4th October 2023

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090,
CANBERRA ACT 2601

To Whom It May Concern,

This submission has been prepared by members of the Blue Energy Futures Lab at the University of Wollongong (UOW) and associated researchers from across multiple faculties within the University. This letter summarises our overarching feedback and recommendations for the Government's consideration in relation to the declaration of an offshore energy zone in the Illawarra region.

The attached report (**Attachment A**) then provides greater detail on our response to the proposed zone, and the development of offshore wind in the Illawarra more broadly based on our collective and individual research expertise. It is broken up into the following sections:

- Part 1 contains an overview of the drivers and need for an emerging offshore wind industry in Australia, and the role that the Illawarra can play, and includes an introduction to some of the engineering and technical challenges and opportunities of this industry for our region.
- Part 2 summarises key legal and regulatory issues which we feel require attention, including the need for greater transparency in governance systems.
- Part 3 focuses on environmental impacts and assessments, including how they interact with the above governance systems.
- Part 4 considers social, cultural, economic impacts and benefits of the industry, with a focus on how they can be maximised for the region through careful and coordinated planning and coordination.

In order to ensure this submission is inclusive, accessible and evidence-based, we have included references to relevant peer-reviewed sources, and provided links to publicly available versions of all documents cited.

Attachment B provides details on our expertise and capabilities. It explains that we are an interdisciplinary research team interested in the emergence of new offshore sustainable industries, including offshore wind. Our research expertise includes law, social sciences, policy, economics, engineering, business, data science and analytics, and marine sciences.

Summary of our feedback and recommendations

As detailed further in the attached report, as a collective group of academics from diverse disciplinary backgrounds we support an accelerated movement towards a renewable energy future. We strongly endorse a rapid movement towards decarbonisation of our current energy base in order to contribute to global efforts to mitigate and address climate change. We believe all parts of Australia will need to play their part in this transition and as a region the Illawarra is both well suited, and strongly positioned to play a lead role in this. We therefore are working from the basis of ***in principle support*** for the development of offshore wind in the Illawarra, but with a firm commitment towards ensuring that these developments are done to the ***highest environmental, social and cultural standards***.

We stand ready to play our part in ensuring that offshore wind, if it is to be developed in our region, can be underpinned by independent and rigorous research. We also believe universities can play a critical role in training the skilled professionals that will be required to develop, assess and monitor the industry.

As detailed in the attached report, we put forward the following priority recommendations for consideration. Additional recommendations can be found in Attachment A.

Technical considerations

Addressing the engineering challenges of offshore wind energy requires the development of a workforce with the necessary knowledge and skills to drive innovation, research, and implementation. Bringing together disciplines including civil engineering, electrical engineering, mechanical engineering, marine technology, environmental sciences, data science and analytics, and more, can be achieved through interdisciplinary collaboration and education. Leveraging existing regional training ecosystems can equip the current workforce with hands-on training and educational opportunities that are directly aligned with the needs of the offshore wind industry. Fostering collaboration between academia and industry to work together on cutting-edge projects could exemplify multidimensional thinking and innovation. There are substantial prospects for NSW to lead the advancements in areas such as floating foundations, mooring and anchoring systems, welding automation and robotics, and advanced materials suitable for marine environments.

Governance considerations

Offshore wind is currently an under-regulated industry, and we have some concerns that the current process abdicates too much responsibility to the developers. We call for greater oversight and planning in relation to key aspects of the assessment and approvals process (see below). In particular, we believe greater consideration should be given to managing use conflicts that will eventuate from the development of the offshore wind industry, including through Marine Spatial Planning.

Environmental considerations

Any new industry, such as offshore wind, needs careful consideration of the range of likely environmental impacts they will produce. The current approvals process for offshore wind places the responsibility for environmental assessment on the developers. However, early community feedback suggests concern over processes that are solely managed by developers and associated consultancies. In addition, site-specific environmental assessments are unlikely to capture the full range of cumulative and population-scale impacts (and benefits) that the farms will produce, particularly for migratory species which may interact with a number of farms and their support vessels along the east coast. We recommend consideration be given to broader regional and national scale assessments conducted independently by trusted research institutions, to inform (but not replace) these site-specific assessments.

Socio-economic and cultural considerations

We recommend that high priority be given to First Nation engagement and partnership to avoid ‘terra nullius’ style assumptions as ocean-based developments progress. We also recommend a coordinated approach to avoid unnecessary consultation burdens on First Nation organisations. In particular, practical support should be provided to Aboriginal organisations and grass roots communities to assist them to negotiate adequately resourced, long-term benefits for their communities as well as measures to support in the protection of underwater and coastal cultural heritage.

We further recommend Government education, intervention, guidance and, where necessary, regulation be employed to ensure the planning process maximises community benefits and clearly identifies pathways and governance structures which local communities can make use of in order to tap into the range of economic benefits that the industry can potentially bring to the region.

Finally, we recommend a national-scale approach to developing the education and skills training required for this emerging industry. By identifying gaps in the current workforce, and the strengths of the relevant institutions which exist in the regions in which offshore wind is currently proposed, there is scope to develop a national system of training which works together to supply the future skills needs of the industry in a coordinated and complementary way.

We acknowledge the contributions of colleagues from across the University in preparing and finalising this submission. While the signatories below are the primary authors of this report it would not have

been possible without the input of a number of additional colleagues from different disciplines. We note that further information and resources on many of these issues, including frequently asked questions about the proposed offshore electricity infrastructure zone, are available on the Blue Energy Futures Lab website at https://www.uow.edu.au/ancors/blue-energy-futures-lab/.

Thank you for your consideration of our response. We are happy to elaborate on any of these points as required.

Yours sincerely

A/Prof Michelle Voyer Keira Endowed Chair in Energy Futures Member: Blue Energy Futures Lab Australian National Centre for Ocean Resources and Security (ANCORS) Faculty of Business & Law University of Wollongong	**Ty Christopher** FIEAust CPEng Member: Blue Energy Futures Lab Director/Honorary Professorial Fellow Energy Futures Network, Faculty of Engineering and Information Sciences University of Wollongong
Dr Aziz Ahmed Lecturer in Structural Engineering School of Civil, Mining, Environmental and Architectural Engineering Sustainable Building Research Center Faculty of Engineering and Information Sciences University of Wollongong	**Dr Chantel Carr** Member: Blue Energy Futures Lab Australian Research Council DECRA Fellow Australian Centre for Culture, Environment, Society and Space (ACCESS) School of Geography and Sustainable Communities Faculty of the Arts, Social Sciences and Humanities University of Wollongong
Dr Freya Croft Member: Blue Energy Futures Lab Post-Doctoral Research Fellow, Australian National Centre for Ocean Resources and Security (ANCORS) Faculty of Business & Law University of Wollongong	**Prof Andy Davis (Emeritus)** Member: Environmental Futures School of Earth, Atmospheric & Life Sciences Faculty of Science, Medicine and Health University of Wollongong
Dr Camille Goodman Member: Blue Energy Futures Lab Senior Lecturer, Australian National Centre for Ocean Resources and Security (ANCORS) Faculty of Business & Law University of Wollongong	**Dr David Gunawan** Member: National Institute for Applied Statistics Research Australia (NIASRA) School of Mathematics and Applied Statistics Faculty of Engineering and Information Sciences University of Wollongong
Dr Dawoon Jung Lecturer, Australian National Centre for Ocean Resources and Security (ANCORS) Faculty of Business & Law University of Wollongong	**A/Prof Natascha Klocker** Member: Blue Energy Futures Lab Australian Centre for Culture, Environment, Society and Space (ACCESS) School of Geography and Sustainable Communities Faculty of the Arts, Social Sciences and Humanities

