Winds of opportunity:

Powering Australia's clean energy future with offshore wind

Full report

CLEAN ENERGY COUNCIL

Deloitte.

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Purpose of this report

The Winds of Opportunity report, commissioned by the Clean Energy Council, highlights the case for offshore wind in Australia. It explores growth scenarios for Australian offshore wind and draws lessons from global leaders to inform potential policy options to accelerate and enable the industry.

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List of abbreviations

Abbreviation	In full
AEMO	Australian Energy Market Operator
CfD	Contract for Difference
CGE	Computable General Equilibrium
CIP	Copenhagen Infrastructure Partners
CIS	Capacity Investment Scheme
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EEZ	Exclusive Economic Zone
EPBC Act	Environmental Protection and Biodiversity Conservation Act
EV	Electric vehicle
FID	Final Investment Decision
FIT	Feed-in-tariff
FLOWMIS	Floating Offshore Wind Manufacturing Investment Scheme
FMiA	Future Made in Australia
FTE	Full-time Equivalent
GDP	Gross Domestic Product
GW	Gigawatts
IEA	International Energy Agency
LCR	Local content requirements
LGA	Local Government Area
LTESA	Long-term Energy Service Agreements

MW	Megawatts
MWh	Megawatt-hour
NEM	National Electricity Market
NZEA	Net Zero Economy Agency
NSW	New South Wales
OEI	Offshore Electricity Infrastructure
OIR	Offshore Infrastructure Regulatory
OPGGS Act	Offshore Petroleum and Greenhouse Gas Storage Act
OSW	Offshore wind
OTWR	Offshore Transmission Network Review
OWIC	Offshore Wind Industry Council
O&M	Operations and Maintenance
p.a.	Per annum
POC	Proof of Concept
PPA	Power Purchasing Agreement
REIP	Renewable Energy Industrial Precinct
REZs	Renewable Energy Zones
RWTN	Rewiring the Nation
SOWEC	Scottish Offshore Wind Energy Council
Tas	Tasmania
TNSP	Transmission Network Service Providers
TWh	Terawatt-hour
UK	United Kingdom
BESS	British Energy Security Strategy
US	United States of America
Vic	Victoria
WA	Western Australia
WTO	World Trade Organisation

Executive summary

Clean energy at scale is critical for Australia to deliver a prosperous, just, and resilient energy transition.

The global energy transition is upon us. Australia has made significant progress towards net zero goals by scaling up clean energy deployment over the last decade, with more than 40 per cent of electricity now generated by renewables. But more needs to be done, and quickly. Australia needs significant amounts of new clean energy sources to decarbonise current and future new electricity demand, while ensuring a just and affordable transition for Australian workers, businesses, households and communities. A diversified clean energy portfolio is the most reliable way to deliver this, and is critical to our energy security and economic resilience.

Offshore wind offers energy at scale when the grid needs it the most.

Offshore ocean winds are strong and consistent, meaning turbines at sea generate more power and boost electricity levels when the grid needs it most. Offshore wind is proven at scale, and by the end of 2024, over 40 countries were developing and deploying turbines in their waters.[1] At the end of 2023, 77 gigawatts (GW) of offshore wind capacity had been deployed globally – equating to almost 13,315 turbines – with another 450 gigawatts of capacity in the global pipeline.[2,3]

Offshore wind is a key enabler when striving towards a 100 per cent clean energy grid in Australia. Australia's coastline hosts some of the world's most consistent and powerful wind resources, with many sites located near major industrial demand and population centres.[4] By way of example, 140 offshore wind turbines alone can produce enough electricity to power the Tomago Aluminium smelter – the single largest consumer of energy in New South Wales.[5]

By adding offshore wind into the national energy mix, Australia can accelerate its transition to a fully renewable electricity system, creating new economic and investment opportunities and bringing forward the economic potential of electrification.

Offshore wind will deliver an economic dividend to Australia.

Streamlining and accelerating the deployment path for offshore wind offers **two strategic benefits to Australia:** 1. economic development and 2. energy security.

1. **Successes achieved by leading offshore wind jurisdictions show that Australia stands to gain from large-scale investment in regional communities and coastal areas if it deploys offshore wind in a timely manner and at scale. More specifically:**

    - **Direct economic benefit: Over the next 30 years (By 2054),** a scaled offshore wind industry delivering 20 GW of offshore wind generation capacity could attract $100 billion in capital investment, boosting Australia's economy by up to AU$15.2 billion[6] and creating up to 5,000 additional full time equivalent (FTE) jobs.

    - **Just transition opportunities**[7]: Australia's declared offshore wind areas are positioned near existing coal-fired generators. The construction and operational phases of offshore wind present an important opportunity to deliver a just transition for mining and manufacturing workers near offshore wind areas (see page 22).

    - **Local and regional development:** Offshore wind development benefits coastal communities,

[1] Engineering and Technology (2024), UK poised to build 'record' number of new offshore wind farms
[2] NREL (2024), Offshore Wind Market Report: 2024 Edition
[3] 4C Offshore (2024)
[4] Blue Economy CRC (2021), Offshore Wind Energy in Australia
[5] Tomago requires 950 MW of firm electricity 24/7, which translates into 8.3 TWh pa. Tomago Aluminium (2024), Tomago Keeps the Lights on Across the State. A 2.1 gigawatt offshore wind farm, which requires 140 offshore wind turbines at 15 MW capacity per turbine, generating at 45 per cent capacity factor will generate 8.3 TWh pa.
[6] Deloitte modelling, GDP (net present value)
[7] A "just" transition in the context of the global/Australian energy transition refers to the process of shifting from fossil fuel-based energy systems to cleaner energy sources while ensuring that the social and economic impacts of these changes are equitable and inclusive. It aims to protect and enhance the rights and livelihoods of those affected by the shift, in particular workers in carbon-intensive industries and communities reliant on fossil fuels (such as coal, oil and gas extraction/production) by providing new jobs and catalysing new clean industrial opportunities.

strengthens local maritime industries, and sparks broader regional economic development. Developers of offshore wind projects have already been investing today in local businesses prior to construction. For example, through the development of their Star of the South offshore wind project, Southerly Ten has already spent AUD$4.8 million in the Gippsland region in Victoria. This spending includes hiring local workers, purchasing goods and services from local businesses, and using local vessels for marine surveys.

2. **Offshore wind can provide reliable clean power that strengthens and futureproofs the Australian electricity grid by:**

    - **Leveraging strong and consistent offshore winds to complement onshore renewable generation during peak demand periods:** As offshore winds are strong and consistent, turbines located at sea generate more power and boost electricity levels when the grid needs it most. This complementary profile reduces reliance on other emissions intensive technologies in critical times – for example hot summer days and winter evenings when energy demand rises, and offshore wind resources remain strong.

    - **Decreasing our need for costly back-up power sources:** Analysis from mature offshore wind markets shows that offshore wind can help to reduce reliance on peaking gas generation. Modelling demonstrates this is the case in both the US[8, 9] and UK [10]. In the Australian context, each gigawatt of peaking gas not required would save up to 0.8 Mt of CO^2e each year of operation and allow AU$1-AU$1.5 billion in investment to be reallocated across the economy.

    - **Unlocking large-scale supply efficiently near demand centres:** Offshore wind delivers the most energy capacity for the shortest transmission distances of any new transmission project, impacting fewer landholders.

With a sizeable portfolio, Australia's offshore wind industry is ready for a $100 billion breakthrough.

Australia's offshore wind industry is at a critical juncture, with a sizeable portfolio of projects on the cusp of crucial investment decisions. Australian governments and the offshore wind industry have made foundational progress over the past few years. The groundwork has been laid by the Federal and state governments, which have created legislative and regulatory frameworks and declared six offshore wind areas across four states (with a total potential capacity of 67.4 gigawatts)[11].

Leading global offshore wind developers have demonstrated significant interest to invest in Australia, resulting in a **pipeline of projects representing AU$100 billion of investment potential.**[12] The rollout of feasibility licences by the Federal Government in 2024 has enabled developers to commence their survey works with confidence, but further steps will be needed to enable projects to progress at speed, reach financial close and proceed to construction.

We know from mature overseas' markets that those projects delivered first face the most challenges, with frictions reducing over time as local experience increases and operational learnings lead to efficiencies. The Australian offshore wind industry has identified four key barriers that are creating uncertainty and delaying investment decisions for projects today:

1. **BARRIER 1 – Revenue uncertainty:** Offshore wind projects have long development lead times and are capital-intensive. Infrastructure projects of comparable magnitude require predictability on long-term revenue streams to ensure bankability and secure financing. While the Victorian Government has announced support for offshore wind, revenue mechanisms in Victoria and at the federal level are still under development. Victoria has announced one auction round so far, of 2 gigawatts. This number is too low to catalyse an advanced development pipeline with economies of scale, and the absence of future rounds is leading to uncertainty for developers.
2. **BARRIER 2 – Unclear offshore wind ambition:** A view on Australia's policy targets for offshore wind is needed for infrastructure buildout, developer confidence and investments in local supply chains. Currently, only Victoria has announced long-term offshore wind targets of 9 gigawatts by 2040. While the Victorian target has attracted substantial interest and investment, there is a lack of a compelling overall target that would make Australia a competitive investment destination for developers and make the supply chain competitive.
3. **BARRIER 3 – Dependence on new capital-intensive enabling infrastructure:** Offshore wind is a nascent industry in Australia, with the supporting port and transmission infrastructure, as well as local expertise yet to scale. The timing and availability of infrastructure is uncertain, which poses problems with sequencing. A lack of upfront coordination between Australian federal and state governments on these enablers sends contradictory signals to the market and undermines confidence.
4. **BARRIER 4 – Complex regulatory processes risk**

[8] NREL (2020), *The Potential Impact of Offshore Wind Energy on a Future Power System in the U.S. Northeast*
[9] PNNL (2020), *w*
[10] Aurora Energy Research (2024), *Is offshore wind still good for billpayers?* The range is based on "Offshore wind dominated" and "Gas CCUS dominated" scenarios, as the only two scenarios that are not dependent on interconnectors.
[11] DCCEEW (2022), Australia's offshore wind areas
[12] Assuming 20GW of announced projects are built and noting that over 25 GW of feasibility licenses have already been granted to projects.

project delays: Offshore wind projects have long lead times and require extensive upfront planning to meet development timelines. Timeline certainty across the whole development cycle is key to offshore wind success. Complexities in regulatory processes due to differences at state and federal levels, and offshore wind being untested in Australia, causes concern among stakeholders about project delays.

Coordinated policy action will ensure that offshore wind projects get built with private investment.

In international offshore wind markets, early projects have been supported by a revenue certainty mechanism such as a contract for difference scheme (CfD) like that being proposed to support the Victorian offshore wind target. In other offshore wind markets with auction mechanisms, government support reduces over time, with bid prices dropping on average 10-50 per cent across these markets between the first and most recent auction round (see page 36 for detail)[13].

In successful offshore wind markets, strong government coordination has been a hallmark – from regulatory processes and ensuring sufficient enabling infrastructure to connect the areas, to the build out of local workforce and supply chains.

For the momentum of early projects to deliver a growing and economically robust market in Australia, more needs to be done. Engagement with Australian developers and analysis of mature offshore wind markets has identified four policy levers to prioritise in the next 12 months, to overcome barriers and unlock investment:

1. **Overcome revenue uncertainty** - Catalyse the national offshore wind industry through initial federal-state co-investment of 4 gigawatts through the Victorian Contract-for-Difference offshore wind auctions by 2028.
2. **Provide consistency on offshore wind aspirations** - Pool funds and/or leverage existing programmes to lower capital costs of upgrades to enabling infrastructure and guarantee on-schedule delivery to underpin offshore wind projects.
3. **Minimise project delays** - Improve the competitiveness of Australia's development environment by identifying efficiency gains for permitting and approvals. Incorporate industry feedback and learnings from the implementation of the new regulatory framework for offshore wind.
4. **Partner for progress** - Work with the Clean Energy Council as the national industry body to design and deliver a national offshore wind strategy.

Governments can build on existing policy initiatives and collaborate closely with industry to set common objectives and build the success of the entire value chain.

Australia's window to act is closing fast. There is finite time for Australia to send a strong market signal and show investors the nation is serious about offshore wind. Any delays risk impacting market confidence, pushing investors towards other markets, and delaying the development of projects.

[13] Deloitte analysis of price support in Denmark, France, Germany, Japan, the Netherlands, Taiwan, the United Kingdom and the United States. Auction tender prices sourced from (House of Commons Library, Bundesnetzagentur, Norton Rose Fulbright, S&P Global, BWO, Ørsted, Japan Energy Hub, TGS, Westwood Global Energy Group, Energy Trend, Wind Europe, Offshore Wind Biz), with currencies converted to AUD using RBA historical exchange rate averages and adjusted for inflation using the RBA Inflation Calculator.

Australia is facing challenges in ensuring an orderly energy transition

The global energy transition is upon us. Australia has made great progress so far in scaling up clean energy over the last decade and lifting annual deployment of renewables from 2.3 gigawatts per annum in 2022 to 2.8 gigawatts per annum in 2023. However, 2024 saw deployment figures backslide to 1.3 gigawatts. Yet to replace ageing and increasingly unreliable coal fired power, increase system reliability and ensure consumer energy bills stay as low as possible a serious uplift in deployment is required.

Australia needs significant new clean energy supply to decarbonise current and future new electricity demand, while ensuring a just transition for Australian workers, businesses and households. A diversified clean energy portfolio, swiftly and extensively deployed, is the most reliable way to achieve success.

Challenge 1: Growing demand requires a major expansion of our electricity supply

Electricity generation is the biggest contributor to Australia's national greenhouse gas emissions, accounting for about a third of our emissions.[14] Achieving net zero emissions by 2050 requires Australia to decarbonise its energy systems, meaning demand for reliable clean electricity will grow significantly on three fronts:

1. Front 1: The decarbonisation of our existing load requires replacing ageing coal-fired power plants with clean electricity generation capacity.
2. Front 2: As more households and businesses electrify their homes for improved energy efficiency and energy bill savings so too will demand increase.
3. Front 3: The energy transition and technological advances better enable energy-intensive industries such as artificial intelligence (AI) and data centres, and bring new economic opportunities, including export opportunities with hydrogen, green iron and steel.

In Figure 1, the timing of the three fronts is mapped against AEMO's future scenarios for the national electricity market. These scenarios are defined and outlined in AEMO's 2024 Integrated System Plan (ISP). Step Change is defined as a scenario that fulfils Australia's emission reduction commitments in a growing economy. Green Energy Exports is defined as a scenario where Australia achieves very strong industrial decarbonisation and low-emission energy exports.

Australia finds itself in an advantaged position. World-class onshore and offshore wind and abundant solar resources offer the potential for a significant volume of clean electrons. But managing demand growth across all three fronts, will require an enormous build-out of new clean electricity generation capacity.

Australia has made important progress in recent years – with an increase in low-cost, clean electricity coming online, seeing national deployment lift from 2.3 gigawatts p.a. in 2022 to 2.8 gigawatts p.a. in 2023.[15] However 2024 saw a regression, with only 1.3 gigawatts of new renewable generation deployed[16]. We need to moving faster. When looking across the range of scenarios modelled in the AEMO ISP, to meet the Australian Government's 2050 net zero requires the national electricity market (NEM) to deploy between 4 gigawatts to 13 gigawatts[17] of onshore wind and solar every year over the next 25 years, as well as storage such as batteries to firm supply. Based on the average capacity of a typical onshore renewable farm in Australia[18], a build out of up to 30 onshore wind and solar farms would be required annually – an enormous leap from today's pace. This is why offshore wind is an essential complement to onshore renewables; it can diversify and stabilize energy supply with high gigawatt projects, reducing the pressure presented by solely onshore capacity.

