

Stantec

GUNN'S HILL WIND FARM

CONSULTATION REPORT

VOLUME 1: PUBLIC, AGENCY AND MUNICIPAL CONSULTATION

Appendix D

Public Consultation Materials

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Appendix D1

**Public Open House (August 2008)
Display Boards**

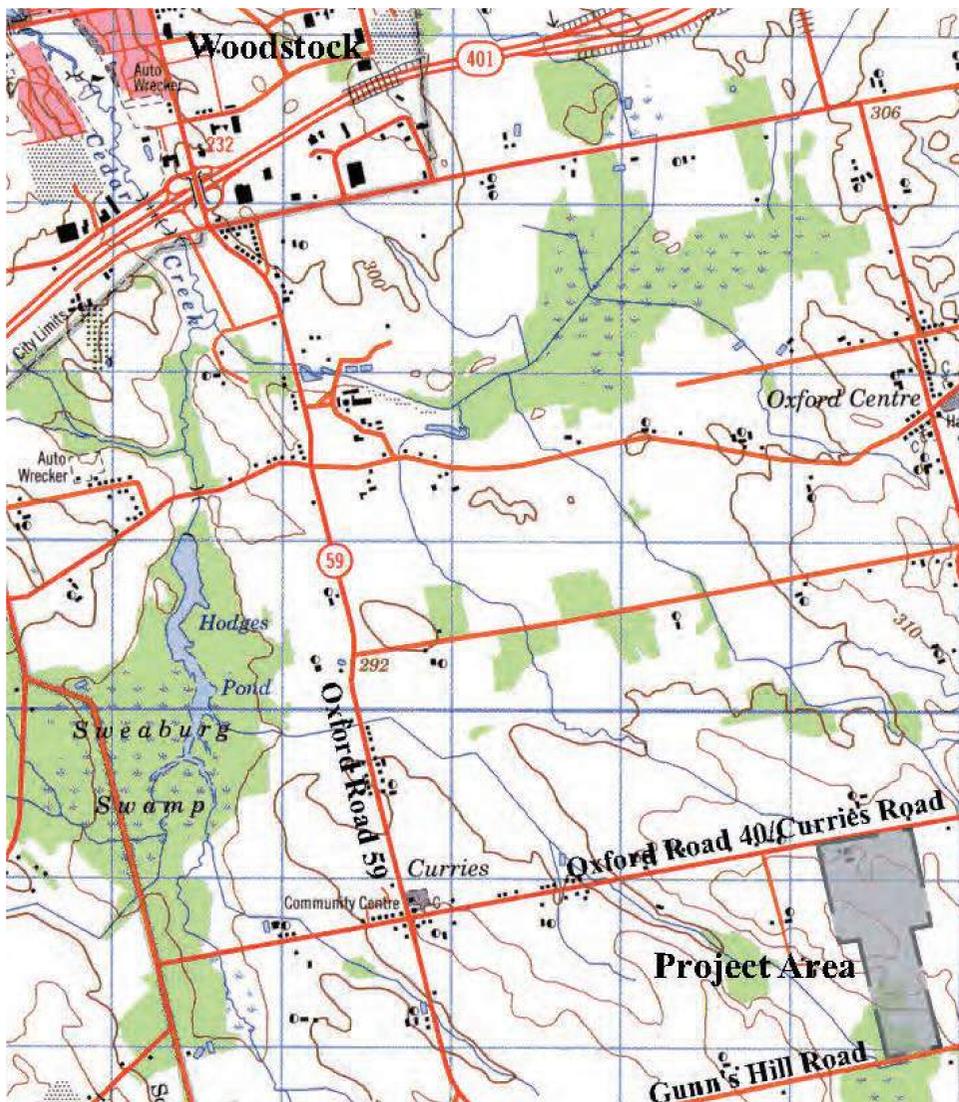
Gunn's Hill Wind Farm

An Introduction

WELCOME...

Prowind Canada Inc. is proposing the construction of a 10 MW (approximately 5 turbines) wind energy project located in the Township of Norwich, Oxford County, just south of the City of Woodstock. It is proposed for privately owned, agricultural land.

Studies are ongoing to determine and mitigate any impacts of the project on the environment and local interests. Public consultation is an integral part of this process. Local, provincial, and federal stakeholders are providing input on various components of the project.



...YOUR INPUT IS IMPORTANT TO US

As members of the local community, you are important stakeholders. We hope to hear your comments and obtain your feedback on the proposed wind farm. Please ask questions and tell us what you think. Make sure to fill out a survey before you leave.

THANK YOU FOR COMING!

WHO WE ARE...



Prowind Canada Inc. is a developer of economic power generation that partners with farmers, landowners, and small communities. Prowind provides wind energy with a trustworthy, competent, ecological and responsible behaviour in an agricultural setting.

M. K. Ince and Associates Ltd. is a wind energy consulting firm experienced in environmental assessment and engineering tasks for many wind projects in Ontario and Canada. MKI is committed to community involvement in developing a sustainable future.



M.K. INCE AND ASSOCIATES LTD.
WIND ENERGY ENGINEERING

Gunn's Hill Wind Farm

Project Details

LOCATION

...Local Landmarks

- The Gunn's Hill Wind Farm will be located within the Township of Norwich in Oxford County.
- The project area is on privately owned, agricultural land within the area surrounded by Gunn's Hill Road, Oxford Road 59, Curries Road (Oxford Road 40), and Middletown Line.
- The study area is located 5 km south of Highway 401 and the City of Woodstock.



The above photo was taken at the project site during the met tower installation in May 2008.

What You Want To Know...

LATEST INFO

- The wind farm will be approximately 5 turbines and produce a maximum of 10 MW of electricity, enough electricity for approximately 3000 average Ontario homes.
- The turbine hub heights are proposed to be between 80-120 m tall with a rotor diameter of 77-82 m.
- Internal access roads for construction and maintenance, and potential upgrades to existing roads, will be planned in consultation with landowners, Ministry of Natural Resources and Ministry of Transportation.
- The exact locations of the turbines have not yet been determined. This will be based on wind resource, municipal setbacks and MOE noise limits, as well as more information gathered through the environmental assessment process.

CONTACTS

If you have any questions or comments please contact us, we'd be happy to hear from you. Please visit us on the web for more project details and updates at www.prowind.ca.

General Project Information

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Gunn's Hill Wind Farm

Project Update

STATUS OF PROJECT

- 
- A meteorological tower was installed on the site on May 8th, 2008 to monitor the wind resource over a minimum of one year.
 - A Notice of Commencement to begin the Provincial Environmental Assessment process was published in the Oxford Review on June 21st, 2008.
 - The Federal Environmental Assessment process will be initiated shortly. The Canadian Environmental Assessment Agency website (www.ceaa-acee.gc.ca) will contain information on the project.
 - Electrical interconnection studies are being carried out to determine connection points and details.
 - An Environmental Assessment of the project is in progress. This includes: public consultation, bird, bat and wildlife studies, an archaeological study, noise assessments and visual impact assessments.
 - Wind turbine manufacturers are being contacted to determine the best suited wind turbine for the project.

WORKING WITH THE COMMUNITY

We Need Your Help...

- Local residents are a very important part of the project and will be included throughout the consultation process.
- If at any time throughout the planning process you have questions or comments, please contact us. Or be sure to add your name and contact information to the sign-on sheet to receive updates on the project.
- There is a potential for local jobs through the construction and operation of the project. It is estimated that a 10 MW wind farm creates 30 temporary jobs in the local community and 1 permanent job.
- Prowind Canada Inc. believes working with the community to use local skills and resources is an important part of the wind energy industry.

PLEASE FILL OUT A SURVEY BEFORE YOU LEAVE AND TELL US WHAT YOU THINK!

Harnessing Wind Energy

Past, Present and Future

WIND ENERGY IS NOT NEW

Doing Good Things for a Long Time

- Windmills were used to grind wheat and corn, pump water and cut wood.
- As late as the 1920s, American communities have been using small windmills to generate electricity.¹
- Today, wind energy is the fastest growing electricity producer.¹
- In Canada, the wind energy industry experienced a 26% growth rate for the year 2007.²



GLOBAL WINDS

Around the World... In Canada...

