CALIFORNIA OCEAN
PROTECTION COUNCIL

Staff Recommendation
June 14, 2007

Environmental Implications of Ocean Energy Study

Developed By: **Laura Engeman**

RECOMMENDED ACTION: Consideration of the **Environmental Implications of Ocean Energy study** and possible: 1) determination that it is a high priority project and 2) authorization for the Secretary to take actions necessary to provide up to $50,000 for its implementation.

NEAREST OCEAN or COASTAL LOCATION: Statewide

AGENCY OR ENTITY RECOMMENDING PROJECT: Ocean Protection Council, California Energy Commission

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EXHIBITS

Exhibit 1: Letters of Support

RESOLUTION:

"The Ocean Protection Council finds pursuant to Sections 35600 *et seq.* of the Public Resources Code that evaluating potential environmental impacts of future ocean energy projects, as herein described, is of high priority for ocean conservation and authorizes the Secretary to take actions necessary for conducting this assessment, including the allocation of up to $50,000 for these purposes."

PROJECT DESCRIPTION:

Staff recommends that the Ocean Protection Council (OPC) authorize up to $50,000 to support a report on the potential environmental impacts in the marine environment that may result from ocean energy projects. The California Energy Commission's Public Interest Energy Research program (PIER) and the OPC will jointly commission this report. The report will include a review of existing literature on ocean energy and environmental impacts and identify critical research needs for evaluating future siting and technology design. It will also facilitate discussions among federal and state regulatory agencies, industry, and the public to address potential site-specific environmental concerns and user conflicts.

The proposed environmental review is designed to complement a technology feasibility assessment currently being prepared by PIER. The feasibility assessment will identify optimal

sites and technology for ocean energy projects in California. Building on the assessment's information and description of potential future ocean energy development, the environmental review will take a more in-depth look at potential environmental impacts and research needs for California.

The primary objectives of the environmental review will be to:

(1) identify and discuss as comprehensively as possible a list of the potential environmental impacts that could result from constructing and operating ocean energy projects in California

(2) determine whether there are existing methods and data to address the environmental impacts

(3) determine what the knowledge gaps are and identify research needs to develop the tools to address the impacts.

Potential environmental impacts that will be addressed include impacts to fishing and other ocean uses, direct habitat loss and disturbance, impacts to marine species, fish entrainment and impingement potential, water quality and turbidity, geophysical processes. The report will also look at ocean energy compatibility with existing marine managed areas and uses such as marine reserves, protected areas, and aquaculture sites.

The final white paper report will consist of maps of areas with wave and tidal resources viable for ocean energy development, a comprehensive list of the potential environmental impact from ocean energy, and a discussion of research needed to adequately assess potential environmental impacts of future ocean energy projects in California. PIER and OPC anticipate hosting a workshop with relevant state and federal agencies to discuss the findings of this report and ways that the agencies can collaborate to facilitate the review and permitting of these projects.

Background

With the adoption of the Global Warming Solutions Act and the State's Renewable Portfolio Standard, California is aggressively pursuing renewable energy development and a diversified energy generation mix. Recently, considerable improvements in technology have made ocean energy a viable candidate for meeting these goals. The West Coast's Pacific waters offers some of the nation's richest wave resources, including California's marine waters, most notably north of Point Conception, and there is an increasingly growing interest in pursuing wave and tidal projects in these waters. In the last two years, 15 permits for ocean energy studies on the West Coast have been granted by the Federal Energy Regulatory Commission, with another 6 currently pending. Four of the six under consideration are slated for California waters. It is anticipated that a number of other proposals are in the works, with major energy companies, such as Pacific Gas and Electric, making serious investments in research and development. Within ten years, it is possible commercial size wave energy conversion devices will be developed that span several miles of water and could provide an energy source comparable to onshore wind farms.

Types of ocean energy technology under consideration

The principal types of ocean energy production under consideration in California are wave and tidal energy. Wave energy installations harvest energy from waves as they move toward the shore. They are anticipated to be offshore structures with cables connecting to transmission facilities onshore. Current technologies proposed for wave energy production include buoys that capture vertical wave motions, water propelled turbines, and oscillating water columns. Four preliminary permit applications are currently pending with the Federal Energy Regulatory Commission (FERC) for wave energy projects off Mendocino and Humboldt counties. These preliminary permits would authorize the applicants to perform feasibility studies and allow them priority status for obtaining a FERC license for the development of a project in the permitted area.

Tidal energy involves harnessing energy from strong tidal flows with the use of underwater turbines, similar to the function of a wind turbine. Marine tidal energy development is currently being considered for an area near the Golden Gate Bridge by the San Francisco Public Utilities Commission and the San Francisco Department of the Environment. The Federal Energy Regulatory Commission has already issued a preliminary permit to Golden Gate Energy for conducting a feasibility study for this project.

