G20 SOUTH AFRICA 2025

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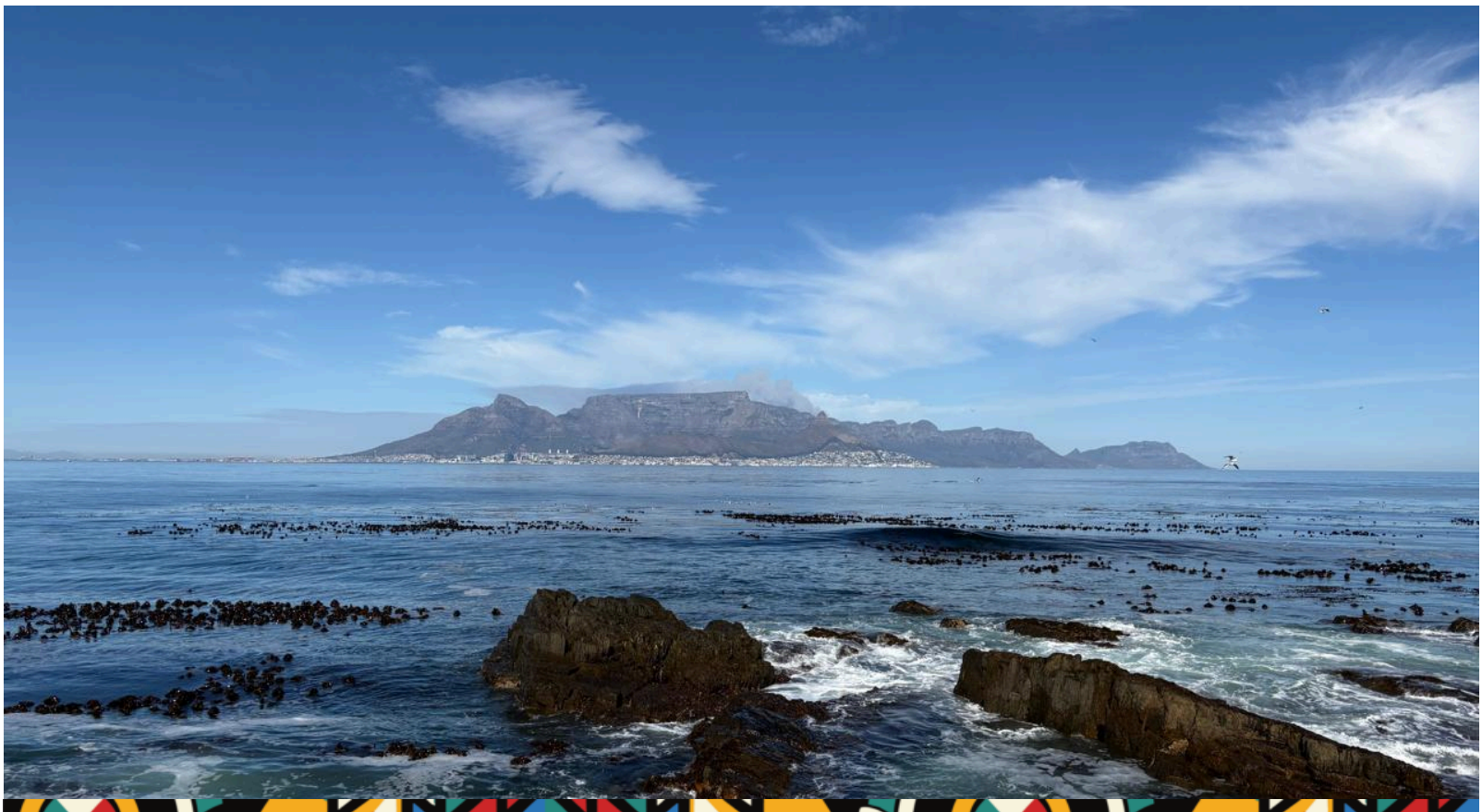
Ocean20 Communiqué

Advancing a Sustainable and Inclusive Ocean Economy



Solidarity | Equality | Sustainability

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Joint Statement

Advancing a Sustainable and Inclusive Ocean Economy

Prepared by the Ocean20 social engagement group under the South African G20 Presidency, 2025

The Ocean20 Social Engagement Group[1] of South Africa's 2025 G20 Presidency, together with our partners, ocean advocates, and associated knowledge holders, are committed to advancing a sustainable and inclusive ocean economy, reaffirming our shared dedication to protecting the ocean as the foundation of climate stability, economic prosperity, biodiversity, and human wellbeing.

Recognising that the ocean connects us all, physically, economically, socially, and culturally, we commit to urgent, coordinated, and science-based action to ensure ocean health and equitable prosperity for present and future generations.

We recall and reaffirm the principles and objectives of the United Nations Convention on the Law of the Sea (UNCLOS)[2], the Paris Agreement[3], the Kunming-Montreal Global Biodiversity Framework[4], and the 2030 Agenda for Sustainable Development, particularly Sustainable Development Goal (SDG) 14: Life Below Water[5].

We further welcome the Agreement under UNCLOS on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ Agreement)[6], underscoring its importance in strengthening ocean governance, ensuring equitable benefit sharing, and safeguarding high-seas biodiversity. We also welcome the recent World Trade Organisation (WTO) Agreement on Fisheries Subsidies[7], which will improve fisheries governance and the sustainable and equitable use of these essential resources.

Together, these instruments form the foundation for action towards a Sustainable Ocean Economy, one that balances environmental integrity, social inclusion, and economic opportunity.

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[1] https://egagasini.saeon.ac.za/ocean20sa/
[2] https://www.imo.org/en/ourwork/legal/pages/unitednationsconventiononthelawofthesea.aspx
[3] https://unfccc.int/process-and-meetings/the-paris-agreement
[4] https://www.cbd.int/gbf
[5] https://sdgs.un.org/goals/goal14
[6] https://www.un.org/bbnjagreement/en
[7] https://www.wto.org/english/tratop_e/rulesneg_e/fish_e/fish_e.htm

Photo: Mark Antonello

Key Recommendations for G20 Members

The G20 plays a critical role in fostering partnerships, knowledge sharing, and institutional strength amongst its member countries, but also between the Global North and South. Under the South African G20 Presidency[8], guided by the theme "Solidarity, Equality, and Sustainability," we call for concerted efforts to:

1. Combat global warming and biodiversity loss through the full implementation of SDG 14, the BBNJ Agreement, and the Kunming-Montreal Framework.
2. Expand sustainable blue food production to enhance nutrition, reduce freshwater use, and strengthen food security, while combating Illegal, Unreported and Unregulated (IUU) fishing.
3. Scale ocean-based renewable energy, including offshore wind, floating solar, and tidal energy, to advance clean and just energy transitions.
4. Reduce shipping emissions and implement the proposed International Maritime Organisation (IMO) Greenhouse Gas (GHG) Strategy for 2027[9].
5. Promote inclusive innovation and the participation of women and youth in all ocean sectors.
6. De-risk finance and foster Public–Private–Philanthropic Partnerships to diversify and scale investments in sustainable ocean solutions.
7. Address the imminent risk of ecological collapse of tropical coral reefs, which are critical ocean natural capital that support 30% of marine species and provide food, coastal protection and economic benefits supporting the livelihoods of 1 billion people.
8. Advance and expand Ocean Literacy for all through inclusive and appropriate opportunities.

To achieve these ambitions, it is essential that:

- Policy design and regulatory frameworks are evidence-based, precautionary and impact-oriented, incorporating the best available scientific and traditional knowledge.
- Projects are financially viable and socially responsible, guided by the UN Global Compact Sustainable Ocean Principles[10] and Ocean Investment Protocol[11].
- Initiatives are inclusive and locally supported, employing tools such as Climate-Smart Marine Spatial Planning[12] and Ocean Accounts[13] to ensure cross-sectoral coherence and inclusion.
- Safety and security of maritime workers, operations, and infrastructure are upheld through strengthened commitment to UNCLOS and international cooperation.
- Respond to the Urgent Call to Action to Restore and Conserve Shallow-water Coral Reefs issued at the UN Ocean Conference 2025 in Nice, France[14].

[8] https://g20.org/
[9] https://www.imo.org/en/mediacentre/pressbriefings/pages/imo-approves-netzero-regulations.aspx
[10] https://unglobalcompact.org/take-action/ocean/communication/sustainable-ocean-principles
[11] https://www.unepfi.org/publications/ocean-investment-protocol/
[12] Queirós, A.M., ten Brink, T., Bas, M. *et al.* The opportunity for climate action through climate-smart Marine Spatial Planning. *npj Ocean Sustain* 4, 26 (2025). https://doi.org/10.1038/s44183-025-00129-2
[13] https://www.oceanaccounts.org/
[14] https://icriforum.org/oosc-urgent-call-for-coral/

Priority Actions for G20 Members

1. Strengthen offshore renewable energy

We advocate G20 members to:

- Recognise the benefits of offshore wind for energy security and energy diversification, job creation and economic development, and enhanced grid reliability.
- Establish stable regulatory regimes and clear legislative frameworks for offshore renewable energy and integrate offshore renewables into Nationally Determined Contributions (NDCs).
- Support trade frameworks for greater affordability and supply chain resilience.

2. Enable policy and Trade Environments for a Blue Economy

We advocate G20 members to:

- Support trade frameworks in line with World Trade Organisation (WTO) rules and strengthen multilateralism and international cooperation in ocean technologies.
- Develop enabling regulatory environments that foster innovation and sustainable blue growth.
- Improve market efficiency for green shipping and vessel decarbonisation while reducing barriers for emerging actors.
- Strengthen energy resilience through trade in green fuels and enhanced international cooperation.

3. Advance Research, Innovation, and Knowledge Sharing

We advocate G20 members to:

- Invest in research and innovation in sustainable ocean energy, blue technologies, nature-based solutions, and environmental assessment of deep-sea ecosystems.
- Foster multi-sectoral partnerships among governments, academia, industry, and civil society.
- Promote and foster inclusive participation by engaging women and youth across all ocean sectors to ensure diverse representation and perspectives to drive ocean solutions.
- Ensure that innovation benefits are shared equitably, particularly with developing nations and the Global South.
- Increase support to the Global Coral Research and Development Accelerator Platform[15], launched by the G20 in 2020[16], the first ocean-based initiative put in place by the G20. In its short, five year span CORDAP has raised support for collaborative efforts involving over 2000 scientists, from 645 institutions and 112 nations to provide the tools required to avoid the collapse of coral reefs. This attests the capacity of the G20 in catalysing ocean action.

[15] https://cordap.org/

[16] https://www.g20.utoronto.ca/2020/2020-g20-environment-1122.html#:~:text=1

4. Scale Ocean-Based Carbon Dioxide Removal (mCDR) Responsibly

We advocate G20 members to:

- Develop environmental integrity standards and a governance framework for mCDR technologies.
- Establish robust monitoring, reporting, and verification (MRV) protocols for mCDR technologies.
- Define pathways into compliance markets only for technologies meeting rigorous scientific and ethical criteria.

5. Mobilise Finance for Ocean Solutions

We advocate G20 members to:

- Promote innovative financial and partnership mechanisms that de-risk investment and empower small, medium, and micro-enterprises to drive locally led, sustainable ocean solutions.
- Support central banks and regulators to integrate ocean-related risks into their activities including financial stability frameworks[17].
- Deepen the Blue Finance market, mobilising private and institutional investment, and strengthening partnerships with Development Finance Institutions (DFIs).
- Develop blue natural capital as an investable asset thereby encouraging the private sector to contribute to a healthy ocean.

6. Enhance Ocean Literacy, Education, and Societal Engagement

We advocate G20 members to:

- Promote the ocean as a unifying connector in terms of physical, economic, social, political, and aesthetic dynamics.
- Broaden public access to ocean education through both formal and informal learning pathways.
- Strengthen and expand ocean and coastal education networks to include teachers, scientists, artists, media, and Indigenous leaders.
- Recognise traditional and local knowledge, and knowledge holders, ensuring inclusive participation in ocean governance.
- Co-develop National (and Regional) Ocean Literacy Strategies and Implementation Plans ensuring accessibility for all, including persons with disabilities.

[17] https://wwfint.awsassets.panda.org/downloads/wwf_gfri_ocean-health-decline-2025.pdf

7. Advance Sustainable Blue Food Systems

We advocate G20 members to:

- Integrate sustainable blue foods into national planning and policy instruments such as Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), and National Biodiversity Strategy and Action Plan (NBSAPs).
- Promote nutrition-sensitive fisheries management and sustainable aquaculture development.
- Empower small-scale actors and women in fisheries and aquaculture as key drivers of equitable blue food systems.
- Foster regional cooperation to build resilient blue food value chains and promote food safety and nutrition diversity.
- Promote the role of sustainable ocean-based systems to contributing to healthy populations, lowering the economic burden of avoidable diseases while reducing pressure on land and water resources and helping restore degraded land[18].

8. Accelerate use of Ocean Technology, Data, and Innovation

We advocate G20 members to:

- Mobilise blended finance and innovation funds to scale affordable ocean technologies.
- Support a global framework for open and co-designed ocean technology development, ensuring inclusion of developing nations.
- Strengthen data equity through open-access F.A.I.R.[19] and C.A.R.E.[20] data principles and shared digital infrastructure.
- Invest in capacity development, regional innovation hubs, and citizen science programmes promoting access to digital tools for inclusive participation.

[18] https://www.nature.com/articles/s41586-025-09365-5
[19] Findable, Accessible, Interoperable, and Reusable
[20] Collective Benefit, Authority to Control, Responsibility, Ethics

9. Ensure Responsible Deep-Sea Governance and Protection

We advocate G20 members to:

- Advance research into deep-sea ecosystems, and close scientific knowledge gaps.
- Consider a precautionary pause on deep-sea mining, prioritising circular economy approaches and terrestrial mining reform.
- Complete and scientifically validate the International Seabed Authority (ISA) Mining Code before any exploitation begins.
- Establish robust standards for transparency, compliance, and equitable benefit sharing, particularly for African and developing nations.
- Uphold the UNCLOS “common heritage of humankind” principle and strengthen multilateral seabed stewardship.
- Advocate for stronger global policies around marine pollution, and the eradication of such, including plastic and microplastics and discarded fishing gear.

