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National Hydropower Association Comments to 24-SB-605 Wave and Tidal Energy Phase 2

Additional submitted attachment is included below.

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May 16, 2025

Chair David Hochschild
Vice Chair Siva Gunda
California Energy Commission
Docket Unit, MS-4
Docket No. 24-SB-605
715 P Street Sacramento, CA 95814-5512

Subject: National Hydropower Association's Comments on the SB 605 Draft Consultant Report on Sea Space Analysis

Dear Chair Hochschild and Vice Chair Gunda,

On behalf of the National Hydropower Association (NHA) and the U.S. marine energy industry, we appreciate the opportunity to submit the following comments in response to the California Energy Commission's (CEC) Draft Consultant Report on Sea Space Analysis (Docket No. 24-SB-605). These comments reflect broad industry perspectives and align with NHA's mission to advance the development and deployment of water power technologies, including wave and tidal energy, as reliable sources of clean energy. The following comments are organized into three parts:

Part I: Clarification of Technology Project Information

Part II: General Comments on Report Content

Part III: Recommendations for State Policy Action

Part I: Clarification of Technology Project Information

We appreciate the inclusion of a previous marine energy project in California within the report; however, we urge the Commission to ensure that all project information is accurate and clearly attributed. For instance, Section 2.3 references a wave energy pilot as having undergone an 11-year permitting process. That timeline corresponds to the permitting of the PacWave test facility in Oregon and should not be associated with the project deployed offshore San Diego, CalWave's x1 pilot project. We respectfully request corrections to ensure accurate representation of technology maturation timelines and permitting experiences. Specifically, please correct the report with the following information under consideration:

1. Page 47 says that the x1 pilot was launched in 2022. It was launched in September 2021 and recovered in July 2022.

2. More importantly, page 48 says that the pilot "emerged after an extensive 11-year permitting process." This is incorrect**.** KQED, linked at the bottom of page 48, published the following sentence in their story: "Much is riding on the success of the project, which took 11 years to acquire permits." This sentence refers to the PacWave facility offshore Oregon, not CalWave's pilot offshore California**.** The wording in the KQED story is a bit confusing, especially given that this sentence was written directly beneath a photo of the CalWave x1 system, but we strongly request that the CEC make sure this is corrected.

For reference, a summary of key facts about the CalWave x1 project in this DOE public repository: https://tethys.pnnl.gov/project-sites/calwave-xwave-demonstration

Part II: General Comments on Report Content

Comments on the report are listed here in page order:

- **Page 37**: The lower overall energy demand in Northern California compared to Central and Southern California shouldn't necessarily be seen as a weakness or a reason not to prioritize the region for wave energy development, but rather as an opportunity to increase utilization of the planned 1.6-14.7 GW of transmission upgrades of the North Coast and create increased diversity of California's energy portfolio.

  Several studies worldwide and CA specific have concluded that sharing on or offshore substations between Offshore Wind and Wave farms can significantly increase the joint capacity factor.

  Sources:

  - Offshore wind and wave energy can reduce total installed capacity required in zero-emissions grids | Nature Communications
  - Publications | EU-SCORES
  - Wave and Floating Wind Energy - Cost Benefit Analysis | WES
  - StoutenburgIEEE11.pdf

  The California Independent System Operator (CAISO) and the California Energy Commission (CEC) have dramatically increased their offshore wind targets for the North Coast:

- Short-term (by 2035): The CAISO 2023–2024 Transmission Plan includes projects to connect 1.6 GW of offshore wind from the Humboldt call area, see Offshore wind big part of ISO's 2023-2024 Transmission Plan | California ISO
- Long-term (by 2045): The CEC's updated strategic plan envisions up to 14,700 MW (14.7 GW) of offshore wind capacity on the North Coast, more than triple previous forecasts, see The ISO posts an updated 20-Year Transmission Outlook | California ISO

Northern California should be viewed as a strategic location for wave energy development. Transmission upgrades and favorable offshore resources create opportunities to co-locate wave and offshore wind, increasing capacity factors and overall grid value.