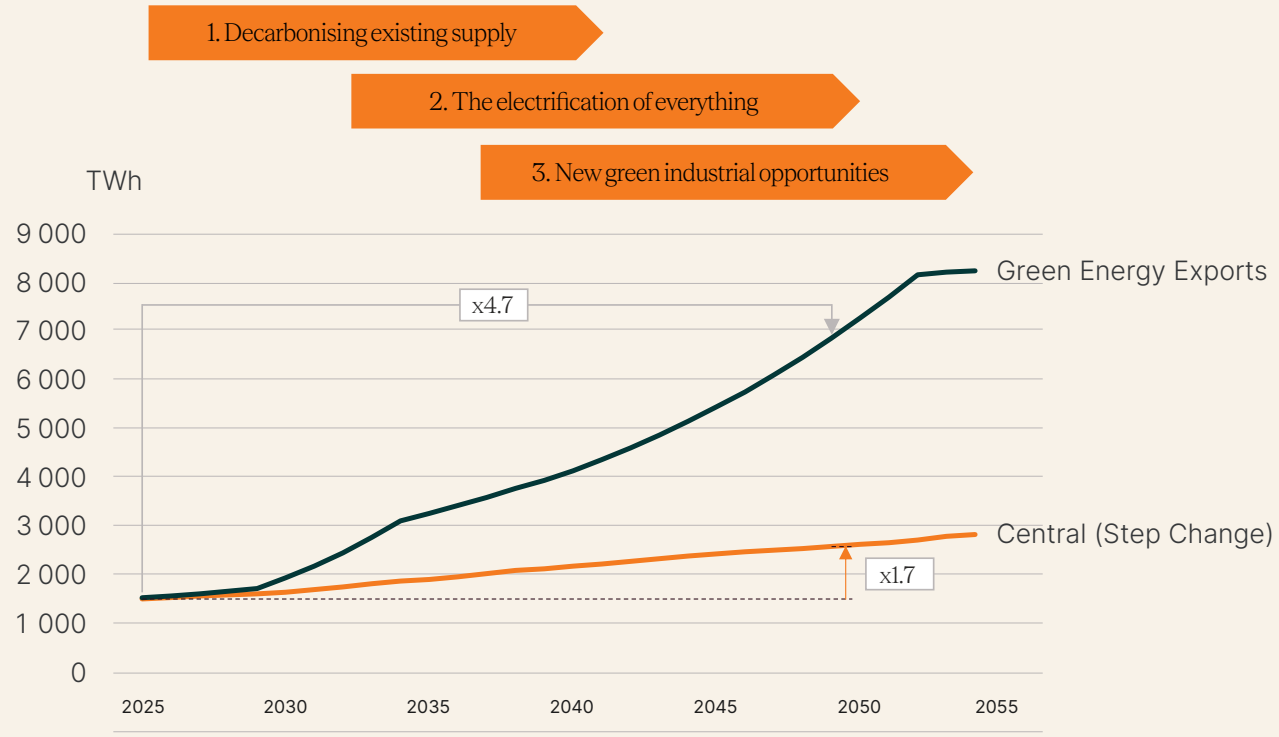


Figure 1: Forecasted National Electricity Market (NEM) annual electricity consumption[19]

[14] CSIRO (2022), Driving down Australia's energy sector emissions.
[15] Clean Energy Council (2024), *Clean Energy Australia Report*; Clean Energy Council (2023) *Clean Energy Australia Report*
[16] Clean Energy Council (2025), *Clean Energy Australia Report*; Clean Energy Council (2024) *Clean Energy Australia Report*
[17] Limited to the NEM and does not include WA or NT, both of which require substantial renewable electricity to decarbonise. AEMO (2024), *Integrated System Plan Generation and Storage Outlook*
[18] 330 MW per project
[19] AEMO (2024), *Forecasting Annual Electricity Consumption*. Note: ESOO 2024 publication, 29/08/2024 version, Operational (Sent-Out), NEM Central and Green Export scenario. NEM data excludes electricity demand in WA and NT, the visual therefore shows an underestimation of projected Australian electricity demand.

Challenge 2: A disorderly transition will put our businesses and communities at risk.

Without a well-planned path to net zero, Australia's communities are at risk of job losses, economic uncertainty and declining investment. Coal-fired power plants are set to close and emissions-intensive industries required to comply with the Safeguard Mechanism[20] – such as steel, cement, iron, and aluminium - will become less competitive if they don't decarbonise. Regional workers in these industries risk losing jobs and declining prosperity if there are no orderly transition pathway opportunities for them.

Across Australia, workers in the emissions-intensive mining, manufacturing and coal power sectors are most exposed to changes sparked by the energy transition. Coastal regions have an elevated representation of these workers, with high concentrations in Western Australia, New South Wales and Victoria (see Figure 2).[21] A smooth transition for workers will require new industries for them to transition into. In the absence of new industries and new investment, these workers may relocate to offset job losses and find new opportunities elsewhere.

Challenge 3. A diversified clean electricity portfolio is critical to our economic resilience and energy security.

Our abundant, world-class clean energy resources can position Australia as a global leader in low-cost energy. This advantage is already attracting global investment and fostering new green fuels and metals industries and creating lasting prosperity in our regions. In this environment, Australia's ability to swiftly build out and connect clean electricity infrastructure, create new supply chains and develop associated industrial capabilities will dictate our economic future.

A diverse clean energy portfolio will ensure Australia's energy security and is the lowest cost pathway as coal retires. Overdependence on a single development pathway makes Australia's system more vulnerable to build-out delays, disruptions and supply shortages. Diversification will ensure more consistent wind and solar supply across different times and weather conditions, reducing reliance on costly peaking solutions (see Section 2 Outcome II for further detail). This diversity ultimately keeps our electricity prices low.

The risks associated with market volatility were evident in 2022, when price volatility driven by international and domestic market pressures led to the suspension of the Wholesale Market across the NEM due to unprecedented high electricity prices (see Case Study and Figure 3).

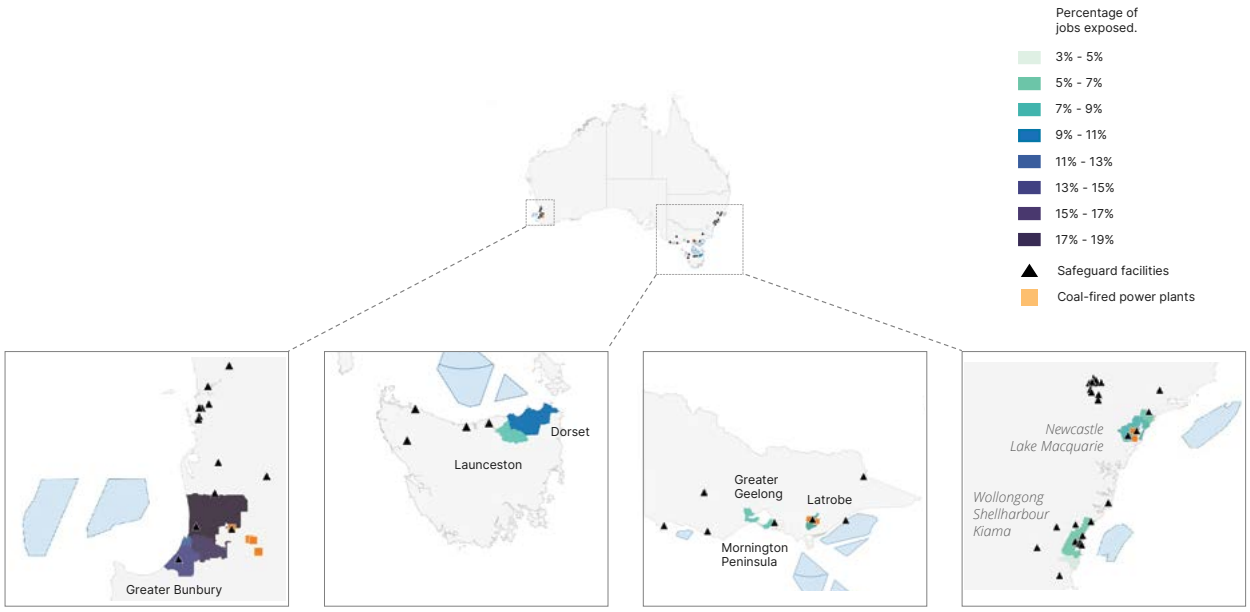


Figure 2: Percentage of transition-exposed jobs in coastal local government areas[22]

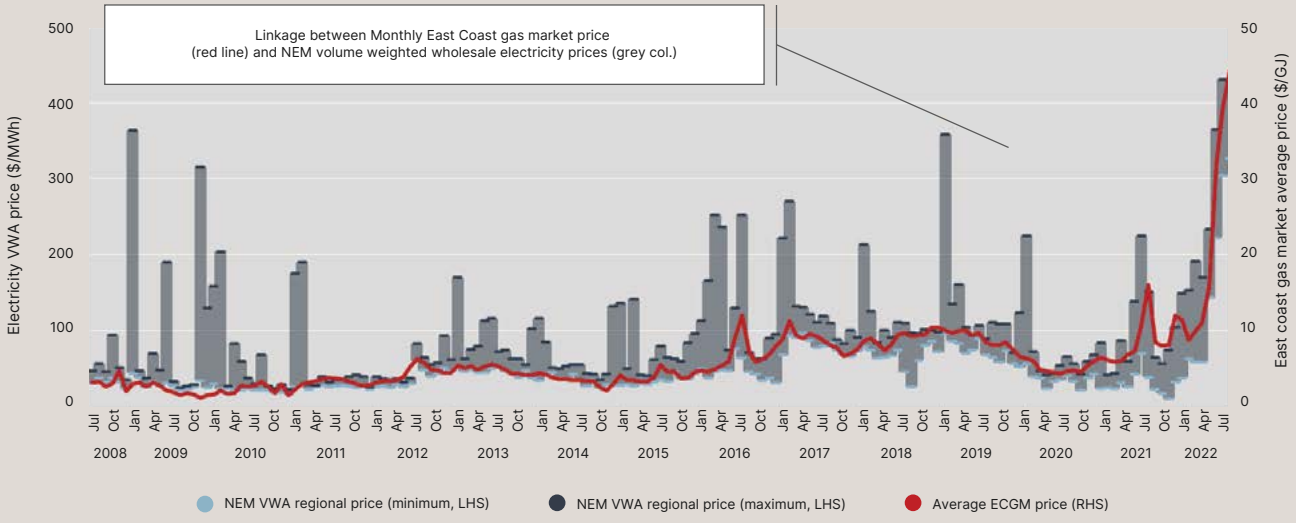
[20] Safeguard Mechanism requires Australia's highest greenhouse gas emitting facilities to reduce their emissions in line with Australia's emission reduction targets of 43% below 2005 levels by 2030 and net zero by 2050

[21] Figure 3 illustrates the percentage of transition-exposed jobs in local government areas (LGA) adjacent to offshore wind areas, alongside the location of safeguard facilities and coal-fired power plants within a 150 km radius of these areas. As the scope of this report centres around the opportunity of offshore wind in Australia, the visual focuses on regions with offshore wind areas and excludes transition-exposed workers in other Australian areas.

[22] Deloitte analysis based on ABS 2020 Census, AEMO (2024), *w* and DCCEEW data. Percentage of exposed jobs is defined as the proportion of employment in offshore wind adjacent LGAs situated in the mining and manufacturing sectors. Coal-fired power stations and safeguard facilities included are located within 150 km of the offshore wind areas.

Case Study: 2022 wholesale market price volatility event

In June 2022, AEMO suspended the NEM wholesale electricity market due to extreme upward pressure on wholesale electricity prices. Concurrent supply-side issues led to an 'energy squeeze', due to significant outages of thermal generation, fuel supply problems in coal and gas markets, and an early winter increasing demand. This put pressure on remaining generation to offer more into the market at a time of increasing domestic and international fuel prices. As illustrated in Figure 3 below, the wholesale electricity prices in 2022 became highly correlated with the East Coast gas market price, especially as some gas generators in the NEM needed to source gas from the spot market when there was record high gas spot prices.



Case Study: NEM Wholesale Market Event[23, 24]
Figure 3: AER NEM 2008 to 2022 actual electricity and gas spot prices[25]

[23] ACCC (2023), *Inquiry into the National Electricity Market: December 2023 Report*
[24] AER (2022), *Wholesale Market Quarterly Q2 2022*
[25] AER (2022), *Wholesale Market Quarterly Q2 2022*

Australian offshore wind has great potential

Offshore wind, with its scale and complementarity to onshore renewables, is a technology of choice for many countries to manage the challenges and ensure decarbonised and reliable energy supply. To date, 77 gigawatts of offshore wind have been installed globally with another 450 gigawatts in the global pipeline across more than 40 countries.

Offshore wind has world-class potential in Australia, and would form an important part of a balanced energy mix to guarantee an orderly energy transition in Australia.

Australia possesses world-class offshore wind resources, with some of the strongest and most consistent winds globally. Its declared offshore wind areas hold technical potential of 67.4 gigawatts, offering strong capacity factors of 40-50 per cent. These exceptional resources position offshore wind as a crucial component in creating a balanced and reliable energy mix for Australia's transition.

Figure 4: Global offshore wind industry

Offshore wind is a technology of choice for more than 40 countries.

Offshore wind is a mature global industry, having been operating for over 30 years. To date, 77 gigawatts of offshore wind have been installed globally –13,315 turbines[26] – with another 450 gigawatts in the global pipeline across more than 40 countries including the UK, Germany, France, Taiwan, South Korea, the US, Japan and China (Figure 4).[27, 28]

The International Energy Agency (IEA) recognises offshore wind is in a category of its own – separate from onshore wind and solar – as the only variable baseload power generation technology.[29] In other words, wind turbines at sea generate more consistently than those on land since:

- Wind speeds at sea tend to be faster and steadier than on land, given there is no obstruction by natural landscapes and built infrastructure. This means that offshore wind generates electricity consistently at different times during the day, night and four seasons compared to onshore wind.
- Offshore wind turbines are much larger in size than their onshore counterparts, and, enabled by shipping wind turbine components directly to ports for construction, remove limitations imposed by road or rail transportation. The newest offshore wind turbines in operation have reached 20 megawatts[30] (compared to the largest onshore wind turbines currently installed in Australia which are just over 6 megawatts[31]), with further opportunities for technology improvements being explored by industry leaders.
- Offshore wind projects offer energy at a large-scale, with most new projects in Australia approaching or exceeding 2 gigawatts.[32]

Moreover, offshore wind has seen a significant cost reduction over the past decade through economies of scale and efficiency learnings, with global weighted average total installed costs dropping 48 per cent between 2010 and 2023.[33]

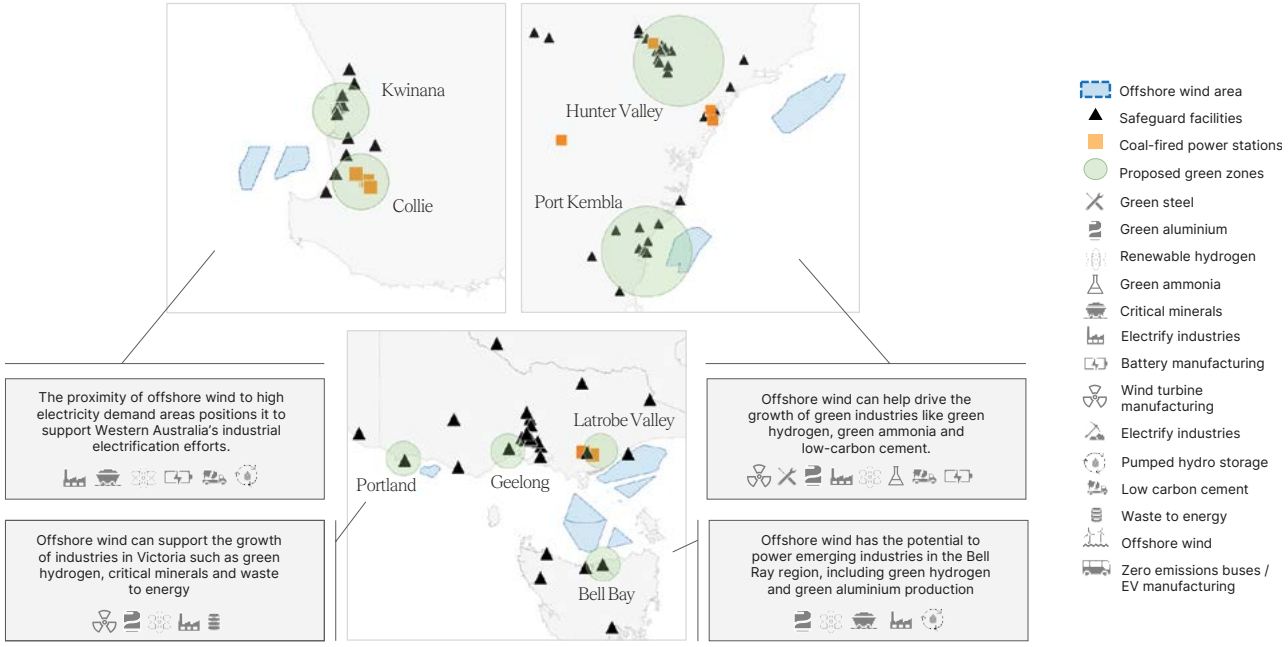


Figure 5: Proximity of offshore wind areas to key industrial demand centres[34]

[26] 4C Offshore, Global offshore wind turbines
[27] Engineering and Technology, (2024), UK poised to build 'record' number of new offshore wind farms
[28] International Energy Agency (2024) Renewables 2024; NREL (2024), Offshore Wind Market Report: 2024 Edition
[29] International Energy Agency (2019), Offshore Wind Outlook 2019 (https://www.iea.org/reports/offshore-wind-outlook-2019)
[30] Balkan Green Energy News (2024), China breaks records with offshore, onshore wind turbines
[31] Renew Economy (2024), Australia's biggest wind project installs first turbine
[32] DCCEEW (2025), Australia's offshore wind areas. Based on the average capacity of offshore wind projects awarded feasibility licences.
[33] IRENA (2023), Renewable Power Generation Costs in 2023
[34] Deloitte analysis based on ABS (2020), Education and employment census, AEMO (2024), Integrated Systems Plan, Beyond Zero Emissions and DCCEEW data.

