



BUSINESS NETWORK *for*
OFFSHORE WIND

POLICY PAPER:

Offshore Wind for New Jersey



Photo courtesy of DONG Energy

Offshore wind is right for New Jersey. The state needs a robust mix of energy resources to power New Jersey’s future. Offshore wind is a large, clean, reliable and cost-effective resource that we can develop right here. New Jersey is blessed with a strong and constant offshore wind resource and shallow water depths, making it an ideal location for the siting of offshore wind generation.¹ Moreover, offshore wind presents the opportunity to generate and deliver clean and renewable energy close to the state’s major load centers, without reliance on costly and controversial overland transmission.

Offshore wind project capacity has steadily increased over time, and today provides **the only renewable energy resource that can be deployed at an electric output scale comparable to nuclear generation.** A well-structured offshore wind program will secure economic growth and jobs for New Jersey businesses and employees. Additionally, these economic benefits will only grow as offshore wind projects are built, maintained and rebuilt over the decades to come.

Cost Reduction

Significant cost reductions in Europe are driving the increase in U.S. offshore wind activity by demonstrating its competitiveness with other energy generation.² Recent European tenders highlight the steady and dramatic decline in offshore wind costs, which stem from increasing competition, a growing and more mature supply chain, and standardizing and increasing turbine size and efficiency. In Germany, the second quarter of 2017 brought the first subsidy-free winning bid for an offshore wind tender.³ For Europe as a whole, the price of offshore wind fell 46 percent since 2012, with a 22 percent decrease in price in 2016 alone, and continues to decline rapidly.⁴ Recently, DONG Energy, a global offshore wind developer, cut the cost of electricity from its projects in half, including transmission costs.⁵

On an adjusted basis, including transmission, the delivered price of offshore wind will continue to decrease, and the right policies will put New Jersey on the path towards affordable offshore wind energy. With continued downward pressure on costs, as seen in Europe, offshore wind will become increasingly competitive on a megawatt per hour basis with other energy sources, and should become part of New Jersey’s future energy mix.

1 U.S. Dept. of Energy, “Wind Vision: A New Era for Wind Power in the U.S.,” March 2015, available at energy.gov/eere/wind/maps/wind-vision. See also the National Renewable Energy Laboratory’s “2016 Offshore Wind Energy Resource Assessment for the U.S.,” available at <http://www.nrel.gov/docs/fy16osti/66599.pdf>

2 U.S. Dept. of Energy, Office of Energy Efficiency & Renewable Energy, “2016 Offshore Wind Technologies Market Report,” available at: <https://energy.gov/sites/prod/files/2017/08/f35/2016%20Offshore%20Wind%20Technologies%20Market%20Report.pdf>

3 “Wind Power Blows Through Nuclear, Coal as Costs Drop at Sea,” March 8, 2017 available at <https://www.bloomberg.com/news/articles/2017-03-09/wind-power-blows-through-nuclear-coal-as-costs-plunge-at-sea>

4 “Germany Accepts First Subsidy-Free Offshore Wind Auction Bid”, April 13, 2017, available at: <http://www.offshorewind.biz/2017/04/13/germany-accepts-first-subsidy-free-offshore-wind-auction-bid>

5 “Wind Power Blows Through Nuclear, Coal as Costs Drop at Sea,” March 8, 2017 available at <https://www.bloomberg.com/news/articles/2017-03-09/wind-power-blows-through-nuclear-coal-as-costs-plunge-at-sea>



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U.S. offshore wind is real. Turbines are spinning today off the coast of Rhode Island. Massachusetts law calls for 1,600 MW of offshore wind⁶ with the first solicitation required in 2017 and New York has a goal of 2,400 MW.⁷ The Maryland Public Service Commission just awarded offshore wind renewable energy credits to the US Wind, Inc. and Skipjack Offshore Energy, LLC projects at a levelized price of \$131.93 per megawatt-hour.⁸ According to the Maryland Public Service Commission, these two projects will provide 368 MW of capacity, along with \$1.8 billion of in-state spending, 9,700 new direct and indirect jobs, and \$74 million in tax revenues over twenty years. The net ratepayer impacts from