	University of Wollongong
Natasha Larkin PhD Candidate and Research Associate Member: Blue Energy Futures Lab Australian Centre for Culture, Environment, Society and Space (ACCESS) School of Geography and Sustainable Communities Faculty of the Arts, Social Sciences and Humanities University of Wollongong	**Duncan Leadbitter** Honorary Fellow, Australian National Centre for Ocean Resources and Security (ANCORS) Faculty of Business & Law University of Wollongong
Dr Matt Moores Member: National Institute for Applied Statistics Research Australia (NIASRA) School of Mathematics and Applied Statistics Faculty of Engineering and Information Sciences University of Wollongong	**Dr Rachel Nichols** Member: Blue Energy Futures Lab Lecturer, Australian National Centre for Ocean Resources and Security (ANCORS) Faculty of Business & Law University of Wollongong
Dr Katharina J Peters Member: Environmental Futures School of Earth, Atmospheric & Life Sciences Faculty of Science, Medicine and Health University of Wollongong	**Dr Pabasara Wanniarachchige** Lecturer in Geotechnical Engineering School of Civil, Mining, Environmental and Architectural Engineering Faculty of Engineering and Information Sciences University of Wollongong
A/Prof Andrew Zammit Mangion Member: National Institute for Applied Statistics Research Australia (NIASRA) School of Mathematics and Applied Statistics Faculty of Engineering and Information Sciences University of Wollongong	

ATTACHMENT A: Detailed responses to the offshore wind zone declaration proposal

Offshore wind energy generation is critical for addressing the overlapping and complex issues of climate change, energy security and energy equity. In what follows, we expand on the reasons for our in-principle support for the development of an offshore wind industry in the Illawarra. The following sections summarise some of the key considerations that we believe require further attention. We provide information on what will need to be addressed to ensure proper regulation and equity in establishing this local industry in a sustainable way.

- Part 1 contains an overview of the drivers and need for an emerging offshore wind industry in Australia, and the role that the Illawarra can play, and includes an overview of the engineering and technical challenges and opportunities of this industry.
- Part 2 summarises key legal and regulatory issues which we feel require attention, including the need for greater transparency in governance systems.
- Part 3 focuses on environmental impacts and assessments and how they interact with the above governance systems.
- Part 4 considers social, cultural, economic impacts and benefits of the industry, with a focus on how they can be maximised for the region through careful and coordinated planning and coordination.

In each area we: 1) summarise our current understanding of the challenges and opportunities for an energy transition for the Illawarra as it relates to offshore wind, based on our research; and 2) identify recommendations for consideration by the Government which are of relevance to the proposed declaration of the Offshore Electricity Infrastructure Zone.

Part 1: Offshore wind in the Illawarra: why and how?

In order to address climate change and meet Australia's international obligations for net zero by 2050, it is widely accepted that we need to significantly increase utility scale renewable energy generation to replace coal and gas in the domestic energy market.[1] Offshore wind has substantial energy production potential, with a 100-turbine project producing 1.5-2GW of energy. To put this in perspective, just two wind farms of 100 turbines would produce more energy than Eraring, Australia's largest coal-fired power station (2.88GW) located near Lake Macquarie in NSW.

A rapid transition towards renewable energy and energy storage is also required to address energy system security, in light of the industry-led withdrawal of coal-fired power from the Australian market. The early retirement of coal-fired power across Australia is accelerating as industry grapples with ageing plants and concern for holding stranded assets. The need for more regular and extensive maintenance on ageing coal fired power stations has led to more significant offline periods. This has reduced the capacity factor of coal to around 65% (a measure of the actual output rather than a theoretical assumption of 100%). At 45-55%, offshore wind has the largest capacity factor of any renewable energy project currently under consideration in Australia, compared to utility scale solar (25%) and onshore wind (35%). This means that offshore wind is currently the most viable way of ensuring time-sensitive renewable energy grid security for the National Energy Market.[2] This is particularly important if Australia is to decarbonise industry, which requires a substantial increase in energy production. In the Illawarra alone, BlueScope Steel, the nation's largest steel producer and the

[1] Australian Energy Market Operator (AEMO) (2022) *Integrated System Plan for the National Electricity Market.* Available at: https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp

[2] AEMO, *Integrated System Plan* (above note 1). Note: the 2022 *Integrated System Plan* does not refer directly to offshore wind, but does outline the need for firmed generation capacity for grid security.

region's largest emitter, has estimated that it will require about 15 times its current energy consumption to decarbonise steelmaking operations.[3]

Finally, offshore wind can capitalise on the existing geographical profile of energy production and consumption in Australia. With 87% of Australia's population living within 50km of the coast,[4] offshore wind enables enormous renewable energy production close to where energy is consumed. This reduces transmission losses and avoids the significant costs and environmental impacts of lengthy transmission lines to connect inland renewable energy projects to the grid. In terms of physical geography and infrastructure, the Illawarra has many of the key features needed for an offshore wind industry: strong wind speeds, a deep-water port, existing heavy transport routes, existing transmission routes and an industrially skilled workforce. The Illawarra has already seen the development of green hydrogen projects which offer the potential for widespread decarbonisation of heavy transport and industry. As green hydrogen production requires the co-location of substantial renewable energy production, it makes good sense for offshore wind and hydrogen to be co-located around heavy industry to address long term decarbonising agendas, such as green steel.

Engineering and technical challenges and opportunities

Australia has significant experience in offshore oil and gas technology; however, offshore wind provides new opportunities and challenges in engineering design, construction and maintenance. While the feasibility and potential of offshore wind in Australia have been critically assessed in recent years, it is essential to evaluate critical environmental conditions applicable to the Illawarra, considering the impacts of a changing climate. This includes strong winds, high waves, storms, saltwater exposure, and offshore geology and sediment conditions. The floating platform design must ensure stability via suitable anchoring and mooring systems that could withstand massive dynamic loads, requiring innovative engineering solutions. For example, the challenging offshore geological conditions require innovative floating foundations, mooring systems and anchoring technologies;[5] thus, site-specific assessment, innovative penetration techniques, modular design approaches,[6] welding automation, robotics and the use of materials that can withstand abrasion and corrosion[7] are critical factors to be considered.

Integrating offshore wind power into the onshore electrical grid can further create unique challenges, including transmission losses due to long distances and the intermittent nature of wind energy, which requires effective energy storage and grid balancing solutions.[8] Developing robust remote sensing technologies and autonomous maintenance systems are further required to address the challenges associated with monitoring and maintenance. Furthermore, establishing logistics and support infrastructure, including ports, maintenance bases, and transportation routes, should be carefully considered. Many of these challenges and considerations need to also take into account the current technological landscape. Data science and analytics are now used at every stage in the lifecycle of an

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[3] Bluescope, *The Future of Steelmaking: The No. 6 Blast Furnace Re-line at Port Kembla* (2021). Community briefing October 2021. Available at: https://vimeo.com/758982053

[4] Australian Bureau of Statistics, *Regional population, 2018–19* (2020, Canberra, ABS). Available at: https://www.abs.gov.au/statistics/people/population/regional-population/2018-19

[5] S.T. Hallowell et al, 'System reliability of floating offshore wind farms with multiline anchors' (2018) 160 *Ocean Engineering* 94-104. Available via: https://www.sciencedirect.com/science/article/abs/pii/S0029801818305341

[6] J. Lerche, H.H. Neve, G. Ballard, J. Teizer, S. Wandahl and A. Gross 'Application of last planner system to modular offshore wind construction' (2020) 146 (11) *Journal of construction engineering and management* 05020015. Available at: https://pure.au.dk/portal/files/218465032/Application_of_Last_Planner_System_to_Modular_Offshore_Wind_Construction.pdf

[7] F. Rubino, A. Nisticò, F. Tucci, and P. Carlone 'Marine application of fiber reinforced composites: A review' (2020) 8(1) *Journal of Marine Science and Engineering* 26. Available at: https://www.mdpi.com/2077-1312/8/1/26

[8] Rahman S, Khan I, Alkhammash H and Nadeem MF 'A comparison review on transmission mode for onshore integration of offshore wind farms: HVDC or HVAC' (2021) 10(12) *Electronics* 1-15. Available at: https://www.mdpi.com/2079-9292/10/12/1489

offshore wind farm, from site planning and predictive maintenance through to energy supply and forecasting. It is essential that powerful, high-quality, and robust data science and analytics tools are used in order to maximise the utility and efficiency of the infrastructure.

