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KGID 2025 Green Growth: The Path to Sustainable Jobs

KGGTF project: Supporting the Development of Offshore Wind in Viet Nam

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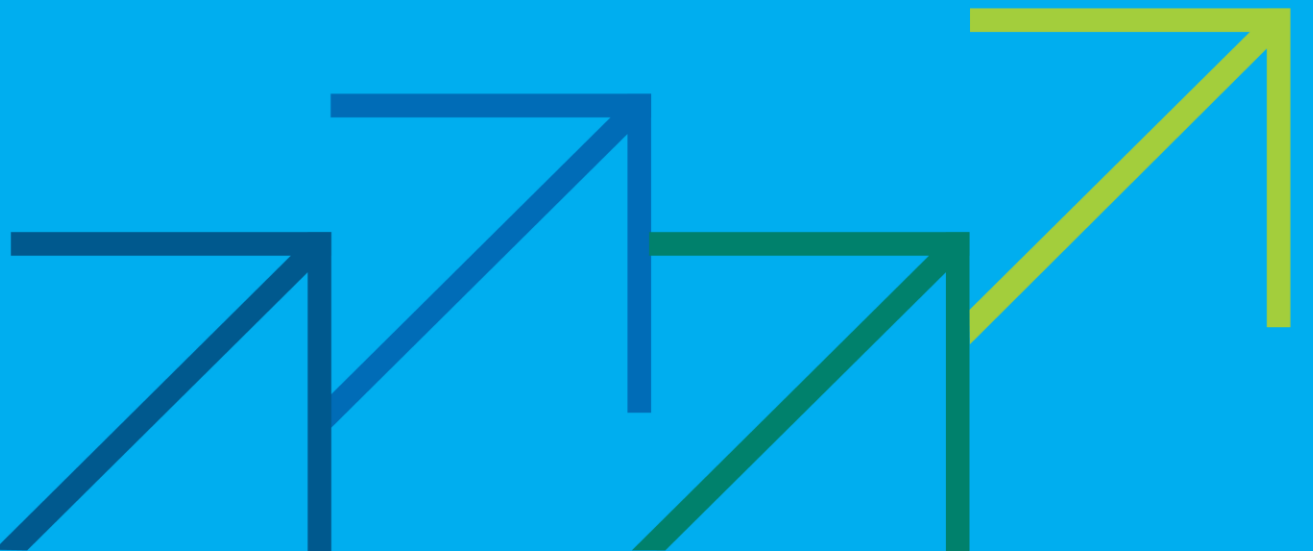
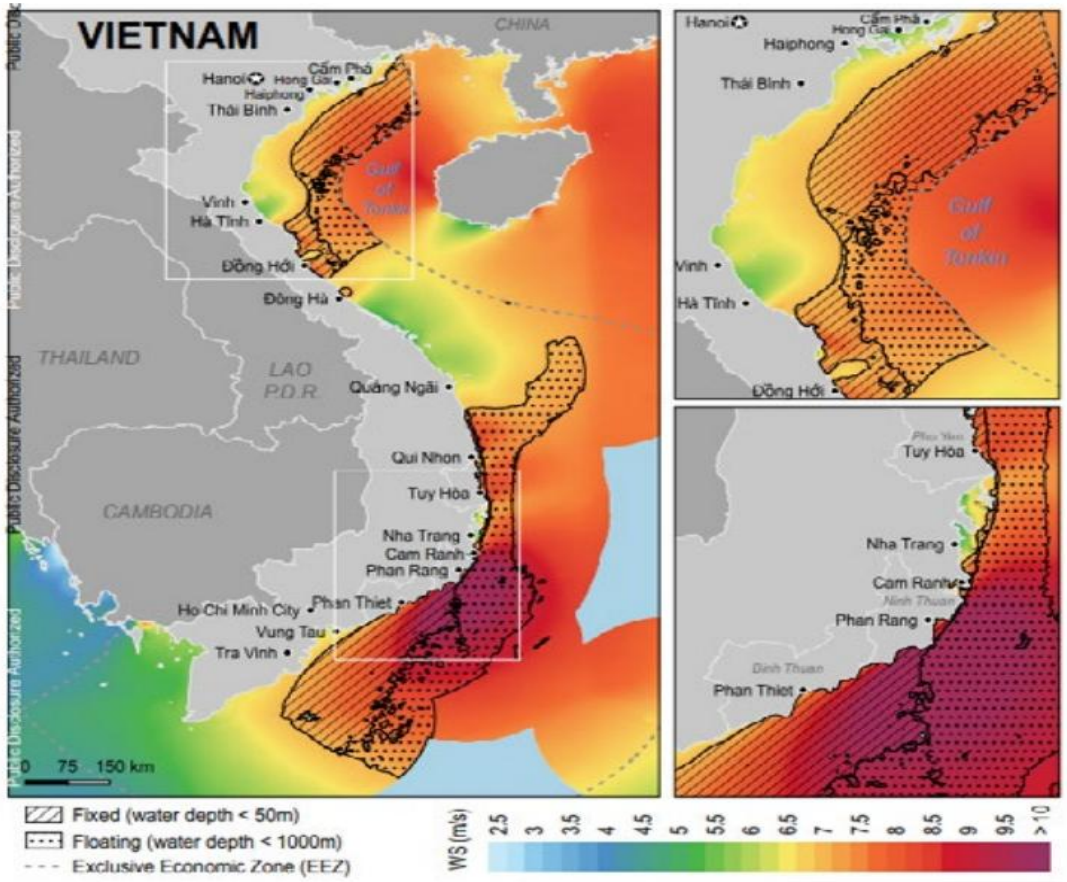


