

# CRS Report for Congress

## Issues Affecting Tidal, Wave, and In-Stream Generation Projects

Updated May 2, 2007

Nic Lane  
Analyst in Environment and Resources Management  
Resources, Science, and Industry Division



Prepared for Members and  
Committees of Congress

# Issues Affecting Tidal, Wave, and In-Stream Generation Projects

## Summary

The development technology that generates electricity from ocean waves, tides, and river currents is still in its infancy. However, Congress has provided some policy guidance on these energy sources through the Energy Policy Act of 2005 (EPACT; P.L. 109-58). The act addresses this area of energy innovation by clarifying federal jurisdiction over, and encouraging the development of, these alternative energy sources. Title II of the act contains provisions for assessment of and reports on renewable energy resources by the Department of Energy; production incentives for renewable energy production; benchmarks for renewable energy purchases by federal facilities; and grants supporting rural electrification with preference given to renewable energy facilities. EPACT §931 directs the Secretary of Energy to conduct research and development (R&D) programs for ocean energy, including wave energy and kinetic hydro generation projects, and §388 amends §8 of the Outer Continental Shelf Lands Act (43 U.S.C. §1337) to give authority to the Secretary of the Interior to grant leases on the Outer Continental Shelf (OCS) for the production of energy from sources other than oil and natural gas.

Because the development and application of these technologies are in the pre-commercial stage, the regulatory requirements governing their implementation are not always clear. To some, there is uncertainty regarding which federal agency most appropriately has jurisdiction over these projects and the regulatory processes that are necessary to ensure resource protection and adequate oversight while encouraging the development of a promising new energy source.

## Contents

Background .....	2
Energy Sources and Technologies .....	2
River Flow .....	2
Tidal Flow .....	2
Waves .....	3
Ocean Thermal Energy Conversion (OTEC) .....	3
Project Activities .....	3
Congressional Action .....	4
Incentives for Wave, Tidal, and In-Stream Projects .....	5
Environmental Issues and Other Considerations .....	5
Project Location .....	6
Baseline .....	6
State Waters .....	6
Territorial Sea .....	7
Contiguous Zone .....	8
Exclusive Economic Zone .....	8
Outer Continental Shelf .....	8
Federal Agencies' Authorities and Federal Legislation .....	8
Corps of Engineers .....	8
Clean Water Act, 33 U.S.C. §1251, et seq .....	9
Rivers and Harbors Act, 33 U.S.C. §403 .....	9
Federal Energy Regulatory Commission (FERC) .....	9
Preliminary Permits, Licensing, and Exemptions .....	10
Federal Power Act, 16 U.S.C. §817 (1) .....	11
Fish and Wildlife Service .....	12
Endangered Species Act, 16 U.S.C. §§1531, et seq .....	12
Fish and Wildlife Coordination Act, 16 U.S.C. §661 .....	12
Marine Mammal Protection Act, 16 U.S.C. §1361-1407 .....	12
Migratory Bird Treaty Act, 50 C.F.R. §10.13 .....	12
Minerals Management Service (MMS) .....	13
Energy Policy Act of 2005, P.L. 109-58 .....	14
Outer Continental Shelf Lands Act, 43 U.S.C. §§1331-1337 .....	15
National Oceanographic and Atmospheric Administration .....	15
Coastal Zone Management Act, 16 U.S.C. §§1451-1464 .....	16
Magnuson-Stevens Act, 16 U.S.C. §§1801, et seq .....	16
National Marine Sanctuaries Act, 16 U.S.C. §§1431, et seq .....	16
Ocean Thermal Energy Conversion Act, 42 U.S.C. §§ 9101, et seq ..	16
U.S. Coast Guard .....	17
Hazards to Navigation, 33 C.F.R. §§62, 64, 66 .....	17
U.S. Environmental Protection Agency .....	17
Discharge Permit, CWA §§1251-1387 .....	17
Broad Federal Legislation .....	17
National Environmental Policy Act, 42 U.S.C. §4332(c) .....	17
National Historic Preservation Act, 16 U.S.C. §470 .....	18
State Agencies and Statutes .....	18
Pending Issues .....	18

An Example: The AquaEnergy Debate over FERC Licensing for a Wave Energy Project ..... 18  
FERC Response ..... 19  
Current Status of Makah Bay Project ..... 21  
MMS Protest of FERC Jurisdiction ..... 21

**List of Figures**

Figure 1. Boundaries of Ocean Jurisdictions ..... 7

# Issues Affecting Tidal, Wave, and In-Stream Generation Projects

Renewable energy technologies will continue to gain importance in the national energy portfolio as long as the public and their representatives in Congress remain concerned about the long-term availability of affordable oil, gas, and coal supplies and the potential environmental impacts from power generation through traditional thermal, nuclear, and large hydropower projects.

The renewable energy technologies that produce electricity from waves, tides, and river currents are still in the experimental stage, and utility-scale generation projects are not yet in place. However, the energy generation potential from these sources has been recognized in recent legislation. The Energy Policy Act of 2005 (EPACT; P.L. 109-58) clarifies federal jurisdiction over, and encourages the development of, these alternative energy sources. Title II of the act contains provisions for assessment of and reports on renewable energy resources by the Department of Energy; production incentives for renewable energy production; benchmarks for renewable energy purchases by federal facilities; and grants supporting rural electrification with preference given to renewable energy facilities. EPACT §931 directs the Secretary of Energy to conduct research and development (R&D) programs for ocean energy, including wave energy and kinetic hydro generation projects, and §388 amends §8 of the Outer Continental Shelf Lands Act (43 U.S.C. §1337) to grant authority to the Secretary of the Interior to grant leases on the Outer Continental Shelf (OCS) for the production of energy from sources other than oil and natural gas.

Because the development and application of these technologies are in their infancy, the regulatory requirements governing their implementation are not always clear. To some, there is uncertainty regarding which federal agency most appropriately has jurisdiction over these projects and the regulatory processes that are necessary to ensure resource protection and adequate oversight while encouraging the development of a promising new energy source.<sup>1</sup>

The federal policy issues that may arise for entities interested in developing wave, tidal, or river current generation projects center on agency jurisdiction and authority, regulatory processes (related to agency jurisdiction), and applicable legislation.<sup>2</sup> The location of a project — offshore, near-shore, or in an estuary or river

---

<sup>1</sup> In a presentation titled *Overview: EPRI Ocean Energy Program*, the Electric Power Research Institute estimates that the total U.S. wave energy resource is approximately 2,100 tera-watt hours annually (one tera-watt hour is one trillion watts produced over one hour), or roughly 1/6 of the country's annual energy requirement. See [<http://www.epri.com/oceanenergy/oceanenergy.html>].

<sup>2</sup> CRS Report RL32658, *Wind Energy: Offshore Permitting*, by Aaron Flynn, provides (continued...)

— determines which federal agency is responsible for its oversight. The agency with ultimate responsibility will, in turn, determine what type of process applies. For example, projects under Federal Energy Regulatory Commission (FERC) authority would be licensed for 30 to 50 years in the same manner as a hydropower dam, and would encounter a license process that generally takes five to seven years to complete.<sup>3</sup> Finally, a number of federal statutes may apply to a potential energy installation, depending on its type, location, and the agency with jurisdiction.

## Background

### Energy Sources and Technologies

For each type of energy resource, a number of specific generator designs have been considered and, as the technology is further developed, new engineering solutions may be devised to generate power with the energy of moving water or waves. Rather than provide great detail on specific mechanical designs, this discussion of technology will focus on the broad categories of renewable ocean and river power generation currently under development.

**River Flow.** Hydroelectric dams — the most familiar waterpower technology — have been a source of energy for centuries, but they have costs due to the changes they create in river flow patterns.<sup>4</sup> However, kinetic, or free-flow, turbines do not rely on the differential height of water on either side of an impoundment to generate electricity, but instead use the force of moving water to spin turbine blades.<sup>5</sup> River currents may be harnessed as a power source with new turbine technologies similar to those identified below for tidal power generation.

**Tidal Flow.** Tidal generation uses the energy of moving water to spin a generator and may produce power from water moving in two directions: inward on the flood tide and outward on the ebb tide. Tidal power technology projects fall into two broad categories: barrage projects and in-stream generators. Barrage generation is similar to the construction of a traditional hydropower dam in that an impoundment is built across a river estuary or other area subject to tidal flow and electricity is generated by the difference of water height on either side of the barrier, depending on whether the tide is flowing in or out. In-stream projects do not impound water but instead use the energy of the tidal current to spin a turbine.<sup>6</sup>

---

<sup>2</sup> (...continued)

additional detail on regulatory issues related to energy development in the ocean.

