

Environmental Assessment of Off-Shore Energy Alternatives

A Programmatic Environmental Impact Study conducted by Argonne's Environmental Science Division (EVS) examines the potential environmental consequences of projects on the U.S. Outer Continental Shelf (OCS) for capturing wind, wave, and ocean current energy. Impacts of projects that make alternate use of existing oil and natural gas platforms on the OCS are also evaluated.

PROBLEM/OPPORTUNITY

The Energy Policy Act of 2005 gave the U.S. Department of the Interior (DOI) leasing authority for activities on the Outer Continental Shelf (OCS) that produce or support production, transportation, or transmission of energy from sources other than oil and gas. The DOI also was given jurisdiction over other projects that make alternate use of existing oil and natural gas platforms in federal waters. In response to this new authority, the DOI is implementing an Alternative Energy and Alternate Use Program on the OCS with associated rulemaking to approve and manage these potential activities. The development of rules to guide the program activities requires an understanding of the potential environmental impacts of the activities. A useful approach to developing this understanding is to obtain an initial broad perspective of potential environmental consequences of implementing the overall program from initial site characterization through decommissioning and to identify potential mitigation measures. A programmatic Environmental Impact Statement (EIS) provides an examination of environmental consequences and potential mitigation measures at a higher scale than would be appropriate for site-specific projects. As the program evolves and more is learned, the site-specific mitigation measures may be modified or new measures developed.

APPROACH

The programmatic EIS conducted by EVS for DOI focused on alternative energy technologies and areas about which industry has expressed a potential interest and the ability to develop or evaluate from 2007 to 2014. The types of alternative energy projects included are offshore wind, wave, and ocean current energy capture technologies. Other energy sources such as solar power and the production of hydrogen are not expected to be economically viable on the OCS for research, demonstration, or commercial ventures within the next 5 to 7 years and, therefore, are not included in this analysis. For the purpose of analysis, the applicable areas on the



Wind Energy Facility Operating off the Coast of Ireland (Source: DOE)

OCS that may support the development of wind and wave energy sources during the time frame of analysis were considered to be the entire continental U.S. OCS, whereas the only area that is considered likely for the development of ocean current energy capture technologies over the same time frame is the southeast portion of the eastern continental U.S OCS through which the Florida Current flows. The OCS areas off the coasts of Alaska and Hawaii are not analyzed in this programmatic EIS for any of the technologies.

Alternate uses of existing oil and natural gas platforms may include, but would not be limited to, alternative energy production, aquaculture, and research and monitoring. At this time, oil and gas structures are present only on the OCS in the Gulf of Mexico and southern California (none are in the Atlantic). Therefore, alternate use of existing structures is limited to facilities in the Gulf of Mexico and southern California over the next 5 to 7 years.

Three alternatives are considered in the draft programmatic EIS: 1) the proposed action (i.e., development of a program and issuance of regulations governing activities related to granting of a lease, easement, or right-of way for production of alternative energy on the OCS; and issuance of regulations for alternate use of existing oil and gas facilities on the OCS); 2) a case-by-case alternative (i.e., no development of a program and issuance of regulations related to granting of a lease, easement, or right-of way for production of alternative energy on the OCS and for the use of existing facilities; however, granting of a lease, easement, or right-of-way for the production of alternative energy on the OCS and for the alternate use of existing facilities could occur and would be assessed on a case-by-case basis); and, 3) a no action alternative (i.e., no development of a program and issuance of regulations related to granting of a lease, easement, or right-of way for production of alternative energy on the OCS and for the use of existing facilities, including no development of any alternative energy facility on the federal OCS and no alternate use of existing offshore facilities).

Potential impacts for energy development projects on the OCS are analyzed for the following five phases of development: technology testing, site characterization, construction, operation, and decommissioning. Potential mitigation measures are identified for each of the phases. The impact areas considered are: Ocean Surface and Sediments, Air Quality, Ocean Currents and Movements, Water Quality, Acoustic Environment, Electromagnetic Fields, Marine Mammals, Marine and Coastal Birds, Terrestrial Biota, Fish Resources and Essential Fish Habitat, Sea Turtles, Coastal Habitat, Seafloor Habitats, Areas of Special Concern, Military Use Areas, Transportation, Socioeconomic Resources, Archaeological Resources, Land Use and Existing Infrastructure, Visual Resources, Tourism and Recreation, Fisheries, and Nonroutine Conditions. Potential impacts and mitigation measures are characterized for the following types of alternate use of existing oil and gas platforms: Alternate Energy Production, Aquaculture, and Research and Development. Discussion of potential high-level cumulative impacts is also provided.

RESULTS

In general, impacts from all phases of development and production of alternative energy sources on the OCS (i.e., technology testing, site characterization, construction, operation, and decommissioning) are expected to be negligible to minor if the proper siting and mitigation measures are followed. Human activity on the OCS related to these activities is relatively low, with only a few support vessels in operation at any one time during the highest activity period (construction). Impacts from spills of oil and other hazardous material from vessels or platforms on the OCS are expected to be negligible to minor with proper implementation of oil spill prevention and response plans as required by the Minerals Management Service. However, impacts from a spill as a consequence of a vessel collision could be moderate to major. Vessel collisions with marine mammals are expected to result in minor impacts but could have moderate impacts in a few instances involving threatened or endangered species.

Rehabilitation and modification of oil and gas platforms for an alternate use during or after oil and gas production has ceased could result in both beneficial and adverse impacts. Impacts from any alternate use of these platforms could include fisheries enhancement and economic development. Removal of a platform structure from the OCS could result in the destruction of the ecological system that developed surrounding that platform's structure.

Because the precise locations of potential new alternative energy facilities or alternate use program facilities are not known at this time, the cumulative impacts from such facilities can not be precisely determined. However, depending on the location chosen and the proximity of new facilities to each other, the cumulative impacts could potentially be important. These impacts would be evaluated and considered during additional site-specific environmental reviews that would be done for new alternative energy and alternate use facilities.

COMMUNICATION OF RESULTS

The public scoping process began for the Draft OCS Alternative Energy Programmatic EIS when the Notice of Intent was published in the *Federal Register* on May 5, 2006, and continued through July 5, 2006. The Draft Programmatic EIS was issued in March 2007, and the Final Programmatic EIS was issued in November 2007, and the Record of Decision in December 2007.