A Municipal Guide to Wind Power Development in Ontario – Reference Book

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A Municipal Guide to Wind Power Development in Ontario – Reference Book

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Background

The Canadian Institute for Environmental Law and Policy is very pleased to release this Municipal Guide to Wind Power Development in Ontario. The opportunities to address and solve several important public health and environmental issues are enormous by steadily developing new wind generation and other certified renewable energy sources. The short Guide is available for free at www.cielap.org as well as at the Toronto Atmospheric Fund web site at www.city.toronto.on.ca/taf that provided both financial and research support for the Guide.

The purpose of this Guide Reference Book is to provide further details on the current financial incentives as well as the case studies, interviews and environmental assessment and planning process requirements for wind development. The reader should be advised that since the interest in wind development is growing, the regulatory and market context for this Guide is a rapidly evolving one, requiring regular updating.

There are many strategies municipal governments can initiate to promote sustainable energy development including green power procurement, investing in partnership with local utilities and communities in wind and solar power facilities, buying the green attributes of power via "Tradeable Renewable Certificates" or "Green Tags", adoption of green energy technologies for municipal facilities, utilization of renewable sources for district energy systems (biomass, deep lake water cooling) and lot orientation designed to maximize solar access so all facilities are more environmentally friendly and "climate friendly". To achieve this potential, municipal governments need to have the information, the resources and the authority to make and implement local action plans.

As the Guide to Wind Development described, currently there are three main ways for municipalities to access green power: invest in green power projects, purchase green power or purchase tradable renewable certificates such as Green Tags. The following sections provide further information on these options.

Despite the growing public interest in buying green power, supportive government policy still remains key. To allow for the development of a robust market for local green power resources there is a need for renewable portfolio standards, uniform consumer labeling, common technical interconnection and net billing standards as well as simplified contractual and other requirements at the provincial and local levels. It is our hope that this Guide and Reference Book will contribute to achieving the real potential of sustainable energy development and consumption in the Province of Ontario and beyond.

Wind Factoids

According to Decima Research, two-thirds of Canadians want new sources of energy developed over the next two decades, with wind power the most popular option at 36%, solar at 35%, hydroelectricity at 24% and small percentages suggesting hydrogen and tidal.

Some of the most common reasons why people buy these green sources of power are to:

- Improve human health
- Preserve the earth for their children and grandchildren
- Reduce environmental impacts
- Conserve finite fossil resources
- Act as a hedge against raising and volatile fossil fuel prices

Green power is low-environmental impact renewable electricity. Wind energy is an especially good choice when buying green power for several reasons. Wind is a renewable resource because it is inexhaustible. It is a result of the sun shining unevenly on the earth. It is one of the cheapest and cleanest renewable energy sources available. There is no extraction and consumption of fuel, and no air pollution.

Wind power is the world's fastest growing energy source with sustained growth rates in excess of 30% per year. According to the Canadian Wind Energy Association (CanWEA), at the beginning of 2002, worldwide wind-generated capacity exceeded 24,000 megawatts.

Ontario ‘s Ministry of Municipal Affairs and Housing estimates Ontario’s land-based wind capacity is about 7500 megawatts, equivalent to about 14 per cent of current consumption. As of April 2003, only 12.1 megawatts of commercially viable wind power is being produced.

Indeed, wind energy has surfaced as a leading source of new, renewable energy due to significant technical advances in turbine design, better product reliability, advances in windpark siting and dramatic reductions in the price of turbines, installations and maintenance. Other factors encouraging the use of wind include:
• Rising electricity prices
• Increasing carbon constraints on electricity generation
• Government sponsored incentives for renewables

CanWEA finds 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.

Improvements in technology have achieved a cost reduction of more than 50 per cent over the last decade. Wind power generation ranges from 8¢ per kilowatt-hour where winds averaging 8 m/s (29 km/hr) to about 12¢ for 6 m/s (22 km/hr) wind sites. Lower prices can be achieved at large wind farms through economies of scale.

According to the Pembina Institute and the Communications, Energy and Paper Workers Union, Green Power creates 50 % more jobs per dollar than investment in conventional generation.

A 660 kW hour wind turbine has the capacity to eliminate 1.4 million kg/year of CO_2, the leading gas contributing to global climate change; and 8,400 kg/year of SO_2 and 5,600 kg/year of NO_x, both of which are key components in creation of smog, ground level ozone and acid rain.

It would require planting approximately 200,000 medium to large trees to displace the same amount of CO_2 as a single turbine could over the lifetime of its operation (app. 25 years)

Studies have shown that the average wind turbine kills 2 birds per year. This is less than the average car or house cat. Since wind turbines have no air or water emissions, replacing other forms of generation with wind generation improves the environment, and therefore improves the survival rates of all species.

Wind turbines are built to withstand strong winds. A control within the turbine shuts it down when winds exceed 100km/hr. The towers themselves can withstand wind blowing at over two hundred kilometers per hour .

According to the Ontario Ministry of Municipal Affairs and Housing, wind energy can increase the municipal tax base by $3,000-5,000 per turbine, per year.

Appendix A - The Benefits of Wind Power

Air Quality Concerns

The opportunities to address and solve several important issues by steadily developing new wind generation and other certified renewable energy sources are enormous.

Deteriorating Air Quality
Citizens of the GTA would certainly concur that poor outdoor air quality is an issue that is not going to go away anytime soon considering it is getting progressively worse over time.

Health Considerations Resulting From Poor Air Quality

Wind power does not produce any airborne emissions during operation. It is very clear that encouraging wind power development to reduce our reliance on coal to meet rising electricity demands will dramatically reduce the costs on our already overextended health care system.

In 2000 the Ontario Medical Association (OMA) reported approximately 1,900 premature deaths are forecast to occur in Ontario as a result of air pollution. As well, 9,800 hospital admissions, 13,000 emergency room visits and 47 million minor illness days are expected to occur which are attributable to air pollutants caused by humans.[1]

The OMA determined poor air quality represents over $1 billion in direct costs to taxpayers and business in Ontario for the year 2000. Health damages equate to a total of about $600 million in costs to the health-care system and a further $560 million in direct losses to employers and employees. The largest contributors to poor air quality are from the energy production, transportation and agricultural sectors.[1]

The first priority would have to be to decommission Ontario's 5 coal powered plants. They are by far the highest point sources of particulate matter and GHG emissions in Ontario[1].
These coal plants act as a safety valve and come online during periods of high electricity consumption in Ontario, typically when the province experiences extreme weather. There is a certain amount of irony in the fact that when the GTA has heat and smog advisory days the electricity demand surges from the use of air conditioners that brings the coal fired generators online to meet demand and only further exacerbate our air quality problems.

It is clear that any type of policy development to deal with poor air quality in Ontario will have to start looking at decommissioning coal-fired generators. The proposition being debated by the provincial government to convert coal generators to cleaner burning natural gas is only a stopgap approach. After the massive costs of retrofitting the

[1] OCAAat http://www.cleanair.web.net/

generators the price of electricity would then simply be tied to fluctuations in natural gas prices.

Surely smart policy would be to switch right over to renewables with the goal of developing an attractive investment climate for energy cooperatives and companies to manufacture and commission wind turbines. The benefits of this type of policy would address so many current issues simultaneously, such as health, climate change and regional economic development.

Ontario's largest electricity producer, Ontario Power Generation's coal plants are responsible for:

- 20% of Ontario's greenhouse gas emissions (climate change);
- 27% of Ontario's sulphur dioxide emissions (smog and acid rain);
- 14% of Ontario's nitrogen oxides emissions (smog and acid rain).
- 27% of Ontario's arsenic emissions (a carcinogen);
- 67% of Ontario's chromium emissions (a carcinogen);
- 34% of Ontario's airborne mercury emissions (a neurotoxin)

Getting to Kyoto

The federal government has ratified an international treaty that over 160 countries have signed obliging Canada to lower its greenhouse gas emissions to 6 percent below 1990 levels during the first commitment period (2008 -2012).

PCP – Partners for Climate Protection see FCM programs

When the City of Iqaluit announced on November 15th, 2002 that it would join the FCM-PCP program, it became the 100th Canadian municipal government to be actively engaged in this national effort to reduce greenhouse gas (GHG) emissions. All of Canada's capital cities, from St. John's to Victoria, are now participating in the PCP.

By joining the PCP, municipal governments commit to reducing GHG emissions from their operations to 20% below 1990 levels within 10 years, and community wide emissions by 6% below 1990 levels. To support this effort the federal government established the $50 million Green Municipal Funds, administered by the Federation of Canadian Municipalities (FCM). The fund provides cost-shared grants and favourable loans to support innovative feasibility studies and development costs, that includes wind power. PCP communities can use these funds to plan and implement projects that will help them achieve their GHG reduction targets,while improving air quality.

In April 2000, the City of Toronto, a participating PCP member, unanimously approved *Clean, Green and Healthy – a Plan for an Environmentally Sustainable Toronto.* This Plan included commitments to increase the City's corporate energy efficiency by at least 15% by 2005 and to purchase 25% of its energy needs from Green Power by 2005. Energy efficiency and green power purchasing commitments have been reiterated at the annual Toronto Smog Summits held by the Toronto Atmospheric Fund.

Renewables are seen as a key element in 2002 Ottawa's December 2002 Climate Change Strategy. Green power is one of the new markets where domestic companies could develop a "critical competitive advantage" now that Canada has ratified the Kyoto Protocol. Renewables could reduce emissions by 3.9 Megatonnes (MT) by providing 10% of new generating capacity and 10 MT from community adoption of renewables. Otherwise, GHG emissions from electricity generation will increase 38% by 2010 seriously jeopardizing meeting our Kyoto obligations.

Municipal initiatives to promote renewable energy include green power procurement strategies, investment in partnership with local utilities and communities in wind and solar power facilities, adoption of green energy technologies for municipal facilities, promotion of solar demonstration projects, utilization of renewable sources for district energy systems (biomass, deep lake water cooling) and land use, subdivision layouts, and lot orientation designed to maximize solar access.

According to the Municipal Table of the 1998 National Climate Change Process, reducing the emissions from municipal operations is a priority. It is considered feasible to reduce by 25 percent the estimated 4 MT of greenhouse gas emissions from Canadian municipal government operations. The focus will be on opportunities to reduce the $600-$800 million annual expenditures (1998) on fuels and electricity by local governments. The development of green specifications and joint procurement networks can leverage the municipality's ability to affect change, particularly in market segments where municipal governments are dominant purchasers of equipment (e.g. heavy equipment, recreational facilities, street lighting, water and sewage treatment technology).

In the long term, it is the potential of community energy management that offers the promise of very deep and sustainable GHG mitigation at the municipal level. The evolution of settlements toward increased density, greater mix of uses, optimum use of infrastructure, preservation of agricultural and forested land, improved solar orientation can all facilitate much more environmentally friendly and "climate friendly" communities. To achieve this potential, municipal governments need to have the information, the resources and the authority to make and implement local action plans.

Appendix B - Funding Sources for Wind Power

Funding and Incentive Sources for Green Power Projects

Federal Incentives

Wind Power Production Incentive (WPPI)

Announced in the December 2001 budget, WPPI provides an incentive for the first 10 years of approved wind projects. The incentive amount depends on the commissioning date of the project:

- April 1, 2002 to March 31, 2003 inclusive - 1.2c/kWh
- After March 31, 2003 and on or before March 31, 2006 – 1.0c/kWh
- After March 31, 2006 and on or before March 31, 2007 – 0.8c/kWh

This could provide some financial incentive for a private-sector partner in a municipal renewable energy project. To get this incentive, the electricity produced from a wind farms has to be for sale in Canada and tied to the electrical grid. The incentive would not apply to electricity used for own consumption, for example, self-generation for a municipality. However, a private sector partner could build a windfarm, connected to the grid, enter into a power purchase agreement with a municipality, and be eligible for WPPI.

- Objective - $260M incentive to encourage 1000 MW of wind power by 2007 by covering half of the premium cost of wind energy
- Eligibility – business, institution or organization such as an independent power producer, provincial crown corporation or energy cooperative; contribution agreement required with NRCAN
- Limitations:
    - in Canada capacity of wind farm must be at least 500 km, except for wind farms north of 60 degrees and in remote locations not tied to electrical grid where the capacity must be at least 20 kW
    - triggers federal EA
    - cannot have both WPPI and CRCE on same turbine; commonly have CRCE on test turbines, WPPI on production ones
    - encourages 1000 MW of new capacity; level of interest from developers is currently at 3500 MW of capacity[2]
    - need similar incentives for other forms of renewable energy
- Business Case Impact – 1.2c/kWh or approximately 0.67c/kWh after tax[3]
    - in Ontario where retail electricity prices for many electricity consumers[4] are capped at the artificially low price of 4.3c/kWh, this incentive does not come

[2] http://www.canren.gc.ca/wppi

[3] "Enhancing Sustainable Economic Development in Canada with Renewable Energy" http://carecoalition.com/

[4] from "Bill 210: First Round of Regulations Released" by Borden Ladner Gervais LLP: Reg 339/02 defines "designated customers" as: a consumer with demand of <= 50kW; a consumer who has an account with a distributor related to a dwelling (condominium, residential complex, co-op property); charitable

close to its objective of covering half the price of the premium cost of wind. Depending on the wind regime, developers need to get approximately 9-10c/kWh to make a reasonable return on investment

- this incentive has been criticized as being insufficient to be on par with U.S.[5] (the U.S. provides a larger tax credit for businesses with taxable income) – original intent was that provinces or customers would contribute an equal amount
- Although the WPPI is taxable some small developers will not have to pay taxes on it because they will not have taxable income.

See http://www.canren.gc.ca/wppi for more detail.

Canadian Renewable and Conservation Expenses (CRCE)

CRCE is legislated by the Federal Department of Finance and administered by the Canada Customs and Revenue Agency (CCRA). The Department of Finance drafts changes to the Income Tax Regulations but it is only the Parliament of Canada that can legislate such changes. CRCE is part of the Income Tax Regulations. It was introduced in the 1996 budget to allow investors to fully write off intangible costs like feasibility and resource assessment studies in the year they are incurred or to carry them forward indefinitely to deduct in later years.

Following the proposed changes to CRCE announced the 1997 budget, the CRCE regulations were amended to allow the costs of the first wind turbine installed at the site of a planned wind farm for the purpose of testing the wind regime at the site to be written off as CRCE. These write-offs can also be transferred to investors via flow-through share financing arrangements. This could be an important financial incentive for a private-sector partner in a municipal renewable energy project. To qualify as CRCE, expenses must be incurred by a taxpayer with respect to a planned project where it is reasonable to expect that at least 50% of the equipment used in the project would qualify for Class 43.1. A private sector business must own equipment and sell energy to qualify for CRCE and Class 43.1.

Prior to CRCE, most intangible costs associated with renewable energy projects would have been expensed, some may have been capitalized and written off at the relevant rate. The main benefits of CRCE are that: it allows losses to be carried forward indefinitely (normally if there is no income, the taxpayer incurs a loss which can only be carried forward 7 yrs); it makes projects more attractive to investors since tax write-offs can be passed on to them through Flow-Through Share financing; it allows test turbine costs to be fully written off in the year they occur.