The finite operational lifespan and impact of decommissioning the offshore energy platforms also presents significant challenges that should be factored into long-term planning.[9] The safe removal of components without causing environmental harm or excessive cost demands requires meticulous planning and innovation. The greenhouse gas emissions associated with offshore wind platforms must be closely monitored and mitigated, from the extraction of raw materials for construction to their transport, assembly and decommissioning phases. This requires a comprehensive lifecycle assessment guiding future engineering efforts to minimise their ecological footprint. The focus on sustainability could reshape options for reusing or recycling recovered components and materials. For example, steel from marine structures is commonly re-smelted for revenue, while reinforced concrete can be repurposed as aggregate or for coastal defences. Composite turbine blade recycling options are as yet limited, and developing specialised facilities handling large volumes of recycling components are other engineering challenges to be addressed.[10]

Recommendation

In order to overcome the engineering challenges mentioned above, it is crucial to equip the local workforce with the knowledge and skills necessary to drive innovation, research, and implementation. The technological complexities associated with harnessing offshore wind power demand a comprehensive understanding of various disciplines, including civil engineering, electrical engineering, mechanical engineering, marine technology, environmental sciences, data science and analytics, and more, which can only be achieved through interdisciplinary collaboration. One of the most effective ways to address the workforce skills gap in the renewable energy sector in the Illawarra region is by establishing cadetship programs for diploma and undergraduate studies. The Illawarra has a long history of hosting such programs through ongoing collaboration between UOW, TAFE, and large industrial employers such as Bluescope (and formerly BHP). For example, current programs at UOW include training for postgraduate and postdoctoral fellows in a Research Hub for "Transforming Energy Infrastructure through Digital Engineering", who will provide focussed expertise in some areas of the "digital energy sector". Leveraging existing regional training ecosystems can equip the current workforce with hands-on training and educational opportunities that are directly aligned with the needs of the offshore wind industry.

Furthermore, fostering collaboration between academia and industry to work together on cutting-edge projects could exemplify multidimensional thinking and innovation. For example, the co-location of hybrid offshore energy resources, harnessing the power of wind, wave, and current energies, could potentially achieve higher energy outputs, enhanced system stability and mitigation of variability often associated with single-source energy production. In addition, the concept of co-locating offshore energy ventures with seaweed cultivation and aquaculture/fisheries presents another avenue of innovation.[11] Such interconnected approaches optimise resource utilisation, further allowing various industries to work harmoniously. There are substantial prospects for NSW to lead the advancements in areas such as floating foundations, mooring and anchoring systems, welding automation and robotics, and advanced materials suitable for marine environments.

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[9] E. Topham, E. Gonzalez, D. McMillan and E. João, 'Challenges of decommissioning offshore wind farms: Overview of the European experience' (2019) 1222(1) *Journal of Physics: Conference Series* 012035. Available at: https://iopscience.iop.org/article/10.1088/1742-6596/1222/1/012035/meta

[10] Jonas Pagh Jensen and Kristen Skelton, 'Wind turbine blade recycling: Experiences, challenges and possibilities in a circular economy' (2018) 97 *Renewable and Sustainable Energy Reviews* 165-176. Available via: https://www.sciencedirect.com/science/article/abs/pii/S1364032118306233

[11] J. Villalba et al, 'Assessment of uncertain alternatives for co-located aquaculture and offshore wind farm in Tasmania' (2022) 249 *Ocean Engineering* 110949. Available via: https://www.sciencedirect.com/science/article/abs/pii/S0029801822003808?via%3Dihub

Part 2: Legal and regulatory issues

While Australia has significant experience in regulating the exploitation of offshore oil and gas, the regulation of offshore renewable energy presents new and different regulatory challenges. This is a chance to develop and implement a new regulatory framework—the *Offshore Electricity Infrastructure Act 2021 (Cth)* (OEI Act)[12] and its accompanying regulations and other instruments—in a way that is specifically adapted to the characteristics of renewable energy resources, and reflects Australia's unique geographic, strategic, economic, social and cultural circumstances and the contemporary values and expectations of the Australian community. This will enable pro-active, strategic engagement in land and sea use planning to manage interactions with existing users, support enabling infrastructure, manage potential marine environment impacts, minimize costs, maximize benefits, and ensure consistency with relevant international obligations in relation to activities in Australia's offshore area.

Of relevance for this consultation, we note that Section 19(1) of the OEI Act provides that in declaring an area as suitable for offshore renewable energy infrastructure, the Minister must have regard to:

a) the potential impacts of the construction, installation, commissioning, operation, maintenance or decommissioning of offshore renewable energy infrastructure in the area on other marine users and interests;
b) any submissions received pursuant to public consultation;
c) any advice received as a result of consultation with the Defence Minister and the Minister responsible for administering Section 1 of the Navigation Act; and
d) Australia's international obligations in relation to the area.

This section makes some observations about the fulfilment of requirements (a) and (d) in the specific context of the declaration of a proposed area in the Pacific Ocean in the Illawarra region, as well as some broader comments about governance processes for the development of offshore wind.

Impacts on other marine users and interests

A diverse range of rights and interests must be taken into account in regulating Australia's offshore areas: commercial, recreational and Indigenous fishing; aquaculture; shipping; marine conservation; tourism and recreational activities; native title sea claims; Indigenous cultural heritage and other underwater cultural heritage; and submarine data cables. Some of these uses will be further influenced by climate-driven changes for which data are not yet available—such as the redistribution of fish stocks and rising sea levels. In addition, the establishment of new offshore industries such as wind will have a different footprint and different limitations to the oil and gas industry with which Australians are familiar, giving rise to new and different social, cultural and economic considerations. For example, given the size and location of the proposed area, and the size and location of proposed offshore wind developments, offshore wind turbines might be installed 10 to 50km from the coastline and occupy a footprint of up to 700 km^2. This is likely to result in very different impacts on other marine users and interests than would be the case for traditional oil and gas platforms.

The consultation documents highlight some of the marine users and interests that may be impacted by offshore renewable energy infrastructure in the proposed area, including:

- the native title rights and other traditional rights, responsibilities and interests of First Nations people;
- matters of environmental and ecological significance;
- airports and aviation, Defence activities, vessel traffic, ports and weather radars;
- commercial and recreational fishing (including charter fishing); and
- tourism.

