



**System Impact Study Report
Report GIP-IR234-SIS-R1**

**Generator Interconnection Request #234
41.4 MW Wind Power Facility
Loganville, NS**

Principal Investigator
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September, 2011

Transmission Planning
Nova Scotia Power Inc.

Executive Summary

This report presents the results of a System Impact Study (SIS) for the proposed 41.4 MW wind power facility (IR234) to be connected to L-6503. The study performed analysis of the impact the proposed development would have on the NSPI power grid. System study, including steady state, stability, short circuit, power factor, voltage flicker, Bulk Power System analysis, low voltage ride through, loss factor and under frequency operation was performed. NSPI and NPCC planning criteria were applied.

Based on study results, it is concluded that the incorporation of the proposed 41.4 MW facility into the NSPI transmission system at the specified location has no adverse effects on the reliability of the NSPI power grid, provided the recommendations given in this report are implemented.

For the 2016 system modelling, TSR100 indicated a Cape Breton Import limit of approximately 320MW. It is expected that with a 720 MW scheduled import and light load conditions, some wind generation would have to be curtailed as there was insufficient load in NS regions it could be delivered to. Under those conditions, lower queued wind generation may generate only for export from NS. In some cases, Trenton generation has to be replaced with Cape Breton generation to reduce the Cape Breton Import to an acceptable level.

As IR234 is an increase to the capacity of IR 225, it is expected that the facilities recommended in the IR225 SIS will be in place. In addition to those facilities, control and communications will be required at the Interconnection substation Recommended Network Upgrades include a load transfer scheme at 1N-Onslow to automatically transfer load in the event of a bus fault at 1N-B61. Section *Base case SP65, 1N-B61* on page 7 contains additional detail. The remote terminal, 67N-Onslow, zone 2 protection will require a 150ms clearing time (with 50ms allowed for breaker operating time). The total, high level, estimated cost for Interconnection Costs and Network Upgrades is \$897,600.

The Facilities Study will provide a more detailed cost estimate based on the IC's final choice of Interconnection Facilities for connection of IR233 to the NSPI system. All costs of associated facilities required at the Interconnection Customer's substation and generating facility are in addition to this estimate.



**System Impact Study Report
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**Generator Interconnection Request #234
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Loganville, NS**

Principal Investigator
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2012-03-05

Transmission Planning
Nova Scotia Power Inc.

Summary of Findings

Introduction

The System Impact Study (SIS) for Interconnection Request #234 (IR#234) was completed on 2011-09-30. This SIS included IR#233, which was ahead of it in the interconnection queue. Subsequent to the completion of the IR#234 SIS, IR#233 was withdrawn from the interconnection queue. Therefore, the SIS results for IR#234 have been updated to reflect this change and have been summarized in this report addendum.

According to the SIS for IR#233, the following transmission system changes were required, and were assumed to be in-service before IR#234:

- New radial 230 kV transmission line from 67N-Onslow to the Interconnection Facility associated with IR#233
- Two new 230kV circuit breakers at 67N-Onslow to accommodate the new radial 230kV line.

IR#233 would have effectively injected 50.6 MW (minus radial line losses) into the 230 kV bus at 67N-Onslow.

Subsequent to the publication of GIP-IR234-SIS-R1, the Interconnection Customer announced that the in-service date of IR#225 and IR#234 would move from 2012-12-31 and 2014-12-31 respectively to 2017-03-03. This new in-service date would place IR#234 behind TSR100 and therefore the transmission facilities associated with TSR100 are deemed to be in service for this review.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Conclusions

The withdrawal of IR#233 from the GIP queue has no impact on the results of the SIS conducted for IR#234 and documented in report GIP-IR234-SIS-R1.

The delay of the in-service date of IR#234 until 2017 means that the transmission upgrades associated with TSR100 will be in service. Therefore the proposed operating restrictions recommended in GIP-IR234-SIS-R1 for base case SP75 would not be an issue, since TSR100 requires the uprating of L-6552. However, the addition of a second 345kV line from Onslow to Memramcook does not change the conclusions and recommendations of GIP-IR234-SIS-R1 with respect to overloading of L-6513 for contingencies involving the loss of bus 1N-B61 at Onslow. Therefore the total, high level, estimated cost for Interconnection Costs and Network Upgrades of \$897,600 is unchanged.