



Wind **POWER** Production Incentive **WPPPI**



**Environmental Impact Statement Guidelines for
Screenings of Inland Wind Farms Under the
*Canadian Environmental Assessment Act***



Natural Resources
Canada

Ressources naturelles
Canada

Canada 

© Her Majesty the Queen in Right of Canada, 2003

Aussi disponible en français sous le titre :

Lignes directrices relatives aux examens préalables des parcs éoliens terrestres
aux termes de la *Loi canadienne sur l'évaluation environnementale*

Cat. No. M144-9/2003E

ISBN 0-662-33977-0

Recycled paper



DISCLAIMER

The objective of this document is to help proponents prepare an Environmental Impact Statement for the screening of inland wind farms under the Wind Power Production Incentive.

These guidelines are distributed for information purposes only and do not necessarily reflect the views of the Government of Canada or constitute an endorsement of any commercial product or person. Canada and its ministers, officers, employees and agents do not make any warranty with respect to these guidelines or assume any liability arising from these guidelines. Proponents are encouraged to consult the *Canadian Environmental Assessment Act*, any amendments to it and any related regulations.

Table of Contents

Disclaimer 1

I. Background 7

II. CEAA Requirements 8

III. Next Steps 9

IV. Report Presentation 9

SECTION 1. PROJECT SUMMARY

1.1. Project Proponent 10

1.2. Title of Project 10

1.3. Project Location 10

1.4. Estimated Capacity of Wind Farm 10

1.5. Construction Schedule 10

1.6. NRCan’s Involvement in the Project 10

1.7. Provincial/Territorial Departments/Agencies
Involved in Provincial/Territorial Environmental Assessment 10

1.8. Author of EIS 10

SECTION 2. PROJECT DESCRIPTION

2.1. Presentation of Proponent 11

2.2. Background of Project 11

2.3. Purpose of Project 11

2.4. Summary of Project 11

2.5. Location of Project 11

2.6. Detailed Project Activities 11

 2.6.1. Construction Phase 11

 2.6.2. Operation Phase 12

 2.6.3. Decommissioning Phase 12

 2.6.4. Future Phases of Project 12

SECTION 3. SCOPE OF THE ASSESSMENT

3.1. Scope of the Project and Its Assessment 12

3.2. Methodology of Environmental Assessment 12

SECTION 4. ENVIRONMENTAL CHARACTERISTICS

4.1. Geophysical Environment.....	13
4.1.1. Physiography and Topography	13
4.1.2. Soil Quality	13
4.1.3. Geology	13
4.1.4. Seismicity.....	13
4.1.5. Hydrogeology.....	13
4.1.6. Groundwater.....	13
4.2. Aquatic Environment.....	13
4.2.1. Aquatic Habitats	13
4.2.2. Aquatic Fauna	13
4.2.3. Aquatic Vegetation	13
4.2.4. Surface Hydrology	13
4.2.5. Surface Water Quality	13
4.2.6. Sediment Quality	13
4.3. Terrestrial Environment.....	13
4.3.1. Flora.....	13
4.3.2. Fauna	13
4.3.3. Endangered Species.....	13
4.4. Atmospheric Environment.....	13
4.4.1. Climate	13
4.4.2. Air Quality	13
4.5. Socio-economic Conditions	13
4.5.1. Population.....	13
4.5.2. Land Use	13
4.5.3. Cultural Resources.....	13
4.5.4. Existing Noise Level.....	13
4.5.5. Heritage Sites, Archaeological Sites and Other Cultural Resources.....	13
4.5.6. Recreation Areas.....	13
4.5.7. Land and Resources Used for Traditional Purposes by Aboriginal Persons	13
4.5.8. Safety Issues	13
4.5.9. Visual Landscape.....	13

**SECTION 5. ASSESSMENT OF ENVIRONMENTAL IMPACTS,
MITIGATION REQUIREMENTS AND RESIDUAL EFFECTS**

5.1. Project Construction Activities – Environmental Effects	15
5.1.1. Surveying and Siting Operations.....	15
5.1.2. Land Clearing.....	15
5.1.3. Road Construction/Modification	15
5.1.4. Delivery of Equipment	15
5.1.5. Temporary Storage Facilities.....	15
5.1.6. Foundation Construction	15
5.1.7. Tower and Turbine Assembly and Installation.....	15
5.1.8. Interconnection from Turbines to Substation	15
5.1.9. Substation Construction	15
5.1.10. Transmission Line to Power Line	15

5.1.11. Fencing/Gates	15
5.1.12. Parking Lots	15
5.2. Operational Activities – Environmental Effects	15
5.2.1. Wind Turbine Operation	15
5.2.1.1. Land Use.....	15
5.2.1.2. Visual Impacts.....	15
5.2.1.3. Noise Impacts	15
5.2.1.4. Wildlife Disturbance	15
5.2.1.5. Safety Issues	15
5.2.2. Maintenance Activities.....	15
5.3. Decommissioning and Abandonment Plans – Environmental Effects	15
5.3.1. Removal of Turbines and Ancillary Equipment.....	15
5.3.2. Removal of Buildings and Waste	15
5.3.3. Removal of Power Line	15
5.3.4. Site Remediation	15
5.4. Accidents and Malfunctions.....	15
5.5. Effects of the Environment on the Project.....	15
5.5.1. Climatic Fluctuations	15
5.5.2. Extreme Events.....	15
5.6. Cumulative Effects.....	16
5.6.1. Past, Present and Future Project(s) at the Site.....	16
5.6.2. Interactions Between Projects and Description of Cumulative Environmental Effects.....	16
5.7. Summary of Potential Environmental Impacts and Cumulative Effects	17
<u>SECTION 6. FOLLOW-UP MEASURES</u>	<u>20</u>
<u>SECTION 7. PUBLIC CONSULTATION.....</u>	<u>20</u>
<u>SECTION 8. FIRST NATIONS CONSULTATION</u>	<u>20</u>
<u>SECTION 9. CONCLUSION</u>	<u>20</u>
<u>SECTION 10. LIST OF SUPPORTING DOCUMENTS</u>	<u>20</u>
<u>SECTION 11. SIGNATURE</u>	<u>20</u>
<u>SECTION 12. ATTACHMENTS.....</u>	<u>20</u>
V. Appendix A: Glossary.....	21
Acronyms Used in the Guidelines	21
Definitions from the CEAA and Terms Used in the Guidelines.....	21
VI. Appendix B: List of Possible Impacts and Mitigation Measures	23
VII. For More Information.....	26

