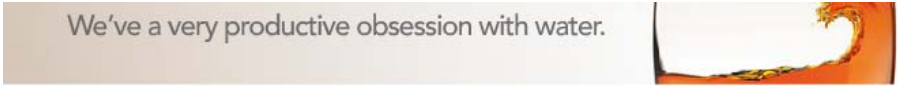


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March 22, 2010

Offshore Awakening: US Investment Flows to Offshore Wind

The US is starting to look beyond the initial cost of offshore wind energy and consider its huge long-term benefits.

by Elisa Wood, Correspondent

London, UK [Renewable Energy World Magazine]

Offshore wind energy isn't cheap. In fact, it can cost twice as much as land-based wind power. Yet, several state and provincial governments vied in 2009 to attract North America's first offshore wind farm – as well as its second, third, fourth and on.



Oddly, many of these states are in the Northeast of the US, where political leaders are wary of raising energy costs. Consumers there pay among the highest electricity rates in the nation, and policymakers are on the lookout for ways to lower costs.

So what does offshore wind offer that makes these price-conscious shoppers suddenly willing to ignore the price?

'Offshore has great wind capacity factors, it blows at the right times, and the transmission challenge is not difficult', says Edward Krapels, director of Anbaric Holding and developer of subsea transmission projects. 'Offshore just makes a lot of sense'.

A lot of that sense is economic. Political leaders in the Northeast and Ontario want to revive their manufacturing sectors, which lost factories in recent decades to states and nations where energy is cheaper. They envision dozens of offshore wind farms in the Great Lakes and in a spine running down the US Atlantic coast that draws in turbine, tower and component manufacturers, as well as research

and development.

'The impact of offshore wind is tremendous, from spurring economic development and new jobs, to providing stable energy costs, and will move our country towards energy independence', said Rhode Island Governor Donald Carcieri at an American Wind Energy Association offshore wind workshop that drew about 700 industry and government representatives to Boston in December.

For Rhode Island and other Atlantic states, offshore wind offers the promise of jobs that might otherwise go west. The eastern states have created aggressive, self-imposed mandates to deliver a percentage of their power from renewable energy, creating a strong market for wind power. But given their dense population, they have little room for utility-scale renewable energy unless it is offshore – or imported from other regions. What Carcieri and the East Coast political leaders don't want – and what they've made clear they fear – is development of a federally imposed super grid of high voltage transmission lines that would push land-based Midwestern wind power 1500 or more kilometers to the energy-hungry eastern seaboard. That scenario places the manufacturing jobs in the Midwestern states, not in their own backyard.

Rhode Island, the smallest state in the nation, has been one of the loudest voices in the struggle to develop an East Coast offshore wind industry. Governor Carcieri in December rescued a nearly failed deal between National Grid and Deepwater Wind for a 28.8 MW demonstration wind farm three miles (5 km) off Block Island.

At the state's urging, National Grid had entered into negotiations to buy power from the Deepwater project under a long-term contract. But the utility walked away from the talks saying power from the project was too expensive.

Carcieri urged the utility back to the table and National Grid finally agreed to a contract when Deepwater dropped the price from 30.7 cents/kWh to 24.4 cents/kWh, beginning in 2013, the first full year of operation. While the utility accepted the deal, it pointed out the cost is well above its average 9 cents/kWh generation costs.

Carcieri, however, counters that the new wind contract will add only \$1.35 per year more to a typical residential customer's electricity bill. Furthermore, offshore wind advocates believe, the demonstration project is a necessary

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precursor to a larger, 106 turbine wind farm Deepwater has agreed to develop off Rhode Island's coast, along with a planned 117 acre (47.4 hectares) manufacturing hub for offshore wind technology.

Cape Wind: An Industry Legend in the Making

Carcieri has made clear he wants Rhode Island to be home to the first US offshore wind farm. But he faces serious competition. In neighboring Massachusetts, the 468 MW Cape Wind project is the furthest along among US wind farms in clinching all of the necessary regulatory approvals.

