

# Harnessing the wind off the Atlantic Coast

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From New England to the Southeast, in Washington and in state capitals, there are oil and gas industry executives and their allies who look out across the Atlantic seashore and immediately think: Drill there, drill now. The American Petroleum Institute wants to open up the entire Atlantic Outer Continental Shelf to oil and gas drilling, regardless of the risk to existing coastal industries or whether this is in fact the most effective economic development strategy for the region.<sup>11</sup>



Indeed, expanded offshore drilling is not the only option. The Atlantic region's vast natural resources, pre-existing infrastructure, and status as one of the nation's largest energy load centers make the area prime territory for offshore wind development. In fact, the Department of Energy classifies Atlantic coastal wind resources as "outstanding," a rating stronger than any land-based wind resources in the nation.<sup>12</sup>

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The Atlantic coastal region is particularly well-suited for offshore wind power development

Resource availability and energy generation potential are high

Not a single wind turbine sits in water off any U.S. coastline. Yet the U.S. Department of Energy estimates that more than 4,000 gigawatts of electricity—more than four times what the U.S. power system can currently produce—could

be generated from winds blowing above coastal waters.<sup>13</sup> More than a quarter of this wind power could be harnessed from winds over the Atlantic Ocean. As an initial goal, the U.S. Department of Energy's National Offshore Wind Strategy includes 10 gigawatts of commercially competitive offshore wind by 2020, and 54 gigawatts by 2030.

Developing even a fraction of the available offshore wind resource would greatly outpace the amount of fossil fuel energy available in the Atlantic Coast region. Atlantic Ocean offshore oil resources extracted over 20 years amount to 18 gigawatts; offshore wind resources, when considering only middle-Atlantic areas up to 50 meters deep, would amount to 450 gigawatts, or 177 gigawatts average power output.<sup>14</sup>

Some might see this as comparing apples to oranges—after all, we primarily use oil for transportation, whereas wind energy would mostly go into electricity generation—but the evolving energy mix makes it a valid comparison. Electricity is powering more and more vehicles, and gas is contributing more and more to electricity, meaning that replacing watts from oil and gas with watts from offshore wind isn't such a stretch.

Furthermore, the relatively shallow depth of the Outer Continental Shelf—which begins a few nautical miles from shore and extends 200 nautical miles outward along much of the Atlantic Coast—means that Atlantic states are well-suited to take rapid advantage of current offshore wind technology (turbines that generate up to 6 megawatts). Future generations of larger, even more efficient turbines, generating between 8 megawatts and 10 megawatts, can be built further away from the shoreline.<sup>15</sup>

Offshore wind farms would be close enough to population centers to deliver reliable energy during times of peak seasonal demand

According to the National Renewable Energy Laboratory, U.S. coastal urban areas “are home to much of the U.S. population; have the highest electricity prices in the nation; and currently depend heavily on a high-carbon, volatile supply of imported fossil fuels.”<sup>16</sup> In the past decade, the Northeast has led all other U.S. Census Bureau regions in total energy consumption.<sup>17</sup>

Pennsylvania, New York, North Carolina, and Virginia are all in the top 15 energy consumer states in the country and include some of the largest metropolitan areas in America.<sup>18</sup> With high-density industrial areas, these population centers cur-

rently rely on a hodgepodge of dispersed inland coal and nuclear plants to meet their electricity needs. Thanks to outdated infrastructure, transmission from these plants can be inefficient and contributes to the national average of 7 percent loss of electricity along the way.<sup>19</sup>

Offshore wind is the only utility-scale renewable energy resource abundant enough to contribute substantially to the sustained, long-term energy demands of the Atlantic Coast region, especially because many of these states have enacted so-called Renewable Portfolio Standards dictating that a percentage of energy be generated from renewable sources. Offshore wind farms would also be constructed relatively close to shore and therefore to population centers, and when electricity travels shorter distances, there is less electricity lost along the way. Because the transmission lines would be new and state-of-the-art, they would further decrease the amount of losses when compared to outdated, land-based transmission lines, while in turn boosting demand for the products and services needed to put these lines in place.