I. Background

The *Canadian Environmental Assessment Act* (CEAA) is the legal basis for the federal Environmental Assessment (EA) process. The CEAA outlines the responsibilities, requirements and procedures for the Environmental Assessment of projects and establishes a process for assessing the potential environmental effects of projects in which the Government of Canada has a decision-making responsibility. All proponents should obtain a copy of the CEAA and related regulations from the Canadian Environmental Assessment Agency at www.ceaa.gc.ca.

The Government of Canada uses an EA as a planning tool to identify, understand, assess and mitigate, where possible, the environmental effects of a project. Under the CEAA, federal departments and agencies (Federal Authorities [FA]) are required to undertake an EA for projects relating to a physical work and for any proposed physical activity listed in the Inclusion List Regulations of the CEAA, whenever, an FA:

- proposes or undertakes a project;
- grants money or any other form of financial assistance to a project;
- grants an interest in the land to enable a project to be carried out; and
- exercises a regulatory duty in relation to a project, such as issuing a permit or licence that is included in the Law List Regulations of the CEAA.

A guiding principle of the CEAA is public participation. To help promote public participation, Responsible Authorities (RAs) must establish a public registry for every project, in which information on the EA of the project is placed and made available to the public. However, confidential information disclosed through the EA process can be protected under the *Access to Information Act*. Protected information under this Act will not be disclosed to the public and thus would not be placed in the public registry.

The financial incentives provided under the Wind Power Production Initiative (WPPI) to a wind energy producer or developer who is building an inland wind farm triggers the need for a federal EA under the CEAA. Natural Resources Canada (NRCan) is the RA for projects funded under the WPPI program. An RA must ensure that an EA is carried out in accordance with the CEAA and must consider the EA findings before a decision is made to provide an incentive for a project. To improve efficiency, a proponent's information on a project will be circulated to other federal departments in accordance with the Federal Coordination Regulations. This process will determine whether other departments also have a decision-making role (RA) or can provide expert advice (FA) on the project in question.

Most inland wind farms will require a screening level of assessment, meaning that the proponent has to provide an Environmental Impact Statement (EIS). The proponent's EIS must be a stand-alone document that provides the RA(s) and the public with details of the proposed project, the existing environment and the interaction between the two. The EIS must be written for the general public. A detailed EIS will likely reduce the need for additional information. The RA(s) will evaluate the EIS and write an Environmental Assessment Screening Report. The screening report will be based on the information provided in the EIS and comments received from FAs. The RA's EA determination will be included in the screening report.

To help proponents write an EIS, NRCan has prepared these guidelines specifically for a screening assessment of inland wind farms under the WPPI program. Proponents should follow the structure of this document when writing an EIS. However, proponents should note that if a project includes a

component that is listed on the Comprehensive Study List Regulations (see CEAA Web site), it would trigger a comprehensive study level of assessment. In such cases, these guidelines would not apply. It is advisable that proponents consult NRCan as early as possible to determine the level of assessment required for a particular project.

Offshore wind farms may be the site of activities not considered under these guidelines, making it difficult to determine the level of assessment they require. Proponents of offshore wind farms are invited to consult NRCan early in the EA process. Appendix A provides a list of acronyms and definitions of terms used in these guidelines.

II. CEAA Requirements

SCOPE OF THE PROJECT

Under the CEAA, the RAs determine the scope of the project. The scope refers to the components that should be considered as part of the proposed project for the purpose of the EIS. RAs determine which undertaking, in relation to a physical work, and which physical activities, fall within the scope of a project. The scope is generally based on the proponent's project description. However, the RAs recognize that the project description is often provided in the early stages of a project and may evolve over the course of the EA. Nevertheless, the project description must be comprehensive enough to allow the RAs to understand the project and to determine its scope.

Although the RAs will determine the scope of each individual project following a review of the project description, typically the scope of a project should include, but may not necessarily be limited to, the following:

- construction (pre-construction surveys, site preparation, excavation, transportation of materials, turbine construction), power connection, site remediation and demobilization of construction works;
- operation and maintenance of a wind farm; and
- decommissioning of the turbines and site remediation.

Should the RAs determine that the scope of the project is broader than the typical case, the RAs will request additional information from the proponent.

SCOPE OF THE ASSESSMENT

The scope of the assessment includes a determination of the environmental components likely to be affected by the project and focuses the assessment on relevant issues and concerns.

For inland wind farms, the scope of the assessment encompasses effects on the biophysical environment (soil, aquatic environment, water quality, terrestrial vegetation and wildlife including mammals, fish, birds, etc.) and the socio-economic environment (cultural and heritage resources, planned land use, recreation, aesthetics, noise and safety relating to collapse and ice shedding).

FACTORS TO BE CONSIDERED

Under section 16(1) of the CEAA, every screening shall consider the following factors:

- environmental effects of the project, including the environmental impact of malfunctions or accidents that may occur in connection with the project, and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;

- the significance of the effects listed in the previous paragraph;
- comments from the public that are received in accordance with the CEAA and regulations;
- measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project; and
- any other matter relevant to the screening, such as the need for alternatives to the project, that the RA may be required to consider.

