

WORLD BANK GROUP OFFSHORE WIND DEVELOPMENT PROGRAM

OVERVIEW





Program Introduction

WBG Offshore Wind Development Program

Program Objective: *To accelerate the uptake of offshore wind in emerging markets by supporting the inclusion of offshore wind into the energy sector policies and strategies of WBG client countries and the preparatory work needed to build a pipeline of bankable projects*

Led by



Energy Sector Management Assistance Program

ESMAP is a partnership between the World Bank and 18 partners to help low and middle-income countries reduce poverty and boost growth through sustainable energy solutions

In partnership with



International Finance Corporation

Member of the World Bank Group and the largest global development institution focused exclusively on the private sector in developing countries



WORLD BANK GROUP

WBG Offshore Wind Development Program



- 5 year program, started in April 2019
- Approximately \$10m budget for;
 - Global knowledge generation and education
 - Grants for in-country studies and technical assistance

TARGET RESULTS

- Engage with at least 10 client countries to integrate 20 GW of offshore wind into their policies and plans
- Develop a pipeline of investable projects, with at least 5 GW of capacity receiving WB/IFC finance
- Maximize women's employment and skills development in offshore wind in multiple client countries

Huge offshore wind potential in emerging markets

- Wind Energy Layers
 - Wind Layers
 - Mean Wind Speed
 - Mean Power Density
 - Terrain Surface Layers
 - Validation Layers

DOWNLOAD LAYERS

Offshore wind possible:

- Wind speed > 7 m/s
- Water depth < 50m (fixed)
- Water depth < 1000m (floating)

Across all WBG countries:
5.6 TW fixed foundation
+ 10.7 TW floating foundation
= 16.3 TW Total Technical Potential

Europe & Central Asia:

- 624 GW fixed foundation
- 578 GW floating foundation

South Asia:

- 163 GW fixed foundation
- 123 GW floating foundation

Middle East & North Africa:

- 238 GW fixed foundation
- 900 GW floating foundation

East Asia & Pacific:

- 1,959 GW fixed foundation
- 2,153 GW floating foundation

Latin America & Caribbean:

- 2,212 GW fixed foundation
- 4,479 GW floating foundation

Sub-Saharan Africa:

- 372 GW fixed foundation
- 2,463 GW floating foundation



Program's Support Options

Typical Activities Supported by the Program

Global Work

Knowledge generation, dissemination and exchange:

- Reports on good practice, lessons learned and opportunities for emerging markets
- Mapping to identify and quantify offshore wind development potential
- Events, workshops and training to inform, educate and gather country support (in collaboration with GWEC)

