

Wind Turbine Effects

This document outlines the noted effects of wind turbines on noise, visual surroundings, safety, wildlife, property values, and the environment.

Noise: Are wind turbines noisy?

Wind turbines are large pieces of equipment, so they can be expected to make some level of sound. Sound from wind turbines comes from two general sources: the mechanical equipment itself, and the sound from the interaction of the air with the turbine parts (primarily the blades).

Modern large-scale wind turbine manufacturers have virtually eliminated sound from mechanical sources due to improved design and insulating—if mechanical noise is prevalent, it is usually due to a malfunction. Improvements have also been made in the design of turbine unit and blades to reduce the sound produced by aerodynamic effects.

Generally, wind turbines radiate more noise as the wind speed increase.

The [World Health Organization](#) has established that a sound level of around 30 dB in the room where people sleep is desirable.

As a comparison, the compressor from a refrigerator operates between 40 to 45 dB, and a normal conversation registers at around 60 dB.

At a distance of 350 metres outside, a wind energy project would have a noise level of between 35 and 45 dB.



The degree to which humans are affected by the sound from wind projects is largely related to proximity to the project and the degree of sound from other sources, as related to the residence of a person.

But, the noise you hear from a wind turbine may actually be overcome due to the sound of the wind blowing. It can be further lessened by other sounds, such as the wind through trees, cars on a highway, waves on a beach, other industrial operations, etc.

Most jurisdictions have chosen to mitigate the issue of sound from wind turbines by establishing minimum setbacks from occupied dwellings. This can be in the form of a minimum distance (i.e. 500 metres from turbine to residence and/or three times the height of the turbine). These minimum distances serve to provide a buffer zone that reduces the noise from wind projects to a level that minimizes the impacts on human health.

The Government of Nova Scotia is well aware of the issues associated with sound from wind projects, and reviews potential impacts very carefully as part of the environmental assessment process. Each proposed project is dealt with on its own merits through the Environmental Assessment, taking into account the:

- number and placement of the wind turbines,
- local landscape and land usage,
- amount of sound produced by the type of wind turbine being used, and
- sound levels at residences and other occupied dwellings.

Visual Impact of Wind Turbines

Wind turbines can be 25 to 30 stories high, and are usually located with others (sometimes referred to as a "wind farm" or "wind park"). Some people can find them imposing on the local terrain. On the other hand, many people find them elegant and graceful, and are comforted by the fact that they are producing clean, renewable energy.

The onus is on the wind project developers to design wind projects so that they not only meet the regulations of the local and provincial governments, but also do it in a way that takes into account the concerns of the local community about health and visual impacts. This involves sophisticated planning and sincere community consultation.



The Government of Nova Scotia assesses the visual impacts of wind projects during the Environmental Assessment process. Each proposed project is dealt with on its own merits, taking into account the topography in the area and the number and placement of the wind turbines.

Wind Energy Safety

Modern turbines are designed to operate in the safest manner possible and constructed using stringent international engineering standards, which are audited by a third party. They are designed to withstand extreme weather conditions, and have specialized internal safety equipment to deal with emergencies.

Tens of thousands of turbines have been generating electricity for over 25 years, and according to the [British Wind Energy Association](#), no passerby or neighbour has ever been injured from wind turbine operations. However, people still express concern over issues like ice throw, blade failure or electromagnetic fields.



Blades are designed to be flexible, and their movements would disperse any ice build-up before it could become an issue.

Construction standards and monitoring equipment ensure the safety of the equipment, and studies have shown that electromagnetic fields are not detectable at 100 feet distance from a turbine.

Ultimately, the standards to which the turbines are manufactured ensure a high level of reliability and safety.

Wind Energy & the Affect on Wildlife

In the 1980s and 1990s, California led the way in wind energy developments. Some projects that were built had a negative impact on an endangered bird species because of placement and the type of turbine technology used. As a result, those projects had to be adjusted to minimize impact on wildlife.

Wind developers and turbine manufacturers have used this experience to develop turbines and projects in a way that minimizes impacts of projects on the surrounding wildlife. Developers now take into account bird and bat migratory paths in planning and design of projects; construct tubular steel towers without guy wires; and monitor and adjust construction schedules according to local wildlife.

A 2005 study by the USDA Forest Service found that wind turbines are responsible for less than 0.01% of all human-caused bird mortality. The findings of the study are below:

Mortality Source	Percent of Total
Buildings	58.2 %
Power Lines	13.7 %
Cats	10.6 %
Automobiles	8.5 %
Pesticides	7.1 %
Communications Towers	0.5 %
Wind Turbines	<0.01%
Airplanes	<0.01%

As the table demonstrates, buildings, power lines and cats are far more dangerous to birds than wind turbines.

We could stop wind turbine construction completely to protect a small percentage of birds and bats. But this ignores the primary reason for wind projects: climate change. The [World Wildlife Fund](#) estimates that between 2% and 72% of bird species face extinction due to the effects of climate change (temperature changes, sea rise, changing precipitation patterns, etc.). This species impact is further exacerbated by worsening air quality from fossil fuel energy generation (smog and local air quality) and environmental energy disasters (the Exxon Valdez oil spill is estimated to have killed over 375,000 birds alone). [Wind energy](#) greatly reduces the greenhouse gas emissions in Nova Scotia, and ultimately we will end up protecting the environment where our wildlife lives.

If a potential issue with wildlife is identified with a particular project, it will be reviewed as part of the provincial Environmental Assessment process.

The Effect of Wind Energy on Property Values

Studies from the Royal Institution of Chartered Surveyors in the United Kingdom and the Renewable Energy Policy Project in the USA have found that there is no statistical evidence that property values within sight of wind projects are lower compared to those in a comparable region.

As a matter of fact, the studies found that values went up in some of the regions studied. Further, proximity to a wind energy project would be just one of many factors that would affect property values.

Wind developers are required as part of municipal and provincial government regulations to minimize the negative impacts of their projects.

Smart project design can lead to successful integration with the landscape and the community and may result in people wanted to relocate closer to a cleaner, green source of energy.



Wind and Environmental Issues

[Various reports by CanWEA](#)

[The Sustainable Development Commission \(UK\)](#): Wind Power in the UK - A guide to the key issues surrounding onshore wind power development in the UK

[The Countryside Energy Co-operative Inc.](#) has assembled a large amount of information addressing the issues associated with wind energy.