6 Chapter 188 of the Acts of 2016 (Signed August 8, 2016) <https://malegislature.gov/Bills/189/House/H4568>

7 25th Proposal of 2017 State of the State, Governor Andrew M. Cuomo <https://www.governor.ny.gov/news/governor-cuomo-presents-25th-proposal-2017-state-state-nations-largest-offshore-wind-energy>

8 Maryland Public Service Commission press release, available at <http://www.psc.state.md.us/wp-content/uploads/PSC-Awards-ORECs-to-US-Wind-Skipjack.pdf>

9 25th Proposal of 2017 State of the State, Governor Andrew M. Cuomo <https://www.governor.ny.gov/news/governor-cuomo-presents-25th-proposal-2017-state-state-nations-largest-offshore-wind-energy>

the Maryland PSC's approval are projected to be below \$1.40 per month for residential customers, and less than 1.4% for commercial and industrial customers.⁹

The Garden State became the first state to enact an offshore wind development target—a minimum of 1,100 MW.¹⁰ Now is the time for New Jersey to get back on track toward developing its large offshore wind energy area. New Jersey's shallow waters and windy conditions offer an unmatched opportunity for development.¹¹ These future projects will help New Jersey meet its emissions-reduction requirements, create many local jobs, reduce the health costs of pollution, and buffer ratepayers from price volatility.



New Jersey's two Wind Energy Areas

DONG Energy is one of two leaseholders seeking to develop projects off New Jersey's coast. DONG Energy's project, known as Ocean Wind, is located about 10 nautical miles offshore and with its 1,000 MW capacity, could provide power to over half a million New Jersey homes by 2023. The second lease is owned by US Wind, which plans a 1,500 MW project. It is worth noting, however, that New Jersey's market is even bigger than just these two lease areas near Atlantic City, as the Garden State may be well served by the other lease areas in the federal waters of adjacent states, including the recently-won New York State site secured by Statoil¹² and a Delaware lease held by Deepwater Wind.¹³

Atlantic Wind Connection (AWC), an electric transmission developer backed by Google, is ready to build advanced, cost-effective

offshore transmission to connect the offshore wind projects to the land-based grid. AWC will coordinate closely with New Jersey's public utilities and the wind developers to ensure that offshore wind connections contribute to a robust, resilient grid that serves ratepayers over the long-term.

In Europe, 12,000 MW of offshore wind capacity in place spawned an industry with more than 75,000 employees today.¹⁴ In 2016, the European market's grid-connected wind farms in 10 countries¹⁵ can power up to 13 million homes.¹⁶ With more than 100 different roles involved with each project, offshore wind can power New Jersey's economic recovery and give the state's workers and businesses a role in projects elsewhere in the Mid-Atlantic region and the Eastern United States. A sustained effort will allow New Jersey to carve out a large portion of the promising offshore wind industry, which forecasts as many as 181,000 new jobs by 2050.¹⁷

An array of skilled labor and professionals is needed to design the wind farm, construct the onshore substations, lay cable interconnections, and erect the turbines. The path of development, from design and permitting, to manufacturing, construction, and operations and maintenance leads to additional job years and indirect jobs as well.¹⁸ New Jersey ports, which would be utilized for the staging and assembling of the turbine components would also benefit from additional economic activity and jobs. Modern wind turbines possess over 8,000 components, and New Jersey currently possesses the manufacturing base and logistics network to play a key role in the supply and manufacturing chain. Key components include rotor and nacelle controls, gearboxes and drive trains, generator and power electronics and steel towers, electrical wiring and advanced polymers and coatings.

