Offshore Wind FAQ

Alison Byrnes MP

FEDERAL MEMBER FOR CUNNINGHAM

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Authorised by Alison Byrnes MP, 74 Crown Street, Wollongong.

Q **Do windfarms Kill whales, sea birds and other wildlife in large numbers during their construction and operation?**

What effect do they have on the natural patterns of whale and bird migration?

Won't the wind wake effect reduce current velocities and negatively impact marine ecosystems?

Will birds have to adjust their travel?

A Potential impacts of the activities associated with developing and maintaining an offshore wind farm on whales and seabirds, and any minimisation and mitigation measures, must be identified by developers and assessed as part of the project's environmental approval. Construction cannot commence until all approvals are in place and a commercial licence is granted.

Despite claims in the US that whale mortality events were caused by offshore wind farms, the US National Oceanic and Atmospheric Administration found that there was no scientific evidence that noise resulting from offshore wind site characterisation surveys could potentially cause mortality of whales.

Good practice management recommendations are included in the Department's **key environmental factors guide.**

Q **Will offshore wind reduce fossil fuel consumption?**

A Offshore wind projects are gigawatt scale projects. Publicly announced projects are approximately 2 GW projects at maximum output. This power generation can replace the need for coal power generation and therefore will reduce fossil fuel consumption.

The declared Hunter zone could support up to 5GW of offshore wind, with the proposed Illawarra region supporting up to 4.2GW.

The National Electricity Market over a 24-hour period uses approximately 12 GW of coal generated power accounting for 64% of energy generation in the NEM.

Electricity generated from fossil fuels is often used to produce renewable energy equipment such as wind turbines. The environmental payback period is the amount of time it takes for a wind turbine to generate the amount of energy used during manufacturing and installation. **Vestas** provide energy payback periods for a 4.2MW turbine as 5-8 months.

Q **Will this disrupt sea breezes that moderate land temperatures?**

A Offshore wind turbines capture part of the wind energy that passes through them and cause a disturbance known as wake. An Institute of Physics study in North America reported that this wake can travel up to 20km (sometimes further across open ocean in the right conditions).

While the disturbance was statistically significant enough to be documented it only caused slight changes of less than 1% to the normal surface temperature especially at longer distances of 10-20km+.

The overall effects on temperature were negligible during summer when the most stable conditions are observed and it would be expected the largest change would occur.

This study was conducted in North America and developers will need to complete their own assessments of environmental impacts when they apply for environmental approval, prior to applying for a commercial licence to develop the project.

Ty Christopher

DIRECTOR OF UOW ENERGY FUTURES NETWORK

"While powering our homes from clean solar energy is great, our major cities and industries also need large scale renewable energy, and we all need energy after the sun sets. Offshore wind energy delivers a proven, renewable and affordable energy source, which is available most of the time, and can deliver the multi-gigawatt scale of energy needed to replace coal fired power stations"

Q **Will these windfarms disturb the ocean currents in the East Australian Current?**

A There are few studies of the effects of offshore wind farms on ocean currents, and those that have been conducted were based in the North Sea. Any effects on ocean currents are likely to be based on local oceanographic conditions and water depth, so European studies and simulations are unlikely to inform the local situation.

Potential impacts on ocean currents must be identified and assessed by developers during the feasibility stage of the project as part of EPBC approvals.

Q **Isn't there a lack of research and knowledge of the effects?**

A There is growing literature available regarding the impacts of offshore wind. A review of studies assessing the ecological impacts of offshore wind farms published in *Nature* in 2022 assessed 1353 publications.

Q **Why are there no other technology proposals apart from offshore wind being proposed?**

A The Offshore Electricity Infrastructure Act 2021 (OEI Act) does not specify that any particular technology has to be used. Technologies other than offshore wind, such as wave energy or floating solar, could be used, however none are currently commercially deployed.

Yael Stone

FOUNDING DIRECTOR OF HI NEIGHBOUR

"I support this round of offshore wind because this region has been a proud industrial heartland which has helped power our nation. With offshore wind we have the chance for an industrial future which once again allows us to proudly power the nation. This time with clean energy. We have the local workforce of tomorrow's clean energy heroes, we have a unique industrial port, we have a steelworks in situ and educational facilities being built as we speak by UOW and TAFE to upskill. This country is looking at a critical energy transformation and here in the Illawarra we are looking at a major energy transformation opportunity. Let's not miss the moment!"

