

Frequently Asked Questions: Offshore Wind in Georgia



Photo Courtesy: Georgia Tech SEI

What is offshore wind energy?

Wind energy is the ability to harness the wind's natural energy through a wind turbine to produce electricity. Offshore wind energy describes the type of energy that is produced from wind turbines located in coastal waters adjacent to the shoreline. In the United States, state governments generally regulate offshore wind energy activities from their respective shorelines up to 3 nautical (n) miles offshore; the federal government regulates in areas from 3 n miles to 200 n miles offshore.

Why choose offshore wind?

Offshore wind farms generally enjoy higher wind speeds, smoother and less turbulent air flows, larger amounts of open space, and the ability to build larger wind turbines than onshore wind projects. Although these turbines are more expensive than smaller ones onshore, they have the ability to produce more energy and therefore can become more cost effective over time than land based turbines. Offshore wind turbines generally offer reduced visual impact compared to land based turbines. Also, whereas onshore wind farms can involve multi-party ownership of property, only state and federal governments have control over offshore surface rights.

Why is offshore wind well suited for the Southeast and Georgia?

Much of the offshore wind potential in the Southeastern U.S. lies near major coastal metropolitan areas. These areas are experiencing rapid growth resulting in increased energy demand. Offshore wind power is a clean energy alternative that can address growing energy demands and reduce reliance on fossil fuels at the same time by providing a more sustainable energy strategy. Also, unlike the increasing costs of electricity from traditional fuel sources such as fossil fuel and nuclear power, offshore wind power can provide these areas with energy at a price that can remain steady for years to come. In addition, offshore wind power requires little or no water to operate, thereby conserving water for other uses.

How is the power from offshore wind used?

The power generated from offshore wind is used in the same way as that generated from onshore wind. The blowing wind causes the rotor of the wind turbine to turn, which drives the shaft of an electric generator, resulting in electricity. The electricity produced is transported to a transformer located onshore via underwater cables. The transformer will convert the voltage for

transmission through the regional grid using the local grid connection. Once the electricity is fed into utility power lines, it is mixed with electricity from other power plants and delivered to utility customers.

How much does it cost?

In the United States, it is estimated that the cost of offshore wind will be about twice the amount of the current cost of land based wind, mainly because of required foundations, turbine installation and maintenance at sea. However, this cost can be offset by higher energy yields than onshore wind, as much as 30%.¹ Similar to the trend for land based wind, these prices are expected to lower as technology improves and more experience is gained.

What is the offshore wind potential for Georgia?

To see a map of Georgia's offshore wind potential, please visit <http://gawwg.org/resources/georgiawindresourcemap.html> . A study conducted by Southern Company and Georgia Tech's Strategic Energy Institute in 2007 identified possible locations for an initial project and determined that locations off the coasts of Jekyll Island and Tybee Island have close access to existing electrical substations that give the best potential for connecting power from an offshore wind farm to the transmission grid. Although many other coastal prospects exist, Tybee Island is thought to be particularly well suited as an offshore wind farm location because of a slightly better wind resource and preferable substrate conditions on the ocean floor.²

When can we expect to see offshore wind farms?

Offshore wind farms have been proposed and are currently in the planning process by Cape Wind in Massachusetts as well as by Bluewater Wind in Delaware. In the southeastern United States, specifically North and South Carolina and Georgia, offshore wind farms are in various stages of planning. An estimate of when Georgia will see these farms is still undetermined. South Carolina is currently conducting a research study with Coastal Carolina University and the South Carolina Energy Office that uses weather buoys to measure the wind off of their state's coast.³ This is a significant step towards the beginning of offshore wind in this area. Also, Southern Company is continuing to pursue the potential for development of feasible wind energy generation in the coastal areas of the Southeast.⁴ Some state projects may move faster than others in places where the wind farm area is sited in state waters.

What are the economic benefits?

Wind power supplies affordable, inexhaustible energy to the economy. It also provides jobs and other sources of income. The assembly, staging, construction, and maintenance of offshore wind farms will create numerous jobs for workers. An example of how offshore wind can create a booming economy can be seen in Bremerhaven, Germany, where 700 new jobs have already been created in the past 3 years with the introduction of offshore wind to the city, and 300-500 more are expected. (To learn more about Bremerhaven, please visit:

¹ <http://www.bwea.com/offshore/faqs.html#cost>

² "Southern Winds" - <http://www.southerncompany.com/planetpower/pdfs/WindReport.pdf>

³ "Offshore Wind: East Coast Perspective." A presentation by Bonnie Ram at the 2009 Wind Powering America Summit. May 8, 2009.

⁴ www.southerncompany.com

<http://www.renewableenergyworld.com/rea/news/article/2009/03/boomtown-bremerhaven-the-offshore-wind-industry-success-story> .) Offshore wind should also help to stabilize and reduce electricity prices by reducing operations of more expensive power plants and by creating long term power contracts for clean alternatives.

How does offshore wind affect birds and marine life?

Research has found that most birds seem to fly around offshore wind turbines rather than into them. Offshore wind turbines are also designed with bird safety in mind with slower moving blades than older wind turbines and a tower that is inhospitable for birds to land on.⁵ Also, wind energy development's overall impact on birds is extremely low (<1 of 30,000 cases) compared to other human-related causes of bird deaths, including buildings, communications towers, traffic, and house cats.⁶

Research is still in progress for the effects of offshore wind turbines on marine life. For the 20 year operational period of the turbines, there are no known impacts on marine life. The noise from the turbines are said to be of a very low frequency that is not audible to many species, and those that do hear them should be used to a similar noise from engines on passing boats. Research is still in progress for the construction and decommissioning periods of the turbines and their effect on marine life, but it may be helpful to consider the impact of this short period of time in the context of other marine activities, such as fishing, shipping, and gas and oil extraction, that can have an even greater impact on marine animals.

To learn about the environmental impacts of the two largest offshore wind farms, Nysted and Horns Rev in Denmark, please look at a multi-year study entitled "Danish Offshore Wind – Key Environmental Issues,"
http://193.88.185.141/Graphics/Publikationer/Havvindmoeller/havvindmoellebog_nov_2006_skr m.pdf

Additional sources used to compile this information include:

The American Wind Energy Association (www.awea.org/faq)

The British Wind Energy Association (www.bwea.com/offshore/faqs.html)

The South Carolina Institute for Energy Studies at Clemson University (www.clemson.edu/scies/wind.htm)

www.gawwg.org



⁵ <http://capewind.org/FAQ-Category8-Cape+Wind+and+the+Environment-Parent0-myfaq-yes.htm>

⁶ Erickson, W. P., Johnson, G. D., & Young, D. P. (2002). "A Summary and Comparison of Bird Mortality from Anthropogenic Causes with an Emphasis on Collisions."