New Zealand's Path to Wildlife Conservation in its Offshore Renewable Energy Regime

Introduction

The New Zealand government has announced its intention to introduce legislation for the establishment of an offshore renewable energy (ORE) regime by mid-2025.[1] This essay will discuss key wildlife conservation factors this legislation should recognise and suggest considerations based upon overseas ORE legislation.

What is Offshore Renewable Energy (ORE)?

ORE is energy generated through non-terrestrial infrastructure or processes, including offshore wind power, offshore solar energy, wave energy, ocean thermal energy conversion, and tidal energy.[2] ORE has the potential to supply large amounts of sustainable energy, reducing CO2 emissions,[3] making it an attractive alternative to fossil fuels.

Offshore wind (OSW) is currently one of the most commercially viable types of ORE[4] and so will be the focus of this essay. OSW energy is generated using large turbines in ocean waters that capture wind energy and convert it into electricity.[5] These turbines can be situated in various configurations, such as fixed-bottom structures in shallower waters or floating platforms in deeper areas.[6]

OSW is becoming more common as a method of energy production;[7] throughout Europe, there were 5047 turbines in operation by the end of 2019.[8] The UK has included OSW consenting in their legislation since 2001.[9]

What are the Environmental Impacts of ORE?

ORE, and specifically OSW, can have negative impacts on the local wildlife at all stages of its lifespan, including installation, operation and maintenance (O&M) and

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[1] Simeon Brown *Regulatory Impact Statement: Offshore Renewable Energy Regime* (Ministry of Business, Innovation & Employment, Regulatory Impact Statement, 16 April 2024).
[2] Jijian Lian and others "Offshore Renewable Energy" (2024) 749 J. Mar. Sci. Eng. 1 at 1.
[3] Carlos Pérez-Collazo and others "A review of combined wave and offshore wind energy" (2014) 42 RSER 141 at 142.
[4] Zhiguo Zhang and others "Overview of the development and application of wind energy in New Zealand" (2023) 4 EBE 725 at 726.
[5] Jijian Lian and others "Offshore Renewable Energy", above n 2, at 2.
[6] Mingsheng Chen and others "Performance Analysis of a Floating Wind–Wave Power Generation Platform Based on the Frequency Domain Model" (2024) 749 J. Mar. Sci. Eng. 92 at 93.
[7] Ignacio Herrera Anchustegui and Tina Soliman Hunter "Geographical, Technological, and Legal Perspectives of Offshore Wind Energy" in Ignacio Herrera Anchustegui & Tina Soliman Hunter (ed) *Offshore Wind Licensing* (Edward Elgar Publishing, Cheltenham, 2024) 2 at 6.
[8] Lizet Ramírez and others *Offshore Wind in Europe: Key trends and statistics 2019* (Wind Europe, Report, February 2020).
[9] The Electricity Act 1989 (Requirement of Consent for Offshore Wind and Water Driven Generating Stations) (England and Wales) Order 2001 (UK).

decommissioning.[10] Offshore wind farms may be hazards to sea birds, disrupt fish communities and have indirect effects on benthic fauna.[11] The most reported are habitat disturbance, mortality of individuals (predominantly birds) and physical damage.[12]

1) Installation

Installing the foundation and cables necessary for OSW mostly impacts the sub-marine environment. Installation typically requires pile driving, which produces significant sound pollution, up to 228 dB in close proximity.[13] While the noise generated from installing one turbine may not be sufficient to cause long-lasting aural harm, cumulative impacts caused by multiple installations can cause hearing damage or loss for wildlife.[14] This is particularly impactful on species that rely on echolocation, such as porpoises.[15]

Installation also requires seabed morphology when installing the foundation and trenching while burying cables. This may result in habitat disturbance or sedimentation[16] which may reduce biodiversity or decrease water quality in the local area respectively.

