Floating Offshore Wind Study: Benefits & Challenges for Oregon
Draft Key Findings

Introduction:

HB 3375 required the Oregon Department of Energy to review literature, consult with agencies, and hold public meetings on the benefits and challenges of integrating up to 3 gigawatts of floating offshore wind energy into Oregon's electric grid by 2030. During its study process, ODOE committed to sharing key findings prior to publishing its final report to provide transparency and an opportunity to address any inaccuracies. While the Department will publish its full report in September, the following is a summary of the key findings ODOE identified and synthesized from the literature review and stakeholder input. **ODOE's purpose in sharing this summary is to provide a preliminary opportunity to review what the Department has captured as key findings during its study process.**

HB 3375 directs ODOE to provide "a summary of the key findings from the literature review and consultation, including opportunities for future study and engagement, in a report." The key findings below are specific and narrow to the benefits and challenges of the potential of 3 GW of FOSW by 2030 and reflect staff's amalgamation and synthesis from our review of the existing literature, our understanding of the power sector and its long-term needs, consultation with other state agencies with FOSW subject matter expertise, and feedback from stakeholders. The full report will include a summary of topics raised during workshops and in comments, as well as information on the process flow of decisions as to where topics might be addressed and opportunities for future study and engagement.

Background:

Oregon, like many states across the west, has adopted aggressive greenhouse gas reduction policies and programs targeting economy-wide decarbonization and clean supplies of electricity. A consensus has emerged in recent technical literature that identifies the core pathways required to achieve these policies by mid-century, including the need to rapidly electrify energy end-uses in the transportation and building sectors (e.g., electric vehicles, electric appliances, electric space and water heating, etc.) and the corollary need to rapidly develop a tremendous scale of new clean energy projects. While the cumulative scale of clean energy resources needed can, and will, likely be built across a diverse geographic region, it is likely that Oregon will require tens of gigawatts of new renewables in the coming decades – even after accounting for savings from energy efficiency – to achieve its GHG reduction goals.

Meanwhile, the offshore wind resource area off the southern Oregon and northern California coast has been identified as one of the strongest wind resources in the world. Technical modeling identifies the potential to develop gigawatt levels of floating offshore wind projects in this area, which could play a critical role in helping the state and broader region achieve our climate and clean energy goals. While the potential benefits are significant, there also remain significant challenges that may take years to address.

Key Benefits:

- **Immense scale of the resource:** The technical scale of Oregon's floating offshore wind resource is immense and has the potential, if significantly developed, to rival the size of the existing hydropower system in the Pacific Northwest.

- **Grid diversity value:** A clean energy system ultimately will require significant diversity in order to ensure reliable, clean power every hour of the year. Onshore solar has become increasingly cost-effective, but it will have its limitations in providing clean power when we need it during certain times of the year, particularly during the winter months. Oregon's offshore wind resource, meanwhile, can generate significant output during evenings, nights, and winter months and thus offers significant diversity value in its ability to complement solar.

- **Economic development:** The scale and nature of floating offshore wind projects requires substantial development offshore and onshore Oregon, including: development of local supply-chains for components, development of local port infrastructure for assembly and tow-out, and development of new offshore transmission and expanded onshore transmission infrastructure for grid interconnection. The sizable scale of these local development needs could deliver new, well-paying jobs to underemployed coastal communities, where average local incomes are less than the state average. Direct, indirect, and induced economic benefits to areas of coastal Oregon, could improve their economic resilience to cyclical downturns in the existing fishing and timber industries.

- **Power system reliability:** The design of the power grid in the Pacific Northwest currently results in most electricity serving load centers (e.g., around Puget Sound and the Willamette Valley) flowing from eastside power plants over the Cascades into the westside load centers. The deployment of significant amounts of offshore wind on the western edge of the regional grid could help grid operators maintain the reliability of the regional power system.