Photo: Juliet Hermes

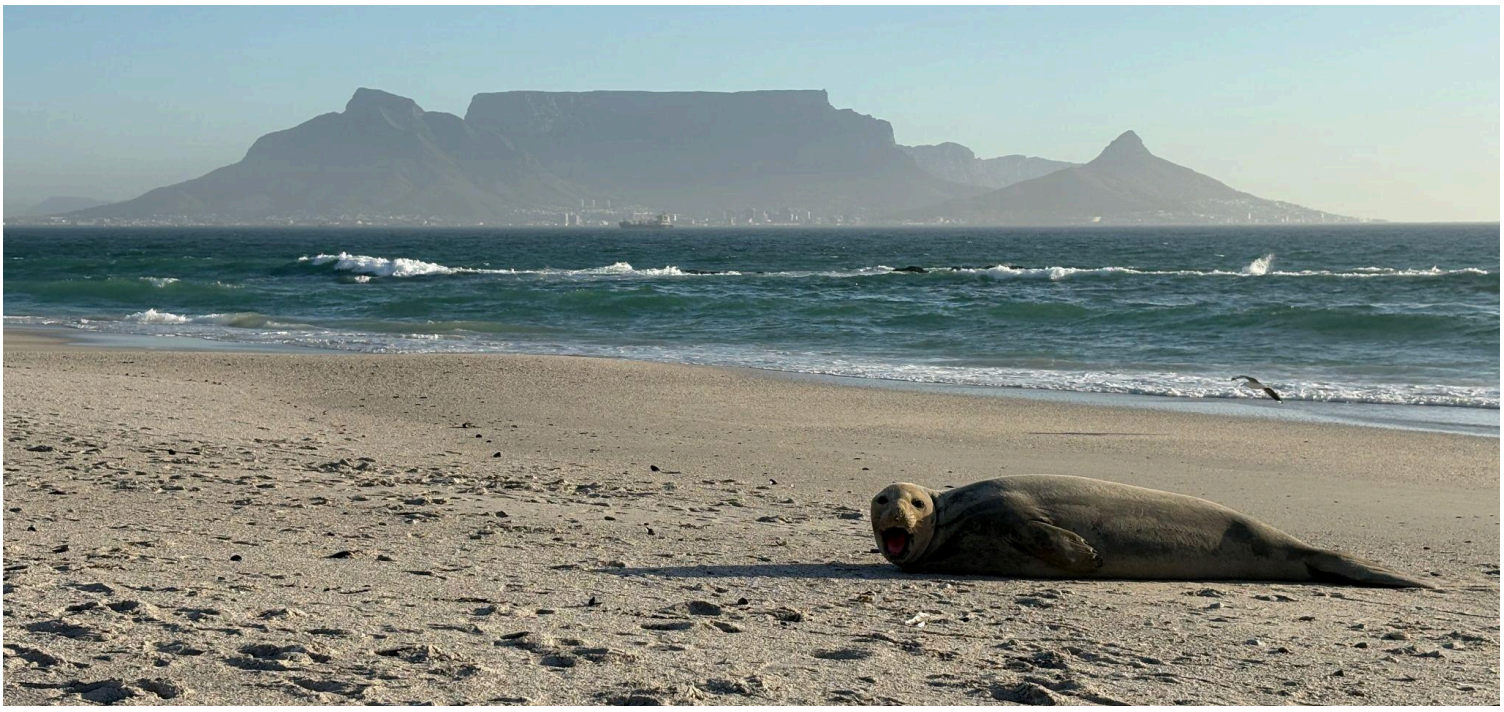

Photo: Tamaryn Morris

Ocean20 Briefing Pack

In support of the Joint Statement, Key Recommendations and Priority Actions, the following Briefing Notes are available below and as individual communications on the Ocean20 South Africa website[21].

Contents:

[21] https://egagasini.saeon.ac.za/ocean20sa/

Briefing Note # 1

Ocean20: Energy Security and the Ocean

Key Recommendations:

1. Recognise what offshore wind has to offer.
2. Create stable and consistent regulatory regimes.
3. Establish clear legislative frameworks for ocean-based renewable energies.
4. Integrate offshore wind into Nationally Determined Contributions (NDCs).
5. Support trade frameworks for greater affordability and supply chain resilience.
6. Promote continued research of sustainable Ocean energy technologies.
7. Facilitate access to climate finance for Ocean-based solutions.

This briefing note was developed under the auspices of Ocean20 South Africa 2025 through a stakeholder consultative process.

Ocean20: Energy Security and the Ocean

Technological advances and the energy transition provide an opportunity to define how markets and economic growth are built and balanced. The G20, under South Africa's leadership, is a timely platform for delivering policies that support resilient growth. The shift towards a low-carbon energy future must be ambitious, equitable, and inclusive, leveraging the ocean's potential for sustainable energy generation. The rapidly growing offshore wind market has already reached maturity in a number of regions around the world. Offshore wind presents an opportunity for countries to improve their energy security and energy diversification, to spur job creation and local economic development, and to enhance grid reliability.

Offshore wind enables domestic energy security by providing homegrown, high-capacity energy assets. It can reduce the need for foreign energy imports, and is resilient to negotiated prices and regulated supply – and thus more resilient to geopolitical disputes. This stabilises energy costs in the long term, protecting consumers and businesses from unexpected price increases through fixed, negotiated contracts. It's also decentralized, providing ample opportunities for redundancy, but static, ensuring predictable security procedures. By diversifying our energy system, we can reduce reliance on fossil fuel imports, mitigate the risk of supply chain disruption, and ensure long-term access to secure and affordable energy across continents.

This paper outlines key recommendations of how governments can work alongside the private sector and non-governmental organizations to support the continued growth of the offshore wind market in an effective and sustainable manner. These recommendations collectively reduce cost and risk, accelerate deployment at sea, and enhance energy security through diversified, interoperable, and sustainable ocean-enabled clean energy systems.

In short, the Ocean20 calls for enabling domestic energy security for G20 nations by:

- Committing to a G20 clean energy trade agenda that eliminates barriers on critical clean energy goods and services, modernizes non-tariff rules, coordinates carbon-related measures, and safeguards ocean ecosystems.
- prioritising ocean-enabled energy security by accelerating offshore wind, subsea interconnectors, green maritime fuels, port logistics, and zero-emission shipping corridors.
- Building diversified, transparent, and sustainable supply chains while maintaining high environmental and labor standards and ensuring fair competition.

1. Recognise what offshore wind has to offer

The Organisation for Economic Co-operation and Development (OECD) finds that by 2030, offshore wind power could make up 8% of the ocean economy, creating jobs for about 435,000 people and adding $230 billion to the economy[22]. Installed capacity has expanded nearly thirty-fold since 2010, while costs have fallen by more than 60% over the past decade, making offshore wind increasingly competitive with conventional fossil fuel generation, especially in countries with strong wind resources, supportive policy frameworks, and mature supply chains[23]. Advances in turbine design now enable individual projects to power millions of homes, demonstrating the sector's ability to deliver large-scale emissions reductions when developed responsibly[24]. For example, one rotation of the Haliade-X turbine used at the Dogger Bank Wind Farm in England is capable of powering a UK home for two days while the project itself is estimated to power up to 6 million homes annually[25].

In addition to the decarbonisation benefits, a strong and productive offshore wind market wind can significantly contribute to a country's energy security. By reducing reliance on imported fuels, and buffering countries against volatile global fuel markets, it provides a domestic large scale reliable source of clean electricity. With capacity factors often exceeding 40–50%, offshore wind supports system diversification, helps balance regional grids, and improves resilience against geopolitical and supply chain disruptions[26].

The offshore wind market is poised for long-term growth underpinned by advances in technology, economies of scale, and growing investor confidence. With appropriate policy frameworks and financing instruments, it can accelerate sustainable development while delivering broad co-benefits for economies, communities, and ecosystems.

2. Create stable and consistent regulatory regimes

Investment in renewable energy sources is facilitated by swift permitting processes and regulatory stability. Clear sightlines on future projects reduce uncertainty and facilitate more attractive financing terms, bolster investor confidence, attract lower-cost capital, and avoid disruptive peaks in demand that pressure the supply chain. The resulting continuity enables strategic investments that strengthen production stability, sustain the workforce, and build overall resilience in the industry and local economies – while reducing consumer costs. Governments should create stable and consistent

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[22] Available from OCED's report "The Ocean Economy in 2030." See at (https://www.oecd.org/en/publications/2016/04/the-ocean-economy-in-2030_g1g6439e.html).
[23] Available from Mckinsey's article "Offshore wind: Strategies for uncertain times." See at (https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/offshore-wind-strategies-for-uncertain-times).
[24] Available from NREL's report "Offshore Wind Market Report 2024 Edition." See at (https://docs.nrel.gov/docs/fy24osti/90525.pdf).
[25] Available at the Society of Operations Engineers article "Everything you need to know about the Dogger Bank offshore wind farm." See at (https://www.soe.org.uk/resources/everything-you-need-to-about-the-dogger-bank-offshore-wind-farm.html)
[26] Available from the IEA's report "Offshore Wind Outlook 2019." See at (https://www.iea.org/reports/offshore-wind-outlook-2019).

regulatory regimes for offshore wind across the entire project lifecycle—from site leasing and permitting to construction, operation, and decommissioning.

Governments can achieve this by:

- Legislating long-term offshore wind targets.
- Establishing a clear and centralized permitting framework (including a "one-stop shop" permitting authority or coordination body that can streamline the siting, environmental authorisation and permitting process).
    - Increase and improve the capacity of the personnel responsible for the permitting process (investing in more staff and digital resources for various decision-making authorities)[27].
- Implementing a clearing house mechanism for legal disputes to prevent extended delays to critical infrastructure projects. This would include a structured and time-limited process for developers to provide evidence, if so required[28].
- Mandating maximum lead times in the offshore wind energy plant permitting process. Following the award/concession of an area for offshore wind development, a maximum of three years from the application for administrative authorisation is suggested[29].
    - Enabling transparent and predictable leasing and auction processes (i.e. multi-year leasing rounds with clear criteria and timelines).
- Conducting government-led spatial planning and site characterization.
- Standardising and publishing regulatory guidelines.
- Aligning offshore wind regulations with grid and energy market policies, including annually allocated contracts for difference schemes.
- Ensuring regulatory stability through legal and institutional frameworks.
- Accelerating the permitting and deployment of critical energy infrastructure, such as grids. This includes reinforcing the infrastructure required to transport offshore power, where needed[30].
- Promoting active dialogue between local authorities, communities, and industry to ensure shared understanding of priorities and solutions during the consenting and construction stages of wind projects[31].

Stable, consistent, regulatory regimes, including at least 10 GW of contract-for-difference-backed capacity each year for 10 years, can provide the short-term predictability to mobilise private capital and reduce the levelized cost of energy by 30% by 2040.

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[27] Available from GWEC and IRENA'S report "Enabling Frameworks for Offshore Wind Scale Up - Innovations in Permitting." See at (https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/Sep/IRENA_GWEC_Enabling_frameworks_offshore_wind_2023.pdf)

[28] ibid

[29] ibid

[30] ibid

[31] ibid

3. Establish clear legislative frameworks

Governments can update legislative frameworks around consenting regimes for offshore wind by making the process faster, clearer, and more coordinated, while still protecting the environment and engaging stakeholders. A reformed framework reduces delays, lowers project risk, and boosts investor confidence. Establishing clear legislative frameworks for offshore renewable energy projects ensures that coastal communities are protected through comprehensive socio-environmental impact assessments, net-positive biodiversity standards, and long-term ecological monitoring commitments.

Governments can achieve this by:

- Conducting Strategic Environmental Assessments (SEAs) across large offshore zones.
- Identifying pre-cleared "low-conflict" areas for leasing and fast-track permitting while acknowledging that ecological risks can still emerge in these zones, requiring adaptive monitoring and safeguards for migratory species and sensitive habitats.
- Requiring agencies to share environmental, technical, and social impact data in open platforms.
- Mandating the use of standardized digital formats for permit applications and review.
- Updating environmental laws to allow for cumulative impact assessments (CIAs) across regions. Governments leading these assessments would avoid developer-by-developer repetition.
- Allowing flexible and phased consents that adapt based on monitoring.
- Including “monitor-and-manage” clauses that balance environmental protection with project progress.
- Legislating coordination between offshore energy suppliers, grid operators, and port authorities
- Creating a framework that ensures grid availability and logistics are planned alongside site consents.
- Standardising regulations across borders that help streamline permitting processes and foster cross-border collaboration.
- Adapting national policies and international frameworks to achieve a global target of 380 GW offshore wind capacity by 2030 and 2,000 GW by 2050, contributing to the global energy transition.

4. Integrate Offshore Wind into Nationally Determined Contributions (NDCs)

Elevate the role of the ocean within climate and biodiversity strategies by incorporating offshore wind and other ocean-based solutions into Nationally Determined Contributions (NDCs) with clear, measurable targets. Align these efforts with global frameworks, such as the United Nations Framework Convention for Climate Change (UNFCCC), so as to drive progress in climate mitigation, adaptation, and biodiversity restoration, ensuring the ocean’s ecological and economic value is recognised in global climate action leading up to COP30. This could be accomplished by joining the Blue NDC Challenge—launched by France and Brazil at the UN Ocean Conference—which calls on Parties to integrate ocean-based climate solutions into their NDCs. Doing so links offshore wind

deployment with broader goals for biodiversity protection, coastal community resilience, and a just transition.

Ensure that the development of offshore renewable energy is accompanied by safeguards to protect marine biodiversity and the livelihoods of coastal communities, including commitments to cumulative impact assessments, adaptive management, and integration with marine spatial planning. Set clear, sustainable targets for renewable energy capacity within national energy strategies and NDCs, emphasizing a just transition that is aligned with the 2030 Agenda for Sustainable Development and the Global Biodiversity Framework. Prioritize offshore renewable energy solutions while embedding protection for coastal communities and marine ecosystems.

Develop and implement targeted social protection programs within the framework of NDCs, including health insurance, unemployment benefits, disaster relief, and support for alternative livelihoods. These initiatives will ensure that coastal communities remain resilient and adaptable to the changes brought about by conservation and energy transition efforts.

5. **Support Trade Frameworks for Greater Affordability and Supply Chain Resilience**

A trade regime that reduces tariff and non-tariff barriers to unleash the full energy potential of G20 nations is critical to ensuring secure energy. Enabling efficient trade between these nations with strong standards for human rights, healthy people and environments, and security can ensure reciprocal, fair, and balanced trade, sustainable supply chain investment and avoid unnecessarily inflated energy costs. Tariff regimes that are consistent and predictable further enable investment and affordable energy development. Offshore wind and other marine renewables rely on robust supply chains, including vessel availability, to deliver high-capacity generation facilities at competitive rates.

