Catalyzing Responsible Offshore Wind in Developing Nations

THE ROLE OF CONCESSIONAL FINANCE

Ocean Conservancy®

orraa
Ocean Risk and Resilience Action Alliance

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OCEAN CONSERVANCY

Ocean Conservancy is working to protect the ocean from today's greatest global challenges, and there is no greater threat to our ocean than climate change. Ocean Conservancy supports sustainable ocean-based climate solutions, and works with all levels of government, society, and the private sector to implement these solutions and help build demand for climate action. Ocean-based climate mitigation solutions critical to avoiding a climate crisis include phasing out offshore oil and gas development, supporting responsible marine renewable energy, like offshore wind, protecting blue carbon ecosystems, and reducing plastic production. Ocean Conservancy and Orsted co-led the development of the Marrakech Partnership Ocean Renewable Energy Breakthrough.

OCEAN RISK AND RESILIENCE ACTION ALLIANCE (ORRAA)

ORRAA is the only multi-sector collaboration connecting the international finance and insurance sectors, governments, non-profits, and stakeholders from the Global South to pioneer finance products that incentivise investment into coastal and ocean Nature-Based Solutions (NBS). ORRAA's mission, by 2030, is to activate at least US$500 million of investment into this space, and in so doing, help build the resilience of 250 million climate vulnerable coastal people.

This project is part of an in-kind membership contribution to the Ocean Risk and Resilience Action Alliance (ORRAA) by Ocean Conservancy. Through this type of support, ORRAA's members enable us to scale our collective impact and to build the product pipeline from the ground up.

Photo Credit: Ashlyn Miranda

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Acronyms

CIF	Climate Investment Funds
COP	Conference of Parties
DFI	development finance institution
GCF	Green Climate Fund
GW	gigawatt (a billion watts)
IPP	independent power producer
IUCN	International Union for Conservation of Nature
LCOE	levelized cost of energy
MDB	multilateral development bank
MW	megawatt (a million watts)
MWh	megawatt-hour
ORRAA	Ocean Risk and Resilience Action Alliance
OSW	offshore wind
NPI	net positive impact [on biodiversity]
PPA	power purchase agreement
TA	technical assistance

Photo Credit: Allan Jay Quesada

Executive Summary

Accelerating the transition to clean energy is crucial to addressing climate change and protecting the ocean. Offshore wind (OSW) is a promising ocean-based climate mitigation solution with the potential for high energy output. It also a critical part of the renewable energy mix required to reach net-zero[1]. As part of the Ocean Breakthrough launched ahead of COP28 last year, dozens of organizations, including Ocean Conservancy and the Ocean Risk and Resilience Action Alliance (ORRAA), set a goal to install at least 380 GW of offshore wind capacity by 2030, while establishing targets and enabling measures for net-positive biodiversity outcomes, and advocating for $10 billion in concessional finance for OSW in developing countries.

This paper examines the role of concessional finance[2] in catalyzing OSW deployment in developing countries. It examines the current landscape of OSW, financing needs, and existing climate finance flows for renewable energy and OSW in particular. It then presents two opportunities for enhancing support for OSW in developing countries and concludes with a broader set of recommendations for promoting OSW projects.

THE CURRENT LANDSCAPE OF OSW GLOBALLY

Offshore wind capacity is growing rapidly, with 10.8 GW going online in 2023, for a total of 75.2 GW, according to the Global Wind Energy Council. As of this writing, there were 315 offshore wind farms operating worldwide, according to the Global Energy Monitor—the vast majority in China and Europe. Vietnam is the only developing country with OSW projects in operation, though a few more countries are developing projects, and several others have integrated OSW into their national energy strategies. For example, Tunisia and South Africa have launched regulatory initiatives and technical studies, and India, Vietnam, and the Philippines are exploring OSW's role in their energy futures. Some Small Island Developing States (SIDS) have also shown interest in OSW, and Cabo Verde is actively pursuing OSW policy frameworks.

The World Bank established the Offshore Wind Development Program in 2019 through its Energy Sector Management Assistance Program (ESMAP), in partnership with the International Finance Corporation (IFC). The program, with an initial term of five years, aims to equip national policy makers, regulators, and financiers with knowledge and tools for OSW investment, offering direct support to countries demonstrating a strong commitment to OSW-friendly reforms. Vietnam, Sri Lanka, Turkey, India, Azerbaijan, Colombia, the Philippines, South Africa, and Brazil are among the beneficiaries receiving customized technical assistance.

[1] *International Energy Agency released the 4th edition of Net Zero by 2050: A Roadmap for the Global Energy Sector*

[2] *Concessional finance is below-market rate finance provided by major financial institutions, such as development banks and multilateral funds, to developing countries to accelerate development objectives. The term does not represent a single mechanism or type of financial support but comprises a range of below-market-rate products used to accelerate a climate or development objective.*

The Offshore Wind Development Program has produced comprehensive handbooks and provides support for policy development in selected countries, aiming to establish a robust enabling environment for OSW projects. It also developed a model project, with a capacity of around 1 GW and an estimated capital expenditure (CAPEX) of US$2.9 billion. To achieve a competitive electricity price (the Levelized Cost of Energy, or LCOE), the model project would need to combine three concessional finance mechanisms: a grant subsidizing the developer's CAPEX by 10–25%; integrating up to 50% of the developer's loans as concessional debt; and allocating the cost of power export infrastructure (to deliver electricity from the wind farm to the power grid) to the national government, which would own and finance it through concessional sovereign loans.

CLIMATE FINANCE AVENUES AND TRENDS

The climate finance ecosystem involves a complex network of donor governments, international financial institutions (IFIs)—including multilateral development banks (MDBs)—and climate-specific funds, such as the Green Climate Fund (GCF) and the Climate Investment Funds (CIF), as well as some philanthropies. The GCF operates exclusively through accredited entities and nationally designated authorities, while CIF channels resources through MDBs, to countries with approved investment plans; neither has financed OSW projects to date.

Over the two-year period of 2021 and 2022, the Climate Policy Initiative (CPI) found that grants for climate projects averaged US$69 billion per year, but grant-based finance for renewable energy was particularly scant: only 4% of climate finance in the energy sector came as grants or low-cost project debt. While the low level of concessionality reflects the maturity and commercialization of many renewable technologies, CPI noted, having to borrow large amounts at market rates may pose real challenges for developing countries. Overall, data from Aid Atlas show, international development finance for renewable energy is modest, with just US$9.14 billion committed in 2021, including US$0.44 billion for wind (on- and offshore). This suggests mobilizing climate finance at the scale needed for OSW projects will require focused efforts.

One promising financial tool is green bonds—that is, bonds with proceeds allocated entirely to projects with environmental benefits—which have been issued by several national development finance institutions (DFIs), MDBs, and even private corporations over the past 15 years. Since 2019, global green bond issuance reached US$575 billion,including between US$6.8 - 9 billion in blue bonds for sustainable marine projects. Europe and North America have historically dominated the market, but countries in other regions are increasingly issuing green bonds.

Support for governments to create an enabling environment for OSW is also important. The Offshore Wind Development Program has helped Vietnam, Sri Lanka, Türkiye, India, and Azerbaijan make notable progress, and efforts are either underway or planned in Colombia, the Philippines, South Africa, and Brazil, along with a regional program for SIDS in the Pacific and Caribbean. These endeavours are complemented by the creation of roadmaps aligned with IFC performance standards for power generation projects.

Blended finance for private sector project developers, combining market-rate and concessional finance, is recognized as crucial for large-scale renewable energy projects in developing countries. Blended finance facilities' total investment in renewable energy declined by about 28% from 2018 to 2020, a survey by the Organisation for Economic Co-operation and Development (OECD) found. Still, the CPI report shows that renewable energy attracted about US$490 billion per year in 2021 and 2022, including both concessional and market-rate finance.

A World Bank report concludes that a blended finance approach could be used to add 10 GW of OSW capacity in five countries, requiring a total concessional financing of US$4.8 billion to government borrowers (for export infrastructure), and US$8.3 billion in loans and US$2.5 billion in grants to private developers for OSW CAPEX. This is a considerable amount of money, especially given the large demand for climate finance worldwide. Additionally, since no single source can fully finance the cost of model OSW projects for developing economies due to constraints meant to limit risk exposure of MDBs, effective coordination of different finance sources is essential.

TWO OPPORTUNITIES FOR ENHANCING CONCESSIONAL FINANCE FOR OSW

This study identified two key strategies for deploying concessional finance to accelerate OSW deployment in developing countries, each targeting a different aspect of the OSW development cycle, and both aimed at ensuring long-term environmental and social benefits:

1 **Technical assistance and direct concessional finance to national governments and sovereign enterprises:** This strategy aims to empower governments to manage OSW projects effectively by creating an enabling regulatory and policy environment; enhancing the quality and availability of data on OSW potential; and upgrading the power grid as needed to integrate OSW. This approach can heighten developer interest and prepare countries for investment, but it will not directly mobilize the substantial finance needed for OSW projects.