Country Specific Work

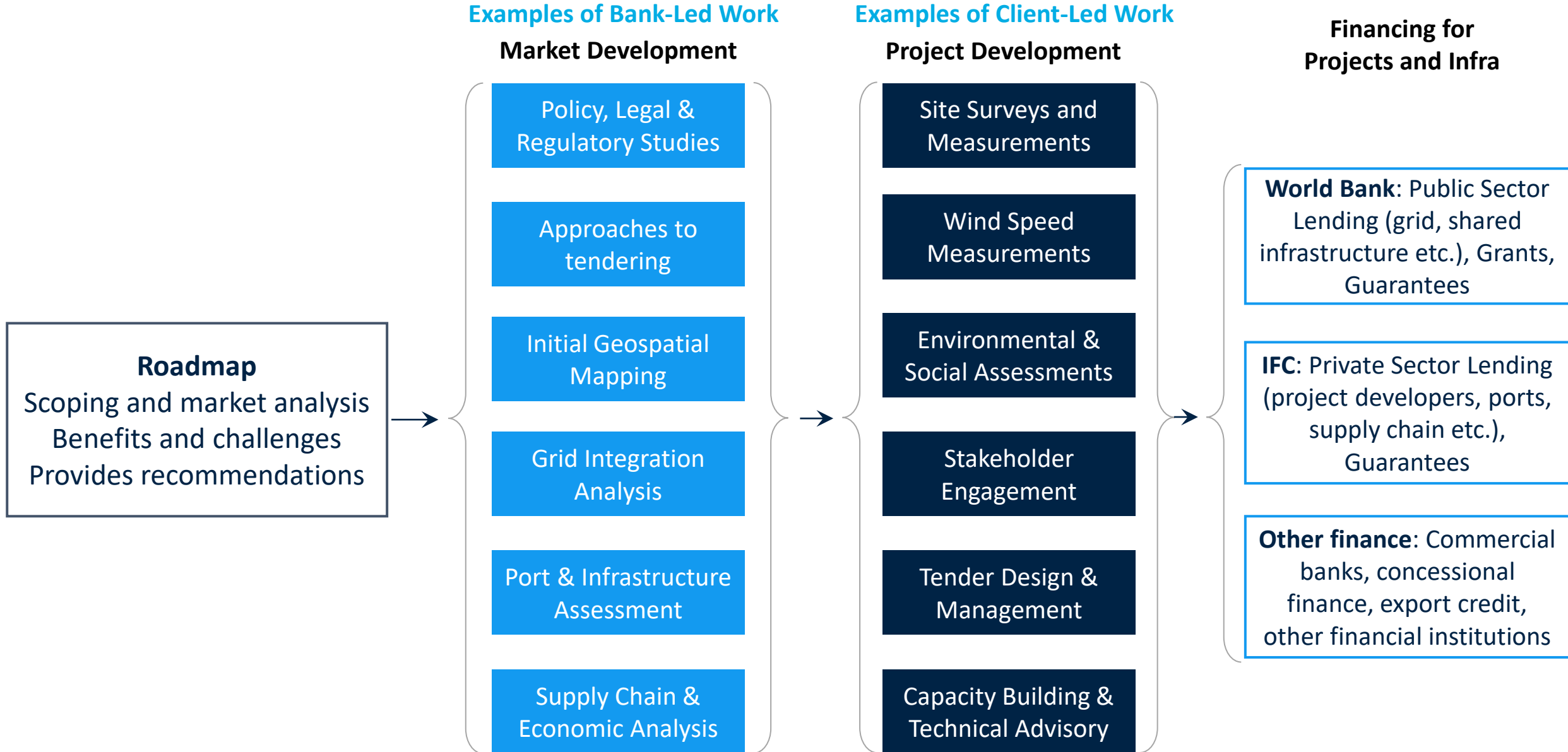
Exploratory country studies and planning work:

- Provide funding for roadmaps, planning and pre-feasibility level activities
- Demand-led, focus on countries with potential for bankable projects within 3-5 years

Preparation of investment plans:

- Assistance in scoping and funding detailed feasibility & site investigation work
- Draw on good industry practices for technical, E&S, procurement

Typical Country Activities Supported by WBG





Program's Global Activities

Study Tour to the UK – June 2019

UK Study Tour, June 24 – 28, 2019

24 representatives from eleven countries including:

- Argentina
- Algeria
- Brazil
- Costa Rica
- India
- Indonesia
- Morocco
- Sri Lanka
- South Africa
- Turkey
- Vietnam

- Workshop and roundtable discussions with leading firms and industry experts
- Attendance at the Global Offshore Wind 2019 Conference, London
- Visit to the Port of Blyth and offshore wind supply chain facilities in the North East UK



Virtual Offshore Wind Study Tour – Sept 2020

Objectives:

- Educate and engage client governments on offshore wind development
- Build stronger links between WBG teams and clients as well as growing the international community

Highlights:

- Organised by GWEC & funded by ESMAP
- Mixture of live study tours, meet the expert sessions, networking & on-demand content
- + 20 hours of masterclasses and tours online
- + 400 delegates including representatives from 24 client governments



1. Algeria
2. Argentina
3. Azerbaijan
4. Brazil
5. Colombia
6. Costa Rica
7. Fiji
8. India
9. Indonesia
10. Kenya
11. Mexico
12. Morocco
13. Nicaragua
14. Pakistan
15. Papua New Guinea
16. Philippines
17. Poland
18. Romania
19. South Africa
20. Sri Lanka
21. Tunisia
22. Turkey
23. Uruguay
24. Vietnam

