

Bringing Offshore Wind Energy To Shore

Environmental challenges and considerations are different in many ways from onshore sites.

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If ever there was a time to explore renewable energy sources, it is now. White House representatives estimate that electricity demands will increase nearly 50% over the next 25 years. Renewable resources, particularly wind power, have the potential to meet those demands.

According to the U.S. Department of Energy, wind energy has become the fastest growing renewable energy source in the world in the last two decades. President Bush recently stated a goal of supplying 20% of the nation's electricity through wind power by the year 2020. In addition, the President's 2007 budgets propose \$44 million in funding for wind energy research.

It's not a passing trend; the possible economic and environmental benefits of wind energy are being acknowledged at all levels – from grassroots to the federal government.

As the importance of wind energy has increased, so has the number of worldwide wind farms. Onshore farms remain predominant, but in countries such as Germany, Spain and Denmark, offshore projects are expanding. In the U.S., all wind farms are currently land-based, but planning and permitting efforts are underway for a number of offshore

projects, and more are sure to follow.

Although wind is more intense off the coastline, giving turbines the potential to produce more energy, there are several issues that must be addressed in order to successfully bring power to the shore. Most important is the need for effective environmental and regulatory planning.

Project planning

Each of the U.S. coasts offers a different set of environmental and regulatory constraints that create obstacles to bringing subsea power transmission cables onshore. The cables, which link offshore wind facilities to onshore power grids, often cross environmentally sensitive areas, including near-shore habitats, beaches, dunes, shallow bays and estuaries, tidal marshes and wetlands of various types.

Many coastal states have environmental programs established under the Coastal Zone Management Act to protect sensitive coastal areas. Understanding the regulations that are part of these programs and the factors that affect them can greatly benefit wind energy producers in the planning and construction phases of their offshore projects.

One of the factors that determine environmental requirements for bringing wind energy onshore is land

ownership. Typically, with offshore projects, energy producers are dealing with federal and state landowners as opposed to private owners. Several National Seashores and other National Parks are located on U.S. coasts. Federal management of these lands often means limited access for construction projects and strict guidelines for habitat restoration.

In addition, any work in these parks requires that a Plan of Operation, outlining proposed activities, be submitted to the National Park Service. In some cases, an environmental assessment (EA) or an environmental impact statement (EIS) is also required. Energy producers wishing to pursue projects on federal or state land should be prepared to explore several types of construction methods, identifying which will cause the least amount of impact and expedite their projects.

Another factor influencing offshore projects is the species that are impacted. All offshore projects must comply with the Endangered Species Act (ESA), regardless of what other permits may be required. To comply with the act, which focuses on the conservation of threatened and endangered species of plants and animals, energy producers must coordinate early in the project and often

with the U.S. Fish & Wildlife Service and take measures to avoid designated critical habitat when possible.

In addition, it is necessary for producers to be aware of any seasonal restrictions on construction and land access. Such restrictions help to ensure that critical breeding and rearing periods are not disturbed.

Impacted habitat types also determine required actions for offshore projects; however, unlike threatened and endangered species, they are not protected under a single regulation. Each impacted habitat type may require different compliance guidelines, construction processes and mitigation measures.

- **Sand Dunes.** Similar to other environmentally sensitive areas, most sand dunes are protected under state and local laws. However, the unique fragility of this habitat may require energy producers to take special measures in order to have permit applications approved.

Agency requirements could include implementing dune restoration plans and using an established right-of-way (ROW) for transmission lines as opposed to creating new routes. A major concern for coastal states and counties is the potential for restriction of public access to beaches. Construction may be limited to non-tourist seasons.

- **Bays and Estuaries.** Bays and estuaries, particularly shallow ones, can be a significant challenge in cable installation projects. The primary environmental constraints presented by these habitats involve submerged vegetation and shellfish beds. Other constraints involve navigation channels, pipelines and other cables.

The ideal method for dealing with bays and estuaries is total avoidance, especially in the case of dredging new channels for access. Unfortunately, this method is not always possible.

When unavoidable disturbances occur, particularly to shellfish beds, both ecological and commercial impacts may result. Some states require mapping of shellfish beds to identify

sensitive areas and minimize project impacts. It may also be required or recommended to map living and dead reefs as well as other hard bottom structures.

