

Big Wind in Ontario by Steven Moore



Photo courtesy of Vision Quest Windelectric Inc.

*How many times can a man turn his head.
And pretend that he just doesn't see?
The answer, my friend, is blowin' in the wind.
The answer is blowin' in the wind.
Bob Dylan*

Is wind a practical source of electrical energy?

Absolutely. The most common measurement of electricity production and consumption is a 1,000 watt unit called a kilowatt (kW). That's what ten 100-watt light bulbs draw, or one toaster, or a small microwave.

But light bulbs and microwaves aren't on all the time, so total electricity requirements require a time factor. Consumption of a kilowatt for an hour is a kilowatt-hour (kWh).

According to the Canadian Wind Energy Association (CanWEA), the average modern home requires 8,000 kWh of electricity per year. That's about 22 kWh per day. That may sound like a lot, but leave those light bulbs on for two hours and they've consumed 2 kWh all by themselves.

There are two basic options for producing all this power for Canadians:

Option A

- Small, cheap decentralized production
- Small grids, failures and disruptions localized
- Free renewable fuel
- Fuel supply secure
- No harmful byproducts
- Simple systems requiring little maintenance

Option B

- Huge, expensive centralized power generating stations
- A massive, inter-tied grid transmitting failures as well as electricity
- Costly, non-renewable fuel
- Fuel supply insecure
- Generation byproducts include air and water pollution, nuclear waste toxic for 10,000 years
- Complex systems requiring expensive maintenance

Easy choice, eh? Well, Canada's energy Big Brains have consistently chosen Option B.

There is a wind farm at North Cape, PEI that produces 16.6 million kWh a year. It could, therefore, power 2075 homes requiring 8,000 kWh per year. According to the federal government, the installation cost \$9.3 million, that's about \$4481 to power a home with wind.

Nuclear energy subsidies from 1953 to 2001 were approximately \$16.6 billion. Total loans written off to the fossil fuel industry were another \$2.8 billion just since 1970. Cleaning up radioactive waste in Port Hope and decommissioning uranium tailings sites added another \$850 million. This totals \$20.25 billion just on nuclear subsidies and cleanup costs and fossil fuel forgiven loans.

If this \$20.25 billion had been poured into wind energy programs like North Cape from the beginning to create efficient technology, it might have powered 4.5 million homes. Statistics Canada says there were approximately 11.5 million occupied dwellings in Canada in 2001.

In other words, just by applying nuclear subsidies and clean-up costs plus fossil fuel bad loans, 40% of Canadian homes could now be powered by free, non-polluting wind. Since Canada produces 60% of its power right now from hydroelectric, that means we could be producing all our power from free, secure renewable sources with no greenhouse gas, no smog, no acid rain, no heavy metals, no particulates. Option A would be a reality.

And that doesn't even consider annual fuel costs. Once a wind generator is built, the fuel is free, and it comes to the generator by itself. You don't have to keep feeding a wind generator coal or oil or gas or uranium. You don't have to buy fuel or dig it up or drill for it. You don't have to transport it to power plants via pipeline, tanker, or truck. Savings from all these annual fuel and transportation costs could then have been used to build more wind generators.

As you know, that's not the case. The politicians we elected over the last 80 years have consistently chosen Option B and our wind opportunity was wasted. Now everyone is scrambling to get that opportunity back, and we have a long way to go. Canada's installed wind production capacity is about 237,000 kW or 237 megawatts (mW). (See sidebar "Wind Energy Production in Canada."). Assuming those 237

mW of installed capacity are producing power an average of eight hours a day, they will power 692,000 mWh of power, enough for about about 86,500 homes annually.

Even back in 2001, the last date for which figures were readily available, Canada lagged behind many other countries. Wind Power Monthly and The Economist reported wind power capacity as follows:

It's probably worthwhile to clear up two common misperceptions about wind energy

• Germany	6113 mW
• Denmark	2297 mW
• USA	5250 mW
• Spain	2402 mW
• India	1220 mW
• Canada	140 mW (237 mW in 2003)

right off the top. First, an urban myth is that wind turbines kill birds. In fact, studies have shown that the average wind turbine kills 2 birds per year. This is less than the average car or house cat. Replacing other forms of generation with wind generation improves the environment, and therefore improves the survival rates of all species compared to traditional sources of generation.

The second fear is that wind turbines are noisy. They do make noise, but the current generation of turbines is quieter than in the past. The only sound heard is the "swoosh, swoosh, swoosh" of the rotating blades, similar to waves on a beach or wind in the trees, only more regular. There is virtually no mechanical sound from a modern wind turbine, and you can carry on a conversation at its base without difficulty.

Would you rather live next to a wind turbine or a coal-fired generating station? The answer is obvious and governments, communities, corporations, and non-governmental agencies are beginning to work together to bring the advantages of wind power to Canadians.

