



Offshore Wind Means Blue-Collar Jobs for Coastal States

By Shiva Polefka and Kyle Cornish April 2, 2018

On April 26, 2017, New Jersey Gov. Phil Murphy (D)—then in the midst of his run for office—issued an unprecedented campaign promise: As part of a strategy for the state to achieve 100 percent clean energy by 2050, he would target construction of 3500 megawatts of offshore wind power capacity by 2030—enough to power as much as 1.5 million New Jersey homes.¹ Soon after his inauguration, on January 31, 2018, Gov. Murphy signed an executive order directing the state’s relevant agencies to begin formulating the finance, planning, and regulatory processes required to realize his expansive vision.² On February 28, the state’s Board of Public Utilities took a first step toward implementation of this directive, forming an interagency offshore wind task force and initiating development of a solicitation for the first 1.1 gigawatts, or 1100 megawatts, of offshore wind capacity.³

As of 2017, 29 states, three U.S. territories, and the District of Columbia have formally adopted laws and regulations establishing minimum clean energy supply standards for their electric power sectors.⁴ Their reasons include fostering in-state generation, reducing pollution, and contributing to collective action on climate change. These renewable portfolio standards also help diversify states’ energy supplies, reducing ratepayer exposure to the price volatility exhibited by fossil fuels such as natural gas and coal.⁵ For many coastal and Great Lakes states, offshore wind can and will play a significant role in achieving these targets, and their state economies and workers stand to benefit.

The rise of American offshore wind power

Past analyses have shown that offshore wind could provide more than 100 percent of the electricity that’s currently generated by fossil fuel burning in 11 of 14 East Coast states.⁶ Because of this abundance, and the proximity of the resource to major urban demand centers, the legislatures and governors of several coastal states are amending their renewable portfolio standards to require utilities to procure electricity generated from offshore wind.⁷

Gov. Murphy’s commitment adds New Jersey to a growing Atlantic Coast bloc, within which state lawmakers are codifying rising ambitions on clean energy and job creation through the aggressive pursuit of offshore wind development. Under Gov. Andrew Cuomo

(D-NY), New York state promulgated regulations requiring 2.4 gigawatts of offshore wind energy supply by 2030.⁸ The Massachusetts legislature and Gov. Charlie Baker (R-MA) established a state law requiring 1.6 gigawatts of offshore wind energy supply for the state by 2027.⁹ In 2017, Maryland utilities regulators approved renewable energy subsidies sufficient to greenlight a cumulative 368 megawatts of offshore wind generation capacity by two different developers.¹⁰ And in Rhode Island, home to America's first offshore wind farm¹¹, lawmakers mandated that state utilities procure 160 megawatts of offshore wind energy capacity through long-term power purchase agreements.¹²

What's in it for workers?

While the environmental and energy security benefits of these policies tend to garner significant attention, America's first steps in offshore wind development reveal that workers in a broad range of often unionized trades—as well as the families and communities they support—also stand to be major beneficiaries of this new industry. Today's offshore wind turbines feature steel towers that are hundreds of feet tall and blades that individually exceed the wing span of 747 airliners, and require extremely high-precision fabrication and assembly. Constructing an ocean wind farm is therefore labor-intensive and requires highly skilled workers across logistics, construction, and maritime industry trades.

But how truly significant is the opportunity for these blue-collar workers? Is offshore wind more of an eco-whimsy than an economic windfall? Two major factors support the energy source as the real deal: First, the burgeoning demand for offshore wind in the United States is backed by state laws; and second, Europe's offshore wind boom provides hard numbers on the resulting economic impacts.