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institution; home for special care; employer with <= 50 employees; MUSH sector (municipalities, universities, school boards, hospitals).

[5] "Enhancing Sustainable Economic Development in Canada with Renewable Energy" http://carecoalition.com/

A wind farm is defined as a group of wind turbines connecting through a common substation into a transmission or distribution grid through a single point of interconnection. The test turbine is currently defined as the first wind turbine on a site among other criteria[6]. A proposed change would allow 20% of turbines on a site to be written off as test turbines provided the test wind turbines meet all other criteria in the regulations such as the 1500M spacing requirement. This change must be enacted by parliament to come into effect. There must be a delay of 120 calendar days between the construction of the test turbines, and construction of the production turbines. The intent is that any true "test turbines" should be testing viability of implementing the rest of the project at the site and therefore, there should be an evaluation period before constructing the rest of the turbines.

A company must be a principle business corporation as defined in the income tax act - i.e. in the business of producing energy from the types of assets described in Class 43.1 - to issue flow-through shares for CRCE. Flow through share financing allows a company with no income, or a loss position to raise start up funds for initial project expenses and pass on the associated write-offs to investors so that the write-offs can be used right away. Companies are very interested in startup financing thru flow-thru share offering.

Currently developers have one year to install the equipment whose costs are being passed to investors through flow-through share agreements. The problem is that with wind turbines so much in demand, and being shipped from Europe, it is difficult to get them commissioned that quickly. Proposed changes to the CRCE regulations include a 1 yr look back clause that would allow a developer to pass deductions to flow-through share investors and have until the end of year 2 to commission the equipment. This change must be enacted by parliament to come into effect.

- Objective - to initiate renewable energy and conservation projects
- Eligibility - "principal business corporations" and other taxpayers incurring qualified expenditures; Flow-through share financing available for "principal business corporations" to raise equity;
- Limitations:
    - Cannot have both WPPI and CRCE on same turbine
    - The time delay between construction of test and production turbines creates practical problems for developers who want to minimize costs by having the right people, equipment, materials on-site only once to erect all turbines at the same time
- Business Case Impact
    - Better access to equity financing since flow-through share financing allows tax write-offs to be passed on to investors
    - Test turbine costs can be written off at 100% in the year they occur
    - Losses associated with intangible startup costs and test turbine costs can be carried forward indefinitely

[6] http://www.fin.gc.ca/news02/02-063e.html, http://www2.nrcan.gc.ca/es/erb/english/View.asp?x=469&oid=530

See http://www.fin.gc.ca/news02/02-063e.html
http://www2.nrcan.gc.ca/es/erb/english/View.asp?x=469&oid=530
http://laws.justice.gc.ca
For more detail advanced income tax rulings are available from CCRA at (613) 957 8953.

Class 43.1 Accelerated Capital Cost Allowance

Class 43.1 is legislated by the Federal Department of Finance and administered by the Canada Customs and Revenue Agency (CCRA). The Department of Finance drafts changes to the Income Tax Regulations but it is only the Parliament of Canada that can legislate such changes. Class 43.1 is part of the Income Tax Regulations. This could be an important financial incentive for a private-sector partner in a municipal renewable energy project.

Class 43.1 can reduce taxes by allowing companies to deduct the cost of eligible equipment at up to 30%/yr on a declining balance basis. Prior to Class 43.1, some tangible capital costs associated with renewable energy projects would have been deductible at lower rates of 4-20% depending on the class they fall into.

- Objective- provide tax relief via accelerated write-off of equipment for renewable energy production or energy conservation
- Eligibility- all taxable entities if Class 43.1 criteria met
- Considerations:
    - Can combine with WPPI for production turbines
- Business Case Impact - reduce taxes by deducting cost of eligible equipment at up to 30%/yr on a declining balance basis instead of the previous annual rates of 4, 6 or 20%.[7]

See http://laws.justice.gc.ca for more detail.

Advanced income tax rulings are available from CCRA at (613) 957 8953.

- [7] Previous deduction rate depends on class of asset, class 34 has been superceded by class 34.1 (class 34 was deductible at an annual rate up to 50% straight line but for a more limited list of eligible equipment). The following classes still exist, but renewable or energy efficiency equipment may qualify as 43.1 instead: class 1 (includes part of building) at 4%; class 2 (includes property that is electricity generating/distribution) at 6%; class 8 (equipment, furniture) at 20%. Note that class 3 also includes parts of building, deductible at 5%;

Municipal Funding Sources

Green Municipal Enabling Fund (GMEF)

The Green Municipal Funds umbrella is intended to stimulate environmental initiatives including renewable energy. GMEF is one of two funding programs under this umbrella, the other is the Green Municipal Investment Fund (GMIF) described below. These two funds are a major source of funding for municipalities planning a renewable energy project.

- Objective - contribute 50 per cent of eligible expenses (includes consultants) to a maximum grant of $100,000 for feasibility study for energy and energy services or sustainable community planning.
- Eligibility - municipalities or partners - determined by Federation of Canadian Municipalities (FCM)
- Limitations- preference is given to projects with an optimal mix of the following aspects:
  - Improve performance by at least 35 per cent over "business as usual", this requires measuring current baseline
  - Significant environmental benefit,
  - Project is replicable in other municipalities
  - Project tests an environmentally innovative approach

As of early 2003, the Green Municipal Funds have provided funding of more than $20 million for 201 projects. Several of these projects are for the deployment of wind farms. The Village of Masset and Uniterre Resources Ltd. were granted $100,000 to perform wind resource assessments for the proposed 700 MW Nai Kun Wind Farm on the Queen Charlotte Islands in British Columbia. The City of Sudbury received $100,000 to produce a business plan for their proposed 50 MW wind farm. Hearthmakers Energy Co-op in Kingston received two $100,000 grants to work on energy conservation and wind development initiatives.

See http://kn.fcm.ca/ev.php for more detail.

Green Municipal Investment Fund (GMIF)

- Objective: to help implement projects which improve the environment – up to $200M total as a revolving fund
- Eligibility: municipalities or partners - determined by Federation of Canadian Municipalities (FCM)
- Business Case Impact –
- GMIF finances up to 15 per cent (25 per cent in exceptional circumstances) of the capital costs of a qualifying project at the preferred interest rate of 1.5 per cent below the Government of Canada bond rate for a municipality (FCM may also provide

competitive loans for private partners of municipalities). GMIF can provide loan guarantees. Loan payback periods may range from four to ten years.

- A pilot project is something that is highly innovative, with a payback in excess of 10years. Loan packages for pilot projects can include a grant portion that lowers risk and shortens the payback. PP is GMIF is highly innovative, payback > 10 yrs. Using combinations of grants, long-term loans and loan guarantees, GMIF can offer financing for up to 50 per cent of eligible project costs for pilot projects.
- Considerations: Municipalities can use GMIF with other federal financial programs

See http://kn.fcm.ca/ev.php for more detail.

Municipal Building Retrofit Guide (MBRG)

The Municipal Building Retrofit Guide used to be called the Municipal Building Retrofit Program (MBRP). Although MBRP is no longer actively funded as a program, some of the guidance and advice it provided is now in the MBRG. Although FCM no longer has funding to hold free workshops, they do still have staff to provide advice and attend meetings to help with Municipal Building Retrofits.

Savings achieved through MBRG can be an important way to fund municipal renewable energy projects. Hearthmakers and the City of Kingston used energy efficiency savings from municipal building retrofits to fund a wind energy project.

- Objective: MBRG provides staff and resources to guide municipalities through the building retrofit process, including advice on funding opportunities through GMEF and GMIF
- Eligibility: municipalities or partners - determined by FCM
- Considerations:
    - Can reduce utility costs and system maintenance/repair costs
    - Generate up to 20 local jobs for every $1 million invested
    - Significant potential impact since municipal governments manage about 5% of Canada's buildings
- Business Case Impact: savings enabled by MBRG can help finance green power projects

See http://kn.fcm.ca/ev.php for more detail.

Partners for Climate Protection (PCP)

Although PCP does not have any formal funding programs, it is listed here for completeness. PCP is a group of municipal and regional governments across Canada working together to reduce greenhouse gas emissions produced locally. The goal is to reduce greenhouse gas emissions from municipal operations 20 per cent below 1990 levels within ten years of joining the program, and to reduce community-wide

greenhouse gas emissions at least six per cent below 1990 levels within 10 years of joining the program.

FCM is the political partner for PCP, responsible for relations with the Canadian federal government, and the formulation of federal climate policy within Canada with respect to local governments. ICLEI is the technical partner, responsible for activities such as software tools, technical manuals, training materials, reporting protocols, energy management, and monitoring and verification activities. The goal of PCP is to support Canadian municipal governments in preparing and implementing local climate action plans.

See http://kn.fcm.ca/ev.php for more detail.

Market Incentive Program (MIP)

Although the deadline for MIP application was Feb 28, 2003 – it is listed here for completeness. It is not yet know if MIP will be extended as part of the Kyoto initiatives announced in the Feb 2003 budget.

MIP was part of the Government of Canada Action Plan 2000 on Climate Change, and part of the $500M Action Plan on Climate Change included in Dec 2001 budget.
It is intended to complement the federal green power procurement program. MIP is to provide an incentive to increase green power sales in the residential and small business markets. The first Request for Letters of Interest under MIP had the goal of seeking innovative proposals from "green power" marketers with the objective of raising public awareness of "green power" choices and increase the market share of "green power".

MIP is jointly managed by Environment Canada and NRCan, with resulting contribution agreements to be administered by NRCan. This could be a source of funding for a municipality, or a distributor or retailer partner in a municipal renewable energy project.

- Objective – incentives to energy retailers to stimulate sales of green electricity to small business and residential markets - total budget of $25M ending March 31/06
- Eligibility: retailers of renewable electricity - determined by Environment Canada and NRCan
- Considerations:
    - Non-Governmental Organizations (NGOs) can do co-marketing arrangements with distributors under this program
    - marketing, administration and distribution costs increase retail price of renewable energy by 2-4c/kWh – some question whether the current MIP budget is sufficient to fund marketing programs such as rebates[8], but NRCan

[8] "Enhancing Sustainable Economic Development in Canada with Renewable Energy" http://carecoalition.com/

and Environment Canada will be further studying the feasibility of a customer rebate program under MIP.

- Business Case Impact – reduce marketing expenses by reimbursing up to 40% of expenditures via a contribution agreement
    - Deadline for Letters of Interest was February 28, 2003.

See http://www2.nrcan.gc.ca/es/erb/english/View.asp?x=457 for more detail.

Technology Early Action Measures (TEAM)

TEAM began with an initial investment of C$60 M over 3 years (1998/99-2000/01) from the Climate Change Action Fund. It has been extended for another three years, through 2003/04, with an additional C$35 M. This could be a source of funding for a community or industry partner in a municipal renewable energy project.

- Objective - part of Climate Change Action Fund (CCAF) provides funding for early action technology deployment to reduce Green House Gases
- Eligibility - determined by NRCan, Industry Canada, Environment Canada and others under existing programs.
- Considerations
    - Triggers federal Environmental Assessment (EA)
- Business Case Impact – must weigh advantages of funding against EA cost and potential delay in receiving $$

See http://www.climatechange.gc.ca/english/actions/action_fund/techno.shtml for more detail.

Public Education and Outreach (CCAF-PEO)

Part of the Climate Change Action Fund, PEO's goal is to raise Canadians' awareness of climate change and promote action to counteract it. One component of PEO is project funding for partnered projects in several streams: Communities; Youth & Educators; Business & Industry; The Public. RFPs for current projects are posted on the web http://www.climatechange.gc.ca/english/actions/action_fund/public.shtml. PEO is administered by Environment Canada. This could be a good source of funding for a community group partner in a municipal renewable energy project.

Ecoaction

This could be a source of funding for a community group or non-profit group partner in a municipal renewable energy project.

- Objective - provides financial support to community groups for projects that have measurable, positive impacts on the environment
- Eligibility - community and non-profit groups as determined by Environment Canada
    - projects should protect, rehabilitate or enhance the natural environment, and builds the capacity of communities to sustain these activities into the future
    - priority for funding is given to projects that will achieve results in the following areas: Clean Air and Climate Change; Clean Water; and Nature
- Considerations: Projects require matching funds or in-kind support from other sponsors

See http://www.mb.ec.gc.ca/community/index.en.html for more detail.

Federal Green Power Procurement

Although not a funding or incentive source, this could be a customer for municipal green power projects.

The first green power sale in Canada was by ENMAX to Environment Canada in 1997. Other federal procurements included purchases for NRCan facilities in Alberta; and for federal facilities generally in Saskatchewan and P.E.I.. In Action Plan 2000 on Climate Change, the Government of Canada committed to expanding purchases to achieve 20% of federal electricity requirements as green power, to reduce greenhouse gas and other air pollution emissions associated with federal use of high-carbon electricity through 2010. Pubic Works and Government Services Canada (PWGSC) administer the procurement with advice from NRCan and Environment Canada. PWGSC issued a Request for Letters of Interest in January 2003 to suppliers in Ontario. Discussions are underway in several other provinces for procurement.

Provincial Funding Sources

The following involves provincial rebates and tax breaks introduced to encourage growth in the renewable energy sector. The provincial budget for 2003[9] has really only scratched the surface of what a new renewable energy policy could provide.

Corporate Income Tax Incentive for Self-Generated Electricity

Corporations that generate electricity for their own use relieve demand on Ontario's supply of electricity. These corporations are currently eligible for the fast write-off for assets used to generate electricity from alternative or renewable energy sources.
To further encourage electricity self-sufficiency, this budget proposes to provide an additional 100 per cent income tax deduction to Ontario corporations for the cost of qualifying assets used to generate electricity for their own use from alternative or renewable energy sources.

The 2002 provincial budget provides that:

- The tax deduction would apply to electrical generating facilities where construction commences after November 25, 2002 and is completed before January 1, 2008; and
- Corporations eligible for this incentive would not be eligible for the 10-year income tax holiday for new electricity generation.

Energy Incentives

Announced in November 2002

- A 10-year corporate income tax holiday for new electricity generation from alternative or renewable energy sources;
- A 10-year property tax holiday for new facilities that generate electricity from alternative or renewable energy sources;
- An immediate 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;
- A retail sales tax rebate for qualifying Energy Star® clothes washers, dishwashers, refrigerators and freezers purchased before November 26, 2003;
- A retail sales tax rebate for building materials purchased and used after November 25, 2002 and before January 1, 2008 to build electricity generating facilities that use alternative or renewable energy sources; and
- A five-year retail sales tax rebate for residential solar energy systems.

New Measures

- An expanded retail sales tax rebate for solar energy systems to include other eligible residential energy systems;
- An increased retail sales tax rebate for certain alternative fuel vehicles, to a maximum of $2,000;
- A 100 per cent corporate income tax deduction for new assets used to self-generate electricity from alternative or renewable energy sources; and
- A two-year transfer tax exemption for sales and amalgamations of publicly owned municipal electricity utilities to encourage greater rationalization and efficiency.

