DIESEL DISPLACEMENT ON AN ISLAND GRID WITH A 1 MW/2 MWH BATTERY ENERGY STORAGE SYSTEM

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Introduction
The Wind Energy Institute of Canada (Institute) is located on Prince Edward Island (PEI) which has a peak load of 260 MW and an installed wind capacity of 204 MW. The Institute owns and operates a 10 MW Wind R&D Park and a 2 MWh Battery Energy Storage System (BESS). PEI is connected to New Brunswick through a 200 MW cable, during low wind and high load this limit is breached and local diesel generators are used to supply the necessary power.

Methodology
In January 2015 the Institute and the local utility Maritime Electric Company Limited –MECL, discharged the battery during periods when local fossil fuel was being used and charged the battery overnight when wind power was available.

Results and Discussion
The Institute discharged 7 times during January with 6 instances occurring during diesel power usage. These 6 discharges resulted in 10.6 MWhs of high value electricity being sent to the network. The BESS includes the S&C’s Purewave® SMS Storage Management System which integrates GE’s Durathon Na-NiCl₂ battery which operates at 300 C. Due to the heating requirements during idle periods the efficiency for January was 50.2%. For the charge/discharge cycles the average full roundtrip AC efficiency was 76.3%

Conclusions
Wind Power can be stored for use during peak periods when wind power is unavailable or insufficient. There were limited opportunities to displace the local diesel power production as they were only utilized 8 times over the month.

Next Steps
Testing other use-cases such as:
- Frequency control
- Automated generation control
- Voltage support.

Continue to improve performance and availability through working with GE and S&C.

Continue to work with system operator and local utility to monetize the value of services offered by a storage system.