The state-level offshore wind requirements in place along the eastern seaboard totaled 4.5 gigawatts before Gov. Murphy's 3.5-gigawatt commitment nearly doubled the sum in late January. While New Jersey's state agencies have heavy lifting ahead to devise the necessary financing and permitting systems, the Murphy administration has strong tailwinds from a friendly legislature; an existing state law that authorizes special renewable energy credits for offshore wind; broad public support for action on climate change;¹³ and an urgent need to diversify the state's energy supply.¹⁴

In other words, New Jersey's electoral shift adds significant momentum to a burgeoning U.S. offshore wind industry that will have major implications for the coastal state labor force. The 8 gigawatts of capacity mandated or committed to by the offshore wind bloc is equivalent to that of eight average U.S. nuclear power plants.¹⁵ As the offshore projects slated to fulfill these mandates begin development, they can be expected to generate tens of thousands of jobs. In 2014, European Union countries achieved the installation of 7.5 gigawatts of total generation capacity.¹⁶ The manufacture, installation, and maintenance of offshore wind facilities supported approximately 75,000 full-time-equivalent workers across the continent that year.¹⁷

Additional concrete evidence of offshore wind's benefits for coastal-state workers comes from pioneering development in Rhode Island, where it's already creating diverse and high-paying jobs.

Block Island Wind Farm: A case study in high-quality job creation

America's first commercial offshore wind project, the 30-megawatt Block Island Wind Farm, commenced regular operations in Rhode Island state waters on December 12, 2016.¹⁸ In addition to the pioneering efforts of the developer, Deepwater Wind, the wind farm's success emerged from forward-leaning state legislation¹⁹; active leadership by two successive Rhode Island governors; and a nation-leading ocean planning process to minimize conflict with other ocean stakeholders.²⁰ The power plant produces enough zero-carbon power for 17,000 homes—far more than is used by the Block Island community—and the surplus is transmitted to shore and into the mainland grid.²¹

The new energy source has allowed Block Island Power Company to decommission the fleet of diesel-powered generators island residents relied on for decades, yielding a significant reduction²²—and stabilization—of consumers' electricity rates. The switch also eliminated significant noise and pollution from diesel burning and even improved the quality and consistency²³ of the electric power supply.

Completing the Block Island Wind Farm and delivering these benefits required a surge of employment across a broad range of professional sectors. According to a study by the New York-based Workforce Development Institute, offshore wind development requires 74 distinct occupation types, from white-collar designers, lawyers, and engineers, to myriad professions in the construction and transportation trades.²⁴

The state and Deepwater Wind took additional steps at the project's outset to maximize the benefits to Rhode Island trades workers. The 2009 contract between the two parties included a provision requiring Deepwater to establish a project labor agreement for the firms it hired for the construction and operation of the Block Island Wind Farm, which directly benefited local workers.²⁵ Deepwater also took proactive steps to ensure that its local contractors were unionized firms, which it perceived as being an investment in building a well-trained workforce that would reduce development costs over the long term.²⁶

The results for Rhode Island workers validated the upfront effort by state policymakers and the developer. According to Scott Duhamel of the Rhode Island Building and Construction Trades Council, more than 300 local, unionized workers were employed in the assembly and installation of the facility.²⁷ This included more than 200 skilled construction and trades workers from across nine distinct labor unions, including carpenters, electrical workers, ironworkers, plumbers, pipefitters, and stevedores.²⁸ Assembly and installation of the project also required more than 100 logistics workers

for the transport of turbine components and crews—including truck drivers, captains, and crew for tugs, barges, crew boats, and project-monitoring vessels. The developer relied on four different Rhode Island ports for construction activities and hired broadly among Rhode Island unions, contractors, and businesses.²⁹ The wages of the union workers that assembled and installed the wind farm ranged from \$28-to-\$40 per hour plus benefits, union representatives told the *Cape Cod Times*.³⁰

Relative to Rhode Island’s statewide needs, the electric power output figures for Block Island Wind Farm are modest, meeting around 1 percent of the state’s overall electricity consumption.³¹ However, the facility represents the launch of an industry that could have profound significance for skilled workers across myriad construction trades. As the nation’s first operational offshore wind farm, the Block Island facility has proven that the technology is viable as a commercial enterprise in the United States and that its economics can align with regional needs. Meanwhile, a multitude of developers have proposed 17 more projects in the Atlantic Ocean and in Lake Erie worth a cumulative 9.1 gigawatts of capacity, or 300 times the capacity of the Block Island Wind Farm.³²

Industrial learning and economies of scale will likely reduce the ratio of workers needed per unit of capacity relative to what was recorded at the Block Island project. Nonetheless, the current offshore wind project pipeline—most of which is guaranteed by state government policy or executive order—foretells a looming eruption of demand for tens of thousands of workers like those who built America’s first offshore wind farm.