<sup>3</sup> FERC, *Integrated Licensing Process*. See [<http://www.ferc.gov/industries/hydropower/gen-info/licensing/ilp/flowchart.pdf>].

<sup>4</sup> See [<http://www.idsnet.org/Resources/Dams/Development/impact-enviro.html>].

<sup>5</sup> Edison Electric Institute, *Kinetic Energy Turbines*. See [[http://www.eei.org/industry\\_issues/energy\\_infrastructure/fuel\\_diversity/hydro/index.htm](http://www.eei.org/industry_issues/energy_infrastructure/fuel_diversity/hydro/index.htm)].

<sup>6</sup> See [[http://www.eere.energy.gov/consumer/renewable\\_energy/ocean/index.cfm/mytopic=50008](http://www.eere.energy.gov/consumer/renewable_energy/ocean/index.cfm/mytopic=50008)].

Tidal resources are modest overall in the United States, although significant potential exists in some areas, such as New England, northern California, and the Pacific Northwest. Where feasible, tidal generators have the benefit of great predictability, as tides can be calculated years in advance.<sup>7</sup>

**Waves.** Wave energy technologies generate electricity from the undulating motion of the ocean's waves.<sup>8</sup> The power in the moving wave may drive a turbine or other device directly or it may pressurize air or hydraulic fluid to power a generator. Waves contain more energy than other renewable energy sources like solar radiation. Wave size is predictable many hours or even days in advance. The United States has considerable wave energy potential, and wave energy generators may minimize aesthetic issues by being located far from shore, underwater, or protruding only slightly above the surface of the sea.<sup>9</sup>

**Ocean Thermal Energy Conversion (OTEC).** OTEC systems rely on technology that uses the ocean's thermal gradient — the difference in temperature of water layers — to drive a generator. These systems require that the temperature between the warm surface water and the cold deep water differs by at least 36°F. Under these circumstances, an OTEC system can produce electric power. The requirement for this temperature differential limits OTEC systems largely to tropical zones. Ocean temperature differentials in the Pacific Northwest, for example, range from 0° to 20° F.<sup>10</sup>

OTEC technology has been demonstrated at the Natural Energy Laboratory of Hawaii (NELHA, formerly NELH), at Keahole Point on the Kona coast of the island of Hawaii. It has become the world's foremost OTEC laboratory and test facility. Unlike the other technologies discussed, due in part to the limited number of suitable sites and the expense of the technology, OTEC systems have not been the focus of recent ocean energy proposals in the United States.<sup>11</sup>

## Project Activities

Energy projects designed to harness the power of waves, tides, or river currents are being considered in a number of U.S. states. Wave energy is being explored in

---

<sup>7</sup> EPRI, *Overview: EPRI Ocean Energy Program the Possibilities in California* (June 2006). See [[http://www.epri.com/oceanenergy/attachments/ocean/briefing/June\\_22\\_OceanEnergy.pdf](http://www.epri.com/oceanenergy/attachments/ocean/briefing/June_22_OceanEnergy.pdf)].

<sup>8</sup> See [[http://www.eere.energy.gov/consumer/renewable\\_energy/ocean/index.cfm/mytopic=50009](http://www.eere.energy.gov/consumer/renewable_energy/ocean/index.cfm/mytopic=50009)].

<sup>9</sup> EPRI, *Overview: EPRI Ocean Energy Program* (Sept. 2006). See [<http://www.epri.com/oceanenergy/oceanenergy.html>].

<sup>10</sup> Northwest Power and Conservation Council, *Biennial Assessment of the Fifth Power Plan, Assessment of Other Generating Technologies* (Nov. 2006), p. 6. See [<http://www.nwcouncil.org/energy/Biennial/BiennialOther%20gen.pdf>].

<sup>11</sup> See [[http://www.eere.energy.gov/consumer/renewable\\_energy/ocean/index.cfm/mytopic=50010](http://www.eere.energy.gov/consumer/renewable_energy/ocean/index.cfm/mytopic=50010)].

locations such as California, Oregon,<sup>12</sup> Hawaii, New Jersey,<sup>13</sup> Rhode Island,<sup>14</sup> and Washington.<sup>15</sup> Tidal power generation is being considered by California<sup>16</sup> and Maine,<sup>17</sup> and a prototype project has been deployed in New York's East River.<sup>18</sup>

## Congressional Action

The 109<sup>th</sup> Congress considered legislation to authorize funding for guaranteed loans to be used for clean energy generation, including ocean energy sources (H.R. 2828), and to allow revenues from OCS leases to fund ocean energy development (H.R. 4761). Neither of these measures was enacted. H.R. 4241 would have authorized funding for mitigation of environmental impacts from the development of alternative energy sources, including those from the ocean. The bill was enacted (P.L. 109-171) but without this provision in the final version. During the development of EPACT, an income tax credit for wave, tidal, river current, and OTEC was approved by the Senate but later dropped in conference committee.<sup>19</sup> EPACT does address wave, tidal, and in-stream energy directly or indirectly in a number of ways. Title II of the act contains provisions for assessment of and reports on renewable energy resources by the Department of Energy; production incentives for renewable energy production; benchmarks for renewable energy purchases by federal facilities; and grants supporting rural electrification with preference given to renewable energy facilities.

In September 2006, Assistant Secretary of Energy Alexander Karsner testified before a subcommittee of the House Committee on Resources regarding ocean energy technology and the potential development of this type of generation resource in state and federal waters.<sup>20</sup>

---

<sup>12</sup> U.S. Dept. of Energy, Energy Efficiency and Renewable Energy (EERE), *California and Oregon Pursue Tidal and Wave Energy Projects* (Oct. 18, 2006). See [[http://www.eere.energy.gov/states/news\\_detail.cfm/news\\_id=10339](http://www.eere.energy.gov/states/news_detail.cfm/news_id=10339)].

<sup>13</sup> EERE, *New Wave Energy Prototypes Deployed in Hawaii and New Jersey* (Nov. 23, 2005). See [[http://www.eere.energy.gov/states/state\\_news\\_detail.cfm/news\\_id=9551/state=NJ](http://www.eere.energy.gov/states/state_news_detail.cfm/news_id=9551/state=NJ)].

<sup>14</sup> EERE, *Rhode Island Launches Wave Energy Pilot Project* (Oct. 1, 2004). See [[http://www.eere.energy.gov/states/news\\_detail.cfm/news\\_id=8628](http://www.eere.energy.gov/states/news_detail.cfm/news_id=8628)].

<sup>15</sup> See [[http://finavera.com/wave/makah\\_bay](http://finavera.com/wave/makah_bay)].

<sup>16</sup> EERE, *California and Oregon Pursue Tidal and Wave Energy Projects* (Oct. 18, 2006). See [[http://www.eere.energy.gov/states/news\\_detail.cfm/news\\_id=10339](http://www.eere.energy.gov/states/news_detail.cfm/news_id=10339)].

<sup>17</sup> EERE, *Maine Assesses Tidal Power Potential* (June 2006). See [[http://www.eere.energy.gov/state\\_energy\\_program/project\\_brief\\_detail.cfm/pb\\_id=1010](http://www.eere.energy.gov/state_energy_program/project_brief_detail.cfm/pb_id=1010)].

<sup>18</sup> See [<http://www.verdantpower.com/initiatives/currentinit.html>].

<sup>19</sup> Staff of the Joint Committee on Taxation, Description and Technical Explanation of the Conference Agreement of H.R. 6, Title XIII, the "Energy Incentives Act of 2005." JCX-60-05 (July 2005).

<sup>20</sup> Testimony of Alexander Karsner, EERE, Assistant Secretary of Energy, on Sept. 18, 2006, before the House Committee on Resources. See [<http://www1.eere.energy.gov/>].

The 110<sup>th</sup> Congress is considering legislation related to ocean and in-stream energy production. S. 425 would amend the Internal Revenue Code, expanding renewable energy tax credits to wave, tidal, and in-stream power generation. Another bill (S. 298) would authorize funds to support the development of ocean energy sources. H.R. 2036 would support R&D, authorize low-interest loans, and provide investment and production credits for wave, tidal, and in-stream energy projects.