Governments can achieve this by:

- Endorsing “rules-based trade and resilience” through rebuilding institutional legitimacy and dispute resolution mechanisms at the World Trade Organisation (WTO).
- Gradually strengthening security and sustainability standards that recognise different levels of implementation capacity.
- Promoting international cooperation on strategies to improve supply chain diversification and transparency.
- Establishing a G20 Energy Supply Security Forum to improve transparency on demand/supply for key inputs (cable-grade metals, rare earths for generators, semiconductors, large bearings), and coordinate strategic stockpiles for rare, long-lead-time components critical to subsea cables and offshore wind.

6. Promote Continued Research of Sustainable Ocean Energy Technologies

Investing in research to advance the development of offshore wind and other marine renewable energy systems—such as tidal, wave, and current energy—can deliver clean, affordable, and equitable energy access. While this policy paper focuses on offshore wind, as it is the most mature technology, the ocean offers a number of renewable energy sources that can support and enable a just energy transition. Expanding research will reduce costs, improve grid integration, and accelerate the commercialization of emerging ocean technologies.

Governments can achieve this by:

- Scaling up international R&D for offshore wind and marine renewables, including tidal, wave, and current energy.
- Establishing joint test facilities, open data platforms, and North–South research partnerships to share expertise and best practices.
- Strengthening technology transfer to bridge infrastructure and capacity gaps in developing economies, enabling them to deploy offshore wind and marine renewables faster and more sustainably.
- Mobilising finance for early deployment through targeted public support to advance pilot and demonstration projects.

7. Facilitate Access to Climate Finance for Ocean-Based Solutions

Governments can achieve this by:

- Developing financial instruments and guidelines to attract investments in ocean-based solutions, prioritising equity and a just transition.
- Enhancing the accessibility of climate finance for viable, nature-positive ocean projects and providing concessional finance to support the green transition in emerging and developing economies.
    - Aligning these efforts by championing the creation of a dedicated Blue Finance Window within the UNFCCC climate finance architecture to unlock concessional flows at scale. Concessional capital mobilised through this mechanism could reduce risks, enhance project bankability, and crowd in private finance—enabling the scaling of offshore wind and other marine renewables.

Across all activities, G20 members can implement shared risk management and safeguards to:

- Mitigate supply concentration by encouraging multi-region manufacturing and open market access.
- Avoid trade fragmentation from uncoordinated Carbon Border Adjustment Mechanisms (CBAMs) via mutual recognition and common MRV (monitoring, reporting, verification).
- Maintain high Environmental, Social and Governance (ESG) standards to prevent environmental or social harm, particularly in marine environments.
- Strengthen cybersecurity and resilience for subsea cables and offshore grids, including joint exercises and contingency planning.

Photo: Mark Antonello

Briefing Note # 2

Ocean20: Financing the Sustainable Ocean Economy

Key Recommendations:

1. Create enabling regulatory and policy environments.
2. Develop and promote Blue Economy clarity through National Plans.
3. Help Central Banks and financial regulators recognise that Ocean health underpins economic and financial stability.
4. Explicitly recognise and value opportunities in the Sustainable Ocean Economy.
5. Continue evolving the Blue finance market.
6. mobilise private investment and support growth in thematic and sustainability-linked products.
7. Partner with Development Finance Institutions (DFIs) and multilateral banks to support investment in the Sustainable Ocean Economy.

This briefing note was developed under the auspices of Ocean20 South Africa 2025 through a stakeholder consultative process.

Ocean20: Financing the Sustainable Ocean Economy

The Ocean Economy is already equivalent in size to the world's fifth largest economy[32], as global markets are reliant on the ocean and its industries to support 90 percent of global trade volume[33]. Despite some inherent challenges relating to the enabling environment, the Sustainable Ocean Economy (SOE) is an attractive finance and investment opportunity. There is growing momentum in delivering finance towards the SOE, in particular, in the context of supporting cost-effective ocean-climate and nature-positive solutions. The ocean economy is becoming increasingly central to global transitions in trade, infrastructure, energy, climate resilience, food security and regenerative tourism. A strong, large and innovative SOE will be necessary to support the transition to green economies as demand increases for decarbonized shipping, green port infrastructure, offshore renewable energy, and sustainable food systems[34].

Enablers such as effective policy and legislation, with clear sector plans and considerations of the SOE in development plans, will play an important role in facilitating this transition[35]. Accelerating sustainable ocean finance requires a structured and coordinated approach that integrates regulatory clarity, financial innovation, and long-term institutional support. Effective action must align public and private capital, scale market-based solutions, and institutionalize ocean finance within the global financial system[36].

An enabling environment provided by the public sector is essential for both public and private capital to flow to opportunities in the sustainable ocean economy. The following are topline recommendations for how governments can contribute to the enabling environment needed to build a large and resilient Sustainable Ocean Economy. The recommendations are derived from the United Nations Global Compact (UNGC) and United Nations Environment Programme (UNEP) Finance Initiative's *Ocean Investment Protocol*[37], the High Level Panel for a Sustainable Ocean Economy's report *Ocean finance for the Sustainable Ocean Economy*[38], the *Baku to Belem Finance Roadmap*[39],

[32] Available from UN Trade and Development's Article "Why a sustainable blue recovery is needed". See at (https://unctad.org/news/why-sustainable-blue-recovery-needed)
[33] Available from Organisation for Economic Co-operation and Development's "Ocean" webpage. See at (https://www.oecd.org/ocean/topics/ocean-shipping/)
[34] Available from the UN Global Compact and UNEP FI's "Ocean Investment Protocol." See at (https://unglobalcompact.org/library/6291)
[35] Available from the High Level Panel for a Sustainable Ocean Economy's report "Ocean finance for the sustainable ocean economy." See at (https://oceanpanel.org/wp-content/uploads/2025/06/25_HLP_Ocean-Finance_v4.pdf)
[36] ibid
[37] Available from the UN Global Compact and UNEP FI's "Ocean Investment Protocol."
[38] Available from the High Level Panel for a Sustainable Ocean Economy's report "Ocean finance for the sustainable ocean economy."
[39] Available from "Views on the Baku to Belém Roadmap to 1.3T." See at (https://unfccc.int/sites/default/files/resource/Ocean_Climate_Platform_Baku_to_Belém_Roadmap_to_1.3T.pdf)

and the *2024 Oceans Communiqué*[40] and represent the collective input from nearly a hundred experts at as many organisations.

1. Create Enabling Regulatory and Policy Environments

- Promote coherence and alignment in ocean and climate finance-related standards, frameworks, and taxonomies to enhance transparency, accountability, and harmonisation, ultimately strengthening investor confidence[41].
- Develop and align private finance frameworks and tools with net zero and nature positive targets, and enforce Environmental, Social, and Governance (ESG) disclosure standards that incorporate marine-related financial risks to facilitate the development of appropriate private sector transition investment strategies and help build resilience and competitiveness[42].
- Implement fiscal policies that provide investment incentives such as through improved depreciation schedules for sustainable maritime infrastructure and the consideration of blue bonds in public investment and pension portfolios to stimulate private investment[43].
- Support the sharing and interoperability of data across the public-private divide to measure progress and impact against shared frameworks[44].
- Continue developing frameworks like marine spatial planning or blue carbon markets that support investable opportunities.

2. Develop and Promote Blue Economy Clarity through National Plans

- Articulate clear development strategies for Sustainable Ocean Plans (SOPs) and implement Marine Spatial Plans (MSPs) to create policy clarity on what development will take place and where, building confidence for ocean industry and investors to participate and invest. Develop these SOPs under national jurisdiction that explicitly incorporate financing for the SOE[45].
- Recognise Ocean Finance as Climate and Nature Finance:
    - Ensure alignment with Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs) and National Biodiversity Strategies and Action Plans (NBSAPs) that address climate and biodiversity action, respectively[46].

[40] Available from the "2024 Oceans20 Communiqué - A Call to G20 Leadership." See at (https://www.oceans20brasil.org/_files/ugd/0a78ab_642ed6e162d744d58ef92d5c0eb798ad.pdf)
[41] Available from "Views on the Baku to Belém Roadmap to 1.3T."
[42] Available from the High Level Panel for a Sustainable Ocean Economy's report "Ocean finance for the sustainable ocean economy."
[43] ibid
[44] Available from the "2024 Oceans20 Communiqué - A Call to G20 Leadership."
[45] ibid
[46] Available from the UN Global Compact and UNEP FI's "Ocean Investment Protocol."

- Creating these investment plans will help secure fit for purpose sustainable infrastructure and technology such as electrified ports and sustainable aquaculture solutions, thus aligning with emerging ocean finance taxonomies, integrating into climate strategies such as NDCs[47].

- Significantly scale up and allocate public funds to strategically support the development of the SOE through national budgets as a form of public investment. As such, consider ocean user fees and the removal of harmful subsidies as potential funding mechanisms that allow the redirection of capital away from harmful marine practices and reallocate finance towards regenerative ocean business sectors[48].

3. Help Central Banks and Financial Regulators recognise that Ocean Health Underpins Economic and Financial Stability

- Actively participate and invest in the reform of the global financial architecture to ensure that it prioritizes the ocean and ocean health, and to ensure these systems reduce capital costs and effectively channel capital towards the SOE[49].
- As ocean finance goes beyond just sector-specific finance practice to a critical component of the broader financial architecture for earth system resilience, regulators and central banks will increasingly become cognisant of their systemic relevance. Reflecting this shift through appropriate risk and capital adequacy ratios, disclosure requirements and other tools will help to ensure that all financial institutions align with an ocean and nature-positive SOE[50].
- Ocean-related risks are material for central banks and regulators. Collective action between financial supervisors domestically and internationally with other central banks and financial regulators, global initiatives and development finance institutions will help mitigate financial risks linked to ocean health decline[51].
- Equally central bank lending activities can be examined such that they do not contribute further to harmful activity in the ocean[52].

4. Explicitly Recognise and Value Opportunities in the Sustainable Ocean Economy

- Raise awareness and develop ocean literacy around the value of the ocean economy and its investment opportunities, including by developing national ocean accounts that capture the value of the ocean economy sectors and the state of the ecosystems on which they depend and by prioritising the recognition of ocean investment as a climate and nature solution[53].

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[47] Available from the High Level Panel for a Sustainable Ocean Economy's report "Ocean finance for the sustainable ocean economy."
[48] ibid
[49] ibid
[50] ibid
[51] Available from the World Wild Life Fund's report "An ocean of possibilities: Why ocean health matters to central banks and financial regulators." See at (https://wwf.panda.org/wwf_news/?14164966/Why-ocean-health-matters-to-central-banks-and-financial-regulators)
[52] ibid
[53] Available from the "2024 Oceans20 Communiqué - A Call to G20 Leadership."

- Work with international accounting bodies to explore the formal classification of blue natural capital as an asset class, ensuring that ocean-related investments are integrated into global financial markets[54].
    - In order to guide development and investment decision-making in the SOE, productivity, profitability, Gross Domestic Product (GDP) contribution and value of underlying assets (including natural capital) must be understood and monitored[55].
    - Look at existing publications on national accounts[56] such as the Global Ocean Accounts Partnership (GOAP), the indicators covered by the Organisation for Economic Co-operation and Development's (OECD) database on the Sustainable Ocean Economy[57] and initiatives on accounting for the SOE[58] for specific guidance and examples of key indicators to include. Build both scientific and reporting capacity where necessary[59].
- Recognise the sustainable development of the real economy and ocean infrastructure, such as port infrastructure, offshore wind development, and the decarbonisation of shipping fleets, as investable themes in the SOE rather than just as general finance or as climate finance.
    - This will enable private finance actors to better align their portfolios with SOE opportunities and embed sustainability principles into project finance and investment[60].
- Recognise sustainable ocean investment as a climate and nature solution
    - Incentivize integrated action on climate and nature by the private sector, including through mechanisms that provide clear incentives for investments that deliver Net Positive Impact (NPI). For example, governments may implement pre-qualification or tender criteria to reward conservation, restoration and sustainable value creation objectives by developers and investors. This can influence the pace of demand creation for sustainable ocean business[61].

5. Continue Evolving the Blue Finance Market

- Encourage the production of comparable data and common language around the ocean economy, including through the creation of dedicated ocean accounts and the adoption of a universal SOE taxonomy[62].

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[54] Available from the High Level Panel for a Sustainable Ocean Economy's report "Ocean finance for the sustainable ocean economy."
[55] Available from the UN Global Compact and UNEP FI's "Ocean Investment Protocol."
[56] https://oceanpanel.org/publication/national-accounting-for-the-ocean-and-ocean-economy/
[57]https://data-explorer.oecd.org/vis?df[ds]=DisseminateFinalDMZ&df[id]=DSD_SOE@DF_SOE&df[ag]=OECD.ENV.EPI
[58] https://www.oceanaccounts.org/
[59] https://oceanpanel.org/publication/national-accounting-for-the-ocean-and-ocean-economy/
[60] Available from the High Level Panel for a Sustainable Ocean Economy's report "Ocean finance for the sustainable ocean economy."
[61] Available from the UN Global Compact and UNEP FI's "Ocean Investment Protocol."
[62] Available from the High Level Panel for a Sustainable Ocean Economy's report "Ocean finance for the sustainable ocean economy."

- This will allow for data capture, analysis and sharing to further support robust sustainable ocean finance decisions[63].

- Carbon and biodiversity credits are potentially opening the door to a deeper engagement with nature finance, based on a more appropriate way to assess and integrate externalities into valuation approaches. In time this can help to build compliance markets and create pathways for investment into natural assets through allocating long-term investment into a blue natural capital asset class[64].
- All stages of finance need to be considered, from early-stage grant and equity support to growth capital, commercial loans, asset and receivables finance to capital markets, to ensure that each private sector participant in the SOE has access at competitive terms to finance. Develop sufficient depth and liquidity in financial markets to facilitate exits and refinancings[65].

6. mobilise Private Investment and Support Growth in Thematic and Sustainability-linked Products

- Expand the use of blue-labelled and sustainability-linked bonds and loans to amplify sustainability impact across ocean industries.
- Consider direct partnerships with industry and research institutions to lower barriers to entry for sustainability-linked financial products, including support for developing credible and robust Key Performance Indicators (KPIs)[66].
- Expand use of blended finance structures to de-risk projects
    - Public capital has different requirements to that provided by the private sector, particularly in its risk appetite and return profile. While limited in availability, it can therefore play a transformational role, alongside philanthropy and development finance institutions (DFIs), in reducing risk associated with investment opportunities that are not (yet) sufficiently attractive to the private sector — for example in stimulating conservation outcomes. Blending capital across different providers with varying return profiles for the SOE can leverage different profiles to achieve more than these capital types could fund individually. Ensure that these opportunities are aligned with Sustainable Ocean Plans[67].
- Concessional financing and other de-risking strategies for infrastructure development should prioritize finance for infrastructure projects that offer climate-resilient, Nature-based Solutions (NbS)[68].
    - Work to integrate NbS and biodiversity financing strategies into their infrastructure finance approaches[69].

