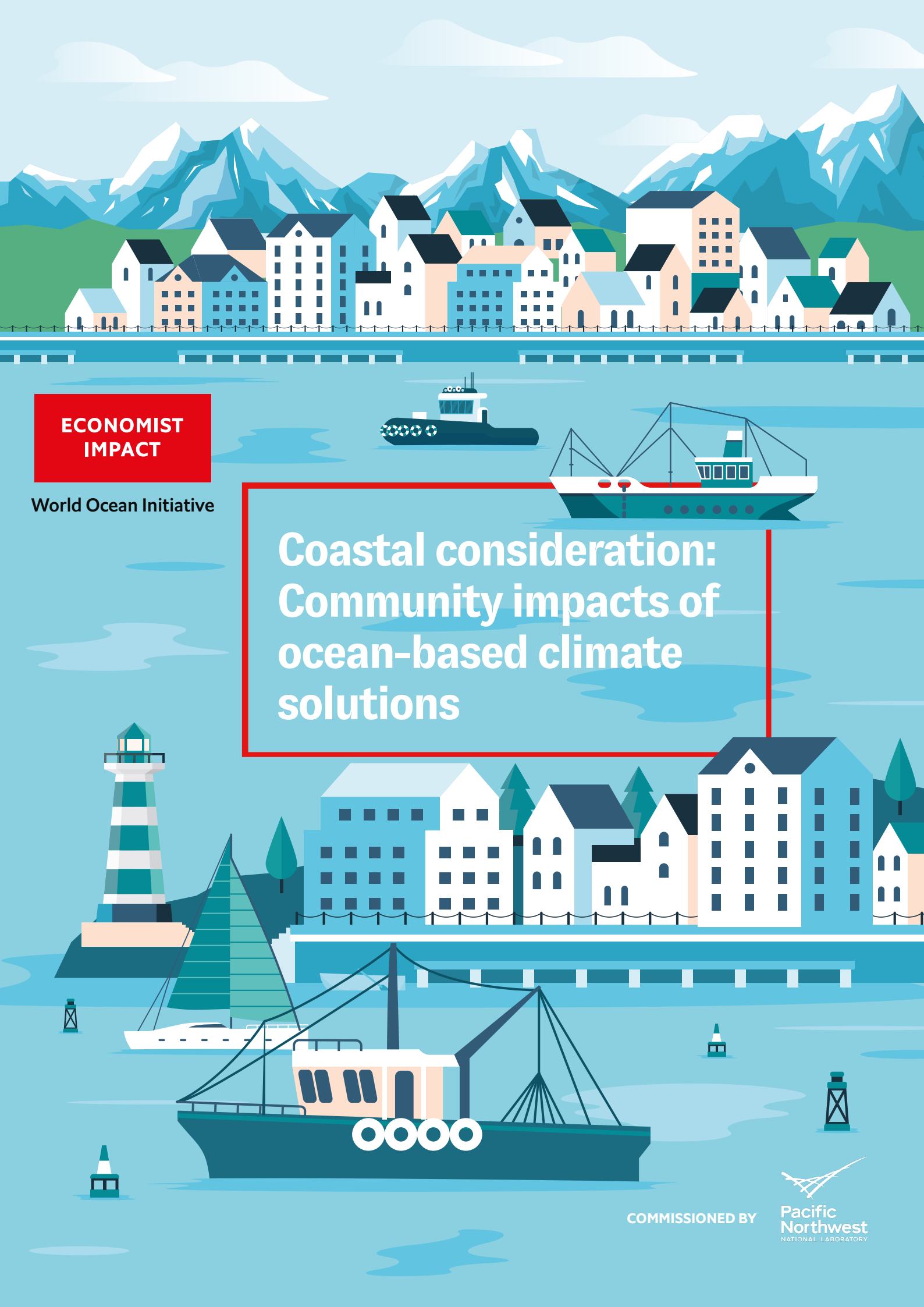

ECONOMIST IMPACT

World Ocean Initiative

Coastal consideration: Community impacts of ocean-based climate solutions

COMMISSIONED BY

Pacific Northwest NATIONAL LABORATORY

Contents

About the research and acknowledgements

Coastal consideration: Community impacts of ocean-based climate solutions is an article from Economist Impact's World Ocean Initiative, commissioned by Pacific Northwest National Laboratory (a US Department of Energy National Laboratory). This is the third in a three-article series on ocean-centred climate change mitigation and adaptation. The first article can be found here and the second article can be found here.