2 **Concessional finance to private entities, to be blended with commercial sources:** This strategy involves deploying blended finance instruments, including concessional loans and equity, to enhance the financial viability of OSW projects. It aims to reduce the cost of capital and alleviate the perceived risks associated with OSW projects in developing countries, improving the risk–return profile. It could help to attract significant private sector investment, but would not address broader infrastructural and technical capacity needs.

RECOMMENDATIONS

In line with Ocean Conservancy's commitment to protecting marine ecosystems and building the resilience of coastal communities while supporting sustainable OSW development, the following recommendations are drawn from the analysis presented in this paper:

- **Ensure that OSW projects are designed, built, and operated with a commitment to deliver a demonstrable positive impact on biodiversity.** Social and political acceptance of OSW technology depends to a great extent on whether it can be trusted to be safe and not harmful to marine ecosystems and coastal communities. Concessional finance could play a pivotal role in integrating conservation into offshore wind development. It has the potential to be a powerful tool for biodiversity safeguarding, particularly when coupled with environmental impact assessment, monitoring, and accountability.
- **Deepen technical assistance to interested national governments,** to increase governments' technical and regulatory capacity and to map potential OSW resources, identify sites, protect biodiversity and upgrade infrastructure as needed. The Offshore Wind Development Program, which is slated to end in 2024, should be extended or succeeded by another program continuing this work.
- **Scale up concessional finance for renewable energy, and specifically for OSW**, through climate finance mechanisms such as the GCF or the CIF as countries become investment-ready. Projects in many countries will only be viable if sufficient concessional resources are available to provide blended finance to private sector developers.
- **Build momentum through partnerships** between advocacy organizations, MDBs, donors, developing country governments, and OSW developers, with regular engagement. Leverage global initiatives Ocean Breakthroughs[3] and partnerships with the ambition to create a global driving force for the uptake of offshore wind, and convene a series of engagements to discuss how to mobilize more resources in favor of OSW in developing countries *and* coordinate efforts related to specific projects and country programs.

[3] *The ocean community united under the Marrakech Partnership for Global Climate Action developed a set of five Ocean Breakthroughs in advance of COP28 in 2023. The Ocean Renewable Energy Breakthrough set a goal to install at least 380 GW of offshore capacity by 2030 while establishing targets and enabling measures for net-positive biodiversity outcomes and advocating for $10 billion in concessional finance for OSW in developing countries.*

1 Introduction

Decarbonizing the energy system and accelerating the transition to clean energy is crucial to addressing climate change and protecting the ocean. Offshore wind (OSW) is a promising ocean-based climate mitigation solution option with the potential for high energy output. However, the expansion of OSW in developing countries is often hampered by financial constraints and the lack of adequate investment mechanisms.

The ocean community, united under the Marrakech Partnership for Global Climate Action, developed a set of five Ocean Breakthroughs in advance of COP 28. Ocean Conservancy co-led the development of the Clean Ocean Energy Breakthrough, which sets a goal to install at least 380 GW of offshore capacity by 2030, while establishing targets and enabling measures for net-positive biodiversity outcomes.[4] The Breakthrough also includes mobilizing $10 billion in concessional finance to support the deployment of OSW in developing countries.

This paper examines the role of concessional finance in catalyzing offshore wind projects in developing countries. It reviews the financial landscape in OSW and other sectors to identify the most suitable structures and modalities—existing and potential—and the resources needed to deliver climate finance to OSW to encourage strong investment, especially by private investors.

The introduction lays out the study's scope and presents key concepts. Section 2 provides more context on the role of OSW within the renewable energy subsector and examines global trends in concessional finance. Building on this, Section 3 introduces an analytical framework designed to assess the suitability of various options for advancing OSW in developing countries, then discusses three potential frameworks for applying concessional finance to OSW projects. Section 4 concludes with a synthesis and recommendations.

1.1 STUDY SCOPE AND KEY CONCEPTS

This study focuses solely on challenges and opportunities for offshore wind projects in **developing countries**, as defined by the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development (OECD) and aligned with the Marrakech Partnership for Global Climate Action.[5] It generalizes country-specific factors to develop a cohesive global approach, drawing insights from the global OSW market, particularly in developed countries. However, due to its global focus, it may not fully address challenges specific to certain countries, regions, or economy sizes.

[4] *See https://climatechampions.unfccc.int/system/oceanbreakthroughs/.*

[5] *See https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/daclist.htm and https://unfccc.int/climate-action/marrakech-partnership-for-global-climate-action.*

A key concept used in this study is blended finance, defined as a mix of commercial and concessional finance. Commercial finance encompasses all market-rate sources of finance, including development finance from multilateral development banks (MDBs) and other development finance institutions (DFIs). Concessional finance, as defined by the World Bank and International Finance Corporation (IFC), is support provided at below-market-rates by development banks and multilateral funds to help developing countries achieve development goals.

To maximize financing for OSW projects**, project-level financing** from concessional and commercial sources is prioritized, excluding broader technical assistance programs aimed at helping governments create an enabling environment. Project-level finance may encompass OSW-specific technical assistance necessary for project transactions, but this study does not delve into general technical assistance covering areas such as standardizing power purchase agreements (PPAs) or upgrading the national grid.

The approach used distinguishes between **private sector-led** and **government-led** OSW investments, but both are considered equally in the landscape analysis and recommendations. That said, the recommendations may differentiate between the two development channels based on the different financing approaches taken by MDBs and DFIs; many international climate funds also treat the two differently.

As in developed countries, a majority of OSW projects in developing countries are likely to be undertaken by private companies. Consequently, this study concentrates on **utility-scale projects** by **independent power producers** (IPPs) and their facilitation/financing, emphasizing research and recommendations tailored to the private sector project development cycle, including:

a. Creating an enabling environment for private sector participation in the OSW space (alongside other renewable technologies), especially as it relates to licensing and PPAs;

b. Reducing exogenous risks to these projects (i.e. from external sources), specifically derived from the developing-country context, including cross-cutting risks (scale, environmental, climate vulnerability), development risks; operational risks; and others;

c. Overcoming challenges related to implementing the very first OSW project in a country or region; and

d. Addressing common issues in developing countries, such as more complex transport/logistics, limited technical capacity, relatively higher construction costs; and exchange rate risk issues.

Notably, OSW will be **competing for very scarce concessional resources**, and the fact that OSW is dominated by large multinational corporations may lead to the perception that these projects need concessional finance less than other energy projects. Competing priorities include, for example, rural electrification, off-grid access and mini-grids, health sector electrification, and clean cooking. Mobilizing concessional resources for OSW at scale will be challenging, and whatever is secured will need to be deployed in concert with blended commercial finance.

Lastly, in order to ensure that OSW projects are truly sustainable, this study stipulates that the assessment of each project's potential impact on biodiversity should be aligned with the International Union for Conservation of Nature (IUCN) definition and methodology for Net Positive Impact (NPI).[6] The IUCN approach seeks to achieve overall positive biodiversity outcomes by combining measures to avoid and minimize negative impacts with rehabilitation and—for any residual impacts after those options have been exhausted—offsets. Net impact measurements are not standardized for ocean projects, but the study explores this as a potential avenue for enforcement and for incentives.

[6] *For overviews from both a conservation perspective and a business perspective, see: https://www.iucn.org/content/making-case-a-net-positive-impact-biodiversity.*

Photo Credit: EcoView, Adobe Stock

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Context and Financial Landscape

The Offshore Renewable Energy Ocean Breakthrough advocates the development of at least 380 GW of offshore wind and notes that OSW is a mature ocean-based energy technology that "offers a critical opportunity to unite global action on the Climate and Nature Agendas."[7] It continues:

As a key climate mitigation measure, its accelerated and large-scale development would support the urgent need to halt biodiversity loss, driven to a large extent by climate change. In addition, important efforts are underway to assess and understand how to minimise and avoid potential negative effects of the industry on marine biodiversity, while being able to deliver at the pace required.

The International Renewable Energy Agency (IRENA) has set an even more ambitious goal for OSW, with a 1.5°C scenario that calls for OSW capacity to grow nearly sevenfold by 2030, to about 500 GW globally, and reach nearly 2,500 GW by 2050.[8] As of this writing, in May 2024, Global Energy Monitor's Global Wind Power Tracker indicates that there are 315 OSW farms of any size operating in the world.[9] Only one developing country outside China, Vietnam, has OSW projects in operation: 42 per Global Energy Monitor, and 29 per TGS/4COffshore[10] (some of this divergence may be due to different definitions of projects versus project phases).