- There are over 100,000 turbines installed in 70 countries.³
- The leaders in wind energy installations in 2007 were USA, Spain and China.⁴
- Denmark produces more than 20% of its electricity from wind energy.⁵
- Some areas in Germany generate over 50% of their power from wind energy.¹²

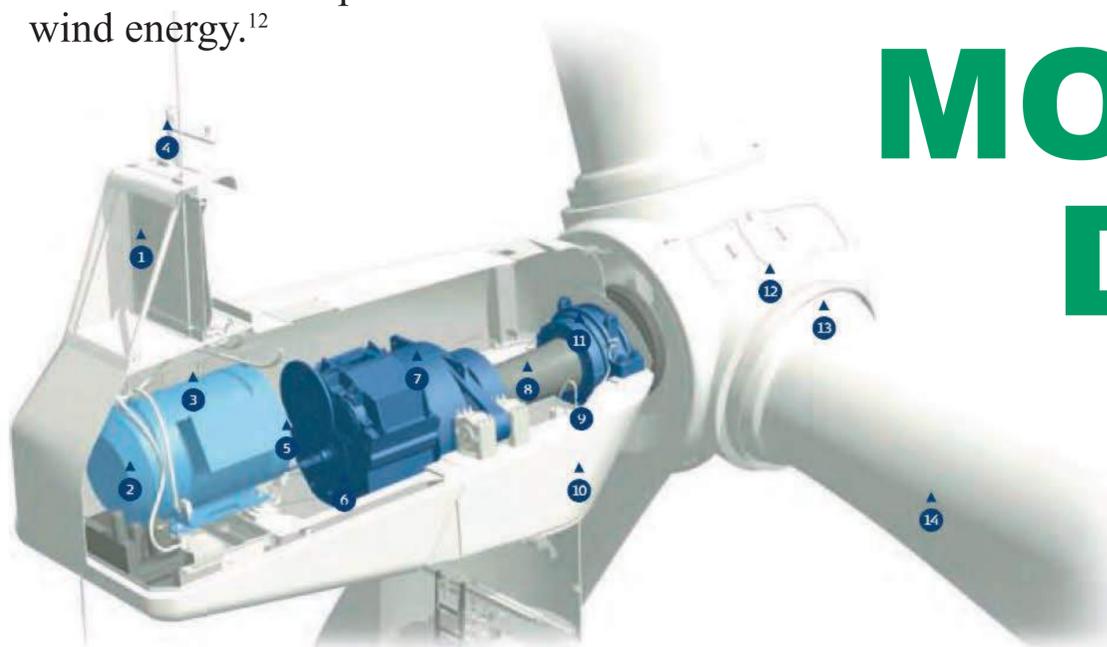
- In 2007, Canada produced enough wind energy to power 537,000 homes.⁷
- The Federal government is committed to increasing renewable energy capacity to 4000 MW.¹⁴
- Large numbers of wind turbines can be found in Ontario, Quebec, Manitoba, Saskatchewan, Alberta, Nova Scotia and PEI.



MODERN DESIGN

Wind Turbine Designs Have Improved

- They are more effective at converting wind resources into electricity.
- Less maintenance is required.
- They can operate well in colder climates.
- Modern turbines are quiet and are considered by many to be pleasing to the eye.



- | | |
|------------------------|-----------------------|
| 1 Cooler | 8 Main shaft |
| 2 Generator | 9 Yaw gears |
| 3 Nacelle controller | 10 Machine foundation |
| 4 Anemometer windvanes | 11 Main bearing |
| 5 Coupling | 12 Hub controller |
| 6 Mechanical brake | 13 Pitch system |
| 7 Gearbox | 14 Blade |

Anatomy of a Modern Turbine

- Height to Hub: 50 - 120 m
- Height to Tip: 95 - 170 m
- Rotor Diameters: 50 - 100 m
- Foundation Size: 12 - 16 m Ø
- Foundation Depth: 2 - 3 m
- Rotor Speed: 10 - 25 rpm

Why Wind Energy?

Local Benefits

BENEFITING YOUR COMMUNITY

Local Job Creation

By focusing on renewable energy, the Oxford County and Ontario can:

- Add well in excess of \$5 million to the local economy during the construction period.
- Create an estimated 27% more jobs than the coal-electric industry and 66% more jobs than the natural gas-electric industry per unit of energy. ²⁰
- Foster a long-term green industry within the province.

Increasing the Municipal Tax Base

- Wind farms support the maintenance of roads and infrastructure by increasing the municipal tax base.
- Wind turbines and accessory structures make minimal demands on municipal services and do not require water sewage connections.



A COMPATIBLE LAND USE

WHEN INSTALLED, ONLY ABOUT 2% OF THE FINAL LAND AREA IS REQUIRED FOR WIND TURBINES. THE REST WILL REMAIN AS FUNCTIONAL FARM LAND.²¹

Wind Power in Natural Areas

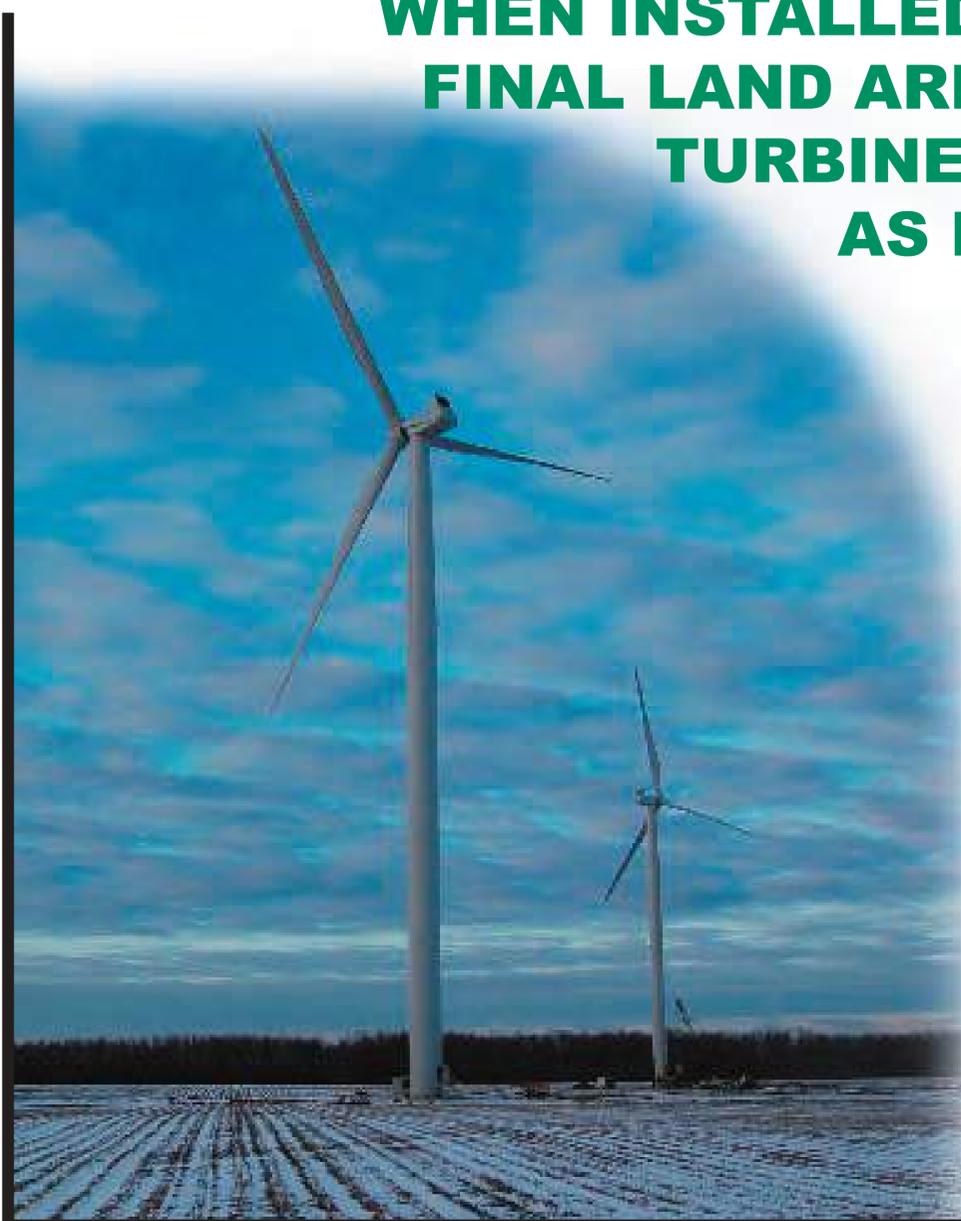
Wind Turbines:

- Require relatively little tree removal.
- Are accessed via existing roads and require minimal infrastructure.
- Provide stable long-term employment that supports the local community.

Wind as a Tourist Attraction

Wind Turbines:

- Enhance the environmental image of the area.
- Attract environmentally curious visitors.
- Stimulate the local tourism industry.



Why Wind Energy?