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Ocean-based climate solutions for community impact

Roughly 40% of the world's population live near the coasts, and over 3 billion people rely on the ocean for their livelihoods. As the world confronts global climate change, the ocean has the potential to be an important resource for mitigation and adaptation, offering an estimated 21% of the total emissions reductions needed to limit global warming to 1.5°C by 2050. This potential stems from ocean-centric climate solutions that span clean energy, transport, food systems and carbon dioxide removal and storage.

Coastal communities will have key roles to play in these ocean-centred mitigation and adaptation activities and are those most likely to benefit from solutions' successful implementation. They are also most likely to be harmed by unsuccessful or unconsidered implementation, as well as inaction. Climate change is increasing the rate of extreme weather events, damaging global agricultural systems, raising sea levels, acidifying the ocean and rendering large swaths of the earth increasingly uninhabitable. Coastal communities are especially vulnerable to many of these outcomes, particularly flooding, disaster events, coastal erosion, infrastructure damage, and degraded coastal economic activity in sectors such as tourism, fisheries and aquaculture. The World Bank predicts that without stronger climate and development action, climate change will lead to the forced migration of 216 million people in six regions by 2050, many from the coasts. Moreover, it is frequently the poorest, most marginalised communities that are affected by these outcomes, which means promoting climate action will support global equity. All in all, coastal communities have much to gain from implementing a broad portfolio of climate solutions, including marine-centred approaches.

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Not only does the climate crisis pose an immediate physical risk to coastal communities, it also endangers the economic safety of the community, threatening jobs, livelihoods and infrastructure. Ocean-based climate solutions can work to address the underlying drivers of these risks through decarbonisation while also helping communities adapt their economies to the already-present effects of climate change and build economic resilience to future shocks. A particular benefit of some ocean-based climate solutions is their potential to lessen the impacts, both physical and economic, of climate change on coastal communities. Projects that focus on the restoration, maintenance or development of natural ecosystems—often referred to as blue carbon—can support local climate adaptation

and economic resiliency, even if the true impacts on decarbonisation remain uncertain. Jessie Ritter, the director of water resources and coastal policy at the National Wildlife Federation, highlights these benefits, explaining that nature-based solutions "can inherently provide benefits to communities in terms of hazard risk reduction, quality of life and economic opportunities."

Further, ocean-based climate solutions can bring direct investment into local communities through taxes and compensation schemes. Evidence from terrestrial wind development in the US, for example, finds that projects led to improved community services in rural locales without impacts on the cost of living. While debates over the merits of compensation schemes are more fraught when it comes to offshore, rather than onshore, climate solutions—due to more complex economic linkages and the use of the ocean as a common resource—they not only benefit communities, but could increase the likelihood of successful buy-in for project development.

Communities can also reap the benefits of investing in, building and implementing ocean-based climate solutions. For instance, connection to the mainland grid is a specific benefit of some offshore energy projects that can significantly lower electricity costs for the community. Experts cite job creation and skill building as the most relevant economic benefits. Raffael Jovine, the co-founder and chief scientist of Brilliant Planet, a microalgae biotechnology company, suggests that when it comes to marine climate solutions, "you can have a very very big impact not just from an environmental point of view, but from a local employment point of view." Offshore wind projects, for example, provide job opportunities in project development, manufacturing, construction, operations and maintenance, training and research. These are considered quality jobs, with opportunities for career advancement and the development of skill sets that can transfer across industries.

More generally, ocean-centred climate solutions offer the potential for coastal communities to become hubs of sustainable innovation, leading to the development of new enterprises and, in turn, creating additional avenues for new community investments and jobs. As Joshua Berger, the founder and president/CEO of Maritime Blue, a US-based cluster organisation focused on building a sustainable and equitable blue economy, puts it, "the jobs of the blue economy of the future are shifting, and so are the opportunities for transferable skills, creating significant opportunities to bring new people into the industry." For instance, organisations such as the Technology Collaboration Programme on Ocean Energy Systems, the International Renewable Energy Agency and the US Environmental Protection Agency predict that developing zero-carbon fuels and renewable

energy for marine transport will create green jobs in port communities. Future investments in marine carbon dioxide removal technologies would likely do so as well, given the importance of coastal hubs for running such operations.