The environmental assessment must cover the following activities:

- construction;
- operation;
- modification; and
- decommissioning/abandonment.

It shall also include:

- cumulative effects for each of these activities; and
- malfunctions and accidents.

III. Next Steps

Based on the information provided in the proponent's EIS report and the comments received from the public and from other government authorities, the RAs will determine whether the EIS for the proposed project meets the EA requirements under the CEAA. The lead RA, which is likely to be

NRCan, will in the screening report summarize actions that the proponent will need to take, if any, to mitigate the adverse environmental effects of the proposed activities. The screening report will then be provided to the proponent and made available for Canadians to view on the public registry.

IV. Report Presentation

Proponents are encouraged to follow the structure presented in this guide when preparing their EIS. As a minimum requirement, proponents must provide all of the information requested in sections 1 through 12.

The cover page of the EIS should contain the following information:

- name of project and, if available, WPPI registration number;
- location of the site (nearest town and province/territory);
- size of the project (in megawatts);
- name of the proponent;
- name of the consultant who prepared the report (when different from the proponent); and
- date of the report.

The proponent must sign the EIS and provide two hard copies and one electronic version on CD of the report and its appendices to NRCan at the following address:

Wind Power Production Initiative
Natural Resources Canada
580 Booth Street
Ottawa ON K1A 0E4

If appendices cannot be provided in electronic form, 10 hard copies of the appendices must be provided with the electronic version on CD of the report.

Section 1. Project Summary

This section provides a summary of the project. Detailed information about the project should be provided in section 2.

1.1. PROJECT PROPONENT

- Name (person responsible for project):
- Company:
- Address:
- Telephone/Fax:
- E-mail:

1.2. TITLE OF PROJECT

- Name of project:

1.3. PROJECT LOCATION

- Exact location of wind farm:
- Coordinates (latitude and longitude):
- One set of coordinates for a point project:
- Two or more sets of coordinates for a linear or an area project:

1.4. ESTIMATED CAPACITY OF WIND FARM

- Number of turbines, model and expected capacity (in megawatts) of wind farm:

1.5. CONSTRUCTION SCHEDULE

- Preliminary engineering:
- Start of construction:
- Commissioning of last turbine:

1.6. NRCAN'S INVOLVEMENT IN THE PROJECT

Give total requested incentive funding over the 10-year period:

Responsible Authority (RA) providing financial support. NRCAN contact:

David Burpee
Director, Energy Resources Branch
Natural Resources Canada
580 Booth Street
Ottawa ON K1A 0E4

Tel.: (613) 995-7460

Fax: (613) 995-0087

1.7. PROVINCIAL/TERRITORIAL DEPARTMENTS/AGENCIES INVOLVED IN PROVINCIAL/TERRITORIAL ENVIRONMENTAL ASSESSMENT

If a provincial/territorial EA has taken place, please provide the contact name and address.

1.8. AUTHOR OF EIS

EIS completed by (if different than under section 1.1):

- Name (person responsible for report):
- Company:
- Address:
- Telephone/Fax:
- E-mail:

Section 2. Project Description

A clear and detailed project description will assist RAs in assessing the EIS. All project components and activities must be identified and clearly explained. The how, when, where and what need to be described. A detailed project description reduces the risk that the RAs will require additional information to understand the project and its interaction with the environment. Proponents are to assume that no information is too obvious to require a detailed explanation. What is obvious to the proponent may not necessarily be obvious to the general public that wants to review the EA and participate in the EA process.

2.1. PRESENTATION OF PROPONENT

- Provide information about the proponent and its partners.

2.2. BACKGROUND OF PROJECT

- Provide information on the project's history.
- Describe regional and national political and economic context for the project.

2.3. PURPOSE OF PROJECT

- Provide a justification for the project.
- Describe the project objectives.

2.4. SUMMARY OF PROJECT

Provide a short description of the project with the following details:

- general overview of site area;
- description of present land use;
- wind turbines (number, capacity, type); and
- connection to grid (underground cabling, transmission line, substation requirements).

2.5. LOCATION OF PROJECT

- Present the general location of the project, the longitude and latitude of the site, and the detailed location of all project components and activities. Provide maps that indicate the layout of project components and activities.
- Provide a map that shows the geographical context of the site and the environmental features that could be affected by the project.
- Identify proximity to designated environmental or cultural sites, such as national parks, heritage sites, historic sites and other protected or sensitive areas.
- Identify the proximity of First Nations reserves and lands that are currently used for traditional purposes by Aboriginal people.
- Provide site plans/sketches/photos with project location, features and activities identified on maps (when necessary to clarify points).

2.6. DETAILED PROJECT ACTIVITIES

Provide detailed information concerning the construction, operation and decommissioning phases and the timing and scheduling of each phase. Describe in detail the project components, including any permanent and/or temporary structures, associated infrastructures and associated construction work and list the type of equipment used at each location. Also provide the capacity and the size of the various components.

2.6.1. Construction Phase

- Surveying activities (site preparation, archaeological monitoring, geotechnical investigations; include personnel and time required for each activity).

- New and existing access roads and trail construction (length, width, machinery used, time required).
- Delivery of equipment (machinery required, road used, number of deliveries, etc.).
- Foundation (excavation requirements, fill requirements [added or removed], waste disposal, machinery required, time required).
- Wind turbine assembly and installation (number, dimensions, machinery required, time required).
- Temporary storage facilities (dimensions, work done, reclamation).
- Interconnection cabling (description, length, trenches, poles, machinery required, time required).
- Transmission line (description, length, poles, machinery required, time required).
- Substation (description, equipment, work performed, time required).
- Gates and fencing (description).
- Parking lots (if needed).
- Project schedule (show planned schedule for above activities).

