CAPTURING THE OFFSHORE WIND OPPORTUNITY

PORTS ASSESSMENT

Analysis of potential ports to support the deployment of offshore wind in selected regions in Brazil, India, Morocco and the Philippines

SYSTEMIQ

CONTEXT AND OBJECTIVES OF THIS DOCUMENT

This document was developed in March and April 2025 as part of the research underpinning the whitepaper "*Capturing the Offshore Wind Opportunity : The Critical Role of Ports and Regional Coordination in scaling Offshore Wind in Emerging Markets and Developing Economies."* This analysis was executed by Systemiq, with input from and building on prior work developed by the Energy Transitions Commission and with support from Ocean Energy Pathway.

This document intends to provide a high-level assessment of ports in selected emerging markets and developing economies (EMDEs) that could potentially support the development of offshore wind. The analysis focuses on ports located near priority offshore wind 'hotspots' and evaluates their suitability based on publicly available information about key infrastructure characteristics typically required for offshore wind activities, such as storage space and port accessibility.

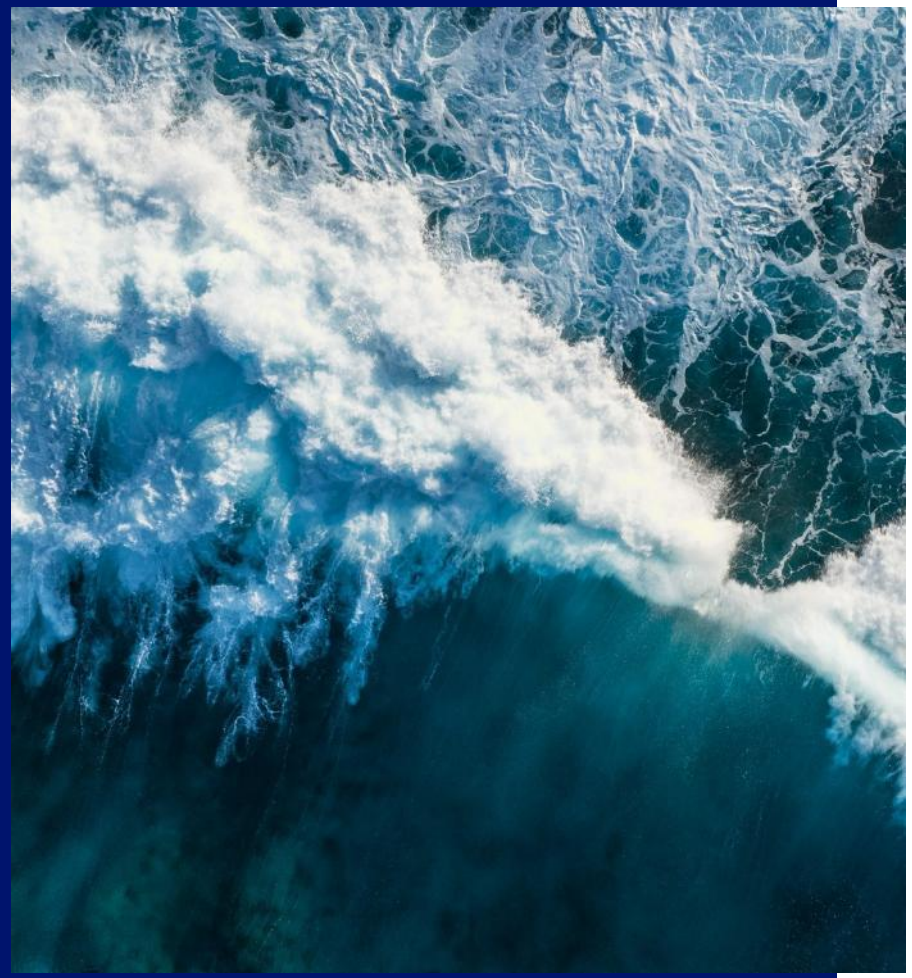
Importantly, this document is intended to initiate discussion—not to serve as a definitive or exhaustive list of offshore wind-ready ports. It highlights opportunities and gaps to encourage deeper engagement with stakeholders on the ground, including port authorities, developers and policymakers. Local insights and further feasibility assessments will be essential to validate and refine these initial findings. Readers should note that the assessments reflect infrastructure readiness as reported in online sources at the time of writing. Actual port conditions may differ and should be verified through in-country consultation and site visits.

Ocean Energy Pathway

SYSTEMIQ

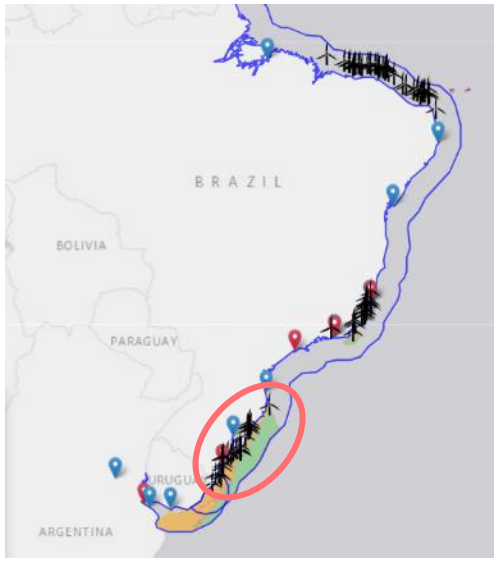
Energy Transitions Commission

CONTENTS OF THIS DOCUMENT

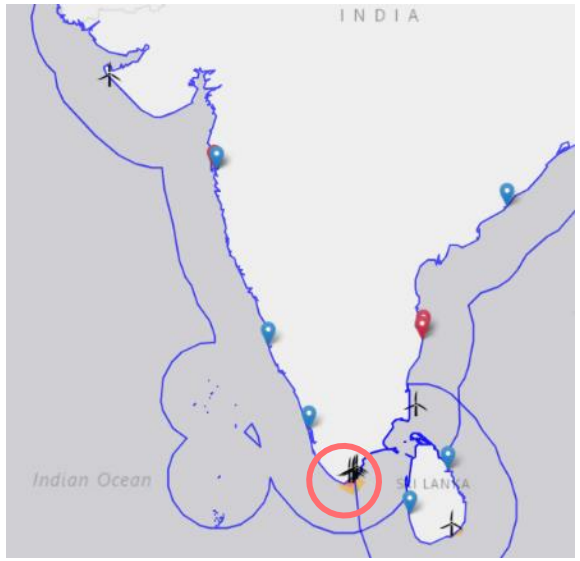


SYSTEMIQ

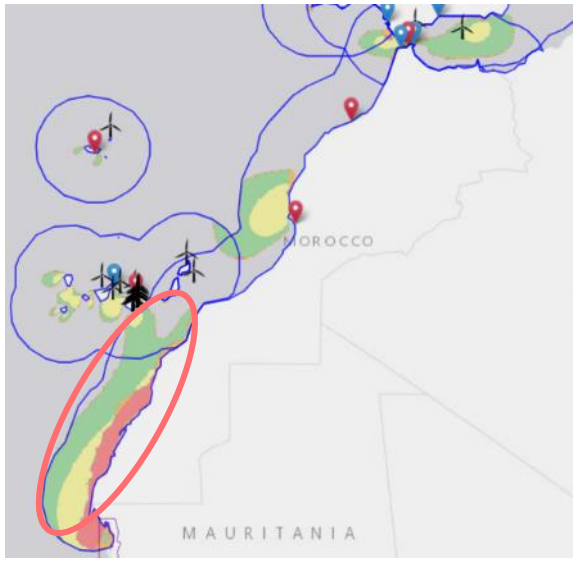
1 WE HAVE SELECTED SUBREGIONS BASED ON FIXED-BOTTOM OFFSHORE WIND POTENTIAL AND PIE/OEP INPUT



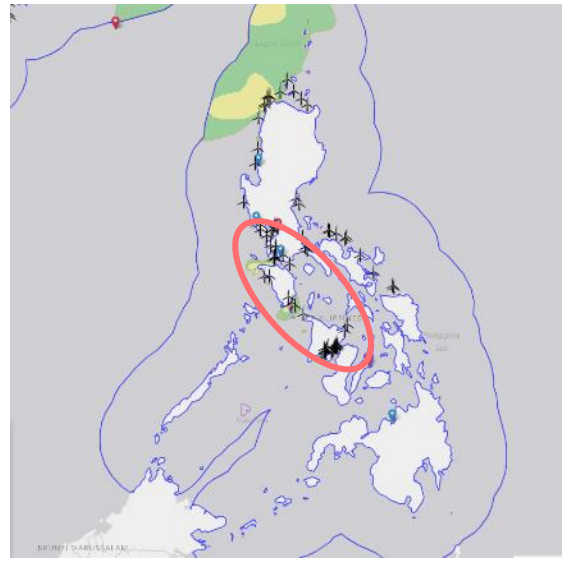
The South of Brazil
(Rio Grande do Sul)



The South of India
(Tamil Nadu)



The South of Morocco /
Western Sahara



Central region of the Philippines
(Manilla bay / Batangas /
Guimaras)

Wind hotspots 700 – 1000 W/m^2, fixed | 1000+ W/m^2, fixed | 700 – 1000 W/m^2, floating | 1000+ W/m^2, floating | Offshore wind hotspot considered for ports analysis

SYSTEMIQ

2 PORTS PLAY MULTIPLE ROLES IN THE OFFSHORE WIND VALUE CHAIN, THIS ANALYSIS FOCUSES ON MARSHALLING AND MANUFACTURING PORTS

Focus roles analysis

Offshore wind development stage	Planning & design	Manufacturing & procurement	Construction & installation	Operation & Maintenance	Decommissioning
Key activities per phase	Site selection, environmental checks, permits & regulatory approvals, wind farm design finalization	manufacturing of components; purchase of turbines key components	Installation of foundations, turbines and associated infra (electrical systems, substructures)	Ongoing wind farm operations (and optimization); regular maintenance and repairs	Decommissioning and dismantling of turbines and associated infra; recovery of recyclable materials; site restoration
Key roles for ports	**R&D ports** act as departure point for site investigations	**Manufacturing ports** produce and ship out components for offshore wind, as these are often so large that they cannot be transported over land. Specialized offshore wind manufacturing hubs sit in ports, ready to transport manufactured components overseas.	**Marshalling ports** serve as marshalling yards where all components for a project are gathered, stored and pre-assembled as much as possible before being loaded onto installation vessels.	**O&M ports** act as O&M bases for operational wind farms. Crew transfer vessels and service operations vessels depart from these ports to conduct maintenance. **Landing hubs** are the points where generated power comes onshore. These can be located anywhere along the coast.	**Decommissioning ports** at the wind farm's end-of-life (or repowering), turbines and foundations will be brought back onshore through these ports.