In addition to their benefits for decarbonisation, coastal resilience and coastal economic activity, marine climate solutions can also foster improved wellbeing, bolstering health and general environmental stewardship.

Sustainable seafood production is another example of an ocean-based climate solution that, in addition to yielding environmental benefits, can be a boon to coastal economies through job creation. While vegetable-heavy diets are the most carbon friendly, for the meat production that must continue, sustainable seafood production is the best global option. Fisheries are a consistent provider of not only "primary" jobs, but also jobs in offshoot "secondary sectors", especially in low- and middle-income countries. The Food and Agriculture Organization estimates that in West Africa, for example, up to a quarter of jobs are linked to fisheries. Since a large proportion of global fisheries and aquaculture jobs are held by women, particularly in post-harvest activities, preserving fishing ecosystems can support women's economic participation. Fishing and aquaculture also support indigenous groups, who often rely on local availability of marine resources, consuming an estimated 2.1 million metric tonnes of seafood each year, as much as 15 times more than non-indigenous populations in the same countries do. Small-scale fisheries provide indigenous and native groups with food security and jobs, and fishing practices are often deeply tied to traditions and cultural identities. Still, both wild-catch fishing and aquaculture must be made significantly more sustainable in order to prevent further damage to already overtaxed global habitats. Additionally, much more work is needed to promote gender equity in global fisheries and aquaculture.

In addition to their benefits for decarbonisation, coastal resilience and coastal economic activity, marine climate solutions can also foster improved wellbeing, bolstering health and general environmental stewardship. These benefits help drive progress towards the UN's Sustainable Development Goals. For example, port sustainability programmes that support decarbonisation will also improve air quality, alleviate water pollution and restore habitats, to the benefit of community health and the environment as a whole.

Are there tradeoffs for coastal communities?

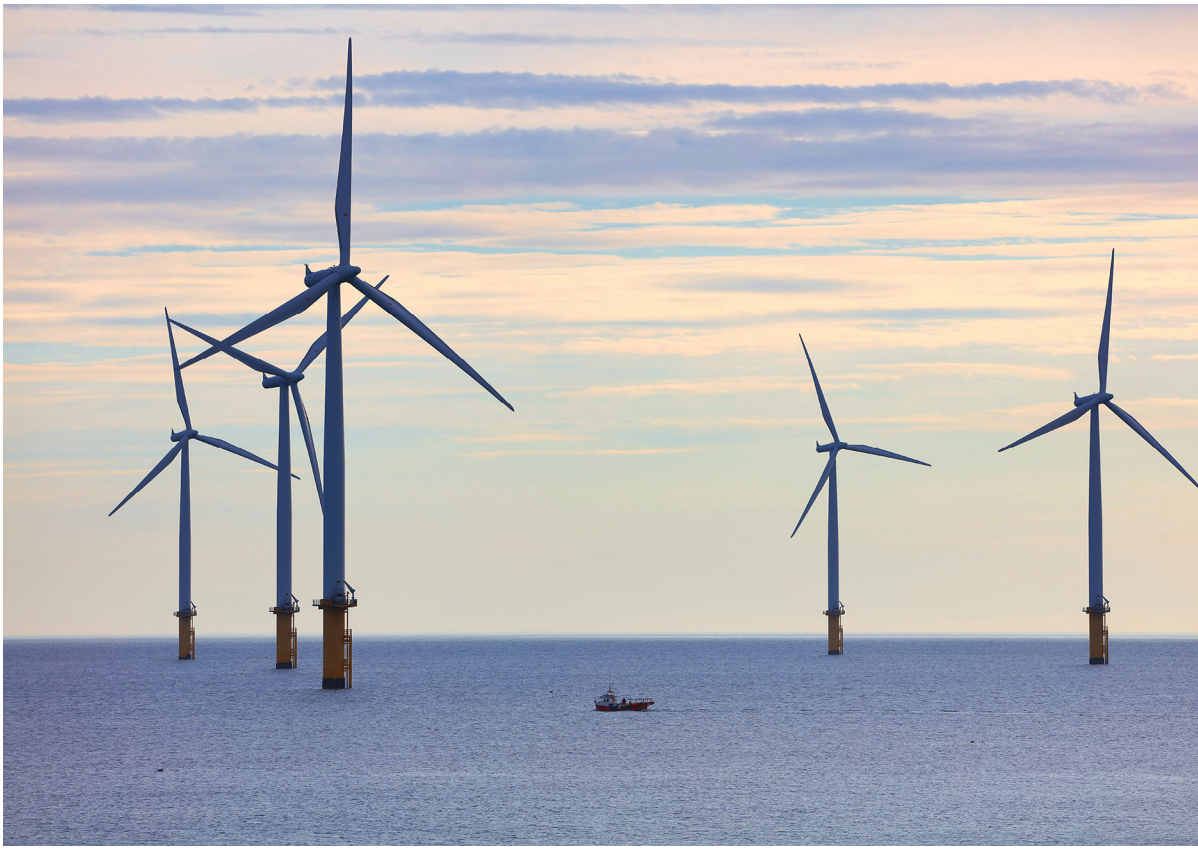
While ocean-based climate solutions offer compelling potential benefits for coastal communities, these solutions aren't without risks and tradeoffs. One possible case is that the economic benefits of projects don't accrue to these communities, and instead only flow to entrenched interests such as investors and shareholders elsewhere. In the absence of local ownership schemes, and if hiring and training take place inland, the economic benefit of projects for coastal communities is considerably more limited. Acknowledging these potential outcomes, and emphasising the importance of equitable job creation, Mr Berger reasons that "we need to make sure that we are working hard to create workforce pathways that are accessible, safe, diverse, and inclusive."

