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AWEA-California Comments on Technical Workshop on SB 100 Joint Agency Report

Additional submitted attachment is included below.

December 2, 2019

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

Docket # 19-SB-100

RE: Technical Workshop on SB 100 Joint Agency Report: Charting a path to a 100% Clean Energy Future

Dear Chair Hochschild, Chair Nichols, and Commissioner Randolph,

Thank you for your leadership and collaboration with the State's energy and environmental agencies to chart a path to a 100% Clean Energy Future for All.

The American Wind Energy Association (AWEA) is the national trade association for the U.S. wind industry. AWEA-California participants include global leaders in utility-scale wind energy development, ownership, and operations. Many companies also develop and own other energy infrastructure such as transmission lines, utility-scale solar, and energy storage. We are committed to the need for—and widespread economic benefits derived from—a diverse and balanced portfolio in California to reliably and affordably meet state energy demands and environmental goals. AWEA-California supported SB 100 (de Leon, 2018) upon its introduction and we are committed to working with the agencies towards ensuring affordable, reliable, equitable and expeditious implementation of these important new statutory requirements.

The American Wind Energy Association of California (AWEA-California) appreciates the opportunity to comment on the Technical Workshop for the SB 100 Joint Agency Report. In these comments, AWEA-California recommends the following:

- Consider the SB 100 modeling effort and report as opportunities to explore all technical solutions, without constraints, and study the myriad of zero carbon generation options that could help California decarbonize its electricity sector. To that end, the modeling effort should not be too narrowly constructed around RESOLVE least-cost portfolio planning.
- Offshore wind presents enormous potential for the state to leverage carbon emission reductions in the electricity sector to further decarbonize the transportation and building sectors. The State agencies should take a leadership role in the development of a robust offshore wind industry through the establishment of a state target and the necessary planning to achieve it.
- The State agencies should perform long-term resource and transmission planning studies to support the SB 100 target, and to drive near-term least-regrets decisions.

I. The Joint Agencies should consider all technical solutions that will help California decarbonize its electricity sector, as well as all the necessary attributes of a 2045 electric system, rather than relying too heavily on forecasting a least-cost portfolio.

To achieve SB 100 mandates, California's load-serving entities will need to make major investments to transform the electric system. They will need to procure 100 - 150 GW of new renewable generation by

2050[1] and develop new approaches to maintaining system reliability without access to the conventional resources that provide the bulk of flexible capacity for the system today. This is an enormous challenge which demands a bold vision and innovation. While it is important for California to achieve its decarbonization goals affordably – both to protect the state's own ratepayers and to serve as an example for other state's and nations – the Joint Agencies should be careful to acknowledge the shortcomings in RESOLVE which may prevent it from accurately identifying a least-cost portfolio over a long-term planning horizon.

First, the Joint Agencies must acknowledge that our ability to identify the least-cost, reliable resource portfolio decades in the future based on the information we have today is by nature highly speculative. Technology-specific cost projections are never certain or static, often changing from year-to-year, and are less accurate the farther they tread into the future. For example, cost projections for offshore wind are rapidly improving, just as the cost projections for battery storage did in the early days of deployment. A recent UC Berkeley/E3 report suggests, "While the cost of floating offshore wind today is higher than fixed-bottom offshore wind, the technology is well understood and its cost is expected to decline rapidly with commercialization and greater scale of deployment."[2] AWEA-California recommends continued refinement of the cost assumptions for floating offshore wind technologies based on known cost reductions and recent generation and cost data from recently contracted east coast projects and European floating offshore wind projects.[3] The Joint Agencies should do their best to incorporate the most up-to-date cost information.