Actual construction can take two to three years, with more than 1,000 people employed per project. Jobs range from operations planning coordinators who manage and coordinate offshore logistics and personnel, to electrical engineers who design and verify electrical connections to the grid, to commercial managers who manage the agreements with local stakeholders. Additionally, residents are employed in local construction, as well as in the operation and maintenance of facilities. Moreover, many jobs from the financial, legal, and communications fields are necessary to see projects to completion. And during the twenty to twenty-five-year life of a project, about 100 people are employed to operate and maintain each offshore wind farm.

⁹ Maryland Public Service Commission Case 9431 <http://www.marylandoffshorewind.com/schedule.html>

¹⁰ New Jersey Offshore Wind Economic Dev. Act (OSWEDA) (PL 2010, C. 57) http://www.njleg.state.nj.us/2010/Bills/PL10/57_PDF

¹¹ National Renewable Energy Lab, "Wind Maps" available at <http://www.nrel.gov/gis/wind.html>

¹² "Statoil wins offshore wind lease in New York", available at <https://www.statoil.com/en/news/statoil-wins-offshore-wind-lease-new-york.html>

¹³ "Deepwater nabs Delaware lease", available at: <http://renews.biz/105107/deepwater-nabs-delaware-lease>

¹⁴ International Renewable Energy Agency, "Renewable Energy and Jobs Annual Review 2015," available at: http://www.irena.org/DocumentDownloads/Publications/IRENA_RE_Jobs_Annual_Review_2015.pdf

¹⁵ Wind Energy Europe Statistics, available at: <https://windeurope.org/about-wind/statistics/offshore/european-offshore-wind-industry-key-trends-and-statistics-2016/>

¹⁶ "Offshore wind investments in Europe reached \$19.5 billion last year, according to new data" <http://www.cnbc.com/2017/01/26/offshore-wind-investments-in-europe-reached-195-billion-last-year.html>

¹⁷ US Dept. of Energy, US Department of the Interior, "National Offshore Wind Strategy", available at: <https://www.boem.gov/National-Offshore-Wind-Strategy/>

¹⁸ International Economic Development Council (IEDC), "Analysis of the Offshore Wind Energy Industry", available at http://www.iedconline.org/clientuploads/Downloads/edr/IEDC_Offshore_Wind.pdf

What New Jersey Needs

Governor Christie signed New Jersey's Offshore Wind Economic Development Act (PL 2010, Chapter 57; "the Act") (hereinafter "OWEDA") into law in August 2009. With significant cost reductions, accumulated experience gained through the first domestic projects, and the entry of many of the world's leading offshore wind developers into the United States' market, now is the opportunity to harness the economic, environmental, energy and health impacts of offshore wind for New Jersey.

OWEDA provides a framework for putting New Jersey on the right path to becoming the nation's leader in clean energy jobs. However, OWEDA became effective eight years ago, and since then, some of the time-sensitive provisions expired. Additionally, others need to be updated through administrative changes. Most importantly, this fledgling U.S. industry needs sustained policy leadership to thrive in New Jersey.

a) FINANCING MECHANISM

Section 38.d.(4) of OWEDA requires the BPU to establish an offshore wind renewable energy certificate (OREC) program to support offshore wind projects that benefit New Jersey. To minimize the cost of capital for wind projects and lower the cost to ratepayers, New Jersey needs to provide certainty that the amount paid by ratepayers for the OREC is transferred to the wind project that generated the energy, and not diverted by the state for other purposes.

ORECs, like other renewable energy certificates, are tradable instruments like commodities, which provide proof of the environmental attributes of one megawatt-hour (MWh) of electric generation from eligible renewable sources. A certifying agency gives each OREC a unique number to facilitate tracking and avoid double counting. Once the renewable energy is added to the grid, it mixes with electricity produced by other generation sources. In short, ORECS, like other renewable energy certificates, help track the ownership of the environmental benefits of renewable energy generation, support the purchase of renewables, and spur further generation.