The question of whether communities want ocean-based climate projects, and what they might look like with full community input and buy-in, is sometimes overlooked when projects are pushed forward.

Beyond jobs, investments into the ocean economy often don't fully address community needs or uphold community values. The question of whether communities actually want ocean-based climate projects, and what they might look like with full community input and buy-in, is sometimes overlooked when projects are pushed forward. Raffael Jovine, the co-founder and chief scientist of Brilliant Planet, a microalgae biotechnology company, warns that integration with local communities is not necessarily a top consideration for all developers. He comments that, especially in the context of developing countries, "it is entirely possible that the local government may enrich themselves on a corporate relationship without much benefit to the local community." What complicates action on these issues is that research in this area most often focuses on the economic contribution to ocean sectors and the resulting amount of jobs rather than how benefits are distributed, which makes equitable and sustainable management of the ocean harder to achieve.

The urgent need for rapid implementation of global decarbonisation solutions can override other considerations, creating inherent tension between local actors and implementing groups. There is a careful balance to strike between promoting global decarbonisation, working to prevent harm and creating tangible incentives

for communities. Without due diligence, one industry, such as offshore wind or marine energy, may negatively affect another, such as fisheries or tourism. For example, excluding local community members from decision-making on blue carbon restoration projects could limit small-scale fishers' access to ocean spaces and hamper their ability to continue providing jobs and supplying nutritional needs. There has at times been friction between offshore wind developers and fishermen, who fear loss of income or livelihoods. Ocean-based climate solutions can play a vital role in the fight against climate change, but if developers overlook local needs and perspectives or fail to meaningfully address potential downsides, it jeopardises these projects and lessens their positive impact on the coastal communities that are most directly affected. With due diligence, negative effects can be avoided, and instead it may be possible to develop synergies among different users of marine and coastal environments.



Incorporating community voices

The first step to making sure tradeoffs are accurately assessed within the community context, and to enabling more effective community partnership and involvement, is better data utilisation in the decision-making process. Professor Ken Findlay, CPUT research chair of Oceans Economy at the Cape Peninsula University of Technology in Cape Town advises, "you need to ensure you can compare the apples in the economic system with the oranges in the social system." Giving more weight to community-critical data that incorporates social impacts will help rebalance assessments of ocean-based solutions in favour of activities that are most likely to have positive local impacts.

