

CANWEA PAPER

ADDRESSING CONCERNS WITH SOUND FROM WIND TURBINES

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Wind turbines produce sound, primarily due to mechanical operations and aerodynamics effects at the blades. Modern wind turbine manufacturers have virtually eliminated the noise impact caused by mechanical sources, and instituted measures to reduce the aerodynamic effects. The sound due to the aerodynamic interaction of the wind with the turbine blades is audible as a “swoosh” and can be heard at some distance from the turbines. In most cases it’s possible to carry on a normal conversation at the base and at a distance of 300 meters the sound they make can be compared to a whispering voice. Oftentimes, much of the sound from the blades is masked by the sound of the wind itself and the accompanying sound of rustling leaves or crops.

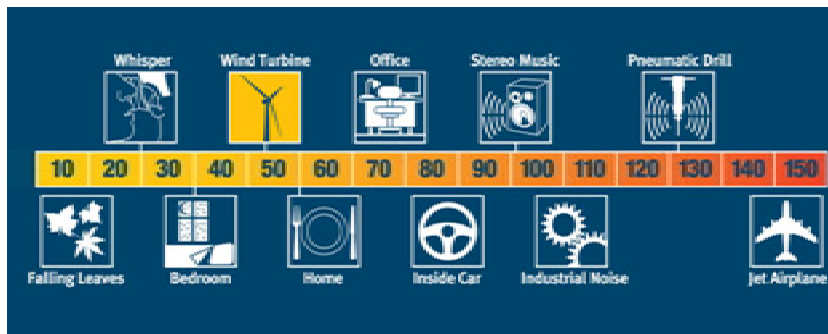


Figure 1 – Comparative sound levels (Source: AWEA)

The magnitude of the sound will depend on a multitude of variables and will vary from day to day and from place to place with environmental and operational conditions. When residences are nearby, care must be taken to ensure that the operations at the wind farm do not unduly cause annoyance or otherwise interfere with the quality of life of the residents.

In certain jurisdictions and situations there is pressure to introduce guidelines that require a certain minimum distance between the placement of turbines and any residential receptors. It is far more appropriate to deal with each application on its own merits, taking into account the topography in the area, the number and placement of the wind turbine, the sound power produced by the particular model of wind turbine, and the ambient sound levels at the receptors. For example, based on a review of operating wind farms in rural areas with 10 or more turbines rated in the range of 1 to 2 MW, acceptable separation distances for sound are generally found to be in the neighbourhood of 300 to 600 m, depending on the particulars for the site. For residences near single low noise models of turbines, separation distances of less than 250 m may achieve acceptable sound levels.

Most Canadian provinces have guidelines governing the assessment of industrial sound developed to various degrees. At present, Ontario is the only provincial jurisdiction with a noise assessment guideline specifically intended for wind turbine generators, recognising that the maximum sound power output generally corresponds with high background sound levels.

CanWEA has developed a “Best Practice” with respect to sound that recommends a separation based on audible sound at the outside of a dwelling of 40 dBA at 4 m/s and 53 dBA at 11 m/s. The document also provides an overview of existing sound guidelines in other jurisdictions, and an overview of the science of sound. The report “*Wind Turbines and Sound: Review and Best Practices*” by HGC Engineering, February 2007 can be found on the CanWEA website at: http://canwea.com/images/uploads/File/CanWEA_Wind_Turbine_Sound_Study_-_Final.pdf