Some of these users and interests are represented visually on the interactive map of the proposed area—in particular, marine protected areas, vessel traffic, ports and weather radars. However, some important information relating to relevant users and interests are not depicted on that map—such as the spatial footprint of fishing activity and fishing licenses, historical fishing patterns or stock distribution; and

[12] Available at: https://www.legislation.gov.au/Details/C2022C00346

other users and interests are not easily *able* to be depicted on a map—such as the complex set of rights, responsibilities and interests arising in relation to Sea Country, or the range of potential impacts on environmental and ecological interests in the area. In short, while a range of other marine users and interests are identified in the consultation documents, limited information is provided about the potential impacts that offshore renewable energy infrastructure might have on them. This is reinforced in the consultation documents, which specifically note in numerous places that further consultation will need to be undertaken in relation to these users and interests.

However, pursuant to the framework established in the OEI Act and the *Offshore Renewable Energy Infrastructure Regulations 2022* (Cth) (OEI Regulations),[13] this further consultation is not a process managed by the Government, but a responsibility assigned to the industry, with individual developers required to consult with other marine industries and users to identify and address potential conflicts as part of their application for a licence. This raises some concerns about how the Minister will be able to meaningfully consider the potential impacts of offshore renewable energy infrastructure on marine users or interests in declaring this area. First (and directly), because the consultation documents make clear on their face that more consultation is needed in order to understand the impacts on these users and interests. Second (and indirectly), because the limited information currently available necessarily affects the extent to which impacts on other users and interests can be considered or addressed by the public in their submissions to the consultation.

It is likely there will be some impact on other ocean users, particularly since there will be exclusion zones around the wind farms that will limit access and specific uses in certain areas. The primary source of impact on the fishing industry would be via exclusion of fishing activities. For example, fishing activities may be restricted in certain areas. Depending on the location of the wind farms, the Commonwealth and State trawl and trap/line sectors could be impacted. The proposed area also overlaps with almost the entire fishing ground for royal red prawns, a locally important fishery. Due to the nature of the management regimes under which the fisheries operate, it may not be a feasible option to simply fish somewhere else, and the government needs to consider the flow-on effects to seafood businesses in the Illawarra, if not more widely.

Shipping may also be impacted by the development of offshore wind farms off the coast of the Illawarra. For example, ships may have to alter their navigational routes, wind turbines may pose a navigational risk (often mitigated by night-time safety lighting), there may be disruption to communication, and to anchorage and mooring for ships. However, the development of offshore wind may also have a positive economic impact on the shipping industry through increased port activity as a result of the construction and maintenance of wind farms and their associated infrastructure.

Certain examples from overseas show that there is opportunity for co-existence between offshore wind and certain other users, such as the tourism industry. For example, in the south east of England, Sussex Boat Trips offers boat tours[14] to the Rampion Offshore Wind Farm.[15] Examples such as this, suggest that it doesn't have to be an 'either-or' situation when it comes to offshore wind and other industries. There is potential for multiple uses. Furthermore, as much of the local marine tourism (such as scuba diving, or whale watching) would likely occur within 10km from the shore, the direct impacts on tourism are likely to be minimal.

Recommendation

As with other aspects of the planning process, the OEI Act largely leaves potential conflicts amongst marine uses and users to be addressed by individual developers as part of their feasibility assessments. However, site-specific negotiations with impacted users may not adequately take into account cumulative impacts such as spatial squeeze on users from multiple developments and other regulatory changes. In addition, they may not adequately consider the broader fisheries management implications of displaced effort associated with exclusion zones. It is therefore recommended that further information

[13] Available at: https://www.legislation.gov.au/Details/F2022L01422
[14] See https://www.sussexboattrips.com/rampion-offshore-wind-farm-voyage/
[15] See https://www.rampionoffshore.com/about/visiting-rampion/

is provided as to how these broader cumulative and secondary impacts will be considered in a coordinated way.

We encourage the Government to actively engage in a more detailed examination of the impact on other marine users or interests in the proposed area, to engage directly with affected users, and to take a strategic, integrated approach to planning the use of the area in partnership with the community, rather than leaving the integration of multiple uses to be managed on a case-by-case basis by individual licence holders. As a first step, we see significant benefits in a single, coordinated and transparent process to identify relevant users and rights, map relevant interests, and establish baseline data, to provide the basis for an inclusive and transparent discussion in the region about how to manage this area and integrate the transition to renewable energy with the needs and interests of existing users and uses. More broadly, we encourage the Government to consider adopting more formal marine spatial planning processes (as was initiated during the Oceans Policy almost 30 years ago), in order to achieve a robust, transparent and inclusive framework for managing multiple uses and achieving multiple objectives in our offshore area in a way that could not be achieved through piecemeal consideration, siloed consultation, or project-by-project approval. The European experience of offshore wind has clearly demonstrated the importance of marine spatial planning as a tool through which to manage the competing (and at times complementary) uses of ocean spaces, including commercial and recreational fisheries, shipping, aquaculture and conservation. Twenty-two European Union member coastal States, as well as the United Kingdom, have now adopted marine spatial planning processes, and they could also have significant advantages for Australia.

Australia's international obligations in relation to the area

Since the exploitation of offshore renewable energy involves activities at sea, beyond Australia's land territory, it is important to ensure that its deployment and operation is consistent with the international law of the sea—and in particular the rights and duties of coastal States and other States in the maritime zones established in the 1982 *United Nations Convention on the Law of the Sea* ('LOSC').[16] In this respect, it is necessary to consider the size and location of the proposed area. The proposed area is described in the consultation documents as covering 1461 km^2, and the interactive map shows it commencing between 10 km and 30 km (5.39 and 16.19 nautical miles (NM)) from the coast and extending out to 50km (26.99 NM) from the coast (see **Figure 1**). This means that it covers areas of both the territorial sea (the area from the coastline out to 12 nautical miles—or 22.224 kilometres) and the exclusive economic zone (EEZ) (the area from 12 to 200 nautical miles—or 370.4 kilometres—from the coast). Australia has different rights and obligations in these two zones.

[16] Opened for signature 10 December 1982, entered into force generally and for Australia on 16 November 1994. Available at: https://www.austlii.edu.au/au/other/dfat/treaties/ATS/1994/31.html

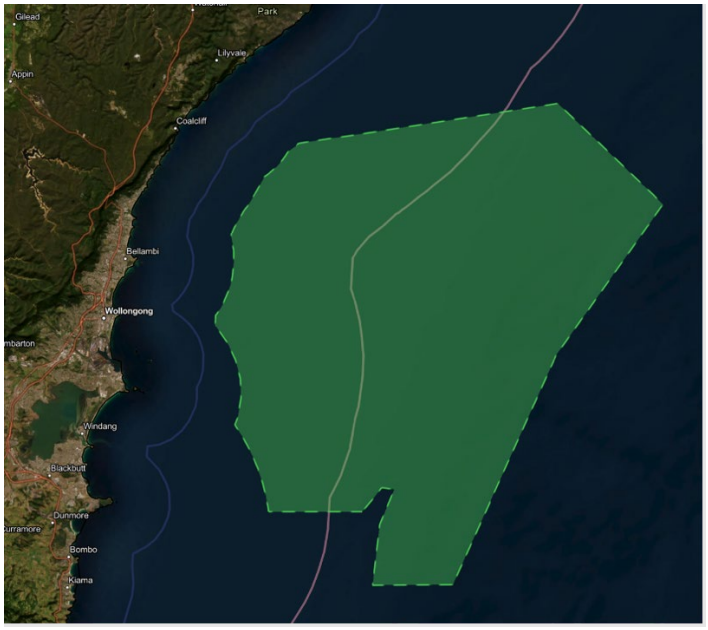

Figure 1. The proposed area in the Pacific Ocean off the Illawarra region, with Australia's 12 NM territorial sea boundary running through it. The area coastward of this boundary is within the territorial sea. The area seaward of this boundary is part of the EEZ. Adapted from the Interactive Map of the Proposed Area — Illawarra Region.

