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CalWave Comments on the 2024 IEPR Update â€“ Wave and Tidal Energy

Additional submitted attachment is included below.

CALWAVE

January 2, 2025
Chair David Hochschild
Vice Chair Siva Gunda
California Energy Commission
Docket Unit, MS-4
Docket No. 24-IEPR-01
715 P Street, Sacramento, CA 95814-5512

Subject: CalWave Comments on the 2024 IEPR Update – Wave and Tidal Energy

Dear Chair Hochschild and Vice Chair Gunda:

CalWave Inc (CalWave) is pleased to submit comments on the Draft 2024 Integrated Energy Policy Report (IEPR) Update. CalWave worked with the National Hydropower Association (NHA) to submit responses to the California Energy Commission (CEC) Docket No. 24-IEPR-01 in April 2024 and the CEC Docket No. 24-IEPR-04 in July 2024. Links to CalWave's two submissions are linked here:

1) April 2024: https://efiling.energy.ca.gov/GetDocument.aspx?tn=255544&DocumentContentId=91313
2) July 2024: https://efiling.energy.ca.gov/GetDocument.aspx?tn=258151&DocumentContentId=94101

CalWave's April submission makes the case that CEC should prioritize the inclusion of marine energy as part of California's future mix to help the state reach 100 percent renewables by 2045, lower costs for ratepayers, and create jobs in California instead of out-of-state or overseas. It also contends that the addition of "marine energy" to activities currently specific to offshore wind would have a significant impact on the growth of the marine energy sector in California while benefiting the offshore wind sector. CalWave's July submission expands upon the April submission and includes comments on both the SB 605 draft report and the Offshore Wind Strategic Plan, while also discussing state-level incentives and programs in California and other states that the CEC and the California legislature can review and potentially replicate that would promote the growth of the marine energy sector in California and beyond. The recommendations of prior referenced submissions are summarized here:

1) Quantify potential savings for California ratepayers resulting from the integration of marine energy technologies into the California grid.
2) Encourage further legislation to create the same pathway for marine energy as offshore wind.
3) Implement statewide marine energy deployment targets of 100 MW by 2030, 500 MW by 2035, and 2,500 MW by 2040.
4) Work with the California Public Utilities Commission (CPUC) to determine the steps required for marine energy to receive an explicit price per MWh as part of the Renewable Market Adjusting Tariff (ReMAT).

5) Provide matching funds for U.S. Department of Energy (DOE) and other federal awards and investments in technology Research, Development, Demonstration, and Deployment (RDD&D) relevant to marine energy.
6) Clarify state regulatory processes for deployment of marine energy projects, and encourage the appropriate federal agencies to clarify federal regulatory processes for deployment of marine energy projects.
7) Partner with the U.S. Bureau of Ocean Energy Management (BOEM) to begin planning efforts related to deployment of marine energy in both federal and state waters off the coast of California, including the potential of expanding offshore wind lease areas for multi-use opportunities to include marine energy.
8) Encourage the Humboldt Bay Harbor, Recreation, and Conservation District to ensure that their $426.7 million investment from the U.S. Department of Transportation (DOT) can also support the marine energy sector.

Two topics from the Draft 2024 Integrated Energy Policy Report (IEPR) Update are expanded upon below:

1) **Factors Contributing to Increased Use of Wave and Tidal Energy in California** (pages 48-49)

We acknowledge that cost reductions, as pointed out on page 49, would be a major factor contributing to the increased use of wave and tidal energy in California. The first two sentences of this section read:

> *"The costs of marine energy projects are expected to decrease with the convergence of technology types and increased capacity installation. Wave and tidal energy must undergo substantial cost reductions to achieve a competitive levelized cost of energy."*