Notes: Most ports can play multiple roles

SYSTEMIQ

2 PORTS IN SELECTED SUBREGIONS WILL BE SHORTLISTED FOR MARSHALLING AND MANUFACTURING USING INFRASTRUCTURE REQUIREMENTS

		Marshalling ports	Manufacturing ports
1. **Identify ports** within feasible ranges of offshore wind hotspots		**<200-400** km from OSW (depending on weather and waves)	<1000 km from OSW if local (local manufacturing only viable from regional pipeline of 1-4 GW p.a.)

2. **Cross-check ports** with infrastructure requirements	**Need to be in place**	• **Storage space**: ~20-30 ha required to develop 1 GW fixed-bottom offshore wind from a port over one-two years[1], 30-40 ha onshore storage and 20-25 ha wet storage for 1 GW of floating offshore wind
		• **Port access:**
		  • Water depth: 9-12 m below LAT for fixed-bottom, 12-20 m for floating
		  • Port entrance width of 200 m
		  • Air draft of >150 m for fixed-bottom, floating requires no air draft restrictions
			• **Storage space** depending on component:
			  • Nacelles: 3-6 ha
			  • Blades: 5-20 ha
			  • Towers: 4-30 ha
			  • Foundations: 15-60 ha
			  • Floating substructures likely require more space – but no commercial examples are available yet
			• **Port access:**
			  • Water depth: 9-12 m below LAT,
			  • Port entrance width of 200 m
			  • Air draft of 40-150 m (depends on component)
			• **Good hinterland connection** (rail, road, waterways)

	Future investment	• ***Load-bearing capacity**: quay with load bearing capacity of 25-30 t/m^2* for fixed-bottom, *40-100 t/m^2 for floating* • ***Long quay:** 350-700 m at which two installation vessels can berth + 400 m for inbound vessels with components*	• ***Load-bearing capacity**: quay with load bearing capacity of 40 t/m^2* • ***Long quay:** ~200 m at which transport vessels can berth*

Source: Stakeholder interviews; Systemiq analysis; World Bank (2022) Key Factors for Successful Development of Offshore Wind in Emerging Markets; Parkison et al. (2022) Marshalling ports required to meet US policy targets for offshore wind power; BVGA (2023) Guide to a Floating Offshore Wind Farm

Notes: 1. If sufficient space is not available, marshalling operations can also be conducted from two ports – but this increases vessel costs.

SYSTEMIQ

2 CLASSIFICATION OF PORTS THROUGH TRAFFIC LIGHT SYSTEM

Initial filtering of ports: all small, medium, large coastal ports within 400 km of OSW hotspot included, and all medium and large coastal ports within 1000 km of OSW hotspot included

Scored as	Marshalling (<400 km)			Manufacturing (<1000km)			
	Distance	Space	Port Access	Distance	Space	Port access	Hinter
Suitable	< 400 km from OSW zone	Situated near open space where expansion seems possible	3 out of 3 access criteria satisfied	<1000 km from OSW zone	Situated near open space where expansion seems possible	3 out of 3 access criteria satisfied	< 25 km from highway
Partially suitable		Situated near densely populated area, some open space	2 out of 3 access criteria satisfied		Situated near densely populated area, some open space	2 out of 3 access criteria satisfied	25-50 km from highway
Not suitable	> 400 km from OSW zone	Situated in densely populated area without open space	1 or 0 out of 3 access criteria satisfied	> 1000 km from OSW zone	Situated in densely populated area without open space	1 or 0 out of 3 access criteria satisfied	> 50 km from highway

Marshalling port access criteria:
Depth > 9m (fixed), >12m (floating)
Entrance width > 200 m
Air draft > 150 m (fixed), no restrictions (floating)

Manufacturing port access criteria:
- Depth > 9m (fixed), >12m (floating)
- Entrance width > 200 m
- Air draft > 40 m, no restrictions (floating)

SYSTEMIQ

3
PORTS ASSESSMENT

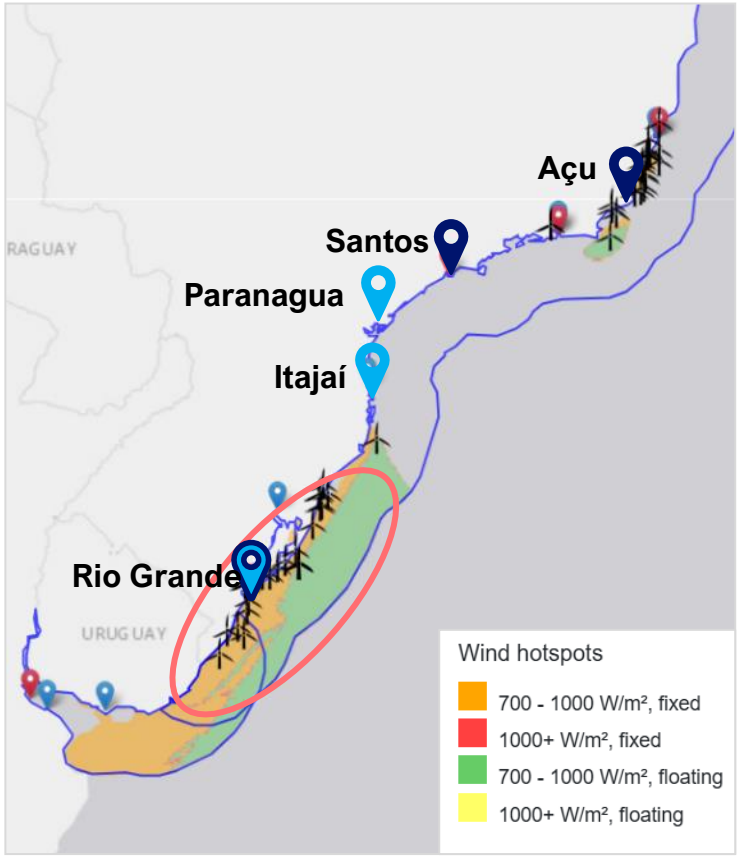
SYSTEMIQ

SOUTH BRAZIL

SYSTEMIQ

3a SOUTH BRAZIL: HIGH OFFSHORE WIND POTENTIAL WHICH COULD BE SUPPORTED BY KEY PORTS

Offshore wind hotspot considered for ports analysis



Marshalling port candidates

Manufacturing port candidates

Large offshore wind potential in all of Brazil

Both in the northeast, the southeast and the south of the country, there is significant potential for fixed-bottom offshore wind development (480 GW technical potential, 234 GW announced projects)

Offshore wind in the south can complement the energy system

The northeastern part of the country has already connected large volumes of onshore wind and is experiencing grid congestion while population and industry in the south could absorb wind power

~1-3 marshalling ports in the south

Only one large port (Rio Grande) suitable for marshalling due to proximity, two smaller ports also within feasible distance (Paranagua, Itajaí)

~2 large ports in the south(east) suitable for manufacturing

The ports of Rio Grande and Açu are large and already house industries. The Port of Açu is positioning itself as a port for the energy transition.

Manufacturing ports in the south could also serve developments in Urugay and Argentina

Urugay is developing an offshore wind pipeline, Argentina has a large technical potential[1]

Notes: 1. Technical potential of 558 GW fixed bottom and 1312 GW floating.
Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); World Bank (2025) Scenarios for Offshore Wind Development in Brazil; World Bank(2020) Offshore wind Technical Potential Argentina; Systemiq Analysis; Expert interviews

SYSTEMIQ

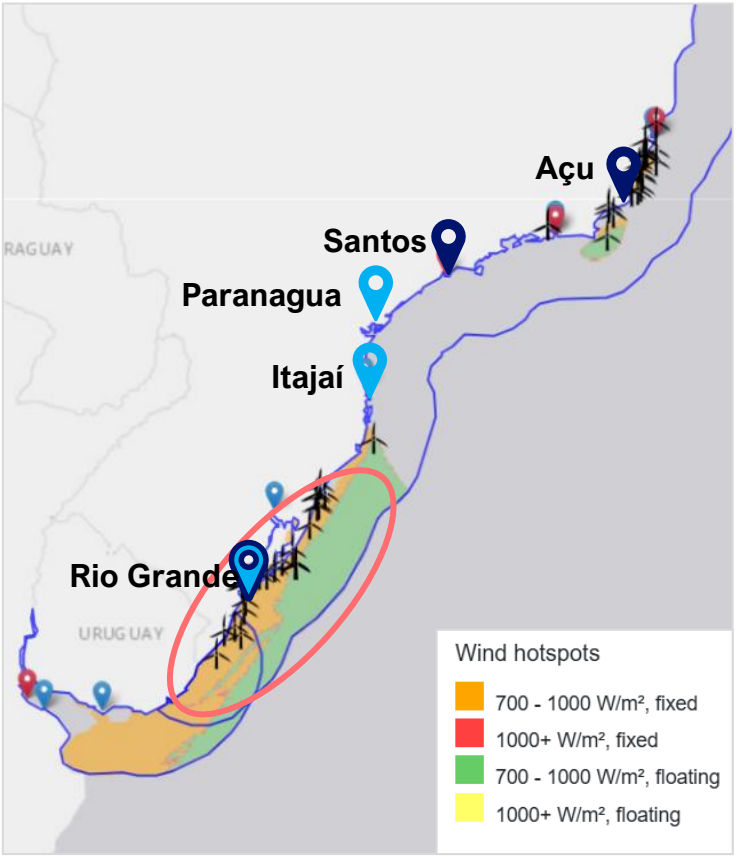
3a SOUTH BRAZIL: 5 SHORTLISTED PORTS THAT COULD PLAY A ROLE IN OFFSHORE WIND DEVELOPMENT

Suitability for: Yes | Partial | No

Port	Distance to OSW zone	Mar-shalling	Manu-facturing	Port characteristics
Porto de Rio Grande (BR)	15 km	Yes	Yes	Brazil's second busiest port, housing a large industrial complex. State-owned port with 3 terminals in a lagoon.
Itajai (BR)	120 km	Partial	Partial	One of Brazil's top container ports, focused on exports of food, textiles and wood. The port entrance width may be too narrow at 170 m and current depth not sufficient for floating at 9.4 m.
Paranagua (BR)	290 km	Partial	Partial	One of Brazil's top container ports, focused on agricultural products. The port entrance width may be too narrow at 150 m and current depth is not sufficient for floating at 11 m.
Port of Açu (BR)	1000 km	No	Yes	Privately owned port, specialized in cargo activities across 2 terminals. Committed to the energy transition, with MoUs focusing on sustainability and energy.
Santos (BR)	500 km	No	Partial	Large container terminal with roll-on/off facilities, may be suitable for manufacturing if space is available.