In the territorial sea (out to 12 NM), Australia has 'sovereignty' and can apply and enforce laws and regulations for the safety of navigation and the protection of installations and submarine cables, provided only that those laws do not impede or prevent the 'innocent passage' of foreign vessels.[17] In principle, sovereignty over renewable energy resources in the territorial sea applies in the same way as sovereignty over land territory, subject to the need to respect the innocent passage of foreign vessels. As such, Australia can deploy offshore installations in the territorial sea as it sees fit (provided that they do not unreasonably hinder or prevent the right of innocent passage or infringe the obligation to protect the marine environment), and may require foreign vessels exercising innocent passage to use sea lanes and traffic separation schemes to protect the installations and ensure the safety of navigation.

Moving away from shore, the rights of the coastal State diminish, and the rights of other States increase. In the EEZ (beyond 12 NM), Australia has 'sovereign rights' to explore and exploit natural resources, including 'activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds', as well as jurisdiction over 'the establishment and use of artificial islands, installations and structures'.[18] This includes the exclusive right to construct, authorize, and regulate the construction, operation, and use of installations in the EEZ, and to designate safety zones of up to 500 metres around them, in order to ensure the safety of those installations, and of navigation.[19] But in exercising these rights, Australia must have 'due regard' for the rights and duties of other States—in particular, their rights of navigation, overflight, laying of submarine cables and pipelines, and other related internationally lawful uses of the sea.[20] In particular, Australia is precluded from placing installations or structures and safety zones in areas where they might cause interference to recognized sea lanes that are essential to international navigation.[21]

As this brief overview of the legal framework shows, Australia has significant discretion with respect to the location and regulation of offshore renewable energy installations in its waters. However, this discretion is not unlimited: it must be exercised with respect for the rights of other States, including the navigational rights of foreign-flagged vessels. While this consultation relates only to the proposed area,

[17] LOSC (note 16), Articles 19-22.
[18] LOSC (note 16), Article 56(1).
[19] LOSC (note 16), Article 60.
[20] LOSC (note 16), Article 56(2).
[21] LOSC (note 16), Article 60(7).

and not to the details of the regulations that will apply to the deployment or operation of offshore renewable energy infrastructure within that area, it is nonetheless important to consider relevant operational requirements as part of this declaration, in order to ensure that the location and the size of the area enable relevant infrastructure to be deployed and operated effectively and efficiently, *and* in a way that is consistent with Australia's international obligations.

Recommendation

Noting that the proposed area is home to a 'high volume of domestic and international shipping traffic heading to a variety of locations', as reflected in the 'Vessel Traffic' layer on the interactive map, we encourage the Government to take a future-focused approach to considering how the size and location of this area might affect the operational and regulatory requirements of offshore renewable energy infrastructure in practice. For example, while there is limited information available about the exact size and location of current proposals for offshore wind in the Illawarra, if licence holders apply for the maximum allowable licence area of 700 km^2, it would only be possible to fit two licence areas within the total 1461 km^2 of the proposed area—which may leave very little room for passage between the two areas. In addition, the location and spacing of turbines within licence areas will also be relevant to where and how (or whether) ships of various sizes can transit safely through the area, rather than having to divert around it. The consultation documents also note that 'there may be restricted areas placed around offshore wind infrastructure, such as individual wind turbines and offshore substations.' Assuming a restricted area of 500m radius around each turbine, consistent with the LOSC limit—and depending on the number and placement of individual turbines—this could result in access to a significant amount of the proposed area being 'restricted' for other users and interests and could further affect the transit of shipping through the area. While the detailed regulation of these practicalities will appropriately be considered as part of the licensing process, it is important to consider them in determining the location and size of the proposed area, in order to ensure that it is designed to enable both the optimal operation of renewable energy infrastructure (eg the placement of a sufficient number of turbines to make the operation economically feasible) and the requirements of international law (e.g. the navigational requirements of ships).

Furthermore, in order to avoid conflicts between offshore wind farm projects and shipping, a Navigational Risk Assessment should be considered in the planning stage. Navigational Risk Assessments identify the risks affecting vessel navigation and determine the probability of collisions with offshore wind installations and cables. This is addressed in Resolution A.572(14) of the International Maritime Organisation, which recommends that: "In planning to establish multiple structures at sea, including but not limited to wind turbines, Governments should take into account, as far as practicable, the impact these could have on the safety of navigation, including any radar interference. Traffic density and prognoses, the presence or establishment of routeing measure in the area, and the manoeuvrability of ships and their obligations under the 1972 Collision Regulations should be considered when planning to establish multiple structures at sea. Sufficient manoeuvring space extending beyond the side borders of traffic separation schemes should be provided to allow evasive manoeuvres and contingency planning by ships making use of routeing measures in the vicinity of multiple structure areas". [22] While they are not a legally binding requirement, Navigational Risk Assessments will contribute to the protection of both offshore wind installations such as turbines and cables, and the navigational interests of vessels.

Governance processes concerning offshore wind development

Establishing an offshore renewable energy industry, intended to fulfill Australia's international obligations and transition the nation away from carbon-intensive energy production, is disruptive to the social, economic and cultural landscape for many Australians. Political opinion, cultural background and socio-economic status all combine to shape the way in which people view and engage with this new industry, and shape their acceptance and support of the renewable energy transition. Issues raised in

[22] IMO Assembly Resolution A.572(14) of 19 October 1989, *General Provisions on Ships' Routeing,* as amended [3.14]. Available at: https://www.imorules.com/GUID-2370CB01-9981-48F8-AB00-9A30C93491CD.html

this document including legal and regulatory issues, the question of community benefit-sharing and its place and role in the social acceptability of offshore wind and the granting of feasibility licences to developers, and the importance of early community engagement in specifically impacted locations, may be answered through more transparency in the governance processes concerning offshore wind, including transparency and certainty in the interactions between federal, state and native title governance. Some of the areas of concern outlined in this submission, including questions around community engagement and community benefit-sharing, may be answered through clarification of governance processes concerning the feasibility of specific offshore wind proposals and so contribute to improved community trust and acceptance of the offshore energy industry.

Recommendations

We recommend that greater clarification be provided regarding what will be held to be "in the national interest" for the purpose of Section 11 of the OEI Regulations, and in particular, whether commitments towards community benefit sharing on the part of developers falls under this definition for the purpose of granting a feasibility licence (specifically where developers are competing for space). More broadly, the objectives of the transition towards offshore energy generation should be made specific and operationalised, including specific timelines for achieving these objectives, and clarity about who bears responsibility for ensuring the objectives are achieved. Further to this, frameworks for ongoing monitoring of social and economic benefits and concerns (qualitative and quantitative) should be established to ensure both that the offshore energy industry delivers continued benefit, and that declines in benefit are identified quickly.

Part 3: Environmental impacts and assessments

Inevitably, putting any infrastructure in the ocean will have some consequences on ocean ecosystems. Extensive studies have been conducted on environmental impacts in other parts of the world, especially Europe, and these have largely found that there are both negative and positive impacts on marine ecosystems as a result of offshore wind.[23] This section provides more detail on our current understanding of the potential impacts of offshore wind development on ocean ecosystems.

