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# THE REGION'S ROLE IN WIND ENERGY

***(Regional Council at its meeting on January 26, 2006 requested the following Clause, be forwarded to the local municipalities for information)***

**The Finance and Administration Committee recommends the adoption of the recommendations contained in the following report, November 14, 2005, from the Commissioner of Corporate Services:**

## 1. RECOMMENDATIONS

It is recommended that:

1. The Region limit its role in the use of wind energy where it could generate power to offset the electrical demand at Regional facilities ("behind the meter") to demonstrate "green energy", subject to an individual business case assessment.

2. The Region decline the funding request received in respect of the Town of Richmond Hill's Wind Power Study.

3. The Region follow-up with the Ministry of Municipal Affairs and Housing (MMAH) on its January 2005 request that the MMAH amend the Oak Ridges Moraine Conservation Plan to include wind energy turbines as permitted uses.

## 2. PURPOSE

The purpose of this report is to:

1. Inform Committee and Council of the findings of the Wind Energy Pre-feasibility Study in the Towns of Georgina and Whitchurch-Stouffville and the wind map analysis for York Region.

2. Examine the Region's role in wind energy.

3. Address the funding request for the Town of Richmond Hill's Wind Power Study.

## 3. BACKGROUND

The Region has completed a Wind Energy Pre-feasibility Study ("Pre-feasibility Study") in the Towns of Georgina and Whitchurch-Stouffville, and wind map analysis for York

Region (collectively referred to herein as "Wind Energy Studies"). The Wind Energy Studies examined the wind resource quality, land use designations and constraints, as well as a host of other factors affecting the viability of a wind energy project.

The timing is now appropriate, following the completion of the Wind Energy Studies, to examine the Region's role in wind energy. The goal is to focus the Region's efforts in the field and align next steps accordingly.

### 3.1 Why Wind Energy?

Wind energy provides a wide range of economic, environmental and social benefits for municipalities in support of Regional strategies and goals including Vision 2026, Corporate Clean Air and Sustainable Development.

These benefits are:

- Improved air quality.
- Increased distributed power generation resulting in improved system reliability, stability, and reduced line losses (A 1 MW wind turbine with a capacity factor of 30%, to take account of the intermittency of wind, would produce enough energy to meet the consumption demand of 320 homes).
- Increased rural capacity to attract new manufacturing and skilled jobs.
- Greater public awareness and acceptance of renewable energy.
- Hedge against rising energy costs.

Municipalities are ideally positioned to show leadership in wind power due to their unique ability to attract both financial incentives (e.g. FCM Green Municipal Funds) and promote environmental initiatives. Wind energy projects, however, do not fit within core municipal businesses or operations and are non-conventional by nature. Some challenges include capital intensity, complexity and potential for high risk. Furthermore, wind projects are subject to the not in my backyard ("NIMBY") phenomenon.

### 3.2 Wind Energy Studies

Regional Council agreed to the Town of Whitchurch-Stouffville's request of January 27, 2004, to investigate implementing a pilot project on "Windmill Energy" within Whitchurch-Stouffville. Regional Council later agreed at its meeting on September 23, 2004, to expand the Wind Energy Pilot to include the Town of Georgina and carry out mesoscale wind mapping. Attachment 1 provides a detailed summary of the results from the Wind Energy Studies.

The scope of work included the following: a wind resource quality assessment, identification of potential site(s) for wind power development, environmental, land use and technical evaluation, and a wind resource quality assessment for all local area municipalities within York Region based on the results of the wind speed mapping.

Candidate sites were identified based on two project scenarios – “behind the meter” and “sell to the grid” – after considering various constraint factors.

The findings of the Pre-feasibility Studies characterize the wind speed in both Towns as “average” with respect to other sites in the Province currently under wind energy development. It was found that both Towns have a higher density of residential and recreational land use compared to areas typically considered for wind projects in Ontario. These constraints posed a significant restriction on site availability for a wind energy project.

Furthermore, the candidate sites for wind energy development in the Towns of Georgina and Whitchurch-Stouffville are located within the land use areas controlled by the Greenbelt Plan area and Oak Ridges Moraine Conservation Plan (ORMCP), respectively. While the ORMCP is silent on the issue of energy generation within designated land use areas, the Greenbelt Plan 2005 includes "electric power generation and transmission including renewable energy systems" as part of its definition of "Infrastructure".

