

# THE TURNING POINT FOR ATLANTIC OFFSHORE WIND ENERGY:

Time for Action to Create Jobs, Reduce Pollution, Protect Wildlife, and Secure America's Energy Future

NATIONAL WILDLIFE FEDERATION

2012



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Report  
CONFRONTING GLOBAL WARMING

# Acknowledgments

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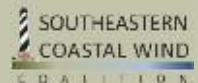
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## REPORT COSPONSORS



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# Executive Summary



Flickr: DanishWindIndustryAssociation

As America struggles to revitalize our economy, create jobs, secure an energy independent future, and protect our communities and wildlife from the dangers of climate change, one energy source offers a golden opportunity to power our homes and businesses without creating more pollution — Atlantic offshore wind.

America has some of the best offshore wind resources in the world, particularly along the Atlantic coast where over 1,300 gigawatts (GW) of energy generation potential has been identified. Harnessing just a fraction of our offshore wind resource — 52 GW — could power about 14 million U.S. homes with local, pollution-free energy while creating over \$200 billion in new economic activity along the coast.

Offshore wind energy is a real, viable option for America and it's ready right now. Europe has been building offshore wind energy for over a decade, and is currently producing enough electricity from offshore wind to power 4 million homes. Around the globe, countries are increasingly looking to their offshore winds as a safe, reliable energy source that has tremendous economic development benefits.

Here in America, offshore wind energy is at a turning point. While we do not have a single offshore wind turbine spinning off our shores, recent actions by the federal government, along with bipartisan leadership from coastal state officials, have put critical building blocks in place — bringing us closer than ever before to finally tapping this massive domestic energy source. Looking forward, action is urgently needed to ensure that appropriately-sited offshore wind energy becomes a reality for America.

## KEY FINDINGS OF THIS REPORT INCLUDE:

### AMERICA HAS MADE SIGNIFICANT PROGRESS IN ADVANCING APPROPRIATELY-SITED OFFSHORE WIND ENERGY

The Federal government is leading an ambitious initiative to deliver offshore wind energy in the Atlantic Ocean, with leases expected this year:

- Task Forces are underway in 10 Atlantic Coast states — Maine, Massachusetts, Rhode Island, New York, New Jersey, Maryland, Delaware, Virginia, North Carolina, and South Carolina — to ensure coordination among state, federal, tribal, and local officials throughout the offshore wind energy leasing process.
- Over 2,000 sq. nautical miles of federal waters with high wind speeds and low potential conflicts have been designated for wind energy development off of 6 states. Environmental reviews that have been completed for these areas have found that no significant impacts will





result from granting leases to developers to collect data needed for their project designs. Industry competition is intense, with as many as 11 companies lined up to bid for leases in some states this year.

- The federal government is also currently reviewing lease applications for a utility-scale project in New York, a floating turbine demonstration project in Maine, and an undersea transmission line from Virginia to New York.

**Many coastal states are leading the way in building a clean energy future with offshore wind:**

- After over a decade, the Cape Wind project proposed for Massachusetts is within sight of the finish line and expected to begin construction in 2013. Project proposals for state waters in Rhode Island and New Jersey are also advancing through the permitting process.
- Three states — Maine, Massachusetts, and New Jersey — have set specific goals for offshore wind energy generation off their shores.
- Governor Patrick of Massachusetts and Governor Christie of New Jersey have signed legislation into law that will facilitate financing solutions and provide incentives for offshore wind energy projects. This is precisely the type of leadership

needed along the coast and at the federal level to jumpstart a robust offshore wind industry in America. Governor O'Malley has been pushing for a similar measure in Maryland, which is expected to be considered by the state legislature in 2013.

- Nine states along the coast — from Maine to Delaware — have prioritized clean energy by requiring a certain percentage of the state's power be generated from renewable sources. The New England Governors recently signed an agreement to pursue a coordinated strategy to purchase renewable sources.
- Massachusetts, Rhode Island, and New Jersey have pursued critical research and planning efforts to facilitate sound siting decisions, and similar efforts are underway in New York and Maryland.

#### **OFFSHORE WIND ENERGY CAN BE DEVELOPED IN A MANNER THAT PROTECTS WILDLIFE.**

- Europe has been producing energy from its offshore wind resources for over two decades, and has been able to avoid and minimize many of the impacts to wildlife. For example, Danish research shows that birds have a strong tendency to avoid offshore wind energy turbines.

- While conditions are different here in the U.S, initial research on birds, bats, sea turtles, and marine mammals off our coast suggests that we can achieve the same result if leasing decisions are based on sound science and informed by key experts and stakeholders. Specifically, data shows that bird density is significantly lower in offshore environments farther from shore.
- All energy sources have some impact on wildlife, but research shows that appropriately-sited and mitigated offshore wind energy is a much safer bet than fossil fuels.

**A THRIVING OFFSHORE WIND INDUSTRY WILL BE AN ECONOMIC POWERHOUSE FOR AMERICA.**

- America's wind industry currently employs over 75,000 people, and research shows that approximately 300,000 jobs and over \$200 billion in new economic activity could result from a robust American offshore wind industry.
- In addition to supporting thousands of jobs to design, construct, and operate offshore wind energy projects, substantial industrial manufacturing jobs will be needed to produce turbines, foundations, blades, sub-stations, and cables along the coast.
- Over 40,000 people are currently employed in the offshore wind industry in Europe, with over 300,000 jobs expected by 2020.

**OFFSHORE WIND ENERGY CAN PROVIDE AFFORDABLE, RELIABLE POWER WHEN AND WHERE WE NEED IT MOST**

- America's immense offshore wind resource lies in close proximity to some of our biggest cities, presenting an opportunity to utilize clean energy to meet the growing demand for power along the East Coast.
- Offshore winds blow strongest during the day and at other times of peak demand such as heat waves, as documented by real-time wind monitors off Massachusetts and Rhode Island.
- Plugging offshore wind into the grid will lead to lower, more predictable energy prices over time.

For example, the New York Independent System Operator has found that for every 1,000 MW of wind on the system, consumers save \$300 million in wholesale energy costs.

- While natural gas prices are currently at historical lows, the region needs to make energy investment decisions for the next several decades. By diversifying the region's energy portfolio, offshore wind energy presents an opportunity for utilities to lock in at a known price for the long term, creating a hedge to protect against future fossil fuel price spikes.
- Industry trends driving down the cost of offshore wind energy include moving toward larger projects farther offshore in order to access economies of scale, a higher wind resource, and areas with fewer conflicts.



Dong Energy



Flickr: danishwindindustryassociation

## URGENT ACTION IS NEEDED TO BUILD ON THIS MOMENTUM AND ENSURE THAT OFFSHORE WIND ENERGY BECOMES A REALITY FOR AMERICA.

State and federal leaders should take the following actions to bring this new clean energy source ashore:

1. Set a bold goal for offshore wind energy development in the Atlantic Ocean, in order to provide clear leadership and vision regarding the important role offshore wind must play in America's energy future and demonstrate that this is a high priority for the federal government and each Atlantic Coast state.
2. Take decisive action to advance offshore wind energy development and jumpstart markets for this emerging industry. Specific actions critically needed to level the playing field for clean energy and create an opportunity for offshore wind power to become a major source of electricity for America include:
  - Prioritize renewable energy generation — and offshore wind power specifically — through policies such as a renewable electricity standard, in order to send a clear market signal to encourage investment in offshore wind energy.

- Extend critically-needed tax incentives including the federal Investment Tax Credit for offshore wind, as well as the Production Tax Credit and Advanced Energy Project Credit needed to support domestic supply chain manufacturing opportunities for wind energy.
- Take direct action to secure buyers for offshore wind power, including pursuing coordinated procurement strategies among key state and federal entities. State leadership is particularly critical for facilitating and approving power purchase contracts with local utilities.
- Increase funding to the Departments of Energy and Interior and relevant state agencies to support needed research and facilitate the efficient deployment of offshore wind energy, in order to avoid subsequent impairment of needed financing and power purchase agreements.
- Enact policies requiring stringent pollution reductions from all power sources, including limits on carbon pollution and other strong air, water, and waste management safeguards for the mining and burning of all fuel sources.

3. Ensure that offshore wind projects are sited, constructed, and operated responsibly in order to protect wildlife and avoid conflicts with other ocean uses. All offshore wind energy leases must contain clear and enforceable requirements to protect wildlife, and key state and federal agencies must have sufficient resources to collect needed data and manage the leasing process for multiple areas along the coast.
4. Increase stakeholder coordination and public engagement throughout the process to achieve all of the above. Offshore wind energy development decisions should be coordinated with federal, state, tribal, and regional coastal and marine spatial planning efforts in a manner that is consistent with the goals of America's National Ocean Policy and includes significant stakeholder and public input.

America has made significant progress over the last two years in pursuing offshore wind energy, but we still have a long way to go to catch up with the rest of the world and finally harness our largest untapped energy source. Leadership by the states and federal government is critically needed to build on this momentum if we are to make the most of the golden energy opportunity sitting right off our shores.



# I. OFFSHORE WIND ENERGY – A GOLDEN OPPORTUNITY

America stands at a crossroads in determining our energy future. One path embraces the exciting possibilities and cutting edge technology of clean, locally produced renewable energy. The other maintains our reliance on the polluting energy sources of the past, and commits us – perhaps irreversibly – to severe environmental and economic consequences.

America is blessed with abundant energy sources like wind, sun, and biomass, which can transform our economy while protecting our communities and wildlife from the dangers of our fossil fuel dependence. It is time for us to harness our single largest untapped renewable energy source: Atlantic offshore wind. The U.S. National Renewable Energy Laboratory (NREL) estimates that the potential of offshore wind energy in America is over 4,000 gigawatts (GW) – four times more energy than is currently generated from all sources combined.

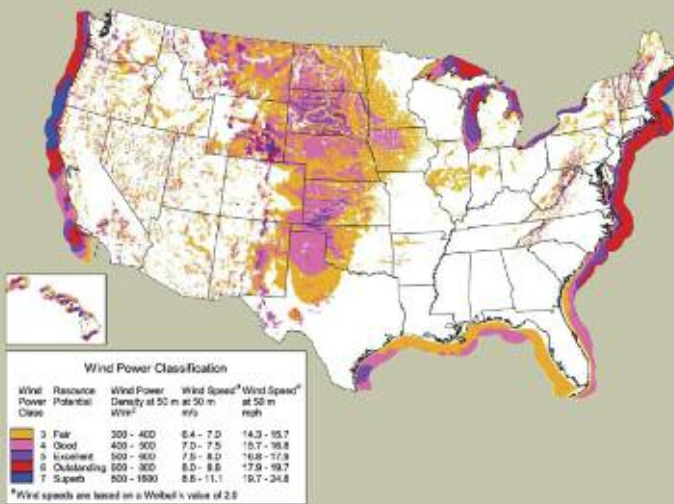
Along the Atlantic Coast, NREL has identified approximately 1,300 GW of energy generation potential.<sup>1</sup>

Tapping this inexhaustible domestic energy supply will create thousands of jobs and slash our dependence on foreign oil, while providing a critical opportunity to confront climate change – the most urgent threat facing future generations of people and wildlife across the globe. Mining, drilling, transporting, and burning fossil fuels can be tremendously destructive enterprises, with game-changing and imminent consequences

for our climate. Renewable energy is an essential part of the solution to this crisis, yet it currently stands at less than five percent of our overall energy mix. Compare this to coal, which generates about 40% of our electricity and is also the country's leading source of carbon pollution.<sup>2</sup>

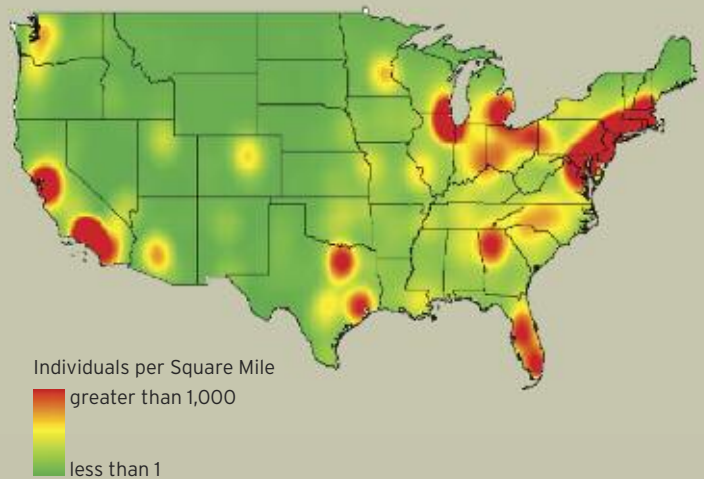
If we are to get serious about tackling the urgent threat of climate change and the national security imperative of energy independence, now is the time to make a dramatic transformation in the ways we produce and use power.

## OFFSHORE WIND ENERGY: POWER RIGHT WHERE WE NEED IT



U.S. land-based and offshore wind resource estimates

Source: National Renewable Energy Laboratory



U.S. Population Density

Source: AWS Truepower

## AMERICA NEEDS TO CATCH UP!

Offshore wind is a valued energy source around the globe, with turbines currently spinning off the coast of twelve countries. Europe has been producing thousands of megawatts of clean energy – and jobs – from offshore wind for decades and China is rapidly mobilizing to take advantage of the substantial manufacturing opportunities. Japan has begun to aggressively pursue renewable energy, specifically offshore wind, following their 2011 nuclear disaster. America must move quickly and match the commitment of these countries in pursuing offshore wind energy if we are to compete in the global marketplace for this exciting new economic opportunity.

- **Europe:** The first offshore wind farm in the world was installed off the coast of Denmark in 1991, and today over 4,000 MW of offshore wind capacity has been constructed – enough electricity to power approximately 4 million homes.<sup>3</sup> In just 2012, Europe has 13 offshore wind projects under construction, including the London Array – a 1,000 MW project on track to be the largest offshore wind project in the world.<sup>4</sup> This project is estimated to power 750,000 homes or about a quarter of Greater London.<sup>5</sup> Across the European Union, over 40,000 people are currently employed in the offshore wind industry, and that number is expected to rise substantially in the next decade. Europe has a goal of reaching 40,000 MW of offshore wind capacity by 2020 – enough electricity to power almost 13 million homes. By 2030, this level of offshore wind development is expected to host roughly 300,000 jobs.<sup>6</sup>
- **China** currently has developed 260 MW of offshore wind energy and has aggressive plans to ramp up development in the near term with a goal of installing 5,000 MW by 2015 and 30,000 MW by 2020 – enough electricity to power 10 million homes.<sup>7</sup>
- **Japan** is moving quickly to advance offshore wind energy, having approved two projects expected to come online in 2013. The country's first floating offshore turbine was launched in August 2012, a demonstration project off the coast of Nagasaki.<sup>8</sup>
- **South Korea** has set a goal of building 2,500 MW of offshore wind energy by 2019.<sup>9</sup>



London Array Limited

## WHAT IS A GW?

“Kilowatt” (KW), “megawatt” (MW), and “gigawatt” (GW) are units used to measure electrical energy (1 GW equals 1,000 MW; 1 MW equals 1,000 KW).

According to the Department of the Interior, 1 GW of wind-generated electrical energy can supply approximately 225,000 to 300,000 average U.S. homes. Thus, 1 MW would supply electricity to approximately 225 to 300 households. The approximate average size of a coal-fired power plant in the United States is 667 MW.<sup>10</sup>



# Offshore Wind Energy: A Clean Alternative

By providing a clean alternative to coal and oil, Atlantic offshore wind can provide numerous benefits to current and future generations:

## ■ Reduce Carbon Pollution that Causes Climate Change:

Generating power from offshore wind greatly reduces carbon emissions – a huge step forward in the fight against climate change. The evidence is unequivocal that carbon pollution from power plants and vehicles is disrupting our climate, placing people and wildlife across the planet in grave danger.<sup>11</sup> Levels of heat-trapping carbon dioxide in the atmosphere are currently increasing at a faster rate than at any other time on record,<sup>12</sup> and scientists have documented rapid and widespread temperature increases during the past century – with nine of the ten warmest years on record occurring since 2000.<sup>13</sup> Rising temperatures are already fueling stronger storms, deeper droughts, more intense wildfires, and higher, faster rates of sea level rise. As the summer of 2012 has already shown us, extreme weather events such as frequent and intense storms, wildfires, and drought are becoming more common, and NASA climatologists warn that we should expect more of the same in the years to come.<sup>14</sup>

## ■ Reduce Carbon Pollution that Causes Ocean Acidification:

Ocean acidification – a process driven by excess atmospheric carbon – poses an existential threat to our ocean ecosystems,<sup>15</sup> particularly to sensitive coral reefs which support thousands of species.<sup>16</sup> As the oceans become more acidic, coral and other species' ability to form skeletons through

calcification is inhibited, slowing growth.<sup>17</sup> A more acidic ocean imperils wildlife including plankton and mollusks, as well as the species that eat them such as sea turtles and marine birds,<sup>18</sup> and over time is expected to severely disrupt the marine food web, with harsh consequences for fishing, tourism, and countless other human activities that rely on the sea.

