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AWEA-CA Comments on Draft Report - Research and Development Opportunities for Offshore Wind Energy in California

Additional submitted attachment is included below.

March 20, 2020

California Energy Commission
1516 9th Street
Sacramento, CA 95814-5512

Docket # 19-ERDD-01

RE: Draft Report - Research and Development Opportunities for Offshore Wind Energy in California

Dear California Energy Commission,

The American Wind Energy Association of California (AWEA-California) appreciates the opportunity to comment on the "Draft Report - Research and Development Opportunities for Offshore Wind Energy in California." We also appreciate having had the opportunity to participate in the advisory group for this report.

In this letter, AWEA-California would like to provide feedback on which of the "barriers" to development of offshore wind in California we agree are significant and how best for the state to address those barriers. We also offer comments on those barriers identified in the report which we believe are overstated and respond to the recommendations offered in the report.

Although we understand that the purpose of this report is to direct CEC research funds to support the offshore wind industry, and we commend the CEC for this effort, AWEA-CA would like to acknowledge that what is needed most to stand-up an offshore wind industry is comprehensive statewide planning toward a long-term deployment goal.

Specifically, **AWEA-CALIFORNIA recommends that California establish a target of at least 10 GW of offshore wind development by 2040 and commit to implement a plan to achieve this target.** We believe this target will be of sufficient size to support investments in new local manufacturing facilities by offshore wind equipment manufacturers[1] and is necessary given the 150 GW of new renewables the state will require before 2050.[2] The Energy Commission should work in coordination with the Coastal Commission, State Lands Commission, Ocean Protection Council, the Governor's Office, and other agencies as needed to develop a strategic plan to implement this 10 GW goal.

[1] Robert Collier et al., *California Offshore Wind: Workforce Impacts and Grid Integration*, September 2019, p. 38: "Among turbine manufacturers and government officials, a rule of thumb is that firms will only invest the hundreds of millions of dollars to build high-tech factories for blades, nacelles, and towers once there is a strong likelihood that at least 8 GW in offshore capacity will be auctioned off over the next decade."
[2] E3, *Deep Decarbonization in a High Renewables Future*, May 2018.

I. Several of the offshore wind deployment barriers identified in the report can be overcome with proper state planning and leadership in support of a specific planning goal.

AWEA-California agrees with several of the barriers identified in the report. However, these barriers can be addressed with proper planning and leadership by state agencies and the Governor's office, as described below.

Most importantly, California should adopt a statewide planning goal for offshore wind to guide all state research and planning. Without a specific goal, it is unlikely that the various agencies and entities that must be involved in building and preparing the state for an offshore wind industry will develop solutions and plans which are mutually compatible. We must define the offshore wind industry which California seeks to achieve in twenty years in order to guide the planning and assessments prepared today. The report provides the example of the research, planning, and public investments made by the State of New York, specifically the New York State Energy Research and Development Authority, in response to the Governor's 2018 and 2019 offshore wind deployment goals.

To that end, AWEA-California agrees with the following identified barriers and supports the associated recommendations made in this report, provided those recommendations are implemented in the context of a large-scale offshore wind deployment goal and comprehensive statewide offshore wind plan:

- *Barrier 1: Limited infrastructure exists to transmit offshore wind generation to load centers, particularly on the northern coast;* And *Recommendations 10a and 10c: Closely study the projected costs and benefits of transmission upgrades required for large-scale offshore development; Evaluate the cost and technical feasibility of offshore HVDC transmission.*

To facilitate offshore wind at scale, California will certainly require new transmission investments and upgrades to connect offshore projects to load centers.

AWEA-California notes that it is not just limited infrastructure that is a barrier, it is the challenges in syncing up procurement through the CPUC with the transmission and planning cost allocation processes at the CAISO. The transmission planning process has been severely hamstrung in recent years due to the iterative nature of the Integrated Resource Planning (IRP) and Transmission Planning Process (TPP), and the cyclical interactions between procurement and transmission planning where new resource availability informing IRP portfolios is limited by assumptions about transmission availability, and transmission studies and investments are limited to the portfolios selected in the IRP. This process/policy challenge is a barrier of its own.