Note: nearby ports in Argentina and Uruguay likely do not have sufficient space and/or port access to be manufacturing ports

Offshore wind hotspot considered for ports analysis



Marshalling port candidates

Manufacturing port candidates

Sources included on next pages with port longlist.

SYSTEMIQ

3a SOUTH BRAZIL: LONG LIST OF POTENTIAL OFFSHORE WIND PORTS [1/2]

Port	Distance to OSW zone [km]	Shortlist	Marshalling (<400 km)			Manufacturing (<1000km)				Port Characteristics
			Distance	Space	Port Access	Distance	Space	Port access	Hinter land	
Tramandai (BR)	2									• Small port focused on fishing fleet • Can accommodate small cargo and oil-related activities
Rio Grande (BR)	15	✓								• Brazil's second busiest port • Large industrial district, 2,500 ha of industrial area • Port Authority is state-owned, terminals operated by private parties
Itajai (BR)	120	✓								• Medium port connecting a river to the sea • Publicly owned by municipality
Sao Francisco (BR)	210									• Small port focused on steel and agricultural shipping • Steel plant closeby • Entrance width of 150m may be too narrow • Depth of 11 m may be insufficient for floating
Paranagua (BR)	290	✓								• Small port used for agricultural exports • Depth of 11 m may be insufficient for floating
Montevideo (UR)	475									• Medium port in the capital of Uruguay • Three docks, used for containers • One dock can accommodate roll-on/roll-off vessels • Depth of 11 m may be insufficient for floating

Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites ; Systemiq Analysis; Expert interviews

SYSTEMIQ

3a SOUTH BRAZIL: LONG LIST OF POTENTIAL OFFSHORE WIND PORTS [1/2]

Port	Distance to OSW zone [km]	Shortlist	Marshalling (<400 km)			Manufacturing (<1000km)				Port Characteristics
			Distance	Space	Port Access	Distance	Space	Port access	Hinter land	
Port of Santos (BR)	500	✓								• Large container port with 58 terminals and 62 berths, roll-on/off capabilities. • Both public and private terminals.
La Plata (AR)	600									• Medium port with better sea access than Buenos Aires • Privately owned • Entrance width too narrow for offshore wind at 60m • Depth insufficient for floating at 7.9 m.
Buenos Aires (AR)	700									• Large port, Argentina's primary port • Located in the city
Rio De Janeiro (BR)	800									• Large port with modern cargo handling facilities, including roll—on/roll-off vessels. • The port has Free Trade Zone Status
Dtse / Gegua Oil Terminal (BR)	800									• Oil terminal situated on an island in the bay of Rio de Janeiro • Depth insufficient for floating at 11 meters.
Port of Açu (BR)	1000	✓								• Privately owned large port, specialized in cargo activities across 2 terminals. • Committed to the energy transition, with MoUs focusing on sustainability and energy.

Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites ; Systemiq Analysis; Expert interviews

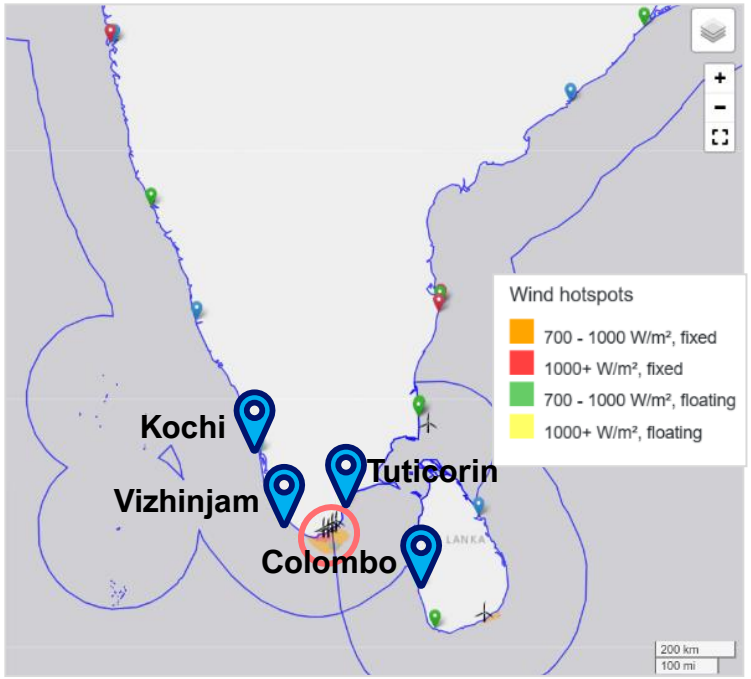
SYSTEMIQ

SOUTH INDIA

SYSTEMIQ

3b SOUTH INDIA: AMBITIOUS OFFSHORE WIND TARGETS AND GOVERNMENT HAS SELECTED TWO PORTS FOR OFFSHORE WIND

Offshore wind hotspot considered for ports analysis



Marshalling port candidates

Manufacturing port candidates

Ambitious target of 30 GW offshore wind by 2030

Technical potential for 91 GW fixed-bottom and 83 GW floating, concentrated in the south (Tamil Nadu) and the northwest (Gujarat). Action for Tamil Nadu expected later this year.

Offshore wind in Tamil Nadu holds possibility for regional collaboration

Ports in both India and Sri Lanka are nearby the offshore wind zone

~2-4 marshalling ports near offshore wind in Tamil Nadu

Ports of Tuticorin and Vizhinjam have been selected by government for offshore wind. Tuticorin is a large port and already active in onshore wind component export, Vizhinjam is a new port with ample space for expansion. Ports of Colombo (LKA) and Kochi are also within marshalling distance.

~2-4 ports suitable for manufacturing

Ports of Tuticorin and Vizhinjam have been selected by government for offshore wind. Ports of Colombo (LKA) and Kochi are also of sufficient size and already home to some industry.

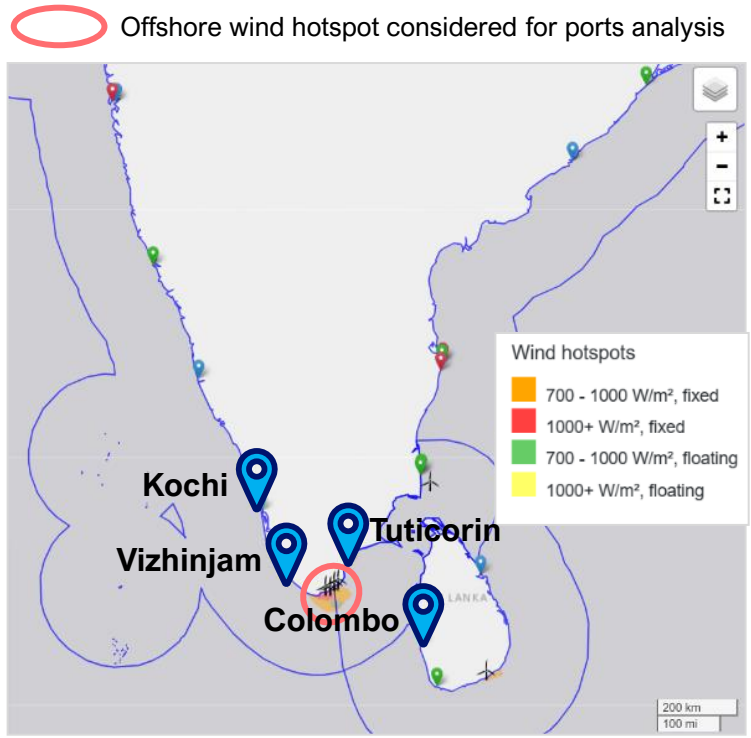
Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites; Indian port readiness for offshore project development, Port Authority Tuticorin; Ocean Energy Pathway (2025) Tamil Nadu Offshore Wind Manufacturing Supply Chain Investment Study; India Offshore Wind Ports Study (2023) Centre of Excellence for Offshore Wind and Renewable Energy; Expert interviews; Systemiq Analysis

SYSTEMIQ

3b SOUTH INDIA: 4 PORTS THAT COULD PLAY A ROLE IN OFFSHORE WIND DEVELOPMENT

Suitability for: Yes | Partial | No

Port	Distance to OSW zone	Mar-shalling	Manu-facturing	Port characteristics
Tuticorin (IN)	60 km	Yes	Yes	Selected by gvmt. for offshore wind development. Good connectivity (air/rail/road). Large port handling palm oil, chemicals and dry bulk. Already active in export of onshore wind components.
Vizhinjam (IN)	100 km	Yes	Yes	Selected by gvmt. for offshore wind development because of large land area available for expansion. Deep-water port designed for handling containers and cargo.
Colombo (LKA)	200 km	Partial	Partial	Medium port with three container terminals. Sri Lanka's main port, 5 terminals owned by public entities or public-private partnerships.
Kochi (IN)	275 km	Partial	Partial	Medium port with 16 berths used for containers, bulk and dry cargo. Supports maritime industries and is a special economic zone for export.



