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Offshore Wind Energy Research, Deployment, and Demonstration

Additional submitted attachment is included below.

CALIFORNIA ENERGY COMMISSION

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The Energy Commission is currently soliciting ideas and stakeholder input for the 2018 – 2020 EPIC Triennial Investment Plan. For those that would like to submit an idea for consideration in the 2018-2020 EPIC Triennial Plan, we ask that you complete the form below. Submittals are due by **5:00 p.m. on February 10, 2017.**

Part 1. Initiative Description and Purpose:

1. Please provide a brief description of the proposed initiative:

To assess the feasibility and potential of utilizing an existing oil platform located off of the coast of California for three purposes: 1) To reuse the existing platform infrastructure (and especially submarine power cable) to facilitate the deployment and demonstration of a small scale floating wind energy research facility, and 2) To establish a deep water marine science research facility and observation station on an existing oil platform in order to aid in the environmental monitoring and impact assessment of the aforementioned floating wind research and demonstration project; and 3) In similar respects to point #2 to utilize the existing oil platform as a research and monitoring facility for the purposes of monitoring California's MPA network and other nearby sensitive coastal and marine habitats using a combination of traditional methods and advanced environmental monitoring technologies.

2. What technical and/or market barriers would the proposed initiative help overcome? For scientific analysis and tools, what knowledge gaps would the proposed initiative help fill?

Regarding Purposes #1 & 2, a small scale floating wind energy research facility would provide researchers the ability to assess the environmental impact of floating wind energy facilities over a range of environmental interactions including: avian impacts, impact on marine mammals, and impacts on fish and aquatic resources like fish, planktonic organisms, sea turtles, and benthic communities. The outcome of this research would additionally inform stakeholder perspectives and the permitting process of future offshore wind energy projects and would also inform mitigation and adaptive management methods and practices. This research would also provide an opportunity to study the potential levelized cost of energy (LCOE) of Pacific offshore floating wind energy by assessing technical considerations like: wake effects of multiple turbine arrays and placement patterns, operations and maintenance requirements and risks and associated technological/infrastructure needs, survivability and operational constraints under a range of Pacific ocean wind and weather regimes/conditions, expected values for Annual Energy Production (AEP) and Capacity Factor (CF), regional grid integration and balancing considerations, and more. Regarding point #3 by providing an open water marine science research and observation facility, this initiative could further the State's goals of providing long term monitoring of nearby MPA's and other sensitive coastal and marine habitats while providing a platform for the development and demonstration of novel/advanced environmental monitoring technologies.

Part 2. Benefits and Impacts

3. If this initiative is successful, either fully or partially, what would be the expected impact?
Who are the primary users and/or beneficiaries?

If Purposes #1 & 2 were implemented the expected impact of this initiative would be to greatly reduce the environmental impact, stakeholder acceptance, and technological uncertainty of offshore floating wind energy while also accelerating the technical/operational knowledge of this technology. Additionally, assessing these factors and potential impacts on a demonstration scale first is likely to be the most productive sequence of operations - for regulators and stakeholders alike - when considering the current interest in commercial scale projects that have been proposed to date. If Purpose #3 were implemented it could conceivably accelerate the development and deployment of advanced environmental monitoring technologies that could be utilized to assess the impact of offshore marine renewable energy and - generally speaking - sensitive coastal and marine environments in California, thereby reducing the impact uncertainty of marine use and potentially reducing the overall permitting costs of marine renewable energy development. The primary users would include academic researchers and industry (as needed for project implementation). The main beneficiaries would include - first and foremost - regulatory agencies, stakeholders/public, researchers; and to a lesser degree, industry.

4. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed initiative:

Due to the broad range of proposed research initiatives and the long term nature of a implementation time-line, the quantitative and qualitative impacts of purposes #1, 2, & 3 would be measured using the most current and widely accepted scientific methodology as research initiatives are developed and undertaken.

5. Please provide a list of peer-reviewed references that support the responses for questions 3 and 4. Proposed initiatives that include peer-reviewed references will be given stronger consideration.

To date and to the best of our knowledge, no feasibility studies of this type (especially with an emphasis on an environmental research component) have been undertaken. A previous study on partial decommissioning scenarios titled "Evaluating Alternatives for Decommissioning California Offshore Oil & Gas Platforms" Bernstein, et. al, 2008 commissioned by the Ocean Science Trust very briefly explored the concept of utilizing a platform for alternative energy re-purposing, or alternatively for re-purposing a partially decommissioned platform as an anchor/mooring point for a potential marine observation sensor but dismissed both options as not likely to be implemented due to a lack of interest and technological immaturity. Additionally, AB 2503 (Perez, c. 687, Statutes of 2010) allows, on a case by case scenario, that partial decommissioning of existing platforms occur if they can demonstrate a net environmental benefit to the marine environment. This research could help to quantify whether or not the re-purposing of an existing platform per Purposes 1, 2, & especially 3 may help to achieve the legislative intent of the law.

6. (For technologies only) What competitive advantages does the proposed technology solution have over current benchmark technologies? If the technology is beyond the prototype stage, what strategies do you suggest to bring to scale?

The National Renewable Energy Laboratory (NREL) has simulated that offshore wind energy in California has the potential to provide considerable generation capacity and grid balancing services that are likely to be complimentary to terrestrial solar and wind generation profiles thus making offshore wind an important California energy generation asset in future Renewable Portfolio Standard (RPS) scenarios of 50% or greater. A critical strategy for bringing this technology to scale would be to initiate a small scale research and demonstration project to better understand the environmental impact, existing data gaps, permitting requirements, and technical uncertainties.

Part 3. Connection to Energy Commission's EPIC Framework

Energy Commission staff have developed a draft strategic framework to guide the CEC's planning and implementation of EPIC across triennial investment cycles. One of the objectives of the draft strategic framework is to communicate a consistent set of priorities for organizing current and future EPIC investments.

7. Please indicate which of the following strategic framework themes you feel the proposed initiative best fits within:

- Advance Technology Solutions for Deep Energy Savings in Building and Facilities
- Accelerate Widespread Customer Adoption of Distributed Energy Resources
- Increase System Flexibility from Low-Carbon Resources
- Increase the Cost-Competiveness of Renewable Generation
- Create a Statewide Ecosystem for Incubating New Energy Innovations
- Maximize Synergies in the Water-Energy-Food Nexus
- Develop Tools and Analysis to Inform Energy Policy and Planning Decisions
- Catalyze Clean Energy Investments in California's Underrepresented and Disadvantaged Communities

Increase the Cost-Competiveness of Renewable Generation

If Other, Please Specify

Advance technology solutions for environmental monitoring technologies in the marine environment