Arthur Rorris

SECRETARY OF SOUTH COAST LABOUR COUNCIL

"Every day we hear of the latest climate induced catastrophe around the world and we realise that our black summer was not a freak event. We feel powerless in the face of these events yet there is something we can all do, something within our power and that is to take a collective responsibility to change the way we do things to give our planet, our children and grandchildren a chance. That is the opportunity we have right now, to safely and responsibly establish renewable energy industries such as off shore wind knowing that they will directly contribute to carbon reduction whilst at the same time giving a massive boost to our traditional steel, manufacturing and maritime industries. Let's get the studies done and if this proposal stacks up let's get it up and running and let our workers do what they do best - make big things work!"

Q **Won't blasting the seafloor with high-powered air guns every 10 seconds during construction reach more than 250 decibels and disturb behaviours?**

A Geophysical surveys to map the seafloor and geology before building an offshore wind farm are required to ensure the safety and suitability of a proposed location.

Seismic surveys conducted for offshore wind gather information on the seabed and the shallow structure beneath the seabed, and not deep into the geological formation like surveys for offshore oil and gas activities. As a result, the surveys for offshore wind use different types of equipment, are smaller scale and lower powered.

Adam Zarth

BUSINESS ILLAWARRA

"The opportunities for local industry will be enormous – as will be the challenges in securing labour supply and in the logistics required to bring a project of this scale to reality. But we have the measures in place to ensure we have a ready pipeline of skilled workers to support these endeavours, particularly the Energy Futures Skills Centre at the University of Wollongong supported by $10 million in Federal funding."

Q **Don't the cables holding the turbine to the seabed emit an electromagnetic field which stuns crustaceans and causes deformities in offspring?**

A Naturally occurring electromagnetic fields (EMF) are present everywhere in the oceans. Undersea cables used for power transfer are also known sources of EMF. Three major factors determine the exposure of marine organisms to magnetic and induced electric fields from undersea power cables:

1) the amount of electrical current being carried by the cable,
2) the design of the cable, and
3) the distance of marine organisms from the cable.

The sensitivity of fish to EMF is based on the basic functions of their sensory organs.

A **single, laboratory based study** found an increased rate of deformity in lobsters exposed to EMF, however the researchers concluded that further research is needed in situ (in the ocean) to understand the impact wind infrastructure has on lobsters. A **US study** found EMF did not create a barrier for movement on lobsters. Good practice management recommendations are included in the Department's **key environmental factors guide**.

All of these factors will be considered in detail as part of the EPBC process before projects can commence.

Q **Will these wind turbines be recyclable?**

I heard more than 40 million tonnes of blade waste will be in landfills by 2050?

Isn't their energy-producing life span only 10-20 years?

A The Government is supporting wind turbine recycling technology in Australia through a $3 million grant to Industrial Property Maintenance and partners to develop a processing treatment and a pilot recycling facility for wind turbine blades. The grant was provided as part of the fourteenth round of the government's Cooperative Research Centres projects which focuses on the circular economy and priorities of the $15 billion National Reconstruction Fund.

Leading global turbine manufacturers are also taking steps to increase the sustainability of the sector. For example, Siemens Gamesa, a major turbine manufacturer, has already commenced production of 100% recyclable wind blade for offshore wind usage, and other major worldwide turbine manufacturers, such as Vestas and GE, have pledged to produce zero waste wind turbines by 2030.

Q **Won't the noise from the wind farm impact home owners?**

A The noise from offshore wind farms is unlikely to affect homeowners and people onshore. This is because offshore renewable energy zones start 10km from shore.

A typical land-based wind turbine produces a similar noise level as a standard refrigerator at a distance of 300m from the turbine. Given the distance of these turbines from shore it is not expected that the noise will be heard from shore. Noise impact will be assessed as part of the environmental impact assessment required for the project.

Additionally, offshore wind turbines are less affected by terrain or vegetation which can increase or reflect noise on land.