[63] ibid
[64] ibid
[65] ibid
[66] Available from the UN Global Compact and UNEP FI's "Ocean Investment Protocol."
[67] ibid
[68] https://iucn.org/our-work/nature-based-solutions
[69] ibid

7. Partner with Development Finance Institutions (DFIs) and Multilateral Banks to Support Investment in the Sustainable Ocean Economy

- Co-create blended finance mechanisms to channel concessional finance into blue economy sectors.
- Facilitate the development of context specific SOE project pipelines through knowledge sharing, capacity building for proposals, provision of seed finance and, assisting (where applicable) in matchmaking with financiers[70].
    - By creating this supportive enabling environment and consolidating smaller projects into investable portfolios, ocean finance "matchmaking" platforms can improve access to finance[71].
- Explore ways of working with DFIs and the private sector to stimulate finance for ambitious SOE projects, and consider what regulatory frameworks may be required or modified in order to facilitate investment into the SOE[72].
- Scale up and mobilise additional development finance, from private, philanthropic partners, and public sources. This may require increased capitalisation of public banks and political support for bank mandates to invest in sustainable ocean activities[73].

Photo: Mark Antonello

[70] Available from the High Level Panel for a Sustainable Ocean Economy's report "Ocean finance for the sustainable ocean economy."
[71] ibid
[72] Available from the UN Global Compact and UNEP FI's "Ocean Investment Protocol."
[73] Available from the High Level Panel for a Sustainable Ocean Economy's report "Ocean finance for the sustainable ocean economy."

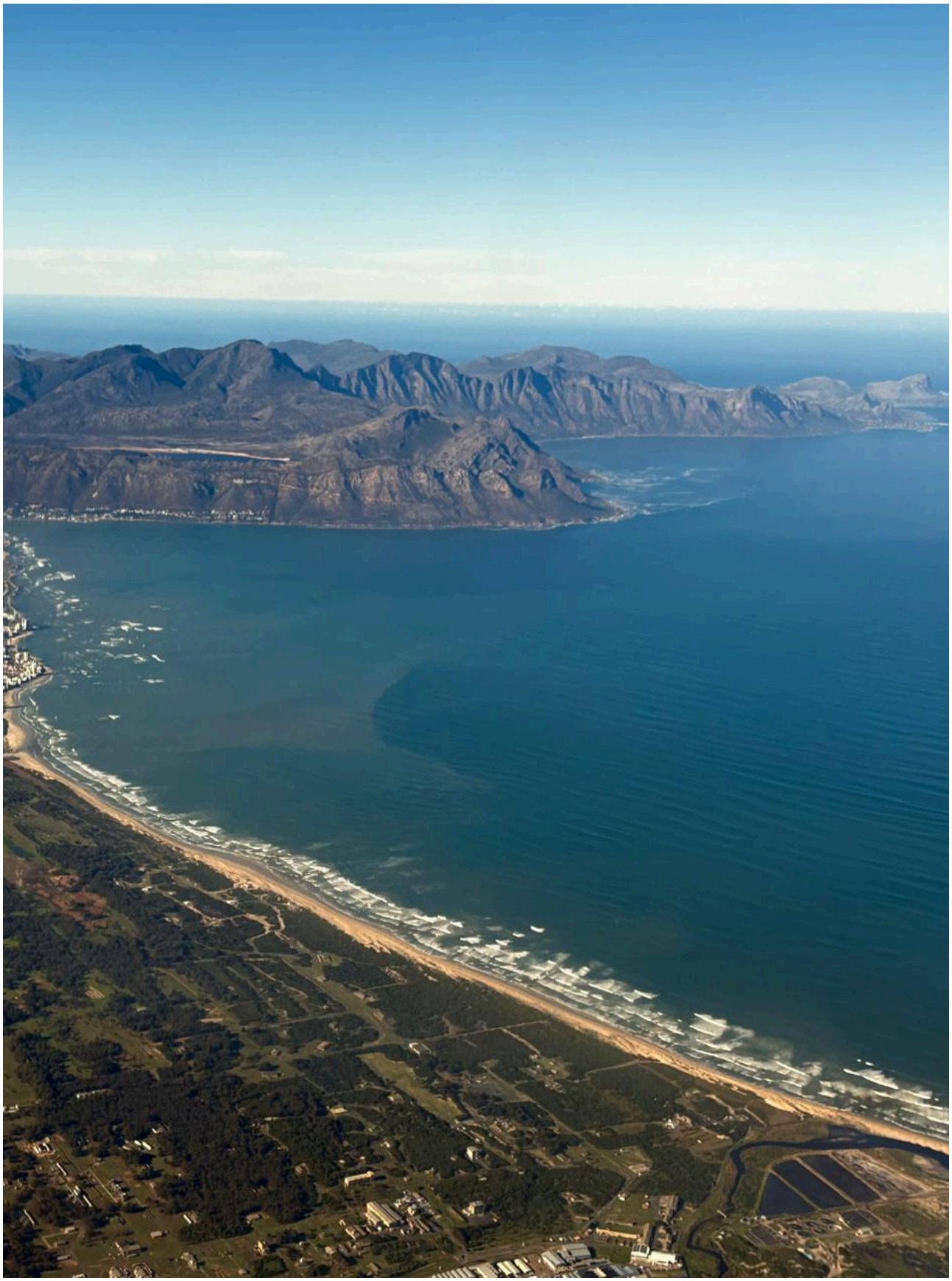

Photo: Mark Antonello

Briefing Note # 3

Ocean20: Enhancing Global Economic Security and Prosperity by building on the Maritime Transition

Key Recommendations:

1. Improve market efficiency for green shipping and decarbonisation of vessels.
2. Reduce barriers to entry for industries working on green shipping technologies.
3. Strengthen energy resilience through trade in green fuels.

This briefing note was developed under the auspices of Ocean20 South Africa 2025 through a stakeholder consultative process.

Ocean20: Enhancing Global Economic Security and Prosperity by building on the Maritime Transition

Technological advances and energy transitions provide an opportunity to refine how markets and economic growth are built and balanced. The G20, under South Africa's leadership, is a timely platform for defining policies that support more resilient growth. South Africa is highlighting equity, solidarity and sustainability as key themes. Building on Oceans20 2024 in Brazil[74] the Ocean20 input sessions this year have concluded that outcomes must include local communities, collaboration on data sharing and partnerships for finance. Transparent access to maritime data, including emissions tracking and fuel usage, will be essential for monitoring progress and ensuring accountability.

One key driver of new investments is driven by the new maritime agreement on decarbonizing shipping. Over 80 percent of all goods, and large parts of oil, gas and hydrogen products, are transported by sea. With the implementation of the International Maritime Organisation's (IMO) Greenhouse Gas (GHG) reduction strategy[75], the global economy has a new tool at hand. This is a lever for building new markets and balancing growth to build more resilient and prosperous economies.

Three key recommendations:

1. Improve market efficiency: Support international collaborations to refresh global shipping infrastructure.

2. Reduce barriers to entry: Promote public private partnerships, streamlining of blended finance mechanisms and funds to de-risk infrastructure investments.

3. Strengthen energy resilience through trade in green fuels: International shipping and energy trade will enable national capacities for renewable energy production.

The shipping industry has already begun its transition to zero GHG emissions. This includes a supply chain of ports, utilities, fuel producers, ship builders and newly trained personnel. Shipping is a nexus for global trade, with over 150 coastal states enabling trade valued at over 20 trillion USD annually. Every port call is part of global economic growth. The new regulations will give ports access to the global market for green energy; both to sell and to buy energy. This global move from extractive and monopolisation of energy resources, towards renewables, will improve individual nation's energy resilience as well as market access. By actively building on the maritime transition, governments will be able to build more secure, prosperous and resilient economies.

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[74] Available from the "2024 Oceans20 Communiqué - A Call to G20 Leadership." See at (https://www.oceans20brasil.org/_files/ugd/0a78ab_642ed6e162d744d58ef92d5c0eb798ad.pdf)

[75] Available from the IMO homepage. See at (https://www.imo.org/en/ourwork/environment/pages/2023-imo-strategy-on-reduction-of-ghg-emissions-from-ships.aspx)

Background

The IMO agreement

The IMO's Marine Environment Protection Committee (MEPC 83), held from 7-11 April, 2025, marked a significant step forward in the decarbonisation of international shipping. A key outcome was the approval of new requirements on GHG fuel intensity, combined with a novel pricing and reward mechanism, which are set to take effect from 2028. These measures are encapsulated in a new Chapter 5 of MARPOL Annex VI[76], comprising the IMO Net-Zero Framework, and aim to gradually lower the GHG intensity of marine fuels. Specifically, ships will be required to meet progressively stricter annual GHG Fuel Intensity (GFI) targets, calculated on a "Well-to-Wake" (WtW) basis, ensuring a holistic assessment of emissions.

To achieve these ambitious targets, MEPC 83 introduced a two-tiered compliance system for the GFI. Ships that outperform the "Direct Compliance Target" will be eligible to generate "Surplus Units" as a reward for their low-emission operations. Conversely, vessels that fall between the "Base Target" and "Direct Compliance Target" will need to purchase "Remedial Units" at a Tier 1 price, currently set at USD 100 per tonne of CO2 equivalent (WtW). For ships exceeding the "Base Target," a higher Tier 2 price of USD 380 per tonne of CO2 equivalent (WtW) will apply. These financial incentives and penalties are designed to accelerate the uptake of zero and near-zero GHG fuels and technologies, thereby driving the maritime industry towards the IMO's overarching goal of achieving net-zero emissions by or around 2050.

Blended finance

Blended finance holds significant relevance for the decarbonisation of ports, shipping, and the development of green shipping fuels. The sheer scale of investment required to transition the maritime sector to net-zero emissions, including infrastructure upgrades at ports for shore power and alternative fuels, the development of new vessel technologies, and the production of green fuels like ammonia and methanol, far exceeds what public funds or traditional private investment can achieve alone. Blended finance, by strategically combining concessional public or philanthropic capital with private sector investment, can de-risk projects, making them more attractive to a broader range of investors and mobilising the substantial capital needed for these transformative changes. This is particularly crucial for early-stage or less commercially viable green projects that might otherwise struggle to secure traditional financing.

Specifically for ports, blended finance can accelerate investments in crucial infrastructure such as shore power connectivity, bunkering facilities for new fuels, and renewable energy generation on-site to power port operations. For shipping, it can support the retrofitting of existing vessels for fuel efficiency and the construction of new ships capable of running on zero or near-zero emission fuels. Furthermore, blended finance is vital for stimulating the nascent green shipping fuel industry.

[76] Available from IMO webpage. See at (https://wwwcdn.imo.org/localresources/en/MediaCentre/HotTopics/Documents/Circular%20Letter%20No.5005%20-%20Draft%20Revised%20Marpol%20Annex%20Vi%20(Secretariat).pdf)

By providing catalytic capital, it can help scale up the production of these fuels, address their higher costs compared to conventional fuels, and create the necessary demand certainty for further private investment in their supply chains.

The IMO's new GHG pricing mechanism is expected to further strengthen demand signals for low-carbon fuels, creating a more favorable environment for blended finance solutions to thrive.

Blended financial tools should not only de-risk infrastructure, but also empower local communities and small-scale innovators, particularly in Africa and the Global South. This means ensuring that ports and shipping fuel hubs are developed in a way that will also benefit surrounding coastal communities, through job creation, training, equity participation, and infrastructure co-benefits like renewable energy access. Opportunities must be made accessible, especially through investment in skills development and knowledge transfer, so that the benefits are equitably distributed, not captured solely by large corporations or foreign investors.

Energy markets

The global push for green shipping and the escalating demand for green shipping fuels, such as green ammonia and methanol, present a transformative opportunity for countries with limited domestic energy production. These "e-fuels" are produced using renewable electricity to create green hydrogen, which is then combined with other elements (like nitrogen for ammonia or carbon dioxide for methanol). This process inherently requires vast amounts of clean energy, primarily from solar and wind power. For energy-importing nations, investing in domestic renewable energy projects to produce green shipping fuels will not only cater to international maritime demand but also significantly bolster their national energy security and reduce reliance on volatile fossil fuel markets. This shift can turn a country's abundant renewable resources, like sunshine or consistent winds, into a valuable export commodity in the form of sustainable maritime fuel.

Furthermore, the scale of renewable energy infrastructure required to meet the projected demand for green shipping fuels is immense. It is estimated that shipping’s demand for e-fuels alone could necessitate an additional two terawatts (TW) of renewable energy generation capacity by 2050. For countries with limited fossil fuel reserves but high renewable energy potential, this translates into a powerful impetus for large-scale national clean energy build-outs. Such projects would not only serve the green shipping sector but also create new green jobs, stimulate local economies, and contribute to national decarbonisation targets across various sectors. This symbiotic relationship positions green shipping as a significant driver for sustainable economic development and energy independence in regions traditionally reliant on imported energy.

Briefing Note # 4

Ocean20: A Global Governance Framework for Ocean-Based Carbon Dioxide Removal (mCDR)

Key Recommendations:

1. Develop environmental integrity standards and a governance framework for Ocean-based carbon dioxide removal.
2. Create robust monitoring, reporting and verification protocols for Ocean-based carbon dioxide removal technologies.
3. Define pathways into compliance markets for Ocean-based carbon dioxide removal technologies that adhere to an established mCDR framework.

This briefing note was developed under the auspices of Ocean20 South Africa 2025 through a stakeholder consultative process.

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Ocean20: A Global Governance Framework for Ocean-Based Carbon Dioxide Removal (mCDR)

The ocean is Earth's greatest climate regulator. It absorbs around 40 % of our carbon dioxide emissions and over 90 % of the excess heat we generate. Yet despite this central role, the ocean remains underrepresented in the toolbox of our climate solutions. If we are serious about climate stabilization, we must recognise the ocean not only as a victim of climate change but as part of the solution.

