MEMORANDUM

TO: Ocean Protection Council

FROM: Laura Engeman, Project Manager

DATE: March 3, 2010

RE: Building Capacity to Plan and Manage Marine Renewable Energy

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REQUESTED ACTION:

Staff recommends the Council adopt the following resolution:

> "The Ocean Protection Council (OPC) resolves to establish the California Marine Renewable Energy Working Group and to support the collection and dissemination of state agency data for use in marine renewable energy planning and management."

SUMMARY:

Wave, tidal, and offshore wind energy capture (marine renewable energy) is still in its nascent stage in the United States. Yet, demonstration projects and potential developments are currently being planned for areas off the coast of California and appropriate measures need to be taken for ensuring that these developments do not cause significant use conflicts or unacceptable adverse impacts to our state's coastal and marine resources. There is currently limited information on these emerging technologies or their impacts. Establishing baseline data collection and monitoring protocols would provide an opportunity for gathering contextual information for evaluating environmental impacts and managing possible use conflicts. Developing geospatial data sets and mapping tools will also provide methods for comprehensive planning and siting of these projects. These efforts can contribute substantially to preventing conflicts with navigation, fishing operations, and other marine uses, and to avoid adverse impacts to ocean resources. OPC establishment of a California Marine Renewable Energy Working Group will provide a foundation of state agency communication and coordination to build data collection protocols, geospatial tools, and improve regulatory processes.

BACKGROUND:

California has aggressive renewable energy power production goals, as outlined in the Governor Schwarzenegger's 2009 Executive Order to increase the state's Renewable Portfolio Standard

goal to 33% by 2020 and the state's greenhouse gas reduction strategy under AB 32. In the last few years, wave, tidal, and offshore wind energy have emerged as potentially viable renewable energy sources that could contribute to meeting these renewable power goals. The state's offshore wave climate, particularly north of Point Conception, is considered some of the country's most productive wave energy resources.[1] In San Francisco Bay, strong tidal flows also provide opportunity for harnessing tidal power. In addition, the state has productive offshore wind energy resources. Although, presently available offshore wind technology is not viable for mooring in water depths found on California's continental shelf, advances in floating platform technology are being tested and could open the door to exploring this energy resource in the future.[2]

The Status of Marine Renewable Energy Development in California

Currently, wave energy, referred to as hydrokinetics, has been the focus of marine renewable energy development in California. Between 2007 and 2008, a number of developers applied for hydrokinetic study permits to conduct feasibility assessments in California marine waters and federal outer continental shelf (OCS) waters. Competition for certain areas, coupled with extremely limited information on this emerging marine industry, elicited concern by state agencies, local coastal communities, marine users, and the general public. Adding to the concern, both the Federal Energy Regulatory Commission (FERC) and the U.S. Department of Interior's Minerals Management Service (MMS) asserted jurisdictional authority for these developments. In 2009, FERC and MMS developed a Memorandum of Understanding outlining their shared jurisdictional roles for federal OCS waters, and confirming FERC's federal licensing jurisdiction in state waters. In response, several California project proponents revised their applications to site their projects in state waters.

Present-day active proposals for hydrokinetic projects in California marine waters include: (1) Pacific Gas & Electric's (PG&E) WaveConnect Project[3], which includes a site in Humboldt Bay and a second site just southwest of Vandenberg Airforce Base, (2) the Sonoma Coast Hydrokinetic Project[4], which includes three sites in waters offshore Sonoma County, pursued by Sonoma County Water Resources Agency, (3) the Greenwave San Luis Obispo Wave Park, and (4) the Greenwave Mendocino Wave Park. These project proponents propose to test several hydrokinetic technologies on a small scale, with the potential to expand to larger scale commercial projects at a later date.

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[1] Bedard, Roger. "Power and Energy from the Ocean Energy Waves and Tides: A Primer." Electric Power Research Institute: May 14, 2007.

[2] In June of last year, Norway's StatsOil tested the world's first full-scale floating wind turbine. After being hooked up to a transmission cable, it began supplying electricity to the Norwegian power grid on Sept. 21. N.Y. Times, November 18, 2009, http://www.nytimes.com/2009/11/19/business/energy-environment/19WIND.html?_r=1&scp=1&sq=floating+wind+turbine&st=nyt.

[3] http://www.pge.com/myhome/environment/pge/cleanenergy/waveconnect/

[4] http://www.scwa.ca.gov/schep/

PG&E will be the first project, with test technologies expected to be placed in the water in summer 2011. Sonoma County is developing study plans for their three sites, with an expectation to apply for a pilot license application in 2011. Greenwave recently entered in a Memorandum of Understanding with Ocean Power Technologies to use their devices exclusively in the Mendocino and San Luis Obispo sites, and is performing site characterizations at this time.

