

December 20, 2006

NaiKun Wind Farm (Phase I) Project Description

The NaiKun wind farm is proposed for the shallow waters off the northeast coast of Haida Gwaii in Hecate Strait. The wind farm is proposed to be developed in five phases according to market circumstances, with a proposed eventual build out of 1750 MW. The proponent, NaiKun Wind Development Inc (NKWDI), is proposing to apply only for the first, 320 MW phase of the project at this time. NKWDI fully understands the requirement to file separate Applications, starting at the very beginning, for any subsequent Phases, and that cumulative effects will be need to be accounted for in any such assessment. Accordingly the “Project” or “wind farm” referred to below is the 320 MW Phase I Project.

This document contains the information required by the British Columbia Environmental Assessment Office (EAO) and the Canadian Environmental Assessment Agency to determine the applicability of the provincial and federal environmental assessment acts to the Project. In preparation of this document, we have followed the CEAA Project Description Guide (Dec, 2006).

1.0 General Information

NaiKun Wind Development Inc. is the proponent of the project. NaiKun Wind Development Inc. (NKWDI) is a BC company created for the sole purpose of developing the NaiKun Wind Farm. NKWDI was incorporated on June 3, 2002 under the *Company Act* (British Columbia). On December 20, 2002, the Company was continued under the Canada Business Corporations Act. NKWDI is a wholly owned subsidiary of the NaiKun Wind Energy Group, Inc.

Directors and officers of NKWDI include, among others:

President - Ray Castelli

Vice-President, Design and Construction - Peter Hunter

Vice-President, Power and Transmission Planning - Michael Margolick

Contact Information

Michael Margolick

NaiKun Wind Development Inc.

1705-1066 West Hastings Street

Vancouver, BC

V6E 3X1

Telephone: 604 639 8460 x 102

Fax: 604 685 4215

e-mail: mmargolick@naikun.ca

The environmental assessment is being coordinated, on behalf of the proponent, by:

Susan Wilkins, Vice President
Pottinger Gaherty Environmental Consultants Ltd.
1200–1185 West Georgia Street
Vancouver BC
V6E 4E6
Canada
Telephone: 604 682 3707
Fax: 604 682 3497
e-mail: swilkins@pggroup.com

1.1 Other EA Regimes

The NaiKun Wind Farm is subject to both federal and provincial environmental assessments under the *Canadian Environmental Assessment Act* (CEAA) and *British Columbia Environmental Assessment Act* (BCEAA), and will therefore be subject to a joint review led by provincial EAO. The project type and size determines whether or not it is a reviewable project under BCEAA. The wind farm is a power facility with a capacity of 320 MW. Under the Reviewable Projects Regulation of BCEAA, a new power facility, including wind generation, with a capacity of ≥ 50 MW of electricity is a reviewable project. Pursuant to this, the Project has received a Section 10 order from the BC EAO. Since both CEAA and BCEAA are triggered by this project, a joint review will be conducted under the directives of the *Canada-BC Agreement for Environmental Assessment Cooperation* (Harmonization Agreement), with the province acting as the lead through the EAO.

It is anticipated that the project will be reviewed by the Haida Power Authority, with the precise EA requirements to be determined.

1.2 Consultations with Other Parties

NKWDI has had consultations with many parties regarding the proposed project to date. Some of these groups include:

BC EAO
Fisheries and Oceans Canada
Canadian Wildlife Service, Environment Canada
Council of Haida Nation
Haida Power Authority
Old Masset Village Council
Skidegate Band Council
Town Council of Masset, Port Clements, Prince Rupert
Skeena-Queen Charlotte Regional District
Tsimshian Executive Association
Kitkatla Band Council

Naikoon Park Advisory Committee

Area A Crab Fisherman's Association
Ground Trawlers Association
David Suzuki Foundation

2.0 Project Information

This section covers project location, project type, size and schedule, and project purpose and rationale.

2.1 Location

The Project is proposed to be located in shallow waters off the northeast coast of Haida Gwaii in Hecate Strait.). NKWDI holds an *Investigative Use Permit* (IUP) from BC, and a *Permit to Conduct Research* from the Haida Power Authority, to conduct investigative work in a trapezoid-shaped area of approximately 550 sq. km. and along a potential subsea cable corridor (Figure 1). The wind turbines will be located within this area, and will cover an area of approximately 36 sq. km.