With world-class potential, offshore wind could become a key part of Australia's electricity mix.

Australia has declared offshore wind areas with technical resources of 67.4 gigawatts and with capacity factors of 40-50 per cent.[35] This is five to ten percentage points higher than the corresponding onshore wind capacity factors. [36] In addition, identified offshore wind areas in Australia are co-located in proximity to retiring coal-fired power stations and major industrial sites and demand centres (Figure 5).[37]

This means high-demand centres can have access to high quality, low variability clean electricity, which can connect to the grid with limited transmission upgrades. Offshore wind's potential to create steady, stable and complementary clean energy would make it a strong addition to the clean energy mix for our homes and businesses.

While Australia has significant potential, the scale and pace of offshore wind development is yet uncertain. As such, it is useful to consider three future scenarios with different levels of offshore wind capacity and industry development. To interrogate Australia's offshore wind potential, Deloitte has modelled the economic impacts that can be unlocked across the three scenarios and one sensitivity. The economic impacts of the three scenarios are modelled relative to a baseline where Australia reaches net zero by 2050 without the investment associated with offshore wind, therefore relying more on onshore renewables.

While three scenarios and one sensitivity have been modelled, only the results from the central scenario and sensitivity – Stable Progress – are referenced throughout this report for simplicity (see next section for more details).

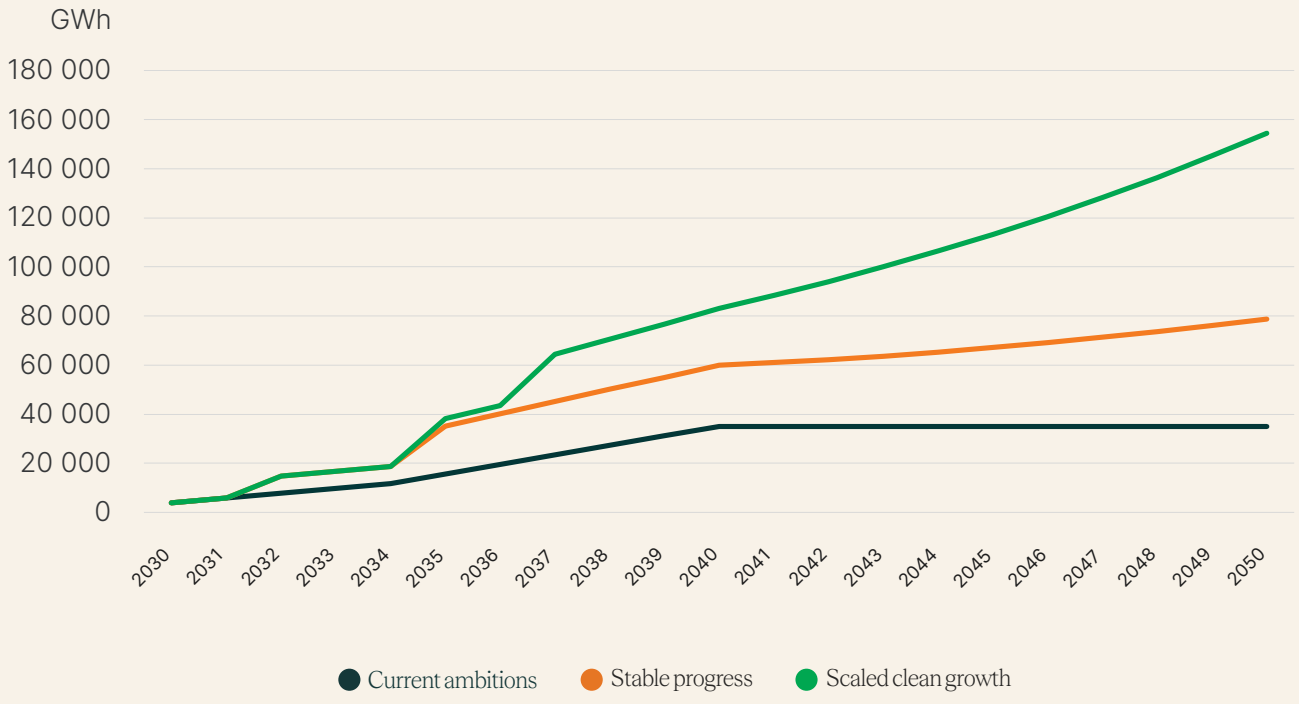


Figure 6: Offshore wind generation by scenario (GWh) [38]

[35] The capacity factor is a measure for electricity generation of a system, representing the ratio of actual electricity production (which is influenced by maintenance, weather conditions, etc.) to the maximum theoretical output over a specific period. The higher the capacity factor, the better the performance of the system. The capacity factor can be used to compare different types of electricity production.

[36] AEMO (2024), Integrated System Plan, IASR Assumptions Workbook. Victoria's offshore wind areas' (Gippsland and Southern Ocean) capacity factors are compared to Victoria onshore wind capacity factor (average of Victoria's REZs).

[37] Blue Economy CRC (2021), Offshore Wind Energy in Australia

[38] Deloitte CGE modelling

Current ambitions: Meeting targets of 9 gigawatts by 2050, but missed opportunities

If Australia fulfils its current offshore wind ambitions, more precisely the Victorian target of 9 gigawatts, it will see around three to five projects in Victorian waters. This would bring significant positive impacts (see page 22) to that state's economic resilience and energy security. However, by 2050, offshore wind would contribute to less than 10 per cent[39] of the NEM's electricity in a grid two times the size of today under AEMO's Step Change scenario.

In limiting offshore wind to Victoria, the result would be a constrained realisation of potential economic and energy benefits presented by offshore wind for Australia.

Stable progress: Strong growth to 20 gigawatts by 2050

The Stable Progress scenario assumes offshore wind projects will be deployed in all the declared offshore wind areas in Victoria, New South Wales, Tasmania and Western Australia. A growth rate that follows the trajectory of offshore wind in the UK in its earlier years would see 20 gigawatts installed by 2050. By 2050, offshore wind is expected to contribute around 15 per cent[40] of the NEM states' electricity in a grid two times the size of today under AEMO's Step Change scenario.

At this scale, offshore wind will realise higher economic benefits than the Current Ambition scenario but doesn't realise its full potential.

Scaled clean growth: Maximising Australia's offshore wind potential to realise economic and energy opportunities

If Australia strives for the Scaled Clean Growth scenario, it could reach 40 gigawatts of offshore wind capacity installed by 2050 (assuming the current year-on-year percentage growth trajectory of offshore wind in the UK). Under this scenario, floating offshore wind would be enabled in Tasmania and Western Australia, and the increased scale and number of projects would unlock higher investment in local supply chains, enabling higher local content.

This large-scale deployment of offshore wind across all southern states would catalyse the largest number of jobs, a just transition for multiple regions and enable clean energy supply to meet the Australian Government's net zero goals. By 2050, offshore wind would supply around 12 per cent[41] of the NEM's electricity in a grid five times the size of today under AEMO's Green Energy Exports scenario. This expanded capacity enables both domestic decarbonisation and the development of new, energy-intensive, clean export industries, such as green hydrogen or low-carbon manufactured products.

Stable progress sensitivity

One sensitivity based on the Stable Progress scenario was also considered. This sensitivity considers when offshore wind capacity is additional to the forecasted growth of other technologies under the AEMO Step Change scenario, instead of a substitute/replacement of other technologies. This sensitivity shows the benefit of offshore wind in addition to forecast onshore wind capacity.

[39] Calculated as 35 TWh of 437 TWh based on AEMO ISP 2024 Step Change electricity generation.
[40] Calculated as 63 TWh of 437 TWh based on AEMO ISP 2024 Step Change electricity generation.
[41] Calculated as 117 TWh of 1,017 TWh based on AEMO ISP 2024 Green Energy Exports electricity generation.

Offshore wind deployment delivers a windfall to Australia

Analysis indicates that Australia could replicate successes achieved by leading offshore wind jurisdictions if it deploys offshore wind in a timely manner and at scale. More specifically:

- Modelling shows that a scaled offshore wind sector of 20 gigawatts could boost Australia's economy by up to AU$15.2 billion and create up to 5,000 additional jobs. It could attract AU$100 billion of capital investment to Australia, supporting an industry that employs 7,700 people per year and generates AU$16.9 billion in industry value add.

- The construction and operational phases of offshore wind present an important opportunity to deliver a just transition for transition-exposed workers near offshore wind areas.

- Offshore wind development could benefit coastal communities, strengthen local maritime industries, and spark broader regional economic development. Developers of offshore wind projects are already investing today in local businesses, prior to any construction taking place.

In addition, offshore wind could provide reliable clean power that strengthens and futureproofs the Australian electricity grid by:

- Complementing onshore renewable generation during peak demand events and when onshore resources are limited.

- Decreasing our need for costly back-up power sources: each gigawatt of peaking gas not required could save up to 0.8 Mt of CO^2e each year of operation and allow AU$1-1.5 billion in investment to be reallocated across the economy.

- Unlocking large-scale supply efficiently near demand centres: offshore wind delivers the most energy capacity for the shortest transmission distances of any new transmission project and impacts the lowest number of landholders.

Outcome 1: The offshore wind industry can deliver significant economic benefits, high-value jobs and just transition opportunities

A scaled offshore wind industry promises significant benefits, through direct economic investment, the creation of just transition opportunities, and broader economic development in coastal and regional communities.

A. A scaled offshore wind industry of 20 gigawatts by 2050 could boost Australia's economy by up to AU$15.2 billion and create up to 5,000 additional jobs. It could attract AU$100 billion of capital investment to Australia, supporting an industry that employs 7,700 people per year and generates AU$16.9 billion in industry value added.

Deloitte has modelled the economic impacts that can be unlocked through different levels of offshore wind capacity and industry development (see Table 1). Under Stable Progress, a scaled offshore wind industry of 20 gigawatts by 2050 could boost Australia's gross domestic product (GDP) by up to AU$15.2 billion.

It could also attract capital investment up to AU$100 billion into coastal and regional communities, create up to 3,900 jobs during construction, and up to 7,680 FTE ongoing jobs, acting as a catalyst for local economic renewal. As the industry expands, direct employment linked to offshore wind projects is expected to grow, providing a range of high-value jobs in construction, operation and maintenance. Importantly the scale and complexity of offshore wind projects make them large ongoing employers in operations and maintenance (O&M) roles, representing up to AU$2 billion in average annual operational expenditure.

Table 1: Economic impact of modelled offshore wind industry development (AUD) [42,43]

		Current ambitions 9 gigawatts by 2050	Stable progress 20 gigawatts by 2050		Scaled Clean Growth 40 gigawatts by 2050
			Central scenario	Sensitivity for the central scenario referenced throughout this report	
Direct economic benefits					
Capital investment	Annual average Total (undiscounted	$1.9 billion	$4.1 billion		$7.2 billion
	Total (undiscounted	$46.8 billion	$99.5 billion		$173.6 billion
Operating investment	Annual average	$1 billion	$2 billion		$3.6 billion
	Total (undiscounted)	$24.3 billion	$48.3 billion		$76 billion
Direct gross value added	Annual average	$0.79 billion	$1.6 billion		$4.7 billion
	Total (net present value)	$8.7 billion	$16.9 billion		$47.7 billion
Net economic benefits (broader economy)					
Impact on GDP (net present value)		$5.0 billion	$9.5 billion	$15.2 billion	$13.6 billion
Jobs opportunity (direct employment)					
Average annual (construction)		1,600 - 2,770	2,240 - 3,900		4,380 - 7,620
Average annual (operations)		2,000 - 4,000	3,840 - 7,680		6,000 -12,000
Peak (operations)		2,700 - 5,400	9,660 - 16,680		12,000 - 24,000
Net jobs opportunity					
Average annual		1,850	3,000	4,770	4,280

[42] Deloitte direct gross value add calculations based on Australian Bureau of Statistics data.
[43] Deloitte job calculations based on Department of Energy, Environment and Climate Change data.

The addition of offshore would also generate AU$16.9 billion of industry added value from the construction and electricity supply sectors.

B. The construction and operational phases of offshore wind present an important opportunity to deliver a just transition for up to 15 per cent of transition-exposed workers near offshore wind areas.

Eleven closing coal-fired power stations and 39 emissions-intensive businesses covered by the Safeguard Mechanism are located within a two-hour drive of Australia's six offshore wind areas.[44, 45] Up to 66,000 workers in mining and manufacturing could be impacted by job losses as these generation assets retire and emissions-intensive businesses decarbonise.[46] Up to 16,680 jobs that will be created in offshore wind could provide important alternative transition opportunities. Figure 7 shows the percentage of new direct offshore wind jobs relative to transition-exposed mining and manufacturing workers in the four offshore wind states.[47]

Offshore wind can be a meaningful part of a just energy transition and is well-positioned to provide opportunities to reskill personnel with transferable skills. The figure could paint an underestimated picture, as it doesn't consider jobs created through supply chain development and other indirect jobs.

C. Offshore wind development will benefit coastal communities, strengthen local maritime industries and spark broader regional economic development.

Deloitte's economic modelling indicates that Australia could add up to 5,000 full time equivalent (FTE) jobs, inclusive of the direct employment generated by the offshore wind industry. These jobs would be concentrated in downstream sectors, like manufacturing, trade, construction and services. A large portion of these jobs are likely to be colocated near offshore wind sites – in regional, coastal communities.

Already, developers are investing in communities near offshore wind areas, even before construction begins (see Case Study on next page).