The Nantucket Sound project is an industry legend because the developer, Jim Gordon, has been stalwart in battling back an organized group of wealthy Cape Cod property owners who oppose the project. The fight has raged before regulators and courts for nine years. Cape Wind has won every round, so far.

Its struggle for acceptance became easier after Massachusetts elected Deval Patrick as governor in 2006. Unlike his predecessor, Mitt Romney, a candidate for the Republican presidential nomination in 2008, Patrick supports Cape Wind. And, he is a close ally of President Obama, who has led a national drive for more renewable energy. Further, Cape Wind's chief nemesis in the US Senate, Edward Kennedy, died in 2009.

Perhaps most significant, a major utility stepped forward in December and offered to buy the project's power under a long-term contract. Cape Wind and National Grid were in negotiations as Renewable Energy World went to press. Cape Wind says that a long-term contract will enhance the project's ability to gain financing.

However, the Alliance to Protect Nantucket Sound, which opposes the project, persists in its fight. The group has been touting arguments by a Native American tribe that the project will block views of the sun for their prayer. Governor Patrick publicly called the claim 'ridiculous', but it must be examined before the project can win a final okay from US Minerals Management Service, the lead agency reviewing Cape Wind.

Power in Numbers as Offshore Gets Organized

While Cape Wind fought its battles alone for many years, the US offshore wind industry has now begun to organize itself. The US Offshore Wind Collaborative launched in 2009 to address the technical, environmental, economic and regulatory issues and catalyze the industry. Steered by environmental, state, academic and industry representatives (among them the American Wind Energy Association), the collaborative hopes to be a repository of information about US offshore wind. To that end, in October it issued a major report on the emerging offshore sector, 'US Offshore Wind Energy: A Path Forward'.

The report places the price issue firmly on the table. A fully installed offshore wind farm costs about \$4600/kW, including turbines, installation and maintenance. In comparison, a land-based wind farm costs about \$2400/kW, the report said.

Why is offshore wind so much more expensive? And, more importantly, will it stay high?

Offshore facilities require more complex design to bear up under storms, waves and tides. Thus, while turbines represent the greatest expense for land-based wind, foundations, towers, transmission and installation tend to account for offshore project's larger costs, the report said. Foundations, in particular, are costly for offshore facilities because they require more steel and concrete. Water depth also plays a big role as each meter of tower height adds some \$2000.

To offset the cost, offshore wind needs scale, says the report. Large projects with turbines of at least 5 MW provide better economics than smaller projects. Indeed, Deepwater says the output is expensive from its planned 28.8 MW Rhode Island project because it is a small demonstration facility.

But supporters say offshore wind's capital cost must be put into perspective. First, wind velocity is higher over the unobstructed ocean surface, which in turn leads to greater capacity factors, more energy production, and greater revenue for offshore wind farms than their onshore counterparts, says the collaborative report. So while, offshore wind may cost more initially, it also may produce more bang for the buck.

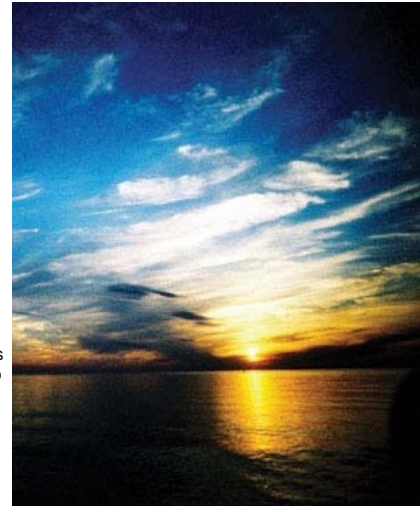
In addition, it's important to consider the cost of alternatives to East Coast offshore wind. Is it cheaper to move land-based wind power thousands of miles eastward or build offshore wind nearby? What will such a massive transmission line cost? The price has yet to be truly analyzed of building a super grid, and it is likely far higher than supposed, Krapels says.