More importantly, new technologies should not be written off or written out of SB 100 planning processes simply because costs today appear high. Even if we could produce cost projections that provide a perfect lens into the future, a model like RESOLVE may continue to underestimate the value of certain resources. For example, the model only solves for the resources needed for a set of representative days, rather than for a full year, and therefore will miss certain multi-day trends or events (e.g., several widespread low solar days) which might require different renewable resources. As the Castle Wind E3 study shows, offshore wind typically generates consistent energy throughout the day, including in the evening hours when net load ramps up, and could therefore provide crucial capacity after the sun goes down and reduce the state's reliance on grid-scale lithium-ion battery storage.[4] In addition, as several parties noted at the conclusion of the 2017-2018 IRP cycle, RESOLVE

[1] https://www.ethree.com/wp-content/uploads/2018/06/Deep_Decarbonization_in_a_High_Renewables_Future_CEC-500-2018-012-1.pdf

[2] Collier, Robert, Sanderson Hull, Oluwafemi Sawyerr, Shenshen Li, Manohar Mogadali, Dan Mullen, and Arne Olson. California Offshore Wind: Workforce Impacts and Grid Integration. Center for Labor Research and Education, University of California, Berkeley. September 2019. http://laborcenter.berkeley.edu/offshore-wind-workforce-grid p 6

[3] The 20-year average cost of long-term contracts for Massachusetts' 800 MW Vineyard Wind Project in is $84.23 per MWh in levelized nominal dollar terms. This is equivalent to a levelized net present value price in 2017 dollars of $64.97 per MWh. https://macleanenergy.files.wordpress.com/2018/08/doer-83c-filing-letter-dpu-18-76-18-77-18-78august-1-2018.pdf

[4] E3, The Economic Value of Offshore Wind Power in California, http://castlewind.com/wp-content/uploads/2019/08/2019-08-08_E3-CastleWind-OffshoreWindValueReport_compressed.pdf (Figure 4 page 21).

does not properly model the cost or effect of curtailment, which may underestimate the value of balancing resources or make certain resources like offshore wind appear falsely expensive.

Furthermore, Pattern Energy described at the Technical Workshop that state policy can stimulate a virtuous cycle leading to technology improvements, cost reductions, and additional policy support.[5] Thus, while multi-decade cost projections should be consider with caution, as described above, the state should also acknowledge its ability to drive markets and cost declines. Portfolio planning to 2045 will not be an objective exercise – by virtue of the signals sent at the conclusion of the planning process, the Joint Agencies will have a role in promoting or hindering the development and cost trajectories of different resources. This is especially true for new technologies like offshore wind.

AWEA commends the Energy Commission for adding "Resource Diversity & Flexibility" and "Innovation and Emerging Technologies" into its key considerations for SB 100 planning. Indeed, state policy mandates planning for a diverse and balanced portfolio.[6] Capacity expansion modeling will build a portfolio that solves for some but not all of what we require or desire from our electric system.

The state should also consider the risk reduction benefit of resource diversification and local resource development. Offshore wind promotes energy security by taking advantage of a natural resource that is uniquely available to California, especially as the state's best land-based renewable resources approach full build-out or become too difficult to site and as demand increases for regional renewables across the west. By providing resource diversity, offshore wind helps abate deployment and market risks. The most recent Reference System Plan produced by the CPUC is remarkably homogenous, calling for the addition of 11 GW of batteries and nearly 12 GW of solar by 2030. The CPUC acknowledges, "Such a large buildout of these resources is unprecedented at this magnitude, and the practical challenges associated with it in reality cannot be effectively estimated using only a model."[7] Certainly diverse portfolios which include land-based regional renewables and offshore wind, could provide a hedge against the risks associated with a less diverse portfolio. AWEA-California believes that in the long-term, a diverse portfolio will be low cost, lower risk, and more resilient than a portfolio which is dominated by one or two technologies from a constrained geographic area.

