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Question of the Week



Is Offshore Wind Making Any Progress?

The recent setback for a massive wind farm proposed off the coast of Massachusetts highlights how the technology has expanded very slowly outside of Europe.

By Kristin Majcher on April 16, 2015



A wind farm off the coast of Britain that can generate 300 megawatts of electricity.

Offshore wind farms are a particularly attractive way to generate renewable energy. Out of the way of densely populated areas, wind turbines on the ocean can be bigger than ones on land. And the wind blows harder and more predictably over the water. Europe has been using the technology for years, but it has been harder to replicate elsewhere—especially in the U.S. Last December, prospects dimmed for the \$2.5 billion Cape Wind farm proposed off the Massachusetts coast. Two power companies [canceled their contracts](#) to buy power from the farm after the project, long delayed by legal challenges from opponents, failed to meet a key financing deadline. Here’s the outlook for offshore wind.

Europe

Europe generates the vast majority of the world’s offshore wind power. [More than 70](#) farms in 11 countries have gone up since the first one opened off the coast of Denmark in 1991. More than half of this offshore wind capacity is based in the U.K., which opened its first in 2000 and now has the four largest farms in the world.

Even with this growth, however, far more wind power is being generated on land. All of the offshore wind farms in Europe account for only about eight gigawatts of capacity, according to the European Wind Energy Association—or about 1 percent

of the European Union's electricity consumption in a typical year.

Offshore wind projects are costly to build and link to power grids back on land, so their electricity has generally been more expensive than power from other sources. Many projects are supported by government subsidies. In the U.K., offshore wind projects competing for recent subsidies secured contracts to produce power for an average of £117 per megawatt-hour; the country has a goal to bring this down to £100 by 2020. But in 2013, the average cost of producing electricity from gas-powered plants was £80 per megawatt-hour, and £90 per megawatt-hour at nuclear plants.

A European Wind Energy Association report shows that offshore wind capacity in the European Union could triple by 2020, when member countries have a goal to generate at least 20 percent of their energy from renewable sources. It's not clear whether the cost could get in the way of that goal. According to a [report](#) from the advisory firm Ernst & Young, the European offshore wind industry will have to cut its costs by 26 percent by 2023 to compete with gas and coal. More efficient wind turbines are expected to help bring costs down: a recent study in the U.K. showed that the lifetime costs of offshore wind farms in the country fell 11 percent between 2010 and 2014.

Meanwhile, about 420 megawatts of offshore wind power has been installed in China and South Korea, according to researchers at the University of Delaware. Taiwan and Japan also have plans to develop the technology.

Slow progress in the U.S.

In 2013, wind farms in the U.S. met about [4.5 percent](#) of the country's electricity needs. Considering that more than [70 percent](#) of the nation's electricity is generated to serve 28 coastal states, offshore wind farms could make a big impact in the U.S. However, none are up and running yet. Starting offshore farms has been far trickier, in part due to the extensive regulatory approvals needed from state, local, and federal governments. And offshore wind has been controversial—Cape Wind fought several lawsuits from opponents who argued that it would have many detrimental effects, including on wildlife and fishing. With 130 wind turbines, the stalled project would have been one of the biggest farms in the world, providing 468 megawatts of power.

A smaller project is fully financed and appears on track to bring offshore wind to U.S. waters soon. [Deepwater Wind](#) has been working since 2008 to get five turbines up and running off the coast of Rhode Island. The company will begin installing turbines this summer for the 30-megawatt plant, planned to start running in 2016. The company secured more than \$290 million in financing earlier this year and is hoping to secure utility contracts for another project off of Long Island. Deepwater Wind says it expects its wind farm to be competitive with the cost of building new gas power plants that would replace the coal- and oil-fueled power plants slated for decommissioning in New England by 2020.

The U.S. Department of Energy has funded several demonstration projects for offshore wind, including those led by [Principle Power](#) in Oregon, [Dominion Virginia Power](#) in Virginia, and [Fishermen's Energy](#) in New Jersey. [This map](#) shows a comprehensive list of offshore wind development projects in the United States. In addition, the Danish firm Dong Energy recently won rights to a development project off the coast of Massachusetts. Google-backed Atlantic Wind Connection is working on an underground transmission line from New Jersey to Virginia that could be ready as soon as 2020. It says the line can support up to 6,000 megawatts of offshore wind energy.

The Takeaway:

Offshore wind capacity around the world has been growing in Europe since the early 1990s. However, it will take several more years before offshore wind will contribute meaningfully to the electricity supply in the United States and many other parts of the world.

Do you have a big question? Send suggestions to questionoftheweek@technologyreview.com.

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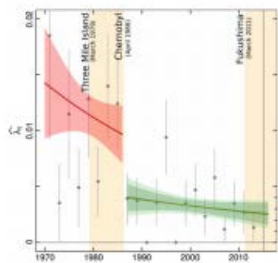
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