



Final Report prepared for

Nova Scotia Power Inc.

**System Impact Study  
for the  
Glendhu 60 MW Wind Generating Facility in  
Pictou County, Nova Scotia  
IR114**

H-330698

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## Executive Summary

This report presents the results of a System Impact Study (SIS) for the Glendhu 60 MW wind generation facility project (IR114) that is proposed to be connected to the existing 138 kV line L-6511 of the Nova Scotia Power Inc. (NSPI) transmission system. The objective of this study was to investigate the potential impacts of the proposed wind generation facility on the NSPI power system.

Accordingly, system studies were carried out employing load flow, short circuit, transient stability and voltage flicker analyses. NSPI's GIP procedures and system planning criteria document were followed in compiling the results for this SIS.

Based on the study results, it is concluded that the incorporation of the proposed wind generation facility into the NSPI transmission system at the specified location has no serious negative impacts on reliability of the NSPI system provided the recommendations given in this report are implemented.

The following is a summary of findings and recommendations:

- The proposed IR114 wind generation facility does not cause serious thermal overloading in the NSPI system for most simulated contingencies under the operating conditions studied. Also, it does not adversely affect the NS-NB transfer limits.
- The existing CBX transfer arming level should be reduced to eliminate the possibility of line overloads. It is expected that NSPI will carry out an operating study to determine the exact setting of the CBX transfer SPS arming level.
- The proposed IR114 wind generation facility marginally meets the GIP reactive power requirements of 0.95 power factor (leading and lagging) at the Point of Interconnection (POI). Appropriate reactive power compensation should be provided at the 34.5 kV bus of the Interconnecting Customer substation to meet NSPI's 0.95 pf criterion should such requirement is established at the detailed design stage of the project.
- 50 MVAR of reactive support is required at an appropriate location in the NSPI system to obviate voltage stability impacts due to the IR114 wind generation facility. This requirement includes a 10 MVAR margin to account for any operating scenario not investigated in this study. A preliminary analysis suggests that Onslow 230 kV bus is a potential candidate for such an installation. It is understood that the proposed amount of reactive power compensation may be a portion of a large reactive support facility to be determined once the reactive power compensation requirements for the other wind generating facilities in the 'Queue' are established.
- No voltage violations occur for normal and emergency operating conditions provided the proposed reactive power compensation is installed at the Onslow 230 kV bus.
- The system is transiently stable for all the simulated disturbance conditions.
- The proposed wind generation facility meets the Low Voltage Ride-Through (LVRT) requirements for faults in the NSPI system.
- An issue with the dynamic model for the Farm Control Unit was identified and, although the stability study results were not significantly affected, Enercon should be advised.

- The proposed wind generation facility is not categorized as bulk power in accordance with the current NPCC A-10 Criteria.
- The short circuit contribution of the IR114 facility does not call for any breaker upgrade at the 138 kV voltage level.
- The proposed wind generation facility does not instigate any voltage flicker beyond NSPI's power quality requirements.

The preliminary cost estimate for the generation interconnection facilities is about CDN \$10.912 million.