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Testimony
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and
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Hearing on "Renewable Energy Opportunities and Issues on the Outer Continental Shelf"

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Introduction

Ocean Renewable Energy Coalition (OREC) is the national trade association for marine and hydrokinetic renewable energy dedicated to promoting energy technologies from clean, renewable ocean resources including wave, tidal, offshore wind and marine biomass. Coincidentally, OREC celebrates its second anniversary the same week as this hearing, and during this time, we have grown from a handful of developers to 36 members from all over the world. OREC is working with industry, academia, and interested organizations NGO's to encourage commercial development of ocean renewable technologies and raise awareness of their substantial, potential contribution to an affordable, reliable, environmentally friendly energy future.

We seek a legislative and regulatory regime in the United States that fosters the development of ocean renewable technologies, their commercial development, and allows for capturing the rich energy potential of our oceans. While other countries have already funded and deployed viable, operating, power generating projects using the emission-free power of ocean waves, currents, and tidal forces, the U.S. is only beginning to acknowledge the importance these technologies.

Ocean energy can play a significant role in our nation's renewable energy portfolio. With the right support, the United States ocean energy industry can be competitive internationally. With the right encouragement, ocean renewable energy technologies can help us reduce our reliance on foreign oil—fossil fuels, in general—and provide clean energy alternatives to conventional power generating systems. And with the right public awareness, our coastline communities can use ocean renewables as a springboard for coastal planning that reflects the principles of marine biodiversity. Today, OREC will address the steps that we must take to realize the promise and potential of ocean renewables.

Is the resource there? Yes, and the resource is located near highly populated areas on the coast, placing fewer demands on already taxed transmission infrastructure.

Is the resource cost competitive? Not yet, but indications suggest a much shorter time to commercial viability than experienced by many other renewable technologies.

Is the resource environmentally friendly? Yes. Ocean renewables present some of the most potentially environmentally benign energy technologies available today—no air emissions, no fuel costs or associated mining or drilling effects, no fuel transportation costs or related environmental effects, and, with proper siting and technology, minimal marine or fisheries effects. Unfortunately, there is very little data to support this last claim, yet the data that does exist suggests minimal impacts with proper technology and siting.

I. BACKGROUND

A. Types of Technology

Before we describe the benefits that ocean renewables offer, we take a step back and offer a description of the different technologies. Ocean energy refers to a range of technologies that utilize the oceans or ocean resources to generate electricity. Many ocean technologies are also adaptable to non-impoundment uses in other water bodies such as lakes or rivers. These technologies are can be separated into three main categories:

Wave Energy Converters: These systems extract the power of ocean waves and convert it into electricity. Typically, these systems use either a water column or some type of surface or just-below-surface buoy to capture the wave power. In addition to oceans, some lakes may offer sufficient wave activity to support wave energy converter technology.

Tidal/Current: These systems capture the energy of ocean currents below the wave surface and convert them into electricity. Typically, these systems rely on underwater turbines, either horizontal or vertical, which rotate in either the ocean current or changing tide (either one way or bi-directionally), almost like an underwater windmill. These technologies can be sized or adapted for ocean or for use in lakes or non-impounded river sites.

Ocean Thermal Energy Conversion (OTEC): OTEC generates electricity through the temperature differential in warmer surface water and colder deep water. Of ocean technologies, OTEC has the most limited applicability in the United States because it requires a 40-degree temperature differential that is typically available in locations like Hawaii and other more tropical climates.

Offshore Wind: Offshore wind projects take advantage of the vast wind resources available across oceans and large water bodies. Out at sea, winds blow freely, unobstructed by any buildings or other structures. Moreover, winds over oceans are stronger than most onshore, thus allowing for wind projects with capacity factors of as much as 65 percent, in contrast to the 35-40 percent achieved onshore.

Other: Marine biomass to generate fuel from marine plants or other organic materials, hydrogen generated from a variety of ocean renewables and marine geothermal power. There are also opportunities for hybrid projects, such as combination offshore wind and wave or even wind and natural gas.

B. The status of US wave, current and tidal projects

At present, prototype offshore renewable projects are moving forward in the United States. These include the following:

New Jersey based Ocean Power Technologies (OPT) has operated a test wave energy buoy off the coast of Hawaii for the U.S. Navy. It has also operated a buoy off the coast of New Jersey funded by Board of Public Utilities since 2005 and in February 2007received a preliminary permit to study the feasibility of a 50 MW commercial wave farm at Reedsport, off the coast of Oregon.

Finavera Renewables, Inc., has proposed a 1 MW pilot project for the Makah Bay off the coast of Washington state. In November 2006, Finavera completed a four year permitting process and submitted a license application and draft Environmental Assessment to the Federal Energy Regulatory Commission which is pending review.

New York based Verdant Power is undergoing licensing at FERC and deployed two of six units of a tidal/current project located in the East River of New York in December 2006. Verdant Power, Inc is in the process of deploying 4 more turbines scheduled for completion early May of 20007. One of the units is already delivering power to a commercial customer on Roosevelt Island.

