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Subject: (Docket 19-SB-100) AWEA-CA Comments on Senate Bill 100 Draft Modeling Results Workshop

I. Introduction

The American Wind Energy Association of California (AWEA-CA[1]) appreciates the opportunity to comment on the Draft Results from the SB 100 Joint Agency Report. As we write this letter, a record breaking 3.3 Million acres have burned in the state this year. Resulting pollution has brought air quality to very unhealthy or hazardous levels in several regions, compromising public health amidst a global pandemic. Heat waves this August caused the CAISO to initiate rotating outages over two days. Climate change is upon us and there is no doubt about the challenge we face globally and locally to mitigate and adapt to the most severe impacts we will face now and into the future.

In this context, we call upon state leaders to draw upon the SB 100 report to demand and create policy and plans that will rapidly and aggressively transform our power system. This report is the first long-term, multi-agency approach for determining how the state will implement SB 100; it should not be relegated to a theoretical or academic exercise, but rather a guidebook for immediate action on planning, procurement, and deployment. AWEA-CA would like to draw attention to four major conclusions from the report:

- **Clear policy leadership is needed:** AWEA-CA and numerous panelists and stakeholders conclude from the draft results a clear and pressing need for state policy direction and leadership. The electric system called for in the SB 100 results will not build itself. The IRP proceeding, running as it has without significant improvements, will not manifest this future electric system. While in recent years the leadership at state agencies, the

[1] The American Wind Energy Association (AWEA) is the national trade association for the U.S. wind industry. AWEA-CA 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-CA 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.

legislature, and the Governor's office may have been cautious about working outside existing proceedings and processes or feared getting too far ahead by over-procuring, it is clear now that the more significant risk for California is doing too little, too late.

- **Technology is available:** E3 concluded in the workshop that SB 100 is attainable with existing renewable energy and energy storage technologies currently commercially available. California does not need to wait for new solutions to be engineered or properly proven. We have the tools to achieve the clean energy transition and maintain reliability, but we must start planning for and building that future today.
- **Procurement is far behind:** The draft results indicate that the annual build rate required to achieve SB 100 will exceed even the peak renewable construction levels in California stimulated by the American Recovering and Reinvestment Act of 2009 (ARRA). Furthermore, California will need to maintain this level of build out year-after-year for twenty-five years. To achieve SB 100, we will need to build nearly 1 GW of wind energy per year for twenty-five years. While the Integrated Resource Proceeding has identified a substantial resource need by 2030 – a total of 25 – 37 GW of new renewables and energy storage – the CPUC has directed only minimal and short-term levels of emergency-based procurement during the first two two-year IRP cycles. The level of procurement required by LSEs in the most recent procurement track is insufficient to provide the replacement generation necessary for the timely retirement of California's aging gas and nuclear facilities in the next several years. Our initial calculation of the need for new capacity to serve California's load and replace these planned retirements would suggest procurement of *at least* 11-12 GW statewide in the next several years. The joint agencies and CPUC Commissioners must recognize that the IRP is failing to put the state on a pathway to achieve the transition required by SB 100 as illustrated in the joint agency report draft results.
- **Resource diversity is critical:** RESOLVE selects both out-of-state wind and land-based wind when made available to the model. Both resources are part of the least-cost portfolio in multiple scenarios out to 2045. This result is notable for two reasons. First, RESOLVE has limited resource diversity by 1) applying caps on the quantity of out-of-state and offshore wind available to the model and 2) failing to account for the value of geographic resource diversity through application of a uniform effective load carry capacity assumption. Correcting these limitations in the modeling will likely result in greater resource diversity in SB 100 portfolios. Second, the IRP has failed to call for significant resource diversity to-date. Thus, a longer-term outlook and improved geographic and locational assessments must be incorporated into the IRP to more properly value and guide procurement of diverse resources.
- **Renewable generation can enhance reliability:** Two relatively recent reports describe the capabilities of utility-scale wind and solar in providing important ancillary services. The findings of these reports should be considered in the broader context of how renewable resources can meet California's various needs as the State transitions to 100% clean energy. They demonstrate that with the right contracting structures in place, both