■ **Protect Public Health:** Wind is an air pollution-free resource, which means huge benefits for our health and the economy. Burning fossil fuels causes a range of harmful public health impacts, including 20,000 premature deaths each year resulting from ground level ozone, or smog.<sup>19</sup> More than 154 million people are exposed to dangerous air pollution levels here in America, including particulate pollution which has been shown to increase heart

attacks, strokes, asthma attacks, and other mortality risks.<sup>20</sup> Additionally, scientists are now warning that the higher temperatures associated with climate change exacerbate air pollution impacts by increasing the risk of unhealthy ozone levels in the air we breathe.<sup>21</sup> Reducing these public health threats also benefits our economy – according to the Environmental Protection Agency, current efforts to reduce air pollution from coal-fired power plants and vehicles will result in \$2 trillion of economic benefits by 2020.<sup>22</sup>

■ **Preserve Wildlife Habitat:** All energy sources have some impact on wildlife habitat, but research suggests that offshore wind is a far safer bet than fossil fuels for many kinds of wildlife (see p. 18). In addition to air emissions, current energy extraction processes are



Flickr: Nick Humphries



resource intensive and can have devastating effects on the environment and public health. Mining can destroy vast amounts of land, pollute rivers and streams, and have other significant environmental impacts on local communities and wildlife.<sup>23</sup> Oil drilling and transport

can also damage our natural resources and communities, whether through drilling disasters such as the 2010 BP disaster or through pipeline spills such as the Kalamazoo River tar sands oil spill in 2010.<sup>24</sup> Perhaps the most devastating impacts from oil extraction can be found in

Canada, where tar sands mining is responsible for the destruction of huge amounts of boreal forest, toxic contamination of massive amounts of fresh water, and significant increases in climate change pollutants into the atmosphere.<sup>25</sup>

#### ■ **Protect Water Quality and Quantity:**

Producing electricity from clean, renewable sources such as offshore wind helps avoid the significant impacts on water quality and quantity that can result from mining, drilling, and burning fossil fuels. For example, mining tar sands (an increasingly exploited form of crude oil) requires 2 to 4 barrels of water just to produce one barrel of oil, creating enormous toxic waste ponds.<sup>26</sup> Coal mining can also have devastating impacts on local waterways, particularly from the destructive practice of mountaintop removal.<sup>27</sup> Natural gas presents a severe water contamination threat when extracted via hydraulic fracturing (“fracking”), where large volumes of chemicals, water, and sand are injected underground at high pressure to crack open layers of rock and release the gas.<sup>28</sup>

## FUELED BY WIND

**America is addicted to oil. We currently depend on petroleum for 95 percent of our transportation fuel, yet offshore wind energy offers a new opportunity to run our vehicles with clean power. Improving vehicle efficiency can reduce our need for oil, but electric vehicles (EVs) hold great potential to break our dependence on oil and other liquid fuels entirely. To combat climate change, clean up local air pollution, and build energy and economic security, it is time to get EVs rolling across the country.**

A typical car fueled by gasoline emits more than 5 tons of greenhouse gas emissions and other air pollutants annually.<sup>29</sup> In 2011, EV sales made up only 2.25% of all the auto sales for the year,<sup>30</sup> but high gas prices, increasing consumer options in the EV market, and advancements in storage and charging technology indicate great potential for broad expansion of this exciting new transportation solution.

In order to take advantage of this pollution reduction opportunity and ensure maximum environmental benefit from EVs, America must take action to power our electric grid with more clean energy such as offshore wind.



## CLIMATE CHANGE IMPACTS: EXTREME WEATHER

2012 is already shaping up to be an intense year of extreme weather and people and wildlife across the globe are feeling the heat.

- The summer of 2012 shattered records for **heat** across the country. In June, 170 U.S. cities met or broke record high temperatures including Washington DC, which broke a 148 year old record with 11 straight days that met or exceeded 95 degrees.
- This intense heat has led to **severe drought** conditions in many parts of the country. According to NOAA, at the end of July about 63% of the country was experiencing moderate to exceptional drought conditions.<sup>31</sup>
- **Wildfires** that burned through Colorado in June have cost nearly \$450 million in damage, according to preliminary insurance estimates. It is estimated that over 600 homes have been lost due to these fires so far.
- When Tropical Depression Debby dumped over 20 inches of **intense rain** on Florida in June, it set a record for the earliest arrival of the 4th named storm of the year. Historically, the earliest a 4th named storm has ever formed was August 23.
- A series of "Derechos" (**severe wind storms**) moved through the Midwest and Mid-Atlantic on June 29, 2012, leaving over two million people without power from this unique extreme weather event.<sup>32</sup>
- **Extreme downpours** are now happening 30 percent more often nationwide than in 1948. New England has experienced the greatest change, with intense rainstorms and snowstorms now happening 85 percent more often. New York, Pennsylvania and Missouri each experienced an increase in extreme downpour frequency of more than 50 percent.<sup>33</sup>
- 4 out of 5 Americans live in counties affected by federally declared **weather-related disasters** since 2006. Last year's Hurricane Irene, which resulted in the death of 45 people in the 13 states hit by the storm, and an estimated \$7.3 billion in damage.<sup>34</sup>



*“Many people around the world are beginning to appreciate that climate change is underway, that it’s having consequences that are playing out in real time and, here in the United States, we are seeing more and more examples of extreme weather and extreme climate-related events.”*

**DR. JANE LUBCHENCO**

Administrator  
National Oceanic and  
Atmospheric Administration

7/6/12



# Offshore Wind Energy: An Economic Powerhouse

Tapping America's offshore wind energy resources will greatly benefit our economy. A vibrant offshore wind industry in the U.S. will produce hundreds of thousands of new, high-quality careers while revitalizing manufacturing opportunities and spurring economic development along the Atlantic Coast. At the same time, plugging hundreds of gigawatts of clean, local power into the electricity grid will allow us to lower and stabilize energy prices.

■ **New, High-Quality Jobs:** Wind energy is a proven job-creation engine. Over 75,000 people are already employed in America's onshore wind industry, including more than 30,000 manufacturing jobs.<sup>35</sup> Europe has seen massive economic development benefits from its offshore wind industry (see p. 6) and once America commits to a pipeline of offshore wind energy projects, there is tremendous opportunity to launch similar regional port development and new

career paths here. And like the power itself, the benefits are local: because the components of offshore wind turbines are so large, it is most cost-effective to manufacture and assemble them in close proximity to where they will be deployed. Recent government and industry analyses have found that:

- ▶ \$200 billion in new economic activity and more than 43,000 permanent, high-paying jobs in manufacturing, construction, engineering, operations, and maintenance could result from building offshore wind energy in America.<sup>36</sup>
- ▶ Over 300,000 jobs and a GDP increase of \$30 billion could result from developing 7.7 GW of offshore wind energy in the Mid-Atlantic region.<sup>37</sup>

■ **Critical Energy Supply for Major Demand Centers:** America's East Coast is an ideal location for offshore wind energy because of the region's



Flickr: rdonnely

high electricity demand and population density. This massive power source lies in close proximity to America's largest demand centers, providing an opportunity to meet the region's growing energy needs with clean power. A diverse energy portfolio including offshore wind can reduce the strain on existing sources of power and alleviate congestion during peak demand periods. And wind is there when we need it most: specifically, offshore winds blow strongest during the day and at other times of high demand – such as heat waves<sup>38</sup> – providing a steady stream of much-needed clean power to the grid in areas already suffering from poor air quality.<sup>39</sup> Innovative approaches to offshore transmission can enhance these benefits, by linking up multiple wind energy projects and providing opportunities to connect into several energy markets. (see p. 12)

■ **Lower, More Predictable Energy Prices:** Offshore wind energy can also protect American households and businesses from the volatility of fossil fuel prices. While natural gas prices are currently at unprecedented lows, history suggests that the fluctuations that have always occurred in the fossil fuel market will continue in the future.<sup>40</sup> Because wind is a free fuel source, utilities can lock in at a known price for a longer term, providing certainty and stability to the grid and protecting ratepayers from future fossil fuel price spikes.



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## OFFSHORE WIND ENERGY: ABUNDANT POWER WHEN WE NEED IT MOST

America depends on electricity. At times of peak demand – summer heat waves and winter cold snaps – utilities are often challenged to secure enough power to keep the heat on and air conditioners running. Offshore wind energy, given its close proximity to major demand centers and ability to produce at a high capacity during these times – can greatly benefit our electric grid. Data collected from the meteorological towers at the Cape Wind and Block Island Wind Farm sites have demonstrated that:

- **Offshore winds blow strongest during the day and at times of peak demand such as heat waves.** Data from Cape Wind's meteorological tower has shown that often when electricity demand is high, so are the wind speeds at the project site. In the case of hot weather, this is typically due to the sea breeze effect.<sup>45</sup> Deepwater Wind recently released similar data showing that its project would have been operating near maximum output on two of the hottest days in June, 2012.<sup>46</sup>
- **Offshore wind can help ensure adequate power supply.** When natural gas supplies are constrained, offshore wind can play a significant reliability role by providing a natural hedge against fuel constraints. A DOE study found that during the January 2012 cold snap and natural gas shortage in New England, Cape Wind would have provided over 396 megawatts per hour to the grid, saving a significant amount of natural gas. Over the twelve month period of April 2003 through March 2004, Cape Wind's production would have been sufficient to replace (and thus provide to the gas system) natural gas and hot water for over 105,000 homes for a year.<sup>47</sup>

By diversifying our energy portfolio with offshore wind, we can reduce energy costs while providing greater security in the face of changing global and national issues that cause fossil fuel price fluctuations. Specifically, adding offshore wind energy into regional energy markets could actually lower energy prices across the rate base by providing downward pressure on wholesale electricity prices, knocking out the more costly, less efficient sources of energy.<sup>41</sup> For example, according to the New York Independent System Operator, for every 1,000 MW of wind on the system, consumers save \$300 million in wholesale energy costs.<sup>42</sup> Industry efforts to bring down the cost of offshore wind energy include moving toward larger projects farther offshore – in order to access economies of scale, a higher wind resource, and areas with fewer

conflicts with viewsheds, birds, and other ocean uses.

- **Energy Independence and National Security:** America's dependence on foreign oil and other fossil fuels is one of the biggest threats to our national security. As retired Brig. Gen. Steven Anderson notes, "*Our dependence on petroleum compromises our national security by making us both strategically and operationally vulnerable...Becoming energy*

*independent must be a top priority for the U.S.*"<sup>43</sup> America spends approximately \$1 billion a day overseas for oil. Instead of pouring this money down the drain, wind gives us the opportunity to invest these funds at home, where our economy sorely needs it.<sup>44</sup> Combined with advancements in electric vehicles, offshore wind energy has the potential to greatly reduce our reliance on foreign and domestic oil (see p. 8).



## INNOVATIVE TRANSMISSION SOLUTIONS

As America looks forward to a future of offshore wind energy along the Atlantic Coast, we must think strategically and build a foundation for efficient and cost-effective development. Innovation transmission solutions have the potential to reduce the cost of offshore wind energy and provide greater system reliability by linking up multiple projects and plugging into multiple electric grids.

- **The Atlantic Wind Connection**, a \$5 billion project proposed by Google and other investors, would create an undersea transmission line from Virginia up to New York.<sup>48</sup> This high voltage line (HVDC) line would have capacity to support 7,000 MW of offshore wind development across the Mid-Atlantic, an area with great wind potential.
- **Deepwater Wind** has proposed to build multiple transmission lines to connect its DWEC project into both the New England and New York energy markets. This is the first project proposed for multiple states, offering an opportunity to increase system reliability in both regions.<sup>49</sup>



“Offshore wind is positioned to play an increasingly important role in powering our businesses, homes, and vehicles while reducing pollution, creating good-paying jobs, and moving our states and our nation toward energy independence. If structured correctly, a robust offshore wind industry would help ensure a strong domestic manufacturing infrastructure, create decent, family-sustaining jobs and maintain the delicate ecological resources where these facilities are sited. Coastal states, in particular, would benefit from a clean energy source close to cities.”

### DAVID FOSTER

Executive Director, Blue Green Alliance

Excerpt from 8/6/12 coalition letter to President Obama on behalf 14 leading labor and environmental partners including United Steelworkers and the Utility Workers Union of America.



Support for offshore wind energy is building all along the Atlantic Coast, as this recent photo from a May, 2012 hearing on Cape Cod demonstrates. Dozens of representatives from business, labor, environmental, and community groups turned out to show support for the Cape Wind project.



# II. CURRENT STATUS OF OFFSHORE WIND ENERGY DEVELOPMENT

**Much progress has been made over the last few years to make offshore wind energy a reality for America, thanks to recent leadership from the federal government and the active engagement of Atlantic Coast states and key public and private stakeholders.**

Since 2010, the Department of the Interior (DOI) has taken several actions to promote the efficient, responsible development of wind energy on the Atlantic Outer Continental Shelf, including:

- Signing a Memorandum of Understanding (MOU) with the Department of Energy (DOE) to coordinate efforts across the many federal agencies needed to advance offshore wind energy development,<sup>50</sup>
- Forming an Atlantic Offshore Wind Energy Consortium with 10 coastal state Governors to facilitate regional coordination,<sup>51</sup> and
- Establishing the “Smart from the Start” program to improve the permitting process and facilitate the rapid, responsible deployment of offshore wind energy.<sup>52</sup>

While significant progress has been made over the last two years in the pursuit of offshore wind energy in the Atlantic as a result of these and other initiatives, many challenges remain including lingering uncertainties in the permitting timeline, unpredictable tax credits, concerns over the current relatively high cost of offshore wind energy, potential siting conflicts, and the intense opposition of fossil fuel-funded special interests.



