
Proponent's Guide to Wind Power Projects: Guide for preparing an Environmental Assessment Registration Document

May 2007

Updated September 2009



Environment

Policy and Corporate Services Division
Environmental Assessment Branch

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1. Introduction

Environmental assessment (EA) is a planning and decision-making tool used to promote sustainable development. By predicting and evaluating the environmental effects of an undertaking before it begins there is the opportunity to mitigate potential impacts of the undertaking on the environment. For the public, this process ensures resources and ecosystem functions are protected; for the proponent, this promotes better project planning, ultimately saving time and money.

Through the use of this guide, the proponent can ensure that issues associated with wind power projects have been considered prior to the submission of the EA Registration Document (EA document), in order to avoid delays in the EA process. Proponents with thoroughly prepared EA documents are less likely to be required by the Minister to submit additional information once the EA process has begun.

Project-specific information will vary according to project scale, location, and the surrounding environment, and it is the responsibility of the proponent to ensure that this information is submitted as part of the registration.

Before registering an undertaking for EA, proponents should also refer to "A Proponent's Guide to Environmental Assessment" for general information about EA and the proponent's role during an assessment. Contact the EA Branch or visit the EA Branch website (www.gov.ns.ca/nse/ea) to obtain a copy of this guide. Proponents are encouraged to contact the EA Branch for verbal and written guidance on the EA process.

1.1 Purpose of the guide

- a reference for proponents prior to registration for wind power projects
- to provide consistent advice regarding the assessment of wind power developments
- to explain what is expected of Proponents of wind projects during the EA review process.

2. What should be considered in the registration document?

- describe what exists on-site and what is being proposed (during construction and as well as the completed development)
- identify the potential environmental, economic, and social impacts, including off-site impacts on the neighbouring environment such as visual effects, noise, dust, water run-off etc.
- clearly explain and document any actions being proposed to minimize impacts on the environment
- maps must be included showing details such as property id's, turbine locations, proposed grid route, transmission corridors, locations of rare species and those potentially at risk, access roads, residences and structures, watercourses, etc.

2.1 Proponent Description

Name of the Proponent*:

Mailing Address:

Street Address:

Telephone Number:

Fax Number:

E-Mail Address (if available):

Website (if available):

*Include the name, address and signature of the Company President/Chief Executive Officer (CEO), indicating acceptance of the contents of the registration document.

3. Project Information Required

- Clearly indicate the name of the undertaking.
- Provide a brief description of the location of the undertaking and show its location on maps at regional and local scales, with the Universal Transverse Mercator (UTM) grid and the UTM coordinates showing the centre of the site. This map should also include the location of each turbine and any other structures on the site.
- The proponent should discuss the scope with the EA Branch prior to starting any work on the EA registration document. Scope of the undertaking should include temporal and spacial boundaries. Scope of the EA should include the valued

environmental components (VECs) that will be considered in the document.

- The names and credentials (CVs attached in an Appendix) of all primary and secondary investigators
- Other Government regulatory agencies such as Nova Scotia Department of Natural Resources and the Canadian Wildlife Service should be contacted in advance of undertaking field work to help define priorities.

4. Public Involvement

It is within the proponent's discretion to proactively work with the public and aboriginal people to address any concerns prior to registering the undertaking.

When deciding to involve the public, the proponent should identify and contact:

- local community representatives
- government representatives (municipal, provincial and federal)
- aboriginal communities and organizations
- other stakeholders who may have an interest in the proposed undertaking

Early involvement enables comprehensive, accurate and relevant information to be provided to the community.

The proponent should describe, for the various phases of project development including planning, design, EA review, construction, operation, and decommissioning:

- public information program(s) initiated (provide copies of the information and materials distributed to the public)
- other opportunities provided to allow the public, Aboriginal People, and stakeholder groups to express their concerns
- all comments brought to the attention of the proponent during the information program(s)
- how public and aboriginal concerns were addressed during and following the information program(s)

5. Description of the Undertaking

This section of the document should describe the project as it is planned to proceed through the construction, operation, and decommissioning stages of the wind power development.

5.1 Geographical Location

Identify the site location and its relation to:

- existing communities
- other developments
- transportation facilities
- the proposed routes of access
- water supplies, etc.

Site plans should also be submitted to show the location of the major components of the proposed site.

Site plans should include:

- scaled site map of the main project components
- proximity to protected and conservation areas within provincial, federal, and municipal jurisdictions (e.g. provincial wilderness areas and provincial parks, federal migratory bird sanctuaries and wildlife management areas, and municipal protected water supply areas, etc.)
- property map including the Property Identification Number(s) (PID)
- large-scale original base map(s) (1:10,000 - 1:12,500 scale preferred)
- recent aerial photos
- location of the proposed development
- alignment of power lines connecting the wind power project to the electricity grid turbine to turbine connections
- proximity of the development to significant features, such as housing, water bodies, etc.
- Proposed road access routes and transmission line corridors

The proponent must contact the Municipality to determine if the proposed project will be affected by any land use by-laws, specifically, setback regulations. The Proponent should also consult with utility or grid system operator to ensure connection is feasible.

