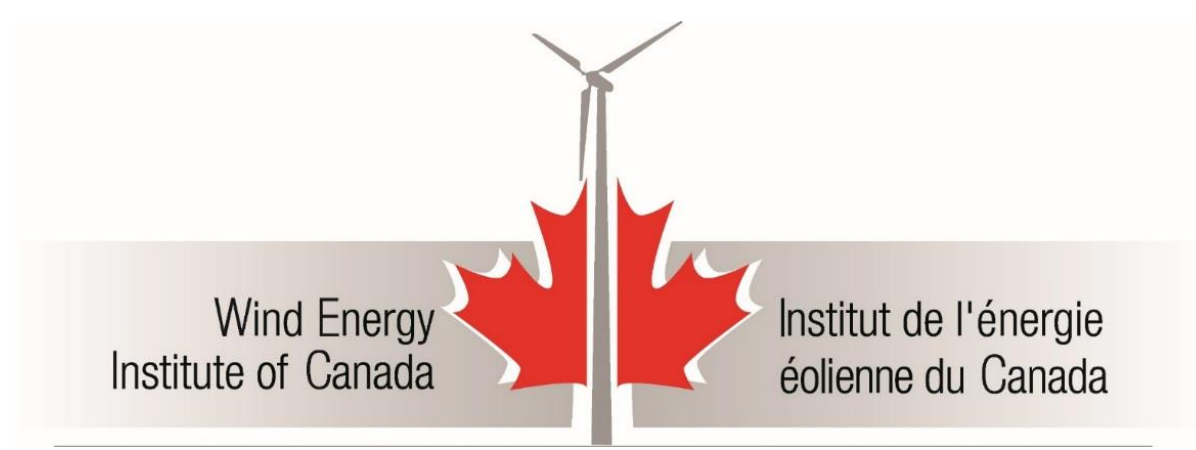


THE WIND ENERGY INSTITUTE OF CANADA'S WIND R&D PARK

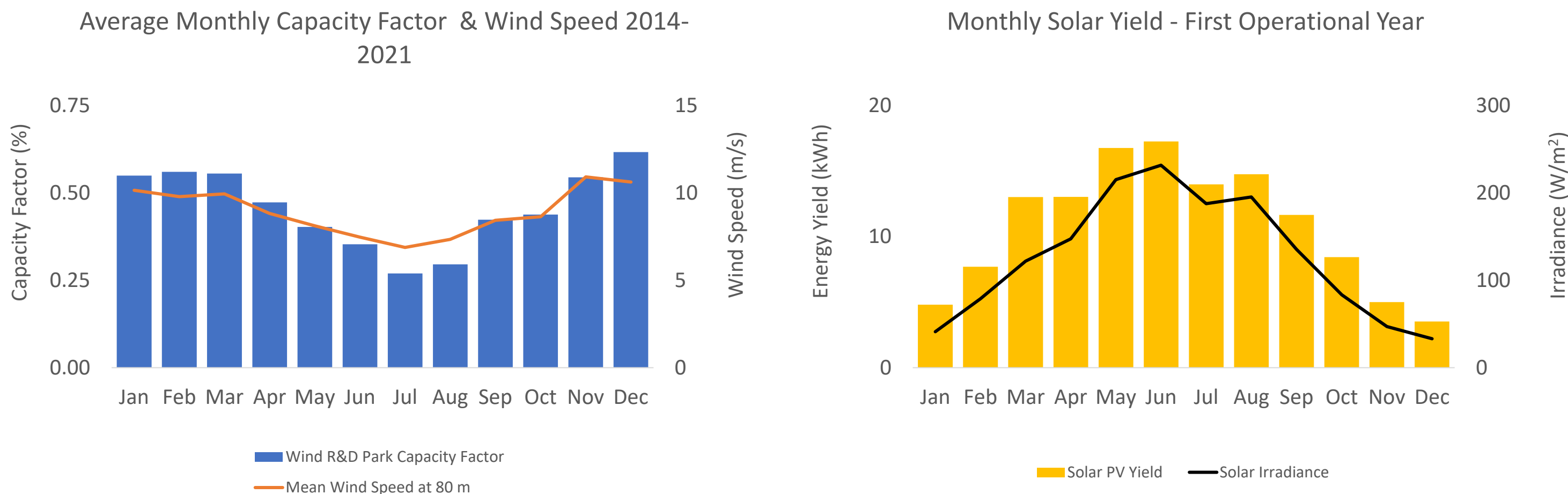


Introduction

The Wind Energy Institute of Canada (WEICan) has led the development of wind energy across Canada since 1981. WEICan views its Wind R&D Park as a laboratory that is available for research and is open to collaboration with interested parties.

Production

WEICan's Wind R&D Park produces ~40 GWh each year from wind and solar, with higher production in the winter than in the summer mainly due to higher average wind speeds. This clean electricity offsets approximately 2,000 tonnes of CO₂ emissions annually.



Generation Infrastructure

Wind Park

Wind Capacity	10 MW
No. of Wind Turbines	5
Turbine Model	DeWind D9.2
Rated Power	2 MW
Blade Diameter	92 m
Hub Height	80 m
Wind Speed Range	4 m/s to 25 m/s
Rated Wind Speed	10.5 m/s
Mean Wind Speed	8.9 m/s at 80 m
Drivetrain	Fixed speed synchronous generator coupled to the variable speed rotor through a hydraulic Voith WinDrive and a two-stage gearbox
Back Up Power for Ancillary Functions	275 kW diesel generator
Topography	10 m cliffs & 300° ocean exposure

Solar PV

PV Capacity	109 kW
PV Make	Jinko
PV Module model	JKM 72-cell
Number of Modules	187 (66%) Bifacial 85 (33%) Monofacial
Inverter	2 Sunny Tripower
Inverter Capacity	62.5 kW
Mounting	Fixed Structure
Tilt	30°
Azimuth	30°

Battery Energy Storage System

BESS Storage Capacity	223 kWh
BESS Storage Rating	111.5 kW
Battery Model	Tesla Energy
Temperature Range	-30°C to +27°C