Viet Nam's great offshore wind potential

Technical potential of offshore wind - 600 GW [260 GW fixed bottom + 340 GW floating]



- A fast-growing economy with strong power demand growth, mainly for industrial base
- National energy security and net-zero 2050
- Offshore wind targets and preliminary development areas in the national Power Development Plan 8 (PDP8) and its Implementation Plan
- Offshore wind specific legal and regulatory frameworks
- Interest from internationally active offshore wind developers, including from the private sector

Estimated technical potential for fixed and floating offshore wind within 200 km of the shorelines.
Source: ESMAP (2021) Going Global – Expanding Offshore Wind to Emerging Markets

National targets and support to offshore wind development

- First **National Marine Spatial Plan** for 2030 with 2050 vision; wind power development earmarked in 5 regions.
- **New Electricity Law**, covering key phases of offshore wind development from: site surveys to investor selection, project approval, and implementation phase requirements, detailing the differentiated approach and requirements for the commercial projects.
- **Power development plan version 8 (PDP8)** proposed the first 17 GW offshore wind projects blocks and intended grid connections, mitigating doubts around grid bottlenecks.

	2030 to 2035	By 2050
Target, GW – domestic power supply from offshore wind	6 to 17 GW	113 to 139 GW
Target, GW – new energy (hydrogen based products) from offshore wind	~15 GW	~240 GW
Target, GW – power export from renewable energy sources including offshore wind	5 to 10 GW or higher (subject to demand)	10 GW or higher (subject to demand)

Source: Revised PDP8 approved on April 15, 2025.

Potentials untapped due to several challenges

Policy & Regulatory frameworks

- Incomplete and evolving regulatory and legal frameworks
- Uncertainty in national policies
- Slow approval process

Financial & Market

- High upfront cost and risk mitigation measures
- Unclear investment framework
- Limited PPA templates & project viability

Infrastructure & Supply Chain

- Grid limitations
- Constrained supply chain
- Limited technical expertise and workforce

Governance & Coordination

- Limited sectoral planning and coordination (e.g., Marine management, fishing, military)
- Unclear governance and dedicated agency

WB – ESMAP's support to Viet Nam Offshore Wind Development

Analytical support

- Offshore wind sectoral planning
- Framework for private sector investment

Operational support

- Procurement framework for Offshore Wind development
- Offshore Wind Survey Strategy
- Gulf of Tonkin – Offshore Wind site screening