Noise

The construction and operation of offshore wind farms can introduce underwater noise, which may disrupt marine mammals such as whales and dolphins. This disturbance can interfere with their communication, navigation, and feeding behaviours. Impacts of noise may also extend beyond cetaceans, affecting the marine ecosystem more broadly.[24] Noise is of particular concern in the construction phase, especially for fixed turbines where pile driving is required but construction impacts will be over a relatively short time frame. We note that the proposed farms in the Illawarra will be floating platforms and pile driving will not be required, which ameliorates many noise concerns. Studies of wind farms during the operational phase have concluded that underwater sound levels are unlikely to reach dangerous levels or mask acoustic communication of marine mammals.[25] Other studies have highlighted that offshore wind turbines make less underwater noise than ships.[26] Reducing underwater

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[23] See, for example: Ibon Galparsoro et al, 'Reviewing the Ecological Impacts of Offshore Wind Farms' (2022) 1(1) *npj Ocean Sustainability* 1. Available at: https://www.nature.com/articles/s44183-022-00003-5#citeas
See also: United Nations, *The Second World Ocean Assessment (Vol II)* (United Nations, 2021), 329-332. Available at: https://www.un.org/regularprocess/woa2launch

[24] T Aran Mooney, Mathias H Andersson and Jenni Stanley, 'Acoustic Impacts of Offshore Wind Energy on Fishery Resources' (2020) 33(4) *Oceanography* 82. DOI: doi.org/10.5670/oceanog.2020.408

[25] Helen Bailey, Kate L Brookes and Paul M Thompson, 'Assessing Environmental Impacts of Offshore Wind Farms: Lessons Learned and Recommendations for the Future' (2014) 10(1) *Aquatic Biosystems* 8. Available at: https://aquaticbiosystems.biomedcentral.com/articles/10.1186/2046-9063-10-8

[26] Jakob Tougaard, Line Hermannsen and Peter T Madsen, 'How Loud Is the Underwater Noise from Operating Offshore Wind Turbines?' (2020) 148(5) *The Journal of the Acoustical Society of America* 2885. Available at: https://pubmed.ncbi.nlm.nih.gov/33261376/

noise pollution can be achieved through the implementation of quieter construction methods, operational practices, or noise modulation techniques.

Migratory birds and mammals (including whales)

The existing literature commonly reports that marine mammals (including whales) and seabirds may be negatively impacted by offshore wind developments.[27] Negative impacts include disturbance through and collision with vessels servicing the windfarms, habitat alterations, and cascading effects if prey abundance is affected by windfarms. There is a risk that collision with wind turbines can lead to injuries and fatalities among migrating seabirds and other avian species.[28] Yet there may also be benefit for some seabirds, as the offshore infrastructure can create shelter and resting spots for some species.

Careful site selection and design considerations can minimize the impact on marine habitats and migration routes. Technologies like bird deterrent systems and marine mammal monitoring can be employed to reduce collision risks and protect sensitive species. Continuous monitoring and research programs can help assess the actual impact on marine life and inform adaptive management strategies, particularly in regions such as the Illawarra, where comprehensive population information for marine species is lacking.

Fish

Underwater structures associated with floating wind farms can be designed to create artificial reefs, attracting marine life and potentially create biodiversity offsets or benefits.[29] There is also the potential of a FAD (Fish Aggregation Device) effect, concentrating fish, with the potential for 'spillover' into regions where they can be exploited. This may well benefit commercial and recreational fishers. Impacts on migratory species, such as tuna remain inconclusive.

Subsea cables will be required to transfer electricity onshore and will generate Electromagnetic Field (EMF) emissions. Many fishes, particularly elasmobranchs (sharks and their relatives), are sensitive to EMF and concerns have been raised about these emissions interfering with their detection of prey and navigation.[30] A study undertaken in shallow coastal waters of NSW with high levels of EMF generated by shark repulsion devices failed to elicit effects on fishes, with the exception of the smallest of scales (cms).[31] Accordingly, EMF impacts on marine biota should be viewed as equivocal and worthy of closer investigation.

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[27] See, eg: Convention on Migratory Species, *Renewable Energy Technology Deployment and Migratory Species: An Overview,* UNEP/CMS/COP11/Inf.26 (2014), 111-129. Available at: https://www.cms.int/en/document/renewable-energy-technologies-deployment-and-migratory-species-0
See also: International Whaling Commission Scientific Committee, Report of the Workshop on Interactions between Marine Renewable Projects and Cetaceans Worldwide, SC/64/Rep6 (2012), 10-11. Available at: https://iwc.int/management-and-conservation/environment/marine-renewable-energy-developments

[28] Ibon Galparsoro, et al, 'Reviewing the Ecological Impacts of Offshore Wind Farms' (2022) 1(1) *npj Ocean Sustainability.* Available at: https://www.nature.com/articles/s44183-022-00003-5

[29] Olivia Langhamer, 'Artificial Reef Effect in relation to Offshore Renewable Energy Conversion: State of the Art' (2012), *The Scientific World Journal,* 386713. Available at: https://www.hindawi.com/journals/tswj/2012/386713/

[30] Luigia Riefolo et al, 'Offshore wind turbines: an overview of the effects on the marine environment', *Proceedings of the Twenty-sixth (2016) International Ocean and Polar Engineering Conference,* Rhodes, Greece, June 26-July 1, 2016 (ISOPE-I). Available at: www.researchgate.net/profile/Luigia-Riefolo/publication/304705230_Offshore_Wind_Turbines_An_Overview_of_the_Effects_on_the_Marine_Environment/links/5777b63b08aead7ba0745943/Offshore-Wind-Turbines-An-Overview-of-the-Effects-on-the-Marine-Environment.pdf

[31] A. Broad, N. Knott, X. Turon, A.R. Davis, 'Effects of a shark repulsion device on rocky reef fishes: no shocking outcomes' (2010) 408 *Marine Ecology Progress Series* 295-298. Available at: https://www.int-res.com/abstracts/meps/v408/p295-298/

Broader ecosystem effects

Artificial structures in the marine environment have been observed as a pathway for invasive pests (although this relates to coastal rather than offshore environments) and the likelihood of floating turbines developing a large fouling assemblage needs to be considered.[32] The likelihood of transfer of invasive species (should they appear) from offshore environments to coastal habitats by service vessels needs to be given particular consideration.

The installation of anchor systems and mooring lines for floating wind turbines can disrupt the seabed, potentially damaging sensitive marine ecosystems – particularly biodiverse deep reefs of high conservation value. The Illawarra is unique in that deepwater reefs can be found at depths of at least 110m and may be contiguous with the coastline.[33] The floating wind farm modules will be anchored to the seabed, but the exact method and configuration is currently unknown and will depend on the preference of the approved developer. Options could include the use of anchors or drilling and the creation of fixed anchor points. Impacts on the seabed would come from the short-term effects of drilling (very localised) or the potential effects of anchor chains. The degree of impact would depend on whether the anchor points were in/on unconsolidated sediments (sands/muds) or rocky reef.

There are two main types of existing long-term seabed impacts in the proposed area. Firstly, the long-term use of ships' anchors for vessels waiting to enter Port Kembla Harbour. The effects of 'anchor scour' (the swinging of the vessel around the anchor point) are demonstrably negative,[34] but the recent implementation of designated anchorages has shrunk the anchor footprint in the region by at least 60%. Second, the soft sediments off the NSW coast have been trawled by fishing vessels for decades (in some cases almost 100 years). Extensive global reviews of trawl impacts suggest that impacts on unconsolidated sediments may not be significant, but this depends on frequency of fishing and natural disturbances caused by wave energy. Whether the wind farms will create a significant addition to the existing impact is not yet clear and is worthy of closer investigation.