[7] *See https://climatechampions.unfccc.int/system/oceanbreakthroughs/.*

[8] *IRENA. 2023. "World Energy Transitions Outlook 2023: 1.5°C Pathway." Abu Dhabi: International Renewable Energy Agency. https://www.irena.org/Publications/2023/Jun/World-Energy-Transitions-Outlook-2023.*

[9] *See the interactive wind tracker map for more details: https://globalenergymonitor.org/projects/global-wind-power-tracker/tracker-map/.*

[10] *See https://www.4coffshore.com/windfarms/vietnam/.*

The overwhelming majority of OSW projects operating today are in East Asia (mainly China) and Europe, and the same is true of projects under development. However, the Global Wind Power Tracker shows some projects in preparation in developing countries, including in Brazil, Colombia, Uruguay, the Philippines, and Egypt (plus additional projects in Vietnam). Still, they account for less than 10% of OSW projects in pre-construction worldwide.

Like other renewable energy sources, OSW has seen a dramatic decline in cost, from 258% above the cheapest fossil fuel source in 2010, to just 17% higher in 2022.[11] Through most of 2022, OSW was growing at a promising rate in developed countries, and there was keen interest from both developers and financiers. However, the global rise in interest rates, compounded by other factors (including limited activism against viewshed impacts from turbines), led to a substantial contraction and slowdown in the deployment of OSW, especially in Europe and North America. The outlook improved somewhat in 2023, with 10.8 GW of OSW going online, the second-largest single-year addition to date, bringing total global OSW capacity to 75.2 GW, according to the Global Wind Energy Council.[12] Of this, just over half (38 GW) was in China, and about 46% (34 GW) in Europe, which had a record year for OSW, adding 3.8 GW.

Some governments in developing countries have prioritized OSW as a component or foundational element of their national energy strategy. For example, in Africa, Tunisia and South Africa are engaged in regulatory and enabling-environment initiatives, along with technical studies, supported by grants routed through MDBs. In Asia, India, Vietnam, and the Philippines have prioritized the analysis of OSW as part of their future energy mix. There is also great interest in OSW in some Small Island Developing States (SIDS), although concrete steps forward have not been observed widely, possibly due in part to the large scale of OSW projects relative to these countries' energy demand. However, there are some exceptions; notably, Cabo Verde appears to be well advanced in seeking grant support to enable policy frameworks for OSW projects.

The World Bank established its Offshore Wind Development Program in 2019 through the Energy Sector Management Assistance Program (ESMAP), in partnership with IFC.[13] The program was launched with an initial term of five years and a budget of about US$10 million, and it may be renewed. In addition to building a library of knowledge and educational materials for national policy makers, regulators, project developers, and financiers, the program also provides direct in-country support. One of the conditions for selection to receive in-country support was strong commitment by policy makers to prioritize reforms that enable OSW investments. Nine countries have or are receiving tailored technical assistance through the program: Vietnam, Sri Lanka, Türkiye, India, Azerbaijan, Colombia, the Philippines, South Africa, and Brazil.[14]

2.1 A 'MODEL' OSW PROJECT STRUCTURE

As part of the Offshore Wind Development Program, in 2023, World Bank and IFC experts produced a comprehensive report on concessional climate finance for OSW.[15] It includes a sample or model OSW project that provides valuable context for this study.

[11] COP28 Presidency et al. 2023. "Tripling Renewable Power and Doubling Energy Efficiency by 2030: Crucial Steps towards 1.5°C." The comparison is for the levelized cost of energy (LCOE).

[12] GWEC. 2024. "Global Wind Report 2024." Brussels: Global Wind Energy Council. https://gwec.net/global-wind-report-2024/.

13 For more details on the program, see https://www.esmap.org/esmap_offshore-wind and this presentation: World Bank Group. 2020. "World Bank Group Offshore Wind Development Program: The Vast Potential of Offshore Wind in Emerging Markets." Presentation given in June 2020. Energy Sector Management Assistance Program. https://www.esmap.org/sites/default/files/Presentations/WBG_Offshore-Wind_Webinar_Jun2020_optimized.pdf.

14 The program also has a regional technical assistance program for SIDS in the Caribbean, Papua New Guinea, and Fiji in an exploratory stage.

15 World Bank Group. 2023. "The Role of Concessional Climate Finance in Accelerating the Deployment of Offshore Wind in Emerging Markets." Washington, DC: Energy Sector Management Assistance Program. https://www.esmap.org/concessional-finance-for-offshore-wind.

The report finds that due to the size of the equipment and the cost of installation, operation, and management, a "normal" OSW project should have a capacity of about **1 GW**—much more than the average onshore wind farm. Drawing on current benchmarks for construction costs of operating OSW projects, the report estimates the total capital expenditure (CAPEX) for such a facility at **US$2.9 billion**. Of this, around 9% is for development costs; around 76% for the turbines, foundations, and cables between turbines; and 15% for the so-called "export" infrastructure required to aggregate, onshore, and connect the produced electricity to the grid. Additionally, the ongoing operations and maintenance (O&M) costs are anticipated to be covered by the private sector within the established tariff structures, ensuring the financial viability and sustainability of the OSW projects. Given the scope of this study and how recent the World Bank estimates are, these cost assumptions are taken as the best available data here.

Notably, a smaller country, including most SIDS, needs far less capacity to meet domestic demand, with implications for economies of scale. For example, Barbados has been considering OSW as one of several options for meeting all its energy needs with renewables by 2030.[16] Yet peak demand in Barbados, which has universal electricity access, is just 152 MW.[17] Buying fewer turbines to generate less power would likely result in a higher price per unit from the supplier, and the civil works contract would also be smaller, but still require mobilizing specialized equipment and considerable expertise. (The cost of infrastructure to deliver electricity to the grid might be less affected, since most of it is relatively standardized and near or on shore.)

Recognizing that limitation, this study nonetheless uses the 1 GW model project for the analysis presented here, particularly given that the developing countries targeted for OSW support by the World Bank to date are larger.

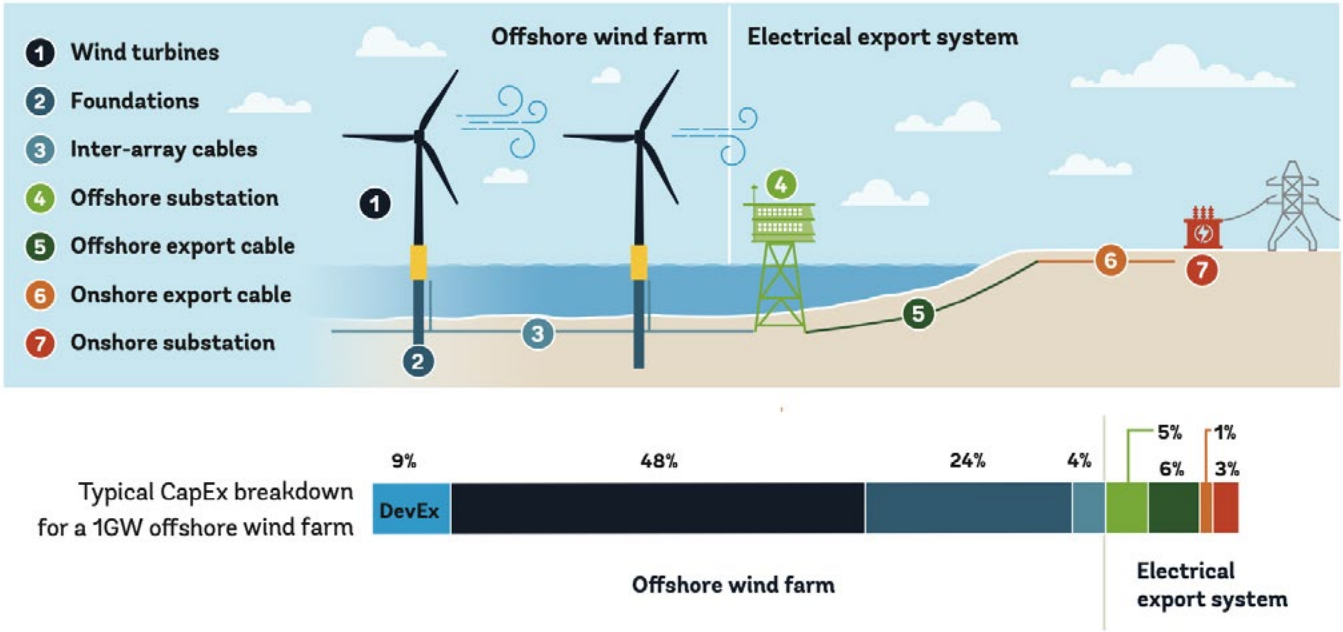


Figure 1: World Bank Typical OSW Model Project[18]

16 Carrington, J. 2021. "Ocean Energy Being Considered for Barbados." Government of Barbados website story. https://energy.gov.bb/ocean-energy-being-considered-for-barbados/.

17 NREL. 2020. "Barbados Energy Snapshot." Prepared by the National Renewable Energy Laboratory with the Caribbean Center for Renewable Energy and Energy. Energy Transitions Initiative, U.S. Department of Energy. https://www.energy.gov/eere/articles/barbados-island-energy-snapshot-2020.