2) O&E

During energy generation, several stressors, such as the rotation of blades and vessel traffic, can disturb local wildlife.[17] These disturbances can lead to avoidance behaviours in species like marine mammals and fish due to habitat disruption.[18] OWFs can also contribute positively by creating reef-like environments that increase biodiversity and provide protected areas for marine species due to the structures' hard substrates.[19]

Collisions with turbine blades can cause bird mortality, particularly long-lived species, as a result of collisions with turbine blades.[20] Noise and vibrations from energy generation can

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[10] O. Mauricio Hernandez and others "Environmental impacts of offshore wind installation, operation and maintenance, and decommissioning activities: A case study of Brazil" (2020) 144 RSER 1 at 7-10. See also Anne Marie O'Hagan "Environmental Considerations in Offshore Wind Licensing" in Ignacio Herrera Anchustegui & Tina Soliman Hunter (ed) *Offshore Wind Licensing* (Edward Elgar Publishing, Cheltenham, 2024) 41 at 43 and Eva Topham and David McMillan "Sustainable decommissioning of an offshore wind farm" (2017) 102 Renew. Energy 470 at 479.

[11] Anne Marie O'Hagan "Environmental Considerations in Offshore Wind Licensing" in Ignacio Herrera Anchustegui & Tina Soliman Hunter (ed) *Offshore Wind Licensing* (Edward Elgar Publishing, Cheltenham, 2024) 41 at 51.

[12] O. Mauricio Hernandez and others "Environmental impacts of offshore wind installation, operation and maintenance, and decommissioning activities: A case study of Brazil", above n 10, at 7.

[13] At 8.

[14] At 8.

[15] Dong Energy, Vattenfall, The Danish Energy Authority and The Danish Forest and Nature Agency *Danish Offshore Wind: Key Environmental Issues* (Dong Energy, Vattenfall, Danish Energy Authority, and Danish Forest and Nature Agency, Report, November 2006) at 81.

[16] A.K.M. Emdadul Haque "Is Maritime Spatial Planning a Necessity" (2015) 45/5 EPL 212 at 221.

[17] O. Mauricio Hernandez and others "Environmental impacts of offshore wind installation, operation and maintenance, and decommissioning activities: A case study of Brazil", above n 10, at 11-12.

[18] At 11-12.

[19] Dong Energy, Vattenfall, The Danish Energy Authority and The Danish Forest and Nature Agency *Danish Offshore Wind: Key Environmental Issues* (Dong Energy, Vattenfall, Danish Energy Authority, and Danish Forest and Nature Agency, Report, November 2006) at 62.

[20] O. Mauricio Hernandez and others "Environmental impacts of offshore wind installation, operation and maintenance, and decommissioning activities: A case study of Brazil", above n 10, at 10.

disturb behaviours such as breeding, feeding, and migration in fish, marine mammals, and birds.[21] Additionally, barrier and wake effects can disrupt the migratory paths of marine mammals and birds, leading to increased energy expenditure and potential habitat loss.[22] Changes to current flow and seabed patterns due to scour protection around turbine foundations further alter local ecosystems over time.[23]

Submarine energy transmission cables can also affect marine life, particularly species sensitive to electromagnetic fields, such as benthic fish and elasmobranchs.[24] Behavioural changes, including avoidance and reduced hunting efficiency, may lead to a decline in local fish populations, potentially impacting fishing industries.[25]

3) Decommissioning

Decommissioning OWFs will also presents environmental challenges, though only a handful of OWFs have reached this stage. Various factors, such as turbine size, foundation type, and site-specific conditions, influence the decommissioning process, meaning it must be tailored to each individual OWF.

One approach proposed to mitigate environmental impacts during decommissioning is the "renewables-to-reefs" program, where partial removal of OWF structures is favoured over complete removal to allow the remaining substructures to serve as artificial habitats for marine life.[26] This approach suggests that, under the right conditions, decommissioned OWF infrastructure can continue to provide ecological value, reducing the need for full dismantling.

Noting these potential negative environmental impacts, ORE legislation and the surrounding regulation should put measures in place to identify and mitigate (or at least assess the requirements for mitigation) the ecological impacts of OSW. New Zealand's regime should address these, especially in light of its unique biodiversity.

Overseas ORE Legislation

One way to assess what should be included in New Zealand's regime is to assess legislative measures that have been implemented in overseas jurisdictions. The existence of these measures can inform directions and requirements to be included in New Zealand law when it is introduced.

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[21] At 11.
[22] At 11.
[23] At 11.
[24] PricewaterhouseCoopers *New Zealand Offshore Wind Industry Report* (PricewaterhouseCoopers, National Impact Study, March 2024) at 77.
[25] *Danish Offshore Wind: Key Environmental Issues,* above n 19, at 66-68.
[26] O. Mauricio Hernandez and others "Environmental impacts of offshore wind installation, operation and maintenance, and decommissioning activities: A case study of Brazil", above n 10, at 10.