Recommendation

Innovative solutions informed by international practice and adapted for the local environment will be required to alleviate the potential negative impacts of the proposed wind farm. A critical starting point is the development of detailed habitat mapping of the proposed area; this will ensure that habitats that may be more sensitive to impacts – such as reefal environments – can be avoided.[35] Further research is required to fully capture existing information on species' movements and potential impacts of proposals. In particular, any examination of impacts needs to be conducted in the context of broader population and ecosystem level impacts.[36] For example, research is required to understand where local level displacement in migratory pathways has broader level implications for the population of a species overall. In addition, cumulative impacts of multiple stressors will need to be accounted for within Environmental Impact Assessment processes.

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[32] L.B. Firth et al, 'Ocean Sprawl: Challenges and opportunities for biodiversity management in a changing world' (2016) 54 *Oceanography and Marine Biology* 189-262. Available via: https://www.researchgate.net/publication/310462801_Ocean_sprawl_challenges_and_opportunities_for_biodiversity_management_in_a_changing_world

[33] Michelle Linklater et al, 'Techniques for Classifying Seabed Morphology and Composition on a Subtropical-Temperate Continental Shelf' (2019) 9(3) *Geosciences* 141. Available at: https://www.mdpi.com/2076-3263/9/3/141

[34] Allison Broad et al, 'Anchor Scour from Shipping and the Defaunation of Rocky Reefs: A Quantitative Assessment' (2023) 863 *Science of The Total Environment* 160717. Available at: https://www.sciencedirect.com/science/article/pii/S0048969722078202?via%3Dihub

[35] Andrew R. Davis et al, 'Mapping of Benthic Ecosystems: Key to Improving the Management and Sustainability of Anchoring Practices for Ocean-Going Vessels' (2022) 247 *Continental Shelf Research* 104834. Available via: https://www.sciencedirect.com/science/article/abs/pii/S027843432200187X?via%3Dihub

[36] Helen Bailey, Kate L Brookes and Paul M Thompson, 'Assessing Environmental Impacts of Offshore Wind Farms: Lessons Learned and Recommendations for the Future' (2014) 10(1) *Aquatic Biosystems* 8. Available at: https://aquaticbiosystems.biomedcentral.com/articles/10.1186/2046-9063-10-8

It is clear from early-stage community feedback on this proposal that there is an absence of trust in developer-led environmental impact assessment processes. As such, we recommend a high level of transparency and accountability be mandated for these activities. In particular, aspects of the environmental impact assessment process may be better considered as part of an independent Strategic Environmental Assessment or similar. Broad-scale, ecosystem-wide, population-level and cumulative impacts require a wider consideration beyond the scale of individual projects given multiple wind farms are proposed along the eastern seaboard and within the migratory pathways of key species. As such we recommend consideration be given to funding these studies independently of the developers to add value to (but not replace) the site level assessments that developers will be required to develop.

Part 4: Social, cultural, economic impacts and benefits of offshore wind

Energy transitions and coastal transformations are more than just technical processes, they are fundamentally social processes.[37] The social, cultural and economic dimensions accompanying energy transitions are inherently complex and require thorough and meaningful consideration.[38] Our collective experience in research in this area suggests a number of critical (and inter-related) areas of consideration which are relevant to the proposed offshore wind zone in the Illawarra (outlined below).

Engaging First Nation communities

There are a range of First Nation considerations which should be prioritised in the development of an offshore wind industry in the Illawarra. We broadly categorise these into three key areas.

Firstly, consideration is required as to how cultural heritage considerations will be assessed and managed, particularly in relation to underwater cultural heritage in deep water locations and intangible cultural heritage relating to songlines, totemic species and other culturally significant species and areas. Current cultural heritage assessments remain heavily reliant on archaeological evidence which may not be available in these underwater environments.

Secondly, as with other aspects of the planning and assessment process, engagement and negotiation with First Nation communities remains largely the responsibilities of the individual developers. This holds significant potential to create a situation in which multiple developers are attempting to engage with and negotiate arrangements with the same communities and organisations, placing considerable burden on these organisations, which are largely underfunded and under resourced. This will be particularly true for the Native Title claimant group as existing legislation will require developers to consult with this group in relation to transmission infrastructure within the claim area.

Thirdly, community benefit sharing arrangements with First Nation communities should be prioritised and co-designed with community so Aboriginal people get a say in how the benefits of this new industry can best flow through to their community. This may include consideration of such measures as employment targets or mandates.

Recommendations

We recommend that education, training and financial assistance be provided to First Nation organisations in the Illawarra region to equip them to appropriately and meaningfully engage with offshore wind developers. In particular, practical support should be provided to assist these organisations negotiate adequately resourced, long-term benefits for their communities as well as support in protecting cultural heritage. We also recommend two-way engagement between First Nation communities and industry and government around co-design of culturally appropriate engagement

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[37] Gavin Bridge, Stefan Bouzarovski, Michael Bradshaw and Nick Eyre, 'Geographies of Energy Transition: Space, Place and the Low-Carbon Economy' (2013) 53 *Energy Policy* 331-340. Available at: https://www.sciencedirect.com/science/article/pii/S0301421512009512?via%3Dihub

[38] Clark A. Miller, Alastair Iles and Christopher F. Jones, 'The Social Dimensions of Energy Transitions' (2013) 22(2) *Science as Culture* 135-148. Available at: https://www.tandfonline.com/doi/full/10.1080/09505431.2013.786989

strategies, building on the work currently being undertaken by Aboriginal scholars and thought leaders such as the Kollective - an Aboriginal led Science and Marine Science initiative.

Economic benefits to the region through jobs and supply chain development

Our recent analysis[39] of the promise of local economic benefits to the Illawarra in establishing an offshore wind industry has found that key stakeholders in the Illawarra (including developers, unions, the tertiary education sector and local political representatives) hold the view that establishing an industry in the region will bring substantial economic benefits in the form of local jobs and contributions to the supply chain. Stakeholders maintain that, at least in the early stages of the projects, the region does not have some of the specialist skills required by offshore wind developments and some workers will need to come from outside the region, drawing both nationally and internationally. While developers are proposing that there will be a commitment to local skills development and the University of Wollongong has been awarded an Australian government grant of $10 million for skills development (with an additional $2.5 million to TAFE Illawarra for facilities upgrade), it is widely acknowledged that this will only partially meet the investment needed for skills development in the region.

For local workers to participate and share in the economic benefits of offshore wind, there will need to be clear pathways for upgrading of skills and new skill development. This will only be meaningful if workers can gain work and transfer their skills across several projects, particularly given the majority of the anticipated jobs are in the construction phase. For this reason, efforts should be put into ensuring workers have genuine long-term employment pathways (industry qualifications rather than firm-specific qualifications) to enable them to work across different projects over time.

International evidence indicates that the greatest local benefits come not from jobs in constructing individual projects but the region's ability to participate in the supply chain for offshore wind development nationally and internationally.[40] We note that there are strong commitments to developing a local supply chain in the region from existing industry (such as BlueScope) as well as the more visible developers proposing projects in the Illawarra. Evidence on the European experience indicates that the regional economic benefits in terms of local jobs and supply chains often fall short of projections.[41] This is for a number of reasons, including the complexity of supply chains for offshore wind projects and the ability of influential global firms in the supply chain to effectively lock out local suppliers (such as through demanding contract terms that local suppliers are unable to meet). Some international research indicates that local content rules do safeguard local benefits, although this is not yet conclusive.[42] We are conscious that the situation in Australia, and in particular in the Illawarra, may well not follow international findings, as the industry is in its infancy and there is substantial distance between existing supply chains and Australian projects, which brings additional challenges.