Wind R&D Park Laboratory



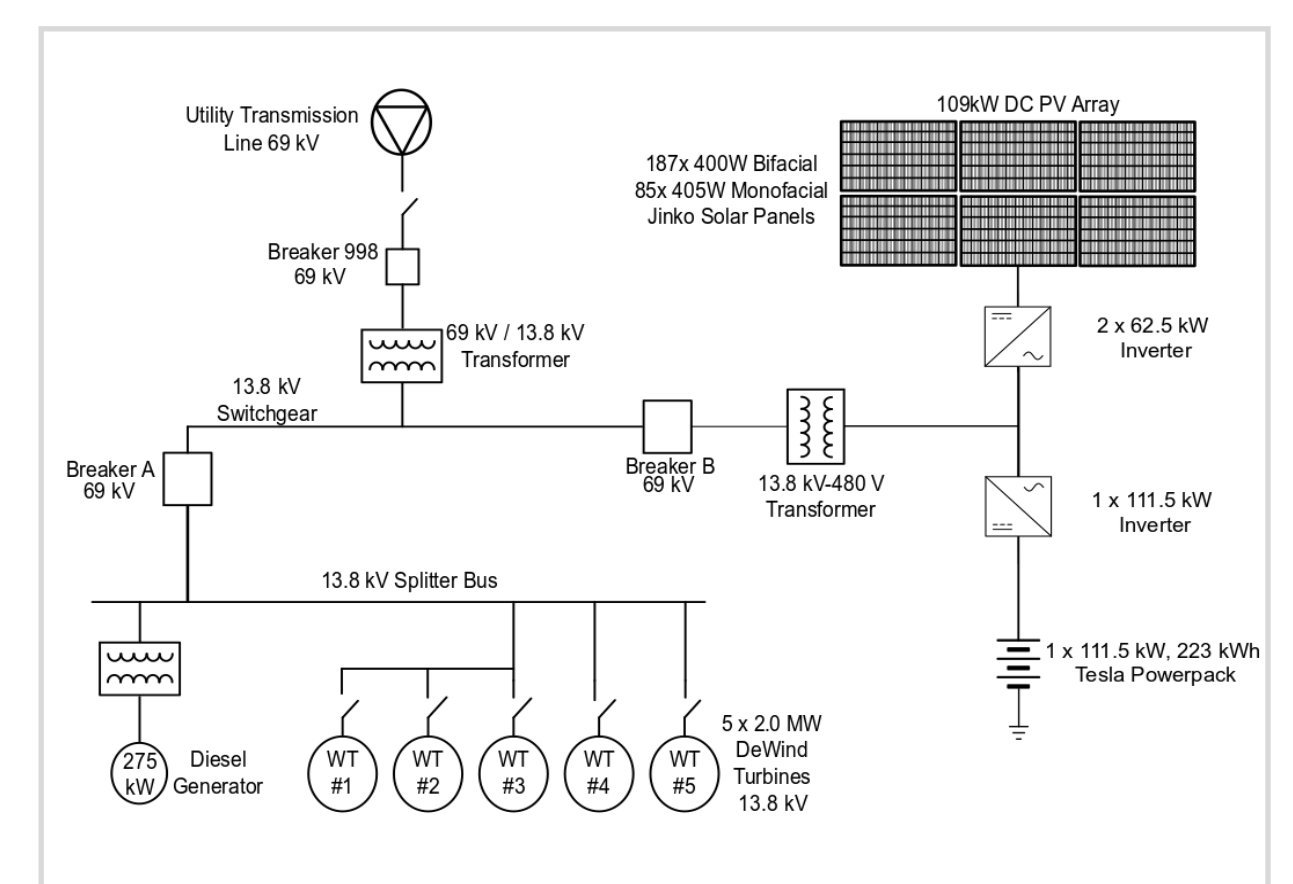
Grid Support Infrastructure

- 111.5 kW/223 kWh Tesla Energy Battery Energy Storage System (BESS)
- Wind R&D Park substation connected to Maritime Electric for 69 kV grid tie-in
- Supervisory Control and Data Acquisition (SCADA) System

Research Operations Support Infrastructure

- **Data management system:** The OSIsoft PI system collects data from all different systems and allows it to be monitored, analyzed, and visualized
- **Wind Turbine Condition Monitoring Systems (CMS) on all Five Wind Turbines:** A B&K CMS capable of advanced wind turbine drivetrain monitoring through continuous analysis of high-frequency vibration data. A *Moventas CMA5* which monitors various parameters to evaluate gearbox performance and anticipates possible upcoming failures
- **Optimizers for PV Panels:** Tigo optimizers are installed on 25% of the solar PV array to equalize the current outputs of each individual panel and allow the collection of operational data at the panel level.
- **Measurement equipment**

Unit	Dates	Measurement variables
60 m met mast	1981 - present	Wind speed and direction, temperature, pressure and relative humidity at different heights.
80 m met mast ¹	2012 - present	Wind speed and direction at different heights; 80 and 10 m temperature, pressure and relative humidity; ice detection; solar radiation
10 m climate monitoring facility ²	2021 - present	Snow depth gauge, rain gauge, air temperature; relative humidity; vapor and barometric pressures; wind speed, gust, and direction; solar radiation; lightning strike (count and distance)
Present Weather Sensor	2018 - 2021	Amount and type of precipitation
Cameras	2021	Imagery is available from a drone and cameras mounted on the solar racking and wind turbines to allow for views of equipment, surface, sky above, and ground cover below



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¹ IEC 61400-12-1: Power performance measurements of electricity producing wind turbines

² IEC 61724-1: Photovoltaic system performance – Part 1: Monitoring, equipped