Despite our very best efforts since the adoption of the United Nations Framework Convention for Climate Change (UNFCCC) in 1992 and added energy and urgency to keeping temperature increase below 2° C as agreed to in the Paris Climate Agreement, anthropogenic emissions continue to destabilize the climate system. Couple this with the rapidly expanding need for carbon markets under the European Union Emissions Trading System, the Carbon Border Adjustment Mechanism, and stringent national laws demanding strict compliance with greenhouse as (GHG) emissions, the demand is real not just for emission reductions, but durable removals that can lock away carbon for centuries, also one of the key findings of Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC AR6).

Ocean-based carbon dioxide removal, through approaches such as ocean alkalinity enhancement, iron fertilization, or seaweed systems, could in theory deliver gigaton-scale sequestration, another key finding of the US National Academy of Sciences[77].

However, a number of barriers exist:

- Scientific uncertainties remain very high.
- Ecological and social risks are real.
- The public legitimacy of these ideas is fragile.
- Few negotiators or policymakers are even aware of these approaches.

If left unchecked, ocean removals could enter markets in ways that are untested, inequitable, or environmentally damaging. If shaped responsibly, however, they could become a vital complement to our climate efforts.

The G20 should call for, and support, the establishment of a global governance and standards framework for marine carbon dioxide removal. This is not a call for deployment. It is not a call for large-scale manipulation of the ocean. It is a call for clarity, integrity, and safeguards before any deployment occurs. In short: a rules-based, precautionary approach, so that if ocean-based carbon dioxide removals are ever deployed, they are credible, equitable, and lawful.

[77] Available from National Academies news release. See at (https://www.nationalacademies.org/news/2021/12/new-report-assesses-the-feasibility-cost-and-potential-impacts-of-ocean-based-carbon-dioxide-removal-approaches-recommends-u-s-research-program)

Three key recommendations:

1. Develop Environmental Integrity Standards. Clear rules for what constitutes legitimate ocean carbon removal, with safeguards for biodiversity, ecosystems, and communities.
2. Create Robust Monitoring, Reporting and Verification (MRV) Protocols. Independent systems to track carbon storage and ecological impacts — ecological MRV, not just carbon MRV.
3. Define Pathways into Compliance Markets. Integration into carbon markets should be conditional on meeting the highest scientific and ethical standards, with oversight by UNFCCC and by International Maritime Authority, World Trade Organization, and other entities where relevant.

Why should the G20 take this on?

The G20 represents the largest emitters, the largest markets, and the actors with the capacity to shape the rules of the global economy.

The G20 can ensure:

- Science drives standards rather than speculation.
- Equity is built in from the start, so that Small-Island Developing States (SIDS), developing countries, coastal states, and Indigenous peoples are not left behind.
- The ocean is safeguarded while being recognised as part of the climate solution.

If the G20 does not lead, standards will be written by markets alone, and history shows us what happens when profit precedes precaution. We risk low-quality credits, ecological harm, and the erosion of public trust.

Photo: Tamaryn Morris

Briefing Note # 5

Ocean20: Effective Ocean Communication and Connectivity

Key Recommendations:

1. Promote the social and educational role of ocean governance and marine science by positioning the ocean as a physical, economic, social, political, and aesthetic connector that unites people during this time of change.

2. Provide opportunities for all citizens to learn about the ocean across formal and informal channels. Formal education in schools and broader informal communication efforts must include direct linkages between inland and the ocean, as water connects us all.

3. Support the growth of marine and coastal educators networks and encourage the inclusion of educators, the media, aquariums and museums, scientists, science communicators, indigenous leaders, communities, conservation agencies, NGOs, artists and others.

4. Empower communities to actively participate in ocean conservation, recognising traditional knowledge, respecting local leadership and hearing community voices. Strengthen society-ocean connections and enable real participation in decision-making and problem-solving, with true accountability and capacity.

5. Develop and resource national Ocean Literacy Strategy and Implementation Plans, co-designed with diverse stakeholders to ensure alignment with national priorities, social relevance, and broad-based ownership.

6. Promote inclusive communication of ocean knowledge and resources across all age groups, ensuring accessibility for people with visual, auditory, cognitive, or other challenges that limit engagement with conventional materials.

7. Develop and enhance Blue education capacity in terms of teaching staff.

8. Foster equitable collaboration among Indigenous, scientific, and civil knowledge systems to build a knowledge democracy that advances inclusive ocean literacy and addresses research and power inequities.
9. Provide access to ocean benefits and opportunities in the Blue Economy for underrepresented communities.

This briefing note was developed under the auspices of Ocean20 South Africa 2025 through a stakeholder consultative process, including inputs from the Thyssen Bornemisza Art Contemporary (TBA)-21 and the Two Oceans Aquarium Foundation.

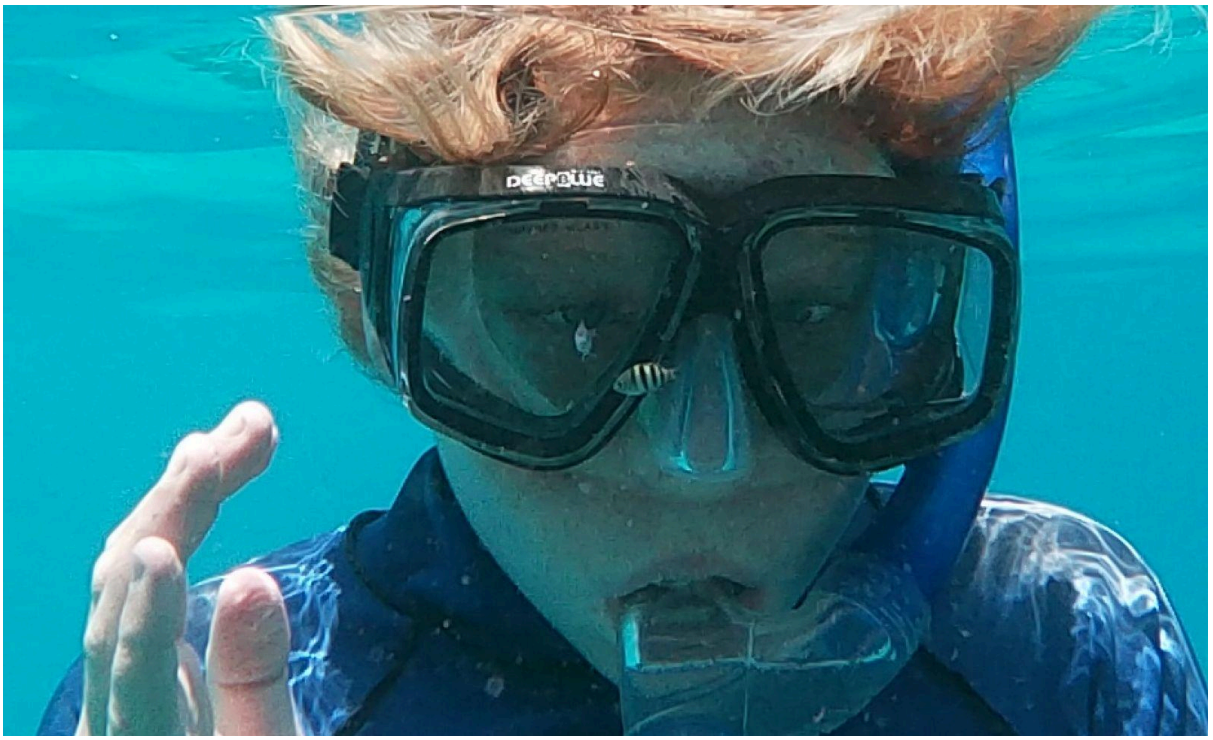

Photo: Juliet Hermes

Ocean20: Effective ocean communication and connectivity

Ocean literacy is the understanding of human influence on the ocean and the ocean's influence on humans. However, it goes beyond just knowing facts: it's about developing the knowledge, skills, and values needed to make informed and responsible decisions about the ocean and its resources. Being *ocean literate* means:

- Recognising how much humans depend on the ocean for food, oxygen, climate regulation, trade, recreation and more.
- Understanding how human actions (like pollution, overfishing, or carbon emissions) affect the ocean.
- Feeling empowered to protect and use the ocean sustainably.
- Being able to re-imagine our relationship with the ocean and its future fostering action through behavioral change.

Much has been done in recent years to promote ocean literacy at all levels of society, from primary and secondary school activities, through tertiary education, public awareness campaigns and societal benefit workshops. Within South Africa, as an example, the subject of Marine Science was introduced at the Grade 10, 11 and 12 levels to strengthen knowledge of the ocean and its dynamics at a secondary school level to promote further studies in this field, but also to equip learners with a greater understanding of this massive resource. Yet more needs to be done to develop awareness at all levels of society, particularly the role the ocean plays in our daily lives for communities residing at the coast, but also inland who may not feel connected to the ocean.

The Blue Schools program is an international initiative that promotes ocean literacy and sustainability by integrating ocean-related topics into the curriculum of schools. In South Africa it is hosted by the South African Environmental Observation Network (SAEON), a business unit of the National Research Foundation, funded by the Department of Science, Technology and Innovation (DSTI). The Blue Schools over the past three years have provided opportunities for both coastal and inland learners, educators and communities to connect with the ocean and understand how they influence the ocean and how the ocean influences them. By linking rivers, oceans, weather, and cultural narratives, the programme demonstrates how traditional knowledge and science can be integrated to strengthen public understanding of ocean–land–climate connections. Globally, research shows that there is limited access to ocean science and a lack of understanding about the ocean. Therefore, there has been a concerted effort to include ocean literacy in classrooms. Many of the beneficiaries of the Blue Schools program in South Africa were not aware of ocean literacy before joining the Blue Schools program. We therefore call for inclusive partnerships and cross-generational collaboration through the Blue Schools and other ocean literacy programs to address complex socio-ecological issues facing the ocean.

During South Africa's implementation of Ocean20, community-based ocean literacy programs were implemented with inland communities and a diverse range of stakeholders. The ocean literacy programme was inclusive as it integrated different knowledge systems, values and actions that are relevant to inland communities. This program illustrated that there is a need to include inland communities' voices in knowledge creation, mobilisation and action. We recommend that inland communities be included in ocean narratives, Blue economic opportunities and decision-making processes.

The current global situation calls for a rethinking of humanity's relationship with water, from local ecosystems to the interconnected global ocean. The ocean is a fundamental resource that connects all people and can play a central role in citizenship education and identity formation from early childhood through adulthood. Educational programs are crucial to this process. When designed with a long-term vision, they foster ecological awareness, ensure access to information for all, and enable participation in global debates as a democratic right. Through participatory dialogue and perspectives from art, philosophy, and philology, these programs deepen understanding of the ocean's significance.

Educational programs should be based on the idea of the ocean as a connector and key ally in addressing the climate crisis. Protecting the ocean requires universal access to scientific knowledge, educational materials and artistic content. This involves recognising diverse needs and creating multiple levels of communication and facilitation to remove physical, sensory, cultural, linguistic, and cognitive barriers. Applying these inclusive principles establishes lasting educational processes, accessible information systems, and environments that benefit everyone and strengthen society's relationship with the ocean.

Enhancement and development of Blue Education Programs

Blue Education programs play a critical role in fostering sustainable behaviors and mindsets toward our oceans, particularly among younger generations. Drawing on a multidisciplinary, inclusive, and participatory approach, these programs integrate scientific knowledge, cultural heritage, and artistic practices to engage diverse audiences worldwide. Art, in particular, plays a vital role in ocean literacy by transforming scientific knowledge into emotional, cultural, and imaginative experiences that inspire care and action. While science explains ocean processes, art humanizes them, bridging the gap between information and empathy. By connecting natural and social sciences with Indigenous and Local Knowledge, art creates inclusive spaces for dialogue and understanding. It helps address a core barrier to sustainability: the lack of emotional connection and imagination needed to envision regenerative futures. Through creative expression, people can experience the ocean as a living, interconnected system that sustains both human and non-human life. In this way, art acts as a bridge between knowledge and behavior change—translating complexity into meaning, and meaning into motivation. Integrating art into ocean literacy initiatives strengthens communication, deepens engagement, and fosters a shared sense of responsibility toward a sustainable ocean future.
The objective of such blue education programs is to develop resilient communities equipped with the skills and awareness necessary to contribute actively to ocean sustainability, while promoting lifelong learning and social inclusion. The following strategies outline practical steps to operationalize Blue Education through inclusive, interdisciplinary, and action-oriented learning.

- **Structured and Phased Learning:**

- Implement a stepwise approach that begins with teacher training, followed by student engagement, practical workshops, and the creation of educational resources.
- Include digital meetings, seasonal schools (summer or winter), and hands-on workshops to ensure continuity and depth of learning.

- **Engagement with Scientific Expertise:**

- Collaborate with marine science researchers across regions to provide students with context-specific knowledge about their local marine environment.
- Ensure at least three interactive sessions where students can directly engage with scientific concepts and research practices.
- Provide access to resources, such as the use of scientific equipment and laboratories, to enable individuals from disadvantaged socio-economic environments to foster a deeper understanding of ocean systems

- **Integration of Arts and Creative Practices:**

- Use art as a lens to explore environmental themes, allowing students to produce their own creative outputs.
- Offer video lessons and practical toolkits adapted to different educational levels to support hands-on learning.

- **Inclusive and Accessible Resources:**

- Develop toolkits and educational materials that are inclusive, catering to diverse audiences including persons with disabilities, neurodivergent students, migrant or multicultural students, and learners experiencing educational poverty.
- Translate resources into the local language that is relevant to the community to enhance engagement and foster trust
- Ensure accessibility through multiple formats such as easy-to-read texts, augmentative and alternative communication, sign language videos, and verbal descriptions.
- Translate materials into multiple languages to support global reach.

- **Peer-to-Peer and Intergenerational Learning:**

- Promote collaboration between students from Fine Arts schools and younger learners through open calls and co-created workshops.
- Encourage mentorship and knowledge exchange across age groups to strengthen community bonds and learning outcomes.
- Mentorship programs in ocean literacy will bridge the gap between knowledge and action by providing opportunities for socio-economically disadvantaged students to receive guidance on topics that they are interested in

- **Digital Platforms and Dissemination:**

- Utilize digital tools, such as interactive maps or online exhibitions, to showcase student work and foster international exchange.
- Ensure that the outputs of workshops and learning activities are widely shared to maximize impact.
- Gaming is a powerful tool in ocean literacy. It enables beneficiaries to interact with the ocean to explore, experiment and solve problems in the virtual environment, especially for those beneficiaries who cannot access the ocean.

- **Principles for Effective Education:**

- Emphasize multidisciplinarity, connecting cultural heritage with contemporary environmental knowledge.
- Apply intersectional, inclusive, and participatory methods that empower all learners.
- Anchor programs in research-based insights on behavioral change toward sustainability.
- Focus on developing key competences for lifelong learning, ensuring that students acquire skills that can drive societal transformation.