Firstly, it is important to understand what states can regulate with regards to OSW. OWFs are typically established in a state's territorial waters or exclusive economic zone (EEZ)[27] where states have the right to the production of energy from the "water, currents and winds."[28] New Zealand legislation impacting the marine environment and OSW applies in its EEZ.[29] OSW in the High Seas is not currently technologically possible[30] so is deliberately left out of this discussion.

OSW legislation differs from state to state. This discussion will look at the environmental considerations in some of the largest global producers of OSW, namely the People's Republic of China and the United Kingdom, and New Zealand's closest cultural and legislative sibling, Australia.

1) People's Republic of China

China lacks a dedicated legal framework specifically for OSW, instead relying on the broader Renewable Energy Act 2005 to regulate development. Oversight of China's OSW is done by the Ministry of Ecology and Environment.[31]

China's OSW development is guided by provincial- and national-level cooperation.[32] This is achieved through the combination of national energy strategies that are practically achieved by provincial governments. Provinces have roles designating suitable areas for OSF development through an assessment of the spatial and environmental considerations. Projects must adhere to certain requirements.[33]

Once suitable sites are identified, they are allocated through a competitive auction process, where companies bid for development rights based on a combination of technical, financial, and environmental factors.[34] Environmental considerations, such as how the project will manage local wildlife impacts and ensure sustainability, are integrated into the evaluation process, ensuring that projects balance energy production with environmental protection.[35]

While China has a fairly conservation-minded consenting and auction process, it has two major downfalls. Firstly, the process does not account for seabed disturbance and submarine sound pollution during OWF operation. Secondly, China's framework does not address decommissioning in legislation, instead focusing predominantly on the consent process. While these factors can be incorporated at the provincial auction process, they do not

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[27] Ministry of Business, Innovation & Employment *Developing a Regulatory Framework for Offshore Renewable Energy* (Ministry of Business, Innovation & Employment, Second Discussion Paper, August 2023) at 39.
[28] United Nations Convention on the Law of the Sea GA Res 2749 (1970) (UNCLOS), art. 56(1)(a) and (b)(i). New Zealand ratified UNCLOS on 19 July 1996.
[29] *Developing a Regulatory Framework for Offshore Renewable Energy,* above n 27, at 38.
[30] Ignacio Herrera Anchustegui and Violeta S. Radovich "Wind Energy on the High Seas: Regulatory Challenges for a Science Fiction Future" (2022) 15 *Energies* 9157.
[31] Llewelyn Hughes and others "Governing offshore wind: is an 'Asia-Pacific Model' emerging?" (2024) 24/6 Climate Policy 1 at 7.
[32] At 8.
[33] At 7.
[34] At 7.
[35] Jinjin Chen "Development of offshore wind power in China" (2011) 15 RSER 5013 at 5016.

currently have to be. Given the potential harms to local biodiversity, this is a significant oversight.

2) United Kingdom

The UK follows a phased leasing process for offshore wind, most recently allocating sites for development in 2019.[36] These leasing rounds require strict compliance with environmental regulations. For instance, every OSW project over 100 MW must undergo a Strategic Environmental Assessment and an Environmental Impact Assessment (EIA).[37] These assessments evaluate potential impacts on ecosystems, biodiversity, and coastal landscapes before a project is approved.

Projects are required to mitigate environmental risks through measures such as Habitats Regulations Assessments, which ensure compliance with the EU Habitats Directive[38] and Birds Directive.[39] This mandates that projects avoid sensitive areas like Special Protection Areas and Special Areas of Conservation, ensuring OSW development does not harm protected species or habitats.

Developers are also required to undertake Seascape and Visual Impact Assessments to minimise visual disruption and protect coastal aesthetics.[40] In Scotland, companies must submit Supply Chain Development Statements detailing how environmental impacts will be managed at each stage of project development.[41]

The UK's framework also makes substantial comments on decommissioning. In line with the UK's international obligations under UNCLOS, the government mandates that OSW installations must be fully removed unless there are strong reasons to leave infrastructure in place.[42] Developers are required to assess their projects' impacts on safety, the marine environment, and navigation during decommissioning.[43] The Crown Estate, which manages seabed leases, collaborates with BEIS to ensure that developers only need to submit a single decommissioning programme.[44]