Cost Benefits

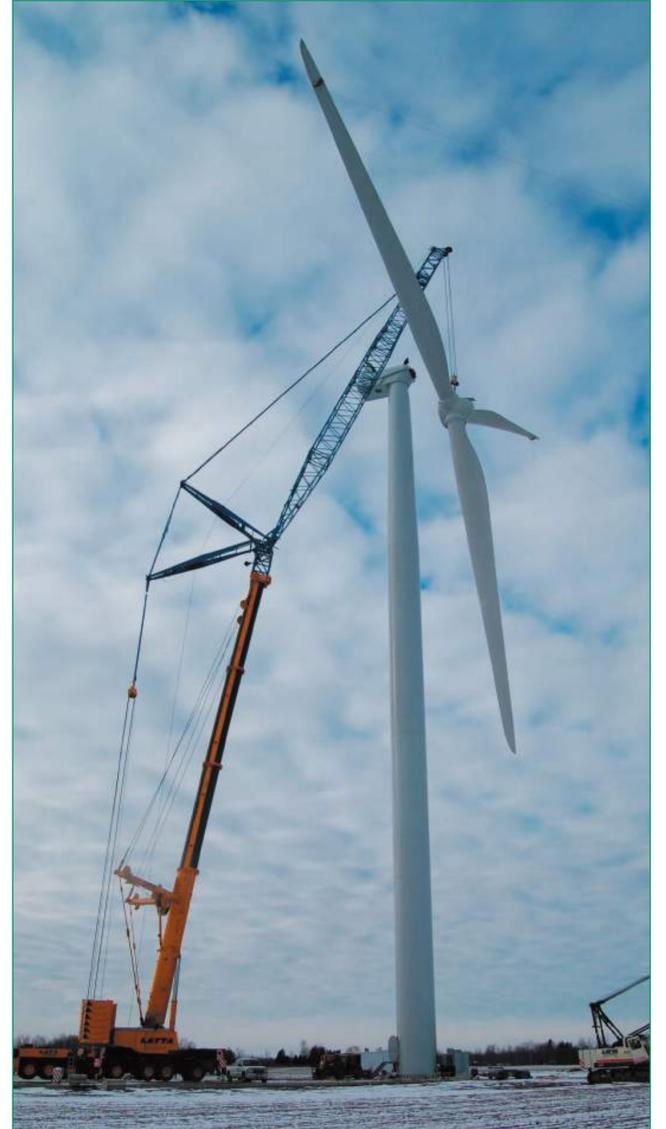
WIND IS FREE

Wind Energy Costs are Competitive...

- Wind energy costs have dropped from 30 to 11 cents per kWh over the last three decades.¹⁶
- Wind energy is cost competitive with nuclear and natural gas.
- Because wind is free, wind energy costs are stable over the long term.
- The cost of electricity from utility-scale wind systems has dropped

AN ECONOMICAL ALTERNATIVE

- Wind energy production facilities are less expensive to construct than large centralized conventional power generation facilities.¹
- It is relatively simple to add wind turbines as power demands increase.¹
- Wind can be used to power the local electricity grid.



NO HIDDEN COSTS

The Cost of Wind

Energy is All-

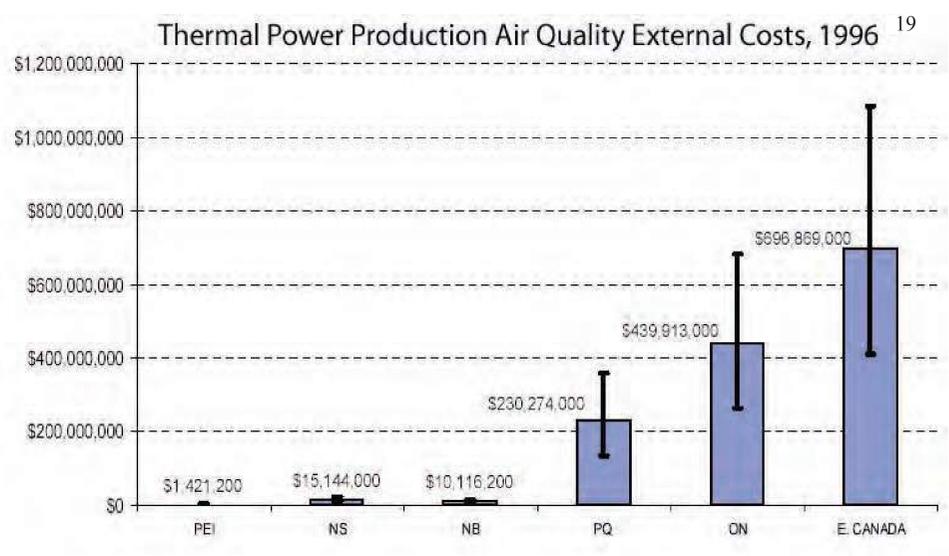
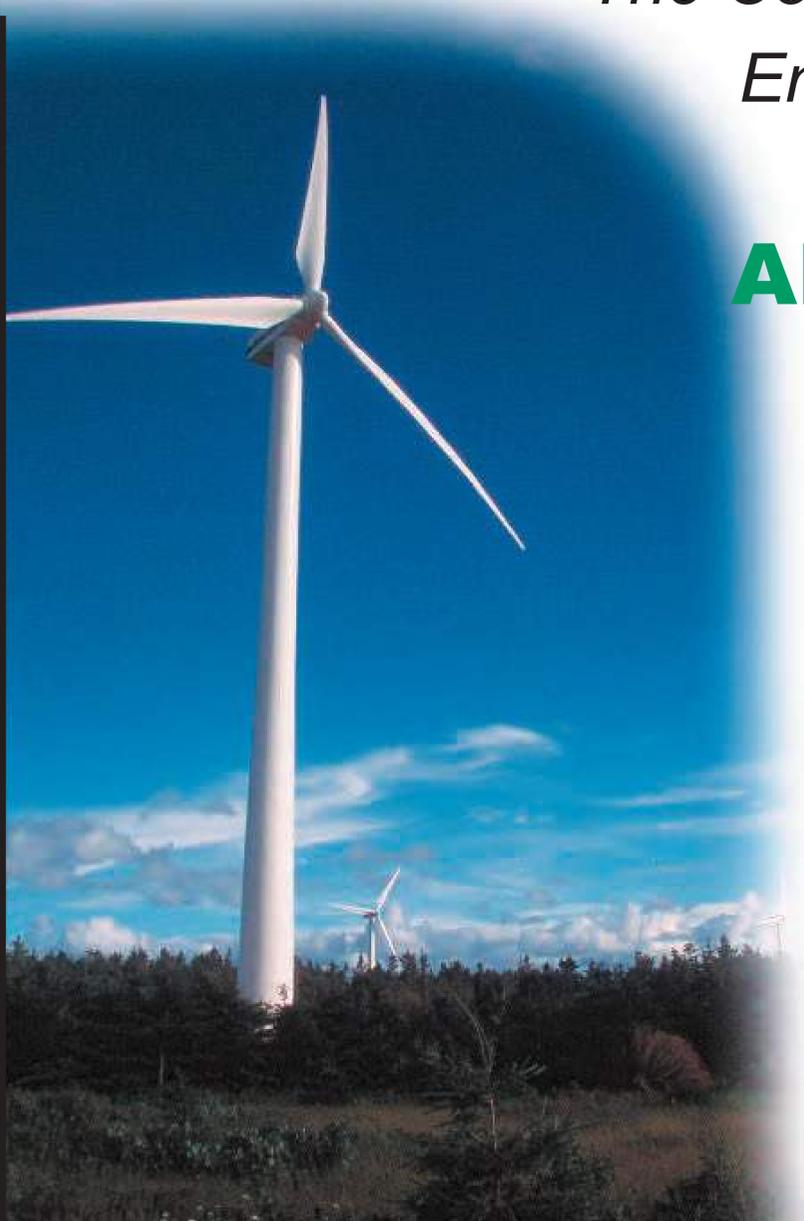
Inclusive...

- There are no costs associated with waste disposal, security or public health care.
- Air and water quality are not degraded.
- Natural Resources are maintained.

AN INFINITE RESOURCE

Conventional Methods of Power Generation are Limited

- Fossil fuels and Uranium are finite.
- Finite fuel costs are expected to increase with time.¹⁸



Harnessing Wind Energy

Considering Your Environment

CAN YOU HEAR IT?

Wind Turbine Sound Levels are Low

- Wind Turbines have become quieter in recent years due to improvements in blade designs, generator enclosures, and drive train technology.⁸
- You can stand below a wind turbine and carry out a normal conversation.⁸
- Sound emissions from a single turbine is generally about 40 dBA at a distance of 400 m which is less than the sound levels in an average residence.

