Floating turbines open wind potential

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In the scramble to harness ocean wind power, floating turbine technology may be the holy grail.
Turbines that can be floated into position and anchored in deeper water are the solution to much of the politics that confronts shallow-water projects, according to proponents of the concept.

A pair of announcements this month seems to herald the next step into deeper water. A Norwegian energy company has begun to produce electricity with the first fully functional floating turbine – a project known as Hywind developed by StatoilHydro.

And less than a week after Hywind was turned on, Blue H USA announced it had applied to the U.S. Army Corps of Engineers to install a floating test platform 23 miles southwest of Martha's Vineyard.

It is an "important time" for floating wind turbine technologies, said Ray Dackerman, general manager for the subsidiary of the Dutch company Blue H Technologies BV. The test platform could be deployed by 2011, Dackerman said.

On the web

For more information on StatoilHydro's Hywind: www.statoilhydro.com and search "Hywind"

For more information on Blue H:

www.bluehgroup.com

Blue H first proposed building a 120-turbine wind farm in the waters off Martha's Vineyard and New Bedford last year. Although the company for the time being has taken "off the table" the formal application for the wind farm it submitted to the U.S. Minerals Management Service, the test structure does not require the agency's approval because of its temporary nature, Dackerman and federal officials said.

Differing approaches

Despite broad conceptual similarities – both technologies use mooring lines to anchor the buoyant components, for example – the Norwegian and Dutch companies have taken different approaches to the challenges of floating turbines.

Blue H relies on an ocean floor counterweight to stabilize its two-bladed, 3.6-megawatt turbines; StatoilHydro uses a steel jacket filled with ballast that extends 100 meters beneath the ocean surface to keep its 2.3-megawatt turbine from toppling into the waves.

The Blue H system could work for waters between 30 and 300 meters deep, Dackerman said. StatoilHydro's turbine can be located in waters between 120 and 700 meters deep.

"We call it a slender-cylinder concept," said Sjur Bratland, asset manager for Hywind. The decision to use the steel jacket was based on StatoilHydro's 40 years in the oil and gas industry, including 20 years in the offshore market, he said.

"We believe this structure is well-suited for the harsh environment that we find in the North Sea and other places around the world," he said. After a two-year pilot project to collect data, the company will decide on next steps, Bratland said.

Defusing controversy

Blue H expects it could have commercial permits in hand by 2013, Dackerman said. Blue H already has deployed a pilot unit off Italy's coast and expects to install its first commercial unit there next year, he said.

Both technologies have the potential to move wind energy projects farther out to sea, alleviating some of the controversies fueled by projects such as the proposed Nantucket Sound wind farm, which, if approved, would be built between five and 10 miles from the shorelines of Cape Cod and the Islands.

"There's a lot less potential conflict in that Blue H plan than in these other ones," said Tom Osmers, a fisherman from West Tisbury.

Osmers, on the board of directors for the Martha's Vineyard/Dukes County Fishermen's Association, said projects like Cape Wind and a proposal by the state that would allow up to 166 wind turbines within three miles of Martha's Vineyard would have much more substantial impacts on fishermen and the island's tourism industry than Blue H.

As long as the area around the Blue H turbines is not closed off to fishing, it is unlikely to see much opposition from fishermen, Osmers said.

"I think the lobstermen will be able to work around the Blue H proposal," Osmers said. The floating turbines may even attract fish, he said.

Still in early development

But Osmers and others may have to wait a bit before they start baiting their hooks for fishing in a field of floating wind turbines.

While the technology shows a lot of promise, it is still in its “embryonic stage of development,” said Walt Musial, principal engineer for Ocean Renewables at the National Wind Technology Center for the National Renewable Energy Laboratory.

“People just have to realize that this is not an easy technology to mature,” Musial said.

Nearshore projects where turbines are anchored into the seabed with traditional monopoles are a necessary step in the development of offshore wind energy, Musial said.

“There’s an incredible amount of information that has to be gained from the shallow water projects in order to do the deep-water projects,” he said.

Questions on the reliability of ocean-based turbines and infrastructure requirements remain for European projects where growth rates for offshore wind energy have been slower than expected, Musial said. These problems must be solved for both near-shore and deep-water technologies, he said.

“There’s reason to be optimistic about floating systems but we should be realistic that we are not going to leapfrog near-shore technologies,” Musial said.

The price tag on deep-water technologies is another significant question. The cost for transmission infrastructure climbs the farther out to sea a wind farm is located.

While the technological kinks and supply chains are worked out, the cost to construct the individual turbines remains high.

The StatoilHydro pilot project cost more than $65 million to develop, far more than the cost for a single offshore monopole turbine.

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