The Wind Speed Maps (Attachments 2 and 3) confirm that the Towns of Georgina and Whitchurch-Stouffville have the best wind resource in York Region with a mean wind speed of 5.8 m/s and 6.0 m/s, respectively. Generally speaking, the wind speeds are greater in the northern part of York Region, particularly in the Towns of East Gwillimbury, Georgina, Whitchurch-Stouffville and the Town of Aurora.

Based on the findings of the wind map analysis, Site 12 (Sutton Water Pollution Control Plant) is the most promising “behind the meter” option, even if the site has wind speeds slightly lower than Sharon/Queensville Wells #1, 2, 3 and 4, given that is was screened in the Pre-feasibility Studies and found that nearby houses were likely far enough away to avoid a potential noise issue. Site 4 in Whitchurch-Stouffville is the most promising “sell to the grid” option with respect to wind speed and available surface area; however the land is privately owned and the land use area is controlled by the ORMCP.

The economic viability of a wind project is heavily dependent on the wind resource quality. The wind map analysis suggests that the identified sites would not be competitive with other prime wind sites in Ontario outside of any financial or market-based incentives (e.g. the proposed Standard Offer Contract Program described in Section 4.2.2). Given the “average” quality of the wind resource in York Region, the presence of land use constraints and the current market conditions, staff recommend that the Region proceed with a small-scale wind energy demonstration project (< 3MW).

## 4. ANALYSIS AND OPTIONS

In order to determine the Region’s role in wind energy, various wind power generation project types, Provincial initiatives that affect the marketplace for wind energy and the Region’s legal capacity to generate power must be reviewed.

## 4.1 Project Types

It was evident following the completion of the Wind Energy Studies that the selection of a site to develop wind power would hinge on the type of project under consideration. There are two main wind energy project types as described below:

A. **Behind the Meter**

A "behind the meter" project refers to a project tied directly to a load, such as the pumps at a water treatment plant. The objective is to reduce the consumption from the grid and therefore reduce electricity costs. This scenario provides a concrete application of wind energy technology. It also enables the project to occur on municipal-owned land. These sites however, are not typically located on prime wind areas. They are also limited to smaller-scale – typically a single small capacity turbine – where the capacity of the turbine is less than the on-site electrical demand. Finally, "behind the meter" projects benefit from the newly enacted Net Metering Regulation (see Section 4.2).

B. **Sell to the Grid**

Projects under the "sell to the grid" type require power purchase and grid connection agreements with the local utility to sell power to the grid. Grid-connected projects are typically larger projects, and therefore more capital intensive; however, they can take advantage of 'economies of scale' resulting in lower costs of generation on a per unit energy basis. They can be sited where there is the best wind resource, thereby decreasing costs further.

To facilitate a wind project the Region could enter into a public-private partnership. Potential benefits include a more favourable allocation of risk, a collaborative approach and a diversified resource base to bring the project on-line. For example, reportedly the Region of Niagara has entered into a partnership with a private company and is ready to capitalize on a Provincial RFP for renewable energy. Moreover, the Town of Richmond Hill is considering a "sell to the grid" project located on municipal land.

It is worthy to note that a local distribution company ("utility") does not have the legal authority to generate power. Therefore, to enter into a partnership with a utility under Option B, the utility would need to have an affiliate company similar to Toronto Hydro Energy Services Inc. (THESI). THESI partnered with Toronto Renewable Energy Cooperative's (TREC) WindShare to develop the wind turbine on the CNE grounds in the City of Toronto.

The following table summarizes the advantages and disadvantages of the project options.

**Table 1**
Project Type Comparison

| Project Type | Advantages | Disadvantages |
|---|---|---|
| A. Behind the Meter | • Municipal land ownership<br>• Savings on development and capital costs (no power purchase and interconnection agreements are required with the utility, and electrical infrastructure requirements are less)<br>• Possible option of selling unused power to the utility through Net Metering for projects less than 500 kW<br>• Reduced potential of public resistance to project | • Higher equipment costs per MW of capacity<br>• Location of Regional facilities may not be aligned with highest wind resource<br>• Challenge of matching load and generation<br>• Electrical control systems are necessary to integrate the variable generation with the load |
| B. Sell to Grid | • Larger projects can take advantage of economies of scale<br>• Greater potential for revenue generation | • Difficult to recover capital costs for small-scale “sell to the grid” projects.<br>• Private land ownership<br>• Less sites available due to large surface area required for larger projects<br>• Larger projects (>2MW) could trigger costly Environmental Assessment process (i.e. minimum estimate $100,000)<br>• Greater potential for public resistance |

## 4.2 Provincial Developments

There have been a number of important developments at the Provincial level affecting the marketplace for wind energy. The developments stem from the Province's commitment to phase out coal-fired power with cleaner sources of energy (e.g., wind power) and achieve its renewable targets as follows: 5% (1,350 megawatts) of all generating capacity to come from renewable sources by 2007, and 10% (2,700 megawatts) by 2010.