3) Australia

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[36] The Crown Estate *Introducing Offshore Wind Leasing Round 4* (The Crown Estate, Information Memorandum, September 2019).
[37] Electricity Act 1989 (UK), s 34.
[38] Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora [1992] OJ L206.
[39] Council Directive 2009/147/EC on the Conservation of Wild Birds [2009] OJ L20/7.
[40] Department of Trade and Industry, Landscape Access Recreation, Countryside Council of Wales, and Scottish Natural Heritage *Guidance on the Assessment of the Impact of Offshore Wind Farms* (Department of Trade and Industry, Seascape and Visual Impact Report, November 2005).
[41] Scottish Government *Offshore Wind Policy Statement* (Scottish Government, Policy Statement, October 2020) at 94.
[42] UNCLOS, art. 56(1).
[43] Department of Trade and Industry *Offshore Energy Strategic Environmental Assessment* (Department of Trade and Industry, Report, January 2009) at Appendix 5 – Regulatory Controls.
[44] The Crown Estate *Introducing Offshore Wind Leasing Round 4* (The Crown Estate, Information Memorandum, September 2019), at 43.

Australia's Offshore Electricity Infrastructure Act 2021[45] (OEI Act) provides its legislative framework for OSW however it is currently lacking in detailed environmental protections. The Environment Protection and Biodiversity Conservation Act 1999[46] (EPBCA) serves as the primary mechanism for environmental approval, requiring OSW projects in the Commonwealth marine area to undergo approval if they are likely to have a significant impact on the environment. However, a review of the EPBCA found the approval process to be outdated and ineffective, highlighting a need for comprehensive reform.[47]

The OEI Act also mandates that licensees submit management plans, which must address "environmental management" in compliance with the EPBCA.[48] Yet, the Act does not clearly define what these management plans must entail beyond basic compliance. The vague requirement that licensees must not "unreasonably interfere with the conservation of the resources of the sea or seabed" is inadequate, offering little in terms of substantive environmental protection.[49]

Australia's framework does not currently account for direct environmental impacts like seabed disturbance or indirect effects such as noise pollution and changes to water quality and hydrodynamics. Future subordinate legislation is expected to improve environmental requirements, but as it stands, Australia's OSW framework offers limited protection against the significant ecological risks posed by OSW development.

New Zealand's Current Legislation

The starting point for New Zealand is the existing conservation legislation including the Marine Reserves Act 1971, Wildlife Act 1953, Conservation Act 1987, Marine Mammals Protection Act 1978 and also the Exclusive Economic Zone (EEZ) and Continental Shelf (Environmental Effects) Act 2012. In accordance with these, OSW projects must avoid marine reserves[50] and must take to not harm seabirds or other protected wildlife[51] or protected marine mammals.[52]

The EEZ Act is particularly important for OSW development in New Zealand. It governs the environmental impacts of activities within the EEZ, where most OSW infrastructure would be located.[53] Under this act, developers must obtain marine consents for activities such as installing turbines, laying transmission cables, and decommissioning infrastructure.[54] This

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[45] Offshore Electricity Infrastructure Act 2021 (Australia).
[46] Environment Protection and Biodiversity Conservation Act 1999 (Australia).
[47] Graeme Samuel *Independent Review of the Environment Protection and Biodiversity Conservation Act 1999* (Department of Agriculture, Water and the Environment, Final Report, October 2020).
[48] Jack Edward Brown "Building on strong Foundations? An Examination of Australia's New Offshore Wind Energy Regulation" in Ignacio Herrera Anchustegui & Tina Soliman Hunter (ed) *Offshore Wind Licensing* (Edward Elgar Publishing, Cheltenham, 2024) 276 at 291.
[49] At 297.
[50] Marine Reserves Act 1971, s 3(2).
[51] Wildlife Act 1953, ss 1-5.
[52] Marine Mammals Protection Act 1978, s 28.
[53] *Developing a Regulatory Framework for Offshore Renewable Energy,* above n 27, at 38.
[54] Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012, s 38.

involves assessing and mitigating potential impacts on marine ecosystems, including water quality, benthic habitats, and marine species.[55]

The Marine Mammals Protection Act 1978 adds further layers of protection by requiring OSW projects to carefully manage noise levels, particularly during the construction phase, when activities such as pile driving can disturb marine mammals like whales and dolphins. Developers may need to implement measures such as seasonal construction schedules to avoid sensitive periods like migration or breeding seasons, as well as acoustic monitoring to ensure compliance with noise limits.