**Center for Marine and Wetlands Studies staff pull wind monitoring buoys from waters off South Carolina's coast.**

# Permitting Update

## FEDERAL WATERS (at least 3 miles from shore)

The vast majority of America's offshore wind energy resources are in federal waters. The Bureau of Ocean Energy Management (BOEM), the federal agency within DOI responsible for leasing offshore wind energy projects, has been very active since the launch of the Smart from the Start process in 2010. Over the last two years, BOEM has:

- Formed intergovernmental Task Forces with federal, state, local, and tribal officials in 10 Atlantic Coast states — Maine, Massachusetts, Rhode Island, New York, New Jersey, Maryland, Delaware, Virginia, North Carolina, and South Carolina — to share information and gather input as the permitting process unfolds;<sup>53</sup>
- Announced formal Wind Energy Areas (WEAs) in federal waters off

the coast of six states — over 2,000 square nautical miles;

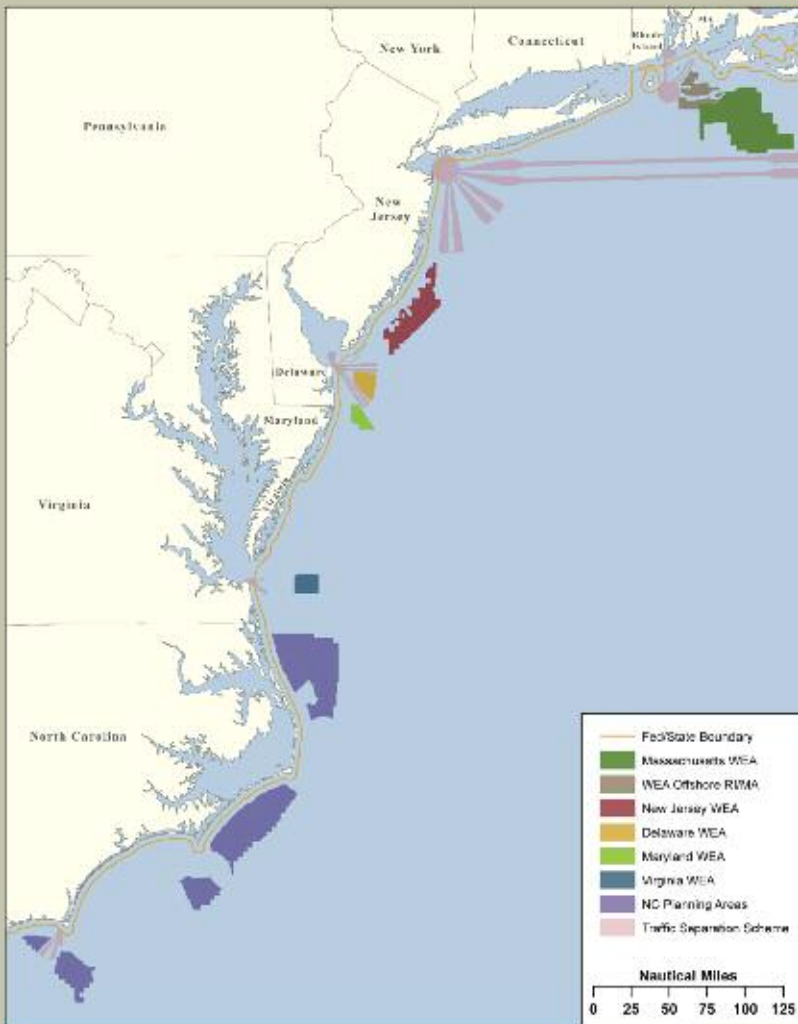
- Completed an Environmental Assessment of four WEAs, with two more underway. Once this step in the environmental review process is completed, BOEM can move forward with leasing.
- Began the formal process to review applications for a utility-scale project off the coast of New York and a floating turbine demonstration project in Maine.

Federal action to advance offshore wind energy has helped spur private sector interest and investment in our offshore wind market. In addition to the Wind Energy Areas and project proposals along the coast, BOEM is also considering a permit application from the Atlantic Wind Connection,<sup>54</sup> a Google-funded project that would create an offshore transmission line connecting offshore wind energy projects from Virginia up to New York (see p. 21).

## STATE WATERS (within 3 miles from shore)

Several project proposals for state waters in the Atlantic are advancing through separate permitting processes that are unique to each state. Rhode Island, New Jersey, and South Carolina are all currently considering proposals in their near-shore waters. With closer proximity to shore and less clarity regarding agency engagement in identifying locations in some states, NWF plans to thoroughly review each state project in comparison to proper siting criteria (see p. 21). For more details on these projects, see State Summaries, p. 26.

## ATLANTIC OFFSHORE WIND ENERGY & PLANNING AREAS



Source: BOEM

## CURRENT STATUS OF FEDERAL PERMITTING FOR OFFSHORE WIND ENERGY IN THE ATLANTIC OCEAN

The following chart tracks the Bureau of Ocean Energy Management's progress in permitting offshore wind energy since the 'Smart from the Start' process was launched in 2010. Cape Wind, interim leases, and state waters projects are not reflected here, nor are the many other permits required from additional state and federal agencies. More details for each state can be found in the State Summaries, p. 26.

KEY PERMITTING PROCESS MILESTONES	ME	MA	MA/RI	NY	NJ	DE	MD	VA	NC	SC
<b>Initiate State Intergovernmental Task Force*</b> BOEM-led Task Force including state, federal, local, and tribal representatives that serves as a forum for informing government stakeholders, identifying conflicts, and collecting input throughout the leasing process.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Request for Interest / Determination of Competitive Interest</b> BOEM issues a formal request for industry interest in a potential Wind Energy Area to determine if a competitive leasing process will be needed.	✓*	✓	✓		✓	✓	✓	✓		
<b>Call for Information</b> BOEM issues a formal request to collect information from interested stakeholders about potential Wind Energy Areas (WEA).		✓	✓		✓	✓	✓	✓		
<b>Wind Energy Area identification</b> Based on information received in the Call, BOEM finalizes a WEA to be considered for leasing.		✓	✓		✓	✓	✓	✓		
<b>Environmental Assessment</b> Formal National Environmental Policy Act review process where BOEM must analyze any potential adverse impacts on the environment that could result from leasing activities in the WEA. If a 'Finding of No Significant Impact' is reached, BOEM can move forward and issue leases.		✓	✓		✓	✓	✓	✓		
<b>Leases Granted</b> BOEM issues leases to developers conveying the right to submit plans (for Site Assessment and Construction & Operations) for specific sites, including mitigation measures to ensure coastal and marine wildlife are not placed at risk. If more than one company is interested in leasing a specific area, leases will be granted via auction based on state-specific factors.										
<b>Site Assessment Plans Approved/Denied</b> Developers submit a detailed Site Assessment Plan for collecting data needed to design Construction and Operations Plans.										
<b>Environmental Impact Statement</b> Once a developer submits a Construction & Operations Plan, a comprehensive environmental review of the proposed project will occur. If BOEM approves the plan, the 25 year 'Operations Term' of the lease begins and construction may commence.										
<b>Offshore Wind Energy Project/s Online</b>										

\* indicates a project-specific process for unsolicited lease request



# Overcoming Market Challenges

For all of the promise offshore wind energy holds, a number of key challenges remain. Current market conditions — including insufficient and unpredictable policies and incentives, historically low natural gas prices, and an uncertain permitting process — have created significant hurdles for offshore wind developers to get projects over the finish line. The following actions are critically needed to improve the market opportunities for offshore wind energy:

## ■ **Prioritize Offshore Wind Energy:**

Policies that prioritize clean energy, such as renewable electricity or portfolio standards, send a strong market signal and stimulate investment in local clean energy projects. Many Atlantic Coast states have requirements that a specific percentage of the state's electricity come from renewable sources. New Jersey has taken one step further by creating specific credits for offshore wind energy within its Renewable Portfolio Standard and providing tax incentives for investment. These efforts must be expanded along the coast to create more favorable markets for offshore wind energy and direct investment toward local renewable energy generation.

## ■ **Provide Predictable Financial Incentives for Renewable Energy:**

Like many emerging energy technologies, offshore wind requires the commitment and investment of our federal government to get up and running in the early stages of development. Market conditions must be improved for wind to compete with already established fossil fuels that still receive significant taxpayer subsidies — as much as \$52 billion annually.<sup>55</sup> At the end of 2012, the current Investment Tax Credit for offshore wind energy will expire. Congress must extend this much-needed tax incentive to

help level the playing field and provide offshore wind energy with a fair shot to compete with other sources of energy that have benefitted from taxpayer support for decades. Additionally, the offshore wind manufacturing supply chain needs to be supported in America through the Production Tax Credit and the Advanced Energy Project Credit (48C), which have successfully spurred growth in the clean energy manufacturing sector. It is critical that we build on the success of these tax credits and provide predictable funding to keep this vital industry growing.

## ■ **Secure Buyers for Offshore Wind Energy:**

Offshore wind developers must have committed buyers for their power in order to secure financing and move forward with construction. State and federal leaders have a major role to play in this, as engagement is required at the highest levels in order to facilitate power purchase contracts between project developers, local utilities, and other potential buyers. In particular, a new report has found that coordinated commitments to purchase offshore wind power will help lower costs significantly, making offshore wind power highly competitive and providing sufficient market demand to attract major investment in U.S. facilities.<sup>56</sup> Two recent announcements have the potential to significantly impact the market for offshore wind energy:

- On July 31, the New England Governors passed a resolution committing to develop a plan for coordinated purchasing of renewable power by 2013.<sup>57</sup>
- August 2012, DOD and DOI signed an agreement that includes an Offshore Wind Partnership plan and

specifically mentions the potential for military commitments to purchase power as an opportunity to advance offshore wind energy projects.<sup>58</sup>

## ■ **Promote Research and Development of Offshore Wind Energy:**

The Department of Energy (DOE) has made \$43 million in funding available over 5 years to support 41 projects that can speed technical innovations, drive down costs, and accelerate the deployment of offshore wind energy by reducing market barriers such as supply chain development, transmission, and infrastructure needs. DOE and other key federal and state agencies should continue to promote research that helps remove barriers to offshore wind development, including advancements in turbine, wind blade, energy storage, and transmission technologies.

## ■ **Hold All Energy Sources Accountable for Air & Water Pollution:**

A national energy policy is urgently needed that prioritizes clean energy for America and requires stringent pollution reductions from all power sources — including limits on carbon and other air pollution as well as safeguards against contamination of our water and land from the mining, processing, and burning of fossil fuels. Most of the Northeast and Mid-Atlantic States participate in the Regional Greenhouse Gas Initiative, and these state leaders are currently deliberating improvements that will strengthen the program and provide greater incentives for renewable energy like offshore wind. Offshore wind power and other clean energy technologies will continue to face a challenging market until the true cost of all energy sources are taken into account.

## STATUS OF POLICY ACTIONS TO ADVANCE OFFSHORE WIND ENERGY MARKETS

For more details on a specific state's efforts, see [State Summaries p. 26](#).

	OFFSHORE WIND ENERGY GENERATION GOAL	POLICIES THAT BENEFIT OFFSHORE WIND	POWER PURCHASE COMMITMENTS & REGULATORY APPROVALS	POLICIES TO LIMIT CARBON & OTHER GREENHOUSE GAS (GHG) EMISSIONS
<b>NATIONAL</b>	<ul style="list-style-type: none"> <li>The Department of Energy has analyzed a scenario for building 52 GW of offshore wind energy in America by 2030</li> </ul>	<ul style="list-style-type: none"> <li>Offshore Wind Investment Tax Credits, (ITC), Wind Production Tax Credits (PTC), and the Manufacturing Tax Credit (48C) are all set to expire at the end of 2012. The Senate Finance Committee approved Energy Tax Extenders legislation (including ITC, PTC &amp; 48C) in August 2012</li> </ul>	<ul style="list-style-type: none"> <li>Department of Defense signed MOU with the Department of the Interior to promote offshore wind development, with specific mention of potential military power purchase contracts (2012)</li> </ul>	<ul style="list-style-type: none"> <li>New regulation to reduce carbon pollution from power plants proposed by EPA in March 2012</li> </ul>
<b>REGIONAL</b>		<ul style="list-style-type: none"> <li>New England Governors (NEG) unanimous Resolution to develop a plan for coordinated purchasing of renewable energy (2012)</li> </ul>		<ul style="list-style-type: none"> <li>Regional Greenhouse Gas Initiative (RGGI) — market based emissions reduction program</li> </ul>
<b>ME</b>	<ul style="list-style-type: none"> <li>5 GW by 2030</li> </ul>	<ul style="list-style-type: none"> <li>Renewable Electricity Standard (RES): 50% by 2017 (10 % from new sources)</li> </ul>		<ul style="list-style-type: none"> <li>RGGI</li> </ul>
<b>NH</b>		<ul style="list-style-type: none"> <li>RES: 25% by 2025</li> </ul>		<ul style="list-style-type: none"> <li>RGGI</li> </ul>
<b>MA</b>	<ul style="list-style-type: none"> <li>2 GW wind energy by 2020 (both on &amp; offshore wind)</li> </ul>	<ul style="list-style-type: none"> <li>Renewable Portfolio Standard (RPS): 15% by 2020, increasing 1% per year</li> <li>Green Communities Act 2012 update: expanded long-term renewable energy contracting program (7% of load)</li> </ul>	<ul style="list-style-type: none"> <li>Cape Wind contracts signed with National Grid (2010) and NSTAR (2012)</li> </ul>	<ul style="list-style-type: none"> <li>Global Warming Solutions Act requires GHG emissions to be 25% below 1990 levels by 2020 and 80% by 2050</li> <li>RGGI</li> </ul>
<b>RI</b>		<ul style="list-style-type: none"> <li>RES: 16% by 2019</li> <li>2009 legislation to support long-term power contracts</li> </ul>	<ul style="list-style-type: none"> <li>Block Island Wind Farm contract signed with National Grid (2010)</li> </ul>	<ul style="list-style-type: none"> <li>RGGI</li> </ul>
<b>CT</b>		<ul style="list-style-type: none"> <li>RPS: 27% by 2020</li> </ul>		<ul style="list-style-type: none"> <li>Global Warming Solutions Act requires GHG emissions to be 10% below 2001 levels by 2020 and 80% below 2001 levels by 2050</li> <li>RGGI</li> </ul>
<b>NY</b>		<ul style="list-style-type: none"> <li>RES: 30 % by 2015</li> </ul>		<ul style="list-style-type: none"> <li>Carbon reduction goal: 80% reduction in GHG emissions from 1990 levels by 2050</li> <li>RGGI</li> </ul>
<b>NJ</b>	<ul style="list-style-type: none"> <li>1,100 MW</li> </ul>	<ul style="list-style-type: none"> <li>RPS: 23% by 2021; including a carve out to support 1,100 MW of offshore wind through an offshore wind renewable energy credit (OREC)</li> <li>100% tax credit for \$50+ million capital investments in offshore wind energy</li> </ul>	<ul style="list-style-type: none"> <li>NJ BPU currently reviewing Fishermen's Energy state waters project</li> </ul>	<ul style="list-style-type: none"> <li>Global Warming Response Act requires GHG emission reductions to be reduced to 1990 levels by 2020 and to 80 % below 2006 levels by 2050.</li> </ul>
<b>DE</b>		<ul style="list-style-type: none"> <li>RES: 25% by 2025, with 3.5 multiplier for offshore wind energy off DE coast by May, 2017</li> </ul>		<ul style="list-style-type: none"> <li>RGGI</li> </ul>
<b>MD</b>		<ul style="list-style-type: none"> <li>RES: 20% by 2022</li> <li>State bill to create ORECs for 200 MW of offshore wind development passed House in 2012</li> </ul>		<ul style="list-style-type: none"> <li>Greenhouse Gas Reduction Act requires GHG emission reductions of 25 % below 2006 levels.</li> </ul>
<b>VA</b>		<ul style="list-style-type: none"> <li>Voluntary RES: 15% by 2025 (with multiplier credit for offshore wind)</li> <li>VA Offshore Wind Development Authority established (2010)</li> </ul>		<ul style="list-style-type: none"> <li>RGGI</li> </ul>
<b>NC</b>		<ul style="list-style-type: none"> <li>RES: 12.5% by 2021</li> </ul>		
<b>SC</b>				
<b>GA</b>				
<b>FL</b>				



### III. PROTECTING WILDLIFE

**The Atlantic Ocean and its coastal areas are home to thousands of species of fish, sea turtles, birds, whales, and other wildlife that sustain our economy and our imagination. Like all ecosystems across the planet, however, the Atlantic faces challenges as diverse as its wildlife. Pollution, diminishing fish stocks, and habitat loss are markers of society’s mismanagement of this vast but fragile resource, and climate change adds an ominous new dimension: sea level rise endangers wildlife by inundating vital foraging and nesting habitat for birds, fish, and sea turtles, while the warmer, more acidic waters threaten to destabilize already stressed food webs.**

Dramatically cutting carbon pollution — by replacing dirty energy with clean alternatives like offshore wind — is the best path forward if we are to protect coastal and marine wildlife from these dangers of a warming world. But even renewable energy must be designed with nature in mind.

Environmentally responsible development of our offshore wind energy resources will require engaging a broad range of key stakeholders to ensure that projects are located, designed, and operated in a manner that protects sensitive habitats, migration corridors, and wildlife populations.