## **Incentives for Wave, Tidal, and In-Stream Projects**

Legislation pertaining to several funding and tax incentive programs that would apply to energy projects using waves, tides, or river currents is mentioned above. Additionally, EPACT Title II authorizes production incentives for renewable energy production as well as grants supporting rural electrification with preference given to renewable energy facilities.

There are also state efforts to encourage the development of these projects. Florida has a renewable energy production tax credit that covers a number of energy sources including tidal energy, wave energy, and OTEC projects. The credit is \$0.01/kilowatt-hour and the program is to continue through June 2010.<sup>21</sup> Similarly, Maine offers matching funds, up to \$50,000, for some parties interested in developing renewable energy resources, including tidal power generation. New Jersey also has a program intended to recruit renewable energy industries to the state by competitively offering recoverable grants of up to \$500,000 to applicants wishing to develop commercial renewable energy systems.<sup>22</sup>

## **Environmental Issues and Other Considerations**

These technologies are appealing to some due to their renewable energy sources and emission-free operation. In contrast to hydroelectric dams, free-flow turbines do not impound water, divert flow, or prevent sediment transport. However, as the technologies develop — especially if their application grows to a commercial scale — there will be environmental issues to consider. These issues likely include:

- **Withdrawal of wave energy:** converting some of a wave's power into electricity reduces wave height, which may alter the coastal or marine environment.
- **Interactions with marine life:** power plants may artificially provide resting space for seals and sea lions and nesting for sea birds, and may create artificial reefs below the surface; and devices with open spinning turbines may pose a hazard to fish or mammals.
- **Air or water emissions:** devices using hydraulic fluid may leak, releasing pollutants.

---

<sup>20</sup> (...continued)  
office\_eere/congressional\_test\_091806\_house.html].

<sup>21</sup> More information on state incentives is at [<http://www.dsireusa.org>].

<sup>22</sup> Ibid.

- Aesthetic concerns: there may be issues with the visual appearance of some devices, and some designs may produce noise that affects humans or marine life.
- Construction and decommissioning of facilities: habitats, structures on the sea bed, and sediment deposition may be affected by these activities.
- Project siting: can affect other uses like shipping, boating, and commercial and recreational fishing.<sup>23</sup>

## Project Location

Offshore areas are subject to various federal and state authorities. Which federal agency has lead responsibility for regulatory oversight of a specific ocean or in-stream generation project depends on the location of the project. Depending on the specific locale, more than one state or federal agency may exercise jurisdiction. All ocean and inland waterway jurisdictions<sup>24</sup> are defined in reference to the following technical demarcations, illustrated in **Figure 1**.<sup>25</sup>

**Baseline.** This is the boundary line dividing the land from the ocean, and other waters are defined by their distance from the baseline in nautical miles (NM).<sup>26</sup> The baseline is defined as the mean low water line along the coast as shown on official U.S. nautical charts. It is drawn across the mouths of rivers and the entrances to bays, and along the outer points of complex coastlines. Bodies of water that are inland of the baseline, such as bays, estuaries, and rivers, are considered inland waterways.

**State Waters.** Generally, offshore state waters cover the area from the baseline out 3 NM, although it is to 9 NM for the offshore Gulf coasts of Texas and Florida. This area of state jurisdiction was granted by the Submerged Lands Act of 1953 (43 U.S.C. §§1301 et seq.). Although the federal government may regulate commerce, navigation, power generation, national defense, and international affairs within this area, states also have the authority to manage, develop, and lease

---

<sup>23</sup> EPRI, *Offshore Wave Power in the US: Environmental Issues*, E21 Global EPRI-007-US (Dec. 2004). See [[http://www.epri.com/oceanenergy/attachments/wave/reports/007\\_Wave\\_Envr\\_Issues\\_Rpt.pdf](http://www.epri.com/oceanenergy/attachments/wave/reports/007_Wave_Envr_Issues_Rpt.pdf)]. EPRI, *Overview: EPRI Ocean Energy Program* (Sept. 2006). See [<http://www.epri.com/oceanenergy/oceanenergy.html>].

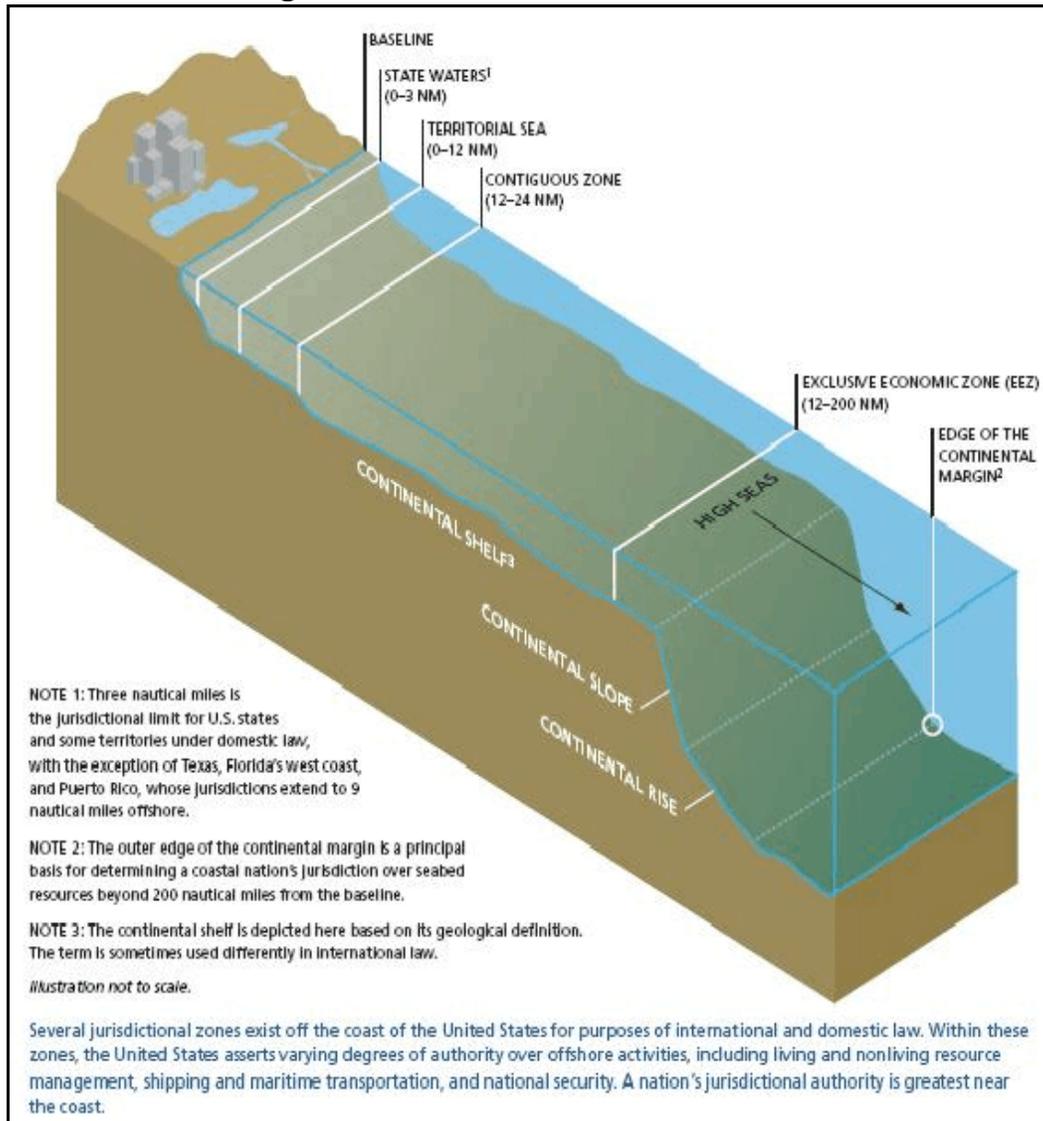
<sup>24</sup> For more detail on maritime boundaries, see CRS Report RL32912, *State-Federal Maritime Boundary Issues*, by Laura Welles, Aaron M. Flynn, and Eugene H. Buck.