utility-scale wind[2] and utility-scale solar[3] can provide ancillary services (e.g. frequency regulation, voltage support, spinning and non-spinning reserves) that are currently provided by conventional generation. The 2020 report *AvanGrid Renewables Tule Wind Farm: Demonstration of Capability to Provide Essential Grid Services* notes "The results demonstrate that wind resources have the capabilities to help accelerate the shift toward a future electric grid with high levels of renewable generation. These results—much like those from a similar test in 2018 on an inverter-controlled solar power plant—promise next generation advances for increased amounts of renewable generation, including pairing it with storage to create more effective dispatchable resources."[3]

To address the conclusions described above, AWEA-CA recommends that the Joint Agencies take the following steps as soon as possible:

1) Correct modeling to enable improved understanding of the value of diverse resources;
2) Provide policy direction to launch the offshore wind industry as soon as possible; and
3) Improve existing planning and procurement processes to realize an optimal long-term resource portfolio.

We note that given the draft results already demonstrate the importance of long-lead time and diverse resources and therefore while it is important to improve the modeling before results are finalized, we expect these improvements will only strengthen the case for taking action on procurement and planning of diverse resources now. Further, the policy and planning recommendations provided here are all within the authority of the state agencies or could be accomplished through executive action and therefore should be pursued immediately.

II. Recommended changes to inputs and assumptions

AWEA-CA recommends that the Joint Agencies make several changes to the inputs and assumptions that are needed to better portray the value of a diverse fleet of clean capacity resources. SB 100 specifically requires the development of a program that achieves certain benefits, which include "meeting the state's need for a diversified and balanced energy generation portfolio."[4] The following refinements to the SB 100 modeling will help ensure that a more diverse set of clean capacity resources throughout the western interconnect are able to compete as candidate resources in the model.

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[2] CAISO and NREL, Avangrid Renewables Tule Wind Farm: Demonstration of Capability to Provide Essential Grid Services. 2020. http://www.caiso.com/Documents/WindPowerPlantTestResults.pdfhttp://www.caiso.com/Documents/WindPowerPlantTestResults.pdf

[3] NREL, Demonstration of Essential Reliability Services by a 300-MW Solar Photovoltaic Power Plant. 2007. https://www.nrel.gov/docs/fy17osti/67799.pdf

[4] Cal. Pub. Util. Code Sec. 399.11(b)(6).

1. *Develop regional effective load carrying capacity ("ELCC") values for wind and solar resources.*

The draft inputs and assumptions use a single marginal ELCC derate for wind and solar. However, ELCCs may vary based on geography and within technology sub-classifications of each of wind and solar technologies. The ELCC methodology directly affects the qualifying capacity value of wind and solar resources, thus affecting the market signal for these resources. These market signals are critical to ensuring that the portfolios envisioned in the IRP can become a reality. One way to create clearer signals for resource diversity is to better account for geographic diversity value in the ELCC model. AWEA-CA is hopeful the utilities' RPS Least Cost Best Fit ELCC modeling as directed in CPUC Decision 19-06-026 will provide important information for the Joint Agency's consideration in the SB 100 Report. This modeling will account for a broader array of resource types and geographic granularity, which may better inform the value of diversity in the wind and solar fleets.

More broadly, the Joint Agencies should consider alternatives to using a marginal ELCC methodology altogether. The ELCC modeling has largely been guided by the relative presence of renewables on the system and the fact that wind and solar resources have not been incentivized to serve as true capacity resources or provide ancillary services. The RPS contract structure incentivizes scheduling coordinators to maximize production from wind and solar resources. As a result, these resources run as much as possible and then are curtailed when supply and demand are out of balance. These system conditions have directly affected the modeling outputs for the ELCC values. As the CPUC and other stakeholders re-evaluate the resource adequacy structure to consider the role of use-limited resources, the Joint Agencies should also be mindful of how the SB 100 report may inform contracting practices for clean capacity resources going forward. The Joint Agencies should specifically identify the need to model and contract all clean capacity resources in a way that incentivizes the provision of ancillary services and maximizes the potential capacity value of these resources.