Maximizing U.S. offshore wind jobs by building a domestic supply chain

Even as the assembly and installation of new offshore wind farms will likely cause a surge in demand for construction and logistics workers, the United States may miss out on additional job creation in the manufacture of the wind turbines without additional action from policymakers and civic leaders. The five GE-brand wind turbines³³ purchased by the Block Island Wind Farm’s developer were built in three separate factories in Europe: The steel towers were fabricated in Spain³⁴; the 73.5-meter-long composite blades were manufactured in Denmark³⁵; and the house-sized generators at the heart of the turbines, known as nacelles, were built in Saint-Nazaire on the coast of France.³⁶

Thanks to aggressive climate policy and generous subsidies, Europe is the world leader in offshore wind development, with 15.8 gigawatts of capacity installed as of December 2017³⁷ and an additional 9.2 gigawatts of projects in the pipeline for completion by 2020.³⁸ As a subset of the more than 75,000 jobs that the offshore wind industry has supported in Europe, this scale of demand has fostered major private-sector investments in wind turbine manufacturing to build a complex supply chain across the continent. Factories similar to those that built Block Island’s turbines support thousands of jobs across Germany, Denmark, the United Kingdom, and France, among other countries.

The history of America's onshore wind industry provides a template for fostering a domestic offshore wind manufacturing base. Due in significant part to the dozens of state-level renewable energy mandates mentioned previously, the onshore industry has mobilized \$143 billion in investment over the past 10 years,³⁹ making the United States a global leader in onshore wind energy and home to the world's second-largest installed wind generation capacity.⁴⁰ In addition to driving down costs through competition, innovation, and economies of scale, this paradigm has made the United States a heavy-weight in onshore wind turbine manufacturing, sustaining more than 500 wind-related factories across 43 states.⁴¹ This manufacturing base has created more than 25,000 jobs—about one-quarter of the approximately 100,000 American workers currently employed in wind-related fields.⁴²

By implementing forward-leaning policy that guarantees long-term demand for offshore wind development, state policymakers can replicate the success of the onshore wind industry—generating thousands of new jobs in offshore wind turbine manufacturing in addition to those in installation. New Jersey lawmakers, for example, can prioritize the codification of Gov. Murphy's 3.5-gigawatt commitment in order to reinforce the signal that sufficient demand exists to reward private investment in a domestic supply chain. Other coastal and Great Lakes states with significant offshore wind resources can pass the offshore wind requirements and energy sector reforms needed to mobilize and sustain steady private investment in a succession of large projects and to foster competition among developers.

State governments and offshore wind stakeholders—including labor advocates—can also support and actively participate in the implementation of the state and regional marine spatial planning processes that are essential for identifying low-conflict ocean areas for wind farm development. The Rhode Island Ocean Special Area Management Plan,⁴³ for example, was instrumental in the timely development of the Block Island Wind Farm. By systematically incorporating stakeholder uses and input in advance, both the state and the developer ensured that the wind farm's siting did not harm other ocean stakeholders, such as commercial fishermen, or provoke costly and time-consuming litigation.⁴⁴

Examples in the United States and Europe show that with the right policy in place, offshore wind development can translate into expansive job creation and demand for skilled workers—on the docks, at sea, and on the factory floor building new turbines from scratch.

Conclusion: Turning offshore winds into economic wins

Imagine a harbor town, once replete with fishing and manufacturing jobs, faded from former glory due to dwindling fish stocks and factories relocated overseas to lower-wage countries. Then imagine, with the introduction of a new clean energy technology, a dramatic reversal of fortune that mobilizes an idled workforce and powers significant, urgently needed investment in infrastructure, manufacturing, and public services.