2.6.2. Operation Phase

- Maintenance plans/activities.
- Wind turbine operation.

2.6.3. Decommissioning Phase

- Expected lifetime.
- Reconditioning plan (schedule, machinery needed).
- Decommissioning plan (removal of turbines and ancillary equipment, site remediation).

2.6.4. Future Phases of Project

- Describe proponent's future development phases, if any.

Section 3. Scope of the Assessment

3.1. SCOPE OF THE PROJECT AND ITS ASSESSMENT

Under the CEAA, the RAs determine the scope of the project in consultation with FAs. However, the proponent is requested to give a brief description of physical activities (as outlined in section 2.6) that will be undertaken to complete the project.

The “proponent” should also identify the limits of the area being assessed. This area must be sufficiently large to cover all projected activities of the project. The proponent must be able to show the direct and indirect effects that these activities will have on identified Valued Ecosystem Components (VECs) at or near the site of the project.

3.2. METHODOLOGY OF ENVIRONMENTAL ASSESSMENT

This section should describe:

- how the EA was performed;
- which indicators and data sources were used to consider the environmental effects associated with this project; and
- how the significance of a residual environmental effect was determined.

Supporting documents, when available, should be referenced and attached as appendices.

Valued Ecosystem Components (VECs) are any part of the environment that is considered important by the proponent, members of the public, scientists and government involved in the assessment process. Importance may be determined on the basis of cultural value or scientific concern.

Section 4. Environmental Characteristics

This section should describe the existing environmental characteristics of the site and surrounding areas (when applicable). Please give a general description of the environment and then focus on the environmental components that may be affected by the project. These environmental components are often referred to as VECs (see section 3). Note that the proponent should provide a rationale for considering certain environmental components and not others in the EIS.

The EIS should, as a minimum, describe the following environmental components:

4.1. GEOPHYSICAL ENVIRONMENT

4.1.1. Physiography and Topography

(including geomorphologic features and natural heritage areas)

4.1.2. Soil Quality

4.1.3. Geology

4.1.4. Seismicity

4.1.5. Hydrogeology

4.1.6. Groundwater

4.2. AQUATIC ENVIRONMENT

4.2.1. Aquatic Habitats

(ponds/streams/lakes/rivers/oceans)

4.2.2. Aquatic Fauna

(including fish and endangered species)

4.2.3. Aquatic Vegetation

4.2.4. Surface Hydrology

4.2.5. Surface Water Quality

4.2.6. Sediment Quality

4.3. TERRESTRIAL ENVIRONMENT

4.3.1. Flora

4.3.2. Fauna

(including local and migratory birds)

4.3.3. Endangered Species

(please refer to provincial/territorial and federal environmental laws and regulations, and note that surveys must be conducted at appropriate times of the year)

4.4. ATMOSPHERIC ENVIRONMENT

4.4.1. Climate

4.4.2. Air Quality

4.5. SOCIO-ECONOMIC CONDITIONS

4.5.1. Population

4.5.2. Land Use

(including existing, planned and adjacent land use)

4.5.3. Cultural Resources

4.5.4. Existing Noise Level

4.5.5. Heritage Sites, Archaeological Sites and Other Cultural Resources

4.5.6. Recreation Areas

(including tourism areas)

4.5.7. Land and Resources Used for Traditional Purposes by Aboriginal Persons

4.5.8. Safety Issues

4.5.9. Visual Landscape

Section 5. Assessment of Environmental Impacts, Mitigation Requirements and Residual Effects

In this section, the proponent must describe the likely effects of the project on the environment, the cumulative environmental effects, the potential for accidents and malfunctions, and the effects of the environment on the project, which include climate fluctuations and extreme events.

The following six-step process ensures that the interactions between the project components and the environment are adequately described, that the likely environmental effects are identified and properly assessed, and that the importance of any residual effect is determined:

1. Describe the project activities.*
2. Identify and describe the environmental component(s) that will be affected.
3. Describe the impact of any interaction between the environment and the project.
4. Describe the mitigation measure(s).
5. Identify any residual environmental effects after mitigation measures.
6. Determine the importance of effects after mitigation measures.

The importance of residual effects mitigation measures is determined using the definitions

Table 5-1: Level of Impact After Mitigation Measures

Level	Definition
High	Potential impact could threaten sustainability of the resource and should be considered a management concern. Research, monitoring and/or recovery initiatives should be considered.
Medium	Potential impact could result in a decline in resource to lower-than-baseline but stable levels in the study area after project closure and into the foreseeable future. Regional management actions such as research, monitoring and/or recovery initiatives may be required.
Low	Potential impact may result in a slight decline in resource in study area during the life of the project. Research, monitoring and/or recovery initiatives would not normally be required.
Minimal	Potential impact may result in a slight decline in resource in study area during construction phase, but the resource should return to baseline levels.

of level of impact shown in Table 5-1.

To facilitate this assessment, the following activities were established for inland wind farms. These points identify most of the possible project activities that would take place and that could cause environmental impacts. They may serve as a

guide, but the EIS should be adapted to the circumstances of each project and is not necessarily limited to this list.

A list of potential impacts and potential mitigation measures has also been provided in Appendix B at the end of this document to help proponents define the environmental effects of their project.