5.2 Physical Components

Indicate the major physical components of the undertaking including:

- site and adjacent areas
- the positions of the proposed wind turbine(s) (generator, rotor blades and supporting structure)
- native vegetation (if any)
- roads
- internal access roads
- proximity to residences
- existing and proposed buildings and structures (including control rooms and electrical substations), etc.

A description of the proposed wind turbine/s, including all relevant details such as:

- how many
- make and model number
- dimensions (tower and the overall design)
- turbine blade speed in revolutions per minute
- lighting requirements (if applicable)
- materials
- colour
- the alignment of guy wires (if any).

5.3 Site Preparation and Construction

Provide a detailed description of the proposed construction activities, location, techniques, and schedules that will be used. Also, identify the size of the area affected by each respective activity. The proponent should consider addressing, but not be limited to, the following aspects and activities:

- site orientation
- stripping of vegetation
- clearing and grubbing
- site access and public roadways
- proximity distances (including from public or common highways, watercourses, and property boundaries)
- site access roads (including gradient) and public roadways
- location of receiving areas, material storage, and parking areas
- drilling and blasting requirements (during turbine installation process)

- permanent structures (towers, and other structures that will be needed onsite.)
- temporary structures
- utilities
- risk management (e.g. contingency plans for malfunctions and accidents, emergency response plans)
- the duration of construction work and explanation of the various development phases including the impacts of each phase on the landscape

5.4 Setbacks and Separation Distances

Many municipalities have development land use by-laws to deal with the setback requirements and separation distances for wind power projects. It is the responsibility of the proponent to be aware of and to comply with the regulations setup by their particular municipality.

Wind turbines should not be located so close to domestic dwellings that they unreasonably affect the amenity of such properties through sound, shadow flicker, visual domination, or reflected light.

The advisable distance between residences and a proposed development to avoid any disturbance of neighbors of the wind farm will depend on a variety of factors including local topography, climate, character and level of background noise, and size of the development.

5.5 Operation and Maintenance

Provide a detailed description of the proposed activities, locations, and schedules during the operational phase of the undertaking. The proponent should consider the following:

- water management (surface water, groundwater, storm water, withdrawal, drainage, erosion and sediment control, water recycling opportunities, ability of the water source to meet requirements taking into consideration other users in the vicinity)
- hazardous waste management (e.g fuels, lubricants, hydraulic oil, asphalt, paints, solvents, de-icing agents,)
- waste management
- transportation (modes, routes, load size)

and frequency, maintenance, refueling, load coverings, speed restrictions, tire cleaning)

- noise management
- viewscape protection (e.g. tree screens, buffer zones)
- utilities
- risk management (contingency plans, emergency response plans, and accidents).

5.6 Decommissioning

The proponent should provide goals and objectives for decommissioning the site, including removal of roads, equipment and structures, and the long-term objective for future use of the property following decommissioning. This section should include comprehensive details with the goal of restoring the site to its natural state with native plants such that impacts of habitat loss (i.e. Connectivity) and invasive species are mitigated.

6. Valued Environmental Components (VECs) and Effects Management

Within the Nova Scotia *Environmental Assessment Regulations*, VECs are interpreted as environmental (including rare species and those at risk) socio-economic, human health, reasonable enjoyment of life and property, cultural, historical, archaeological, paleontological and architectural features that may be impacted, whether positive or negative, inside or outside the Province, by the proposed undertaking.

The EA registration document should include information on existing environmental conditions, identified VECs, predicted environmental effects, proposed mitigation to address environmental effects, and proposed monitoring programs for the undertaking.

In instances where the proponent predicts that no impacts to an environmental component will exist within the proposed wind power site or within any other area of the wind power development, the proponent must clearly explain why.

6.1 Biophysical Environment

6.1.1 Weather Conditions

Provide a description of weather conditions at the site including presentation of methods and/or data used to assess the site suitability for wind generation. This should not only demonstrate that conditions are adequate for power generation, but also that the design will accommodate extreme winds and ice loads. Provide rationale for site selection and consideration of alternatives.

6.1.2 Geology

Provide a general description of the geological features of the wind power site including:

- surficial geology (soil types, permeability, porosity, risk of erosion)
- bedrock geology (acid producing/consuming rocks, sulfides, carbonates, host rock)

Geotechnical investigations should be conducted to help assess whether construction of the foundations for the wind turbines, the erection of the machines, and the provision of access roads is practical and economic. The geological maps should be included in the registration document.