2. *The Joint Agencies Should Bolster the Electrification Scenarios*.

During the September 2nd workshop, stakeholders questioned the electrification assumptions and whether various Behind the Meter resources resulting from high electrification efforts (e.g., Electric Vehicles) could be optimized as candidate resources in the capacity expansion model. The Joint Agency staff indicated that the RESOLVE model does not optimize the dispatch of behind the meter resources. The ability to optimize these resources is subject to considerable policy development. Irrespective of how BTM resources may be optimized, the fact remains that the State is on an historic and unprecedented path to electrification. An equally important question is how the capacity expansion of supply-side resources can be optimized to meet the hourly demand profile associated with the high electrification and other demand scenarios. High capacity factor wind resources have a generation profile that closely matches a typical residential EV charging session. A recent study from California Polytechnic State University[5] concluded that central coast offshore wind produces energy consistently during evening hours and peaks in summer months, nearly perfectly matching the most challenging load

[5] https://www.sciencedaily.com/releases/2020/09/200908170537.htm.

patterns in the state. The Joint Agencies should refine the modeling assumptions to ensure that resources with generation profiles that peak in the evening hours are appropriately accounted for in terms of satisfying demand in those hours.

3. The Joint Agencies Should Refine the Transmission and Distribution Cost Assumptions to Ensure that Candidate Resources Compete on an "apples-to-apples" Basis.

During the September 2nd workshop, Joint Agency staff clarified that the costs of supply side resources were accounted in terms of the total revenue requirement the utility would incur due to the procurement of the resources. These costs would include all costs associated with development (e.g., development, construction, transmission, etc.). By contrast, Joint Agency staff clarified that distribution upgrade costs of demand side resources were not included in the model. In order for demand side resources to compete to provide resource adequacy, the resources will typically need to undergo a deliverability assessment or otherwise complete the utility's load impact protocol. The deliverability assessment will lead to distribution costs that should be accounted for in the context of enabling demand-side resources to compete with supply-side resources on an apples-to-apples basis.

In addition, it is not clear that regional wind and offshore wind resources are able to compete on an apples-to-apples basis with other supply-side resources due to the unavailability of transmission cost data. Resources with active interconnection requests in the CAISO interconnection process have readily available transmission cost data. However, regional and offshore wind resources do not have many active interconnection requests. In the absence of this data, the Joint Agencies have developed assumptions for delivering high capacity factor wind energy from various regions in the Western Interconnect. Regional wind developers are actively working on building transmission costs into PPAs with California off-takers. In particular, the cost assumptions presented in Table 38 of the SB 100 Draft Inputs and Assumptions document appear to be much greater than the PPA-based pricing developers are currently marketing. AWEA-CA recommends that the Joint Agency staff coordinate with the CPUC's IRP staff to evaluate the responses to the 2020 regional wind data solicitation conducted in R.20-05-003, particularly with respect to transmission costs for delivering regional wind from New Mexico.

In addition, the Joint Agencies appear to be utilizing cost assumptions for delivering offshore wind energy to shore that may also be overly conservative and inconsistent with NREL's 2020 LCOE projections. The Joint Agencies should ensure that these resources have a fair opportunity to compete in the model and are not unnecessarily limited because there is no CAISO-generated transmission cost data available at this time.

4. The Joint Agencies Should Revise and Update Offshore Wind Assumptions

AWEA recommends several additional changes to improve the assessment of offshore wind in the study: 1) Incorporate new NREL cost estimates in October; 2) increase the cap from 10 GW to 15 GW; and 3) accelerate the first available date for offshore wind to 2026.