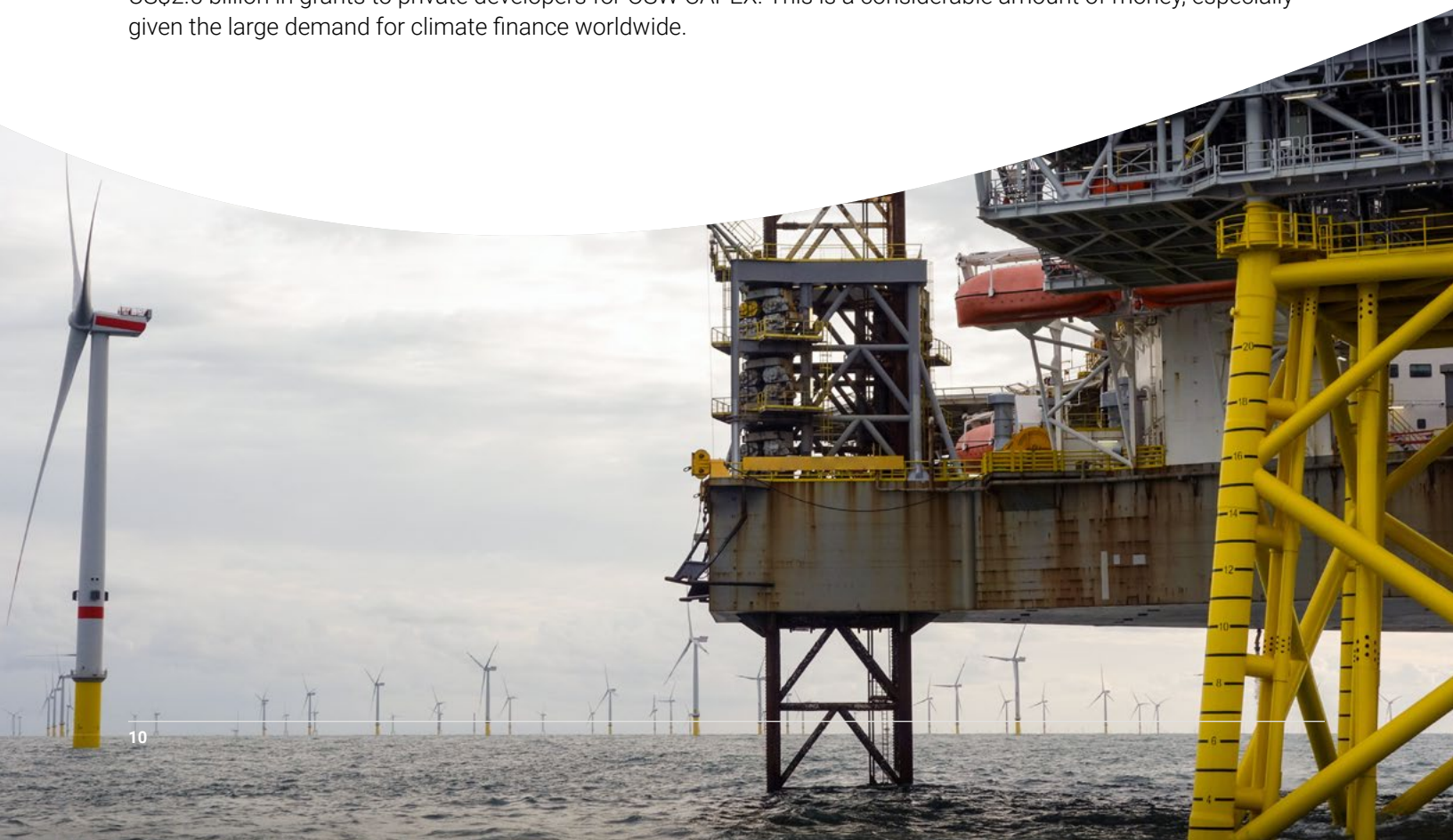
18 World Bank/ESMAP/PROBLUE. The Role of Concessional Climate Finance in Accelerating the Deployment of Offshore Wind in Emerging Markets. 2023.

A critical part of the World Bank's analysis of the competitiveness of OSW relative to other power generation technologies (renewable and not) is the levelized cost of energy (LCOE). In brief, this is an analytical benchmark that considers all the costs associated with producing energy from a given source, including the cost of building, operating, and decommissioning a plant. This total cost is then divided by the total lifetime energy production of the plant. By comparing the LCOE of different energy sources, policy makers, investors, and energy planners can make informed decisions regarding the most cost-effective and sustainable options for energy generation.

The LCOE for the model project, assuming normal commercial financing costs (i.e., commercial interest rates and other loan terms applied) for all components, is US$108 per MWh, which compares unfavorably with onshore wind, utility-scale photovoltaics, and combined-cycle natural gas. The World Bank report suggests that a LCOE of US$70 per MWh is what OSW would need to be an economically viable option, putting aside environmental and other non-financial considerations.

The World Bank analysis shows that the lower LCOE is achievable by applying through three concessional finance mechanisms: a grant subsidizing the developer's CAPEX by 10–25%; integrating up to 50% of the developer's loans as concessional debt (5% fixed interest rate 25 years); and allocating all of the export infrastructure costs to the national government, which would own the infrastructure and finance it through concessional sovereign loans. The estimates are highly sensitive to variations in the interest rate and related terms (grace period and tenor particularly) on the non-concessional portion of the debt; the World Bank assumed a non-concessional interest rate of 8%, which may not be achievable in some countries because of perceived risk, the creditworthiness of underlying purchase agreements and other factors.

In short, the World Bank finds that a competitive LCOE can only be achieved by combining all three concessional approaches, including full separation of the electrical export system from the project CAPEX. In real dollar terms, this amounts to a separate funding requirement, outside the project finance package for the OSW project itself, of around US$480 million just for export infrastructure to be financed on concessional terms, and it assumes technical and financial capacity on the national government's part in contracting and commissioning export infrastructure in sync with the construction of privately held OSW that will use the infrastructure. The World Bank report concludes that this approach could be used to add 10 GW of OSW capacity in five countries, requiring a total concessional financing of US$4.8 billion to government borrowers (for export infrastructure), and US$8.3 billion in loans and US$2.5 billion in grants to private developers for OSW CAPEX. This is a considerable amount of money, especially given the large demand for climate finance worldwide.



2.2 POTENTIAL SOURCES OF FINANCE FOR OSW

Climate finance flows through a complex architecture involving donor governments, international financial institutions, and multilateral climate funds. Donor governments play a crucial role in providing funding to climate finance initiatives, channeling contributions to international funds such as the Green Climate Fund (GCF) and the Climate Investment Funds (CIF). These funds, supported by donor contributions, exclusively route resources through pre-qualified entities. The GCF operates exclusively through accredited entities and nationally designated authorities, while CIF channels resources through MDBs, to countries with approved investment plans; neither has financed an OSW project to date.

International-facing DFIs, including MDBs and bilateral DFIs,[19] often use mechanisms for blending concessional resources with market-rate loans. For developing countries, government borrowing from MDBs typically occurs through pre-established terms via standalone trust funds. Non-sovereign "blended" finance, on the other hand, involves the use of standalone grant funds to provide concessional loans and grants alongside market-rate loans, offering finance at lower costs and on better terms overall to private sector borrowers.

Mobilizing concessional resources for renewable energy investments (even if not *yet* for OSW) is already a common practice among MDBs and climate funds. These institutions have pioneered innovative financing mechanisms and supported numerous renewable energy projects in developing countries, laying a foundation of replicable models and best practices that could be applied to OSW. They account for most of the concessional and climate finance provided to developing countries, beyond grants provided as official development assistance (ODA).

Nearly all international development finance to the private sector adheres to the IFC's Performance Standards,[20] including PS 6, which addresses "biodiversity conservation and sustainable management of living natural resources." This standard would be applicable to any OSW project financed by the World Bank and IFC or other MDBs. For projects situated in areas designated as "natural" habitats, PS 6 mandates a "no net loss" policy for the habitat, requiring measures such as avoidance, minimization, restoration, and offsets if necessary. Furthermore, projects within critical habitats demand a net gain in habitat beyond the "no net loss" principle (see also Section 1.1).

Apart from MDBs and bilateral DFIs, there are limited avenues for delivering the substantial resources required for OSW projects. Financiers also face constraints regarding the maximum percentage of capital expenditure that an individual institution can finance, and this further limits the options for financing large-scale projects such as OSW. It is also complicated to coordinate financing to both a government and a private sector OSW developer within a single institution—even more so across multiple institutions. This highlights the complexities and limitations within the current climate finance architecture. Efforts to address these challenges and explore innovative financing mechanisms are essential to accelerate the transition toward sustainable energy solutions.