KGGTF to support Vietnam Offshore Wind Development

Three supporting activities

- Integrating ESMAP-supported offshore wind sectoral planning into the National Marine Spatial Planning (MSP), including GIS data mapping and publication
- Supporting local stakeholder engagement and management for investment
- Marine use zoning for selected province and stakeholder engagement and technical capacity building

"1st engagement with Korea's Ministry of Oceans and Fisheries for energy support"

"Good demonstration of complementary synergies between ESMAP and KGGTF for higher impacts"

Asia-Pacific Wind Energy Summit 2024 in Korea

- **Five delegations leading offshore wind development in Viet Nam**: Central Economic Committee, Ministry of Planning and Investment, Vietnam Electricity (EVN), Vietnam Administration of Sea and Island (VASI), and Electricity Regulatory Authority of Vietnam (ERAV)

- **Three bilateral meetings with**:

- Korea Ministry of Oceans and Fisheries
- Korea Marine Environment Management Corporation (KOEM) & Korea Maritime Institute (KMI)
- SK Oceanplant - private Korean developer

- **Focus on:**

- Offshore wind mapping digitalization + publication
- Governance and regulatory streamlining
- Technical knowledge sharing

>> visit to Busan's industrial cluster and Hyundai Heavy Industries shipbuilding and substation manufacturing operations

Leveraging Korea's journey to offshore wind development

🎯 National Energy Transition Commitment and Targets

- Under the national Carbon Neutrality by 2050 target - 14.3 GW of offshore wind by 2030

⚙️ Current landscape

- ~321 MW operational as of 2025 but with substantial projects in the pipeline to be commissioned around 2030, including 3.2 GW Sinan complex in public-private partnership –> one of the largest offshore wind clusters

🧩 Challenges

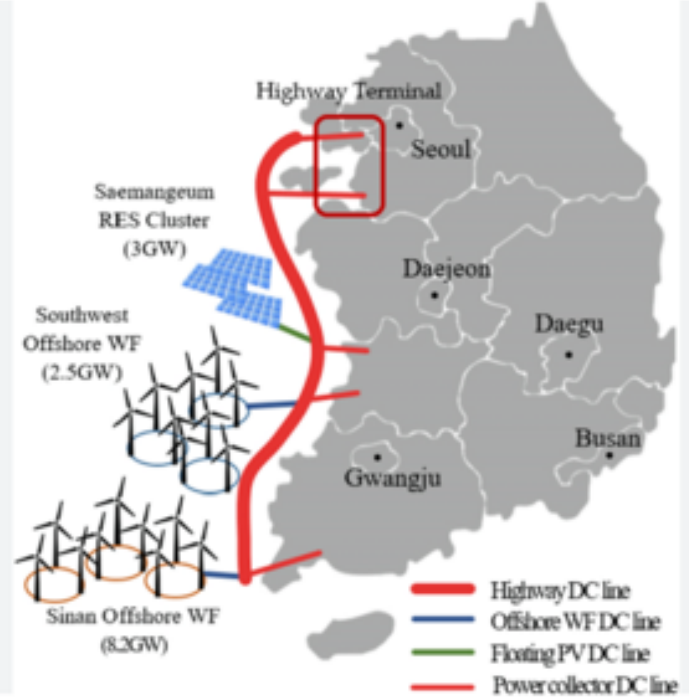
- Complex regulatory and permitting process across multiple ministries + high security radar
- Grid bottlenecks + underdeveloped domestic supply chain
- High costs and volatile market

🚀 Breakthrough developments

- **Special Act on Offshore Wind development (2025)**: centralized zoning, fast-track permits, systemized local engagement entering into effect March, 2026

- **Energy Highway initiative with government reforms –** a dedicated Ministry of Climate and Energy to centrally manager climate policy and energy development, addressing long-standing fragmentation

Korea offshore wind Act: a strategic turning point



Source. Offshore MTDC Transmission Expansion for Renewable Energy Scale-up in Korean Power System: DC Highway

- **Streamlined one-stop shop**: a new cross-ministerial 'Offshore wind power committee & government designated 'power generation zones'
- **Stronger investor confidence**: transparent and periodic capacity auctions (two per year) with an updated two-stage bidding process
- **Reinforced Public–Private Partnerships and local engagement**: Premiums for PPPs and formalized governance mechanisms for inclusive local participation
- **Aligned with grid expansion**: integrated planning with the national grid expansion/modernization (U-shaped grid) & energy transition agenda
- **Synergized with industrialization**: strengthening domestic supply chain and industrial capacity for sustainable offshore wind industry growth.