Maryanne Stuart MP

STATE MEMBER FOR HEATHCOTE

"As coal fired power stations close down over the next 10 to 15 years, renewable energy options such as wind farms need to be explored as we make the transition away from traditional fossil fuels. A clean and green future will benefit the environment and address the rise in the cost of living through cheaper power bills."

Q **How do the developers get their licence and what does it mean for my rooftop solar?**

A Companies that are seeking to obtain licences to develop offshore wind farms in Australia are required to submit their business case and address how their project will benefit the national interest in their feasibility licence applications.

Developers that obtain a feasibility licence will be required to consult with local communities and existing marine users to negotiate co-existence and benefit sharing arrangements where relevant.

Australia has a huge range of types of electricity generation. We are supporting increased rooftop solar PV through our community batteries and solar banks proposals.

Stephen Jones MP

FEDERAL MEMBER FOR WHITLAM

"The science is in. We need to reduce our emissions to protect our future. Renewable energy is the future, and our region needs to be part of it. Generating jobs through clean energy - it's a no brainer."

Gavin Bubb

AUSTRALIAN MANUFACTURING WORKERS UNION

"Paramount to local job security and playing as best a part as we can in ensuring a viable green future."

Rob Long

NSW TEACHERS FEDERATION

"TAFE teacher members of the NSW teachers Federation supports and encourages investment in renewable energy to transition our community and economy away from carbon polluting electricity generation. The development in off shore wind will require thousands of highly skilled Workers in construction and on going maintenance. Federation members continue to support and work with our community to campaign for the off shore wind electricity generation."

Fiona Philips

FEDERAL MEMBER FOR GILMORE

"Generating energy from wind will support our transition towards renewable energy, create good, local jobs and help bring power bills down. At the same time, taking real action to address our changing climate will help our beautiful environment, reduce the impact of natural disasters and provide a better future."

Q **Won't the wind farm become an eyesore and de-value the magnificent views of the Illawarra and properties of home-owners, renters and residents that bought into the area?**

A In 2018, a large-scale study analysed the impact of offshore wind turbines on the value of nearby residential and vacation properties in Denmark, a country that has had offshore wind for 30 years. The study concluded that having an ocean view with a wind farm had no significant impact on property value, in comparison to one without a wind farm.

Q **Will these wind farms be dependent on government subsidies?**

A Developers are required to submit their business case in their feasibility licence applications. The issue of licences is a competitive process.

The government does not provide any specific subsidies to the offshore wind industry.

Q **Will taxpayers pay for the decommissioning/recycling/ disposal of windfarms?**

A The Australian Government does not propose to build or develop any offshore wind infrastructure itself. This will be done by developers who are successful in obtaining a licence.

The costs of all offshore wind activities from conducting environmental studies, to building wind towers and ultimately decommissioning, or recycling infrastructure is the responsibility of the offshore licence holder developer.

To ensure taxpayers are protected, the Government requires financial security (such as a bank guarantee) from the developer to ensure the costs and expenses related to offshore infrastructure liabilities, such as cost of decommissioning are paid by industry and not by the Government.

Q **Is this a case of the developer only profits with no benefit to the Illawarra?**

A Ports and workforce are essential to the success of an offshore wind industry. Port upgrades will be required, with Port Kembla identifying offshore wind within their **NSW Ports Master Plan**. These upgrades would require contractors to conduct the works to ensure port readiness.

The construction phase of an offshore wind project requires thousands of qualified workers, ranging from trades and engineers to project managers and lawyers. OceanEx has prepared a detailed **Supply Chain & Investment Opportunities report** and states 3,000+ jobs will be required during the construction phase and 300 jobs during the operational life of 30 years of their Illawarra project.

These offshore wind projects are estimated to cost ~$10 billion, bringing a large amount of expenditure to the region.

Several studies have considered the economic benefits of offshore wind farms on surrounding communities. Some of the benefits include:

a) Job creation

b) Investment opportunities

c) Revenue generation

d) Electricity cost reduction.

Professor Tim Flannery

"Offshore wind farms are a vital asset in combating climate change. We have to do our bit if we are to avoid ever worsening drought, fires, floods and heatwaves."

Q **Won't most of the energy produced go to industry with none going to households?**

A OceanEx state on their website that 1,000,000+ homes would be powered by the project in the Illawarra region.