The Feds

The federal government, faced with the highest per-capita production of fossil-fuel emissions in the world, has taken the leadership in efforts to slow or even reduce global warming. For this it should be applauded. Instead of fabricating arguments to invade other countries to secure a future supply of oil, Canada is taking positive steps to reduce CO₂ emissions, and one of those steps is tapping renewable energy sources.

Wind Power Production Incentive (WPPI)

On May 22, 2002, The Honourable Herb Dhaliwal, Minister of Natural Resources Canada (NRCan), launched the Wind Power Production Incentive (WPPI) — a \$260-million initiative to develop wind energy across the country.

"Increasing our use of emerging renewable energy is a part of Canada's plan to address climate change and improve air quality while spurring innovation in the wind power industry," said Minister Dhaliwal. "The program will help this industry compete successfully in the marketplace and give consumers the option to choose cleaner energy sources, thereby ensuring that future generations share the economic, social and environmental benefits of our natural resources."

Through WPPI, the Government of Canada will provide a financial incentive for the installation of 1,000 megawatts of new wind energy capacity in Canada over the next five years.

The program encourages participation from all regions. Qualifying producers will receive an incentive of between 0.8 and 1.2 cents for every kilowatt-hour generated during the first ten years of operation. They will be encouraged to secure additional funding through partnerships with provincial and territorial governments, electric utilities, or end-use customers. Overall, the WPPI is expected to leverage approximately \$1.5 billion in capital investments.

To be eligible for the incentive, the prospective producer must negotiate and sign a contribution agreement with NRCan. The agreement contains the following criteria, among others, for setting up a wind farm:

1. The wind farm must be commissioned between April 1, 2002, and March 31, 2007;
2. The wind farm must be independently metered at the point of interconnection with the electricity grid; and

3. The wind farm must have a minimum nameplate capacity of 500 kilowatts. In northern and remote locations, the minimum capacity is 20 kilowatts.

The amount of the incentive is about half of the current estimated cost premium for wind energy in Canada and can be claimed for every kilowatt-hour of net production during the first ten years of production based on the commissioning date as follows:

- April 1, 2002 to March 31, 2003 inclusive — 1.2 cents per kilowatt-hour (¢/kWh)
- After March 31, 2003 and on or before March 31, 2006 — 1.0 ¢/kWh
- After March 31, 2006 and on or before March 31, 2007 — 0.8 ¢/kWh

Since it was announced, the following wind generation capacity has applied for the incentive, according to the WPPI website:

Projects under Construction and/or Commissioned under WPPI Company, capacity, expected completion

Saskatchewan Power Corporation	5.94 Kw
Gull Lake, Saskatchewan	10/18/2002
Huron Wind Inc.	9.00 Kw
Tiverton, Ontario	11/15/2002
Vision Quest Windelectric Inc.	36.30 Kw
Fort McLeod, Alberta	06/30/03
Vision Quest Windelectric Inc.	39.60 Kw
Fort McLeod, Alberta	06/30/03
Vision Quest Windelectric Inc.	1.80 Kw
Pincher Creek, Alberta	02/15/03
Exhibition Place Wind Turbine	0.75 Kw
Toronto, Ontario	01/21/03

Wind Energy Production in Canada(CanWEA <http://canwea.com/CanadianProduction.html>)

	Date Installed	Total Nameplate Power (kW)
Prince Edward Island		
Prince Edward Island Energy Corporation		
North Cape 8 X 660	2001/11	5280 Active
Nova Scotia		
Nova Scotia Power ¹		
Little Brook, Digby County		
1 x 600	2002/10	600 Active
Nova Scotia Power		
Grand Etang, Inverness County		
1 x 660	2002/10	660 Active
Québec		
Hydro-Québec		
Magdalen Islands 1 x 230	1977/05	230 Removed
Eole (Hydro-Québec)		
Cap Chat 1 x 4000	1988/03	4,000 Inactive
Hydro-Québec ²		
Matane 3 x 750	1998/01	2,250 Active
Le Nordais (Phase 1) ³		
Cap Chat 76 x 750	1999/03	57,000 Active
Le Nordais (Phase 2) ⁴		
Matane 57 x 750	1999/09	42,750 Active
Ontario		
Ontario Hydro		
Tiverton 1x600	1995/10	600 Active
Ontario Power Generation		
Pickering 1x 1800	2001/10	1,800 Active
Private		
Port Albert 1x 660	2001/12	660 Active
Huron Wind ⁵		
Kincardine 5 x 1800	2002/11	9,000 Active
Sky Generation ⁶		
Ferndale 1 x 1800	2002/11	1,800 Active
Windshare ⁷		
Toronto waterfront 1 x 750	2003/01	750 Active
Saskatchewan		
Sunbridge (Suncor & Enbridge)		
Gull Lake 17x 660	2001/09	11,200 Active
Saskpower ⁸		
9 x 660	2001/09	5,940 Active

(See footnotes on page 15)

