

NOVA SCOTIA POWER INC.  
CUSTOMER OPERATIONS  
TRANSMISSION & DISTRIBUTION ENGINEERING DEPARTMENT



INTERCONNECTION FACILITIES REPORT  
FOR  
ESTABLISHING A 69 kV SYSTEM CONNECTION  
FOR A NEW 45 MW WIND POWERED GENERATING FACILITY  
AT NUTTBY MOUNTAIN IN COLCHESTER COUNTY, NOVA SCOTIA

Rev. 1

Prepared by: Ron Tutty 2009/01/09  
Project Engineer Date

Approved by: Tim Leopold 2009/01/09  
Director, T&D Assets Date



# Facilities Study Infra-Structure Report

System	Description								
1.0	<p><b>SUMMARY</b></p> <p>This project provides for the establishment of a 69 kV system connection for a 45 MW wind powered generation facility (IR082) located at Nuttby Mountain, Colchester County, Nova Scotia. This generating facility is comprised of 15 Vestas wind-turbine generators (WTG) type V90, each rated at 3 MW. Each WTG will be interconnected to a 34.5 kV collection system via an individual 1000V/400V - 34.5 kV transformer. The 34.5 kV collection feeders will be tied to the 34.5 kV switchgear side of one 30/40/50 MVA, 34.5/69 kV step-up transformer. The proposed wind powered generation facility will be interconnected to the Nova Scotia Power transmission system by tapping the existing L-5040 69 kV line between 1N-Onslow 138/69 kV and 4N-Tatamagouche 69 kV substations at approximately 22 km from Onslow. A one-line diagram of the proposed interconnection is shown in Appendix B – One Line Diagram of System Connection.</p> <p>The system connection will consist of a 0.6 km, 69 kV line which will tap the existing Nova Scotia Power transmission line L-5040 and connect to the customer owned 69-34.5 kV interconnection substation. The system connection will also include modifications to the protection and control circuitry at the 1N Onslow substation. This includes replacement of the line protection on L-5040, transfer trip logic to trip the wind farm when the 1N Onslow terminal is tripped, and wind farm status logic to prevent closure of the 1N Onslow terminal if the wind farm switch gear is already closed.</p> <p>The point of common coupling will be the point where the new 69 kV line tap connects to the existing transmission line L-5040.</p> <p>The estimated cost of the Nova Scotia Power portion of the project and the estimated scheduled in-service date are as follows:</p> <table border="1" data-bbox="324 1554 1299 1743"> <thead> <tr> <th>Cost Estimate</th> <th>Annual Licence Cost</th> <th>Project Duration</th> <th>In-Service Date</th> </tr> </thead> <tbody> <tr> <td>\$550,719</td> <td>\$136</td> <td>12 months</td> <td>2009-11-27</td> </tr> </tbody> </table>	Cost Estimate	Annual Licence Cost	Project Duration	In-Service Date	\$550,719	\$136	12 months	2009-11-27
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\$550,719	\$136	12 months	2009-11-27						

Transmission Engineering	prepared by: <u>Ron Tutty, P. Eng.</u>	Department	approved by: _____
Customer Operations		checked by: _____	
Division		approved by: _____	



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The above in-service date assumes a connection with a 15 wind turbine, generating facility complete with protection, transfer trips, status, SCADA and revenue metering.

The project in-service date is dependent upon the starting date, which cannot commence until the following conditions are met:

- the customer provides Nova Scotia Power with a legally binding easement in the form acceptable to Nova Scotia Power for any land that the 69kV line right-of-way requires.
- the customer delivers to Nova Scotia Power the balance of the cost estimate for the project, in a form acceptable to Nova Scotia Power, as per the Interconnection Agreement.

1.1

## ESTIMATED COSTS

The estimated cost for Nova Scotia Power to provide a 69 kV interconnection to the Nuttby Mountain wind powered generating facility is \$550,719. This cost estimate is summarized in Table 1 – Nuttby Mountain Cost Estimate:

**Table 1 – Nuttby Mountain Cost Estimate**

Nuttby Mountain Wind Farm									
Establish 69 kV Line Tap		T???							
Modify L-5040 Protection & Control at 1N		809							
Establish Communications to Nuttby Site									
Activity	Accounts -->	Labour	Material	Expenses			Contracts	Totals	
		001	012	011	014	041	066	013	
003	Buildings, Structures and Grounds	0	0	0	0	0	0	6,900	6,900
022	Electrical Control Equipment	1,007	26,565	0	0	0	575	10,488	38,635
035	Wood Poles	0	31,625	0	0	0	748	98,325	130,698
043	Substation Devices	3,355	2,070	0	0	0	0	6,555	11,980
061	Telephone Equipment (/ Comm Equip.)	17,446	88,136	0	0	0	575	27,600	133,757
085	Design (i.e. Engineering)	39,405	0	2,300		173	1,150	26,458	69,485
086	Commissioning	6,710	0	0	0	0	0	0	6,710
088	Survey and Mapping	0	0	0		0	0	5,750	5,750
<b>Sub-Total (New Capital)</b>		<b>67,923</b>	<b>148,396</b>	<b>2,300</b>	<b>0</b>	<b>173</b>	<b>3,048</b>	<b>182,076</b>	<b>403,915</b>
<b>Sub-Total (Other Expenses)</b>				<b>14,259</b>			<b>112,545</b>		<b>126,804</b>
005	Interest Capitalized							20,000	20,000
<b>Grand Total</b>		<b>67,923</b>	<b>148,396</b>	<b>16,559</b>	<b>0</b>	<b>173</b>	<b>135,593</b>	<b>182,076</b>	<b>550,719</b>

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<b>Department</b>	approved by: _____	<b>Division</b>	approved by: _____