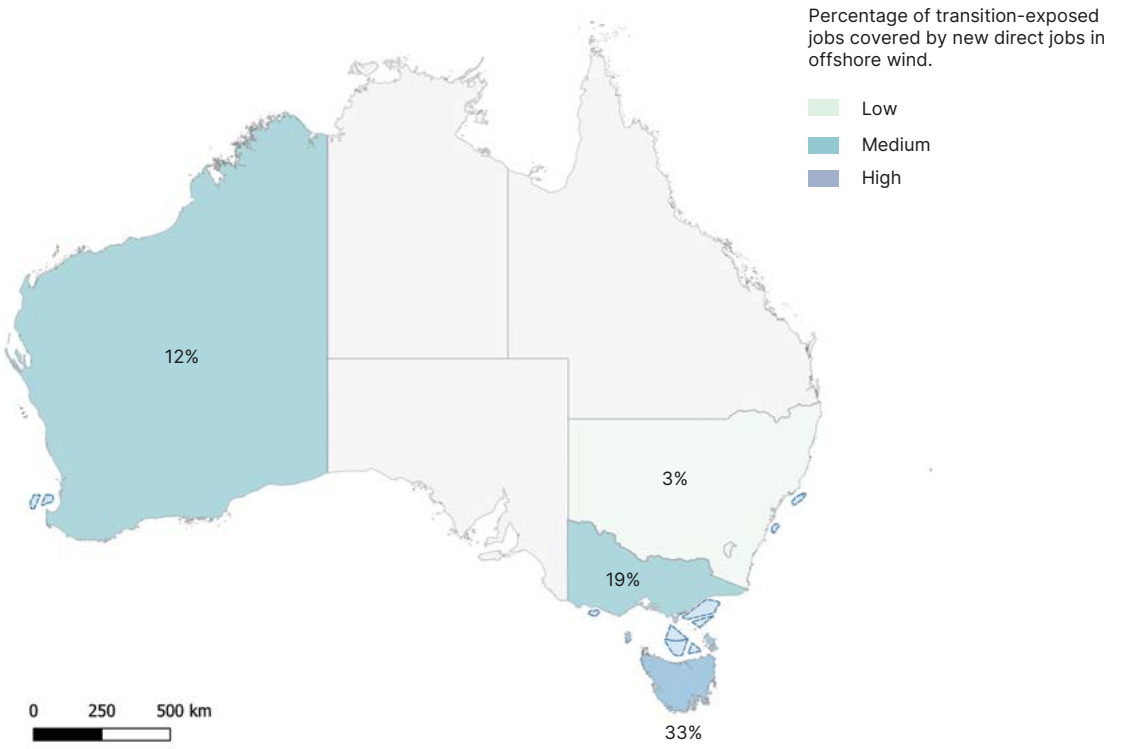


Figure 7: Percentage of transition-exposed mining and manufacturing jobs directly met by offshore wind during operation [48]

[44] Australian Government Clean Energy Regulatory (2023), Safeguard facility data 2021-2022

[45] DCCEEW (2025), Safeguard Mechanism. The Safeguard Mechanism is an emissions reduction policy targeting large industrial facilities, such as mining, manfuacturing and waste management, that emit over 100,000 tonnes of carbon dioxide equivalent (CO^2-e) annually. These facilities are subject to an annual emissions limit, known as a baseline, to help Australia meet its emissions targets.

[46] Deloitte analysis based on ABS (2020), Education and employment census data. Transition-exposed jobs are calculated from employment numbers in the mining and manufacturing sectors.

[47] The total transition-exposed job numbers for each state are calculated from the total transition-exposed jobs for LGAs adjacent to offshore wind areas in the mining and manufacturing sectors.

[48] Deloitte analysis based on ABS (2020), Education and employment census data and Deloitte CGE modelling data of the average operational employment numbers per state under a Stable Progress scenario.

Case study: Regional impact of Star of the South on Gippsland communities

Through the Star of the South offshore wind project, proposed off the Gippsland coast, offshore wind developer, Southerly Ten, has spent AU$4.8 million in Gippsland during its development to date (to end 2024). The project has engaged six permanent local workers and supported approximately 100 local businesses by purchasing goods and services, and utilising local vessels for marine surveys. Since 2019, 10 local vessels have participated in project work with owners of an additional 10 expressing interest in collaborating with contractors. Star of the South is projected to contribute approximately AU$8 billion to the broader Australian economy over its lifetime, including AU$3 billion specifically to the Gippsland region.

Outcome 2: Offshore wind will enhance our energy resilience by providing a complementary source of clean energy

A. Offshore wind will play a major role in providing green electrons during peak demand events and when onshore renewables generate less.

Because winds offshore blow faster and more consistently, and offshore turbines are larger, offshore wind technology typically delivers five to seven per cent more energy than onshore wind. Depending on the region within Australia, offshore wind will typically play an important role in periods of peak summer demand (see Figure 8), which is when gas peaking plants are switched on or large industrial sites are required to turn off (i.e. load shedding). This is particularly valuable, as daily gas-powered generation offtake is forecast to become more volatile and even more costly in the coming decades (see Figure 9).

This means that offshore wind can play an important complementary role in ensuring electrons are available when businesses and households need them most. It is important to recognise that different states have different energy requirements and have unique plans to reach the goal of net zero economies. The relative strengths of offshore wind also differ by area (see Table 2 for more detail).

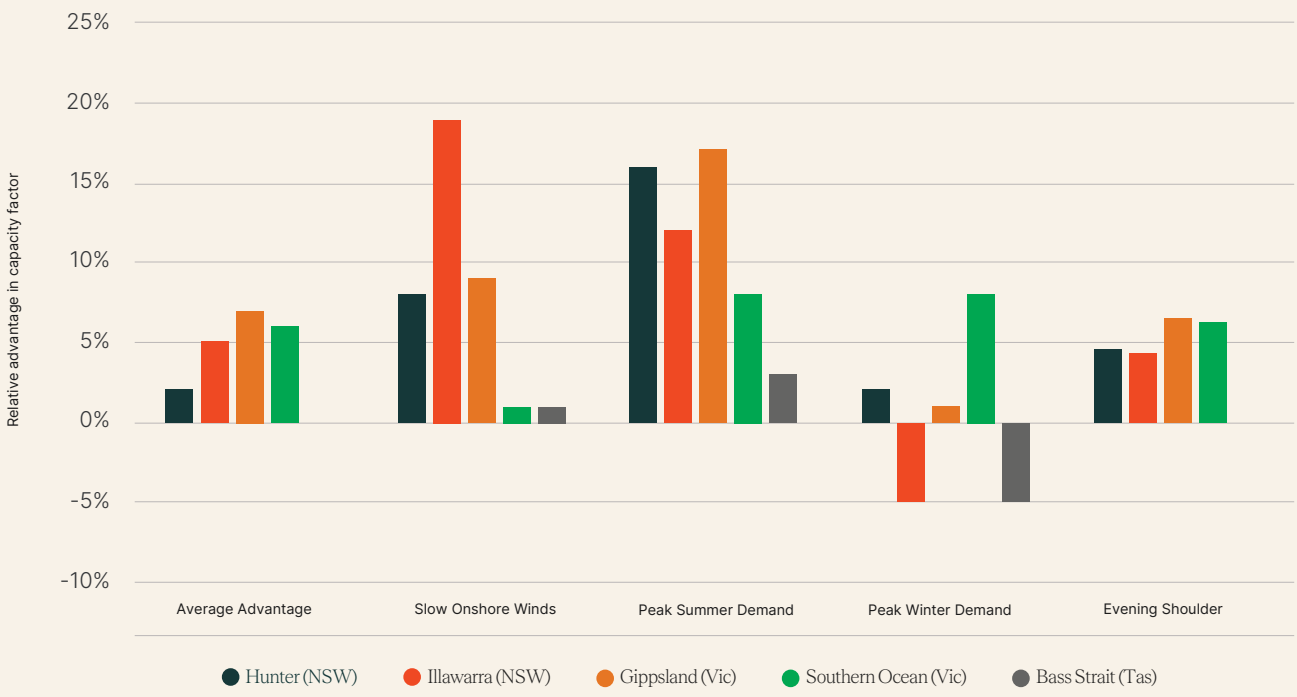


Figure 8: AEMO integrated system plan 2024 time of day and seasonal advantage of offshore wind areas in New South Wales, Victoria and Tasmania[49]

[49] AEMO ISP 2024 30 minute wind traces, 2024 to 2052, from New South Wales, Victoria and Tasmania.

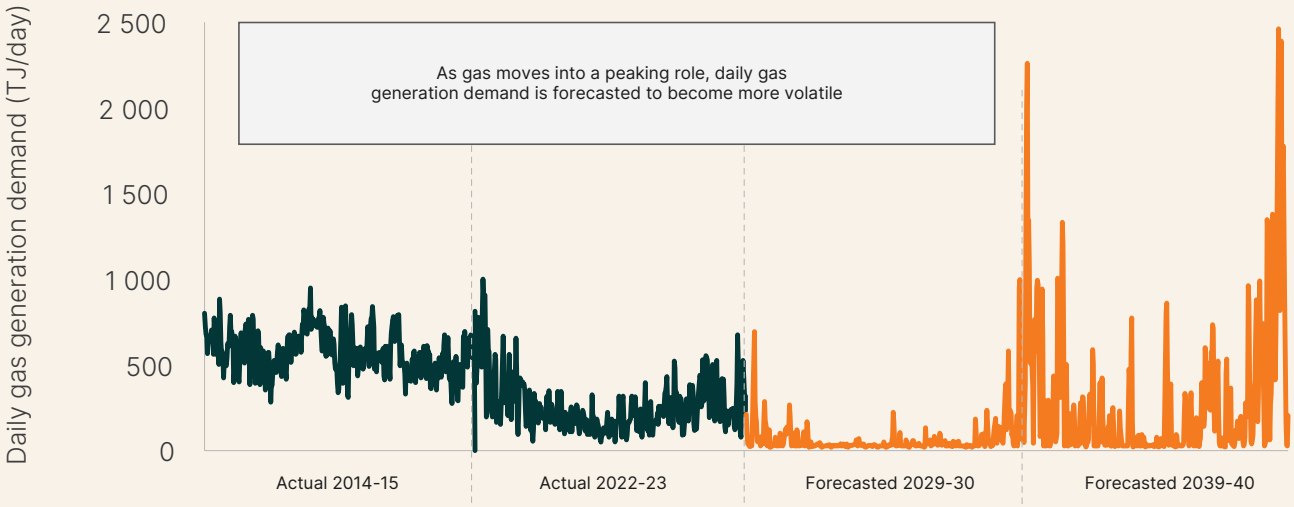


Figure 9: AEMO actual and forecasted daily gas powered generation offtake, NEM[50]

The challenge summarised

The challenge for Australia is clear. We must balance rapidly rising demand for green electrons and the transition of our workforce with the build out of a new, more distributed clean energy system.

Managing this transition successfully will require a highly diversified energy mix, with all forms of renewable generation competing to deliver the best outcomes for consumers.

To build momentum, we need large, gigawatt-scale projects, which can be deployed quickly and connected simply into the grid.

[50] AEMO (2024), ISP 2024 data, Figure 23

State-by-state case for offshore wind

Table 2: The case for offshore wind by states and area

Victoria	• The Gippsland offshore wind area has a significantly higher capacity factor – 10 percentage points when compared to Victoria onshore wind and offers strong diversification value in summer and autumn.[51] In other words, the offshore wind in Gippsland is stronger than onshore wind in summer and autumn. This area is comparable with the North Sea in Europe, home to approximately 25 gigawatts of offshore wind.[52] • The Southern Ocean offshore wind area could power industrial sites such as the Portland Aluminium Smelter, which is a significant energy consumer, presenting a clear decarbonisation opportunity for the largest local employer. Both the Gippsland and Southern Ocean offshore wind areas could power households, especially as coal-fired power stations in Latrobe Valley will be retired by the mid-2030s.
NSW	• The Hunter offshore wind area offers strong diversification value. In particular, Hunter offshore wind could service the summer "shoulder" period of 6pm, which is typically when households cause a surge as they switch on the aircon, internet and cooking appliances. Both NSW offshore wind areas could power households and industrial sites, including the Tomago aluminum smelter and the proposed Renewable Energy Industrial Precinct (REIP) in Hunter Valley. • The Illawarra offshore wind area is strategically located near the industrial centre of Wollongong and Port Kembla, that has an established steel industry. Offshore wind could provide clean energy to help decarbonise these industrial hubs and shift to production of green products. The deep-water industrial port of Port Kembla offers infrastructure that can be upgraded to support construction, assembly, and maintenance of turbines. The Illawarra is well-connected to the grid, and transmission lines connected to load centres in Sydney.
Tasmania	• The Bass Strait (Northern Tasmania) offshore wind area could underpin Tasmania's clean energy export ambitions, as Tasmania has already fully decarbonised its electricity generation. The area is strategically located near proposed industrial opportunities around Bell Bay, including green hydrogen and green ammonia production.
WA	• The Bunbury (Indian Ocean) offshore wind area presents significant potential, especially as coal-fired power stations in the region are scheduled to shut down in the late 2020's. The Bunbury offshore wind area could power industrial sites, including Alcoa's Pinjarra and Wagerup Alumina refineries, South32's Worsley Alumina Refinery and CSBP's Kwinana ammonium nitrate facility, helping these facilities transition to clean sources of energy.

[51] Based on AEMO (2024), Integrated Systems Plan 2024 30-minute wind traces from Vic, NSW, Tas. Fixed offshore wind traces (with "WFX" labelling) were compared with weighted averages of high onshore wind traces (with "WH" labelling) and solar traces (with "SAT" labelling), weighted by the AEMO forecasted ODP buildout

[52] Global Energy Monitor Wiki (2024), North Sea Offshore Wind Development

B. Offshore wind has the potential to cut system costs by decreasing our need for costly back-up power sources.

Evidence from mature offshore wind markets shows that deployment of offshore wind can reduce dependence on more expensive and carbon-intensive energy, with the potential to lower overall system costs. This has been shown in both the US and UK, and Australia has the potential to capture a similar benefit. For example, Aurora (2024) modelled that offshore wind helps reduce peaking gas in the UK at a ratio of 1 TWh offshore wind to ~0.6 TWh to 1 TWh peaking gas.[53] In the US, the National Renewable Energy Laboratory modelled that offshore wind helps reduce peaking gas in the US Northeast at the ratio of 1 TWh offshore wind to ~0.75 TWh peaking gas. The Pacific Northwest National Laboratory modelled that offshore wind is complementary – especially on a seasonal basis – to pumped hydro due to significant yearly changes in water inflows, especially low inflows at the end of summer and in winter. Offshore wind can support pumped hydro by reliably producing energy in late summer and winter when pumped hydro output can be low.

In the Australian context, **each gigawatt of peaking gas not required could save up to 0.8 Mt of CO^2e each year**[54] and allow AU$1 billion to AU$1.5 billion in investment[55] to be reallocated across the economy. As noted previously, offshore wind will typically play an important role in periods of peak summer demand and will help reduce the need for peaking gas plants.

C. The diversification benefits of offshore wind can be realised at a gigawatt scale and connected to the grid swiftly and efficiently.

Offshore wind's unique advantage comes from its magnitude and location. These large-scale projects are strategically built near demand centres, such as coastal cities and industrial hubs. Characterised by the vast amounts of clean electricity they unlock, with a typical Australian offshore wind project being ~2 gigawatts in size[56].

Projects facilitate efficient energy generation and also minimise the need for extensive transmission infrastructure development; the four transmission projects identified by AEMO in the 2023 Transmission Expansion Options Report (referenced as T4 in Tasmania, N10 and N11 in New South Wales, and V7 in Victoria) show that connecting the offshore wind areas in New South Wales, Victoria, and Tasmania delivers the most energy capacity for the shortest transmission distances of any new transmission project (Figure 10). Offshore wind transmission projects also impact the fewest number of landholders, reducing complexity and facilitating quicker decision-making and implementation.

By unlocking more capacity with minimal stakeholder impact, offshore wind is a powerful addition to the Australian energy mix.

