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Tidal and Wave Energy Projects Present Permitting Challenges

By Michael Lufkin and Laura Fandino

The adoption of renewable energy portfolio standards promises to push forward investment in the development of wave and tidal power. Projects are being developed in New York, Washington, Oregon, California and other states, spurred in part by state laws requiring public and private utilities to obtain a portion of their electricity from renewable resources. As an example, Oregon recently adopted a renewable electricity portfolio standard which requires the state's largest utilities to meet 25% of their electric load with new renewable energy resources by 2025.[1] Challenges to these projects include the environmental and land use impacts associated with them. Just as wind power has drawn its share of opponents, so too are critics of tidal and wave energy raising concerns about the impacts of large-scale development of these resources.

What is Tidal and Wave Energy?

Two types of marine renewable energy resources have garnered substantial interest: wave energy and tidal energy. There are several methods to capture energy from ocean surface waves. For example, one wave power device slated for use by Finavera Renewables, Ltd. ("Finavera") in Makah Bay, Washington,[2] involves the use of moored wave energy conversion buoys (the "Aquabuoy") similar in size to the large navigational aids that demarcate shipping lanes. Aquabuoy converts the kinetic energy of the vertical motion of waves into pressurized water, which is directed into a conversion system consisting of a turbine that drives an electrical generator. The power from the buoys is then transported to shore through the use of an anchored submarine transmission cable installed on or just beneath the sea floor.[3] While the Finavera plans to operate the Makah Bay project 3.7 miles offshore, wave energy devices may be used at the shoreline, nearshore, and offshore.[4]

Another ocean energy resource, tidal energy, captures energy from the rise and fall of tides. Most tidal energy projects rely on offshore turbines, which operate much like an underwater wind farm. The ebb and flow of the tides is used to turn the blades which are connected directly to an electrical generator.[5] Energy produced by the system is transferred to shore through the use of a submarine transmission cable installed on the sea floor. In France, and several other countries, tidal energy production has involved the construction of a dam (or barrage) to block incoming and outgoing tides across a delta, estuaries, or other coastal basin area, where the amplitude of tides are increased.[6] In that case, the ebb and flow of the tides is used to turn turbines, or push air through a pipe which then turns a turbine, that drives an electric generator.[7]

Preliminary Projects

Eight tidal energy projects are currently under development in Washington State that use offshore turbine technology.[8] On March 9, 2007, the Snohomish County Public Utility District ("PUD") received preliminary permits from the Federal Energy Regulatory Commission ("FERC") to conduct technical and economic feasibility studies and evaluate tidal energy potential at seven locations in Puget Sound: Spieden Channel, San Juan Channel, Guemes Channel, Agate Pass, Rich Passage, Admiralty Inlet and

Deception Pass.[9] FERC has also granted a preliminary permit to Tacoma Power to evaluate the development of tidal power in the Tacoma Narrows.[10] Each of the preliminary permits will enable these entities to study tidal energy at the permitted sites for a period of three years.

In addition to Washington State, FERC has issued preliminary permits for tidal energy projects in Alaska, California, Maine, Oregon, and New York.[11] In New York, the Verdant Power Roosevelt Island Tidal ("RITE") Project, is on its way to becoming the first tidal energy project to be licensed by FERC. FERC granted a preliminary permit for the RITE project, located in New York's East River, in September 2002. FERC is licensing the RITE project under the authority granted through the preliminary permit. The project will consist of 200 turbines and will generate up to 10 MW of distributed power.

In addition, Finavera is currently developing a 1 MW demonstration *wave* power plant at Makah Bay, Washington. The company completed a Preliminary Draft Environmental Assessment in October of 2006 which concluded with a finding of no significant environmental effects from the technology. In Oregon, FERC issued preliminary permits to Ocean Power Technologies ("OPT") to develop a project off the coast of Reesport, southwest of Eugene, and AquaEnergy Group, Ltd. to develop an offshore wave energy project in Coos Bay.

Environmental Concerns

The primary concerns raised by critics of tidal and wave energy projects are their potential adverse impacts on marine ecosystems, fishery resources, and mammals. Environmental concerns raised by these groups include noise, species' effects, and the physical disturbance of marine habitat. Environmental noise is said by some to affect the behavioral patterns of marine species i.e., feeding, mating and migration in areas where the habitat of protected marine species overlaps with the project.[12] Habitat disturbance is also raised as a concern, as is displacement of benthic organisms in the footprint of the construction, including endangered or threatened species. Other concerns raised are the potential loss of fishing areas and impacts on shellfish resources.

