CalWEA

California Wind Energy Association

February 14, 2020

California Energy Commission
Docket No. 19-ERDD-01
Docket Office
1516 Ninth Street
Sacramento CA 95814

Submitted Electronically via CEC website to Docket 19-ERDD-01

Re: Comments on Draft *Utility-Scale Renewable Energy Generation Technology Roadmap*

The California Wind Energy Association appreciates this opportunity to comment on the Draft *Utility-Scale Renewable Generation Technology Roadmap* ("draft *Roadmap*"), which provides the Energy Commission with 17 recommended initiatives to guide research, development and demonstration activities across nine technology areas, including land-based wind, on which these comments are focused.

In our judgment, this draft report does not provide sufficient justification for the RD&D efforts that are recommended for land-based wind. We offer the following five comments for your consideration.

1. Potential development made possible by the recommended RD&D should account for land-use and transmission constraints

The RD&D initiatives proposed for land-based wind focus on pathways to increase deployment of larger turbines on rugged terrain, with higher wind speeds, by increasing conversion efficiency and lowering installation costs.[1] The substantial associated resource potential that is estimated to result from these initiatives does not seem to have been informed by two critical considerations: transmission access and land-use restrictions.

[1] Draft *Roadmap* at pp. 48-49.

The areas of advancement and estimated associated resource potential discussed in the draft *Roadmap* are:

- Technologies and techniques that can improve onsite manufacturing and assembly include: Rough-Terrain Cranes; Turbine Tower Attached Cranes; Self-erecting tower/turbines (Telescopic towers); Additive Manufacturing (3D Printing) Techniques using Concrete; Automated Spiral Welding.

  These advancements are estimated to result in 2,600 new turbines by 2030, and 6,000 turbines by 2045.[2]

- Development of improved blade materials that are more durable and can stand higher local stresses. Flexible blades that can bend and twist passively to adapt and produce more power.

  These advancements are estimated to enable 10,700 GWh or 3.3 percent of SB-100 2045 goals.[3]

Lack of transmission infrastructure and land-use restrictions are the two most significant development barriers in California. Most of the state's untapped wind resources are either in northeastern California, where transmission access is severely limited, or in the southwestern portion of the state where, as the draft *Roadmap* appropriately notes (p. 16), the Desert Renewable Energy Conservation Plan severely restricted wind development.

Before the development-potential figures presented in the draft *Roadmap* can be considered realistic, these limitations should be taken into account. (Only brief references to these issues are made on pp. 52-53.) While major new transmission infrastructure can be built and land-use restrictions can be changed, the report should note that these actions would need to be taken to unlock the identified potential. Importantly, moreover, if those steps, alone, were taken, it would likely unlock a large portion of the identified additional resource potential irrespective of any technological developments.

2. <u>Overemphasis on older turbines</u>

The narrative overstates the presence and significance of older turbines:

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[2] *Id. at* p. 49.

[3] *Id. at* p. 51.

> p. 45: "The majority of land-based Wind Resource Areas (WRAs) are currently saturated with older, smaller wind turbines."
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> p. 43: "Potential locations for new wind developments in California have lower wind speeds than the ideal sites for wind farms in the state which are already occupied by legacy wind power plants."
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> p. 52: "Old turbines limit accessibility to land-based wind resources in California. As previously mentioned, California has installed wind energy systems for multiple decades. While this has been great for the maturation of the wind industry, it has resulted in a significant amount of space being occupied by less efficient, legacy wind turbines."
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> p. 52: This statement, which cites a 2017 report based on 2014 data, is inaccurate: "There are 2,600 Kenetech KCS 56-100 turbines in use in California." These turbines have been removed as the Altamont Pass has been largely repowered. A 2019 Energy Commission report on California wind does not list any Kenetech 56-100 machines.[4]

CalWEA estimates that less than 1,000 MW of 1980s-vintage turbines remain to be repowered, and many additional repowering projects are currently underway. It is reasonable to expect that, within a few years, no more than a few hundred MW of vintage capacity will remain. This figure compares to the roughly 5,000 MW of capacity that has been built or repowered since the mid-2010s, the large majority of which has taken place in the historic wind resource areas, with average wind speeds of at least 7 m/s.