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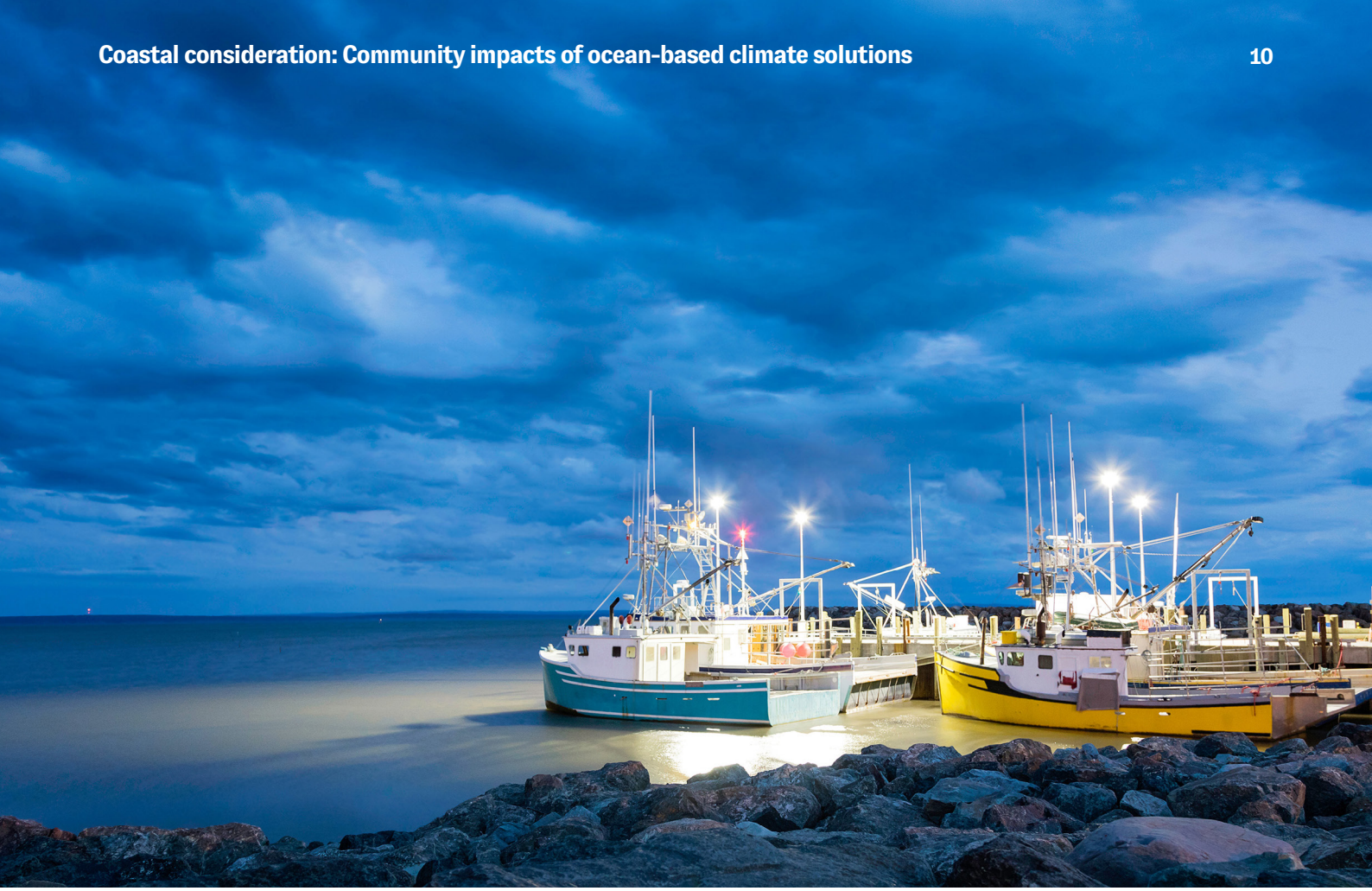
Data collection is not straightforward, however. There are complex social and economic dynamics at play at the community level that can be difficult to measure even under the best of circumstances. Charles Colgan, director of research at the Center for the Blue Economy at Middlebury Institute of International Studies at Monterey, cited the case of transitioning to low-carbon fishing vessels as an example of assessing local tradeoffs within the context of technological change. While changes such as the distribution of fish stocks can be measured with a degree of certainty, it is more challenging to capture and incorporate socioeconomic information, such as whether rural fishing communities can afford to or are willing to make a technical transition. Ben Milligan, secretariat director of the Global Ocean Accounts Partnership, suggests that organising social impact data through a framework is a strong approach for answering important, granular questions pertaining to topics such as indigenous values and community importance, gender dimensions of ocean-centred economic activities, and the revenue accruing to local households versus capital cities or big businesses.