Alberta

Adecon Wind Farm		
Pincher Creek 2x 100, 8x 150	1993/06	1,400 Inactive
<u>Canadian Hydro Developers, Inc⁹</u>		
<u>Cowley Ridge Wind Farm¹⁰</u>		
Cowley 52x 360	1993/12	18,720 Active
5 x 375	2000/09	1875 Active
Cowley Ridge North Wind Farm		
Cowley 15 x 1300	2001/10	19,500 Active
Sinnot Wind Farm		
Pincher Creek 5 x 1,300	2001/11	6,500 Active
Dutch Valley Produce Wind Farm		
Pincher Creek 3 x 65	1992/06	195 Active
G&P Johnson 150 Site		
Pincher Creek 1x 150	1993/05	150 Active
Lundbreck Developments Joint Venture A		
Lundbreck 1x 600	2001/12	600 Active
<u>Vision Quest Windelectric¹¹</u>		
Pincher Creek		
(Castle River Wind Farm)		
1 x 600	1997/11	600 Active
15 x 660	2000	9900 Active
44 x 660	2001	29,041 Active
<u>Vision Quest Windelectric¹²</u>		
Hill Spring 1 x 600	1997/11	600 Active
2 x 600	1998/11	1200 Active
1 x 660	2000/06	660 Active
Vision Quest Windelectric / ENMAX		
114 x 660	2003/06	75,240 Active
Weather Dancer I		
Peigan Nation Reserve (near Pincher Creek)		
1 x 900	2001/09	900 Active
Waterton Wind Turbines		
1x 600	1997/11	
1x 600	1998/11	
1x 600	1998/11	
1x 660	2000/06	
1x 660	2001/12	
1x 660	2002/01	3,780 Active
Summerview		
1x 1800	2002/4	1,800 Active
McBride Lake East		
1x 660	2001/12	660 Active
Yukon		
Yukon Energy Corporation		
Haeckel Hill (Whitehorse)		
1 x 150	1993/07	150 Active
1x 660	2000/11	660 Active

Total Active: 237,170 kW

Market Incentive Program (MIP)

In addition, the Market Incentive Program (MIP) is a \$25-million Government of Canada initiative through the *Action Plan 2000 on Climate Change* to stimulate emerging markets for renewable electricity.

Under the program, electric utilities, retailers, and marketers submit proposals to Natural Resources Canada (NRCan) and Environment Canada to develop market-based programs and promote the sale of electricity from emerging renewable sources to residential and small-business customers. The Government of Canada will provide a short-term financial incentive of up to 40 per cent of the eligible costs of an approved project, to a maximum contribution of \$5 million per recipient.

Projects are selected based on several factors, notably the ability to reduce greenhouse gas emissions and to stimulate “green power” markets. In return, participating distributors establish performance measures and report on these measures to the Government of Canada.

The MIP complements another measure, the Procurement of Electricity from Renewable Resources program that commits the Government of Canada to purchase electricity from renewable sources for federal facilities. The Government currently has agreements to purchase wind energy for some of its facilities in Alberta, Saskatchewan and Prince Edward Island.

“The federal government has committed to buy 20% of the energy it needs from renewable sources,” says Denis Zborowski of NRCan. “Public Works approaches a utility and solicits bids for green energy.”

The Canadian Wind Energy Association (CanWEA) aims to represent organizations and individuals who are directly involved in wind energy technology, products, and services. CanWEA supports renewable energy policies but finds some weaknesses in the federal government’s WPPI program.

“CANWEA applauds the Federal Government for its leadership on Kyoto, and its support for wind energy through the WPPI,” says CanWEA President Glen Estill. “Our industry knows that wind energy has the potential to play a significant role in Canada’s greenhouse gas reduction efforts and that there is a pent-up surplus of capital and entrepreneurs ready to do the job. However, in order to seize this opportunity the Federal Government must address two the financial limitations hampering the success of WPPI.”

CanWEA is recommending that the Federal Government double the amount of the WPPI to 2 cents per kWh for the remainder of the program and increase the program budget to accommodate up to 4,000 MW of installed capacity over the next four years, four times the current goal. These new WPPI funds should not be allocated on a provincial basis but rather be available on a first built, first serve basis to

