The Dawn of Federal Marine Renewable Energy Development

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Our country's rapidly accelerating desire for renewable energy has reinvigorated interest in producing energy from the sun, the wind, and the oceans. While onshore solar and wind energy projects already contribute energy to the grid each day, our domestic oceans remain an enormous, untapped resource for renewable energy.

In the 1970s, when U.S. oil supplies were curtailed, the federal government invested millions of dollars in marine renewable energy research and development, hoping that this intriguing technology would ease the looming energy crisis. As the crisis subsided, however, the framework for marine renewable energy production collapsed. Today, the United States again faces energy challenges, but this time, particularly as climate change concerns escalate, marine renewable energy is prominently poised to help secure our nation's energy future. Soon the U.S. energy supply will be driven by sunny days, brisk winds, and the power of our oceans.

The federal government is supporting renewable energy at unprecedented levels. In February 2009, President Obama and Congress agreed to significant U.S. support of renewable energy in the stimulus bill. The president and Congress have dramatically increased funding for the U.S. Department of Energy's wave and tidal technologies program. In addition, President Obama has advocated that by 2012, 10 percent of our domestic energy supply should come from renewable resources, increasing to 25 percent by 2025. Also, now that federal regulation of greenhouse gas emissions is increasingly likely, the focus on the renewable energy sector is sharpening.

Since the recent rebirth of interest in renewable energy, onshore solar and wind power projects have enjoyed the spotlight because they employ proven technologies. By comparison, marine renewable energy remains in its infancy largely due to technical challenges and, until recently, a lack of funding and financial incentives, as well as uncertainty over which federal agencies would regulate development of this new technology on the Outer Continental Shelf (OCS). At present, however, entrepreneurs, politicians, and coastal state governments have stimulated progress in this nascent industry with their new focus on the encouraging prospects of marine renewable energy.

While states have considerable interest in renewable energy development in state-managed waters, this article addresses only marine renewable energy on the federally managed OCS. The OCS begins 3 nautical miles (mi.) off the coast (except for Texas and the Gulf Coast of Florida, where it begins at approximately 9 mi.) and extends 200 mi. offshore.

Marine renewable energy has some distinct advantages over onshore renewable energy. The ocean presents a fertile area for energy production due to the shear power of offshore winds and waves. Marine energy technologies tap the energy stored in offshore winds, waves, and currents, depending on the technology's location on the OCS. More than eighty different marine energy technologies are under research worldwide, although only a handful has been commercialized.

To capture wind energy, wind farms consisting of multiple wind turbines are anchored to the seabed. Commercial wind facilities have been successfully installed in shallow waters throughout Europe, including Denmark and the United Kingdom. The world's largest offshore wind farm, 14 kilometers off the west coast of Denmark, contains dozens of wind turbines, each over 100 meters tall. Because most of the U.S. OCS is deeper than European waters, new wind technologies are being developed for the more challenging U.S. conditions.

Moving water is at least 800 times denser than wind blowing at the same speed. Consequently, ocean waves and currents produce significantly more energy than wind over the same surface area. Wave energy is also more consistently available than solar or wind energy, and wave strength can be predicted days in advance. To capture wave energy, wave power devices extract energy from the surface motion of waves or from pressure fluctuations below the ocean's surface. For example, Pelamis Wave Power Limited (PWPL) commissioned the world's first commercial wave farm off the coast of Portugal in 2008. This project uses 140-meter long attenuators, multi-segment floating devices that capture wave energy by means of the differing wave heights along the length of the devices. Each attenuator can produce enough electricity for 500 hundred homes.

Energy from ocean currents, such as the Gulf Stream, is also relatively constant and predictable. Ocean current energy may be captured by submerged turbines anchored to the sea floor. Offshore solar technologies are also possible, but, at present, there is limited interest in this technology.

Marine renewable energy could provide more than 10 percent of U.S. energy demand (based on 2004 levels). This estimate is especially encouraging because marine renewable energy would be produced where the United States is experiencing its most rapid population growth—our coasts. Electric Power

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Research Institute, Primer: Power from Ocean Wave and Tides (2007), *available at* www.aidea.org/aea/PDF%20files/OceanRiverEnergy/6-22-2007EPRIprimer.pdf. By 2025, it is expected that 75 percent of the U.S. population will live near the coast. Marine energy, therefore, could help power these high population centers without the need for extensive, new transmission systems. Marine renewable energy is also often more aesthetically pleasing than its onshore solar or wind counterparts. The visual impacts of marine energy can be minimal or nonexistent because, after construction, the devices may have a low profile, be completely submerged, or be over the horizon.