In 2004, the government passed Bill 100, entitled the *Electricity Restructuring Act, 2004*, which created the Ontario Power Authority (the "OPA"). The OPA's mandate includes the following:

- Ensuring long-term supply adequacy in Ontario.
- Developing and maintaining an integrated system plan for the operation of generation and transmission.
- Calling on all sectors when needed to build new generation capacity through a competitive and transparent procurement process.
- Achieving the targets set by the government for conservation, renewable energy, and the overall supply mix of electricity in Ontario, as part of a broader system planning role.

As the third bullet point states, the Province has turned the page on self-financing power generation and is now contracting for clean power supply with various entities to locate power close to the communities that it serves. This has transcended into the Province paying the true cost of electricity generation (whether it be natural gas or renewable power) and a shift to more local, or "distributed" power generation.

### 4.2.1 Request for Proposals (RFP)

On June 24, 2004, the Ontario Ministry of Energy (MOE) issued a RFP for 300 megawatts (MW) of renewable power. Ninety percent of the ten winning projects totalling 395 MW of new renewable supply comprised wind power. In 2005, the MOE launched two RFPs for Renewable Energy Supply. The first of which calls for up to 1,000 MW of new renewable energy supply and the other RFP seeks up to 200 MW of new renewable energy supply.

The OPA also attempts to address the power shortage in York Region by releasing an RFP which sets out three main demand response project types as follows: Load interruption projects; Load shifting projects; Behind the Meter Generation Projects. These projects deal with energy efficiency, electricity load shifting and shedding, as well as dispatching generating supply through the use of controls.

Under the third category, "Behind the Meter Generation Projects", the RFP presents an opportunity for York Region to receive payment from the OPA to utilize its existing standby emergency generators during periods where the grid stability may be compromised. The Region has retained a law firm to clarify its legal jurisdiction under

this and other concepts. The Region may be able to play a role on the demand response side, something we are doing already through our conservation actions, and receive an additional incentive from the Province through the RFP mechanism to do so.

#### 4.2.2 Proposed Standard Offer Contract Program

The Province is actively encouraging municipal involvement in the power sector through the development of a Standard Offer Contract Program. In August 2005, the MOE directed the Ontario Energy Board (OEB) and the OPA to develop a standard offer program for small generators embedded in the distribution system that use clean or renewable energy systems (e.g. wind power). A Standard Offer Contract (SOC) is a long term, fixed-price contract with the right to interconnect to the grid and addresses many of the challenges associated with wind power projects outlined in Section 3.1.

The following SOC program components are drawn from a report the Province commissioned by the Ontario Sustainable Energy Association:

- Contract Term: 20 years.
- Project Size: Up to 10 MW.
- Eligible Participants: Municipal entities, community-based organizations, co-ops, First Nations, NGOs, farmers, rural landowners, private individuals and small business.
- Price: Differentiated by available resource, sufficient price per kilowatt-hour to drive development, and a pricing model that provides minimum profitability at sites with a moderate wind resource.
- Implementation: The OEB and OPA are currently working on the implementation details including appropriate pricing, necessary changes to codes etc.

To expand on the fourth bullet point, through the SOC program the Province would offset the incremental cost of renewable power by paying its “true” cost thereby establishing a level playing field for the procurement of electricity. In brief, a SOC program would likely be a municipality’s best option to drive wind power development, especially for those municipalities with a moderate or “average” wind resource.

#### 4.2.3 Net Metering Regulation

The Province also passed a regulation in October 2005, to encourage more development of renewable energy. The new regulation permits “net metering,” which allows electricity customers to generate their own power from renewable sources such as wind energy, and send any excess electricity back to the grid for credit.

With net metering, customers use their own renewable generation to offset their consumption over a billing period – i.e. the “behind the meter” project type described in Section 4.1. When customers generate electricity in excess of their demand, they can send the surplus back to the grid for credit on their next bill. At the end of the billing period,

the customer gets a credit for excess power that was put into the grid and only pays for the net amount of power consumed.