Typical Sound Pressure Levels

(Paul Gipe – Wind Power Comes of Age - Table 10.2)

Source	Distance from the Source		Sound Pressure Levels in dB(A)
	ft	m	
Threshold of Pain			140
Freight Train	100	30	70
Vacuum Cleaner	10	3	70
Freeway	100	30	70
Wind in trees	40	12	55
Light Traffic	100	30	70
Average Home			50
Soft Whisper	5	2	30
Quiet Bedroom			20

Source: Handbook of Noise Measurement, General Radio; Bergey Windpower Co.; and U.S. Windpower.

What Is Infrasound?

- Infrasound is low frequency noise that is generally below our threshold of hearing.
- It occurs naturally in the environment from such elements as waves and wind.
- “There is no evidence that the current upwind turbine technology presents any problems related to the generation of infrasound/low frequency sound energy.”

[Ontario Ministry of the Environment, “Frequently Asked Questions for Wind Turbine Projects”, July 2005.]



Birds and Wind Turbines

- The average bird mortality observed in North American wind parks is 1.83 birds per turbine per year.⁹
- Buildings and windows continue to be the greatest cause of bird mortality, responsible for an estimated 55% of all bird deaths.⁹

Visual Impact and Property Value

- Wind turbine visibility will not have a negative impact on property value.¹⁰
- Studies have shown that wind turbines often have a net benefit on property value.¹¹

(‘The Effect of Wind Development on Local Property Values’, Renewable Energy Policy Project, May 2003)

“VIEWS OF WIND TURBINES WILL NOT NEGATIVELY IMPACT PROPERTY VALUES. Based on a nation-wide survey conducted of tax assessors in other areas with wind power projects, we found no evidence supporting the claim that views of wind farms decrease property values.”

- ECONorthwest, November 2002



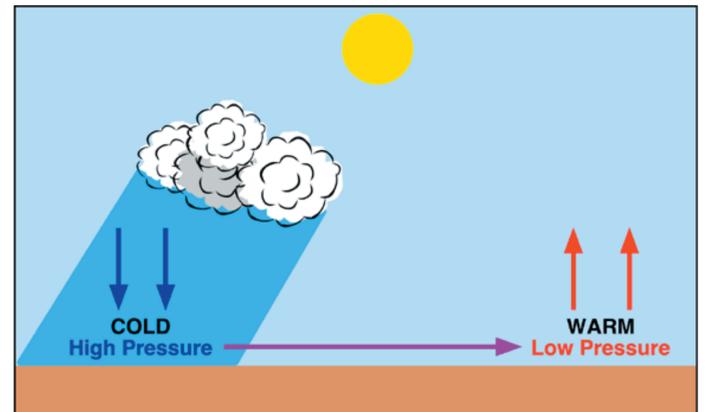
Why Wind Energy?

A Clear Future

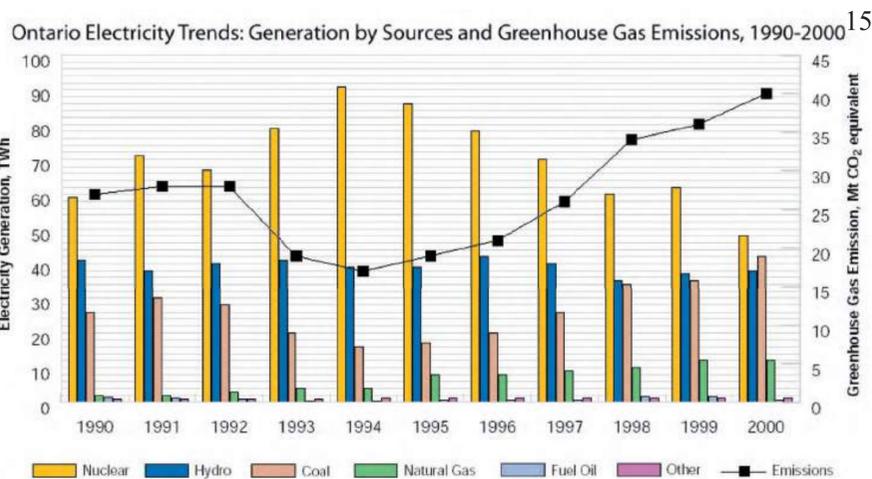
WIND = AIR IN MOTION

Where Does Wind Come From?

- Wind is produced by the uneven heating of the earth's surface by the sun.
- When the sun is shining during the day, the air over land heats more quickly than the air over water.
- The warm air over the land expands and rises, and the heavier cooler air over water moves in to take its place, creating local winds.



WIND IS A CLEAN FUEL



Pollution Free!

- Scientific studies in the 1990s raised concerns about climate change due to fossil fuel use and Greenhouse Gas Emissions.
- Unlike conventional power generation methods, wind power does not burn fossil fuels or create hazardous or toxic waste.

The Real Cost...

- The Ontario Medical Association calls air pollution “a public health crisis”.
- Air pollution costs the province's economy over \$10 billion.¹²
- Air pollution kills over 5,800 Ontarians every year.¹²

WIND AND KYOTO

Canada's Obligations

- By signing the Kyoto protocol, Canada has agreed to reduce Greenhouse Gas emissions to 6% below 1990 emission levels.¹³
- THAT'S 25% LESS THAN TODAY'S EMISSIONS!¹³
- Operation of a 1.5 MW turbine over 1 year will avoid Greenhouse Gas Emissions equivalent to that of 375 cars.¹⁴

**WIND IS CALLED
A RENEWABLE
RESOURCE
BECAUSE IT WILL
CONTINUALLY
BE PRODUCED
AS LONG AS THE
SUN SHINES ON
EARTH.**

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GUNN'S HILL WIND FARM

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Appendix D2

**Public Open House (February 2010)
Display Boards**



WELCOME TO...

Prowind Canada's PUBLIC INFORMATION OPEN HOUSE

COMPANY INTRODUCTION

Prowind Canada Inc. is a Canadian corporation based in Kemptville, Ontario with a mandate to develop wind power generation facilities across the country.

Prowind Canada is intimately tied with Prowind GmbH (Osnabrueck, Germany), a full service company whose core competencies are the planning, financing, construction, and operation of power plants driven by renewable energy; this includes wind, solar, organic and hydro power.

Both Prowind Canada and Prowind GmbH have strong relationships with the farming community. Our success continues to rely on this relationship in order to secure rights on agricultural land to develop wind power. We believe wind energy and agriculture make great partners and this partnership is valued and encouraged by everyone at Prowind.

**With our
agricultural
partners we seek
to develop viable
wind farms that
produce clean,
renewable power
that continually
bring revenue
back to rural
communities in
Canada.**

COMPANY HISTORY

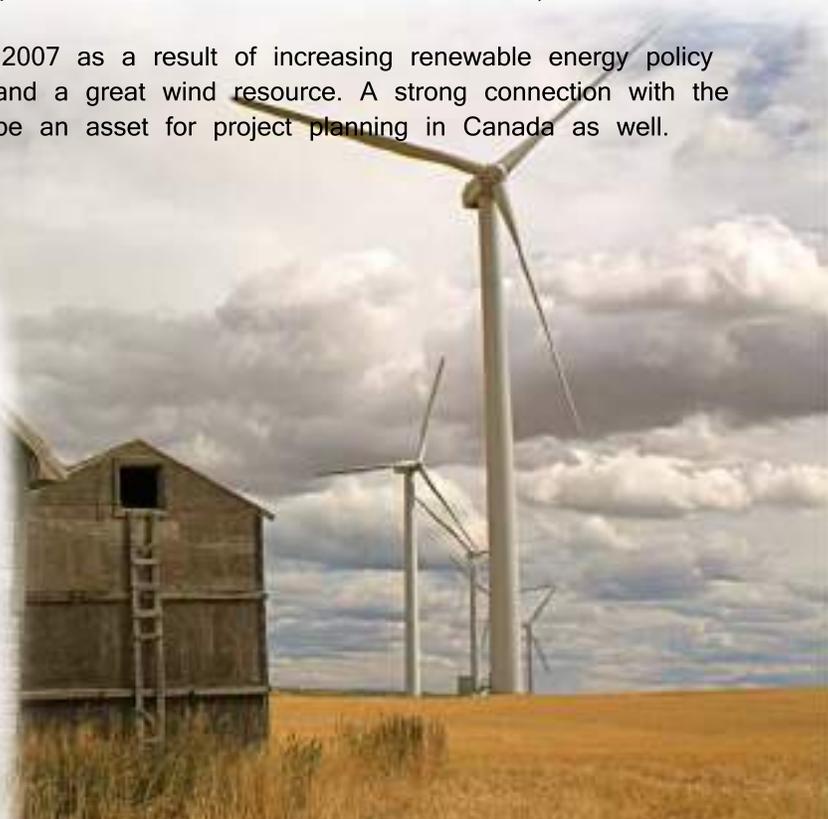
Prowind GmbH was established in 2000 by dairy farmer and lawyer Johannes Busmann. It has since completed 16 successful wind power projects in Germany alone. The company's current project list includes wind, solar and biomass projects in excess of 1,000 MW in eight countries on four continents (Europe, North & South America, and Australia).