- **Page 43**: "Powering the Blue Economy" infrastructure, like ports, shipyards, and other infrastructure that serves maritime industries, are generally positioned in sheltered areas away from significant wave energy resources. Breakwaters, jetties, and other coastal structures near this infrastructure only experience a few kilowatts per meter of wavefront, at best. To extract any meaningful amount of power for port or shipyard operations from this weak wave energy resource would require an immense spatial footprint and CAPEX while yielding a very low capacity factor. This is especially true in Southern California, where the Channel Islands block the attractive wave energy resource from reaching the mainland. For ports or shipyards to leverage wave energy systems in an economically viable way, there would likely need to be tens of megawatts deployed offshore (where there is a resource of at least 20 to 30 kilowatts per meter of wave front) with one single cable connected to shore.
- **Page 45:** We have two separate comments regarding "Colocation With Offshore Wind Infrastructure."

  1. The report states that "The land-based and nearshore components of marine energy and wind energy operations could be colocated, potentially reducing the overall spatial and visual impact of that supporting infrastructure." While reducing the spatial and visual impacts of supporting infrastructure is certainly appealing, we would argue that the potential to share this supporting infrastructure, as opposed to simply co-locating with it, may reduce balance-of-system costs for both offshore wind and marine energy components of an offshore energy project.

2. The report states that “all wind energy lease areas are in medium-high wave energy areas, meaning there is resource potential for colocation of electrical cable connections or integration of WECs either into the turbine platform infrastructure itself or in the area within the turbine arrays.” We would like to highlight the point that all five BOEM offshore wind leases (two in Northern California off the coast of Eureka and three in South-Central California off the coast of Morro Bay) have significant wave energy resources. However, it is important to recognize the difficulty of integrating into the floating wind platforms themselves, especially given that floating offshore wind platform OEMs are still early in their growth phases as well. The most likely scenario may instead be that some offshore infrastructure is shared, like substations, export cables, and potentially even anchors.

- **Page 70**: We agree that it will be important to engage with both the commercial and recreational fishing communities throughout the marine energy project development process for projects offshore California. While the report generally talks about potential conflicts between marine energy devices and fishing efforts, the environmental data from CalWave’s x1 pilot offshore San Diego suggests that the presence of slow-moving wave energy devices may increase local fish stocks through the artificial reef effect that often comes with offshore structures.

- **Page 84**: We agree that “developers must address potential conflicts with U.S. Department of Defense (DoD) activities when siting wave and tidal energy near DoD properties and operations, particularly areas critical to national security,” but we believe there should be a stronger emphasis on the fact that “the military could have use for marine energy technologies since the devices can be deployed in off-grid locations along the coast.” As geopolitical tensions rise, especially in the Pacific, it is crucial that DoD installations are equipped with power generation capabilities that are both resilient and can operate below the ocean’s surface. In addition, WECs may enable capabilities beyond power generation that other technologies cannot enable, like docking and charging for unmanned underwater vehicles (UUVs).

- **Page 86**: We support the statement that “placement of WECs and TECs on existing marine structures, such as a decommissioned oil and gas platform or an active platform, could reduce installation costs and reduce device footprints, thereby reducing the environmental impact of marine energy projects.” Given that balance-of-system infrastructure is often what makes or breaks a project’s economic viability, there should continue to be a focus on leveraging existing offshore and onshore infrastructure as much as possible to minimize project costs.