The relative technological newness of many ocean-based solutions lends an urgency to data gathering, and to ensuring community values are incorporated throughout planning and development. In many cases long-term tradeoffs aren't necessarily clear, so transparent and ongoing dialogue and community input are essential for ensuring the best possible outcomes for all stakeholders. Existing evidence can serve as a baseline for the types of perspectives that will help drive success. Research on local support for offshore renewable energy projects, for instance, finds that projects' alignment with local sense of place and their visual aesthetics are both important for community acceptance.

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Consideration of the varied nature and attitudes of community stakeholders, and others, such as tourists, can also help to appropriately contextualise local needs and opinions. Still, creativity, empathy and experimentation in data gathering and engagement will be needed to support learning and effective project implementation in the long run.

Dr Yoshitaka Ota, professor of practice at the University of Washington's School of Marine & Environmental Affairs and director of the Nippon Foundation Ocean Nexus Center, stresses this need for varied input, suggesting that costs and benefits for ocean solutions ought to be soberly assessed from multi-stakeholder and environmental perspectives. He cautions that "ocean policies involve so many stakeholders, and there is a significant power imbalance among them." This leads to policy analyses "missing important equity and justice considerations" that, if included, could prevent the exacerbation of environmental injustice. In some cases, implementing ocean-based solutions may not ultimately be the most effective tools for climate change mitigation or for communities.

Promoting a diversity of perspectives

Thanks to the many stakeholders involved, data that captures the nuanced power dynamics at play within communities is required for effective decision making. Different communities have different priorities, and considerations of benefits and tradeoffs from all groups may vary based on how they emphasise these values, which makes representative community inputs essential. Such considerations are particularly important for promoting equitable, successful projects given gender imbalances and barriers to minority group inclusion in ocean-related matters. Tensions persist, for instance, between deploying marine energy solutions and improving agency and access to natural resources for indigenous and other marginalised groups that have faced previous injustices in the context of marine resource control and allocation: There is a broad need for further indigenous inclusion in the development of ocean-related climate solutions.

Even when good-faith community engagement takes place, there are frequent shortcomings. Both Dr Ota and Dr Amelia Moore, associate professor of marine affairs in the College of Environment and Life Sciences at the University of Rhode Island, emphasise that existing efforts often fail to sufficiently incorporate the voices of marginalised groups. Research from the UK on offshore wind projects in the UK, for instance, stresses that community-engagement processes can exclude those who are seen as lacking relevant knowledge or experience, or who are not the most prominent voices, even if these individuals and groups are those with the most at stake. One analysis of offshore wind projects in the Northeast US cautions against drawing false equivalencies between benefits to communities as a whole and benefits to groups of individuals, noting that developers have often taken the latter to be the same as the former. Failure to include diverse community input in the decision-making process can result in projects that don't adequately account for the risks and benefits to all stakeholders, including project developers themselves.