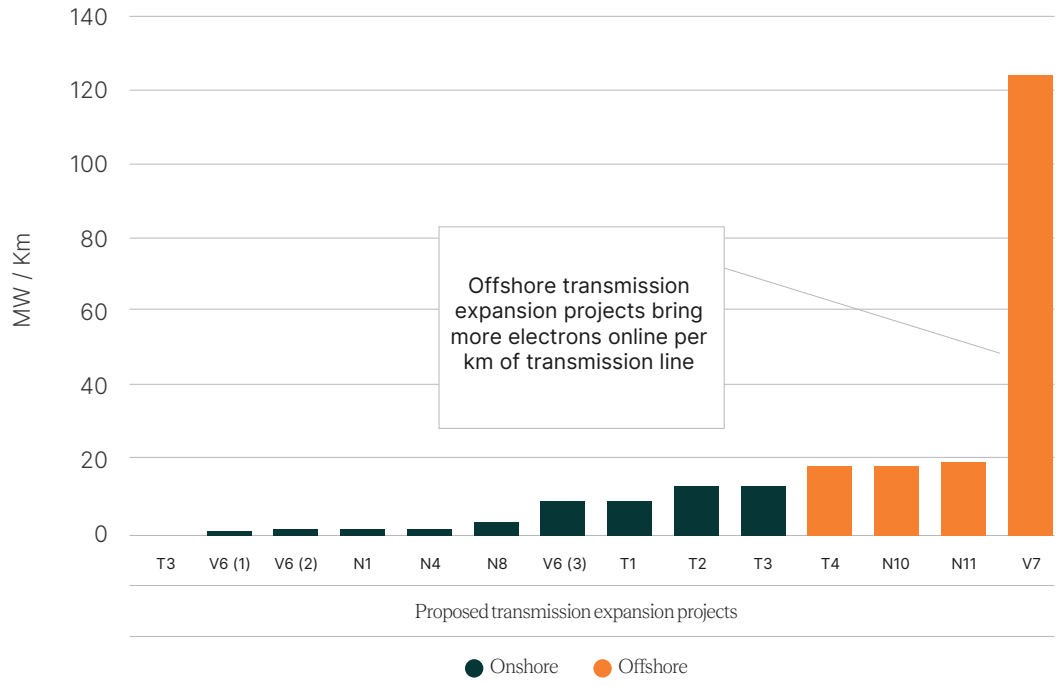


Figure 10: Megawatt (MW) capacity unlocked per kilometre of transmission line easement length[57]

[53] Aurora Energy Research (2024), Is offshore wind still good for billpayers? The range is based on "Offshore wind dominated" and "Gas CCUS dominated" scenarios, as the only two scenarios that are not dependent on interconnectors.
[54] AEMO (2024), Integrated Systems Plan
[55] Based on 1GW OCGT being displaced in 2032 and CSIRO (2024), GenCost 2024-25 Consultation Draft. Based on OCGT (large) at ~$1,000 / kW in capital cost, ~10 / kW in O&M fixed over 25 years, and $ 7 / MWh over 25 years.
[56] Average gigawatt capacity based on the proposed capacity of 13 offshore wind projects awarded feasibility licences across the Gippsland and Hunter region. Data derived from project websites.
[57] Deloitte analysis based on AEMO (2024), Integrated System Plan and AEMO (2023), Transmission Expansion Options Report

Australian offshore wind is at a crossroads

Australia's offshore wind industry is ready to make significant investment decisions, but faces multiple headwinds that require government intervention. Challenges for offshore wind projects in Australia include revenue uncertainty, lack of visibility of Australia's offshore wind aspirations, dependence on capital-intensive new critical infrastructure such as ports and transmission, and complex regulatory processes risking project delays.

With major investment decisions approaching, the next 12 months will be critical in shaping the future viability and success of a local offshore wind industry, with deployment either occurring at scale or the industry facing delays due to uncertainty, stifling momentum gained over the last few years and decreasing investor confidence.

There is strong interest for offshore wind in Australia.

Industry, federal and state governments already recognise the opportunity of offshore wind in Australia and have made great progress in recent years (see Figure 11 below).

Industry

- Australia has attracted all major global offshore wind proponents, and early announcements from industry saw consideration for 47 projects, totalling over 90 gigawatts[58] - more than 62 times the 1.45-gigawatt nameplate capacity of Victoria's Yallourn power plant that is scheduled to close in 2028, yet can currently provide power to two million Australian homes[59].
- While the number of projects has reduced following the awarding of feasibility licences, there is still extensive interest in all six declared offshore wind areas across Australia from industry-leading developers.

Federal Government

- The Federal Government has declared six offshore wind areas across four states, including: Gippsland and Southern Ocean (Victoria), Hunter and Illawarra (New South Wales), Bunbury/Indian Ocean (Western Australia), and Bass Strait (Tasmania), with a total potential capacity of 67.4 gigawatts[60] All areas have progressed to the feasibility licence stage, with 28 gigawatts of Feasibility licences either awarded or offered across three of the areas.
- There has been strong bi-partisan support in shaping the development of the legal framework for the establishment of an offshore wind industry, as well as in the establishment of the Offshore Electricity Infrastructure (OEI) Act, and the Offshore

[58] Energise Renewables (2024), Australia Offshore Wind Energy Summar
[59] Energy Australia (2019), Statement on the Yallourn power station
[60] DCCEEW (2024), Australia's offshore wind areas

Infrastructure Regulator (OIR), which oversees the offshore renewables industry.[61]

- The Federal Government has also established working groups in partnership with the state governments to progress industry development, such as the Gippsland Licence Holders Advisory Committee and the Southern Ocean Wind Industry Committee.

State governments

- The Victorian Government has already legislated offshore wind capacity targets of at least 2 gigawatts by 2032, 4 gigawatts by 2035, and 9 gigawatts by 2040.[62] In March 2025, they also commenced the procurement process for a revenue stabilisation mechanism (a Contract-for-Difference with availability payment, see page 32)[63], making it the only state that has explicitly developed targets and outlined financial support for offshore wind so far, resulting in significant private sector investment interest.

- Planning of shared transmission infrastructure to connect Victoria's offshore wind technology to the grid has also begun, with VicGrid launching a call in late 2024 to the private sector for expressions of interest to build the infrastructure.[64]

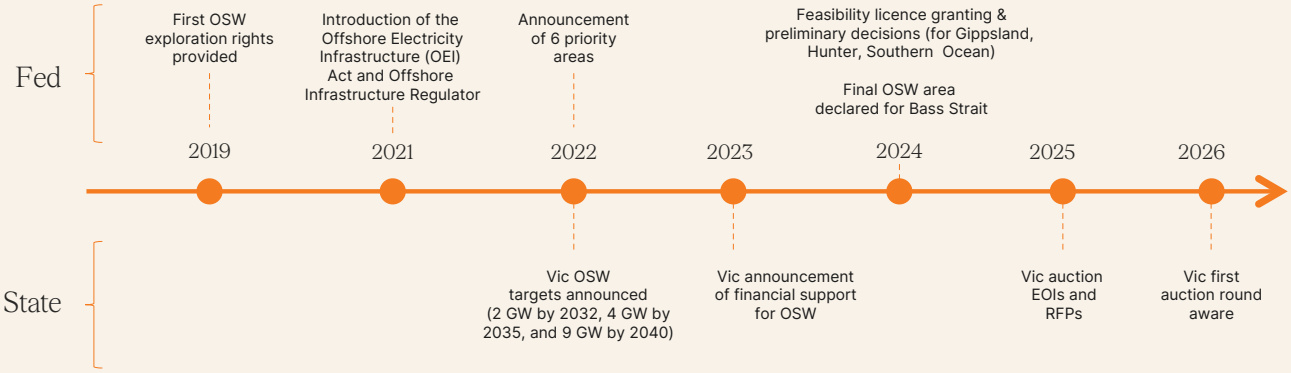


Figure 11: Timeline of key decisions and announcements from governments related to offshore wind[65]

However, the industry in Australia faces headwinds.

Despite being a mature technology which has been deployed globally and demonstrated industry interest, no offshore wind turbines are in Australian waters yet.

Barriers to setting up an entirely new offshore wind industry in Australia have been compounded by recent macroeconomic trends like inflationary pressures and supply chain disruptions. Operating against this backdrop, offshore wind developers in Australia look for certainty on different investment parameters across markets in their global portfolios. There are four key barriers creating uncertainty and delaying investment decisions for offshore wind projects in Australia today: uncertainty on revenue, lack of visibility on the future pipeline for supply chain investment, critical infrastructure availability, as well as complex regulatory processes (Figure 12).

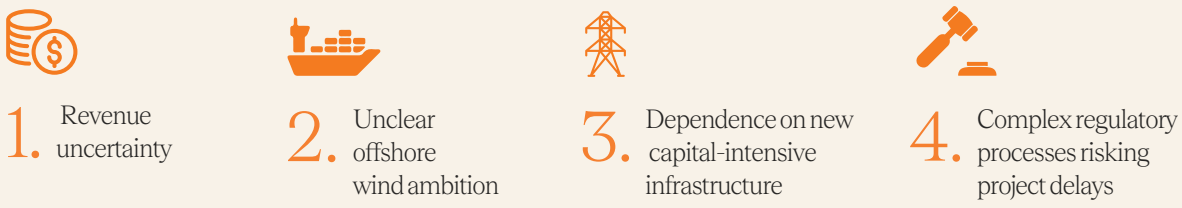


Figure 12: Barriers to Australian offshore wind development[66]

[61] Offshore Infrastructure Regulatory (2024), Governance and accountability
[62] Energy and Public Land Legislation Amendment (Enabling Offshore Wind Energy) Act 2024.
[63] DEECA (2024), Offshore wind energy
[64] Premier of Victoria (2024), Delivering the Infrastructure for Offshore Wind Energy
[65] DISR (2024), Morrison government approves licence to explore possibility of Australia's first offshore wind farm; DCCEEW (2024), Offshore wind in Australia; DEECA (2024), Offshore wind energy and OIF (2024), Governance and accountability
[66] As identified through 1-1 interviews with developers and stakeholder engagement with Offshore Wind Taskforce.

1. **BARRIER 1 – Revenue uncertainty:** Offshore wind projects have long lead times and are capital-intensive. Infrastructure projects of this magnitude require predictability on long-term revenue streams to deliver investor confidence and ensure bankability. While Victoria has announced support for offshore wind, mechanisms nationally are still under development. So far, despite its support, Victoria has only announced one auction round of 2 gigawatts. This number is considered too low to catalyse a healthy pipeline with economies of scale and supply chain development, and the absence of future rounds is leading to uncertainty for developers. Greater clarity around the scale of support mechanisms and their consistency over time is needed to unlock offshore wind project financing in Australia, specifically regarding certainty on the funding and timing of auction rounds.

2. **BARRIER 2 – Unclear offshore wind aspiration:** A view on the likelihood and scale of offshore wind in Australia is needed for infrastructure build-out, developer confidence, and required investments in local supply chains. Currently, Victoria is the only state that has announced long-term offshore wind targets. At present, the Victorian target is significantly lower than other international markets (see Figure 12), making the Australian market less attractive comparatively. In the absence of visibility on the long-term pipeline, such as communicated national/state targets or multiple rounds of support mechanisms, players across the value chain lack confidence that the industry will truly take off.

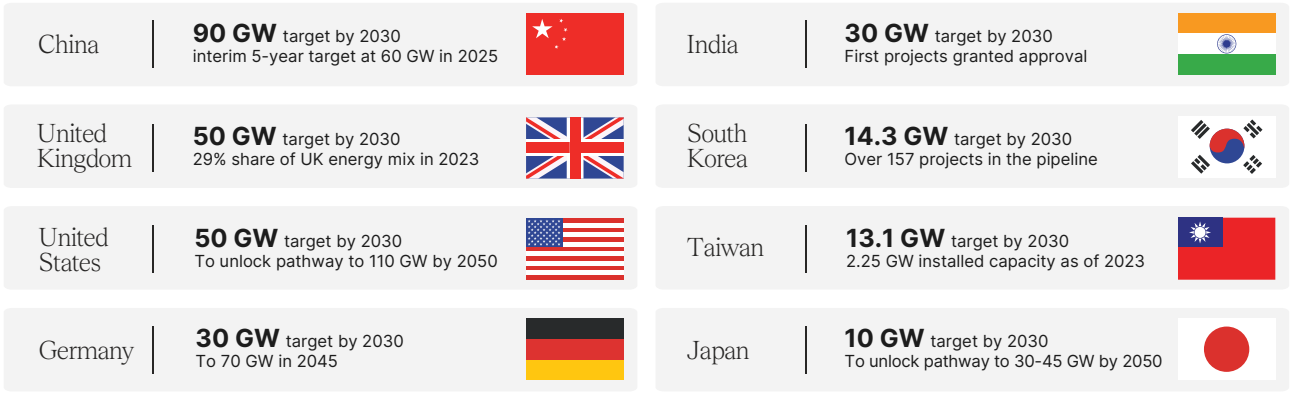


Figure 13: Offshore wind targets by country[67]

3. **BARRIER 3 – Dependence on new capital-intensive enabling infrastructure:** Offshore wind is a nascent industry in Australia, with the supporting port and transmission infrastructure, as well as local expertise lacking to date. Developers are uncertain on the timing and availability of infrastructure, which poses problems with sequencing. Enhanced coordination between Australian governments on these enablers would strengthen market confidence and provide consistent signals to industry.

4. **BARRIER 4 – Complex regulatory processes risking project delays:** Offshore wind projects take between seven to 12 years to deliver, though this can be even longer in new markets. This includes from early planning to final construction and therefore requires extensive upfront planning to meet development timelines, making timeline certainty across the whole development cycle key to project success. Complexities due to multiple levels of approvals across state and federal regulatory processes, as well as all early offshore wind projects being the first of their kind to be reviewed domestically, has generated concern that projects may face delay while awaiting necessary regulatory approvals.

[67] National Renewable Energy Laboratory (NREL) (2024), Offshore Wind Market Report: 2024 Edition, gigawattEC (2024), Global Offshore Wind Report 2024, Norton Rose Fulbright (2024), Global offshore wind: Taiwan, gigawattEC (2024), gigawattEC Report Outlines Crucial Next Steps for Vietnam to Scale Investment and Achieve Offshore Wind Targets

Failure to deploy offshore wind will have consequences

There are consequences if Australia delays the development of investment grade policy to underpin the offshore wind industry and address challenges.

Countries with clear offshore wind targets (see Figure 13 above) and mature industry mechanisms, compete for the same developers, suppliers, equipment and skilled workforce. This is particularly relevant for Australia in the Asian Pacific context: markets such as Japan, South Korea, Taiwan and Vietnam, have been rapidly growing and are already ahead of Australia in terms of progress. Consequently, steadfast policy support in Australia is critical to entice developers to commit to high upfront investment and long development times.

The simultaneous enacting of the Offshore Electricity Infrastructure regime and the Victorian Government announcing offshore wind policy and targets led to 37 applications in the Gippsland offshore wind area, and the subsequent award of 12 feasibility licences in the same area. However, delays in addressing barriers and lack of further encouraging market signals could erode investor confidence and result in project delays or lack of investment, with the current AU$100 billion of direct investment interest going elsewhere.

This could cast a long shadow, not only missing out on direct jobs and investment but, by missing federal and state renewable energy targets, result in a lack of stable clean power supply and higher electricity prices. On average, if there are delays to offshore wind[68], Victoria could see a 42 per cent increase in wholesale energy prices between 2031 and 2036 . Worst case, the broader economic consequences could expose coastal and regional communities and industrial energy users to a more uncertain and less inclusive energy transition and could see major manufacturers and industries leave Australia. Put another way, these forces could erode the momentum in economy of Australia's energy transition, undermine investment, and expose the economy to unnecessary volatility.[69]

[68] Infrastructure Victoria (2024), Victoria's energy transition risks and mitigation actions, Final Report August 2024, average of price affordability impact of alternative scenarios between 2031 to 2036 (p. 41)

[69] Jenkins, JD (2014) Political economy constraints on carbon pricing policies: What are the implications for economic efficiency, environmental efficacy, and climate policy design?

Making it happen

For the momentum of early offshore wind projects to deliver a scaled and self-perpetuating market in Australia, more needs to be done. Benefits of offshore wind industries worldwide are evident; however, these have not been realised without strategically coordinated action. Australia can take advantage of our fast follower status by learning from other jurisdictions and fast-tracking its offshore wind development. Analysis of mature offshore wind markets and engagement with the Australian development ecosystem points to five critical policy levers to overcome barriers and unlock investment before 2030.

Australia's window to act is closing fast. Mature offshore wind markets provide a blueprint for how to unlock private investment

Australia has the tools to overcome complex existing barriers and can build on its existing progress and the more than 30 years of lessons learnt in offshore wind markets to guarantee success. Although this would require public investment and a high degree of coordinated action between governments and industry, if we get it right, we can accelerate the transition and deliver a meaningful economic dividend.