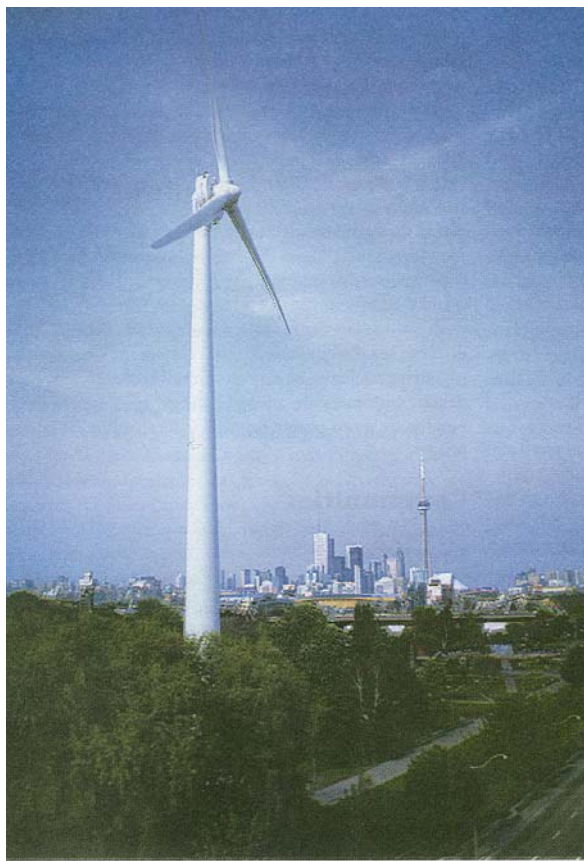


Photo courtesy of Toronto Hydro.

motivate provincial governments who move quickly to implement proactive policies that will leverage the greatest investment in their province.

According to CanWEA, developers in most markets across the country are finding that the size of the WPPI incentive is less than half of what is necessary to overcome the price differential between incumbent fossil-fuel generation and wind power.

By comparison, the US production incentive for wind, while inconsistent from year to year, has resulted in significant installations over the last decade for two reasons:

1. The US Production Tax Credit (PTC) is two and half times the size of the Canadian incentive per unit of production and almost four times as valuable on an after-tax basis.

2. The PTC is unlimited by region, developer, and in total budget size. The WPPI is limited in all three of these dimensions.

“To the credit of the Federal Government, the current program has sound design principles and the infrastructure is already in place,” says Estill, “What the program needs now is the financial muscle to reach its objectives.”

The Province of Ontario

Steam-driven generators were powering mills and lighting a few Ontario streets in the 1880's. By 1890, most towns of 3,000 people or more had electricity provided by privately-owned thermal-electric plants. Electricity was catching on, and in 1895 the first major hydroelectric station in the world harnessed the Niagara River.

Numerous power leases were held by private utilities serving local areas, and public sentiment was growing for low-cost power and for choice over who provided it. In 1900, a committee of the Toronto Board of Trade reported that the Niagara River was the most economical source of power for Toronto, but there was the question of who should own and operate the necessary transmission lines from Niagara.

Public-Private Competition

A private Toronto group known as the Mackenzie Syndicate obtained a power franchise in 1903. It included William Mackenzie, a railroad builder; Henry Pellatt, the builder of Casa Loma; and Frederic Nicholls, a pioneer electrical developer. They were determined to control Toronto's electricity, as they controlled the Toronto Electric Power Company and the Toronto Street Railway, the biggest users of electricity in the province. They would fight the advocates of public power for the next 19 years.

Toronto's application for a public utility was turned down by the provincial government of Liberal Premier George W. Ross, and the Ontario Legislature passed a bill prohibiting any municipality from competing with a private company unless it bought the company out at a

price determined by arbitration. The private producers had won. But all that changed in 1905.

The Birth of Hydro

The election of the Conservative government of James Whitney swung the tide to public power. In the spring of 1906, Adam Beck, former Mayor of London, organized a march of 1500 demonstrators to Queen's Park demanding cheap power. A bill was passed creating The Hydro-Electric Power Commission of Ontario and, on June 7, Adam Beck took his seat as the first Chairman.

Adam and The Big Brains at Queen's Park did pretty well, generally following Option A. Their greatest hits included small generating stations at Big Chute and Wasdell Falls in 1914. In 1917 they purchased the Ontario Power Company Plant in Niagara Falls. In 1922, they acquired the Toronto Power Company plant at Niagara.

Then something happened. Adam died in 1925 and The Big Brains suddenly got stupid. They embraced Option B with nuclear, coal, oil, and gas-fired generating stations, as did other provincial governments. They may finally be re-thinking that choice and moving in the direction of renewable sources again. Only this time, the emphasis might be on wind power, not hydroelectric.

Green Power Standard

On July 3, 2003, Ontario Commissioner of Alternative Energy Steve Gilchrist announced that the Green Power Standard will require Ontario's electricity system to secure an additional one per cent of its current electricity needs from renewable sources in each of eight years.

“During its eight-year lifespan, the program will add about 3,000 mw of renewable energy to the Ontario electricity system,” Gilchrist said.

Unfortunately, this timetable doesn't start until 2006.

Ontario's instantaneous power demand is generally 20,000 to 25,000 mw. On hot summer days, demand approaches 30,000 mw at any one

time, and that's Ontario's production capacity limit. Higher demand will trigger brownouts or blackouts. About 7,500 mw comes from hydro-electric generating stations and 8,000 mw comes from coal, so this program will only replace a fraction of Ontario's coal use. Nevertheless, the Conservative goal is to phase out coal plants by 2015. The Ontario Liberals and NDP say coal can be phased out by 2007.

This type of standard legislates minimum amounts of renewable energy that must be supplied to an electricity system. Green standards have already been announced or established in several U.S. states, including Texas, California, Massachusetts, and New York. In Ontario, all forms of renewable energy sources would be eligible, but it's expected that Ontario's Green Standard will primarily promote wind, water, and biomass sources.

