

Nexen Marketing

Soderglen Windfarm Project Plan

GHG Offset Project Plan
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Part 1: Project and Proponent Identification

The Project proponent for the GHG emissions reductions is Nexen Marketing. Nexen owns 50% of the GHG credits associated with the Soderglen Windfarm Project by virtue of our working interest. We have contractual entitlement to the other 50% under the terms of our joint venture agreement with Canadian Hydro Developers, Inc. Nexen Marketing has notified Canadian Hydro Developers, Inc. that all available GHG emission reductions for the Soderglen Windfarm Project will be registered in Nexen Marketing's name and this has been acknowledged and accepted by Canadian Hydro Developers, Inc.

Project Proponent

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Part 2: Project Overview

Introduction

Nexen Marketing in joint venture with Canadian Hydro Developers Inc. own 50% respectively of Soderghen Windfarm Project. This project was commissioned in September 2006. It is a 70.5 MW (gross) wind farm in southern Alberta. This project generates approximately 245,000 MWh annual of green power for sale, or 159,000 tonnes per annum of marketable CO₂ equivalents (assuming 0.65 tonnes CO₂/MWh).

As the project is emission-free, all MWh generated will directly off-set the marginal price setting unit, be that natural gas or coal fuelled generating units.

Project Background

The Soderghen Wind Project is located in the Province of Alberta, 20 kilometres southwest of Ft. McLeod on approximately 4,000 acres of native prairie grasslands and cultivated lands. The majority of the land is located on the southern most edge of the plateau visible from Ft. McLeod and is at an elevation of 3900 feet. The figure below indicates the position of the Soderghen Windfarm Project (SWP) relative to the major roads and urban areas.



Presently, Soderghen Windfarm Project has a capacity of 70.5 MW. However, the land allows for the development of approximately 120 MW of wind energy.

The project employs state of the art wind turbines with a rating of 1.5 MW each. There are 47 wind turbines located throughout the project lands producing a total capacity of 70.5 MW.

The turbines power is collected through a medium voltage collection system to the main substation. At the main substation the voltage is increased to 138 kV for direct connection to the Alberta Interconnected Electrical System via a 12 kilometre interconnection line. The substation is located at the north-western corner of the wind farm lands. The enclosed map shows the current layout of Phase I of the Soderghen Wind Farm.

The turbines are interconnected via a 25 kV collector system to the main substation where the electrical energy is transformed into the required 138 kV grid voltage for connection. Each wind turbine has a meter attached to it for the purposes of measuring its performance and output characteristics. The aggregate wind farm production will be measured through an approved custody transfer meter located at the substation.

The following provides additional detail of the major project parameters:

Nearest Substation:	Peigan Substation, 59S
Nearest Transmission line:	725L (138 kV)
Proposed Commissioning Date:	June 2005
Energy Sales:	Power Pool of Alberta or End users within Alberta
Phase I Capacity:	70.5 MW
Projected Average Energy production:	245,000 MWh/year
Machine Type:	GE 1.5 SLE Class 2 turbines
Full Project Capacity:	70.5 MW
Project Average Energy Production:	245,000 MWh/Year

Green house gases will be removed from the environment by the project via the displacement of marginal price setting electricity units in Alberta. Power generated with wind turbines will displace natural gas and coal fuelled generators.

Project Proponent

Nexen Marketing is a division of Nexen Inc., a thriving Oil, Gas and Chemicals Company with operations around the world. The company was formed in 1971 and was originally known as Canadian Occidental Petroleum Ltd. The marketing arm of Nexen Inc., Nexen Marketing, operates the Balzac natural gas power plant north of Calgary. Nexen Marketing is also active in the wholesale and retail power markets of Alberta.

Nexen's partner for this project, Canadian Hydro Developers, Inc. is Canada's premier independent developer of EcoLogo® certified low-impact renewable energy. Publicly listed since 1990, the company owns and operates twenty green power facilities. Wind-generated electricity accounts for seven sites and hydroelectric power twelve sites.

