

Backgrounder

Wind Energy

This document provides fact based information and resources on some of the topics addressed in the documentary “Big Wind” which aired on TVO on March 25, 2015 and also highlights the positive contributions the wind energy industry is making in Ontario.

Human health and wind turbines:

Wind energy is widely recognized as one of the safest and most environmentally friendly forms of electricity generation around the world. This is based on decades of operational experience, and the significant body of independent reviews, studies and statements from governments, independent researchers, medical groups and experts from all around the world.

CanWEA and the wind industry in Canada and abroad will continue to work with world-renowned experts in science, acoustics, medicine and occupational health to monitor ongoing research in the area of wind turbines and human health.

The documentary *Big Wind* references the start of the Health Canada study but was completed before the results of the study were released. As a result, it failed to mention the below conclusions.

In addition to the [extensive research and health reviews available on wind and health](#), the most recent new research by [Health Canada as summarized in their recent publications](#), finds:

- No evidence to support a link between exposure to wind turbine noise and any of the self-reported illnesses and chronic conditions
- No association between multiple measures of stress and exposure to wind turbine noise
- No association between wind turbine noise and self-reported or measured sleep quality
- No association between wind turbine noise and any significant changes in reported quality of life, or with overall quality of life, and satisfaction with health.

The findings from the Health Canada study and field research are consistent with a growing number of other studies and health reviews completed on this matter, in particular, a recent report commissioned through the Massachusetts Institute of Technology (MIT) which provides one of the most comprehensive and multidisciplinary reviews of the scientific literature on wind turbines and human health to date. The MIT paper, entitled [“Wind Turbines and Health: A Critical Review of the Scientific Literature”](#), has been peer reviewed and published online in the *Journal of Environmental and*

Occupational Medicine. It is an open access document, freely available for [download](#). The major findings and conclusions of this literature review are consistent with the findings of many of the more robust epidemiological studies in the area of wind and health, including the above referenced Health Canada summary. Specifically, the MIT study provides the following conclusions:

1. Measurements of low-frequency sound, infrasound, tonal sound emission, and amplitude-modulated sound show that infrasound is emitted by wind turbines. The levels of infrasound at customary distances to homes are typically well below audibility thresholds.
2. No cohort or case-control studies were located in this updated review of the peer-reviewed literature. Nevertheless, among the cross-sectional studies of better quality, no clear or consistent association is seen between wind turbine noise and any reported disease or other indicator of harm to human health.
3. Components of wind turbine sound, including infrasound and low frequency sound, have not been shown to present unique health risks to people living near wind turbines.
4. Annoyance associated with living near wind turbines is a complex phenomenon related to personal factors. Noise from turbines plays a minor role in comparison with other factors in leading people to report annoyance in the context of wind turbines.

The Health Canada and MIT work add to a significant body of evidence that points to the safety of wind energy – both from an environmental and human health perspective. These findings have led to a significant level of support for wind energy from a number of independent, health based organizations and professionals, including:

- **Public Health Association Australia -**
http://www.phaa.net.au/documents/120216_Position%20Statement%20on%20Human%20Health%20Effects%20of%20Wind%20Turbines-FINAL.pdf
- [Australian Medical Association](#)
- [National Collaborating Centre for Environmental Health](#)
- [American Lung Association](#)
- [Australian National Health and Medical Research Council](#)
- [Registered Nurses Association of Ontario](#)
- [Ontario Chief Medical Officer of Health](#)

Regulated setbacks:

Setback guidelines for wind turbines are put in place to address public health and safety, minimize environmental effects, ensure acceptable sound levels for surrounding dwellings and promote good land use planning practices, while balancing the economics and viability of the wind energy project. Ontario's regulated setback distances are consistent with those in jurisdictions across Canada.

A [2011 study from the Minnesota Department of Commerce](#) found in their review of setbacks in thirteen countries that “the average lower setback distance is approximately 470 meters, and the average upper setback distance is 700 meters.” In Ontario, the regulations do not permit wind turbines to be closer than 550 metres to a residential home.

Commitment to community engagement and public consultation:

Effective and meaningful community engagement is fundamental to the success of a wind energy project. CanWEA recognizes and values the right of citizens to have a meaningful role in discussions about developments that affect their community and we are putting this into action through continual improvement and industry responsibility.

The Canadian Wind Energy Association's (CanWEA) [Best Practices for Community Engagement and Public Consultation](#) guide has been designed to support wind energy project developers in continuously improving their work with local communities while ensuring that they meet and strive to exceed provincial requirements for public consultation.

CanWEA interviewed dozens of municipal leaders, stakeholders and experts in consultation -- and all of this informed the Best Practices guidelines.

Realising community benefits:

Wind energy developments are delivering local benefits and making positive and lasting economic contributions while helping to diversify communities across Canada.

Host communities are realizing significant economic benefits through new tax revenues and stable incomes for farmers and landowners. Wind energy developments are also creating career and employment opportunities for local trades-people and contractors as well as full-time permanent jobs once the wind farm is operational for students graduating from programs such as the wind turbine technician programs offered at many educational institutions across Canada.

Wind energy provides substantial economic benefits to rural communities. Every megawatt of new wind energy represents an investment of approximately \$2 million; a large portion of which is spent in the local host community. Since 2009, wind energy companies have spent over \$5 billion to develop Ontario's wind energy industry.

Wind farm developers continue to create innovative ways to provide economic benefits and support community partnerships (e.g., voluntary Community Benefits Program / Community Vibrancy Funds).

Property values:

Communities hosting wind energy projects benefit from local investment through new sources of stable revenue in the form of taxes and land lease payments, as well as new opportunities for local contractors and service providers.