- **Contribution to Global Ocean Sustainability Goals:**

- Align educational activities with the Decade of Ocean Science for Sustainable Development by generating knowledge that can inform policies and support sustainable practices.
- Foster a mindset shift toward more sustainable patterns, contributing to the growth of a globally connected “blue community.”

Inclusive communication promotes the social and educational role of marine science, especially in this time of significant change, by positioning the ocean as a physical, social, and political connector that includes everyone. This involves developing facilitators, campaigns, and digital resources focused on marine science and blue education.

Briefing Note # 6

Ocean20: Blue Foods

Key Recommendations:

1. Integrate blue foods into national planning processes and mechanisms (NDCs, NAPs, NBSAPs), national dietary guidelines, national health policies and national trade accounting systems.
2. Promote integration of nutrition outcomes into fisheries management and sustainable aquaculture development.
3. Recognise and support the central role of small-scale actors and women in blue food systems to ensure healthy, just and sustainable food systems transformation.
4. Promote the inclusion of blue foods in diets as a sustainable and nutritious option for enhancing food diversity.
5. Foster regional cooperation to build resilient blue food value chains across borders, support value addition and product diversification and promote food safety.

Acronyms for noting:
NDC - Nationally Determined Contributions
NAP - National Adaptation Plan
NBSAP - National Biodiversity Strategy and Action Plan

This briefing note was developed under the auspices of Ocean20 South Africa 2025 through a stakeholder consultative process.

Ocean20: Blue Foods

Aquatic “blue” foods play a critical role in global food security. They are highly diverse, rich in protein, essential micronutrients, and fatty acids, and often critical to marginalized resource users, while offering sustainable alternatives to many terrestrial animal-source proteins.

Food systems are located at the nexus of global goals for health, environment, climate, and justice. The recent report by the EAT-Lancet Commission on Healthy, Sustainable and Just Food Systems[78] illustrated how current food systems account for nearly 30% of global greenhouse gas emissions. Food systems are also the largest contributor to pushing five of the six planetary boundaries processes that regulate life on earth over their defined thresholds. These include Climate Change, Biosphere Integrity, Land System Change, Freshwater Change and Biogeochemical Flows. Transforming the way in which food systems are developed and managed, including the use of under-utilized aquatic production systems such as seaweed and kelp, could cut these greenhouse gas emissions in half.

The lack of awareness of the important contribution of blue foods, as well as unsustainable practices such as illegal, unregulated and unreported (IUU) fishing, climate change, ecosystem degradation, vague and often inconsistent policy frameworks, and a lack of targeted financing, threaten the resilience of aquatic food systems and by extension the communities that rely on them. This brief explores how just and equitable blue food contributions to food security and socio-economic development, could support the G20 agenda, through inclusive and locally-managed resources. It highlights the importance of considering both terrestrial and aquatic food systems as a part of complex socio-economic and ecological systems. The brief recognises the interconnectedness of human well-being, environmental health, and governance, aligning with the broader G20 commitments.

The recommendations build on insights from the T20 Indonesia policy brief “Integrating blue foods into food system policy and practice”[79] and the United Nations Food and Agriculture Organisation (FAO) reports on Blue Transformation. They also align with the 2030 Agenda for Sustainable Development Goals (SDGs), particularly SDG-2 (Zero Hunger), SDG-13 (Climate Action), and SDG-14 (Life Below Water). In the context of Africa, the recommendations align closely to the recently adopted Comprehensive Africa Agriculture Development Program (CAADP) Kampala Declaration, Strategy, and Action Plan (2026-2035), and provide tangible examples from regional blue food systems, including in South Africa, to highlight best practices and success stories.

[78]Rockström, J. et al. The EAT–*Lancet* Commission on healthy, sustainable, and just food systems. The Lancet, Volume 406, Issue 10512, 1625 - 1700

[79]https://www.global-solutions-initiative.org/publication/integrating-blue-foods-into-food-system-policy-and-practice/

1. Blue foods in global food systems

Blue foods play a critical role in global food security. More than 40 percent of the world's population depends on aquatic foods for at least 20 percent of their animal protein intake.[80] For hundreds of millions of people, these foods are their primary source of protein and provide essential micronutrients such as calcium, iron, vitamin A, vitamin B12, and omega-3 fatty acids. In many places, these micronutrients cannot be easily replaced by land-based alternatives.[81]

Blue foods are particularly important for developing countries and vulnerable communities. Globally, around 600 million people depend, at least partially, on the aquatic food sector for their livelihoods, with nearly 500 million involved in small-scale fisheries and aquaculture supply chains.[82] Women play key roles in these systems, comprising 24% of fishers and fish farmers and 62% of processing workers around the world in 2022, where sex-disaggregated data are available.[83] In the small-scale capture fisheries sector alone, women constitute approximately 47% of workers, accounting for around 56 million jobs along the entire fisheries value chain, and are most active in processing and trade activities[84].

Blue and green food systems are deeply interconnected – in diets, in supply chains, and in the environment[85]. For example, capture fisheries provide feed inputs for aquaculture and livestock; terrestrial crops provide feed inputs for aquaculture. Excess nutrients from agriculture and aquaculture can pollute rivers and cause coastal dead zones, undermining fisheries and ecosystems. Blue foods are globally the most traded food products – for developing countries, net revenues from trade of blue foods exceed those of all agricultural commodities combined[86].

Climate change poses severe challenges to blue food systems. Rising atmospheric greenhouse gas (GHG) concentrations affect marine and freshwater production capacities, aquaculture feed supply, and post-production processes. For example, pelagic fisheries face shifts in species distributions, while coral reef fisheries and bivalve production suffer from ocean acidification. Inland fisheries contend with changes in freshwater quality and availability, and fed aquaculture is impacted by terrestrial crop losses affecting feed supply. Small-scale actors, women, Indigenous communities, and other marginalized groups are particularly vulnerable to these climate impacts, especially those communities that rely on

[80] FAO. 2024. The State of World Fisheries and Aquaculture 2024 – Blue Transformation in action. Rome. https://doi.org/10.4060/cd0683en
[81] Golden, C. D., et al. 2021. Aquatic foods to nourish nations. Nature, 598(7880): 315-320.
[82] FAO. 2022. The State of World Fisheries and Aquaculture 2022. Towards Blue Transformation. Rome, FAO. https://doi.org/10.4060/cc0461en
[83] FAO. 2024. The State of World Fisheries and Aquaculture 2024 – Blue Transformation in action. Rome. https://doi.org/10.4060/cd0683en.
[84]https://www.fao.org/voluntary-guidelines-small-scale-fisheries/key-thematic-areas/gender-equity-and-equality/en
[85] Cottrell, R. S., et al(2018). Considering land-sea interactions and trade-offs for food and biodiversity. *Global Change Biology*, *24*(2), 580–596.
[86] FAO. 2020. The state of world fisheries and aquaculture 2020. Sustainability in action. Rome. https://openknowledge.fao.org/items/b752285bb2ac-4983-92a9-fdb24e92312b

aquatic food for sustenance and economic stability.[8788] Ensuring these groups are represented in planning and decision-making is important for enhancing the resilience of aquatic food systems and supporting food and nutrition security.

Blue foods can also play roles in reducing GHG emissions from food systems. They generally have a lower carbon footprint than terrestrial animal-source foods, with some, such as bivalves and seaweed, having minimal or neutral GHG emissions[89]. Sustainable management of aquatic food systems offers significant potential for reducing emissions in existing systems by, for example, more effectively managing capture fisheries. There is an even bigger opportunity for emission reduction by shifting from high-emission species and practices to lower emission species. There is considerable variation in GHG emissions across different species, geographical regions, and farming practices. For instance, the CO2 emissions from small pelagics are one-eighth those from flatfish, while bivalves emit, on average, one-ninth the CO2 of farmed shrimp. Targeted investments in sustainable and low-carbon aquatic foods can support low-emission development strategies, addressing both poverty and food and nutrition insecurity.

2. Blue foods in Africa/South Africa

Africa's population totalled more than one billion in 2024. An average of 15.2% of Africa's people remain undernourished, representing a decrease of only 2.4% over the past 10 years. Blue foods from fisheries and aquaculture, provide food and nutritional security to an estimated 200 million people. While aquatic animal products contribute an estimated 18% of all animal protein in Africa (more than the global average of 15%), the average per capita annual fish consumption is only 9.4kg, less than half of the global average, and is projected to decline further without targeted interventions. A growing population and increased per-capita income are estimated to increase demand for aquatic products by 30% by 2030.

Africa is grappling with significant health challenges linked to deficiencies in essential micronutrients, such as vitamin A, vitamin B12, zinc, and iron, which have contributed to approximately 257 million people being classified as undernourished. Recent studies have increasingly highlighted seafood as a rich source of bioavailable macro and micronutrients, presenting a unique opportunity to bolster nutrition across the continent. Blue foods not only represent one of the few sustainable protein sources, but it also has the potential to help countries remain within the planetary boundaries by promoting a more environmentally friendly and just food system[90].

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[87] FAO. 2024. Blue transformation actions on climate resilient aquatic food systems

[88] Cooley, S., et al, 2022: Oceans and Coastal Ecosystems and Their Services. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M.the FAO strategy on climate change. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 379–550, doi:10.1017/9781009325844.005.

[89] Gephart, J. A., et al. 2021. Environmental performance of blue foods. Nature, 597(7876): 360-365

[90] FAO. 2024. The State of World Fisheries and Aquaculture 2024 – Blue Transformation in action. Rome. https://doi.org/10.4060/cd0683en.

This promise is, however, tempered by growing concerns regarding the sustainability of blue foods, as approximately 35% of capture fish stocks in Africa are fully exploited or overfished. This sustainability dilemma raises questions about the long-term viability of relying on fisheries to bridge the nutritional gaps. Nevertheless, research indicates that a relatively small fraction of the available production from fisheries could effectively close these nutrient gaps[91]. For instance, in Namibia, only 9% of the fish caught within their Exclusive Economic Zone (EEZ) is needed to meet the dietary iron requirements of its population, while in West Africa, the nutritional needs of all children under five could be fulfilled with 20% or less of the current catch.

Despite these findings, many African countries are falling short in leveraging blue foods to meet their nutritional needs. For example, South Africa currently meets only 9% of its protein requirements through blue food, Mauritania meets only 10% of its protein needs through blue foods, Gabon meets 40%, and Tunisia meets 18% of its protein needs through blue food. The high and low percentages seen in these countries can be attributed to either an increase in exports, fisheries, or aquaculture production, and/or an increase in imports[92].

Fisheries and aquaculture are an essential commodity sector, providing a critical contribution of aquatic foods to Africa's agri-food systems. Fish remains Africa's most highly traded commodity, contributing to international, as well as intra- and inter-regional fish trade. Africa is currently a net exporter of aquatic animal products, but significant volumes of fish are imported to meet growing demands and supplement animal protein needs[93]. The heavy reliance of Africa on external aquatic food supply chains is a significant food security risk.

Some of the key interventions required to shift the transformation of food systems towards more sustainable, just and healthy solutions will require comprehensive and integrated responses that: promote increased investment into the sector; strengthen fisheries management and sustainable aquaculture development, including the diversification of production to include previously under-utilized aquatic production systems; increase inclusivity and empowerment of small-scale actors, women, youth and marginalised groups; and strengthen resilience to shocks.

[91] Coomson, J. B., Smith, N. W., & McNabb, W. (2025). Contribution of large-scale food fortification to micronutrient requirements of women of reproductive age in Sub-Saharan Africa. Proceedings of the Nutrition Society, 84(OCE2), E168.
[92] Akinyemi, T. J., Boustany, A., Finkbeiner, E., Gephart, J., Zuercher, R., (in prep) Impacts of fisheries, aquaculture and trade on nutrients available through blue foods in Africa
[93] FAO. 2024. The State of World Fisheries and Aquaculture 2024 – Blue Transformation in action. Rome. https://doi.org/10.4060/cd0683en.

Photo: Tamaryn Morris

Briefing Note # 7

Ocean20: Accessible Ocean Observing Technologies

Key Recommendations:

1. Leverage financing mechanisms by mobilising blended finance and innovation funds to scale affordable ocean technologies for climate resilience and blue economy growth.
2. Support a global framework for affordable and open ocean technologies and promote co-design with developing countries.
3. Strengthen data equity by encouraging G20 member states to expand open-access data policies, leveraging accessible software and shared digital infrastructure.
4. Invest in capacity building by enhancing technical training, establishing regional innovation and sensor calibration / validation hubs, and promote citizen science programmes using internet-enabled mobile devices to empower equitable participation.

This briefing note was developed under the auspices of Ocean20 South Africa 2025 through a stakeholder consultative process, including inputs from the Partnership for Observation of the Global Ocean (POGO) Director's Meeting and Nippon Foundation-POGO (NF-POGO) Centre of Excellence scholar cohort for 2024 / 2025.

Ocean20: Accessible Ocean Observing Technologies

The ocean is foundational to the global climate stability, economic prosperity and human well-being. While there have been many advancements in ocean observing technologies, access and data collection remains biased to the Global North. The tools required to observe, monitor and sustainably manage the ocean remain largely inaccessible to many regions around the world, due to funding constraints, tariffs and sustained and impactful knowledge transfer, leaving many developing and small island states unable to monitor and manage their ocean systems. The high cost, proprietary software and centralised research and development investments, compounded by the lack of data sharing have left many regions unable to contribute or benefit from ocean knowledge and innovation.

The G20 nations have previously recognised the importance of digital inclusion, innovation and climate actions in their objectives and recommendations. Supporting accessible ocean technologies aligns directly with these priorities and will further enhance:

- **Climate resilience:** Improved monitoring supports early warning systems for extreme weather and climate driven changes.
- **Blue Economies:** Broader access to technology enables responsible fisheries, aquaculture and marine resource management.
- **Scientific Innovation:** Inclusive research and development networks accelerate technological development and knowledge transfer across regions.