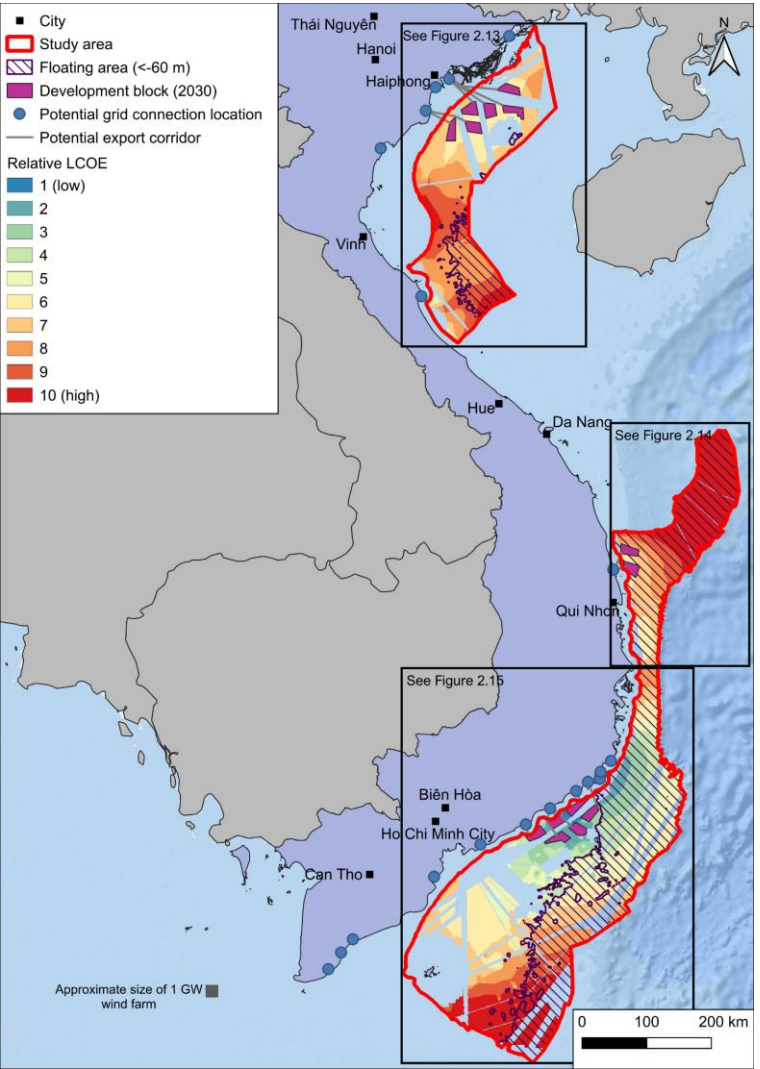
Lessons from Korea's Special Act offer actionable insights to support countries with offshore wind development