ELECTRICITY ACT, 1998

(Pg 171 budget)

Transfer Tax

Municipalities and municipal electricity utilities that transfer an interest in electricity assets to another person are subject to a 33 per cent transfer tax on the value of those assets.
Prior to the restructuring of the electricity industry, there were over 300 municipally owned electricity utilities in Ontario. A two-year transfer tax exemption that applied from

[9] 2003 Ontario Budget - The Right Choices: Securing our Future - Budget Papers; http://www.gov.on.ca/FIN/bud03e/pdf/papers_all.pdf

1998 to 2000 reduced this number significantly. But, still over 90 municipally owned utilities remain. To encourage further rationalization and greater efficiencies within the publicly owned electricity distribution sector, a regulation will be made to re-introduce a two-year transfer tax exemption.

The transfer tax exemption would be available for transfers of electricity assets from a municipality or a municipally owned electricity utility to another municipality or publicly owned electricity utility. This exemption would apply to transfers occurring after March 27, 2003 and before March 28, 2005.

RETAIL SALES TAX ACT

Rebate for Wind, Micro-Hydroelectric and Geothermal Energy Systems for Residential Premises

To encourage the production of clean, renewable energy in Ontario, legislation will be introduced that would expand the five-year retail sales tax rebate for solar energy systems, announced in November 2002, to include wind energy systems, micro-hydroelectric systems and geothermal heating/cooling systems for residential premises. The rebate would be available for purchases made after March 27, 2003 and before November 26, 2007.

Increased Rebate for Alternative Fuel Vehicles

To encourage the purchase of alternative, cleaner vehicles and to support their development, legislation will be introduced to double the retail sales tax rebate for qualifying alternative fuel vehicles delivered to purchasers after March 27, 2003, to a maximum of $2,000. The maximum rebate for propane vehicles will remain at $750.

Emissions Trading

General

"Emissions Trading" refers to a market-based system where entities can buy and sell "allowances" or "permits". These can be thought of as the "right to emit" certain amounts of specified air-borne pollutants. In such markets, "credits" for reductions of the specified pollutants are also tradeable commodities. The objective of these Emissions Trading markets or systems is to gradually reduce emissions over time by allowing emitters more options to reduce their share of emissions.

It may be more cost effective for emitters to buy "allowances" or "credits" to cover part of actual emissions rather than making the large capital expenditure to install a new system. Emissions Trading systems are also intended to encourage innovation in the development of emissions reduction technology.

Most Emissions Trading systems focus on large emitters, fossil fuel fired electricity generators in particular, since they tend to be the largest sources of the most damaging emissions. The production of energy from fossil fuels results in emissions of carbon dioxide (CO_2), nitrogen oxides (NOx) sulphur dioxide (SO_2) , volatile organic compounds (VOCs), particulates and mercury. SO_2 causes acid rain, NOx and VOCs cause smog (ground level ozone), and CO_2 is the most common Green House Gas (GHG). Nitrogen Oxides (NOx) is a general term used to refer to both Nitrogen Oxide (NO) and Nitrogen Dioxide (NO2)[10]. Ontario has instituted a "cap, credit and trade" system to limit some of these emissions and mitigate their associated environmental and health problems. In the U.S. they have "cap and trade" systems, but the Ontario concept of "credits" which can be used similarly to allowances is unique among North American trading systems.

To encourage innovation in sectors outside the regulated entities, emissions trading systems may allow for emissions reductions or emissions removals in these non-regulated sectors to be traded within the system. Once these emissions reductions or removals are approved by the regulating body, they are allocated to the entity that implemented the project as "credits" or "offsets", and can then be sold by that entity into the emissions trading system. Allowing this sort of credit from outside the capped sectors has been criticized by Environmental Non-Governmental Organizations (ENGOs) for allowing emissions within the capped and non-capped sectors to increase. The intent is overall reductions in the air shed. This will be achieved if non-capped entities selling credits share the same air shed, assuming the regulator issuing the credits verifies that the reductions are "real".

[10] NO at the burner tip turns into NO_2 as it goes up the stack. 1 kg of NO = 1.533 kg of NO_2.

The Ontario NO and SO_2 trading system regulated by the Ministry of the Environment (MOE) allows: direct emissions reductions in non-regulated sectors to be traded as "Emissions Reductions Credits (ERCs)"; and indirect emissions reductions from displacing fossil-fuel fired electrical generation via conservation or renewable energy projects to be traded as "set-aside allowances". Similarly, the Climate Change Plan for Canada allows "carbon sinks" which remove CO_2 from the environment – such as the mass planting of trees - to generate "offsets" which can be traded.

Once the emissions credits from a "green" project such as renewable energy or conservation have been sold, the proponent of the project can no longer claim to be "green" (in an ethical market sense) since the environmental benefits of the project are being used to permit larger emissions somewhere else. For example, if a municipality implements a renewable energy project, obtains emissions credits for this project, and sells them, they should no longer claim to be producing "green power". The buyer of the credits is producing as much additional emissions as those saved by the renewable energy project, resulting in no net benefit to the environment. To build and maintain a marketplace for "green" power, it is essential from an ethical standpoint not to "double-count" the greenness by selling the green product to one buyer and the attributes that make it green (like emissions credits) to another. It is up to the regulator to ensure that any environmental credits awarded such as ERCs are real. The IMO keeps records of how much electricity has been sold onto the grid by generators such as wind farms. Marketplace participants such as generators or distributors selling green power, or its "green attributes" must ensure that the "greenness" of each MWh of electricity produced is sold only once. One unethical seller could destroy credibility for the entire "green power" market by selling green attributes twice or "double counting".

Some municipalities have a policy to not sell any emissions credits such as the City of Sudbury.The City of Toronto has agreed not to not even consider appling for any emissions credits until they have met their 20% emissions reduction target. This is a public policy issue, not a regulatory one since municipalities in Ontario are not capped under the existing emissions trading system.

Emissions Limits and Allowances

In an emission trading system, entities in the Industrial, Commercial and Institutional (ICI) sector, especially electricity generators, who emit regulated emissions are "capped". There is a specified amount (measured in tons) of each regulated emission that they are allowed to release each year without penalty, this is called an "allowance" or "permit".

Regulators decide on a total emissions limit for each type of emission over a number of years for the capped sectors as a whole. Usually these total emissions limits will decrease over time and/or more ICI sectors will be brought under the same overall limits to reduce emissions for individual emitters over time. These total emissions limits are divided among the individual capped emitters of each substance as "allowances" or "permits".

For electrical generators in Ontario, the total emission allowances are allocated in proportion with the electrical output of each generator. In other words, if a generator produces 10% of the total electricity produced by all capped generators, they would get 10% of the allowances.

Another way to allocate allowances is to assume certain amounts of emissions per MWh of electric generation with reasonable "best practices" and allocate allowances based on expected output of electricity for the year. For example, if 1.5 lb of NOx is emitted during the generation of 1 MWh of electricity with "best practices", a generator could be allocated allowances based on the following formula[11]:

$$\frac{1.5 \text{ lb NOx /MWh} * \text{anticipated electric output in MWh/yr}}{2000 \text{ lb/ton}}$$

The benefit of this approach is that a reasonable level of emissions reduction technology for producing electricity is assumed as the baseline. Emitters who do better than this baseline are rewarded with excess allowances at the end of the year, while those with inferior technology must buy excess allowances for the amount they emitted beyond their cap. The approach where emitters are allocated a % of the overall emissions allowances based on their electricity output can also have this positive motivation assuming the overall emissions allowances are set low enough to assume reasonable emissions reduction technology.

It is essential for ENGOs to be involved in the design of an emissions trading system. In particular, they should have input into setting emissions limits which are low enough to stimulate real emissions reduction improvement.

Set-asides

Some emissions trading systems have the concept of "set-aside allowances". A "set-aside" is a small number of the total emissions allowances within a jurisdiction which are not allocated to emitters, but are reserved for developers of renewable energy or energy conservation projects. These "set-aside" reductions (SRs) are intended to encourage approved new conservation and renewable energy projects each year which displace electricity from coal or oil-fired plants.

Approved "set-aside" reductions represent the quantity of emissions which have been prevented by implementation of the renewable energy or conservation project. In Ontario, Electricity savings for conservation projects are measured in accordance with the "International Performance Measurement and Verification Protocol" http://www.ipmvp.org/info/ipmvp.pdf. Once developers of such projects have had their "set-aside" reductions approved by the regulating body, they can sell these into the system.

[11] Promoting Green Power in Canada, Green Power Policies: A Look Across Borders by Pollution Probe, Nov. 2002

Emissions Reduction Credits (ERCs)

Emissions Reductions Credits (ERCs) can be created by the regulating body for qualifying emitters who are not subject to emissions caps, but who undertake projects to reduce their emissions. The objective is to encourage emission reduction technology improvements in non-capped sectors. Reducing emissions by reducing production or going out of business is not an eligible activity for credit creation.

Reducing emissions indirectly by implementing conservation or renewable energy projects which displace coal-fired generation comes under the treatment for "set-asides", not ERCs.

Offsets

Some trading systems define the term "offset" to represent indirect emissions reductions such as removing emissions from the environment (ex carbon sequestration) or displacing fossil fuel fired electricity. The Ontario trading system doesn't use this term. In Ontario there are "allowances" allocated to emitters as a "right to pollute" and "credits" approved for some projects which reduce emissions. These allowances or credits "offset" (used as a verb, not defined as a term) emissions within the system.

Some trading systems define a separate term "offset". In the Climate Change Plan for Canada, an "offset" allows Emission Reduction Credits (ERCs) to be generated from sectors not covered by the capped trading system, and sold into that system. For ex. The mass planting of trees by the forestry industry could "offset" CO_2 emissions within the trading system, providing the company which implemented the project received ERCs from the regulatory body. The advantage of allowing these offsets is that they can provide more alternatives for large industrial emitters to meet their allowance limits, and stimulate emission reduction activity in other sectors via income from ERCs.

Trading of allowances and ERCs

Each capped emitter monitors their actual emissions on an on-going basis with an approved monitoring system to establish the yearly total. Emitters who release fewer emissions than permitted by their allocated allowances can sell the extra allowances to others in the system at a price determined by market supply and demand. Proponents of conservation and renewable energy projects who have earned "set-aside" allowances can sell these into the system. Entities who have approved ERCs can also sell them into the system.

Capped emitters who release more than their allowance must buy enough Ontario allowances and/or ERCs on the market to make up for the shortfall. The Ontario system limits the % of the total emissions release which can be met via purchase of ERCs.

All allowances and ERCs will be tracked in a system to ensure their source is valid and that all allowances and credits are only used once. Once credits and allowances have been used, the system will mark them as "retired". It is important to note that once a renewable energy provider has sold their ERCs, from a marketplace standpoint, they can no longer sell "green power" or the "green attributes" of power (via a "green tags"

business model) since the "greenness" has already been sold via ERCs and the associated power is now "null" or "brown". As discussed above, this is a critical marketplace ethics issue.

NO_x and SO_2 Trading in Ontario

In the Ontario context, emissions fall into two broad categories: those which cause regional environmental problems such as smog and acid rain (NOx, SO_2); and the Green House Gases (GHGs), like CO_2 which cause global environmental problems. NO and SO_2 emissions are regulated by the Ontario Government under the Ministry of the Environment (MOE), while GHG emissions are subject to Federal and International rules. GHG trading systems relevant to Canada are discussed in a later section of this document. The remainder of this section provides a summary of Ontario's NO and SO_2 trading system.

The Ontario Pilot Emission Reduction Trading (PERT) project was an industry-led pilot project established in 1996. PERT's objective was to evaluate the effectiveness of ERC trading as a way to reduce greenhouse gas emissions, smog and other air pollutants in the heavily industrialized area between Windsor, Ontario, and Quebec City. Industry participants in PERT earned credits for emissions reductions beyond those required by regulations. In 2000, PERT was replaced by Clean Air Canada Inc. (CAC), a federally incorporated non-profit organization that was formed by the original private sector members in PERT (including OPG). CAC's objective was to continue the voluntary initiatives started under PERT to foster an emissions reduction trading market in Canada for NOx, SO_2, VOC's and GHGs.[12] Before issuing ERCs for these early action reductions, MOE subjects them to the same review as new ERC applications to ensure the reductions are valid.

As of Dec 31, 2001 Ontario has had mandatory emissions reporting and trading for NO and SO_2 as defined by Ontario Regulation 397 under the Environmental Protection Act. Details of regulation O.Reg. 397 and the Ontario Emissions Trading Code which sets out the rules for trading allowances and ERCs can be found at http://www.ene.gov.on.ca/envision/air/etr/.

The Agreement between Canada and the United States on air quality is taken into account in the Ontario emissions trading regulations and rules. Ontario regulation 397 specifies 12 key states: New York, New Jersey, Pennsylvania, Delaware, Maryland, West Virginia, Kentucky, Ohio, Michigan, Indiana, Illinois, Wisconsin within which emission reductions can be considered for credit creation in the Ontario system. Emission reduction activity in these 12 states and the District of Columbia are relevant to the Ontario emissions trading system since ERCs created in these states can be traded in Ontario.

[12] http://www.emissions.org/publications/emissions_trader/0103/

Emissions Limits and Allowances

NO_x

Beginning in 2002, the regulation applies to the coal and oil-fired electric generating stations owned by OPG: Lakeview, Nanticoke, Lambton, Atikokan, Thunder Bay and Lennox. In 2004 it will be expanded to cover other fossil-fuel electricity generators who:

- Have more than 25 MW capacity;
- Annually provide more than 20,000 MWh of electricity to the IMO-controlled grid or sell it directly to a user;
- Emit more than trace amounts of NO and SO_2

For the years 2002, 2003 the OPG facilities covered by this regulation are limited to a total of 35 kt/yr (thousand tons/yr). This initial limit is a reduction from the 50 kt of NO they emitted in 2000. This limit decreases as follows: 25 kt in 2004, 22.4 kt in 2005; 21.1 kt in 2006; 17 kt in 2007.

For Non-Utility Generators (NUGs) who are covered by the regulation beginning in 2004, the limit starts at 10 kt for 2004, increasing to 12.6 kt in 2005 and 13.9 kt in 2006. This is to allow for new generation facilities and the fact that Lakeview, if it continues as a generating station after 2005, must get its allowances from the overall NUG emissions limit.

Commencing in 2007, NO emissions limits are set to meet obligations in Annex 3 of the Agreement between Canada and the United States on air quality. Generators in southern Ontario who are south of the 48th parallel are part of the Pollution Emission Management Area (PEMA). Allowances allocated by MOE in this area will be 24.6 kt/yr from 2007-2010, and for generators north of this area, the allocation is 2.4 kt/yr. Limits in the Canada-U.S. Agreement are higher than these amounts.

All generators covered by the regulation must install Continuous Emission Monitors (CEMs) or similar systems approved by MOE to measure actual emissions.

SO_2

In 2002, 2003, the regulated OPG facilities have a total limit of 153.5 kt/yr. From 2004-2006 this same limit is shared among OPG and other regulated fossil fuel fired generators. From 2007-2010 this limit is decreased to 127 kt/yr for all regulated generators.

Set-asides

There is a set-aside of 1 kt/yr of NO allowances and 4 kt/yr of SO_2 allowances from 2002-2010 inclusive. These “set-aside” reductions (SRs) are intended to encourage approved new conservation and renewable energy projects each year which displace electricity from coal or oil-fired plants. SRs are awarded allowances for 7 years based on 12 month accumulation periods beginning on the in-service date of the project, and its anniversaries. Any unused “set-aside” allowances will be returned to OPG until the end of 2007, after that they will be returned to the common allowance pool.