Note: Ports of Karaikal, Cheinnai, Kattupalli and Kamarajar seem closeby but large ships cannot sail the strait between India and Sri Lanka due to shallow waters.
Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites; Indian port readiness for offshore project development, Port Authority Tuticorin; Ocean Energy Pathway (2025) Tamil Nadu Offshore Wind Manufacturing Supply Chain Investment Study; India Offshore Wind Ports Study (2023) Centre of Excellence for Offshore Wind and Renewable Energy; Expert interviews; Systemiq Analysis

SYSTEMIQ

3b SOUTH INDIA: DEEPDIVE ON OFFSHORE WIND PORTS

Port	Distance to OSW zone [km]	Shortlist	Marshalling (<400 km)			Manufacturing (<1000km)				Port Characteristics
			Distance	Space	Port Access	Distance	Space	Port access	Hinter land	
Tuticorin (IN)	60	✓								• Selected by gvmt for OSW • Large port handling palm oil, chemicals and dry bulk • Active in export of onshore wind components
Vizhinjam port (IN)	100	✓								• Selected by gvmt for OSW • Deep-water port designed for handling containers and transshipment cargo
Colombo (LKA)	200	✓								• Medium port with three container terminals • Sri Lanka's main port, 5 terminals owned by public entities or public-private partnerships
Kochi (Cochin) (IN)	275	✓								• Medium port with 16 berths used for containers, bulk and dry cargo • Supports maritime industries and is a special economic zone for export
Galle Harbor (LKA)	325									• Small port with four berths and 660 m quay • Primary used for leisure and services • Depth not sufficient for floating at 9.4 meters.
New Mangalore (IN)	700									• Medium port, exporting commodities and containers • Offers berth to cruise vessels • Located next to fertilizer manufacturing
Trincomalee Harbor (LKA)	850									• Medium port • Growth plans to cater for break bulk cargo and grow industrial activities

Note: Ports of Karaikal, Cheinnai, Kattupalli and Kamarajar seem closeby but large ships cannot sail the strait between India and Sri Lanka due to shallow waters.
Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites; Indian port readiness for offshore project development, Port Authority Tuticorin; Ocean Energy Pathway (2025) Tamil Nadu Offshore Wind Manufacturing Supply Chain Investment Study; India Offshore Wind Ports Study (2023) Centre of Excellence for Offshore Wind and Renewable Energy; Expert interviews; Systemiq Analysis

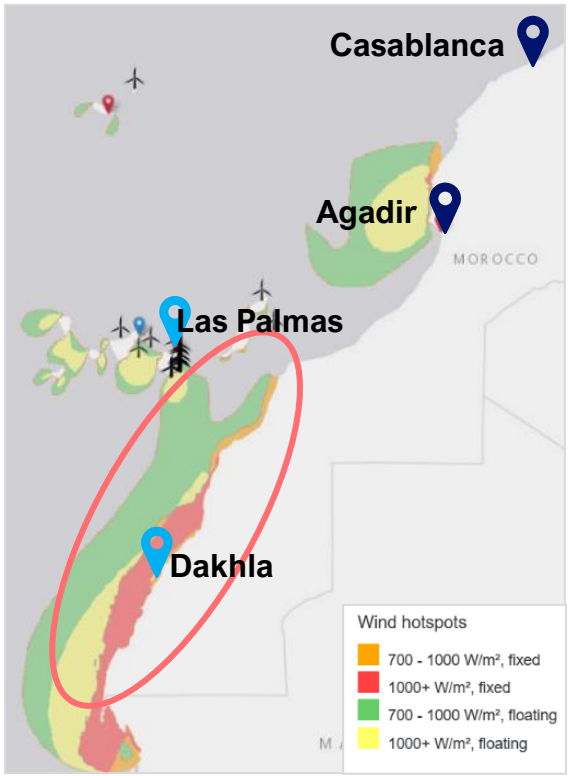
SYSTEMIQ

SOUTH MOROCCO

SYSTEMIQ

3c SOUTH MOROCCO: LARGE OFFSHORE WIND POTENTIAL AND FIRST PROJECT STARTING, FURTHER DEVELOPMENT OF PORT INFRASTRUCTURE REQUIRED

Offshore wind hotspot considered for ports analysis



Marshalling port candidates

Manufacturing port candidates

Large offshore wind potential in all of Morocco

Potential concentrated in the north (Mediterranean) and the central & south areas. Total technical potential of 22 GW fixed-bottom and 178 GW floating, highest potential in the south.

Feasibility studies for first project started last year

Feasibility studies for a first offshore wind farm near Essaouira started last year, funded by the European Investment Bank

Large-scale offshore wind development not expected soon

2030 renewable electricity target of 52% does not include offshore wind development, with solar power as the main source of renewable energy. Offshore wind may come into play in the 2040s-2050s.

Zone with highest potential is partially within contested region

Offshore wind hotspot in the south is partially situated in contested Western Sahara region. Political instability will make attracting investment to this region challenging.

The only marshalling port suitable today is on the Canary islands

Only the port of Las Palmas is suitable for marshalling, but it is a Spanish port on the Canary Islands. The port of Dakhla is perfectly located and planning large-scale expansions, it may be suitable in the future. Other ports require more development or are too far from the offshore wind zone considered (Agadir)

2 ports may be suitable for manufacturing, but import from Europe more likely

The ports of Agadir and Casablanca are medium-large and house industry. However, with current production hubs in Europe, import seems more likely initially.

Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); World Bank (2020) Offshore Wind Technical Potential Morocco; Port Authority websites; Ports Europe (2024) Las Palmas port expands to support offshore wind energy development; North Africa Post (2024) Morocco considers Tan Tan port for green hydrogen; Arab Aea Ports; Agadir 24 (2025) Agadir: Le project de rehabilitation du port […]; Marsa Maroc; Offshore Energy (2024) EBRD invests up to 65M to support Moroccan port expansion, sustainability; Climate Action Tracker (2023) Morocco; Expert interviews; Systemiq analysis

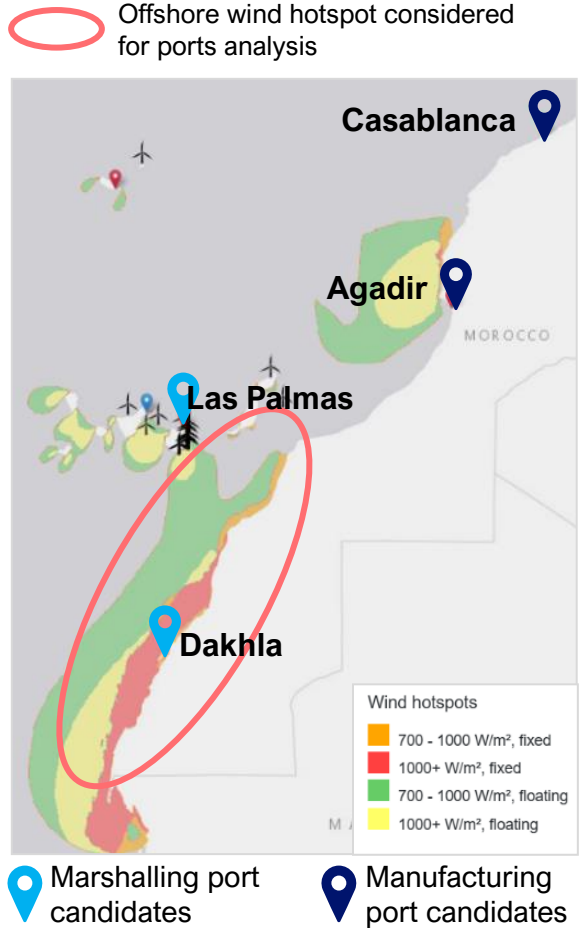
SYSTEMIQ

3c SOUTH MOROCCO: 5 PORTS THAT COULD PLAY A ROLE IN OFFSHORE WIND DEVELOPMENT IN THE SOUTH OF MOROCCO

Port	Distance to OSW zone	Mar-shalling	Manu-facturing	Port characteristics
Dakhla (MA)	0 km			Currently small port undergoing $1.2B upgrade project, as part of the government's 2030 port strategy. Set to become a major trade port in the future, ample space available.
Las Palmas (ES)	200 km			Largest port in the Canary Islands, used for container handling, cruise services, shipyards. Port is expanding quay and storage space to support offshore wind, current depth insufficient for floating.
Port of Tan-Tan (MA)	200 km			Most southern port in undisputed Morocco close to airport and highway. Small port, width currently not sufficient for offshore wind, but ongoing upgrades and potential H2 production.
Agadir (MA)	450 km			Main port in the southern region of Morocco, importing food and oil. Announced upgrades including dredging (current port depth not sufficient for offshore wind).
Casablanca (MA)	900 km			Large port with 4 terminals covering 450 hectares and a roll-on/roll-off terminal. Active in containers, steel, chemicals and machinery. Announced EBRD loan for a capacity increase.

Suitability for: Yes | Partial | No

Note: manufacturing highly likely to happen in nearby European manufacturing hubs.



Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites; Ports Europe (2024) Las Palmas port expands to support offshore wind energy development; North Africa Post (2024) Morocco considers Tan Tan port for green hydrogen; Arab Aea Ports; Agadir 24 (2025) Agadir: Le project de rehabilitation du port […]; Marsa Maroc; Offshore Energy (2024) EBRD invests up to 65M to support Moroccan port expansion, sustainability; Expert interviews; Systemiq analysis

SYSTEMIQ

3c SOUTH MOROCCO: DEEPDIVE ON OFFSHORE WIND PORTS [1/2]

Port	Distance to OSW zone [km]	Shortlist	Marshalling (<400 km)			Manufacturing (<1000km)				Port Characteristics
			Distance	Space	Port Access	Distance	Space	Port access	Hinter land	
Port of Dakhla (MA/Western Sahara)	0	✓								• Currently small port undergoing $1.2B upgrade project, as part of the government's 2030 port strategy. • Set to become a major trade port in the future, ample space available.
Port of Boujdour (MA/Western Sahara)	0									• Very small port, mainly used for coastal fishing • Current port entrance too narrow (90 m) and port not deep enough (3.5 m below LAT) to support offshore wind • Situated in contested Western Sahara region
Tarfaya Port (MA)	25									• Very small port, mostly used for fishing • Current depth (6 m below LAT) not sufficient • Canarian and Moroccan government delegations are working to restore a maritime line between Tarfaya and Fuerteventura
Las Palmas (ES)	200	✓								• Largest port in the Canary Islands, hub for container handling, cruise services, naval repairs and fuel supply • Port is expanding quay and storage space to support offshore wind • Current depth (11 m) not sufficient for floating
Port of Tan-Tan (MA)	200	✓								• Current port width (100 m) not sufficient for offshore wind • Most southern port in undisputed Morocco close to airport and highway • Ongoing redevelopment inc. desalination plant and solar PV • Ongoing Moroccan study considering H2 exports from port
Santa Cruz de Tenerife (ES)	300									• Major cruise port, can accommodate some of the world's largest passenger ships • Port situated next to mountains and urban development – space availability may be limited • Current depth (11 m) not sufficient for floating

Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites; Atalayar (2024) Morocco and the Canary Islands are working on the maritime line […]; Ports Europe (2024) Las Palmas port expands to support offshore wind energy development; North Africa Post (2024) Morocco considers Tan Tan port for green hydrogen; Arab Aea Ports; Agadir 24 (2025) Agadir: Le project de rehabilitation du port […]; Elkebir Lamrani (2023) Analysis of the cost of building an offshore wind farm on the Moroccan coast; CNN (2024) We're Constructing an ecosystem: How a small […]; Royaume du Maroc (La strategie portuaire nationale a l'horizon 2030; Expert interviews; Systemiq analysis