Environmentally responsible projects are projects which have certain fundamental attributes in their relation to the environment. These projects use the best available technologies to exploit the resource and contribute towards a cleaner environment. The attributes of environmentally responsible projects result in "clean" energy, best described as follows:

Clear skies, Low impact, Efficient, Attractive economic returns, New technology

Projects which clearly fall within this definition employ technologies to harness energy from wind, water through "run-of-river" hydro, biomass and natural gas co-generation. Soderglen Windfarm Project is Nexen's first wind project.

Project Partnerships

Nexen Marketing was originally partnered with GW Power with each have a 50% interest in the project. In 2007, GW Power sold its 50% interest to Canadian Hydro Developers, Inc. Nexen owns 50% of the GHG credits associated with the Soderglen Windfarm Project by virtue of our working interest. We have contractual entitlement to the other 50% under the terms of our joint venture agreement with Canadian Hydro Developers, Inc. Nexen Marketing has notified Canadian Hydro Developers, Inc. that all available

GHG emission reductions for the Soderglen Windfarm Project will be registered in Nexen Marketing's name and this has been acknowledged and accepted by Canadian Hydro Developers, Inc.

Monitoring and Data Management

Nexen Marketing & Canadian Hydro Developers, Inc. monitor and measure all electricity produced through a SCADA system. The Alberta Electric System Operator (AESO) will also provide monitoring. Data will be housed in a secure database, such as Oracle.

Project Technology

The project proponents presently anticipate installing approximately 47 General Electric 1.5 SLE wind turbines. These turbines are capable of producing 1.5 MW of electrical energy from a wind resource. They use proven existing technology.

As wind power is emission free and has a near-zero marginal cost, all wind power produced will off-set the marginal price setting electricity generating facility in Alberta - either natural gas or coal.

Real and Measurable

This project meets the Real criteria as no emissions are created in the creation of electricity through wind turbines. Emissions in Alberta are reduced as electricity from wind will displace electricity produced from natural gas and coal fired units.

This project meets the Measurable criteria as Green House Gas (GHG) emissions with this project in place are lower than those in the reference without this project.

Based on Alberta's Quantification Protocol for Wind-Powered Electrical Generation Version 1, March 2008, this project will produce approximately 0.65 tonnes CO₂e GHG offsets for every mega-watt hour of electricity it will produce. Given that the project produces measurable electricity, the GHG offsets are measurable.

Verifiable

Steps taken to manage and make available all data records required to conduct an audit.

- All electricity produced is accurately metered. Each individual WTG is metered for control purposes. A separate single revenue meter located at the wind farm substation is used for revenue metering. For all metering system management services, MIDAS is contracted to provide the required services.
- Emission reductions claimed have been verified by Mr. Frank Kloiber of Amberg Corp. Mr. Kloiber is a professional engineer (APEGGA) with 25 years of experience. His current activities include regulatory and compliance management with particular focus on air emissions. He has permitted numerous facilities and managed their compliance issues. Mr. Kloiber is also a Certified Environmental Auditor (CECAB) and is familiar with current audit standards and the Alberta requirements.

Surplus

All emission reductions for this wind project, offered in this proposal, are presently available as they represent a net reduction in emissions that is not otherwise contracted. Nexen Marketing has previously sold to the PERRL program.

Sustainable

Wind projects such as Soderghen Windfarm Project have high capital costs but low operating costs. In essence, this project will continue to operate almost regardless of future economic conditions. As natural gas fired power plants are expected to be the marginal price setting units in Alberta for the next 20 years or so, this wind project is sustainable. Electricity produced from wind turbines will offset emissions produced from natural gas fuelled power plants.

Location

This project is located approximately 20 km south of Fort McLeod in Alberta, Canada. The location of both baseline emissions and project emission reductions encompass all of Alberta through the Alberta Interconnected Electric System.

Latitude: DD Lat. 49.513

Longitude: DD Lon. 113.494

(The latitudinal and longitudinal coordinates are taken from the middle of the wind farm.)

