

What's in a wind farm?

An update on wind energy in Manitoba

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Wind energy and wind farms are becoming well-used terms in Manitoba, especially with Manitoba Hydro's call for up to 300 megawatts (MW) of commercial-scale wind-powered generation. This initiative is spurring municipalities, landowners and private companies to consider building wind farms. Each proposal is required to have a minimum capacity of 20 MW, but where do you start when planning a wind farm? What needs to be considered?

Wind monitoring and data collection has confirmed that Manitoba has an excellent opportunity to expand energy generated through wind resources, as there are many sites that are located in close vicinity to existing transmission lines so the energy can be moved effectively. Wind energy and hydroelectricity are complementary power sources, with hydro complimenting wind in the short-term and wind complimenting hydro in the long term. In addition, wind energy production peaks in the winter when demand for energy is at its highest.

There are a number of challenges and benefits to wind energy development. Municipalities interested in pursuing this option are well advised to fully research this opportunity before signing agreements with wind developers. Challenges for Manitoba include the need for coordinated provincial policy, planning and transmission concerns, ownership models, aerial spraying concerns, and issues of sound and visual impact. A majority of these challenges can be resolved with quality planning, design and coordination with stakeholders.

There are numerous benefits to wind energy generation as well that should be considered throughout the process of pursuing a wind project. Benefits include:

- Increased local economic development, job creation and skill development in the areas of project management, manufacturing, construction, operation and maintenance;
- Increased tax base for municipalities;
- Low maintenance revenue streams for landowners;
- Environmental benefits (wind energy is emission-free); and
- Increased tourism.

Municipalities interested in developing a wind energy generation project should fully research the option prior to signing agreements with wind developers. As the wind energy generation sector grows in Manitoba, information gained through individual projects will assist

Did you know?

Wind is the world's fastest growing energy source with sustained worldwide growth rates in excess of 25% annually.

By the end of 2006, worldwide wind-generated capacity was over 70,000 MW.

Canada has about 1500 MW of installed capacity and is growing by about 50% a year. This accounts for approximately 1% of Canada's electricity supply, or enough to power 450,000 homes.

According to the Canadian Wind Energy Association (CanWEA), Canada has at least 50,000 MW of developable wind resources, which is enough to supply about 20% of Canada's electricity supply.

in the development of other projects. However, knowledge of the industry including planning and design should be fully researched.

Some information sources are:

- Canadian Wind Energy Association (CanWEA) - <http://www.canwea.ca/>
- Manitoba Hydro - http://www.hydro.mb.ca/projects/wind_powered.shtml
- Wikipedia - http://en.wikipedia.org/wiki/Wind_power
- American Wind Energy Association - <http://www.awea.org/>
- Global Wind Energy Council - <http://www.gwec.net/>
- Energy Council of Canada - <http://www.energy.ca/users/folder.asp>
- ecoENERGY, Government of Canada - <http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/power-electricite/index-eng.cfm>

Fast Facts:

- A rating of 99 MW (as is the case for the St. Leon's wind farm) means that a wind farm has the ability to create 99 MW at any given instant, however that does not mean that it generates a constant 99 MW throughout the year. To determine how much electricity a wind farm generates in a year, we use the term capacity factor, which represents the average output over the year as a percentage of rated capacity. A well-sited wind generator will have a capacity factor of about 30-40% - the St. Leon's wind farm is in the upper part of this range. So, we can calculate that St. Leon's annual electricity generation is equal to 99 MW x (the number of hours in a year) x (the capacity factor). This means that the St. Leon wind farm generates approximately 350,000 MW of energy per year. That is enough energy to power all the homes in Portage la Prairie and Morden combined!¹
- According to Environment Canada, burning fossil fuels to generate electricity creates 18% of Canada's greenhouse gas emissions.
- The American Wind Energy Association indicates that technological improvements such as lightweight materials have enabled the development of bigger, more efficient wind turbines. These changes have contributed to the 80% decrease in wind energy costs over the last 2 decades.
- A wind turbine was featured on the 51¢ postage stamp from Canada Post.
- A study reviewing the impact of wind farms on birds in the US, found that generally, only 2 birds per turbine per year ever die in collisions with wind turbines which is far less than the millions of deaths per year associated with birds crashing into buildings and windows.²

¹ Manitoba Hydro and CanWEA.

² Avian Collisions with Wind Turbines: A Summary of Existing Studies and Comparisons to Other Sources of Avian Collision Mortality in the United States, August 2001

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Aerial application near wind farms

Transport Canada does not impose airspace restrictions in the vicinity of wind farms. While the *Canadian Aviation Regulations (CARs)* set out altitudes and distances for the safe operation of an aircraft, a person may operate an aircraft, for the purpose of aerial application, at altitudes and distances less than those set out in the *CARs*. For more detailed information, please read the Permissible Low Altitude Flight section of the *CARs*, [section 602.15 (2)], which may be found online at http://www.tc.gc.ca/CivilAviation/Regserv/Affairs/cars/PART6/602.htm#602_14_2_b. If you have questions about how the *CARs* apply to aerial application, please call Transport Canada toll-free at 1-888-463-0521.



Photo courtesy of TransAlta Wind

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