### Potential Impacts

Europe has been building offshore wind energy projects for over two decades, and has been able to avoid and minimize many of the impacts to local wildlife. A recent synthesis of European research and preliminary U.S. data on offshore wind-wildlife interactions (see p. 19) indicates that minimizing harm to our sensitive coastal and marine wildlife is possible. However, activities associated with the design, construction, and operation of offshore wind energy projects does create conditions — including habitat alteration, electromagnetic fields, noise from surveying the ocean floor

and securing foundations (pile-driving), increased or altered vessel traffic, and artificial reef effects — that have the potential to temporarily or permanently affect fish and wildlife.<sup>59</sup>

Given these potential impacts, it is critical that appropriate planning, broad stakeholder outreach, use of best practices, and comprehensive environmental review of potential projects occurs to ensure that marine and coastal habitats, fishery resources, and wildlife species such as whales, sea turtles, shorebirds, and sea ducks are not placed at risk.



## KEY FINDINGS OF RECENT WIND AND WILDLIFE RESEARCH

The following information summarizes scientific studies completed in Europe and the U.S. over the last two decades. While these findings indicate that it is possible to avoid and minimize impacts to wildlife, additional research is needed to verify these findings at specific locations.

### Birds & Bats

- Bird density is significantly lower in offshore environments than it is in terrestrial environments.<sup>60</sup>
- Birds have a strong tendency to avoid offshore wind facilities<sup>61</sup> and energy spent to avoid turbines at one project during migration is likely insignificant compared to those of weather-related route diversions.<sup>62</sup>
- Most seabirds and waterfowl usually fly below the area swept by turbine blades while nocturnally migrating and shorebirds usually fly above swept area.<sup>63</sup>
- Bats are primarily land-based, and the few species known to forage and migrate offshore primarily fly below the area swept by turbine blades.<sup>64</sup>
- Current, bird-safe warning light designs are available for installation on offshore wind facility structures to avoid the bird mortality issues associated with older designs.<sup>65</sup>



Flickr: Gary Yankech

### Marine Mammals & Sea Turtles

- Abundance of certain marine mammals may be reduced in the vicinity of an offshore wind facility during the entire construction period, returning in some cases within hours after construction activities end.<sup>66</sup>
- In some cases, site-specific sound impacts to marine mammals and sea turtles from installation and decommissioning of offshore wind facilities can be effectively mitigated using known and validated techniques.<sup>67</sup>
- Boat traffic during construction, maintenance, and decommissioning can pose a strike threat to mammals and turtles; however, this risk can be reduced with dedicated shipboard observers, aerial monitoring, speed limits, and other safeguards and restrictions.<sup>68</sup>



Flickr: pennstative

# Strategies to Protect Wildlife

There are many ways to ensure that wildlife is protected as offshore wind energy projects are sited, constructed, and operated in the Atlantic Ocean. Sound science and the engagement of key stakeholders are both essential for guiding project siting decisions and developing robust best practices for the development of our offshore wind resources.

Technological advancements now allow projects to be sited far offshore in deep water, which greatly reduces potential conflicts with migratory birds and other coastal wildlife. Still, a framework for siting individual projects

is needed that prioritizes protecting fish and wildlife habitat, while providing flexibility to address site-specific conditions. Identifying project locations that avoid sensitive, high-conflict areas is the first key step, followed closely by minimizing any remaining impacts through scientifically-derived best practices and standards required for the design and operation of offshore wind projects. Industry and government are working to improve techniques and develop new technologies for reducing noise, maintaining safety zones, and monitoring for impacts.

The National Ocean Council has

initiated a process for regional coastal and marine spatial planning, which calls for an unprecedented degree of collaboration among federal and state agencies and other key stakeholders to consolidate ocean data and stakeholder input.<sup>69</sup> Through this process, as well as BOEM's "Smart from the Start" permitting process, and efforts by states including Massachusetts, Rhode Island, New York, New Jersey, and Maryland, studies are underway to inventory and compile available information, analyze potential impacts to natural and cultural resources, and identify and fill prioritized data gaps (such as the Atlantic Marine Assessment Program for Protected Species).<sup>70</sup>

While huge strides have been made in recent years to inform offshore wind development decisions, continued and enhanced collaboration among key public, private, and non-governmental interests is necessary to ensure locations with the fewest wildlife and habitat conflicts are chosen and formal standards for wildlife protection are included throughout the permitting process.

## SPECIES SPOTLIGHT: NORTH ATLANTIC RIGHT WHALE

**The North Atlantic Right Whale is one of the most critically endangered animals in the world, with an estimated population of only 350-450 individuals. Right Whales are producing a very low number of calves, and the National Marine Fisheries Service (NMFS) has warned that the loss of even a single mature female could affect the Right Whale's long-term viability.<sup>72</sup> The areas under consideration for offshore wind development in the Atlantic overlap with the migratory corridor for Right Whales, between summer foraging grounds near Maine, Massachusetts, and Rhode Island and their winter calving grounds off Georgia and Florida.<sup>73</sup>**

**Most migration is done by reproductively mature females, pregnant females, and mothers and calve pairs whose conservation is most vital to the Right Whale conservation.<sup>74</sup> Efforts to survey and research the whales during migration have not been significant to date, though it is thought that mothers and calves may have a greater presence at the surface, making them more vulnerable to vessel collisions — the leading cause of mortality for the Right Whale. Pregnant mothers and calves, if displaced by acoustic disruption, might also be more vulnerable to predation.**

**Key measures needed to protect Right Whales include seasonal restrictions on surveying and pile-driving activities, ship speed restrictions, sound reduction technologies, exclusion zones, and increased monitoring efforts.**



NOAA

## SAFEGUARDING WILDLIFE

### Identify Appropriate Project Locations

Key features of a siting framework include:

- **Steer projects further offshore.** In general, the abundance and diversity of bird species declines further from the shoreline (see Map).<sup>71</sup>
- **Prioritize areas with strong wind and minimal conflicts.** Areas where current landscape-scale analyses indicate minimal impacts on fish and wildlife should be prioritized, and siting in biologically-sensitive areas (such as shoals, boulder reefs, rocky cobble areas, the mouths of inlets, and areas critical to migration, breeding and wintering) should be minimized.
- **Engage key stakeholders.** Prioritize areas where stakeholder input indicates minimal impacts on other ocean uses such as commercial and recreational fishing, shipping, transportation safety, coastal communities, scenic viewsheds, military readiness, and historic, cultural, and scenic resources.



iStockphoto, www.iStockphoto.com

### Utilize Best Practices and Standards for Offshore Wind Energy Development

Federal offshore wind energy leases, permits, and plan approvals should:

- **Require the use of best management practices and risk-appropriate mitigation strategies** to deter negative impacts (such as project lighting and layout standards, seasonal restrictions, and exclusion zones) and minimize the risks of marine mammal and turtle ship collisions and acoustical disruptions (such as boat speed restrictions, wildlife monitors, and use of best available technology to reduce sound).
- **Require comprehensive, site-specific wildlife monitoring and data collection** that is appropriate to a project's potential risk to wildlife. Data collection approaches must follow uniform standards that facilitate an adequate year-round assessment of specific sensitive birds or marine mammals before and after construction.
- **Provide a scientific assessment for understanding the potential cumulative impacts** on wildlife and marine habitat from all ocean uses, including the scale-up of offshore wind site assessment, construction, and operation activities.
- **Include strategies for adaptive management**, a key method for improving siting and operations protocols for offshore wind energy development over time using data collected from the first round of projects in the water. Development of specific guidance for adaptive management is needed now so that developers, investors, stakeholders, and other regulatory agencies can plan for future data collection requirements. Adaptive management should not be used to defer analysis of potential impacts upfront or prevent best practice and mitigation requirements.



# Recommendations to Ensure Wildlife Protections

All energy development — including clean energy like offshore wind — should not cut corners or adversely affect wildlife. Scientific data indicates that Atlantic offshore wind energy can and must meet this standard, and efforts to do so will remove hurdles to launching a robust offshore wind industry in America. NWF and our partners along the Atlantic Coast are actively engaged to ensure that wildlife is protected throughout the process.

Overall, the permitting process for offshore wind energy development is moving forward on the right track to avoid and minimize impacts to sensitive ocean resources. As outlined in Section II, over the last two years BOEM's Intergovernmental Task Forces — involving key representatives from federal, state, local, and tribal governments — have taken a very collaborative approach in determining suitable Wind Energy Areas along the Atlantic Coast. Using available ecological baseline analyses in places like Rhode Island and New Jersey, the Department of the Interior's "Smart from the Start" process has identified appropriate locations for potential

offshore wind development in the Atlantic Ocean. Massachusetts and Rhode Island have formed advisory groups for wildlife habitat and commercial fishery experts — a model all states should follow to ensure decisions are informed by these key stakeholders.

Looking forward, the current permitting process (see p. 15) will offer leases to developers within identified Wind Energy Areas this year that include mandatory requirements to avoid and minimize harm to wildlife. Measures such as monitoring requirements, boat speed restrictions, seasonal restrictions, exclusion zones, sound reduction technologies and methods, and ramp-up procedures prior to commencing certain surveys are critical for ensuring wildlife is protected during the data collection process. So long as robust measures adequate to protect critical species like the North American Right Whale (see p. 20) are required, NWF believes that allowing developers to move forward, while state and federal regulators work to address the data collection needs identified above, creates an efficient permitting timeline for this critical



**Researchers from Tetra Tech EC, Inc. and the University of Maine installing wildlife monitoring equipment off of Block Island, Rhode Island.**

clean energy source without sacrificing environmental review. A comprehensive, project-specific environmental analysis will be required once developers submit detailed construction and operations plans for their projects.

Key stakeholders such as marine wildlife experts, advocacy organizations, research institutions, industry, and state and federal regulators must continue to work together to ensure wildlife is protected in our pursuit of offshore wind energy. To summarize, key needs for protecting wildlife include:

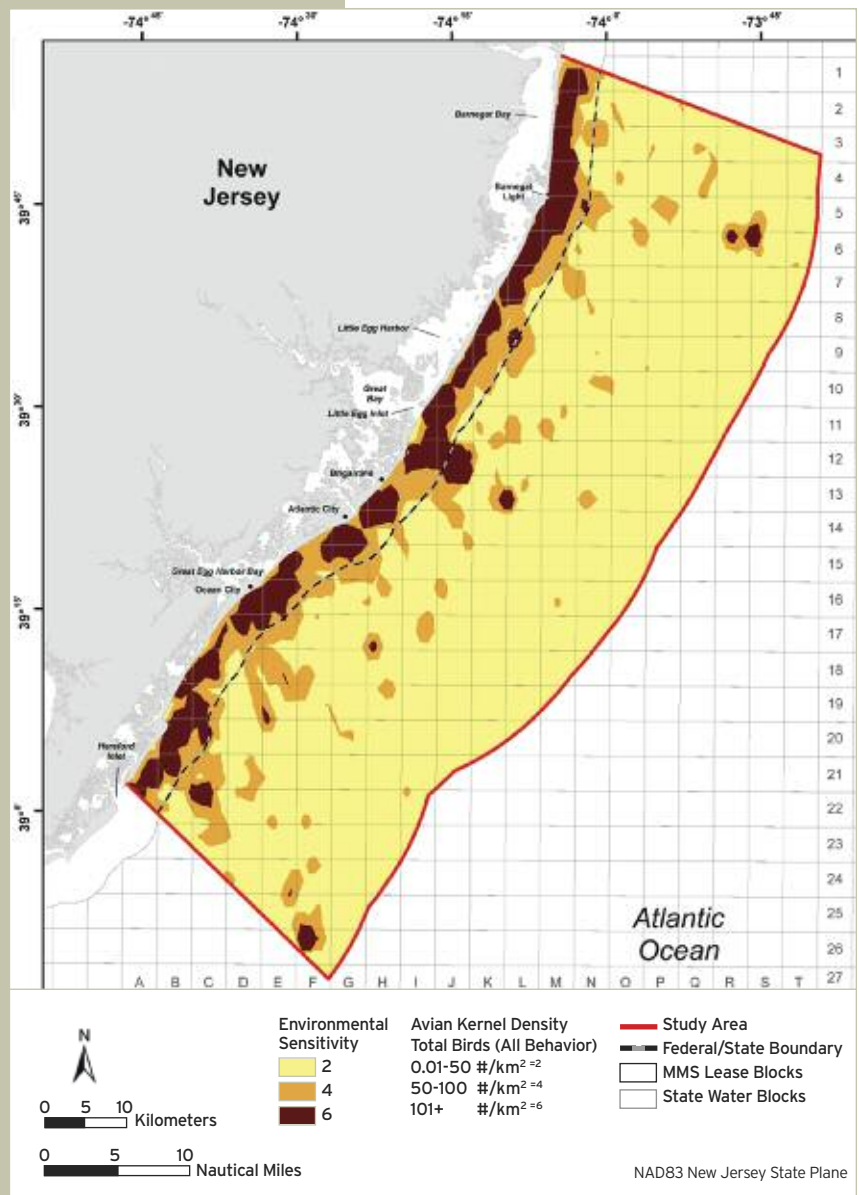
- **Enforceable measures** to avoid, minimize, and mitigate potential site-specific impacts to wildlife;
- **Clear federal guidance** for developers on risk-appropriate data collection requirements and methodology; and
- **A coordinated effort** to fill baseline and site-specific data gaps and expand opportunities for key stakeholders to engage and provide input throughout the process.



## NEW JERSEY STUDY FINDS OFFSHORE WIND AND WILDLIFE PROTECTION ARE COMPATIBLE

In July, 2010, the New Jersey Department of Environmental Protection released one of the most comprehensive environmental and socioeconomic studies to date of the impact of offshore wind farms. The two-year, \$7 million study focused on 1,360 nautical miles of state and federal waters off the New Jersey coastline.<sup>75</sup> Key findings included:

- The highest density of bird populations was found closest to the shore. Further offshore, beginning about 7.6 miles out, the number of birds significantly declined. These findings were more pronounced in winter than in summer.
- When birds were present in the offshore study area, they were consistently concentrated near shoals (shallow areas offshore).
- Of the more than 70,000 flying birds recorded, 3,433 (4.8%) were found in the potential turbine rotor zone. Almost one-third of the birds found in the potential turbine zone were Scaup (*Aythya* spp.) that were recorded during a severe cold snap in January 2009, illustrating the potential effects of a major weather event on avian movements.
- Dolphins were the most common marine mammals observed in the study area, with far fewer sightings of other mammals such as whales and seals. Additionally, there were few sightings of sea turtles, with just two species observed and those only during summer months.
- The study also found that mitigation steps could be used to limit negative impacts on birds and marine mammals, including brief turbine shutdowns during peak migration seasons and techniques to ease the strain of noise on dolphins and whales.



Gary A. Buchanan, NJDEP

Researchers from study author, Geo-Marine Inc., conduct wildlife observations off the New Jersey coast.

# IV. RECOMMENDATIONS

National Wildlife Federation is calling for swift action to ensure that responsibly-sited offshore wind energy plays a major role in America's energy future. As this report outlines, many important steps have been taken to begin harnessing the offshore wind energy resources of the Atlantic Ocean. It is clear that state and federal leadership is urgently needed to build on this growing momentum and usher in a massive, new clean energy source for America.



Specifically, NWF and our partners call on our state and federal leaders to take the following actions that are critical for jumpstarting offshore wind energy development in America:

**1. Set a bold goal for offshore wind energy development in the Atlantic Ocean,**

in order to provide clear leadership and vision regarding the important role offshore wind must play in America's energy future and demonstrate that this is a high priority for the federal government and each Atlantic Coast state. The Department of Energy's scenario for achieving 54 GW of cost-effective offshore wind energy by 2030 should be elevated to a national priority, and each Atlantic Coast state should set their own goals for incorporating offshore wind into future energy plans.

**2. Take decisive action to advance offshore wind energy development and jumpstart markets for this emerging industry**

The following specific actions are critically needed to level the playing field for clean energy and create an opportunity for offshore wind power to become a major source of electricity for America:

- **Codify goals** for renewable energy generation — and offshore wind power specifically — through policies such as a renewable electricity standard, in order to send a clear market signal to encourage investment in offshore wind energy.





Flickr: danishwindindustryassociation

➤ **Extend critically-needed tax incentives** including the federal Investment Tax Credit for offshore wind, as well as the Production Tax Credit and Advanced Energy Project Credit needed to support domestic supply chain manufacturing opportunities for wind energy.