To be eligible for set-aside reductions (SRs) an energy conservation or renewable energy project must: begin after Jan 24, 2000; be located in Ontario; reduce the use of electricity purchased or received from the IMO-controlled grid (conservation) or deliver electricity to the IMO grid (renewable energy) and; conform to one of the MOE approved "standard methods" to measure emissions reductions[13]. Electricity savings for conservation projects are measured in accordance with the "International Performance Measurement and Verification Protocol"[14]. Note that renewable energy projects not connected to the IMO-controlled grid are not eligible for set-aside reductions but may be eligible for ERCs if the project is reduces NO emissions from an existing NO source.

Emissions Reduction Credits (ERCs)

The Ontario Emissions Trading Code defines the process to apply for Emissions Reductions Credits (ERCs), including the process to have new technologies for emissions reductions added to the list of acceptable activities defined as "standard methods". ERCs may be approved for non-regulated emitters who reduce their emissions, provided they conform to one of the "standard methods" to measure their emissions reductions[2]. Emitters capped and regulated under O.Reg. 397 cannot apply for ERCs. If they reduce their emissions they may end up with surplus allowances instead. Three types of ERCs are recognized within the Ontario trading system:

- Early Action for actions taken under the Pilot Emissions Reduction Trading (PERT) program
- Foreign Allowance for emissions permits and allowances from U.S. jurisdictions
- Project Credits for projects which reduce emissions by non-regulated emitters

Credits can be claimed for a 12 month accumulation period beginning on the operational (in-service) date of the project. ERCs will be created annually on the anniversary date for 7 years from the date the project starts operating. This period may be cut short or ERCs may be reduced or eliminated if: emissions from the facility or sector operating the project come under emissions trading regulation or if other emissions regulations reduce allowed emissions.

Early Action

Credits can be claimed for actions: taken since Jan 1, 2000 or; actions submitted to the Pilot Emissions Reduction Trading (PERT) program for reductions created since July 1, 1998.

Foreign Allowance

Allowances issued in U.S. may be treated as a credit in the Ontario trading system. They must be approved like any other ERC and are subject to the same limitations on use and discounts as other ERCs.

[13] http://www.ene.gov.on.ca/envision/air/etr/credits/smethods.htm
[14] http://www.ipmvp.org/info/ipmvp.pdf

Foreign Credit

ERCs can be created by emitters in New York, New Jersey, Pennsylvania, Delaware, Maryland, West Virginia, Kentucky, Ohio, Michigan, Indiana, Illinois, Wisconsin, District of Columbia or Ontario who are not covered by O.Reg. 397 and who undertake projects to reduce their emissions. A "scientific over-ride" allows for ERCs created outside this area to be accepted if sufficient scientific evidence demonstrates Ontario air quality will be improved by the activity.

Project Credits

Non-regulated emitters who have projects in operation after Jan 1 2002 which reduce their emissions of NO and/or SO_2 can apply for ERCs. These projects must directly reduce emissions. ERCs are not awarded for projects such as conservation or renewable energy which indirectly reduce emissions by displacing conventional power on the IMO-controlled grid. These types of projects would apply for "set-aside" allowances instead.

New NO or SO_2 sources not subject to the regulation such as alternative power plants or co-gen power plants cannot create ERCs by displacing electricity production from traditional generators covered by the regulation. However, this new NO source can create ERCs by lowering emissions from other "on-site" emissions sources. For ex. a new NO source like wind turbines with diesel-backup in a remote location can get ERCs by displacing emissions from the 100% diesel-fired generation plant that served the electrical load before introduction of the turbines. "On-site" is defined loosely enough to take into account the fact that the wind/diesel generation may be in a different geographic location than the original diesel plant for maximum wind speed. As long as the wind/diesel power is displacing a source of power which had more NO or SO_2 emissions it can apply for ERCs.

Nuclear plants and high-impact hydro cannot apply for ERCs under this regulation since they are not sources of NO or SO_2, and therefore cannot acquire ERCs by reducing these emissions.Offsets

In Ontario there are "allowances" allocated to emitters as a "right to pollute" and "credits" approved for some projects which reduce emissions. These credits can be considered to "offset" emissions within the system. In the Ontario trading system there is no separate term "offset" defined as a separate source of tradeable credits as there is in some other trading systems.

Trading of allowances and ERCs

Trading rules are outlined in the Ontario Emissions Trading Code. The MOE administers allocation of credits and set-aside allowances through the Ontario Emissions Trading Registry http://www.ene.gov.on.ca/envision/air/etr/, it also administers the retiring of

these allowances and credits. Banking of allowances and credits for use in following years is allowed.

The first 3 months of the year are the "true-up" period where capped entities determine their actual emissions for the previous year. Those whose emissions are less than their allocated allowances may sell their excess allowances or bank them for the next year. Those whose emissions exceed their allowances buy allowances and/or credits to match actual emissions. Emitters who exceed their allowance are limited in terms of the % of ERCs they can use to make up the difference between actual emissions and their allowances. For NO, 33% of the allowances can be from ERCs, for SO_2 it is 10%. In addition, only 90% of an ERC can be used, the other 10% is "retired" - when the ERC is used - for environmental benefit.

Currently since the market is so small, buying and selling of allowances and credits is done privately based on negotiated agreements between the buyer and seller, they are under no obligation to divulge price information. MOE verifies that capped entities can balance their actual reported emissions with an approved combination of allowances and credits. MOE is not involved in the actual buying and selling of allowances and credits.

By March 31, emitters submit to MOE a record of their actual emissions, and apply to retire allowances (and credits where necessary) to balance these emissions. MOE then has until April 30 to approve these applications. This is followed by an appeal period until May 31 where entities with credits which were not approved can appeal that decision, or buy other credits to meet their actual emissions.

Cross-border Trading

ERCs used to meet caps in Ontario must be created in Ontario or the same 13 states listed above, unless "scientific over-ride" shows Ontario air quality improvement as a result of ERCs originating elsewhere. Because Ontario's trading system allows trading between capped and non-capped sectors, the U.S. regulations currently prohibit credits created in Canada from being used to meet emissions targets in the U.S.

Prices

There are no prices set for NO and SO_2 in Ontario yet since the first yearly cycle of this trading system is not complete as of the date of this Guide. There are prices for these substances in U.S. emissions trading systems which are documented in publications like "Air Daily" and Natsource's monthly publication "Airtrends". In the U.S. there is an inter-state allowance trading market. Allowance prices in the U.S. have been as high as $1,700 U.S. for a U.S. ton of NOx, < $200 U.S. for a U.S. ton of SO_2[15]. However, it is very problematic to apply these numbers to the Ontario context because:

- Allowance prices in Ontario are unknown since the system is new and currently OPG owns all capped sites.

[15] MOE – seen in price publications as of March 4, 2003

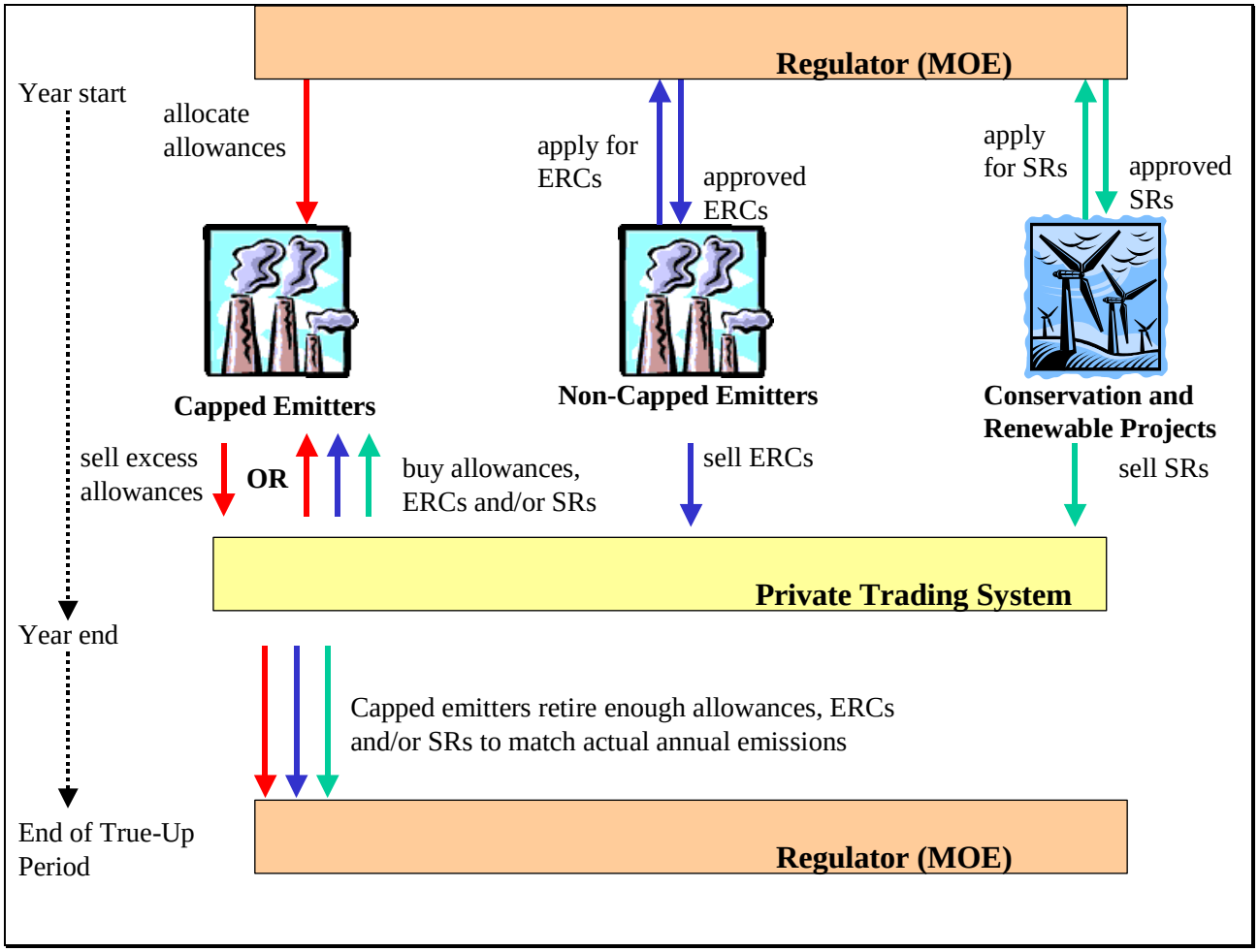
- Credit prices are very specific to each state and vary widely from one to another. This is due to different systems for defining credits, and different supply/demand dynamics for these substances with regional environmental and health impact. Also, it takes time for Ontario companies interested in projects which could result in ERCs to plan the capital and get the project deployed, enabling credit creation.
- Capped emitters in Ontario are likely to purchase credits from Ontario as their first choice if they are available. Extra approval time by MOE would be necessary to decide how credits from a particular state equate to Ontario credits.

Even if capped entities in Ontario can't find enough Ontario credits and must buy them from the U.S., making values of U.S. credits relevant in Ontario - there are additional conversions to do in addition to currency conversions:

U.S. trading systems operate in "short tons" which is 2000 lb. Canada uses "long tons" which is 1000 kg = 2200 lb. U.S. systems trade NO_2 while Canadian ones trade NO. 1 kg of NO = 1.533 kg of NO_2.

It is expected that allowances will be more valuable in this system than credits. Credits are subject to MOE approval and to limits on use and to discounting when they are retired while allowances are not.

Simplified View of Ontario Emissions Trading



Practical Experience

According to the Ontario Emissions Trading Registry, as of Jan 2003 there has been very minimal activity in applying for set-aside allowances and credits. OPG has been awarded a number of ERCs based on early action under PERT[16] and there are some other early action applications pending, there are no Foreign Allowance or Project Credit ERCs. Only 0.1% of the total NO set-aside allowance, and 0.08% of the SO_2 set-aside allowance had been applied for and approved for a renewable energy project for 2002. These numbers show that the trading system for NO and SO_2 is not yet an effective mechanism to encourage renewable energy development.

The system has been criticized by some for setting the caps too high. Other reasons for the lack of trading activity are that: the trading system is quite new, emissions caps for NO and SO_2 have been in effect since Jan 2002 and the true-up period for this first year doesn't end until March 31, 2003; currently only OPG facilities are capped, limiting demand for allowances and credits (although OPG may need to buy credits if their nuclear capacity stays down due to outages).

[16] http://www.ene.gov.on.ca/envision/air/etr/credits/index.htm

Other Initiatives

Canada's Climate Change Voluntary Challenge and Registry Program (VCR Inc.) encourages large companies to reduce their GHG emissions through voluntary action by creating Action Plans, and exchanging information about best practices and achievements.

Green House Gas (GHG) Trading

A GHG reduction target for all industrialized countries has been agreed to under the United Nations- sponsored accord, the Kyoto Protocol[17]. Once ratified by 55 nations emitting 55 percent of the industrialized world's total GHG emissions, the Protocol will become international law. Although the U.S. has not ratified the Kyoto Protocol, some individual states have limits on CO2 emissions. Many European countries also have CO2 limits. The Kyoto Protocol permits these countries and their individual GHG emitters to trade GHG credits internationally.

The Protocol provides for three market-based emissions trading mechanisms:

- international emissions trading (IET) - allows industrialized countries to trade emissions permits among themselves
- joint implementation (JI) - allows the transfer of project-based emissions reduction credits between industrialized countries
- the clean development mechanism (CDM) – allows for developers in industrialized countries to gain certified emissions reduction credits from projects in developing countries, these can then be used by industrialized countries to meet their reduction targets.

The United States, the United Kingdom, and Denmark already have some trading systems in place. The European Union is planning a GHG trading system for its members by 2005.

Canada's Current GHG Trading Initiatives

Under the Kyoto Protocol, Canada committed to reduce its GHG emissions by 6% below 1990 levels on average throughout the first commitment period (2008 – 2012). This translates to an annual reduction of 240 Megatonnes (MT) of CO2 from the projected "business-as-usual" emissions level in 2010. To put this in perspective, one MT is one million (metric) tonnes, a tonne is 1000 kg. The average person Canadian is responsible for about 5.4 tonnes of GHG per year.

The Climate Change Plan for Canada[18] lays out a 3 step approach for meeting the above goal:

I. actions underway - investments to date are expected to account for 80 MT;
II. new actions - strategy for 100 MT reduction;

[17] Kyoto Protocol to the United Nations Framework Convention on Climate Change, 1997 http://unfccc.int/resource/docs/convkp/kpeng.pdf - see Annex B for targets.
[18] http://www.climatechange.gc.ca/plan_for_canada/plan/index.html

III. current and potential actions for the last 60 MT reduction.

Actions Underway

While there is currently no domestic GHG trading program in Canada, there are some voluntary initiatives to encourage large companies to reduce their emissions. The Canadian Industry Program for Energy Conservation (CIPEC) is a federal-industry partnership which encourages industry to set reduction targets, exchange information and develop tools and services to improve energy efficiency. Canada's Climate Change Voluntary Challenge and Registry, Inc. and le Bureau d'enregistrement des mesures volontaires sur les changements climatiques (ÉcoGESte) in Quebec are programs which encourage emissions reductions by implementing action plans, documenting best practices and achievements.