The coordinates of the trapezoid are (1:250 000 map sheet 103G):

	Longitude	Latitude
Lower Left	W131° 43.5'	N53° 45.5'
Lower Right	W131° 20.5'	N53° 45.5'
Upper Left	W131° 39'	N54° 00'
Upper Right	W131° 24'	N54° 00'

The sea cable route under IUP is a rectangular corridor of a width of 1 kilometer whose western extremity is centred at:

- Longitude W131° 26' 49" 25
- Latitude N53° 53' 23" 59

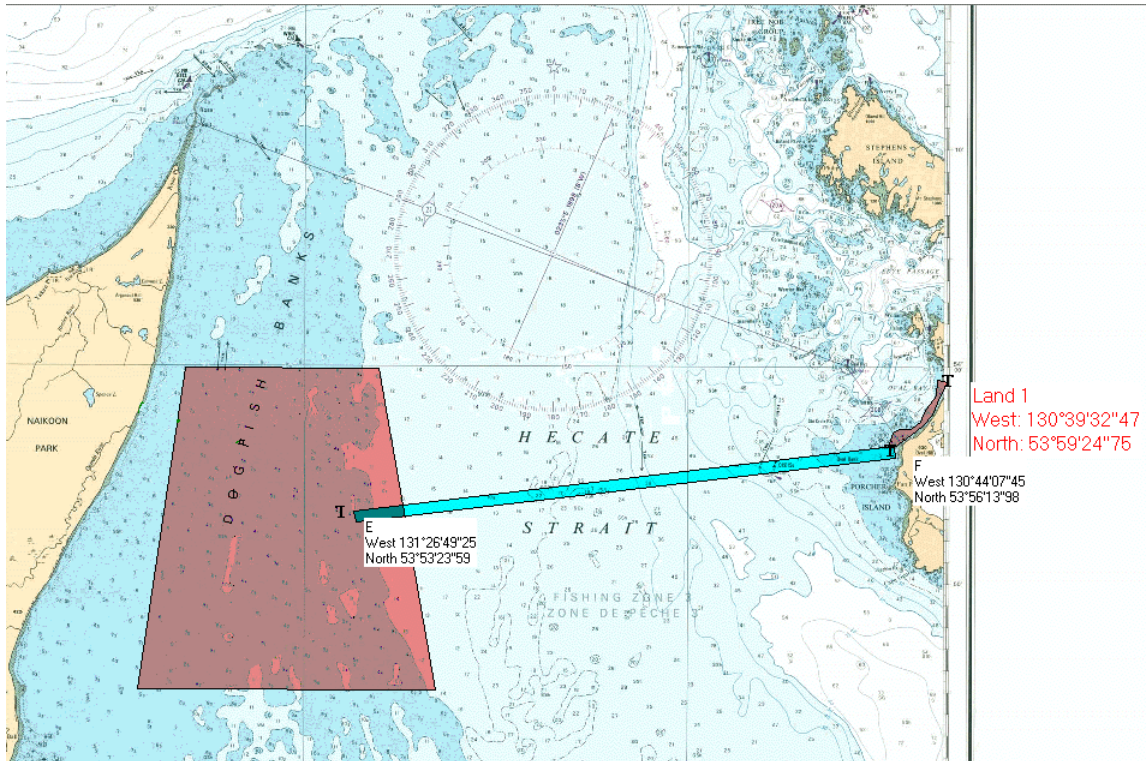
And whose eastern extremity is centred at:

- Longitude W130° 44' 07" 45
- Latitude N 53° 56' 13" 98

And an irregular shape bounded on the south by the above rectangular corridor, bounded on the west by the 20-meter depth contour, bounded on the east by the shoreline low-water mark, and bounded on the north by latitude 53° 59' 24" 75.

The wind farm will occupy approximately 6-7% of the area of the trapezoidal IUP and Haida permit.

Figure 1 – Investigative Use Permit



2.2 Project Type & Size

The wind farm is a power facility with a capacity of 320 MW. The Comprehensive Study List Regulations under CEAA identify the types and sizes of projects that require a comprehensive study. Wind power projects are not specifically mentioned in the Comprehensive Study List Regulations, though the proposed construction of an electrical transmission line with a voltage of 345 kV or more that is 75 km or more in length on a new right of way requires a comprehensive study as per *Part II - Electrical Generating Stations and Transmission Lines*. The proposed transmission line is longer than 75 km, hence a Comprehensive Study is triggered.

2.3 Project Purpose & Rationale

The Nai Kun project will be one of many new generation plants supplying the increasing demand for electrical power in western Canada and the United States. The project will:

- feed a growing market with a safe, secure and environmentally sound domestic source of electricity;
- establish British Columbia and Canada among the world leaders in renewable energy development;
- produce utility-scale power for the competitive market; and
- substantively contribute to meeting national greenhouse gas emission objectives.

The wind conditions at the site are excellent for wind energy generation.