To finance an offshore wind project at the lowest cost, the project developer must illustrate a high degree of certainty with regard to future revenue streams, subject to well-understood and managed risks to satisfy concerns from sources of equity and debt funding. These funding sources will review the state's OREC funding mechanism, and charge more for capital if they perceive a risk that the state might divert the OREC funding. This concern is not without basis because several Administrations in New Jersey diverted clean energy funds for other budgetary purposes. In fact, during the last eight years, approximately \$680 million in clean energy funds were diverted to plug budgetary shortfalls. Ratepayers will benefit from lower cost offshore wind projects if the law is clear that OREC funds cannot be diverted.



RECOMMENDATION: Protecting the OREC funds can be done through BPU rulemaking, which would

include a formal stakeholder process. The best way to prevent diversion would be the so-called "invoicing option" funding mechanism, in which an OREC administrator, hired by the utilities, oversees that the monies pass directly between the OREC buyers (the state's electric utilities) and sellers (the offshore wind developers).

b) GENERATION COMMITMENT

OWEDA set a minimum target of 1,100 MW from qualified offshore wind projects, representing a small percentage of electricity sold in New Jersey.



RECOMMENDATION: The Business Network maintains a 100 percent commitment and desire to see a robust and thriving offshore wind industry. However, with that commitment comes a realistic view that setting generation commitments too high may create challenges for the industry because a high generation commitment will be seen as too costly for ratepayers and businesses. Additionally, we do not want to raise expectations and then potentially fall short of meeting them, whether that is with generation commitments or job numbers.

We believe that New Jersey should commit to steady, predictable procurement of offshore wind on the order of 250 MW per year to create a powerful, local industry with many jobs. A commitment of that size can incentivize domestic and foreign investment in manufacturing and port facilities, specialized vessels and other elements necessary to create a strong regional supply chain, which will lead to lower cost projects and a lower ratepayer impact. Over time, this builds the ideal conditions that can spur the creation of long-term jobs in the sector and provide a more modest and gradual impact on rates. Indeed, as offshore wind costs decline over time due to competition and a growing domestic-based capability, the rate impact would go down. This

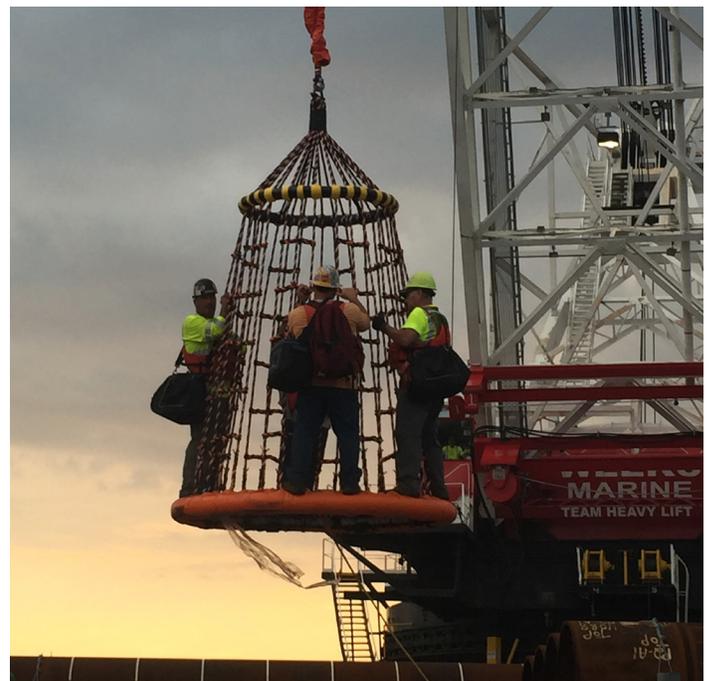


Photo credit: Dan Clark, Pile Drivers Local 56/Weeks Manson

approach better aligns attainable offshore wind energy growth with sustained job creation.

