Economic Study Request

The economic study request window is posted on the NorthernGrid website at https://www.northerngrid.net

Please return the completed form to: NWPP_NorthernGrid_Staff@westernpowerpool.org

Requesting Stakeholder Information:

Date:	March 31, 2022	
Requesting Stakeholder Company:	Oregon Public Utility Commission	Oregon Department of Energy
Address:	201 High St. SE, Suite 100	550 Capitol St. NE, 1st Floor
City, State and Zip Code:	Salem, Oregon 97301	Salem, Oregon 97301
Contact Person:	Megan Decker	Adam Schultz
Title:	Chair, Public Utility Commission	Lead, Electricity Policy Group
Phone Number:	503-378-6611	503-580-1398
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Interconnection of Offshore Wind At-Scale to the Bulk Transmission System in Oregon

- Summary: Study the effects of a range of GW-scale offshore wind development scenarios with associated transmission upgrades (as specified below) on: (1) total production cost to supply system load, and (2) congestion across the regional transmission system, as well as indicating additional likely transmission expansion needs and high-level cost estimates for any needed expansion.
- Specifications:
  - Year 2032 (end of 10-year study; topology equivalent to 10-year future)
  - Evaluate the effects across three potential offshore wind capacity build-outs scenarios:
    1. Scenario 1: **1.5 GW cumulative nameplate capacity**
       - 900 MW capacity interconnected at Fairview substation near Coos Bay, Oregon (or a proximate substation that could provide a more economical solution)
       - 600 MW capacity interconnected at Wendson substation located near Florence, Oregon (or a proximate substation that could provide a more economical solution)
    2. Scenario 2: **3 GW capacity** – split across same points of interconnection as above.
    3. Scenario 3: **10 GW capacity** – split across same points of interconnection as above.
  - Offshore wind technology and production profile per 2021 NREL study data (National Renewable Energy Laboratory, Evaluating the Grid Impact of Oregon Offshore Wind, October 2021, https://www.nrel.gov/docs/fy22osti/81244.pdf).
  - Potential Transmission Upgrade Pathways:
    - Evaluate upgrading existing 230 kV to 500 kV from Fairview to Dixonville; and from Wendson to Lane and/or J.P. Alvey
    - Identify potential need for reinforcement to the 1-5 corridor and/or COI Path 66

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Interconnection of Offshore Wind At-Scale to the Bulk Transmission System in Oregon

The Oregon members of the Enrolled Parties and State Committee (EPSC) requests that NorthernGrid study the economic and reliability impacts to the regional bulk transmission system from a large-scale deployment of offshore wind generation into several points of interconnection along Oregon's coast, as studied by the National Renewable Energy Lab (NREL) in 2021[1] and anticipated to be opened to development by Bureau of Ocean Energy Management in 2025 and potentially in development within 10 years.[2]

Background

Regional power sector studies, including the cited NREL and PNNL studies and others[3] have indicated floating offshore wind could be an economically competitive resource option for western utilities within the 10-year planning horizon, particularly for utilities needing to procure resources to meet 100% clean energy requirements and commitments. Recent transmission assessments by NREL (see footnote 1) and Pacific Northwest National Labs[4] have identified that gigawatt-scale deployments of offshore wind have the opportunity to result in a net reduction in total production costs to supply system load while reducing congestion on existing regional transmission paths, particularly east of the I-5 corridor, without major upgrades to trans-coastal transmission (see footnote 1, pg. xv).

Recent information about the Bureau of Ocean Energy Management leasing process indicates consideration of 3 GW for near-term commercial deployment sited and interconnected at the western most edge of the regional transmission system. Developers are currently in the process of securing access to the BOEM call areas, which represent proof of concept for potential long-term development of dozens of gigawatts of offshore wind generation along the West Coast. Lease agreements to secure site access are expected to be complete prior to 2025, followed by what could be as little as 7 years of permitting before receiving approval for construction.[5]

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[1] National Renewable Energy Laboratory, Evaluating the Grid Impact of Oregon Offshore Wind, October 2021, https://www.nrel.gov/docs/fy22osti/81244.pdf

[2] Bureau of Ocean Energy Management, BOEM Oregon Intergovernmental Renewable Energy Task Force Meeting, February 2022, slides 3-8, https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/BOEM%20Oregon%20Proposed%20Call%20Area%20Presentation.pdf