First, we note that the National Renewable Energy Laboratory (NREL) is completing an assessment funded the Bureau of Ocean Energy Management to update cost and capacity factor information for multiple offshore wind development areas off the California coast. The intent of this study was, in part, to provide the CPUC with more robust cost information than the 2018 NREL Annual Technology Baseline (ATB) projections currently used in RESOLVE. These cost estimates incorporate improved information on wind speed, wake losses, plant size, turbine growth trajectory, port and interconnection assumptions, and capital expenditure learning curve. Once results are published in October, the joint agencies should immediately direct E3 to update offshore wind assumptions in RESOLVE.

Second, we suggest that NREL increase the cap on offshore wind in the model and consider transmission planning needs of offshore wind, in addition to other resources. Since all 10 GW of offshore wind is selected by the model in most scenarios, it is likely a larger quantity of offshore wind may also be selected if permitted, which is worth examining in this report. Specifically, regarding transmission planning, during the September 2 workshop, E3 staff explained the 10 GW cap is based on the assumption of roughly 5 GW of transmission capacity available to offshore wind in the central coast and an assumed build out of an additional 5 GW of transmission capacity from the North Coast.

In October of 2019, the CAISO indicated significant developer interest and transmission capacity, particularly on the Central Coast given the planned retirement of Diablo Canyon.[6] More recently, the CAISO has reported 5 to 7 GW of transmission capacity that could be available for offshore wind in the central coast. In addition, there are active proposals to construct new transmission that would connect renewables in the central valley and central coast to the LA Basin.[7] Roughly 3 GW of offshore wind could come online by 2026 assuming there are lease auctions next year. This timing is important because offshore wind may be one of the best resources for replacing Diablo Canyon Power Plant and utilizing the transmission capacity that will be made available upon the facilities retirement in 2025. Further, the 2026 date aligns with the strategic objective of the Ocean Protection Council to facilitate a commercial offshore wind project by 2026. We suggest accelerating the first available date for offshore wind to 2026.

For the north coast, the selection of a 5 GW limit seems somewhat arbitrary and premature. NREL found that the North Coast offshore wind potential totals 6,500 MW when combining Humboldt and a potential Crescent City development area.[8] E3 found an estimated 14.2 GW of offshore wind potential in the North Coast combining the Humboldt Call Area with potential resources in Del Norte County and Cape Mendocino.[9] AWEA-CA recommends that a future study examine transmission solutions that would optimize build-out and delivery of offshore wind in the North Coast based on offshore wind costs and value, system needs, and transmission costs. The report should seek to optimize the quantity of offshore wind based on the

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[6] Presentation by Neil Millar, California Independent System Operator. Transmission Planning Implications and Considerations of Offshore Wind**.** 1 October 2019. Filed in CEC Docket 19-IEPR-07, p.7.

[7] See: https://tred-llc.com/projects/

[8] NREL, https://www.nrel.gov/docs/fy17osti/67414.pdf.

[9] UC Berkeley Labor Center, *California Offshore Wind: Workforce Impacts and Grid Integration*, September 2019.

resource rather that predetermining a potential transmission solution. We recommend either increasing or eliminating the cap on offshore wind.

We expect that these improvements will lead the model to select large quantities of offshore wind and in earlier years. Given the attention that will be paid to this joint agency report from policymakers throughout the state, it is essential these updates are made before the report is finalized and submitted to the legislature in January.

