



**System Impact Study Report  
Report GIP-IR461-SIS-R0**

**Generator Interconnection Request #461  
16.45 MW Wind Generating Facility  
Hants County, NS**

Principal Investigator  
Jay Nair, P. Eng.

July 11, 2014

Transmission Planning  
Nova Scotia Power Inc.

## Executive Summary

This report presents the results of a System Impact Study (SIS) for a proposed 16.45 MW wind turbine generating facility interconnected to the NSPI transmission system. The study performed analysis on the impact of the proposed development that would have on the NSPI power grid. System studies, including short circuit, power factor, voltage flicker, steady state, stability, Bulk Power System analysis, under-frequency operation, low voltage ride through and loss factor were performed. NSPI and NPCC planning criteria were applied.

This wind facility will be interconnected to the 69kV substation 17V-St. Croix with a single breaker and a new 6 km line from the Point of Interconnection to the wind farm substation. A circuit switcher at the high side of Interconnection Customer's (IC) power transformer and protection systems acceptable to NSPI are required at the IC's Interconnection Substation.

The voltage flicker  $P_{st}$  for continuous operation under this configuration is within NSPI's required limit. The increase in short circuit levels due to the addition of IR#461 are within the capability of the associated breakers. There are no concerns with regard to increased short circuits levels.

As long as the western valley transmission system is operated within historical limits, the addition of IR#461 does not adversely impact the thermal capacity of the NSPI transmission system. No issues were identified in either the steady-state or stability analysis that were attributable to IR#461. It is therefore concluded that the incorporation of the proposed 16.45 MW facility into the NSPI transmission system at the specified location has no negative impacts on the reliability of the NSPI power grid provided the recommendations given in this report are implemented.

IR#461 was not found to cause issues with the stability of the interconnected system. IR#461 is not classified as part of the Bulk Power System, was found to comply with the Low Voltage Ride Through requirements, and remained on-line though simulated under frequency islanding events.

Study based on the assumed of transformer and line impedances indicate the additional requirement of 2.2 MVAR of reactive power. This will be further addressed in the Facility study when actual impedances are made available. No details or costs associated with this requirement are addressed in this report.

The total high level estimated cost for Interconnection Costs and Network Upgrades is \$2,513,000. The Facility Study will provide a more detailed cost estimate. All cost of associated facilities required at the Interconnection Customer's substation and generating facility are in addition to this estimate.