Thank you

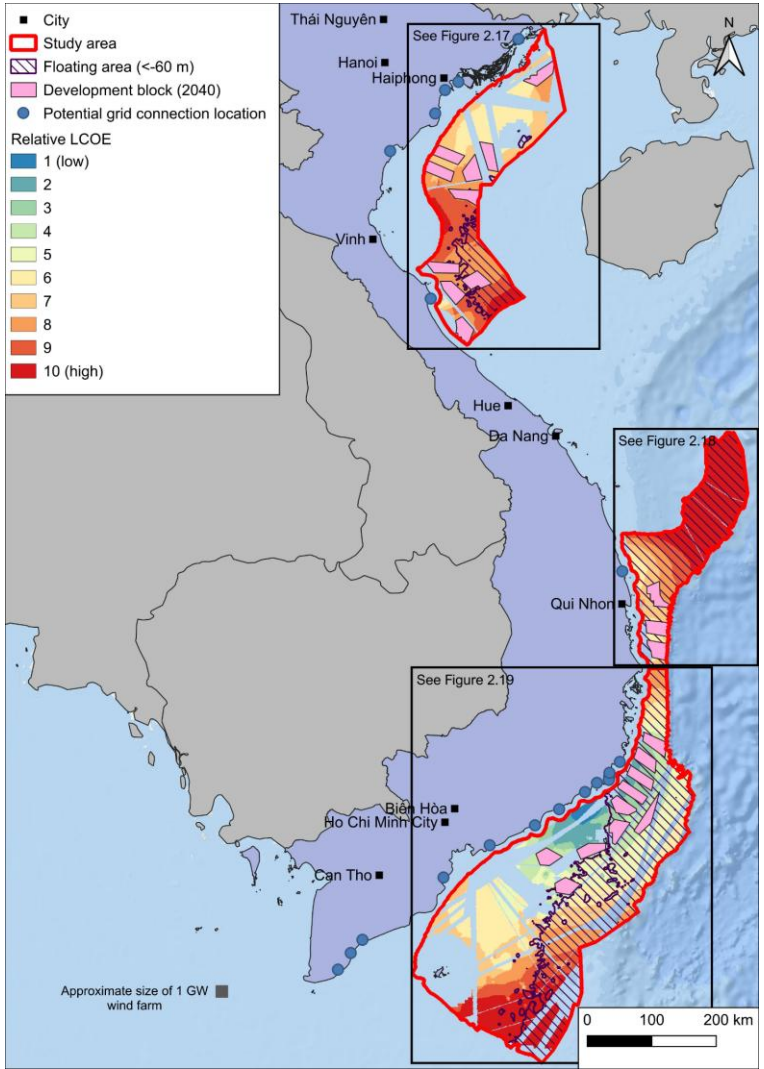
ANNEX

Viet Nam Offshore Wind Sectoral Planning

2030 deployment scenario



2040 deployment scenario



Assumption	2030 scenario	2040 scenario
PDP8 offshore wind capacity target	6 GW (North: 2.5 GW, Center: 0.5 GW, South: 3 GW)	40 GW (in line with PDP8 2050 target)
Project size	1 GW	2 GW
Power density	3 MW/km²	3 MW/km²
Development Block area	333 km2	666 km2
Distance between Development Blocks	10 km	10 km
Project attrition	50 %	25 %

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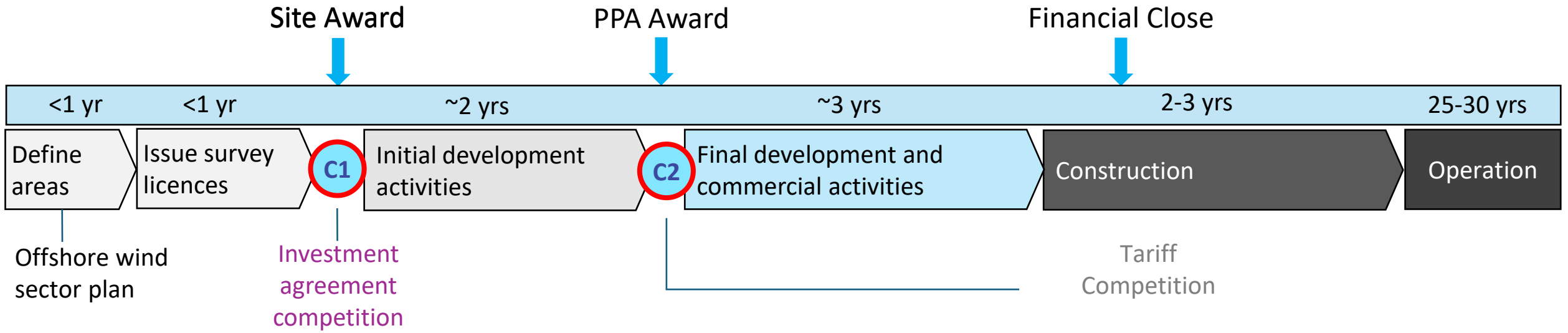
Offshore Wind in Viet Nam Procurement Framework