2.3 EXISTING CLIMATE FINANCE FLOWS AND NEW OPTIONS

Over the two-year period of 2021 and 2022, the Climate Policy Initiative (CPI) has found, grants for climate projects averaged US$69 billion per year, a tiny fraction of the total of US$1.27 trillion per year in climate finance from public and private sources, most of which was debt or equity.[21] In the same report, CPI noted that finance for OSW grew by 42% relative to 2019/2020, to an average of US$45 billion per year. Yet grant-based finance for renewable energy is particularly scant: only 4% of climate finance in the energy sector was delivered as grants or low-cost project debt, CPI found. While the low level of concessionality reflects the maturity and commercialization of many renewable energy technologies, CPI noted, it may pose real challenges for developing countries. Overall, 47% of market-rate debt financing for climate change mitigation in 2021/2022 went to projects in emerging and developing economies.

19 For a list of bilateral DFIs, see https://www.oecd.org/development/development-finance-institutions-private-sector-development.htm.

20 See https://www.ifc.org/en/insights-reports/2012/ifc-performance-standards.

21 Buchner, B., B. Naran, R. Padmanabhi, S. Stout, C. Strinati, D. Wignarajah, G. Miao, J. Connolly, and N. Marina. 2023. "Global Landscape of Climate Finance 2023." Climate Policy Initiative. https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2023/.

Data from Aid Atlas, which covers international development finance (including climate finance) from bilateral and multilateral sources as well as international organizations and philanthropic sources, further highlight how little concessional finance is currently available for renewable energy projects in developing countries. In 2021, total commitments for renewable energy were just US$9.14 billion,[22] of which just $688.7 million went to Latin America, and $120.4 million to SIDS worldwide. Total commitments for wind (on- and offshore) were just US$0.44 billion. Recalling the World Bank's estimate that a single 1 GW OSW project would cost US$2.9 billion, the climate finance outlook is sobering. This suggests that mobilizing climate finance at the scale needed for OSW projects will require new, focused efforts at the international level.

At the same time, countries may be able to mobilize some finance for OSW and related infrastructure by issuing green bonds—that is, bonds with proceeds allocated entirely to projects with environmental benefits. The European Investment Bank issued the world's first green bonds in 2007,[23] and the World Bank issued its first green bonds in 2008, backed by rigorous criteria for eligible projects.[24] By early 2019, the World Bank had raised more than US$13 billion through green bonds sold to institutional and retail investors globally, and approved 91 eligible projects, including 44 in renewable energy and energy efficiency. Green bonds have also been issued by several national DFIs and even private corporations, attracting both domestic and international investors.[25] Since 2019, global green bond issuance reached US$575 billion, including US$6.8 - 9 billion in blue bonds—instruments to finance the sustainable use of marine resources.[26] Europe and North America have historically dominated the market, but a growing number of high- and middle-income countries in other regions are issuing green bonds.

Developing countries can employ green bonds to mobilize resources through the Ministry of Finance, a national development bank (NDB) or similar entity (the bond issuer), and then use the proceeds for capital investments in line with the criteria established by the green bond framework. An important caveat, however, is that issuing green bonds to raise funds from the private sector can be costly. Governments must repay investors their principal plus coupon interest rate when the bond matures, and the interest rate can be quite high, even with the discounts typically offered for green or blue bonds.

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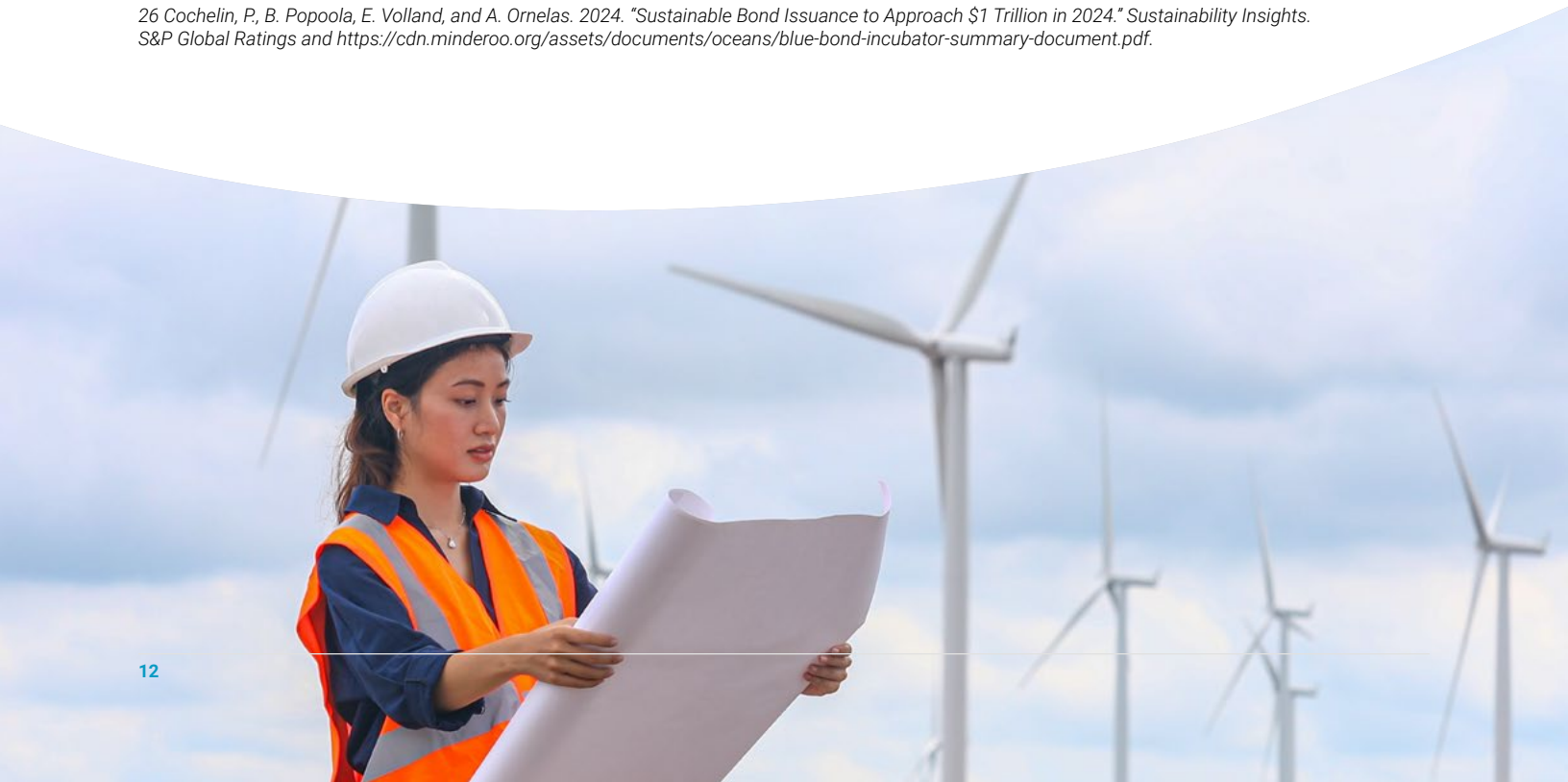
22 See https://aid-atlas.org/profile/all/all/energy/2021-2021?usdType=usd_commitment.

23 See https://www.eib.org/en/investor-relations/cab/.

24 World Bank. 2019. "10 Years of Green Bonds: Creating the Blueprint for Sustainability Across Capital Markets." Website story. March 18. https://www.worldbank.org/en/news/immersive-story/2019/03/18/10-years-of-green-bonds-creating-the-blueprint-for-sustainability-across-capital-markets.

25 Azhgaliyeva, D., A. Kapoor, and Y. Liu. 2020. "Green Bonds for Financing Renewable Energy and Energy Efficiency in Southeast Asia: A Review of Policies." ADBI Working Paper 1073. Tokyo: Asian Development Bank Institute. https://www.adb.org/publications/green-bonds-financing-renewable-energy-efficiency-southeast-asia.

26 Cochelin, P., B. Popoola, E. Volland, and A. Ornelas. 2024. "Sustainable Bond Issuance to Approach $1 Trillion in 2024." Sustainability Insights. S&P Global Ratings and https://cdn.minderoo.org/assets/documents/oceans/blue-bond-incubator-summary-document.pdf.



2.4 CREATING AN ENABLING ENVIRONMENT FOR OSW

As part of the Offshore Wind Development Program, the World Bank and IFC published a comprehensive handbook aimed at establishing a robust enabling environment within the public sector.[27] As shown in Figure 2, it delineates a series of steps, from formulating a strategy, to developing policies and frameworks, to implementation. A key consideration is how to facilitate private investment in OSW projects.