Offshore wind power helped deliver just such renewal to the cities of Hull and Grimsby, England, where unemployment was halved over the past five years.⁴⁵ The United Kingdom's aggressive pursuit of offshore wind energy development has changed the fortunes of the cities' workers and residents—and for workers across the country.

As the *Boston Globe* reported in 2017:

*The U.K. is already on track to double its offshore power by 2020 and double it again by 2030. That means jobs. Nationally, a University of Hull study recently predicts that direct and indirect jobs should grow from today's 17,500 to nearly 40,000 by 2032. Hull and Grimsby will likely go from its (sic) current 1,500 full-time offshore workers to more than 6,000 and probably add thousands more indirect workers in local businesses.*⁴⁶

Workers in America's struggling industrial port cities stand to reap similar rewards. With more than 100 gigawatts of offshore wind resources available in federal and Great Lakes waters,⁴⁷ and a clear case⁴⁸ for the net positive fiscal and public benefits of large-scale offshore wind development, civic leaders in coastal and Great Lakes states have before them an opportunity to turn offshore winds into economic wins for their working ports and harbors, communities, and workers.

Labor leaders and policymakers can accelerate these opportunities for the workers they represent through pursuit of the following policy options:

- Labor leaders and champions can actively participate in the permitting process for specific offshore wind projects—such as those underway in Massachusetts, New York, and Maryland—to demonstrate their interest and stake in clean energy policy and permitting outcomes.
- Labor leaders can support comprehensive ocean planning frameworks—such as the ocean planning bodies for the Northeast⁴⁹ and Mid-Atlantic⁵⁰ regions—which provide unique fora for dialogue and problem solving with other ocean stakeholders, including state and federal agencies, the commercial and recreational fishing industries, wild-life advocates, shippers, and Native American tribes. State- and regional-level ocean planning processes have proven that when properly and inclusively managed, they can facilitate project design and siting that minimizes conflict among marine activities and values. A strong emphasis on state and regional ocean planning will ensure that the rise of the offshore wind industry will both create new jobs for workers and protect

the jobs and livelihoods of commercial fishermen, hospitality workers, and others that depend on marine resources.

- Coastal states that have yet to act on offshore wind policy can create jobs and support the creation of a domestic offshore wind supply chain by passing offshore wind procurement requirements like those in New York and Massachusetts.
- Policymakers and labor leaders in states where offshore wind power is in development can take additional steps to ensure that local workers benefit. These efforts could include developing and funding training programs to prepare skilled tradesmen and women for the particularities of maritime work environments, such as vessel safety and firefighting at sea, which the state of Rhode Island provided for ironworkers, electricians, and others working on the Block Island project.⁵¹
- State appropriators can also invest in the development of necessary port or transmission infrastructure—as Massachusetts did with the Marine Commerce Terminal in New Bedford⁵²—to lay the groundwork for both construction and operations and maintenance activities in the years to come.
- State leaders should pursue regional coordination on offshore wind policy to ensure that their incentive systems to attract offshore wind development and maximize labor benefits do not result in either a race to the bottom in competitive tax policy or duplicative supply chain requirements that slow overall industry growth.

Policy innovations and lessons learned in Europe, Rhode Island, and a growing bloc of Atlantic Coast states now provide a playbook to foster private investment in offshore wind energy and the development of a domestic supply chain. Through active engagement in ocean planning, permitting, clean energy policy, and regional coordination, labor leaders and state policymakers can claim their stake in the future of this rising coastal energy industry.

At the same time, these leaders have numerous policy opportunities at hand to ensure that the rise of offshore wind occurs harmoniously with the other sustainable, ocean-dependent industries that enliven America's coastal communities, such as fishing, recreation and tourism, and ecosystem restoration. Seizing those opportunities will ensure that all American workers prosper equitably in the transition to a clean energy economy.