The offshore wind projects in NSW, Tasmania and Victoria are likely to sell their electricity through the National Electricity Market and therefore the energy will reach households.

Some projects in future may elect to sell power direct to industry, however we are unaware of any of these deals being done. Green hydrogen and green steel could be examples of this moving forward. If offshore wind was being sold direct to industry, there is still a net benefit to the environment due to decarbonisation of Australian industries.

Q **Will this disrupt shipping and navigation routes for ships and shipping lanes? What about Safety of vessels and their operators?**

A Wind turbines in an offshore wind farm are spaced widely in a grid pattern. They are lit and marked in accordance with nautical safety guidelines, and their position is reflected accurately on nautical charts.

We also consult extensively with AMSA and relevant port authorities to determine the best possible shipping and vessel traffic routes in and around offshore renewable areas.

Paul Scully MP

STATE MEMBER FOR WOLLONGONG

"The potential of an offshore wind zone off the coast of the Illawarra fits well with the advocacy I undertook to have the Illawarra declared a Renewable Energy Zone as it will help create jobs, power homes and businesses and reduce emissions.

Q **But won't this create an eye-sore?**

A We understand that visual impact is an important concern of the community. We also acknowledge that visual appeal of turbines is subjective. We have received mixed feedback, where some people do not like the look of turbines, while others consider them visually appealing.

Q **Won't this take away from picturesque nature of the Illawarra?**

A We have received mixed feedback, where some people do not like the look of turbines, while others consider them visually appealing.

Q **Doesn't offshore wind require high initial investment which would be better suited to other sources of energy.**

A Developers are required to submit their business case in their feasibility licence applications. The issue of licences is a competitive process.

The offshore wind industry is thriving in other countries and a proven viable technology. Australia's strong winds and large coastline make us well suited to this industry.

Q **Don't storms, saltwater corrosion, and access difficulties make repairs and maintenance costly and time-consuming?**

A Offshore wind turbines are purpose built to withstand natural conditions at sea. The steel structures are coated with purpose designed coatings to protect from corrosion.

Operations, maintenance and repair costs are factored into the life of a project prior to final investment decision for the project to understand total project costs and determine viability.

It is likely that floating offshore wind technology will be required off the coast of NSW. Floating foundations and turbines can be towed back to port using tugs for more significant works if required. Conducting works in ports is a safer and more stable environment.

Q **Won't these be an eyesore that will affect tourism rates?**

A Available research demonstrates there is no reason to believe that offshore wind harms tourism, with some seeing it as a good reason to visit the area.

Q **Are offshore wind farms reliable and energy efficient?**

A When developers identify an area for offshore wind farms, wind speed and turbulence is a crucial consideration. Areas should ideally have high and consistent wind speeds. Wind maps and data modelling have identified the areas around Australia with highest wind potential.

Offshore wind turbines generate power almost all the time – and there will always be a backup option in the grid.

Offshore wind is more consistent than onshore wind and solar, meaning it is more reliable, more of the time.

Ryan Park MP

STATE MEMBER FOR KEIRA

"It's important that we continue to play our role in progressing our energy supplies to one where renewables play a major role. I want community members to engage in the process but to do so in an objective and informed way because I think all of us have a desire to see our region play its part in a renewable energy future."

Q **Won't there be red flashing lights on the wind farm at night?**

A Marine navigational lighting has an intensity which is expected to be visible for up to 18.5km (10 nautical miles) and is located at a level at which it is unlikely to be visible over longer distances due to the curvature of the Earth.

Aviation lighting is red, more intense, and located on the turbine nacelle. As turbine blades pass in front of the lights they appear to flash when viewed from upwind. Turbine lighting is visible over long distances (> 30km). However, effects tend to be more important at closer distances. The spread of turbines across the horizon affects the impact.

Q **I have heard there will be approximately 105 floating wind turbines each 260 metres high, three offshore substations and an onshore grid connection. Is this true?**

A The location, size and number of turbines and associated infrastructure is yet to be determined. If an area is declared, project specifics like these will be determined during the second phase of the process when proponents apply for and are granted feasibility licences.

Q **Will the turbines be 260 metres tall?**

A The height of wind turbines is yet to be determined as these project specifics would be decided when projects have collected relevant information. To collect this information, they will first need to apply for and be granted a feasibility licence.