SYSTEMIQ

3c SOUTH MOROCCO: DEEPDIVE ON OFFSHORE WIND PORTS [2/2]

Port	Distance to OSW zone [km]	Shortlist	Marshalling (<400 km)			Manufacturing (<1000km)				Port Characteristics
			Distance	Space	Port Access	Distance	Space	Port access	Hinter land	
Agadir (MA)	450	✓								• Main port in the southern region of Morocco, importing mostly food and oil • Plans to upgrade it announced in early 2025 – including dredging for deeper channels (current port depth (8 m below LAT) not sufficient for offshore wind)
Safi (MA)	650									• Main port near Marrakesh • Most active in fishing and exports in textiles and phosphates • Inaugurated in 2019
Funchal (PO)	700									• Large port mainly used by cruise ships and ferries visiting Madeira
El Jorf Lasfar (MA)	750									• Commercial port active in export of phosphates and chemicals, close to industrial complex • Upgraded in 2018 (quay walls and dredging) • EBRD has announced a loan to finance capacity increase
Casablanca (MA)	900	✓								• One of the main ports in Morocco, with 4 terminals covering 450 hectares and a roll-on/roll-off terminal • Active in transport of containers, steel, chemicals and machinery • EBRD has announced a loan to finance capacity increase

Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites; Arab Aea Ports; Marsa Maroc; Offshore Energy (2024) EBRD invests up to 65M to support Moroccan port expansion, sustainability; Expert interviews; Systemiq analysis

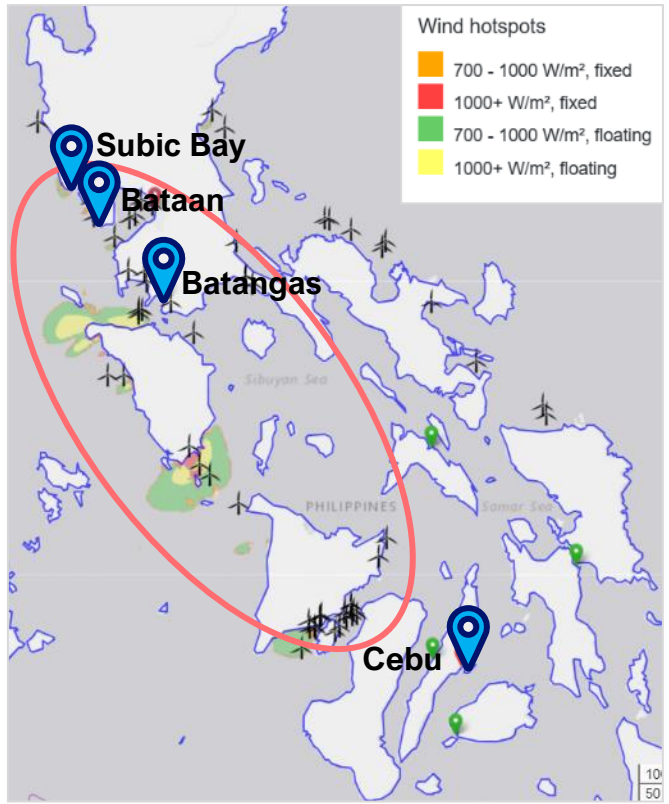
SYSTEMIQ

CENTRAL PHILIPPINES

SYSTEMIQ

3d CENTRAL PHILIPPINES: LARGE OFFSHORE WIND POTENTIAL AND FIRST AUCTIONS AWARDED, PORTS SELECTED BY GOVERNMENT

Offshore wind hotspot considered for ports analysis



Marshalling port candidates

Manufacturing port candidates

Large offshore wind potential in the Philippines, mostly floating

Total technical potential of 18 GW fixed-bottom and 160 GW floating, with initial fixed-bottom development likely happening around Manila Bay, Mindoro Island and Guimaras Strait.

Many projects have been announced, only three cleared for first auction

55 GW of offshore wind projects announced when government gave out first licenses, but only three have firmed up (1.65 GW total) and have been cleared to compete in the first offshore wind auction later this year.

Government has identified 10 ports for offshore wind, of which 3 will be upgraded with priority

Priority selection includes Batangas (Santa Clara Port and Batangas City Port), Port of Currimao (for projects in the north), Port of Jose Panganiban (for projects in the east).

2-4 suitable marshalling ports in considered region

The ports of Batangas and Subic Bay seem most suitable, and Batangas has been prioritized by the government for offshore wind. Bataan and Cebu ports are also candidates.

2-4 ports may be suitable for manufacturing, import from China more likely

The ports of Batangas and Subic Bay seem most suitable, and Batangas has been prioritized by the government for offshore wind. However, with the Philippine's proximity to mass production capacity in China, import seems more likely.

Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites; World Bank Offshore Wind Roadmap for the Philippines; Systemiq Analysis; Herma Shipyard Inc; Expert interviews; Systemiq analysis

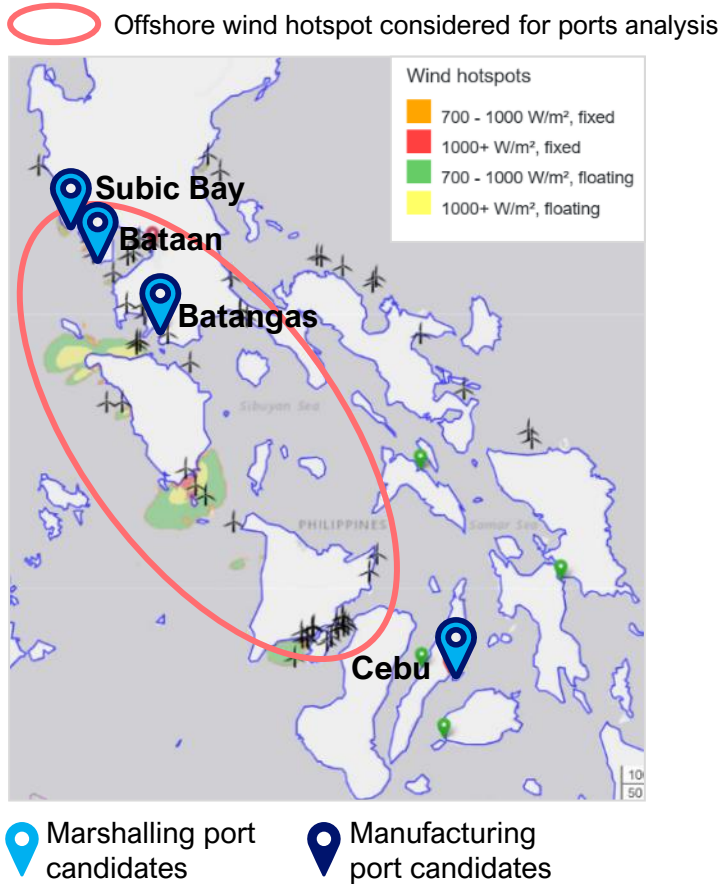
SYSTEMIQ

3d CENTRAL PHILIPPINES: 4 PORTS THAT COULD PLAY A ROLE IN OFFSHORE WIND DEVELOPMENT

Port	Distance to OSW zone	Mar-shalling	Manu-facturing	Port characteristics
Batangas[1]	125 km			Major port with space available, nearby shipbuilding and marine heavy fabrication. Strategically located near multiple OSW zones. Selected by gvmt. for offshore wind.
Bataan (Herma Shipyard)	350 km			Small port, but home to one of the biggest shipyards in the region. Strategically located for marshalling multiple OSW zones.
Subic Bay	50 km			Medium port used for containers and bulk cargo. Shipbuilding and marine heavy fabrication nearby. Suitable for marshalling around Manilla bay.
Cebu	275 km			Large port that is home to a shipbuilding yard Some space available, current depth insufficient for floating. Suitable for marshalling around Guimaras Strait, but too far from Manilla bay area.

Suitability for
Yes | Partial | No

Note: the government has also selected the ports of Currimao and Jose Panganiban for offshore wind development, but those are too far from the offshore wind zone considered here. They will support development in the north and/or around San Miguel Bay.



Note: manufacturing highly likely to happen in nearby Chinese manufacturing hubs.

Notes: 1. Includes both Batangas City and Santa Clara.
Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites; World Bank Offshore Wind Roadmap for the Philippines; Systemiq Analysis; Herma Shipyard Inc; Expert interviews; Systemiq analysis

SYSTEMIQ

3d CENTRAL PHILIPPINES: DEEPDIVE ON OFFSHORE WIND PORTS [1/2]

Port	Distance to OSW zone [km]	Shortlist	Marshalling (<400 km)			Manufacturing (<1000km)				Port Characteristics
			Distance	Space	Port Access	Distance	Space	Port access	Hinter land	
Manila	50									• Largest port in the Philippines, primary international gateway • Very crowded with container traffic, little unused space • Current depth (9.4 m) insufficient for floating offshore wind
Subic Bay	75	✓								• Medium port used for containers and bulk carbo • Former US Naval Base • Shipbuilding and marine heavy fabrication nearby
Batangas	125									• One of the major trading ports in the region, but not as congested as Manila. • Focused on international container traffic and domestic ferries • Manufacturing industries nearby
Toledo	150									• Small port serving as inter-island passenger hub • Berth depth of 4-5 meters insufficient for large vessels
Cebu	275	✓								• Large port, serving both cargo and passenger traffic • Home to a shipbuilding yard • Space may be limited due to urban developments • Current depth (9.4 m) insufficient for floating offshore wind
Masbate	300									• Small port, mainly facilitating inter-island passenger and cargo transport • Can only accommodate one 300 m long vessel at a time

Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites; World Bank Offshore Wind Roadmap for the Philippines; Systemiq Analysis; Herma Shipyard Inc; Logistics Cluster Philippines Ports Assessment; Manila Standard (2024) DOE PPA agree to support three ports for offshore wind projects; Philippines Port Assessment, LCA; Expert interviews; Systemiq analysis

SYSTEMIQ

3d CENTRAL PHILIPPINES: DEEPDIVE ON OFFSHORE WIND PORTS [2/2]