"This announcement is a watershed for the clean renewable power industry in Ontario," says CanWEA President Estill. "As far as I know, the Ontario Green Power Standard will be the biggest single commitment to renewable power by any jurisdiction in North America. A sizable commitment like this will create substantial economic development and jobs, as wind and other renewable power generators seek out Ontario-sourced parts and labour."

The Ontario government has also committed to purchasing 20 per cent of the electricity used in provincial government buildings from renewable sources.

This is part of an overall government strategy to encourage new forms of clean generation. Other initiatives include:

- A budget proposal for a 100 per cent corporate income tax deduction for new assets used to self-generate electricity from alternative or renewable energy sources;
- A 100 per cent corporate income tax write off for new assets used to generate electricity from alternative or renewable energy sources;
- A capital tax exemption for new assets used to generate electricity from alternative or renewable energy sources before January 1, 2008;

- Provincial sales tax rebates on new residential solar installations, and budget proposals that would extend this to wind, micro-hydro and geothermal heating/cooling systems; and
- Funding to establish a Centre of Excellence for Electricity and Alternative Energy.

"I've always been interested in alternative energy," says Commissioner Gilchrist, Conservative MPP for Scarborough East, "ever since I sat on a federal committee about the development of hydrogen as a fuel source. Our plans are to go even further, to increase the government's renewable energy use by 10% per year until we are purchasing 50% green power."

"And that's not all," Gilchrist continues. "We also plan to require everyone who receives provincial funding, such as municipalities, hospitals, universities, and schools, to also buy 20% of their energy from renewable sources."

When asked why his title refers to "alternative energy", a designation implying that wind, solar, and biomass will always be on the minority fringe, rather than the more optimistic "renewable energy", Gilchrist says, "If I had it to do over again I would do it differently. Maybe the title will change in the enabling legislation."

Is all this federal and provincial attention to wind having an impact? You bet it is, but it's hard to assess.

"No one really knows the exact proposed numbers for wind generation," says Jill Pritchard-Scott, Energy Advisor, Ontario



Ministry of Energy. "The federal WPPI site lists expressions of interest. Some of these may drop out and there will certainly be others added. Ontario's commitment will also spur wind energy development, but no one knows by exactly how much."

Ontario Power Generation (formerly Ontario Hydro)

One thing is sure. The marketing strategy of Ontario Power Generation (OPG) is changing. They are now offering Green Power, electricity produced from renewable sources such as wind, low-impact hydroelectric, biomass, and solar. All OPG Evergreen™ Energy Green Power products are supplied by facilities that have been EcoLogo™ certified or equivalent under the federal government's Environmental Choice Program.

Right now, OPG's 29 small hydroelectric plants provide most of their green power, but there is some contribution from wind. The Pickering Wind Generating Station is a 1.8 MW turbine commissioned in 2001 and designed to produce enough emission-free power to satisfy about 600 average households a year.

OPG is marketing two versions of OPG Evergreen™ Energy Green Power to large commercial and industrial customers directly, as well as to energy retailers for resale to residential and business consumers.

Evergreen Clean™ Green Power is a blend, generated by renewable energy facilities of which 50% were built prior to 1991 and 50% which were built after 1991. All OPG's renewable facilities are EcoLogo certified.

Evergreen Pure™ Green Power is generated by EcoLogo™ certified renewable energy facilities built after 1991. OPG charges more for Green Power because they claim that green power generation still costs more to build than plants that generate electricity from conventional sources. How much more varies. As their website says, "Precise premiums above conventional power prices for green power are established by competitive forces."

It's much less confusing for homeowners because OPG does not sell directly to residential customers. They do supply energy resellers who may serve residential accounts. Residential customers are advised to seek information about purchasing green power from their local utility or energy retailer.

Communities

Green Tags

The Green Tags program of the Grey Bruce Renewable Energy Cooperative (GBREC) is one way to support Green Power. GBREC is an arm of the Grey Bruce Power Council and is chartered as a not-for-profit cooperative corporation in the Province of Ontario. As a cooperative, GBREC acts on behalf of its members; allowing individual members, organizations, and companies to take concrete and measurable action to improve the environment.

Regardless of where you buy your electricity, you can buy Green Tags from Green Tags Ontario to support green energy. Green Tags are not electricity. They are a way to unbundle the benefits of clean electricity from the electricity itself and sell those benefits to environmentally responsible consumers.

GBREC purchases Green Tags from wind energy generators. The wind energy generators place their electricity onto the grid, and GBREC sells the Green Tags to stimulate the development of new sources of green energy. Each Green Tag sold represents exactly one megawatt-hour of clean electricity that has gone onto Ontario's power grid. Any surplus Green Tags sold will be held in trust, and used to develop more new green generation.