<sup>25</sup> U.S. Commission on Ocean Policy, *Primer on Ocean Jurisdictions: Drawing Lines in the Water* (hereafter referred to as *Primer*). On December 19, 2004, the commission expired, as provided under the terms of the Oceans Act of 2000 (P.L. 106-256), as amended. However, the following website will continue to be available as an archive of the commission's work: [[http://www.oceancommission.gov/documents/full\\_color\\_rpt/03a\\_primer.pdf](http://www.oceancommission.gov/documents/full_color_rpt/03a_primer.pdf)]. For the Minerals Management Service definition of Outer Continental Shelf, see [<http://www.mms.gov/aboutmms/ocsdef.htm>].

<sup>26</sup> A nautical mile is 1.15 statute miles.

resources throughout the water column as well as on and under the associated sea bed.<sup>27</sup>

**Figure 1. Boundaries of Ocean Jurisdictions**



**Source:** See [[http://www.oceancommission.gov/documents/full\\_color\\_rpt/03a\\_primer.pdf](http://www.oceancommission.gov/documents/full_color_rpt/03a_primer.pdf)].

**Territorial Sea.** Under international law,<sup>28</sup> every coastal nation has sovereign rights over the air space, water column, sea bed, and anything beneath it, within its territorial sea. In 1988, President Reagan proclaimed that the United States' territorial sea extended 12 nautical miles seaward from the baseline.<sup>29</sup>

<sup>27</sup> *Primer*, pp. 70-71.

<sup>28</sup> United Nations Convention on the Law of the Sea (LOS). The United States is not a signatory to the Convention.

<sup>29</sup> Presidential Proclamation 5928 (54 *Fed. Reg.* 777, Dec. 27, 1988).

**Contiguous Zone.** International law establishes a contiguous zone adjacent to a nation's territorial sea. The contiguous zone of the United States covers the area between 12 and 24 nautical miles off shore. Within this area a country has more limited authority that is generally related to customs, immigration, and sanitation laws.<sup>30</sup>

**Exclusive Economic Zone.** The exclusive economic zone (EEZ) is an area recognized under international law within which a nation has sovereign rights for exploiting, conserving, and managing living and nonliving resources within the water, or on or under the sea bed. In 1983, President Reagan proclaimed that the United States' EEZ extends to 200 nautical miles.<sup>31</sup>

**Outer Continental Shelf.** The federal government administers the outer continental shelf (OCS), which comprises the submerged lands, subsoil, and sea bed lying between the seaward extent of the states' jurisdiction and the seaward extent of federal jurisdiction. Typically, this is the area between three and 200 nautical miles.

## **Federal Agencies' Authorities and Federal Legislation**

Depending on project type and location, a number of federal agencies may be involved in reviewing or permitting of a wave, tidal, or in-stream generation project. Federal laws may directly or indirectly affect a proposed ocean or in-stream energy project. Laws that protect fish and wildlife or regulate pollution or public safety will have a direct effect. Compliance with such laws will dictate what can or cannot be done, how a project can be operated, or where it may be located. Laws with an indirect effect could include a statute that has a broader influence on the project. For example, §388 of EPACT established the Department of the Interior's Minerals Management Service as the lead federal agency — thus changing the applicable regulatory process — with oversight for renewable energy projects on the OCS. Many federal statutes define the oversight authority of specific agencies, although some statutes apply generally to federal actions. The authorities are listed below by agency alphabetically with cross-cutting federal authorities and state authorities at the end.

### **Corps of Engineers**

The U.S. Army Corps of Engineers is responsible for a number of permitting activities in waterways and offshore areas. In this capacity, it may be involved in the development of an ocean or in-stream energy project. Specifically, the Corps regulates and issues permits for structures and work that affect navigable waters

---

<sup>30</sup> In 1999, through Presidential Proclamation 7912, President Clinton extended the outer boundary of the contiguous zone of the United States from 12 to 24 nautical miles (64 *Fed. Reg.* 48701, Sept. 8, 1999).

<sup>31</sup> Presidential Proclamation 5030 (48 *Fed. Reg.* 10601, Mar. 10, 1983).

under §10 of the River and Harbors Act.<sup>32</sup> The Corps also issues permits for the discharge of dredge and fill material into navigable waters under §404 of the Clean Water Act (CWA).<sup>33</sup> Additionally, the Corps may be involved in water quality certification under §401 of the CWA.<sup>34</sup>

**Clean Water Act, 33 U.S.C. §1251, et seq.** The primary purpose of the CWA is to protect and restore the quality of the nation's surface water. Sections of this act that may be applicable to wave, tidal, and in-stream energy projects are described below.

**§401 Water Quality Certificate.** Applicants for a federal license to conduct an activity that might result in any discharge of a pollutant, including water that contains pollutants (a temperature change may be considered a pollutant), must obtain a water quality certificate from the state in which the project will be located, certifying that the project will comply with applicable state water quality standards. Some wave, tidal, or in-stream generation projects may be construed as discharging water, and so must comply with this regulation. Section 401 only applies to locations within three nautical miles of the coast.

**§404 Dredge and Fill.** This section of the CWA regulates the discharge of dredged or fill material into waters of the United States. The law requires a permit for the discharge any such material. Permits are issued by the Corps, in consultation with and using environmental guidance issued by the Environmental Protection Agency (EPA). However this permit, too, is only applicable within the three nautical mile limit.

**Rivers and Harbors Act, 33 U.S.C. §403.** Section 10 of the Rivers and Harbors Act requires a permit issued by the Corps for any obstruction not authorized by Congress that would be built in the navigable waters of the United States. A project being constructed under a FERC license is exempt from this permit.<sup>35</sup> Projects which are exempt from FERC licensing — either through application for a standard exemption, or those experimental projects (such as the Verdant Power tidal energy project) that are granted a limited exemption — may need to apply for a §10 permit from the Corps.

## **Federal Energy Regulatory Commission (FERC)**

FERC is the federal agency responsible for licensing non federal hydroelectric projects. The agency derives its authority to license hydropower projects under 16 U.S.C. §817 (1) of the Federal Power Act (FPA). This section of the act states that for the purpose of generating power, it is illegal to construct, operate, or maintain; any dam, reservoir, powerhouse, or other works across, along, or in any of the navigable waters of the United States without a FERC-issued license.

---

<sup>32</sup> 33 U.S.C. §403.

<sup>33</sup> 33 U.S.C. §1344.

<sup>34</sup> 33 U.S.C. §1341.

<sup>35</sup> Corps regulations state that issuance of a FERC license precludes the need for a §10 permit (33 C.F.R. §221.f.).

**Preliminary Permits, Licensing, and Exemptions.** FERC has three general administrative categories which may apply to a potential wave, tidal, or in-stream generation project. First, a proposed project may be issued a preliminary permit. This permit is not required prior to license application. A permit is valid for up to three years and gives the holder a priority status if the holder chooses to apply for a license. That is, the permit reserves a project location for the applicant while the holder conducts feasibility studies and prepares a license application. The permit does not allow a demonstration project or any other construction, and the permit holder must file periodic reports on the progress of the feasibility studies. Due to the ease of obtaining a permit, some are concerned that the “reservation” feature of the preliminary permit may cause numerous permit applications by entities who may not be prepared to follow through with development. This could tie up possible generation sites.<sup>36</sup>

The second category, licensing, refers to the traditional operating license associated with non federal hydropower projects. This is the regulatory document referenced in 16 U.S.C. §817 (1). Hydropower licenses typically are issued for 30 to 50 year periods and require several years of analysis and review before issuance.<sup>37</sup>

Finally, for some projects, FERC may issue an exemption to the licensing required under the FPA. An exemption is valid in perpetuity and the process of applying for an exemption may be simpler than applying for a license. However, there are some stipulations and technical specifications for an exemption. To be exempt, a project must be rated at less than 5 megawatts (MW)<sup>38</sup> and use a natural water feature<sup>39</sup> for head (or be built at an existing dam).<sup>40</sup> An exempted project is still subject to mandatory prescriptions set by state and federal fish and wildlife agencies and FERC.<sup>41</sup>

Additionally, in a 2005 declaratory order, FERC issued a new type of exemption to Verdant Power LLC,<sup>42</sup> under which Verdant has deployed an in-stream tidal generator in New York’s East River. This exemption differs from a standard exemption in that it is not granted in perpetuity, and does not represent a formally established FERC program. The company is developing new generation technology

---

<sup>36</sup> Ocean Renewable Energy Coalition (OREC), *Policy Paper on Preliminary Permits, Site Banking and Wave and Tidal Energy Development*. See [<http://oceanrenewable.typepad.com/orecpermitprocess2final.pdf>].