The latest 15MW turbines are approximately 260m high with blades up to 115m long. (The Hunter declared area has a turbine height limit of 260m, which was a requirement to ensure any offshore wind farms can coexist with Defence activities in that area.)

Cr Tania Brown

WOLLONGONG CITY COUNCIL

"We are an economy in transition, moving from coal and gas to a renewable energy future. If we are to meet net zero emission targets by 2050 we need to embrace renewable energy sources and I understand that offshore wind provides a sustainable and reliable method of energy generation. I support an offshore wind zone in the Illawarra and look forward to detail on any future wind farm proposals to ensure they meet the highest standards our community deserves."

Q **Will there be lights consistently on 100 turbines that can be easily seen at distances exceeding 35km?**

A According to marine safety and aeronautical safety regulations, warning lights are required to make very clear where any obstacle is situated.

Marine navigational lighting has an intensity which is expected to be visible for up to 18.5km (10 nautical miles) and is located at a level at which it is unlikely to be visible over longer distances due to the curvature of the Earth.

Aviation lighting is red, more intense, and located on the turbine nacelle. As turbine blades pass in front of the lights they appear to flash when viewed from upwind. Turbine lighting is visible over long distances (> 30km) and this is by design for the safety of aeroplanes. However, effects tend to be more important at closer distances. The spread of turbines across the horizon affects the impact.

Additionally, weather conditions, diffraction of light and other atmospheric conditions can affect the visibility at great distances.

Q **Will the aerial navigation lights be seen further than 39 km?**

A Aviation lighting is red, more intense, and located on the turbine nacelle. As turbine blades pass in front of the lights they appear to flash when viewed from upwind. Turbine lighting is visible over long distances (> 30km). However, effects tend to be more important at closer distances. The spread of turbines across the horizon affects the impact.

The distance that something is visible at will also be greatly affected by weather conditions, diffraction of light and other atmospheric conditions especially when considering distances over 30kms.

Q **Isn't this just single-purpose infrastructure akin to single-use plastic?**

A Leading global turbine manufacturers are taking steps to increase the sustainability of the sector. Siemens Gamesa, a major turbine manufacturer, has already commenced production of 100% recyclable wind blades for offshore wind usage. Other major turbine manufacturers, such as Vestas and GE, have pledged to produce zero waste wind turbines by 2030. The towers are often made of steel which can be recycled.

Turbine lifecycles are 25 years, and can be extended with regular maintenance out to 30-40 years.

Q **Doesn't a windfarm require too many resources and would mean expanding mining operations?**

A Mining will still be necessary to source the steel and required components of the generator. However, wind turbines become energy neutral from 5-8 months after installation, meaning they produce the amount of energy required to manufacture and install them within this period.

Oil and coal consume more energy than they generate and supply to the grid over their lifetime with mining of these resources necessary to continue feeding the oil and coal generators.

Q **Doesn't South Australia have the most expensive power bills in the world because of renewables?**

A SA currently has high power bills due to a number of factors such as less competition in the market, the decommissioning of coal fired power plants and inconsistent generation by renewable sources.

However, renewables are still one of the cheapest forms of electricity generation available in Australia and with investment in battery storage and transmission projects the prices will come down as the nation transitions to 82% renewables. Doing nothing will result in higher bills over time due to even more money needing to be spent on fossil fuels.

Q **Don't these turbines not last long and don't they create a large amount of waste?**

A Offshore wind turbines are designed to last 20 to 25 years, but this may vary depending on the environmental conditions, maintenance, and technological innovations. A newly developed 80GWh/year **15MW turbine** has been designed to provide enough power to meet the energy requirements of approximately 20,000 households. With an assumed lifespan of 20 years, the total energy production would be 80GWh/year x 20 years amounting to 1600GWh.

The lifespan of offshore wind turbines can be extended to 30-40 years by proper monitoring and preventative maintenance, which can detect and correct potential failures before they become serious problems. Additionally, some offshore wind farms may be repowered with new technology in the future, instead of decommissioned, which can improve their efficiency.

Offshore wind projects offer large, year-round baseload generation capacity, providing cheaper, cleaner, reliable energy for our electricity network.

