land-based NETs and much less is known about the ocean-based NETs. The OceanNETs project brings together the expertise needed to answer major open questions concerning the viability of using ocean-based NETs for climate stabilization.

Why focus on ocean-based NETs?

- ▶ The ocean covers over 70% of the Earth's surface, contains many times the amount of carbon in the atmosphere and terrestrial biosphere, and will be the predominant, largest long-term sink for anthropogenic CO₂. These factors suggest that ocean-based NETs should have a large CDR potential.
- ▶ Meeting the Paris Agreement goals with land-based NETs alone will be extremely difficult, if not impossible due to their side effects, sustainability related trade-offs (e.g., competition for land use, accelerated loss of biodiversity), limited individual potentials, and/or issues of carbon storage permanence. For many NETs, current policies, international laws, public resistance, a lack of incentives and infrastructure, justice issues, and current costs are also barriers that must be overcome.

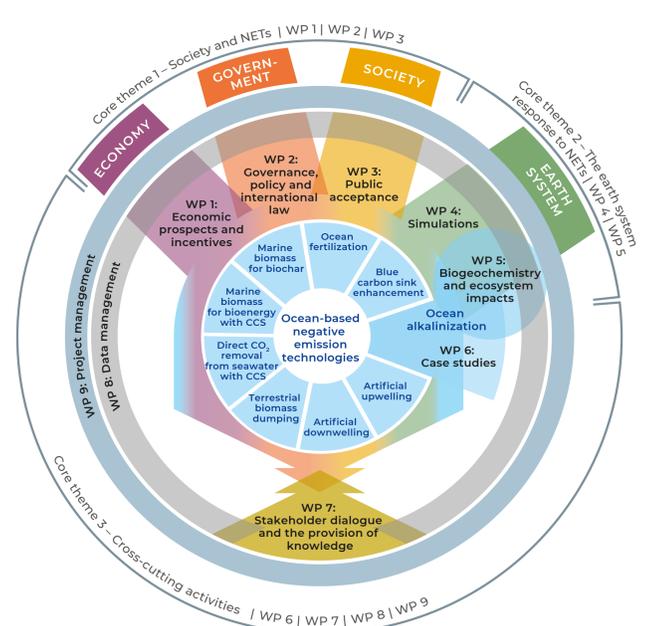
Overall goal

OceanNETs aims to determine to what extent, and under what conditions, the deployment of ocean-based negative emission technologies could contribute to realistic, sustainable and effective pathways for Europe and the world to achieve climate neutrality and reach the goals established in the Paris Agreement. The project also intends to identify and prioritize options with the most potential in regard to CO₂ mitigation, environmental impact, risks, co-benefits, technical feasibility, cost effectiveness, and political and societal acceptance.

What are the specific objectives of OceanNETs?

- ▶ Determine the most effective ocean-based NETs with low environmental and ecological risks (e.g., to biodiversity, ecosystem services) and high co-benefits.
- ▶ Identify the degree of (and factors affecting) social and political acceptance, affordability, and societal impacts and risks (e.g., to food security, human safety) for different ocean-based NETs.
- ▶ Comparatively assess ocean NETs – by combining new multi-disciplinary data, stakeholder knowledge, and case study assessments – and provide this information to society and policymakers to increase their capacity to enable and design optimal medium-to-long-term sustainable mitigation pathways.

OceanNETs structure

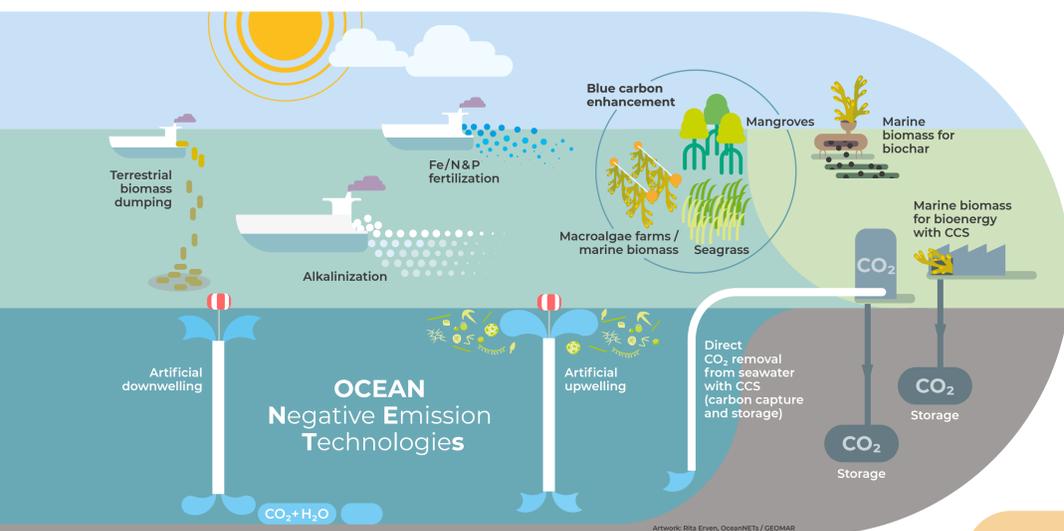


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Coordinating institute:	GEOMAR



Participating Institutions