<sup>37</sup> For more information on FERC licensing, see [<http://www.ferc.gov/industries/hydropower/gen-info/licensing.asp>].

<sup>38</sup> Projects that are constructed in existing conduits may be up to 40 MW if the developer is a municipality.

<sup>39</sup> To be eligible for this type of exemption, in addition to meeting other requirements, the developer of a wave or tidal energy project in the ocean would need to successfully argue to FERC that the facility would use a “natural water feature.”

<sup>40</sup> See [<http://www.ferc.gov/industries/hydropower/gen-info/licensing/exemptions.asp>].

<sup>41</sup> *Ibid.*

<sup>42</sup> *Declaratory Order re Verdant Power LLC’s Roosevelt Island Tidal Energy Hydropower Project, under P-12178*. 111 FERC ¶61,024 (April, 14 2005).

which employs moving water currents to generate electricity without a dam or conduit. FERC issued the exemption with several specifications: (1) the technology must be experimental; (2) the proposed facilities must be used for a short time (in this case, 18 months) to gather data in support of a license application; and (3) power generated from the test project will not be transmitted into, or displace power from, the national electric grid thereby affecting interstate commerce.<sup>43</sup> This is the first project of its type to be installed and FERC's second stipulation under the exemption implies that it would be the agency to assume responsibility for licensing a tidal, or in-stream generation project.

**Federal Power Act, 16 U.S.C. §817 (1).** The FPA authorizes FERC to regulate hydroelectric facilities on navigable waters of the United States. FERC maintains that its authority extends to the oceans under the FPA, referencing 16 U.S.C. §796 (8) “...streams or *other bodies of water*...” (emphasis in original) and cites Presidential Proclamation 5928<sup>44</sup> as having extended the territorial sea, and thus its federal jurisdiction, to 12 nautical miles. FERC contends that wave and tidal energy projects are under its jurisdiction based on FERC's interpretation of the FPA — adding its own emphasis — “... any dam, water conduit, reservoir, power house, or *other works incidental thereto*...”<sup>45</sup>

The agency has asserted that project features such as undersea anchors, or conduit leading to a station on the shore, would occupy land under federal jurisdiction and so the project would require a FERC license. Additionally, FERC finds that any generator connecting to, or displacing power from, the electric transmission grid affects interstate commerce, thereby triggering a need for a FERC license.

Finally, FERC has stated that it considers wave or tidal energy structures to be powerhouses under the FPA licensing provision.<sup>46</sup> and has indicated that it considers wave and tidal projects that connect to the electric grid to be powerhouses affecting interstate commerce, thus requiring a FERC license.<sup>47</sup>

---

<sup>43</sup> Verdant Power indicated that, due to the nature of its proposed technology, it must be connected to the grid to generate power. However, it proposed to provide the power generated to the end users at no charge, and to compensate Consolidated Edison of New York, Inc. and New York Power Authority for any power displaced by the test. FERC accepted this proposal. 112 FERC ¶61,143.

<sup>44</sup> 54 *Fed. Reg.* 777, Dec. 27, 1988.

<sup>45</sup> 16 U.S.C. §817(1)

<sup>46</sup> 16 U.S.C. §817 (1).

<sup>47</sup> 102 FERC ¶61,242

## Fish and Wildlife Service

The Fish and Wildlife Service (FWS) may have jurisdiction under the Endangered Species Act (ESA)<sup>48</sup> and the Marine Mammal Protection Act,<sup>49</sup> depending on the location of a proposed project, and consultation with FWS may be required. If a proposed wave, tidal, or in-stream energy project might interfere with birds identified under the Migratory Bird Treaty Act (MBTA),<sup>50</sup> FWS consultation would be required.

**Endangered Species Act, 16 U.S.C. §§1531, et seq.** The ESA protects plants and animals that have been designated by FWS or the National Marine Fisheries Service (NMFS) as threatened or endangered. Once listed, any action undertaken or funded by a federal agency must be publicly determined by FWS or NMFS not to be jeopardizing the species or adversely affecting its designated critical habitat.<sup>51</sup>

**Fish and Wildlife Coordination Act, 16 U.S.C. §661.** The Fish and Wildlife Coordination Act provides the authority for FWS and NMFS involvement in evaluating fish and wildlife impacts from proposed water resource development projects. The act requires that fish and wildlife resources be given equal consideration to other aspects of a proposed project, and it mandates that federal agencies that construct, permit, or license water resource projects must consult with the relevant federal and state fish and wildlife agencies regarding possible effects and necessary mitigation to the resources under their authority.

**Marine Mammal Protection Act, 16 U.S.C. §1361-1407.** The act prohibits harassment, hunting, or capture of any marine mammal. It may apply if a proposed project is deemed by a regulatory agency to harass marine mammals. This decision may be based on project location or some aspect of its construction or performance.

**Migratory Bird Treaty Act, 50 C.F.R. §10.13.** The MBTA prohibits the harming of more than 800 species of migratory birds.<sup>52</sup> If an energy project might harm any of the species, consultation, and possibly permitting, would be required through FWS.

---

<sup>48</sup> P.L. 93-205; 16 U.S.C. §§1531, et seq.

<sup>49</sup> 16 U.S.C. §§1361-1407.

<sup>50</sup> 50 C.F.R. §10.13.

<sup>51</sup> For background on the ESA see CRS Report RL31654, *The Endangered Species Act: A Primer*, by M. Lynne Corn, Eugene H. Buck, and Pamela Baldwin.

<sup>52</sup> See [<http://www.fws.gov/permits/mbpermits/ActSummaries.html>].

## Minerals Management Service (MMS)

MMS in the Department of the Interior, manages the nation's OCS oil, natural gas, and other mineral resources. The agency collects, accounts for, and disburses more than \$8 billion annually in revenues from offshore federal mineral leases and from onshore mineral leases on federal and Indian lands. With the passage of EPACT, MMS has additional authority to act as the lead federal agency for offshore renewable energy projects.

Under the new program described as Alternate Energy-Related Use (AERU), MMS has jurisdiction over energy projects on the OCS including, but not limited to: offshore wind energy, wave energy, ocean current energy, offshore solar energy, and offshore hydrogen generation. MMS will also have jurisdiction over other projects that make alternate use<sup>53</sup> of existing oil and natural gas platforms in federal waters of the OCS.<sup>54</sup> MMS will grant easements, leases, and rights-of-way for renewable energy uses of the federal OCS, and may issue regulations related to the implementation of its additional authority. EPACT stipulates that the agency must also establish a formula for revenue-sharing with coastal states that are within 15 miles of a renewable energy project.

EPACT, §388, stipulates that MMS authority does not supercede the existing authority of any other agency for renewable energy project permitting. Thus, a wave or tidal energy project on the OCS may still require a FERC license to operate although leasing and environmental review would be fulfilled by MMS.<sup>55</sup> The act did not authorize any additional activities related to oil or natural gas reserves, and MMS was not granted jurisdiction over areas within the boundaries of the National Park System, national wildlife refuges, national monuments, or the National Marine Sanctuary System.<sup>56</sup>

The National Environmental Policy Act of 1969 (NEPA, 42 U.S.C. §4332(c)) stipulates that federal agencies must prepare an environmental impact statement (EIS) on major federal actions with potential for significant changes to the quality of the human environment. MMS has determined that establishing the AERU program and rulemaking constitute a major federal action and thus is in the process of

---

<sup>53</sup> MMS indicates that alternate uses of existing oil and gas platforms may include non-energy activities such as offshore aqua-culture, research, telecommunications, and recreation. MMS is not seeking authority over those activities, but rather would grant permission for a platform's use, with ultimate authority over the specific activity being the purview of the appropriate federal agency. See[<http://ocsenergy.anl.gov/guide/platform/in dex.cfm>].

<sup>54</sup> See [<http://ocsenergy.anl.gov/>].

<sup>55</sup> Personal communication with Ms. Julie Fleming, Legislative Specialist, Mineral Management Service, Washington, DC, Jan. 22, 2007.