** Note that a project activity may affect more than one environmental component identified in section 4. Section 5 should clearly identify the components that are selected, explain why they were selected and describe the possible impacts.*

5.1. PROJECT CONSTRUCTION ACTIVITIES – ENVIRONMENTAL EFFECTS

For each activity carried out during the construction of the wind farm, the six-step process previously listed should be used to describe the following:

5.1.1. Surveying and Siting Operations

5.1.2. Land Clearing

5.1.3. Road Construction/Modification

5.1.4. Delivery of Equipment

5.1.5. Temporary Storage Facilities

5.1.6. Foundation Construction

5.1.7. Tower and Turbine Assembly and Installation

5.1.8. Interconnection from Turbines to Substation

5.1.9. Substation Construction

5.1.10. Transmission Line to Power Line

5.1.11. Fencing/Gates

5.1.12. Parking Lots

5.2. OPERATIONAL ACTIVITIES – ENVIRONMENTAL EFFECTS

For each activity carried out during the operation of the wind farm, the six-step process should be used to describe the following:

5.2.1. Wind Turbine Operation

5.2.1.1. Land Use

5.2.1.2. Visual Impacts

5.2.1.3. Noise Impacts

5.2.1.4. Wildlife Disturbance

5.2.1.5. Safety Issues

5.2.2. Maintenance Activities

5.3. DECOMMISSIONING AND ABANDONMENT PLANS – ENVIRONMENTAL EFFECTS

For each activity carried out during the decommissioning of the wind farm, the six-step process should be used to describe the following:

5.3.1. Removal of Turbines and Ancillary Equipment

5.3.2. Removal of Buildings and Waste

5.3.3. Removal of Power Line

5.3.4. Site Remediation

Decommissioning and abandonment plans should be provided.

5.4. ACCIDENTS AND MALFUNCTIONS

This section should describe possible accidents or malfunctions, their probable and potential effects on the environment, and the implementation of any mitigation measures or contingency plans. The proponent must demonstrate a commitment to having an Environmental Protection Plan that would address potential accidents and malfunctions.

5.5. EFFECTS OF THE ENVIRONMENT ON THE PROJECT

5.5.1. Climatic Fluctuations

This section should assess the potential of climatic fluctuations at the site of the project and describe the effects those fluctuations may have on the project.

5.5.2. Extreme Events

This section should describe the potential effects of extreme events such as hail, ice storms, fire and earthquakes on the project and show any measures taken to mitigate these effects.

5.6. CUMULATIVE EFFECTS

This section should examine the likely cumulative effects on the VECs identified in section 4.

Cumulative effects are residual effects on the environment (i.e., that occur after mitigation measures have been put in place) combined with the environmental effects of past, present and future projects or activities. Cumulative effects can also result from the combination of different individual environmental effects of the project acting on the same environmental component.

5.6.1. Past, Present and Future Project(s) at the Site

When looking at past, present and future projects or activities, the proponent must include all projects and activities in the area, not just other wind farm projects. Other projects or activities could include farming, oil and gas activity, hydro dams, roads, transmission lines, and recreational or tourism activities.

5.6.2. Interactions Between Projects and Description of Cumulative Environmental Effects

The possible interactions between the different projects at or near the site must be shown, and the cumulative effects of these interactions on VECs must be determined. This cumulative effects assessment should focus on the VECs identified in section 4. For wind farms, the most likely VECs include, but are not necessarily limited to, the following:

- disturbance to terrain;
- disturbance to wildlife and wildlife habitat;
- destruction of native vegetation;

- permanent change of land uses;
- impact on archaeological, historical and/or cultural resources;
- changes to noise levels;
- visual/aesthetic impact; and
- socio-economic effects.

If a VEC was a bird-nesting site that, following mitigation measures, showed a residual effect, the cumulative effects assessment would have to look at other activities in the area (e.g., farming and/or oil and gas development) to determine whether these activities also have an impact on the bird-nesting site. If they do, the cumulative effects from the wind farm project and from other activities would have to be assessed and their significance determined. For example, if noise from the wind farm project causes a residual effect on a bird-nesting site, the other activities in the area would have to be examined not only for noise, but also for other sources of residual impacts (e.g., dust or physical disturbance). This would be done for all VECs with residual effects and for all projects and activities that could possibly have an impact on the identified VEC. Should it be determined that there are no other activities that have an impact on the VEC, this should be explained in the assessment.

Guidance on how to consider cumulative environmental effects in an EA is provided in the reference guide entitled *Cumulative Effects Assessment Practitioners Guide*, Canadian Environmental Assessment Agency, February 1999, available at www.ceaa.gc.ca.

5.7. SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS AND CUMULATIVE EFFECTS

In this section, the proponent is requested to summarize, using the following two tables, the EA information identified in section 5 of the EIS.

In Table 5-2, “Summary of Environmental Impacts,” the proponent is requested to complete the table using the environmental impact assessment information identified in sections 5.1 to 5.4. In Table 5-3, “Summary of Cumulative Effects,” the

proponent is requested to complete the table using the cumulative effect assessment information identified in section 5.6 of the EIS.

Note that the following tables contain hypothetical information. They are only meant to show how each section should be completed. The level of impact (see definitions in Table 5-1) is measured after mitigation measures have been taken.

Table 5-2: Summary of Environmental Impacts

Project Activities	Environmental Components Subject to Impacts	Impacts – Short Description	Mitigation Measures	Residual Environmental Effects	Level of Residual Impact *
Construction Activities					
5.1.7. Tower construction • Vehicle and equipment travel	• Soil and terrain	• Soil compaction • Surface disturbance • Soil erosion	• Limit vehicles to existing trails • Build temporary road using geotextile material • Avoid slopes of greater than 15 percent • Use low-impact trucks	None anticipated	Minimal
5.1.7. Tower construction • Vehicle and equipment travel	• Local residents	• Creation of noise • Creation of dust on access routes	• Vehicles will be properly maintained • Vehicles driven in proper manner • Trail and gravel roads will be watered down if dust becomes an issue • Personal vehicles will be denied access to the site • Reasonable construction hours	Some impact, but short construction duration	Minimal
5.1.7. Tower construction • Vehicle and equipment travel	• Wildlife (birds, burrowing animals and other small animals)	• Increases wildlife mortality due to vehicle use • Disrupts wildlife • Relocation of wildlife	• Personal vehicles will be denied access to the site • Spring/summer surveys will be conducted prior to project construction. Follow-up and monitoring will be done after construction is completed • No personnel near shrubs and trees • Construction will avoid burrow colonies and den sites • Vehicle speed will be less than 30 kilometres per hour	Some impact, but short construction duration	Low

* See Table 5-1 on page 14.