Port	Distance to OSW zone [km]	Shortlist	Marshalling (<400 km)			Manufacturing (<1000km)				Port Characteristics
			Distance	Space	Port Access	Distance	Space	Port access	Hinter land	
Bataan - Herma Shipyard	350	✓								• Small port • Home to one of the biggest shipyards in the region
San Fernando Harbor	350									• Medium port handling bulk cargo and serving as hub for various industries, including steel manufacturing. • Only OSW developments in Manila bay are within <400 km
Puerto Princesa	400									• Small port mainly involved in regional tourism • Airport nearby port
Cagayan De Oro	450									• Medium port, serves a s a hub for cargo and passenger traffic, mainly transporting agricultural products • Adjacent to urban development, limited space
Currimao Port	500									• Selected by gvmt to support OSW • Likely to service OSW in the north of the country
Port of Jose Panganiban	700									• Very small port • Selected by gvmt to support OSW • Likely to service OSW in San Miguel Bay • Current depth (9.4 m) insufficient for floating offshore wind

Source: World Port Index (2024);Global Energy Monitor (2025) Global Wind Power Tracker, February 2025 release; Global Wind Atlas (2023); Climate Trace (2025); Open Infrastructure Map (2025); Port Authority websites; World Bank Offshore Wind Roadmap for the Philippines; Systemiq Analysis; Herma Shipyard Inc; Logistics Cluster Philippines Ports Assessment; Manila Standard (2024) DOE PPA agree to support three ports for offshore wind projects; Philippines Port Assessment, LCA; Expert interviews; Systemiq analysis

SYSTEMIQ

4
APPENDIX

SYSTEMIQ

PORTS SOUTH BRAZIL

SYSTEMIQ

4a TRAMANDAI, BRAZIL

SPACE ASSESSMENT

Tramandaí, Brazil: Located adjacent to dense urban development, limiting available land. Offshore operations are supported by two SPMs capable of handling large vessels.

SYSTEMIQ

4a PORTO DE RIO GRANDE, BRAZIL

SPACE ASSESSMENT

Porto de Rio Grande, Brazil: Located in a less densely developed area, with flat terrain and notable open space that could be suitable for manufacturing or storage facilities.

SYSTEMIQ

4a ITAJAI, BRAZIL

SPACE ASSESSMENT

Itajaí, Brazil: Close to dense urban development, though some open green spaces could offer limited development potential.

SYSTEMIQ

4a SÃO FRANCISCO, BRAZIL

SPACE ASSESSMENT

São Francisco do Sul, Brazil: Surrounded by dense urban development and a hilly landscape, with few flat areas suitable for large infrastructure.

SYSTEMIQ

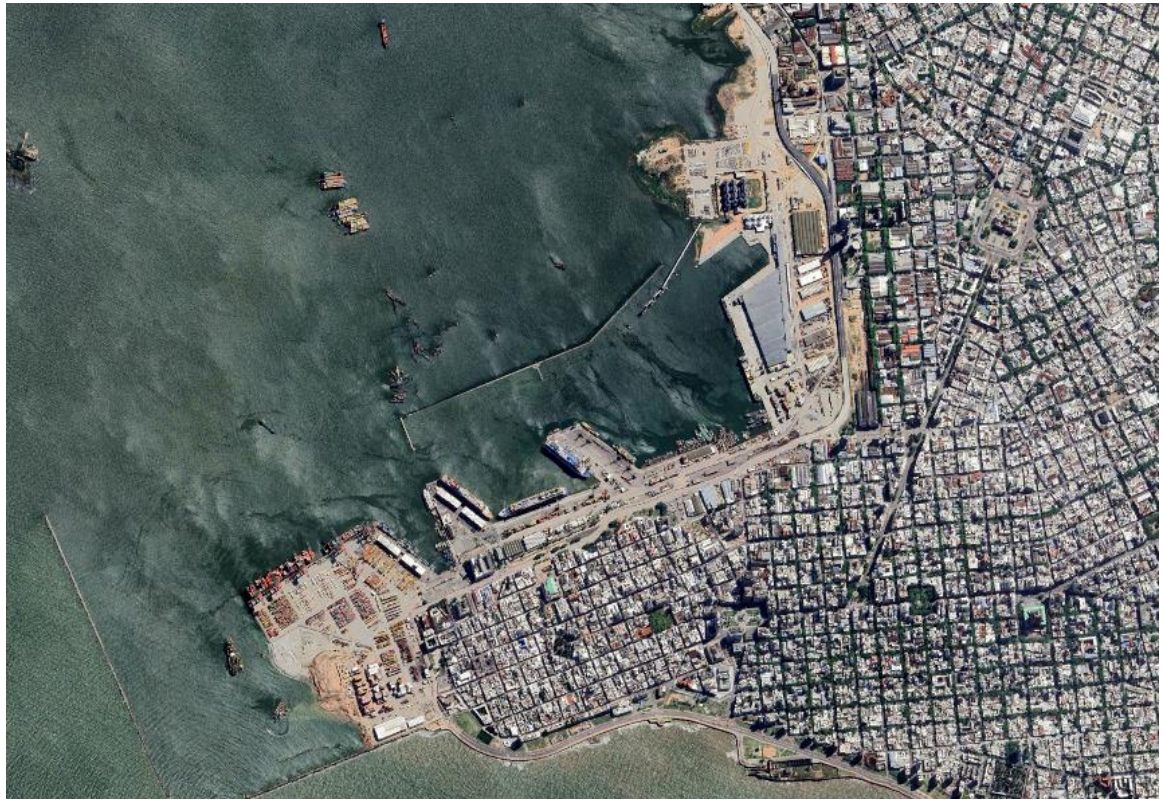
4a PARANAGUÁ, BRAZIL

SPACE ASSESSMENT

Paranaguá, Brazil: Adjacent to dense urban development; however, there may be potential to expand the dock area.

SYSTEMIQ

4a MONTEVIDEO, URUGUAY



SPACE ASSESSMENT

Montevideo, Uruguay: Surrounded by dense urban development, with limited opportunities for large-scale land use.

SYSTEMIQ

4a SANTOS, BRAZIL

SPACE ASSESSMENT

Santos, Brazil: Located near dense urban development and a hilly landscape, with some open green areas that may be usable.

SYSTEMIQ

4a LA PLATA, ARGENTINA

SPACE ASSESSMENT

La Plata, Argentina: Adjacent to dense urban development, but includes some open green spaces that may be suitable for development.

SYSTEMIQ

4a BUENOS AIRES, ARGENTINA

SPACE ASSESSMENT

Buenos Aires, Argentina: Bordered by dense development and a nature reserve (Reserva Ecológica Costanera Sur), significantly limiting expansion potential.

SYSTEMIQ

4a RIO DE JANEIRO, BRAZIL

SPACE ASSESSMENT

Rio de Janeiro, Brazil: Densely developed urban surroundings offer limited available land for new facilities.

SYSTEMIQ

4a DTSE/GEGUA OIL TERMINAL, BRAZIL

SPACE ASSESSMENT

DTSE / Gegua Oil Terminal, Brazil: Situated on an island with no free space currently available, though island expansion might be possible.

SYSTEMIQ

4a PORT OF ACU, BRAZIL

SPACE ASSESSMENT

Port de Açu, Brazil: An industrial deepwater port with extensive available land for large-scale infrastructure. Located in northern Rio de Janeiro state, Açu has dedicated zones for energy, logistics, and offshore industries, and is already involved in offshore wind and hydrogen projects.

SYSTEMIQ

PORTS SOUTH INDIA

SYSTEMIQ

4b TUTICORIN, INDIA

SPACE ASSESSMENT

Tuticorin, India: Located in a less densely developed area with substantial open land. The port has allocated land for green hydrogen and ammonia manufacturing and storage facilities, indicating potential availability for other industrial uses.

SYSTEMIQ

4b VIZHINJAM PORT, INDIA

SPACE ASSESSMENT

Vizhinjam Port, India: Vizhinjam Port offers substantial open space for development, with deep natural waters nearshore and ample surrounding land earmarked for phased expansion into container handling, logistics, and industrial zones.

SYSTEMIQ

4b COLOMOBO, SRI LANKA

SPACE ASSESSMENT

Colombia, Sri Lanka: Undergoing expansion projects to enhance capacity. While surrounded by urban development, the expansion may offer new areas suitable for industrial activities.

https://www.dailynews.lk/2025/03/17/business/742797/colombo-port-set-to-double-capacity-by-2027/?utm_source=chatgpt.com&__cf_chl_tk=kbGxYEG2hqB.e6jaluUofTvUlwnBnf1A8f_Vo0WHy8w-1743001489-1.0.1.1-B2FFM_HBK9zGW1FbJhxHzVYePoY4KXI1IAfExe36ksY

SYSTEMIQ

4b COCHIN, INDIA

SPACE ASSESSMENT

Colombia, Sri Lanka: Undergoing expansion projects to enhance capacity. While surrounded by urban development, the expansion may offer new areas suitable for industrial activities.

https://infra.economictimes.indiatimes.com/news/ports-shipping/cochin-shipyard-eyes-capacity-expansion-with-a-new-rs-2000-crore-facility-at-adjacent-cochin-port/118101982?

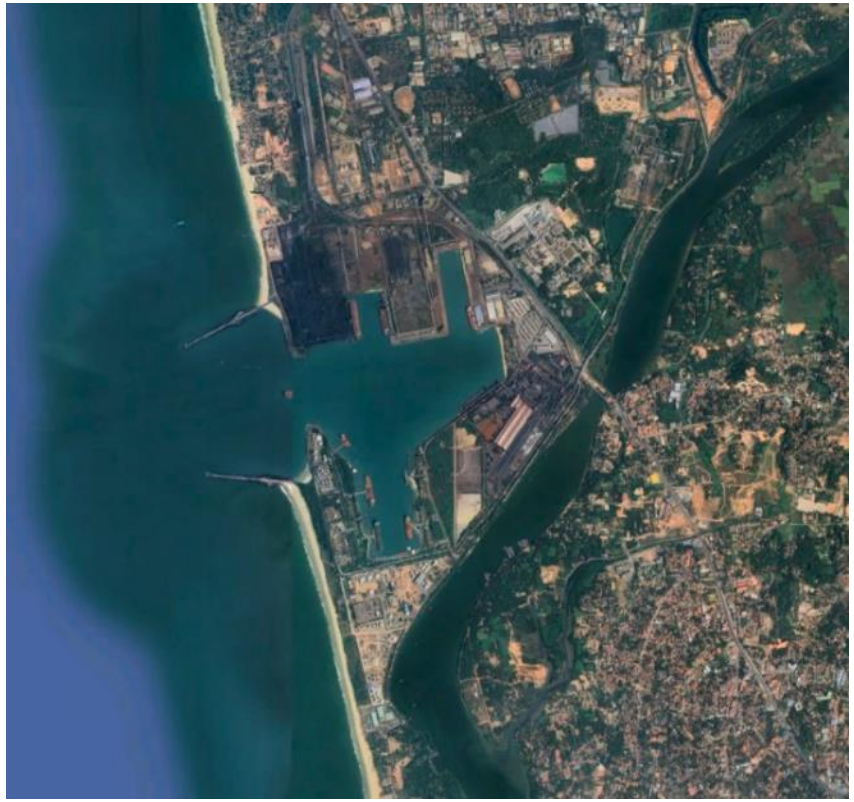
4b GALLE HARBOUR, SRI LANKA

SPACE ASSESSMENT

Calle Harbour, Sri Lanka: Plans for land reclamation to expand Galle City's land area by 45 hectares could provide space for development.