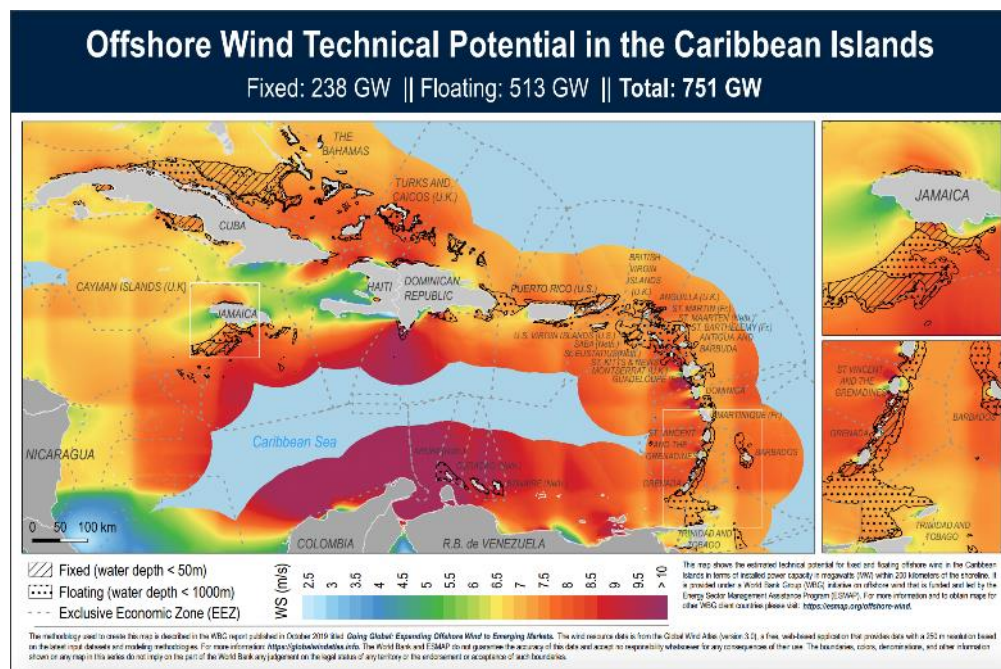
Going Global Report – October 2019

- [Methodology](#) for assessing the technical potential for offshore wind using GIS analysis, wind speed data derived from the [Global Wind Atlas](#) and [GEBCO bathymetry](#)
- Eight case studies on the technical potential for offshore wind in Brazil, India, Morocco, the Philippines, South Africa, Sri Lanka, Turkey, and Vietnam
- These eight countries have a total technical potential of approximately 3.1 TW, including 1,016 GW of fixed capacity and 2,066 GW of floating capacity



Maps and Technical Potential – May 2020

- Using the methodology developed for the Going Global report, [maps were produced](#) and the technical potential estimated for an additional 48 countries and regions
- Total technical potential of 15.6 TW for 48 emerging markets, including 5.5 TW of fixed potential and 10.1 TW of floating potential



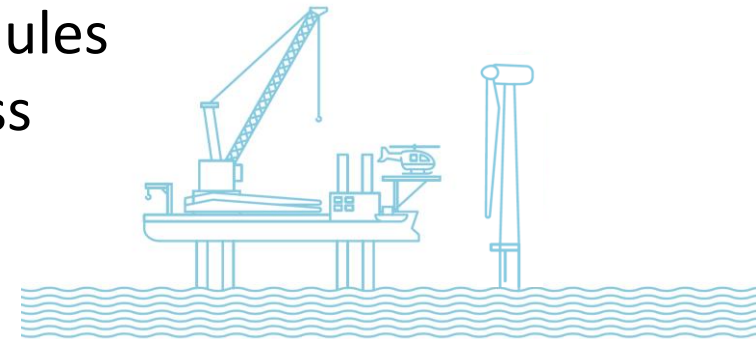
Region	Total technical potential	Highlights
Latin America & Caribbean	6.3 TW	Highest regional potential, strong wind resource, good proximity to demand centers
East Asia Pacific	4.4 TW	Strong offshore wind resource, China has the largest potential of any country
Sub-Saharan Africa	2.3 TW	Strong potential primarily in floating wind due to relatively deep waters off the southern coast
Europe & Central Asia	1.2 TW	Favorable conditions in the Black Sea and the Caspian Sea which could become regional markets
Middle East & North Africa	1.1 TW	Moderate resource in Northern Africa, primarily in floating wind
South Asia	306 GW	Some good but limited resources, primarily in fixed foundation offshore wind