STATE MANAGEMENT CHALLENGES:

California agencies tasked with managing marine renewable energy development include: the California Coastal Commission, the California State Lands Commission, the California Department of Fish and Game, the California Public Utilities Commission, the California Energy Commission, and the State Water Resources Control Board. Many of these agencies have jurisdiction and experience with the siting and operation of energy facilities such as power plants and natural gas facilities, yet marine renewable energy projects, present a number of new management challenges.

Permitting Projects with Limited Information on Technologies and Impacts:

Information about hydrokinetic technologies remains limited. Many of these devices are still under development and there are only a handful of demonstration projects in the world. In 2008, OPC and the California Energy Commission co-funded the report, "Wave Energy Development in California: Potential Ecological and Socio-economic Effects" to identify species, habitats, and marine uses that had the potential for being impacted by proposed California hydrokinetic development projects. In Oregon, a workshop was held with scientists and agency representatives to identify environmental stressors resulting from hydrokinetic development. A technical summary report from that workshop was released by NOAA[5]. The U.S. Department of Energy and MMS have also initiated grant programs for funding research into marine renewable energy technologies, potential environmental impacts, and marine user conflicts. Many of the federal grants will contribute valuable input on issues such as electromagnetic field impacts, acoustic impacts, and modeling for sediment process changes. Unfortunately, the results from many of these grant research projects will not be available for a few years.

In the meantime, California agencies are faced with determining how much information is sufficient for approving demonstration projects and what information can be collected during the demonstration phase. Data gathered through these demonstration projects will provide the foundation for monitoring and adaptively managing this industry. It is therefore, important that protocols for baseline studies and monitoring be developed based on standard scientifically sound methodologies. Standardizing baseline data collection and monitoring protocols would facilitate data comparison and analysis of multiple projects and of cumulative impacts. For example, multiple wave buoy arrays in a geographic area may result in cumulative impacts on the marine environment. OPC staff propose coordinating this effort by working with the various state agencies, federal resources agencies, and project developers to develop a baseline data

[5] "Ecological Effects of Wave Energy Development in the Pacific Northwest: A scientific workshop, October 11-12, 2007

collection and monitoring framework. OPC staff will also work with members of the West Coast Governors' Agreement on Ocean Health (WCGA) Alternative Energy Action Coordination Team (ACT) to share information on the development of standard protocols and to leverage federal research funds for filling critical data gaps.

Navigating FERC License and MMS Lease Procedures

All the hydrokinetic demonstration projects proposed for California are currently located in state waters, where FERC has federal jurisdiction. FERC has proscribed several license processes for hydrokinetic projects, including an accelerated six- month pilot license process[6]. The accelerated pilot license timeline, evolving license procedures, and limited information on technology and impacts pose significant challenges for state agency permit and lease processes, such as conducting California Environmental Quality Act analysis. To improve coordination between FERC and the state agencies on regulatory processes for hydrokinetic energy development, OPC staff have been managing the negotiation of a Memorandum of Understanding between FERC, the California Natural Resources Agency, the California Environmental Protection Agency, and the California Public Utilities Commission. The MOU is in the final stages of approval and outlines a process for cooperation between the state and FERC to coordinate application review schedules, encourage pilot projects prior to commercial development, and to coordinate environmental reviews, where possible.

It is expected that most commercial hydrokinetic and offshore wind developments will be sited on the OCS to avoid visual impacts and minimize conflicts with other marine users. However, cables and other infrastructure would be located in state waters since grid connections are onshore and regular maintenance will be necessary for these developments. According to the MOU between MMS and FERC, hydrokinetic projects on the OCS would require both a FERC permit and a MMS lease. Offshore wind projects would only require an MMS lease. Given that there are multiple scenarios where marine renewable energy projects will require overlapping federal and state permits, leases, and licenses, it is essential that these agencies are communicating in a productive and efficient manner.

Informal meetings of California state agencies have been periodically organized by OPC staff to provide forums for drafting comments on federal licensing and leasing programs. These meetings were instrumental in drafting an MOU between California and FERC, sharing information on technology and project developments, and for coordinating with federal resources agencies such as National Marine Fisheries Service and U.S. Fish and Wildlife Service on identifying species and habitats of concern. OPC staff propose establishing an inter-agency marine renewable energy working group to continue this form of cooperation.

[6] Federal Energy Regulatory Commission White Paper on Hydrokinetic Pilot Project Licensing Process. April 14, 2008.

Incomplete Tools for Informing Planning and Siting Decisions:

Siting marine renewable energy, either at the pilot or commercial scale, so that it does not significantly affect other marine uses or resources is a formidable challenge. California waters are already actively used for a range of commercial and recreational activities. Given that the proposed project areas can range from one to two acres to a few hundred acres of ocean (depending on the type of technology and the shape of the array, i.e., multiple device formation), there are significant concerns about how this type of development could conflict with fishing activities, marine navigation, and coastal and marine recreation. For example, fishermen have expressed concerns about the potential for entanglement of energy capture devices with fishing gear. Geospatial mapping and analytical tools can provide methods for evaluating various siting decisions, trade-offs and cumulative impacts. However, there is a significant need to gather geospatial data, and evaluate potential tools for displaying and analyzing this data.