SYSTEMIQ

4b NEW MANGALORE PORT, INDIA

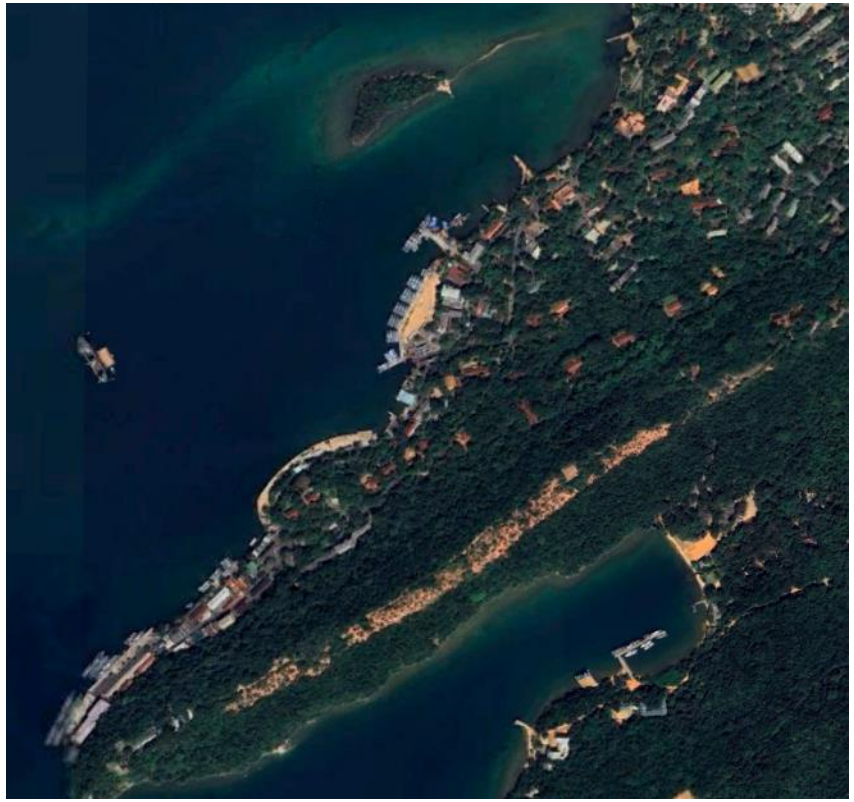


SPACE ASSESSMENT

New Mangalore Port, India: Offers substantial space for industrial development of land and is actively expanding its infrastructure through berth upgrades, LNG terminal development, and has been offering land parcels on long-term leases for various industrial purposes.

https://newmangaloreport.gov.in/allotment-land-long-term-lease-eastern-and-western-side-nh-66-commercial-activities-new-mangalore

4b TRINCOMALEE HARBOR, SRI LANKA



SPACE ASSESSMENT

Trincomalee harbour, Sri Lanka: The government plans to convert Trincomalee Port into a mega industrial port city, with land allocated for various industries, indicating significant potential for development.

SYSTEMIQ

PORTS MOROCCO

SYSTEMIQ

4c PORT OF DAKHLA, MOROCCO

SPACE ASSESSMENT

Port of Dakhla, Morocco: Ample space available for new developments. However, Daklha is situated in the contested Western Sahara region so development may be challenging.

SYSTEMIQ

4c PORT OF BOUJDOUR, MOROCCO

SPACE ASSESSMENT

Port of Boujdour, Morocco: Ample space available for new developments. However, Boujdour is situated in the contested Western Sahara region so development may be challenging.

SYSTEMIQ

4c TARFAYA PORT, MOROCCO

SPACE ASSESSMENT

Tarfaya port, Morocco: Ample space available for future developments.

SYSTEMIQ

4c LAS PALMAS, SPAIN (CANARY ISLANDS)

SPACE ASSESSMENT

Las Palmas, Spain: Located near dense urban development but some space available near port.

SYSTEMIQ

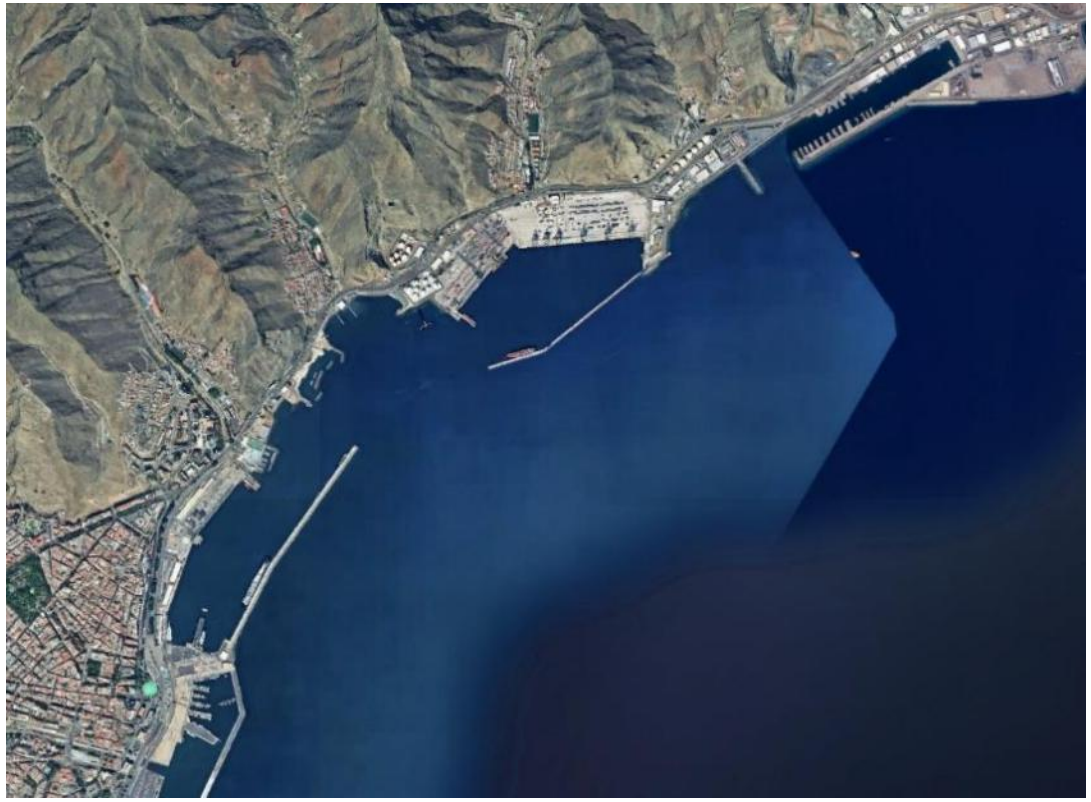
4c PORT OF TAN-TAN, MOROCCO

SPACE ASSESSMENT

Port of Tan-Tan, Morocco: Ample space available

SYSTEMIQ

4c SANTA CRUZ DE TENERIFE, SPAIN (CANARY ISLANDS)



SPACE ASSESSMENT

Santa Cruz De Tenerife, Spain (Canary Islands): Some space available, but port is adjacent to mountains and city.

SYSTEMIQ

4c AGADIR, MOROCCO

SPACE ASSESSMENT

Agadir, Morocco: Space available, but much of the terrain adjacent to the port is mountainous.

SYSTEMIQ

4c SAFI, MOROCCO

SPACE ASSESSMENT

Safi, Morocco: Situated close to urban development but sufficient space seems available for development

SYSTEMIQ

4c FUNCHAL, PORTUGAL (MADEIRA)

SPACE ASSESSMENT

Funchal, Portugal: Adjacent to dense urban development – likely limited space available.

SYSTEMIQ

4c EL JORF LASFAR, MOROCCO

SPACE ASSESSMENT

El Jorf Lasfar, Morocco: Ample space available in areas adjacent to port.

SYSTEMIQ

4c CASABLANCA, MOROCCO

SPACE ASSESSMENT

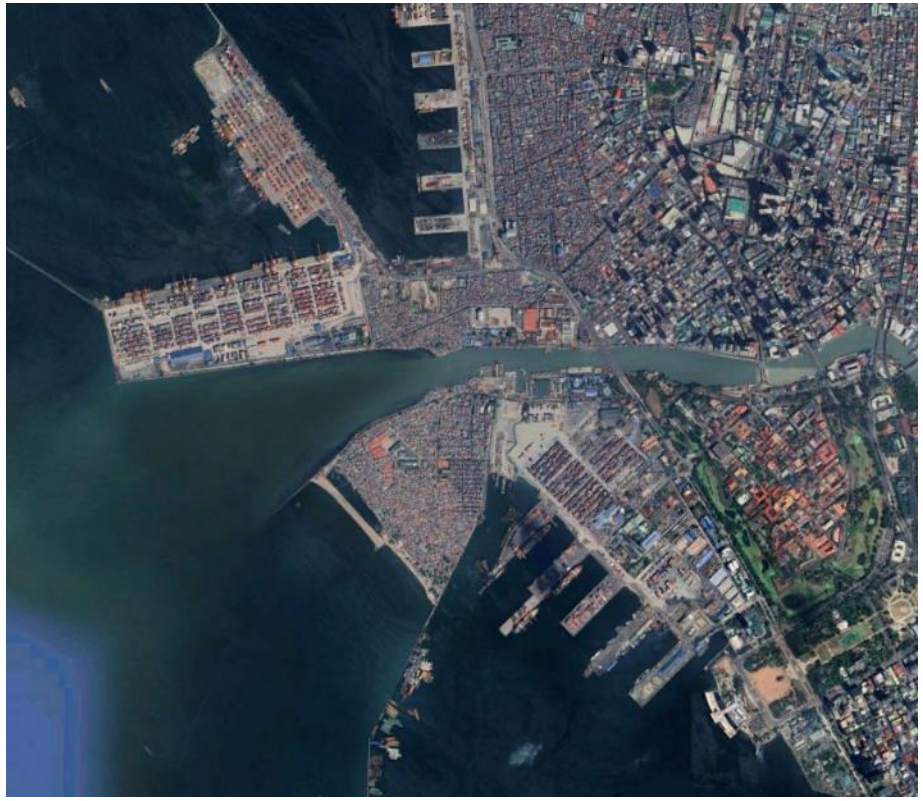
Casablanca, Morocco: Located adjacent to dense urban environment – space availability may be limited.