Additionally, Atlantic Coast regional energy load centers are under huge strain during times of peak demand and seasonal weather extremes. Offshore wind would generate more energy during those peak hours, which would lessen this strain. Data collected from a test tower at the site of Cape Wind—a wind farm set for construction 6 miles off the shore of Cape Cod in Massachusetts—showed promising results for both summer and winter. The tower registered strong afternoon winds on hot summer days, “when air conditioning use pushes electric demand in New England to historic peaks,”<sup>20</sup> and “full capacity” operation during a three-day cold snap in January 2004, when a natural gas shortage forced electrical grid managers to contemplate rolling blackouts.<sup>21</sup>

### Proposed infrastructure will pave the way

In May the Department of the Interior declared no competitive interest for a mid-Atlantic transmission backbone project, the Atlantic Wind Connection, meaning the project can move forward with acquiring the permits necessary for construction. This sweeping project—funded by Google Inc., Bregal Energy, Marubeni Corp., and Elia System Operator NV/SA—will provide the foundation for future offshore wind farms and is designed to exploit economies of scale and reduce impacts on sensitive coastal environments. Once built, the Atlantic Wind Connection would have the potential to connect 7 gigawatts of offshore wind power back to land, funneling reliable, price-stable energy to

thousands of homes and businesses and reducing installation costs for offshore wind developers—each of whom would otherwise have to build an independent transmission line to shore.<sup>22</sup>

The offshore wind energy generation interconnected through the project is predicted to reduce production costs from fossil fuel generation by \$1.1 billion per year,<sup>23</sup> making the project a game-changer for energy consumers up and down the Atlantic Coast. Meanwhile, research facilities in Maine, Virginia, and South Carolina are already working to create a tech cluster in the region, pushing research and development that will advance offshore technology and spur its adoption.

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## Offshore wind farms will create jobs and build the regional economy

### Developing a commercial-scale offshore wind industry will create significant regional employment opportunities

A wind turbine is made up of as many as 8,000 components.<sup>24</sup> If produced in the United States, the installation of new large-scale wind projects off the Atlantic Coast could translate into much-needed jobs across a wide range of occupations and industries. The National Renewable Energy Lab estimates that the Atlantic states “would generate \$200 billion in new economic activity and create more than 43,000 permanent, well-paid technical jobs in manufacturing, construction, engineering, operations and maintenance” if just 54 gigawatts of available offshore wind resources were developed in this region.<sup>25</sup> A more recent report from the National Wildlife Federation referenced research showing that harnessing just 7.7 gigawatts of already-identified offshore wind resources could lead to the creation of 300,000 jobs.<sup>26</sup>

More than 40 states currently have facilities for building wind turbine components. In fact, most components of existing U.S. wind farms are made in America.<sup>27</sup> Offshore turbines are larger, and their components require closer-to-site fabrication, which has the potential to boost the domestic wind manufacturing industry from its current employment level of about 75,000 jobs.<sup>28</sup>

These are not idle predictions. Offshore wind in Europe has grown steadily over the past decade. The European Wind Energy Association estimates that the indus-

try will employ 169,000 people by 2020, and 300,000 people by 2030.<sup>29</sup> Countries that were “first movers,” or the first to establish a welcome environment for manufacturers in the offshore wind supply chain, dominated export markets on the continent. In Denmark—an early supply chain hub—the wind industry accounts for 8.5 percent of total annual exports and employs 25,000 people. In Germany—a “first mover” in land-based wind that is now setting ambitious offshore generation goals—more than 90 large domestic manufacturing facilities have created 40,000 jobs.<sup>30</sup>

## The benefits of Atlantic offshore wind

Developing 54 gigawatts of offshore wind in Atlantic waters

Coal-fired power plants displaced	52
New economic activity generated	\$200 billion
Permanent technical jobs in manufacturing, construction, engineering, operations, and maintenance created	43,000

Source: National Renewable Energy Laboratory; University of Sydney

The Atlantic coastal region is particularly well-suited to become just this kind of first mover in North America. With existing port facilities, manufacturing capacity, and marine expertise, states such as Maryland, Massachusetts, and New Jersey—three states where wind-energy developers have proposed offshore wind farms—could reap huge economic rewards by establishing a hub for an entire regional, or even national, industry. Maryland’s Eastern Shore has a rich history of shipbuilding expertise and is already drawing interest from several companies that are capable of producing wind turbine components. Recently, a Salisbury, Maryland-based manufacturer called AC Wind pledged to spend \$10 million to convert a former boat plant into a turbine blade production facility.<sup>31</sup> At full capacity, AC Wind says this facility could employ more than 200 people.

In Massachusetts, the Cape Wind project is expected to create 1,000 regional jobs during construction and 50 permanent jobs for ongoing operation and maintenance—not to mention that a local cruise company plans to build a visitor’s center and train local community college students for jobs giving boat tours of the wind farm.<sup>32</sup> General expectations for job creation range from primary and secondary manufacturing to jobs in direct services such as installation, maintenance, and transport of turbine components, as well as indirect services such as banking and communications.