Reduction targets from actions underway are:

- large industrial emitters – 25 MT
- Buy credits from the international market- 2 MT

As GHG emissions trading systems are designed, government has committed to work with industry to ensure any early GHG reduction actions are taken into account. The goal is to develop a general approach to industrial emissions reductions in early 2003, design an emissions trading system in 2003-4 and implement it as soon as it is ready.

Next Steps

The Plan proposes a Domestic Emissions Trading (DET) system where GHG emissions limits of large industrial emitters would be set by covenants negotiated between the federal government and the emitter. This DET system would include emitters in the upstream (producers) and downstream (end users) of the oil and gas sectors, electricity generation, mining and manufacturing. The total emissions from this group are estimated to be half Canada's total emissions by 2010. The negotiated emissions limits for this group represent a 55 MT reduction from "Business As Usual" (BAU).

A large proportion (maybe 85%) of emissions permits would be provided to companies based on their "emissions intensity factor". To cover the rest of their actual projected emissions, companies could combine: reducing emissions; purchasing permits and/or offsets. The "emissions intensity factor" for a sector represents the quantity of emissions per unit of production. This can be calculated by actual performance, or by technical and economic assessment of emissions reduction options for the sector.

A "carbon sink" is any process which removes CO_2 from the atmosphere and stores it, such as photosynthesis by trees and plants. This type of storage is temporary in that the CO_2 will be released when the plant or tree dies and decomposes. CO_2 can also be permanently removed by processes such as carbon sequestration which pumps CO_2 into the ground to extract oil. These kinds of emission reductions in sectors not covered by the DET are referred to as "offsets" since the CO_2 they remove offsets (or cancels out) emissions from the capped sectors in the trading system.

"Sinks" that are created by Business As Usual (BAU) activities in agriculture and forestry will go towards Canada's overall emissions reduction target. This is estimated in the Climate Change Plan for Canada to be about 30 MT. Investments in "sinks" beyond this 30 MT will create "offsets" for the owners to sell in the DET.

Creation of "offsets", especially for the forestry industry needs to be scrutinized from an environmental point of view. ENGOs like the Sierra Legal Defense Fund[19] have criticized many forestry practices in B.C., Ontario and elsewhere. These groups should be involved in deciding which forestry practices are "green enough" that they should be awarded offsets. Similarly, ENGOs should be involved in the Action Plan 2000 "Feasibility Assessment of Afforestation for Carbon Sequestration (FAACS)" which will look at the potential for creating large new forests. Especially where forest habitat has been destroyed, mixed natural forests with species native to the particular area may be preferable to the "fast growing, high yield forest plantations" mentioned in the Plan. Another key issue is how the temporary nature of these "offsets" is taken into account in the trading system. Once the tree or plant dies, the CO_2 it was storing is released again – how is this accounted for in the trading system?

Capped emitters of GHG would meet their commitments by directly reducing their emissions or by purchasing domestic "offsets" or international permits. The intent is to provide alternatives for large industrial emitters to reduce their emissions, and stimulate emissions reductions in other sectors. ENGOs have criticized this type of "offset" because it allows industries in the capped sectors to increase their emissions.

Reduction targets from these next steps are:

- Domestic Emissions Trading (DET) system
    - Reductions through negotiated covenants with regulatory or financial backstop for large industrial emitters – 55 MT
    - Sinks and Offsets from Agriculture, Forestry, Landfills – 20-28 MT (may be sold to industry through Domestic Emissions Trading, so won't contribute to overall reduction) – how about removal like sequestration?
- Other Industrial Emissions - 16 MT
- Canada to buy credits from the international market- 10 MT

From an environmental standpoint, these trading systems could produce the desired benefits if:

- the financial and/or regulatory backstops for non-compliance have real teeth,
- the negotiated emissions limits are set low enough to assume best practices, and continued improvement
- emissions limits in the DET and international trading systems are set low enough that offsets and international permits prices are high and create a real economic incentive to reduce emissions
- offsets from sources such as planting trees recognize the temporary nature of this type of CO2 storage (CO2 is released when the tree dies and is burned or decomposes)

[19] http://www.sierralegal.org/

- "offsets" should be created for new sources of low environmental impact renewable energy which "displace" fossil-fuel fired electrical generation
- "offsets" should be created for energy efficiency and conservation projects which "displace" fossil-fuel fired electrical generation
- emissions credits are not given to non-capped entities outside the system such as nuclear or high-impact hydro which they can sell within the system. This type of provision can have the effect of allowing overall emissions within the capped sectors of a trading system to increase.

Current and potential actions

The federal government doesn't intend to increase reductions from emissions trading in industry beyond the 55 MT. Incentives will be used to contribute to the additional 60 MT reduction.

Where companies can show that a longer term technology change can produce greater emission reductions over the long term, the government may accept this in lieu of lesser emissions reductions in the shorter term – i.e. up to 2012, the end of the first commitment period under the Kyoto Protocol. This flexibility may be defensible as long as companies can justify how the longer-term improvement provides more overall reductions. It allows companies to avoid being locked into minor improvements in "obsolete" technology if they know technology is developing which will reduce emissions even further over the longer term.

Credit for cleaner energy exports – up to 70 MT. This is an area of concern in that Environmental Non-Governmental Organizations (ENGOs) do not want large, high-impact hydro and nuclear to be eligible for such credits.

Appendix C - Environmental Assessments for Wind Power Projects

Environmental Assessment Considerations

Environmental Assessments (EA) has consistently been an invaluable tool for developers to conduct public consultations on proposed wind turbine projects.

That being said, the novelty of wind turbines in Ontario has proven to be a major stumbling block. The environmental and socio-economic issues and impacts surrounding a proposed site from the design, construction and operation of a turbine are new to government regulators and citizen groups. This has led to lengthy and costly EA's due mainly to the uncertainty about the process and framework that a developer must meet in order to be issued an approval.

Common issues surrounding turbines have been:

- Potential impacts on both local and migratory bird populations
- Noise and visual impacts that could affect local residents
- Blade icing, a winter phenomenon whereby ice could form on the blade and become a possible projectile when the blades spin

These issues are certainly relevant ones that the local community may wish to raise. The process is outlined in the March 2001, Ontario Guidelines on Environmental Assessment and Screening for New Electricity Projects and where federal funding is sought, as outlined in the Canadian Environmental Assessment Act. More details about the process can be found in the Guide Reference Book. Under the provincial scheme, the public has at least two opportunities to be consulted about wind projects over 2 MW. The first step involves the proponent assessing the project against a set of screening criteria and requiring it to provide the public with "notice of commencement". At this point the public can raise issues that if not addressed can trigger an "Environmental Review" by the MOE. The second opportunity for public consultations is provided when the proponent files a "Notice of Completion" at which point the public can request that the project be elevated to an individual EA during the notice period if the issues raised have not been adequately addressed. For further information on the province's new electricity screening guidelines go to:
http://www.ene.gov.on.ca/envision/env_reg/er/documents/2000/electricity.htm - RA00E0005

Birds

There have been numerous studies of the impact of wind turbines on birds. Data consistently shows that birds face more hazardous threats from high-rise buildings, fossil fuel generators, automobiles and even pet cats! "Even in poor flying conditions there has never been a mass kill of nocturnal migrants such as are commonly associated with tall buildings or communications towers" (Gipe 1995, Winkelman 1992). Even in poor flying conditions, the vast majority of birds can fly unharmed through slowly rotating turbine

blades. Current wind turbine technology offers solid tubular towers to prevent birds from perching on them.

In general turbines should not be placed in the middle of areas of high concentrations, i.e. in the centers of valleys, ridges, swales, or other microhabitats where large numbers of birds are known to fly or concentrate. And more importantly, careful siting studies beforehand to elucidate any potential problems are necessary. Where more than one turbine is to be placed, it is preferable that they be located in groups, as groups are more visible than solitary ones (Winkelman 1992).

While the average turbine kills two birds per year, the environmental effects of continuing to derive our energy from fossil fuels and nuclear power plants have a far greater impact on protection measures than carefully sited wind turbines.

Noise

The current generation of turbines is quieter than in the past. The sound heard is the "swoosh, swoosh, swoosh" of the passing blades, similar to the waves on a beach, only more regular. There is virtually no mechanical sound from a modern wind turbine.

In the case of the WindShare turbine at the CNE in Toronto, the issue of noise pollution had to be placed into context. The fact is that it is located in a dense urban area situated right beside a major loud automobile artery that serves the downtown Toronto core. Nevertheless Toronto City Council adopted in 1999 the following turbine location standards concerning noise and potential impacts to City residents:

- A 200 metres separation between wind turbines and residential low-rise dwellings;
- A 300 metre separation between wind turbines and high-rise residential buildings; and
- A 50 metre separation between wind turbines and sensitive natural areas or sensitive park use areas

The standards were based upon noise levels associated with typically sized wind turbines (660kW), the use of commonly employed separation distances for wind turbines around the world, and the Province of Ontario's standards regarding noise in "Outdoor Living Areas" as provided in Ontario's Ministry of Environment 1997 "Noise Assessment and Land Use Planning: Requirements, Procedures, and Implementation"

Visuals

Near populated areas, wind projects may run into opposition from people who regard them as unsightly, or who fear their presence will reduce property values. Many

individuals consider wind turbines to be a symbol of sustainability. Recent studies of the first commercial wind developments in New England, as well as a number of studies in Europe, have shown greater public acceptance after construction than before.

The layout of towers should be in some type of geometrical design to flow with the landscape. Towers should not be scattered happenstance throughout the site.

Ice

Wind turbines are built to withstand strong winds and ice build up. A control within the turbine shuts it down when winds exceed 100km/hr and automatically shuts off when it senses a load imbalance on the blades. Ice shedding is therefore a minimal risk. However, to mitigate this risk, security checks and operational procedures are agreed upon to secure safely. The manual restart process is also linked to a flag placement and falling ice warning protocol as an operator responsibility

Recommendations

Recommendations to improve EAs from turbine proponents are almost unanimous:

- The burden of proof regarding potential environmental impacts of wind turbines may in many cases be put to rest with data from similarly situated facilities.

- Establish a class EA, as developed by the Ministry of Environment and Environment Canada with input by turbine developers and citizen groups. A class EA would put in place a predetermined set of criteria that developers could focus upon to best commit their resources in the development phase of a wind turbine project.

- A clear and well publicized joint federal-provincial Class EA, with MOE oversight and meaningful and early opportunities for citizen participation are key.

It is worth noting again that streamlined EA process should not hinder constructive community consultation in any way. It is always useful to include an examination of the public health and environmental impacts of electricity generation from conventional sources as a comparative.

Planning Issues

Planning Issues-Wind Development and Agriculture – A " Win Win"

At the municipal level, siting wind turbines can be either a rather straight forward process or more of a murky process. These discrepancies by and large seem to depend on what municipality and what type of location a developer has chosen to erect a turbine in.

Land Use and Farming

One of the most misunderstood aspects of wind power is its use of land. Wind turbines occupy only a small fraction of the land area across which they are sited. The rest can be used for other purposes or left in its natural state. For this reason, wind development is ideally suited to farming areas. Farmers can plant or allow grazing right to the base of turbine towers. In fact, landowners can derive substantial benefits in increased income and land value by leasing land for wind turbines, much like another crop. According to the Ministry of Municipal Affairs, wind energy can benefit landowners and farmers by as much as approximately $20,000 - $30,000 per 100 hectares.

Wind Turbines and Crown Land

In November 2002 The Minister of Energy announced further details of the government's action plan to promote conservation and encourage alternative fuels. In addition to a commitment to purchase 20 per cent of the provincial government's electricity usage from "green electricity", a policy framework dealing with the development of wind power sites on Crown land with royalties payable was also announced. The strategy brings together numerous government initiatives following the final report of the Legislature's Select Committee on Alternative Fuels, which was released in June 2002.

According to the Ontario Ministry of Municipal Affairs and Housing, wind energy can increase the municipal tax base by $3,000 - 5,000 per turbine, per year.

Municipalities, especially those who have signed on to the FCM's Partners in Climate Protection, would benefit from common guidelines and action plans that facilitate future wind power development. Consideration might be given to developing a model amendment to Official Plans or a clear guideline that planning departments have in order to manage the approval of appropriate wind development projects.
Early and full public consultations will stimulate interest in community energy management and sustainable energy development and consumption.

The Ferndale Wind Farm Development in Bruce County provides a workable model of environmental and municipal planning.

Appendix D – Electricity Restructuring

Electricity Restructuring

In May 2002, the Ontario government opened up the electricity generation sector to competition. The new market has created opportunities for the wind industry.

Restructuring: The global trend towards electrical restructuring is a process of replacing a monopoly system of central electric utilities with competing sellers, allowing individual retail customers to choose their electricity supplier but still receive delivery over the power lines of the local utility. Green power can be made available from both regulated electric utilities and from energy service providers in restructured electricity markets that are open to competition. With clear regulatory and market signals, wind energy can present an opportunity for economic, social and environmental benefits in many of Ontario's communities.

these are the same changes I made to the short document – I don't find it helpful to have these links to AWEA since the Canadian and esp Ontario situation is different from U.S. Currently there are three main ways for municipalities to access green power:

1. Invest in green power project (on-site to me implies at a municipal facility which is a subset of other projects munis can invest in)

2. Purchase green power (really PPAs with entities like a municipal government are signed with generators like WindShare, OPG; I think only LDCs buy from the grid)

3. Purchase Tradable renewable certificates such as Green Tags

The June 2002, all party legislative Select Committee on Alternative Fuels recognized the need for further measures to stimulate the green energy market, and containedd 141 recommendations, including many that would remove barriers to the development of the wind industry.

Recommendations include:

- Develop policy to allow wind development on Crown land (Crown land is 87% of the provincial land).
- Match the federal government's Wind Power Production Incentive.
- Review the Property Tax Assessment Act, and consider more favourable treatment for wind turbines, including a 10-year tax holiday.
- Amend the Planning Act to encourage the development of wind turbines.
- Net metering for turbines less than 60 KW.

A Renewable Portfolio Standard which would commit a percentage of electrical generation from renewable energy sources.
.)

Barriers

Barriers to the development of locally distributed green power systems include subsidies to traditional power generators, interconnection and net billing issues as well as other regulatory and market barriers to entry[20].

Distributed Generation (new H3 heading)

Distributed green power generation is any small- scale power generation technology that provides electric power at a site closer to customers, that can be connected directly to the consumer or to a utility's distribution system.

Local distributed generation helps solve problems such as overburdened electric distribution grids, air pollution and runaway peak electricity demand, while providing customers with lower costs, enhanced power reliability and quality, and the ability to meet their own energy needs.

Interconnection Issues (now H3)

Interconnecting locally distributed green power resources with the provincial grid can also be quite complex and costly. Local projects must meet many technical interconnection and liability requirements to ensure that the electricity distribution system operates safely and reliably. But like the environmental and municipal planning process, have become so complex and burdensome that they may hinder the deployment of distributed technologies such as wind power. Again common protocols and model agreement would facilitate the ramping up of green power options.