➤ **Take direct action** to secure buyers for offshore wind power, including pursuing coordinated procurement strategies among key state and federal entities. State leadership is particularly critical for facilitating and approving power purchase contracts with local utilities.

➤ **Increase funding** to the Departments of Energy and Interior and relevant state agencies to support needed research and facilitate the efficient deployment of offshore wind energy, in order to avoid subsequent impairment of needed financing and power purchase agreements.

➤ **Enact policies** requiring stringent pollution reductions from all power sources, including limits on carbon pollution and other strong air, water, and waste management safeguards for the mining and burning of all fuel sources.

**3. Ensure that offshore wind projects are sited, constructed, and operated responsibly** in order to protect wildlife and avoid local conflicts. Actions to ensure projects are sited responsibly include:

- **Requiring** all offshore wind development to follow clear and enforceable standards to avoid, minimize and mitigate potential site-specific impacts to wildlife.
- **Increasing** site-specific and baseline data collection.
- **Ensuring** that the Department of the Interior, Bureau of Ocean Energy Management, and relevant state

agencies have sufficient staff and resources to manage the learning curve required to sufficiently review and issue multiple offshore wind project leases along the coast.

**4. Increase stakeholder coordination and public engagement** throughout the process to achieve all of the above. Offshore wind energy development decisions should be coordinated with federal, state, tribal, and regional coastal and marine spatial planning efforts in a manner that is consistent with the goals of America’s National Ocean Policy and includes significant stakeholder and public input.

# V. STATE SUMMARIES

## Maine



### WIND POTENTIAL

The 2010 NREL Assessment identified approximately 157 GW of offshore wind energy potential within 50 nautical

miles of Maine's coast.<sup>76</sup> The State of Maine similarly has estimated the Gulf of Maine's offshore wind resource to be 149 GW within 50 nautical miles.<sup>77</sup> Given the depth of Maine's coastal waters, developing the state's vast offshore wind energy potential depends on the advancement of floating turbine technology.

### STATUS OF OFFSHORE WIND ENERGY PERMITTING PROCESS

- BOEM has an active Task Force process underway in Maine, which has held four meetings to date including federal, state, tribal, and local officials.<sup>78</sup>
- October 12, 2011: StatOil North America filed an unsolicited lease application to BOEM for a 12 MW floating turbine demonstration project on the Outer Continental Shelf.<sup>79</sup>
- August 10, 2012: BOEM issued a public notice with details on the StatOil proposal, including a formal

Request for Interest<sup>80</sup> (to solicit public input and determine if other companies are interested in the location) and a Notice of Intent to Prepare an Environmental Impact Statement for reviewing the Construction and Operations plan for the StatOil project once it is submitted.<sup>81</sup>

### PROJECT DETAILS

- **StatOil Hywind Maine:** StatOil North America has proposed to build four 3 MW floating turbines in the deep waters (over 100 meters) off the coast of Maine. The site is roughly 2 to 4 square miles, over 12 miles

### FLOATING TURBINES

Today's offshore wind energy projects are built in relatively shallow water where foundations fixed to the sea floor are possible. Maine, like many places around the globe, has vast areas for potential wind development offshore that are too deep for this traditional construction. Harnessing Maine's vast offshore wind resource will require the development of floating turbines that can generate energy in much deeper (100+ meters) waters. Companies like StatOil have been designing and testing floating turbines for several years. In 2009, StatOil established the world's first floating turbine for a two year trial in Norway, similar to the Hywind project proposed in Maine.<sup>93</sup> Other companies are moving to develop floating offshore wind turbines, including WindPlus<sup>94</sup> — a consortium including Principle Power that in 2011 deployed Windfloat, the 2 MW floating turbine featured here. Windfloat was fully assembled onshore, then towed offshore using a single tug vessel and hooked to a mooring in the waters off Portugal.<sup>95</sup>



offshore.<sup>82</sup> StatOil held 3 public meetings in June 2012 to inform local stakeholders about their proposal.<sup>83</sup>

## POLICY & POLITICAL ENVIRONMENT

- **Clean Energy Policy:** Maine has a requirement that utilities produce 40% of their electricity from renewable energy sources by 2017, 10% of which must come from new renewable energy projects.<sup>84</sup> Maine participates in the Regional Greenhouse Gas Initiative. On July 30, 2012, Governor LePage joined the New England Governors in passing a resolution to coordinate regional renewable energy procurement, including a commitment to issue a joint Request for Proposals for renewable power contracts in 2013.<sup>85</sup>
- Maine has implemented legislation that sets an ambitious goal of producing 5 GW of electricity from offshore wind turbines by 2030.<sup>86</sup>
- June, 2010: Voters approved a \$26.5 million bond package which allocates \$10 million to the University of Maine for the development of a deep water wind energy test site located 20 - 50 miles offshore, and generates \$24.5 million in match funding from federal and other sources for offshore wind energy.<sup>87</sup>

## ACADEMIC & PARTNER SUPPORT

- **University of Maine's Advanced Structures and Composites Center** is widely supported at both state and federal levels for launching offshore wind technology and testing center in Maine.<sup>88</sup> A new Offshore Wind Laboratory is under construction that will position Maine as a global leader in research, design, and deployment of composite technology for floating offshore wind energy turbines.<sup>89</sup>



EDP Renewables North America, LLC

- **DeepCWind**, a University of Maine led-consortium of over 30 academic institutions, industry leaders, utility companies, and nonprofit organizations, is working to establish Maine as a leader in deepwater offshore wind technology.<sup>90</sup> DeepCWind is working to develop a demonstration site where researchers will provide independent, third-party assessment of new deepwater turbine, platform, and foundation designs and conduct geophysical, wind resource, and wave assessment studies.<sup>91</sup>
- The **University of Maine** estimated that the \$20 billion expenditure necessary to develop 5 GW of wind off of Maine's coast would generate about 16,700 new or retained jobs per year for 20 years.<sup>92</sup>

# New Hampshire



Michael D. D'Agostino

## WIND POTENTIAL

The 2010 NREL Assessment lists New Hampshire's offshore wind resource at 3.4 GW within 50

nautical miles of the coast.<sup>96</sup>

## POLICY & POLITICAL ENVIRONMENT

- **Clean Energy Policy:** New Hampshire has a requirement that utilities secure at least 24.8% of their electricity from renewable energy sources by 2025.<sup>97</sup> New Hampshire participates in the Regional Greenhouse Gas Initiative

(RGGI). On July 30, 2012, Governor Lynch joined the New England Governors in passing a resolution to coordinate regional renewable energy procurement, including a commitment to issue a joint Request for Proposals for renewable power contracts in 2013.<sup>98</sup>

## ACADEMIC & PARTNER SUPPORT

- **University of New Hampshire's Center for Ocean Renewable Energy (CORE)** is actively engaged in offshore wind research, having received a \$700,000 DOE grant in 2009 to participate in the DeepCWind consortium led by the University of Maine.<sup>99</sup>



# Massachusetts



## WIND POTENTIAL

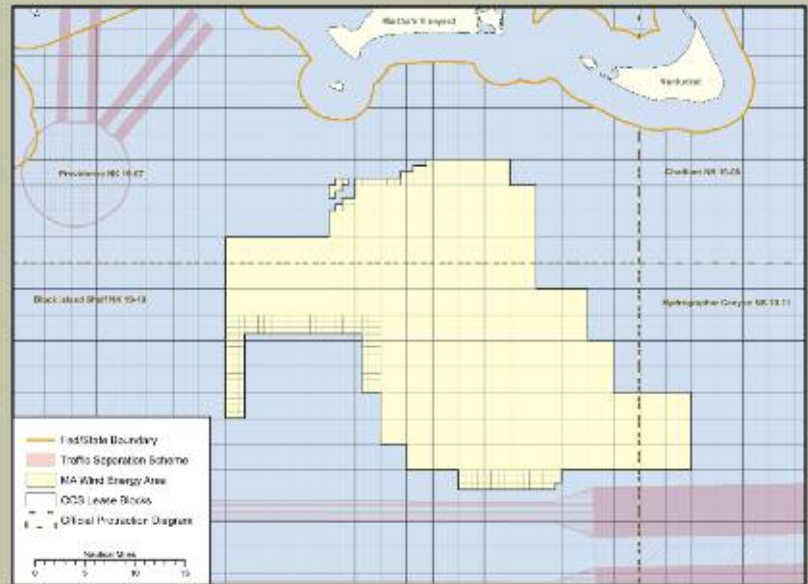
The 2010 NREL assessment lists Massachusetts' offshore wind resource at 200 GW within 50

nautical miles of the coast.<sup>100</sup> The Commonwealth of Massachusetts has estimated that over 6 GW of offshore wind energy generation potential is available in the Wind Energy Areas identified off its shores.<sup>101</sup>

## STATUS OF OFFSHORE WIND ENERGY PERMITTING PROCESS

- In 2010, the Department of the Interior issued the first commercial lease for offshore wind energy to Cape Wind Associates to build a 486 MW project in Nantucket Sound and approved its Construction and Operations Plan.<sup>102</sup>
- In 2010, Massachusetts and Rhode Island signed a Memorandum of Understanding to declare a shared stake in the development of offshore wind projects in federal waters off both state's coasts, in a so-called "Area of Mutual Interest."<sup>103</sup>
- BOEM has had an active Task Force process underway in Massachusetts since 2009 including key federal, state, tribal, and local officials.<sup>104</sup> The Massachusetts Task Force has held 10 meetings to date, four in conjunction with the Rhode Island Task Force to ensure coordination on the Area of Mutual Interest.
- BOEM has identified two formal Wind Energy Areas (WEA) off the coast of Massachusetts. The Massachusetts WEA is the largest area BOEM is considering for any state, covering nearly 1,000 sq. miles roughly 15 miles south of Nantucket, MA.<sup>105</sup> The second is the Rhode Island-Massachusetts WEA, a

## MASSACHUSETTS WIND ENERGY AREA



Source: BOEM

roughly 257 sq. mile area within the Area of Mutual Interest.<sup>106</sup> The Commonwealth of Massachusetts estimates that these areas have the potential to provide 6 GW of clean energy.<sup>107</sup>

- July 2012: BOEM released an Environmental Assessment for the RI-MA WEA regarding any potential impacts resulting from issuing leases to developers for site assessment and characterization activities in this area.<sup>108</sup> BOEM issued a Notice of Intent to prepare an Environmental Assessment for the MA WEA, expected to be released this fall.<sup>109</sup>
- BOEM has received 10 expressions of interest from developers within the MA WEA and 8 within the RI-MA WEA. Because of this showing of competitive interest, BOEM will grant leases through an auction process. Leases are expected to be issued for these areas in late 2012 or early 2013.<sup>110</sup>

## PROJECT DETAILS

- **Cape Wind Energy Project:** In 2010, the Department of the Interior

issued the first commercial lease to Cape Wind Associates to build a 130 turbine, 486 MW offshore wind energy project in Nantucket Sound and approved its Construction and Operations Plan.<sup>111, 112</sup> The permitting for this project began well before BOEM's Smart from the Start process was established in 2010 and is advancing on a separate track. In March 2012, Cape Wind signed a 15-year contract (currently under review before Massachusetts' Department of Public Utilities) with NSTAR Electric for the sale of 129 MW of the project's output. Combined with a contract secured in 2010 with National Grid for 50% of its output, Cape Wind is now well-positioned to move toward construction.<sup>113</sup> In May 2012, strong support for Cape Wind was clear at a suite of public hearings to discuss the long-term contract with NSTAR.<sup>114</sup> In August 2012, the Federal Aviation Administration found for the fourth time that no hazard to air navigation will result from Cape Wind, clearing the final remaining federal review hurdle for the project.<sup>115</sup> Currently,

there are four pending federal lawsuits, consolidated in a single proceeding, challenging Cape Wind's exhaustive federal environmental and permitting reviews. Cape Wind recently announced the purchase of a new headquarters in Falmouth Harbor, where it will host 50 new permanent jobs.<sup>116</sup>

- The following 10 companies expressed interest in a lease within the MA WEA for projects ranging from 350-3,000 MW:<sup>117</sup>
  - Arcadia Offshore Massachusetts, LLC
  - Condor Wind Energy, LLC
  - Deepwater Wind New England, LLC
  - Energy Management, Inc.
  - enXco Development Corporation
  - Fishermen's Energy LLC
  - Iberdrola Renewables Inc.
  - Neptune Wind, LLC
  - Offshore MW LLC
  - US Mainstream Renewable Power (Offshore) Inc.
- Eight companies expressed interest in a lease within the RI-MA WEA for projects ranging from 350-2,000 MW (see *Rhode Island*, p. 30)

## POLICY & POLITICAL ENVIRONMENT

- **Governor Deval Patrick** has been a strong supporter of offshore wind energy since taking office in 2007 and in 2009 set a goal of developing 2 GW of wind energy by 2020 (both on and offshore).<sup>118</sup>
- **Clean Energy Policy:** Massachusetts has a Renewable Energy Portfolio Standard which requires the state to meet at least 15% of its electricity needs from renewable sources by 2020 and continues to increase by 1% per year thereafter.<sup>119</sup> Massachusetts is a participant in the Regional Greenhouse Gas Initiative and has the most ambitious statutory greenhouse gas reduction requirement in the nation, with a 2020 emission target of 25% below 1990 levels and a 2050 target of 80% below 1990 levels.<sup>120</sup> In 2012,

Governor Patrick signed a significant new energy bill into law that, among other things, requires electric distribution companies to secure additional amounts of renewable energy through long-term contracts between 2013 and 2016.<sup>121</sup> On July 30, 2012, Governor Patrick joined the New England Governors in passing a resolution to coordinate regional renewable energy procurement, including a commitment to issue a joint Request for Proposals for renewable power contracts in 2013.<sup>122</sup>

- **Habitat & Fisheries Working Groups:** Governor Patrick's Executive Office of Energy and Environmental Affairs formed a Habitat Working Group and Fisheries Working Group to bring key stakeholders together to discuss offshore wind energy issues and inform the BOEM permitting process off the coast of Massachusetts. This has proved to be an invaluable forum and NWF believes it should be replicated in other states to ensure quality information is gathered early in the process.
- **New Bedford Marine Commerce Terminal:** In 2010, Governor Patrick announced that a new multi-purpose marine commerce terminal will be built in the port of New Bedford to support the delivery, assembly, and installation of offshore wind turbines as well as shipping and other commercial activities.<sup>123</sup> On July 24, 2012, the Executive Office of Energy and Environmental Affairs (EEA) and the U.S. Environmental Protection Agency (EPA) held a public hearing in New Bedford on the permitting of the proposed terminal, focused on the Commonwealth's proposal for development of a confined disposal facility at the South Terminal location. Broad support for the development of the Marine Commerce Terminal was expressed at the hearing from local residents, businesses, and officials who see

this as a major economic opportunity for New Bedford.<sup>124</sup>

## ACADEMIC & PARTNER SUPPORT

- **New England Clean Energy Center's (NECEC) Offshore Renewables Task Force** was launched in May 2012 to further the offshore wind industry in the region by crafting strategies to foster market creation.<sup>125</sup> NECEC was instrumental in advancing the New England Governor's renewable energy procurement agreement in July 2012.<sup>126</sup>
- **Massachusetts Clean Energy Center's (MassCEC<sup>127</sup>) Wind Technology Testing Center (WTTTC):** On May 18, 2011, the first facility in America capable of testing 100+ meter turbines opened in Charlestown, MA.<sup>128</sup> This project is a joint effort of MassCEC, DOE, and NREL and has received over \$25 million in federal funding to be combined with \$15 million in state funds, and has created approximately 300 clean energy jobs for the Commonwealth.<sup>129</sup>
- **UMass Dartmouth's New England Marine Renewable Energy Center (MREC)** performed its first in-ocean technology test of its National Offshore Renewable Energy Innovation Zone, located just southwest of Nantucket On August 15, 2011.
- **Avian & Whale Research:** The state of Massachusetts is currently pursuing multiple key environmental studies to help inform the offshore wind permitting process. The **New England Aquarium** is collecting data on marine mammals and sea turtles, and the **College of Staten Island** is performing an avian study. The goal of the studies is to determine the presence and abundance of species in the areas under consideration for wind energy development in order to make sound siting decisions.<sup>130</sup>