New Incentives for Commercial Development of Marine Renewable Energy

The dawn of marine renewable energy is here. This new industry stands ready to catch up with the land-based solar and wind energy sectors thanks to the recent convergence of several events. First, the federal government is providing unprecedented support for marine renewable energy. The availability of new renewable energy tax subsidies, loans, and billions of dollars in cash grants under the American Recovery and Reinvestment Act (ARRA) has dramatically increased the federal government's investment in this technology and provided substantial financial incentives to development companies. Ocean Renewable Energy Coalition, Stimulus Bill Promises to Buoy Marine Renewables Industry (Feb. 20, 2009), *available at* www.oceanrenewable.com/2009/02/20/stimulus-bill-promises-to-buoy-marine-renewables-industry/#more-527. The Omnibus Appropriations Act for fiscal year 2009 quadrupled U.S. Department of Energy water power research funds, including funds for wave and tidal technology, and, if approved as proposed, the Omnibus Appropriations Act for fiscal year 2010 will provide significant new research funding in this area as well. U.S. Department of Energy, FY 2010 Control Table by Appropriation (May 6, 2009), *available at* www.cfo.doe.gov/budget/10budget/Content/AppControl.pdf.

Second, a recent Memorandum of Understanding (MOU) between the Minerals Management Service (MMS) and the Federal Energy Regulatory Commission (FERC) has reduced regulatory uncertainty regarding the scope of each agency's jurisdiction over marine renewable energy projects on the OCS. MOU between the U.S. Dep't of the Interior and the Fed. Energy Regulatory Comm'n (Apr. 9, 2009), *available at* www.mms.gov/offshore/AlternativeEnergy/PDFs/DOI_FERC_MOU.pdf. Third, MMS recently promulgated the first regulatory regime for renewable energy development on the OCS, including offshore wind, wave, ocean current, and solar energy technologies. The new MMS rule, Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf (OCS Rule), became effective on June 29, 2009. 30 C.F.R. pts. 250, 285, 290.

On June 26, 2009, the House of Representatives approved the leading Democratic climate change bill, The American Clean Energy and Security Act. H.R. 2454, 111th Cong. (2009). The bill includes a number of provisions favorable to marine renewable energy, including provisions that (1) create an emissions "cap and trade" system under which marine renewable energy projects could qualify as emission "offsets;" (2) require large retail electricity suppliers to meet a renewable portfolio standard of 20 percent by 2020 (and recognize that marine-based energy is an eligible resource); and (3) direct federal agencies to work with the Council on Environmental Quality (CEQ), coastal states, and nongovernmental organizations (NGOs) to study marine spatial planning's potential to facilitate environmentally responsible marine renewable energy development. *Id.* A Senate bill, largely modeled on the House bill, is expected to be released by the time this article is published. If either piece of legislation becomes law, capital investment in marine renewable energy will quickly escalate.

Of all recent developments, the greatest boost to marine renewable energy development is MMS' 2009 OCS Rule. Under the OCS Rule, MMS established an entirely new regulatory regime for wind, wave, current, solar, and other emerging technologies on the OCS. MMS will issue commercial leases for electricity generation with a twenty-five year operating term and "limited" leases with a five-year term, primarily for testing and site assessment. 30 C.F.R. §§ 285.2–.238 (2009). Commercial and limited leases must be issued through a competitive process if more than one developer has an interest in the proposed area. *Id.* at § 285.231 (2009). MMS also may grant rights-of-way or rights-of-use-and-easement for activities related to renewable energy production. *Id.* at § 285.300. Similar to MMS' longstanding regulations governing OCS oil and gas development, the final rule establishes a comprehensive regulatory program for leasing and development of renewable energy on the OCS, including financial obligations for lessees and grantees to ensure a fair return to the U.S. government. *Id.* at §§ 285.500–.543 (2009). In July, MMS issued guidelines to provide further program details. The guidelines are very practical, describing what should be included in a MMS lease or grant application, how the leases and grants will be administered, and how payments must be made to the federal government. MMS, Guidelines for Minerals Management Service Renewable Energy Framework (July 2009), *available at* www.mms.gov/offshore/RenewableEnergy/PDFs/REnGuidebook_03August2009_3_.pdf.