Table 5-2 (Continued)

Operation Activities					
5.2.1.1. Land use	<ul style="list-style-type: none"> • Terrain/vegetation 	<ul style="list-style-type: none"> • Reduction of land for agricultural use 	<ul style="list-style-type: none"> • Land occupied by equipment will be less than 1 percent of site • Agricultural activities are possible near turbines 	None anticipated	Minimal
5.2.1.4. Wildlife disturbance	<ul style="list-style-type: none"> • Birds 	<ul style="list-style-type: none"> • Bird collision 	<ul style="list-style-type: none"> • Siting of turbines away from migratory bird corridors and in area of low topographic relief, away from potential nesting areas and in agricultural area with a low diversity of natural vegetation • Monitoring of bird collisions using carcass surveys • Turbines will have a tubular structure, which will deter birds from landing or perching on them 	Monitoring to be done for a minimum of one year	Low
Decommissioning/Abandonment Activities					
5.3.1. Turbine removal	<ul style="list-style-type: none"> • Terrain/vegetation 	<ul style="list-style-type: none"> • Reduction of land for agricultural use • Soil compaction 	<ul style="list-style-type: none"> • Plan to remove all above-surface equipment • Use of low-impact trucks • Reseeding • Turbine foundations left in but marked 	Underground structure left in but marked	Minimal

Table 5-3: Summary of Cumulative Effects

Valued Ecosystem Components (VECs)	Description of Project Activity	Other Activities	Assessment of Cumulative Effects	Level of Cumulative Effect
Bird habitat	<ul style="list-style-type: none"> • Project construction 	<ul style="list-style-type: none"> • Farming 	<ul style="list-style-type: none"> • Farming activity has already affected bird habitat to such an extent that no birds are nesting in the project work area • Mitigation measures will be put in place (e.g., project construction will occur outside of bird-nesting times and will avoid nesting areas where possible) • No cumulative increase in the destruction of bird habitat is anticipated 	Low
Bird population	<ul style="list-style-type: none"> • Presence of turbines 	<ul style="list-style-type: none"> • Silos • Other farm buildings • Transmission lines 	<ul style="list-style-type: none"> • Collision hazard for birds is expected to increase in proportion to the number of turbines added. Therefore, turbines will not be clustered in one location; therefore birds should be able to fly around or above turbines • Mitigation measures include siting turbines away from migratory bird corridors and in an area of low topographic relief, away from potential nesting areas and in an agricultural area with a low diversity of natural vegetation. Turbines will have a tubular structure, which will deter birds from landing or perching on them • Little cumulative increase in bird collisions is anticipated 	Low
Noise level	<ul style="list-style-type: none"> • Noise from turbine 	<ul style="list-style-type: none"> • Farming operation 	<ul style="list-style-type: none"> • Sound produced by turbines will be added to the noise produced by farming activities • Sound from turbines dissipates rapidly and turbines are set away from residences, therefore no cumulative increase in ambient sound levels is anticipated 	Low
Aesthetics	<ul style="list-style-type: none"> • Presence of turbines 	<ul style="list-style-type: none"> • Silos • Other tall structures 	<ul style="list-style-type: none"> • Turbine visibility from nearby roads and residences will combine with other tall structures and may contribute to a reduced view of mountains from certain locations • Mitigation measures will be put in place (turbines are far apart and are painted off-white to be less visible) • The public has been consulted and has not raised any concerns (in fact, most people consulted find the turbines pleasant to look at) • Turbine installation will contribute to a limited cumulative effect on the visual landscape 	Low

Section 6. Follow-up Measures

This section should summarize the proponent's follow-up measures and monitoring programs.

Section 7. Public Consultation

The proponent must hold information session(s) to inform members of the public about the project and to give them the opportunity to raise concerns. The consultation process needs to be well documented in the EIS. Concerns raised must be reported and addressed. A summary of the session(s) and key events should be presented in this section. RAs may also have a responsibility to consult the public.

Section 8. First Nations Consultation

In addition to public consultation, the proponents must consult with a First Nations official if a project is near a First Nations community to give First Nations the opportunity to raise concerns about the project. The First Nations consultation process needs to be well documented in the EIS. Concerns raised must be reported and addressed. A summary of the session(s) and key events should be presented in this section. RAs may also have a responsibility to consult First Nations communities.

Section 9. Conclusion

The EIS needs to state one of the following:

- The project is not likely to cause important environmental effects, taking into account the implementation of appropriate mitigation measures.
- The project is likely to cause important environmental effects.

- It is uncertain at this time whether or not the project is likely to cause important environmental effects.

Section 10. List of Supporting Documents

This section should list all supporting documents used to prepare the EA. Important excerpts should be attached in an appendix.

Section 11. Signature

EIS conducted by:

Name of proponent

Date

Signature

Name of consultant

Date

Note: The proponent is responsible for the report's content and any commitments made therein. Therefore, the proponent must sign off on the report even if external consultants were used.

Section 12. Attachments

- Location map of project.
- Map showing location of turbines, access roads, substation and transmission lines.
- Supporting documents.