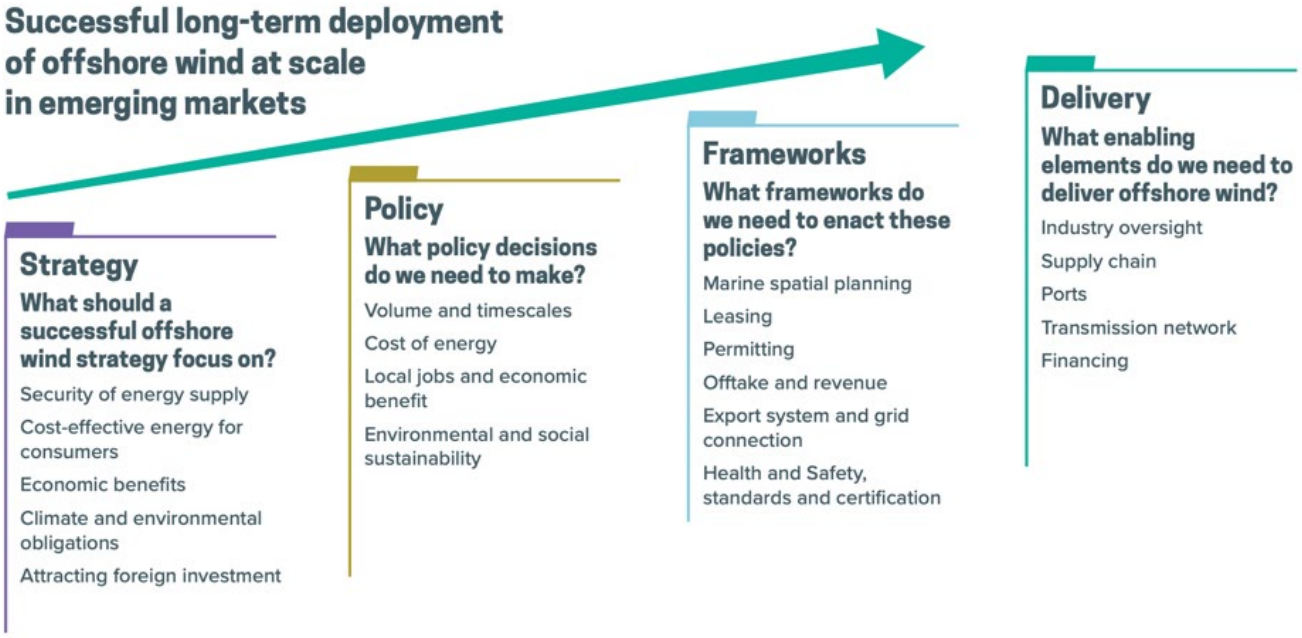


Figure 2: World Bank's Long-term Policy Reform Process[28]

As noted above, the Offshore Wind Development Program has already provided support to five countries in implementing this model, and there are plans to extend assistance to another five countries. Noteworthy progress has been achieved in Vietnam, Sri Lanka, Türkiye, India, and Azerbaijan. Efforts are either underway or planned in Colombia, the Philippines, South Africa, and Brazil, along with a regional program for SIDS in the Pacific and Caribbean. These endeavors are complemented by the development of roadmaps integrated with environmental and social assessments, aligned with IFC performance standards for generation projects.

This proactive programmatic approach underscores the World Bank's commitment to fostering sustainable development and facilitating private sector involvement in renewable energy initiatives. By providing targeted support and expertise, the Offshore Wind Development Program is working with countries directly to create conducive environments for OSW investments, particularly in places with the potential for large-scale deployments of OSW. While there are good reasons for this approach from financial, economic, and technical perspectives, however, it may not do much to make OSW accessible to a majority of developing countries.

ESMAP, IEA, IRENA, the Global Offshore Wind Alliance, and the Global Wind Energy Council are actively collaborating with governments and regional entities to identify the most promising sites for OSW development. This includes a comprehensive analysis considering factors such as water depth, habitat, geotechnical data, wind speeds, and grid proximity. Some governments are also establishing their own tender and technical offices, which would play a crucial role in prioritizing and tendering OSW leases, thus streamlining the development process.

27 World Bank Group. 2021. "Key Factors for Successful Development of Offshore Wind in Emerging Markets." Washington, DC: Energy Sector Management Assistance Program. https://www.esmap.org/key-factors-for-successful-development-of-offshore-wind-in-.

28 Reproduced from World Bank Group, 2021.

2.5 PRIVATE SECTOR FINANCE FOR OSW

The OECD undertakes a regular survey of blended finance funds and facilities, most recently in 2020 (with results published in 2022).[29] Although the data do not yet reflect the full impact of the COVID-19 pandemic, they still provide useful insights. Discussing renewable energy finance broadly, the report notes that (a) blended finance plays a pivotal role in mobilizing resources for large-scale renewable energy projects, defined as those with CAPEX greater than US$120 million; (b) there has been notable growth in facilities and funds targeting renewable energy as a core focus of investment activities; but (c) there was a substantial decline (around 28%) between 2018 and 2020 in the surveyed facilities' total investment in renewable energy. However, the data are not disaggregated by subsector or technology, so nothing can be inferred directly about blended finance flows to OSW projects specifically.

As noted earlier, corporations can also issue green and blue bonds. However, the viability of those bonds often depends on the credit rating of the corporation, which means that typically only large multinationals are able to raise corporate bonds. Furthermore, in the context of OSW in developing countries, corporate green and blue bonds would likely be associated with specific projects and would therefore face the dual challenge of corporate and developing country credit rating considerations.

Still, there are reasons to be optimistic. The CPI report shows that renewable energy attracts a sizable share of climate mitigation finance—US$490 billion in 2021/2022, including both concessional and market-rate finance.[30] Although most of that finance is not concessional, there are several billion dollars in concessional finance to renewable energy projects in developing countries every year. Green and blue bonds offer yet another way to mobilize finance. Thus, the blended finance approach proposed by the World Bank, presented in Section 2.1, is grounded in the norms of global development finance. Since no single source could fully finance the cost of the model OSW project, effective coordination of different finance sources will be a critical aspect of operationalizing OSW in developing countries.

Photo Credit: Gabriel Barathieu

[29] *Dembele, F. et al. 2022. "Blended Finance Funds and Facilities: 2020 Survey Results." Paris: Organisation for Economic Co-operation and Development. https://read.oecd.org/10.1787/fb282f7e-en?format=pdf.*

[30] *Buchner et al., 2023. "Global Landscape of Climate Finance 2023."*

Photo Credit: Pulsar Imagens / Alamy

3

Exploring Opportunities for Supporting OSW in Developing Countries

This section presents two opportunities for mobilizing concessional finance to support OSW in developing countries. It begins by outlining the analytical framework and methodology used to identify and evaluate potential approaches. It then presents the three options themselves, with a brief discussion of each one's main features and major advantages and limitations.

3.1 IDENTIFYING AND ANALYZING OPPORTUNITIES

In defining opportunities for enhancing blended and concessional finance support, careful consideration was given to the guiding principles for the assignment. The primary objective was to leverage proven models for providing sector-specific financing in the renewable energy space, drawing mainly from existing models deployed for renewable energy projects broadly or, where suitable, for specific technologies. This approach aimed to eschew truly "out of the box" concepts with limited practical track records, as the large scale of OSW projects necessitates relatively low-risk approaches.

The opportunities identified can be implemented individually or together; they are not mutually exclusive. They are also intended to serve as archetypes or overarching "frameworks" for intervention, adaptable to each project's specific context, so they are not limited to a singular instrument. The analysis considered expanding several existing facilities and concessional finance delivery mechanisms, especially where they already exist for OSW or where OSW qualifies as an eligible activity. In some instances, these options may also incorporate novel components, inspired by approaches used in concessional finance contexts outside of OSW and even beyond the renewable energy sector, if deemed appropriate.

The main basis for analyzing opportunities and weighing the "value" of each option was five guiding principles that were defined in consultation with Ocean Conservancy and Ocean Risk and Resilience Action Alliance at the start of this consultancy, summarized in Figure 3.

Guiding Principle	Dimension	Description
I. Relevance	to needs	Addresses the needs of OSW in developing countries, as identified in the literature and by stakeholders
	to OSW as a sub-sector	Addresses specific challenges to bringing novel technologies to developing countries in a commercially viable manner
II. Breadth	across geographies	Is globally appropriate and adaptable to most developing country contexts
	across the project development cycle	Provides the broadest range of support to enable project development and financing across the project development cycle
III. Leverage[31] potential	through proven instruments	Uses known and proven blended financing approaches, so that financiers, investors, developers, and governments are generally familiar with the proposed approach
	through addressing scarce resources	Makes the most of available concessional resources, recognizing that they are scarce
IV. Practicality	to implement	Is relatively easy to conceive, structure, and operationalize in terms of time and human resources
	to manage cost	Is relatively cost-efficient in terms of ongoing overheads, ancillary costs, and requirement for parallel investments
V. Outcomes alignment	to biodiversity and ocean resources	Supports to the best extent possible alignment with IUCN's Net-Positive Biodiversity approaches in the oceanic context
	to achieve electrification targets	Enables timely and sustainable achievement of long-term OSW targets

Figure 3: Guiding principles, dimensions, and descriptions for analyzing framework options

The analysis starts from the premise that developing country governments are likely to need additional technical and financial capacity to effectively undertake OSW projects on their own. As a result, we assume that in these contexts, OSW projects may be most viable if implemented through a combination of private ownership/development of the generating assets (turbines, masts, and mast interconnections) and government-owned assets for export, transmission, and grid interconnection. Furthermore, to facilitate the successful implementation of OSW initiatives, governments and regulatory agencies must create an enabling environment by adopting appropriate policies and frameworks. Significant upgrades to the power grid may also be needed to integrate OSW, which is a non-dispatchable energy source.[32]

The next section presents opportunities for addressing expected challenges for OSW projects in developing countries:

1. Technical assistance and direct concessional finance to national governments and sovereign enterprises
2. Concessional finance to private entities (i.e., non-sovereign guaranteed), to be blended with commercial sources

A detailed evaluation of these concepts, based on the guiding principles presented above, is provided in Annex.

