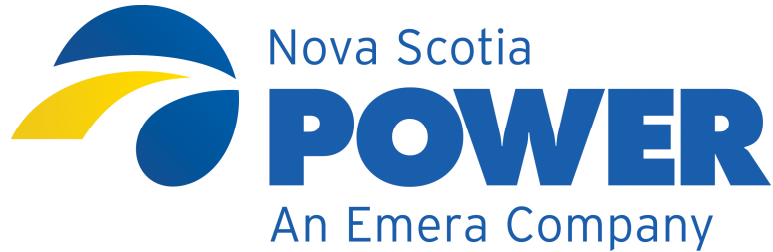

Facilities Study Report

IR 372 – South Canoe Wind Farm (SCWF)



Facilities Study Report IR-372 24 MW South Canoe Lake

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Transmission Project Implementation
Nova Scotia Power Inc.

Facilities Study Report

IR 372 – South Canoe Wind Farm (SCWF)



EXECUTIVE SUMMARY

This project provides for the establishment of a 138 kV system interconnection for a 24 MW wind generation facility (IR-372) located at South Canoe Lake, in Lunenburg County, Nova Scotia.

The general scope of this FAC includes the following:

- 1) A new 138 kV, Three-Breaker-Ring (TBR) switching substation located near the Avon Hydro facility, herein referred to as 101V MacDonald Pond.
- 2) A new 138 / 34.5 kV substation located at the South Canoe Wind Farm (SCWF) site, herein referred to 110W South Canoe Lake.
- 3) A new 138 kV, H-Frame transmission line approximately 17 km in length, herein referred to as L-6053, which will connect the above mentioned substations.
- 4) Associated line protection upgrades required at Canaan Rd. substation (43V) and Sackville substation (90H).
- 5) Associated teleprotection / telecommunications systems at 101V and 110W.

The 24 MW generating facility will be comprised of eight (8) Acciona AW3000 wind turbines, each nominally rated at 3.0 MW. Each individual wind turbine will be connected to a 34.5 kV collector feeder via a step-up padmount transformer. This feeder will be received at 110W and transformed to 138 kV for connection to the transmission system.

The 110W South Canoe Lake substation is being designed and built to receive wind energy from two (2) separate wind projects (IR-372 – 24 MW owned by Minas Basin Pulp & Power Company Ltd. and IR-379 – 78 MW owned by Oxford Frozen Foods Ltd.).

IR-372 and IR-379 will share a common 138 kV bus on the high side of their respective power transformers within NSPI's 110W South Canoe Lake substation.

The Point of Change of Ownership between NSPI and its project partners will be between the terminals of the collector circuit power cables and the 3-pole group-operated disconnect switch (not included in this FAC as supplied by others) at the riser pole located just outside the generation interconnection substation 110W. Point of Change of Ownership is indicated on the Basic One Line diagram shown in Appendix B.

The new system connection at 101V will consist of a Three-Breaker-Ring (TBR) switching substation having three (3) line terminations. The new TBR station will interconnect line L-6004 approximately 25.5 km from the 43V Canaan Rd. substation and 47.4 km from the 90H Sackville substation. The new connection will split L-6004 into two (2) separate segments. The line segment from 90H Sackville to 101V MacDonald Pond will be designated L-6004 while the line segment from 43V Canaan Rd. to 101V MacDonald Pond will be designated L-6054. The line segment interconnecting 101V MacDonald Pond and

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110W South Canoe Lake substations will be designated L-6053. Refer to the Basic One Line diagram in Appendix B for specific details.

The new generation interconnection substation 110W South Canoe Lake (excluding IR-379) will generally consist of the following:

- 1) 138 kV line terminal equipment.
- 2) 138 kV circuit breaker 110W-661
- 3) One (1) 138 / 34.5 kV, 30 / 40 / 50 MVA power transformer.
- 4) 138 kV revenue metering & protection equipment.
- 5) 34.5 kV bus c/w three (3) circuit breakers, switching equipment, switched capacitor banks, and associated equipment.

Refer to the Basic One Line diagram in Appendix B for specific details.

The new system connection will include modifications to the protection and control (P&C) schemes at 43V Canaan Rd. and 90H Sackville substations. These modifications will ensure the line protection schemes at the remote terminals are compatible with the protection schemes at the new 101V substation. Inter-trip and block-close logic will also be included to ensure that the generating facility is not islanded with any portion of NSPI's system.

The total estimated cost to construct the 101V TBR substation is **\$4,650,955**. The total estimated cost to construct the new 138 kV line L-6053 from 101V to 110W substations is **\$5,831,001**. This total cost of L-6053 was allocated equally between IR-372 and IR-379 each amounting to **\$2,915,500**. The overall cost estimate for establishing the common generation interconnection substation site at South Canoe Lake for these two (2) wind facilities (IR-372 and IR-379) is **\$7,760,891**. The estimated percentage of this total cost of 110W South Canoe Lake for the 24 MW (IR-372) portion is approximately 37.4% or **\$2,906,074**.

The detailed cost estimates in Appendix C include the scope of work related to the new switching station 101V MacDonald Pond, L-6053 and the new generation substation 110W South Canoe Lake (IR-372 only).

The IC's target in-service date is October 31, 2014.