Recent initiatives demonstrate that accessible ocean technologies and open data policies can transform participation in ocean observation. Some examples include:

- Argo floats: This is an international program of autonomous instruments that measure the open ocean's temperature and salinity down to 2000m[94]. This data has become the backbone of scientific studies, state-of-the ocean reports and climate forecasts. A recent technological advancement by Seatrec[95] allows Argo float technology to generate its own power, making the floats last longer and allowing them to be more versatile.
- Sofar Spotter Buoys[96]: These instruments provide an affordable, cloud connected wave and weather monitoring platform. A complementary project to the spotter buoys is Bristlemouth[97], an open source hardware product that allows users to customize their oceanographic instruments allowing them to become more versatile.
- Solutions for Cost-Effective Ocean Observation Platform (SCOOP)[98]: A (largely) European funded project that provides a platform for "people involved in collecting marine and oceanographic observations in a cost-effective way" to create a community & share products

[94] https://argo.ucsd.edu/
[95] https://seatrec.com/
[96] https://www.sofarocean.com/products/spotter
[97] https://www.bristlemouth.org/
[98] https://www.scoop-ocean.org/

(at all stages of maturity). Projects such as the Coastal Observations Lab in a Box (COLaB)[99] make use of SCOOP to collate a region (and need)-specific suite of instruments to help low income countries and or regions observe and monitor their ocean using internationally standardised methods.

The G20 nations have a unique opportunity to promote inclusive innovations which enable equitable access to technologies that foster sustainable development and enhance global ocean resilience. This note recommends the establishment of a G20 Accessible Ocean Innovation Initiative supported by funding mechanisms that supports inclusive research and development and innovative ocean technologies, open data policies, capacity building and the development of communities of practice to extend these capacity building initiatives into established programmes.

1. Identifying gaps and needs in Accessible Ocean Observing Technologies

One of the first objectives within this discussion of accessible ocean observing technologies is to understand where there are gaps in ocean observing systems, be they coastal or open ocean, and if these gaps can be filled with accessible technologies. Three gaps that were highlighted in discussions included:

- Synthesis for data systems, especially new networks such as surface autonomous instruments and the integration of data from low-cost technologies currently being developed.
- High quality vs stable data and the reliability of data sets. Data needs to be handled efficiently and with the appropriate metadata to ensure continued value.
- Benthic sampling techniques such as camera systems and those providing biological samples for taxonomy. The use of AI to analyse large volumes of videodata acquisition and the need for sea-going vessels for deep sea sampling are essential.
- Calibration networks within regional hubs which assist in providing “cheaper” calibration opportunities for highly sensitive sensors such as oxygen and carbonate sensors.

One aspect that would greatly increase access to low-cost sensor technologies is mechanisms for accelerating the commercialisation of prototypes, accessibility workshops, open access to 3D printable versions of the hardware itself, twinning pilot projects for communities to learn from one another, access to databases for uploading data, and easy access to use of existing data.

[99] https://oceandecade.org/actions/coastal-observation-lab-in-a-box/

2. Barriers to procurement and maintenance of ocean observing technologies that could be addressed by the G20

Numerous barriers exist for developing countries and small island developing states to access ocean observing technologies, regardless of cost and affordability, which could be addressed through national economic policies. The G20 countries are encouraged to engage with the following recommendations to assist their ocean observing institutions to enhance their ocean observing networks:

- Encourage Global North and Global South interactions: While these exist to some degree, there also exists a great divide. The Global North are traditionally the leaders in the development of ocean observation technologies, but the Global South have many innovative ideas that hold great potential which could be of further interest.
- Joint measuring campaigns for both science and capacity development opportunities: It must be noted "parachute science", mostly impacting Global South states, continues to occur. This is the practice of researchers from more affluent countries collecting data in a countries' waters, "training" their scientists, but then processing and publishing these data without Global South participants. It is also incorrectly assumed that because there are no "dots on a map" of ocean observations that there are no ocean observations at all within these regions. There needs to be an honest and truly inclusive discourse around scientific campaigns, especially in foreign waters.
- Create and facilitate access to new markets and encourage procurement of technologies between G20 states.
- Government agreements, whether bilateral or multi-lateral, on preferential tariffs and import taxes for scientific equipment.
- Enabling implementation of F.A.I.R.[100] and C.A.R.E.[101] open science principles on data and data access.
- Encourage and facilitate citizen science projects and data systems.

[100] Findable, Accessible, Interoperable, and Reusable
[101] Collective Benefit, Authority to Control, Responsibility, Ethics

Briefing Note # 8

Ocean20: Deep-sea Mining - Why a Precautionary Pause is Needed

Key Recommendations:

1. Urgently consider a precautionary pause on deep-sea mining, prioritising circular economy approaches, product innovation, and terrestrial mining reforms.
2. Insist on the completion and scientific validation of the International Seabed Authority (ISA) Mining Code.
3. Establish robust standards for compliance, transparency, and equitable benefit sharing, particularly for African and developing countries before any exploitation commences.
4. Advance research into deep-sea ecosystems, and close scientific knowledge gaps before irreversible decisions are made.
5. Build ocean governance and deep sea research and knowledge capacity, including on good practice legislation and regulations, in Africa and other developing nations.
6. Strengthen multilateral stewardship of seabed minerals under the UNCLOS "common heritage" principle, resisting unilateral licensing or mining ventures that circumvent international law.

This briefing note was developed under the auspices of Ocean20 South Africa 2025 through a stakeholder consultative process.

Ocean20: Deep-sea Mining - Why a Precautionary Pause is Needed

1. Context

Technological advances have not diminished the uncertainty and risk associated with deep-sea mining. Exploratory mining activities in areas like the Clarion-Clipperton Zone cause destruction of seafloor habitats, impacting slow-growing benthic communities and generating sediment plumes that spread toxic[102] metals across marine environments[103]. The physical removal of habitat (for example nodules) and sediment disturbance kills immobile deep-sea fauna, including species not yet identified, impacting marine life far beyond mining sites. There exists no viable habitat rehabilitation process[104] and natural recovery of these ecosystems could take millions of years. These disturbances extend through the water column, potentially disrupting critical ocean processes such as carbon sequestration and threatening commercially important migratory fish stocks, with cascading effects on food security for vulnerable coastal and island nations[105]. In international waters, the International Seabed Authority (ISA) administers contracts for the exploration (and, in future, exploitation) of seabed minerals. Regulations for commercial exploitation of deep-sea minerals are still in development by the ISA and its member states.

2. Rethinking deep-sea mining in the green transition

Proponents frame deep-sea mining as indispensable to the global energy transition, particularly for metals like cobalt, nickel, and copper. However, growing evidence shows global supply chains can meet demand through terrestrial mining reforms, innovations in battery chemistry, and improved recycling, all with significantly lower economic, environmental and social costs. The European Academies Science Advisory Council (EASAC) illustrated that while global demand for metals is increasing, there is substantial untapped potential in circular economy strategies[106], including large-scale recycling of existing materials, improved product design for reuse, and technological innovations that reduce reliance on new extraction[107]. Such approaches can meet resource needs without jeopardising deep-sea environments that are ecologically invaluable, and risk irreversible damage from mining.

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[102] Hauton, C. et al. (2017). Identifying toxic impacts of metals potentially released during deep-sea mining – A synthesis of the challenges to quantifying risk. Frontiers in Marine Science, 4. https://doi.org/10.3389/fmars.2017.00368

[103] Benthic communities refers to the diverse groups of organisms that live in, on, or around the seafloor or bottom of any aquatic body of water, such as an ocean, lake, or river.

[104] Niner, H.J. et al (2018). Deep-sea mining with no net loss of biodiversity - an impossible aim. Frontiers in Marine Science, 4.

[105] Crane, R., Laing, C., Littler, K. et al. (2024). Deep-sea mining poses an unjustifiable environmental risk. Nat Sustain 7, 836–838. https://doi.org/10.1038/s41893-024-01326-6

[106] Gaustas et al. 2018. Circular economy strategies for mitigating critical material supply issues. Resources, Conservation and Recycling 135, 24 - 33. doi.org/10.1016/j.resconrec.2017.08.002

[107] https://easac.eu/publications/details/deep-sea-mining-assessing-evidence-on-future-needs-and-environmental-impacts

The EASAC also finds that the production targets envisioned by the ISA for nodule mining would contribute a relatively small fraction of future demand for metals like nickel and copper. Research on mining polymetallic sulfides, such as those in hydrothermal vent fields found along the Mid-Atlantic Ridge and western Indian Ocean Ridges around Africa, indicates that even in regions where the ISA has issued exploration contracts, the potential yield is marginal compared to what can be achieved through robust circular economy measures[108]. Protecting deep-sea ecosystems while advancing metal recovery from existing supply chains represents a more sustainable pathway to a carbon-neutral future.

3. Lack of agreement on regulations

The absence of internationally agreed regulations and a broad social license, with mounting opposition from countries, indigenous groups, fishers, scientists, and corporations alike, underscore the urgent need for precaution. The potential for deep-sea mining to exacerbate global biodiversity loss and undermine ocean health is at odds with international commitments to sustainable development, ocean governance, and climate resilience.

The rush for deep-sea mining ignores the risks of irreparable harm to complex ecosystems that are the least understood on the planet. An intermittent pause on deep-sea mining, in line with the precautionary principle of international law, is warranted until robust scientific assessments, regulatory frameworks, and sustainable alternatives are established to prevent irreversible harm to marine ecosystems and biodiversity[109].

4. Critique of deep-sea mining narratives

Multiple governments, scientists, and civil society organisations have called for a precautionary pause or moratorium, recognising deep-sea mining as profiteering by a few at the expense of shared ocean heritage and global stability[110]. The economic viability of deep-sea mining remains uncertain, raising questions about its long-term stability and ability to deliver equitable benefit sharing, environmental management, compliance, and transparency.

States should recognise that deep-sea mining, as a source of short-term economic gain, is fundamentally misleading, given robust scientific evidence showing the risks to deep-sea biodiversity and global ecosystem functions remain unresolved and could cause irreversible harm. It is essential to ensure that gaps between the temporary commercial benefits to seabed miners translate to compensation for the long-term threats to economies dependent on sustainable land-based mineral exports and vibrant ocean systems.

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[108] Van Dover, et al (2018). Scientific rationale and international obligations for protection of active hydrothermal vent ecosystems from deep-sea mining. *Marine Policy*, 346. https://www.sciencedirect.com/science/article/pii/S0308597X17306061

[109] Amon, et al (2022). Assessment of scientific gaps related to the effective environmental management of deep-seabed mining, 138 Marine Policy. https://doi.org/10.1016/j.marpol.2022.105006

[110] https://news.mongabay.com/2025/06/madness-world-leaders-call-for-deep-sea-mining-moratorium-at-un-ocean-summit/

- Countries at risk of economic harm due to deep-sea mining, including those reliant on terrestrial mining and healthy marine environments, should insist on clear and robust compensation mechanisms, as required under international law, before any mining begins.
- Compensation schemes must fully account for lost export revenues, negative ecosystem impacts, and broader socio-economic damages, including for developing states, as stipulated by the United Nations Convention of the Law on the Sea (UNCLOS).
- In the absence of agreed mechanisms to ensure sufficient and equitable compensation for vulnerable states, a precautionary pause should be adopted to halt deep-sea mining activities until outstanding scientific, economic, and justice issues are resolved through transparent multilateral negotiations.
- Such a pause aligns with the precautionary principle and respects the principle that ocean resources in international waters constitute the "common heritage of humankind", requiring careful stewardship for current and future generations

Further, the widespread myth that deep-sea mining is essential for national security, often leveraged by mining interests, fails to address real supply chain bottlenecks, which lie in policy, not resource scarcity. The international community has highlighted that mining the deep seabed risks undermining decades of multilateral ocean protection efforts and breaches the "common heritage of humankind" principle enshrined in UNCLOS.

5. A deep-sea mining pause is in harmony with the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement

The BBNJ Agreement, having reached over 60 ratifications, presents a historic opportunity for the G20 to demonstrate international leadership in ocean governance through support for a precautionary pause on deep-sea mining. Harmony between a deep-sea mining pause and the BBNJ's objectives is reflected in several key articles, notably the commitment to the "conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction" and the explicit emphasis on measures such as Marine Protected Areas (MPAs) and environmental impact assessments.

A precautionary pause on deep-sea mining aligns with Article 7 of the BBNJ Agreement on the application of the precautionary approach, enabling rigorous scientific and technical review before any industrial exploitation, while Article 8 ensures that states actively promote the objectives of the Agreement during international decision-making, including at the ISA[111]. This approach not only safeguards rare species and vulnerable marine ecosystems but also facilitates capacity-building, fair and equitable benefit sharing, and technological cooperation as stipulated in the Agreement.

[111] Thiele, T. and Kachelriess, D. (2024) Deep Dives? Part VII of the BBNJ Agreement: Financial Resources and Mechanism. High Seas Alliance Briefs. At https://highseasalliance.org/wp-content/uploads/2024/05/DeepDives-finance-2.pdf

The two governance systems, ISA's mining regime and BBNJ's conservation mandate, risk mis-alignment if deep-sea mining precedes systematic prioritisation of important biodiversity areas and spatial planning to support coordinated ecosystem-based management. Mining exploitation contracts in key biodiversity areas, including areas that the BBNJ Agreement seeks to safeguard through MPAs, could render BBNJ protections ineffective, especially if not preceded by robust scientific baselines and environmental assessment[112].

6. The leadership required

A precautionary pause on deep-sea mining is legally crucial because current regulatory gaps and scientific uncertainties make responsible exploitation impossible under international law. UNCLOS mandates the ISA to protect the "common heritage of humankind," but in 2021, the so-called "two-year rule"[113] was invoked by Nauru, a Small Island Developing State in Micronesia, formally requesting the ISA to finalize the exploitation regulations within that time frame. The ISA has failed to adopt such regulations, resulting in a governance vacuum and significant risk to marine ecosystems. The two-year rule has thus forced the ISA to consider mining applications without clear safeguards in place[114]. Still, this rule does not obligate approval without proper environmental protection or full regulatory frameworks, and ultimately demonstrates why a precautionary pause accords with the precautionary obligations of UNCLOS. Importantly, UNCLOS was negotiated during the 1970s, when climate concerns were minimal in international discourse, and so its frameworks need to be complemented by contemporary scientific findings around ocean resilience and climate impacts.

A precautionary pause on deep-sea mining would offer several benefits: it would give time for the international community to fill regulatory, scientific, and institutional gaps, strengthen global governance, and avoid irreversible harm to deep-sea ecosystems, while aligning with the precautionary approach necessary for intergenerational equity. Achieving a precautionary pause on deep-sea mining demands bold leadership, particularly at platforms such as the G20, where broad consensus and political commitment are required to ensure that deep-sea mining is not authorised until all risks are understood and regulated; this safeguards both global environmental interests and the standing of international law in an era of climate emergency.