Australian based Energetech has formed a subsidiary in Rhode Island which has received funding from the Massachusetts Trust Collaborative and has planned a 750 kw project for Port Judith Rhode Island. Permitting has not yet commenced.

Ocean Renewable Power Company of North Miami, Florida recently secured preliminary FERC permits for two sites in Alaska

Multiple permits for sites in Maine, California, Oregon, Alaska and Florida have been filed with the Federal Energy Regulatory Commission.

The Mineral Management Service (MMS) now has authority to lease lands for offshore wind projects on the Outer Continental Shelf. MMS has conducted environmental review of the proposed 420 MW Cape Wind Farm off the coast of Nantucket, MA and LIPA/FPL 100 MW project off the coast of Long Island, NY.

C. Overseas

In Europe, projects are moving ahead. Europe has already installed 587 MW of offshore wind in Denmark, Holland, Scotland, England and UK. See http://www.bwea.com/offshore/worldwide.html. Two near shore wave projects, are operating in Scotland and Isle of Azores. Pelamis of OPD in Scotland is deploying the world's first commercial wind farm off the coast of Portugal and Marine Current Turbines has operated a prototype tidal project for 2 years.

D. Commercial Viability of Ocean Renewables

Offshore wind costs range from 3-8 cents per kWh compared to 2.5-7 cents onshore. (World Renewable Energy Report 2002-2007, Renewable UK). These figures have been derived based on operating experiences in Europe and reflect operating experience. Costs for offshore wind increase as projects move further offshore, necessitating more costly mooring systems and larger turbines.

As for wave and tidal, we have general parameters on cost, but they remain subject to further refinement. The World Renewable Energy Report estimates the cost of wave energy at an average of 9 cents/kWh and tidal and current an average of 8 cents/kWh.

Recent EPRI reports have found that, presently, the cost of power from ocean technologies ranges from 7 cents to 16 cents/kw in a low case scenario. For tidal, the May 2006 EPRI report found that the cost is driven by the resource, a strong resource can yield power at prices as low as 6 cents/kwh. Plus, similarities between tidal and offshore wind bring costs down.

And, the costs of offshore wind or wave are stable. Whereas natural gas and oil have fluctuated over the years (with natural gas now higher than ever), offshore wind and wave energy costs are stable, since the cost of renewable power sources like wind or wave are free. The analogy here is that renewable energy financing functions more like a fixed-rate mortgage as opposed to a variable rate mortgage associated with the use of finite fossil fuel resources.

Also, costs are expected to decline as the industry matures and as economies of scale make ocean projects less costly. To compare, back in 1978 wind energy cost 25 cents/kwh to produce – but now costs between 4.5 and 6 cents/kwh. Wave is already less costly than wind was in its early stages. Moreover, the EPRI report found that if wave had obtained the same government subsidies as wind, it would be a far more advanced technology than at present. As the offshore wind industry makes advancements on mooring systems, turbine durability and other issues that bear on the cost of marine projects, these advancements will help bring down the cost of ocean energy. In addition, if we can gain a better assessment of our resources, we can target the most powerful sites first and learn from our experience in these locations to bring costs down further.

In addition, ocean renewable energy offers other economic benefits. Development of a robust offshore renewables industry can:

- Reduce reliance on foreign oil
- Rely upon ocean terrain for power generation as opposed to onshore land resources
- Revitalize shipyards, coastal industrial parks and shuttered naval bases

- Create jobs in coastal communities

- Allow the US to transfer technology to other countries, just as a country like Scotland is exporting its marine renewables know-how

- Provide low cost power for niche or distributed uses like desalination plants, aquaculture, naval and military bases, powering stations for hybrid vehicles and for offshore oil and gas platforms

- Provide use for decommissioned oil platforms through "rigs to reefs program"

- Promote coastal planning that reflects the goals of bio-diversity, that maximize best comprehensive use of resources and capitalizes on synergies between offshore industries

II. WHAT THE INDUSTRY NEEDS TO ACHIEVE OUR GOALS

What will it take for the ocean renewable industry to move from where it is now to achieve its potential? OREC recommends the following actions:

--More funding for R&D and technology development: Wind energy has benefited from substantial government investment. Thirty years ago, wind cost 30 cents/kWH to generate; today, that cost stands at 3 to 7 cents/kWH. And even today, DOE continues to invest in wind. Just a few months ago, DOE announced a $27 million partnership with GE to develop large-scale turbines and also issued a $750,000 SBIR to Northern Power for offshore wind technology development.

Private developers have borne the costs of bringing the ocean energy technology forward for the past thirty years, but they need government support. Government funding will also give confidence to private investors and help attract private capital.

