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Principle Power Comments on R&D Opportunities for Floating Offshore Wind Energy Draft

Please see attached comments.

Additional submitted attachment is included below.

Principle Power | Globalizing floating wind

Comments on the CEC Staff Workshop, Research and Development Opportunities for Floating Offshore Wind Energy In California

Research Idea Exchange, Docket Number 19-ERDD-01

As an industry-leading floating technology provider, Principle Power would like to submit the following public comments to the draft report *Research and Development Opportunities for Offshore Wind Energy in California* and the questions posed by the CEC on the subsequent WebEx presentation.

(1) Do the identified **recommendations** capture high priority research, development, and deployment (RD&D) opportunities specific to the California market?

To Principle Power, the RD&D Recommendations generally capture the challenges of deploying low-cost floating wind in California. However, we would like to submit specific comments on various Recommendations presented by the CEC:

Recommendation 1: Advance technologies for mooring and cabling, including inter-array cabling webs and dynamic cabling.

As leaders of the DeepFarm research consortium, we believe that more research initiatives in the areas of deep-water inter-array cabling and mooring systems are needed to continue to lower costs and support innovative technologies. However, we do not see the concept of dynamic tensioning of mooring systems to shift platform dynamics to be a reliable solution. Instead, research funds should be focused on the *temporary* use of such technologies for installation, retensioning and decommisioning purposes.

Recommendation 2: Develop technologies to ease O&M in extreme wind and wave conditions, including remote monitoring and robotic maintenance

As the Prime Recipient of the DigiFloat research consortium, we see a need for the intelligent contextualization, synthesis and visualization of data coming from floating offshore floating wind platforms. However, we do not see a strong need for robotic vessels to repair and replace components on the seafloor. Instead, we believe the focus of this initiative should be on the coordination of a 'fleet' of autonomous vehicles, including AUVs (autonomous underwater vehicles), onboard robotic vehicles (working on the deck or in compartments of a floating platform), and UAVs (unmanned aerial vehicles).

Recommendation 3: Develop technical solutions to integrate offshore wind to the grid, including facilitating technologies like advanced hydrogen and subsea storage.

We believe that other offshore technologies, directly integrated with or co-located around floating wind farms, can lead to better outcomes for the California ratepayer. However, we do not see technologies such as subsea storage as a viable technology for California. Instead, technologies that can be run intermittently, such as hydrogen production facilities,

desalination processes, ammonia production facilities or others, should be given priority. The integration of these 'storage' technologies directly onto floating wind hulls should also be considered.

Recommendation 6: Conduct a comprehensive study on port infrastructure in California and develop technical solutions to identified gaps

A comprehensive study on port infrastructure, as it applies to floating offshore wind is necessary to secure a California supply chain and to have a low-cost operations and maintenance base. Specific attention should be paid to the strength and availability of the laydown area of the ports so that various operations can take place in California (e.g., turbine erection, turbine commissioning, large corrective procedures, etc).

Recommendation 7: Conduct additional LIDAR wind resource studies offshore of California.

In-situ measurements are the only way to confirm the atmospheric and oceanic models that are used to estimate the environmental conditions in offshore wind lease areas. However, improvements to these models are necessary to more accurately capture the air-sea interface (see, for example the DOE FOA Offshore Wind Atmospheric Science and Project Development[1]). Historically, the atmospheric modelling community and the ocean modelling community have operated separately. These communities and their respective tools need to be brought together to produce coupled, mesoscale models to more accurately represent the environmental conditions offshore California.

Recommendation 8: Advance technologies to reduce wildlife impacts, including smart curtailment and deterrence.

We believe that the smart curtailment and deterrence to minimize wildlife impacts is a powerful technology for the wind industry. However, we think that offshore wind can actually improve the richness of aquatic life. Other work by Navigant has described how the introduction of offshore wind turbines can actually increase marine biodiversity by providing hard substrates for benthic organisms to attach[2]. The quantificaiton of the marine biodiversity before, during and after installation of a floating wind farm can prove that such a phenomenon to be true for California.

Additional Recommendation: Accelerate the development of floating-specific 15MW+ wind turbines

Cost reductions in floating wind industry would be accelerated if the CEC facilitated the development of next-generation, floating-specifc wind turbines. These turbines would be designed to alleviate many of the design drivers of floating platforms that are relics from the technology development of land-based wind turbines. The co-development of floating-

[1] https://eere-exchange.energy.gov/FileContent.aspx?FileID=2c17b8e0-ded3-447e-b6cc-4187289b2d39
[2] https://guidehouse.com/-/media/www/site/downloads/energy/2018/navigant2018marinebiodiversitydevelopmentnorthseag.pdf

specific wind turbines can be performed by incentivizing turbine OEMs to collaborate with floating hull designers.