<sup>56</sup> AquaEnergy's Makah Bay Project is located within the Olympic Coastal National Marine Sanctuary, thus MMS authority does not apply to that project.

completing a programmatic EIS on its proposed AERU program.<sup>57</sup> The EIS analysis will focus on the environmental, cultural, and socio-economic effects associated with different approaches to implementing the AERU program and its related rulemaking. Specifically, the programmatic EIS process is intended to:<sup>58</sup>

- Provide for public input concerning the scope of national issues associated with offshore alternate energy-related use activities;
- Identify, define, and assess generic environmental, socio-cultural, and economic impacts associated with offshore alternate energy-related use activities;
- Evaluate and establish effective mitigation measures and best management practices to avoid, minimize, or compensate for potential impacts; and
- Facilitate future preparation of site-specific NEPA documents. Subsequent NEPA documents prepared for site-specific AERU projects will be based on the Programmatic EIS and MMS' final Record of Decision.

MMS filed a Notice of Intent to prepare the EIS in May 2006.<sup>59</sup> It completed a series of public scoping comment meetings for the EIS in May and June of 2006, and the agency intends to have a final programmatic EIS and Record of Decision completed in the fall of 2007. When the EIS is complete and the AERU program is established, MMS is to begin taking applications for wave and tidal energy projects located on the OCS.<sup>60</sup> Despite MMS authority over alternative energy projects on the OCS pursuant to §388 of EPACT, and the pending finalization of an MMS program for oversight of renewable energy projects on the OCS, FERC has also been accepting license applications for these types of projects.<sup>61</sup>

**Energy Policy Act of 2005, P.L. 109-58.** EPACT clarifies federal jurisdiction over, and encourages the development of, alternative energy sources. Title II contains provisions for assessing and reporting on renewable energy resources by the Department of Energy. It also establishes incentives for renewable energy production, specifies benchmarks for renewable energy purchases by federal facilities, and authorizes grants supporting rural electrification with preference given to renewable energy facilities.

Section 931 directs the Secretary of Energy to establish R&D programs for ocean energy, including wave energy, and kinetic hydro projects, and §388 amends

<sup>57</sup> See [<http://ocsenergy.anl.gov/eis/why/index.cfm>].

<sup>58</sup> See [<http://ocsenergy.anl.gov/faq/index.cfm#ScopeAnalysis>].

<sup>59</sup> 71 *Fed. Reg.* 26559, May 5, 2006.

<sup>60</sup> Telephone conversation with Ms. Julie Fleming, Legislative Specialist, Minerals Management Service, Washington, DC, Jan. 22, 2007.

<sup>61</sup> FERC, *Notice of application & applicant-prepared EA accepted for filing, soliciting motions to intervene & protests, ready for environmental analysis, etc re AquaEnergy Group Ltd's Makah Bay Offshore Wave Energy Pilot Proj-12751*, FERC docket number P-12751-000 (Dec. 18, 2006).

§8 of the Outer Continental Shelf Lands Act (43 U.S.C. §1337) to grant authority to the Secretary of the Interior — through MMS — to grant leases on the OCS for producing energy from sources other than oil and gas.

MMS views its primary authorities under §388 to be (1) granting leases, easements, and rights-of ways for renewable energy-related uses on federal OCS lands; (2) acting as the lead agency for coordinating of the permitting process with other federal agencies; and, (3) monitoring and regulating facilities used for renewable energy production and energy support services.<sup>62</sup>

**Outer Continental Shelf Lands Act, 43 U.S.C. §§1331-1337.** This law stipulates that energy developers operating on the OCS are required to have a federal lease for the project. Originally limited to oil and gas resources, the EPACT amended §8 of the act to include energy from sources other than oil and gas, naming MMS the lead agency. Wave and tidal energy developers on the OCS will require a lease even if a FERC license is required for the project.

## **National Oceanographic and Atmospheric Administration**

Pursuant to the OTEC Act,<sup>63</sup> the National Oceanographic and Atmospheric Administration (NOAA) would be the lead agency for licensing any proposed OTEC project. NOAA retains jurisdiction of OTEC projects on the OCS with passage of EPACT §388. However, as noted above, OTEC projects are of limited commercial appeal in most U.S. waters, because OTEC requires site conditions found only in tropical waters. Thus it is primarily of interest in Hawaii, Puerto Rico, and some U.S. territories.

NOAA's National Marine Fisheries Service (NMFS) may also be involved in Endangered Species Act<sup>64</sup> consultations triggered by wave, tidal, and in-stream energy projects, as well as those related to marine mammals under the Marine Mammal Protection Act.<sup>65</sup> NMFS has authority over national marine sanctuaries and any federal action that may affect these areas would require consultation with NMFS<sup>66</sup>. NMFS would also be the lead agency ensuring that a proposed energy project did not conflict with fishery management under the Magnuson-Stevens Fishery Conservation and Management Act.<sup>67</sup>

NOAA has other legal authorities and responsibilities that may affect wave, tidal, and in-stream energy projects. In particular, NMFS (also known as NOAA

---

<sup>62</sup> See [<http://www.mms.gov/offshore/RenewableEnergy/RenewableEnergyAndAlternateUses.pdf>].

<sup>63</sup> 42 U.S.C. §9111.

<sup>64</sup> ESA; P.L. 93-205; 16 U.S.C. §§1531 et seq.

<sup>65</sup> 16 U.S.C. §§1361-1407.

<sup>66</sup> 16 U.S.C. §1434(d).

<sup>67</sup> 16 U.S.C. §1801 et seq.

Fisheries) shares jurisdiction under ESA, MMPA, and the Fish and Wildlife Coordination Act with FWS; these provisions are addressed above.

**Coastal Zone Management Act, 16 U.S.C. §§1451-1464.** The Coastal Zone Management Act (CZMA) is the primary federal statute for protecting of America's coastal areas from development, including pollution associated with residential, recreational, commercial, and industrial uses. The CZMA assists states in the development of Coastal Zone Management Programs aimed at balancing the competing uses of coastal resources. The programs define permissible land and water uses within state coastal areas. Federal actions must be consistent with established state programs.

The CZMA requires federal consistency; that is, federal activities that affect the coastal zone must be consistent to the maximum extent practicable with the enforceable policies of a coastal state's federally approved coastal management program. (Federal agency activities are activities and development projects performed by a federal agency, or a contractor for the benefit of a federal agency.) NOAA interprets the CZMA, oversees the application of federal consistency, and mediates CZMA-related disputes.<sup>68</sup> Thus, wave, tide, and in-stream energy projects must be consistent with state coastal zone plans as well as with NOAA implementation of CZMA.

**Magnuson-Stevens Act, 16 U.S.C. §§1801, et seq.** The Magnuson-Stevens Fishery Conservation and Management Act governs the conservation and management of ocean fishing and established the United States' exclusive management authority over all fishing within the EEZ, all anadromous fish<sup>69</sup> throughout their migratory range, except when in another nation's waters, and all fish in the waters of the OCS. The act also established eight Regional Fishery Management Councils that are responsible for preparing fishery management plans designed to provide for the optimum yield from the fisheries in their regions. A wave or tidal energy project must not be constructed in conflict with these management plans.

**National Marine Sanctuaries Act, 16 U.S.C. §§1431, et seq.** The NMSA authorizes the Secretary of Commerce to designate and manage areas of the marine environment that have special significance as national marine sanctuaries. The management of national marine sanctuaries is conducted by the National Marine Sanctuary Program (NMSP). Through the NMSP, the Secretary of Commerce may issue regulations that specify the types of activities that can and cannot occur within the sanctuaries. Permits may be issued for activities which are normally prohibited by the regulations. Any federal actions that may affect a sanctuary require consultation with NMSP.

**Ocean Thermal Energy Conversion Act, 42 U.S.C. §§ 9101, et seq.** The OTEC Act would apply to parties interested in applying for a permit for an OTEC project. NOAA, the agency with primary authority over OTEC

---

<sup>68</sup> See [<http://coastalmanagement.noaa.gov/consistency/welcome.html>].

<sup>69</sup> Fish that are born in fresh water, mature in the ocean, and return to fresh water to breed.

projects, established regulations for license applicants<sup>70</sup> but withdrew them in 1996 because no applications had been received since the OTEC Act was passed in 1980.<sup>71</sup>

## U.S. Coast Guard

The Coast Guard regulates waterborne navigation and safety. An energy project requiring the addition of any aids to navigation in U.S. waters must meet Coast Guard approval and conform to established standards.

**Hazards to Navigation, 33 C.F.R. §§62, 64, 66.** Coast Guard regulations establish conventions for marking marine hazards and placing aids to navigation. A proposed project must not be a hazard to navigation and must be marked in compliance with the regulations.