Analysis of mature offshore wind markets and engagement with the Australian development ecosystem points to five policy levers for the next 12 months to overcome barriers and unlock investment before 2030 (Figure 14):

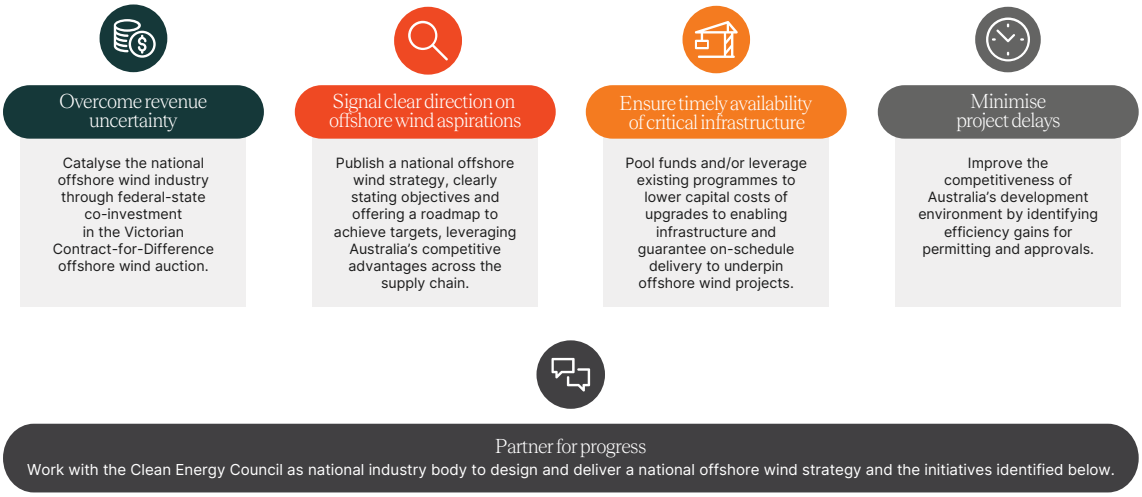


Figure 14: Policy recommendations

Types of revenue support mechanisms for offshore wind (non-exhaustive)

Diversity in policy approaches exists across markets but are functionally similar, with duration of support ranging between 15-20 years. Government support often takes the form of offering price stability. Governments' preferred mechanism can change over time. FITs and FIPs (see below) are not contemplated by Australian market players.

Mechanism (non-exhaustive)	Definition	Fixed minimum price	Price ceiling	Contracted volume	Price allocation	Example market
Contract for Difference (CfD)	Mechanism where government guarantees a fixed strike price for electricity. If the market prices is lower than the agreed price, the developer is paid the difference (one-way contract), if the market price is higher, the developer pays government the excess back (two-way contract)	Yes	Equal to minimum price	Variable	Administrative process / auction	the United Kingdom, currently contemplated by Vic Gov to support its target
Feed-in-Tariff (FITs)	Guarantees a fixed price per unit of electricity, regardless of market prices, during a fixed period of time	Yes	Equal to minimum price	Variable	Administrative process	Taiwan
Feed-in-Premium (FIP):	Offers a premium payment that is added to the market price of electricity, which can be constant or vary	Yes	No	Variable	Auction	Japan
Power Purchase Agreements (PPAs)	PPAs with public utilities (or corporate buyers) are long-term contracts where government (buyer) agrees to purchase a set amount of electricity at a fixed price, reducing developers' exposure to market volatility	Yes	Equal to minimum price		Auction (Government), bilateral negotiation (corporate)	State governments in the United States
Production (Tax) Credit (PC/PTC)	Is a financial incentive based on the amount of electricity produced, where developers obtain a set amount per generated MWh	Yes	Equal to minimum price	Variable	Set by Government, compliance with requirements could add a "bonus" rate	The US Fed Gov provides a tax-deductible PC on top of State support.*

Source: adapted from Oxford Energy. *Note: this case study was prepared prior to the incoming 2025 Trump administration. Support granted under the previous Biden administration may change.

Barrier 1: Overcoming revenue uncertainty

What have other offshore wind markets done?

Successful global offshore wind markets have been catalysed with some form of government support. Revenue certainty mechanisms underpin targets, with predictable rounds linked to deployment objectives. In international cases, early offshore wind projects have been supported by appropriately designed revenue certainty mechanisms to lower the cost of capital and reduce investor risk.

This is similar to other Australian energy industries, which have traditionally required government investment to become established technologies.[70]

Providing certainty towards long-term deployment targets through regular auction round announcements (including clarity on duration, frequency, and size of support), has worked well in other jurisdictions to ensure project predictability and bankability. Over the past decade, auction rounds have typically been staggered by one to three years.

Case study: The UK's CfD mechanism

The UK's contract-for-difference mechanism has been very successful in scaling the UK's offshore wind industry and unlocking lower-cost financing for projects in the past decade. With risks being priced out as the industry scaled over time and very competitive rounds of bidding, strike prices have come down ~50% between its first and most recent round (2015 and 2024). Even though the UK's CfD mechanism is inflation adjusted, adjustments were made to the UK's sixth and seventh auction rounds following the lack of bids in the fifth round.

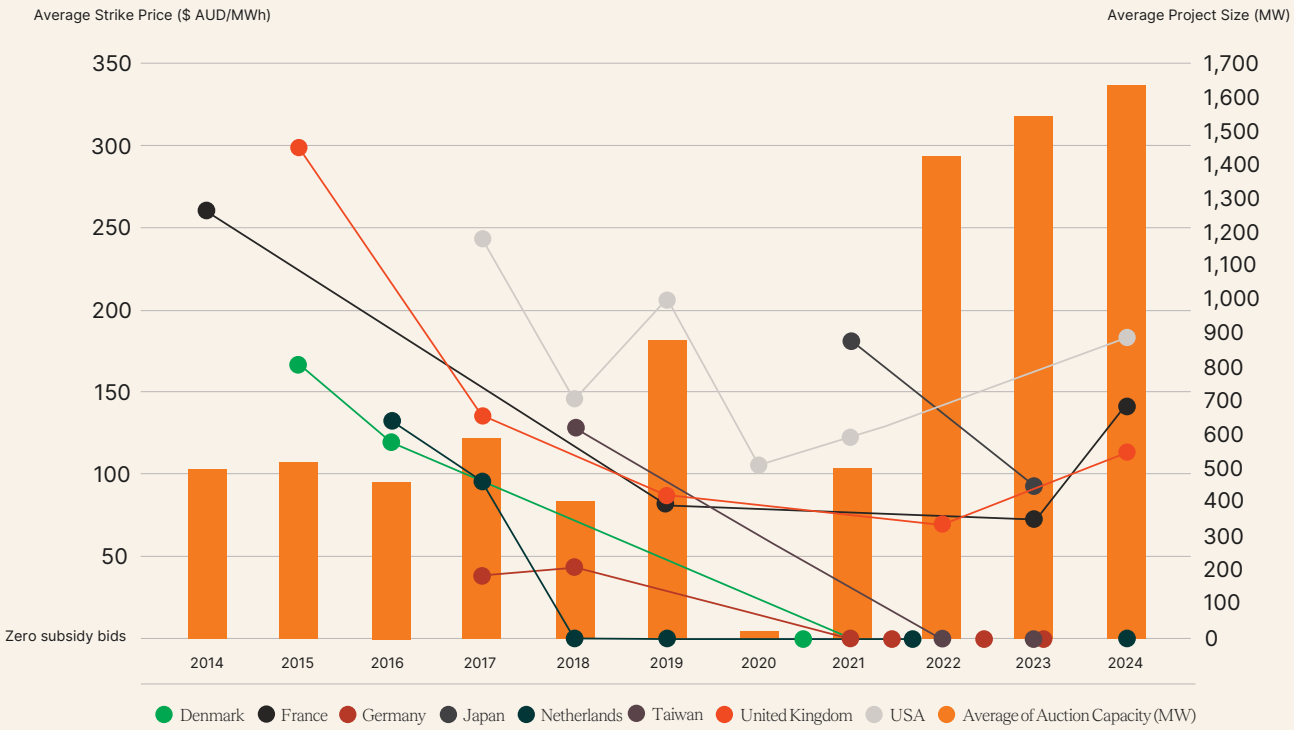


Figure 15: Global offshore wind tender prices over the past decade (by jurisdiction, in 2024 adjusted AUD) [71]

[70] The North West Shelf (NWS) gas project in Western Australia has benefited from tax exemptions and funding for enabling infrastructure. Large-scale renewable energy generators can get a feed-in tariff in the ACT and a reverse auction scheme for renewable energy is in place in Victoria. The Clean Energy Finance Corporation (CEFC) and Australian Renewable Energy Agency (ARENA) are established government bodies that provide funding and concessional finance to scale clean energy technologies, such as onshore wind and solar, hydrogen and bioenergy.

[71] Based on Deloitte analysis. Auction tender prices sourced from (House of Commons Library, Bundesnetzagentur, Norton Rose Fulbright, S&P Global, BWO, Ørsted, Japan Energy Hub, TGS, Westwood Global Energy Group, Energy Trend, Wind Europe, Offshore Wind Biz), with currencies converted to AUD using RBA historical exchange rate averages and adjusted for inflation using the RBA Inflation Calculator.

Analysis of price support in Denmark, France, Germany, Japan, the Netherlands, Taiwan, the United Kingdom and the United States (Figure 15 above) shows that:

- Government-led tenders for offshore wind generation offtake agreements have seen an average reduction in the strike price of 18 per cent between the first round and the second round of tenders. Further reductions from the first rounds to the most recent tender rounds have also been experienced, with strike prices reducing by 10 to 50 per cent across markets.

- **The average size of winning projects has tripled over the decade, bringing more energy into the grid.** For example, Japan, France, and the UK have respectively seen a 35 per cent, 27 per cent and 50 per cent reduction between their first and last rounds (Figure 15). Markets such as the Netherlands, Germany and Taiwan have even seen zero-subsidy bids after the first rounds.

- **While competition drives innovation and cost reduction over time, auction mechanisms that overemphasise costs or permit negative bidding can lead to unsustainable outcomes.** Latest market developments have demonstrated the importance of balanced and flexible auction design (the lack of bids in the UK's fifth auction round and Denmark in December 2024[72,73]). Flexible policy frameworks that can adapt to inflationary pressures, supply chain fluctuations and changes in capital costs are key to ensure long-term viability for offshore wind projects. The inclusion of non-price criteria in bid evaluations - such as local economic benefits, environmental stewardship, and technological advancement - helps ensure both competitive pricing and sustainable long-term value for communities. This balanced approach maintains healthy competition while avoiding the pitfalls of pure price competition.

What should Australia do to kickstart the industry - recommendations for the next 12 months:

Australian context:

Victoria has already announced its intention to award a 2 gigawatts CfD in 2026 to support the offshore wind industry. While welcomed, this number is considered too low to catalyse a sufficient pipeline in Australia, and the absence of future auction rounds, nationally, is leading to uncertainty for developers. International best practice and experience from other Australian industries (such as previous wind auctions in Victoria, the federal CIS scheme, and Long-term Energy Service Agreements (LTESA) in New South Wales) provide lessons on how to set up a sustainable revenue certainty mechanism for offshore wind in Australia.

Victoria, which is the most progressed state in relation to offshore wind, will provide the first market signal with its auction and set the tone for the national industry. A successful auction will set a price benchmark, which will be closely watched by all international developers. The future of Australian offshore wind is therefore highly dependent on a successful first auction, and it is important that there is strategic alignment between government and industry to convert momentum from the first auction into a scale-up pathway for the industry. Kickstarting the offshore wind industry will also support Australia's developing sustainable finance market by providing lenders and institutional investors new opportunities to reduce financed emissions.

Recommendation:

Given the importance of the Victorian auction, the Federal Government should co-invest in the initial Victorian auction. Federal matched co-investment in this scheme would enable commitment to a second 2 gigawatts auction round by 2028 and provide greater investment certainty to developers and those in the supply chain. The scheme could leverage many of the innovative criteria from the recent CIS tenders (such as tender three and four, which include assessment criteria on First Nations and community engagement and commitments).

Short term recommendation 1:
Catalyse the national offshore wind industry through federal-state co-investment in the Victorian Contract-for-Difference offshore wind auction.

What should Australia do to set a course for 20+ gigawatts - recommendations before 2030:

Australian context:

Victoria's offshore wind auctions alone are insufficient to deliver a scaled offshore wind industry. Market players agree that 20 gigawatts or more of offshore wind capacity (slightly more than the UK has already deployed) would deliver a vibrant industry in Australia. A clear, predictable, and realistic pathway to reaching this will enable investment in projects, communities and the supply chain.

Australia has six offshore wind areas across four states, with varying levels of maturity and progress across these. Federal co-investment in the Victorian revenue certainty mechanism could create a strong incentive for other state governments to accelerate policy and market development. This would see projects in non-Victorian areas being brought forward and in a condition where competitive bids are viable.

[72] Watt Logic (2023), CfD auction round failure underscores Government's wrong thinking on subsidies
[73] Reuters (2024), Failed offshore auction highlights how Denmark missed winds of change

Recommendation:

The Federal Government, in consultation with the offshore wind states, should develop a long-term revenue certainty mechanism for offshore wind to be able to reach scale across all offshore wind areas. This mechanism should be in addition to the initial auctions in Victoria and should be technology specific to enable projects where the electrons are needed. The Federal Government will need to consider appropriate duration of support, and regional and technology differences, as well as periodic review and adjustments of the auction process, to maximise public value.

Mid- to long-term recommendation 1: Federal and state Governments to develop a revenue certainty mechanism to succeed the initial Victorian auctions that recognises states' local context and objectives. To maintain effectiveness and ensure appropriateness, the auction framework should be periodically reviewed and adjusted to reflect changing market conditions.

Barrier 2: Signalling clear direction on offshore wind ambition

A. What have other offshore wind markets done?

Pipeline certainty is a consistent element in the policy mix for mature markets that signal government ambition. International case studies suggest long-term offshore wind targets with clear and predictable pathways through well-defined national strategies underpin certainty. Targets are a commonly adopted policy tool to signal government commitment and provide visibility on the long-term pipeline. This visibility provides certainty to developers to invest and scale, and unlocks investment in enabling infrastructure, supply chain and skills development.

Once the long-term pipeline is guaranteed, jurisdictions will focus on developing local supply chains through sector deals and local content requirements (LCRs), the latter with mixed success. Overly rigid LCRs without the presence of a domestic supply chain, such as previously seen in Taiwan for component manufacturing and in the US, for domestic installation vessels, can slow industry development.[74, 75] Markets such as the UK and Japan focus on soft forms of local content, where domestic value is captured over the lifetime of the project, allowing flexibility over how to achieve this target and to ensure compliance with World Trade Organization (WTO) rules.

Case study: US offshore wind strategy

Development of offshore wind in the United States has evolved from state-led initiatives to a comprehensive federal approach. Early pioneer states such as Massachusetts, New York and New Jersey spearheaded offshore wind development by setting ambitious targets and developing support mechanisms. Prompted to build on these foundations, the federal government (Biden administration) set a national offshore wind target of 30 gigawatts by 2030 and 110 gigawatts by 2050. Further states have followed, with the sum of state targets far exceeding the federal target and providing developers with more focused guidance.

To support the realisation of national ambition and provide a clear roadmap to stakeholders, the federal government under former President Joe Biden directly invested in key infrastructure and developed a detailed supply chain strategy, leveraging policy under the Inflation Reduction Act (IRA) to incentivise local manufacturing and investment through bonus tax credits. Prior to that, studies conducted by the National Renewable Energy Laboratory (NREL) mapped out supply chain gaps to inform policy decisions. A national strategy reflects the importance of market visibility and detailed planning to scale an offshore wind industry.

However, following inauguration the current Trump administration withdrew offshore wind energy leases, halting the extensive industry progress seen in the US to date. This has put licenced projects under severe economic pressure and more broadly the entire US offshore wind industry in jeopardy. This has highlighted how long-term policy stability across the entire project lifecycle is fundamental to maintaining an attractive investment environment and enduring industry

Case study: US Offshore Wind Strategy[76, 77, 78]

[74] Infrastructure Investor (2023), US offshore wind hopes under threat as developers seek PPA renegotiations
[75] Taiwan implemented strict LCRs in 2021 with the ambition of developing a domestic offshore wind supply chain, which was met with significant backlash. The local supply chain was too immature to meet demand for specialised components, leading to project delays and increased costs for developers. In addition, the EU contested the requirements with the WTO. Taiwan has since back peddled on its requirements.
[76] U.S Department of Energy (2023), Advancing Offshore Wind Energy in the United States
[77] National Renewable Energy Laboratory (2023), A Supply Chain Road Map for Offshore Wind Energy in the United States
[78] Congressional Research Service (2024), Offshore Wind Provisions in the Inflation Reduction Act

What should Australia do to kickstart the industry – recommendations for the next 12 months:

Australian context:

Successful offshore wind markets build on comprehensive industry development strategies. With offshore wind legislation now in place and Victoria leading with targets, the moment is right for a clear offshore wind development pathway. A coordinated approach would give investors and supply chain businesses the confidence to commit capital and fully capture the economic benefits across Australia.