Before MMS finalized its OCS Rule, it had to resolve its disagreement with FERC regarding jurisdiction over renewable energy development on the OCS. Each agency believed that the Energy Policy Act of 2005 amendments to the Outer Continental Shelf Lands Act, 43 U.S.C. §§ 1331(a), *et seq.*, gave it authority to govern marine renewable energy on the OCS. The agencies resolved their jurisdictional dispute in 2009 through a Memorandum of Understanding (MOU), whereby the agencies agreed that MMS has exclusive jurisdiction to regulate all aspects (e.g., leasing, production) of nonhydrokinetic renewable energy projects on the OCS (e.g., wind and solar projects). MOU Between the U.S. Dep't of the Interior and the Fed. Energy Regulatory Comm'n (Apr. 9, 2009). For OCS hydrokinetic (nonwind) activities such as wave and current projects, MMS and FERC agreed that MMS will have authority to issue the leases, easements, and rights-of-way and that FERC will have exclusive jurisdiction to issue the licenses and exemptions for such projects. *Id.*

Although the MOU resolves the regulatory uncertainty

caused by the jurisdictional dispute, it is still highly likely that this dual leasing/licensing process will delay the approval of OCS hydrokinetic projects. This is of particular concern because the first developers of hydrokinetic projects are likely to be less sophisticated and less well-funded than developers of proven technologies such as wind energy. To address these concerns, MMS and FERC recently issued a guidance document intended to streamline and clarify their jurisdictional responsibilities for hydrokinetic projects on the OCS. Regarding the concern that dual leasing/licensing processes will result in duplicative reviews under the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. §§ 4321, *et. seq.*, the guidance states that MMS and FERC will combine their NEPA review processes when possible, but if multiple levels of NEPA review are necessary, each review will build on relevant information developed by the other agency during the prior review. MMS / FERC Guidance on Regulation of Hydrokinetic Energy Projects on the OCS (Aug. 4, 2009), *available at* www.ferc.gov/industries/hydropower/indus-act/hydrokinetics/pdf/mms080309.pdf.

In a small but significant step toward the first development of renewable energy on the OCS, in June 2009, pursuant to an interim regulatory program, MMS issued five exploratory leases to four companies for OCS wind energy development off the coasts of New Jersey and Delaware. Press Release, MMS, Secretary Salazar Announces Five Exploratory Leases for Offshore Wind Energy Development off Coasts of New Jersey and Delaware (June 23, 2009), *available at* www.mms.gov/ooc/press/2009/press0623.htm. These "interim" leases allow the companies to construct meteorological towers on the OCS to collect data on wind speed, intensity, and direction but do not authorize commercial development.

Marine Spatial Planning as a Tool for Marine Renewable Development

Overlaying these drivers towards marine energy development is renewed interest by the Obama administration and Congress to create a comprehensive ocean resources management regime, a step long advocated by governmental commissions and NGOs. On June 12, 2009, President Obama established the Interagency Ocean Policy Task Force (led by the CEQ Chair and composed of senior government officials) to recommend a national policy that both ensures the protection, maintenance, and restoration of ocean, coastal, and Great Lakes ecosystems and supports sustainable ocean and coastal economies. Press Release, The White House, Memorandum for the Heads of Executive Depts. and Agencies (June 12, 2009), *available at* www.whitehouse.gov/the_press_office/Presidential-Proclamation-National-Oceans-Month-and-Memorandum-regarding-national-policy-for-the-oceans/. On September 10, 2009, the task force fulfilled its first mandate by releasing an interim report recommending a national policy for stewardship of the ocean, our coasts, and the Great Lakes. The White House, CEQ, Interim Report of the Interagency Ocean Policy Task Force (Sept. 10, 2009), *available at* www.whitehouse.gov/administration/eop/ceq/initiatives/oceans/interimreport/. By the end of 2009, the task force must recommend a framework for coastal and marine spatial planning that addresses economic activity, conservation, user conflict, and sustainable use of ocean, coastal, and Great Lakes resources. *Id.* at 2.

