Sound Levels from Wind Turbines

Wind energy has been used to generate electricity in Canada for more than three decades. It has many benefits – wind power does not pollute the air or emit greenhouse gases, it does not use water when producing electricity, and it has become the lowest-cost source for new electricity while benefiting local communities economically.

Some people living near existing or proposed wind turbines have expressed concerns about the sound levels coming from the turbines. Here are some facts about sound levels and how the wind energy industry strives to keep them at very low levels.

What kinds of sounds do wind energy developments produce?

Construction represents the most active phase of a wind energy project, in terms of personnel, equipment and overall activity, so during this time sound emitted on a project site can be louder. When construction concludes, the related sounds end too. Once the wind turbines are operational and are producing electricity, they produce two types of sound, aerodynamic and mechanical.

Aerodynamic sound is created as the turbine blades pass through the air. This makes a "whoosh" or "swishing" sound.

Mechanical wind turbine sound comes from the working components and rotating gears of the turbine. The wind energy industry has reduced mechanical sounds through improved insulation and overall design.

Some people claim that infrasound (which is sound at frequencies that cannot be heard by people) are a health concern. However, various studies show that infrasound near wind developments does not pose a concern for human health. For example, the Association of Australian Acoustical Consultants produced a position paper stating that "investigations conclude that infrasound levels adjacent to wind farms are below the threshold of perception and below currently-accepted limits set for infrasound."

Canadian sound regulations

Government requirements across Canada require that wind farms keep sound levels at required levels when measured at nearby dwellings.

Wind energy developers in Canada follow regulations for wind facilities that are administered by provincial governments. They also follow the best practices developed by the wind energy industry. This is in the interest of wind developers, who must meet the stringent requirements designed by regulators to protect communities from noise for their project to be approved.

For example, in Alberta a *Noise Impact Assessment* is required for all wind power project applications. The assessment considers other operational or proposed wind facilities nearby, as well as sound limits and distance constraints that create space between areas of concern (such as inhabited structures and property lines) and the wind project.

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In Ontario, noise guidelines specific to wind power have been in place since 2004 and have been updated a number of times since. The regulatory requirements include detailed noise modelling, sound level limits for operating wind turbines, and post-construction sound measurement requirements.

Studying potential sound levels

Wind energy developers first rely on wind turbine manufacturers to provide data about the sound levels the wind turbine will produce during operations. Next, the developer uses the noise calculations and measurements within the context of the development area to optimize turbine layouts and to minimize sound levels for residents.

Once the turbines are operational, sound audits are conducted to measure turbine sounds (ensuring they meet manufacturers' sound specifications), and to measure sound levels at nearby residences.

Are wind turbine sounds more noticeable at night?

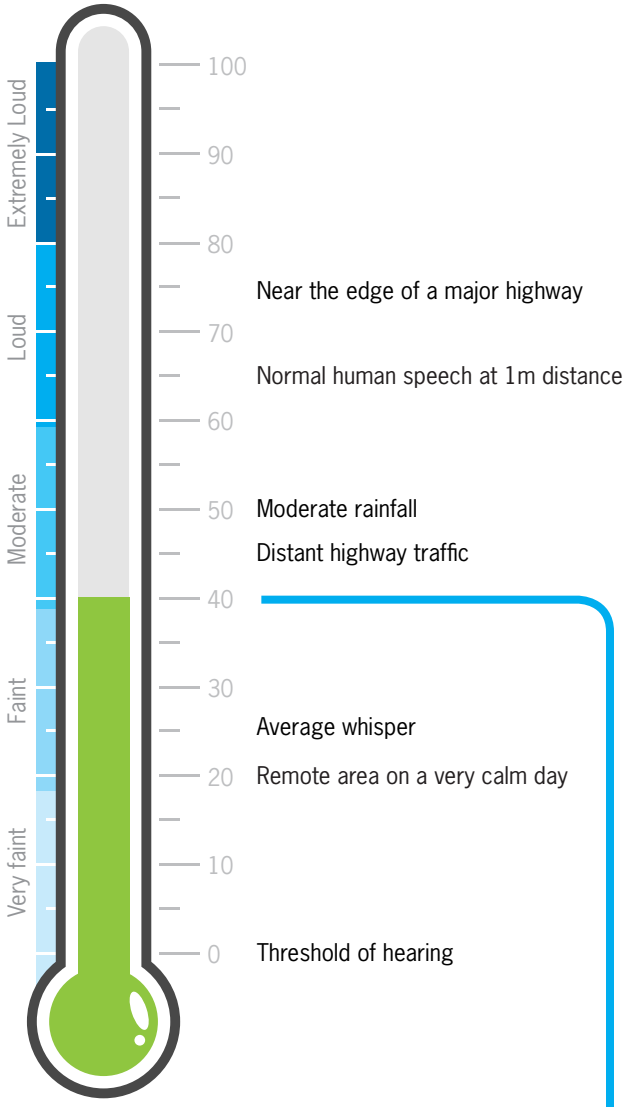
The background noises typically heard in rural areas during the day – such as from farming, or from nearby roads – often decrease at night. When that happens, wind turbine sounds can be more noticeable.

How can residents around a wind project learn more about sound levels?

As part of the provincial environmental assessment process, local residents have an opportunity to attend open houses and discuss concerns about potential sound levels with the wind developer and provincial and local regulators.

How loud is a wind turbine?

The diagram below shows how the sound levels from a wind turbine measure up.



At a distance of 550 metres, typically the sound from a wind turbine will have a sound pressure level of approximately 40 decibels at the outside of a residence.