Key Factors Study – September 2021



- **Objective:** to help government officials in developing countries answer the question “*what do we need to do to establish and grow a successful offshore wind market?*”
- Flagship knowledge report to provide lessons learnt and good practices but for a developing country setting
- Includes 39 case studies and 327 references to further reading material
- The report will be accompanied by a series of online learning modules which will present and discuss the essential key factors

[Download here](#)



FOWSP - Framework for Offshore Wind Spatial Planning

- **Title:** An Environmental and Social Framework for Offshore Wind Spatial Planning (FOWSP):
A strategic approach to integrating E&S considerations into sectoral planning for offshore wind
- **Objective:** enable WBG client governments to adequately plan for and roll out a country-scale spatial assessment of environmental & social aspects associated with the offshore wind
- FOWSP will support the planning and siting of offshore projects with lower environmental and social risks and possibly opportunities, to help ensure bankability and uptake of good practice
- Important to be appropriate and practical for emerging markets and compatible with UNESCO marine spatial planning methodology

Funding provided by:

PROBLUE
HEALTHY OCEANS · HEALTHY ECONOMIES · HEALTHY COMMUNITIES



Credit: Vestas – Aberdeen Bay OWF



Program's Country Activities

Country Roadmaps

- Procurement from a roster of six experienced, international consultancy firms;
Arup, BVG Associates, COWI, DNV, Everoze, and RCG
- Partnerships with local consultancies is essential for local market insights
- Study scope is discussed and agreed with client government. This will depend on any previous activities, the potential size of the market and any particular objectives
- **Typical scope could include:**
 1. Geospatial mapping & zoning
 2. Economic analysis
 3. Financial analysis
 4. Environmental & social analysis
 5. Permitting, consenting,
 6. regulatory & legal framework
 7. Identification of stakeholders
 8. Transmission upgrades
 9. Economic impact assessment
 10. Supply Chain Analysis
 11. Health and safety analysis
 12. Infrastructure capabilities
 13. Scope, timing and cost of downstream technical studies
 14. Recommended actions

Country Studies - 10 target markets

1. **Vietnam:** Roadmap completed. High & low growth scenarios with recommendations. Continuing support on market strategy, planning, and grid
2. **Sri Lanka:** Started Nov 2020. Highly engaged Govt. Focus on sites in Gulf of Mannar – possible link to India grid interconnection
3. **Turkey:** Started Nov 2020. Focus on economic analysis, regulatory gap analysis, E&S risks. To advise Govt prior to future project tenders
4. **India:** Started Dec 2020. Focus on economic benefit & demonstration program
5. **Azerbaijan:** Started Jan 2021. Caspian Sea challenges. O&G transition
6. **Colombia:** Started Mar 2021. Key topics; hydro integration, and E&S constraints
7. **The Philippines:** Started Mar 2021. Predominantly floating wind.
8. **South Africa:** Collaboration with CSIR to explore country specific drivers for offshore wind as a scoping study for a future roadmap
9. **Brazil:** WBG commissioned event in July 2020 at Minister's request. Ongoing engagement scoping WBG support for a study on deployment scenarios
10. **SIDS: Caribbean, Papua New Guinea & Fiji:** Exploring opportunities for small scale projects.