As the U.S. diversifies its use of ocean resources, the use of marine spatial planning, a marine version of land use planning, will ensure that renewable energy projects sited in any given area do not conflict with other marine use priorities in that area, such as oil and gas development, critical habitat for sensitive species, or commercial fishing. As noted above, H.R. 2454 calls for a study to evaluate the use of this tool to facilitate environmentally responsible marine renewable energy development. Similarly, in its April 2009 national ocean policy recommendations to President Obama, the Joint Ocean Commission Initiative also supported marine spatial planning.

The federal government is not alone in seeking to utilize marine spatial planning to ensure comprehensive resource management on the OCS. Several coastal states are already developing marine planning programs to accommodate renewable energy production. Rhode Island is a leader in undertaking a strategy to comprehensively zone all waters off its coasts, including state offshore waters and the OCS, to accommodate ocean-based resources, such as offshore renewable energy infrastructure, via the state's "Ocean Special Area Management Plan" (Ocean SAMP). Rhode Island Ocean SAMP (2009) *available at* http://seagrant.gso.uri.edu/oceansamp/. Once completed and approved by the appropriate state and federal agencies, the state will use the Ocean SAMP as a coastal management tool for its offshore waters and the OCS. Although Rhode Island does not have jurisdiction over the OCS, the state works closely with MMS to ensure consistency in federal and state regulation. *Id.*

This growing interest in marine spatial planning represents an important step in the development of the marine renewable industry at the state and federal levels.

Challenges for Commercial Development of Marine Renewable Energy

Despite all the positive attributes of marine renewable energy and the technological advances in this field, this energy sector must overcome substantial hurdles before it can become commercially viable in the United States. Commercial-scale marine projects have yet to be tested in this country. Some also believe that renewable energy projects will have economic limitations because they are ultimately dependent on federal government subsidies or favorable climate change legislation. Moreover, private funding, the primary source for the enormous upfront investment required for these projects, has declined since the world's economic crisis began in 2008. Finally, although FERC and MMS resolved the jurisdictional uncertainty regarding hydrokinetic projects on the OCS, it remains to be seen whether these agencies' regulatory regimes can be harmonized and effectively implemented for renewable energy projects.

As with many new technological advancements, marine renewable energy will have unknown impacts on the marine environment. Efforts to better understand the environmental effects of marine renewable energy development are underway at a number of federal agencies, including the National Oceanic and

Atmospheric Administration (NOAA) and the U.S. Department of Energy. These government agencies, as well as academics and technology developers, have identified a number of potential impacts that renewable energy technologies could have on the marine ecosystem, including: (1) alteration of currents and waves; (2) changes to sediment transport or deposition and benthic habitats; (3) impacts from noise and electromagnetic fields; (4) impacts from releases of toxic chemicals; (5) interference with fish and marine mammal movement and migration; (6) changes to the ocean's visual appearance or cultural resources; and (7) conflicts with other ocean users. U.S. Department of Commerce, Ecological Effects of Wave Energy Development in the Pacific Northwest (Oct. 2007) *available at* http://spo.nwr.noaa.gov/tm/Wave%20Energy%20NOAATM92%20for%20web.pdf; U.S. Department of Energy, Presentation, Draft Potential Envtl. Effects of Marine and Hydrokinetic Energy Technologies (Nov. 25, 2008), *available at* www.ornl.gov/sci/eere/EISAReport/pdfs/webinar_presentation.pdf. All of these potential impacts will require extensive study to ensure that marine ecosystems are not unduly harmed.

What this new industry needs most to understand its impacts is to "get devices in the water."

Not all potential impacts from marine renewable energy development are necessarily problematic. Some devices may actually have a positive impact on the marine environment by supporting new marine habitats. For example, floating wave energy devices could shelter fish and sea birds in areas that are off-limits to fishing due to the marine energy device. Likewise, new micro-ecosystems for crustaceans and aquatic plants could flourish on seabed moorings connected to marine devices.

MMS addressed many of these environmental concerns when the agency prepared a Programmatic Environmental Impact Statement (PEIS) analyzing the potential environmental effects of marine renewable energy activities that could result from MMS' new rule. Dept. of the Interior, Minerals Management Service, Final Programmatic EIS for Alternative Energy Development and Production and Alternate Use of Facilities on the OCS (Oct. 2007). The 2007 final PEIS extensively discusses plausible environmental impacts from each type of device used in marine renewable energy development and production and proposes best management practices, which MMS will consider as mitigation measures when reviewing individual projects.