5. The Joint Energy Agencies Should Update Regional Wind Potential and Costs

First, we note that according to CPUC executed project data, regional wind *currently* provides at least 2,800 MW to California today[10], with at least 500 MW of additional new regional wind under contract.[11] Much of this wind is delivered as a 'Bucket 1' resource.[12]

In January of 2019, AWEA-CA filed comments on an ALJ Ruling of the Proposed Preferred System Portfolio and Transmission Planning Process Recommendations, which identified over 15,000 MW of potential for western utility-scale wind development, as well as publicly available price information from western IRPs and RFPs.[13] Since these comments are over a year old, and 2019 was a critical year not only for Production-tax credit-related procurement but also for passage of multiple RPS increase and 100% clean energy requirements in the West, it is likely that many of the projects listed in the table have since secured PPAs with Western off-takers, however the table illustrates both the quality of the resource and the commercial interest in Western wind.

Given the passage of aggressive greenhouse gas policies in Washington, New Mexico, Colorado, and Nevada, following California's passage of SB 100, competition for utility-scale renewable energy and clean capacity has increased. The Western Flexibility Assessment modeled Western resource portfolios with the goal of investigating "the flexibility of a future grid in which renewable resources are deployed at levels consistent with enacted and foreseeable public policy requirements of the Western states."[14] The study highlights the importance of enhanced regional coordination to achieve these goals—and in particular, the need for transmission expansion and upgrades. The report emphasizes that investments made in the next decade will be critical to the successful implementation of Western clean energy requirements, and that without improved regional transmission, increases in operational costs, emissions, and renewable energy curtailment are likely. In the long-term, results indicate that it will be very

[10] CPUC, RPS Executed Projects [Updated April 2020]. https://www.cpuc.ca.gov/RPS_Reports_Data/ and the Milford wind projects in Utah.
[11] CalCCA, CCA New Renewable Long-Term Power Purchases. https://cal-cca.org/wp-content/uploads/2018/11/CCA-New-Renewable-PPAs-November-2019.pdf
[12] 'Bucket 1' refers to Product Content Categories defined in California RPS statute; Public Utilities Code Section 399.16(b (1).
[13] AWEA-CA Comments in Response to the Administrative Law Judge's Ruling Seeking Comment on Proposed Preferred System Portfolio and Transmission Planning Process Recommendations.
[14] Energy Strategies and Western Interstate Energy Board. https://westernenergyboard.org/wp-content/uploads/2019/12/12-10-19-ES-WIEB-Western-Flexibility-Assessment-Final-Report.pdf10 Dec. 2019.

difficult, or at least extremely costly, to achieve Western policy targets without broad coordination of wholesale markets.

In terms of costs of Western wind, AWEA-CA offers the following data points:

- A 2018 Xcel RFP selected projects in the $11-28/MWh range.[15]
- PacifiCorp's 2019 IRP included capital costs for wind of $1,301 - $1,358/KW and capacity factors between 29.5% and 43.6%.[16]
- Lazard's Levelized Cost of Energy 2019 suggests that onshore wind has a capital cost of $1,100 - $1,500/kW.[17]

III. Improve existing transmission planning and procurement processes

The joint agencies should seek to improve the effectiveness of the collective planning processes critical to achieving SB100: The SB100 Joint Agency Plan, the IRP, the Resource Adequacy (RA) Proceeding, the CAISO's Transmission Planning Proceeding (TPP), the Integrated Energy Planning Report (IEPR), and the Air Resources Board's AB 32 Scoping Plan. Given the interdependencies between these processes, if any one plan or report underdelivers, the result will be a failure to appropriately identify long-term electric system needs. Collectively, these planning processes need to aim for more aggressive transformation beginning in the near term. As a first step, this means more stringent carbon reduction targets for the electric system allocated by CARB and adopted by the CPUC. Next, we need the CPUC to provide policy guidance and procurement direction that will enable the CAISO to plan the transmission system of the future.

Second, the joint agencies need to plan for the replacement of major baseload generating resources set to retire. To date, there has been no planning for the replacement of the Diablo Canyon Power plant, as required both by statute and settlement.