6.1.3 Surface Water

- Provide a general description of the hydrological conditions and water quality and quantity for all surface waters in the vicinity of the wind power project for construction, operation, and decommissioning.
- Discuss and quantify the predicted effects (with rationale) the wind power equipment (or project) may have on existing surface water both on-site and downstream.
- Describe the proposed methods to avoid or mitigate such effects and any monitoring programs that will be designed to provide information on the effects on surface water.

6.1.4 Groundwater

- Provide a general description of hydrogeology.
- Provide detail on how potential impacts to groundwater will be avoided or mitigated.

6.1.5 Wetlands

Identify the location, size and class of any wetland

on-site or downstream that may be impacted by the wind power project. If there are any wetlands involved the following should be considered:

Wetland Information:

- wetland delineation (location, size, boundaries)
- maps and photos clearly indicating the location of the project, the wetland and other natural features
- description of the wetland's ecological character
- existing hydrological characterization
- existing hydrogeological characterization
- include a bibliography of reference materials used in developing the evaluation; a listing of the expertise retained in preparing the evaluation

Purpose and description of the alteration:

- reason for the alteration
- detailed description of the nature of the proposed alteration
- detailed description of alternatives that have been considered
- detailed description of all identifiable impacts to the wetland (% of wetland to be altered; species at risk present and/or species of conservation concern - terrestrial & aquatic flora and fauna)
- description of past impacts to the wetland
- a listing of the expertise retained and resources referenced in determining the impacts
- opportunities for mitigation of impacts and/or compensation

6.1.6 Flora and Fauna Species and Habitat

Qualified professionals (biologist, botanists, etc.) should be engaged by the proponent to conduct a survey to identify flora and fauna species that exist or that may exist throughout the wind power site and throughout any other areas which may be impacted by the development. Refer to the Site Sensitivity Table to determine the level of risk (low to very high).

- Priority species and habitats for field inventory work should be identified through a desktop analysis using the process described in "A Guide to

Addressing Wildlife Species and Habitat in an EA Registration Document".

- The proponent must apply standards and protocols for bird monitoring specified for the given "Category" projects as defined by Environment Canada and the Canadian Wildlife Service.
- Proponents are encouraged to contact NSE, NSDNR, and CWS early in the planning stages to ensure that all relevant issues have been identified and all required components of the EA are understood and considered.

Once the potential sensitivity has been established, given the facility size, one can determine the category that the wind farm falls into, in terms of potential risk to wild species and/or their habitats. With this, the project can be planned and monitored such that impacts resulting from its construction or operation can be minimized and/or mitigated.

Site Sensitivity Table:

Potential Sensitivity	Determining factor
Very high	<p>Species identified are:</p> <ul style="list-style-type: none"> probability of a species listed as “at risk” federally or provincially (NS Endangered Species Act, SARA, COSEWIC or NS General Status as ‘Red’) occurring within, or being negatively affected by the development <p>Site identified as:</p> <ul style="list-style-type: none"> habitat for a large or important bird colony, such as herons, gulls, terns, common eider and seabirds a known bat hibernacula (25 km radius) a significant migration staging or wintering area for bats, waterfowl or shorebirds an area recognized as internationally, nationally or provincially important for birds (e.g., by being located in or adjacent to a provincial Wildlife Management Area or Wildlife Sanctuary, National Wildlife Area, Migratory Bird Sanctuary, Important Bird Area, National Park, Western Hemisphere Shorebird Reserve Network (WHSRN) and/or Ramsar sites, or similar area specifically designated to protect birds) providing habitat for large concentrations of raptors (e.g. wintering, migration) a known, or reasonably inferred migration corridor having potential to reduce functional quality/quantity of habitat and/or cause significant land fragmentation with loss of connectivity
High	<p>Site identified as:</p> <ul style="list-style-type: none"> having landform factors that concentrate species (e.g., shoreline, ridge, peninsula or other landform that may funnel bird movement) or significantly increase the relative height of the turbines a coastal island, or less than 5 km inland from coastal waters an area of large local bird movements (between habitats) or is close to significant migration staging or wintering area for waterfowl or shorebirds an area recognized as provincially or nationally significant for habitat conservation and/or protection. having increased bird activity from the presence of an area recognized as nationally and/or provincially important habitat for birds (e.g., a National Wildlife Area, Migratory Bird Sanctuary, Important Bird Area, National Park, or similar area protected provincially or territorially because of its importance to birds). containing species of high conservation concern (e.g. <i>Species listed as ‘Yellow’ under NS General Status of Wild Species.</i>).
Medium	<ul style="list-style-type: none"> Site is recognized as regionally or locally important to birds, or contains provincially significant habitat types.
Low	<ul style="list-style-type: none"> Site does not contain any of the elements listed above.

