Social Considerations for Wind Energy

Above Photo: Sheet Harbour, Nova Scotia
SOURCE: COMMUNICATIONS NS

What social issues are raised by wind energy?

Municipalities that commit to becoming more sustainable through domestic renewable energy production derive direct and indirect community benefits; many indirect benefits are financial or environmental, like lower greenhouse gases and air emissions, stabilized long-term electricity costs, a larger tax base, and more jobs. While these are important, affordable electricity is often cited as the foremost social issue.

For a community to accept a wind energy project – or any electricity generation facility - the local benefits must outweigh the costs. In the case of wind turbines, larger projects elicit the greatest number of social concerns, including noise, health effects, property values, and view planes. Wind energy projects have been identified as a particular source of annoyance for some community members.

Health Canada recognizes annoyance as a reaction to community noise which can lower quality of life. The World Health Organization also considers annoyance an adverse health effect. The source is most commonly road traffic, but can also be wind turbine noise. Levels of annoyance are reduced when there are personal benefits, like land leasing fees and community improvements. Residents' perception of the sight or sound of wind turbines affects their feelings of annoyance. A well-planned project with transparent community engagement can set the stage for increased acceptance and lower levels of annoyance. Negative effects can be minimized through good site selection, project planning and community consultation.

What about different sources of electricity and the community?

To be an efficient resource, electricity has to be produced in or near a community; the question is, what form of electricity generation technology makes a good neighbour? The social costs of different options, like risks to health and climate, are weighed below:

Coal

Coal is a major part of thermal generation in Nova Scotia. Coal-fired generation is located near the communities of Trenton, Lingan, Point Tupper and Point Aconi. These communities have cited concerns about air quality and emissions, including particulate matter.

Natural Gas

Natural gas provides about one fifth of current electricity generation in Nova Scotia. Communities near coal-fired plants often view natural gas as a more acceptable alternative. A cleaner burning hydrocarbon, natural gas produces fewer air emissions, including the particulate matter which concerns many who live near thermal generating stations.

Nuclear

Nova Scotians may be using nuclear-generated electricity transmitted from New Brunswick; there are no existing or proposed nuclear plants in Nova Scotia.

Oil

Oil-fired generation is a small part of Nova Scotia's thermal generation mix; it has community issues similar to coal.

Biomass

Social acceptance of biomass plants is very specific to the site and project; concerns relate to particulate matter from burning biomass feedstock and the sustainability of harvesting techniques.

Hydro

As with biomass, social acceptance of run-of-river and reservoir hydro projects varies. Larger projects gain less acceptance if there is concern about impacts to land use and local ecology, especially related to traditional uses by the Mi'kmaq of Nova Scotia.

Solar

Photovoltaic solar generates no noise or emissions. This technology is well-suited for many communities, even dense urban areas.

Wave & Tidal

Because they are often at some distance from neighbouring communities, there may be less concern with wave and tidal; however, issues of fishing and traditional use by the Mi'kmaq of Nova Scotia need to be addressed.

Wind

The size and number of turbines, as well as setback distances from dwellings, are the factors most likely to influence community acceptance of wind energy projects. Concerns about noise and visual impacts are most commonly cited, but both are subjective and greatly influenced by perception of the project.

Are wind turbines noisy?

As wind turbine design has evolved, sound emissions have been dramatically reduced, mainly in the mechanical components; the remaining audible sound is primarily the 'swoosh' of wind moving past the turbine blades. Sound can be predicted and measured. It is reported in decibels at the A-weighted level (dBA), frequencies which correspond to human hearing. Sound models can be accurate (often to 3 dBA) if used correctly; they include input for ground cover, topography and climatic conditions like wind speed and humidity.

In Nova Scotia, a guideline of 40 dBA has been adopted as the maximum sound level outside of a dwelling, and is a requirement for wind projects 2 MW or more in nameplate capacity to be approved under the Nova Scotia Environmental Assessment (EA) process. This level is in line with many other jurisdictions, as well as the World Health Organization's recommendation, which deems 40 dB to be protective of sleep. This sound level is comparable to a quiet street in a residential area. Noise is the perception of sound; unwanted sound is considered noisy.

