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Magellan Wind Comment on CEC Draft Renewable Generation Research Roadmap

Additional submitted attachment is included below.

Magellan Wind Comment in response to CEC Research Idea Exchange
Docket No. 19-ERDD-01

July 12, 2019
California Energy Commission
Dockets Office
1516 Ninth Street,
Sacramento, CA 95814
Submitted via CEC Electronic Commenting System

Re: Research Idea Exchange, CEC Docket No. 19-ERDD-01 – Magellan Wind Comment on the CEC's Draft Renewable Generation Research Roadmap

Dear CEC Managers of the Research Idea Exchange Project:

Magellan Wind welcomes the opportunity to provide comments regarding the CEC's Request for Public Comments on the Preliminary Draft Research Roadmap. Our comments, which supplement views on price and performance standards set out in a joint submission to this docket by Magellan and other parties, are intended to support the CEC as it develops the research roadmap for renewable energy generation technologies.

Introduction

Magellan Wind is a developer of floating offshore wind farms in U.S. waters. Magellan draws on lessons learned from Europe's 28-year history with offshore wind and more than a decade of work by U.S. offshore wind developers. Magellan's strategic partners include Copenhagen Infrastructure Partners and Stiesdal Offshore Technologies.

Magellan's seeks to develop clean, renewable offshore wind power at deep water sites off the California coast, using emerging, cost-effective floating foundation technology. This development can place the U.S. in a leadership role in the rapidly emerging floating offshore wind industry. Magellan believes that development of floating foundation wind farms off the California coast can serve as a model for projects off Oregon and Washington, and provide valuable lessons for overseas projects, particularly in deep water locations near population centers around the Pacific Rim.

This submission provides a two-part response to the CEC's "Presentation Webinar for Public Comments on the Preliminary Draft Research Roadmap."[1] It includes

[1] Silvia Palma-Rojas, PhD., California Energy Commission, *Presentation Webinar for Public Comments on the Preliminary Draft*, CEC Docket No. 19-ERDD-01, TN 228811 (July 1, 2019) available at https://www.energy.ca.gov/event/webinar/2019-06/webinar-public-comments-preliminary-draft-research-roadmap This submission also draws upon the draft research roadmap that the CEC made available in advance of the webinar presentation. Energetics, Preliminary Draft Utility-Scale Renewable Energy Generation Research Roadmap (June 2019) (Draft Roadmap), CEC Docket No. 19-ERDD-01, TN 228863.

- responses to the questions raised in the "Offshore Wind Initiative Discussion" (slide 39), and
- comments on the CEC's reference to a demonstration project in "Notes – Offshore Wind" (slide 40).

A. Responses to the CEC's Offshore Wind Discussion Questions

Q1 - Are these research initiatives the right ones for cost and technology breakthroughs for utility-scale renewable energy generation?

Our responses address the proposed research initiatives in turn.

> Initiative 5.1: Cost Reduction of Offshore Floating Systems with a Focus on Platform and Anchoring Systems

Magellan believes continued reduction in the cost of platforms and anchoring systems is critical to the future of offshore wind for California. Technological improvements in other aspects of offshore wind technology, including turbine and cable design and manufacture, wind farm layout, and operation and maintenance equipment and practices, will also be important.[2] However, continued growth in the established global market for conventional, bottom-fixed projects should drive helpful innovation in these areas without CEC research investments. The Draft Roadmap correctly emphasizes research needs specific to emerging floating wind technology.

Floating foundation technology is progressing rapidly. Since 2011, seven floating foundation designs have been deployed, mostly as single-unit prototypes. Only Equinor's Hywind design has been deployed as part of a multi-turbine floating array.[3] The pace of research, development, and deployment of floating foundations and mooring systems is accelerating. Over the next three to four years, at least eight new foundation designs are scheduled to enter the water as the industry works to complete ten new multi-turbine projects.[4]

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[2] We note that bottom-fixed offshore wind technology has a positive record of performance over more than 20 years, with expected lifespans of some early offshore wind farms now be extending to 30 years. In addition, floating foundation prototypes have been successful in maintaining the stability required by manufacturers' specifications for offshore turbines. Accordingly, we are uncertain as to the basis for the Draft Roadmap's suggestion that "long-term performance of offshore wind turbines is not well understood." Draft Roadmap at 28.

[3] Peter Beiter et al., National Renewable Energy Laboratory, *2017 Offshore Wind Technologies Market Update* at 72-74 (Sept. 2018) (NREL Offshore Update) available at https://www.energy.gov/sites/prod/files/2018/09/f55/71709_V4.pdf.

[4] Id. at 73-74 (listing planned demonstration and commercial scale projects).