- **Page 87**: Because “coupling wave energy with wind energy allows for better energy yields and higher predictability,” the price per MWh generated by co-located projects should reflect the enhanced value of this power. Large energy buyers, including companies like Google, are increasingly seeking clean power portfolios that offer greater consistency and reliability to meet around-the-clock energy needs. Wave energy, particularly when paired with offshore wind, can complement existing renewable sources by delivering more predictable generation profiles. As California continues to diversify its clean energy mix, pricing structures should evolve to recognize the grid and customer benefits of these complementary marine energy resources.
- **Page 103**: The statement that the “high cost of stand-alone wave energy conversion development has been an obstacle for large-scale application” is misleading. While correct that co-location with other offshore infrastructure may reduce balance-of-system costs for all infrastructure involved, this has not been an obstacle for large-scale application. The main obstacle for large-scale application has been the lack of consistent funding to advance technologies from 1) R&D to 2) single-unit demonstrations to 3) array deployments of many units. As technology developers build larger individual systems and larger projects, costs are expected to fall significantly for a few key reasons:
    1. Leveraging economies of scale when scaling manufacturing capabilities
    2. Deploying projects with many WECs to share the same balance-of-system infrastructure to reduce the overall percentage of CAPEX covered by balance-of-system
    3. Learning from deployed systems how to more efficiently design future systems

Part III: Recommendations for State Policy Actions

The SB 605 process has helped bring marine energy to the forefront of energy policy in California. In a time when the share of intermittent renewables on the grid is consistently rising, follow-on policy mechanisms to support more consistent clean energy sources, like marine energy, are crucial to maintaining a clean and reliable energy system. The following are suggested next steps the state of California could take with regard to marine energy R&D, demonstration, and deployment to both build a more resilient energy system in California and serve as a model for the rest of the country:

1. **Introduce Marine Energy Legislation**:

   In September 2021, the California Legislature passed and the Governor signed AB 525, which required CEC to work with a variety of federal, state, and local agencies "to develop a strategic plan for offshore wind energy developments installed off the California coast in federal waters, and submit it to the California Natural Resources Agency and the Legislature." We recommend that the California Legislature introduce and pass a similar bill to AB 525 for marine energy development. The Offshore Wind Strategic Plan, which was released in July 2024, stated that "the AB 525 suitable sea space identified in this report is intended to be a starting point for future BOEM activities related to offshore wind development off California's coast." We believe that "suitable sea space" work done for marine energy should also be a starting point for future BOEM activities. One way to engage with BOEM on this topic is to respond to its "Request for Information and Comments on the Preparation of the 11th National Outer Continental Shelf Oil and Gas Leasing Program," which explicitly asks for "comments and suggestions of national or regional application" relating to "wave, current, or other alternative energy sites." Here is a link to the RFI on the Federal Register:

   https://www.federalregister.gov/documents/2025/04/30/2025-07479/request-for-information-and-comments-on-the-preparation-of-the-11th-national-outer-continental-shelf

2. **Integrate Marine Energy into CEC Planning and EPIC Investments**:

   When updating the CEC Utility-Scale Renewable Energy Generation Technology Roadmap and the EPIC 4 Investment Plan, we strongly recommend considering actual global state of marine energy via:

   a. OES | Ocean Energy Systems - an IEA Technology Collaboration Programme
   b. Marine Energy - National Hydropower Association
   c. Ocean Energy Europe - Ocean Energy Europe

   This allows the Electric Program Investment Charge (EPIC) Program to include marine energy technologies as eligible to receive support from the state of California. From here, we recommend that the state – through the marine energy equivalent of AB 525 suggested above – create a pathway for marine energy technologies and projects to advance from 1) R&D to 2) single-unit demonstrations to 3) array deployments of many units with funding support from the state.

3. **Explore State-Level Incentives**:

   NHA's submission to Docket No. 24-IEPR-04 in August 2024 included seven different state-level clean energy incentive programs that California can use as examples in scaling marine energy technologies and projects: 1) Deployment targets and centralized procurement; 2) Feed-in tariffs; 3) Renewable portfolio standard carve-outs; 4) Clean transition tariffs; 5) Production tax credits; 6) Investment tax credits; and 7) Innovation funds. While these are not all realistic to have in the near or even medium term for marine energy technologies and projects in California, we recommend that a guidance is created on what would need to be done for each of these clean energy incentive programs to be introduced at the state level.

Thank you for your continued leadership in evaluating wave and tidal energy opportunities. We look forward to partnering with the CEC to support California's clean energy transition through innovative water power technologies.

Sincerely,

Kelly Rogers

Program Manager

National Hydropower Association

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