The CAISO and the California Public Utilities Commission should work together with the CEC to identify transmission solutions, assess the cost of those solutions, and evaluate alternatives for allocating those costs. The right transmission costs must be applied as inputs in the IRP model in order to properly value the costs of offshore wind. The portfolios selected in the IRP also drive the transmission planning and studies performed by the CAISO. Thus, if the costs of transmission associated with offshore wind are misunderstood, or if offshore wind is only a limited candidate resource in the model, then offshore wind is unlikely to be selected in substantial quantities as part of an IRP portfolio, which in turn limits the CAISO's ability to study that transmission need.

AWEA-California therefore strongly supports the recommendation provided here to study transmission needs, costs, and options, including subsea transmission options. In a recent SB 100 workshop, the CAISO identified offshore wind as an opportunity for helping achieve SB 100 goals but asked policymakers to direct the CAISO on which new resources will be needed so that transmission solutions can be evaluated and planned accordingly.[3]

We recommend that the CEC work with the CAISO and the CPUC to assess the transmission investments and upgrades necessary to support a 10 GW offshore wind goal, including through a Transmission Planning Process Special Study considering existing transmission capacity, near-term least-regrets transmission investments, and long-term investments in new transmission infrastructure. The CEC, CPUC, and CAISO should conduct an assessment of standard and alternative approaches to funding new transmission to support offshore wind.

We also suggest that the CEC, CPUC, and CAISO specifically 1) study the opportunity to make use of the 3-4 GW of offshore wind which could be integrated with upgrades to existing transmission following the retirement of Diablo Canyon;[4] 2) incorporate upcoming findings from the Schatz Energy Research Center[5] on transmission and interconnection costs for offshore wind from the Humboldt Call Area, including a subsea cable option; and 3) the proposed subsea Pacific Transmission Expansion Project which would connect Diablo Canyon to the LA Basin.

- *Barrier 2: Need to assess statewide port capabilities to identify improvements required and RD&D opportunities for large offshore wind projects;* And *Recommendation 6: Conduct a comprehensive study on port infrastructure in California and develop technical solutions to identified gaps.*

The offshore wind industry will require significant port upgrades to facilitate construction and installation of turbines off the coast. The UC Berkeley Labor Center Study[6] has already provided an initial assessment of port capabilities and necessary improvements. Therefore, the focus of this recommendation should be to assess the specific upgrades and improvements required to facilitate an industry with a 10 GW by 2040 project pipeline, including construction and staging of foundations, manufacturing of components, and long-term operations and maintenance facilities.

This assessment should include the potential availability of land and water acreage at each seaport, including competing/existing uses, infrastructure feasibility, deepwater access, and bridge height restrictions. The CEC should work with the State Lands Commission and the GO-Biz in this effort.

[3] Delphine Hou, CAISO, "Planning for reliability and resource adequacy under SB 100," Slide 10.
[4] CAISO, "Transmission Planning Implications and Considerations of Offshore Wind," October 3, 2019 IEPR Workshop on Offshore Wind.
[5] Schatz Energy Research Center, *Offshore wind feasibility study 2*, https://schatzcenter.org/2019/07/oswstudy2/.
[6] Collier, *California Offshore Wind*.

AWEA-California further notes that goal setting can drive infrastructure investments. State commitments have also stimulated hundreds of millions of dollars in public and private investments in port upgrades to support the offshore wind industry.[7]

- *Barrier 3: Uncertain market conditions restrict project development and supply chain investment;* And *Recommendation 4: Develop approaches to use and optimize existing supply chain and manufacturing or assembly solutions in California.*

AWEA-California agrees wholeheartedly with this observation made in Barrier 3. California needs to send a market signal to offshore wind companies and manufacturers to stimulate local investment. A deployment target will support the offshore wind industry by signaling to investors and developers that the future market in California is real and substantial.

The most straightforward, effective approach to providing greater market certainty is to set a state-wide planning goal.