Project Size:

Size	Definition
very large	Total local area projected to contain more than 100 turbines
Large	Total local area projected to contain 41- 100 turbines
medium	Total local area projected to contain 11-40 turbines
Small	Total local area projected to contain 1-10 turbines

Project Category:

Facility Size	Site Sensitivity			
	Very High	High	Medium	Low
Very Large	Category 4	Category 4	Category 3	Category 2
Large	Category 4	Category 3	Category 2	Category 2
Medium	Category 4	Category 3	Category 2	Category 1
Small	Category 4	Category 2	Category 1	Category 1

Categories are defined as follows:

Category 1. Projects in this category represent the lowest level of potential risk to wild species and/or their habitat(s). Typically, such projects would require some basic field surveys before an approval is granted to assess the occurrence of significant habitats and species within the proposed area for the turbines, and to confirm that there are not any conservation issues that were previously overlooked. Carcass searches for bats and birds will usually be required after the project is approved to document unexpected mortality events.

Category 2. Projects in this category present a moderate level of potential risk to wild species and/or their habitat(s), and require basic surveys, usually spread over a one year period, to obtain quantitative information on wild species and habitats on the site and to identify any potential mitigation measures to minimize environmental impacts during construction. Depending on the species and numbers detected, some follow-up surveys may be required to assess impacts. These follow-up surveys may not need to commence until one year after construction is completed. Carcass searches for bats and birds will usually be required after the project is approved to document unexpected mortality events.

Category 3. Projects in this category present an elevated level of potential risk to wild species and/or their habitat(s), and require comprehensive surveys to gather baseline information. These will normally need to be done over the course of one calendar year unless additional concerns are identified in the process (e.g., an unexpected species at risk is found to be present), which could extend the time period. The proponent must apply standards and protocols for bird monitoring specified for “Category 3” projects as defined by Environment Canada and the Canadian Wildlife

Service. Pre-construction surveys need to quantify what species are using the area and obtain measures of their relative abundance.

If the site contains concentrations of birds, or species thought to be particularly vulnerable to colliding with turbines, or that have potential to be negatively affected by the presence of turbines then more detailed studies may be required. Such information may help to inform placement of turbines, or to determine the need for other mitigation measures. Post-construction follow-up surveys, spread over at least two years, are required to determine changes in wildlife use of the area associated with installation of the turbines. Regular carcass searches will normally be required to monitor the impact to breeding and migrating bats and birds. Given the potential for fragmenting habitat and the resulting loss of landscape connectivity, by large (41-100 turbines) and very large (101) projects, these sites will require consideration and analysis of potential landscape scaled impacts.

Category 4. Projects in this category present the highest level of potential risk to wildlife, and/or their habitat(s) and will require the highest level of effort for environmental assessment. As with category 3 projects, comprehensive baseline surveys will be required. The proponent must apply standards and protocols for bird monitoring specified for “Category 4” projects as defined by Environment Canada and the Canadian Wildlife Service. Proponents are strongly encouraged to design and initiate baseline surveys as far in advance as possible, so that delays in data gathering do not affect EA approval of the project.

If the project is approved, detailed follow-up will normally be required as a condition of the approval. Post-construction follow-up surveys, spread over at least two years and sometimes

more, are required to determine changes in wildlife use of the area associated with construction of the turbines. If the site contains concentrations of birds, or species thought to be particularly vulnerable to colliding with turbines, or that have potential to be negatively effected by the presence of turbines, then more detailed studies may be required. Regular carcass searches around turbines over at least 2 years will likely be required during seasons when there is an elevated collision risk (e.g., when concentrations of birds are present, or during the migration season). Data gathering for more than two years would normally be targeted to answer very specific questions or conservation concerns. Long-term monitoring extended over five years or more, for example, may in some cases be required to document potential negative effects of functional habitat loss. Given the potential for fragmenting habitat and the resulting loss of connectivity, by large (41-100 turbines) and very large (101) projects, these sites will require consideration and analysis of potential landscape scaled impacts.

Refer to:

- A Guide to Addressing Wildlife Species and Habitat in an EA Registration at: <http://www.gov.ns.ca/nse/pubs/>
- The Wildlife Division of the Nova Scotia Department of Natural Resources online database for the population status of flora and fauna taxonomic groups throughout Nova Scotia at: <http://www.gov.ns.ca/natr/wildlife/genstatus/ranks.asp>
- *Endangered Species Act* of Nova Scotia to identify species at risk.
- The Nova Scotia Museum of Natural History and Department of Tourism, Culture and Heritage for information on significant habitat and species at risk and distribution data.
- Significant habitat data relative to endangered species can also be obtained from the Atlantic Canada Conservation Data Centre.

6.1.6.1 Native Vegetation/Biodiversity

Conservation and preservation of native vegetation, including rare species and species-at-

risk is a major objective. Generally, the appropriate siting and design of wind power projects ensures that native vegetation is maintained. However, transmission lines may traverse a much greater area than the turbines, making it more difficult to avoid damage to native vegetation. Botanical inventory standards should be developed through early consultation with Nova Scotia Department of Natural Resources, Wildlife Division prior to undertaking any field work.