Even as promising new designs are deployed and tested in prototype and pilot-scale projects, the first utility-scale floating wind projects are beginning to take shape. In South Korea, the 1.4 GW Ulsan floating wind project is under development by a consortium composed of South Korea utility SK E&S, Shell, Wind Power Korea, and Macquarie's Green Investment Group.[5] A separate consortium, comprising Equinor, Korea National Oil Corporation, and Korea East-West Power, recently announced plans to construct a 200 MW floating wind project known as Donghae 1, by 2022 (grid-connected by 2024). Magellan believes that growing global interest in floating offshore wind will continue to drive rapid cost-cutting innovation in floating wind components and systems.

Magellan believes that for offshore wind to be important in California, foundation suppliers will need to achieve significant reductions in construction and fabrication costs. We recommend that the research roadmap plans for offshore wind support development and testing of floating foundations that:

- Incorporate major components that are
    - produced by existing industrialized supply chains capable of delivering high quality and low cost without an extended period of investment and scaling
    - designed for rapid quayside assembly by workers with widely available construction skills using land-based cranes and other widely available equipment
- Rely on advanced passive structural design rather than mechanical pumping systems or overwhelming (and expensive) mass to meet turbine stability requirements
- Deploy from a wide range of ports that do not require investments in channel deepening, surface expansion, or dry-dock installation that will have little or no value for other operations

In view of the rapid pace of innovation and investment in floating foundation technology, Magellan intends to select floating foundations for its projects based on project-specific conditions and options available when a foundation selection must be made. Magellan has entered into a partnership with Stiesdal Offshore Technologies (SOT) and regards the SOT family of floating foundation designs as an especially promising potential option.[6]

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[5] D. Snieckus, Recharge News, *Floating Lidar Install Launches Giant Korea Offshore Wind Project* (June 10, 2019) available at https://www.rechargenews.com/wind/1803643/floating-lidar-install-launches-giant-korea-offshore-wind-project

[6] A recent review in Recharge reported that SOT's TetraSpar design "promises to 'halve' the capital cost of current floater units being piloted around the world." The article also stated, "By SOT's calculations, the TetraSpar should slash the weight of an 8MW floating wind turbine from 2,500-10,000 tonnes to under 1,500 tonnes and bring the cost of large-scale floating wind farms down to under €2.5m/MW ($3m/MW)." Recharge News, *Full-scale Stiesdal floater heading for first outing off Norway* (March 2018)

Magellan recommends that the CEC consider, perhaps in the next round of research funding if necessary, support for work on improving deep water mooring, deep water array cable solutions, and offshore logistics for installation and operation and maintenance in the challenging metocean conditions off the California coast.

Initiative 5.2: Establishment of Local Manufacturing Capabilities for Offshore Tower Components

While important, Magellan believes this initiative is premature. East Coast US experience informs our opinion. Three of the leading states supporting offshore wind, Massachusetts, New York, and New Jersey, have actively sought to attract offshore wind manufacturing businesses. Massachusetts has committed to 3,200 MW of offshore wind; New York is at 9,000 MW, and New Jersey is at 3,500 MW. Yet no manufacturer has firmly committed to locating on the East Coast. Manufacturers have indicated that investment in new factories will require firm orders at levels they have not yet seen. California's nascent offshore industry is far behind these East Coast states.

Having said this, we think that it could be useful for California economic development officials to begin conversations with potential offshore wind businesses – both original equipment manufacturers (e.g., wind turbines, towers, foundations) and their supply chain partners. The feedback these officials receive could inform state initiatives to bring offshore wind-related manufacturing to California.

Initiative 5.3: Ensuring that Port Infrastructure can Handle Large Wind Turbine Components

There are a limited number of ports available to the offshore wind industry in California. Leading floating foundation designs require a pathway to the ocean without bridges or other overhead obstructions for towing of the assembled turbines to deployment sites.

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available at https://www.rechargenews.com/wind/1454804/full-scale-stiesdal-floater-heading-for-first-outing-off-norway (subscription only)

Based on published reports, the unit cost of the TetraSpar prototype, scheduled for deployment in 2020, will be €4,200/MW ($4,726/MW), which represents 22-43% of the per MW costs of prototypes of leading existing designs, including Equinor's Hywind, Principle Power's WindFloat, and Ideol's Floatgen. E.B. Villaespesa C.M. Gonzalez N.G.K. Martin, Aalborg University, *Transportation and Installation of the TetraSpar Floating Offshore Wind Turbine* (June 2018) available at https://projekter.aau.dk/projekter/files/281663582/Master_Thesis.pdf

Accordingly, ports inside San Francisco Bay, inland of the Golden Gate Bridge, will not be as attractive as ports with no air draft restrictions, like the Port of Hueneme and Humboldt Bay. Ports far from the proposed lease areas, such as San Diego, Long Beach, and Los Angeles, may be unattractive due to the risks of long transits through rough Pacific seas.

