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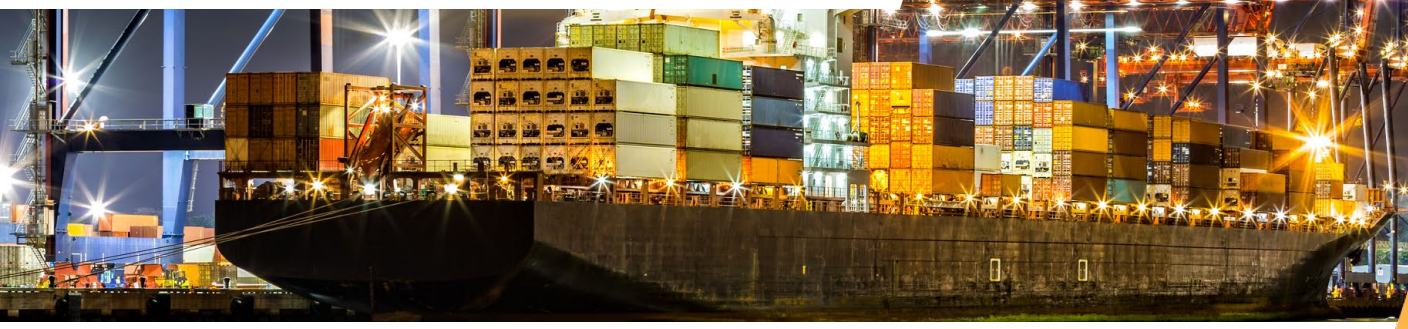


INFORMATION PAPER

PORTS & NET ZERO

Ports have a central role in the transition to net zero in Australia by facilitating the import of components for renewable power projects. Below we look at the opportunity for ports in eastern Australia based on solar and onshore wind generation capacity forecasts in AEMO's draft 2024 Integrated System Plan.

THE ROLE OF PORTS

Supply Chain Management: Ports are central nodes in the supply chain for renewable power projects. They handle the import of components needed for renewable power projects. Efficient port operations are essential for ensuring the timely delivery of components to project sites.

Logistics and Transportation: Ports and landside infrastructure provide logistical support for transporting renewable power project components.

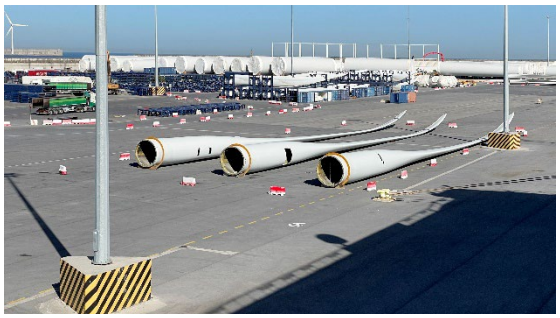


Photo Credit: Istock

Land for laydown areas for wind turbine component storage and the proximity of ports to warehouses for unpacking containers are central to efficient logistics for projects. This can also help to reduce the environmental impact of transporting components.

Offshore Wind Farm Development: Ports could serve as hubs for the assembly, construction and maintenance of offshore wind farms. Ports also offer berthing facilities for offshore support vessels.

However, there are challenges in developing port infrastructure as was seen with the Commonwealth Government's rejection of a proposal for a new terminal at the Port of Hastings in Victoria. The Port of Hastings could be a hub for offshore windfarms in the Commonwealth Government's Gippsland Declared Area for offshore wind development.

AEMO'S 2024 ISP

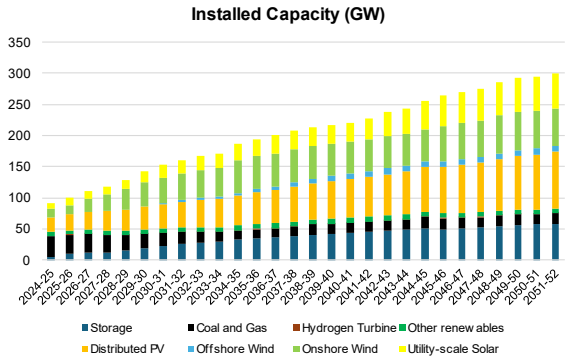
The opportunity for ports in facilitating the delivery of equipment for renewable power projects can be assessed based on electricity generation capacity forecasts.