Given the dominance of relatively modern turbines in California's fleet, and the 42 percent average nationwide capacity factor for turbines installed between 2014 and 2016 noted in the draft *Roadmap*,[5] it is difficult to explain the reported 27 percent overall fleet capacity factor for California.[6] Further inquiry into this figure may be warranted.

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[4] Hingtgen, John, Diana Le, Brandon Davis, and Brian Huang. 2019. *Productivity and Status of Wind Generation in California, 2014 Through 2016*. California Energy Commission. Publication Number: CEC-200-2019-002. (See Appendix A.)

[5] *Id. at* p. 47.

[6] Based on a personal communication with CEC staff, this figure was calculated from CEC data on total wind generation capacity and total production. California Energy Commission, Energy Almanac, Total System Electric Generation and Total System Plan (2018). (*See* https://ww2.energy.ca.gov/almanac/electricity_data/total_system_power.html and https://ww2.energy.ca.gov/almanac/electricity_data/electric_generation_capacity.html.)

3. Context is needed when referencing health and environmental impacts

In the section titled "Land-Based Considerations" (p.52-53), these paragraphs require added factual scientific context:

- **"The environmental impact of wind turbines is heavily scrutinized.** … With California's wind capacity being around 5,500 MW, an estimated 17,000 to 34,000 birds are killed in the state by wind turbines per year. … the exact effects of both turbine design and fatality mitigation strategies on bird and bat fatality numbers are currently uncertain. (AWWI 2018)." The final *Roadmap* should add more context from this same source (AWWI), such as "Most bird species, especially songbirds, are at low risk of population-level impacts" from wind energy facilities.[7]

- **"There are social concerns such as sound and aesthetics that hamper wind development.** The social impacts of wind turbines center around public health and community concerns. … Working with communities on limiting the potential health impacts of wind turbines with proper siting and continuing research on this impact is necessary to ensure communities have the best information accessible so they can work with developers." The final *Roadmap* should make clear that there is no scientific basis for these concerns, so as not to perpetuate that myth. For example, San Diego County's Health and Human Services Agency recently conducted a thorough review of the peer-reviewed science and other materials related to the human health impacts of wind turbines.[8] The agency affirms that "the current state of research indicates no conclusive, direct, causal link between wind turbines and adverse health outcomes or impacts." While turbines "may be a source of annoyance for a small minority of community residents" – which may in turn cause stress for some individuals – "[t]he weight of evidence suggests that, when sited properly, wind turbines are not related to adverse health effects."

4. Typographical error re: value of wind energy

There appears to be a typographical error in this sentence, which erroneously states that wind energy is not an attractive complement to solar energy:

[7] "Impacts to Wildlife of Wind Energy Siting and Operation in the U.S.," *Issues in Ecology* (Fall 2019). This publication was authored by AWWI's Director of Research and 12 other experts. *See* https://awwi.org/resources/issues-in-ecology/.

[8] San Diego County Health and Human Services Agency, Public Health Position Statement on the Human Health Effects of Wind Turbines (February 25, 2019).

p. 46: "Additionally, wind turbines ability to generate power at times when solar panels cannot make them an attractive addition to the California grid."

In addition to correcting the error, we suggest expanding on the point. The California Independent System Operator recently stated, in its *2019 Summer Loads and Resources Assessment*, that the system faces increasing operational risks in the late afternoon when solar generation output decreases while system demand is still high. Wind energy generally picks up in these same late afternoon hours.[9] These operational risks will increasingly translate to higher market value for wind energy.

5. Data citation problems

The following statement is erroneously attributed to "Perez, Jerome. 2018":

"While the development of DRECP was a collaborative effort, when DRECP was announced, all wind projects being pursued in the region were cancelled, and there has been little to no development in wind power since in southeastern California."

Please correct the citation to reference CalWEA.

Please add citation for this statement:[10]

p. 47 and p. 51: "Based on 2018 generation data, the Capacity Factor for land-based wind turbines in California was 27 percent."

CalWEA appreciates your consideration of these comments, and we would be pleased to discuss them further.

Sincerely,

/s/

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Executive Director
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[9] *See,* Energy and Environmental Economics (E3), *The Economic Value of Offshore Wind Power in California* (August 2019) at Figure 4, depicting the hourly generation profile of California, out-of-state, and offshore wind resources.

[10] *See* note 5 *supra.*