Producers should recognize that while remote mapping through aerials and side scan sonar is an effective way to determine specific areas, having someone actually get into the water to field-mark boundaries is the optimal choice. Also, in cases where sensitive areas have been avoided, measures may still need to be taken to protect surrounding areas from excess turbidity.

Floating and fixed barriers, used to prevent silt from settling onto shellfish beds, seagrasses and other sensitive areas, are an effective turbidity protection method.

- **Coastal Marshes.** Like sand dunes, bays and estuaries, coastal marshes are a unique habitat. When they are present in a proposed project area, a number of measures may be required to minimize environmental disturbances and comply with relevant regulations.

First, the route selection of transmission cables should be considered. Selecting routes that do not run directly through marshes can mean the difference between rapid permit approval and a drawn-out process with repeated application revisions. Equipment choice also plays a role in the severity of impacts. It is imperative that only equipment designed for work in marshes is used in this habitat.

Regulating agencies may also require specific burial depths when designated navigation channels are crossed. In addition, any excavated material should be stored in non-wetland areas, and as with sand dunes, use of an existing ROW is preferred over the creation of new ones.

- **Construction.** Of all the issues energy producers must consider, one of the most significant is construction techniques, which often determine what environmental impacts will result and relevant regulations.

For example, producers working

in coastal marshes may find it necessary to trench into wetlands. As a result, they may be required to use a "double ditch" method, in which top soil is set to the side then placed back on top of the backfilled trench to encourage regrowth of wetland plants. Also, use of directional drilling may qualify a project for authorization under nationwide or other general permits, qualifying producers for an expedited approval process.

Trenching and directional drilling are two common activities used during the construction of transmission lines. As the name implies, trenching involves the digging of trenches to create paths for cables. This method can result in both direct destruction of habitat from equipment or indirect destruction from siltation, or silt accumulation. Rather than a destructive force, however, directional drilling can be quite beneficial and is a bit more complex than trenching.

For certain projects, landowners may have existing transmission corridors or roads that they will require producers to use. In the event that the corridors or roads cannot be used, and producers have to "blaze a new trail," they will be required to not only restore the area that was impacted, but also demonstrate that there is no other way to get the cable through an area without affecting undisturbed areas.

Directional drilling is a method for avoiding this type of impact. Using this method, a contractor can set up a drilling platform or barge offshore and, using a flexible drill stem, drill under an island or another sensitive site. Producers then pull the cable back through the bore. There are limitations on how far the contractors can accurately and effectively drill. Therefore, it is necessary to be sure that a contractor can actually drill as far as he or she may claim. It is also necessary to verify that setup areas are outside of sensitive areas and to set up contingency plans for unexpected problems.

For trenching, directional drilling and construction techniques in gener-

al, there are numerous actions that can be taken to maximize efficiency. Before construction begins, field staking should be done to designate all critical areas such as construction and access corridors and off-limits, sensitive areas. Prior to and during construction, energy producers should make contractors aware of the penalties they will incur for damage caused by going into off-limits areas.

Upon construction completion, plans for restoration should be finalized and implemented. These plans may include backfilling, allowing disturbed areas to settle and replanting of vegetation or placement of shell base. Finally, thorough documentation will most likely be required from regulating agencies and other interest groups.

Once construction is complete, responsibilities may continue. Energy producers need to make sure they have fulfilled the commitments they made during the permitting and construction processes. They should proactively coordinate with regulating agencies to ensure compliance

and continue their monitoring and reporting efforts.

Land ownership issues, impacted species and habitat types, and required or preferred construction techniques can give energy producers a lot to think about while planning their wind power projects. However, if the key aspects to obtaining a permit – trust, knowledge and communication – are not established, planning efforts could be futile.

Trust is important because the public and approving agencies must have confidence that project participants will follow through on their promises and comply with all relevant regulations. If credibility is lost from an unfulfilled commitment, approval expectations and projects may not come to fruition.

The importance of knowledge cannot be overemphasized. Learning agency expectations and acknowledging them in a permit application can expedite the review process for energy producers. Agencies will most likely have construction guidelines for cables. Using them could make projects go much more smoothly. Fi-

nally, maintaining an open line of communication with agencies and the public is critical to understanding and responding to project-related concerns.

Offshore wind power has the potential to become a significant energy resource for communities throughout the United States and the world. As its use increases, the environmental, political and commercial implications of this resource will become more evident and will require offshore wind power producers to address existing challenges and plan for those that lie in the future. **SWP**

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