For example, if a wind turbine exceeds the consumption of the site which it is feeding, the energy can be sent into the grid and that energy will effectively reduce the total consumption of that plant load for that month. Note that the deduction cannot be reduced below zero for a given month; so assessment of the load pattern and the forecast energy production pattern is essential to determine the right turbine size.

Until now, net metering had been available only at the discretion of local energy distribution companies, and usually only up to 50 kilowatts. The new regulation eliminates this inconsistency and requires that distributors permit net metering for all eligible projects that produce up to 500 kilowatts.

#### 4.2.4 Proposed Energy Conservation Leadership Act, 2005

On November 3, 2005, the Minister of Energy introduced Bill 21, the "Energy Conservation Responsibility Act, 2005" ("Bill 21"). A component of Bill 21 is the proposed "Energy Conservation Leadership Act, 2005" (the "ECLA"). The ECLA creates a variety of conservation measures that will apply to public sector entities under the ECLA in order to further energy conservation.

Under the proposed regulation, the Region would be required to prepare and publish periodic energy conservation plans, implement such energy conservation plans, achieve prescribed energy conservation targets, and consider energy conservation and energy efficiency when making capital investments or acquiring goods and services. The ECLA specifies that the energy conservation plans should include the current and proposed conservation activities and measures and any progress and achievement in energy conservation or reduction since the publishing of a previous plan.

### 4.3 York Region's Role?

This section addresses the issue of York Region's role in the wind energy business and more specifically, whether the Region has the legal jurisdiction to generate wind power and if so, under what circumstances.

York Region is a large user of energy and has significant energy costs associated with its facilities and operations. On a corporate scale, the Region consumes more than 90,000 MWh of electricity and 3,000,000 $m^3$ of natural gas resulting in an annual energy bill exceeding $14 million. In 2004, the Region's peak demand on the power grid ranged from 15 to 20 MW.

In 2004, Hydro One indicated that the demand for electricity in York Region would soon 'outgrow' the existing system capabilities, potentially resulting in intermittent blackouts by 2007. The Hydro One proposal recommended upgrades to the existing transmission corridor to increase the size and capacity of transmission lines from Markham to Newmarket and to add a transformer station. The plan received many comments

from affected municipalities, residents, and school boards. A key criticism was that only transmission and distribution options were being considered, and that options to generate more power locally or to manage demand had not been explored.

York Regional Council responded on December 16, 2004, with the following resolution "… the legislated and regulatory authority for provision of electricity to York Region consumers rests with Hydro One and the local distribution companies." The issue was also communicated in a written letter dated January 6, 2005 to the Minister of the Environment and President and Chief Executive Officer of Hydro One Inc. that stated "…[York Region] has no jurisdiction in the transmission or delivery of electrical power…".

While this resolution addressed the Region's role in electricity transmission and distribution, it did not, however, resolve the Region's authority to generate power. To answer this question the Region received a legal opinion on three different power generation scenarios as follows: (i) self-generation solely for the municipality's use "behind the meter"; (ii) self-generation with the sale of excess power to the distributor under the net metering regulation scheduled to come into force January 23, 2006; or (iii) sale directly to the distributor or the wholesale electricity market "sell to the grid".

In brief, the Region may not generate electricity in its own capacity, and the relevant legislation does not distinguish among the possible reasons for generation. Pursuant to section 144 of the *Electricity Act, 1998* ("OEA"), municipalities are prohibited from generating electricity, directly or indirectly, except through a corporation incorporated under the Ontario *Business Corporations Act* ("OBCA") pursuant to section 142(1) of the OEA and utilizing a retroactive transfer of generation assets.

Regulations made under the *Municipal Act, 2001* ("OMA") pertaining to municipal business corporations require the incorporation of a separate holding corporation to hold the shares of an OBCA corporation incorporated pursuant to section 142(1) of the OEA. There are stringent requirements attached to the incorporation of the holding corporation, including the development of a business case study and public consultation.

Regional staff are aware that the Ontario Sustainable Energy Association, in its May 2005 "Study Outlining Policy Options to Encourage Small or Community-Owned Renewable Energy Generation in Ontario", proposes that "municipal entities" be permitted to participate in a pilot standard offer program for the procurement of renewable energy. The question of the appropriate parties for participation in a standard offer program is also being discussed at the Ontario Power Authority, which as noted in Section 4.2.2 has, together with the Ontario Energy Board, been requested by the Minister of Energy to develop a standard offer process for small embedded clean and renewable generators. However, at this time, staff are not aware of any proposed legislative amendment to the prohibition against generation directly by municipalities.