# Rhode Island



## WIND POTENTIAL

The 2010 NREL Assessment lists Rhode Island's offshore wind resource at 25.6 GW within 50 nautical miles of the coast.<sup>131</sup> A 2008 study commissioned by the State of Rhode Island determined that 15 percent, or approximately 150 MW, or more of Rhode Island's electricity requirement could be supplied by offshore wind farms and that 10 specific areas were suitable for consideration as wind farm locations based on wind speed data.<sup>132</sup> The report further concluded that "the total offshore resource, if fully developed using technology available today and without any additional siting constraints, could supply as much as five times the 15 percent goal."<sup>133</sup>

## STATUS OF OFFSHORE WIND ENERGY PERMITTING PROCESS

### Federal Waters

■ In 2008, the Rhode Island Coastal Resources Management Council (CRMC) began a planning process to develop a comprehensive management and regulatory tool for siting offshore renewable energy projects in Rhode Island Sound (the Rhode Island Ocean Special Area Management Plan, or the Ocean SAMP). Within the Ocean SAMP boundary, a Renewable Energy Zone was identified as the preferred area for offshore wind renewable energy projects. Because the area is located in federal waters, Rhode Island and Massachusetts signed a Memorandum of Understanding documenting the states' mutual agreement to proceed with the development of offshore renewable energy projects in the Renewable Energy Zone, now commonly

referred to as the Area of Mutual Interest.<sup>134</sup>

- BOEM has had an active Task Force process underway in Rhode Island since 2009 including key federal, state, tribal, and local officials.<sup>135</sup> The Rhode Island Task Force has held six meetings to date, four in conjunction with the Massachusetts Task Force to ensure coordination on the Area of Mutual Interest.<sup>136</sup>
- In 2012, BOEM formally identified a Rhode Island-Massachusetts Wind Energy Area (WEA) of roughly 257 sq. miles 15-20 miles off the coast of Rhode Island, within the Area of Mutual Interest.
- In July 2012, BOEM released an Environmental Assessment for the RI-MA WEA to determine any potential impacts resulting from issuing leases to developers for site assessment and characterization activities in this area.
- BOEM has received 8 expressions of interest in the RI-MA WEA.<sup>137</sup> Because of this showing of competitive interest, BOEM will grant leases through an auction process. Leases are expected to be issued for the RI-MA WEA in late 2012 or early 2013.

### State Waters

■ The state of Rhode Island is considering an application for an offshore wind energy project in state waters off the coast of Block Island. An application has been filed by Deepwater Wind for a 5 turbine demonstration project with two undersea transmission lines. Because this line would pass through federal waters, BOEM is the permitting authority for the transmission line up to the mainland and on August 8, 2012 announced that no other companies have expressed interest in this right-of-way application.<sup>138</sup> BOEM will work in partnership with the US Army Corps of Engineers on the

Environmental Assessment for this project and associated transmission line because it covers both state and federal waters.

## PROJECT DETAILS

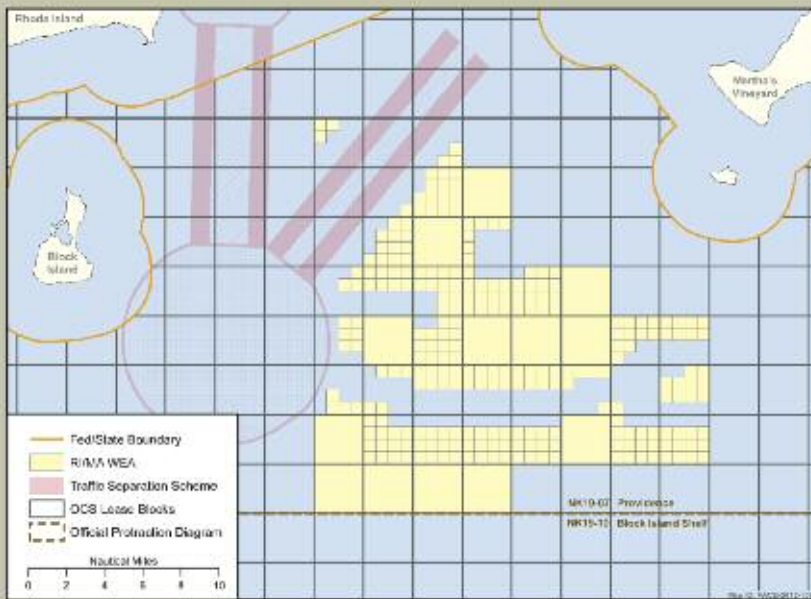
### ■ Block Island Wind Farm (BIWF):

Deepwater Wind has proposed to build a 30 MW demonstration-scale project approximately 3 miles off the southeast coast of Block Island, using 5 state-of-the-art, 6 MW turbines from Siemens Energy.<sup>139</sup> The project also includes a 21-mile transmission cable that will connect the project — and for the first time, Block Island itself — to the mainland electric grid. In August, 2010, the Public Utilities Commission (PUC) agreed to a 20 year Power Purchase Agreement (PPA) with National Grid to buy energy from Deepwater Wind at 24.4 cents/kWh for the first year, with 3.5 percent annual increases.<sup>140</sup> The PPA was originally challenged as commercially unreasonable but was upheld in the Rhode Island Supreme Court in July 2011. Block Island currently generates electricity from burning expensive and highly-polluting diesel fuel, so this project presents a clean, lower cost alternative. Only 10% of the power generated from BIWF will be needed to supply Block Island's electricity needs, and the remaining power will be transmitted back to the grid. Following completion of required state and federal permitting, Deepwater Wind expects to begin construction of the BIWF in 2013-2014.

■ **Deepwater Wind Energy Center (DWEC):** Deepwater Wind's DWEC, proposed for the RI-MA Wind Energy Area, is the largest offshore wind energy proposal in the United States with an estimated 1,000 MW of electricity generating capacity. Located approximately 15-20 miles



## RHODE ISLAND-MASSACHUSETTS WIND ENERGY AREA



Source: BOEM

from the coast in federal waters south of Rhode Island Sound, this project's 150 turbines (each 6 MW) can be used to power multiple states in the northeast. As currently designed, this project will distribute energy via transmission lines to Long Island and southeastern New England, including Rhode Island, Massachusetts, and Connecticut, providing enough electricity to power roughly 350,000 homes and displace over 1.7 million tons of carbon dioxide each year.<sup>141</sup>

- The following eight companies have expressed interest in a lease within the RI-MA WEA for projects ranging from 350-2,000 MW:<sup>142</sup>
  - Deepwater Wind New England, LLC
  - Energy Management, Inc.
  - enXco
  - Fishermen's Energy, LLC
  - Iberdrola Renewables Inc.
  - Mainstream Renewable Power
  - Neptune Wind LLC
  - US Wind, Inc.

### POLICY & POLITICAL ENVIRONMENT

- Since taking office in 2011, **Governor Lincoln Chafee** has been a strong supporter of the offshore wind energy initiatives begun by his predecessor, Republican Governor Donald Carcieri.
- **Clean Energy Policy:** Rhode Island has a Renewable Energy Portfolio Standard which requires the state to meet at least 16% of its electricity needs from renewable energy by 2019.<sup>143</sup> Rhode Island is a participant in the Regional Greenhouse Gas Initiative. On July 30, 2012, Governor Chafee joined the New England Governors in passing a resolution to coordinate regional renewable energy procurement, including a commitment to issue a joint Request for Proposals for renewable power contracts in 2013.<sup>144</sup> Additionally, the Rhode Island legislature has passed several pieces of legislation supporting the development of offshore wind energy, including a

2009 bill that created standards to allow for long-term power contracts.<sup>145</sup>

### ■ Rhode Island Ocean Special Area Management Plan (Ocean SAMP):

In October 2010, following years of research, analysis, and stakeholder engagement, the Rhode Island Coastal Resources Management Council approved the RI Ocean SAMP – a federally recognized tool for guiding coastal management and regulatory decisions, including a series of policies related to the protection of marine wildlife and the mitigation of negative impacts to ocean and coastal habitats.<sup>146</sup> The Ocean SAMP included 1,467 square miles of portions of Block Island Sound, Rhode Island Sound, and the Atlantic Ocean. A 2011 update to the Ocean SAMP clearly identified potential wind development areas designed to avoid sensitive areas, including ecologically important rocky moraines, and impacts to marine species. This has greatly benefitted the process for identifying sites for state waters project sites as well as the federal WEA.<sup>147</sup>

- **Habitat & Fisheries Advisory Boards:** As part of the Ocean SAMP, Advisory Boards for both Habitat and Fisheries were created in order to ensure engagement of key stakeholders in offshore wind permitting decisions.

### ACADEMIC & PARTNER SUPPORT

- **University of Rhode Island's Center of Excellence for Research on Offshore Renewable Energy (RORE)**<sup>148</sup> was established in 2008 to advance research and development of offshore wind and other technologies and position the State of Rhode Island as the national leader in ocean energy. Additionally, *URI's Coastal Resources Center* has also been instrumental in advancing planning for offshore wind energy through the Ocean SAMP process.<sup>149</sup>

# Connecticut



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## WIND POTENTIAL

The 2010 NREL Assessment lists Connecticut's offshore wind resource at 6.4 GW within 50 nautical miles of the coast.<sup>150</sup>

## POLICY & POLITICAL ENVIRONMENT

- **Clean Energy Policy:** Connecticut has a requirement that utilities secure at least 27% (7% from waste-to-energy or combined heat/power projects) of their electricity from

renewable energy sources by 2020.<sup>151</sup> Connecticut has regulations in place requiring a 10% reduction in greenhouse gas emissions from 2001 levels by 2020 and 80% from 2001 levels by 2050, and the state is a participant in the Regional Greenhouse Gas Initiative. On July 30, 2012, Governor Malloy joined the New England Governors in passing a resolution to coordinate regional renewable energy procurement, including a commitment to issue a joint Request for Proposals for renewable power contracts in 2013.<sup>152</sup>



Siemens press picture

# New York



Vanessa M. Dobre

## WIND POTENTIAL

The 2010 NREL Assessment lists New York's combined Atlantic and Great Lakes offshore wind resource at 147.2 GW within 50 nautical miles of the coast.<sup>153</sup>

## STATUS OF OFFSHORE WIND ENERGY PERMITTING PROCESS

- BOEM launched a New York Task Force process in 2010 and has held 2 meetings to date including federal, state, tribal and local officials.<sup>154</sup>
- September, 2011: A lease application was filed for the Long Island – New York City Offshore Wind Project, a 350-700 MW project off the Rockaways.<sup>155</sup>

## PROJECT DETAILS

- **Long Island – New York City Offshore Wind Project:** The Long Island-New York City Offshore Wind Project is a collaborative effort of

New York Power Authority (NYPA), Consolidated Edison of New York (Con Edison), and the Long Island Power Authority (LIPA). These three entities have teamed up to develop a 350-700 MW offshore wind energy project approximately 13 miles southwest of Rockaway Peninsula.<sup>156</sup>

- **Deepwater Wind Energy Center (DWEC):** As described on p. 30, there is a large project moving through the permitting process in Rhode Island Sound that has the potential to meet approximately 10% of Long Island's electricity needs with clean, offshore wind energy. The project includes a proposed New England-Long Island Interconnector (NELI) transmission line that would connect the project with Long Island and New England. Deepwater Wind has submitted a proposal to the Long Island Power Authority (LIPA) for the sale of the power and is currently awaiting a decision that could come as early as the end of 2012.<sup>157</sup>
- **Hudson Canyon Wind Farm:** Deepwater Wind has also submitted a proposal to LIPA to sell power from a 1,000 MW wind farm off of New

York City, approximately 40 miles south of Long Beach Island. The wind farm could also supply power to New York City and northern New Jersey utilizing a transmission network called the Submarine Regional Transmission (SMRT) Line. This project was identified as a priority project in Governor Cuomo's 2011 New York Regional Economic Development Council plan.<sup>158</sup>

## POLICY & POLITICAL ENVIRONMENT

- **Governor Andrew Cuomo** has made many public statements in support of clean energy. In his 2010 book *Power NY*, Cuomo shared his vision for powering New York's economy with clean energy and specifically mentioned that building offshore wind energy projects has the potential to "serve to hedge against unforeseen future increases in fossil fuel prices, create significant economic development opportunities and serve as a strong endorsement of New York's commitment to environmental quality and the new energy economy."<sup>159</sup>

■ **Clean Energy Goals:** New York has clear goals for ramping up clean energy and reducing pollution that causes climate change. In 2009, then Governor Paterson issued an Executive Order (which was reauthorized by Governor Cuomo<sup>160</sup>) setting a goal to reduce greenhouse gas emissions in the state 80% by 2050 and requiring the state to develop a Climate Action Plan to reach the goal.<sup>161</sup> Additionally, New York participates in the Regional Greenhouse Gas Initiative and has Renewable Energy Standard in place requiring that 30% of the state's electricity be generated from renewable energy by 2015.<sup>162</sup>

■ **New York Department of State** is in the process of a major planning effort to amend its Coastal Management Program in order to identify appropriate sites for offshore wind energy projects and

provide greater protection of ocean habitats.<sup>163</sup> A state with an approved Coastal Management Program has the authority to approve or deny a proposed federal action if it may affect the state's coastal resources.<sup>164</sup> Once finalized, this information will be used by BOEM to formally designate a Wind Energy Area for New York.

■ **Energy Highway Task Force:** In his 2012 state of the state address, Governor Cuomo announced the New York Energy Highway — a public-private initiative to upgrade and modernize the state's energy system. A number of influential business, labor, and environmental groups filed comments with the Energy Highway Task Force advocating for the inclusion of offshore wind as part of the energy supply portfolio for the load centers in New York City and Long Island.<sup>165</sup>

■ New York City's Bloomberg Administration has identified offshore wind potential as a key element of the City's push for renewable energy. The Administration estimates that turbines placed offshore from the windy coasts of Queens, Long Island, and Brooklyn could generate up to 10 percent of the city's electricity needs within 10 years.<sup>166</sup>

**FOR MORE INFORMATION ABOUT OFFSHORE WIND ENERGY IN NEW YORK:**

**Wind Works for Long Island:** A coalition of leading business, labor, civic, and environmental groups working to build support for offshore wind energy in New York. More details can be found on the coalition website at: [www.windworks4li.org](http://www.windworks4li.org)





# New Jersey



## WIND POTENTIAL

The 2010 NREL Assessment lists New Jersey's offshore wind resource at 99.7 GW within 50 nautical miles of the coast.<sup>167</sup>

## STATUS OF OFFSHORE WIND ENERGY PERMITTING PROCESS

### Federal Waters

- BOEM has had an active Task Force process underway in New Jersey since 2009, which has held four meetings to date including federal, state, tribal and local officials.
- BOEM has identified a formal Wind Energy Area for New Jersey (see map). The area is approximately 418 square nautical miles and begins approximately 7 nautical miles from shore.
- In February of 2012, BOEM finalized its regional Environmental Assessment of the Mid-Atlantic Wind Energy Areas (New Jersey, Maryland, Delaware, and Virginia). BOEM concluded that no significant impacts would result from issuing leases to developers for site assessment activities in the NJ Wind Energy Area.<sup>168</sup>
- BOEM has received 11 expressions of interest from developers for lease sites within the NJ Wind Energy Area. Because of this showing of competitive interest, BOEM will grant leases through an auction process.<sup>169</sup> Leases are expected to be issued in early 2013.

### State Waters

- July, 2012: Fishermen's Energy received its final permit for a 25 MW offshore wind project in state waters approximately three miles off the

coast of Atlantic City.<sup>170</sup> The New Jersey Board of Public Utilities (NJBPUB) is currently reviewing the project's potential impacts on the state's ratepayers.