Recommendation:

The Federal Government should publish a national offshore wind strategy (similar to strategies developed for other industries such as hydrogen[79] and gas[80]), which clearly articulates priorities, policy targets, and consolidates a pathway to deliver on its ambitions. The strategy should integrate aspirations at state level and set out a coordinated pathway to build on the efforts of each state to date.

The national offshore wind strategy should analyse and map out the potential supply chain segments where Australia can develop competitive advantage and consider policies that leverage these areas, for example, evaluating the opportunity for local steel and cement production for towers and platforms.

Similarly, the national offshore wind strategy should also seek to identify partnership opportunities across the Asia Pacific region to enhance cooperation, reduce costs and catalyse new economic opportunities for future offshore wind service exports.

In parallel, Jobs and Skills Australia (JSA) should expand on previous work, such as the Clean Energy Generation analysis, and include analysis on offshore wind-specific capabilities and skills pathways. This includes mapping offshore wind needs and identifying opportunities to build on existing skills in preparation for future offshore wind auctions and will ensure Australia has the workforce in place by the time construction commences. In addition, Treasury should conduct a sector assessment for offshore wind, in alignment with work being done on worker transition and skills pathways.

Short-term recommendation 2:
Publish a national offshore wind strategy, clearly stating objectives and offering a roadmap to achieve targets, leveraging Australia's competitive advantages across the supply chain and identifying partnership opportunities.

Short-term recommendation 3:
Map out offshore wind-specific capabilities and skills pathways in preparation for project construction. Commission a sector assessment for offshore wind in alignment with worker transition and skills pathways planning.

What should Australia do to set a course for 20+ gigawatts - recommendations before 2030:

Australian context:

Global offshore wind markets leverage both momentum and scale of deployment to drive investment across the value chain (including manufacturing and installations, transmission and port infrastructure, and workforce training). An Australian deployment rate of ~2-3 gigawatts p.a. is suggested by stakeholders as a key benchmark to drive investment in the supply chain.

Sustained local benefit for Australians through jobs and investment is essential to ensure community acceptance of offshore wind and to achieve long-term policy goals. Mechanisms for coordinating local benefits are a common feature of offshore wind policy design. Mechanisms range from direct government intervention (such as incentives, bonus credits, non-price criteria in auction design, or hard requirements) to commitments from industry on a sectoral (e.g. sector deals in UK and Japan) or project level (which can address specific localised concerns).

Recommendations:

A threefold strategy is recommended to maximise long-term benefits for Australia:

1. **First provide market transparency to the pipeline**

To provide the market with confidence and transparency, the Federal Government should publish a timetable of upcoming support rounds, targeted capacity and merit criteria for the long-term revenue certainty mechanism for offshore wind in Australia.

2. **Build capacity in supply chains to bolster pipeline deployments**

Leverage existing clean manufacturing and supply chain development funds (such as Made in Victoria, NSW Net Zero Manufacturing Initiative, WA Strategic industries Fund, Tasmania Renewable Energy Supply Chain Directory) and the federal Future Made in Australia (FMiA) initiatives to increase and uplift Australian capabilities in direct supply chains and O&M practices. This will provide projects with a ready source of local suppliers to engage on projects and will improve the overall capabilities and competitiveness of the Australian supply chain.

[79] DCCEEW (2024), National Hydrogen Strategy, accessible via https://www.dcceew.gov.au/energy/publications/australias-national-hydrogen-strategy
[80] DISR (2024), Future Gas Strategy, accessible via https://www.industry.gov.au/publications/future-gas-strategy

3. **Link supply chain development to market maturity**

The Federal Government should follow the precedent of the CIS tenders and allow market participants to create their own community engagement and First Nations commitments in the bidding process, such as proponent funding for local content capabilities or workforce training programs.

Mid-to-long-term recommendation 2:
Provide market transparency on pipeline through publication of a national auction schedule.

Mid-to-long-term recommendation 3:
Leverage existing policy initiatives to build capacity in supply chains and workforce development.

Mid-to-long-term recommendation 4:
Link supply chain and workforce development to market maturity to optimise local benefit for communities.

Barrier 3: Ensuring availability of critical infrastructure

What have other offshore wind markets done?

Government support for the development of common user infrastructure provides certainty on the timing and availability of enabling infrastructure. To establish fundamental enabling infrastructure in time for project delivery, some jurisdictions have acted through nationally coordinated planning and direct investment in ports and enabling infrastructure. Jurisdictions differ in their approach to transmission build-out, with some placing the burden upon developers (and priced into project support), and others providing grid connection through grid operators (priced into network charges).

Case study: Japan coordinated port strategy

Japan's Ports and Harbours Act allows for strategic planning for government-owned ports used by the offshore wind industry. The infrastructure is overseen by the Minister for the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). As such, they efficiently allocate the JPY 42.6 billion (~AU$440 million) with provision for strategic ports included in the FY2023 budget. Benefits of this arrangement materisalise in improved access to funds and alignment of development timing with expected offshore wind construction periods - construction of six offshore wind designated 'base ports' is underway to accommodate larger wind turbines.

While Australians ports are owned by a mix of government and private operators, Australia can still benefit from a coordinated approach to development of common user port infrastructure, to provide confidence to developers that the necessary infrastructure will be in place to support large-scale offshore wind installations.

Case study: Japan's coordinated port strategy[81]

What should Australia do to kickstart the industry – recommendations for the next 12 months

Australian context:

The competitiveness of developers' bids in the Victorian (and subsequent) auctions will depend on projects being able to access enabling infrastructure on time. Timely access to transmission and specialised port infrastructure is therefore essential.

Important work has been done in Victoria to meet projected transmission needs. The transmission funding provided through the Rewiring the Nation (RWTN) program and efforts from VicGrid mark a vital step forward, helping clear the path for offshore wind projects to advance. An agreement between the Victorian and Federal governments has resulted in joint funding for offshore wind projects, with AU$1.5 billion in concessional finance being made available for REZ projects in Victoria from the Commonwealth, including for offshore wind.[82]

[81] Hokkaido Development Bureau, Port Planning Division (2023), Overview and current status of base ports in offshore wind power generation.
[82] Prime Minister of Australia (2022), Rewiring The Nation To Supercharge Victorian Renewables

While Victoria has multiple port options to service the industry, its ports require capital-intensive upgrades to cater to offshore wind projects. There remains a sequencing and investment challenge to ensure infrastructure is built in time and to ensure costs can be incorporated into bids.

Recommendation:

Federal and state governments have traditionally partnered on infrastructure for strategic industries to achieve economic benefit (for example, the Australian Marine Complex in Western Australia).[83] Australian governments should consider pooling funds or modifying the mandate of existing programs (e.g. a RWTN equivalent for ports), to extend concessional support to all enabling infrastructure for offshore wind projects. This includes both transmission and port infrastructure.

Support could take the form of concessional capital or grant funding, with the most appropriate arrangement being that which best helps to overcome challenges, while the support granting process should be a competitive process. The overarching goal of support is ensuring the infrastructure capacity exists in the market to support offshore wind projects. deployment.

Short-term recommendation 3: Australian governments should pool funds and/or leverage existing programs to lower capital costs of new critical infrastructure and ensure timely delivery to underpin offshore wind projects.

What should Australia do to set a course for 20+ gigawatts – recommendations before 2030

Australian context:

Significant infrastructure upgrades are required for each of the six offshore wind areas. Some areas will be able to leverage common infrastructure with Gippsland, such as Southern Ocean (Victoria) and Bass Strait (Tasmania), while other areas will need dedicated infrastructure projects to be developed, for both ports and transmission. Development of these infrastructure plans and their timely delivery (in alignment with auction rounds) will be critical to making future auctions attractive and competitive.

Recommendation:

Port planning: Publish a national strategy for timely availability of port infrastructure and specialised vessels to provide clarity to industry (such as clarifying number of prioritised ports, planning for specialised vessels, and communicating milestones and deadlines). The government can explore synergies between offshore wind development and other offshore activities, such as oil and gas decommissioning, particularly in vessel utilisation.

By aligning these marine operations and building on the establish policy framework of the National Offshore Petroleum Safety and Environment Management Authority (NOPSEMA), this coordinated approach could improve operational efficiency and create cost savings.

Transmission planning: Ensure each offshore wind area has a scoped-out, dedicated plan for transmission delivery, including clear timelines and roadmaps to provide industry with certainty on transmission infrastructure availability.

Mid- to long-term recommendation 5: Develop a nationally coordinated offshore wind port strategy.

Mid- to long-term recommendation 6: Ensure each offshore wind area has a scoped-out, dedicated plan for transmission delivery, including clear timelines and roadmaps to provide industry with certainty on transmission infrastructure availability.

Barrier 4: Minimising delays through streamlined processes

What have others done?

Planning processes must be clear and predictable to provide timeline certainty and limit delays in project delivery. Offshore wind projects are capital-intensive and have long lead times, and timeline certainty is key to success. Robust environmental and community assessments are essential steps in project development, but overlapping federal and state permitting processes can make this stage more time-consuming than in other jurisdictions. Streamlining important assessments, while maintaining their rigour, helps to create a predictable process for projects.

Mature offshore wind jurisdictions recognise the importance of timeline certainty for smooth industry development and provide this through different approaches. These include establishing clear, streamlined and predictable approvals processes for offshore wind projects through “one-stop-shops” (see case study on the Danish approach below[84]), mandating approval timeframes, leading stakeholder engagement and environmental baseline studies, and establishing guidelines on acceptable impact levels for key aspects such as subsea noise. Centralised models have worked well to speed up timelines and avoid stakeholder fatigue, which can be caused by multiple developers engaging with the same stakeholders.

[83] Government of Western Australia (2024), Australian Marine Complex reaches 21-year milestone
[84] World Economic Forum (2024), One-Stop-Shop Case Study: Danish Energy Agency

Case study: Denmark one-stop shop for permitting

The Danish Energy Agency (DEA) established a one-stop-shop for offshore wind development to address permitting issues that hinder project timelines. A one-stop-shop seeks to streamline the consenting process through providing a single interface, to ensure a transparent and efficient procedure to minimise developer uncertainties and project delays. The DEA one-stop-shop identifies key offshore wind sites and consults with relevant authorities prior to coordinating licence acquisition on behalf of project developers once tenders have been issued. A key factor of the one-stop-shop contributing to the successful development of offshore wind projects is a clearly defined role and mandate, which is established in legislation and identifies the DEA as the primary authority.

What should Australia do to kickstart the industry – recommendations for the next 12 months

Australian context:

Timeline certainty and predictability sits at the heart of an attractive development environment and timely delivery of large-scale clean electricity is essential to deliver a just energy transition.

The Federal Government is making progress though guidance and templates having revised the Offshore Electricity Infrastructure Amendment Regulations. This includes changes to management plans for reduced regulatory assessment timeframes and simplified revision triggers.

In the past, the Federal Government has streamlined environmental approvals under the Environment Protection and Biodiversity Conservation Act (EPBC Act) for offshore petroleum and greenhouse gas storage activities in Commonwealth waters. In this case, NOPSEMA acts as the coordinating regulatory body, which has worked well to create efficiencies and remove duplication across federal and state jurisdictions. This program includes a requirement to routinely review performance against its objectives.[85]

Recommendations:

Work with industry as projects mature to identify and address opportunities for improved efficiencies in the permitting of offshore wind farms. With that in mind, any efficiency gains should not compromise on proper engagement with stakeholders and assessment of environmental, community and marine impacts.

Consider a commitment to make assessment and decision timeframes for licences, management plans and environmental approvals under the EPBC and OEI acts publicly available on the OIR/DCCEEW websites (as is done under the OPGGS Act). This should include the non-legislated 'screening' phases of approvals processes without prescribed timeframes. This will promote transparency and accountability and inform regular reviews and update the regulations based on feedback from industry and stakeholders, to ensure that the regulatory framework is adaptive and fit-for-purpose.

Investigate accrediting the Offshore Infrastructure Regulator to undertake the EPBC review and approval process for offshore wind projects, consistent with the role it performs for offshore oil and gas (as NOPSEMA). This will help to reduce the number of regulators, minimise avoidable duplication of processes, leverage existing skill sets and understanding of the offshore construction industry within the OIR, and ensure consistent application of expectations between regulators and offshore industries.

Short-term recommendation 4:
Consider a commitment to regularly review and update regulations based on transparent data on assessment timeframes and feedback from community and industry stakeholders.

Short-term recommendation 5:
Investigate the merits of accrediting the Offshore Infrastructure Regulator to undertake the EPBC review and approval process for offshore wind projects.

[85] NOPSEMA (2024), EPBC Act Program

What should Australia do to set a course for 20+ gigawatts – recommendations before 2030

Australian context:

Offshore wind projects traverse both federal and state jurisdictions, with turbines situated in Commonwealth waters (beyond three nautical miles from shore) and connections often crossing state waters (up to three nautical miles from shore).

While Commonwealth legislation has been developed to enable assessment of and approvals for offshore wind energy infrastructure, each state's environmental and planning legislation may require differing levels of amendment to enable this development. Experience in enabling the onshore components of industrial development in Commonwealth waters varies significantly between states and it is often unclear who is taking the lead within and between jurisdictions on developing the capacity of the states to support offshore wind development.

As a result in Australia, planning and environmental approvals are required across both jurisdictions, along with lengthy environmental impact assessments, which will be a focal point for offshore wind proponents over the next few years. More proactive coordination across states is needed, and alignment of approval timelines with those of auctions and enabling infrastructure would further streamline the development process.

Recommendations:

Set up a regulatory "sandbox" for developers of leading offshore wind projects to trial innovative approaches to streamlining approvals in collaboration with all relevant regulators. A regulatory "sandbox" refers to creating a controlled environment where developers can propose, test, and enhance solutions to accelerate permitting, environmental assessments and grid connection approvals without compromising regulatory integrity. Regulatory sandboxes have been successfully implemented in other sectors to de-risk regulatory innovation while gathering real-world evidence before scaling reforms. For example, the UK Financial Conduct Authority (FCA) established a sandbox to allow fintech companies to test new financial services in a supervised but flexible environment.[86] In Australia, a regulatory sandbox has been introduced for customs, to allow businesses to trial simplified customs procedures and reduce trade delays while ensuring compliance.[87]

To inform area-based environmental planning and approval decisions, explore a public-private investment model in solutions that allow streamlining of data collection and planning of least-impact siting of offshore wind turbines. This is prevalent in jurisdictions such as Japan where government provides prospective developers with site data such as wind resource survey results and existing grid connection rights following area assessment. Another example is the Playa Lakes Joint Venture in the US, which supports renewable energy developers in minimising environmental impacts by sharing biodiversity data and other resources for project development.[88]

Consider modern digital systems for permitting and approval processes, to streamline applications, while increasing transparency and ensuring consistent treatment for all projects. For example, the system EasyPermits[89] has been piloted in European jurisdictions by Wind Europe for faster processing of applications.

Mid- to long-term recommendation 7: Set up a regulatory "sandbox" for offshore wind to test streamlining solutions. Set up a regulatory sandbox for offshore wind to test streamlining solutions.

Mid- to long-term recommendation 8: Explore a public-private investment model in solutions to streamline data collection and identify lowest environmental impact solutions.

Mid- to long-term recommendation 9: Consider implementing modern digital systems to speed up permitting and approval processes for offshore wind.

Making it happen: partnering for progress

What have other offshore wind markets done?

Government-industry partnerships underpin success. Success in mature offshore wind markets is characterised by long-term political commitment and industry-government platforms. Public-private partnerships are a consistent element for success (see case study). Governments commit to visibility on the long-term pipeline through targets, mandates or multiple support rounds. Industry in turn commits to local benefits and supply chain development, the degree of which are often workshopped with policymakers.

[86] Financial Conduct Authority (FCA) (2022), Regulatory Sandbox
[87] Australian Border Force (2023), Regulatory Sandbox
[88] Playa Lakes Joint Venture (2024), Renewable Energy Development Tools
[89] WindEurope (2023), Easy Permits

Case study: Public-private offshore wind collaboration platforms in the UK, Japan and Germany

Successes in scaling offshore wind in jurisdictions such as Japan, Germany and the UK, have all been achieved through public-private collaboration platforms. These platforms have been effective in fostering innovation and overcoming barriers to accelerate development through extensive dialogue between industry and governments.

