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WHEN TRUST MATTERS

OREGON'S BLUE FRONTIER:

CHALLENGES AND OPPORTUNITIES FOR DEVELOPING OFFSHORE WIND PROJECTS

Energy Systems North America Offshore Wind Advisory
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Summary

United States Offshore Wind Market: Oregon Wind Energy Areas

Oregon's current generation power mix includes hydroelectric power, natural gas, onshore wind, coal, and other small generation sources. Although the state meets its current Renewables Portfolio Standard (RPS) compliance criteria, the prospect of offshore wind in Oregon and floating wind is rapidly evolving—both technically and commercially—to provide a carbon-free alternative energy source.

For companies seeking to success in Oregon's upcoming offshore wind auction, DNV tapped into our global and local expertise to identify permitting and technical opportunities and challenges. Our insights come from 125 years of helping clients safely and economically develop offshore energy projects and, recently, our involvement in California's 2022 offshore wind auction.

DNV is committed to accelerating the development of offshore wind, and we are playing our part by providing advisory services and support to 97% of global wind projects.

Contents

1. Introduction

Introduction

The Oregon offshore wind auction is approaching and the Bureau of Ocean Energy Management (BOEM), an agency within the United States (U.S.) Department of the Interior (DOI), has announced two draft Wind Energy Areas (WEA) located in the existing Call Areas (CA) off the southern Oregon coast.

Once sites are awarded by BOEM, these projects will share similar development timelines as the California offshore wind projects. Synergies between Oregon and California will benefit offshore wind development on the U.S. Pacific coast, and DNV has a proven track record of regional expertise as demonstrated by our assessment of the challenges and opportunities for offshore wind projects in California[1]. This regional expertise is enhanced through our global network of offshore energy experts who are working with numerous clients to progress the safe and efficient delivery of offshore wind projects around the world. However, such development presents a unique set of challenges that require a regional understanding of supply chain, permitting, environment, and technical and commercial feasibility of commercial scale deployment of floating offshore wind (FOW) and integration to the grid.

To reach Oregon's established targets by 2030, it is critical to thoroughly understand the full value that offshore wind can deliver to Oregon's grid.

2. Background

Background

In April 2022, BOEM announced two CAs for offshore wind energy production offshore of Oregon. The CAs with potential to host offshore wind farms were identified as Coos Bay ("Coos Bay CA") and Brookings ("Brookings CA")[2] [3]. Figure 1 shows the Oregon Draft WEAs and CAs.

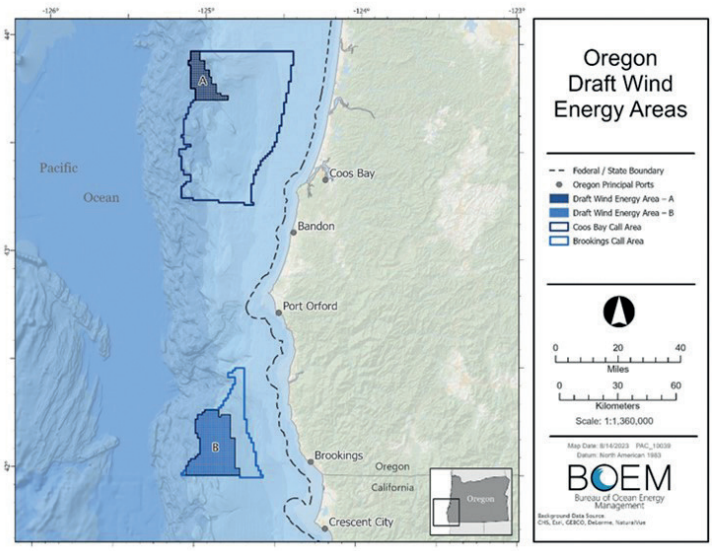

Figure 1. Oregon WEAs and CAs (boem.gov)

The boundary of the Coos Bay CA begins 13.8 miles (mi) offshore from Charleston, Oregon and extends to about 65 mi offshore. The eastern boundary water depth ranges from about 394 to 722 feet (ft; 120 to 220 meters [m]). The area is about 67 mi in length from north to south and about 41 mi in width from east to west. The entire area is approximately 872,854 acres (ac). The boundary of the Brookings CA area begins 13.8 mi offshore from Gold Beach and Brookings, Oregon, and extends to about 46 mi offshore. The eastern boundary water depth ranges from about 410 to 1,115 ft (125 to 340 m). The area is about 46 mi in length from north to south and about 22 mi in width from east to west. The entire area is approximately 286,444 ac[3].

In August 2023, BOEM announced a 60-day public comment period on two draft WEAs located in the existing CAs offshore from southern Oregon. These draft WEAs cover approximately 219,568 ac with their closest points ranging from approximately 18 to 32 mi off the coast[4]. BOEM identified the most suitable areas for FOW energy leasing and development, taking into consideration consultation with collaborating federal agencies and the possible impacts to local coastal and marine resources and ocean users.