Third, the joint agencies need to begin incorporating more location-specific planning into the SB 100, RA, and IRP processes. Multiple parties at the September 2 workshop emphasized this point. The CAISO called for an SB 100 portfolio that is actionable and provides locational granularity about where resources will be needed on a cumulative basis. This will be essential for effective transmission planning. Representatives from the Union of Concerned Scientists, Physicians, Scientists, and Engineers for Healthy Energy, and Communities for a Better Environment called for locational planning for the purpose of prioritizing pollution reduction in disadvantaged communities. Industry representatives and a commenter from the Nature Conservancy pointed to the importance of confronting land-use impacts, which requires

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[15] See Public Service Company of Colorado 2016 Electric Resource Plan, 120-Day Report "Public Version", Colorado PUC Proceeding No 16A-0396E; June 6, 2018; page 50-51.
[16] PacifiCorp 2019 IRP. https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2019_IRP_Volume_I.pdf Table 6.1 on page 133.
[17] Lazard. Levelized Cost of Energy 2019. https://www.lazard.com/media/451086/lazards-levelized-cost-of-energy-version-130-vf.pdf

geographically granular planning. In addition, as discussed in section 1 of this letter, geographic differentiation will improve the capacity valuation of intermittent renewables.

The magnitude of new renewable capacity needed to achieve both 2030 and 2045 goals will undoubtedly necessitate new transmission development. Current state processes do not appropriately consider the procurement and development timelines necessary for an efficient and timely build-out of infrastructure projects to enable delivery of renewable generation to California consumers at lowest cost. Below are three categories of transmission planning that must be considered in statewide planning processes:

- **Secure and accelerate CAISO-approved transmission upgrades:** The joint agencies must ensure that transmission upgrades already approved by the CAISO move through the siting, engineering, and construction phases as soon as possible. Accelerating and securing these transmission upgrades will support near-term development of the associated renewable energy resources. However, some of these transmission upgrades are stalled or have not been prioritized by the transmission developer responsible for their completion. Doing so could unlock a minimum of 1400 MW of renewable generation and battery storage in the near-term.
- **Facilitate approval of transmission upgrades that require minimal, additional permitting:** Several transmission upgrade projects have not yet received approval via the CAISO transmission planning or generator interconnection process. Similar to the CAISO-approved upgrade projects described above, however, these projects would also have minimal environmental impacts and are not expected to require extensive additional permitting as they are generally upgrading transmission facilities that already exist. This effort could enable a minimum of 3 GW of new renewable and storage capacity.
- **Enable new transmission development through an updated statewide transmission planning effort, linked to the procurement processes:** The State should build upon the first two RETI efforts by initiating a new process. This new effort should include assessments of both western regional transmission and other long-lead time resources that could help with resource portfolio diversification and renewable integration, such as offshore wind and long-duration storage. To begin to take immediate action on long-term resources, the study should produce near-term actionable recommendations for the agencies, balancing areas, and load-serving entities. This updated effort should include mechanisms to ensure that the effort goes beyond simply studying and analyzing transmission that is needed for the State to achieve its climate goals. It should include provisions that will help ensure that beneficial and necessary transmission expansion projects can proceed with approval, permitting and construction.

IV. Policy direction and planning for offshore wind

It should no longer be a question for state energy leadership and load-serving entities about whether offshore wind is necessary, cost effective, and needed in large scale. The answer is clearly: Yes, we need it and we need at least 10 GW over the next two decades. As a new industry, with unique infrastructure requirements and siting and permitting challenges, we need to plan for at least 10 GW of offshore wind starting now. This level of build out will not happen without state leadership and action. Furthermore, slow, incremental development of offshore

wind at a scale of a few turbines at a time is a failing approach. The fact that there are no offshore wind turbines online in California today despite the massive need and value of this resource is cause for aggressive and comprehensive planning, not small, timid steps.