V. Appendix A: Glossary

ACRONYMS AND ABBREVIATIONS USED IN THE GUIDELINES

CEAA

Canadian Environmental Assessment Act

EA

Environmental Assessment

EIS

Environmental Impact Statement

FA

Federal Authority

NRCan

Natural Resources Canada

RA

Responsible Authority

VEC

Valued Ecosystem Component

WPPI

Wind Power Production Incentive

DEFINITIONS FROM THE CEAA AND TERMS USED IN THE GUIDELINES

Comprehensive study:

an environmental assessment that is conducted pursuant to section 21 of the CEAA and that includes a consideration of the factors under subsections 16(1) and (2) of the Act.

Comprehensive study list:

a list of all projects or classes of projects that have been prescribed pursuant to regulations made under paragraph 59(d) of the CEAA.

Cumulative effects:

a project's effect on the environment combined with the effects of projects and activities (past, existing or imminent). These may occur over a certain period of time or distance.

Environment:

the components of the earth including

- (a) land, water and air, including all layers of the atmosphere;
- (b) all organic and inorganic matter and living organisms; and
- (c) the interacting natural systems that include components referred to in (a) and (b).

Environmental Assessment:

with respect to a project, an assessment of the environmental effects of the project that is conducted in accordance with the CEAA and its regulations.

Environmental component:

a fundamental element of the natural and human environment, such as air, water, soil, terrain, vegetation, wildlife, fish, avifauna and land use.

Environmental effect:

with respect to a project, any change that the project may cause in the environment, including any changes to health and socio-economic conditions, physical and cultural heritage, and current land and resources used for traditional purposes by Aboriginal persons. Also included are changes to any structure or site that is of historical, archaeological, paleontological or architectural significance, and any change to the project that may be caused by the environment.

Environmental Impact Statement:

a document outlining the environmental effects of the project on the environment, prepared by the proponent of a project and presented to decision makers and the public.

Federal Authority:

- (a) a Minister of the Crown in right of Canada;
- (b) an agency of the Government of Canada or other body established by or pursuant to an Act of Parliament that is ultimately accountable through a Minister of the Crown in right of Canada to Parliament for the conduct of its affairs;
- (c) any department or departmental corporation set out in Schedule I or II of the *Financial Administration Act*; and
- (d) any other body that is prescribed pursuant to regulations made under paragraph 59(e) of the CEAA, but that does not include
 - the Commissioner in Council or an agency or body of the Yukon Territory, the Northwest Territories or Nunavut,
 - the council of a band within the meaning of the *Indian Act*,
 - the Hamilton Harbour Commissioners constituted pursuant to the *Hamilton Harbour Commissioners Act*,
 - the Toronto Harbour Commissioners constituted pursuant to the *Toronto Harbour Commissioners Act, 1911*,
 - a harbour commission established pursuant to the *Harbour Commissions Act*,
 - a Crown corporation within the meaning of the *Financial Administration Act*, or
 - a not-for-profit corporation that enters into an agreement under subsection 80(5) of the *Canada Marine Act* or a port authority established under that Act.

Follow-up program:

a program put in place to verify the accuracy of the Environmental Assessment of a project and/or to determine the effectiveness of any measures taken to mitigate the adverse environmental effects of the project.

Lead responsible authority:

where the same project has two or more responsible authorities, one of the responsible authorities may be designated as the lead for the purpose of conducting the Environmental Assessment.

Mitigation:

with respect to a project, the elimination, reduction or control of adverse environmental effects, including restitution through replacement, restoration, compensation or any other means for any damage to the environment caused by such effects.

Monitoring:

a continuing assessment of conditions at and surrounding the action taken with respect to a project. Monitoring determines whether effects occur as predicted, operations remain within acceptable limits and if mitigation measures are as effective as expected.

Physical work:

any proposed construction that is fixed and permanent.

Project:

- (a) in relation to a physical work, any proposed construction, operation, modification, decommissioning, abandonment or other undertaking, or
- (b) any proposed physical activity not relating to a physical work that is prescribed or is within a class of physical activities that is prescribed pursuant to regulations made under paragraph 59(b) of the CEAA.

Proponent:

with respect to a project, any person, body, business, government or federal authority that proposes the project.

Public registry:

a system for providing convenient public access to documents relating to an Environmental Assessment.

Residual effects:

effects that remain after mitigation measures have been applied.

Responsible Authority:

in relation to a project, a Federal Authority that is required, pursuant to subsection 11(1) of the CEAA, to ensure an Environmental Assessment of the project is conducted.

Scope of the assessment:

a determination of the environmental effects to be addressed, the scope of the environmental effects to be assessed, and the effects to be considered in making decisions regarding the project.

Scope of the project:

those components of the proposed development that should be considered part of the project for the purposes of the Environmental Assessment.

Scoping:

a process by which all relevant issues and concerns related to the proposed project and assessment are identified and prioritized.

Screening:

an Environmental Assessment that is conducted pursuant to section 18 of the CEAA and that includes a consideration of the factors set out in subsection 16(1) of the CEAA.

Screening report:

a report that summarizes the results of a screening.

Valued Ecosystem Component (VEC):

any part of the environment that is considered important by the proponent, members of the public, scientists and government involved in the assessment process. Importance may be determined on the basis of cultural values or scientific concerns.

VI. Appendix B: List of Possible Impacts and Mitigation Measures

The following lists of potential impacts and mitigation measures were compiled from existing EAs. Note that the proponent's EIS should address

all relevant potential environmental impacts and mitigation measures and should not be limited to the examples provided in the following lists.