Outside of the 250 MW per year goal, the Business Network favors 2,000 MW by 2025 and 3,500 MW by 2030. This is more closely aligned with New York State’s commitment of 2,400 MW by 2030 and Massachusetts’ commitment of 1,600 MW by 2027. This cumulatively provides a robust domestic pipeline of 7,500 MW of offshore wind.

CURRENT LEGISLATION: We are currently monitoring several pieces of legislation, which taken together provide a clear message about New Jersey’s commitment to renewable energy. Coupled with targeted changes to OWEDA, the passage and enactment of these bills will help to promote the offshore wind industry in New Jersey.

S. 3432 – Former Governor Codey recently introduced this measure, which seeks to increase the amount of offshore wind energy required to be generated by electric power suppliers and basic generation service providers to 3,500 MW by 2030. We fully support this legislation, as it would statutorily provide an attainable and forward-looking goal for offshore wind in New Jersey.

S. 1707 / A. 1759 – These bills are sponsored by Senators Smith, Bateman, and Gordon and Assembly members Eustace, McKeon, Benson, Muoio, and Sumter. They set an ambitious target to achieve the goals of the 2007 Global Warming Response Act (“GWRA”) by adopting statewide limits on greenhouse gas emissions. Specifically, GWRA mandated the statewide reduction of greenhouse gas emissions to 1990 levels by 2020, approximately a 20 percent reduction, followed by a further reduction of emissions to 80 percent below 2006 levels by 2052. S. 1707 requires an increase in the percentage of electricity sold in New Jersey from Class I renewable energy to 11 percent beginning with Energy Year (EY) 2017, followed by an increase to 20 percent by EY 2022, and then increases in increments of 10 percent every five years thereafter until 80 percent of the electricity sold in the State is from Class I renewable energy by EY 2052. Class I renewable energy includes electricity derived from solar energy, wind energy, wave or tidal action, geothermal energy, landfill gas, anaerobic digestion, fuel cells using renewable fuels.



Photo courtesy of DONG Energy

S. 3059 / A. 4701 – These bills are sponsored by Senators Sweeney, Smith, Bateman and Greenstein; and Assembly Members Eustace, Zwicker, Vainieri Huttel, Gusciora, Kennedy, Benson, Jasey, Mosquera, Wisniewski, and Pinkin. They clarify the intent of P.L.2007, c.340 (C.26:2C-45 et al.) and specifically require the State’s full participation in the Regional Greenhouse Gas Initiative (“RGGI”) P.L.2007, c.340, commonly referred to as the Regional Greenhouse Gas Initiative or the “RGGI” implementing law. The RGGI implementing law partially implements the policies of the GWRA by creating an emissions auction and trading mechanism to reduce the level of greenhouse gas emissions, especially carbon dioxide. P.L.2007, c.340 recognizes the State’s participation in RGGI by setting forth the parameters to be followed for allowance auctions, creating the “Global Warming Solutions Fund,” and statutorily dedicating all the proceeds received from the sale, exchange or other conveyance of allowances through a greenhouse gas emissions allowance trading program to the fund.

SCR 151 / ACR 235 – These bills are sponsored by Senators Smith and Bateman, and Assembly Members McKeon, Eustace, and Zwicker. The constitutional amendment would dedicate all revenue derived from the societal benefits charge imposed on electric and natural gas bills pursuant to section 12 of the “Electric Discount and Energy Competition Act” (EDECA), P.L.1999, c.23 (C.48:3-60), to provide funding for the following purposes: demand side management energy programs; energy efficiency programs; renewable energy programs; manufactured gas plant remediation; nuclear plant decommissioning; energy consumer education programs; and social programs specified in section 12 of EDECA. In recent years, the State’s annual appropriations act appropriated some of the monies collected from the societal benefits charge to be used for purposes other than those specified above by law. The amendment would end that practice. The full dedication would be phased in over a period of five years.

