Deepwater Wind

THE NEXT FRONTIER

BY SALVATORE SALAMONE

WHILE T. BOONE PICKENS HONES his plans to tap the wind corridor from Texas to the Canadian border to generate electricity, coastal regions have to try something more radical.

Wind farms the size Pickens has in mind are often not possible in coastal regions because there is simply no room to build them. Yet wind energy would certainly be useful for urban coastal regions where the high population densities require ever more electricity.

To meet this demand, a number of offshore wind farm projects have been proposed. Many of these projects have faced harsh criticism from locals who do not want their ocean views changed.

The solution may be to simply push the wind farms farther out into the water where the turbines are no longer visible from shore. That's the idea behind several proposed projects including one announced in June involving Delmarva Power that is expected to be the first commercial offshore wind farm.

Specifically, Delmarva Power and Babcock & Brown have teamed up in a 25-year deal by which Delmarva will buy up to 200 megawatts of power from an offshore wind farm to be developed by Babcock & Brown's subsidiary, Bluewater Wind Delaware.

This wind power will help Delmarva Power meet a Delaware state mandate that 20 percent of the company's electricity comes from renewable sources by the year 2019. "With the addition of this contract, I'm confident we will meet the aggressive renewable energy goals established by Delaware in 2007," said Gary Stockbridge, president of the Delmarva power region.

CHALLENGES AND BENEFITS ABOUND

Projects of similar scope involving a number of wind farm developers are being considered along the Gulf coast, West coast, and Northeastern seashore. There are also similar projects under way or already being built around the world.

With these projects in mind, the Delmarva project illustrates the mixed bag of technology and economics that companies will encounter when locating wind farms far offshore.

As is the case with all wind farm projects, environmental studies must be conducted and a number of permits must be obtained. But there are also challenges specific to a far offshore project. For example, placing turbines in deep water is more complicated than building the same structures on land or in shallow water. And getting the electricity to the shore requires installing complex and often hard to maintain underwater cables and energy delivery systems.

However, there are also benefits to locating a wind farm far offshore.

Offshore wind farms are in some ways better environmentally than their land-based counterparts. The noise associated with the spinning onshore turbines often disturbs sensitive wildlife. This problem does not exist for offshore systems.

There are stronger winds offshore, enabling the systems to produce more electricity. When winds blow over water versus over land, there is less friction and there are no obstacles such as buildings, hills or trees. There are many offshore areas where the winds blow continuously at high speeds.

In July, scientists from NASA's Jet Propulsion Laboratory published new research about the physical mechanisms that drive these winds. For instance, they identified a region off the coast of Northern California near Cape Mendocino. The geography of the cape's land mass deflects northerly coastal winds, creating a wind jet that blows year-round. Other areas noted in the research for having sustainable high-speed winds included the mid-latitude Atlantic and Pacific, New Zealand, and the ocean near Tierra del Fuego in South America.

If these and other areas with high winds are used, they could potentially generate 500 to 800 watts of energy per square meter, according to the research. Paul Dimotakis, chief technologist at the lab, put this capability into perspective noting that while this is slightly less than solar energy, wind power can be converted to electricity more efficiently than solar energy and at a lower cost per watt of electricity produced.

And finally, offshore winds often better match electricity demands when compared with onshore winds. That's because ocean weather mechanisms continue to produce wind throughout the day on even the hottest days.

Once completed, an offshore wind farm will generate 200 megawatts of electricity for Delmarva Power.

PHOTO COURTESY OF BLUEWATER WIND

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Even with these benefits, installing turbines in deep water is an expensive proposition. Some industry experts estimate that it can cost up to twice as much as placing turbines in sparsely populated onshore areas such as the regions in Texas being eyed by Pickens. However, a recent *Business Week* article noted that in areas like the Northeastern United States where open land is scarce, electricity rates are high, and demand keeps surging, the economics of an offshore wind solution are not bad.

Energy companies might have more expertise in developing offshore wind farms than many realize. Most oil and gas companies are used to building platforms far out in the ocean. And many already have major installations in the regions of the world such as the U.S. Gulf Coast where the winds are strong.

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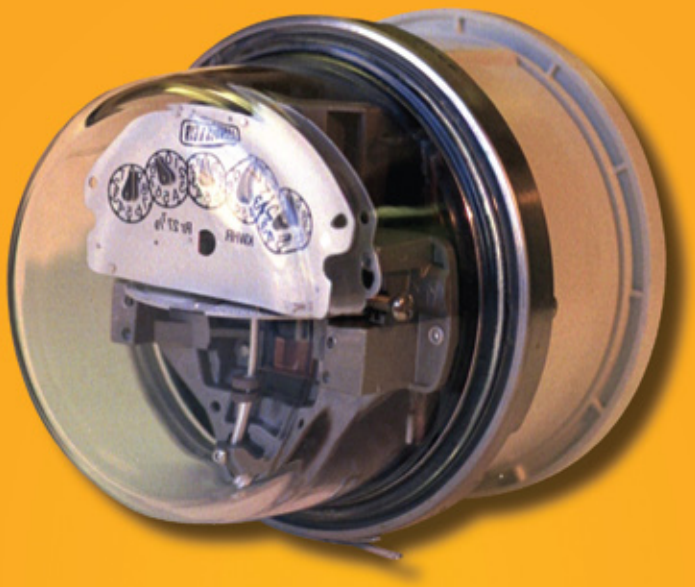

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