AEMO's draft 2024 Integrated System Plan (ISP) forecasts the future generation mix in the National Electricity Market (NEM).

The ISP includes three future scenarios:

- **Step Change** - *fulfils Australia's emission reduction commitments in a growing economy*
- **Progressive Change** - *reflects slower economic growth and energy investment*
- **Green Energy Exports** - *sees very strong industrial decarbonisation and low-emission energy exports*.

AEMO considers the Step Change scenario to be the most likely future scenario. The generation mix to 2050 for this scenario is set out in this chart.



Source: AEMO draft 2024 ISP

The installed capacity under the Step Change scenario for Utility-scale Solar, Distributed PV (rooftop solar and other distributed solar) and Onshore Wind is presented below.

GW installed - Step Change scenario

	2025	2038	2050
Utility-scale Solar	10	29	56
Distributed PV	23	55	89
Onshore wind	13	53	60

Source: AEMO draft 2024 ISP

Offshore wind is not discussed as the first project is not expected under this scenario until the early 2030s and in 2050 offshore wind accounts for only 3% of capacity.

SHIPMENT OF COMPONENTS

The components required for:

- solar generation includes solar modules (panels) and racking to support modules
- wind farms include generators, nacelles, blades and tower sections.

Solar components are shipped in containers. Utility-scale Solar and Distributed PV benefit from the efficient and mature containerised supply chain. The efficiency of the supply chain is important as about 1,200 containers are required to ship the components for a 300 MW solar farm.

Wind farm components are shipped as either "break-bulk" or containerised cargo on multi-purpose heavy lift cargo ships.

Components for wind farms in Australia have typically been shipped on "Handysize" vessels with the capacity to carry components for less than 10 wind turbines.

The global demand for shipping of wind farm components and the increasing size of components has resulted in the use of multi-purpose heavy lift cargo vessels. Wind farm components are estimated to be 20% of all global multi-purpose heavy lift cargo.

Chipolbrok's MV Taixing (pictured below) is a 62,000 DWT heavy lift cargo ship capable of carrying blades for fourteen turbines.

Photo Credit: Chipolbrok website

Photo Credit: Marine Traffic

The MV Zhi Xian Zhi Xing (pictured above) is a special-purpose ungeared vessel (geared is a reference to onboard cranes) that can carry blades for over fifty turbines.

For a discussion on how we can assist you contact Rod Johannessen (Director/Principal Consultant)

(61) 7 3132 9292 rod@demc.net.au demc.net.au

Challenges that may be encountered at some ports in Australia include:

- road access as the size of wind blades increases (the longest blade used in an Australian project to date was 92 metres)
- the suitability of port infrastructure for large, ungeared vessels.

OPPORTUNITY FOR PORTS

In this section the opportunity for ports under the Step Change scenario is discussed.

Photo Credit: Istock

The forecast number of containers (TEU = Twenty Foot Equivalent Units) for Utility-scale Solar and Distributed PV is set out below.

Utility-scale Solar - containers

Period	TEUs
2025 - 2029	115,000
2030 - 2034	99,000
2035 - 2039	36,000
2040 - 2044	248,000
2045 - 2049	96,000

Source: Drake Energy & Maritime analysis

Distributed PV - containers

Period	TEUs
2025 - 2029	68,000
2030 - 2034	65,000
2035 - 2039	62,000
2040 - 2044	64,000
2045 - 2049	74,000

Source: Drake Energy & Maritime analysis

This analysis is based on the quantity of panels and racking systems that can currently be packed into a container. Technology changes over time will have an impact on the number of containers.

Photo Credit: Istock

The forecast number of shipments by heavy lift cargo ships and number of containers for Onshore Wind is set out below.

Onshore Wind - shipments

Period	Shipments
2025 - 2029	485
2030 - 2034	190
2035 - 2039	0
2040 - 2044	110
2045 - 2049	80

Source: Drake Energy & Maritime analysis

Onshore Wind - containers

Period	TEUs
2025 - 2029	46,000
2030 - 2034	18,000
2035 - 2039	0
2040 - 2044	10,000
2045 - 2049	7,000

Source: Drake Energy & Maritime analysis

CONCLUSION

Ports in Australia play a multi-faceted role in the transition to net zero, serving as hubs for the import, storage and distribution of renewable power station components.

Leveraging their infrastructure combined with nearby landside infrastructure enables ports to facilitate the transition to net zero in Australia.

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