

ENVIRONMENTAL STUDIES PROGRAM: Studies Development Plan FY 2009-2011

Region: Gulf of Mexico

Planning Area(s): North Atlantic, Mid-Atlantic, South Atlantic, Straits of Florida, Washington/Oregon, Northern California, Central California, Southern California

Title: Energy Market and Infrastructure Information for Evaluating Alternative Energy Projects for OCS Atlantic and Pacific Regions

MMS Information Need(s) to be Addressed: The Energy Policy Act of 2005 grants Minerals Management Service (MMS) responsibilities over renewable energy and related-uses of the Federal OCS. The MMS Office of Alternative Energy Programs (OAEP) addresses the management of this emerging industry. This study will support the OAEP effort by providing insights into the types and scale of alternative energy-related activities likely to occur in the next 5 to 10 years, and by providing information and analyses in support of the assessment of these concerns and effects. The study addresses new and pressing information needs, and supports development of longer-range strategies for managing this rapidly evolving industry.

Total Cost: \$443,319

Period of Performance: 2008-2010

Description:

Background:

This study focuses on two aspects of the developing alternative energy activities of the Outer Continental Shelf: the energy market and infrastructure needs of future alternative energy projects. The Energy Policy Act of 2005 delegates to Minerals Management Service (MMS) new responsibilities for renewable energy and related uses and activities of the Outer Continental Shelf (OCS). These include uses and activities that produce or support the production, transportation, or transmission of energy from sources other than oil and gas, that is, alternative energy. Consequently, the Energy Policy Act adds considerably to the breadth of MMS responsibilities.

The National Environmental Policy Act (NEPA) of 1969 requires use of the natural and social sciences in any planning and decision making that may have an effect on the human environment. To this end the MMS develops and participates in environmental impact statements, environmental assessments, marine environmental data acquisition and data analysis studies, literature surveys, socioeconomic studies, and studies in other disciplines such as marine biology and physical oceanography.

Alternative energy projects link to an electricity market that is very different from the petroleum-based industry MMS manages under the OCS Lands Act. These projects will also have very different potential environmental effects and operational needs than do offshore petroleum projects. Based on current expressions of industry interests, MMS expects that most, if not all, alternative energy projects and activities in the foreseeable future will focus on portions of the MMS OCS Atlantic and Pacific Regions. These are "frontier areas" with no ongoing alternative energy operations.

The alternative energy industry is rapidly evolving in the face of changing energy markets, technologies, and governmental policies. Most OCS energy projects that will prove economically viable over the next decades are yet to be described fully let alone proven. For example, ultimately wave and current energy from oceans may be the best source of energy versus wind energy. But wind is of greatest interest currently because of its proven technology. However, wind from the OCS may not prove to be the most

economic source for wind energy compared to onshore wind resources or other onshore sources of energy.

Planning for this future cannot be based on past experience alone. Limited ocean-based alternative energy development has occurred world-wide and this has been primarily wind power, located offshore of Europe. In contrast, the U.S. OCS represents a frontier area for alternative energy operations, holding much promise but providing no actual operational experience.

Energy markets adjoining the MMS OCS Atlantic and Pacific Regions are largely dependent on coal, hydropower, and natural gas. Alternative energy projects link to an electricity market that is very different from the petroleum-based industry MMS currently manages. These projects will also have very different potential environmental effects and operational needs than do offshore oil and gas projects. Numerous utilities and large grid operators compose the complex mix of energy providers. Also MMS needs to gain a better understanding of the existing energy infrastructure adjacent to the Atlantic and Pacific Regions.

Objectives:

- To provide an overview, or primer, of energy markets and energy infrastructure and how they work and to apply these principles to the analysis of likely alternative energy development scenarios.
- To collect and synthesize information to support socioeconomic portions of environmental assessments and other types of MMS decision documents related to alternative energy on the OCS.