6.1.6.2 Bird Strike/Bird Migration

The proponent needs to be aware of the paths for travel, roosting, nesting, and Spring and Autumn migrations, so that they can be avoided when choosing a wind power site. Negative impacts on bird species occur through the careless removal or disturbance of the native vegetation that supplies them with a food source and nesting places, and through the placement of wind turbines directly in a flight path.

Migratory birds, their eggs, their nest, and their young are protected under the Migratory Birds Convention Act (MBCA) and the Nova Scotia Wildlife Act. For further information see the Migratory Birds Convention Act, Nova Scotia Wildlife Act and Wind Turbines and Birds: A Guidance Document for Environmental Assessment (Appendix). Note that pre-development inventories and post development monitoring will in some cases be required and the proponent is encouraged to contact the Canadian Wildlife Service (Sackville, N.B.) And the Nova Scotia Department of Natural Resources, Wildlife Division (Kentville) before undertaking any field work.

6.1.6.3 Other Flying Species

Bats serve an important ecological role in nature. Locating wind turbines in bat migration areas can result in strikes and disruption of migration patterns. The proponent will need to determine if the project is in the vicinity of any known bat hibernacula, whether significant numbers of bats migrate through the area and assess the possible impacts of wind turbines on migratory bats. Some sites may require pre-development inventory for bats and post-development monitoring. Contact the Nova Scotia Department of Natural Resources, Wildlife Division early in the planning stages to establish whether inventory for bats will be

required and to establish post-development monitoring standards.

If appropriate for the project site, also refer to Canadian Wildlife Service of Environment Canada (responsible for all migratory birds and for all wildlife on federally owned land)

6.1.7 Fish and Fish Habitat

The principles and information sources that apply to flora and fauna species and habitat also apply to fish and fish habitat. Department of Fisheries and Oceans (DFO) will be reviewing the registration document to determine if the wind power project will likely result in a harmful alteration, disruption, or destruction (HADD) of fish habitat. A qualified professional should be hired by the proponent to determine whether any fish or fish habitat exists in any identified watercourse within the wind power site or any other receiving watercourse that may be impacted by the development. The appropriate survey(s) should be conducted in a manner that is acceptable to DFO.

For additional information contact DFO.

6.1.8 Visual Impact Assessment

The proponent should take into account:

- the various perspectives of the 'visual user' groups represented in the local community,
- the degree to which turbines modify landscapes
- the visibility of the proposal from public viewpoints
- the proximity to sites of significance such as conservation areas and national parks
- the provincial significance of the landscape in question

Proponent needs to describe the visual effect of the proposed wind turbine/s on the locality. This may include illustrations, photographs and other graphic representations of the appearance of the wind projects and transmission lines (where applicable) from all significant vantage points including views from both the land, the beach and the sea, where relevant.

A landscape analysis is likely to be required particularly in locations of high landscape quality. The existing landscape should be described and the potential visual impacts of the proposal

assessed. The visual effect of the development is likely to be one of the more significant issues in the assessment of the proposal.

6.1.9 Noise Levels

The advisable distance between residences and a proposed development to avoid any disturbance of neighbors of the wind farm will depend on a variety of factors including local topography, climate, character and level of background noise, and size of the development.

It is normally noise criteria that determines setback distances from residences. Setback distances can range from about 400 metres to 1 km or more, depending on a variety of factors including the noise standard prescribed, local topography, prevailing wind conditions and the wind farm layout (Australian Wind Energy Association). Ontario has developed guidelines that have established sound level limits for stationary sources such as industrial and commercial establishments or ancillary transportation facilities, affecting points of reception in Class 1 and 2 Areas (Urban) and Class 3 Areas (Rural). Refer to publications numbers 3405e and 3406e.

The Proponent should:

- Provide information on existing (background) noise levels and the expected levels of all potential noise sources associated with the construction and operation of the wind power project, including wind turbines, traffic movements, and substation.
- Discuss the predicted effects (with rationale), if any, the increased noise levels will have on wildlife and residents near the wind power project.
- Include the decibel ratings for all equipment related to the wind power project.
- Describe the extent to which these noise emissions can be reduced and contained to minimize effects upon the wider locality and nearby residences, including potential future development.
- Discuss the methods to be used to monitor noise levels throughout the life of the development.

Contact the EA Branch to obtain a copy of the *Nova Scotia Environment: Guideline for Environmental Noise Measurement and Assessment*.

6.1.10 Other Issues

Other issues that may need to be considered include shadow flicker, blade glint, coastal erosion and/or inundation, sites of cultural significance, electromagnetic interference, site access, ecological impacts, cumulative impacts, geo-technical/ground stability and impacts to ground water. Also consider the net benefits of the project (i.e. reduction of green house gas emissions).