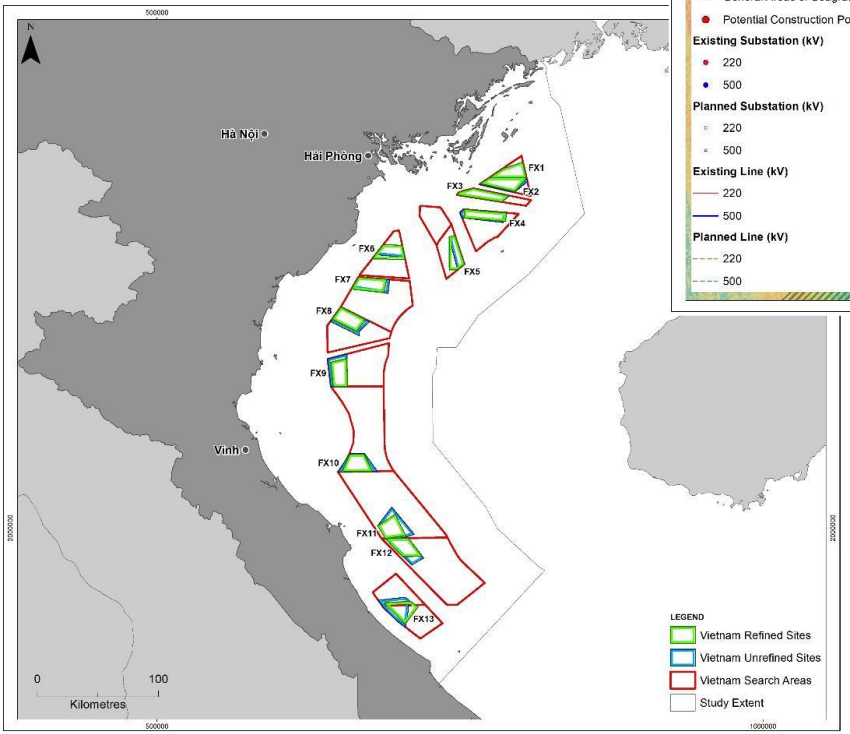
We recommend a Procurement Framework with following steps