Prowind Canada was established in 2007 as a result of increasing renewable energy policy support in the provincial government and a great wind resource. A strong connection with the agricultural community proved to be an asset for project planning in Canada as well.

CONTACT INFORMATION

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PO Box 1678
Kemptville, ON K0G 1J0

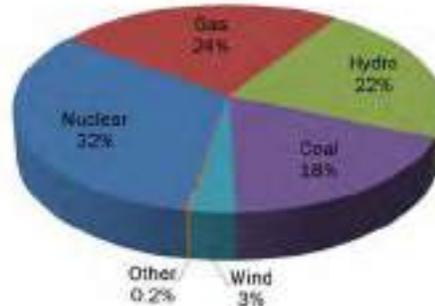
Phone: (613) 258-6700
Toll-free: (877) 258-6702
Fax: (613) 258-6722
Email: info@prowind.ca
Website: www.prowind.ca



Canada's energy needs are still reliant on fossil fuels. Energy policy and procurement is the responsibility of each province and priorities differ across the country. In Ontario, coal is slowly being phased out, as it is the most environmentally damaging, although it still provides Ontario with a portion of it's electricity. Renewable energy technologies are in a good position to fill the void left behind by coal, with low start-up costs and quick build times compared to the alternatives.

The Green Energy Act was passed in 2009, which will see renewable energies advance in Ontario and create 50,000 green sector jobs.

Installed Electricity Generation in Ontario ⁶



Canadians have a huge appetite for electricity; worldwide, we are the 3rd largest consumer per capita and 7th largest in total consumption.

A VIEW ACROSS CANADA

Canada's wind energy sector produces enough electricity to power 860,000 homes or approximately 1% of Canada's total energy demand.² Currently, 3,319 MW of wind energy is installed in Canada, but this is increasing quickly.

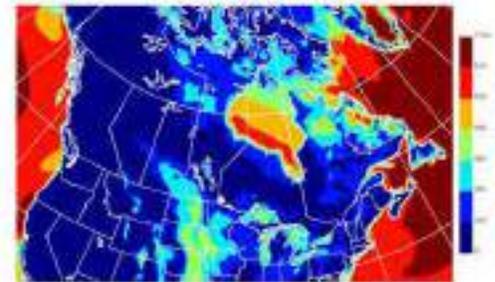


Wind Installations per Province ²

CANADA'S WIND ENERGY ATLAS¹

Environment Canada has released a Wind Energy Atlas to improve the understanding of the wind resource in Canada and facilitate the development of wind energy.

This tool is used by wind developers and the public for siting wind projects and assessing wind patterns. You can find this at www.windatlas.ca



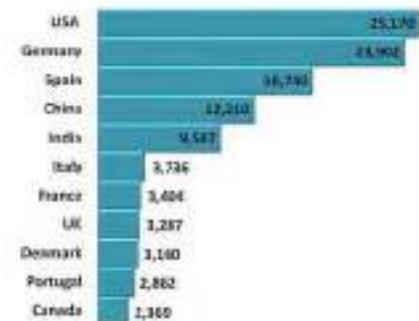
GLOBAL WIND MARKET

Wind energy is growing around the world. The year 2008 saw a 29% global increase in wind installation capacity.⁴ This growth is expected to remain on an upward trend for the near future, reaching 200,000 MW of wind energy globally within the next few years.

Many European countries are decades ahead of Canada. Denmark is still the world leader in this area; more than 20% of the power produced and used in Denmark is from wind energy.

WORLD WIND LEADERS⁴ >

The year 2008 marked the advance of the USA to the top of the global wind energy installation list. Canada came in at a modest 11th place.⁴ This is seen in the graph to the right, measured in MW.

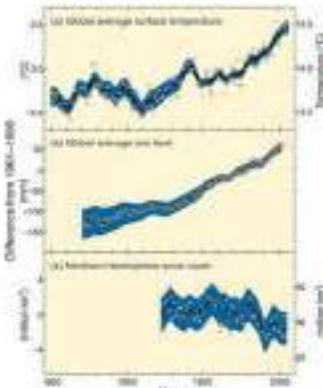


1. Environment Canada. (2002). Canadian wind atlas. <http://collaboration.emc.ec.gc.ca/science/rpn/modcom/eole/CanadianAtlas.html>
 2. Canadian Wind Energy Association. (2010). Canadian Wind Farms. http://www.canwea.ca/farms/index_e.php
 3. Fick and Vincent. (May/June 2001). Who has mapped the Wind? in National Geographic. <http://www.canadiangeographic.ca/Magazine/M101/alcarte.asp>
 4. World Wind Energy Association. (2009). World Wind Energy Report 2008. http://www.windeva.org/home/images/stories/worldwindenergyreport2008_s.pdf
 5. International Energy Agency. (2008). Key World Energy Statistics. http://www.iea.org/textbase/nppdf/free/2008/key_stats_2008.pdf
 6. Independent Electricity System Operator. (2010). Supply Overview - Existing Installed Generation. http://www.ieso.ca/imoweb/media/mid_supply.asp

Wind power is clean and limitless and leaves a small environmental footprint. Wind is the natural choice.²

A GLOBAL PROBLEM

It is internationally accepted that climate change, and its association with global warming effects, are a reality.



Climate Change Indices³

The Intergovernmental Panel on Climate Change (IPCC) has recently released figures indicating that global temperatures have risen 0.76°C in past 100 years.³

Global Greenhouse Gas Emissions 2004³



Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level.

Global greenhouse gas emissions due to human activities have grown since pre-industrial times, with an increase of 70% between just 1970 and 2004.

Continued greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century.

The need for renewable energy has never been greater.

To limit and minimize the anticipated impacts of a changing and unpredictable climate, targets on reducing emissions have been legally agreed internationally - through the Kyoto Protocol. This is accomplished through:

- Improving energy efficiency
- Improving efficiency of transport
- Reducing emissions from generating electricity.

A LOCAL SOLUTION

Wind energy has so much to offer us and so little to contribute to global warming.

Wind turbines produce zero emissions during operation. Any emissions associated with construction and transportation are offset within the first 6 months of energy production.¹

Wind energy is free, endless and readily available for harvest. There are no mines, no wastes, no displacement, and no health impacts.

Each 2 MW wind turbine produces enough electricity to power approximately 500 average homes.

Each turbine built will produce enough power to leave 1,800,000 kilograms of coal in the ground and reduce annual greenhouse gas emissions by 4,000 tonnes. This has the same positive impact as taking 834 cars off the road or planting 20,000 trees.¹

Modern wind turbines are efficient too. They are producing electricity 70-85% of the time, although they are not always producing at their maximum output. Over a year, the turbine will produce about 30% of its maximum capabilities. For comparison, large scale power facilities (coal, nuclear) operate at about 50% capacity.¹



SOME HISTORY



The wind has long been recognized as a valuable source of energy. Windmills have been used for centuries to grind wheat and pump water. They were regularly used in Holland starting from the 17th century.¹



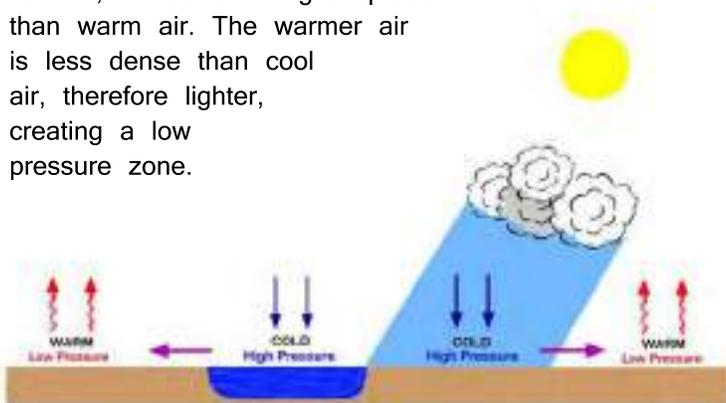
The more recent wind energy technology used to produce electricity was invented in the USA in the late 1800s. Charles F. Brush invented the first efficient wind turbine that was used in the public electric grid producing 12 kW.¹ His company was sold and merged into what is today known as the General Electric Company.²

Since then, wind energy technology has been rapidly improving. The average inland turbine is being built to produce 1.65 to 2.5 MW of electricity. Turbines with an output of 5 MW are currently being tested.