6.2 Socio-Economic Conditions

6.2.1 Economy

- Describe the economic conditions for the region and surrounding communities. Information should be provided on the available labour supply and rates of employment for the region and surrounding communities.
- Provide detail on the number of full and part-time jobs during the construction, operation, and decommissioning phases of the undertaking.
- Specify whether these will be new jobs or existing jobs which will be maintained.
- Predict the positive and negative effects (with rationale) that the proposed wind power project will have on the local economy.
- Discuss how any negative impacts to the economy will be avoided or mitigated.

6.2.2 Land Use and Value

- Identify the past land use(s) of the site and describe any potential contamination that may have resulted from past land use.
- Describe the planned and existing land uses within the wind power site and any other area that may be impacted by the proposed wind power project.
- Describe the predicted impacts (with rationale) that the proposed wind power project will have on the existing and planned land uses (e.g. property values,

land use conflicts, architecture).

- Discuss the methods that will be used to avoid or mitigate impacts to land uses and existing structures.

6.2.3 Transportation

- Describe the existing conditions of the proposed modes and routes of transportation (e.g. provincial highways, arterial highways, on-site access roads, etc.) that will be used throughout the wind power project. Include information on the existing types and volumes of traffic.
- Discuss the predicted impacts (with rationale) to traffic volumes and road conditions. Include the proposed methods for avoiding or mitigating impacts to the existing transportation infrastructure.

6.2.4 Recreation and Tourism

- Discuss the existing and planned recreation and tourism activities (hunting, fishing, hiking, parks) for the surrounding area.
- Describe the predicted effects (with rationale) the wind power project will have on recreation and tourism and how those effects will be avoided or mitigated. Include a discussion of the impacts of the wind power project's architecture on the landscape aesthetics and viewplanes.

6.2.5 Human Health

According to the *Environmental Assessment Regulations*, an environmental effect in respect of an undertaking includes an effect on environmental health, which is defined as those aspects of human health that are or can be affected by contaminants or changes in the environment. Discuss the predicted effects (with rationale) that the undertaking will have on the health of people in the surrounding area and what will be done to avoid or mitigate any negative impacts.

6.2.6 Cultural and Heritage Resources

Notify the Department of Tourism, Culture, and Heritage of the proposed wind power project so

that any areas of historical, archaeological and paleontological importance can be identified. Preliminary information and advice regarding the likelihood of archeological, historical, or paleontological (fossil) remains can be obtained through the Heritage Division.

Proponents should refer to the *Special Places Protection Act* if any of the above areas are identified. If it is determined that areas of historical, archaeological and paleontological importance may exist, site investigations should be conducted in a manner that is acceptable to the Heritage Division, including obtaining the necessary permits. If any artifacts are discovered during a site investigation, the Proponent must notify the Heritage Division, Department of Tourism, Culture and Heritage and the Executive Director of either the Confederacy of Mainland Mi'kmaq or the Union of Nova Scotia Indians, depending on the location of the development.

6.2.7 Other Undertakings in the Area

- Indicate the type, size, location and any other relevant information of other undertakings or developments in the area of the site.
- Describe the predicted effects (with rationale) that the proposed wind power project will have on other undertakings in the area, including any effects that are cumulative in nature (water withdrawal, additional trucking traffic).
- Discuss how the predicted negative effects to other undertakings will be avoided or mitigated.

7. Effects of the Undertaking on the Environment

Present an evaluation and summary of the benefits and drawbacks to the environment, including the VECs, during the construction, operation, and decommissioning stages of the undertaking.

8. Effects of the Environment on the Undertaking

Provide a description of the predicted effects the

environment may have on the proposed undertaking.

9. Other Approvals Required

It is the proponent's responsibility to identify any other approvals (provincial, federal and municipal) required for the proposed project. List the other permits, licences, approvals, and other forms of authorization required for the undertaking to proceed, together with the names of the authorities responsible for issuing them (e.g. federal, provincial and municipal government departments).

10. Funding

Identify any public source of funding that will be used to finance any part of the undertaking. Include the contact information for any government department or agency from which the funds have been requested.

11. Additional Information

Proponents are encouraged to include any other information they believe is necessary or relevant for the environmental assessment.

Appendix

Reference Documents

Endangered Species Act of Nova Scotia

<http://www.gov.ns.ca/legislature/legc/statutes/endspec.htm>

Federal Migratory Birds Convention Act (MBCA)

<http://laws.justice.gc.ca/en/showtdm/cs/M-7.01///en>

Nova Scotia Environment. *Environmental Assessment Regulations*

<http://www.gov.ns.ca/nse/legislation/>

Nova Scotia Environment. *Fee Schedule for Environmental Assessment.*

<http://www.gov.ns.ca/nse/pubs/>

Nova Scotia Environment: *Guideline for Environmental Noise Measurement and Assessment*