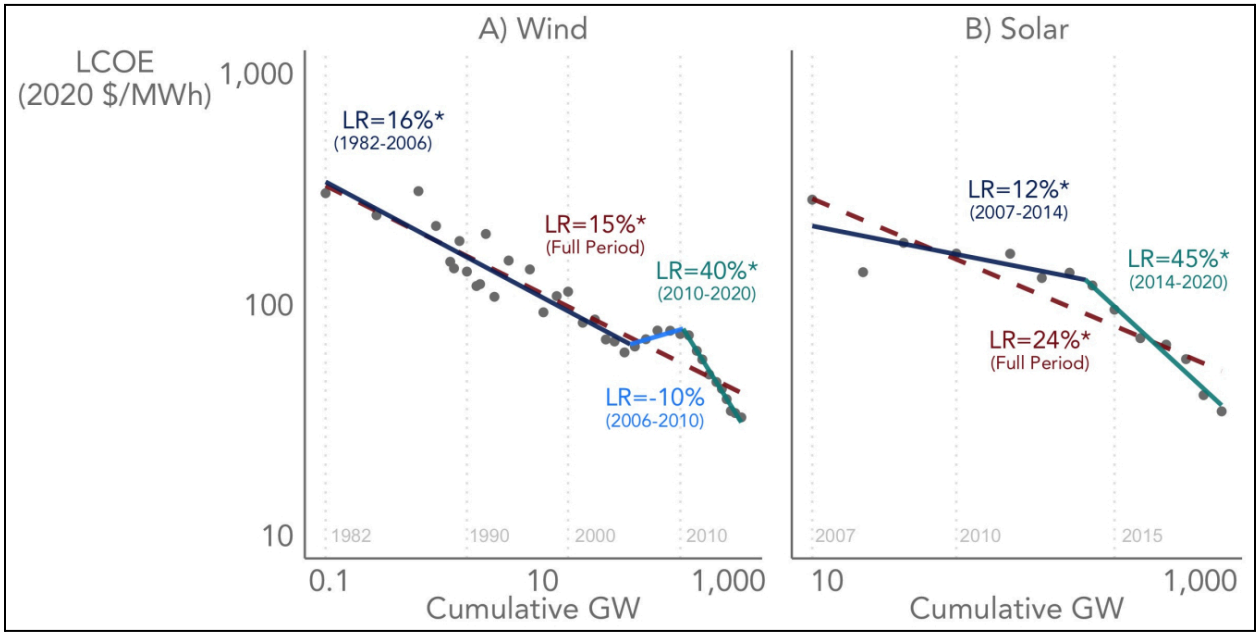
The convergence of technology types and increased capacity installation should directly lead to cost reductions; however, there are additional factors with regard to cost that should be considered.

First, the energy density of the waves off California's coast is around 20 times higher, on average, than the energy density of other renewables like wind and solar. Thus, the space and material required to reach the same level of installed capacity is significantly lower. This is also a key driver of the conclusion by the Intergovernmental Panel on Climate Change (IPCC) that marine energy has the lowest lifecycle emissions of any renewable energy source. If wave energy reaches the same cumulative manufacturing capacity as wind and solar, the costs may be significantly lower. It is critical that we not directly compare the costs of different technologies at different levels of cumulative manufacturing volume.

Second, LCOE may be the primary cost metric that project developers consider for individual projects, but it is not necessarily the best cost metric to look at when considering the interest of California ratepayers. Instead, we should look at the cost of the entire energy system. Because

of their consistency relative to wind and solar, integrating wave and tidal energy into California's generation mix may reduce costs for ratepayers even if individual project LCOE figures are higher than those for wind and/or solar.