THE SCIENCE OF WIND

As the sun beats down on the earth it heats the surface and consequently, the air above the surface.

The cooler air higher in the atmosphere is heavier, denser and higher pressure than warm air. The warmer air is less dense than cool air, therefore lighter, creating a low pressure zone.



The heavier air rushes in to balance the pressure zones, creating a movement of air, or local winds. This differential in air pressure occurs across many landscapes as the sun heats different areas and surface materials at different rates.

In this illustration, water and shady areas heat more slowly than soil and asphalt, creating the pressure difference. This is why coastlines are frequently very windy.



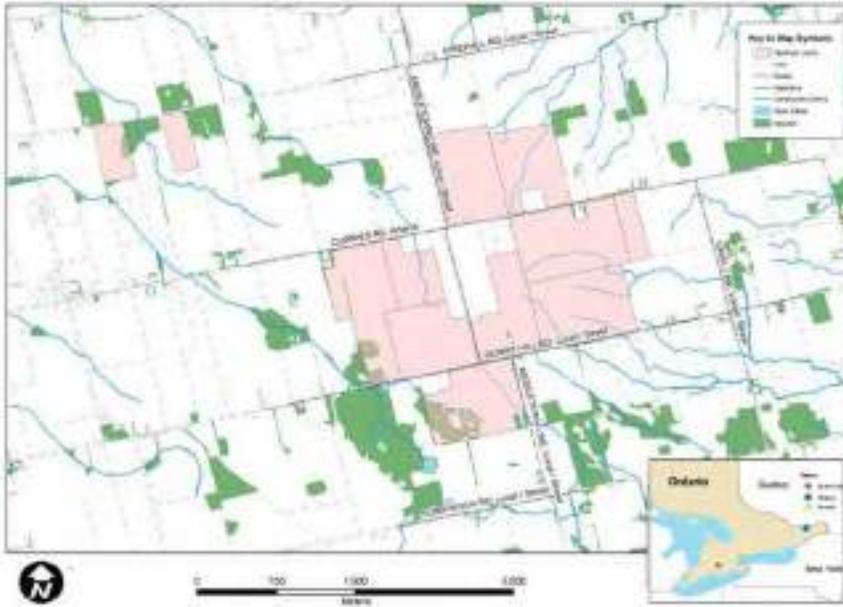
TURBINE FIGURES

- Tower Height - 80 to 120 m
- Blade Length - 40 to 50 m
- Rotor Diameter - 80 to 100 m
- Base Diameter - 3 to 4 m
- Foundation Depth - 8 to 10 m
- Energy Output - 1.65 to 2.5 MW



The Gunn's Hill Wind Farm is proposed to produce **25 MW** of renewable energy, enough to power **6,250** average Ontario homes each year.

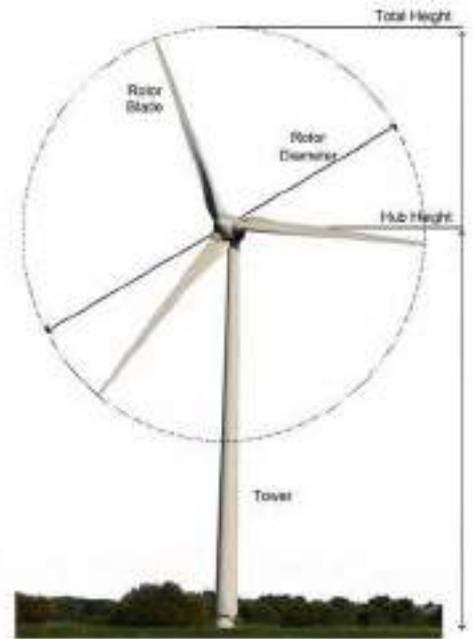
PROJECT AREA



The project will include up to 10 turbines within the area outlined on the map to the left.

Each turbine will produce 2.5 MW of electricity and have a hub height of 100 metres and a rotor diameter of 100 metres.

Aside from the turbines, the wind farm will also require the construction of access roads, a switching substation and underground cabling to connect the turbines to each other and the electrical grid. The details of these features are not yet known, as they are planned closer to the end of the planning process.



VISUAL REPRESENTATION OF PROJECT

The image below represents a typical agriculturally based wind farm. The size and density of the turbines at Innerkip will be similar to that pictured below.

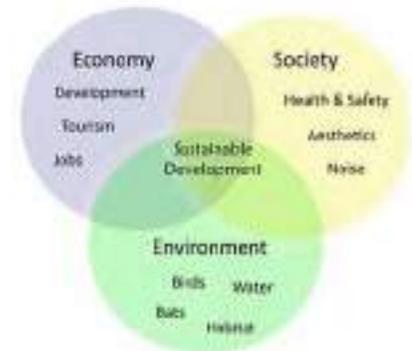


Environmental assessment is a process that is used to predict, evaluate and mitigate the environmental effects of a proposed undertaking.¹ The term “environmental” has a broad focus in this context, taking into consideration the economic, social and natural components of an area.

WHAT IS IT?

Each provincial government requires an environmental assessment report for commercial-scale wind farm projects. A federal review is triggered if federal funding is required, a federal permit is sought, or if it is on federally-owned land.

If properly analyzed and planned, each project can be built in a sustainable way that addresses the community’s concerns and the future of our planet. The graphic to the right illustrates the three realms of possible impacts. Sustainable development is reached when all three needs are balanced.



Environmental Assessment is a generic process that follows the basic format outlined in the illustration below. In Ontario, the Green Energy Act aims to streamline the process for renewable energy projects. This streamlined process is called the Renewable Energy Approval (REA) process.



RENEWABLE ENERGY APPROVAL

The Provincial Green Energy Act was passed early in 2009. The Renewable Energy Approval is a regulation (O. Reg 359/09) of the Green Energy Act which streamlines the environmental assessment process for renewable energy projects. The purpose of the regulation is to improve the efficiency and give specialized focus to renewable energy projects while ensuring the same environmental considerations and safe-guards as the old process.

The REA application document is broken into many individual reports dealing with a specific topic. These reports are drafted and then submitted various government ministries and other agencies for approval before submission to the Ministry of the Environment for final approval. The reports typically required for Prowind’s wind farms include:

- ▶ Project Description Report
- ▶ Construction Plan Report
- ▶ Design and Operations Report, *which includes:*
 - ▶ Site Plan
 - ▶ Noise Assessment Report
 - ▶ Telecommunications Assessment Report
 - ▶ Avian Monitoring Report
 - ▶ Bat Monitoring Report
- ▶ Decommissioning Plan Report
- ▶ Natural Heritage Assessment Report
- ▶ Water Assessment Report
- ▶ Archaeological and Cultural Heritage Assessment Report
- ▶ Turbine Specifications Report

In the REA regulation, wind farms are sorted into a “Class” to determine the depth of investigation for environmental assessment and impacts. Of the five classes identified in the regulation, all of Prowind’s projects will be designated as “Class 4” wind energy facilities, as they are land-based wind facilities greater than or equal to 50 kW with a sound power level greater than or equal to 102 dBA. “Class 5” wind facilities are those located off-shore. Prowind’s proposed wind farms are subject to the strictest and most in-depth environmental assessment process for renewable energy projects to ensure the projects are developed in an environmentally and socially responsible manner.



Years of study and post-construction monitoring at wind farms all over the world indicate that the impact of wind turbines on birds is less than originally thought.

BIRDS

Observation has revealed that most bird species are able to see the wind turbines and navigate around them. Many bird species have been seen foraging around the base of turbines and they can land and take off within metres of the base and blades. The average number of bird mortalities due to wind turbines is 2/turbine/year. This is comparatively very low when considering the thousands of birds that die every night from collisions with windows and city buildings.



Habitat loss from turbine construction is another concern, but can be easily prevented by considerate and knowledgeable planning. By avoiding sensitive habitat features and maintaining buffers from woodlots, wetlands, etc., habitat destruction can be virtually eliminated from wind farm development. Agricultural land is a perfect partner for wind energy projects as it is already in production and unavailable for wildlife habitat.

A much bigger concern for birds today is the habitat loss associated with climate change. As average temperatures increase and vegetation species move north, birds that once could not live at particular latitudes are being seen for the first time. This pushes the resident species further north until there is nowhere left to go. Wind energy is part of the climate change solution, which will protect the northern climate habitat and the birds that depend on it.



BATS

The impact of wind turbines on bats is generally understudied; however, there is some concern about the unknowns surrounding the relationship between them.