3. Regulatory, social, and environmental review

Regulatory, social, and environmental review

3.1 Federal permitting

Projects located in federal waters must receive a lease from BOEM, a process DNV has experience in helping our clients understand and navigate.

The National Environmental Policy Act (NEPA) is the principal environmental legislative statute in the U.S., which dictates the permitting and review process for offshore wind projects sited in waters of the U.S. The NEPA process includes review and consultations with numerous agencies including (but not limited to) the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), the United States Fish and Wildlife Service (USFWS), and the United State Army Corp of Engineers (USACE). The developer must conduct studies and compile a Construction and Operations Plan (COP), which is subject to review by BOEM. Meanwhile, BOEM will assess the WEAs through development of an Environmental Assessment (EA) and later evaluate the developer's COP through an Environmental Impact Statement (EIS). These reviews and approvals are required to receive the Record of Decision (ROD) and ultimately approval from BOEM.

Current unknowns related to the federal permitting process include:

- Whether BOEM will incorporate Programmatic Environmental Impact Statement (PEIS) to analyze potential impacts from wind energy development activities in California. The PEIS would streamline the agency review process and create standardized impact avoidance, minimization, mitigation, and monitoring measures. However, there is uncertainty surrounding the involvement of the public and it may minimize or eliminate comment periods, which have been a large part of the current permitting and review processes.
- Details of the Proposed Sale Notice (PSN) and Final Sale Notice (FSN) will also have key implications on development within the lease areas, to the extent they relate to spacing requirements.
- Understanding whether developers will be provided "lanes" or footprint buffers to allow for some additional flexibility in design for floating technology in the case that, for example, the mooring design and its associated footprint change. Currently, BOEM's concept of the design envelope allows flexibility in layout and planning but the lease area is assumed to be the boundary or project limit.

3.2 State of Oregon

Marine energy projects located in Oregon's Territorial Seas, the boundary of which is 3 nautical miles (nm) off the state coastline, require compliance with the regulatory structure laid out in Part 5 of the Territorial Sea Plan, in addition to other state permits and standards[8]. Oregon recognizes the merits of studying and planning for offshore wind, though it has not committed to deployment targets. House Bill 3375 (2021) required the Oregon Department of Energy (ODOE) to develop a legislative report that identifies the benefits and challenges of integrating up to 3 gigawatts (GW) of FOW by 2030[3].

Similar to the national trend in offshore wind development, stakeholder engagement has become a focal point for the State of Oregon[5]. Developers should meet proactively and early with all relevant and interested stakeholders, whether regulatory entities, non-governmental organizations (NGOs), environmental NGOs, Tribal and fishing communities, or the public. Such timely and regular engagement is critical for successful and efficient progression through the NEPA process and the stages of project planning.

In Oregon, this process may be more stringent than other regions, as the State (through HB 3375)[8] requires broad stakeholder engagement with numerous agencies, including but not limited to:

- Oregon Department of Land Conservation and Development (DLCD)
- Oregon Business Development Department (Business Oregon)
- Oregon Department of Fish and Wildlife (ODFW)
- Oregon Public Utility Commission (OPUC)
- Northwest Power and Conservation Council (NPCC)
- Bonneville Power Administration
- National Renewable Energy Laboratory (NREL)
- Pacific Northwest National Laboratory (PNNL)

3.3 Environmental and cultural

In addition to finalizing the state legislative process and accounting for the extensive stakeholder engagement expected to be required for offshore wind development, the ODOE released a report of key findings[6] in 2022. The State identified siting and permitting conflicts and complexity associated with floating offshore wind development. Furthermore, the report highlights the need to understand the true impact to environmental resources, marine species, cultural resources, and ocean uses (i.e., fisheries operations)[3].
The marine ecosystem in this region is very rich and diverse. According to the ODFW, offshore waters support nearly 75 species of fish and 30 species of whales, dolphins, porpoises, sea lions, seals, and sea turtles[7]. Oregon has considerable investment and programs dedicated to protection of these environmental resources, including a Nearshore Strategy, Conservation Strategy, and the establishment of five marine reserve areas dedicated to conservation of unique habitats, critical species, and the progression of scientific research[3 9].

Mindful of the importance of understanding the scale of impacts to seabirds and marine species, BOEM has funded numerous research efforts along the Pacific coast. These studies inform the scientific community on species presence, migration patterns or disruptions to these migrations, and consider the risk of entanglement associated with floating technologies. Mitigating entanglement risk is necessary to reduce the occurrence of drowning, direct injury, fatigue, and starvation of the marine life that frequent zones being considered for offshore wind development.

4. Technical assessment

Technical assessment

4.1 Pre-feasibility

Although the technical feasibility and bankability of floating wind is extensively proven in other regions, the U.S. West Coast presents some particular challenges to the development of this technology. Oregon's main coastal challenges for offshore wind projects, which are similar to California, are presented below.