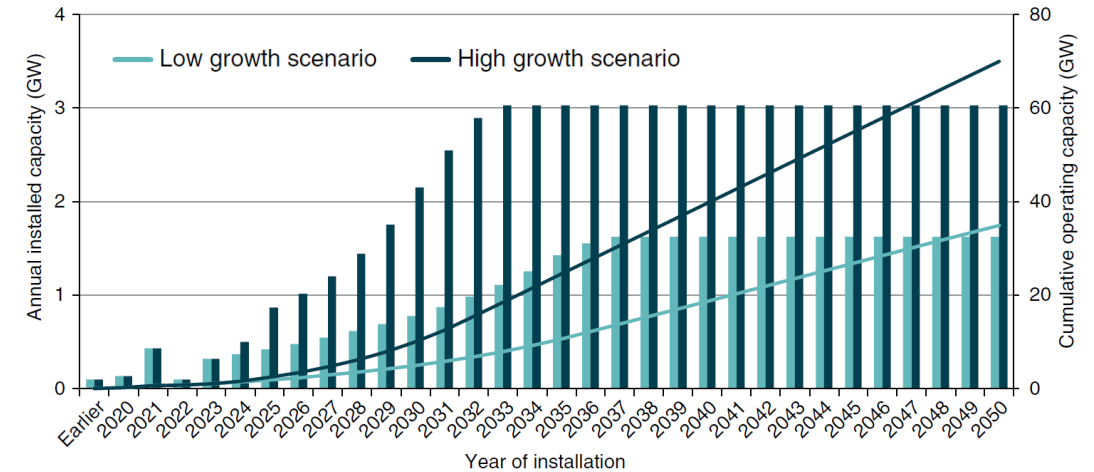


Vietnam Offshore Wind Roadmap – June 2021

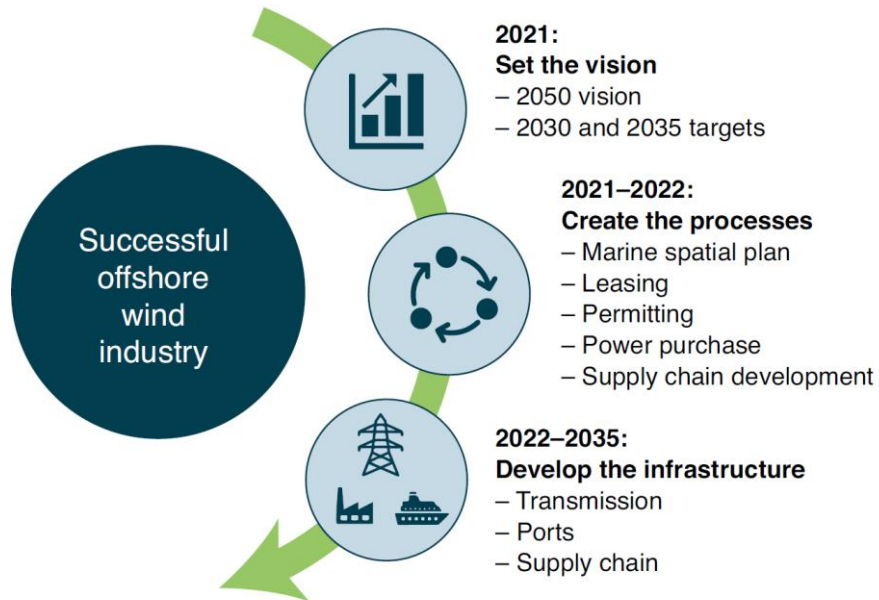
[Click here to download Roadmap Report](#)

- Rapidly growing energy demand, world class wind resource
- Analysis of the implications of two industry growth scenarios
- Identified gaps and challenges to delivering those scenarios
- Made 20 key recommendations for next steps
- Offshore wind targets are now being incorporated into policy