Nova Scotia Environment. *Wetlands Designation Policy, 2006*

Nova Scotia Environment. *Regulatory Time Frames for Environmental Assessment.*

<http://www.gov.ns.ca/enla/ea/docs/EATimeFrames.pdf>

Nova Scotia Environment. *Requirements for Submitting Electronic Copies of Environmental Assessment Documents.*

<http://www.gov.ns.ca/nse/pubs/>

Proponent's Guide to Environmental Assessment

www.gov.ns.ca/enla/ea/docs/EAProponentsGuide.pdf

Special Places Protection Act of Nova Scotia

<http://www.gov.ns.ca/legislature/legc/statutes/specplac.htm>

Wildlife Division of the Nova Scotia Department of Natural Resources online database for the population status of flora and fauna taxonomic groups throughout Nova Scotia at:

<http://www.gov.ns.ca/natr/wildlife/genstatus/ranks.asp>

"Wind Turbines and Birds - A Guidance Document for Environmental Assessment" and "Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds". : http://www.cws-scf.ec.gc.ca/publications/eval/index_e.cfm

List of Abbreviations

COSEWIC	Committee on the Status of Endangered Wildlife in Canada
EA	Environmental Assessment
DFO	Department of Fisheries and Oceans
DNR/NSDNR	Department of Natural Resources
NSE	Nova Scotia Environment
MBCA	Migratory Birds Convention Act
PID	Property Identification Number
SARA	Species at Risk Act
UTM	Universal Transverse Mercator
VEC	Valued Environmental Components

Definitions

Bird Strike

Is a collision between a bird and a wind turbine.

Blade glint

This refers to the regular reflection of the sun off rotating blades. When turbines are situated near roads (depending on road alignment and the orientation of turbines), blade glint can potentially distract drivers.

Class 1 undertaking

Class 1 undertakings are usually smaller in scale and may or may not cause significant environmental impacts or be of sufficient concern to the public. Therefore, a public review of a proponent's initial submission or registration is required and the Minister will decide if a more detailed review and/or public hearing is required. These types of developments include, but are not limited to, mines, certain highways and waste/dangerous goods handling facilities.

Cumulative Impacts

The cumulative impacts that may occur when successive wind power projects or other types of projects are located alongside each other also need to be taken into account.

Decommissioning

Preparing facilities for abandonment at the end of project life.

Electromagnetic impacts

This refers to the potential for turbines to cause interference to television and radio reception etc.

Environment

The components of the earth and includes:

- (i) air, land and water;
- (ii) the layers of the atmosphere;
- (iii) organic and inorganic matter and living organisms;
- (iv) the interacting systems that include components referred to in subclauses (i) to (iii); and
- (v) for the purposes of Part IV, the socio-economic, environmental health, cultural and other items referred to in the definition of environmental effect.

Environmental Assessment

A process by which the environmental effects of an undertaking are predicted and evaluated and a subsequent decision is made on the acceptability of the undertaking.

Environmental Assessment Report

A report that presents the results of an environmental assessment.

Environmental Effect

In respect of an undertaking,

- (i) any change, whether positive or negative, that the undertaking may cause in the environment, including any effect on socio-economic conditions, on environmental health, physical and cultural heritage or on any structure, site or thing including those of historical, archaeological, paleontological or architectural significance; and
- (ii) any change to the undertaking that may be caused by the environment, whether the change occurs inside or outside the Province.

Erosion

Detachment of soil particles by agents such as water, wind, and ice.

Fauna

Animals

Fish Habitat

The spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes.

Flora

Plants

Groundwater

All water naturally occurring under the surface of the Province.

Habitat

The environment in which the life needs of a plant or animal are supplied

Hazardous Materials

Any prohibited, restricted, or controlled product.

Heritage Resource

Archaeological resources, heritage structures, designated historic sites, sacred sites, burial sites, and areas of historical importance.

Hibernacula

The places in which an animal hibernates or overwinters; winter quarters

Impact

An observable and measurable response of a population, individual or abiotic factor to an external source of disturbance.

Migration (birds)

Movement of birds, usually in large numbers, with the purpose of reaching areas used for breeding.

Mitigation

With respect to an undertaking, the elimination, reduction or control of the adverse effects or the significant environmental effects of the undertaking, and may include restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.

Noise

Tonal. Tonal noise is defined as noise at discrete frequencies. It is caused by wind turbine components such as meshing gears, non aerodynamic instabilities interacting with a rotor blade surface or unstable flows over holes or slits or a blunt trailing edge.

Broadband. This is noise characterized by a continuous distribution of sound pressure with frequencies greater than 100 Hz. It is often caused by the interaction of wind turbine blades with atmospheric turbulence, and also described as a characteristic "swishing" or "whooshing" sound.

Low frequency. Noise with frequencies in the range of 20 to 100 Hz is mostly associated with downwind turbines (turbines with the rotor on the downwind side of the tower). It is caused when the turbine blade encounters localized flow deficiencies due to the flow around a tower.