Recommendation

We propose that governments of all levels should canvass the best regulatory measures to uphold the promise to hosting regions that they will receive economic benefits in the form of jobs and contributions

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[39] N. Larkin, C. Carr, and N. Klocker 'Building an offshore wind sector in Australia: Economic opportunities and constraints at the regional scale' (forthcoming) *Australian Geographer.*

[40] See, eg: G. Allan, D. Comerford, K. Connolly, P. McGregor and A.G. Ross, 'The economic and environmental impacts of UK offshore wind development: The importance of local content' (2020) 199 *Energy* 1-11. Available via: https://www.sciencedirect.com/science/article/abs/pii/S0360544220305430
See also: A. Rose, D. Wei and A. Einbinder, 'The co-benefits of California offshore wind electricity' (2022) 35(7) *The Electricity Journal* 1-14. Available at: https://www.sciencedirect.com/science/article/pii/S1040619022000938.

[41] See, eg: D. Gibbs and P.D Jensen, 'Chasing after the wind? Green economy strategies, path creation and transition in the offshore wind industry' (2021) 56(10) *Regional Studies* 1671-1682. Available at: https://eprints.whiterose.ac.uk/181326/1/Gibbs%20and%20Jensen%202021%20%28author%20version%29.pdf
See also: Allen et al, 'The economic and environmental impacts of UK offshore wind development' (note 31); A. van der Loos, R. Langeveld, M. Hekkert, S. Negro and B. Truffer (2022) 'Developing local industries and global supply chains: The case of offshore wind', (2022) 174 *Technological Forecasting & Social Change* 1-15. Available at: https://www.sciencedirect.com/science/article/pii/S004016252100682X.

[42] Allan et al, 'The economic and environmental impacts of UK offshore wind development' (note 31).

to supply chains for Australia's offshore wind sector. In addition, the government should carefully and progressively monitor economic benefits to hosting regions (including beyond the construction phase), so that early projects can inform policy settings and future licence conditions to safeguard local economic benefits as the domestic industry matures.

Community engagement and participatory planning

Understanding the social dimensions of energy transitions is of vital importance, not only to ensure success, but also to place community at the centre of decisions that impact their future and to work towards the wellbeing of individuals and communities.[43] Putting in the effort upfront to properly consult and consider the multitude of social considerations should be seen as important, as failure to do so will likely lead to unjust outcomes or will require further work in future to ensure social success. Viewed in this way, energy transitions should be based on socially equitable processes that meaningfully consider and include community values, connections and perspectives and work towards the fair distribution of harms and benefits. It is therefore important to understand diverse and relational values, consider emotions and emotional attachments to place and to recognise the many ways in which the coast is important to people.[44]

Recommendation

Social science research is a critical but often overlooked tool within consultative processes.[45] Consultation exercises are often judged by communities as predetermined or tokenistic and communities can be left feeling disenfranchised or unheard by these processes, especially when they rely on largely quantitative 'counts' of support versus opposition or social and economic values.[46] Engaging with social researchers can provide a deeper understanding of communities' connection to place, emotional response to projects and values in relation to a project. Each Offshore Electricity Zone designated by the government has a context that is inherently specific to that site and will thus require in-depth place-based research. A one-size-fits-all approach will not work, rather, looking for local knowledge and conducting rigorous local research will be necessary.

Transparent and equitable community benefit sharing arrangements

There is considerable scope for the development of an offshore wind industry to deliver a range of community benefits to the Illawarra, including generation of a large new economic and employment base, cheaper energy prices, skills development, local content or broader community benefit sharing of profits through community funds provided by developers as part of their Corporate Social Responsibility arrangements.

International research has shown that good public engagement involves two-way deliberative learning and providing local community benefits.[47] Community benefits serve as a form of distributive justice

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[43] Dominque Coy, Shirin Malekpour, Alexander K. Saeri, and Roger Dargaville, 'Rethinking community empowerment in the energy transformation: A critical review of the definitions, drivers and outcomes' (2021) 72 *Energy Research and Social Science.* Available via: https://www.sciencedirect.com/science/article/abs/pii/S2214629620304461?via%3Dihub

[44] S. Huttunen, M. Ojanen, A. Ott, and H. Saarikoski, 'What about citizens? A literature review of citizen engagement in sustainability transitions research' (2022) 91 *Energy Research & Social Science* 1-20. Available at: https://www.sciencedirect.com/science/article/pii/S2214629622002183.

[45] Emma McKInley, Tim Acott, Katherine L. Yates, 'Marine Social Sciences: Looking Towards a Sustainable Future' (2020) 108 *Environmental Science and Policy.* Available at: https://doi.org/10.1016/j.envsci.2020.03.015

[46] T.G. Acott, et al, 'Coastal transformations and connections: Revealing values through the community voice method' (2023) 5(2) *People and Nature* 403-414. Available at: https://besjournals.onlinelibrary.wiley.com/doi/full/10.1002/pan3.10371

[47] S.C. Klain, T. Satterfield, S. MacDonald, N. Battista, & K.M Chan, 'Will communities "open-up" to offshore wind? Lessons learned from New England islands in the United States' (2017) 34 *Energy Research & Social Science* 13-26. Available at: https://www.sciencedirect.com/science/article/pii/S2214629617301172.

as adjacent communities receive a benefit for shouldering the burden of living in proximity to large scale infrastructure. Formal community benefit sharing provisions have increasingly been adopted in the European offshore wind industry as a recognition of the disruption and significant impacts associated with the enormous infrastructure that is required for offshore wind energy production.

Despite the substantial opportunity presented by the development of this industry, it presently remains unclear how community benefits will be assured through the proposed offshore wind development in the Illawarra and how these will be delivered in a fair and equitable way.

Recommendation

There are a number of ways in which the Australian Government can provide support for the Illawarra to ensure the community benefits are maximised from the proposed development of offshore energy in the region. International examples include explicit assessment criteria in licensing arrangements which address benefit sharing arrangements, regulation of local content requirements and requirements about investment in local level skills development and training. We strongly advocate for greater guidance and, if necessary, regulation from the Australian Government about how local scale benefit sharing arrangements should be developed, implemented, monitored and enforced as soon as possible to inform community debates and deliberations.

From our perspective, we feel strongly that local communities should have the opportunity to have a say in how local level benefits are identified and distributed in accordance with regional priorities and need. This will require open and transparent communication from both Government and industry about who is responsible for delivering on promised benefits and how. For the Illawarra we recommend the development of a community benefit sharing strategy and roadmap, co-designed with community, which outlines equitable benefit sharing priorities and objectives, governance mechanisms, responsibilities, timelines and performance indicators to track success.

Building ocean and energy literacy and skills and training for the offshore sector

Building a long term 'social license to operate' for the offshore wind industry in the Illawarra is a shared responsibility of industry, Government and educational institutions. To a large degree ensuring community support will rely on active and meaningful community engagement, and fair and just benefit sharing arrangements, as outlined above. However, it will also require regular and ongoing education and information sharing across all sections of the community to ensure the energy transition is understood by all. It will be important that members of the community have the opportunity to have their questions answered, that information is made readily available in order to inform deliberations and debate and that education pathways exist for people to build their understanding, skills and expertise to allow them to take advantage of the employment and business opportunities that this new industry will create.

Recommendation

We recommend investment in regional readiness assessments in relation to education and training needs for the Illawarra. In addition, we recommend support from the Australian Government to provide national level coordination across the different offshore wind zones in relation to both ocean and energy literacy, as well as skills and training gaps and opportunities. It will be critical for educational institutions across the different zones to work together to ensure that skill shortages can be addressed in a coordinated and strategic way, building on the strengths of the different regions. For example, the Illawarra is well positioned to contribute to building a workforce in the manufacturing and engineering sectors that can service other offshore wind zones in Australia and overseas.