As the report acknowledges, the success of the offshore wind industry in the East Coast is at least partially the result of state commitments for offshore wind deployment, totaling over 25 GW among six East Coast states. Specific resource targets and goals have proven highly effective for stimulating long-term development of clean energy technologies. Nearly two decades ago, California's landmark renewable portfolio standard created stimulus for utility-scale wind and solar developments. Building new wind and solar is currently cheaper than building new gas, and by 2030, it may be even more affordable to build new wind and solar than it will be to use existing gas facilities.[8] In 2007 the California Solar Initiative provided funding for distributed solar installation toward the goal of "1 million solar roofs" – a target which was exceeded before the 2016 program end date. More recently, AB 2514 (2010) mandated procurement of 1,325 MW of energy storage by the IOUs by 2020, and, like the solar mandate, helped accelerate deployment of energy storage and drove down the costs of batteries.

By making this goal large enough, the state can also drive greater local supply chain investment. The UC Berkeley study concluded, "If a sufficiently large project pipeline threshold were created—for example at least 8 GW[9] over a decade …turbine manufacturers and other supply chain firms might be more likely to invest in building new factories in California. If that minimum threshold were not met, however, and if the procurement process evolved more incrementally, wind manufacturers would lack clarity about

[7] See: Port of Virginia partnership with Ørstedhttps://www.marinelog.com/offshore/renewables/offshore-wind-port-of-virginia-and-orsted-in-lease-agreement/; Public funding for the Port of New Bedford: https://www.windpowerengineering.com/federal-funding-to-support-offshore-wind-staging-for-the-port-of-new-bedford/; Deepwater Wind (now Ørsted) investment in Port of New London in Connecticut: https://www.courant.com/business/hc-biz-state-pier-wind-power-20190309-sxki2foyazhvvhxfirovy6fxx4-story.html; Sunrise Wind investment in NYSERDA for port improvements: https://us.orsted.com/News-Archive/2019/04/Sunrise-Wind-NY-Port-Investments

[8] Lazard, *Levelized Cost of Energy and Levelized Cost of Storage 2019*, November 7, 2019, https://www.lazard.com/perspective/lcoe2019.

[9] Collier, *California Offshore Wind*, p. 38: "Among turbine manufacturers and government officials, a rule of thumb is that firms will only invest the hundreds of millions of dollars to build high-tech factories for blades, nacelles, and towers once there is a strong likelihood that at least 8 GW in offshore capacity will be auctioned off over the next decade."

the future California market for their products. In that case, wind farms likely would be built with primarily imported inputs, and the economic benefits would be markedly less significant."[10]

The state should adopt a 10 GW by 2040 offshore wind deployment goal to increase market certainty and drive local economic development benefits.

- *Barrier 5: Lengthy federal leasing and untested California permitting processes;* And *Recommendation 10 d: Map out the permitting process and develop a handbook.*

The permitting process for offshore wind will be both extensive – requiring permits or mitigations from multiple agencies and input from many competing stakeholder interests – and uncharted, with no off-the-shelf permitting process that can be easily adapted for this new resource. Offshore wind projects will require approval and/or input from the federal government, including BOEM and the Department of Defense, as well as state agencies. As the permitting process for offshore wind will be extensive and expensive – costing tens of millions of dollars – investors in these projects will require a greater level of regulatory certainty regarding the permit process in California in order to make these necessary upfront investments.

The Ocean Protection Council has already been leading a Marine Renewable Energy Working Group of relevant state agencies to define the permitting requirements for offshore renewable energy. As recommended by the report, AWEA-California agrees that the CEC and OPC should convene a similar working group that includes the Governors' Office of Planning and Research, State Lands Commission, Coastal Commission, Ocean Protection Council, Department of Parks and Recreation, Department of Fish and Wildlife, BOEM, and others, as appropriate, to collectively develop and produce guidelines, timeframes, and milestones for a coordinated, comprehensive, and efficient permitting process for offshore wind facilities and associated electricity and transmission infrastructure off the coast of California. The agencies should look to the example set by the Renewable Energy Action Team as a model for a comprehensive and efficient process.