Analyzing the environmental impacts of this new technology is challenging because each type of marine renewable energy device will have different effects. A submerged turbine anchored to the seabed will have different effects than a floating wave device. The precise effects of any one device, or the cumulative effects of multiple projects, on a given area cannot be accurately understood until these devices are placed in the water and tested under a multitude of conditions, thus the commonly heard refrain that what this new industry needs most to understand its impacts is to "get devices in the water."

Environmental Regulation of Marine Renewable Energy

Many potential impacts from marine renewable energy development will be addressed through protections afforded under the vast network of federal and state environmental laws. Energy projects on the OCS will trigger review under NEPA. NEPA requires that federal agencies evaluate the potential impacts of any proposed "major Federal actions significantly affecting the quality of the human environment" and consider alternatives to such actions. 42 U.S.C. § 4332(C). MMS is the lead federal agency tasked with ensuring NEPA compliance for renewable energy activities on the OCS. If a proposed project will likely have a "significant impact on the environment," MMS must prepare an Environmental Impact Statement (EIS), but if an action's significance remains uncertain, MMS can first prepare a more concise Environmental Assessment (EA). 40 C.F.R. §§ 1501, 1508. MMS' OCS Rule requires multiple levels of NEPA review for proposed marine renewable energy projects, depending on the type of lease or grant proposed. OCS competitive lease sales and development proposals will require an EIS. *Preamble to the Final Rules*, 74 Fed. Reg. 19,638, 19,659 (Apr. 29, 2009).

Proposed OCS projects also must be reviewed under states' coastal zone management programs. The Coastal Zone Management Act (CZMA) specifies that coastal states may protect coastal resources and manage coastal development by denying or restricting development off their coasts if the reasonably foreseeable effects of such development would be inconsistent with the states' coastal zone management programs. 16 U.S.C. § 1456. Under the OCS Rule, there are two phases of CZMA review for most types of leases or grants: one review for the site assessment plan the applicant expects to perform and a second review of proposed construction, operation, and decommissioning plans. 30 C.F.R. § 285.612 (2009).

Construction of renewable energy facilities on the OCS, such as the installation of wind turbines or electrical service platforms, will also require a Section 10 permit under the Rivers and Harbors Appropriations Act of 1899 (RHA), 33 U.S.C. § 403. The U.S. Army Corps of Engineers (Corps) has authority to review and regulate certain structures and activities that are located in, or that affect, navigable waters of the United States. A Section 10 permit is required for the construction of devices on the seabed to the limit of the OCS, although the Corps' authority to authorize this permit is limited if the land is under lease from the U.S. Department of the Interior (DOI).

In addition to the broader project planning environmental statutes just described, marine renewable energy projects on the OCS must comply with several statutes that protect endangered marine species, habitats, resources, and sanctuaries. Exactly how

these species and habitats may be affected could vary widely based on the technology used and its location. For example, on wind farms, impacts on migratory birds must be considered.

Impacts to endangered marine mammals, fish, wildlife, and birds, and their habitats due to marine renewable energy development must be addressed under the Endangered Species Act of 1973 (ESA), 16 U.S.C. §§ 1531, *et seq.*, the Marine Mammal Protection Act (MMPA), 16 U.S.C. §§ 1361, *et seq.*, and the Migratory Bird Treaty Act of 1918 (MBTA), 16 U.S.C. §§ 703–712. The ESA requires that federal agencies consult with the DOI's U.S. Fish and Wildlife Service (FWS) and the Commerce Department's National Fisheries Service (NOAA Fisheries) (formerly the National Marine Fisheries Service) to ensure that proposed federal "agency actions" are not likely to jeopardize the continued existence of any species listed as endangered or threatened. 16 U.S.C. § 1536(a)(2). The ESA prohibits the "taking" of listed species or the destruction or adverse modification of the species' critical habitat without a permit. *Id.* at § 1538(a). Similarly, the MMPA prohibits the "taking" of marine mammals in U.S. waters and by U.S. citizens on the high seas. 16 U.S.C. § 1372(a). Under the OCS Rule, renewable energy development proposals must demonstrate ESA and MMPA compliance. To ensure protection of migratory birds, MMS entered into a MOU with the FWS in June 2009, as required under the MBTA. MOU between the U.S. Dep't of the Interior's Minerals Mgmt. Service and Fish and Wildlife Service (June 4, 2009), *available at* www.mms.gov/PDFs/MMS-FWS_MBTA_MOU_6-4-09.pdf. Under the MOU, MMS committed to expand its current practice of considering the impact of proposed actions on migratory birds and identifying OCS areas already under lease from MMS that could negatively affect migratory birds. *Id.* at 6–7.

