

## WEICan Wind R&D Park, North Cape, Prince Edward Island, Canada



### General description of turbine/facilities

The Wind Energy Institute of Canada (WEICan) operates a commercial, grid-connected 10 MW R&D wind farm. WEICan's site includes five 2 MW wind turbines manufactured by DeWind. DeWind were a German turbine manufacturer and are no longer in existence. Each wind turbine has a 2 MW, four pole synchronous generator directly connected to the grid. No power electronics are used between the generator terminals and the power grid. The turbines have a rotor diameter of 92 m and a hub height of 80 m. Blade pitch is hydraulic. A two stage gearbox is used between the rotor and the torque converter. A torque converter (WinDrive from Voith) is used between the gearbox and the generator. The WinDrive provides a fixed 1800 rpm output to the generator shaft.

WEICan's site also has a 109 kW solar PV array with a mix of bifacial and monifacial panels. WEICan recently installed a 111.5 kw / 223 kWh Tesla Li-ion battery.

### Location of site

Site address: 85 Waterview Road, Tignish, PE, COB 2B0, Canada

WEICan's site is located at the northern tip of the province of Prince Edward Island (PEI). PEI is an island province on the east coast of Canada and has a high annual average wind speed, approximately 9 m/s at 80 m above ground. The IEC turbulence class is A and the turbines are class 2, cold climate.

WEICan's North Cape site has approximately 300 degrees of ocean exposure and winds generally have low turbulence. All five wind turbines are located close to the shore and are exposed to a generally corrosive salt environment. WEICan's site has a wide range of operating temperatures, typically between - 15 C to + 25 C. Snow and icing conditions are common, especially in the winter months.

### Control and measurement systems and signals.

WEICan's site has significant instrumentation and data gathering capabilities. The site has been operational since 2012 and high-resolution data is available starting 2016. SCADA data is available since inception.

We operate an 80 m meteorological mast, compliant with IEC 61400-12-1, with anemometers at 33 m, 50 m, 60 m and 80 m. We also have a smaller, 10 m meteorological tower, compliant with IEC 61724-1, that was designed specifically for the solar PV array and has wind speed measurements at 2.5 m and 5 m. Many of WEICan’s anemometers are heated and all are regularly calibrated.

We gather extensive data from the wind turbines and use OSISoft’s PI system for data logging and storage. WEICan’s ability to gather wind turbine data is superior to most commercial wind farms. All data is gathered at as high resolution as is available, with most data tags updated at 1 Hz. The turbine control systems and logic were developed by DeWind and are unmodified although WEICan has limited ability to modify the PLC source code. The meteorological tower data loggers are supplied by Campbell Scientific and WEICan has full control over these.

IEC meteorological mast (80 m)	Wind speeds, directions, ambient temperature, humidity, precipitation, barometric pressure etc
Met mast for solar PV (10 m, only data relevant to wind generation listed here)	Wind speed, precipitation particle size, vapour pressure, barometric pressure, precipitation intensity, accumulated rainfall, wind speed at 2.5 m, 5 m, wind direction, lightning strikes, approximate distance to lighting, ground snow depth
Nacelle & hub	Blade pitch angles, yaw direction, gearbox gear speed, generator rpm, nacelle temperatures etc
Gearbox	Accelerometer-based condition monitoring system.
Blades	Strain gauges installed on one wind turbine, unused
	Currents, voltages, powers, frequency, phase angles etc.
Substation	Site electrical measurements, currents, voltages, turbine error and fault messages, run times etc.

## Research possibilities

WEICan’s site is unique in that it is a commercial, grid connected wind farm of reasonable size that is made available for research purposes. Significant research possibilities exist, particularly since WEICan has access to a large amount of data in addition to historical data. WEICan’s wind data for the site goes back to 1987. In addition to data, the wind farm, solar PV array and battery can be used for research. WEICan is also open to the possibility of adding instrumentation to gather data e.g. strain gauges on the towers and blades.

## Contact data and more information

Name: Marianne Rodgers Email: [Marianne.rodgers@weican.ca](mailto:Marianne.rodgers@weican.ca)

Phone: +1-902-882-2746 x207

Website: [www.weican.ca](http://www.weican.ca)