The states of Massachusetts, New York, and Rhode Island released three reports (see here [2], here [3], and here [4]) last week that together set out a roadmap for the development of offshore wind development in the Northeast and highlight the economic benefits from the development of offshore wind farms off the Northeast coastline, from Maine to Maryland. According to these reports, the Northeast has the potential for offshore wind deployment of between 4,000 to 8,000 megawatts (MW) by 2030 and the creation of up to 36,000 jobs.

Is offshore wind the next big thing for U.S. clean energy?

Encouraging project development activities and recent state and regional policy seem to suggest that the prospects for offshore wind development are looking up in the United States.

That always hasn’t been the case in the United States and successful deployment of offshore wind farms thus far has been extremely limited. The nation’s first commercial project, a 30 MW Deepwater Block Island Wind Farm project [5] off the coast of Rhode Island, came online only in December 2016. While the American offshore wind industry has remained in its infancy, its European counterpart has boomed in recent years. There were 111 operating offshore wind projects, representing 12,913 MW of installed capacity, around the world at the end of 2016. Out of that, 11,679 MW of installed capacity was in Europe.
However, the U.S. offshore wind market is poised to see a significant development gust owing to several factors, including dramatic cost declines, policy initiatives, and big leap in technical advancements. As of June 2017, the U.S. offshore wind project development pipeline includes 24,135 MW of potential installed capacity [6], across 28 projects (none of this is now under construction). While much of this activity is concentrated in the East Coast, other projects are in various stages of development across the country, including the Great Lakes, the West Coast, and Hawaii.

There are three key factors that can positively impact the development of the nascent U.S. offshore wind market:

1. Costs have declined dramatically across Europe, making offshore wind increasingly competitive with land-based wind, solar, and nuclear.

   A key barrier to offshore wind in the United States is its cost. With low natural gas prices and competition from cheaper solar and land-based wind, the competition is fierce. However, recent reductions in offshore wind procurement prices and costs in Europe signal potential viability for the U.S. market.

   According to Bloomberg New Energy Finance [7], the price of building an offshore wind farm has dropped by 46 percent in the last five years across Europe. In 2016 alone, costs dropped 22 percent. Bids for projects in Europe are now coming in at costs dramatically lower [8] than the industry had ever previously reported. In July 2016, DONG Energy—the Danish company known as the world’s largest offshore wind developer—clinched a 700 MW project in the Netherlands for a price of about $81/MWh. In September 2016, Swedish utility and electric power producer Vattenfall won a bid for a 350 MW in Denmark as just $67/MWh. Project costs in the UK have also been falling. Together these data points suggest that costs are being pushed down faster than anticipated. A new report from McKinsey [9] corroborates this and forecasts that projects in 2020 will come in at costs 68 percent below 2010 figures.
Although offshore wind development costs across Europe and in the United States can certainly be expected to differ, the European industry is demonstrating that offshore wind can be cost competitive with other forms of energy sources. The University of Delaware’s Special Initiative on Offshore Wind [10], which looked at the impacts of a Massachusetts commitment to building 2,000 MW of offshore wind between 2020 and 2030, has estimated that economies of scale would drive price down to $0.108/kWh by 2030, making offshore wind competitive with New England wholesale electricity prices. For comparison, Deepwater Block Island 20-year power purchase agreement with National Grid has a contracted price of $0.244/kWh.

1. Game changing new technologies are emerging which can take the industry to the next level.

A second factor helping offshore wind take off is technology improvements, with turbines becoming larger, more powerful and efficient. While onshore wind technology is fairly mature, offshore wind industry is witnessing significant technological advancements that are yet to be implemented, suggesting that this industry will see further cost reductions. In the largest-ever survey of energy experts [11] conducted by researchers at Lawrence Berkeley National Laboratory, the experts predicted that a wide range of technology advancements will increase project performance, extend project design lives, and lower costs by 38 percent to 41 percent by 2050.

Globally there is a push to develop floating turbines, which can allow access to deep water wind resources near large energy markets. In the United States, nearly 60 percent of potential wind resources, including nearly all of the West Coast potential, is in deep waters. Deployment of floating turbines could open new clean energy options in regions with high speed wind, such as the North Atlantic, and in areas that lack the wide coastal shelf necessary for building near-shore, fixed-base turbines, such as the U.S. West Coast and Hawaii. Statoil is testing this technology in the world’s first floating wind farm [12] off the coast of Scotland.

That is why it is important for the federal government to maintain a robust budget that would enable increasing investment in R&D to advance offshore wind technology and adapt it to U.S. offshore conditions. In addition, the federal government should build and sustain a robust portfolio of technology demonstration projects to demonstrate the feasibility of offshore wind. Its current portfolio [13] is small and rapidly dwindling. From seven offshore demonstration projects selected in 2012, only two—Lake Erie Energy Development Corp.’s Icebreaker project and the University of Maine’s New England Aqua Ventus I—are currently being supported by the Department of Energy.

1. State and regional policy support will be key to offshore wind prospects in the United States.

Policy support is going to be a critical component, along with improving economics and technology, if the U.S. offshore wind boom is to materialize. While the Production Tax Credit (PTC) and the Investment Tax Credit (ITC)—tax policies that support wind projects at the federal level—were reinstated in late 2015, the recent Tax Cuts and Jobs Act bill from the House [14] proposes to reduce the wind energy PTC to 1.5c/kWh from 2.3c/kWh and also hardens a deadline for its phaseout. Such a move sparks market uncertainty for the wind industry, especially coming after a bipartisan deal struck two years ago which agreed to phase out tax credits for the wind industry.

Against this backdrop, state-level policy will be critical to realizing offshore wind’s potential as an economic and clean energy asset. Already states are gearing up for an offshore wind expansion by announcing new suite of policies.

Massachusetts and New York have included requirements for utilities to procure a certain percentage of electricity from offshore wind—1.6 GW by 2027 for Massachusetts [15] and 2.4 GW
by 2030 for New York. In compliance with the 1.6 GW mandate in Massachusetts, the state’s electric utilities have issued request for proposals from offshore wind developers for projects between 400 and 800 megawatts of capacity for 15 to 20 year contracts. While Massachusetts’ policy has been codified, New York’s offshore wind policy is being pushed by the administration of Gov. Cuomo. NYSERDA is leading the development of the New York Offshore Wind Master Plan that will provide a comprehensive roadmap to advance offshore wind in New York. The plan is expected to be completed by the end of 2017. Meanwhile Long Island Power Authority has contracted with Deepwater for a 15-turbine, 90 MW project at a cost of $740 million.

In addition, some states are taking other initiatives to support the growing offshore wind industry. In 2013, with the passage of the Maryland Offshore Wind Act, Maryland required electricity suppliers to purchase Offshore Wind Renewable Energy Credits (OREC) and carved out up to 2.5 percent of the state’s energy supply for offshore wind energy. However, it was only earlier this year that the Maryland Public Service Commission awarded offshore renewable energy credit to two projects to be built off the coast of Maryland.

As states follow through with their policy commitments, big multinational developers like Statoil and Dong Energy are beginning to invest in the U.S. market and snapping up leases for ocean parcels with the goal of competing for utility contracts in Maryland, Massachusetts, and New York.

Offshore wind is still a nascent industry in the United States. But a combination of technology improvements and economies of scale make the prospects of offshore wind more appealing day by day. However, smart state policy support, including a focus on market development and investment in essential infrastructure, will be key to unlocking offshore wind’s potential in the United States.

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