The Resource Management Act 1991 (RMA) also plays a key role in the consenting process, particularly within New Zealand's territorial waters. It mandates comprehensive environmental impact assessments (EIAs) that consider both local and cumulative impacts of OSW on marine biodiversity, cultural values, and other environmental factors. These assessments must be publicly notified, providing opportunities for iwi, hapū, and local communities to participate in decision-making processes.

Proposed OSW Legislation

The 26 August 2024 Cabinet Paper entitled "Offshore Renewable Energy Regulatory Regime: Policy Decisions" sets out the Minister for Energy's broad outline for New Zealand's OSW policy.[56]

The proposed OSW framework centres around a two-permit system: feasibility permits and commercial permits.[57] Feasibility permits grant developers exclusive rights to explore designated marine areas and assess their suitability for OSW projects.[58] Upon completing feasibility studies, developers can then apply for commercial permits, which are necessary before construction can commence.[59]

A key aspect of the framework is ensuring developers assess and mitigate the environmental impacts of their activities on marine ecosystems.[60] Compliance with New Zealand's existing conservation laws is mandatory and EIAs play a critical role in the consenting process, considering the cumulative effects of OSW developments.

To prevent land banking and encourage timely project development, the framework incorporates "use it or lose it" provisions.[61] This ensures developers are progressing with their projects within set timeframes or risk losing their permits.

The framework also addresses decommissioning, requiring developers to plan for the safe removal of infrastructure at the end of a project's operational life.[62] Financial securities must

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[55] Section 39.
[56] Simeon Brown *Offshore Renewable Energy Regulatory Regime: Policy Decisions* (Ministry of Business, Innovation & Employment, Cabinet Paper, 26 August 2024).
[57] At 6.
[58] At 6.1.
[59] At 6.2.
[60] At 21.
[61] At 42.4.
[62] At 18.

be in place to cover these costs, reducing the risk of default and ensuring that the environment is properly managed post-operation.[63]

Overall, this approach is designed to promote renewable energy growth while safeguarding New Zealand's unique marine ecosystems.

Learning from Overseas Jurisdictions

When New Zealand introduces its OSW legislation, it should take into account the wider methods that have been used in overseas jurisdictions with an application to the local context. One area where New Zealand can learn is in regard to its spatial planning approach, ensuring OSW developments avoid marine reserves and ecologically sensitive areas. Under the Marine Reserves Act 1971 and the EEZ Act, developers must identify and protect critical habitats for species like seabirds and marine mammals. Spatial planning under this approach could mirror China's system, where regions designate suitable sites to avoid key ecological zones (including, and potentially wider than, statutory protected areas) ensuring that OSW projects are aligned with conservation objectives.

The RMA and the EEZ Act already require EIAs but New Zealand can strengthen these by mandating assessments that consider cumulative impacts on marine biodiversity. Borrowing from the UK's Habitats Regulations Assessments model, New Zealand can require EIAs to address specific risks to endangered species, such as Hector's dolphins, and to ensure projects avoid migratory routes and critical feeding areas. EIAs should also account for long-term impacts on benthic habitats, water quality, and fisheries.

The legislation, including EIA requirements, should also have the flexibility to account for the decommissioning lifecycle stage which has not had sufficient opportunity to be properly understood from a conservation perspective yet. New Zealand must be open to reassessing the environmental impact of the "renewables-to-reefs" policy when the subject has had a greater chance to be explored.

Conclusion

As New Zealand advances towards implementing its ORE regime, the proposed framework must address both the potential benefits of OSW and its environmental impacts. While the development of OSW infrastructure can significantly contribute to the country's renewable energy goals and reduce reliance on fossil fuels, careful planning is necessary to protect New Zealand's unique marine ecosystems. International models from jurisdictions like China, the United Kingdom, and Australia offer valuable insights into spatial planning, EIAs and decommissioning protocols that could inform New Zealand's legislative approach.

By learning from overseas experiences and integrating stringent environmental protections into the regulatory regime, New Zealand can establish a robust framework that balances the need for renewable energy with the preservation of its marine biodiversity. This will position

[63] At 40 and 64-69.

the country as a leader in sustainable offshore energy development while protecting its environmental legacy for future generations.

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