--Resource Assessment: At present, we do not even know the full potential of offshore renewables, because no agency has ever mapped the resource comprehensively. The Energy Policy Act of 2005 directed the Secretary of DOE to inventory our renewable resources but that work has never been funded. And even as MMS moves forward with a rulemaking for offshore renewables on the OCS, it has not received funding to map the resource.

Preliminary studies done by EPRI and private companies show that we have substantial ocean resources. But we will not know the full scope without further mapping and study.

--Incentives for Private Investment: Offshore renewables are compatible with other large industries in our country, such as oil and maritime industry. These industries, with the right tax incentives, can provide substantial support to offshore renewable development. Incentives could include investment tax credits for investment in offshore renewables and incentive to use abandoned shipyards and decommissioned platforms for prototypes and demonstration projects.

--Incentives for coastal communities: Coastal municipalities stand to gain tremendously from installation of offshore renewables. They need to be stakeholders in the process with a voice in development that takes place off their shores. Congress can support this by continuing to authorize Clean Renewable Energy Bonds (CREBS) and the Renewable Energy Portfolio Incentives (REPI) for coastal projects.

--Reduced regulatory barriers: Until companies get projects in the water, we will not learn about the environmental impacts or true costs of offshore renewables. Unfortunately, developers face onerous barriers to siting small, experimental projects. We should establish streamlined regulation and permitting for offshore renewables, with maximum cooperation between state and federal agencies. A system to coordinate joint authorities could be established up front, either through MOUs, a Joint Office or liaison system, so there is one place that coordinates and integrates the lead agency process with other state and federal permits. Agencies will establish clear lines of responsibility and coordination and adhere to firm deadlines.

To minimize duplication of effort and develop expertise with hydrokinetic and offshore renewable technologies, each agency could dedicate teams of responsible parties from their respective agency that can coordinate on applications. The same team can learn the new technology, the new permitting and licensing process, and can more efficiently process all applications.

Another option is to create a Joint Hydrokinetic and Marine Renewables Office, staffed with key personnel from relevant agencies. Working through a joint office will increase accountability and enhance efficiency and information sharing. In the Energy Policy Act, Congress provided for creation of a joint renewables office within BLM.

III. Principles of Adaptive Management

In particular, we need a streamlined system that will allow for deployment of pilot projects to demonstrate technological viability and allow for study of environmental effects. Right now, pilot projects, few of which will ever generate significant revenues, remain subject to the same permitting requirements as conventional projects. In fact, environmental studies and regulatory costs account for as much as forty percent of the cost of wave and tidal projects. Agencies should be encouraged to minimize upfront review and extensive study of smaller, demonstration and pilot projects, and instead,

incorporate principles of adaptive management that allow for study and mitigation on an "as you go" basis.

The concept of adaptive management allows for modification of project operation to accommodate newly discovered affects. For nascent technologies, adaptive management is preferable to a front loaded process, because it allows continued collection of data and ongoing monitoring after the project is deployed. Information gleaned from adaptive management is therefore, more accurate about affects than pre-deployment studies and projections. Adaptive management also allows for proportionality – the actions taken should be proportional to the adverse impacts identified. This concept is critical to the development of this industry.

IV. Dual Regulation Stifles Innovation, is Anti-Competitive, and Wasteful

OREC opposes any jurisdictional overlap between MMS and FERC for projects on the OCS. Dual regulation will give rise to duplication of effort and unduly burden developers. Moreover, such duplication would unnecessarily waste taxpayer dollars.

In addition, dual regulation will place wave energy developers on the OCS at a competitive disadvantage to developers of other alternative technology (like offshore wind) because these technologies are not subject to FERC's licensing requirements. Wave developers would also face additional costs, because MMS intends to charge royalties for use of public lands, while FERC assesses annual charges for costs associated with administration of the Federal Power Act.

Moreover, MMS must move expeditiously to devise regulations for issuing licenses and permits on the OCS. While we laud MMS' extensive work to date in developing rules for alternative energy development on the OCS, at the same time, the deadline imposed on MMS by Congress in the Energy Policy Act to issue regulations for siting alternate energy projects on the OCS have long passed. As a result, developers are still without guidance for licensing on the OCS at this critical juncture that wave, tidal and offshore wind technologies are building momentum.

It is essential that the Federal Government deals with the licensing process for this industry is to move forward.

V. Conclusion

Both the Federal Energy Regulatory Commission and the Minerals Management Service were established decades ago with responsibility over large scale energy development. With the resurgence of hydrokinetic and marine renewables, both of these agencies have undertaken the enormous task of interpreting their mission, as defined by

law, in the regulation and permitting of these new and emerging technologies. I applaud their efforts and encourage them to achieve a timely, fair, and realistic approach.

It is essential that a licensing process for new and emerging renewable technologies take into account the principles of proportionality and fairness while encouraging innovation to address our common environmental and energy goals.

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Ocean renewables can help diversify our energy portfolio and improve our environment. With the proper support, these resources will become a robust part of a reliable, affordable, clean electric supply portfolio.