Finally, there are benefits to certain resources which may be difficult to quantify or incorporate into a resource planning model, such as economic development potential. Participants at the CEC's October 3 IEPR workshop on offshore wind highlighted the economic development potential of offshore wind, which include port revitalization as well as local manufacturing. The American Jobs Project estimates that offshore wind could generate 5,300 jobs in California a 5 GW scale and 17,500 jobs at an 18 GW scale in 2045.[8]

Thus, while AWEA believes that capacity expansion modeling can be instructive, the Joint Agencies should consider the full set of attributes that we desire from a 2045 portfolio and take proactive measures to incorporate diverse and innovative technologies, such as offshore wind, into their long-

[5] Pattern Energy Presentation, SB 100 Technical Workshop, November 18, 2019
[6] PUC 454.51
[7] Administrative Law Judge's Ruling Seeking Comment On Proposed Reference System Portfolio And Related Policy Actions, Rulemaking 16-02-007, November 6, 2019, p 21
[8] American Jobs Project, The California Offshore Wind Project: A Vision for Industry Growth, February 2019, p. 28

term planning efforts. Rather than simply casting a future based on what we see today, the Joint Agencies should envision what the future resource portfolio should look like and evaluate the steps necessary to make that portfolio both practically and economically feasible.

With all of this said, the modeling should not discount the role of existing technologies such as land-based utility-scale wind and solar as foundational components of the portfolio to achieve California's greenhouse gas reductions in a timely and affordable manner. Innovations in wind and solar technologies continue to drive cost reductions and facilitate integration of renewables as emerging technologies come up to scale. Modern solar and wind technologies and components offer new attributes and can provide a suite of services to the grid, enabling simultaneous investments in a suite of emerging technologies as well.

AWEA-California is of the mind that California needs immediate procurement of new low-cost, carbon-free renewable energy to capture near-term greenhouse gas emission reductions and to drive technology innovation and cost-reductions that can sustain continued long-term progress toward 100% clean energy.

II. The Joint Agencies should take a leadership role in the development of a robust offshore wind industry through the establishment of a state target, a state plan designed to achieve it, and a commitment to implement long-term planning. A statewide target of 10 GW of offshore wind by 2040 will stimulate industry investment, expedite development, and reduce costs.

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.[9] 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.

On the east coast, state mandates and targets have led to the nation's first offshore wind developments: the 800 MW Vineyard wind project will help fulfill Massachusetts' 3.2 GW offshore wind mandate,[10] New Jersey Governor Murphy's 2018 Executive Order setting a 3.5 GW target has stimulated new development, and New York's 9 GW[11] target has driven Governor-lead offshore solicitations as well as

[9] https://www.lazard.com/perspective/lcoe2019
[10] https://www.mass.gov/service-details/offshore-wind
11 https://www.nyserda.ny.gov/All%20Programs/Programs/Offshore%20Wind

workforce and port investments. Developments and solicitations have also occurred in Rhode Island, Virginia, Connecticut, and Maryland.[12]

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 and by unleashing state agencies' resources, expertise, and political capital toward addressing the key challenges to achieving the target.

A target is essential for realizing the full benefits from offshore wind. The UC Berkeley study concluded, "If a sufficiently large project pipeline threshold were created—for example at least 8 GW[13] 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 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."[14] Large-scale commercial deployments of offshore wind also benefit from economies of scale to drive down costs.

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 is achievable given the state's 20+ GW of development potential[15] and overall clean energy resource additions required between 2020 and 2050. A 10 GW target is also consistent with finding from the Castle Wind study by E3, which found that 7-9 GW of offshore wind are part of the 2040 least-cost portfolio.[16] A 10GW target by 2040 is also sufficiently ambitious to make a meaningful contribution to California's climate goals.

This target will serve as a signal not only to investors and industry, but also to the state and federal government. To that end, the state should develop a plan to address the siting, permitting, infrastructure, and supply chain requirements for offshore wind to achieve this target, as described below.

State agencies and the governors' office should take a leading role in negotiations with the DOD and BOEM to identify sufficient commercially viable wind energy areas, both as part of BOEM's task force and in site-specific discussions, along with relevant local representatives and industry.

The Energy Commission, in collaboration with the CPUC, State Lands Commission, Coastal Commission Ocean Protection Council, and CAISO should spearhead a comprehensive planning effort (a "state strategic plan and implementation schedule for offshore wind") to support the development of offshore wind in the state to achieve the target. Since floating offshore wind energy will be new to California, the

[12] https://www.awea.org/Awea/media/About-AWEA/U-S-Offshore-Wind-Fact-Sheet-September-2018_2.pdf;

[13] Collier, Robert, 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."

