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Offshore windmills hold clean-energy promise

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(08-02) 19:56 PDT -- Someday decades from now, California's sprawling coastal cities could draw their power from floating windmills that bob on the sea like buoys, far from shore.

Their blades would spin over deep ocean water, turning in winds that are steadier and stronger than they are on land. Undersea cables would send their electricity to shore.

This kind of floating windmill has not yet been deployed en masse. But a model of one sits in the Berkeley office of Principle Power, one of several companies trying to tap the powerful winds at sea.

Principle has signed agreements with utilities to test its device, called the WindFloat, off the coasts of Oregon and Portugal. Three connected canisters filled with ballast water will support a wind turbine, with cables mooring the entire device to the seabed.

"The most prolific minds in the renewable energy business are talking about taking land-based wind and dragging that power out to the coast, which really doesn't make much sense," said Jon Bonanno, the company's president. "It makes much more sense to generate that power from deepwater sources and transmit it to the coast."

Used in europe

While the idea may be simple, executing it isn't.

Offshore wind farms have been used for years in Europe. But those windmills sit in shallow water, their bases bolted into the ocean floor. Wind farms proposed for the U.S. East Coast, including the contentious Cape Wind project off Massachusetts, take the same approach.

But the seabed off most of California's coast drops quickly, close to shore. Standard ocean wind farms would have to be built near the state's beaches, plainly visible from land. And they wouldn't be able to cover much space, confined to a narrow band of water.

Oil companies have long used floating platforms to drill into the seabed far from shore. But those platforms tend to be wide and heavy, and they aren't designed to catch the wind. A windmill floating on a

small platform will have to endure heavy gusts without tipping.

Big rewards

The potential rewards are huge. The National Renewable Energy Laboratory estimates that the wind blowing across California's deep water could generate as much as 130 gigawatts of electricity. That's roughly twice as much electricity as the state needs on a hot summer afternoon.

Principle Power, based in Seattle, last fall signed an agreement with the Tillamook People's Utility District in Oregon to install the WindFloat off the coast of central Oregon as early as 2012. The project will start with a single WindFloat, capable of generating a maximum of 5 megawatts of electricity when running at full tilt. Megawatts measure the amount of electricity generated in any given instant, and one megawatt is enough electricity for 750 homes.

If all works as planned, the WindFloat project will expand into an entire offshore wind farm, covering 12 to 15 square miles and capable of generating 150 to 200 megawatts.

Concerns over birds

The WindFloat design is stable enough to withstand the fierce winter storms that pound Oregon's coast, said Alla Weinstein, Principle Power's chief executive officer.

Environmentalists, however, want to ensure that offshore wind projects don't prove as deadly to birds as onshore wind farms have. Gary Langham, director of bird conservation for Audubon California, wants offshore wind developers to steer clear of island or coastal nesting grounds. In addition, the ocean surface off California has places where birds congregate to eat, mostly where upwellings of water from far below bring up their favorite types of food.

"You can get a hundred thousand seabirds in a big patch at once," Langham said. "So the more we can do to avoid those hot spots, the better we'll avoid impacts."

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