Urgently addressing the barriers for development of offshore wind at scale will also enable the state to plan for a more optimal power system overall. For example, the transmission capacity available today in the central coast and by 2025 with the closure of Diablo Canyon is ideal for delivering offshore wind from the Morro Bay call area to serve load. Similarly, offshore wind in the central coast is an ideal resource to help replace Diablo Canyon, given its consistent generation profile peaking in the late afternoon and evening. However, as Delphine Hou from the CAISO noted at the September 2, 2020 SB 100 draft results workshop, the transmission capability at Diablo Canyon "will not remain unutilized for very long", nor can it be held for offshore wind that isn't able to come online in time to compete with other resources for the capacity.[18] Without proper policy direction now, we will miss an opportunity to optimize usage of existing transmission assets. Ms. Hou also noted the compressed timeframe in which to implement the portfolios of SB100. Given the timeframe for transmission planning and development, the first run year in the model, 2027, is essentially just around the corner and we cannot wait until the next report, filed in 2025, to decide where and what long-lead-time resources will be needed.

Thus, we recommend that the CPUC study a portfolio of resources including 3 GW of offshore wind by 2030 and consider new transmission necessary to achieve the state's GHG reduction goals by 2030 and 2045 (including at least 10 GW of OSW).

AWEA-CA has called for state goal setting and planning for offshore wind in multiple policy forums over the last 18 months. The California Energy Commission, along with the State Lands Commission, the Ocean Protection Council, and the Governor's Office, should adopt a state goal of 10 GW of offshore wind by 2040, with an interim goal of 3 GW by 2030. Goal setting will be critical for sending the right market signals to stimulate private investment and for coordinating state, federal and local planning around shared objectives at sufficient scale. A 10 GW by 2040 goal specifically will help bringing offshore wind to sufficient scale to maximize in-state economic development potential, drive technology cost reductions, make a meaningful contribution to the state's clean energy future, and address Department of Defense resistance to offshore wind in California. The SB 100 draft results should provide state agencies and the Governor's Office assurance that we need offshore wind at scale. Acknowledging this conclusion by adopting a state planning goal is an obvious first step. Next, the agencies should work together to develop an implementation plan that addresses the following:

- **Sea-space planning:** State agencies should work together with federal agencies to identify, at a high-level, the most promising areas for commercial leasing, totaling 1,200

[18] Presentation by Delphine Hou, California Independent System Operator. SB 100 Draft Results Workshop. Recording 1. https://energy.zoom.us/rec/play/bUuRf6kjOhSZ7g8MIGF_J-Dox3NUx-JR3jwfmhJU2l4gvy8tok-MowBJUJB5gruufv1CQlP8E2A726Jb.sxqE-UdkX6egs13i?continueMode=true&_x_zm_rtaid=bbtqRRIvRxyZtiwxKkIvGQ.1599261507324.db25140b864492794d7ec91acedd47c1&_x_zm_rhtaid=490

square miles and sufficient to achieve a 10 GW offshore wind deployment goal. The identified areas should minimize both conflicts with the Department of Defense as well as potential impacts to ocean species and cultural and tribal resources. This effort should coordinate with the ongoing mapping efforts funded by the OPC and CEC[19] to ensure that all efforts are organized around achieving a long-term offshore wind goal. Participants in the first panel at the September 2 workshop emphasized the issues of land-use and siting in achieving SB 100 portfolios. Renewables in any form and in the quantities needed will require a substantial amount of space, either on land or in the ocean. Spatial planning may be helpful if driven by the right goals (e.g., total level of build out) and if commercial viability is incorporated appropriately into the spatial analysis. Agencies should of course assess potential environmental and human-use impacts and available mitigations in this process, but we must also consider the potential consequences of the alternative: failing to meet our climate objectives and keeping fossil resources online longer. In total, we will need to say "yes" to a much larger quantity of ocean and land space than we have in the past, which again, will require state leadership and direction.