[31] *In the context of this guiding principle and related discussion, leverage is defined as concessional resources mobilizing relatively more non-concessional resources. It has nothing to do with debt and equity ratios in the project, for this discussion.*

[32] *A dispatchable energy source can be ramped up or down in response to demand. Wind power generation instead goes up and down with the wind itself.*

3.2 OPTION 1: TECHNICAL ASSISTANCE AND CONCESSIONAL FINANCE TO THE PUBLIC SECTOR

The first option involves channeling concessional resources to governments in developing countries, primarily as technical assistance and direct concessional finance with the national government as a borrower. This approach aims to strengthen governments' capacity to navigate and effectively manage offshore wind projects. Through technical assistance with data collection, analysis, and interpretation, for example, countries can enhance their understanding of the offshore wind potential within their territories. Grants to enable countries to access higher-resolution data, measure wind directly through test masts, and measure for longer periods could expedite the readiness for OSW investments, but resources are lacking. Additionally, direct concessional finance can support the implementation of necessary infrastructure and preparatory measures required for offshore wind deployment.

Focusing on enhancing data capabilities is crucial for developing countries aiming to venture into offshore wind energy. With access to comprehensive and reliable data, governments can make informed decisions regarding the feasibility, location, and scale of offshore wind projects. Concessional resources can support the establishment of robust data collection mechanisms, including meteorological assessments, environmental impact studies, and resource mapping. Strengthening data infrastructure ensures that governments have the necessary information to attract investment, mitigate risks, and optimize the development of offshore wind resources.

Furthermore, providing concessional finance to help countries improve their tendering capacity and ensure grid readiness is likely to be critical to the success of OSW projects in developing countries. Governments need to design and implement transparent and competitive tendering processes that attract reputable developers and investors. Investments in grid infrastructure and interconnection facilities, in turn, are necessary to enable the integration of offshore wind energy into existing power systems. In large part, the World Bank is already delivering this option, especially the technical assistance.

3.3 OPTION 2: CONCESSIONAL FINANCE TO THE PRIVATE SECTOR

Another strategic option involves mobilizing concessional resources to directly finance private developers who would own and operate OSW assets in developing countries. This approach addresses the challenge of attracting sufficient capital to OSW projects by enhancing projects' global competitiveness in terms of risk–return profiles. Providing concessional finance directly to private developers can help make these projects more attractive to investors and thus more financially viable.

To structure concessional resources effectively, various mechanisms can be employed, including blended loans and specialized equity funds aimed at reducing the financial leverage ratio (debt to equity) of OSW projects. As noted earlier, blended finance instruments combine concessional and commercial capital to achieve mutually beneficial outcomes, such as lower financing costs and improved risk-sharing arrangements. Moreover, specialized equity funds dedicated to OSW investments can provide targeted support to developers, ensuring a balanced capital structure that enhances project sustainability and resilience.

Photo Credit: Alamy

One other key hurdle in financing OSW projects in developing countries is overcoming country risk ratings, which often deter private investment due to perceived uncertainties and political instability. In addition to debt and equity approaches, concessional resources can help mitigate these risks by providing financial guarantees or insurance mechanisms to protect investors against potential losses. By managing country risk (through concessional political risk insurance, like that provided by the World Bank Group's Multilateral Investment Guarantee Agency) associated with investing in OSW projects in developing countries, concessional finance enhances investor confidence and encourages greater participation in developing country markets.

More broadly, to mobilize private debt (and in some cases equity investments), instruments such as guarantees or insurance can be deployed to mitigate specific risks. Depending on the provider, these can be made concessional through reduced guarantee fees or premiums that are far less than what a market guarantor or insurer provides. These can address other than country risks associated with offtaker non-payment, inclement/disastrous weather conditions, wind resource reliability and others.

IFC has confirmed readiness and appetite to begin blended financing for OSW in many developing countries, once projects are fully prepared and ready to negotiate construction finance. However, internal institutional credit limits constrain how much finance any one entity can provide to a given project, particularly for projects as large as OSW infrastructure. Co-lending with another institution is thus necessary. One way to address these issues is to structure projects in phases, where risk is managed/mitigated as the viability is adequately demonstrated.

3.4 CONSIDERING POWER EXPORT INFRASTRUCTURE

Note that neither of the above approaches fully address the technical and financial capacity needs for power export infrastructure for OSW projects.

The World Bank has highlighted the need for both concessional finance and certainty that power export infrastructure will be ready on time for successfully developing OSW in developing countries.[33] However, as discussed in Section 2, the concessional finance approaches proposed to date focus on concessional loans to national governments, which would build the infrastructure themselves.

In most developed countries, transmission system operators (TSOs) would normally take the role of building and managing the export infrastructure for OSW projects. However, many developing countries have unbundled[34] utilities[35], which require substantial budget allocation from the national governments that lack sufficient resources to maintain or significantly upgrade their existing grid infrastructure. A poorly funded or under-capacitated TSO could create additional uncertainties for private-sector developers that need to be addressed.

Bringing together specialized expertise in offshore power generation and export infrastructure through a regional power export company could provide an alternative to a traditional TSO model and ensure that grid infrastructure projects are developed and operated efficiently and sustainably. This could reduce the likelihood of delays, cost overruns, and uncertainties surrounding grid interconnection, making OSW projects more attractive to private developers and investors.

[33] *World Bank Group. 2023. "The Role of Concessional Climate Finance in Accelerating the Deployment of Offshore Wind in Emerging Markets."*

[34] *Unbundling refers to the process of separating the different components of the electricity supply chain—generation, transmission, distribution, and retail—into distinct entities or companies. This process aims to promote competition and efficiency within the energy market by ensuring that no single entity has control over all aspects of electricity supply.*

[35] *Chawla, M., and M.Pollitt. 2013. "Global Trends in Electricity Transmission System Operation: Where Does the Future Lie?" The Electricity Journal, Volume 26, Issue 5, Pages 65-71.*

Two examples of comparable models are InfraCo Africa and InfraCo Asia, which are funded by capital grants from the UK, the Netherlands, and Switzerland, without any private investment. Each InfraCo company takes a direct and sometimes leading role in supporting the conceptual design and pre-financing development of renewable energy generation assets on its continent. Both operate according to private company principles and are governed accordingly. They adopt this approach because the technical and financial capacity they bring to the riskiest stage of the project lifecycle attracts substantial follow-on investment from commercial investors and lenders once the project is adequately designed and prepared. The InfraCo approach directly reduces intrinsic project risk and enables more rapid deployment of grid-connected renewables across an entire continent, spanning multiple countries, languages, and regulatory environments.

This company-based approach has some drawbacks. First, it could be seen as undermining country ownership; this concern could be partially addressed by establishing a board comprised mostly or entirely of representatives from developing countries and ensuring board oversight of operating principles that require substantial consultation with national governments and other stakeholders. Second, this approach incurs higher direct overheads (staffing requirements, asset management operations, etc.) compared to a traditional one-off sovereign concessional loan. However, it may prove to be more resource-efficient in the long run, given the common delays and cost overruns encountered in concessional sovereign finance operations, especially in novel sectors such as offshore power.

This report does not include a recommendation for investing in power export infrastructure for OSW but highlights that it must be considered as programs are developed to address the financial needs for OSW in developing economies.

Photo Credit: Alamy

4

Conclusion and Recommendations

More broadly, and in line with the vision of the Ocean Breakthrough, the following recommendations are drawn from the analysis presented above:

Ensure that OSW projects are designed, built, and operated with a commitment to deliver a demonstrable positive impact on biodiversity. Social and political acceptance of OSW technology depends to a great extent on whether it can be trusted to be safe and not harmful to marine ecosystems and coastal communities. A global approach to effectively achieve this is to advocate for the inclusion of IFC's Performance Standards - PS6 and, where possible, the IUCN's Net Positive Impact on Biodiversity standard. Compliance could be incentivized through results-based finance or grant matching mechanisms. By emphasizing the integration of social and environmental considerations into OSW development, governments can take the lead in ensuring that OSW projects promote sustainable practices and proactively mitigate potential adverse impacts on ecosystems and communities.