- *Barrier 9: Conflicts with training and operation of the military on the central and southern coasts*

AWEA-California agrees that conflicts with military operations in southern and central California represent a barrier to offshore wind industry development. Off the central coast, however, AWEA-California believes there is a path to resolution. A state goal for 10 GW of offshore wind will help facilitate these conversations by defining the quantity of commercially viable sea-space that California requires.

[10] Collier, *California Offshore Wind*, p. 7.

II. Certain offshore wind deployment barriers identified in the report are overstated, and the related recommendations should be revised or reframed.

- *Barrier 6: Limited data on potential negative impacts on commercial fisheries and offshore ecosystems in California. Recommendation 9: Conduct state-led environmental studies along the California coast to fill gaps in existing research.*

Although AWEA-California agrees there may be additional state-led research which could contribute to environmentally responsible siting and operation of offshore wind facilities, AWEA-California disagrees that the lack of data on ecosystem impacts is a substantial barrier to offshore wind deployment. There are two initiatives currently underway to assess existing data-sets which may help determine potential interactions between marine ecosystems, as identified in the report.[11] In addition, the Pacific Offshore Wind Energy Research (POWER) group comprises offshore wind industry and environmental NGO members which intends to work together to collectively identify and prioritize research on potential offshore wind and wildlife research. This group will likely provide valuable recommendations on additional state-led research needs. Finally, AWEA-California recommends that research focus on potential impacts in federal waters, 20-30 miles off the coast where most if not all projects will be sited, as opposed to impacts in the near-shore environment.

The lack of data on potential impacts from offshore wind to commercial fisheries is perhaps a greater gap which should be addressed, potentially through a CEC or OPC workgroup. There may be some lessons to draw from the East Coast. While floating technology poses different challenges than fixed bottom foundations, the turbine spacing, and layout alternatives being evaluated on the East Coast may offer solutions for California. However, it's also worth noting that fisherman focused on different stocks and fisheries will likely be impacted differently, and there may be site-specific interactions and potential mitigations which would be best addressed as part of site identification and project permitting.

However, we can expect that data on potential impacts to both commercial fisheries and marine ecosystems will be collected and assessed as part of regular environmental assessments, through BOEM at the Federal Level as part of NEPA and by California agencies through CEQA. Once there are specific projects proposed at specific sites, data collection needs will be more clearly defined.

Most importantly, the lack of data on possible future impacts across the California Coast should not be cause for slowing down the planning and progress of addressing the more pressing barriers identified in Section 1 of this letter, which are essential to achieving an offshore wind industry at scale. Thus, while , AWEA-California supports continued state engagement in research to fill gaps in our understanding of potential impacts, the CEC should be thoughtful about determining research priorities as well as the best timing for research and data collection to advance project siting and permitting in an efficient manner.

III. *Barrier 7: Uncertain cost trajectory and concerns surrounding cost-competitiveness with onshore resources.*

[11] "There are ongoing research efforts to study ecosystem effects of offshore wind farms in California (e.g., research being conducted by Schatz Center, Point Blue Conservation Science and the Conservation Biology Institute)." P. 5

AWEA-California disagrees that the uncertainty of cost trajectories and cost competitiveness are barriers for offshore wind.

Energy and Environmental Economics, Inc. (E3) was commissioned by Castle Wind to conduct a study using a public version of the RESOLVE model.[12] The study shows that a resource portfolio that includes between 7 and 9 gigawatts (GW) of offshore wind could save California customers between $1 billion and $2 billion (net present value) between now and 2040 when compared to an energy portfolio dominated by additional solar PV and battery storage. Those benefits will increase as energy prices continue to decline. This study utilized cost trajectories from the 2019 NREL ATB which project rapid declines for floating offshore wind.

AWEA-California expects that the cost declines for floating offshore wind will follow the pattern of fixed-bottom offshore wind, which have seen quick declines. Mayflower Wind, a fixed bottom offshore wind project, will be sold to Massachusetts utilities at a levelized price of $58/MWh[13], which is highly competitive compared to offshore wind projects on the East Coast contracted just five years earlier.[14] Mayflower's low price point also proves that Vineyard Wind, with a contract price of $65/MWh in 2019, wasn't an outlier but rather part of a trend.