Operating concerns include: (a) potential injuries to marine wildlife and diving birds arising from direct contact with tidal energy turbines; (b) behavioral impacts to marine species; (c) habitat disturbance, including disturbance of contaminated sediments, and impacts to sensitive spawning and nursery areas; (d) water quality impacts; and (e) hydrodynamic impacts. Hydrodynamic impacts resulting from the extraction of energy and physical presence of tidal project structures can include direct alteration of area siltation patterns, and changes to area ecology by alteration of substrate type.[13]

Additional Barriers to Commercial Development

Permitting Process

Because of the relative infancy of wave and tidal energy development, there remains some uncertainty and confusion over which federal and state agencies have regulatory jurisdiction over marine energy projects.[14] Generally speaking, a project's location determines which federal agency takes the lead in overseeing the permitting process. Under the Federal Power Act ("FPA"),[15] FERC has the authority to regulate and license all hydroelectric facilities on navigable waters of the United States. FERC has interpreted its authority under the FPA broadly to include essentially all wave and tidal energy projects,

including ocean projects.[16] In 2005, Congress muddied the jurisdictional waters by granting lead federal agency status to the Minerals Management Service ("MMS") for renewable energy projects on the Outer Continental Shelf ("OCS").[17] Congress stated, however, that in granting MMS lead agency status over projects on the OCS, it was not eliminating the jurisdiction of other federal agencies. Thus for now, it appears that FERC and MMS will share lead agency status for OCS projects, while FERC will have exclusive authority to license projects in rivers and ocean waters out to the OCS.

The FERC Process

Most of the tidal and wave energy projects under consideration in the Pacific Northwest have not formally entered the FERC licensing process. Rather, these projects have received a preliminary permit from FERC which reserves a project location for the permit holder while environmental and feasibility studies are conducted. The preliminary permit is valid for three years. At the end of the three years, the permit holder must file a license application or lose priority for the location. Construction activities are not allowed during the period in which a project is being studied under a permit.[18]

To construct and operate a tidal or wave energy project a developer must either obtain a hydropower operating license from FERC, or be granted an exemption from licensing.[19] The process for obtaining a FERC operating license can often take five to seven years and requires significant analysis and consultation with state, federal, and tribal resource agencies.[20] Operating licenses are normally granted for 30 to 50 year periods.

Because of the burdensome nature of the licensing process, some developers have sought an exemption from FERC licensing requirements. FERC may exempt hydropower projects "which are 5 megawatts or less, that will be built at an existing dam, or projects that utilize a natural water feature for head or an existing project that has a capacity of 5 megawatts or less and proposes to increase capacity."[21] FERC has shown a willingness to grant short term exemptions that allow for the deployment and testing of new generation technology.[22] Projects determined to be exempt from FERC licensing requirements must still comply with applicable state and federal environmental and resource protection laws.[23]

Transmission

Another issue affecting the commercial viability of wave and tidal power is the ability and cost of bringing the power to the market. Like other types of renewable based generation, wave and tidal power resources are often located a significant distance from load centers and/or existing transmission systems. The construction costs and additional environmental impacts associated with constructing transmission lines to bring wave and tidal power to the grid can be a challenge to the viability of a project.

For more information on marine renewable energy, please contact Michael Lufkin or Laura Fandino.

[1] *See* SB 838, 74th Oregon Legislative Assembly (2007) (Oregon Renewable Energy Act).

[2] *See* Preliminary Draft Environmental Assessment for the Makah Bay Offshore Wave Energy Pilot Project, dated October 2006.

[3] *Id*.

[4] *Id*.

[5]*See* http://www.pstidalenergy.org / for information on tidal projects in Puget Sound.

[6] Tidal Energy: UN Atlas of Oceans; *see also* Tidal Power – Energy from the Sea.

[7] *Id*.

[8] *See* http://www.pstidalenergy.org / for information on tidal projects in Puget Sound.

[9] *Id*.

[10] *Id*.

[11] *See* FERC issued preliminary permits.

[12] *See* comments of the Mid-Atlantic Fishery Management Council to FERC regarding rule making for preliminary permits for wave, current, and instream new technology hydropower projects, dated March 19, 2007; comments of the Washington State Department of Fish and Wildlife (regarding same), dated April 30, 2007.

[13] Instream Tidal Power in North America, Environmental and Permitting Issues, prepared by Devine Tarbell & Associates, Inc. for the Electric Power Research Institute, Inc. pp. 2-23 to 2-24 (June 2006).

[14] Lane, Nic, *"Issues Affecting Tidal, Wave and In-Stream Generation Projects,"* Congressional Research Service, May 2007.

[15] 16 U.S.C. Â§ 817

[16] *See* 113 FERC Â¶ 62,027, 2005.

[17] *See* Energy Policy Act of 2005, Pub. L. 109-058, (2005).

[18] *See* FERC website.

[19] 16 U.S.C. Â§ 817(1).

[20] *See* FERC website providing description of licensing process.

[21] *See* FERC website outlining exemptions from licensure.

[22] *See* Verdant Power LLC, 112 FERC Â¶ 61, 143, July 2005.

[23] *Id.*