- **Local energy resilience:** Similar to the previous benefit, Oregon's coastal communities are often at the "end of the line" when it comes to their location on the grid, with power needing to travel over long-distance transmission lines from power plants in eastern Oregon. The deployment of offshore wind resources closer to these coastal loads would provide more resilient local power supplies for these communities.

- **Balance land use impacts from onshore resource development:** The scale of clean energy development required to achieve mid-century clean energy policy goals is likely to require significant amounts of onshore development of generation resources and associated transmission lines. The scale of the offshore wind resources could balance, and minimize, some of those land use impacts by locating significant amounts of clean energy generation offshore.

Key Challenges:

- **Siting and permitting:** There is a complex ecosystem of rules and regulations governing the development of energy resources offshore. The candidate waters for development are controlled by the federal government, and comprehensive project planning can only proceed after a developer secures a lease from the Bureau of Ocean Energy Management. Many other local, state, tribal, and federal entities are involved with BOEM's siting and permitting process, and many would also be involved with siting and permitting processes for development upgrades to land-based infrastructure needed to support floating offshore wind. Offshore and onshore development could have a multitude of potential effects to coastal communities, ocean and land users, the environment, and cultural resources. Questions about the potential adverse impacts from these projects, as well as potential opportunities for avoidance and mitigation, remain unanswered at this time. Navigating the substantive topics addressed in siting and permitting processes could take a considerable amount of time.

- **Technology:** Wind turbines are a commercially viable, mature technology. They have been increasing in size and have been successfully deployed across the globe, both onshore and offshore in shallow water depths. However, to deploy offshore wind in the deep waters of the Pacific Ocean off Oregon's coast, the mature wind turbine technology must be paired with new types of floating platforms. Similar platforms have successfully been used in other industries such as the oil and gas industry. These novel floating offshore wind projects, while based on proven and mature technologies, have only been deployed at demonstration size scales (tens of megawatts) and have yet to be deployed at a utility-scale (gigawatts). As global deployment of floating offshore wind projects increase over time, the cost and reliability of the technology should improve.

- **Port infrastructure:** While the development of a robust offshore wind industry has the potential to deliver significant economic benefits to coastal Oregon, a pre-requisite would be substantial investments in upgrading a deep-water port. Upgrades would take several years but would improve the port's capability to manufacture floating platforms, integrate turbines with platforms, and accommodate the sea vessels required to tow assembled projects to their deep ocean location.

- **Transmission infrastructure:** Due to the current design of the regional power grid, Oregon's coastal transmission infrastructure is limited in its ability to accept significant additions of power from floating offshore wind projects. Substantial investment to upgrade the onshore electric transmission grid would likely be required to develop floating offshore wind projects at gigawatt scale and could take over a decade to accomplish.

- **Investment magnitude requires a consortium of buyers:** In order to attract the significant capital investment necessary for upgrading port and transmission infrastructure, and to develop floating offshore wind projects themselves, offshore wind projects will likely need to be constructed at the gigawatt-scale. At this scale it would be challenging for a single Oregon utility to finance a project. It is likely that some type of consortium of buyers would likely need to be arranged—including Oregon utilities, and utilities and entities from California and Washington.

Increased Collaboration to Optimize Scale and Location to Minimize Costs, Risks, and Impacts:

- **Need for interregional and local collaboration.** A common theme among many stakeholders was an interest in interregional and local collaboration to help optimally balance the two primary drivers affecting floating offshore wind deployment: the investment magnitude and siting and permitting issues.

- **Need for increased collaboration.** Long lead times for technology improvements, the scale of required port and transmission infrastructure investments, and potentially lengthy siting and permitting processes means interregional and local collaborative planning needs to begin soon in order for floating offshore to play a role in the clean energy future.

More Information / Questions / Concerns

For more information, see ODOE's webpage for this study:
https://www.oregon.gov/energy/energy-oregon/Pages/fosw.aspx

Please contact Jason Sierman with questions or concerns:
jason.sierman@energy.oregon.gov