

Wind Energy Institute of Canada

Leading the development of wind energy across Canada through research, testing, innovation, and collaboration.

The Wind Energy Institute of Canada (WEICan), located in North Cape, Prince Edward Island, has been leading the development of wind energy across Canada through technical testing and consultation; research, development and demonstration; and outreach since its formation in 1981. As a national research facility and independent wind farm and battery energy storage system operator, with strong industry ties, the Institute is well-positioned to lead research in the advancement of wind energy. WEICan owns and operates a Wind R&D Park that features five 2 MW wind turbines, an energy storage system with a 111.5 kW/223 kWh capacity, and a 109 kW solar photovoltaic (PV) array. WEICan views this infrastructure as a laboratory that is available for research and is open to collaboration with interested parties.

Wind R&D Park Characteristics

| | |
|-----------------------|------------------------------|
| Wind Capacity | 10 MW |
| No. of Wind Turbines | 5 |
| Wind Turbine Model | DeWind D9.2 |
| Energy Storage | 223 kWh |
| Capacity | 111.5 kW |
| Energy Storage Rating | Tesla Energy |
| Battery Model | 109 kW |
| PV Generation | Jinko Solar 33% |
| Capacity | mono-facial and 66% bifacial |
| PV Model | SMA |
| PV Inverter Model | |

GRID INTEGRATION RESEARCH ACTIVITIES

As the amount of non-synchronous renewable generators such as wind and photovoltaic (PV) increases on the electric grid, they can present challenges to its operation:

- Generation sources such as wind and solar are variable by nature, making their generation uncertain
- Wind and solar generators replace conventional power generators which traditionally provide ancillary services

WEICan is researching ways to overcome the perceived shortcomings of renewable energy through carrying out demonstrations in collaboration with utilities and system operators.

Renewable Energy Demonstrations

WEICan works with utilities and system operators to research issues that need to be addressed on the grid with regards to renewable energy. WEICan has seen that providing field data rather than using theoretical performance and cost assumptions sets WEICan apart from most other research groups and the data can be used to validate and inform theoretical studies from academic or utility partners. WEICan's infrastructure:

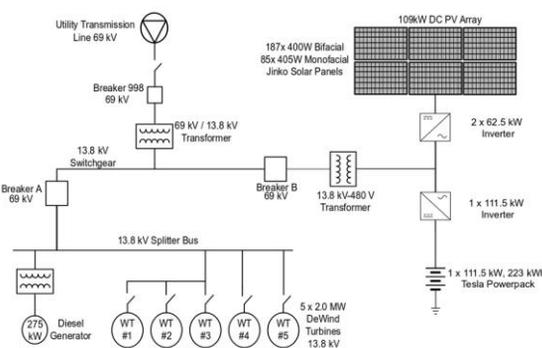
- Produces actual data to inform policy and provide a business case for optimal grid integration of multiple renewable power sources — for both remote off grid Northern micro utilities, and for fully integrated utilities
- Develops operating parameters and processes to optimize the power generation from a wind/solar-PV/battery combination
- Develops models for micro-grid and local renewable power generation to facilitate increased adoption of distributed and regional generation

Utility Forum

WEICan acts as Secretariat to a Utility Forum that brings together representatives from utilities and system operators across Canada who contribute to a four-year plan to carry out research and field demonstrations that have a high identified need and a high research potential.

The first task was a demonstration of automated generation control, power frequency response, and inertia emulation on Nuttby Wind Farm with Enercon and Nova Scotia Power. It was completed in Spring 2021.

The second task analyzed transmission level codes, reviewed global best practices, and proposed a common set of integration and interconnection guidelines for nonsynchronous generators. This document was completed in Spring 2021.



WEICan Wind R&D Park



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