Given the ambiguity and uncertainty in the matter Regional staff recommend that the appropriate Ministry's be contacted to ascertain and clarify the role of municipalities with respect to the generation of electricity from wind energy, clarification on the process available for municipalities to participate in these activities and whether any legislative changes are contemplated to promote municipal participation in wind energy.

In summary, the Province has moved away from self-financed, centralized generation and is now actively encouraging municipalities to become part of the power solution through RFPs, Net Metering Regulation, the Proposed Standard Offer Contract Program and the Proposed Energy Conservation Leadership Act, 2005. The Net Metering Regulation, in particular, favours a "behind the meter" project.

Given that wind energy is not a core business of the Region and the results of the Wind Energy Studies which recommend small-scale wind energy development, staff recommend that the Region focus its efforts on investigating the use of wind energy where it could generate power to offset the electrical demand at a Regional facility ("behind the meter"), as opposed to generating power to sell to the grid. This would allow the Region to reduce its electricity costs, demonstrate environmental leadership and become part of the solution that addresses the local power issues facing York Region.

### 4.4 Town of Richmond Hill Funding Request

Regional Council agreed to carry out a wind energy pilot in the Towns of Georgina and Whitchurch-Stouffville, and conduct a York Region wind map analysis to identify promising domains in other local area municipalities. The wind mapping exercise in particular demonstrates the Region's contribution to it's local area municipalities. The Wind Speed Maps will be made available to all local area municipalities upon request.

Regional Council at its meeting on February 24, 2005, received a funding request for the Town of Richmond Hill's Wind Power Study. The Town of Richmond Hill has undertaken a number of wind energy initiatives. This includes an initial wind power study in 2004 and a wind resource quantification in 2005, at a cost of $14,000 and $55,000, respectively.

The Region has limited funds to cover the costs of additional Pre-feasibility Studies. Furthermore, the Town is eligible for 50% funding from FCM to offset the cost of their wind energy studies. Therefore, staff recommend that the funding request be denied at this time.

### 4.5 Relationship to Vision 2026

A wind energy project supports Goal 2 in Vision 2026 which includes "investigating and promoting alternative energy sources".

## 5. FINANCIAL IMPLICATIONS

There are no financial implications directly associated with this report.

## 6. LOCAL MUNICIPAL IMPACT

Wind energy in general would have numerous benefits to the local community. A "behind the meter" project, in particular, deals with small-scale wind project located on municipal-owned land, which would likely have less adverse noise and visual impacts than a "sell to the grid" project. Moreover, locally generated power, or 'distributed generation', means less wires/infrastructure and associated upgrades, as well as greater electrical grid reliability and stability in the Region.

One of the main advantages includes improvements in Regional air quality and reduced greenhouse gas emissions. Furthermore, a wind energy project would be highly visible to the public and would demonstrate the Region's commitment to Vision 2026, Corporate Clean Air and Sustainable Development.

## 7. CONCLUSION

This report examines the Region's role in wind energy and outlines two project types – "behind the meter" and "sell to the grid". The report also summarizes the results of the Pre-feasibility Studies for the Towns of Georgina and Whitchurch-Stouffville and the wind map analysis results for York Region. Provincial developments affecting the market place for wind energy and the Region's legal capacity to generate power are also described.

Given that wind energy is not a core business of the Region and the results of the Wind Energy Studies which recommend small-scale wind energy development, staff recommend that the Region focus its efforts on investigating the use of wind energy where it could generate power to offset the electrical demand at a Regional facility ("behind the meter"). By developing a wind energy project to offset the electrical demand at Regional facilities, the Region would reduce its electricity costs, demonstrate environmental leadership and become part of the solution that addresses the local power issues facing York Region.

Regarding the request from the Town of Richmond Hill to fund the Town's Wind Power Study, there are limited funds available to the Region to conduct Pre-feasibility Studies. However, the Town is eligible to receive funding from FCM for their study. On this basis, staff recommend that the Town's request be declined. The Region will make available the Wind Speed Maps to its local area municipalities upon request.

The Senior Management Group has reviewed this report.

*(The attachment referred to in this clause was included in the agenda for the January 12, 2006 Committee meeting.)*