

WIND ENERGY STUDY FINDINGS

The Wind Energy Pre-feasibility Studies and mesoscale mapping were completed by Dillon Consulting and Helimax in partnership (“Dillon-Helimax”) in 2004 and 2005.

The scope of work for the studies included the following:

- Wind resource quality assessment (on the basis of secondary source information).
- Potential site(s) identification for wind power development.
- Identification of land use, environmental and power grid connection issues.
- Assessment of the viability of a possible wind project in the study area.

Both Pre-feasibility Studies were conducted based on wind data available at the time of the studies. The Region was in contact with Ontario Ministry of Natural Resources (MNR) staff in the fall of 2004 and was informed of the MNR plans to develop a provincial mesoscale wind map at a resolution of 200 m. The MNR wind map data was made available to the Region in September 2005. The Region was able to leverage this map to perform an analysis of wind speed in York Region.

The scope of work for the wind mapping analysis included the following:

- Wind resource quality assessment of all local area municipalities within York Region (based on MNR data).
- Evaluation of the sites selected for wind energy development in the Wind Energy Pre-feasibility Studies conducted for the Towns of Georgina and Whitchurch-Stouffville.
- Identification of the most promising sites for wind energy development in York Region based on the MNR wind map and actual constraints.

The following sections present the findings of the Georgina and Whitchurch-Stouffville Wind Energy Pre-feasibility Studies and the York Region wind map analysis. Possible next steps and the funding request for the Town of Richmond Hill’s Wind Power Study are also addressed.

1. Wind Energy Pre-feasibility Study Findings

1.1 Site Selection

The analysis considered two project types: “behind the meter” and “sell to the grid”. Candidate sites in both Towns were selected based on the following criteria:

- Wind resource quality.
- Topography.
- Surface roughness and obstacles in the direction of prevailing winds.
- Proximity to access roads, electric transmission and distribution (load).
- Setbacks from residences and roads.
- Environmental constraints.

- Construction constraints (wetlands, waterbodies and watercourses).
- Land area required for wind farm configuration.

1.2 Land Use Implications

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". As such, these uses would be permitted in the Protected Countryside designation of the Greenbelt Plan 2005 subject to meeting the tests contained in Section 4.2 of the Greenbelt Plan. The tests require that such uses support Greenbelt Uses or the significant growth and development expected in southern Ontario beyond the Greenbelt, that Planning design and construction minimize the amount of Greenbelt traversed or occupied by the infrastructure, that negative impacts be minimized and where possible be coordinated with other infrastructure while avoiding key natural heritage or sensitive hydrological features.

The silence of the ORMCP regarding electricity generation may cause problems in the future should these generation facilities be pursued. Therefore, the Region passed a resolution in January 2005, requesting that the MMAH amend the ORMCP and modify the Greenbelt Draft Plan to include wind energy turbines as permitted uses. While the Greenbelt Plan 2005 was modified as requested, the ORMCP issues remain outstanding. Regional staff understand that there is to be a "harmonization" exercise between the two Provincial Plans however, it is unknown whether this issue can be reasonably dealt with under the heading of "harmonization" or whether it would require an amendment to the wording and definition of Transportation Utilities and Infrastructure contained in Section 41 of the ORMCP. Further work will be required to reconcile this issue if a project proceeds in land use areas controlled by the ORMCP.

Field visits were conducted with both Town/Regional staff to verify land uses. It was found that both Towns have a high density of residential and recreational land use compared to areas typically considered for wind projects in Ontario. The selection of candidate sites considered exclusion zones of 150 m applied on both sides of roads for safety reasons (and to respect likely municipal set back requirements), and of 400 m around buildings, to address noise intensity and visual impact considerations. These constraints posed a significant restriction on site availability for a wind energy project.

1.3 Summary of Pre-feasibility Study Findings

The following table summarizes the results of the Wind Energy Pre-feasibility Studies and identifies the recommended sites for a wind energy project within the Towns of Georgina and Whitchurch-Stouffville.