'If you are building an overhead line through a waste land, there is no question that overhead is the cheapest way to go. As soon as you introduce terrain into the equation the cost goes up. Crossing mountains, rivers, those things all add a lot to the price of overhead. When you get into an urban area and you have to bury the cable, then it gets really expensive', he says.

While it might cost only \$1 million per mile (1.6 km) for over head transmission in a 'waste land', it can cost as much as \$10 million per mile to build in a densely populated city. That is part of the reason Krapels sees the super grid idea as unlikely. Even if the line can win all of the approvals necessary to cross from the midwest of the US, it then faces the costs and difficulties of connecting into the congested eastern seaboard, where it must break through not only concrete and roads, but also NIMBY opposition.

Krapels, a key player in development of the Neptune Regional Transmission System, a 65 mile (104 km) undersea and underground cable from New Jersey to Long Island, says opposition tends to be greater for land-based transmission than invisible undersea lines.

Geography is a key part of the argument for offshore wind for other reasons as well. Coasts and high population go hand-in-hand in the nation. And, high population means high energy consumption. Of the 48 contiguous US states, the 28 that have coastal boundaries consume 78% of the nation's electricity, according to the US Energy Information Administration. Thus, offshore wind offers a nearby energy source for the nation's highest load pockets.





Moreover, today's price for offshore wind is unlikely to be tomorrow's. Analysts expect innovation and scale to drive down costs. The collaborative report cites sources that put capital costs at \$2520/kW through 2010 with a 12.5% drop by 2030.

Critics may complain that offshore wind is too expensive but, 'We heard the same thing about onshore wind 10 years ago', says Andy Spielman of partner in law firm Hogan & Hartson's Environmental practice. 'Now we have terrestrial wind all over the place because people have figured how to drive down the costs', he adds.

Offshore activity is so great in Europe, and emerging so quickly in Ontario and the US, that prices could begin to drop in six months to a year, according to John Kourtoff, president and chief operating officer of Trillium Power Wind Corporation, which is developing wind power in the Great Lakes. He says, 'I think the whole cost matrix will change very rapidly'.

But the industry must contend with some 'chicken and egg' issues before it sees lower prices. Fundamentally, projects must get built before prices can come down. 'Until we get some experience with commercialization, we are not going to see prices drop. Until we get projects closer to construction and commercial operation, the risk premium is going to stay high', says Jon Mostel, a partner in Energy and Project Finance partners at the law firm of Stroock & Stroock & Lavan.

In the US, much depends on how quickly projects can make their way through the nation's notoriously arduous regulatory process. Georgina Benedetti, Frost & Sullivan research analyst, sees the US, along with Germany, making rapid advancements in market share over the next four years.

Benedetti foresees 200 MW of offshore turbines installed by 2011, likely from Cape Wind. Bluewater's Delaware project is the next most likely to begin operations, she says.

Emerging Energy Research forecasts that North America will develop more than 6 GW of offshore wind by 2020. Between 2010 and 2020, North America and China will contribute 25% of all new offshore capacity installed worldwide, according to EER's December 2009 report: 'Global Offshore Wind Energy Markets and Strategies: 2009-2020'.

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For now, with no offshore wind farms yet built, North America remains well behind the United Kingdom and other European nations in developing the sector. But the federal government elevated the importance of offshore wind in energy policy this year. The Department of the Interior awarded the first ever leases for offshore wind on the outer continental shelf (OCS) near New Jersey and Delaware.

In addition, Ken Salazar, secretary of the interior, says in 2010 the Minerals Management Service will set up a new regional office to support renewable energy development off the Atlantic seaboard. And, earlier in 2009, the Minerals Management Service issued a final rule for renewable energy development on the OCS.

'We have created the first-ever US framework for offshore renewable energy development', Salazar said in a speech on 10 December at the United Nations conference on climate change in Copenhagen. 'We have cleared out bureaucratic red tape among federal agencies that was creating unnecessary confusion for potential offshore renewable projects'.

So with a strong push from federal, state and provincial governments, North America enters 2010 with a will to build offshore wind, the same kind of vigour the continent brought to land-based wind at the start of the millennium. In 2000, the US had 2579 MW of installed wind capacity on land; by

third quarter 2009 it had 31,000 MW.