## U.S. Environmental Protection Agency

The U.S. EPA may be involved in a tidal, wave, or in-stream generation project if it determines that the project may be considered a “point source discharger.” The Clean Water Act authorizes EPA to regulate discharge of waterborne pollutants through a program of National Pollutant Discharge Elimination System (NPDES) permits. The NPDES permit program regulates point sources that discharge pollutants into waterways of the United States (40 C.F.R. §122).

**Discharge Permit, CWA §§1251-1387.** The CWA regulates the discharge of pollutants, including sand, rocks, and chemical waste — but not unpolluted water. EPA may issue technology-based effluent limitations for different categories of point source discharge. These are nationally applicable rules that would be incorporated into the CWA discharge permits issued to individual sources under the NPDES program. In the absence of national rules for a particular category of discharger (wave generation projects for example), the permit writer (EPA or state water quality regulators) would develop discharge limits for a specific source using best professional judgement. In many cases, EPA delegates responsibility for the NPDES permit program to qualified states.<sup>72</sup>

## Broad Federal Legislation

Some federal statutes apply broadly to federal activities and require some action on the part of the lead agency in a process, or from the agency that is intending to conduct an activity such as licensing or permitting.

**National Environmental Policy Act, 42 U.S.C. §4332(c).** NEPA requires the preparation of an EIS for federal actions that may significantly affect the quality of the human environment. Thus, any federal permitting or other action related to a proposed energy project would require first an environmental assessment (EA) to

---

<sup>70</sup> 15 C.F.R. §981.

<sup>71</sup> 61 *Fed. Reg.* 2969, Jan. 30, 1996.

<sup>72</sup> See [<http://cfpub.epa.gov/npdes/statestats.cfm>].

determine if an environmental impact statement is required. The EA and EIS must consider alternatives such as alternate locations, a “no action” option, and socio-economic, environmental, and cultural impacts.

**National Historic Preservation Act, 16 U.S.C. §470.** The act protects historic, archeological, and cultural resources. Compliance involves consultation with state historic preservation officers (SHPO), Tribes, and other interested parties to determine the effect of a proposed activity on historic properties, and, if necessary, the development of plans to avoid or mitigate damage to important sites.

## State Agencies and Statutes

States may have restrictions or impose their own conditions on the use of cultural, fish and wildlife, and water resources and may have legislation more stringent than federal law. In some cases, federal law defers to state regulatory agencies for implementing programs related to resource management. There would also likely be relevant state energy agencies involved in the approval process for a wave, tidal, or in-stream energy project proposal.

## Pending Issues

### An Example: The AquaEnergy Debate over FERC Licensing for a Wave Energy Project

AquaEnergy has been developing a wave energy project in Washington’s Makah Bay. In 2002, it filed a declaration of intent<sup>73</sup> with FERC for its proposed 1 megawatt (MW) wave energy project to be 1.9 miles offshore. AquaEnergy claimed that the project should be exempt from FERC licensing because it meets the four requirements pursuant to FPA, §23(b)(1):

- **Navigable Waters.** AquaEnergy asserted that the project was not located on a navigable stream of the United States or the State of Washington and that the sea-based portion (the project is to include a facility on the shore for connection to the power grid) is located solely within state waters.
- **Land Status.** AquaEnergy stated that the land-based portion of the generating project would be located on tribal land owned by the sovereign Makah Indian Nation.
- **Use of Surplus Water from a Government Dam.** AquaEnergy also suggested that the project should be exempt from FERC licensing because the project would not use surplus water or water power from a government dam. This surplus water stipulation for licensing is

---

<sup>73</sup> *AquaEnergy Group Ltd’s declaration of intent for the Makah Bay Ocean Wave Energy Pilot Power Plant under DI02-3*, FERC docket number DI02-3-000 (Apr. 29, 2002).

referenced in addition to navigable waters in the act (16 U.S.C. §817(1)).

- **Interstate Commerce.** Finally, AquaEnergy asserted that the proposed project should be exempt from FERC license requirements because the project would deliver its power to the grid of Callam County Public Utility District, and be consumed locally by the Makah Indian Nation. Since the energy was produced and used within the service territory of Callam County PUD, AquaEnergy contended that the project would not affect interstate commerce.

**FERC Response.** In an October 3, 2002 ruling, FERC found that a license was required for the AquaEnergy project because Makah Bay is a navigable waterway as defined in the FPA (16 U.S.C. §796 (8)): “navigable waters” means those parts of streams or other bodies of water which are used or suitable for use for the transportation of persons or property in interstate or foreign commerce.<sup>74</sup>

AquaEnergy immediately filed a request for rehearing<sup>75</sup> of the order suggesting that the order “stretched the scope of the Commission’s jurisdiction substantially beyond its statutory limits, to boundaries where it has never been applied.” It stated that FERC was going beyond its authority to assert jurisdiction over a structure that would not be a hydroelectric project, but a wave energy project located outside of “navigable waters” more than three nautical miles offshore (AquaEnergy indicated a project location change to a site farther offshore) and thus additionally beyond FERC jurisdiction due to its location.<sup>76</sup> AquaEnergy reiterated its point that the proposed project would have no effect on interstate commerce and, finally, asserted that FERC should take a sparing approach to its jurisdiction in this case because (1) the proposed project would be a small-scale, first of its kind, pilot designed to showcase a new technology in the United States and attract investors; and (2) the complex and lengthy hydroelectric licensing process<sup>77</sup> would place an undue financial burden on a small pilot program endeavoring to demonstrate the commercial viability of a new technology. AquaEnergy asserted that a successful demonstration may lead

---

<sup>74</sup> FERC, *Order Ruling on Declaration of Intention and Finding License Required*, 101 FERC ¶62,009, FERC Docket number DI02-3-000 (Oct. 3, 2002).

<sup>75</sup> AquaEnergy. *Request for Rehearing or Appeal of AquaEnergy Group of FERC’s Order issued 10/3/2002 under DI02-3*, FERC Docket number DI02-3-001 (Nov. 1, 2002). Hereafter referred to as *Request for Rehearing*.

<sup>76</sup> *Request for Rehearing*, p. 6. In its filing, AquaEnergy indicated its intent to relocate the project site to a point 3.17 NM off shore, placing the project beyond the range of navigable waters which the company cites as traditionally extending through 3 NM per 33 C.F.R. §329.12 containing the Corps of Engineers’ definition of “navigable waters.” §329.12 indeed indicates that the navigable waters of the United States over which the Corps of Engineers regulatory jurisdiction extends include all ocean and coastal waters within an area 3 nautical miles seaward from the baseline. While this definition may apply to the Corps, FERC may be justified in applying the definition found in its authorizing legislation.

<sup>77</sup> See CRS Report RL31903, *Relicensing of Nonfederal Hydroelectric Projects: Background and Procedural Reform Issues*, by Nic Lane.

to further development of what is a novel approach to power generation which has limited environmental impact and a free, renewable source of energy.<sup>78</sup>

FERC denied AquaEnergy's request for rehearing.<sup>79</sup> In stating its rationale for assuming jurisdiction over this type of energy project, it addressed all four points raised in AquaEnergy's request for rehearing.

Regarding navigable waters, FERC again cited the FPA (16 U.S.C. §796 (8)) with emphasis added in reference to "... streams or *other bodies of water*..." The agency further cited Presidential Proclamation 5928<sup>80</sup> as having extended the territorial sea, and thus federal jurisdiction, to 12 nautical miles.

Citing 16 U.S.C. §817 (1), with added emphasis, "... any dam, water conduit, reservoir, power house, or *other works incidental thereto*..." FERC refuted AquaEnergy's argument asserting that the project was not located on federal land. It indicated that the project must be licensed because some parts of the project — other works incidental thereto — such as undersea anchors and conduit leading to a station on the shore, would occupy land under federal jurisdiction. Additionally, FERC clarified that the sea and land components of the project, which would be located on federal land in the Olympic Coastal National Marine Sanctuary, form a basis for requiring a FERC license independent of the project's location in navigable waters.<sup>81</sup>

Although it does note that the term "powerhouse" as used in the FPA<sup>82</sup> would be a novel application in the sense of a wave energy buoy, the agency concluded that the structures would be powerhouses for the purposes of FERC jurisdiction. FERC asserted that the proposal was for a hydropower project and suggested that the fact that wave energy technology did not exist at the time the FPA was passed was not a valid basis for arguing that the act would not apply to this technology — stating that "the issue is not whether Congress contemplated a particular form of hydropower development, but rather whether specific projects, regardless of their technology, fall under the commission's jurisdiction as defined by Congress."<sup>83</sup>

Finally, FERC acknowledged AquaEnergy's assertion that there are good policy reasons for allowing agencies other than FERC to regulate offshore energy projects, and that at the time of submission of its proposal, pending legislation might address the issue. However, FERC stated that it must act based on current law in matters of jurisdiction.<sup>84</sup>

<sup>78</sup> *Request for Rehearing*, pp. 3-4.

