

In September 2009, Duke Energy Carolinas LLC (“Duke Energy”) partnered with the University of North Carolina at Chapel Hill (“UNC”) to install up to three demonstration wind turbines. These turbines were to be among the first placed in waters off the coast of the United States. Duke Energy agreed to develop and provide the wind turbines for the project. In addition, the site was to be made available for UNC and other third parties to conduct on-site research that gauges and improves the feasibility of generating electricity from offshore wind farms. Duke Energy and UNC selected a site for the demonstration project in the Pamlico Sound.

After more than a year of in-depth analysis of project scope, schedule and overall economics, this first-of-its-kind, small-scale demonstration project is ending. The updated cost estimate is more than 300 percent higher than the original and exceeds the benefits Duke Energy customers would receive if it were to continue the demonstration project in the Pamlico Sound.

Instead, Duke Energy and UNC plan to seek opportunities to use knowledge gained from preparing for the Pamlico Sound demonstration project to further study or enable large-scale offshore wind development — on the ocean.

Why make this decision now?

The purpose of the coastal wind demonstration project was to research the potential for coastal wind generation in an effort to expedite and enable large-scale wind generation off the coast of North Carolina. After significant study and better understanding of what is required to economically construct wind generation in the Pamlico Sound where large scale growth is limited, the costs of the project simply would exceed the benefits our customers would receive if we were to continue.

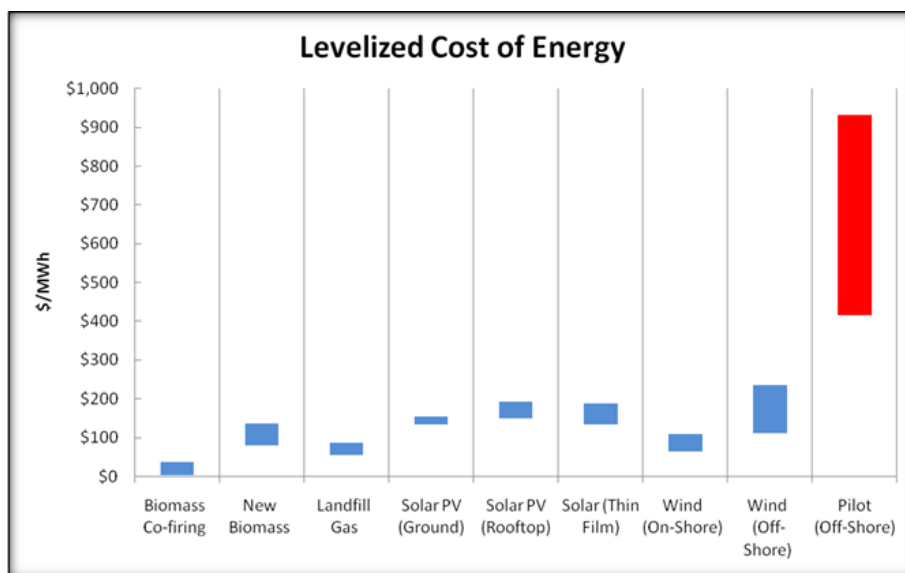
The limited size of the demonstration project significantly impacts its economic viability. The relatively high fixed cost of developing, permitting and installing the first turbine makes a small three-turbine demonstration project much less cost-effective than a large-scale project. The need to use modified shallow water construction techniques and a greater than anticipated potential to disturb submerged aquatic vegetation also presents challenges to the project.

How much are the cost estimates?

(chart citation i)

The initial estimate for the coastal wind demonstration project of approximately \$35 million was based on limited information. As we gained knowledge working with engineers, contractors, regulators and manufacturers to better understand the real cost of the demonstration project, the estimates quickly escalated.

As with land-based wind generation, significant economies of scale are achieved as more turbines are installed. For example, one turbine under the coastal wind demonstration project would cost \$88 million, but adding a second or third turbine would only increase the cost by approximately \$14 million for each additional turbine. Ultimately, it was determined that the costs associated with this demonstration project were not prudent despite receiving the benefit of three times the normal renewable energy certificates. Given the unfavorable economics, UNC supports Duke Energy’s decision to end the demonstration project.