2.4 Project Schedule

The project development schedule is expected to consist of:

- Construction 3 years – This corresponds to the maximum estimated time for all design, siting work, and construction of the wind farm.
- Operation 40 -50 years – Currently there are no restrictions for the operational period. The expected physical life of the towers, substation and sea cable is 40+ years, while the first generation of turbines are expected to last 15 -25 years.
- Decommissioning As a starting point, we have assumed 2 years is sufficient for decommissioning.

2.5 Project Components

This section includes a description of the main components of the project, including their construction, operation, and decommissioning.

General

The proposed wind farm consists of 67 to 110 wind turbine towers, each with a capacity of no less than 3 MW and no more than 5 MW. The hub (centre of the rotor) is at an elevation of approximately 80 meters or more above the ocean surface. The lower extremity of the blades is no less than 20 meters above the water at Highest Astronomical Tide (HAT). The turbines operate in much the same manner as large onshore turbines. The blades rotate at a maximum rate of approximately 18-20 rpm and are feathered out and braked during very strong winds. Maintenance access is either by helicopter or by a special marine vessel designed for the harsh sea conditions. The tower and foundation design will be determined by the results of a geophysical survey of the seabed and measurement of waves and currents as well as data on wind and seismic activity. Monopile, gravity and pile-jacket foundation designs are under consideration.

The electricity from the turbines is gathered via sea cables at an offshore substation and transmitted to the mainland, interconnecting with BC Hydro's 287 kV power line at a point near Prince Rupert. The planned transmission route may cross Porcher and Smith Islands with overhead transmission lines. A direct undersea route to Prince Rupert is also under investigation. All sea cables will be buried to a suitable depth.

There are three distinct geographical “areas of focus” associated with the proposed wind farm:

1. **The Wind Farm Grid Area** - the 550 km² area on Dogfish Bank, generally <20m deep.
2. **The Seabed Cable Corridor** – a submarine cable is proposed to run between the windfarm and Prince Rupert. Water depth in the corridor is generally 20 to 100m deep.

3. **The Cable Landfalls and Terrestrial Corridor** – the transmission cable may cross Porcher and Smith Islands and eventually terminate in the Prince Rupert area. A direct undersea route to Prince Rupert is also under investigation.

The Nai Kun project includes development, construction, maintenance and operation of the wind farm, cable and switchgear, and delivery of electricity to the BC Hydro grid via underwater cable and overhead transmission.

A Sustainability Plan for the project will be developed during the project design with the goal of meeting suitable sustainability criteria.

Turbines

The turbines consist of generators connected to large-diameter blades, both of which are mounted on steel towers of approximately 80m height above the water level. The towers would be spaced approximately 450 - 750m apart and either pile-driven or resting on the seabed using gravity based foundations. The towers also contain control and electrical conversion equipment. The facility includes one or two offshore substations. The following table illustrates one possible configuration based on a monopile foundation and 3.0MW turbines

Number of towers	110
Hub height (above sea level)	80m
Diameter of each tower	6m
Depth of foundation in sediment	25m
Total seabed footprint of towers	0.0093 sq. km.
Turbine spacing	450 x 630 m
Total Windfarm Area	31 km ²
Rotational speed	0 -18 rpm
Tower Type	tubular steel
Blade Type	fibreglass

A full description of the project layout will be the subject of further work. This will include details of the number of towers and their locations, type of turbines, structural design of the towers, anchoring technique, and offshore substation facilities.

Grid Connection

A high voltage underwater cable from the centre of the wind farm would reach landfall on the west coast of Porcher Island. An overhead transmission line would cross Porcher Island, connecting to a seacable to Smith Island and then across Smith Island via overhead line, connecting to the Mainland between Port Edward and the north side of the mouth of the Skeena River. . A direct undersea route to Prince Rupert is also under investigation.

There will be one or two offshore substations and associated cabling to connect the wind turbines to the substation. All sea cables will be buried to a suitable depth. Details of the grid connection, routing, underwater and onshore cabling requirements, and other electrical transmission elements will be determined.

Staging Activities

Construction for the project will be based from Fairview Terminals at Prince Rupert. Fairview Terminals is currently being expanded and it is expected that there will be sufficient room for staging, up to 5.5 hectares, at the expanded terminal. The Fairview Terminals are accessible year-round by water and rail. The site has direct access to North Pacific shipping lanes.

Specifications for the terminals are:

- Area 21.5 hectares
- Dock Length 645 m
- Water Depth 13.7 m
- Rail Siding on Site 2,850 m
- Terminal Operator Canadian Stevedoring Company Ltd.
- Weather Proof Storage 4 Transit Sheds (53,000 sq. m., 170,000 sq. ft.)