## PROJECT DETAILS

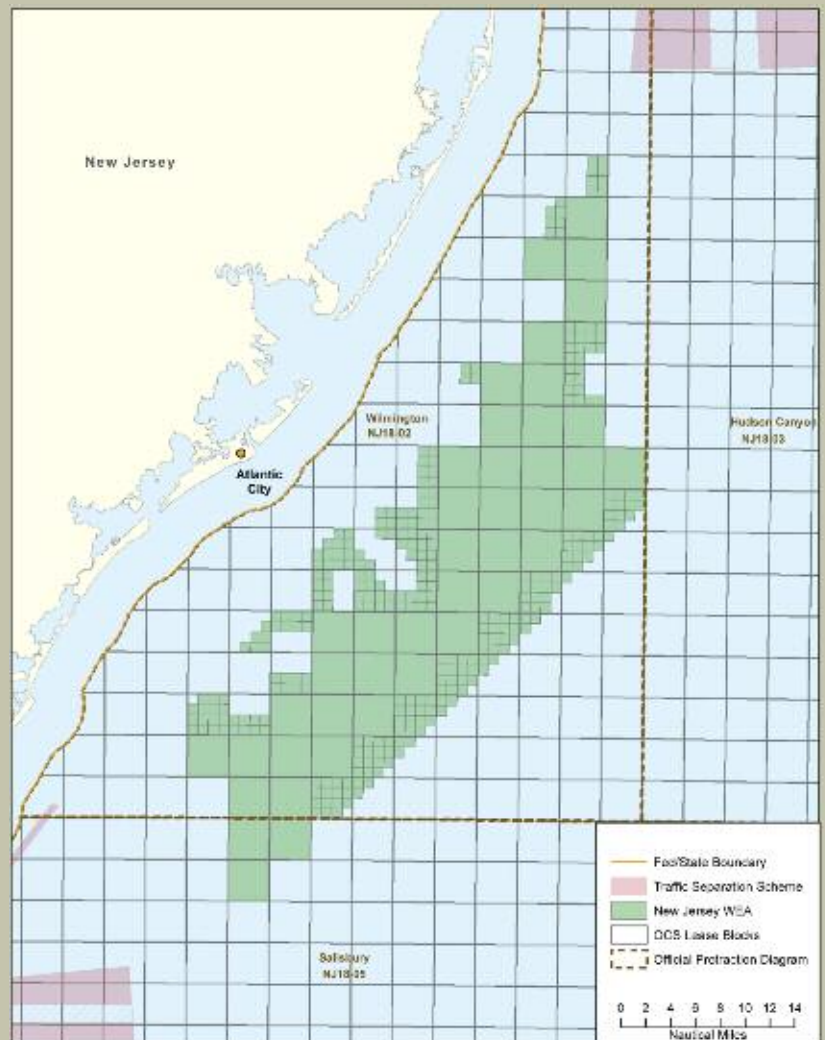
### ■ Fishermen's Atlantic City

**Windfarm:** State waters proposal from Fishermen's Energy for a 25 MW, five-turbine pilot project 2.8 miles off the coast of Atlantic City.<sup>171</sup>

In March 2011, Fishermen's Energy purchased the first floating meteorological buoy to be deployed in the United States. The WindSentinel buoy costs significantly less than standard ocean meteorological towers and can provide vital data for offshore wind developers as they plan their projects.<sup>172</sup>

- The following 11 companies have expressed interest in a lease within

## NEW JERSEY WIND ENERGY AREA



Source: BOEM

the NJ WEA for projects ranging from 350-3,000 MW:<sup>173</sup>

- Bluewater Wind New Jersey Energy LLC
- enXco Development Corporation
- Fishermen's Energy of New Jersey, LLC
- Garden State Offshore Energy I, LLC
- IBERDROLA RENEWABLES, Inc.
- Neptune Wind LLC
- New Jersey Offshore Wind, LLC
- Offshore MW LLC
- TCI Renewables LLC
- US Mainstream Renewable Power (Offshore) Inc.
- US Wind Inc.

## POLICY & POLITICAL ENVIRONMENT

### State & Federal Support

■ In April, 2010, **Governor Chris Christie** outlined an energy policy that included an emphasis on developing offshore wind energy.<sup>174</sup> Previously, former Governor Jon Corzine had issued an Energy Master Plan calling for the construction of 3 GW of offshore wind energy facilities by 2020.<sup>175</sup> In updating the plan, Governor Christie indicated that a goal of 1,100 MW was feasible.

■ **Clean Energy Policy:** New Jersey has a goal of producing 23% of its electricity from renewable energy sources by 2021.<sup>176</sup> On October 7, 2010, Governor Christie signed the *Offshore Wind Economic Development Act*, directing NJ's Board of Public Utilities (BPU) to develop an Offshore Wind Renewable Energy Certificate program (OREC) that calls for a percentage of electricity sold in the state to come from offshore wind energy. This percentage would be developed to support at least 1,100 MW of generation from qualified offshore wind projects. The State will offer 100 percent tax credits for capital investments of \$50 million or more in offshore wind projects, with an initial cap of \$100 million for all projects, which can be extended by



Flickr: DeepCwind

the NJ Department of Environmental Protection (DEP) to \$1.5 billion total.<sup>177</sup> In February 2011, NJ BPU approved new rules implementing the OREC program which will allow offshore wind developers to receive the credit if they can provide a positive economic impact, however the rules have still not been finalized.<sup>178</sup> NJ's *Global Warming Response Act* requires GHG emissions to be reduced to 1990 levels by 2020 and to 80% below 2006 levels by 2050.<sup>179</sup>

■ NJ was an original participant in the Regional Greenhouse Gas Initiative, although Governor Christie pulled the state out in May, 2011. The legislature has voted twice to keep NJ in the program (both vetoed by the Governor) and the Christie Administration is currently being

sued for illegally ending the program without a necessary rulemaking process.

■ June, 2010: Groundbreaking two year, \$7 million report released by the NJ DEP shows minimal environmental impact would occur at sites proposed for several wind energy projects 8 - 20 miles off the coast of New Jersey.<sup>180</sup> (see p. 34)

## ACADEMIC & PARTNER SUPPORT

### ■ Rutgers University Institute of Marine and Coastal Sciences:

Provided the NJ BPU with offshore and coastal wind resource assessments to indicate cost-effective and environmentally sensitive wind energy resource areas.<sup>181</sup>

# Delaware



## WIND POTENTIAL

The 2010 NREL Assessment lists Delaware's offshore wind resource at 14.7 GW within 50 nautical miles of the coast.<sup>182</sup> The University of Delaware has estimated that Delaware has an offshore wind energy resource of over 7 GW, which is four times the current energy consumption of the entire state.<sup>183</sup>

## STATUS OF OFFSHORE WIND ENERGY PERMITTING PROCESS

- BOEM has had an active Task Force process underway in Delaware since 2009 and has held four meetings to date including federal, state, tribal and local officials.<sup>184</sup>
- BOEM has identified a formal Wind Energy Area for Delaware of approximately 122 square nautical miles, roughly 7 nautical miles from shore at the closest point.<sup>185</sup>
- In February of 2012, BOEM finalized its regional Environmental Assessment of the Mid-Atlantic Wind Energy Areas (New Jersey, Maryland, Delaware, and Virginia). BOEM concluded that no significant impacts would result from issuing leases to developers for site assessment activities in the Delaware Wind Energy Area.<sup>186</sup>
- BOEM had previously issued an interim policy lease to Bluewater Wind to build a meteorological wind tower in November of 2009. On April 12, 2012, BOEM announced that NRG Bluewater Wind is the only qualified company interested in the DE Wind Energy Area so there is no competitive interest in the site.<sup>187</sup> A lease for this area is expected to be issued in 2012.

## PROJECT DETAILS

### ■ NRG-Bluewater Wind Offshore

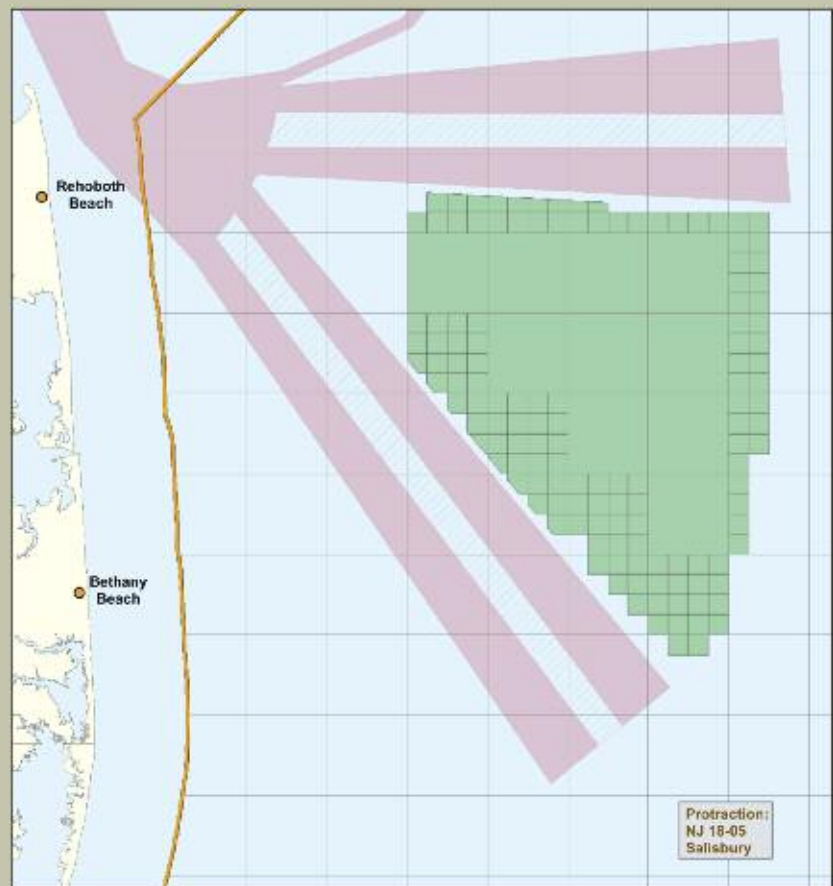
**Wind Park:** NRG Bluewater's proposal for a 200+ MW offshore wind energy project 13 miles off the Delaware Coast was the first utility-scale project in America to secure a Power Purchase Agreement (PPA) with a local utility (Delmarva Power). In December 2011, NRG Bluewater announced they were ending the PPA and putting a hold on active offshore wind energy development due to financial

uncertainty concerning tax incentives and loan guarantees, however it is expected that a lease will be negotiated between BOEM and NRG by the end of 2012.<sup>188</sup>

## POLICY & POLITICAL ENVIRONMENT

- **Governor Jack Markell** is a strong supporter of offshore wind energy.
- **Clean Energy Policy:** Delaware has a Renewable Portfolio Standard requiring that 25% of its electricity be generated from renewable

## DELAWARE WIND ENERGY AREA



- Fed/State Boundary
- Traffic Separation Scheme
- Delaware WEA
- OCS Lease Blocks



Source: BOEM





Siemens press picture

energy sources by 2025.<sup>189</sup>

Regulated utilities can receive 3.5 Renewable Energy Credits for each megawatt hour of offshore wind energy purchased from a project sited off the Delaware coast before May 31, 2017.<sup>190</sup>

### **ACADEMIC & PARTNER SUPPORT**

■ **University of Delaware's (UD) Center for Carbon-free Power Integration:** The Center has been actively involved in the development of offshore wind related policies and legislation and has encouraged commercial

investment in offshore wind projects, including supporting NRG Bluewater Wind's successful bid and hosting a 2 MW research turbine on its coastal campus.<sup>191</sup> In May 2012, UD and NREL submitted a funding proposal to the Department of Energy for an offshore wind testing site off of the Delaware coast to advance technology innovation as well as solutions to non-market barriers facing offshore wind energy.<sup>192</sup> Also in 2012, UD produced a comprehensive report on marine spatial planning and offshore wind energy.<sup>193</sup>

# Maryland



## WIND POTENTIAL

The 2010 NREL Assessment lists Maryland's offshore wind resource at 53.8 GW within 50 nautical miles of the coast.<sup>194</sup>

Similarly, a report prepared by the University of Delaware estimated that the state has offshore wind resource potential of 60 GW.<sup>195</sup> The report found that Maryland could install 14,625 MW of offshore wind energy using current technology — enough power to satisfy 67% of Maryland's current energy needs — while bringing manufacturing jobs to the state and stimulate the economy.<sup>196</sup>

## STATUS OF OFFSHORE WIND ENERGY PERMITTING PROCESS

- BOEM launched a Maryland Task Force process in 2010 and has held five meetings to date including federal, state, tribal and local officials.<sup>197</sup>
- BOEM has identified a formal Wind Energy Area for Maryland. The area is located 10 nautical miles from Ocean City, MD, covering about 94 square nautical miles or roughly 79,000 acres.<sup>198</sup> According to the Maryland Energy Administration, this site could generate as much as 1,000 MW of energy for the state.<sup>199</sup>
- In February of 2012, BOEM finalized its regional Environmental Assessment of the Mid-Atlantic Wind Energy Areas (New Jersey, Maryland, Delaware, and Virginia). BOEM concluded that no significant impacts would result from issuing leases to developers for site assessment activities in the Maryland Wind Energy Area.<sup>200</sup>
- BOEM has received six expressions of interest from developers for the MD Wind Energy Area. Because of this

## MARYLAND WIND ENERGY AREA



Source: BOEM

showing of competitive interest, BOEM will grant leases through an auction process.<sup>201</sup> Leases are expected to be issued in early 2013.

## PROJECT DETAILS

- The following 6 companies have expressed interest in a lease within the MD WEA for projects ranging from 285-1,500 MW:
  - enXco Development Corporation
  - Fishermen's Energy, LLC
  - RES Americas Developments, Inc
  - Energy Management, Inc
  - Arcadia Offshore Maryland, LLC
  - Orisol Energy, Inc

## POLICY & POLITICAL ENVIRONMENT

- **Governor Martin O'Malley** is a strong supporter of renewable energy and his Administration has advanced several initiatives to facilitate offshore wind energy development. In 2007, O'Malley

signed an Executive Order<sup>202</sup> establishing the Maryland Commission on Climate Change which submitted a Climate Action Plan for the state in 2008.<sup>203</sup>

- **Clean Energy Policy:** Maryland has a renewable portfolio standard requiring that 20% of the state's electricity be generated by renewable sources by 2022.<sup>204</sup> Maryland also participates in the Regional Greenhouse Gas Initiative and in 2009 passed the Greenhouse Gas Reduction Act — requiring the state to reduce greenhouse gas emissions 25% below 2006 levels by 2020. In March of 2012, Maryland's Department of the Environment submitted *Maryland's Plan to Reduce Greenhouse Emissions* which prioritized legislation to incentivize offshore wind energy as a key strategy for implementing the plan.<sup>205</sup>

■ **The Maryland Energy**

**Administration** has found offshore wind power to be the state's only homegrown energy source abundant enough to satisfy the state's Renewable Energy Portfolio Standard (RPS), which requires 20% of the state's electricity be generated by renewable sources by 2022.<sup>206</sup>

■ A \$30 million **Offshore Wind Development Fund** was established in Maryland as a result of the 2012 merger between Exelon and Constellation Energy. On July 30, 2012, the **Maryland Energy Administration** issued a request for proposals to conduct geophysical survey studies in the MD Offshore Wind Energy Area using this funding. These necessary studies will provide critical information to developers and reduce the cost of development.<sup>207</sup>

■ Offshore wind energy has received strong support from Maryland's General Assembly in recent years. Governor O'Malley sponsored legislation in 2011 and 2012 to help put Maryland businesses at the forefront of the U.S. offshore wind industry. The *Maryland Offshore Wind Energy Act of 2012 (HB 441)*,<sup>208</sup> which would encourage the development of 200 MW of offshore wind energy off the Eastern Shore, passed the House of Delegates 88 to 47 but did not come to a vote in the Senate. Similar legislation is expected to be proposed during the 2013 legislative session with many stakeholders committed to securing passage.<sup>209</sup>

■ Offshore wind power also maintains strong public support among Maryland voters and a diverse array of stakeholders. Polling results have found that 62% of Marylanders support offshore wind energy and are willing to pay a couple dollars more on their monthly electric bills to develop this local clean energy source.