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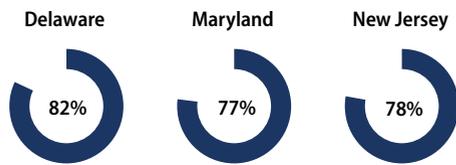
## Offshore wind has broad public support

### Majority of ratepayers willing to pay more for homegrown electricity produced by wind farms off their coastlines

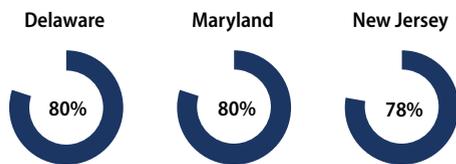
Despite vehement opposition from fossil fuel industry interest groups and the politicians they support, offshore wind is popular among energy consumers. Surveys commissioned in 2011 by Atlantic Wind Connection in Delaware, Maryland, and New Jersey show majority support for offshore wind development among voters of both parties in all three states. Furthermore, majorities in each state said they would be willing to pay at least \$2 more per month in utility bills to receive offshore-generated wind power, and majorities in Delaware and Maryland prefer that the clean, renewable electricity production quotas be filled by nearby offshore wind rather than land-based wind farms in the Midwestern United States.<sup>33</sup>

#### Public support for Atlantic offshore wind

Voters supporting the development of offshore wind off their coasts



Voters willing to pay at least \$2 more per month to receive electricity generated from offshore wind



Source: FederickPolls for Atlantic Wind Connection

Despite the public battle over Cape Wind in Massachusetts, a substantial majority of the state's residents also support offshore wind, along with other renewable energy projects. In 2011 a public opinion survey by the think tank MassINC on issues related to climate change asked Massachusetts residents if they would favor or oppose policies that would raise their monthly electricity bills by set amounts to accommodate renewable energy from wind and other sources. Eighty percent supported a \$1 increase; 69 percent supported a \$3 increase; and 60 percent supported a \$5 increase. The same poll found that 80 percent of respondents were willing to pay the rate increase estimated by Massachusetts Department of Public Utilities once Cape Wind came online.<sup>34</sup>

New Jersey residents are also willing to make a bet on offshore wind. In 2009 Fishermen's Energy, a community-based offshore wind developer in New Jersey, commissioned a survey to gauge public sentiment on a proposed wind farm that would be located three miles offshore from Atlantic City. After being shown photo illustrations of what the turbines would look like, 75 percent of those surveyed said they favored the project. When asked if the wind turbines would have a positive or negative effect on Atlantic City, 66 percent said the turbines would have a positive effect.

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## Offshore wind conserves and protects natural resources

### Reduces reliance on both foreign and domestic sources of fossil fuels

Developing 54 gigawatts of offshore wind in Atlantic waters would displace the annual output of 52 coal-fired plants, transitioning a large chunk of America's energy economy toward a renewable, safely harvested, and predictably available resource. Per kilowatt-hour of energy consumed, offshore wind emits less than 1 percent the greenhouse gases of coal.<sup>35</sup>

Offshore wind also would greatly decrease the region's reliance on nuclear power and natural gas, two other big players in the East Coast energy mix. A recent report from the National Wildlife Federation estimates that developing equivalent offshore oil resources would release 97.2 million metric tons of carbon dioxide each year, "the amount of carbon dioxide emitted by almost 17.7 million cars annually."<sup>36</sup> And as the region's nuclear power plants age, concerns about waste disposal and the potential effects of natural disasters—such as the earthquake centered in Mineral, Virginia, in 2011 that rattled the reactor at the North Anna Nuclear Generating Station—are a convincing argument to phase in more stable sources of energy.

Furthermore, offshore wind could help the mid-Atlantic avoid the environmental and public health costs associated with fossil fuels. It is a myth that fossil fuel energy is cheaper than renewable energy. On the contrary, researchers at Harvard Medical School estimate that the average external costs of fossil fuels—such as negative health and environmental consequences of burning coal—is 18 cents per kilowatt hour. When added to the market price of fossil-fuel energy, this additional social cost makes traditional energy, especially coal-based energy, far more expensive than renewable energy sources such as offshore wind.<sup>37</sup>

### Offshore wind's damage to wildlife is minimal

Studies show that marine wildlife, including migratory birds, can be protected from offshore wind development with smart siting and mindful wildlife impact assessments.<sup>38</sup> Because the oceans are the world's great carbon sink—holding about 50 times as much carbon as the air—the effects of global warming (a direct result of burning fossil fuels for energy) are likely to have more adverse

effects on marine wildlife and sea birds than any potential interaction with offshore wind farms.<sup>39</sup>

One study shows that marine wildlife is thriving around wind turbines. The National Institute of Aquatic Resources in Denmark discovered “positive reef effects” around turbines at the Horns Rev 1 wind farm, including attracting several species of fish to the new reefs.<sup>40</sup>

The risks posed by offshore oil and gas drilling on the Atlantic Outer Continental Shelf, however, are much more severe. The presence of rigs, increased seismic activity, and the potential for an oil spill present a very real danger for the existing coastal industries that form the backbone of this region such as tourism in the Outer Banks of North Carolina, the Eastern Shore of Virginia, Maryland, and Delaware, and the Jersey shore, as well as some of our nation’s oldest fishing communities, all of which rely on healthy oceans for their survival.