Can wind turbines affect human health?

In certain weather conditions, there is potential for ice throw, release of ice build-up on the blades. Ice thrown from a moving turbine blade will not go beyond a distance of two or three times the turbine height (240 m for a typical large-scale turbine). There is also potential for shadow flicker, an effect created when wind turbine blades rotate in front of a low-level sun. Projects undergoing an EA need to show that shadow flicker levels at nearby dwellings do not exceed 30 hours total per year or 30 minutes maximum in one day based on clear sky assumptions. Both of these risks are well known and can be addressed with good site planning.

There has been much debate on the effects of audible sound, low frequency sound and infrasound. To assess the potential impacts of wind turbine noise on community health and well-being, Health Canada completed a study[1] which found that self-reported sleep disturbance, self-reported illnesses, and self-reported perceived stress and quality of life were not associated with wind turbine noise exposure. However, statistically significant relationships were found between increasing wind turbine noise levels and the reporting of high annoyance due to noise, vibrations, blinking lights, shadow and visual impacts from wind turbines. In all cases, annoyance increased with exposure to higher noise levels. The study found a significant increase in annoyance when noise levels exceeded 35 dBA. It was also found that low frequency noise correlated well to the audible range. Results for infrasound are still being evaluated by Health Canada and are expected to be released later in 2015.

Annoyance can affect health; the Health Canada study determined that wind turbine noise annoyance was statistically related to both self-reported and measured health effects. Community acceptance of wind turbines often determines perception of noise and resulting levels of annoyance.

Wind turbines also have beneficial human health affects by displacing fossil fuel electricity generation, which produces greenhouse gases and other air emissions leading to health risks.

1 *http://www.hc-sc.gc.ca/ewh-semt/noise-bruit/turbine-eoliennes/summary-resume-eng.php*

SOURCE: COLCHESTER COUNTY WIND FIELD

Spiddle Hill, Nova Scotia

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Case Study Basic Stats

Location:

Municipality of the County of Colchester

Output:

150 kW and 1.6 MW

No. of Turbines:

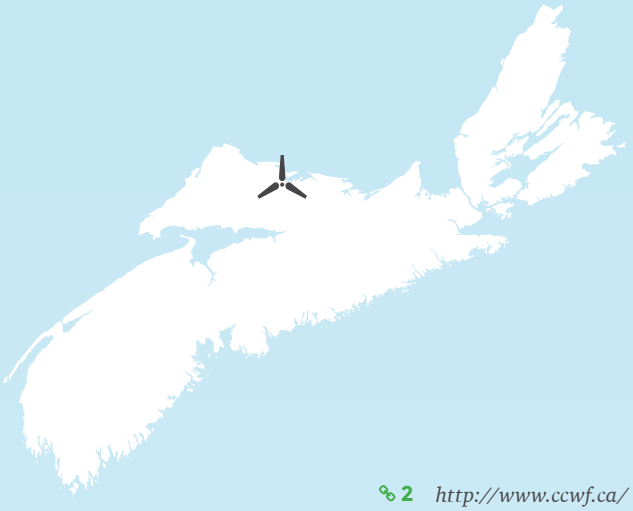
5 (3 small and 2 large)

Case Study: SPIDDLE HILL WIND ENERGY PROJECT

After the Colchester-Cumberland Wind Field (CCWF) was approved to operate as a Community Economic-Development Investment Fund (CEDIF) in 2007, momentum for this community-based wind energy project began to build. Seven years later, three 50 kW turbines and two 800 kW turbines are operating on private land leased on Spiddle Hill between Tatamagouche and Earltown in the northern part of Colchester County[2]. The Spiddle Hill Wind Energy project now delivers renewable electricity to the local community via the distribution grid.

The project is well supported at the local level. In a survey of three wind energy projects in Nova Scotia[3], this project showed the highest sense of community ownership. This was attributed to its being locally initiated, providing opportunities for local investment, and being perceived as having greater community participation in the planning process.

Most research shows that local ownership, community involvement, and public education increase community acceptance and support for a specific wind energy project.



2 *http://www.ccwf.ca/*

3 *https://sites.google.com/site/nswindenergystudy/*