- **Lack of infrastructure** (ports and fabrication yards) and supply chain suitable to host and support the different stages of FOW construction (hull fabrication, assembly and integration, and other tier-1 components' logistics at industrial scale). The port infrastructure is very scarce on the West Coast and is already congested by shipping and military activities. Several medium size ports have expressed interest in upgrading their infrastructure to support offshore wind development, with different levels of support and public engagement.
- **Lack of track record** of FOW technologies in deep waters. Water depths within the CAs range up to 1300 m. This is unprecedented within the global FOW industry, and significantly deeper than all existing FOW installations to date. This will require the implementation of innovative mooring systems and cable configurations (suspended cables, shared anchors etc.), which have not yet been technologically qualified or tested.
- **Power transmission.** The onshore grid is insufficient, especially in Northern California and Southern Oregon and extensive investments will be required to integrate the FOW capacities planned in these areas. In addition, the distance to shore within the proposed WEAs and the associated water depths imply the need for floating substations, which are also at an early stage of development.
- **Permitting process.** The permitting process is expected to be a significant obstacle. The Oregon coast includes sensitive environmental regions, significant fishing activities, and important Tribal presence, all of which make stakeholder engagement and permitting particularly extensive.
- **Stakeholder engagement.** Potential lack of industry knowledge about the regional socio-economic factors implies an additional challenge in terms of permitting, stakeholder engagement, and workforce training.
- **Pricing considerations.** From a general project development and financing standpoint, higher levels of uncertainty within the offtake handling procedures (compared to those set in New Jersey or New York) might shrink the number of bidders, potentially relaxing bidding prices.

4.2 Wind resource – potential and energy assessment

The bathymetry of the Oregon CAs is sufficiently similar to the bathymetry of the California lease areas auctioned in 2022 to initially assume that the FOW technological challenges will not be substantially different between the two regions[10]. These include mooring system design and footprint limitations with respect to the wind farm area layouts, anchor installation planning and operations in deep waters, hull fabrication challenges in areas lacking infrastructure, and expertise to manufacture offshore wind components.

The above conditions, together with the novelty of offshore wind in the region in terms of port infrastructure, workforce expertise, and manufacturing logistics and experience, set a relatively low readiness level for offshore wind deployment in Oregon, similar to California.

All these conditions are assumed to impact capital and operational expenditures (CAPEX and OPEX), with some potential synergies from the previous developments in California that could potentially help both regions be more cost competitive. However, on the Levelized Cost of Energy (LCOE) front, the exceptionally strong winds along the Oregon coast could result in lower LCOE compared with the California lease areas.

5. DNV recommendations

DNV recommendations

As the industry prepares for BOEM's Oregon offshore wind auction, there will be significant challenges to address. Key next steps include understanding the federal and state permitting requirements, environmental, visual, and cultural impacts, viewshed impacts, co-existence with fisheries, technical and commercial feasibility of and optimizing FOW technology for large-scale deployment in Oregon's coastal waters, and the value of integrating FOW into the grid and its existing generation mix.

DNV recommends that future work should focus on assessing these primary challenges and any other information gaps. To facilitate successful pre- and post-auction project execution, DNV's North America Offshore Wind team offers clients unique and meaningful regional expertise related to offshore wind project development in Pacific Coast. For example, DNV provided advisory services to most of the participants in California's 2022 offshore wind lease sale and we continue to partner with several auction lease holders.

DNV can aid in developing comprehensive risk assessments and mitigation strategies through targeted analyses of a project's development strategy (offtake, stakeholder identification, permitting and regulatory analysis, project execution plans), technical feasibility including point of interconnection (POI) review, site constraints analysis, layout and project siting, navigation safety risk assessments, technology overview, and selection) and commercial feasibility (supply chain evaluations, construction and logistics studies, CAPEX and OPEX assessments, and LCOE benchmarking).

Contact DNV's North America Offshore Wind Advisory team to find out how we can help you achieve success in Oregon's upcoming offshore lease sale.

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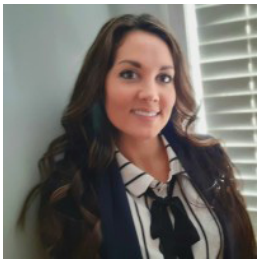

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ABOUT DNV

DNV is an independent assurance and risk management provider, operating in more than 100 countries, with the purpose of safeguarding life, property, and the environment. Whether assessing a new ship design, qualifying technology for a floating wind farm, analysing sensor data from a gas pipeline or certifying a food company's supply chain, DNV enables its customers and their stakeholders to manage technological and regulatory complexity with confidence. As a trusted voice for many of the world's most successful organizations, we use our broad experience and deep expertise to advance safety and sustainable performance, set industry standards, and inspire and invent solutions.

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