Supportive government policy is key. To allow for the development of a robust market for local green power resources, in the increasingly competitive electricity industry, there is a need for renewable portfolio standards, uniform consumer, technical interconnection and net billing standards as well as simplified contractual and other requirements at the provincial and local levels. With net billing, on-site generation can turn the electric meter backwards, giving the site owner credit for electricity generated, at least up to the level of on-site consumption. Over 43 jurisdictions in the United States provide for net-billing, which the Ontario Alternative Fuels committee did recommend.

Small wind turbines are ideal for remote locations not otherwise served by power lines**.**

[20] Christine Elwell and Tyson Dyck, Ensuring Green Power Supplies in Ontario: Responding to Perverse Subsidies and Other Market Barriers, Canadian Institute for Environmental Law and Policy, 2002, www.cielap.org, for strategies to address the main barriers to green power.

Appendix E - Initiatives Underway in Ontario

Sudbury – A Municipal Wind Project

"Earthcare Sudbury" is a Local Action Planning initiative under the FCM Partners for Climate Protection (PCP) program. Community partners include business and industrial sectors as well as municipal entities. Earthcare Sudbury includes a Community Energy Plan, Strategic Energy Planning and a Wind Farm among other initiatives. The focus is on energy to achieve:

- Reinvestment of traditional energy dollars in the community
- Reduced dependence on external energy supply
- Economic development and diversification
- Reduced GHG emissions – energy generation is a big contributor

The Community Energy Plan includes:

- Energy efficiency savings target of $5M/yr;
- Ways to reduce dependence on outside energy sources by 50% by local generation of green energy;
- Ways to capture intellectual property benefits of locally developed technology and expertise.

The initiative to generate 50% of energy needs locally with green energy includes: a wind farm, described in more detail in the following sections; a plant to manufacture bio-diesel fuel; small hydro projects to take advantage of the many local lakes and rivers; geothermal energy to take advantage of existing mine shafts.

The first phase of the plant to manufacture bio diesel fuel will have annual production capacity of 12,000 Litres (L)/yr, increasing to 300,000 L/yr in future stages. This fuel would be used for transportation vehicles as well as electric generators for remote locations or backup. One particular application is for INCO use underground where bio-diesel replaces diesel, vastly reducing INCO's ventilation costs. This project provides economic development for soybean and canola farmers in NE Ontario. It is estimated that the economic spin-off for the NE Ontario economy could be as high as $40-50M from manufacture and use of this bio diesel locally.

Of these projects, the wind project seems most replicable in the GTA given proximity to the Great Lakes wind regimes. It is described in more depth in the following sections.

Contractual Mechanism

The City of Sudbury has established a joint venture partnership with Northland Power Inc. for the development of renewable energy projects. The first of these projects is an initiative to develop approximately 50 megawatts of wind power inside and outside of Sudbury's geographical boundaries. Northland Power is the lead partner in the consortium, but Northland and the City of Sudbury expect to share the majority of financial commitments equally.

The project is currently at the feasibility stage. Some wind resource assessments have been completed. More wind resource assessments are currently being conducted with financing from Northland Power and a grant from the Federation of Canadian Municipalities (FCM) Green Municipal Enabling Funds (GMEF). The business case for the project is currently being developed with funding from GMEF.

Since the project is in the feasibility stage, the numbers here from early planning exercises are not firm, but are presented to give an idea of the anticipated scale of the project. As the business case unfolds, it will determine the best way to roll out the project, capacity of turbines to use etc. Work currently underway includes the study of interconnection issues, completing wind resource assessment, costing engineering estimates, timing and rollout for deployment. The project is considering constructing the project utilizing 66 wind turbines - each with a capacity of 750 kilowatts (kW) - by the end of 2004. There are other options available and the exact choice of turbines has not been finalized at this point in the feasibility study. Sites on Manitoulin Island, and near the City of Sudbury are under consideration.

The second component of the project involves German wind turbine manufacturer, REpower Systems AG. and the City of Sudbury. Both parties have entered into a partnership that has seen REpower Systems AG. incorporate a subsidiary firm, REpower Wind Corp., within Sudbury. REpower Wind Corp. is currently establishing assembly and marketing operations and will be using its proprietary technology in the development of the project. Depending on how the market for wind turbines develops in North America, and especially Canada, this could have a very significant economic development and diversification payoff.

The bulk of wind electricity produced was intended to be sold as "green power" to residential customers through energy retailers at a premium of about 7.5c/kWh. However, Ontario's restructuring of the electricity market is pushing Northland Power and the City of Sudbury to negotiate Power Purchase Agreements (PPAs) with the Industrial, Commercial and Institutional (ICI) sector. The ICI sector is not covered by the current 4.3c/kWh price cap and those whose previous PPAs are expiring have recently seen prices as high as 11.3c/kWh. Northland Power is currently discussing PPAs with a few potential buyers. They will likely be the prime negotiator for signing up buyers for the power and managing those contracts although the City of Sudbury will also be involved.

In addition to PPAs, other mechanisms for selling green power are under investigation. These include selling the “green attributes” of the power via a “Green Tags” business model to smaller buyers such as residential and small business.

Northland Power may consider selling Emissions Reductions Credits (ERCs) associated with any unsold “green power” from this project. There will be no “double counting” in that any “green power” sold via a PPA or other mechanism, and any power from the project whose “green attributes” are sold via a Green Tags mechanism will pass on any ERCs associated with the power to the buyer of the power or its green attributes. The

City of Sudbury has stated that it will not sell any ERCs associated with this project or its other environmental initiatives under "Earthcare Sudbury" since its objective is environmental improvement and selling ERCs to permit others to emit more is not consistent with that objective.

How does it work?

This Joint Venture has been working very well in terms of moving the wind project ahead. Some of the aspects, which have been key to its success to date, are:

- A champion for the project inside the city who has been instrumental in generating support for the project within council, outside partners and the community at large
- The City of Sudbury has done a very good job of managing the balance between the premium cost of green power, and economic development. For example, to keep the cost of green power down during the development phase of the project, it is necessary to hire 'experts' on wind power, who do not have to allocate resources to the learning curve, rather than train people locally to do it. It is very important to manage these kinds of economic development expectations to prevent a "backlash" from the public against the project later.
- The City of Sudbury has been willing to set a good example for Business, Residential and ICI consumers of power by showing its willingness up front to pay the premium price for green power.
- The City of Sudbury is planning to put up a large equity stake in the project once the construction phase begins, and thus will be accepting some of the risk associated with the project.
- The City of Sudbury has been an important partner in terms of attracting potential buyers (including ICI) of the power. The City has been an active supporter and promoter of the project.
- Given its municipal powers, and stakeholder position in the project, the City has enabled the project by activities like making land available for the project, speeding up processing of permits where possible.
- The Sudbury area is already an economy, which is predominantly heavy industry. It has the local expertise and infrastructure - like transportation of large products – in place to enable manufacture of large industrial components. This makes it a good candidate for some of the manufacturing associated with this project and others like it as the market for wind power continues to develop in Canada.

Benefits

The wind project is expected to supply up to 40 % of Sudbury's residential electrical needs, keeping these energy expenditure dollars in the local economy. According to a city representative, these dollars are expected to circulate about 7 times within the economy, creating a spin-off effect.

Economic development and diversification benefits are expected from REpower Wind Corp. local assembly and marketing. As the project and the market for wind power in Canada mature, the plans for how much of the turbine and which parts to manufacture and market locally will evolve. There is already some blade manufacturing in Ajax and tower manufacturing in Southern Ontario, providing expertise in these areas within the province.

In terms of this wind project, there will be some local jobs created during construction and ongoing operation of the project. Numbers from Superior Wind Energy Inc. estimate that the number of short term jobs created during construction is approximately 1 / MW, and the number of long term jobs created for ongoing operation of the wind farm are approximately 1 / 10MW of capacity. The construction phase usually lasts about 6 months and involves jobs such as road building, concrete work, crane work, engineering, environmental consulting, construction management. Local people could be trained to perform the operations and maintenance work associated with the ongoing operation of the wind farm.

For the part of the project that is local, security of electricity supply is an important benefit. This will help to prevent local users and industry against outages elsewhere in the IMO grid such as the widespread failures caused by the 1998 ice storm.

By promoting the project and agreeing to pay a premium for green power itself, the City of Sudbury is setting an excellent example for others, and building the market for green power locally.

Working with the City of Sudbury has been good for Northland, this experience and success to date of the project positions it well for working with other municipalities.

Potential CO_2 and GHG Reductions

As plans for the project - including timing and rollout of capacity - evolve, it will be possible to determine the reductions associated with coal-fired generation on the IMO grid displaced as a result of this project.

The City of Sudbury does not plan to sell any Emissions Reductions Credits (ERCs) it receives as a result of its “Earthcare Sudbury” initiatives. Its motivations for these projects are environmental improvement, including GHG reduction and economic development. Northland Power may consider selling ERCs from this project if there is power whose “greenness” has not already been sold by another means, as described above.

Barriers, opposition

There is a risk whether enough PPAs can be signed to sell all the wind power from this project. Although discussions are underway, no PPAs have been signed to date.

As part of public consultation the stakeholders held had a town hall meeting on Manitoulin Island and the feeling was that the attendees provided strong support. Further information sessions and project updates are planned. Sudbury council members gave unanimous support to this initiative.

It is hoped that the 4.3¢/kWh price cap will be removed before the scheduled 2006, raising conventional electricity prices to more realistic levels for all electricity consumers. This will create a much more level playing field for the sale of wind power.

Cost of Implementation

Based on early planning estimates, construction of the turbines is expected to cost $86 million.

Financing and incentives used

The City of Sudbury received $100,000 from the FCM GMEF to produce a business plan for their wind farm. They are planning to use the FCM GMIF to partly fund implementation of the project.

Northland Power is planning to use the Wind Power Production Incentive (WPPI) as well as the Class 43.1 Accelerated Capital Cost Allowance. The Canadian Renewable and Conservation Expenses (CRCE) have not been used yet for a couple of reasons. The first of these is that its requirement that there be a time lapse of 120 calendar days[21] between construction of "test turbines" and the rest of the turbines on the site creates practical problems in having to arrange to have the right people, material and equipment on site for 2 separate construction phases. The second reason is that Flow-Through Share (FTS) financing is not viewed by Northland Power as core financing option for this project.

Financing for the first phase of this project is internal to the Joint Venture between Northland Power and the City of Sudbury. The FTS financing enabled by CRCE may be considered for project at the appropriate time. It could be helpful in attracting strategic partners via tax write-offs. Since WPPI and CRCE can't be used on the same turbine, this would most likely involve using CRCE for the test turbines and WPPI for the rest if they decide to use CRCE.

[21] The intent behind this requirement is that "test turbines" should be just that – i.e. testing the viability of the rest of the project at the site, if more turbines go up at the same time, NRCAN views all of them as implementation turbines. See July press release at - these proposed changes still need to be enacted by parliament to come into effect - practically speaking some developers are going ahead with implementation assuming they will be enacted.

Toronto Renewable Energy Cooperative and WindShare - A Municipality and an Energy Co-op

WindShare features community owned power as well as a successful partnership between the public and private sectors, with financial support from government.

With seed money from the Toronto Atmospheric Fund (TAF), among others, the Toronto Renewable Energy Cooperative (TREC) developed a proposal to construct Canada's first urban wind turbine at the CNE fairgrounds in partnership with Toronto Hydro Energy Service Inc. (THESI), the retailing arm of Toronto Hydro. Key to this partnership was THESI's commitment to a 3-year Power Purchase Agreement to provide an initial stable revenue stream for the newly constructed turbine. WindShare was formed by TREC to be a co-operative with share capital that would be the ultimate owner, with THESI, of the assets, and the Co-op to which members would belong. . TREC is a founding member of the Ontario Sustainable Energy Association (OSEA).

The cost of the turbine was split 50/50 between THESI and WindShare. WindShare's capital was raised from offering share units to citizens and businesses in Toronto. These share units are similar to buying stock in private corporations where investors can earn dividends from the profits that WindShare will generate. To be eligible for membership in the co-operative one must purchase a Membership Share ($1.00) and a minimum of five (5) Preference Shares ($100.00 each) which makes the buyer a voting member of WindShare. Each member has one vote.

Each Preference Share entitles members to a share of the proceeds earned from selling electricity to THESI. TREC has spent a significant amount of time pressing the provincial government to allow members to participate in net billing which entitles the shareholder to have their share of the wind power delivered to them and deducted from their electrical bill in an arrangement called "net metering", but has not yet been successful in doing so.

Summary of TREC Approvals and Permits

The TREC project is unique in that the project involved siting wind turbines on City-owned land thereby increasing the significance of the City as a stakeholder in the overall approvals process, most notably the Environmental Assessment.

Municipal:

Type of Approval:
Project; siting; zoning; land lease; Building permit; Sign permit

Agencies Involved:
Toronto City Works Committee, Toronto City Council, Toronto Committee of Adjustment (CoA), Ontario Municipal Board (OMB), Exhibition Place Board Of Governors (ExBOG), Toronto Regional Conservation Association (TRCA), TPA?? (spell out), TEDCO?? (spell out), Toronto City EA Branch, Toronto Recreation and Parks

Provincial:

Types of Approvals:
Environmental Assessment
Net Billing
ESA (spell out)

Agencies Involved:
MOE Environmental Assessment Approvals Branch; Statutory Business Committee and Cabinet
Ontario Energy Board (OEB)

Federal:

Types of Approvals:
Environmental Assessment
Height and airport safety

Agencies Involved:
Navigation Canada, Transport Canada, Environment Canada, Canadian Wildlife Service, Health Canada

Dates and Order of Approvals Attained

Sept 99
Council Approves Project in Principle (to site turbines on City-owned land), and Council limits the project to 3 wind turbines

Dec 99
Council Approves 3 Preferred Sites
Feb 00
Works/TPA spell out? Approve Zoning Application ABTP? spell out

March 00
TRCA Endorses ABTP Site

May 00
Zoning Approval – CofA ABTP

July 00
Works Approves ABTP Site

Aug 00
Council Approves ABTP Site

Dec 00
Environment Canada Approves EA – 3 sites

Dec 00
MOE Grants Declaration Order- 2 sites

May 01
Ex BOG? spell out Approves project in principle

Aug 01
EA Amendment on ABTP site

Sep 01
Ex BOG Approves site

Oct 01
Policy and Finance Approve Ex site

Oct 01
City Council Approves Ex site

Nov 01
Federal EA Approval Ex site
Nov 01
Building Permit Approved for ExPlace (no Land Use permits or Site Plan approval required)

Federal EA Process

- Extensive community and stakeholder consultation
    - 11 public meetings: scoping, updating, feedback
    - Specific avian stakeholder meetings
    - Post-installation bird monitoring after one year
- Scope of EA: noise, birds, safety, aesthetics
    - 3 expert siting/meteorological studies
    - 2 expert ornithological studies
    - Extensive noise analysis
    - Post-installation noise monitoring after one year

- Env Can: ‘no significant environmental effects’

Noise

- Average sound output of utility scale wind turbines at hub height (where the blades connect with the turbine) is 98dBa
- Standard setback recommended in Planning documents ~250m from residences
- Average sound output of utility scale wind turbines at 200 m is 45 dBa (equivalent to whispering)

Birds - Avian Mortality

- Average Mortality < 1 bird/turbine/year
- According to European and North American studies:
    - in coastal environments
    - variable speed turbines
- Comparative mortality is far higher at other structures:
    - tall communications towers > 1000 birds/tower/year
    - single buildings > 1500 birds/building/year

Birds - Disturbance Effects

- No to little disturbance to nesting birds
    - disturbance due to people and traffic
- Minimal effects to staging or resting birds
    - disturbance effects measured within 250m - 500m of turbine
- Migrants
    - migrants often change course at > distances than locals
    - migrants fly higher than local populations

Birds: Other COMPARATIVE IMPACTS

- The effects of airborne pollutants are not as direct as picking up a dead bird below a tower, but they are far more insidious and far reaching
- Acid rain has already destroyed 31,000 lakes and threatens 10,000 more fish and wildlife habitats, and threatens 15 million hectares of forest

Visual Impact

- Studies show that while visual impact is a common concern before construction, once turbines are installed this concern is significantly reduced
- Most common comment “interesting”
- Increase of aesthetic appreciation:
    - personal contact
    - time
    - sense of ownership

Ferndale

Sky Generation's first wind turbine was installed south of Ferndale, on the Bruce Peninsula in the fall of 2002. The turbine is a Vestas 1.8 MW V80 manufactured and shipped from Denmark, and will generate enough power to supply 500 homes. The turbine tower is 78 m high and has 3 40 m blades. Two more turbines are scheduled to produce 15 GWh of electricity every year upon confirmation of an adequate wind resource and acceptable conditions in the wholesale electricity market.