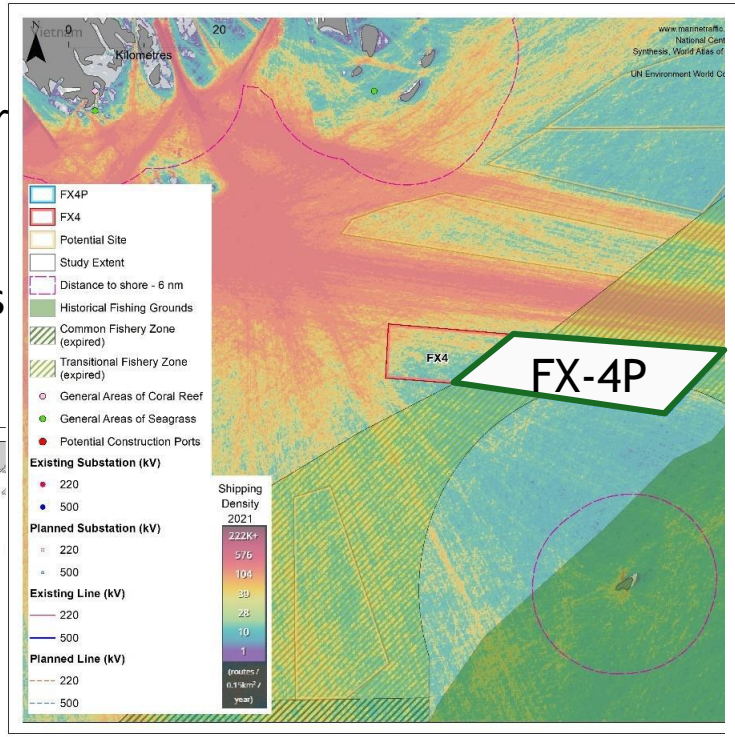


Pre-qualification	Proposal submission	Assessment & award	Pre-qualification	Proposal & bid price submission	Assessment & award
Developers must pass a pre-qualification step to be eligible to compete	Developers must submit a proposal, addressing how they meet the Selection criteria	Proposals are scored and ranked. Winners receive an Investment Agreement, which gives site exclusivity for 10 years. Winners are eligible to participate in the Stage 2 Tariff Competition	Developers meet certain pre-qualification criteria to compete	Developers must submit a bid price $/MWh and a proposal, outlining the project status and maturity of development	Scores are tallied and projects are ranked Winners receive a Tariff Award Agreement, which gives a guaranteed grid connection and right to a 20yr PPA at the submitted bid price

Offshore Wind Site Screening in the Gulf of Tonkin

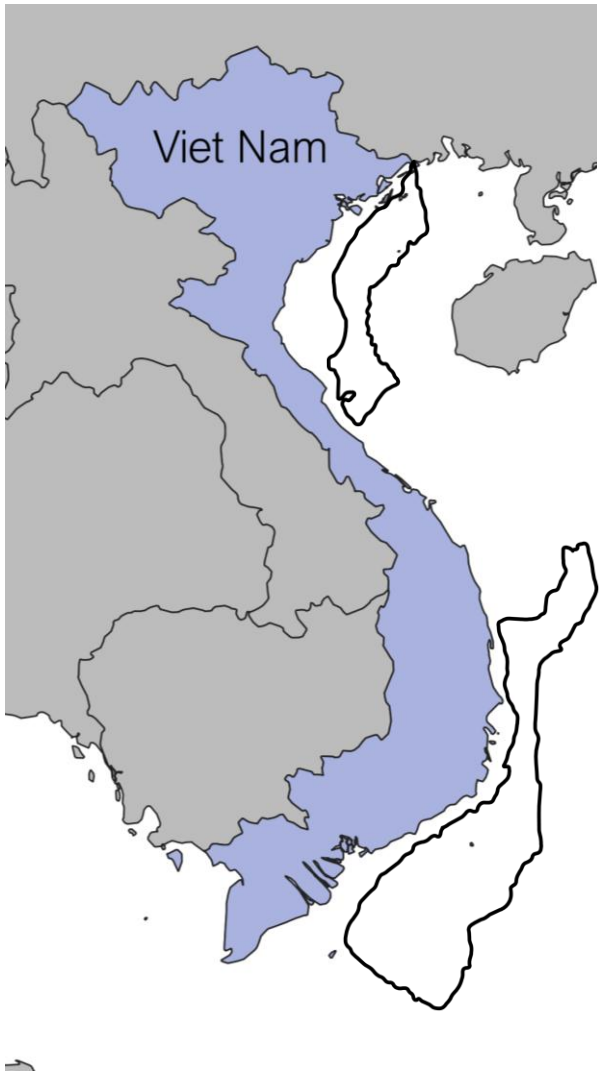
1. Determine suitable areas, sites and potential capacities for OW development in the Gulf of Tonkin
2. Identify appropriate locations for a pilot OW project