Why is offshore wind so much more expensive than land-based wind?

With wind generation development — whether onshore or offshore — you achieve much greater economies of scale as more turbines are built. However, there are also additional costs and risks that must be addressed with offshore wind that

EXPLORING WINDS' POSSIBILITIES

land-based projects do not face, such as burial of the transmission lines under the ocean or sound floor, use of marine based construction vessels/methods, weather interferences and lack of data for wind resources, hydraulic forces, biologically conflicted areas and standardized procedures. In addition, there is a lack of interest from installers to provide bids on relatively small projects. The increase in cost can be offset by an increase in wind resources, larger turbines and legislation that supports multiple renewable energy certificates in the ocean.

What has the project accomplished?

We've started the permitting, design and equipment procurement processes and performed avian studies. Additionally, the Army Corps of Engineers started the National Environmental Policy Act permitting review for the project. To date, Duke Energy has committed nearly \$3.6 million in the project. Based on what we have learned and our economic modeling, we believe encouraging large-scale development of offshore wind resources is a better approach than enabling small demonstration projects that lack economies of scale.

What have you learned?

In short, Duke Energy has gained knowledge about the differing project economics and environmental issues associated with offshore wind generation. For example:

- **Small projects lack economies of scale**, with multiple fixed costs for permitting, design and installation. These costs are nearly the same regardless of whether you're building three turbines or 100.
- **Shallow waters present problems**. For example, building the turbines in the Pamlico Sound would require modifications to barges or installation of temporary platforms in the sound to build the turbines. In addition, shallow waters increase the concerns associated with submerged aquatic vegetation and associated marine life that relies on this vegetation.
- **Future uncertainties associated with completing the project** would mean that project cost increases could continue. In addition, the permits for this project would be limited to three turbines, making it unlikely to ever scale to commercial size.
- **Public funding from the Department of Energy or others likely wouldn't close the gap** between projects that are large enough to benefit from economies of scale and small demonstration projects.

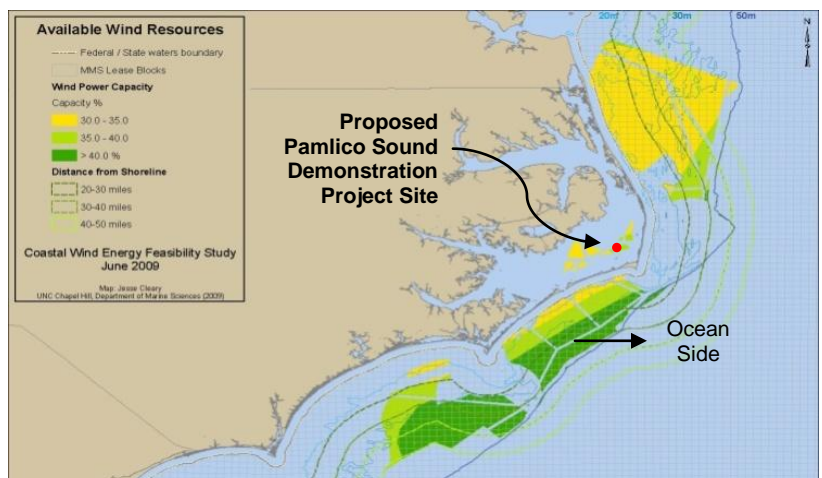
Does this mean Duke Energy will not continue to explore offshore wind?

Duke Energy remains committed to continuing to support the ongoing research and study of coastal wind generation.

Knowledge gained from this project and our interest to work with UNC on offshore wind for diversification of large-scale renewable energy continues and we believe our customers would benefit from that effort.

Please submit questions to:

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There are greater wind resources on the ocean side, as shown in the map. In addition, a larger project on the ocean would have better economies of scale.

ⁱ Data from the chart is publically available industry data: Lazard: Levelized Cost of Energy Analysis, 2010.