The annual emissions prevented by this project are as follows:

1. Carbon Dioxide - 13,350,000 Kg
2. Nitric Oxide - 6,000 Kg
3. Sulfur Dioxide - 18,000 Kg.

The power will be sold into the Ontario power pool to Hydro One. In addition, the project will be supported through the sale of Green Tags. Selling tags to Green Tags Ontario was an important factor in making the economics of the wind farm viable.
While this project was funded principally from privately raised capital, incentive programs utilized by Sky Generation included the Canadian Renewable and Conservation Expense and the Wind Power Production Incentive (WPPI).

The project required an Environmental Assessment according to the guideline for Wind Farms under the Federal WPPI. This guideline is applicable to any wind farm that is applying to qualify for the Incentive. In addition, the project completed an Environmental Assessment Screening Process pursuant to the 2001 requirements for new electricity generation published by the Ontario Ministry of Environment for wind generated electricity projects over 2 MW. In order to simplify the process, the Federal guidelines were used as a template, and any additional information required by the Province was added, and so that one process and one report covered both requirements.

The project developer was also required to consult with the following agencies:

- Transportation Ontario – entrance expansion permit
- Ontario Ministry of Natural Resources – Areas of Natural and Scientific Interest (wetlands)
- Ministry of Environment – Environmental Screening Assessment
- Transport Canada - aeronautic obstruction clearance
- Navigation Canada – aeronautic obstruction clearance
- Municipality of Northern Bruce Peninsula – zoning and building permit
- Canadian Standards Association – equipment rating
- Electrical Safety Authority – interconnection
- Hydro One – connection agreement
- Ontario Energy Board – generators license

The Bruce County Planning and Economic Development department also engaged in agency consultations as part of the planning process, including the Ministry of Transportation of Ontario (MTO), and the Conservation Authority. MTO requested a

minimum setback from the highway of 120 m and so a zoning amendment required a setback of 120 m from the road, and 80 m from property lines.

The following are the first five pages of the Environmental Screening filed for the Ferndale windfarm.

Draft Screening Report

Ferndale Wind Park

1. Project Information
1.1 Proponent

Glen Estill, President
Sky Generation, Inc.
Rockwood, ON.
Web site: www.skygeneration.ca

1.2 Title of Project: Ferndale Wind Park

1.3 Location:
Lot 17, conc 3 EBR, Municipality of Northern Bruce Peninsula
West Pt Lot 18/19 conc 3 EBR, Municipality of Northern Bruce Peninsula
These two 100 acre farms are adjacent to Highway 6, 3.5 Km south of Ferndale, in the middle of the Bruce Peninsula.

1.4 Capacity of Wind Farm upon completion: 3 1.8 MW Vestas V80's, 5.4 MW in total.

1.5 Construction Schedule
Wind study during calendar 2001, completed.
Geotech study of soils on both farms done April/May 2002, completed.
First turbine built Sept/Oct 2002, on Lot 17.
Foundation engineering on two additional turbines, commence spring 2003.
Start of construction on 2 additional turbines on lot 18/19, summer, 2003.
Completion of Construction, turbine commissioning, summer, 2003. Completion of the additional 2 turbines is dependant on qualifying for Wind Power Production Incentive, and markets for renewable power.

1.6 Estimated Funding by NRCan
Production is estimated at 15,000 –18,000 MWh/year. At 1 cent/KWh, NRCan's contribution would be $1.0 – 1.2 million over 10 years. Only 2 of the three turbines are eligible for the Wind Power Production Incentive (WPPI), since the first one was built using the Canadian Renewable and Conservation Expense, and are ineligible.

1.7 NRCan's Involvement

Responsible Authority (RA) providing financial support. NRCan contact

Natural Resources Canada, Energy Sector

Energy Resources Branch, Director
580 Booth St., Ottawa, Ontario

1.8 Other Federal Departments involved in the Environmental Assessment (completed by NRCan)

1.9 Provincial Agency Involved in Provincial Environmental Screening:

Ministry of the Environment
London Regional Office
2nd Floor, 659, Exeter Rd.
London, ON N6E 1L3

Ontario Ministry of Natural Resources
1450 7th Ave. E.
Owen Sound, ON N4K 2Z1

2 Project Description

2.1 Background of Project

Sky Generation Inc. was formed in the fall of 2000, as a private company to undertake construction, development, and operation of wind turbines. The Ferndale project is the first development for the company. Glen Estill is the founder, and owns the largest number of shares. Mr. Estill has 2 years of university biology, years of experience as a leader of children's environmental and nature study, a BA Economics, MBA, and was the co-founder of a publicly traded computer distribution company, EMJ Data Systems (TSX:EMJ).

The turbines are built on land leased from Emerson and Isobel McLay.

2.2 Purpose of Project

The turbines will feed their electricity into the provincial grid on the main transmission lines on Highway 6. The power will be sold to Hydro One, at the prevailing spot market prices. The environmental attributes of the power will be sold to other entities, including GreenTagsOntario (www.greentagsontario.com). The project is done in two phases: phase one involved the construction of a single turbine. Phase 2 adds two more turbines, and will proceed based on confirmation of the wind resource (from the first turbine), and an acceptable electricity market, including WPPI and sale of green attributes.

2.3 Detailed Description of Project

The wind farm is located on the farms of Emerson and Isobel McLay, which are 3.5 Km south of Ferndale, in the Municipality of Northern Bruce Peninsula. One turbine is located in the north east corner of Lot 17, conc 3 EBR, 950 m east of Highway 6. Two additional turbines will be located on the east side of the west part of lot 18/19 EBR, in the middle, and on the north east corner of the lot, approx 400 m from Highway 6. The turbines will be at least 80 m from the property lines.

The turbines are Vestas V80's, on 78 m tubular towers, and have 3 40 m blades. The turbines will be connected via underground cabling to the substation located in the north west corner of lot 17, adjacent to Highway 6. The base of the tower is 4 m in diameter, and will sit on a reinforced concrete foundation that is approximately 15 m in diameter, and as much as 3 m deep. The foundation is an inverted T, with the majority of the foundation underground, and with topsoil backfill to allow ongoing agricultural use up to the base of the tower. There are no additional storage buildings required, other than some cabinets at the substation to host telecommunications and meters.

The capacity of each turbine is 1.8 MW. They are connected via 4 underground cables (3 phases and a ground) buried in a 4 foot trench, about 2 –3 feet wide) to the substation. The underground cables operate at a 13.8 KV. At the substation, the voltage is transformed into 44 KV, and attached to the transmission grid via an overhead wire.

Construction occurs over a relatively short time frame. First, the roads are installed and upgraded to handle the large bulky equipment. Roads must be 5 m wide, and be of sufficient carrying capacity to accommodate 15 tons/axle (the same as a gravel truck). The roads will be gravel. Bulldozers, and dump trucks will be required during this process. Any bends in the road must be very wide, to accommodate the turning radius of the long blades. For Lot 18/19, the existing road will be used, but it will be straightened, widened, and the entrance will be expanded. The north entrance to the circle road on this property will be the one used for access. Road and crane pad construction will take approximately 2 weeks. The foundations will be built and the cement poured in less than a week. This will require cement trucks. The foundation must cure for a month prior to erecting the turbine. The burying of the power cables will require a high hoe, and will take about 2 days. The construction of the tower requires two cranes, a large one and a small one. The large crane is assembled on site, and weighs 850,000 pounds. It is delivered to the site on 21 transport trucks. The turbine and tower arrives on a series of specialized trucks, which can accommodate large components. The actual assembly of the turbine and tower takes about 1 week. Commissioning of the turbine, including full safety inspections, will take about 2-4 weeks.

Expected Schedule

Road and crane pad construction, cable burying: June 15-+
Commissioning: Aug 20-Sept 10, 2003

The turbines will be under service contract with the manufacturer, Vestas. Vestas is hiring two technicians to service turbines in Ontario. The substation transformer will be under service contract to Tiltran Services. Service time on the turbine is expected to be minimal, amounting to 5 days per year, unless a major service incident occurs.

The turbines are designed to have a lifetime of 20 years. However, with proper maintenance, the lifetime may well be extended to 30 – 35 years. At the end of their lifetime, the turbines will be dismantled. The industry has found that the scrap value of

the steel and copper in the turbine generally covers the cost of dismantling. The foundation will be removed to a depth to allow farming to resume over the former foundation.

3 Scope of Environmental Assessment

3.1 Scope of the Project

The physical undertakings of the project include:
Roads. The roads will consist of .5-.6 m of coarse gravel, covered by 10-15 cm of crushed gravel. The topsoil is 15-20 cm deep, and will be removed from the site. The remainder of the fill removed will be relocated on the farm to a non agricultural hollow that was the location of a rehabilitated gravel pit, or removed from the site. For phase 2 of the project, the existing farm road will be utilized, but widened and straightened.

Foundation Construction
The foundation is an inverted T design, approximately 15 m in diameter, and made of reinforced concrete. The foundation is approximately 3 m deep, and the bottom of the T is buried under 1.5 m of fill, and then covered by topsoil.

Turbine and Tower Construction
The tower consists of 4 sections, bolted together, with a generator, gear box, and dry transformer located in the nacelle at the top of the tower. Attached to the front is the nose cone, which supports the 3 blades.

Cables and Substation
There are 4 insulated cables buried in a trench 4 feet deep. They run from the turbines to the substation. The northern turbine is daisy chained to the middle turbine, and the cables run to the substation. The trenches are refilled, and covered by topsoil, and replanted with hay or grass. The substation that was utilized for the first turbine will have some additional equipment installed in it to accommodate the new turbines. However, this equipment will be able to utilize the existing cabinets, and will be housed in the same fenced and graveled are, and utilize the same transformer.

3.2 Scope of the Environmental Assessment

3.2.1 Factors to be considered

The environmental effects of each of the following will be assessed: Roads, Foundation, Turbine construction, Cables and substation. The effects of any malfunctions or accidents that may occur, as well as the cumulative environmental effect of the project will be assessed. The assessment will review the impact of construction, operation, and decommissioning, as well as cumulative effects of each of these activities.

The effect on land, water, and air will be considered. The effect on living organisms, flora and fauna, and natural systems will be considered. The socio-economic impact will be assessed. The noise level, land uses, visual landscape, and safety issues will be assessed.

The project requires an Environmental Assessment under guidelines for Wind Farms proposed under the Federal Wind Power Production Incentive Program. This guideline is applicable to any wind farm that is applying to qualify for the Incentive. In addition, the project must have an Environmental Assessment Screening Process pursuant to the Requirements for Electricity Project, published by the Ministry of Environment (Ontario), Environmental Assessment and Approvals Branch. This Assessment is required for wind generated electricity projects over 2 MW. In order to simplify the process, the Federal Guidelines are used as a template, and any additional information required by the Province is added, and so this report covers both requirements.

3.2 Methodology of the Environmental Assessment

The assessment relies on information from a variety of sources. Each issue is assessed on its own, and outside information sources are used where appropriate. Much of the assessment is based on common sense, with a description of the existing local environment, and an assessment of the impact of the wind farm on that environment. For specific issues, publicly available studies have been referred to. Consultation with the public, combined with the facts about the project, and certain publicly available data, was used to assess the socio-economic impact.

References to the “existing turbine” apply to the turbine that is built, or expected to built in Oct/Nov 2002, depending on when this report is read.

Green Tags Ontario - A Community Based Wind Project

Green Tags Ontario Objectives

Green Tags Ontario's objective is to raise awareness and disseminate information to achieve individual acceptance of responsibility for climate change, and commitment for realistic, practical actions that individuals and businesses can take right now to counter climate change. Green Tags Ontario believes that "the solution to climate change is social change", and that the most effective way to achieve the necessary social change is through non-profit grass roots community groups. Green Tags Ontario encourages local community groups to become members of the "Green Tags Ontario" umbrella organization to advocate for individual action on climate change such as energy efficiency improvements and buying green power.

Green Tags Ontario sells the "green attributes" of wind energy from 2 wind turbines in Ontario via "Green Tags" which is described in detail below. It is important to note that Green Tags Ontario does not support just one generator, it is currently retailing the green attributes of power from 2 different generators – Port Albert Wind Farms Ltd. and Sky Generation, owner of the Ferndale site - and plans to add more as sales of Green Tags increase.

Encouraging people to support renewable energy by buying "Green Tags" is just one of the actions being promoted by Green Tags Ontario to counter climate change and air pollution. Other initiatives include bulk buying of energy efficient light bulbs to reduce their cost to community group members; also encouraging individuals and businesses to have an energy audit done, and providing contact information for local providers of that service.

Meeting Kyoto Targets with Green Tags

The Green Tags business model empowers individuals and businesses to meet their own personal Kyoto target, set by the Federal Government, of reducing their GHG emissions by at least 1 tonne. By purchasing 2 Green Tags, an individual can easily exceed this "1 tonne challenge" target since 2MWh of clean wind-generated electricity displacing 2MWh of coal-fired electricity results in approximately 1.7 tonnes less CO2 emissions.

Green Tags are a good complement to other means of promoting renewable energy such as a Renewable Portfolio Standard (RPS). Entities such as distributors who are subject to an RPS can "top up" their purchase of green power via Green Tags if actual production of green power from their other sources falls short of the required percentage. Individuals and enterprises that want to raise their support of green power above the minimum % specified by the RPS can easily do so. This will allow enterprises that want to differentiate themselves as environmental leaders to continue to do so if an RPS is introduced.