Project Conditions

Most of the project land is native prairie with a small portion cultivated. During construction, careful consideration was given to how top soil was removed, segregated and stored to build access roads, crane pads and the foundations, while mitigating erosion from wind or water. Access during construction was restricted to access road ways to reduce impact on surrounding lands and wildlife habitat. Once construction was completed, the access roads were reduced to a narrow track to allow access by work truck to the turbine sites. The soil was reclaimed to the adjacent land of the access roads. The crane pads were also removed and had the soil restored. The disturbed areas were then reclaimed in accordance with accepted industry standards. Seed mixtures were selected with consultation of the landowner and included a native seed mix that was selected specifically for that region, in consultation with Alberta Agriculture. Consideration was also given to control weed growth throughout the construction and reclamation phases.

Currently, the native prairie component of the reclaimed areas has recovered very well as a result of the reclamation efforts. Aside from the narrow tracks for the access roads, there is very little visible differentiation between the original native lands and the reclaimed lands from construction.



Quantification Protocol Applicability

The applicability criteria, identification of sources and sinks, and quantification methodologies for this Project have been determined in accordance with the Alberta Offset System Quantification Protocol for Wind Powered Electricity Generation (AENV, 2008). As outlined in the protocol, the Project must conform to the following applicability criteria. This Offset Project Plan must demonstrate that:

1. The metering of net electricity production must be made at a point downstream of both generation and any storage system, typically to where generated electricity is connected to its loads; and
2. The quantification of reductions achieved by the Project is based on actual measurement and monitoring (except where indicated in this protocol) as indicated by the proper application of this protocol.

Demonstration that the Project complies with the applicability criteria outlined above is provided in the following sections.

Metering of Electricity Downstream of Generation

Metering of electricity occurs downstream of generation at the substation before being transmitted to the AESO Transmission Grid.

Quantification of Reductions

Reductions can be quantified as accurate metering has been applied to the project's power generation and Alberta has set an electrical system emissions intensity factor of 0.65 tonnes CO₂e per MWh of power generated.

Offset Eligibility Requirements

This Project meets the requirements for offset eligibility as specified in the applicable regulation and guidance documents for the Alberta Offset System. In particular:

1. Ownership of the GHG emission reductions has been established. Nexen owns 50% of the GHG credits associated with the Soderglen Windfarm Project by virtue of our working interest. We have contractual entitlement to the other 50% under the terms of our joint venture agreement with Canadian Hydro Developers, Inc. Nexen Marketing has notified Canadian Hydro Developers, Inc. that all available GHG emission reductions for the Soderglen Windfarm Project will be registered in Nexen Marketing's name and this has been acknowledged and accepted by Canadian Hydro Developers, Inc. No other entity is claiming credit for the reductions realized at the Project site. Credits created from the specified reduction activity have not been created, recorded or registered in more than one trading registry for the same time period.
2. Any offsets sold under the PERRL program will be discounted from the total emission reductions considered in this report.
3. The wind powered electricity generation system installed at the facility produces reductions that are real and are not the result of a shutdown or cessation of an activity.
4. The emission reductions are related to the facility's operations and are quantifiable using the provided protocol based on metered and measured data.
5. The emission reductions created as a result of the Soderglen Windfarm Project are surplus to any regulation.

Part 3: System Functions & Scope

System Functions

A: Project System Function	Functional Unit (quantitative reference)
Function 1 – Wind Input	Available wind in the natural environment is used to produce zero emission electricity.
Function 2 – Energy Output	MWh (mega-watt hours).
Function 3 – Emissions Output	Tonnes CO2 equivalent (0).

Scope of Measurement & Reporting

B: Baseline System Function	Functional Unit (quantitative reference)
Function 1 – Fuel Input	Tonnes coal or GJ natural gas
Function 2 – Energy Output	MWh (mega-watt hours)
Function 3 – Emissions Output	Tonnes CO2 equivalent.