At this point in time, information is still lacking and the best approach to protecting bat species is proper placement of wind turbines.

Bats live in hibernacula such as caves, abandoned mines or other cavernous spaces. They forage for food in woodlots and near open water. They migrate along coastlines and ridges. By recognizing their habits and understanding the way they live and move, wind farms can be placed considerately to avoid areas that bats use frequently. This way wind farms and bats can live separately and happily away from each other.



1. Canadian Wind Energy Association. (2006). Birds, Bats and Wind Energy Fact Sheet. http://www.canwea.ca/images/uploads/File/NRCan_-_Fact_Sheets/6_wildlife.pdf
 2. Erickson, W. P. et al. (2005). A summary and Comparison of Bird Mortality from Anthropogenic Causes with an Emphasis on Collisions. Published in USDA Forest Service Gen Tech . Rep. http://www.fs.fed.us/psw/publications/documents/psw_gtr191/Asilomar/pdfs/1029-1042.pdf

Pre-construction bird and bat monitoring is an important component of proper environmental assessment. It is essential to understand the existing environment in order to protect it.

BATS



Bat monitoring was carried out over two seasons. This is done in late August and/or early September during migration season. Not all bats species found in this area migrate, but those that do will travel during this time period.

Acoustic monitoring was done in 2008 and additional acoustic monitoring along with radar monitoring was completed this past migration season in the late summer of 2009.



The map to the left illustrates the radar monitoring range at the Gunn's Hill Wind Farm.



Radar monitoring was carried out at several locations across southern and eastern Ontario. This methodology was used to acquire a broad overview of bat movement in Ontario during migration season. This survey provides local data around the project site and also contributes to a greater understanding of a variety of bat species in the province.



This overview of bat movement across Ontario is valuable to the general understanding of the habits and migration routes of bats. This data is currently lacking in Ontario and Prowind's input will help piece together a wider picture of these species.

BIRDS

Bird monitoring was carried out over one year during three separate seasons. This is necessary to get an accurate picture of the bird species that use this area during the entire year and for different purposes.

Winter Bird Survey: This survey was conducted during the months of December 2008 to February 2009. This monitors the resident bird species in the project area that over-winter here.

Breeding Bird Survey: This survey was conducted in June of 2009. This survey monitors the area for birds who may be using the local area for breeding activities, which is the most sensitive time period for birds.

Fall Bird Survey: This survey was conducted during the months of August to October 2009. This survey monitors migration and raptors who may use the project area.

The map to the left is an example of the survey points used for a fall monitoring campaign. Different methodology is used for each survey.



SOUND

Modern turbines are so quiet that it's possible to carry on a normal conversation at the base.⁴

Noise from wind turbines comes from two main sources. There is the “swoosh” sound made by the blades passing through the wind, and a less audible hum from the mechanical noise of the generator inside the nacelle.

Wind projects are required to meet strict Provincial guidelines. Noise approvals are granted only if the wind project meets the noise limits under a “predictable worst case scenario” of operation. The result is that sound levels from the turbines are very often significantly lower than the allowable limits.

The noise limits for wind projects vary with the wind speed. When the wind is calm the limits become more strict to account for a quieter environment.

Under these conditions the noise limit is 40 to 45 dBA, depending on the province, which is louder than a whisper, but quieter than the inside of a residence. The best reassurance we can offer is to visit a modern operating turbine to hear it for yourself.

Typical Sound Levels³



PROPERTY VALUES

Studies completed by several real estate firms have indicated that there are no noticeable decreases in property value after a wind farm is built in the area.

The Renewable Energy Policy Project (REPP) found that there is... “no evidence that property values decreased as a result of wind farms, [...] for the great majority of projects the property values actually rose more quickly in the view shed than they did in the comparable community. Moreover, values increased faster in the view shed after the projects came online than they did before.”²

Levels of infrasound near the wind turbines are similar to natural infrasound levels due to wind and waves.¹

INFRASOUND

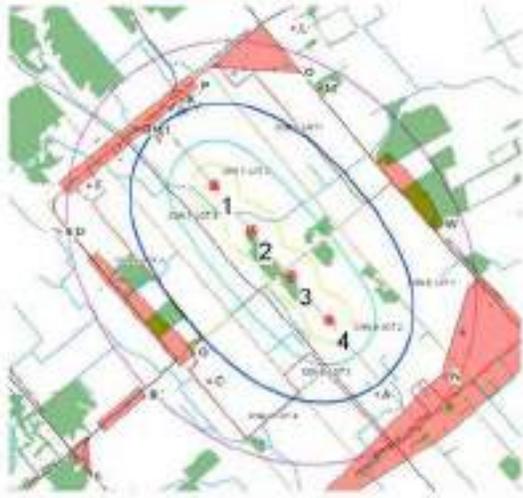
Infrasound is low frequency sound that is below a level audible to humans. Infrasound exists naturally from environmental features such as wind and waves and common occurrences such as industrial and transportation sources. It is generally accepted that it does not cause impacts to human health.¹

Concerns surrounding vibrations and health impacts from infrasound are not supported by peer-reviewed scientific evidence. A study completed by HGC Engineering entitled *Wind Turbines and Infrasound* states that “while infrasound can be generated by wind turbines, it is concluded that infrasound is not of concern to the health of residences located nearby.”¹ It is possible for infrasound to cause body vibrations, but only at very high levels of sound, around 80 dB.¹ As you’ve read above, noise levels from wind turbines will typically reach around 40 to 45 dB, therefore low frequency noise from wind turbines will not be at a level high enough to create body vibrations.



1. HGC Engineering. (2006). *Wind Turbines and Infrasound*. http://www.canwea.ca/images/uploads/File/CanWEA_Infrasound_Study_Final.pdf
 2. Renewable Energy Policy Project. (2003). *The Effect of Wind Development on Local Property Values*. http://www.repp.org/articles/static/1/binaries/wind_online_final.pdf
 3. US Department of Labour. (n.d.). *Noise and Hearing Conservation OSHA Technical Manual*.
 4. CanWEA. (2006). *The Sights and Sounds of Wind*. http://www.canwea.ca/images/uploads/File/NRCan_-_Fact_Sheets/7_visual_sound.pdf

SOUND



Predictive sound modeling is a required study for the provincial environmental assessment process. Strict guidelines are in place to ensure the sound levels from wind farms are acceptable.

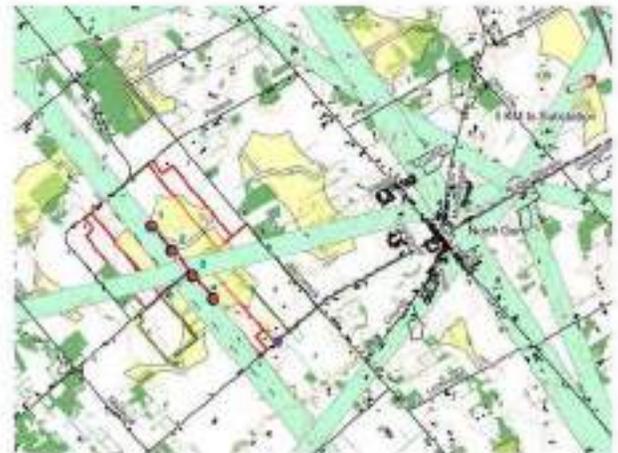
By inputting the turbine to be used, the type of receptor (home, barn, etc.) and a few environmental conditions, we are able to predict the sound levels experienced at nearby locations. Worst-case conditions are used, so often the sound model returns higher results than what is expected in reality.

TELECOMMUNICATION

The Radio Advisory Board of Canada has guidelines and studies required for wind energy projects so that interference with radio communication, radar and seismoacoustic systems does not interrupt service.

The pathways of the existing signals are able to be mapped and the turbines can be placed within this landscape while maintaining the quality of all existing signals.

Consultation is conducted with government agencies utilizing these signals, including Industry Canada, NavCanada, RCMP, Natural Resources Canada, etc.



Impact to existing television broadcast signals will also be studied as required by the Canadian Broadcast Corporation. If the turbines are placed without consideration to public television network signals, interference can occur, impacting the image quality. By studying the location of these signals in relation to receivers and the turbines, negative impacts can be eliminated or reduced and mitigated.



Handouts and Printed Reference Materials

Wind Energy Background and Mechanics

Fact Sheet: Wind Power Realities. (2009). Pembina Institute, Tim Weis.