Individuals, companies, and organizations can buy Green Tags through GBREC or from another partner in the Green Tags Ontario community sales network. When you purchase Green Tags, you automatically become a member of GBREC or a Green Tags Ontario member group in your area.

Each Green Tag costs \$75 annually, \$20 quarterly, or \$7 Monthly (a monthly minimum of two), and a free Enerwiz energy-saving light bulb is included with the purchase of two or more

Green Tags as well as a statement indicating the amount purchased. You will also receive quarterly reports on the performance of the renewable energy project your Green Tags come from and an annual statement.

Plus, Green Tags Ontario's contract with its green energy suppliers provides a rebate, or discount, if the price of electricity rises. So Green Tags Ontario will have a pool of funds that can be used on behalf of members, as the membership sees fit. If the price of electricity rises dramatically, as it did in California, Green Tags Ontario could pay a rebate to members, based on their Green Tag purchases. Or Green Tags Ontario could use the funds to buy more Green Tags on its members' behalf, thus reducing emissions even further.

Kingston Trade Winds

A similar community effort is also being launched in Kingston. The Greater Kingston Trade Winds Project is a partnership among Hearthmakers Energy Co-Op, the city of Kingston, the township of Frontenac, and GAIA Power Inc. The partnership plans to build a wind farm on Wolfe Island and retrofit government buildings in Kingston.

The money saved after retrofitting would then be used to buy electricity from the wind farm. The final product would be a private and co-operative utility supplying enough electricity to power all of downtown Kingston. The Trade Winds Project has received a Green Municipals Fund grant of \$200,000 for a feasibility study of the wind farm and a city energy audit. These funds are to be matched by another \$200,000 from the Trade Winds Project partners.

Father Brian Hart, a pastor in Erinsville, north of Napanee, has been the major force behind the Trade Winds Project.

"It's the first project of its kind linking energy efficiency to green power developments," Father Hart says, "It's unique in Canada. We would like to see regulations that would allow people to collectively run their meters backward, only paying the difference between how much our shares generate in electricity and how much we use at home. This is a case where the government could get out of the way and let it happen. But, probably the best we will do is sell the power and

give the co-op members a share of the windpower profits so they can pay their electricity bill with the money."

Wolfe Island is also the potential site of another wind farm proposed by Canadian Renewable Energy Corporation (CREC) from Mississauga. CREC has the option to lease 3,000 acres on the west end of Wolfe Island, considered a "good to excellent" wind resource.

CREC is waiting for markets such as the Green Tags program to develop, however. "If we're going to make money as producers of green energy," says Fred Siemonsen, a CREC representative, "Utilities must be required by legislation to buy green power first so there is a guaranteed market. I think it's going to come, but not until our political people get their act together."

Build Your Own

Another, more direct way to support windpower has been achieved by the Toronto Renewable Energy Co-Op (TREC). The concept is simple — build your own large-scale wind generator.

TREC was founded by a neighbourhood community group, the North Toronto Green Community, in 1997 because business and government leaders were not acting fast enough to address issues such as smog and climate change. TREC is a co-operative corporation to develop new renewable energy cooperatives and spawn an emerging community-based green power movement in Ontario. TREC also provides renewable energy co-op management services, renewable energy advocacy and education. It also occasionally provide energy conservation products and services to its affiliated co-ops.

One of the TREC projects, called WindShare, is a 50/50 partnership with Toronto Hydro Energy Services to build and own two wind turbines on the Toronto Waterfront. TREC and Toronto Hydro share equal responsibility for development, capital costs, operation/maintenance, decommissioning and all contractual agreements related to the project.

The wind turbines that make up this project are the first North American utility-scale turbines in an urban environment. The first turbine, already

built and producing power, is situated at Exhibition Place. The second turbine will be built on the grounds of the Ashbridges Bay Treatment Plant.

The Exhibition Place turbine cost \$800,000 and was financed by selling preference shares at \$100 each to individuals, groups, and corporations. Shareholders (those who have purchased a \$1 membership share and at least \$500 in preference shares) own 50% of the wind turbines and 50% of the power they generate and sell.

WindShare shareholders can go down to the Toronto waterfront, point to the turbine and say, "I own part of that." They will also receive a dividend from the sale of the green power generated, expected to be five to eight per cent of their investment per year, not bad when bank accounts are paying next to nothing and equities are losing money. Plus, dividends receive preferential tax treatment.

The Exhibition Place turbine is on target to generate 1.8 mWh/year and seeing the first turbine up and running has increased interest in the second one.

"We've already sold \$200,000 worth of shares in the Ashbridges Bay turbine," says Dave MacLeod, Treasurer of Windshare, "and that's without any special advertising or promotion. The first turbine is doing that for us."

There is also the educational value of an urban turbine. "People can see what a turbine looks like, and hear how quietly it operates," says MacLeod. "We will have an education centre at the Toronto Exhibition, and people have had wedding pictures taken at the turbine. The interest has been phenomenal."