We further note that the lack of certainty on cost trajectories for solar and batteries didn't prevent the state from moving forward with aggressive planning goals and deployment targets to bring those resources online. As a result of this policy initiative, the markets responded, as did the costs for these resources. The cost of floating offshore wind will undoubtedly respond in similar fashion.

- *Barrier 8: Incomplete understanding of the total value proposition of offshore wind to California; and Recommendation 11: Conduct a comprehensive study on the total value proposition of offshore wind development, including grid and macroeconomic benefits.*

While , AWEA-California agrees that additional assessments of the total value proposition of offshore wind could be helpful, the known value proposition for offshore wind is quite strong:

  - **Technology Diversity and Grid Reliability:** Diversifying renewable energy resources through the introduction of offshore wind promotes reliability, provides resource adequacy, and reduces risk. By 2035, California will need to dispatch more than 18 GW *per hour* to meet its maximum 3-hour net load ramp as a result of solar production falling off in the afternoon.[15] Offshore wind is particularly valuable because it tends to pick up and generate the most energy in evening hours, thereby reducing reliance on gas generation (and the resulting emissions). A recent study by the

[12] E3, *The Economic Value of Offshore Wind Power in California*, August 2019.
[13] Riviera Maritime Media, *'Competitively priced' Mayflower Wind beats Vineyard Wind on cost*, February 13, 2020, https://www.rivieramm.com/news-content-hub/lsquocompetitively-pricedrsquo-mayflower-wind-beats-vineyard-wind-57976.
[14] U.S. Department of Energy, *2018 Offshore Wind Technologies Market Report*, https://www.energy.gov/sites/prod/files/2019/08/f65/2018%20Offshore%20Wind%20Market%20Report.pdf. See p. 17
[15] Energy Strategies for Western Interstate Energy Bureau, *Western Flexibility Assessment*, December 2019.

CAISO also demonstrated that wind facilities equipped with inverter-based smart controllers can provide essential grid services similar to gas and hydro power.[16]

- **Geographic Diversity:** There is only 2-5 GW of new in-state land-based wind development potential in California.[17] Offshore wind, along with regional on-shore wind offer geographic diversity which could help California balance the objectives of maintaining environmental protections in project siting while managing costs.[18]
- **Local Economic Development:** Tapping at least 10 GW of this energy by 2040 would create 9,000-10,000 jobs, with roughly fifteen percent in operations and maintenance. [19] With global offshore wind potential estimated at 500 GW, California's next wave of manufacturing investments can also position the state to be a major source of offshore wind technology and a critical part of the supply chain — substantially increasing its economic impact.[20]

Regarding both Barrier 7 and 8, the CEC should be careful with how this research report may be misinterpreted. For example, a California Energy Markets article[21] on the staff workshop for the report paints the potential for offshore wind in a rather negative light, highlighting barriers or uncertainties for the industry without also highlighting the major benefits which offshore wind will bring to the state or explaining that other clean energy technologies have faced and surmounted similar barriers in the past. The article reports, "Perhaps most importantly, Parzygnot noted that floating turbine technology has yet to be proven at a commercial scale…'It remains unknown what, if any, unforeseen obstacles commercial-scale project development in California may encounter (for example, port limitations, supply chain constraints, wake effects) and how these obstacles may affect the value proposition.'"

IV. *Barrier 10: Limited data supporting floating technology performance at commercial scale.*

Floating offshore wind technology has been demonstrated around the world, with close to 200 MW of installed capacity to be operational next year. The technology is available and ready for commercial deployment.[22] We already know that floating offshore wind technology is viable and ready for

