



## NC Coastal Wind Demonstration Project Frequently Asked Questions February 2010

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### How many wind turbines will Duke Energy build as part of the Coastal Wind Demonstration Project?

A: Duke Energy is exploring the development of a one to three turbine demonstration project to learn about the potential of offshore wind as a renewable energy resource. Duke Energy is still developing the budget, scope and schedule for the project. Therefore, we do not know yet how many turbines will be built as part of this project, but it would be a maximum of three wind turbines.

### How much electricity will the Coastal Wind Demonstration Project produce?

A: The amount of electricity that will be produced will depend upon several factors:

- (a) the installed megawatts (MW) of capacity of the wind turbines (3MW to 5MW per turbine);
- (b) the number of wind turbines (one to three wind turbines); and
- (c) the capacity factor (efficiency (%)) of the wind turbines.

We have not made final decisions on the size or the number of the turbines we will build for the demonstration project, so we do not know exactly how many MW or megawatt hours (MWh) the turbines will produce. Depending on the number and type of turbines we install, the demonstration project could have an installed capacity of 3MW or up to 15MW. Assuming an average capacity factor (efficiency) of 30%, this will produce approximately 8,000 MWh to 40,000 MWh per year—enough to power 500 to 2,500 homes.

### How large are offshore wind turbines?

A: Offshore wind turbines are larger than their land-based cousins in order to operate in the more extreme ocean environment and capture stronger, more consistent winds. A 3.6MW wind turbine has the following characteristics: The tower is approximately 260 feet from the water level to the center of the blades. The lowest blade tip height is approximately 75 feet above the water and the tallest blade tip is approximately 440 feet above the water level. In comparison, the Cape Hatteras Lighthouse is 208 feet tall.

### Where will the wind turbines be located?

A: The Coastal Wind study conducted by the University of North Carolina-Chapel Hill found that the best location for the demonstration project is in eastern Pamlico Sound. The project plan being developed now will determine the exact location.

### How far will the Coastal Wind Demonstration Project be from the Outer Banks?

A: The UNC Coastal Wind Study's proposed location in eastern Pamlico Sound is approximately 7.3 miles west of Avon, 9.1 miles north of Frisco and approximately 8.3 miles from Buxton. Based on the final location of the demonstration project, the wind turbines will be visible off in the distance in the sound. A visualization study will be conducted to help residents picture the Coastal Wind Project from multiple locations on the Outer Banks.

### How are water-based wind turbines secured to the sound floor?

A: Typical offshore wind foundations utilize monopile foundations, gravity foundations or jacket foundations. The diameter of typical offshore wind turbine foundations is between 14-18 feet. Duke Energy is currently conducting preliminary engineering analyses to determine the appropriate foundation technology for this project.

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### **How fast does the wind have to blow for the turbines to produce electricity?**

A: Certain minimum wind conditions must exist to generate electricity. Different wind turbine models have different minimum (cut in) and maximum (cut out) speeds to protect the integrity of the wind turbine. By monitoring current wind conditions, wind turbine operators aim to optimize energy output from a wind farm.

### **How much noise will the wind turbines make?**

A: Noise used to be an issue with wind turbine design many years ago, but over time, the issue has largely been eliminated. A small amount of noise is generated by the mechanical components of the turbine. To put this in perspective, a wind turbine 300 meters (980 feet) away is no noisier than the reading room of a library. (Source: American Wind Energy Association)

### **Will the wind turbines be secure enough to avoid damage or destruction in a hurricane?**

A: Offshore wind turbines are tested to withstand extreme wind conditions, including hurricanes. In severe weather, the blades can turn out of the wind and slow down for safety reasons when winds exceed certain speeds. (Source: American Wind Energy Association)

### **Are the wind turbines compatible with recreation boating and fishing?**

A: Yes. Offshore wind turbines are compatible with recreational fishing and boating. Recreational boaters and fishermen will need to exercise caution around the turbines by staying approximately thirty feet from the foundations for safety. The footprint of the Coastal Wind Demonstration project will include three square miles—less than 0.15% of the 2,000 square mile area within Pamlico Sound.

Duke Energy will reach out to local fishermen to ensure they have the opportunity to give us their thoughts and concerns about the demonstration project. During construction of the Coastal Wind Project, access to the project location will be limited in order to coordinate installation of the cables, foundations, tower and nacelle, which houses the generator and other equipment.

### **What is the environmental impact of wind turbines?**

A: As part of the permitting process, Duke Energy will be working with federal and state permitting agencies to conduct an environmental impact study of the demonstration project. In fact, the UNC Coastal Wind Study indicated environmental impacts should be minimal and in some areas the wind turbines foundations could enhance the marine environment by providing habitat for aquatic and marine organisms. Duke Energy is committed to working with agencies and other stakeholders to understand and address environmental impacts associated with the demonstration project.

### **Are the wind turbines compatible with birds and fish species?**

A: Yes. After nearly twenty years of building offshore wind energy projects around the world, researchers have documented that avian species fly around offshore wind turbines. As of December 31, 2009, offshore wind power projects total 2,055.9 MW. Potential avian and aquatic impacts will be studied, both as part of the permitting process, and as part of the ongoing research aspect of the Coastal Wind Demonstration Project.

### **Will the Coastal Wind Demonstration Project attract tourists?**

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A: Because the Coastal Wind Demonstration Project may be the first offshore wind project in the Southeast (and perhaps the first in the United States), it could attract people interested in learning about offshore wind as a renewable energy resource. European countries market offshore wind farms as an eco-tourism attraction. See the European Wind Energy Association's (EWEA) website for additional information.

### **Who ultimately decides whether these wind turbines will be constructed?**

A: There are many steps that have to be taken before construction begins – primarily the securing of permits from the state and federal government. We will be working with multiple federal, state and local agencies including: the U.S. Army Corps of Engineers, the N.C. Department of Environment and Natural Resources, the N.C. Utilities Commission, Dare County Commissioners and others to secure the permits and signoffs we need to move forward. In addition, Duke Energy will conduct its own assessment of the costs associated with this project and make determinations about schedules based on those findings.

### **When the demonstration project is over, will you dismantle the wind turbines or leave them there?**

A: If successful, we believe that this demonstration project could continue to generate electricity for 20 years or longer. Duke Energy will seek to maintain these turbines for the useful economic life of the turbines. During this time period, Duke Energy will collaborate with the University of North Carolina and other research partners to learn more about offshore wind. Duke Energy is responsible for decommissioning the project at its conclusion.

### **How much money will this project cost? Who is paying for it?**

A: It is too soon to tell how much the project will cost. Duke Energy is paying for the project and we are looking into the possibilities of securing research partners who may want to participate and thus defray some of the costs associated with the project.

### **How soon will the wind turbines be operational?**

A: Legislation passed by the North Carolina General Assembly indicated an operation date of September 1, 2010. However, this is a first time evolution and with any project like this there can and will be schedule challenges. Our focus is on the success of the project and making sure we learn and collect the needed data from every step of the process.

#### ADDITIONAL RESOURCES

**Duke Energy Coastal Wind Demonstration Project**

<http://www.duke-energy.com/north-carolina/renewable-energy/nc-coastal-wind.asp>

**University of North Carolina at Chapel Hill Report (2009): "Coastal Wind: Energy for NC's Future"**

<http://www.climate.unc.edu/coastal-wind>

**Wind Powering America**

<http://windpoweringamerica.gov/>

**US Offshore Wind Collaborative**

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

**American Wind Energy Association**

<http://www.awea.org/faq/>

**European Wind Energy Association**

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