Construction

Proposed construction related activities include:

- project schedule for all activities (with contingency scheduling for potential delays)
- general siting requirements including mobilization and anchoring of construction vessels
- hiring of workforce
- temporary housing for workers
- offsite manufacturing and assembly of turbines
- transportation of turbine parts
- use of temporary onsite power generation (likely gas/diesel powered)
- onsite construction of turbines, including installation of turbine bases
- construction of offshore substation
- trenching and burial of the seabed transmission cable
- land-based clearing for onshore control room (Graham Island) and overland transmission corridor
- installation of the overland transmission line
- waste disposal, possibly including ocean disposal
- environmental construction monitoring plans

Construction is currently planned to commence as early as 2009.

Operation and Maintenance

In operation, the turbines will use no fuel, and have no air emissions or effluent flows. All turbines are equipped with remote control and management devices. It is planned that there will be a central control room located onshore where all signals are collected and analyzed by a sophisticated computer system. For the wind farm, there will be dedicated control room with personnel operating in shifts. Maintenance visits to the turbines may be by helicopter or by special marine vessel designed for high-wave environments, or a combination. Full details of the control facility and vessel operations will be included in the EIA.

Meteorological Tower

NKWDI was granted permits to build and operate a meteorological tower at the site from Transport Canada and the BC Water, Land and Air Protection on November 27, 2003 and

on August 20, 2003, respectively. The federal government approval included a number of mitigation requirements that include ensuring proper water construction techniques and providing appropriate marine traffic measures.

The meteorological tower will measure wind, current and wave data for a period of one year. The data will provide valuable information for the design of the proposed wind farm. The mast will be installed as early as 2007.

Decommissioning

All decommissioning activities and equipment used will be described for the offshore and onshore infrastructure as part of the detailed project description.

3.0 Federal Involvement

The project was reviewed using the *Project Description Guide to Determine Federal Roles under the Canadian Environmental Assessment Act* (CEAA, 2006) to define involvement of federal agencies in the environmental review process. The following table describes the involvement of various federal agencies and the resulting CEAA triggers:

Federal Agency	Involvement / CEAA Trigger
Natural Resources Canada	Potential federal funding through the Government of Canada's Wind Power Production Incentive (WPPI). CEAA is triggered where federal money may be provided.
Fisheries and Oceans Canada	Habitat Authorization required under the <i>Fisheries Act</i> for the harmful alteration, disruption or destruction of fish habitat (trigger under the Law List Regulations)
Transport Canada (TC)	Authorization required under the <i>Navigable Waters Protection Act</i> for a potential impact on the navigability of a waterbody (trigger under the Law List Regulations). TC would also provide input on effects on air transportation.
Environment Canada (EC) including Canadian Wildlife Service (CWS)	EC will be involved to provide regulatory guidance related to the <i>Species At Risk Act</i> , <i>Migratory Birds Convention Act</i> , other wildlife, <i>Canadian Environmental Protection Act</i> (CEPA), soil, water and air quality, and climate issues. EC would regulate a CEAA-triggering authorization under CEPA if the project proposes to use ocean disposal (under consideration).
Indian and Northern Affairs Canada	Regulatory interest through the involvement of a First Nation corporation (Haida Power Authority).
Industry Canada	Regulatory role under the <i>Radiocommunication Act</i> related to potential interference with radio-communication and the installation of radio-communication antenna structures.
Health Canada	Regulatory interest in potential noise, air quality, electromagnetic, and socio-community impacts.

As per CEAA, the proposed NaiKun Wind Farm has several CEAA triggers, is defined as a 'project,' and not on the 'exclusion list'; therefore, a CEAA environmental assessment is required.

3.1 Current & Anticipated Permits

The Project proponent currently has the following permits for conducting preliminary investigations:

- Investigative Use Permit [IUP] from Land and Water BC (now Integrated Land Management Bureau)
- Permit to Conduct Research from Haida Power Authority
- Permit to construct a meteorological tower under the *Navigable Waters Protection Act*

Further anticipated Project permits/approvals include:

- Habitat Authorization under the federal *Fisheries Act* for the harmful alteration, disruption or destruction of fish habitat
- authorization under the federal *Navigable Waters Protection Act* for impacts to the navigability of a waterbody
- radio licence under the *Radiocommunication Act* for the installation of radiocommunication apparatus
- Project Approval Certificate under the BC *Environmental Assessment Act*
- *Canadian Environmental Assessment Act* screening

4.0 Environmental Features

This section provides basic descriptions of the physical, biological, and socioeconomic environment of the proposed study area, and a preliminary summary of potential environmental effects.