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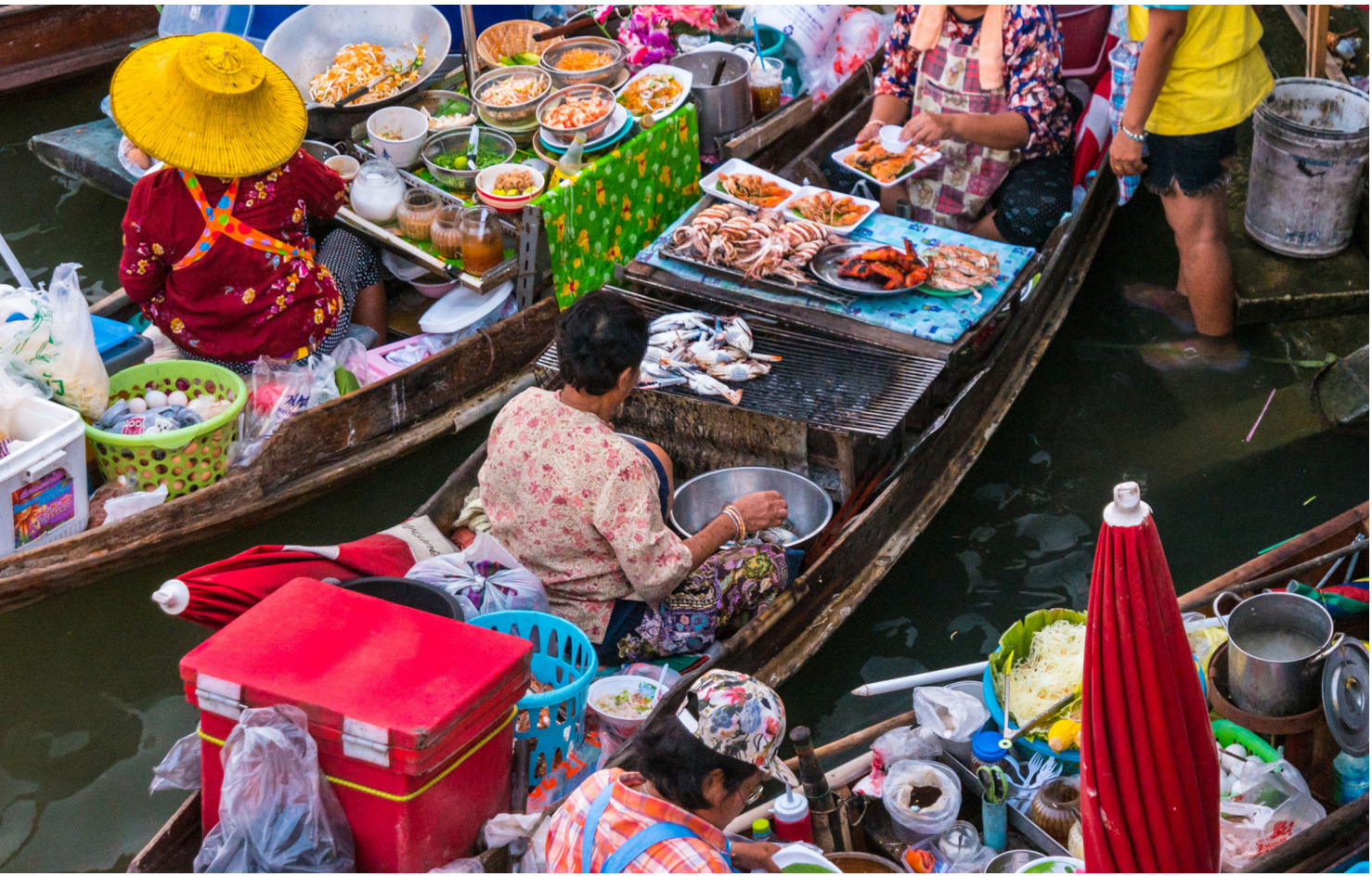
Gathering and leveraging these diverse inputs will help developers reveal a more genuine version of local views regarding ocean-based climate solutions, better promote community-oriented projects and promote justice in climate change mitigation and adaptation. Opinions are likely to be varied and sophisticated. Foregrounding community needs could require project plans that are less appealing to investors, and therefore less likely to become implemented, but local stakeholders may also be comfortable with projects that don't explicitly put their needs first if they offer incentives, such as community benefit payments or grid connection, or have perceived net-positive environmental benefits. Such tradeoffs may be acceptable within the larger context of projects, but it is important that communities are granted agency over these decisions, with a focus on marginalised voices. Some communities may be well aware, for example, that the economic returns and energy from offshore wind projects do not necessarily flow to local communities, but still be comfortable with the benefits to regional or local governments. Others might not be in favour of such an outcome. Rich understanding of community perspectives may reveal a need for advocates of ocean-centred decarbonisation projects to address misinformation or disinformation. In each of these cases, developers cannot know how to proceed in a locally oriented way that can produce optimal outcomes for as many stakeholders as possible without early, close engagement with communities.