Considering the increasing number of permits being issued and the potential requests that may come over the next few years, PIER and OPC staff believe there is a significant need to evaluate environmental impacts of ocean energy technologies. By conducting this assessment in parallel with a number of the industry studies, the State will be able to engage in discussions about technology design and siting, thereby preempting potentially significant ecosystem impacts and facilitating the process for permitting and environmental review.

Related federal and state review processes

The construction, operation, and decommissioning of ocean energy structures in the water and on land have the potential to affect terrestrial and marine environmental resources. Given the robust environmental standards in California, it is expected that wave and tidal energy projects proposed for state waters will be subject to a high level of public and regulatory scrutiny.

To date, there is limited data available on the specific environmental impacts of ocean energy technologies. In fact, the only two environmental reviews conducted on a wave energy project in the United States are an environmental assessment of a wave energy project at Marine Corps Base Hawaii Kane'ohe Bay prepared by the Department of the Navy in 2003 and a 2006 preliminary environmental assessment of the Washington Makah wave energy pilot project (not yet constructed). Although the Navy found no significant environmental impacts in its assessment, it did take precautionary steps to site the project to minimize impacts to sensitive coral reefs and marine habitats.

At the federal level, the Minerals Management Service, which has authority for renewable energy projects on offshore lands under the Energy Policy Act of 2005, is currently conducting a Programmatic Environmental Impact Assessment (PEIS) for the Outer Continental Shelf Alternative Energy and Alternate Use Program, authored by Argonne National Laboratory. The draft PEIS is scheduled to be released in the fall of 2007, but will only highlight broad, not site-specific, impacts from ocean energy technology developments.

In the interim, states such as Oregon and Washington are pursuing various avenues to facilitate and oversee ocean energy development. In Oregon the Ocean Wave Energy Initiative is recommending that the Legislature invest approximately $4 million to encourage ocean energy research and development in the state. In Washington, the Makah offshore wave energy project is on track to be the first commercial wave energy project in the U.S. and a consortium of utility regulators, tribal representatives, renewable energy organizations and industry are working collectively to address public and environmental concerns surrounding the project as it moves through the official FERC licensing process.

In California, the California Energy Commission (CEC) recently conducted an Energy Resources and Technical Feasibility Assessment to determine the feasibility of ocean energy technology and to address questions such as where ocean and tidal resources are located, which technologies are feasible in what locations, and the minimum requirements for establishing ocean energy facilities such as transmission capabilities and potential power productivity. However, additional work is needed to better understand the expected environmental impacts of technologies under development and in the most likely sites of deployment. In its letter to the West Coast Governors' Agreement on Ocean Health, the OPC proposed that the three states collaborate with the appropriate federal regulatory agencies to evaluate the potential for and impacts of new renewable ocean energy projects off the West Coast. Using the CEC's feasibility assessment as a foundation for more site- and technology-specific information, the proposed review of potential environmental impacts will provide California agencies with critical initial information and will set the stage for more directed research on ocean energy and its potential impacts to marine environments and species.

PROJECT FINANCING

Ocean Protection Council	$50,000
California Energy Commission's PIER program	$75,000
Total Project Cost	**$125,000**

Staff anticipates using up to $50,000 in funds appropriated to the Coastal Conservancy in the California FY06/07 State Budget from the Environmental License Plate Fund for Ocean Protection. These funds can be used pursuant to the Ocean Protection Act for the protection of fish and wildlife habitat, including review of the potential impact of development activities on that habitat. The Conservancy funds are expected to cover part of the cost of the review, with PIER funding the other portion. If the cost of the study is less than $100,000, the OPC will contribute fifty percent of the total cost.

CONSISTENCY WITH OCEAN PROTECTION COUNCIL'S FIVE-YEAR STRATEGIC PLAN:

This project is consistent with objective E(5) of the Strategic Plan: *Encourage sustainable economic activity*. The environmental review will gather critical information related to wave and tidal energy technologies which may have significant economic benefits for the State. By initiating early environmental impact discussions, OPC and PIER will assist industry and the regulatory agencies to address these impacts early in the development stage, thereby encouraging the development of these technologies in a sustainable manner.

This project is also consistent with objective B(1) of the Strategic Plan: *Improve scientific understanding of our ocean and coastal ecosystems.* The environmental review is designed to identify gaps in critical research needs for adequately evaluating future ocean energy projects. The review will use site-specific information from the Technology Feasibility study to characterize the ecosystems that may be impacted, and recommend scientific investigations and monitoring that would improve our understanding of the potential effects of ocean energy technologies on the marine and coastal environment.