<sup>79</sup> 102 FERC ¶61,242.

<sup>80</sup> 54 *Fed. Reg.* 777, Dec. 27, 1988.

<sup>81</sup> Under the National Marine Sanctuaries Act, (16 U.S.C. §1434 et seq.), the Secretary of Commerce has jurisdiction over marine sanctuaries.

<sup>82</sup> 16 U.S.C. §817 (1).

<sup>83</sup> 102 FERC ¶61,242, p5.

<sup>84</sup> EPACT, §388 confers authority on the Department of the Interior, Minerals Management (continued...)

**Current Status of Makah Bay Project.** AquaEnergy decided to pursue a FERC license for the Makah Bay Project and began work in preparation for a filing under FERC's Alternative Licensing Process (ALP) which combines pre-filing consultation and environmental review under NEPA into one process. The license application was filed December 15, 2006.<sup>85</sup> The Makah Bay Project is the first in the United States to use the FERC licensing process for a wave energy project. AquaEnergy expects that federal, state, and tribal governments will review the license application for six months to a year, and construction will begin upon license approval.<sup>86</sup>

## MMS Protest of FERC Jurisdiction

Wave, tidal, and in-stream kinetic energy generation technologies are just starting to emerge. The fact that their regulatory status is still evolving is shown by recent changes in law aimed at clarifying the federal role in ocean wave and renewable energy.<sup>87</sup> At least two federal agencies currently have what appears to be a lead role in offshore renewable energy projects. MMS indicates that its authority as the lead agency for projects proposed on the OCS is made clear by EPACT §388, and it is not accepting applications for these projects until its rulemaking process is complete.<sup>88</sup> MMS intends to establish a "cradle-to-grave" process to oversee and coordinate projects from initial proposal evaluation, permitting, and leasing, to final project decommissioning at the end of a project's useful life. As stated above, FERC is proceeding with license applications for projects on the OCS in advance of MMS final rulemaking. Because MMS jurisdiction does not commence until beyond 3 NM, FERC is currently the primary federal regulatory agency in rivers and ocean waters up to this boundary.

In response to FERC acceptance of an application<sup>89</sup> for a preliminary permit for a wave energy project in waters off the coast of Oregon which is at least partially located on the OCS, MMS has filed a protest of FERC's authority under the FPA to issue permits or licenses for projects on the OCS.<sup>90</sup> MMS cites three points of protest:

---

<sup>84</sup> (...continued)

Service to grant energy development leases on the Outer Continental Shelf, the area beyond state jurisdiction which begins (in most cases) at 3 NM.

<sup>85</sup> FERC docket number P-12751-000.

<sup>86</sup> See [<http://finavera.com/files/2006-11-03%20Finavera%20Renewables%20Makah%20Bay%20FERC%20Licence.pdf>].

<sup>87</sup> EPACT, §388.

<sup>88</sup> Personal communication with Ms. Julie Fleming, Legislative Specialist, Minerals Management Service, Washington, DC, Jan. 22, 2007.

<sup>89</sup> FERC, *Notice of Application Accepted for Filing and Soliciting Motions to Intervene, Protest, and Comments RE AquaEnergy Group Ltd's Coos County Offshore Wave Energy Project Under P-12752* (Dec. 1, 2006).

<sup>90</sup> MMS, *Protest of the United States Minerals Management Service*, FERC Docket P-12752-000. (Jan. 30, 2007).

- FERC’s FPA jurisdiction does not extend beyond 3 NM into the ocean. MMS specifically refutes a FERC claim that Presidential Proclamation 5928 extending the territorial sea to 12 NM also extends FERC authority. MMS cites the Proclamation language indicating that its intent is not to extend or alter existing federal law or jurisdiction.
- MMS cites §388 of EPACT granting authority for renewable energy projects on the OCS to MMS.
- MMS asserts that FERC’s existing hydropower licensing process is inappropriate for wave energy projects on the OCS for a number of reasons, such as: preliminary permits tie up large areas of potential development based on the first applicant rather than the best applicant; and a 30 - 50 year FERC license is too long for prototype projects.

Finally, citing the reasons above, MMS requested that FERC reject AquaEnergy’s application for a preliminary permit for a wave project off the coast of Oregon, and further that it stop processing all permit applications for wave energy projects on the OCS.

FERC has posted a Notice of Inquiry soliciting comments on its preliminary permitting procedure and outlined its interim policy on the issue. Pending final resolution, FERC will continue to issue preliminary permits for wave, tidal, and in-stream generation projects, however it will administer these permits under a “stricter scrutiny” policy. FERC states that, preliminary permits will be issued with more limited project boundaries to prevent site-banking and promote competition, and the required project progress reports will be given closer review to ensure active exploration of the energy resource.<sup>91</sup>

Supporters of wave and tidal project development have expressed concern that the prospect of FERC imposing a standard hydropower licensing template could pose barriers to the development and commercialization of new ocean, wave, and tidal energy technologies. Proponents claim this prospect has already prevented the initiation of many projects, and they have proposed alternative approaches.<sup>92</sup> FERC has granted a limited exemption for one experimental tidal power project — with the stipulations that it be operated only for a short time, non-commercially, and to gather information in support of an application for a standard hydropower license.<sup>93</sup> However project proponents have suggested a broader exemption program, wherein FERC would automatically waive license requirements for several years, once a project’s developer had obtained all other necessary permits.<sup>94</sup> Another alternative suggested is a streamlined “mini license” which would authorize a five-year license for experimental renewable energy projects, allowing them to operate, gather data,

---

<sup>91</sup> FERC, *Notice of Inquiry*, Docket Number RM07-08-000 (Feb. 15, 2007).

<sup>92</sup> *Amended Comments of Carolyn Elefant in Response to Notice of Declaration of Intent of Verdant Power LLC*, FERC Docket Number P-12519-000 (Mar. 13, 2005) pp. 8-10.

<sup>93</sup> 112 FERC ¶61,143.

<sup>94</sup> *Amended Comments of Carolyn Elefant in Response to Notice of Declaration of Intent of Verdant Power LLC*, FERC Docket Number P-12519-000 (Mar. 13, 2005), pp. 8-10.

and generate power with the option to extend operation under annual license renewal until a formal license would be issued.<sup>95</sup>

There is also concern among ocean energy proponents that having different agencies with regulatory authority on either side of a 3 NM line may lead to hardship for project developers. Some projects may be sited outside of the limit specifically to avoid FERC licensing, while others that choose to use similar technology inside the 3 NM limit would require a FERC license.<sup>96</sup>

FERC has indicated that while it agrees it is important to encourage innovative energy technology developments, it does not support these proposed alternatives because the creation of a blanket exemption or a limited licensing program may raise significant legal, policy, and regulatory issues. The agency feels that the limited, project-specific approach taken with the Verdant exemption is the appropriate course of action.<sup>97</sup>

There are some who may oppose wave or tidal power development or have concerns about project impacts. This may especially be true among groups such as commercial or sport fishing organizations, other recreational users, and some environmental interests. These stakeholders may prefer to see a slower-paced, more traditional FERC licensing process which ensures more extensive public involvement.

Many aspects of regulatory procedures applicable to wave, tidal, and in-stream generation projects are yet to be decided. At present, multiple federal agencies are involved in establishing of these projects and the lead agency depends in part on a project's location. Some project developers have contended that there is no consistent template for state or federal oversight of wave, tidal, and in-stream energy project development. They feel that a clearly defined, formal process specific to this type of resource development would be an important step in the growth of this technology.<sup>98</sup>

---

<sup>95</sup> Ibid.

<sup>96</sup> *Request for Rehearing*, p 22.

<sup>97</sup> 111 FERC ¶61,024, p4.

<sup>98</sup> Personal communication with Mr. Craig Collar, Senior Manager, Energy Resource Development, Snohomish Public Utility District, Everett, WA. On Jan. 26, 2007. Snohomish PUD is investigating the development of several tidal current energy sites in Washington's Puget Sound.