



Sustainability, Energy & Resiliency Committee

City of Salem, MA

Wind Energy Frequently Asked Questions

What is wind energy?

Wind energy, or wind power, is the process of creating electricity by converting the movement of the wind using a wind turbine. The turbine converts the kinetic energy of the wind into electricity through a process like a fan in reverse. The wind turns the blades of the turbine, which spins a shaft that is connected to a generator that creates electricity. To learn more visit [How Do Wind Turbines Work](#).

Why does the Sustainability, Energy and Resiliency Committee (SERC) want to encourage the city to generate energy from wind?

In April of 2016 the [City Council passed a resolution](#) in support of switching to 100% renewable energy for the City of Salem. Going forward we will all need to rely on renewable energy generated within our communities. Renewable energy systems must use the resources available where they are located. We have wind in Salem- so we should harness it for electric power, money, price stability, energy independence, educational benefits, and for our future generations. The SERC is continuing to research potential onshore and offshore wind for Salem.

Why wind in particular?

Where wind is available, it has a better value, particularly with respect to the power it can generate in each space (for instance solar would need about 8 acres to produce similar energy output). Other renewable sources have been, and will continue to be, evaluated.

How much energy comes from wind energy in the United States?

In 2016, wind energy supplied around 6% of the total U.S. electricity with an installed capacity of over 80 gigawatts. This is enough electricity to power 24 million homes. ([American Wind Energy Association](#))

What about offshore wind?

Exciting things are happening with commercial offshore wind, such as the Block Island Wind Farm developed by Deepwater Wind, located a little under four miles from Block Island, Rhode Island. Although offshore wind is comparatively more expensive than land-based commercial wind installations, costs continue to decrease per MW of produced energy as the wind turbines continue to get bigger and quieter. SERC believes that shallow- water offshore wind could be viable for Salem as part of a multi-

community endeavor. SERC is currently investigating a location for a meteorological tower offshore to gather wind data for a 12-month period and is seeking funding to install such a tower.

Why do wind turbines need to be so tall, why can't we erect several smaller units instead?

The higher you go, the more wind you can capture. The more wind- the more energy, the more energy the more money generated. Standard turbine heights sold are 200, 230 and 260 ft. The cost of two or more units of smaller size to produce the same amount of power is significantly more than one turbine of a larger size. More units would also take up more space and more maintenance, and smaller units often lag behind the technological improvements of the larger ones.

What about the sound of wind turbines?

Wind turbines create two types of sound, a “whooshing” sound from air moving past the blades and a mechanical hum created by the generator. Many factors play a role in the sound from a wind turbine, including distance, topography, and the noise level of the environment it is placed in. At 400 meters a typical turbine sound will be at about 40 decibels (dBA) and sometimes cannot be heard over the wind. This is comparable to the sound of an average refrigerator and is lower than typical ambient noise in urban and suburban environments.

What about low frequency sound (infrasound) and “Wind Turbine Syndrome”?

To date, there is no credible evidence that Wind Turbine Syndrome is a real health condition, nor that infrasound, the lowest frequency range of sound (often inaudible), poses any kind of health risks. There have been a few studies suggesting the existence of the condition; however, these studies have failed to withstand the rigors of scientific scrutiny. By contrast, there is a substantial body of credible evidence indicating that we are routinely exposed to infrasound from many sources in our day-to-day environment and that this sound does not pose any kind of health risk at the intensity levels at which they typically occur. Furthermore, the level of intensity of infrasound produced by these varied sources is often far above that which wind turbines can produce. For more information, please see the [National Library of Medicine article](#).

What is shadow flicker, how likely is it to have an impact and can it be avoided?

Shadow flicker is the flickering effect produced as the rotating blades pass by the sun. The feasibility study Salem conducting when researching a Winter Island Wind Turbine predicts shadow flicker would occur for fewer than 20 hours a year with most occurring over Salem Harbor, rather than over residential areas. The remedy for shadow flicker is to simply idle the turbine temporarily if neighbors feel that the flicker impact is too annoying. In addition, shades, trees, and other methods can be used. [Feasibility Study](#) (Page 61)

Will the turbine need to be lit with a red strobe?

Yes. All structures over 200 ft. in height must have a red beacon per the Federal Aviation Administration. The old stacks at the power plant had several of these lights, and there is no reason to assume that the single strobe required for a wind turbine would create any more significant impact.

What about catastrophic failures such as ice throw, blade throw, fire, or collapse?

These conditions are exceedingly rare. Modern wind turbines are fitted with ice monitoring technologies that sense ice buildup and “turn off” the turbine until inspected. In a study that looked at a 31-year period ending in 2006, among thousands of installations worldwide, there were no injuries or deaths attributable to wind turbine blade throw, either among the public or wind industry workers. Typically, it would take something more than a Category 5 hurricane to blow one of the units over. Further review of the reasons and remedies to avoid catastrophic failures will be completed. But our current understanding is that the risks are low, and the situations that pose risk are the scenarios that would also reduce the likelihood of a public presence on the island.

Will having a wind turbine in my neighborhood affect my property values?

The best studies to date indicate that wind turbines have little (if any) long term effect on property values. [Energy.gov - Property Values](#).

Will birds or bats be impacted?

Studies show that wind turbines pose significantly less risk to birds and bats than many other widely accepted risks such as tall buildings and house cats, which are responsible for annual bird deaths numbering in the hundreds of millions (perhaps billions). In their position statement on the Cape Wind project, the MA Audubon Society says: “...we conclude that Cape Wind will make a positive contribution to help reduce the worst effects of climate change with no significant ecological threat to the avian and marine life...” ([Source](#))

What happens to the electricity supply when the wind is not blowing?

The U.S. power grid has always had to deal variability and has had unexpected off-line periods. The power grid consists of a vast number of interconnected transmission lines with a variety of generation sources. When one source is not operating, the grid operators use the interconnected power system to call upon other generation sources. In other terms, if there is a prolonged period without wind, the power grid will be able to substitute electricity from other sources. Potential additions of battery storage to commercial wind are still at the R&D stage.

Are there turbine projects in the area?

Yes. There are existing turbines in Gloucester, Ipswich, Hull, Newburyport, Boston, and Lynn. Gloucester currently has two 2 megawatt (mW) turbines owned by the city and one 2.5mW turbine privately owned. Ipswich has two wind turbines, one 1.6mW and the other 2mW. Hull has two turbines as well, one 600kW and the other 1.8mW. Newburyport has one 600kW turbine. Lynn has one 600kW turbine as well.

Any wind turbines Salem acquires will be the newest technology, and therefore likely quieter and more efficient than these current local projects.

How will a Salem project be different from others that have raised concerns?

Just like any technology or development, some projects are more successful than others. There are thousands of turbines installed across the world that are embraced by their communities. However, there have been a few that have created issues. Most issues are associated with older technology and with improper installation. For example, older turbines typically use “stall-regulation” technology to control the turbines in high wind situations. “Pitch-regulation” is the most favored approach today and

is quieter. Wind manufacturers and project developers continually learn and adapt so that newer turbines and projects are better and have fewer negative impacts. SERC and the City of Salem are committed to learning about the best methods and places to install turbines and will work with the community to address concerns.

Further resources:

[Energy.gov - Frequently Asked Questions](#)

[Sustainability, Energy, and Resiliency Committee](#)

[Salem's Sustainability & Resiliency Department](#)