c) TAX CREDITS

OWEDA’s tax credit provisions were a helpful incentive to build out the infrastructure necessary to secure New Jersey’s central role in this burgeoning industry, but the time frames listed in the law largely expired. To assist the growth of a robust supply chain, and many well-paying New Jersey jobs related to the manufacturing of wind turbines, we believe the time constraints should be amended. First, under C.34:1B-209.4, §6 (a)(4)(b), which pertains to \$100 million of tax credits for wind energy facilities, businesses must apply for the credit within five years of the effective date of the Act. The effective date was August 19, 2010, which means that applications needed to be submitted for these tax credits by August 19, 2015. Secondly, if a business applied within this five-year limitation, they need to submit all documentation for approval of the credit amount by August 19, 2018. If the tax credit remains unapproved by the Economic Development Authority after August 19, 2018, it is forfeited. Finally, the tax credits must be taken over a 10-year period.



RECOMMENDATION: These time constraints should be amended to foster the growth of the industry in New Jersey without restriction. Therefore, the dates

should be changed to reflect the time needed to complete an OSW project. Applications for the tax credits should be within 10 years of the effective date of these amendments to OWEDA; all documentation should be submitted within five years after the application is submitted; and all tax credits from the state should be available for twenty years after the enactment of these amendments to OWEDA.

d) PORT INFRASTRUCTURE

There are no concerns for the offshore wind industry regarding the Port of Paulsboro. In early March 2017, the Port of Paulsboro received its first shipment of steel. Today, Holt Logistics maintains control of this beautiful port facility. Any future discussions regarding port infrastructure for offshore wind should necessarily include the South Jersey Port Corporation, Gloucester County Improvement Authority, and Holt Logistics, as well as the South Jersey Legislative delegation and local elected officials.

One engineering concern, however, is with the power cables and bridges downriver of the Paulsboro Marine Terminal. The overhead clearance at the Delaware Memorial Bridge is 174' (53m) and is the lowest clearance obstruction between the ocean and the Paulsboro Marine Terminal. This is the primary constraint to heavy lift jack-up vessels reaching the terminal to load-out foundations and turbines. Most heavy lift jack-up vessels will have 75m-95m legs and require 60m-80m overhead clearances. The Delaware River channel depth is 14m, so lowering the legs helps for a 75m leg length, but not for a 95m leg length.



RECOMMENDATION: The Port of Paulsboro provides an excellent port facility and an ideal location for New Jersey's offshore wind industry. While clearance of the Delaware Memorial Bridge is not an insurmountable engineering challenge, other nearby options might obviate this clearance issue. One such location is controlled by the Delaware River & Bay Authority, which is located next to the ferry operation in Cape May. There are approximately 160 acres of land available that could be developed into a port staging facility for construction. Dredging of the canal and channel in the Bay will be needed to meet a 6m draft requirement for jack-up vessels, but doing so would avoid the entire overhead clearance issue. Additionally, a location at the mouth of the bay will reduce transit times.

e) TRANSMISSION

According to the 2016 DOE/DOI National Offshore Wind National Strategy Report, impacts of significant offshore wind deployment on grids need to be better understood at state and regional levels, and the costs and benefits associated with different offshore transmission infrastructure configurations and strategies need to be characterized.

The Strategy further states key challenges and advantages specific to offshore wind energy merit further study. These include examining the benefits and impacts of integrating significant quantities of offshore wind into congested load centers as well as the effects of offshore wind-specific transmission and other electrical infrastructure on the power system.

An integrated transmission design and system should 1) reduce ratepayer costs; 2) advance reliability; 3) promote efficiency; and 4) minimize curtailment during operations and potential failures.



RECOMMENDATION: The Board of Public Utilities should continue to solicit transmission system design proposals from the industry to accomplish these aforementioned goals. The Board of Public Utilities should also review best practices and lessons learned from Europe. Further analysis can help determine the best approach to meet these goals, and the Business Network stands ready to assist with this analysis.