4.1 Water Depth

The proposed wind farm will be built at depths of 10 - 20m or less. The seabed cable route to the mainland will cross water depths of 20 100m.

4.2 Seabed Condition

Limited surficial geology surveys suggest that the seabed is generally sand, gravel or small stones throughout the project area. A small sample of survey records in the area indicates a variety of geophysical circumstances. A geophysical survey is planned for the Spring of 2007. This information is important for the design of foundations.

4.3 Aquatic Ecology

The aquatic ecology includes all life history stages of fish and invertebrates along with their benthic and pelagic habitats in the proposed project area, located in the shallow northwest portion of Hecate Strait known as Dogfish Bank. These organisms and their habitats are potentially impacted by construction, operation and decommissioning of a wind farm in the proposed project area. Fish and invertebrate communities of particular importance in the proposed project area include groundfish, migratory juvenile salmon and Dungeness crab. Additional benthic and pelagic flora and fauna could also be impacted by cable installation, tower construction, wind farm operation and decommissioning.

4.4 Wildlife

All major groups of marine birds, some marine mammals, and terrestrial wildlife species occur at some time throughout the year in areas potentially impacted by construction, operations, or decommissioning of the proposed wind farm and its transmission corridors. Some species occur only during migration. Others frequent the areas seasonally. Birds breeding in nearby seabird colonies, or in lakes on Graham Island and Porcher Island, for example, forage in the marine environment and will routinely visit productive foraging areas during spring and summer. Wintering waterbirds (e.g., loons, grebes, waterfowl) forage in the wind farm area, varying their locations according to tides and weather. Five bird surveys have been conducted to date.

4.5 Heritage, Cultural and Traditional Use

NKWDI is well aware of the need to work closely with First Nations communities. NKWDI have begun a dialogue process whereby the impacts and benefits of the project on the aboriginal and non-aboriginal communities located close to the offshore wind farm location will be fully explored. Two First Nations groups have been identified as potentially impacted by the wind farm, the Haida and the Tsimshian.

Formal consultations with the Council of the Haida Nation commenced on September 2, 2003. In November 2004, NKWDI entered into a partnership agreement with the Council of the Haida Nation. The agreement provides a financial interest in the project to the Haida as well as a permit from the Haida Power Authority to conduct met-ocean measurements and a geophysical survey within the wind farm area.

NKWDI met in 2006 with hereditary chiefs and elders of the Gitxaala with a request to re-open a discussion (initiated in 2003) regarding an accommodation agreement. NKWDI has also opened discussions with the respective elected chiefs and councils of the Metlakatla and LaxKw'alaams (Coast Tsimshian Nation), with the intention of discussing accommodation agreements.

4.6 Resource Use, Transportation and Recreation

The area of the proposed wind farm is used by the Area "A" crab fishery, by trawl vessels and by recreational and other small boats in transit. The BC ferry route (between Prince Rupert and Haida Gwaii) is well south of the site, and the main north-south shipping lane is on the east side of the Hecate Strait, close to the mainland.

4.7 Land tenure

The central control room will be located onshore, either in Massett or in the Prince Rupert area.

If the transmission line goes over Porcher and Smith Islands, there will be new Rights of Way (ROW) required on those overland portions.

The relevant portion of the seabed of Hecate Strait is claimed by Canada, BC and First Nations – the Haida on the west, where the turbines and offshore substation will be located,

and the Gitxaala, Metlakatla and LaxKw'alaams on the east, covering the cable route options under investigation.

4.8 Potential Environmental Effects

Preliminary scoping of the potential environmental effects and related Valued Ecosystem Components (VECs) has been completed:

Regime	Environmental Components	Potential Issues	VECs
Physical	Water Systems	changes to offshore wave climate	shoreline processes
		sediment dynamics/transport/disturbance	seabed topography
	Terrestrial Systems	soil movement/terrain stability, changes to surface water courses	erosion/sedimentation
	Air Systems	odours/emissions/greenhouse gases from use of fuel oils to operate equipment	air quality
Biological	Aquatic Ecosystems	change to benthic/shellfish habitat quality	benthic and shellfish and habitat
		change to pelagic zone habitat quality	fish and fish habitat
		changes to marine habitat quality	marine bird and mammal habitat
	Terrestrial Ecosystems	changes to terrestrial habitat quality	terrestrial biota and rare and endangered species
Socioeconomic	Local Area	park use	visual landscape
		offshore use	navigation (air and water)
		harvesting activities	crab and fish, timber
		changes to economic resources	timber resources
		exploration	oil and gas
		heritage resources	
		traditional use	
	Region Wide	employment opportunities	