



Ocean-based Negative Emission Technologies



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<p>Abstract: This report summarizes OceanNETs stakeholder engagement activities in the Canary Islands, prior and during the mesocosm study in ocean alkalinity enhancement carried out on the island of Gran Canaria in September-October 2021. It also presents ideas for future stakeholder engagement in the islands.</p>	



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D7.1 Summary report on deliberative workshop with stakeholders on mesocosm research in the Canary Islands

Starting in January 2021, OceanNETs conducted stakeholder engagement activities in the island of Gran Canaria, in conjunction with the first mesocosm study in ocean alkalinity enhancement. In the first instance, engagement activities included meetings with individual stakeholders, including representatives of local and regional governing bodies, institutions dedicated to scientific and technical research, civil society organisations, groups and individual dedicated to environmental conservation, business associations, the local port authority, and economic development agencies. In September and October, as the mesocosm studies were underway, OceanNETs conducted several *in situ* public outreach activities, including media interviews and the celebration of a public dissemination and discussion event at the Poema del Mar aquarium in the capital city of Las Palmas. Stakeholder engagement activities have continued after the completion of the mesocosm study, and future collaborations with local actors are currently being explored. This report summarizes key observations derived from these meetings and discussions, and lays out an agenda for future engagement with local actors on marine carbon dioxide removal (mCDR).

Knowledge and interest

Awareness of marine CDR was generally low prior to these engagement activities, as most stakeholders (other than scientific researchers) were not familiar with the proposed methods of carbon capture. Yet, there was a great deal of interest in the OceanNETs research agenda, and a general desire to learn more about the potential risks and benefits of ocean-based CDR, specifically ocean alkalinity enhancement. The mesocosm study attracted significant interest from local, regional and national media, with newspapers and press agencies covering both the scientific design and purpose of the research (see for example [here](#) and [here](#)) and the public dissemination event in Poema del Mar (see for example, [here](#) and [here](#)).

Although local actors were generally unfamiliar with ocean alkalinity enhancement or other forms of marine CDR, there is an intense regional debate on climate change mitigation strategies. This is partly a result of the islands' exposure to high climate risks – both direct impacts on local ecosystems (eg. beach erosion, tropicalization of local waters, proliferation of invasive species), and indirect effect for an economy highly reliant on tourism and fossil fuels (eg. local economic impacts of measures designed to de-carbonize key economic sectors). Soon after the completion of the mesocosm study, the regional government of the Canary Islands presented new legislation on its proposed 'ecological transition,' which sets the target of reaching carbon neutrality for 2040 (a decade ahead of the target set by the Spanish government in the respective national law).

Despite the high visibility of 'carbon neutrality' or 'net zero' as policy goals, there has been little discussion so far on which methods of carbon dioxide removal might be used to achieve a balance of emissions and sinks. As in other jurisdictions, the implicit assumption seems to be that removal will be achieved through conservation and restoration of vegetated habitats, including 'blue carbon' interventions, with no explicit mention of 'technological' forms of removal. The idea of the ocean as an 'ally' in the fight against climate change resonated broadly, however, and served as the basis for rich discussions on what forms of marine intervention (if any) would be acceptable to enhance the ability of the oceans to absorb atmospheric CO₂.

Environmental concerns and conservation imperatives

There appeared to be little concern over the safety of the mesocosm study itself, which was understood to be contained and well monitored, but the question of the potential negative impacts of increased ocean alkalinity was raised in individual interviews and at the public event, particularly when the scale of potential deployment became clear. In this regard, it was crucial to highlight that the primary purpose of the research conducted in Gran Canaria was precisely to identify such potential impacts well in advance of any field application of the method. Similarly, it was important to discuss ocean alkalinity enhancement in relation to ocean acidification, a subject of concern to many stakeholders in the islands.