[3] See Northwest Power and Conservation Council, 2021 Northwest Power Plan, March 2022, pg. 51, https://www.nwcouncil.org/media/filer_public/4b/68/4b681860-f663-4728-987e-7f02cd09ef9c/2021powerplan_2022-3.pdf; Evolved Energy Research, Oregon Clean Energy Pathways Analysis, July 2021, https://www.cleanenergytransition.org/projects/oregon-clean-energy-pathways-analysis; National Renewable Energy Laboratory, A systematic evaluation of wind's capacity credit in the Western United States, January 2021, https://onlinelibrary.wiley.com/doi/epdf/10.1002/we.2620; National Renewable Energy Laboratory, Updated Oregon Floating Offshore Wind Cost Modeling, September 2021, https://www.nrel.gov/docs/fy22osti/80908.pdf; updating NREL Oregon Offshore Wind Site Feasibility and Cost Study, October 2019, https://www.nrel.gov/docs/fy20osti/74597.pdf

[4] Pacific Northwest National Laboratory, Exploring the Grid Value Potential of Offshore Wind Energy in Oregon, May 2020, https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-29935.pdf

[5] See Bureau of Ocean Energy Management, BOEM Oregon Intergovernmental Renewable Energy Task Force Meeting, February 2022, slides 3-8, https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/BOEM%20Oregon%20Proposed%20Call%20Area%20Presentation.pdf The following elements of the BOEM leasing process are described in slides 5-8 of the February presentation:

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With leasing activities to secure ocean site access creating the potential for gigawatt-scale development of offshore wind to be interconnected to the regional transmission system by 2032, a regional study using NorthernGrid's power flow modeling is timely and important. The NorthernGrid members have an opportunity to understand regional transmission impacts by building on these transmission assessments with a study of the effects of a range of GW-scale deployments of Oregon offshore wind on total production cost to supply system load and on congestion across the regional transmission system.

Study Request

We request the evaluation of (3) 2032 scenarios in which 1.5 GW, 3 GW, and 10 GW of nameplate capacity is interconnected to the bulk transmission system in Oregon.

- **Scenario 1 (1.5 GW total nameplate)** – 900 MW of nameplate capacity is interconnected to the Fairview substation located near Coos Bay, Oregon (or a proximate substation that could provide a more economical solution), and 600 MW of nameplate capacity is interconnected to the Wendson substation located near Florence, Oregon (or a proximate substation that could provide a more economical solution). These two substations were studied in the 2021 NREL study, but could be substituted if NorthernGrid identifies superior alternatives.
- **Scenario 2 (3 GW total nameplate)** – interconnected to the same substations as Scenario 1 (or proximate substations identified as superior alternatives).
- **Scenario 3 (10 GW total nameplate)** – interconnected to the same substations as Scenario 1 (or proximate substations identified as superior alternatives).

This evaluation should also include an identification of transmission system upgrades necessary to accommodate the power flow capacities of key existing transmission corridors and paths (e.g., 230 kV to 500 kV) to enable the full deliverability of the power to load with minimal curtailment of generation due to transmission constraints. Necessary upgrades might include, but likely would not be limited to transmission capacity expansion along E-W trans-coastal corridors (lines crossing Oregon's Coast Range) and along N-S lines such as the I-5 corridor and/or segments of Path 66. A possible scenario of specific coastal transmission line upgrades to consider is expanding lines from Fairview to Dixonville, and lines from Wendson to Lane and/or J.P. Alvey, from 230 kV to 500 kV. We also request that NorthernGrid consider the potential need for reinforcement to transmission along the I-5 corridor and/or COI Path 66.

National lab studies have already suggested the potential for a net reduction in total production cost and reduced congestion by integrating new offshore wind resources, meeting all three of the NorthernGrid's ESR tariff criteria.

- Slide 3 – timeline showing BOEM's leasing and permitting process.
- Slide 5 - "considering 3 GW for near-term commercial deployment"
- Slide 6 - map showing where leasing areas will be located & proximate onshore interconnection points.
- Slide 8 – showing preliminary assessment of headroom capacities for power injection at select substation POIs (totaling 2,625 MW).

Successful development of any large-scale offshore wind capacity in Oregon waters, as anticipated by the recently announced BOEM call areas, may itself impact regional power flows, because the westernmost edge of the existing regional bulk transmission system has not previously received large-scale power injections of this scale. Beyond the initial development, the technical potential for dozens of additional GW of offshore wind capacity could transform regional power flows with significant effects on E-W and N-S transmission paths, net benefits to the regional bulk transmission system, and significant implications affecting transmission and reliability planning for decades to come.

Studying the impacts of 1.5 GW, 3 GW, and 10 GW of offshore wind interconnected along Oregon's southern coast is an invaluable first step toward understanding the magnitude of potential impacts within the 10-year planning horizon and would provide base scenarios from which future planning cycles could build upon.