Q **But the Illawarra is a coal and steel town, why do we need these?**

A The development of offshore electricity infrastructure projects presents significant opportunities for regional coastal communities through job creation and investment.

It will support new jobs and economic development in the regions that have always powered Australia, such as the Illawarra, and will power Australia into the future.

Offshore wind will require a variety of business, engineering, administration, trade, and maritime professionals. Most jobs are in project construction – however, a strong project pipeline will ensure demand for construction workers.

Workers from other industries, such as coal power or offshore oil and gas should be able to move to offshore wind. For roles such as electricians, welders, mechanical fitters, and maritime workers, some upskilling may be required, such as safety certifications.

Floating wind turbines require a large amount of steel depending on the floating substructure technology. A semi-submersible floating foundation requires 3000-5000 tonnes of steel per unit with 500-800 tonnes of steel for the wind turbine tower.

Q **How does this benefit the community?**

A The establishment of the offshore wind industry will provide significant opportunities for regional coastal communities.

Developers that obtain a feasibility licence will be required to consult with local communities and existing marine users to negotiate co-existence and benefit sharing arrangements where relevant.

Operational wind farms are expected to have 200-300 ongoing jobs, primarily wind turbine technicians, crane operators, crew transfer vessel officers, electricians, safety inspectors and mechanical workers.

Workers from other industries, such as coal power or offshore oil and gas should be able to transition to offshore wind.

Scott Carter

BRANCH SECRETARY, MARITIME UNION OF AUSTRALIA SOUTHERN NSW BRANCH

"People in Wollongong are genuinely excited by the new jobs that will come from offshore wind. We're looking forward to a sustainable industry that will give generations of seafarers and wharfies access to good, long term employment that complements our steel industry and the bulk and general cargo wharves at Port Kembla."

Q **Will the turbines release plastics and oil into the ocean which will be consumed by fish and sealife which we consume?**

A Wind turbine blades contain only microscopic traces of residual BPA and therefore do not emit these into the environment. They also have protective coatings on the blades which are non-toxic and contain negligible amounts of BPA. They are also specifically designed to have high resistance to weathering.

Recent studies have found that the major sources of microplastic emissions are from boat bottom paints, plastic litter, and fishing gear. Land-based emissions, such as wear and tear on car tyres and textiles, are also important sources of microplastics in the sea. Importantly offshore wind turbines and their blades were found to not be a significant source.

Additionally, when operational and maintained correctly as required by environmental legislation turbines do not leak anything into the ocean. If a crisis does occur the company is required to plan for crisis scenarios and create a risk management and action plan during the approval process. This needs to be done before anything is built.

Q **Will the wind farm be dangerous to boaters?**

A Wind turbines in an offshore wind farm are spaced widely in a grid pattern. They are lit and marked in accordance with nautical safety guidelines, and their position is reflected

accurately on nautical charts. All this allows mariners to navigate and fish within the wind farms, except in discreet areas that will be restricted during the construction phase of the project.

Q **Won't the plastic coasting break down from salt erosion and falling into the ocean and into the food chain?**

A coating offshore wind turbines as it is not durable, resistant or protective enough against the harsh environmental conditions and corrosion risks that offshore wind turbines face.

Recent studies have found that the major sources of microplastic emissions are from boat bottom paints, plastic litter, and fishing gear. Land-based emissions, such as wear and tear on car tyres and textiles, are also important sources of microplastics in the sea. Importantly offshore wind turbines and their blades were found to not be a significant source.

Ellen Couch

UNIVERSITY OF WOLLONGONG STUDENT

"As a young person who has grown up in The Illawarra, most of my life has been spent around the ocean, watching the world change around me. The globe is warming at an alarming rate, and one viable way to mitigate some of this warming is by using renewable energy. That is why I think that offshore wind farms are a great choice to be placed in The Illawarra region. I know that I have grown up in a coal mining community, but I also know that we need a more renewable energy source, so transitioning to a different solution will be important for our economy. Young people will be most affected by this, so by ensuring a more eco-friendly future, offshore wind farms should be seen as the lesser of the evils. It is seen as part of a mix of solutions that aren't solely reliant on fossil fuels."

Alison Byrnes MP

FEDERAL MEMBER FOR CUNNINGHAM

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