In order to understand the environmental sensitivities that might arise in relation to larger-scale experimental work on ocean alkalinity enhancement, it is important to place this question in the context of local and regional experiences of environmental degradation. The Canary Islands experience severe environmental strains, and have witnessed very significant losses of natural habitats. This is the direct and indirect effect of an economy that is primarily reliant on international tourism (the islands, with a population of 2.2 million, received more than 15 million tourists in 2019, and the sector represented around 35% of local GDP before the pandemic), and presents some of the worst economic and equality indicators in Spain (e.g. 23,9% of unemployment in 2021, 56,2% in people under 25).

A useful case to illuminate local environmental politics (and an issue that was repeatedly mentioned by participants as paradigmatic of the islands' predicament) is the ongoing debate over the construction in the island of Gran Canaria of a pumped-storage hydroelectric power station. The infrastructure is seen by its proponents, and by many civil society actors, as part of a necessary transition towards renewable energy sources. The project, however, has been the target of significant opposition from environmental activists, who criticize the destruction or severe alteration of key local habitats (many of which are included in the European Natura 2000 network) and control of the project by a Spanish transnational utility. The debate crystallizes the challenge of aligning conservation imperatives with the creation of infrastructures that might alleviate the islands' unsustainable reliance on fossil fuels. Any form of 'climate action' perceived to be disconnected from, or incompatible with, local conservation priorities is likely to face significant public opposition.

Potential economic value of ocean alkalinity enhancement

In individual interviews and at the public event, several local actors were interested in the potential economic value of ocean alkalinity enhancement – and marine carbon dioxide removal more generally. This was particularly true of local businesses (including utilities) and policy-makers. The question of economic opportunities associated with marine CDR was especially salient in the context of the Canary Islands, as there is a general understanding that the islands' reliance on tourism makes for an extremely fragile and unsustainable economic model. Marine carbon dioxide removal was seen by some as a potential component of an emerging regional 'blue economy,' a strategy that will allow the islands to capitalize on their

natural resources in a sustainable fashion. This is an issue that has generally been ignored in discussions of marine CDR: the benefits are expected to accrue at the global or planetary level, in the form of its contribution to climate stability, but little attention is paid to how the development of these technologies might be integrated within regional strategies for economic development.

Discussions about potential local/regional benefits to be derived from ocean-based negative emissions technologies drew attention to the current state of regulation for carbon dioxide removal. Without a clear regulatory framework, including a robust system to certify ocean-based removals, there is no clear prospect for incentivizing investment in the development of marine CDR options, and at the moment it appears that ocean alkalinity enhancement will not be included in upcoming EU legislation on these issues. In the meantime, we continue to assess the possibility of involving local economic interests, particularly in the desalination industry, in the development of realistic deployment scenarios for ocean alkalinity enhancement.

Role of local technical infrastructures and scientific partners

Local actors were proud of the contribution that the Canary Islands were playing in the development of marine carbon dioxide removal methods. This included the significant contribution of local researchers to our scientific understanding of the impact of climate change on the oceans, but also the technical infrastructures the Canary Islands had developed to carry out experimental oceanographic research. A key institution in this regard is the Oceanic Platform of the Canary Islands (PLOCAN), which hosted the OceanNETs mesocosm studies and been a key partner of other projects projects in this area. Hopes that the islands could become a sort of ‘laboratory’ for the further assessment of CDR options were expressed by several local policy-makers and research organisations. OceanNETs should make sure to highlighting the role of local members and partners in its site-specific research activities.

Prospects for future stakeholder engagement

Given the extent of interest and engagement with OceanNETs, it is imperative that public outreach activities with local stakeholders do not end with the completion of the mesocosm study. Several participants in our activities expressed a desire to be kept informed of the progress of the research, and the completion of the second mesocosm study in Norway would be a good opportunity to revisit these issues in Gran Canaria.

Exploring the role that local institutions can play in the further assessment of ocean-based negative emission technologies is a second strand of engagement that ought to continue in the future, for example by scoping future collaboration with PLOCAN.

Research for WP6 on the development of case studies for ocean alkalinity enhancement could use local actors (eg. desalination plants) to provide key assessment parameters, thus using the specific opportunities and constraints available in the islands to develop realistic scenarios.