Floating wind turbines on the rise

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Over 26,000 megawatts (MW) of planned offshore wind capacity exists in the offshore wind development pipeline. Rapidly falling technology costs for offshore wind, including floating offshore wind technology, have aided the growth of this pipeline and promise to help wind become a significant part of the power mix in coastal communities.

To help explain the strong tailwinds in the offshore industry, National Renewable Energy Laboratory Offshore Wind Research Platform Lead Walt Musial, one of the nation's foremost offshore wind experts, summarized the latest information in a recent "Overview of Floating Offshore Wind" webinar. More than 300 individuals from universities, research institutions, government, regulatory and legislative bodies, NGOs, investment organizations, and electric utilities attended.

Wait—Turbines Can Float?

Not only can wind turbines float, but they are growing in popularity. Projections indicate that floating offshore wind could be deployed at the utility scale by 2024.

Floating offshore wind platforms borrowed liberally from oil and gas platforms initially, using tension leg platforms, spar buoys, and semisubmersible designs, but technological advances increasingly optimize floating offshore platforms for wind capture that are less bulky and expensive. In addition, design models like the IEA Wind 15-MW reference turbine help bring offshore wind technologies to ever greater heights by making it possible to evaluate the viability of new innovations for offshore wind turbines before prototype development.

"Floating offshore wind platforms can access untapped wind resources, helping make this technology cost competitive," Musial said. "Access to new resource areas helps make floating offshore wind an enticing proposition, and it may soon be competitive in many electric markets, including the Northeastern United States and Pacific regions."

Floating offshore wind platforms work by connecting the buoyant substructure of the turbine to the seabed using mooring cables. Floating wind systems can help foster future offshore wind development by accessing higher-speed and more consistent wind resources than their

fixed-bottom counterparts can access.

On the Rise

According to Musial, depths of around 60 meters represent the offshore wind cutoff where fixed-bottom support structures end and floating substructures begin. Most offshore wind platforms have been installed at depths less than 60 meters so far, but floating offshore wind technology opens deeper waters to development.

Most of the world's usable offshore wind resources exist at depths greater than 60 meters, which provides a strong economic incentive for the development of floating offshore wind technology that can make these machines cost competitive.

Economic incentives for pursuing floating offshore wind result from the match between available offshore wind resources and population centers. The fact that 80% of the U.S. population lives along a coast adjacent to an ocean or great lake makes it easier to build offshore wind transmission for these communities. In addition, 58% of U.S. offshore wind resources that could feasibly be developed exist at depths greater than 60 meters, meaning floating offshore wind could provide a considerable amount of electric power to coastal communities.

Other key takeaways from the webinar include:

- Large projects can be built offshore because oceans offer vast expanses of open space
- Offshore wind farms can be clustered into large areas and built so they aren't visible from shore
- Construction of offshore wind farms can help create jobs and revitalize ports
- The technology and supply chains for floating offshore wind are

improving, reducing costs
- Larger offshore wind turbines capture more wind, resulting in lower operational costs.

More information: Learn more about floating offshore wind by watching Musial's webinar in the video above or reading the answersPDF to attendee questions: www.nrel.gov/news/program/2020 … 1-webinar-qa-web.pdf

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