POTENTIAL IMPACTS

- | | |
|--|---|
| <ul style="list-style-type: none"> • Soil compaction • Surface disturbance • Loss of topsoil • Admixing of soils • Soil erosion • Reduction of soil productivity • Soil contamination | <ul style="list-style-type: none"> • Admixing of contaminated soil with clean soil • Alteration of terrain • Rutting • Slope damage • Damage to heritage resources • Disturbance to vegetation • Destruction of vegetation |
|--|---|

- Destruction of rare plants and communities
- Disturbance to sensitive areas
- Disturbance to habitats of species at risk
- Disturbance to species at risk
- Introduction and proliferation of nuisance and noxious, non-native weed species
- Change in species composition
- Loss of native ecosystem integrity (fragmentation)
- Fires/wildfires
- Groundwater contamination by spills
- Standing water contamination
- Wetland habitat contamination
- Change in drainage patterns
- Wildlife mortality
- Wildlife mortality increase through vehicle use
- Avian mortality
- Disruption of wildlife
- Change in wildlife population dynamics
- Sensory disturbance to wildlife
- Wildlife harassment
- Displacement of wildlife
- Disturbance to animal behavior
- Wildlife reproduction failure
- Additional noise
- Additional dust
- Air emissions
- Loss of grazing areas
- Loss of public recreational area
- Loss of Aboriginal land
- Public safety
- Visual disruption
- Release of livestock
- Property damage
- New access trail could be used by the public
- Loss of significant archaeological resources

POTENTIAL MITIGATION MEASURES

- Construction is not scheduled during critical life-cycle periods for wildlife (breeding, nesting, rearing of young, migration, etc.)
- Spring/summer surveys will be conducted prior to the project construction for identification of floral species
- Spring/summer surveys will be conducted prior to the project construction for identification of wildlife (birds and fish)
- Choose to construct underground transmission lines where bird-wire interactions would be problematic
- Construction activities (tower site, transmission lines, substation, trenching, storage facilities) are located away from sensitive features and significant viewing sites (e.g., unique plant communities, rare and endangered or threatened species)
- Personnel not to be permitted near sensitive features
- Personnel will be instructed to stay away from shrubs and tree covers to avoid disturbance to wildlife
- Burrow colonies (e.g., burrowing owls, ground squirrels, gophers), hibernacula and nest sites will be avoided
- Location of burrow colonies and nest sites will be mapped and provided to personnel with instruction to avoid these sites
- No activities will take place near the habitats of species at risk

- Tower sites are located away from structures that might attract avian species
- Tower sites will be located away from existing nesting areas
- New trails will avoid slopes greater than 15 percent
- Steep slopes and sided slopes will be avoided
- Shortest routes and least environmentally sensitive routes will be selected
- Where new access roads are required, geotextile material will be spread over the existing ground surface and covered with clean road gravel
- Access trails and gravel roads will be watered down should excess dust become a problem
- New trails will avoid depressions that may hold temporary bodies of water in spring or after rainfall
- Limit vehicles to existing trails and approved roads where possible
- All construction equipment and vehicles will be cleaned before entering the site to reduce the chance of spreading weeds and non-native species
- Vehicle maintenance will be done off-site
- Vehicle maintenance will be done on-site with proper protection equipment in place
- Vehicle speed will be less than 30 kilometres per hour
- Vehicles will be driven in proper manner and drivers will respect all traffic laws, regulations and company policies
- Personal vehicles will be denied access to the site
- Vehicles will be equipped with proper exhaust systems
- No-idling policy for vehicles where appropriate
- Vehicles/heavy equipment will not be moved at any time that mating is likely to occur
- Vehicle imprints or erosion gullies will be re-graded
- Surface grading will be minimized
- Topsoil stripping will be minimized
- Excavation will be minimized
- Access trails and tower sites that require less grading will be selected
- Ensure topsoil is stored separately from subsoil
- Use “three lift” soil excavation technique and storage where appropriate (i.e., topsoil, middle layer and subsoil)
- Trenches and new roads will be combined to avoid disturbance
- Transmission lines will be installed within the access track right-of-way
- Underground cable routes will be located away from sensitive features (unique plant communities, rare and endangered species)
- Erosion prevention troughs/berms will be constructed
- Silt fences will be erected
- Exposure of bare ground will be minimized
- Disturbed areas will be reseeded with appropriate native seed mix
- Areas of concern will be flagged and avoided
- Disturbed area will be restored
- Spills will be cleaned up immediately using proper remediation procedures
- Re-vegetation will be undertaken on disturbed sites
- Reclamation will be done using native species where possible
- Reclaimed site will be fenced
- Hydrological features, heritage resources and coulee complexes will be avoided

- Natural drainage will not be disrupted
- Surface drainage will be controlled by lined perimeter ditches and drained into a sediment pond
- Construction activities (tower site, transmission lines, substation, trenching, storage facilities) are not located near water bodies
- All construction and operation activities will be confined to the surveyed areas
- An historical and archaeological resources assessment will be conducted prior to construction activities
- Archaeological excavations will be conducted prior to construction activities
- Time of equipment on-site will be minimized
- Disturbance to grazing lands will be minimized
- Damaged fences are to be repaired as soon as possible
- All litter will be disposed of in an approved manner
- General public will be denied access to the site
- Landowners will be contacted and kept informed of development activities

VII. For More Information

For more information on the WPPI or to obtain additional copies of this publication, please contact:

Wind Power Production Incentive
Natural Resources Canada
580 Booth Street
Ottawa ON K1A 0E4

Tel.: 1 877 722-6600 (toll-free)

Fax: (613) 947-0373

E-mail: wppi@nrca.gc.ca

Web site: www.canren.gc.ca/wppi

For more information on wind energy or other forms of renewable energy, please visit the Canadian Renewable Energy Network's Web site at www.canren.gc.ca.