### State and federal policies must progress rapidly

To make offshore wind a reality in the United States, states and the federal government must move swiftly to put out the welcome mat for developers and manufacturers.

So far, the U.S. Bureau of Ocean Energy Management’s Smart From the Start initiative is improving cooperation between federal agencies responsible for the permitting and leasing of offshore wind farm sites. The Department of Energy has laid out a vision for developing 52 gigawatts of offshore wind off American coastlines by 2030, and several Atlantic Coast states have Renewable Portfolio Standard laws that require stepped-up use of renewable energy in the next five years to 20 years. In 2012, for example, the New England Governors Conference voted unanimously to develop a coordinated plan for regional purchases of renewable energy, of which offshore wind could be a huge source.<sup>41</sup>

Despite these efforts, it will be difficult to build the investor confidence needed to develop utility-scale wind farms off the Atlantic Coast without near-term federal support in the form of extending the federal production tax credit and investment tax credit, and innovative power purchasing strategies. A recent analysis from the Offshore Wind Accelerator Project found that “aggregated procurement”—essentially when buyers’ networks contract with developers to purchase large

amounts of energy in tandem with low-cost financing and use of the investment tax credit—could result in an expected cost of energy for offshore wind of \$95 per megawatt hour, on average. This would make offshore wind power highly competitive with other forms of electricity in the United States.<sup>42</sup>

Meanwhile, elected officials and regulators must build support for state-backed, economically viable offshore wind development projects in key states such as Maryland, where a bill supporting offshore wind development failed to pass by a narrow margin in 2012.

Such sensible, economically friendly policies at the state and federal level have fallen by the wayside. In March, for example, 47 U.S. senators filibustered a bill that would have extended tax credits for wind energy. In opposition, Sen. Jim Webb (D-VA) echoed a flawed refrain: “Government should avoid picking winners and losers and should allow the marketplace to work.” But those who voted against the bill, including Sen. Webb, are already picking a winner: the fossil fuel industry, which stood to lose \$24 billion in tax breaks if the bill passed.

Perhaps not surprisingly, Sen. Webb and his 46 colleagues receive a combined \$23 million in career contributions from Big Oil.<sup>43</sup> Federal subsidies and tax breaks to oil and gas companies are projected to total more than \$55 billion between 2011 and 2015.<sup>44</sup> These types of subsidies made sense in the early 1900s, when the fledgling industry needed help getting to scale. But today fossil fuels are no longer in need of handouts.

In contrast, offshore wind and other fledgling industries could greatly benefit from these scarce public dollars. Once economies of scale are reached, and turbines are in the water, offshore wind generation will be reliable, plentiful, and will have a predictable long-term price tag, freeing American ratepayers from dependence on fossil fuels (both foreign and domestic) and nuclear power. The U.S. offshore wind industry—similar to the big oil and gas companies before it—should at that point have no problem standing on its own.

The American Petroleum Institute and its supporters want to open up the Atlantic Coast to oil and gas drilling, taking more fossil fuels out of the ground despite the fact that our offshore reserves are unproven and that offshore drilling poses a serious threat to the existing coastal industries that sustain these states. In contrast, the same Atlantic Coast is prime territory for a regional offshore wind development effort that would spur a diversity of new industries and jobs, while

providing reliable power to its industrial and residential consumers. All this could be accomplished without unduly compromising the region's tourism, fishing, and shipping industries.

Offshore wind is simply a better solution to the mid-Atlantic's energy needs than expanded offshore drilling. It's time for Congress to give the new energy economy a fighting chance.

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## About the Center for American Progress

The Center for American Progress is a nonpartisan research and educational institute dedicated to promoting a strong, just, and free America that ensures opportunity for all. We believe that Americans are bound together by a common commitment to these values and we aspire to ensure that our national policies reflect these values. We work to find progressive and pragmatic solutions to significant domestic and international problems and develop policy proposals that foster a government that is “of the people, by the people, and for the people.”



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## About the Center for the Next Generation

The Center for the Next Generation works to shape national dialogue around two major challenges that affect the prospects of America’s Next Generation—advancing a sustainable energy future and improving opportunities for children and families. As a nonpartisan organization, the Center generates original strategies that advance these goals through research, policy development, and strategic communications. In our home state of California, the Center works to create ground-test-ed solutions that demonstrate success to the rest of the nation.

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