Several other statutes address potential impacts to OCS habitats, often by employing consultation provisions. Under the Magnuson-Stevens Fishery Conservation and Management Act, federal agencies must consult with NOAA Fisheries regarding proposed federal actions that may adversely affect essential fish habitat necessary for spawning, breeding, feeding, or growth of federally managed fisheries. 16 U.S.C. § 1855(b). MMS will incorporate conservation recommendations to avoid or minimize adverse effects on essential fish habitat as terms and conditions in the lease or grant. Similarly, the Fish and Wildlife Coordination Act of 1958 requires that federal agencies consult with federal and state fish and wildlife agencies before issuing a permit for an activity that would impound, divert, deepen, or otherwise control or modify any stream or other waterbody. 16 U.S.C. § 662. The National Marine Sanctuaries Act also protects marine sanctuary resources from destruction or injury by requiring that federal agencies consult with NOAA regarding actions that are likely to destroy, injure, or cause the loss of any sanctuary resource. 16 U.S.C. § 1434(d). Taking a somewhat different approach, the Estuary Protection Act requires that federal agencies assess the impacts of commercial and industrial developments on estuaries. 16 U.S.C. § 1222.

Marine renewable energy projects must also comply with traditional media-specific environmental statutes. Multiple sections of the Clean Water Act (CWA), 33 U.S.C. §§ 1251, *et seq.*, apply to renewable energy development projects. Sections 402 and 403 of the CWA require a National Pollutant Discharge Elimination System (NPDES) permit from the Environmental Protection Agency (EPA) (or an authorized state agency) for any point source discharge of a pollutant into territorial waters, the contiguous zone, or the ocean. *Id.* at §§ 1342–43. For example, the installation of onshore transmission lines and associated components would require a NPDES general storm water construction permit. In addition, Section 404 of the CWA requires a permit from the Corps before discharging dredge or fill material into waters of the United States, including the territorial seas and wetlands. *Id.* at § 1444. Applicants for federal licenses must obtain a water-quality certificate from the state demonstrating that any activity that may discharge within 3 mi. of shore will meet state water-quality standards. *Id.* at § 1341. Section 311 of the CWA also prohibits discharges of oil or hazardous substances into a wide variety of waters and discharges that may affect natural resources belonging to the U.S. *Id.* at § 1321. For example, various oils or hydraulic fluids internal to marine renewable energy devices could be discharged during construction or operation activities.

OCS renewable energy projects also may trigger Clean Air Act (CAA) requirements. Under the CAA OCS regulations, renewable energy developers need a CAA permit during construction on the OCS and for equipment and activities that emit air pollutants or constitute "OCS Sources" during operation. 40 C.F.R. § 55.6. Moreover, MMS cannot approve any project that does not conform to an approved State Implementation Plan for achieving and maintaining the National Ambient Air Quality Standards in the applicable area of the activity. 42 U.S.C. § 7410. CAA requirements also differ for OCS air pollution sources within 25 mi. of a state's seaward boundary and those located beyond it. 40 C.F.R. §§ 55.6, .13–.14.

Finally, two other federal statutes regulate materials that are generated or disposed of into ocean waters: the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA), 33 U.S.C. §§ 1401, *et seq.*, and the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6921, *et seq.* The MPRSA prohibits the dumping or transportation for dumping of materials derived from ocean waters or other waste without a permit from EPA. RCRA regulates the generation, storage, transportation, and disposal of hazardous waste and could come into play after a wind turbine is decommissioned, for example. If any lubricating oil or cooling liquids contained on-site are RCRA hazardous wastes, they must be transported and disposed of in accordance with RCRA requirements.