In assessing research proposals relating to port infrastructure, it is important to bear in mind that investment needed to deploy one class of designs may be unnecessary or detrimental to others. For example, designs that require large dry dock facilities for extensive assembly work by skilled welders may require investments and long-term commitments of scarce portside space that other designs would not require. Indeed, the dedication of port improvement funds and limited portside real estate to specialized dry dock infrastructure could disadvantage more efficient designs. Magellan recommends that an expert panel of technology providers be convened to discuss how to ensure that any research funds allocated to port improvements be utilized as efficiently as possible.

We also note that the technical assessment document for the Draft Roadmap references the need for new Jones Act-compliant vessels.[7] To our knowledge, none of the floating foundation designs under active consideration for California projects would require the construction of new vessels. Existing Jones Act-compliant tug boats will meet developers' installation needs.

Initiative 5.4: Improve Offshore Energy Interconnection through Development of Offshore High-Voltage Cables

Wind resources off of Humboldt Bay region are the strongest in the state. However, load served in this region is quite low and transmission capacity from this region to load centers is virtually non-existent. Magellan is pleased that the state is considering possible use of HVDC cables to transmit offshore wind power from northern California to the state's load centers and would be happy to support the state's efforts in this regard.

Two caveats with respect to research on HVDC transmission are in order. First, CEC should focus its research efforts on application of this rapidly advancing technology to California rather than on the technology itself. Extensive deployments in northern Europe, with a number of major projects in development, should drive substantial research and development for some time.

[7] Energetics, *Technical Assessment of Grid Connected Renewable Energy and Storage Technologies and Strategies* at 74 (Jan. 2019) TN# 228862 available at https://www.energy.ca.gov/event/webinar/2019-06/webinar-public-comments-preliminary-draft-research-roadmap

On the East Coast, where 18.6 GW of offshore wind is projected to be deployed by 2030,[8] a policy issue has arisen regarding whether wind farm and transmission development should continue to be owned and operated by offshore wind project developers or whether these functions – wind farm construction and transmission construction – should be separately built, owned, and operated. The U.S. Department of the Interior's Bureau of Ocean Energy Management (BOEM) has published a "Request for Competitive Interest"[9] for a New York-New Jersey offshore transmission system. The main concern of developers regarding separate transmission ownership is the risk of delay in the commencement of commercial operations for reasons entirely beyond developers' control. A transmission developer's failure to stay on schedule would delay the transmission of power and the collection of power revenues, thereby upending project finances. Magellan believes the timing is right for California to begin considering this issue and work with interested parties to find a solution that results in lower costs for ratepayers, reliable transmission service, and that ensures access to the transmission systems when they are needed.

Q2 - What are the cost/performance targets for each technology that should be considered for California?

Magellan's views on cost and performance targets for floating offshore wind in California are set out in the joint letter referred to above.

Q3 - Are there any gaps in these initiatives?

We believe that the final research roadmap should devote more attention to improved understanding of effects on wildlife. Initiative 5.2 includes a brief reference to "radar and wildlife detection systems." This should be expanded to discuss the development of protocols for studying the presence of wildlife in and near offshore wind sites identified by BOEM and ways to mitigate potential wildlife impacts. We recognize that BOEM's Pacific Region office is supporting these types of studies and think valuable information will be gleaned from them. Nevertheless, Magellan recommends that California officials consider, in consultation with BOEM, supporting studies similar to the extensive offshore wind-related wildlife studies commissioned by New Jersey, Rhode Island, and New York.

B. Comment on the CEC's Note Relating to a Possible Offshore Wind Demonstration Project

[8] Stephanie A. McClellan, Ph.D., University of Delaware, *Supply Chain Contracting Forecast for U.S. Offshore Wind Power* (March 2019) available at https://www.ceoe.udel.edu/File%20Library/About/SIOW/SIOW-White-Paper---Supply-Chain-Contracting-Forecast-for-US-Offshore-Wind-Power-FINAL.pdf

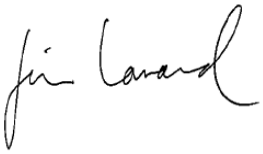
[9] BOEM, *BOEM Announces Next Steps for Proposed New York – New Jersey Wind Energy Transmission Line* (June 2019) available at https://www.boem.gov/press06172019/

The Roadmap Presentation mentions the possibility of CEC support for an offshore wind demonstration project. Magellan and its partners are open to this possibility and would welcome the opportunity to further explore this with the appropriate staff. A joint industry-university research effort tied to a demonstration project could provide a proving ground for technological innovations and an opportunity for detailed research on the effects of offshore wind turbines on marine life and birds. In discussions of a possible demonstration project, the CEC should make clear that this effort would complement rather than delay or replace efforts to move forward as quickly as possible with commercial scale leasing on sites identified in the Bureau of Ocean Energy Management's December 2018 Call for Information and Nominations.

Conclusion

Offshore wind can play an important role in California's energy transition. Magellan appreciates this opportunity to comment on research relating to offshore wind that could advance the State's ambitious and vitally important renewable energy and greenhouse gas emission reduction goals.

Respectfully submitted,



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