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Endnotes

- 1 Insider NJ, "Murphy Unveils Aggressive Plan to Combat Climate Change & Make New Jersey A National Leader in Clean Energy," Press release, April 26, 2017, available at <https://www.insidernj.com/press-release/-murphy-unveils-aggressive-plan-combat-climate-change-make-new-jersey-national-leader-clean-energy/>.
- 2 State of New Jersey, Gov. Phil Murphy, Executive Order 8, January 31, 2018.
- 3 New Jersey Board of Public Utilities, "NJ BPU Approves Order to Implement Governor Murphy's Offshore Wind Executive Order," Press release, February 28, 2018, available at <http://nj.gov/bpu/newsroom/announcements/pdf/20180228Offshore-Wind-pr.pdf>.
- 4 National Conference of State Legislatures, "State Renewable Portfolio Standards and Goals," available at <http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx> (last accessed February 2018).
- 5 Thomas Jenkin and others, "The Use of Solar and Wind as a Physical Hedge against Price Variability within a Generation Portfolio" (Golden, CO: National Renewable Energy Laboratory, 2013), available at <https://www.nrel.gov/docs/fy13osti/59065.pdf>.
- 6 Shiva Polefka and Elise Shulman, "Offshore Wind Energy Can Deliver Big Carbon Cuts for Coastal States" (Washington: Center for American Progress, 2015), available at <https://www.americanprogress.org/issues/green/reports/2015/09/17/121289/offshore-wind-energy-can-deliver-big-carbon-cuts-for-coastal-states/>.
- 7 Shiva Polefka, "State Policies Can Unleash U.S. Commercial Offshore Wind Development" (Washington: Center for American Progress, 2017), available at <https://www.americanprogress.org/issues/green/reports/2017/09/18/439078/state-policies-can-unleash-u-s-commercial-offshore-wind-development/>.
- 8 New York State, "Governor Cuomo Presents 25th Proposal of 2017 State of the State: Nation's Largest Offshore Wind Energy Project Off Long Island Coast and Unprecedented Commitment to Develop up to 2.4 Gigawatts of Offshore Wind Power by 2030," Press release, January 10, 2017, available at <http://www.governor.ny.gov/news/governor-cuomo-presents-25th-proposal-2017-state-state-nations-largest-offshore-wind-energy>.
- 9 Mass. Gen. Laws. ch. 23M, §1-17.
- 10 Maryland Public Service Commission, "Maryland PSC Awards ORECS to Two Offshore Wind Developers," Press release, May 11, 2017, available at <http://www.psc.state.md.us/wp-content/uploads/PSC-Awards-ORECs-to-US-Wind-Skipjack.pdf>.
- 11 Tatiana Schlossberg, "America's First Offshore Wind Farm Spins to Life," *The New York Times*, December 14, 2016, available at <https://www.nytimes.com/2016/12/14/science/wind-power-block-island.html>.
- 12 Jerry Elmer, "Blazing the Trail for Offshore Wind in Rhode Island," Conservation Law Foundation, December 5, 2016, available at <https://www.clf.org/blog/blazing-trail-offshore-wind-rhode-island/>.
- 13 Keith Goldberg, "Garden State Energy Policy Goes Green With New Gov," Law360, January 24, 2018, available at <https://www.law360.com/articles/1005341>; Michael Sol Warren, "Breaking with Trump, N.J. buys into Paris Climate Accord," NJ.com, February 21, 2018, available at http://www.nj.com/news/index.ssf/2018/02/nj_just_joined_a_coalition_to_uphold_climate_accor.html.
- 14 Joseph L. Fiordaliso, "Offshore wind must play big role in NJ clean energy future, says Joseph L. Fiordaliso," *The Press of Atlantic City*, December 27, 2017, available at http://www.pressofatlanticcity.com/opinion/commentary/offshore-wind-must-play-big-roll-in-nj-clean-energy/article_fccecc6c3-8963-5b64-945b-6d18db49b25.html.