Current efforts by OPC staff to build geospatial data-sharing opportunities and tools will assist in improving the planning and siting of renewable energy deployments. OPC staff are also working with the Multipurpose Marine Cadastre (MMC), a geospatial mapping tool developed by NOAA and MMS, to build geospatial mapping capacity for marine renewable energy in California. MMC staff are assisting California, Oregon, and Washington to map offshore infrastructure, habitats, seafloor geology, and jurisdictional boundaries, such as National Marine Sanctuaries and military zones, which have implications for where marine renewable energy can best be sited to avoid user conflicts and impacts to sensitive marine resources.

OPC staff are also actively engaged in the development of the West Coast Guidebook for Renewable Energy. This is intended to be a reference guide of relevant data resources and tools useful for marine renewable energy planning and siting decisions. The Guidebook is a direct action identified by the West Coast Governors Agreement on Ocean Health (WCGA) Alternative Energy Action Coordination Tea (ACT), of which OPC staff are members.

OPC staff propose to continue to support these efforts to gather data and develop tools, such as the MMC, for marine renewable energy siting and planning decisions by building geospatial data sets, improving access to geospatial data, and coordinating MMC staff with state agency staff responsible for managing California GIS and other data.

NEXT STEPS:

Marine Renewable Energy Working Group

OPC staff recommend that the OPC establish a California Marine Renewable Energy Working Group. The Working Group will be co-chaired by OPC staff and California Energy Commission (CEC) staff. This framework represents the state's goals for improving state marine protection and renewable energy goals. It also builds on OPC staff's role in building geospatial data, filling data gaps through scientific input and research, and facilitating agency coordination. CEC staff would bring experience with regional renewable energy planning for the West. State agency

staff responsible for managing marine renewable energy will be invited to participate in the formation and development of the Working Group including staff from the OPC, CEC, the California Coastal Commission, the Public Utilities Commission, the Department of Fish and Game, the State Lands Commission and the State Water Resources Control Board. OPC staff expect to use current staff and budget to provide the support services for the Working Group.

The primary roles of the Working Group will be to support coordination among state agencies to address regulatory challenges, information gaps, and coordination with federal counterparts. In particular, the Working Group will take on the following roles:

- Support the implementation of the Memorandum of Understanding between the California Natural Resources Agency, the California Environmental Protection Agency, the California Public Utilities Commission and the Federal Energy Regulatory Commission (to be executed in the near future). The MOU calls for federal-state consultation and coordination for hydrokinetic project reviews.
- Act as a focal point for federal/state coordination to address regulatory and data management issues. Working group meetings could also provide project developers with a venue for presenting project proposals to regulatory agencies and soliciting initial input.

In addition to providing facilitation and management support for the Working Group, OPC staff will also continue to support the following efforts to improve the capacity of the state to manage marine renewable energy development projects:

- Development of the Multipurpose Marine Cadastre (MMC) and other geospatial mapping tools by facilitating the collection and translation of pertinent state agency data into useful geospatial formats.
- Workshops or meetings with developers, agencies, and the scientific community to assess data gaps and sources of relevant information, define data collection and monitoring protocols, develop tools, and facilitate information sharing.

CONSISTENCY WITH THE CALIFORNIA OCEAN PROTECTION ACT:

The proposed action is consistent with the California Ocean Protection Act (Division 26.5 of the Public Resources Code). Section 35615(a)(1) specifically directs the Council to coordinate activities of state agencies to improve the effectiveness of state efforts to protect ocean resources.

CONSISTENCY WITH THE OPC'S STRATEGIC PLAN GOAL(S) & OBJECTIVE(S):

The project is consistent with the OPC's Five-Year Strategic Plan in the following respects:

Goal A (Governance), Objective 2b: Interagency Collaboration: "Work with all relevant state agencies to develop necessary legislation, regulations, or other tools to improve ocean governance." The proposed action is designed to encourage collaboration among state and federal agencies with regard to marine renewable energy planning and regulation. Interagency collaboration will also improve data availability and the development of data analysis tools available to state marine managers for marine renewable energy planning and decision-making.

Goal E (Ocean and Coastal Ecosystems), Objective 5a: Encourage Sustainable Economic Activity: "Encourage and support new and innovative economic activities that can be conducted in a sustainable manner along or off the California coast." The proposed action will promote the development of regulatory and planning approaches for marine renewable energy consistent with the protection of the state's valuable marine and coastal resources and activities.