[112] Hernández, A. (2024). The interaction between the BBNJ Agreement and the ISA regulatory regime: A case study on the EIA and ABMT (Master's thesis, Joint Nordic Masters Programme in Environmental Law). https://munin.uit.no/bitstream/handle/10037/34405/thesis.pdf?sequence=2&isAllowed=y

[113] https://enb.iisd.org/international-seabed-authority-isa-council-28-2-summary

[114] Singh, P. A., Jaeckel, A., & Ardron, J. A. (2025). A Pause or Moratorium for Deep Seabed Mining in the Area? The Legal Basis, Potential Pathways, and Possible Policy Implications. *Ocean Development & International Law*, *56*(1), 18–44. https://doi.org/10.1080/00908320.2024.2439877

Photo: Tamaryn Morris

Briefing Note # 9

Ocean20: Freshwater Flowing into the Ocean is not Wasted

Key Recommendations:

1. Recognise that the provision of freshwater to the marine environment is a shared mandate between the lead agencies mandated to regulate water, fisheries and the environment.
2. Formally incorporate marine environmental flow requirements into water resources allocation processes.
3. Develop new legislation and resource management tools under environmental legislation to secure coastal ecosystem integrity, processes and fisheries resources, and ensure cumulative impacts are considered when decisions on freshwater flow are made.
4. Address shortfalls in existing water resource allocation processes that fail to account for marine and coastal flow requirements (water quantity, quality and sediment loads).
5. Prioritise research funding to address critical knowledge gaps on linkages between aquatic systems, with consideration of international opportunities.
6. Further scientific research and capacity enhancement opportunities to expand global understanding of the impacts of freshwater reduction on the coast.

This briefing note was developed under the auspices of Ocean20 South Africa 2025 through a stakeholder consultative process.

Ocean20: Freshwater Flowing into the Ocean is not Wasted

1. Recognise the importance of freshwater flows to the marine environment

Freshwater flowing from rivers and groundwater into the sea is not wasted, and is essential for coastal and marine food production, livelihoods, tourism and future climate resilience. Adequate freshwater and sediment inputs play a key role in the functioning and health of marine and coastal ecosystems and in ensuring productive fisheries. Freshwater flows to the sea maintain important physical habitats (e.g., beaches and subtidal mudbanks); provide nutrients and detritus to coastal food webs; and support important ecological processes.

Freshwater inputs are essential not only for water but also for the sediment and nutrients they provide. Fluvial sediments transported to the coast are critical for ensuring healthy beaches and dunes, as well as creating offshore muddy habitats that support key fisheries. For example, within South Africa, sediment delivery to the coast through rivers and estuaries, and the natural movement of sand across land and in the ocean surf and inner shelf zones has not been well managed. Many beaches and dunes are in a state of erosion, and in some places, beaches are being lost as they erode to bedrock. Extensive beach erosion has significantly compromised critical infrastructure (e.g., coastal roads and rail lines), residences (e.g., Kwa-Zulu Natal Province) and has the potential to impact tourism. Without beaches and dunes in the littoral active zone, South Africa is more vulnerable to climate change impacts, such as ocean storms, sea level rise.

Many important offshore marine mud ecosystems on the South African continental shelf rely on land-derived sediment input to maintain their functioning. The west coast mud belt (60-120m depths) extends from the Namibian border to St Helena Bay covering more than 10 000 km2. This mud belt is maintained through sediment deposition from the Orange and Olifants Rivers. It supports relatively high biodiversity and ensures food security as a nursery ground for juvenile hake, which makes up the largest proportion of the South African Fisheries catch.

uThukela sediment supply to the uThukela Banks MPA

Catchment-derived nutrients are an important component of coastal and marine foodwebs stimulating phytoplankton production. A KwaZulu-Natal study showed that suspended riverine particulate organic matter (e.g. terrestrial, aquatic plant material) plays an important role in supporting inshore filter-feeder communities such as red bait Pyura stolonifera, mussels Perna perna, and oysters Striostrea margaritacea and Saccostrea cuccullata. It was found that up to a third of marine filter-feeder diets consisted of material introduced by rivers.

Mzimvubu plume

The trophic roles provided by rivers coupled with their influence on coastal turbidity and suspended sediment are thought to have a profound influence on the types of marine organisms characterising large areas of the coast. For example, along the northern KwaZulu-Natal coast in South Africa where there is a dearth of rivers, coral communities thrive due to the clear low nutrient waters. Further south, however, there is significantly more riverine input which results in communities dominated by filter-feeders and a paucity of light-reliant corals. Thus contributing to South Africa's high coastal diversity.

At local scales, sand introduced to the sea via rivers plays a role in structuring benthic communities by altering disturbance regimes. For example, reef communities growing on a vertical reef where there is limited sand inundation and disturbance are often dominated by monospecific stands of filter feeders, such as red bait, whereas communities growing on a horizontal reef where there is periodic sand inundation tend to have higher levels of diversity as they experience regular disturbance, thereby reducing the chance of monopolisation by one or a few competitive species.

Contrasting levels of turbidity characterising different bioregions of the KwaZulu-Natal coast has a profound effect on ecosystem structure and functioning

Fisheries resources globally are vulnerable to changes in freshwater inputs including soles, linefishes such as kobs and steenbras, and prawns. The ecological needs of transitional waters (i.e. freshwater dependent coastal and marine ecosystems) must be considered in the allocation of freshwater resources to ensure healthy functioning marine ecosystems that support productive and sustainable fisheries. For example, the loss of offshore muds is believed to have contributed to the poor catch rates of trawled soles of the Orange River Mouth after the construction of large dams in the 1970s and 1980s.

In short, freshwater flowing into the sea is not wasted. Changes in freshwater flow and associated variations in sediment supply, salinity, turbidity, nutrients and detritus can impact marine biodiversity and fisheries resources and decrease their socio-economic value.

2. Understand the impact of present flow reduction on coastal environments

Reduced river inputs have a significant impact on coastal and marine ecosystems around coastline's globally. The impacts of altered freshwater flow reduction extend offshore with responses to flow patterns measured in catches of commercial linefish documented. For example, the total freshwater flow to the marine environment in South Africa has been reduced from 36 900 to 24 800 million m^3/year (more than 12 000 million m^3/year reduction). Globally larger river systems have experienced the greatest flow reduction and are therefore expected to have driven the most change in marine ecosystems. The reduction of river flow leads to a reduced sediment supply to the coast with implications for beaches and subtidal habitats. Reduced sediment input can change beach dynamics, accelerating beach erosion and can even lead to the loss of beach habitat. In the subtidal environment, fluvial inputs provide important sediment inputs for the maintenance of submarine

fluvial fans outside the mouth of large river systems. Many of these habitats are also important for ecological processes. For example, in South Africa the endemic and endangered white steenbras Lithognathus lithognathus is believed to spawn on submarine fluvial fans, a localised habitat of a limited extent. Changes in salinity and water temperature linked to flow alteration also impact thermohaline fronts which affect plankton feeding communities and the fish, birds and mammals that feed on the concentrated food associated with these habitats.

Important processes that can be compromised through altered freshwater flow include nursery functions, environmental cues, productivity and food web processes. Increased frequency of estuary mouth closures and associated conditions due to reduced freshwater flow can also disrupt lifecycles and connectivity, and deprive fish and invertebrates of the important nursery function of estuaries. Sediment input leads to turbidity providing an important refuge for fish which is a key component of estuarine, coastal and offshore nursery areas. Reduced turbidity can alter predation pressure and the catchability of fishes. Altered freshwater flow leads to changes in important environmental cues such as those relevant for spawning, recruitment and migration.

The impacts of reduced nutrient supplies will travel through coastal and marine ecosystems via foodwebs. Reduced detritus also impact marine food webs as river-associated detritus are important food sources for filter feeders, detritivorous fish and invertebrates.

3. Address the policy gaps in ensuring healthy, safe and productive coasts and resources

Freshwater flow allocations and Environmental Management Objectives (RMOs) are generally determined under national or regional water acts. Both surface and groundwater requirements need to be addressed. However, at present, the South African Water Act does not recognise river-influenced nearshore marine ecosystems as a 'water resource'. As a result, the flow requirement processes exclude freshwater allocations to these critically important estuarine-associated ecosystems, with serious implications/ knock-on effects to estuaries, offshore ecosystems and marine species, e.g. limited spawning habitat (subtidal fluvial fans) for White Steenbras. Concern thus also exists around ensuring ecosystem functionality to meet globally committed biodiversity protection targets and their associated freshwater flow requirements as conservation priorities are still simply viewed as 'another water user' in a catchment, rather than their freshwater allocations being given a higher priority to sustain the fabric of life and associated ecosystem services.

At present, the 'Classification' process seems to view existing water resource use as sacrosanct, while other forms of resource use, e.g. fishing or pollution, are treated as negotiables. To reach a truly balanced distribution of ecosystem benefits even existing lawful uses may need to be redistributed through compulsory licensing mechanisms.

Furthermore, globally, the objectives and principles of fisheries-related legislation include a commitment to implementing an 'Ecosystem Approach to Fisheries Management'. These include the need to develop fisheries whilst maintaining a sound ecological balance, protecting marine biodiversity and the ecosystem as a whole. Implicit within this is the need to protect ecological processes and ecosystem functioning, including environmental flows. Consequently, the allocation of

freshwater flows to fish and fisheries needs to be explicit in water resource management processes, and the current legislation needs to be adjusted to accommodate this.

Additional legislation that can be leveraged towards the protection and wise use of transitional waters include mandates relating to integrated coastal management and biodiversity protection.

4. **Invest in future research and monitoring needs**

Further scientific research and capacity building are needed to expand our understanding of the impacts of freshwater reduction on the coast:

- Improve scientific understanding of the role of freshwater flow in marine environments to support predictive capabilities in the assessment of the impact flow reduction have on the marine ecosystem, including the mapping of fluvial fans and identification of key beaches, the mapping of mud habitats and unique ecosystems, linking biological responses to flow patterns and linking fisheries management protocols to freshwater flows.
- The cumulative impacts of flow reduction, land-use change and climate change need urgent evaluation to inform future resource use, with a focus on sediment supply to estuaries, beaches and coastal ecosystems under future climate conditions (e.g. sea level rise, changing rainfall regimes and increased storminess).
- There is also a need to expand on the capacity of policymakers and governments to assess, monitor, and account for the climate mitigation and adaptation value of these ecosystems.

5. **Urgent recommendations to ensure adequate freshwater flows to the ocean**

Priority Actions for policy makers and resource managers:

- Recognise that the provision of freshwater to the marine environment is a shared mandate between the lead agencies mandated to regulate water, fisheries and the environment.
- Formally incorporate marine environmental flow requirements into water resources allocation processes.
- Develop new legislation and resource management tools under environmental legislation to secure coastal ecosystem integrity, processes and fisheries resources and ensure cumulative impacts are considered when decisions on freshwater flow are made.
- Address shortfalls in existing water resource allocation processes that fail to account for marine and coastal flow requirements (water quantity, quality and sediment loads).
- Prioritise research funding to address critical knowledge gaps with consideration of international opportunities.

The provision of freshwater to the marine environment is a wicked problem that straddles a range of sectoral mandates (i.e., water, fisheries, coastal management, biodiversity protection, waste management). It is thus critical that it be recognised as a shared mandate between the lead agencies mandated with water resources, fisheries and environmental management and protection.

Photo: Tamaryn Morris

Conclusion

We reaffirm that a sustainable and inclusive ocean economy is essential to human and planetary wellbeing. The choices made in this decade will determine the future of the ocean, and with it, the future of humanity. We therefore commit to coordinated, transparent, and science-based action, to solidarity among nations and peoples, and to placing ocean health at the heart of global climate, economic, and social resilience. Together, we will build a thriving, equitable, and sustainable ocean future, for people, planet, and prosperity.

For more information, please visit our website and socials

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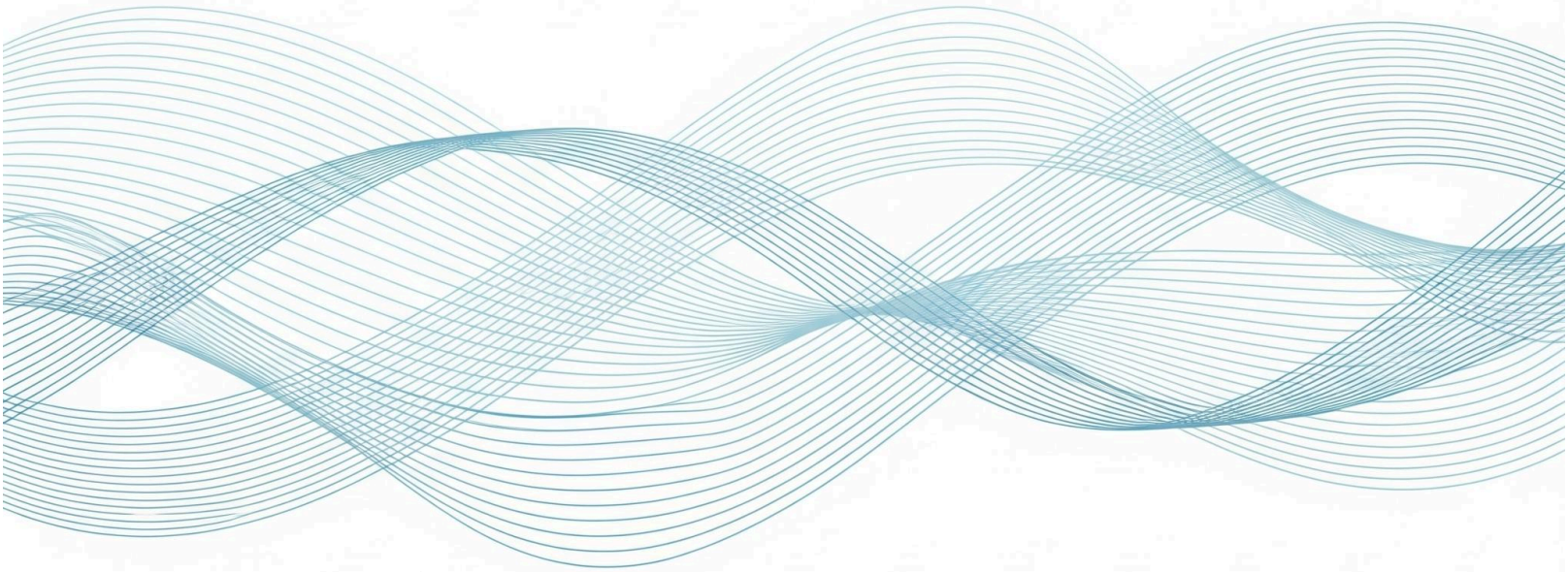

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