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[16] CAISO, *Avangrid Renewables Tule Wind Farm: Demonstration of Capability to Provide Essential Grid Services*, March 11, 2020, http://www.caiso.com/Documents/WindPowerPlantTestResults.pdf.
[17] CPUC Inputs & Assumptions: 2019-2020 Integrated Resource Planning, November 2019, p. 39
[18] The Nature Conservancy, *Power of Place: Land Conservation and Clean Energy Pathways for California*, June 2019, https://www.scienceforconservation.org/products/power-of-place.
[19] American Jobs Project, *The California Offshore Wind Project: A Vision for Industry Growth*, February 2019, http://americanjobsproject.us/wp/wp-content/uploads/2019/02/The-California-Offshore-Wind-Project-Cited-.pdf.
[20] U.S. Department of Energy, *2018 Offshore Wind Technologies Market Report*.
[21] California Energy Markets, NewsData Inc, "California Faces Barriers to Offshore Wind, CEC-Led Study Concludes," March 6, 2020.

[22] NREL's 2018 Market Projections report, available here, states, "The floating wind energy project pipeline is growing, with multiple floating pilot projects advancing. The global pipeline for floating offshore wind energy reached 4,888 MW in 2018. The pipeline comprises 38 announced projects, including 46 MW of operating projects. The floating "…offshore wind energy industry is well into a second-generation, multiturbine, precommercial pilot phase." (p. xiii). "…Just last week, MHI Vestas moved to the installation of their latest 10 MW turbine on a French 30 MW project" (https://www.offshorewind.biz/2019/11/18/french-floating-wind-farm-to-feature-mhi-vestas-10mw-turbines/).

commercial deployment in California. With a long-term market signal, offshore wind companies can manage the supply chain appropriately. Further, there is no reason to believe that additional turbines in proximity to one another in the water will create wake affects which haven't been observed in smaller installations. It is not clear that performance of a 500 MW or 1000 MW floating offshore wind farm would be significantly different from the performance of a 30 MW facility. In the land-based context, project size has increased relatively rapidly. Issues like wake effects are already understood due to existing offshore and land-based experience and aren't likely to change due to a difference in platform foundation.

V. Recommendation 10 should be revised or reframed so as not to inadvertently set the industry back.

- *Recommendation 10: Assess the offshore wind installed capacity that is complementary to solar generation and feasible to support a reliable, cost-effective, and low carbon energy system. Evaluate the role of multiple levels of offshore wind development toward supporting a more reliable and cost-effective grid.*

Recommendation 10 includes several discrete sub-recommendations which AWEA-CA supports, as referenced in Section 1, above. However, AWEA-CA opposes the concept of evaluating the feasibility or value of multiple levels of offshore wind development to determine which level of deployment is ideal. The case for a large quantity of offshore wind (e.g., 10 GW) is already quite strong. Determining the exact "right" quantity before proceeding with the crucial planning and preparation needed to drive the industry forward would only serve to delay the most important steps to standing up the industry.

The need for planning is urgent given active and ongoing negotiations with the Department of Defense, upcoming coastal power plant closures, and the long lead time for transmission planning. A 10 GW planning goal would send a strong signal to the Federal government about the sea-space California requires for offshore wind, amplifying the role of the State and its stakeholders in determining where offshore wind facilities will be installed. Offshore wind could take advantage of existing transmission capacity connected to local load centers in areas with upcoming coastal power plant closures. For example, the Diablo Canyon closure in 2025 will make 2 GW of transmission capacity available, so long as sea-space issues are resolved in time. Planning, permitting, and construction for transmission will take at least 10 years. Additional transmission capacity is needed to connect Northern California offshore wind resources to load centers farther south. In order to get offshore wind online in the next two decades, we need to start transmission planning now.

VI. Conclusion

AWEA-California appreciates the efforts of the CEC in preparing this report and supports several of the barriers and recommendations identified. We recommend that the Commission and other state agencies focus on and prioritize the recommendations in this report which point to the major planning

efforts necessary to stand up an offshore wind industry in the state: site identification, transmission planning, and port and workforce development.

Sincerely,

Molly Croll
Offshore Wind Program Director, AWEA-California
California Environmental Associates
Tel: (401)595-4327
molly@ceaconsulting.com

Danielle Osborn Mills
Director, AWEA-California
Renewable Energy Strategies, Inc.
Tel: (916) 320-7584
danielle@renewableenergystrat.com