The UK's Offshore Wind Sector Deal is a strategic partnership between the UK Government and the offshore wind industry, through the Offshore Wind Industry Council (OWIC). The Deal encompasses ambitious targets, such as expanding offshore wind capacity to 30 gigawatts by 2030, and focuses on enhancing productivity, driving innovation and advancing local supply chains. Similarly, the Scottish Offshore Wind Energy Council (SOWEC) is a collaborative body formed by representatives of the Scottish Government and industry to grow the offshore wind industry in Scotland.

A similar approach is adopted by Germany's Offshore Wind Energy Foundation, where government and industry players focus on projects to further develop the industry, such as streamlined planning and grid integration.

Japan's Public-Private Council on Enhancement of Industrial Competitiveness for Offshore Wind Power Generation fosters collaboration among industry and government to alleviate bottlenecks and accelerate industry growth. Additionally, rules for specific zones (including community funds and other benefits) are determined via Local Deliberative Councils, which are built into the auction process and have participation from local stakeholders as well as government representatives.

Case Study: Public-private offshore wind collaboration platforms in the UK, Japan and Germany[90, 91, 92, 93]

[90] Government of the United Kingdom (2019), Offshore wind: Sector Deal
[91] Offshore Wind Scotland (2024), Scottish Offshore Wind Energy Council (SOWEC)
[92] Offshore Wind Energy Foundation (2024), German Offshore Wind Initiative
[93] Public-Private Council on Enhancement of Industrial Competitiveness for Offshore Wind Power Generation (2020), Vision for Offshore Wind Power

What should Australia do – recommendations for the next 12 months

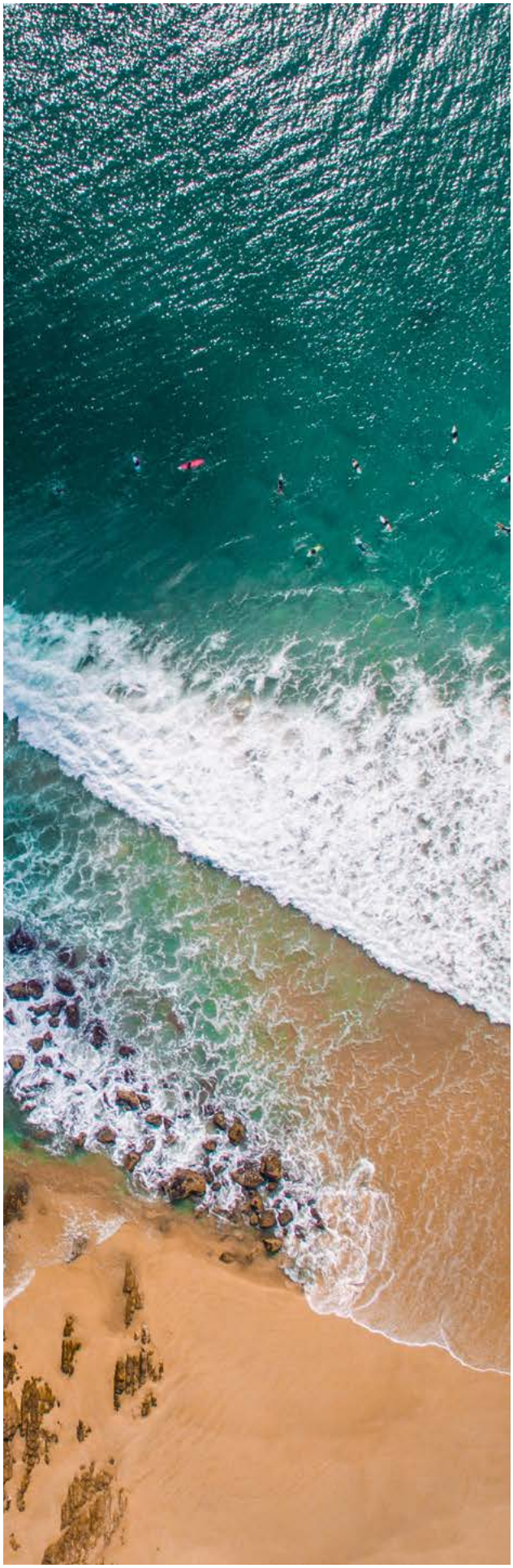
Governments can build on existing policy initiatives like the Capacity Investment Scheme (CIS), Rewiring the Nation (RWTN) and Future Made in Australia (FMiA) to boost the offshore wind ecosystem (e.g. apply CIS eligibility criteria to support for offshore wind projects, leveraging the RWTN for offshore transmission buildout, support segments in the offshore wind supply chain where Australia has comparative advantage or export opportunities through FMiA funding etc). Importantly, it will be important for policymakers to understand that successful deployment hinges on the overlapping and complementary effects of each of the policy proposals identified in our recommendations.

To guarantee success, Australia should collaborate closely with industry to set common objectives and monitor success of the entire value chain. Community support for the offshore wind industry can be fostered through economic participation and partnership with First Nations, workforce development, and supply chain development initiatives workshopped with industry. To tie everything together and make offshore wind a prosperous reality for Australia, government should work with a national industry body to deliver the National Offshore Wind Strategy (see recommendation 2).

Recommendation for the short-term: Work with the Clean Energy Council as the national industry body to design and deliver the national offshore wind strategy.

Recommendation for the mid- to long-term: Support establishment of local independent energy hubs through direct funding to provide communities in offshore wind areas with access to reliable information, building trust and countering misinformation

To deliver place-based information and education on offshore wind to strengthen community acceptance and address local needs and opportunities, the Federal Government should provide direct funding for the establishment of Local Energy Hubs[94] in each of the six offshore wind areas. These hubs should operate independently from offshore wind project proponents and their project requirements, instead delivering insight into renewable energy and the benefits and opportunities for the regions.



[94] Local Energy Hubs (2025), Model & Design Rationale, 30 January 2025

Recommendations for the short-term

Australia's offshore wind industry is at a critical juncture, with a sizeable portfolio of projects on the cusp of crucial investment decisions. There is a short – but achievable – window for Federal and state governments to act together with industry.

With decisive action and clear and coordinated policy, Australia can harness the full power of offshore wind and deliver a prosperous clean energy future that will benefit Australians through direct investment of capital in regional communities, increased employment opportunities, and gigawatt scale capacity delivered when and where it's needed to strengthen and electrify our grids.

Following is a summary of near- and long-term recommendations to enable delivery of the sector.

MARKET NEEDS	SHORT-TERM RECOMMENDATION	RESPONSIBILITY
Provide revenue certainty	1. Catalyse the national offshore wind industry through initial federal-state co-investment of 4 gigawatts through the Victorian Contract-for-Difference offshore wind auctions by 2028.	Federal Government and Victorian Government
Signal clear direction on offshore wind ambition, such as intended scale and timelines	2. Publish a national offshore wind strategy, clearly stating objectives and offering a roadmap to achieve targets, leveraging Australia's competitive advantages across the supply chain and identifying partnership opportunities.	Federal Government working closely with industry and state governments
	3.Map out offshore wind-specific capabilities and skills pathways in preparation of future project construction. Commission a sector assessment for offshore wind in alignment with worker transition and skills pathways planning.	Treasury to lead sector assessment, Jobs and Skills Australia to lead on workforce development
	4. States build on the Victorian example and develop coordinated policies for offshore wind, e.g. communicate targets, support infrastructure development, and harmonise policy mechanisms and frameworks.	State governments
Ensure timely availability of new capital-intensive enabling infrastructure	5. Australian governments should pool funds and/or leverage existing programmes to lower capital costs of new port and transmission infrastructure and ensure timely delivery to underpin offshore wind projects.	Federal and state governments
Streamline regulatory processes for timeline certainty	6. Consider a commitment to regularly review and update offshore wind regulations based on transparent regulator data on assessment timeframes and feedback from community and industry stakeholders.	Federal Government and Offshore Infrastructure Regulator
	7. Investigate accrediting the Offshore Infrastructure Regulator to undertake the EPBC review and approval process for offshore wind projects.	
Making it happen	8. Work with a national industry body to design the national offshore wind strategy.	Clean Energy Council working closely with Federal Government

Recommendations for the mid- to long-term

MARKET NEEDS	MID- to LONG-TERM RECOMMENDATION	RESPONSIBILITY
Provide revenue certainty	1. Federal and state governments to develop a revenue certainty mechanism to succeed the initial Victorian auctions that recognise the local context and objectives for each state. To maintain effectiveness and ensure appropriateness, the auction framework should be periodically reviewed and adjusted to reflect changing market conditions.	Federal + state governments in consultation with industry
Signal clear direction on offshore wind ambition, such as intended scale and timelines	2. Provide market transparency on the pipeline through publication of a national auction schedule.	Federal + state governments
	3. Leverage existing policy initiatives to build capacity in supply chains and workforce development, leveraging Australia's competitive advantages across the supply chain.	State governments to lead on supply chain, Jobs and Skills Australia to lead on workforce development
	4. Link supply chain and workforce development to market maturity, to optimise local benefit for communities.	Industry to provide regular feedback on supply chain and workforce maturity
Ensure timely availability of new capital-intensive enabling infrastructure	5. Develop a nationally coordinated offshore wind port strategy.	Federal Government
	6. Ensure each offshore wind area has a scoped-out, dedicated plan for transmission delivery, including clear timelines and roadmaps to provide industry with certainty on transmission infrastructure availability.	TNSPs + state governments
Streamline regulatory processes for timeline certainty	7. Set up a regulatory sandbox for offshore wind to test streamlining proposals.	Federal + state government s
	8. Explore a public-private investment model in solutions that facilitate data collection and identify lowest environmental impact solutions.	Clean Energy Council
	9. Consider implementing modern digital systems to speed up permitting and approval processes for offshore wind.	Federal + state governments
Making it happen	10. Support establishment of local independent energy hubs to provide communities in offshore wind areas with access to reliable information, building trust and countering misinformation	Federal Government and eNGOs

Appendix A – Country case studies

Four offshore wind case studies were conducted and used to inform the policy asks summary.

Legend: Addressing barrier

Revenue certainty | Enabling infrastructure dependence | Supply chain investment uncertainty | Complex regulatory processes and timeline uncertainty | Local benefit expectations

14.7 GW installed by 2024 | **3.9 GW** under construction | **50 GW** target by 2030
(up from 30GW target in 2019)

The UK's CfD mechanism has been very successful in scaling the UK's OSW industry and reducing costs over time. Information on auction scheduling, duration (15 years) and size is shared in advance, supporting certainty towards its long-term deployment target.

The mechanism has proven flexible for design changes, whilst still being a consistent and clear mechanism for industry. Changes that have occurred include:

- Change to annual auction rounds
- Separate budget for OSW from other renewable technologies
- Separation of support for fixed-bottom and floating OSW wind projects
- Support is inflation-adjusted. Last auction round allowed for re-bidding of 25% of project capacity in response to market challenges

To speed up timelines and ensure a transmission network fit for purpose, the UK launched the Offshore Transmission Network Review (OTNR) in 2020 to explore opportunities for efficiency.

The Floating Offshore Wind Manufacturing Investment Scheme (FLOWMIS) allocates £160 million in grant funding to support port infrastructure upgrades .

The Government considers offshore wind a matter of national energy security and aims to reduce permitting times for offshore wind from up to 4 years to one year (British Energy Security Strategy).

The UK's policy focus has shifted to local supply chain development in recent years. The Offshore Wind Industry Council (OWIC) and the Scottish Offshore Wind Energy Council (SOWEC) provide platforms for coordination and have been instrumental in achieving a sector deal between governments and industry. The government has also introduced a "Clean Industry Bonus" to incentivise UK-based offshore wind manufacturing.

Figure 16: International offshore wind case study: United Kingdom[95]

[95] WFO (2024), Global Offshore Wind Report: April 2024

346 MW installed by 2024 | **10 GW** target by 2030, 30-45 GW by 2040

OSW projects in Japan's feed-in tariff (FIT) program do not have to compete with other technologies for support, as Japan's technology-specific FIT distinguishes offshore wind from other technologies and further categorises it into floating and fixed offshore wind.
Japan's model also pre-commits to ~1GW/year of auctions, allocating leasing rights through its auction design.

Japan has strategically planned for the availability of ports for its offshore wind projects and preparing for floating offshore wind installations.
Japan began planning for grid investment early in the Northern Tohoku area, because of recognised weaknesses in grid availability.

Aside from potential delays due to rigorous government assessment of areas for development, investors may face challenges in approvals regarding the need for Japanese partnership in competitive bids as well as difficult changes of bid ownership.

The Japanese government has set up support for the offshore wind sector through soft local content requirements. In the bid evaluation stage, 40 of the 240 points available relate to local contribution.

When an opportunity for offshore wind development in Japan's Exclusive Economic Zone (EEZ) becomes available, local interests and those of prospective developers are balanced via Local Deliberative Councils. Following issuance of a provisional permit, these input views from a range of local parties into the decision. Once an agreement is reached for the relevant zone, a formal permit may be issued to the developer.

Figure 17: International offshore wind case study: Japan[96]

8.3 GW installed by 2024 | **1.6 GW** under construction | **30 GW** target by 2030

A significant portion of Germany's offshore wind turbines are installed relatively far from shore in the North Sea (7 GW) resulting in challenges with grid connection and operation and maintenance. Although projects are underway to remedy grid connection challenges, these have been amplified by clustering of wind farms in the North, and clustering of industrial centres in the South and transmission project delays from landowner issues.

Germany established the Offshore Wind Foundation (OWF) in 2005 to act as a collaborative platform in coordinating industry, government and other stakeholders. Since inception, the Foundation provided a unique driving role through the first decade of the German OSW industry as a trusted platform for discourse to aid government in investigation and resolution of roadblocks to industry development.

Recent changes to the German Offshore Wind Energy Act have included new tender and bidding procedures. Whilst these changes are made with the long-term aim of faster industry development, they risk eroding developer confidence through perceived distortions to competition.

Figure 18: International offshore wind case study: Germany[97]

[96] WFO (2024), Global Offshore Wind Report: April 2024
[97] NREL (2024), Offshore Wind Market Report: 2024 Edition

Legend: Addressing barrier

Revenue certainty | Enabling infrastructure dependence | Supply chain investment uncertainty | Complex regulatory processes and timeline uncertainty | Local benefit expectations

174 MW installed by 2024 | **938 MW** under construction | **30 GW** target by 2030
(combined state targets exceeds this national target)

In the US, the Federal Government has bolstered State Governments' support with the Inflation Reduction Act (IRA). Under the IRA, Government provides both tax-deductible Opex and Capex support, through its Production Tax Credit and Investment Tax Credit schemes.

US targets for offshore wind have been set by State and Federal governments, some States include renewable energy portfolio mandates to provide clear demand signals and certainty regarding offshore wind offtake.

The abovementioned support has sparked a lot of interest in the US market, however, lack of bi-partisan support for offshore wind has created upheaval in investor confidence, in particular after the 2024 election.

The auction process to award offshore wind development leases in the US are managed centrally by the Bureau of Ocean Energy Management.

The US Jones Act specifies that vessels transporting goods between two US points (including offshore wind installations) must be US flagged vessels. Whilst this does not apply to vessels working on construction, many offshore wind developments have been delayed due to a lack of eligible vessels.

The Federal Government has closely analysed US supply chain capabilities, needs and opportunities (NREL studies) and has an advanced manufacturing production credit under the IRA to support US-based production of specific offshore wind parts .
In addition, the IRA indirectly provides incentives for supply chain development through bonus credits for developers: including bonuses for meeting local content thresholds, e.g. 100% of applicable iron and steel components domestically manufactured, and 20% of costs for manufactured products and components domestically manufactured, for projects that begin construction through the end of 2024.

Designs in the IRA ensure local benefits, e.g. the option to transfer credits as direct payments to native tribes, eligibility for credits conditional on prevailing wage and apprenticeship criteria, bonus credits if requirements pertaining to "energy communities" are fulfilled (e.g. communities located near coal mine or coal-fired powerplant closures, higher than average rates of unemployment, etc.).

Bidders in US lease auctions must demonstrate commitments to workforce training, supply chain development and fisheries compensation. E.g. the Vineyard project commits $15m to marine environmental protection and workforce programs.

Figure 19: International offshore wind case study: United States of America[98]

[98] WFO (2024), Global Offshore Wind Report: April 2024

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