Communities, regulation and governance

Unfortunately, existing regulatory and governance structures often do not sufficiently support inclusive community agency regarding ocean-based climate solutions. Dr Moore explains that in the US, regulations around local input for marine and coastal projects are in place, but "they're broad, and gaps exist," particularly when it comes to considerations of equity. She adds that "if it's not required within existing forms of regulation, then there's only a social pressure for industry leaders to understand the effects or possible benefits, but there's no mandate to do it." Regulatory concerns extend to project selection and the incentive structures that drive them. When it comes to renewable energy projects in the UK, for example, major projects and large corporations are prioritised by government policy over smaller, community-owned operations.

Any additional regulation designed to promote community agency for ocean-based climate solutions must be well designed and well enforced. Otherwise, it risks hampering the pace of global decarbonisation.

Any additional regulation designed to promote community agency for ocean-based climate solutions must be well designed and well enforced. Otherwise, it risks hampering the pace of global decarbonisation. In the US, a complex patchwork of regulations that vary considerably by geography is already slowing renewable energy project development. In Ecuador, government protections on overfishing by locals, designed to promote sustainable fishing have also led to perverse incentives, creating ripe conditions for unregulated Chinese fishing fleets and local bottom trawlers to operate untrammelled. In order to accelerate project timelines, regulators must aim to streamline and consolidate frameworks rather than complicate them, while also increasing meaningful community input.

Still, in the best cases, regulation can support, rather than hinder project development. Regulation that improves upon existing incentive structures can help ease the process for developers and promote a greater amount of diverse community inputs in decision-making processes. When it comes to renewable energy solutions, for example, recent evidence from the US suggests that regulation that promotes early, robust community engagement around siting may help to overcome the most common sources of project opposition—typically local stakeholders who are against proposed locations. Dr Ota proposes a model that would

mandate community involvement in all stages of development, including environmental impact and strategic assessments. As Ben Martens, executive director at Maine Coast Fishermen's Association advises, "if you want good, durable policy and rules and regulations, you need to put the users at the table and ask them for input and get them to buy into the process, so that when you have that rule or regulation, they are invested in the success of it." Ultimately, there is a fine line for policymakers between fostering community engagement and preventing meritless obstructions. Further research and more pilot programs are needed to build institutional frameworks that gather buy-in across stakeholder groups while effectively supporting project execution.

There are an increasing number of examples of countries working to better incorporate community perspectives into marine planning and governance, and the lessons from these cases can be applied to the development of ocean-based climate solutions. One paper by an international team of researchers, based on case studies related to ocean monitoring in Canada and New Zealand, found that "successful collaboration includes practices for two-way knowledge sharing between scientists and communities, co-development of funding proposals, project plans and educational resources, mutually agreed installation of monitoring equipment, and ongoing sharing of data and research results." In the US, the The Magnuson–Stevens Fishery Conservation and Management Act mandates that fishermen have an advisory role in the stewardship of fishing resources through the US Regional Fisheries Management Councils, first established in the 1970s. A similar approach that promotes co-management of a suite of ocean-based climate solutions through a broader, inclusive range of constituent members could be effective for the management of American marine decarbonisation efforts—perhaps expanding upon the existing Regional Ocean Partnerships, which are voluntary fora for coordination. The Sustainable Ocean Plans initiative from the High Level Panel for a Sustainable Ocean Economy, a multi-national body, offers a promising national framework. Some of the key tenets of plans that follow this model are: establishing inclusive development from the outset; taking an integrative approach; incorporating local and indigenous knowledge; and recognising the interactions between environment and people.

Looking to the future of community-oriented marine climate solutions

At present, though most ocean-based climate solution-based projects are still in early stages, there is much to be optimistic about when considering the potential benefits these solutions can have on a local level. As ocean-based climate solutions continue to develop, however, more and better community input will be essential to ensure community-level benefits and tradeoffs are adequately taken into account and benefits accrue to communities. There's a pressing need for more pilot programs and further research to ensure policymakers and project developers understand how to best incorporate community-level considerations.

There is a delicate balance when it comes to project implementation and community say too: neither climate action nor community buy-in should be sacrificed in the name of the other. Entrenching community input through tested governance structures and regulation that support robust, diverse and representative community voices, will help achieve this balance, and increase the likelihood that ocean-based climate solutions will benefit local communities broadly.

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