A: Project System Elements	Element Descriptions	A	B	C (% of total system)	D	Included in Scope?
1. Creation of electricity through the conversion of wind energy to electrical energy.	Force exerted by wind is converted to electrical energy. This process is emission free.	Yes	No	Yes, 100%	Yes	Yes
				Total:	100%	

B: Baseline System Elements	Element Descriptions	A	B	C (% of total system)	D	Included in Scope?
1. Creation of electricity through combustion of hydrocarbons.	Natural gas and coal are burned to create electricity. Emissions are created through this process.	Yes	Yes – Fuel Combustion	Yes, 100%	Yes	Yes
				Total:	100%	

Element GHG Overview Information		
Element GHG Intensity (CO ₂ e/unit)	0.65	n/a
Element Installation GHG Emissions	n/a	n/a
Element Maintenance GHG Emissions	n/a	n/a
Element Decommissioning GHG Emissions	n/a	n/a
Environmental Information		
Comments about Air	addition to the GHG emissions which are produced by thermal power plants, numerous other pollutants (NOx, SOx,etc) and particulates are discharged into the air. As an example, combined cycle gas fired power projects produce 0.5 kg/MWh. For the same power production as the Soderglen Wind Project a gas fired plant would produce upwards of 125,000 kg of NOx annually. Coal fired power plants emit more GHG and other noxious elements as they are particularly high emitters due to the nature of the fuel. All fossil fuel based thermal power plants have a long term negative effect on the environment resulting from the air emissions.	Wind power projects do not emit any pollutants into the air.
Comments about Water	Thermal power plants can consume water large quantities to produce steam and for cooling, they generally are not large polluters of water resources.	Wind Power projects do not utilize water.
Comments about Land	Thermal power plants typically have a small footprint and a corresponding low impact on land; however the land which is utilized is removed from the ecosystem.	Wind power project utilize a very small amount of land and have a minimal impact. The land which comprises the wind farm may still be used for the purposes that it was being used prior.
Comments about Wildlife	Thermal power plants impact on wildlife is the direct result of the removal of land from the ecosystem, however given that the land footprint is small; overall effect on wildlife would be minimal.	Due to the low impact on land and the ecosystem, wind power projects have a minimal impact on wildlife.

Part 4: Project and Baseline Data Templates

General Element Information		
Element Name	Baseline – Hydrocarbon Electricity Production	Project – Wind Electricity Production
Element Description	Hydrocarbons are burned to produce electrical energy	Kinetic energy of the wind is converted to electrical energy using a wind turbine
Type of Element (direct or indirect)	Direct	Direct
Element Measurement Unit	MWh	MWh
Expected Life of Element (years)	25+	25+
Type of Element Emission Estimation Method	Published emission factors	Published emission factors
Element Input Information		
Name of Input	Hydrocarbon fuel	Wind Energy
Type of Input (energy, mass, GHG)	Energy (natural gas)	Kinetic wind energy
Number of Units of Input	~8 GJ	0
Units of Measure	GJ	0
GHG/Unit of Input	~0.65 tonnes CO ₂ E/MWh	0.00 tonnes CO ₂ E/MWh
Units of Measure	MWh	MWh
Element Output Information		
Name of Output	Electricity	Electricity
Type of Output (energy, mass, GHG)	Energy	Energy
Number of Units of Output	235,000 MWh/year	235,000 MWh/year
Units of Measure	MWh	MWh
GHG/Unit of Output	~0.65	0
Units of Measure	tonnes	tonnes

References

The following provides the names of organizations, documents etc which were utilized to produce this application.

- Nexen Marketing
- Alberta Offset System Project Guidance Document (AENV, 2008)
- Alberta Offset System Quantification Protocol for Wind Powered Electricity Generation (2008)
- General Electric Web site
- Information generated by GW Power in the course of project development
- Options Paper prepared by the Electricity Table of the National Secretariat for Climate Change
- Amberg Corp. reviewed document