- **Permitting:** The California Marine Renewable Energy Work Group identified five state agencies that will be involved in permitting offshore wind projects in addition to BOEM's NEPA process. The CEC, along with the State Lands Commission should convene a working group that includes the Governor's Office of Planning and Research, CEC, Coastal Commission, OPC, Parks and Recreation Department, 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. This program should draw from the framework created by the Renewable Energy Action Team (REAT), established by the state during the Great Recession. In just over two years, the REAT agencies jointly permitted 15 utility-scale solar energy projects (5,700 MW) on public lands and paved the way for many more. By working together and coordinating state and federal environmental review and permitting processes under NEPA and CEQA, DOI and California were able to complete complex renewable energy project siting and permitting decisions involving multiple state and federal agencies in as little as 12 months while ensuring proper protections for species and habitats.
- **Transmission planning:** The CPUC should direct the CAISO to assess the transmission investments and upgrades necessary to support the 2045 SB 100 portfolios. This should include specific direction to assess transmission needs to support the 10 GW offshore wind goal, 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. By February 2021, the CPUC should provide to the CAISO a portfolio of resources to achieve SB 100 targets that can be utilized in the 2021-2022 TPP. This direction should include a request for the CAISO to assess sub-sea transmission and any other long lead-time resources necessary to meet 2030 GHG requirements as well as the transmission resources needed to meet 2045 GHG requirements.

[19] Assessments underway by the Conservation Biology Institute and Point Blue Conservation Science.

- **Port planning:** Offshore wind will require port facilities with the laydown space, quayside areas, water depth, distance to installations and clearance height out to sea to accommodate the fabrication, assembly, installation, and maintenance of offshore wind turbines. No port in California is currently equipped to serve the offshore wind industry. The Port of Humboldt provides one of the best opportunities for assembly of floating offshore wind platforms and is eager to become a new offshore wind hub, but it will require substantial upgrades and renovations. There are multiple entities that will be involved in readying one or more ports for offshore wind, including port authorities, contractors in the construction industry, port operators, and offshore wind developers. The state should develop a plan to prepare port infrastructure and enable coordinated project phasing and investment. A useful model for this type of planning was performed by the Massachusetts Clean Energy Center[20] and the City of New Bedford.[21] Port planning would also position California to receive potential new funds through the Department of Transportation or National Defense Authorization Act as recommended by the Select Committee on the Climate Crisis[22] and the Bipartisan Policy Center[23] to support offshore wind infrastructure nationally.
- **Work-Force development:** Offshore wind will require a new skilled workforce to support manufacturing, construction, operation and maintenance of turbines. On the third panel at the September 2 workshop, Shrayas Jaktar from the California Workforce Development Board recommended planning for a "high road" vision of the economy and workforce defined by equity, environment, and jobs, and beginning with an assessment of hiring and skill needs followed by a plan for training. The Governor's Office of Business Development should analyze workforce development needs for the California offshore wind industry, including the use of a skilled and trained workforce, and then develop a plan for training and apprenticeship.

We note that several east coast states adopted offshore wind planning goals and commenced implementation planning for offshore wind after completing analyses similar to the SB 100 Joint Agency report demonstrating the importance of this resource for meeting the states' clean energy targets. Today, East Coast offshore wind targets total 27 GW. California should follow these examples.

[20]Massachusetts Clean Energy Center, Port and Infrastructure Analysis for Offshore Wind Energy Development, February 2010 http://www.nbedc.org/wp/wp-content/uploads/2014/02/MA-Port-Study-Final-Report_4-20-10.pdf

[21] City of New Bedford, Ready for Offshore Wind

[22] "Ocean-Climate Elements: Congressional Action Plan from the Select Committee on the Climate Crisis." Ocean Conservancy, July 2020.

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V. Conclusion

AWEA-CA appreciates the work of the joint agencies and their staff in preparing this timely report. While California struggles with wildfires, electric system reliability challenges, air pollution, a pandemic, and an economic recession, we have an opportunity to start planning a brighter, cleaner future for Californians. The draft report paints a clear picture: the needs are great, and the time for the state to act is now.

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Respectfully submitted,

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