It's not yet clear who will win the race to build the first offshore wind farm. And, ultimately, it probably makes little difference. What's important is that the first is built. Then 'gradually like a snowball rolling down hill, we will have thousands of megawatts', Krapels says.

Elisa Wood is U.S. correspondent for Renewable Energy World Magazine.

Sidebar: Key initiatives by the states

- Maine has sent a target to develop 300 MW of offshore wind by 2020.
- Massachusetts intends to develop 2000 MW of wind power, most of it offshore, by 2020.
- Rhode Island has formed a partnership to assist Deepwater Wind in developing a 28.8 MW offshore demonstration project, followed by a larger 385 MW project.
- In New York, a collaborative of industry and government agencies plan to seek a project developer in the spring to build up to 700 MW of wind power off the coast of Long Island. In addition, the New York Power Authority issued a solicitation for projects totaling 120-500 MW to be built in the Great Lakes.
- New Jersey struck a deal with Deepwater Wind and Public Service Electric & Gas to build a 350 MW offshore wind farm. The state has set a goal to attract 1000 MW of offshore wind by 2012 and 3000 MW by 2020.
- In Delaware, Bluewater Wind won a competitive solicitation to build an offshore wind farm and sell the output to Delmarva Power. The developer plans a 450 MW project.
- The states of Delaware, Maryland and Virginia joined forces in November to develop offshore wind power.
- Duke Energy and the University of North Carolina plan demonstrator turbines 7-10 miles (11-16 km) from the Outer Banks.

Sidebar: Offshore Bonanza at the Great Lakes?

The Great Lakes appears to be a gold mine for offshore wind, with thousands of megawatts positioned for development due to polices created by the Ontario government.

An enormous body of water, the Great Lakes is a windy place. The five lakes, which border eight US states and Ontario, can produce more offshore wind energy than all of the US coasts combined, according to a report by the

Trillium Power Wind Corporation, a company that plans to build four Great Lakes wind farms, which will produce about 3500 MW.

'The opportunity here is enormous', says John Kourtoff, Trillium president and CEO. 'NREL's (The National Renewable Energy Laboratory) numbers show that the largest offshore resource in the entire coastal US is on the US side of the Great Lakes. And that is less than the Ontario side.'

Kourtoff says that on the Ontario side there appears to be 64 good-quality areas for offshore wind in less than 30 meters of water. These sites could generate 34,500 MW using 5 MW turbines. His company's analysis finds a 7000 to 9000 MW potential on the US side in water depths of 30 meters or less that are at least 4 km offshore.

Ontario took a big step toward developing this potential in October 2009 when it launched a feed-in tariff (FIT) for renewable energy facilities. Ontario's FIT awards set payments to offshore wind projects of 19 CA cents/kWh with a 20% escalator, part of its attempt to phase out all coal plants by 2014.

Just one month after the province began accepting tariff applications, it had received so many it had to place a halt on accepting new submissions. Developers turned in 500 offshore wind applications for projects representing 20,790 MW, according to the Trillium report.

The Great Lakes offers a better environment than the ocean for offshore wind facilities, says the report, because the installations corrode more slowly in fresh water and are spared strong waves and tides.

Ontario has instituted a series of policies that make it easier to site projects. The provincial government recognizes that offshore wind projects differ from onshore and require a distinct set of rules. The province also offers projects priority connection rights to the transmission grid, and limits the permitting process to six months.

The Great Lakes wind farms promise to be an economic bonanza for Canada, according to the Trillium report. The 20,790 MW of offshore wind projects will require \$83.2 billion in capital investment, are expected to generate \$253.5 billion in gross economic activity, and 66,362 jobs. Trillium envisions the industry creating an offshore wind-based innovation chain that draws not only manufacturing, but also R&D, demonstration and deployment activity.

'In effect, offshore wind development can precipitate a return to building Ontario's economy to its original foundation – clean, perpetual and reliable renewable energy', says the Trillium report.

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