Operations & Maintenance and Workforce Development

We believe that collaboration with New Jersey's technical schools, colleges, universities, labor unions, and employers can help educate, train, and prepare the State's workforce to provide long-term, family-wage jobs to support the offshore wind industry.

a) OPERATIONS

Eighty percent of the hours worked during the lifetime of an OSW project will likely be in the form of operations and maintenance, whereas twenty percent will be in the form of project construc-



Photo courtesy of DONG Energy

tion. Such operations employment will consist of day-to-day plant monitoring and support. These “operational” support employees would likely be located in a support facility close to the project.

b) MAINTENANCE

Project Maintenance will consist of employees from a subcontractor in order to provide recurring maintenance services, including annual inspection and parts replacement. Estimates forecast that a team of personnel could consist of twenty or more employees who would travel from unit to unit to inspect components and provide the needed service as required by the manufacturer. It may take one day to inspect and service a unit. Emergency work would probably require many more personnel. As the turbines age, the number of hours to be worked and the number of personnel required to provide the needed services would increase. For example, five years after the date of plant commissioning, bearings might need to be changed, potentially requiring the disassembly of the turbine. This may take twice the number of employees who may have to work twenty hours straight to finish the job.

c) WORKFORCE DEVELOPMENT

Where will the workers required to provide operations and maintenance services come from? The wind farm lease owners could draw from local university and college students who possess STEM backgrounds to recruit operational support employees. Maintenance employees likely would come from the relevant trade union based on the required task or service. Millwrights would service the rotating equipment, the turbine, bearings, gearboxes, among other components. Divers would come from the local Wharf and Dock Building Local union and service everything below the water line.

The Trade unions could partner with the local trade schools, colleges and universities to provide candidates for membership that meet the specific needs of these unions. These specific needs could be reduced to writing in an articulation agreement that would be executed by and between the relevant union and the relevant school, which would give referrals preferred enrollment into an apprenticeship program.

A maintenance contractor approved and selected by the owner would hire the needed craft to provide their specialized services. For example, Atlantic Plant Maintenance is a company that is owned by General Electric that is hired by the plant owner to service all their General Electric installed equipment. Atlantic Plant Maintenance then hires the needed Millwrights, Electricians, and/or Carpenters, to provide the required services. Siemens also owns their own maintenance companies/divisions that services installed Siemens equipment.

How would the offshore wind plant owner manage the different service contractors and all the different craft workers from separate unions working on their facility at the same time? All craft workers and contractors would provide the needed services under a Project Labor Agreement (“PLA”). On terrestrial power

generating facilities, the owner uses one agreement that binds all the contractors and the different unions to uniform hours of work, management rights, work rules, and a dispute resolution process. This PLA model worked well throughout the United States and Canada for over fifty years, and should be utilized on offshore wind projects.

What is the workforce capability of the relevant trade unions to construct, and maintain an offshore wind farm? The relevant trade unions, from the Operating Engineers, Pile Drivers, and the Millwrights, are more than capable of providing the craft workers to successfully build and maintain an offshore wind farm. The contractors that employ union members maintain a successful fifty-year history of building and maintaining coal, nuclear, and natural gas fired power plants across North America for large utility companies. Constructing and maintaining an offshore wind power farm would use similar skills and capabilities and build upon the past successes from New Jersey’s trade unions.

What is the training capability of the relevant trades? The Pile Drivers and the Millwrights are both affiliated with registered regional apprenticeship training centers that possess the physical capacity to provide any industry-related training. The union’s International Training Center in Las Vegas supplements this regional capability with more than 1 million square feet of training space under roof.