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http://www.ene.gov.on.ca/en/business/green-energy/docs/REP_Guide.pdf

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Property Value Study: the Relationship of Windmill Development and Market Prices. (2006). Blake, Matlock and Marshal Ltd.

http://www.windrushenergy.com/update_sep_2009/Appendix%20F%20-%20Property%20Value%20Assessment%20-%20local%20County-optimized.pdf

HGC Engineering. (2006). Wind Turbines and Infrasound.

http://www.canwea.ca/images/uploads/File/CanWEA_Infrasound_Study_Final.pdf

Power Generation and Sale

Ontario's Feed-In-Tariff Program Backgrounder. (2009). Ontario Power Authority.
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Revised Feed-In-Tariff Rules. (2009). Ontario Power Authority.
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GE 2.5 MW Wind Turbine Brochure. (2009). GE Energy.
http://www.gepower.com/prod_serv/products/wind_turbines/en/downloads/GEA17007A-Wind25Brochure.pdf

Prowind and Gunn's Hill Wind Farm Materials

Gunn's Hill Project Newsletter
http://www.prowind.ca/downloads/GunnsHill_Project%20Info%20Sheet_2009-12.pdf

Gunn's Hill Wind Farm Draft Project Description Report
http://www.prowind.ca/downloads/GunnsHill_PDR_2010-01-04.pdf

Prowind Canada Newsletter
<http://www.prowind.ca/downloads/Prowind%20Canada%20Newsletter%202009-04-17.pdf>

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GUNN'S HILL WIND FARM

CONSULTATION REPORT

VOLUME 1: PUBLIC, AGENCY AND MUNICIPAL CONSULTATION

Appendix D3

**Public Open House (February 2010)
Information Handout**

Handouts and Printed Reference Materials

Wind Energy Background and Mechanics

Fact Sheet: Wind Power Realities. (2009). Pembina Institute, Tim Weis.

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Wind Power Survey. (2008). The Strategic Counsel.

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The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis. (2009). Ben Hoen, et al.

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HGC Engineering. (2006). Wind Turbines and Infrasound.

http://www.canwea.ca/images/uploads/File/CanWEA_Infrasound_Study_Final.pdf

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<http://fit.powerauthority.on.ca/Page.asp?PageID=924&ContentID=10616>

Revised Feed-In-Tariff Rules. (2009). Ontario Power Authority.
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GUNN'S HILL WIND FARM

CONSULTATION REPORT

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Appendix D4

Public Open House (February 2010) Fact Sheet

Prowind Canada Inc., located in Kemptville, ON, is the developer and owner of the Gunn's Hill wind farm. Contact us anytime if you have further questions or comments:

613.258.6700 | info@prowind.ca

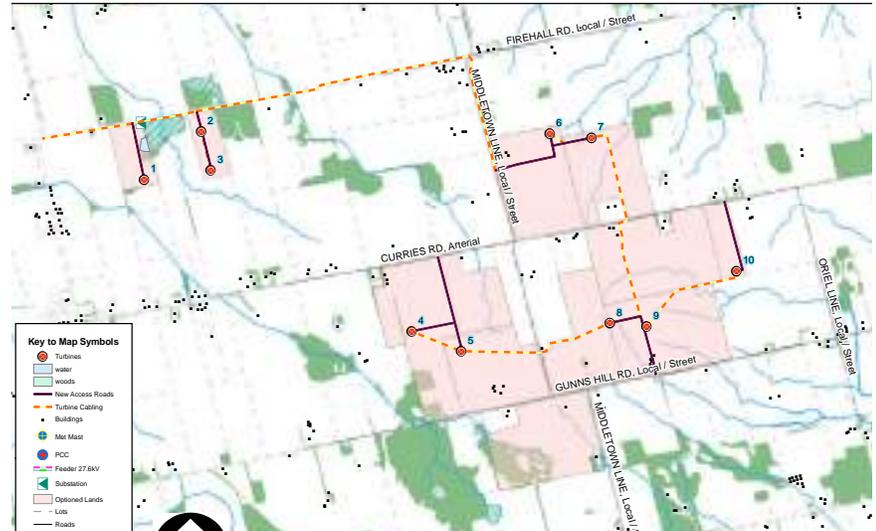
This sheet was prepared in order to offer you the facts about the Gunn's Hill wind power project. For the past 2 years, Prowind Canada has been working on a 25MW facility to be located between Curries and Oxford Centre and we hope that the following questions and answers will assist you in better understanding what it's all about.

How many turbines will be built, and where?

The wind farm will consist of up to ten turbines distributed across nine area farms as shown in the graphic on the right.

What about future expansion?

The size of the wind farm is determined, in part, by the capacity of the transformer station in Woodstock. There are no plans for future expansion as capacity on the station is very limited.



Why wind power?

Ontario is committed to weaning itself off of archaic, polluting, and diminishing electricity generating sources like coal, oil, and gas. Wind energy, along with other renewables, is a key component of that sustainable energy future.

Why here?

Several factors contribute to the suitability of a location for wind power generation, and the Gunn's Hill area has all of them; good wind resource, open farmland that is regularly worked, sufficient grid access and a significant load centre nearby.

How big are the turbines?

Prowind plans to use the 2.5MW XL machines manufactured and supplied by General Electric (http://www.gepower.com/prod_serv/products/wind_turbines/en/2xmw/index.htm). These will be installed on 100 metre tall tubular towers, and each blade will measure 50 metres in length.



How close will turbines be placed to homes?

In 2009, under the Green Energy and Green Economy Act, Ontario introduced new guidelines for wind farm design that restrict the placement of turbines around homes, schools, and residential areas. The Ministry of Environment will no longer allow a turbine to be placed

closer than 550m to a non-participating home, nor is the total cumulative sound level produced by the wind farm allowed to exceed 40dBA at these same homes. We agree that a sound level limit of 40dBA is appropriate if not conservative, and in order to exceed these minimum requirements, we are planning to place the turbines in the Gunn's Hill wind farm an average minimum distance of **675m from non-participating homes**.

How much electricity will the Gunn's Hill wind farm produce?

Over the course of a year, the wind farm is expected to produce more than 70,000 megawatt-hours of electricity. That is enough to supply approx 20% of Woodstock Hydro's demand



Gunn's Hill Wind Farm – Fact Sheet

How loud is 40dBA?

Not very loud. 40dBa is considered between “quiet” and “very quiet” on the sound intensity scale. It is compared to the background noise in a library or a quiet office.

What about these health issues I hear some people talk about?

There are a small number of residents citing cases of discomfort from living near turbines, but, as Ontario's Chief Medical Officer of Health, Dr. Arlene King, stated in an October 2009 memorandum to Medical Officers of Health and Environmental Health Directors throughout Ontario, “... there is no scientific evidence, to date, to demonstrate a causal association between wind turbine noise and adverse health effects.” Here is a link to a very informative discussion about this topic by experts in the fields of human health and environmental sound: <http://www.windustry.org/wind-turbine-syndrome-myths-and-facts-webinar>

Will my property value be affected by this wind farm?

There is no evidence to suggest that property values are negatively affected in or around wind farms. The following studies are available for further information:

Ontario: <http://www.canwea.ca/pdf/talkwind/PropertyValuesConsultingReportFebruary42010.pdf> **

United States: http://www.canwea.ca/pdf/talkwind/Property_Value_Study.pdf **

When will the wind farm begin producing electricity?

The wind farm application has been submitted to the Ontario Power Authority's Feed-in Tariff program and we hope to be awarded a contract in April 2010. If this is the case, construction could begin as early as the end of this year, and we plan to begin producing power by December 2011.

Can I own part of this wind farm?

Yes. We are offering investment opportunities to local residents, businesses, co-operatives and charities

Where will the electricity go and who is buying it?

The wind farm will feed power directly into the Hydro One grid system. All of the electricity produced will be sold to the Ontario Power Authority at \$0.13/kWh on a 20-year contract.

Where can I get more information?

Hard copies of the environmental studies for wind farm can be viewed at the Norwich Township offices, or at the public library in Burgessville. Electronic copies are available on our website at <http://prowind.ca/?page=projects-gunns-hill>. Also, you may contact us any time at 613-258-6700 or info@prowind.ca. Please let us know if you'd like to be added to our project email list to receive future updates and notifications.

Who benefits?

\$12,000 per year will be paid to the local **community**

the **municipality** will receive tax revenue each year

landowners hosting turbines will receive annual rent payments for infrastructure on their land

local **businesses** will benefit from increased tourism in the region

trades people in the area will benefit from an increase in jobs

we will all benefit from cleaner air, a secure local source of power generation, and a more sustainable energy future

** if you do not have access to the internet and you are interested in researching some of the studies and documents referenced in this sheet, please contact us for assistance

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GUNN'S HILL WIND FARM

CONSULTATION REPORT

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Appendix D5

**Public Open House (October 2012)
Display Boards**