Table 1
Wind Energy Pre-feasibility Findings Summary

Evaluation Criteria	Georgina	Whitchurch-Stouffville
Wind Resource	Moderate or “average” with respect to other sites being developed for wind energy in Ontario.	Moderate or “average” with respect to other sites being developed for wind energy in Ontario.
Land Use Designations	Greenbelt Plan	Oak Ridges Moraine Conservation Plan
Land Use Constraints	High density of recreational and residential land use with respect to other sites being developed for wind energy in Ontario.	High density of recreational and residential land use with respect to other sites being developed for wind energy in Ontario.
Environmental Review	Minimal impact; confirmation required through further study.	Minimal impact; confirmation required through further study.
Interconnection	Connection to the existing 44 kV grid via the construction of about 1 to 6 km of new 44kV line depending on the site. Further assessment required.	Connection to existing 44 kilovolt (kV) grid could be made, via the construction of about 1 to 5 km of new 44kV line depending on the site. Further assessment required.
“Sell to the Grid” Recommended Site(s)	Located on the quadrangle formed by Baseline Road to the north, Kennedy Road to the east, Warden Avenue to the west and Bethel Sideroad to the south (referred to herein as “Site 8”).	Located on ridge north of Bloomington Road, between Warden Avenue and Ninth Line (referred to herein as “Site 3” and “Site 4”)
“Behind the Meter” Recommended Site(s)	Sutton Water Pollution Control Plant located east of the Town of Sutton and south of Black River Road (referred to herein as “Site 12”). The site could accommodate a single turbine of about 250 kw capacity.	None within the areas of interest; no large loads were noted that could have the potential to absorb the full output of a small wind project.

2. York Region Wind Map Analysis

Subsequent to the completion of the Pre-feasibility Studies and with the public release of the Provincial wind map, a wind resource assessment was conducted for York Region. The purpose of the analysis was to leverage the Provincial wind speed data to quantify the wind speeds in the Towns of Georgina and Whitchurch-Stouffville and identify any new promising sites for wind energy development in York Region.

2.1 Wind Speed Maps

The Wind Speed Map (see Attachment 1) presents the mesoscale map for York Region without any type of constraint applied. It provides mean wind speeds based on over 43 years of wind speed data at a vertical elevation of 80m above ground level (agl). It also identifies those sites selected in the Georgina and Whitchurch-Stouffville Pre-feasibility Studies.

The Wind Speed Map confirms 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 and Whitchurch-Stouffville and small areas within the Town of Aurora.

A Wind Speed Map with constraints (see Attachment 2) was developed taking into account the criteria included in Section 4.1.1 in order to identify lands suitable for wind energy development. Based on the Constraints Map, the sites selected as part of the Pre-feasibility Studies within the Georgina and Whitchurch-Stouffville boundaries are among the best sites in York Region. The mean wind speeds for the recommended “sell to the grid” sites identified in the Pre-feasibility Studies are 6.0 m/s (Site 8) and 6.1 m/s (Site 3 and 4), and 5.7 m/s (Site 12) for the “behind the meter” site.

2.2 Selection of New Candidate Sites

The selection of new candidate sites in York Region considered both “sell to the grid” and “behind the meter” projects.

Under the “sell to the grid” scenario, only sites showing wind speeds of 6 m/s and over were selected. Two reasons motivated this choice:

- The economic viability of a future wind project based on MNR wind speed classifications at 80 m agl for a small-scale project (MNR recommends that small-scale development occur where wind speeds fall between 5.0 m/s and 6.5 m/s, and mid-to-large-scale development proceed with wind speeds above 6.5 m/s).
- The uncertainty of mesoscale map results, which can be quantified as at least $\pm 7\%$.

Based on this criteria, additional sites were selected and are indicated on the Wind Speed Maps as New Site of Interest in The Regional Municipality of York, and referred to individually as Sites 13 through 16.

Sites in addition to Site 12 (Sutton Water Pollution Control Plant) were selected in the northern municipalities for potential “behind the meter” sites, given that the northern area municipalities show stronger wind speeds. These new locations are indicated in the Wind Speed Maps as New Site of Interest (Behind the Meter) and referred to individually by their site name.

2.3 Summary of the Wind Map Analysis

Based on the findings of the wind map analysis, Site 4 is the best site in York Region for a “sell to the grid” wind project with respect to current information on wind resource quality and surface area. There are other sites which offer a good wind regime, such as Site 16 located in East Gwillimbury, but very little land surface area is available for wind energy development. Site 13 located in East Gwillimbury has wind speeds equal to or superior to Site 4, however, this site was not evaluated in the Pre-feasibility Studies and would require further technical and environmental study to ensure there are no issues of concern.

The Mount Albert Water Pollution Control Plant and Sharon/Queensville Wells #1, 2, 3 and 4 represent attractive options for a “behind the meter” project. The wind resource is promising if compared to Site 12 and, in the case of Sharon/Queensville Wells, the electricity load is comparable to that of Site 12. Mount Albert shows a very small load that is expected to increase sharply in the coming years to service growth in the area. Site 12 (Sutton Water Pollution Control Plant) is the most promising option, even if the site has wind speeds slightly lower than Sharon/Queensville Wells #1, 2, 3 and 4, given that it was screened in the Pre-feasibility Studies and found that nearby houses were likely far enough away to avoid a potential noise issue.