"One or two turbines is a labour of love," continues MacLeod, "what will really matter is large-scale wind development — windfarms — that communities can own. We are now looking at 10 sites, and three are very promising."

Ontario Sustainable Energy Association

One of the vehicles to make community wind development happen is the Ontario Sustainable Energy Association (OSEA). Organizing a community to take action at the household level

is a powerful approach to environmental improvement. Our communities are the largest scale at which most of us feel personally connected and capable of direct, meaningful participation. They are also the smallest scale to mobilize the resources needed for a major energy initiative.

So far there are several members:

- Toronto Renewable Energy Co-operative (TREC)
- Perth Area - ecoPerth, winners of the Federation of Canadian Municipalities Sustainable Community Award, have built an Energy Service Company that works with the town, businesses, and institutions to design and implement energy-efficient retrofits. These include a Solar Hot Water Systems Programme, Energy Efficiency Projects, and an Energy Service Company that worked with the town to design and implement energy-efficient retrofits in all municipal facilities. Improvements to efficiency of heating, lighting, and climate control were financed with the savings in energy consumption. The Town undertook almost \$400,000 in additional work, mostly by local contractors, and will realize savings of between \$40,000 and \$50,000 annually.
- Kingston-Belleville Area – As mentioned above, the Greater Kingston Trade Winds Project aims to make changes to city-owned buildings so that electrical and heating energy systems are more efficiently operated. Some of the saved money is directed toward the purchase of electricity generated by proposed wind turbines on Wolfe Island and elsewhere. These wind power purchases will support local efforts to build wind turbines.
- York Region - WindFall Eco-Works, a non-profit multi-partner organization that brings environmental solutions to homes, businesses, institutions, and communities.
- Hamilton - Positive Power received \$30,000 funding from the Hamilton Community Foundation (Community Fund) to partner with the Conserver Society of Hamilton for a wind resource assessment. They've installed

their first anemometer at a potential site in the Hamilton area on Hamilton Drumlin just north of Highway 5 and west of Highway 6.

- Durham - Eco-energy Durham

OSEA also sponsors Community Green Energy Workshops. These day-long events teach participants about opportunities, options, and the required steps and actions to establish a green energy project in their community.

Private Sector Corporations

The promising future of wind energy has attracted the attention of Canadian energy corporations, most notably TransAlta. On October 28, 2002, TransAlta announced an agreement to purchase Vision Quest Windelectric Inc. for \$37 million. This deal brings TransAlta's total investment in the Calgary wind power company to \$50 million.

TransAlta is Canada's largest non-regulated power generation and wholesale marketing company. They have close to \$9 billion (10,000 megawatts of capacity) in coal-fired, gas-fired, hydro, and renewable generation assets in Canada, the U.S., Mexico, and Australia.

"The purchase of Vision Quest is the cornerstone of our renewable energy strategy," said Steve Snyder, TransAlta's President and CEO, in their press release. "TransAlta's long-term goal is to have 10 per cent of our total generation from renewable energy. Vision Quest and its superb management team provide one of the strongest platforms in North America for wind power development. This transaction also reflects our commitment to a multi-fuel, balanced approach to electricity generation and a commitment to sustainable development. Renewables, including wind power, are an important part of that mix."

"We are very excited about this deal and the future of our company," said Fred Gallagher, Managing Director and CEO of Vision Quest. "TransAlta demonstrated its confidence in wind power over two years ago with its first investment in Vision Quest. This latest investment confirms the significant opportunity to grow wind energy as a major source of electrical generation. Vision Quest is now better positioned, stronger and more capable to expand rapidly."

Vision Quest currently operates over 100 wind turbines in southern Alberta near Pincher Creek and Fort MacLeod. The turbines operate at two locations: Castle River and McBride Lake. Castle River's 44 MW wind farm produces more than 125 million kilowatt hours of electricity per year.

Canadian Wind Energy Association

Probably the clearest vision about Canada's potential for wind power is held by CanWEA, quoted earlier as critical of the paltry Federal government commitment to wind power. They foresee a robust Canadian wind energy community that makes a significant contribution to safe, reliable, economically and environmentally sustainable energy supply in Canada.

CanWEA's goal is to install more than 10,000 megawatts of wind power capacity by 2010 (10 X 10), providing at least 5% of Canada's electricity from wind.

"This is easily achieved," says CanWEA President Glen Estill. "We have the largest coastline in the world and the second-largest landmass with good winds in every region. All we need are forward-thinking policies. Look at what other countries have done. Denmark produces 25% of its energy from wind. Germany has established 12,000 mw of capacity in the last eight years and we have more wind and more space than they do."

Compared to other countries, the Federal government's much-trumpeted goal of 1,000 megawatts in five years does look puny. Germany created 1,668 megawatts of installed capacity in the year 2000 alone. Ontario's 3,000 megawatts in eight years is only a quarter of what Germany achieved, and why are we waiting until 2006 to start? Right now, we are behind Germany, Denmark, the U.S., Spain, India, and Greece in our development of wind power.