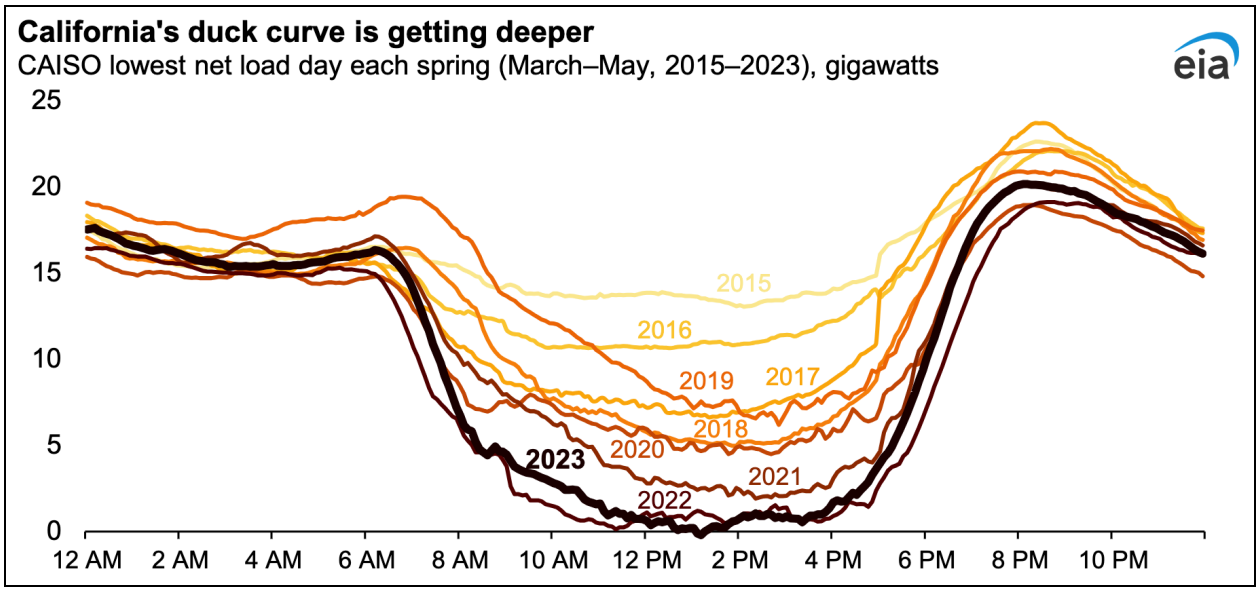
Additionally, historical forecasts have consistently underestimated the cost reductions of renewable energy technologies. According to the U.S. Department of Energy, both wind and solar have each experienced extended periods of time with learning rates of at least 40 percent (meaning costs fall by at least 40 percent with every doubling of cumulative capacity). By comparison, the industrial average learning rate is only 12 percent.



Although wave and tidal energy technologies are still in the early stages of scaling, this learning rate trend suggests significant potential for cost reductions as production volumes increase. Keeping these factors in mind is essential when evaluating the future role of marine energy in California's energy mix.

We also propose that the challenges brought about by the increased use of solar and wind in California be added as a major factor that may contribute to the increased demand and value of wave and tidal energy in the state. We included the following in our April submission:

> *"However, the solar power resource is strongest in the middle of the day when demand is relatively low, and the availability of the resource drops significantly as energy demand increases in the evening. California's growing reliance upon solar power means that dispatchable power plants (like coal, natural gas, and nuclear) must be ramped up more and more aggressively during the evenings in order to meet demand. This problem can be shown by the 'Duck Curve,' the plot of California's net load (demand remaining after subtracting variable energy generation) throughout the day, which resembles a duck."*



Additionally, in this section, it is stated "As wave and tidal are emerging technologies, there is limited understanding of the potential adverse environmental effects." However, there have been numerous studies done over the last two decades investigating and documenting the lack of adverse environmental impact from marine energy technologies. We recommend referring to the *2024 State of the Science Report: Environmental Effects of Marine Renewable Energy Development Around the World* published in September 2024.

2) **Next Steps and Recommendations** (pages 60-61)

We appreciate the inclusion of several recommendations to "provide direction and guidance for the responsible and timely development of wave and tidal energy projects." To strengthen these recommendations even further, we suggest:

- Adopting more specific language around exploring the "potential development of market incentives to support investment in wave and tidal energy technology." Just as the CPUC is using centralized procurement to help scale offshore wind in California, we recommend that the CEC engage with CPUC to design market incentives to bring wave and tidal energy projects online.
- Focusing early-stage fundamental research less on individual devices and more on the benefits that wave and tidal energy projects can provide to the grid in California. Efforts related to early-stage fundamental research for devices in California should instead be redirected toward building demonstration projects in California state waters.
- Implementing statewide marine energy deployment targets of 100 MW by 2030, 500 MW by 2035, and 2,500 MW by 2040.
- Including federally funded marine energy projects as eligible for cost share by the Electric Program Investment Charge Program (EPIC). Efforts to raise capital as cost share for federal funding can slow down progress toward demonstrating these critical technologies. Because marine projects hold significant potential to reduce total energy

system costs and therefore reduce rates for ratepayers, the state of California should play a role in funding these technologies from R&D stages to demonstration and deployment.

CalWave appreciates the CEC considering the above comments. Please reach out to the contact below with any questions or for additional information. We look forward to working with the CEC and other relevant entities to advance the marine energy sector in California.

Sincerely,

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