[14] Collier, Robert, September 2019, p. 7

[15] Collier, Robert, September 2019, p. http://laborcenter.berkeley.edu/pdf/2019/CA-Offshore-Wind-Workforce-Impacts-and-Grid-Integration.pdf

[16] E3, The Economic Value of Offshore Wind Power in California, http://castlewind.com/wp-content/uploads/2019/08/2019-08-08_E3-CastleWind-OffshoreWindValueReport_compressed.pdf

development process for offshore wind remains relatively amorphous and uncertain. State leadership through robust planning and coordination and implementation will help overcome potential uncertainties regarding permitting requirements, authority, and sequencing which could unnecessarily stall or halt the development process.

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. AWEA-California recommends that the Energy Commission continue to serve as a convener, working with BOEM and state agencies to bring together permitting agencies and stakeholders to chart out a complete and efficient permitting process that extends from the offshore site lease award to final BOEM approval and state consistency reviews. This upfront planning process will help avoid lengthy and expensive delays which could otherwise arise from a "trial-and-error" approach to permitting.

Achieving a 10 GW offshore wind target will also require new investments in the bulk transmission system. Neil Millar's presentation on behalf of the CAISO during the CEC's October 3rd Offshore Wind workshop[17] highlighted the limitations of the Generation Interconnection Process for offshore wind developers requiring major transmission upgrades, the lack of adequate capacity in the North Coast transmission system, supporting transmission pathways which will require upgrades to deliver offshore wind to load centers, and the importance of the Transmission Planning Process (TPP) to realizing necessary infrastructure investments. As AWEA-California has advocated across proceedings at the CPUC and CAISO, the TPP has been severely hamstrung in recent years due to the iterative nature of the Integrated Resource Planning and TPP processes, and the cyclical interactions between procurement and transmission planning where procurement is challenging without transmission certainty, and transmission development and cost allocation is challenging without clear procurement.

Given potential project size and the division of load in the state, offshore wind will require financially solvent load-serving entities and a planning and procurement regime that can support several capital-intensive offshore wind projects.

Finally, the state should support the offshore wind target by promoting investments in local supply chain workforce development. The American Jobs Project advocates for "a cluster-based approach: creating market certainty, training workers, and facilitating connections in its innovation ecosystem, among other strategies."[18]

[17] Neil Millar, CAISO, "Transmission Planning Implications and Considerations of Offshore Wind," Presentation at IEPR Commissioner Workshop on Offshore Wind.

[18] American Jobs Project, The California Offshore Wind Project: A Vision for Industry Growth, February 2019, P. 8

III. The Joint Agencies should perform long-term, regional resource and transmission planning in the near term to support the SB 100 target, and to drive near-term, least-regrets decisions

For all renewable energy development, the state could consider conducting an analysis of successful strategies employed in other jurisdictions to expand transmission to enable large-scale renewable energy development. The Competitive Renewable Energy Zone (CREZ) process, in particular, serves as a highly relevant case study example. Since its implementation, CREZ has enabled development of more than 18 GW of wind energy capacity while overcoming technical issues such as curtailment and transmission congestion.[2] California of course had its own version of this effort with the Renewable Energy Transmission Initiative (RETI) and RETI 2.0, both of which resulted in valuable information to inform renewable energy development. The State could re-boot its renewable energy transmission planning efforts for a third time in a manner that improves the certainty of transmission development by feeding the least-regrets results directly into the procurement process. The Joint Agencies should consider the enabling value of modern transmission to deliver a diverse portfolio of low-cost, zero-carbon, utility-scale power to California customers.

Conclusion

AWEA-California appreciates the Joint Agencies' efforts to lead the transformation of electric sector to achieve SB 100 goals and encourages further contemplation of both geographic and resource diversity to decarbonize California's economy quickly and cost-effectively.

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[2]Competitive Renewable Energy Zones in Texas, National Renewable Energy Lab (2018) https://www.michigan.gov/documents/mpsc/tx-crez-background_258398_7.pdf