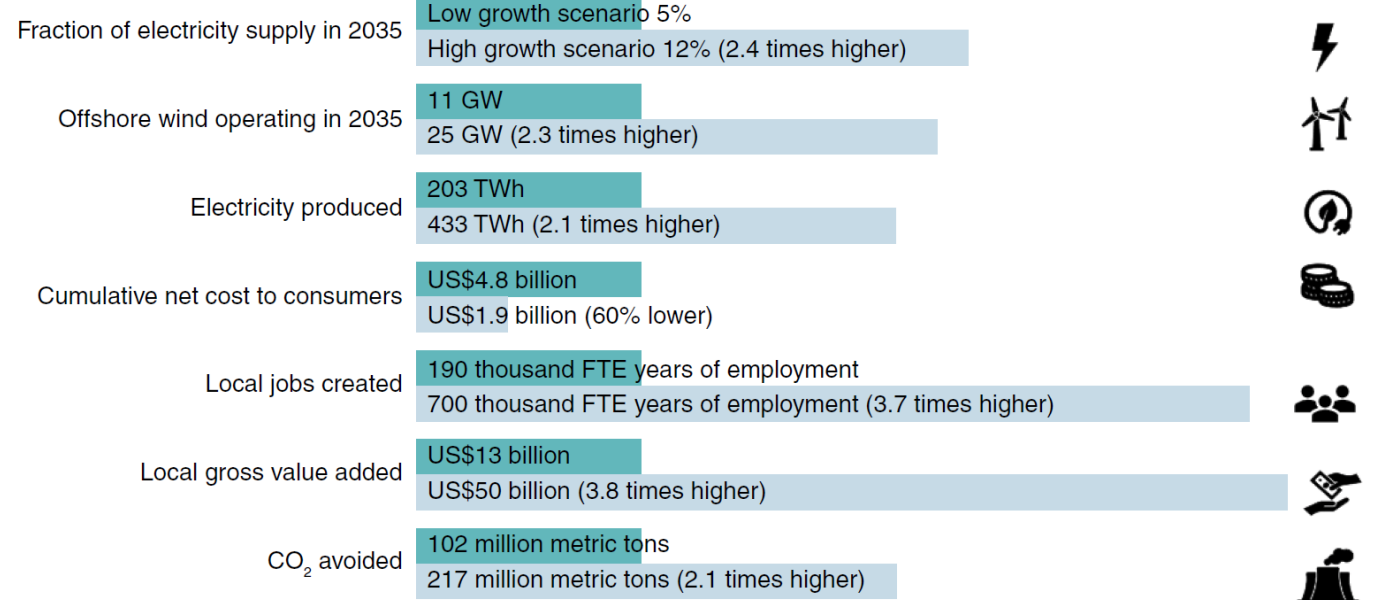
Industry growth scenarios considered



High-level Roadmap for Vietnam



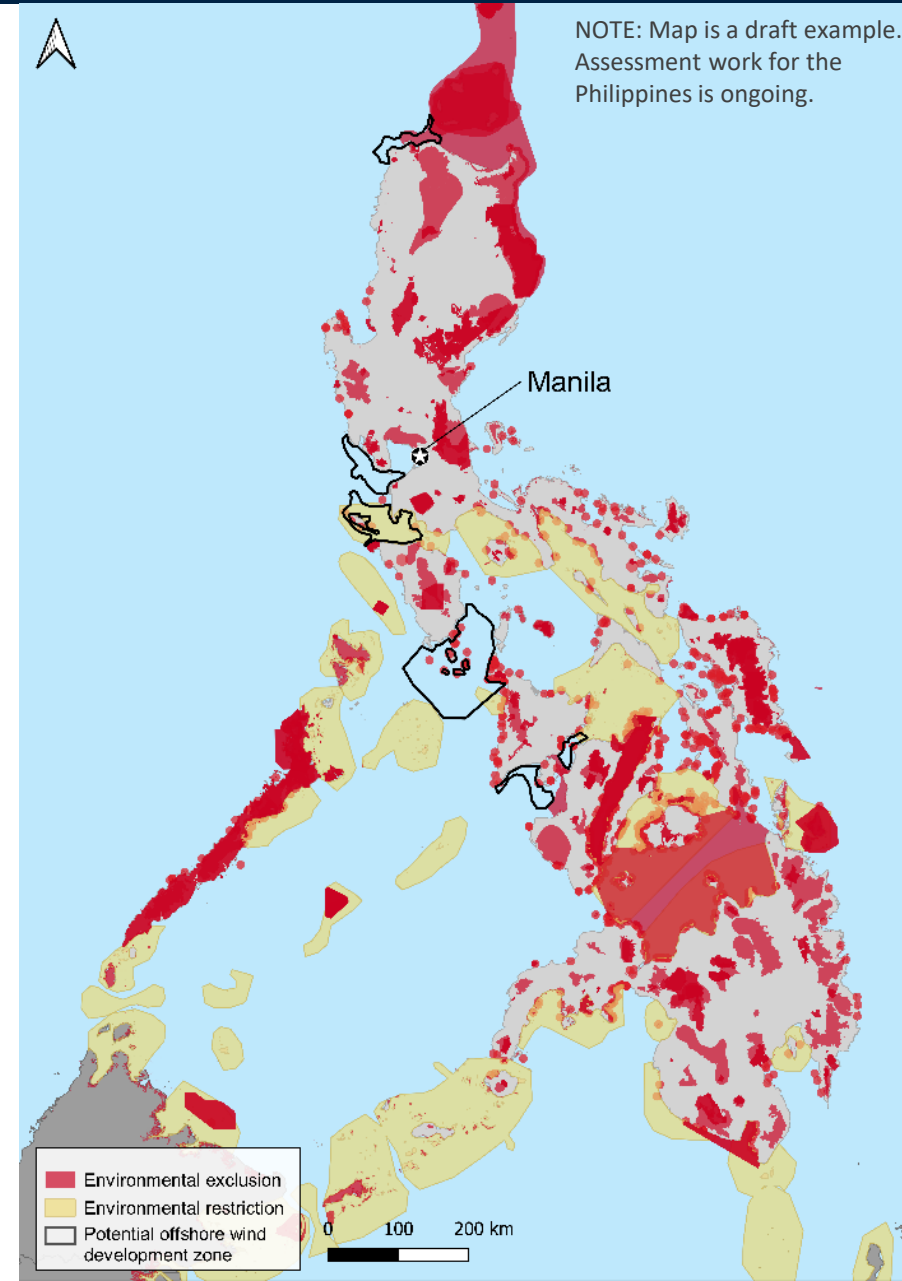
Estimated Impact of the Two Scenarios between 2020 and 2035



Country Level E&S Assessments & Advice - PROBLUE

- Environmental and social (E&S) assessment work input into Country Roadmaps;
 - Engage and consult relevant E&S stakeholders to identify high-risk receptors
 - Screen the IUCN Red List to identify ‘hotspot’ areas for highest risk species for offshore wind development (i.e. areas that would likely qualify as Critical Habitat per IFC PS6 / WB ESS6)
 - Identify high-risk social aspects, likely to have significant impacts from offshore wind development
- Recommendations on transparent consenting process to reduce risk & ensure bankable projects.
- ESIA Recommendations to help ensure project ESIA will meet [World Bank](#) and [IFC](#) E&S standards

Funding provided by:



Capacity Commitments & Technical Assistance

Turkey:

- [European Union IPA funding](#) – EUR 9.3m over 3 years
- Objective: promote reinforcement of the Ministry of Energy and Natural Resources (MENR)'s level of preparedness to select and develop sites for auction/tender/competition for offshore wind
- Including site surveys, technical assistance and capacity building ahead of future offshore wind tenders

Vietnam:

- Building on initial roadmap work to support the Government of Vietnam to deliver on forthcoming PDP-8 commitments
- Coordination with DEA's support program
- Technical assistance to options for seabed leasing and offtake agreement strategy following the end of the FiT regime
- WB providing financing for transmission reinforcement



THANK YOU

SEAN WHITTAKER, PRINCIPAL INDUSTRY SPECIALIST, IFC

MARK LEYBOURNE, SENIOR ENERGY SPECIALIST, ESMAP, WORLD BANK