Methods:

For the MMS OCS Atlantic and Pacific Regions and associated onshore areas the study will focus on the following.

Part 1. Overview of Energy Markets

1. Overview

The overview of the energy markets should provide information and analysis on the following.

a. Regional energy markets: examine at least the following factors influencing activity in regional energy markets and discuss the strategies and risk management practices employed by companies participating in the generation, transmission and distribution of electricity, specifically in terms of alternative energy:

- Regional entities
- Energy and capacity markets
- Regional load requirements
- Capacity and generation mix
- Imports and exports of electricity
- Transmission infrastructure

b. Federal and state policies: examine present and proposed federal and state policies relevant to energy markets and explain the impacts on organized electricity markets with respect the regional

and national topics discussed in the previous section. Analyze Federal and State policies and regulations including at least the following:

- FERC legal framework and its regulatory market structure.
- Federally mandated air pollution regulations
- Proposed regulations
- State air pollution regulations, including emissions standards and import rules.
- State-level policies, including regulated/deregulated status, and Regional Portfolio Standard.

c. Emissions and trading markets: examine at least the following programs and discuss how each could benefit alternative energy developers:

- Emissions trading programs
- CO₂ trading programs
- Renewable Energy Credits (REC) trading programs
- Voluntary markets for green energy and carbon offsets

d. Market Trends: Analyze trends in the various regional energy markets and discuss the likelihood of future trends that might result including at least the following factors:

- Fuel prices, the volatility of electricity prices relative to other energy commodities and electricity price forecasts.
- Proposed and approved generation additions and retirements and anticipated changes to existing fuel mix.
- Current capital cost, financing, technology advancement, etc., for conventional and renewable technologies as well as future trend lines.

2. Scenarios

Develop both short and long term scenarios, in cooperation with MMS, for the development of offshore wind, wave and ocean current energy. These scenarios should include, but are not limited to, the following assumptions and projections.

- Technology, including the types of available technologies, different capital input options, where capital equipment is produced (local, U.S., or foreign), capital expenditures, and amount and types of labor skills or each stage of the project (construction, operation, and decommissioning),
- Likely capacity and generation of such projects given technology advancement, economies of scale, and regulatory considerations.
- Locations of projects in areas that most likely will host such developments, including industry interest and economics as well as analysis regarding the integration of each project into the electricity transmission grid system and any associated expansion of the grid.
- Economic deployment of each technology with respect to the changes in the energy markets as described in the energy markets overview section.
- Discussion of the European offshore alternative energy experience and how they may be applied to the United States.

Part 2. Energy Infrastructure

1. Define the coastal area with respect to OCS alternative energy use. This means primarily economic connections to the coastal area. This includes ports used for staging, areas used for fabrication of offshore components (for example, blades and towers for wind energy), support and transport facilities, facilities for transmission lines, etc.
2. Work with state Coastal Zone Management (CZM) programs in defining coastal areas or boundaries for the regional areas of interest. Each state will have different characteristics. State CZM program offices are likely to have knowledgeable resources. Also MMS seeks to work with state CZM programs.
3. Describe energy infrastructure including, for example: energy grid operations, major utilities, major power plants, DC to AC inverters, substations, and major transmission lines within the coastal areas. Energy markets proximate to the MMS OCS Atlantic and Pacific Regions derive electricity from multiple sources and this complex energy mix is made up of numerous utilities in conjunction with large grid operators.
4. Describe likely support infrastructure needs that are specific to OCS alternative energy development, including such components as substations and transmission lines, ports, relevant manufacturing capabilities, shipyards and shipbuilding, and transportation of components. As a point of reference, support infrastructure in coastal communities is the backbone of offshore oil and gas energy development.
5. Describe communities where the supporting infrastructure is located and where socioeconomic impacts are most likely to take place. That is, describe the salient features of the communities most important for assessing potential effects.
6. To the extent that aspects of this study are geo-spatial, put the data in Geographic Information System (GIS).

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