



Natural Resources Canada

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Pan-Canadian Wind Integration Study

Project Lead: Richard Fry, NRCan, Ottawa

Lead Proponent: Canadian Wind Energy Association

Location: Ottawa, Ontario

ecoEI Contribution: \$1,755,000

Project Total: \$ 2,756,963

Strategic Area: Renewables

Background:

CanWEA is a not-for-profit national wind industry association, representing nearly 400 corporate members across Canada. CanWEA's mandate is to promote the responsible and sustainable growth of wind energy in Canada.

This Project consists of a study that will evaluate how large penetration of wind energy could be integrated on the provincially run Canadian electric grid and show the challenges and opportunities in doing so. The key to making this Project a success is the involvement of system operators and utilities that are at the forefront in providing a stable and secure electrical system and have access to electricity system data required to make this analysis. This work will be supported by a Steering Committee that has been established to guide and inform the work as it progresses, as well as to act as a liaison for the system operators themselves.

This Project is the first national, system-level study of high wind energy penetration in Canada. The involvement of key U.S. system operators will also aid in informing future planned continental-wide, integration studies.

Project Objective:

The objective of this Project is to undertake a study to evaluate the technical aspects of high wind energy penetration on a national basis. The project's primary goal is to obtain insight into the challenges, opportunities, mitigation measures and operational tools needed to efficiently integrate wind energy into the grid. This will be accomplished by undertaking an integration study approach, which involves matching time series modelled wind energy production data with electricity demand data, and evaluating how this influences the rest of the electricity grid.

Benefits to Canada:

The results of this Project include data that will allow even more detailed regional analysis, and will enable Canada and the US to consider continental wide system studies; such broad study of the energy system is necessary due to the broad interconnected nature of the electricity system in Canada.

In addition, this Project will yield many additional benefits for Canada, including:

- Becoming a platform for the government of Canada to take part in more robust US/Canada Clean Energy dialogues, by providing a technical foundation from which energy policies can be developed that are realistically achievable and technically sound;
- Helping to inform efficient build-out and expansion of the overall energy system that accounts for increased penetration of wind energy. This in turn will support Canada's commitments with respect to climate change and greenhouse gas reduction goals;
- Canadian data of this nature, type and extent, which considers a national view of the electrical system does not presently exist and, when produced, will provide much needed data for future continental-wide North American studies that Canada is currently unable to participate in;

- Providing data with this level of granularity will provide baseline data for future studies that may consider other forms of energy, within focused regional contexts (e.g., tidal data for the Maritime regions, solar electric); and

Project Status:

The Project is on schedule and on budget. Detailed wind resource data for all years has been received from Environment Canada (2008, 2009 and 2010), and a library of future wind projects for use in building study scenarios has been created. The project team is working to set up detailed wind development data for each study scenario.

GE has received feedback on generation/demand study data from provincial system operators and has performed initial simulations for quality assurance testing. Development of the generation expansion plan to be used across all study scenarios is currently underway. The project team has begun a preliminary set of outputs, expected by the end of August 2014, in order to test the model's behavior and data in the 5% Scenario. Once complete, additional runs will be undertaken for future scenarios that are currently under development.

Technical Advisory Committee:

- Alberta Electric System Operator (AESO)
- BC Hydro
- Hydro Quebec
- Independent Electricity System Operator (IESO)
- ISO-New England (ISO-NE)
- Manitoba Hydro
- Midwest Independent System Operator (MISO)
- National Renewable Energy Laboratory (NREL)
- New York Independent Electricity System Operator (NYISO)
- SaskPower
- Utility Variable Energy Integration Group (UVIG)
- Western Electricity Coordinating Council (WECC)

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