

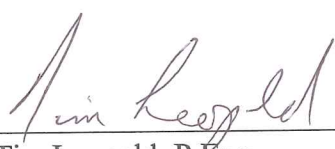
NOVA SCOTIA POWER INC.  
TRANSMISSION & DISTRIBUTION ENGINEERING DEPARTMENT



FACILITIES STUDY INFRA-STRUCTURE REPORT  
FOR  
ESTABLISHING A 69 kV SYSTEM CONNECTION  
FOR A NEW 30 MW WIND POWERED GENERATING FACILITY  
AT DIGBY, NOVA SCOTIA

**FINAL**

Rev. 0

Approved by:  2009/09/08  
Tim Leopold, P.Eng. Date  
Director, Project Implementation



# 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 30 MW wind powered generation facility (IR141) located at Digby, Nova Scotia. This generating facility is comprised of twenty 1.5 MW GE ESS wind-turbine generators (WTG). Each WTG will be interconnected to a 34.5 kV collection system via its own step-up transformer. The 34.5 kV collection feeder will be tied to the 34.5 kV switchgear side of one 20/27/33 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 a new 10.6 km, 69 kV transmission line from the 77V Conway substation. A one-line diagram of the proposed interconnection is shown in Appendix B – One Line Diagram of System Connection.</p> <p>The system connection for the wind powered generating facility at Digby will include the installation of a 69 kV circuit breaker, associated switches, protection, control, metering and telecommunications at 77V Conway and the construction of a 10.6 km transmission line from 77V Conway to the customer’s interconnection substation at the generating facility.</p> <p>The system connection will also include the following modifications to the Nova Scotia Power system:</p> <ul style="list-style-type: none"> <li>• Metering upgrades on L-5533 and L-5531 at 13V Gulch, L-5026 and L-5025 at Paradise and L-5025 at 51V Tremont.</li> <li>• Line upgrades on L-5533 to resolve overload issues</li> <li>• Installation of a special protection system at 51V Tremont to resolve contingency issues such as the loss of bus 11V-B51 at Paradise, loss L-5025, or loss of bus 51V-B51 at Tremont</li> <li>• Installation at 9W Tusket substation of an 8.5 MVar shunt capacitor bank, a 7 MVar shunt reactor, and the reuse of the existing 7.2MVar capacitor bank to form a 2 staged switched shunt capacitor bank. This installation will include three new breakers, current limiting reactors, switches and associated structures and protection and control circuitry.</li> <li>• Removal of the under frequency load shedding scheme at 13V Gulch and the installation of under frequency load shedding on the 12 kV reclosers at 77V Conway.</li> </ul>

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



# Facilities Study Infra-Structure Report

## System

## Description

- Installation of a transfer trip scheme at 13V Gulch to prevent islanding of the Digby generating facility.
- Installation of communication infrastructure to allow monitoring and control of the equipment that connects the Digby generating facility to the Nova Scotia Power system.

The Point of Interconnection will be the 69 kV line bus at the 77V Conway substation as shown in Appendix B. Primary revenue metering and required telecommunication equipment will be installed at the customer's interconnection substation.

The estimated cost of the Nova Scotia Power portion of the project and the estimated scheduled in-service date are as follows:

Cost Estimate	Annual Licence Cost	Project Duration	In-Service Date
\$5,683,007	\$1088	11 months	2010-08-31

The above in-service date assumes a connection with a 20 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 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. The in-service date noted assumes the project start date to be no later than October 1, 2009.

Construction on the transmission line also cannot begin until the customer provides Nova Scotia Power with a legally binding easement in the form acceptable to Nova Scotia Power for any land that the transmission line and associated line taps require.

Transmission  
Engineering

prepared by: Tim Leopold, P.Eng.

Customer  
Operations

checked by: \_\_\_\_\_

Department

approved by: \_\_\_\_\_

Division

approved by: \_\_\_\_\_