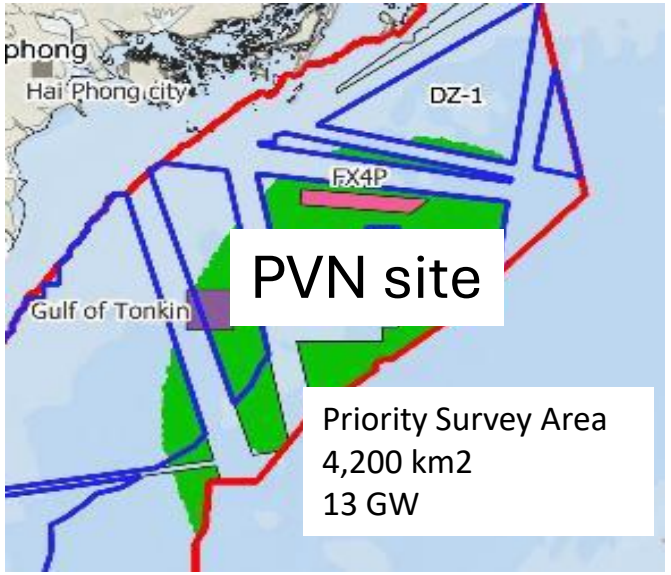


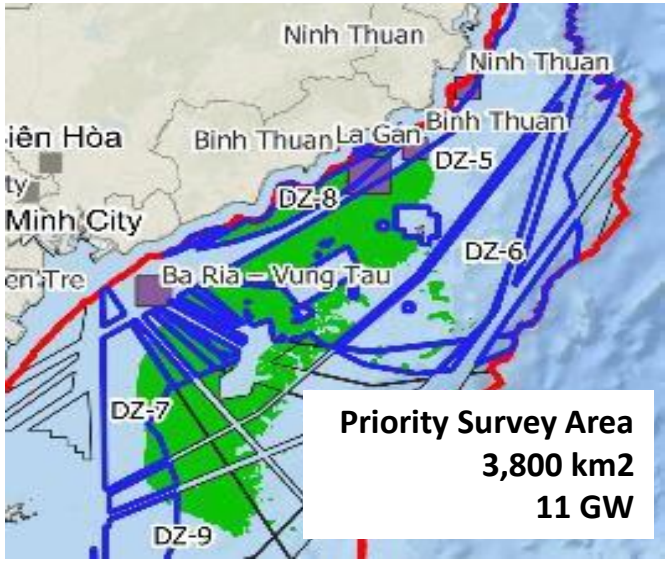


Item	FX-4P (VND 2022)
Project Size	**810 MW**
Turbine size	**15 MW**
LCoE	**VND 2,675,000/MWh**
Net Capacity Factor (NCF)	**40.3%**
Key Sensitivity Factors	**Cost/LCoE Uncertainty**
Site Boundary Refinement	Low
Geotechnical conditions	Medium
Met-Ocean conditions	Low
Weighted Average Cost of Capital (WACC)	High
Installation Vessel Assumptions	Medium
Yield – Wind Data and Power Curves	Medium
Cost Trajectories – 2030 (incl Global OSW supply chain constraints)	High
Transmission concept and topology	Medium
Foundation Design and regional Supply Chain	Medium-Low

Offshore Wind Survey Strategy







Survey scope options could be delivered with a 3 mUSD budget

	Option 1 –Pilot project focus	Option 2 – Wind focus	Option 3 – Environment focus	Option 4 – Balanced approach	Option 5 – Risk-based approach
Wind measurement	1 x floating lidar centered around preferred pilot project	Floating lidars in both north and south. Could be centered around preferred pilot projects	None	Onshore lidars in both north and south along headland or on islands	Floating lidar in north, where wind speed is lower and project viability is less certain
Environmental surveys	Perform full EIA surveys for preferred project. Could include baseline studies and analysis work.	none	Perform long lead surveys for north and south areas, focusing on birds, bats and marine mammals. Could be centered around preferred pilot projects	Perform long lead surveys in both north and south areas, focusing on birds, bats and marine mammals. Could be centered around preferred pilot projects Reduced frequency and density compared with Option 3	Perform long lead surveys in the south, where environmental and social risks are higher (MSP output) Sub-option to decrease survey frequency /density and include some surveys in the north

- Option 1 is best for supporting a single / cluster of projects
- Option 2 and 3 will provide the highest quality data, with less breadth
- Option 4 attempts to cover all areas, but will deliver the lowest quality data
- Option 5 will delivery high quality data, focusing on addressing the development risks of specific areas