- 15 The Nuclear Energy Institute, "U.S. Nuclear Operating Plant Basic Information," available at <https://www.nei.org/resources/statistics/us-nuclear-operating-plant-basic-information> (last accessed February 2018).
- 16 Europe Wind Energy Association, "The European Offshore Wind Industry – Key Trends and Statistics 2014" (2015).
- 17 Ernst & Young, "Offshore Wind in Europe" (2015).
- 18 Reuters Staff, "Deepwater says commercial operations start at Block Island Wind Farm," Reuters, December 12, 2016, available at <https://www.reuters.com/article/us-deepwater-windfarm-rhodeisland/deepwater-says-commercial-operations-start-at-block-island-wind-farm-idUSKBN1412CQ>.
- 19 Shiva Polefka, "State Policies Can Unleash U.S. Commercial Offshore Wind Development."
- 20 Shiva Polefka, "Ocean Planning Is the Key to Unlock America's New Blue Economy," Center for American Progress, May 10, 2016, available at <https://www.americanprogress.org/issues/green/news/2016/05/10/137204/ocean-planning-is-the-key-to-unlock-americas-new-blue-economy/>.
- 21 Barbara Spencer, "This is BIG: Building the First Offshore Wind Farm," *Wire Rope News & Sling Technology*, October 23, 2016, p. 8-14.
- 22 Cassius Shuman, "Island operating on wind farm power," *The Block Island Times*, May 1, 2017, available at <http://www.blockislandtimes.com/article/island-operating-wind-farm-power/49352>.
- 23 Molly Seltzer, "On Block Island, offshore wind ushers in a new time—quite literally," *Into the Wind*, October 24, 2017, available at <http://www.aweablog.org/block-island-offshore-wind-ushers-new-time-quite-literally/>.
- 24 Ross Gould and Eliot Cresswell, "New York State and the Jobs of Offshore Wind Energy" (New York: Workforce Development Institute, 2017), available at https://wdiny.org/Portals/0/New%20York%20State%20and%20The%20Jobs%20Of%20Offshore%20Wind%20Energy_%20WDI2017.pdf?ver=2017-05-03-150746-023.
- 25 State of Rhode Island and Deepwater Wind Rhode Island, LLC, "Joint Development Agreement Between the State of Rhode Island and Deepwater Wind Rhode Island, LLC" (2009) available at: http://www.offshorewindhub.org/sites/default/files/resources/govcarcieri_1-2-2009_rideepwater-windjointdevelopagreement_0.pdf.
- 26 Ben Rosen, "Unions for green jobs: Why organized labor is getting behind offshore wind," *The Christian Science Monitor*, October 15, 2016, available at <https://www.csmonitor.com/Environment/2016/1015/Unions-for-green-jobs-Why-organized-labor-is-getting-behind-offshore-wind>; Mary Ann Bragg, "Labor, environmentalists tout first U.S. offshore wind farm," *Cape Cod Times*, June 13, 2017, available at <http://www.capecodtimes.com/news/20170613/labor-environmentalists-tout-first-us-offshore-wind-farm>.
- 27 Judy Benson, "Environment, labor groups see bright future in Block Island wind farm," *The Day*, June 13, 2017, available at <http://www.theday.com/article/20170613/NWS01/170619722>.
- 28 Ross Gould and Eliot Cresswell, "New York State and the Jobs of Offshore Wind Energy."
- 29 Deepwater Wind, "Block Island Wind Farm," available at <http://dwwind.com/project/block-island-wind-farm/> (last accessed February 2018).
- 30 Mary Ann Bragg, "Labor, environmentalists tout first U.S. offshore wind farm."
- 31 Tatiana Schlossberg, "America's First Offshore Wind Farm Spins to Life."