CanWea's goal of 10,000 megawatts in ten years could create the following benefits:

- **Jobs** – creating 80,000 to 160,000 permanent jobs

- **Renewable Energy** – generating 30 million megawatt hours of electricity annually with long-term stability and resource availability
- **Environment** – displacing between 15 and 25 million tonnes per year of atmospheric greenhouse gases, equivalent to permanently removing 7.5 million personal automobiles
- **Investment** – adding between \$10 billion and \$20 billion in new capital investment, predominantly in rural areas
- **Regional Diversification** – creation of local construction and maintenance jobs, investment in rural economies, income for private landowners such as farmers, and a permanent municipal tax base
- **Human and Health Benefits** – a reduction in smog, acid rain-producing pollutants, heavy metals, and particulates. There would be a measurably positive impact on human health and reductions in health-care spending (especially in areas that use a significant amount of coal, areas with urban smog problems, and remote areas that use diesel electricity generation).

“We can easily do it,” says Estill. “At one-fifth to one-sixth of the cost of homeowners installing their own wind systems. We can have a fully sustainable electricity grid just from wind and hydroelectric power, all we have to do is properly use what we already have. For example, Canada already generates 60% of its power from hydroelectric, compared to 10% in the U.S. We have huge dams and reservoirs that can act as gigantic batteries, storing water pumped there by wind power, then releasing it through the hydrogenators in times of need. Plus, wind is more stable than water power, it doesn’t vary as much from year to year.”

“Our wind power is half what it should be right now,” says Estill, “Iowa has more installed wind capacity than Canada, Denmark has ten times more. Let’s get going.”

Of course, this would threaten the powerful vested oil, gas, nuclear, and coal interests that have built up over the years because of politicians’ insistence on Option B. Perhaps we will have to rely on the only force in our society that is stronger than the pursuit of power — the pursuit of money. When power interruptions and

shortages threaten profits, alternatives like wind will be actively pursued.

What’s the future for wind? Bruce Power LP has delayed the restart of two nuclear reactors on the Bruce Peninsula because the cost has jumped 36%. Originally slated at \$450 million, co-owner TransCanada Corp. admitted on July 26 that costs have climbed to \$610 million.

That’s enough money to power over 136,000 homes with wind.

And, on August 14, a power blackout in Ontario, New York, Pennsylvania, Michigan, and Ohio affected over 50 million people. The Ontario grid blew when distributing 22,500 mW, according to CBC. That’s only 75% the power we’re told it can handle. So much for Option B, designed and built by the energy Big Brains. The existing grid is fragile and this latest blackout has prompted many questions.

The answer may be blowin’ in the wind.

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Wind Energy Quick Facts

- The global wind energy potential, even excluding environmentally sensitive areas, is roughly five times current global electricity use.
- Wind power is the world's fastest growing energy source with sustained growth rates in excess of 30% per year. At the beginning of 2003, worldwide wind-generated capacity exceeded 31,000 megawatts.
- In the last decade the cost of wind-generated electricity was typically 30¢ per kilowatt-hour. Today's cost ranges from about 8¢ per kilowatt-hour at a site with winds averaging 8 m/s (29 km/hr) to about 12¢ for 6 m/s (22 km/hr) wind sites. Even lower prices can be achieved at large wind farms through economies of scale. (David Milborrow, Windpower Monthly, January 2002)
- Major energy reviews by the British government and the US Department of Energy predict that in 2020 the cost of wind energy will range from 3.4¢ per kilowatt-hour to 5.5¢. (David Milborrow, Windpower Monthly, January 2002)
- The technology has matured rapidly with typical reliability rates greater than 98% for good quality, modern wind turbines, making them on par with the reliability of a present-day farm tractor.
- Canada has far more wind energy potential than its current total use of electricity (about 497,000,000,000 kilowatt-hours used in 1999). While wind energy will not ever supply all of Canada's electrical requirements, it is not unreasonable to expect this clean, non-polluting, renewable energy source to supply up to 20%.

- At the beginning of 2002, Canada had about 205 megawatts of wind generation plant installed (see Production in Canada) producing about 449,000,000 kilowatt-hours of electricity per year - enough to supply about 56,000 typical Canadian homes. If this electricity is used to displace coal-generated electricity, it avoids discharging about 449,000 tonnes of carbon dioxide into the atmosphere annually.
- Canada has the ability to manufacture utility-scale wind turbine components such as blades, towers and nacelles. However, there are no manufacturers of generators, gear-boxes and control systems, nor are there any comprehensive wind turbine manufacturing facilities in Canada at this time.
- Wind-diesel projects in remote northern Canadian and Alaskan locations have demonstrated that wind energy can reduce the high costs associated with transporting diesel fuel to these remote sites.
- Small wind turbines (under 100 kilowatts) are manufactured in Dartmouth NS and Guelph ON.
- There is a significant rural Canadian and potentially huge international market for small non-electric wind turbines for pumping water and aerating ponds.

Source: CanWEA