Deepen technical assistance to interested national governments: It is critical that the work undertaken to increase governments' technical and regulatory capacity, map potential OSW resources, identify sites, and receive sustained support. Notably, the ESMAP Offshore Wind Development Program is slated to end in 2024; additional resources should be mobilized to continue its work, either via the existing program or through related programs. Support for governments in developing countries in developing protocols or guidelines for monitoring the biodiversity impacts of renewable energy projects and working to support reforms and transparency in the energy sector is necessary. All of this should be supported through more donor contributions to technical assistance efforts focused on building robust capacity at the national and utility levels as a means to become a reliable counterpart to the private sector-led generation of OSW project construction and operations.

Scale up concessional finance for renewable energy broadly, and OSW specifically, as countries become investment-ready: Despite the sharp drop in the cost of renewable technologies, projects in many developing countries still face considerable financing challenges, so their success may depend on having concessional resources to provide blended finance to private sector developers. For countries with OSW resources, this is a way to generate large amounts of clean power; as noted in the introduction, the International Renewable Energy Agency's 1.5°C scenario calls for nearly 500 GW of OSW capacity by 2030—and almost 2,500 GW by 2050.[36] Without concessional finance to support OSW development beyond developed economies, significant OSW potential will go unrealized. Scaling up financial flows through dedicated OSW programs within existing climate finance channels (e.g. GCF, CIF, MDBs) and national opportunities, such as green and blue bonds, can be an effective finance mechanism for OSW.

Build momentum through partnerships between advocacy organizations, MDBs, donors, developing country governments, and OSW developers, with regular engagement: Leverage global partnerships such as the Marrakech Partnership for Global Climate Action, the Global Offshore Wind Alliance (GOWA) founded by Denmark, IRENA, and GWEC with the ambition to create a global driving force for the uptake of offshore wind, and convene a series of engagements at the managerial and operational level to discuss how to mobilize more resources in favor of OSW in developing countries *and* coordinate efforts related to specific projects and country programs focused on the implementation of OSW. Some of this already appears to exist informally, but a global partnership of key stakeholders, especially spanning the spectrum of financiers, government representatives and developers, would help to build and sustain momentum for OSW beyond the countries where most activity is currently taking place.

36 IRENA. 2023. "World Energy Transitions Outlook 2023: 1.5°C Pathway." Abu Dhabi: International Renewable Energy Agency. https://www.irena.org/Publications/2023/Jun/World-Energy-Transitions-Outlook-2023.

Annex: Evaluation of Concepts

This section presents an analytical discussion of the three concepts outlined in the previous section against the guiding principles and global context outlined previously in this report. Note that the guiding principles are defined in Figure 3. Below, there is a tabular summary highlighting how each option aligns or diverges with each of the five guiding principles, preceded by an overall discussion of the best fit option, where applicable.

CAPITALIZE GUIDING PRINCIPLES

I. Relevance

In terms of relevance, both options address a key area of needs that are still unmet in creating a robust developing country OSW investment climate; they just each do it in a different way. By focusing on either the public or private side, options A and B tend to focus on one aspect and leave out the other, requiring a more tandem approach to both.

Relevance	Alignment	Divergence
Option 1: Public-side TA & direct financing	= Meets immediate national government needs for technical capacity and financial capacity = Specifically endorses/supports solutions to some of the challenges facing OSW	= Only addresses the public side challenges, which are mostly technical, but leaves a glaring gap in the total capitalization required to build OSW projects = Is largely redundant with ongoing World Bank/ESMAP TA programs
Option 2: Private-side financing	= Specifically addresses country risk issues and challenges of bringing novel technologies to commercial fruition	= Does little to bolster national government technical capacity (or financing for public-side challenges) = Is generally "ready to go" per most key financing stakeholders, once the projects are suitably prepared

II. Breadth

In terms of breadth, both options are relatively flexible across multiple geographies. The key distinction is in the operational delivery to cover multiple countries at once. In the case of Option A, most operational aspects have to be structured as national programs because resources are typically disbursed to governments directly, especially when it comes to loans, since parliaments will only guarantee borrowing undertaken by the country and not other countries. TA can be delivered across multiple countries in some procurement models, but this may not always be effective. That said, donor approvals and delivery programs could be structured in a bundled or combined approach.

Both options have relative limitations when it comes to project development, as they do not address the full spectrum of the project development cycle on their own. Option A tends to only address the enabling environment and sometimes concept-stage development (as tendering), while option B tends to focus on late-stage development costs like legal and technical validation post feasibility study.

Breadth	Alignment	Divergence
Option 1: Public-side TA & direct financing	= Is generally applicable to most developing countries and their technical and financial needs to prioritize OSW	= Only focuses on the enabling environment of project development cycle, leaving much risk in development unmitigated (which may inhibit most projects from moving beyond concept stage)
Option 2: Private-side financing	= Is generally applicable to most developers and project company contexts considering OSW = Can drastically enhance the returns and appeal of OSW as an asset class when considering alternative investment options	= Unless specifically structured to address development risks, also does not alleviate any development risks

III. Leverage potential

When it comes to concessional resources being used to maximize the amount of non-concessional resources brought on board, Option B has the best direct and measurable leverage capacity. It utilizes proven instruments on both debt and equity sides, and these resources are shown to have strong additionality in terms of their ability to mobilize non-concessional co-financing. Option A tends to focus on activities that are not directly leveraging any additional finance (but are no less important); this makes them less appealing in some respects to donors looking to maximize value for money in terms of mobilizing resources.

Leverage	Alignment	Divergence
Option 1: Public-side TA & direct financing	= Perhaps the oldest form of "concessional finance," this is a proven model = Enabling environment is a key precursor to investment decisions at the project level	= TA can be slow to implement (procurement, disbursement, etc.) and may feature overheads for contract management, etc. = Usually does not directly leverage investments, even though it does help to establish a sound enabling environment = Financial management of key government-owned entities (i.e. utilities) is not always at a desirable level
Option 2: Private-side financing	= Blended finance is well established and, if well structured, achieves a strong value-for-money ranking when using scarce concessional resources	= Typically "locks" concessional resources into infrastructure project repayment lifespans (25-30 years), with principal repayment taking many years to recoup

IV. Practicality

Both options have established channels and are already widely practiced in renewable energy globally. However, Option A may, at the aggregate level, be the least cost-effective, because of the heavy reliance on national procurement systems and generally limited competition allowing for some price-seeking by firms providing expertise to governments under the auspices of technical assistance. Generally speaking, options A and B rely on a project-by-project approach which would not necessarily create synergies or leverage economies of scale across projects. There may be programmatic approaches that are available, at the national level, through issuances of green bonds, for example. However, green bond issuances only support in raising more affordable capital; the way projects are implemented, constructed and operated still relies on the government or its organs contracting services from private sector operators.

Practicality	Alignment	Divergence
Option 1: Public-side TA & direct financing	= Is relatively straightforward to launch and operationalize = Is generally familiar in structure to both donors and recipient governments	= Relies heavily on national procurement law and procurement operations, and costs/timelines can become inflated over time = Only cost control comes out of competitive bidding, which may not yield sufficient competing bids to really set an accurate cost for TA services = Likely requires separate procurement and origination operations for each country due to variations in procurement laws
Option 2: Private-side financing	= Has a long track-record of successful blending in other sectors and in renewable energy in most countries = MDBs and climate funds are already organized around large-scale non-sovereign financing as a standard practice, including provision of blended finance that provides overall sub-market cost of capital	= Full cost of export infrastructure borne by private side would drive up overall project costs and especially financing costs = Built in due diligence, supervision and appraisal costs can be relatively high for high risk projects

V. Outcomes alignment

Considering the distinctions between the net-positive biodiversity impact and the net-zero approach as defined in IFC Performance Standard 6 (PS6) concerning natural resource and biodiversity protection, it's unlikely that Option B will achieve net-positive effects independently. This is primarily because most Multilateral Development Banks (MDBs) and some private commercial investors mandate only adherence to IFC PS6, rather than requiring actions that exceed these standards. Similarly, the enforcement of biodiversity protections under Option A would be constrained, as it would probably depend on national laws that demand net-positive outcomes.

Outcomes	Alignment	Divergence
Option 1: Public-side TA & direct financing	= Building enabling environment is absolutely critical to achieving long-term OSW targets (350 GW by 2030)	= Relies on government adoption of net-positive biodiversity as a standard, and leaves supervision/enforcement up to the government (i.e. requires legislation to enforce)
Option 2: Private-side financing	= Contributes to and unlocks the great quantity of private capital required to achieve long-term OSW targets	= Likely requires compliance with IFC PS 6 to secure financing

Photo Credit: Paul Dirks