Based on the various property values studies conducted to date, well over 200,000 transactions have been considered – of these, no significant statistical evidence suggest long term and negative impacts to property values.

The [Municipal Property Assessment Corporation \(MPAC\)](#) recently stated that there is no statistically significant impact on sale prices of residential properties in Ontario market areas resulting from proximity to [a wind turbine].

Peer-reviewed research out of the University of Guelph, and published in a recent issue of the [Canadian Journal of Agricultural Economics](#) concludes wind turbine developments have no effect on property values of nearby homes and farms.

Wind Energy is Affordable:

A reliable and affordable electricity system is one of the most important investments we can make to ensure Ontario can remain competitive in an increasingly global market. Unfortunately both here and in many other places in Canada the electricity system has suffered from decades of underinvestment. According to the Conference Board of Canada, \$347 billion in investment in Canada's electricity system is required between now and 2030 – all of these costs will be passed on to consumers. It is also clear that the cost of electricity from all sources of electricity generation built today will be higher than electricity produced from generation sources that were commissioned decades ago. As we consider which sources of power to invest in, CanWEA believes that newer and cleaner sources of electricity will help reduce costs that we currently bear as a result of the impact of conventional electricity generation on human health and the environment.

Notwithstanding the profound environmental benefits attributed with wind energy, as well as the broad benefits wind contributes to electricity system reliability and resiliency, wind energy is also one of the cheapest new forms of electricity today. The evidence for this is re-affirmed across Canada and North America, as new projects to be commissioned in Quebec in a few years have signed long term power purchase agreements with an average cost of [6.3 cents/kWh](#) – cheaper than new hydro, new nuclear and new coal plants. Alberta is also realizing the pricing advantage associated with wind energy. In their 2014 long term outlook, the Alberta Electric System Operator found that on average, wind costs [8.9 cents/kWh](#), with only some forms of highly efficient natural gas generation able to produce electricity more cheaply.

These same pricing advantages are being realized in the United States as well – data from the United States Energy Information Administration and the consulting firm Lazard provide further evidence that wind energy is one of the cheapest forms of power that can be procured today – and without the externalities associated with fossil fuel extraction, use and consumption. The 2014 report from the US investment firm Lazard found that wind energy is the lowest cost option for any new supply and without any subsidies. This pricing advantage is expected to continue well into the future. The US Department of Energy funded Lawrence Berkeley National Laboratory and the National Renewable Energy Laboratory report *Recent Developments in the Levelized Cost of Energy from US Wind Power Projects* shows that improved turbine performance alone has made wind's cost of energy 5 to 26 per cent lower today than it was a decade ago, depending on the wind resource at the project site.

It is clear that wind energy is a good investment for Ontario, bringing much needed social, environmental and economic benefits to the Province, and helping to shelter Ontario rate payers from fossil fuel fired sources of electricity generation that are open to price volatility. The long-term cost-certainty and stabilizing effect of electricity rates from wind farms will provide important protection for consumers and industry alike.

Wind Energy in Ontario:

Ontario is Canada's leader in clean wind energy with more than 3,600 MW of installed capacity, supplying over 3.5 per cent of the province's electricity demand.

Over 50 per cent of all new wind energy capacity in Canada in 2014 was commissioned in Ontario (999 MW), including four projects with ownership stakes from First Nations and local farmers. The Ontario market is expected to remain strong for the next several years, through the addition of at least another 1,100 MW plus additional contracts arising from the Large Renewable Procurement programs presently underway. The combination of current and future wind projects will all help to ensure a vibrant and sustainable Ontario supply chain.

Ontario communities hosting wind energy projects are realizing significant economic and social benefits through new municipal tax revenues, additional and stable income for farmers and landowners from land lease agreements, direct investment in the form of contracts for raw materials and infusion of dollars to local services and retail businesses. The approximately 1,000 MW of new wind energy projects commissioned in Ontario in 2014 drove \$2 billion in investments, created 10,500 person-years of employment, and will produce enough clean power for over 300,000 homes annually.

Ontario's wind energy market has successfully attracted the interest of companies from around the world, facilitating investment and job creation that has made Ontario a North American leader in renewable energy development. New wind energy developments are creating and maintaining an increasingly diverse, made-in-Ontario, supply and value chain that will encourage new investments and create competitive advantages for Ontario's green energy economy.

In addition, Ontario's wind energy industry is providing high quality jobs for graduates from post-secondary programs like Fanshawe College, St. Lawrence College, St. Clair College, to name a few. Hundreds of much-needed jobs have also been created in places like Windsor, Tillsonburg and Niagara, and thousands more are being created across the supply chain as well as in construction and local services.

Most importantly, unlike most other forms of power, wind turbines generate electricity without consuming or contaminating fresh water supplies, and they do not emit greenhouse gases, air pollutants, or hazardous waste of any kind.

Procuring a stable and steady stream of wind energy complements energy conservation measures, and provides Ontario with unprecedented opportunities to quickly re-align electricity supply needs with changing economic and environmental circumstances.

As of 2013, Ontario's Independent Electricity System Operator (IESO) is now able to use the inherent flexibility of wind generation to help balance demand. According to the IESO, "Wind generation has taken on a whole new role in the Ontario electricity system – moving from a passive resource to one that is actively used to balance supply against demand. The dispatch of wind has become an effective tool to manage surplus baseload generation."

Wind by the numbers in Ontario (March 2015)

Number of Wind Farms: 71

Number of Wind Turbines: 1,934

Total Installed Capacity (MW): 3,632

For more on the many benefits of wind energy, visit the [WindFacts website](#).