Green Tags Ontario Organizational Structure

"Green Tags Ontario" is a brand name of "Grey Bruce Renewable Energy Co-op (GBREC)" which was provincially incorporated as a not-for-profit co-op in early 1999. The leaders of GBREC recognized that while the critical efforts to counter climate change at the community level had to be grass roots, there was a need for an umbrella group and common brand. GBREC launched the province-wide "Green Tags Ontario" brand name and business concept in March 2002 and thus was the first member group. "Guelph Energy Alternatives (GEA)" has been a member of "Green Tags Ontario" since its launch. When a person buys a Green Tag, they automatically become a member of one of the Green Tags Ontario member groups. If there is no local group which is part of Green Tags Ontario, by default the individual becomes a member of GBREC, the first member group.

Green Tags Ontario views GBREC and GEA as "pilots" of this community based approach to achieving acceptance of individual responsibility and concrete, measurable action at the individual level to counter climate change. As of January 2003: almost 500 "Green Tags" have been sold, mostly due to the efforts of these 2 groups; in addition, Guelph Energy Alternatives has taken the equivalent of 1.5 houses off the grid by the sale of low cost energy efficient light bulbs. Based on the success to date of these groups, the goal of Green Tags Ontario is to roll out this model to other communities, and to develop public education and awareness materials to be used by all groups who become members of "Green Tags Ontario". For more information, please see www.greentagsontario.com and http://www.skygeneration.com/.

Green Tags in the Ontario Regulatory Context

Currently, Industry, Commercial and Industrial (ICI) entities in Ontario have the option of buying green power through a power purchase agreement (PPA) with a generator. ICI can also support green power via Green Tags; any entity can buy any number of Green Tags. However, Green Tags Ontario is the first, and still the only way for smaller electricity users like Residential and Small and Medium Enterprises (SME) to "consume" green power from new sources by buying its "green attributes".

In the Ontario context, the distinction between consuming "green power" directly vs. consuming the "green attributes" of green power is important. To directly sell "green power" in Ontario requires that an entity become a "retailer" which involves significant financial and practical barriers. Also, November 2002 changes to the electricity market in Bill 210 "The Electricity Pricing, Conservation and Supply Act, 2002" have effectively taken the retailers out of business by imposing a price cap of 4.3c/kWh for the majority of electricity consumers.

The current regulatory framework, especially lack of net billing, makes it very difficult for members of community groups to directly consume green power from a generating source such as a wind farm they collectively own. This is particularly true if the generation facility is outside the local electricity distribution network controlled by the Local Distribution Company (LDC). The Green Tags Ontario business model avoids these regulatory problems by providing a mechanism for environmentally conscious consumers to buy the "green attributes" of green power in Ontario, instead of buying "green power" directly. Currently Green Tags Ontario is the only mechanism by which the citizens of Ontario can support renewable energy from new sources.

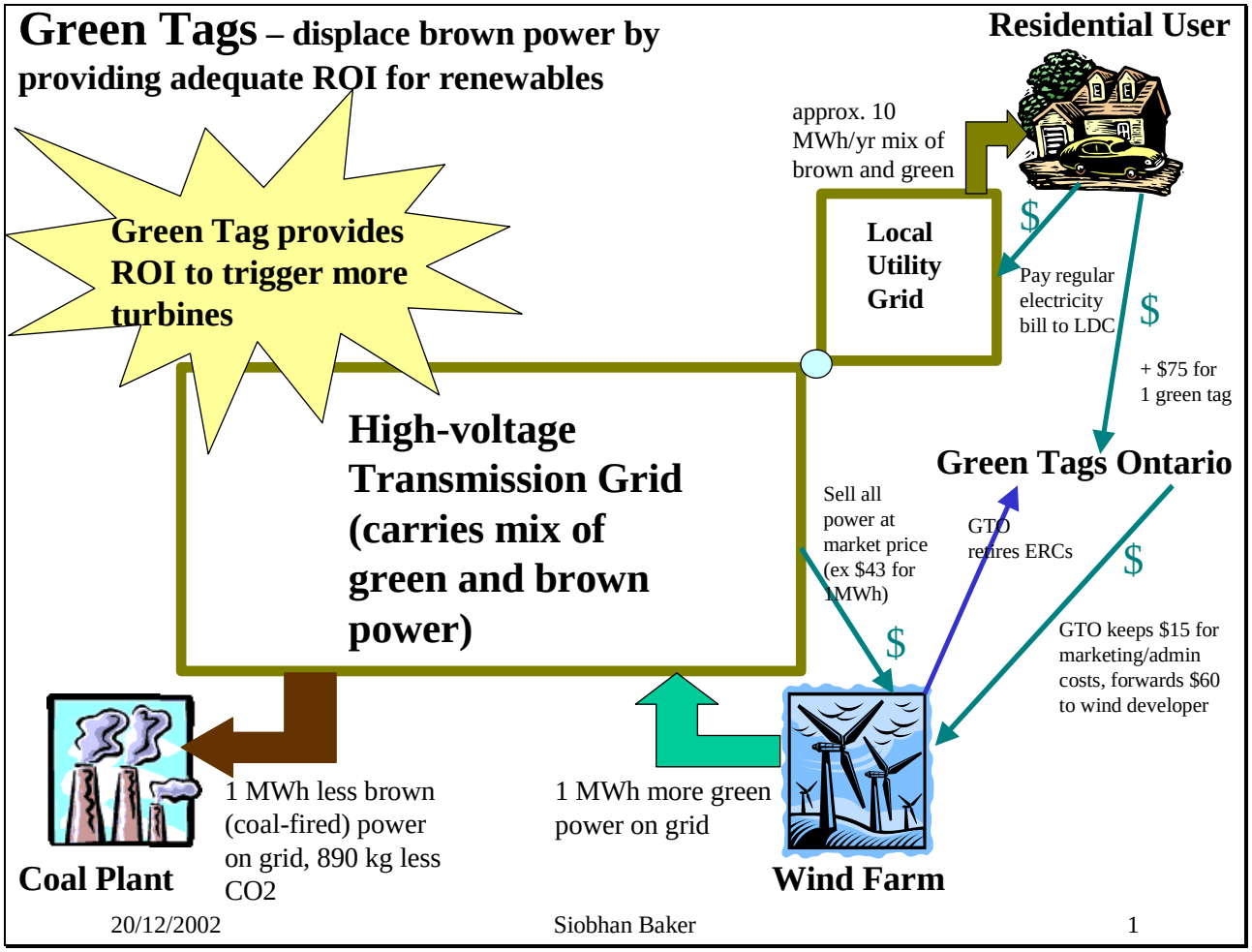
One "Green Tag" at $75 provides the price premium necessary to provide an adequate return on investment to the generator for 1MWh of electricity. Since coal is turned up to meet demand when supply from other sources is insufficient, buying one Green Tag effectively replaces 1 MWh of coal-fired electricity with 1 MWh of clean wind power. This results in a reduction of 890kg of CO2, a powerful greenhouse gas, as well as other emissions. The power whose "green attributes" are sold by Green Tags Ontario currently comes from 2 wind farms at Port Albert and Ferndale, both of which are EcoLogo certified.

Problems with becoming a "Retailer" in Ontario

For Residential and SME consumers to directly buy "green power" in Ontario requires that the seller become a "Retailer" which involves significant hurdles including:

- Bill 210 has taken away the market for retailers by imposing a 4.3c/kWh price cap for the majority of end-use electricity customers;
- A cost of$250,000 or more for a billing system;
- Signing up customers for 3-5 yr term contracts at greater than the expected spot price of power (to date the average spot price is > 5c/kWh) while they can pay the artificially low price of 4.3c/kWh from their current distributor;
- Cost and operational barriers of signing agreements and posting bonds with 90 LDCs for access to customers in their area;
- In Ontario wholesale customers for power such as large ICI may sign PPAs with a number of generators but retail customers of power must buy all their power from one provider - the Local Distribution Company (LDC) or a retailer. This means that any retailer wanting to sell a certain percentage of "green power" must also sign agreements with conventional generators for the "brown power" to mix with it. It is difficult for such retailers to sign PPAs with conventional generators for this "brown" power. Large generators like Ontario Power Generation (OPG) don't want to deal with small retailers and since generating capacity is limited, they have no problem selling their power to conventional distributors.

Selling the "green attributes" of wind power via Green Tags – how it works



The Green Tags Ontario business model provides a way for environmentally conscious consumers to provide an adequate Return On Investment (ROI) for green generators, thereby encouraging more green power generation on the grid. When an individual buys a Green Tag, they continue to buy their physical power from their Local Distribution Company (LDC) and pay that bill as usual. The $75 for one Green Tag represents the "green attributes" of 1MWh of green power, which effectively displaces 1MWh of coal-fired power from the system. Conceptually, the consumer is paying to remove 1MWh of coal-fired generation and its associated emissions by replacing it with clean wind-generated power. The $75 is sent to the non-profit "Green Tags Ontario" who keeps $15 for their marketing and administration costs and forwards $60 to the generator.

Given the average wind speeds along the shores of the Great Lakes in Ontario where the existing turbines are located, wind generators need to make about $0.11c/kWh to make a reasonable return on their investment. The generator receives the spot market price for

all the power they generate, this is controlled by the Independent Market Operator (IMO). As of January 2003 the average spot market price has ranged between $0.05/kWh and $0.06/kWh. The generator receives a "premium" of $0.06/kWh for the amount of power represented by sales of Green Tags, i.e. $60 for each Green Tag representing 1MWh. Generators who sell the "green attributes" of their power through Green Tags Ontario have taken the risk that enough Green Tags will be sold to provide a reasonable return on their investment, they have also agreed to a cap on their profits.

To ensure that any "windfall" as a result of high spot market prices accrues to members of Green Tags Ontario instead of the generator, Green Tags Ontario's contracts with its generators specify terms for a rebate. If the average price obtained by the generator from selling power into the grid is greater than $0.05/kWh for one year, the generator will reimburse Green Tags Ontario for the amount for that year.

Example:

Average annual spot market price of electricity per kWh:	$0.057
Minus maximum average price as per agreement with GTO	$0.050
Rebate amount per kWh	$0.007
x 1,000 = amount per Green Tag	$7.00
x Total # Green Tags sold/annum	1,000
Total Rebate to Green Tags Ontario	$7,000

In effect, the total revenue generators can get from the power whose "green attributes" are sold via "Green Tags" is capped at $0.11/kWh. This ensures that if the market price of power on the grid rises, the premium paid by Green Tags Ontario members to buy Green Tags is not paying the generators profits in excess of the minimum needed to attract investment in more turbines. Green Tags Ontario will keep this rebate in trust to develop more renewable energy generation, or provide a rebate (less cheque processing fee) to individual members of its member groups for their share of the rebate at the individual member's discretion.

Legitimacy

Green Tags Ontario has been in business since March 2002 and has developed its own stringent method of ensuring that there is no double counting of the "green attributes" associated with the 1MWh of wind power represented by 1 Green Tag. GBREC books are audited by an independent Chartered Accountant and it is a simple matter to compare the number of MWh whose green attributes have been sold via "Green Tags" to the number of MWh of power produced by the 2 wind farms according to records from the Independent Market Operator (IMO). In addition, the advantages, disadvantages and cost of obtaining "Green Leaf Tradeable Renewable Energy Certificate" designation from TerraChoice are currently under investigation. This certification program came into

effect in late 2002 after Green Tags Ontario had already been up and doing business for almost a year.

Any environmental benefits such as Emissions Reductions Credits (ERCs) associated with "Green Tags" sold are retired by Green Tags Ontario on behalf of the end user – the Green Tags purchaser - and may not be resold by Green Tags Ontario or its suppliers. Wind farms that supply power to Green Tags Ontario may sell environmental benefits of power whose green attributes have not been sold via Green Tags. In other words, they may sell the "greenness" of part of their power output via Green Tags, and sell the "greenness" of the rest of their power output via environmental credits such as ERCs. Independent auditing ensures that the "greenness" of each MWh of power produced is sold only once.

Advantages of the "Green Tags Ontario" business model

The Green Tags Ontario business model has a number of advantages compared to other ways of selling green power or its green attributes:

- Green Tags are a good complement to other means of promoting renewable energy such as a Renewable Portfolio Standard (RPS). Entities such as distributors who are subject to an RPS can "top up" their purchase of green power via Green Tags if actual production of green power from their other sources falls short of the required percentage.
- Low cost – Green Tags Ontario is a non-profit organization whose member community groups will do much of the education and selling on a volunteer basis; this keeps the cost of the green attributes of the power ("Green Tags") low.
- Green Tags Ontario's sales and administration costs are low compared to retailers who must buy very expensive billing systems, and pay sales people and other staff.
- No "windfall" profit for generators if spot market prices for power rise - Green Tags Ontario's contract with its generators specifies that any profit in excess of the minimum needed to attract investment in building wind turbines is returned to Green Tags Ontario in the form of a rebate. This rebate is held in trust to fund development of more wind turbines, or rebated to members at their discretion.
- Support for small generators of green power – the "Green Tags Ontario" way of retailing the "green attributes" of wind power is ideal for small generators. It is much more difficult for entrepreneurs with small wind farms to sign Power Purchase Agreements than for large corporations like OPG who can afford to erect huge wind farms and sign PPAs for much larger amounts of power.
- Individual empowerment – for as little as $75, everyone in Ontario and beyond may directly support green energy by buying the green attributes of 1MWh of clean wind power. Without Green Tags Ontario, individuals or businesses that want to buy green power would have to wait until their Local Distribution Company (LDC) or a retailer offers it. There is currently no such product available from the LDCs or retailers in Ontario, although ICI can buy green power directly from generators like Ontario Power Generation (OPG).

- Community involvement – selling green attributes of green power is just one of the initiatives advocated by community groups who are part of Green Tags Ontario.
- Modular growth – unlike a Power Purchase Agreement where a certain amount of green power is sold over a period of time, the Green Tags Ontario business model is ideal for accommodating growing demand for wind power. As more Green Tags are sold, more wind turbines will go up one by one.
- Low cost retailing of "green attributes" for multiple generators – Green Tags Ontario does not support just one generator, It already sells the green attributes of wind power from 2 different generators and can easily add more as demand for "Green Tags" grows.

Further Info

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Climate Change Plan for Canada, http://www.climatechange.gc.ca/plan_for_canada/plan/index.html

CCAF-TEAM, http://www.climatechange.gc.ca/english/actions/action_fund/techno.shtml

CRCE, http://www.fin.gc.ca/news02/02-063e.html

CCAF-PEO, http://www.climatechange.gc.ca/english/actions/action_fund/public.shtml

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Paul Gipe, *Wind Power in View: Energy Landscapes in a Crowded World* and *Wind Energy Comes of Age*. Paul Gipe is chair of the Kern-Kaweah Sierra Club chapter located in Bakersfield, California (http://kernkaweah.sierraclub.org/

Intergovernmental Panel on Climate Change (IPCC), http://www.ipcc.ch/

MIP http://www2.nrcan.gc.ca/es/erb/english/View.asp?x=457

The ABCs of Emissions Trading: An Overview, National Round Table on the Environment and the Economy (NRTEE)

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Toronto Atmospheric Fund, http://www.city.toronto.on.ca/taf/

Union of Concerned Scientists, http://www.ucsusa.org/CoalvsWind/c01.html

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Windshare, http://www.windshare.ca/

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