A New Day for Marine Renewable Energy

The potential environmental costs associated with marine renewable energy must be balanced with the environmental ben-

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rights priority system. Those senior rights have to be slotted in ahead of other rights that people have come to rely on, which causes tensions. The way that this can happen without a huge dislocation of interests is through the use of Reclamation water projects. The Navajo-Gallup water project that allowed the settlement that the Secretary recently signed was authorized by the Omnibus Public Lands Act of 2009, which authorized a Bureau of Reclamation water project that would bring water to the reservation and also to the City of Gallup. So Reclamation plays a significant role. There are a number of Indian water right settlements that are in various stages of negotiation. It's a particular priority of Secretary Salazar's to address those legitimate and longstanding tribal claims to water and reduce the backlog in ways that can bring water to the tribes and surrounding rural communities.

NR&E: One of the articles in this *NR&E* issue mentions the impact that groundwater withdrawals for irrigation have had on the Ogallala aquifer and other groundwater reserves. Are groundwater withdrawals something that Reclamation addresses? If so, how?

Castle: Groundwater is generally a state issue that doesn't directly involve Reclamation. But the USGS plays a critical role in monitoring High Plains/Ogallala aquifer reserves. Every two years the USGS compiles groundwater-level monitoring data from eight High Plains states and reports on the status of the resource. This work allows us to quantify the scope and rate of groundwater-level declines.

NR&E: What is a typical day like for you?

Castle: Work in Washington D.C. gets done through meetings. As a result, much of my typical day is spent in meetings that include Reclamation and USGS leadership and subject-area specialists briefing us on particular issues of interest. I also meet with other Interior leadership to coordinate interagency efforts, with members of Congress and their staffs to discuss water and science issues, and other federal agency officials to coordinate strategies and efforts. It's not unusual to have eight to ten meetings in a day. I'm usually at my desk by around 8 a.m. and finish up my day around 7:30 or 8:00 at night.

NR&E: You're relatively new to Washington. What's been your impression so far?

Castle: I'm enjoying taking advantage of everything D.C. has to offer. Each weekend I try to do something new, visit a new museum, kayak on the Potomac, or ride my bike on one of the great trails. A few weeks ago, I toured the monuments by night and was particularly impressed by the beautiful FDR memorial, which I had not seen before. I've gone to a performance at the Kennedy Center and visited the National Gallery several times. I'm looking forward to exploring the city further. It's not the Rockies, but I think I can make it work.

NR&E: What aspect of your job do you like the most so far?

Castle: The Secretary has put together a fabulous leadership team of people who are all experts in their fields, and it's fascinating to work with them and learn from them. And it's great to see firsthand how passionate career employees are about their work. This team and its collective brainpower makes each of us better at what we're doing. I believe that under the Secretary's leadership we have the opportunity to make lasting changes and restore the Department of the Interior to its position as a leader in protecting and thoughtfully managing the nation's natural resources.

NR&E: Thank you very much.

Castle: Oh, thank you. I appreciate it.

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efits of harnessing a renewable resource that emits substantially less greenhouse gases than traditional energy sources. Although marine renewable energy may likely have fewer negative environmental effects overall than traditional energy sources and will undoubtedly emit less greenhouse gases, this sector, like the traditional energy sector, must comply with a broad range of regulatory requirements before receiving government approval.

The regulatory approval process will provide interested parties an opportunity to comment on proposed marine renewable energy projects. How these entities will weigh the various environmental choices remains to be seen. One encouraging sign is the 2008 effort by the Environmental Defense Fund to develop a set of marine renewable energy principles for the Obama administration. Working group members, including utilities, energy developers, local governments, academics, and environmental organizations, agreed that this promising form of alternative energy should be further researched and tested to anticipate possible environmental effects. Ocean Renewable Energy: A Shared Vision and Call for Action (2008), *available at* www.edf.org/documents/8969_OceanRenewableEnergy_JointPrinciples_08.pdf. Some state environmental and fishing organizations (e.g., Save Our Sound), however, have expressed substantial skepticism that marine renewable energy can be implemented in a way that would not harm the ocean environment or commercial fisheries.

The dawn of OCS renewable energy development is truly exciting. MMS has implemented a new regulatory program, state and federal agencies are working together to balance development opportunities and environmental protection, and Congress and the Obama administration are providing the requisite financial incentives. Now the challenge is for this nascent industry to capture the enormous renewable energy potential of our domestic oceans and help secure our nation's energy future.