- 32 Michelle Froese, "U.S. offshore wind momentum sparks competition among state leaders & businesses," *Windpower Engineering and Development*, October 25, 2017, available at <https://www.windpowerengineering.com/business-news-projects/u-s-offshore-wind-momentum-sparks-competition-among-state-leaders-businesses/>.
- 33 GE Renewable Energy, "Haliade 150-6MW Offshore Wind Turbine," available at <https://www.gerenewableenergy.com/wind-energy/turbines/offshore-turbine-haliade> (last accessed February 2018).
- 34 Saqib Rahim, "Can America's first farm help resurrect manufacturing?" *E&E News*, September 9, 2016, available at <https://www.eenews.net/stories/1060042542>.
- 35 LM Wind Power, "Wind turbines installed at first US offshore wind farm, with LM 73.5 meter blades," available at <https://www.lmwindpower.com/en/stories-and-press/stories/news-from-lm-places/wind-turbines-installed-at-first-us-offshore-wind-farm> (last accessed February 2018).
- 36 Tomas Kellner, "The Temple of Turbine: One of These Wind Turbines Can Power 5,000 Homes," *GE Reports*, May 23, 2016, available at <https://www.ge.com/reports/where-ge-makes-haliade-turbines/>.
- 37 Wind Europe, "Wind in power 2017: Annual combined onshore and offshore wind energy statistics" (2018).
- 38 Wind Europe, "Offshore wind in Europe grew 25% in 2017," Press release, February 6, 2018, available at <https://windeurope.org/newsroom/press-releases/offshore-wind-europe-grew-25-2017/>.
- 39 American Wind Energy Association, "Wind Energy Facts at a Glance," available at <https://www.awea.org/wind-energy-facts-at-a-glance> (last accessed February 2018).
- 40 Global Wind Energy Council, "Global Wind Report: Annual Market Update" (2015).
- 41 American Wind Energy Association, "Wind Energy Facts at a Glance."
- 42 Celeste Wanner, "What's the state of American wind power manufacturing?" *Into the Wind*, November 30, 2016, available at <http://www.aweablog.org/whats-state-american-wind-power-manufacturing/>.
- 43 Rhode Island Coastal Resources Management Council, "Rhode Island Ocean Special Area Management Plan," available at: <http://seagrant.gso.uri.edu/oceansamp/> (last accessed February 2018).
- 44 Alex Kuffner "Laying the foundation: Deepwater Wind project hailed as national model," *Providence Journal*, July 27, 2015, available at <http://www.providencejournal.com/article/20150727/NEWS/150729360>.
- 45 Derrick Z. Jackson, "In England, new offshore wind farms mean jobs," *The Boston Globe*, August 21, 2017, available at <https://www.bostonglobe.com/opinion/columns/2017/08/20/england-new-offshore-wind-farms-mean-jobs/d6LwmpGsa2um4jmZUSanL/story.html>.
- 46 Derrick Z. Jackson, "In England, new offshore wind farms mean jobs," *The Boston Globe*, August 21, 2017, available at <https://www.bostonglobe.com/opinion/columns/2017/08/20/england-new-offshore-wind-farms-mean-jobs/d6LwmpGsa2um4jmZUSanL/story.html>; Aura, "Future UK Employment in the Offshore Wind Industry" (2017).
- 47 Andrew Menaquale, "Offshore Energy by the Numbers" (Washington: Oceana, 2015), available at http://oceana.org/sites/default/files/offshore_energy_by_the_numbers_report_final.pdf.
- 48 U.S. Department of Energy, "Wind Vision: A New Era for Wind Power in the United States" (2015).
- 49 Northeast Ocean Planning, "Homepage," available at <https://neocanplanning.org/> (last accessed February 2018).
- 50 Bureau of Ocean Energy Management, "Mid-Atlantic Regional Planning Body (MidA RPB)," available at <https://www.boem.gov/Mid-Atlantic-Regional-Planning-Body/> (last accessed February 2018).
- 51 Personal communication from David Langlais, business manager and financial secretary, Iron Workers Local Union No. 37, East Providence, RI, February 23, 2018.
- 52 Commonwealth of Massachusetts Executive Department, Office of Governor Deval L. Patrick, "Governor Patrick Signs Investment Bill Continuing Unprecedented Growth in Energy and Environmental Protection," Press release, August 13, 2014, available at <http://archives.lib.state.ma.us/bitstream/handle/2452/213455/ocn795183245-2014-08-13b.pdf>.