

Frequently Asked Questions: Wind in North Georgia



How do wind turbines generate electricity?

A wind turbine, which is installed atop of a tall foundation tower, operates by collecting kinetic energy from wind and converting it into electricity. Energy is generated when wind speeds reach about 10 miles per hour, while a speed of 25 miles per hour allows for a turbine to generate at its rated capacity.¹

How much electricity can wind generate?

The performance of wind turbines greatly depends on siting factors, such as type of terrain, height above ground, time of day, season of year, etc. However, the proper placement of a wind turbine in a breezy location not affected by large obstructions will greatly enhance its performance.

The energy generation potential of wind in the US is clearly substantial. According to a 2008 report from the Department of Energy, wind power could provide 20% of the country's electricity by 2030.²

What is Georgia's wind potential?

Georgia's coastal and mountainous regions offer the greatest promise for state wind energy potential. Georgia's wind maps indicate the levels of wind energy potential, ranging from Class 1 winds to Class 4 winds found in North Georgia and near Savannah. According to a study by AWS Truewind, Georgia's Class 3 and 4 winds, most of which are concentrated in the northern mountainous region, have a total potential of 6200 MW. Based solely on the area available, there are hundreds of megawatts of wind potential in this area. Factors such as wildlife, topography, viewsheds and other considerations will eliminate certain areas from development. The Georgia Wind Resource Map can be viewed at: <http://www.gawwg.org/windresources/georgiawindresourcemap.html>

Why not put all the wind turbines off-shore?

Off-shore wind projects benefit from the advantages of harder blowing winds and larger turbines. Despite these advantages and based on experience worldwide, offshore projects generally take longer to develop and have a broader range of issues to address than on-

¹ http://www.tva.gov/greenpowerswitch/wind_faq.htm

² http://www1.eere.energy.gov/windandhydro/wind_2030.html

shore projects. Current offshore technology capital costs are 50-100% more expensive than on-shore, although the higher wind speeds somewhat ameliorates the capital cost differential.

The US has a great deal of on-shore area that is suitable for wind development. Wind farms located on ridgelines in hilly terrain require only 25-60 acres/MW, with actual footprint space for turbines, transformers, and roads as little as one-two acres per megawatt.

How will on-land wind farms impact landowners and property taxes?

Wind energy projects are now commonly seen as farmers' and landowners' new "cash crop," given the amount of revenue they may generate for both landowners and the local community. For instance, a 100 MW project could generate \$250,000-450,000 in annual landowner payments and 6-10 permanent operating jobs. Wind power projects provide a substantial support to rural areas in the form of tax revenues; while property taxes vary among counties and states, 1%-3% is a typical rate. Thus, property tax payments at 1% may provide \$10,000 per MW of installed capacity.³ Wind projects offer great promise for supporting the economic development and tax revenues of their host communities.

How would turbines affect wildlife and mountain habitat?

All energy generation projects impact habitat and land use to different degrees. And while wind energy projects can be land-intensive, they affect land and wildlife much differently than fossil fuel energy generation activities. The ratio of wind project land actually needed for infrastructure is quite low; while projects may occupy 25-60 acres per MW (depending on the given terrain), only 2-5% of the project acreage would be needed for turbine foundations, roads, etc.

The Audubon Society, one of the country's most prominent avian (bird) wildlife and habitat conservation advocates, "strongly supports properly-sited wind power as a clean alternative energy source."⁴ The potential negative side effects of wind power facilities can be minimized through appropriate siting, operation, and management.

Do wind turbines use a lot of water?

No. Turbines do not require much water to operate, nor do they emit pollutants that contaminate bodies of water. According to the American Wind Energy Association, wind power generation requires 0.001 gallons per kWh, while cooling nuclear plants requires 0.62 and coal requires 0.49 gallons per kWh.⁵

Are wind turbines noisy?

While virtually everything with moving parts will produce some type of sound, wind farms are very quiet relative to other types of industrial facilities and energy producers. A modern operating wind farm at a distance of 750 to 1,000 feet produces no more noise than a refrigerator in a moderately quiet room.⁶ Furthermore, wind turbines are typically located on sites where wind speed is higher than average; thus, the naturally occurring

³ http://www.nationalwind.us/why_wind

⁴ <http://www.audubon.org/campaign/windPowerQA.html>

⁵ <http://www.awea.org/faq/water.html>

⁶ www.awea.org/pubs/factsheets/WE_Noise.pdf

background noise created by the wind itself is usually more noticeable than any sound produced by the movement of turbine blades.

Can I install a residential turbine on my property?

Many residential properties are well-suited for wind energy development. In fact, residential wind turbines have been installed on properties in at least 47 of the 50 states.

Proper siting is the key to successful usage of a wind turbine. A residential wind turbine is a relatively large device, so larger properties in rural areas are the most desirable. A property size of at least 1 acre is desirable for a residential project. As for the measurement of wind speeds on one's property, the Department of Energy's published resource data may be sufficient for the prediction of wind turbine performance by an experienced evaluator.

Small-scale wind turbines can be either connected to a utility grid or stand alone as an "off-grid" producer for homes, farms, schools, and businesses. Consumers interested in installing a residential wind turbine may choose from either complete turnkey (ready-to-operate) or direct purchase options from turbine dealers and manufacturers. A list of Small Wind Turbine Manufacturers may be found at <http://www.awea.org>.

How can a residential turbine reduce my electricity costs?

While the initial start-up costs for a residential turbine may be considerable, the economics depends heavily on the wind resource, the electricity rates, and the state policies, including incentives. The system usually recoups its investment costs through utility savings over a 6-25 year period. A wind turbine can lower an electric bill by 50% to 95%.

Additionally, a well-sited wind turbine system may substantially increase property value, as both a home improvement and source of cheap electricity. Furthermore, a residential turbine helps safeguard against unpredictable increases in conventional energy costs and electricity rates.

This information has been gathered by the Georgia Wind Working Group (2008). Research sources include the U.S. Department of Energy's Wind Powering America Program, American Wind Energy Association (AWEA), the Tennessee Valley Authority (TVA), and National Wind LLC.