SYSTEMIQ

PORTS THE PHILIPPINES

SYSTEMIQ

4d MANILA PORT, PHILIPPINES

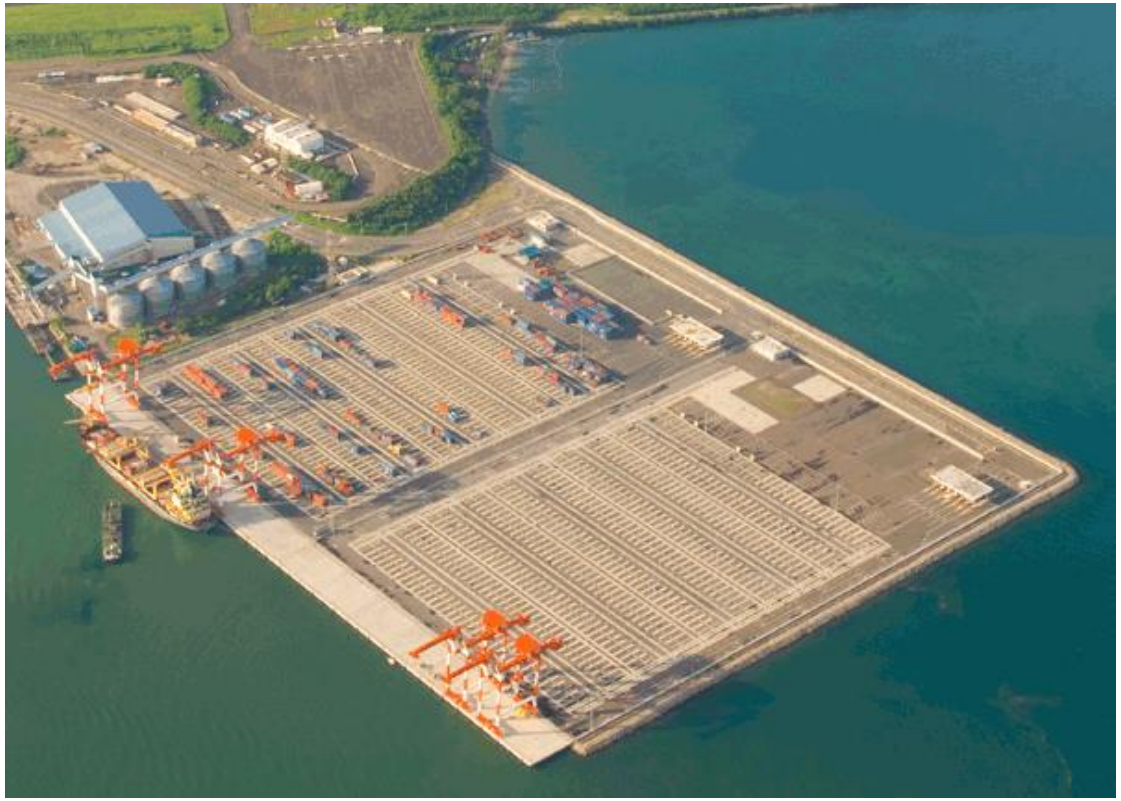


SPACE ASSESSMENT

Manila Port, Philippines: The Port of Manila faces significant congestion and limited expansion space, making it less suitable for large-scale offshore wind manufacturing or marshalling operations.

SYSTEMIQ

4d SUBIC BAY, PHILIPPINES



SPACE ASSESSMENT

Subic Bay, Philippines: Ample flat industrial land, deep water access, no air draft restrictions, and existing large-scale port and logistics infrastructure.

SYSTEMIQ

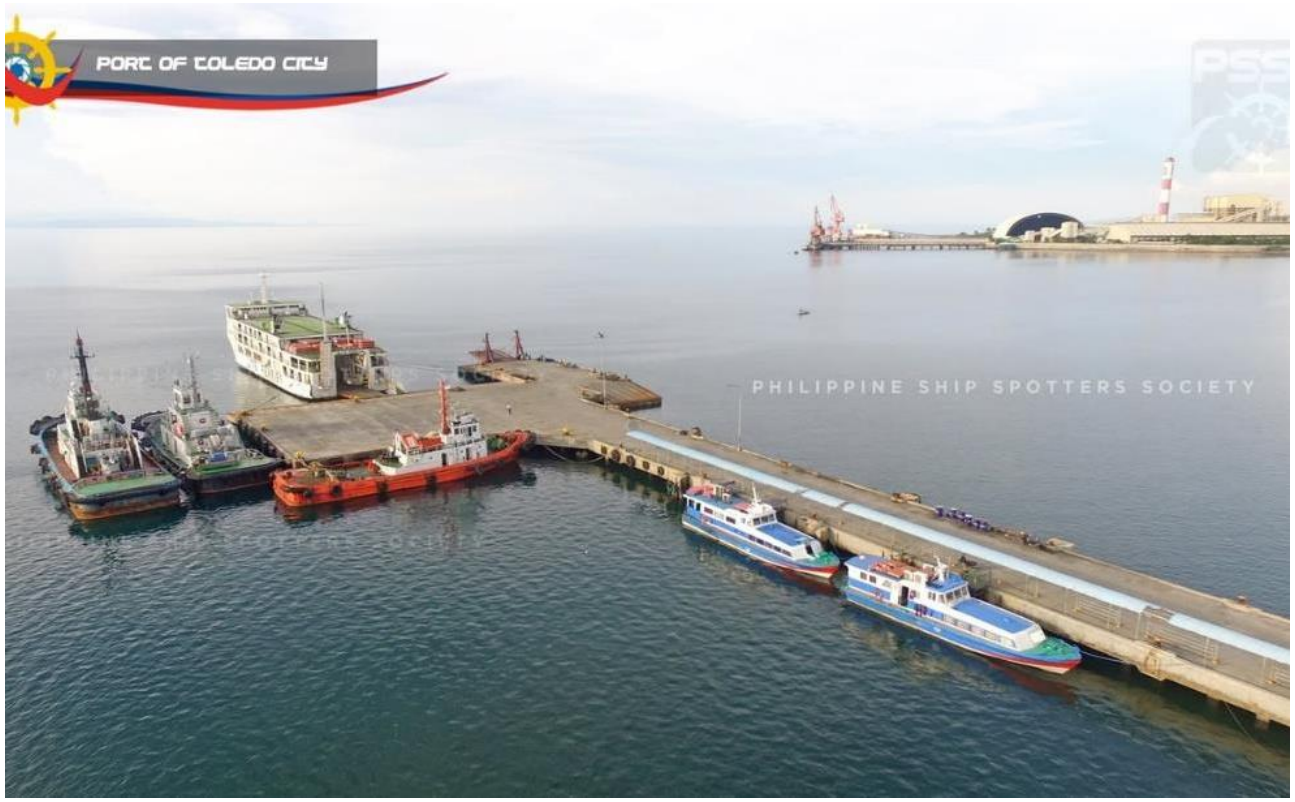
4d BANTAGAS CITY PORT, PHILIPPINES

SPACE ASSESSMENT

Subic Bay, Philippines: Ample flat industrial land, deep water access, no air draft restrictions, and existing large-scale port and logistics infrastructure.

SYSTEMIQ

4d TOLEDO, PHILIPPINES



SPACE ASSESSMENT

Toledo, Philippines: Small port used for inter-island travel. Some open spaces adjacent to the port.

SYSTEMIQ

4d CEBU PORT, PHILIPPINES

SPACE ASSESSMENT

Cebu Port, Philippines: Limited. The Port of Cebu has air draft restrictions due to existing bridges, and available land for large-scale offshore wind operations is constrained by the urban developments.

SYSTEMIQ

4d MASBATE, PHILIPPINES

SPACE ASSESSMENT

Masbate, Philippines: Small port on the edge of dense urban development, likely limited space available in the port, but some open areas near the port.

SYSTEMIQ

4d HERMA SHIPYARD, PHILIPPINES

SPACE ASSESSMENT

Herma Shipyard Inc., Philippines: located in the Bataan Freeport Zone, spans 17 ha with 9 ha of open storage, fabrication facilities, and dry docks; when combined with a nearby 12 ha yard, the site could support floating foundation assembly for offshore wind, though limited cranage capacity would require mobile cranes and environmental considerations for anchorage use.

SYSTEMIQ

4d SAN FERNANDO HARBOUR, PHILIPPINES

SPACE ASSESSMENT

San Fernando Harbour, Philippines: Spans 30 hectares and serves as a hub for various industries, including steel manufacturing, petroleum storage, and agricultural products. Currently used spaces will likely have to be repurposed for offshore wind.

SYSTEMIQ

4d PUERTO PRINCESA, PHILIPPINES

SPACE ASSESSMENT

Puerto Princesa, Philippines: Small port bordering on dense urban development, with some open spaces nearby port. Airport nearby.

SYSTEMIQ

4d CAGAYAN DE ORO, PHILIPPINES

SPACE ASSESSMENT

Cagayan de Oro, Philippines: Adjacent to urban development, so space seems limited unless current land is repurposed for OSW.

SYSTEMIQ

4d CURRIMAO PORT, PHILIPPINES

SPACE ASSESSMENT

Currimao Port, Philippines: Currently underdeveloped, but is undergoing significant developments to support the country's OSW energy sector. In September 2024, the Philippine Ports Authority (PPA) and the Department of Energy (DOE) announced plans to repurpose Currimao Port to accommodate the installation, commissioning, and operational requirements of OSW developments.

SYSTEMIQ

4d PORT OF JOSE PANGANIBAN, PHILIPPINES

SPACE ASSESSMENT

Jose Panganiban, Philippines: Very small port surrounded by small village and dense forest. Selected by the Philippines government for offshore wind development.

SYSTEMIQ