How much employment can be generated through the construction, operation and maintenance of an offshore wind farm? The

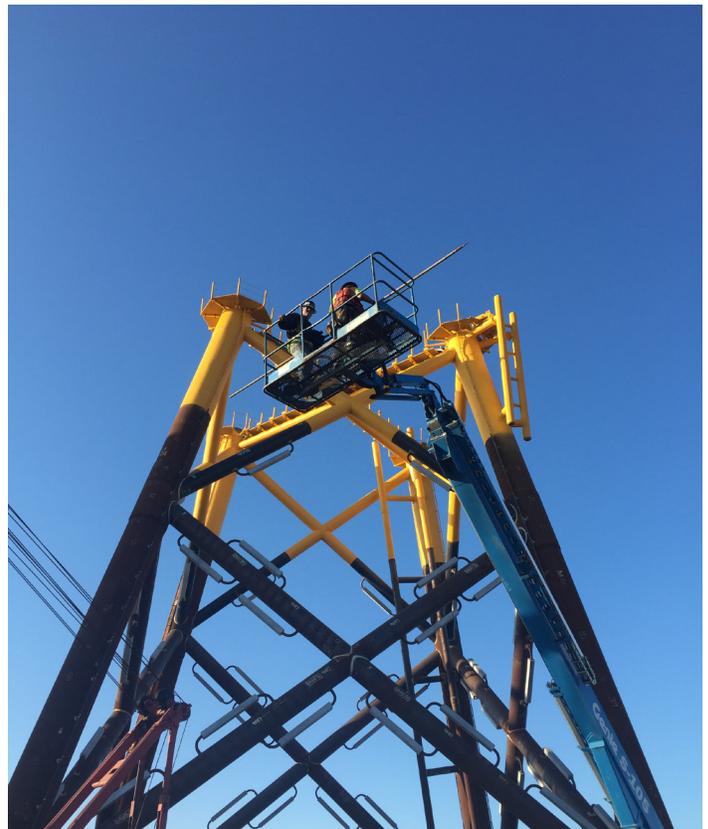


Photo credit: Dan Clark, Pile Drivers Local 56/Weeks Manson

Pile Drivers were employed on the 30 MW Block Island project installing the foundation system and worked 180,000 hours, which represents approximately equal \$13,500,000. Projects that are much larger than the Block Island project would consequently generate much greater amounts of wages and benefits paid.

For Operations, a projected estimation includes: 10 employees x 40 hours per week, which equals 400 hours per week x 52 weeks. That translates to 20,800 hours worked x \$40.00 an hour (Wages = \$30.00 + Benefits = \$10.00 per hour), and totals \$832,000 in estimated wages and benefits.

For Maintenance, a projected estimation includes: A team of 20 total personnel are paid \$70 per hour in wages and benefits to inspect and service an offshore wind farm that works 10 hours a day for two weeks. That would equal \$28,000 in paid/earned wages and benefits for each potential maintenance and inspection cycle. (20 maintenance personnel x 10 hours per day equals 200 hours per week worked x \$70.00 per hour in wages and benefits earned. In summary, \$14,000 per week x 2 weeks, totals \$28,000.)

It should be noted that the hours worked and the number of personnel that could be employed may be much greater, and as previously stated, the employment impact of the maintenance work will probably increase as the age of the plant increases. Additionally, this estimate does not include emergency work, which may require double the personnel and twenty-four hour shifts.

In summary, offshore wind in New Jersey offers the potential of new robust employment opportunities that provide livable wages with benefits for existing union members and jobs for future graduates from New Jersey's technical schools, colleges and universities.

Conclusion

The long-term success of offshore wind in New Jersey requires the industry to demonstrate steadily declining costs for clean and reliable energy. The aforementioned recommended policy actions would provide policy certainty for the industry, and at the same time deliver high quality jobs throughout the phases of an offshore wind project. We look forward to providing the expertise of Network members to craft further policies that will support New Jersey's goal of becoming an offshore wind industry leader.

Contact

About the Business Network for Offshore Wind

The Business Network for Offshore Wind is a national 501(c)(3) non-profit organization dedicated to building the U.S. offshore wind (OSW) supply chain. Comprised of over 150 private companies and public institutions from across the country, our goal is to lower the costs of energy through a well-developed and educated supply chain, and facilitate research and development. The Network also helps to leverage European industry expertise with American business acumen, thereby further lowering costs and creating business opportunities for our members.

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Photo courtesy of DONG Energy