**ACADEMIC & PARTNER SUPPORT**

■ **Coastal Atlas:** The Maryland Department of Natural Resources, the Maryland Energy Administration, Towson University, the University of Maryland, The Nature Conservancy, and the National Oceanic and Atmospheric Administration have collaborated to develop the Coastal Atlas – an online mapping and planning tool that allows users to explore data for coastal and ocean planning activities, including renewable offshore energy exploration, and identifies potential conflict zones such as areas that are environmentally sensitive or used for military activities.<sup>210</sup>

■ AC Wind has proposed an offshore wind turbine manufacturing facility in Salisbury, MD.<sup>211</sup> Once online, the company plans to employ over 200 workers to build the blades.<sup>212</sup>

**FOR MORE INFORMATION ABOUT OFFSHORE WIND IN MARYLAND:**

The **Marylanders for Offshore Wind Power Coalition** includes county chambers of commerce, faith groups, unions, small business owners, potential supply chain businesses, minority business advocates, civil rights groups, and the state's leading environmental community. Visit:

<http://www.marylandoffshorewind.org/>



Siemens press picture



# Virginia



## WIND POTENTIAL

The 2010 NREL Assessment lists Virginia's offshore wind resource at 94.4 GW within 50 nautical miles of the coast.<sup>213</sup>

## STATUS OF OFFSHORE WIND ENERGY PERMITTING PROCESS

- BOEM launched the Virginia Task Force process in 2009 and has held six meetings to date including federal, state, tribal and local officials.
- BOEM has identified a formal Wind Energy Area for Virginia. The area is approximately 23 nautical miles from Virginia Beach and covers approximately 112,799 acres or 133 nautical square miles.<sup>214</sup>
- In February of 2012, BOEM finalized

its regional Environmental Assessment of the Mid-Atlantic Wind Energy Areas (New Jersey, Maryland, Delaware, and Virginia). BOEM concluded that no significant impacts would result from issuing leases to developers for site assessment activities in the Virginia Wind Energy Area.<sup>215</sup>

- BOEM has received eight expressions of interest from developers in the VA Wind Energy Area.<sup>216</sup> Because of this showing of competitive interest, BOEM will grant leases through an auction process. Leases are expected to be issued in 2012.

## PROJECT DETAILS

- The following 8 companies have expressed interest in a lease within the VA WEA for projects ranging from 200-2,000 MW:<sup>217</sup>
  - Apex Virginia Offshore Wind, LLC

- Arcadia Offshore Virginia, LLC
- Cirrus Wind Energy, Inc.
- Dominion Virginia Power
- enXco Development Corporation
- Fisherman's Energy, LLC.
- Iberdrola Renewables Inc.
- Orisol Energy US, Inc

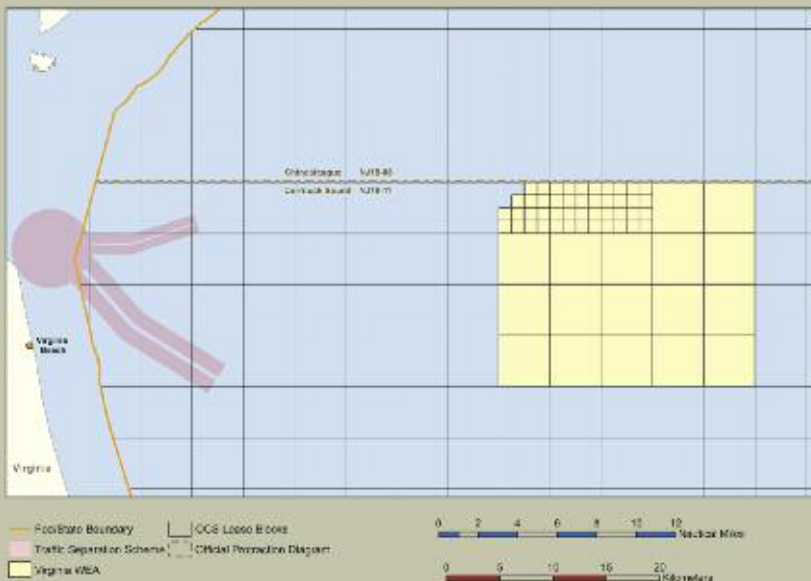
## POLICY & POLITICAL ENVIRONMENT

- **Clean Energy Policy:** Virginia has a voluntary goal of generating 15% of its electricity from energy efficiency and renewable energy sources by 2025.<sup>218</sup> In April, 2010, Governor Bob McDonnell signed into law several bills that promote the development of offshore wind, including: the establishment of the *Offshore Wind Development Authority*,<sup>219</sup> which creates a system to procure up to \$4 billion of US DOE loan guarantees and removes regulatory obstacles to potential projects; and modifications to the state's voluntary Renewable Portfolio Standard to award offshore wind credits three times the amount given to other forms of renewable energy.<sup>220</sup>
- In 2011, Virginia's General Assembly passed a non-binding resolution calling for 3,000 MW of offshore wind power by 2025.<sup>221</sup>

## ACADEMIC & PARTNER SUPPORT

- The **Virginia Coastal Energy Research Consortium (VCERC)** identified an area with 3.2 GW of potential offshore wind capacity in relatively shallow waters no deeper than 30 meters that are beyond the visual horizon and have Class 6 winds (which are strong and consistent, capable of supporting a utility scale offshore wind project).<sup>222</sup> Assuming a build-out rate of 160 MW per year, within two

## VIRGINIA WIND ENERGY AREA



Source: BOEM



REpower

decades 9,700 - 11,600 career-length jobs could be created that are solely associated with developing this 3,200 MW of offshore wind potential.<sup>223</sup> VCERC estimated cost of power from this proposed site (closer in than the VA WEA), assuming domestic turbine supply, at 11 cents/kWh.

- The **Virginia Economic Development Partnership** released a 2012 report entitled *Virginia Advantages, Energy Industries* which included offshore wind energy as an economic development opportunity for the state.<sup>224</sup>
- **The Offshore Wind Technology Center** in Chesapeake was launched in 2011 as a partnership between Gamesa Technology Corp and Northrop Grumman Corp. to develop the next generation of offshore wind technology.<sup>225</sup> In 2012,

Gamesa canceled plans for a planned test turbine at the mouth of the Chesapeake Bay, citing uncertainty in the U.S. offshore wind market for the change in plans.<sup>226</sup>

- In addition to VCERC, several organizations have released reports examining Virginia's offshore wind resource potential: the **Virginia Marine Resources Commission** has evaluated whether sufficient subaqueous land exists in state territorial waters to support offshore wind resource generation, concluding the best potential exists on the Outer Continental Shelf.<sup>227</sup> The Environmental Law Institute, commissioned by the **Virginia Coastal Zone Management Program**, issued two reports detailing recommended changes to Virginia environmental and regulatory policies in light of offshore wind development.<sup>228</sup>

## FOR MORE INFORMATION ABOUT OFFSHORE WIND IN VIRGINIA:

### VA4WIND

A coalition working to spur offshore wind development off Virginia's coast including state environmental, labor, and faith organizations. More details can be found at: <http://va4wind.com>

### Virginia Offshore Wind Coalition

The VOW Coalition is made up of developers, manufacturers, utilities, localities, businesses, environmental groups, and other organizations and individuals who have an interest in offshore wind. Visit: [www.vowcoalition.org](http://www.vowcoalition.org)

# North Carolina



## WIND POTENTIAL

The 2010 NREL Assessment lists North Carolina's offshore wind resource at 297.5 GW within 50 nautical

miles of the coast.<sup>229</sup> The University of North Carolina (UNC) has estimated there to be over 55 GW of potential offshore wind energy in the ocean beyond the Pamlico Sound.<sup>230</sup>

## STATUS OF OFFSHORE WIND ENERGY PERMITTING PROCESS

- BOEM launched a North Carolina Task Force process in 2011 and has held four meetings to date including federal, state, tribal and local officials.<sup>231</sup>
- BOEM is in the process of developing several Wind Energy Areas for the state of North Carolina, and will be issuing a Call for Information as the next step in the process.<sup>232</sup> Recent BOEM discussions have focused on five areas of interest off North Carolina.

## POLICY & POLITICAL ENVIRONMENT

- **Clean Energy Policy:** North Carolina has a requirement that utilities generate 12.5% of their electricity from renewable energy sources by 2021.<sup>233</sup>
- April 2011: *Offshore Wind Jobs and Economic Development Act* was introduced in the North Carolina legislature to help foster the development of offshore wind in the state by creating a competitive request for proposals for 2,500 MW of offshore wind energy.<sup>234</sup>
- Governor Perdue issued an Executive Order calling for the establishment of an Offshore Wind Economic Development Task Force in 2011,<sup>235</sup> but General Assembly

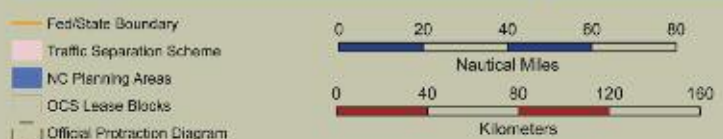
budget cuts in NC have precluded this task force from being set up.

## ACADEMIC & PARTNER SUPPORT

- **The Carolinas Offshore Wind Integration Case Study (COWICS)** is an ongoing, DOE-funded collaborative effort including Duke Energy, ABB, AWS Truepower, UNC, and NREL, working to evaluate large-scale grid integration opportunities for offshore wind in the Carolinas.<sup>236</sup>

- **University of North Carolina** has done extensive research supporting large scale offshore wind development in North Carolina. Initial wind turbine assessments found that North Carolina is well positioned to develop offshore wind generation. In June 2009, UNC's **Department of Marine Sciences** released a nine-month feasibility study commissioned by the North Carolina General Assembly which found significant potential for utility-scale production of wind

## NORTH CAROLINA PLANNING AREAS



Source: BOEM



energy off the coast and possibly within eastern Pamlico Sound.<sup>237</sup>

- **The North Carolina Wind Working Group**, coordinated by the NC Solar Center, is a collaborative body through which key issues facing wind development in the region (on and offshore) are being addressed. The NCWWG includes policy makers, industry, educators, environmental groups, and other key stakeholders.<sup>238</sup>

## South Carolina



### WIND POTENTIAL

The 2010 NREL Assessment lists South Carolina's offshore wind resource at 130.2 GW within 50 nautical miles of the coast.<sup>239</sup>

### STATUS OF OFFSHORE WIND ENERGY PERMITTING PROCESS

- The BOEM South Carolina Renewable Energy Task Force was launched in 2012 and has held two meetings to date including federal, state, tribal, and local officials.<sup>240</sup>

### PROJECT DETAILS

- **Southeast Atlantic Wind Innovation Demonstration Project (SEAWIND)**: Santee-Cooper, a publicly owned utility, led the formulation of a 40 MW demonstration project for South Carolina as part of the Palmetto Wind Research Project—a partnership of utilities, academic institutions, and national labs in the Southeast.<sup>241</sup> Unfortunately the project is not currently moving forward due to unforeseen circumstances, but this effort is a noteworthy achievement that has paved the way for future collaborations.

### FOR MORE INFORMATION ABOUT OFFSHORE WIND ENERGY IN NORTH CAROLINA:

#### North Carolina Offshore Wind

**Coalition:** A coalition of industry members, non-profits, and local leaders working together to help North Carolina capitalize on the benefits that offshore wind energy has to offer. Visit: [www.ncoffshorewind.org](http://www.ncoffshorewind.org)

### POLICY & POLITICAL ENVIRONMENT

- In 2008, the General Assembly formed an offshore wind feasibility study committee, which released a report on *South Carolina's Role in Offshore Wind Energy Development* in 2010 outlining 18 recommendations to the General Assembly, including the establishment of state policy to support 1,000 MW of offshore wind energy development by 2018. The report identified the need for a state renewable energy policy, a state leasing process, and a one-stop shop entity to coordinate a developers' permitting and regulatory needs.<sup>242</sup>
- **South Carolina Regulatory Task Force** for Coastal Clean Energy was established in 2009 via a DOE \$500,000 grant to the South Carolina Energy Office and partners, and is working to identify and overcome barriers to deployment of coastal clean energy such as offshore wind.<sup>243</sup>

### ACADEMIC AND PARTNER SUPPORT

- **Clemson University Restoration Institute Wind Turbine Drivetrain Testing Facility:** On October, 2010 Clemson broke ground on the world's largest turbine drivetrain testing facility on the former

Charleston Navy base. This state-of-the-art facility is supported by \$98 million in public and private funding (\$45 million U.S. DOE grant, \$53 million from other public and private sources).<sup>244</sup> The 7.5-megawatt test rig is scheduled to begin commissioning this fall, with the 15-megawatt rig to follow in early 2013.<sup>245</sup>

- **The South Carolina Consortium for Offshore Wind**, including the Savannah River National Laboratory, the Clemson University Restoration Institute, Santee Cooper, Clemson University's S.C. Institute for Energy Studies, Coastal Carolina University, the Center for Hydrogen Research, and the U.S. Coast Guard installed a SODAR wind measurement tool on a Coast Guard platform off the South Carolina coast in an effort to accurately gauge the state's offshore wind potential, the first sonic wind test of its kind off a North American coast.<sup>246</sup>
- **Clemson University's Restoration Institute and Strom Thurmond Institute** collaborated on a South Carolina Wind Energy Supply Chain Survey and Offshore Wind Economic Impact Study. Released July 2012, this report profiles the state's current wind energy industry and estimates that roughly 4,000 jobs and \$4.2 billion in local economic benefits would result from the construction and operation of a 1,000 MW offshore wind project.<sup>247</sup>
- **Clemson University** has produced several reports on the issue of offshore wind in South Carolina, including a recent *Survey of Marine Recreationists' Attitudes towards Potential Offshore Wind Energy in South Carolina* which found over 73% support for offshore wind energy,<sup>248</sup> and a 2010 report in collaboration with the **South Carolina Institute for Energy Studies** focused on offshore wind transmission opportunities.<sup>249</sup>

# Georgia



John Kotz

## WIND POTENTIAL

The 2010 NREL Assessment lists Georgia's offshore wind resource at 60.4 GW within 50 nautical miles of the coast.<sup>250</sup>

## PROJECT DETAILS

■ **Southern Winds Project:** Two-year feasibility study conducted by Georgia Tech Strategic Energy Institute and Southern Company assessing the viability of wind energy generation off the Georgia coast. The study investigated a project concept involving 3 - 5 turbines with a generation capacity

of 10 MW, or enough to power 2,500 homes.<sup>251</sup> Following this study, Southern Company and Georgia Power filed a joint application to BOEM in April 2011 for two lease sites to collect wind resource data off Tybee Island, Georgia.<sup>252, 253</sup>

## POLICY & POLITICAL ENVIRONMENT

■ On February 24, 2012 the **City of Tybee Island** passed a resolution supporting wind energy development, recognizing the significance of the Southeast's vast offshore wind resource and its opportunity to provide affordable, clean, renewable energy and economic development.<sup>254</sup>

## ACADEMIC & PARTNER SUPPORT

■ **Georgia Wind Working Group:** Established in 2005, with over 50 members including utilities, wind developers, government, universities, and other stakeholders promoting the development of wind resources. The group includes a Georgia offshore wind committee that has filed public comments on federal testing and leasing policies.<sup>255</sup> The Working Group, [www.GAWWG.org](http://www.GAWWG.org), held public forums in 2012 to raise awareness of the potential and economic advantages of offshore wind.



Steve Prosser picture

# Florida



Katie M. Hughes

## WIND POTENTIAL

A November, 2008 report prepared for the Florida Public Service Commission

estimated that Florida has an offshore wind resource potential of 40 GW in waters less than 30 meters in depth and 88 GW in waters 30 - 60 meters in depth.<sup>256</sup> A 2012 NREL analysis estimates that 10 GW of offshore wind potential capacity exists off Florida.<sup>257</sup>

## ACADEMIC & PARTNER SUPPORT

■ Florida State University has conducted research on the state's offshore wind potential.<sup>258</sup>

■ NOAA's Hurricane Research Division on Virginia Key, Florida, has conducted research on the hurricane risks to offshore wind farms.<sup>259</sup>

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