Impulsive. This noise is described by short acoustic impulses or thumping sounds that vary in amplitude with time. It is caused by the interaction of wind turbine blades with disturbed air flow around the tower of a downwind machine.

Paleontological

The study of the forms of life existing in prehistoric or geologic times, as represented by the fossils of plants, animals, and other organisms.

Proponent

Is any person who carries out or proposes to carry out an undertaking, or is the owner or person having care, management or control of an undertaking.

Property Identification Numbers

Is a unique number assigned to each piece of real estate

Rotor Blades

The aerodynamic surface that catches the wind.

Registration Document

A document that identifies the Proponent and outlines the general characteristics of the undertaking (e.g. location, nature, purpose, schedules, etc.). Proponents have the option to include other information that they feel is necessary.

Setback

The distance a structure must be set back from the property lines in accordance with local zoning ordinances or deed restrictions.

Shadow flicker

This occurs when the sun is low on the horizon and the blades pass between the sun and an observer, creating a flickering. This issue needs to be considered as it could cause irritation and visual impairment.

Site Plan

A plan, prepared to scale, showing accurately and with complete dimensions, the boundaries of a site and the location of all buildings, structures, uses, and principal development features proposed for a specific parcel or parcels of land.

Significant

With respect to an environmental effect, an adverse impact in the context of its magnitude, geographic extent, duration, frequency, degree of reversibility, possibility of occurrence or any combination of the foregoing.

Species

A self-perpetuating population of animals or plants which is more or less genetically isolated.

Surface water is water on the ground or in a stream, river, lake, sea, or ocean; as opposed to groundwater.

Topography

The configuration of the Earth's surface, including the shape, elevation, and position of its natural and man-made features.

Undertaking

An enterprise, activity, project, structure, work or proposal and may include, in the opinion of the Minister, a policy, plan or program that has an adverse effect or an environmental effect and may include, in the opinion of the Minister, a modification, extension, abandonment, demolition or rehabilitation as the case may be, of an undertaking.

Universal Transverse Mercator

A system of plane coordinates based upon 60 north-south trending zones, each 6 degrees of longitude wide, that circle the globe.

Valued Environmental Component

A valued environmental component (VEC) is a resource or environmental feature that is important (not only economically) to a local human population, or has a national or international profile, or if altered from its existing status, will be important for the evaluation of environmental impacts of industrial developments.

Visual impact assessment

An assessment of potential impacts to visual amenity and landscape character, predictions of their magnitude and significance to local "viewsheds" and landscape features.

Watercourse

The bed and shore of every river, stream, lake, creek, pond, spring, lagoon, or other natural water body, and the water therein, within the jurisdiction of the Province, whether it contains water or not, and all groundwater.

Wetland

Land commonly referred to as marshes, swamps, fens, bogs and shallow water areas that are

saturated with water long enough to promote wetland or aquatic processes. Salt marshes are also wetlands.

Wind Power Project

A group of wind turbines interconnected to a common utility system through a system of transformers, distribution lines, and (usually) one substation. Operation, control, and maintenance functions are often centralized through a network of computerized monitoring systems, supplemented by visual inspection.

Contact Information

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Fax: (902) 424-0503

Email: EA@gov.ns.ca

Website: www.gov.ns.ca/nse/ea

Nova Scotia Department of Natural Resources

Wildlife Division

Provincial Building

136 Exhibition Street

Kentville, NS

B4N 4E5

Phone: (902) 679-6091

Fax: (902) 679-6176

Website: www.gov.ns.ca/natr/wildlife

Nova Scotia Department of Tourism, Culture, and Heritage

Heritage Stewardship Section

Heritage Division

1747 Summer Street

Halifax, NS

B3H 3A6

Phone: (902) 424-7370

Fax: (902) 424-0560

Website: <http://museum.gov.ns.ca/mnh/>

Atlantic Canada Conservation Data Centre

PO Box 6416

Sackville, NB

E4L 1G6

Fax: (506) 364-2656

Website: www.accdc.com

Canadian Environmental Assessment Agency - Atlantic Region

1801 Hollis Street

Suite 200

Halifax, NS

B3J 3N4

Phone: (902) 426-0564

Fax: (902) 426-6550

Website: <http://www.ceaa-acee.gc.ca/>

Fisheries and Oceans Canada (DFO) Habitat Management Division

1 Challenger Dr., 5th Floor Polaris, BIO

PO Box 1006

Dartmouth, NS

B2Y 4A2

Phone: (902) 426-8015

Fax: (902) 426-1489

Email: info@dfo-mpo.gc.ca

Website: <http://www.dfo-mpo.gc.ca>

Environment Canada

Canadian Wildlife Service

PO Box 6227

17 Waterfowl Lane

Sackville, NB

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Phone: (506) 364-5044

Fax: (506) 364-5062

Email: nature@ec.gc.ca

Website: <http://www.cws-scf.ec.gc.ca/>

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