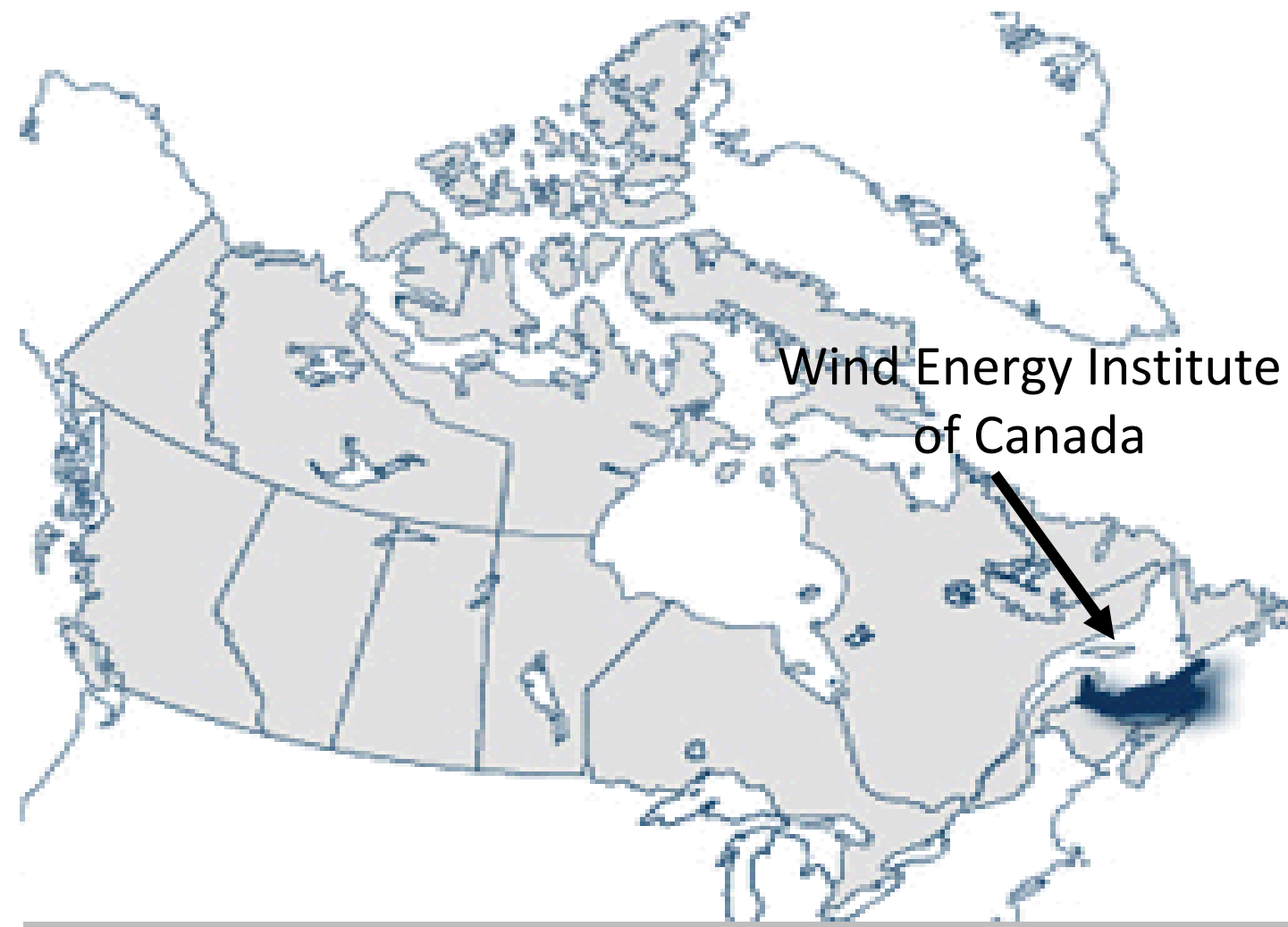


*Exceptional service in the national interest*



# Wind Energy Institute of Canada Energy Storage Use Cases

## Introduction

The Wind Energy Institute of Canada (WEICan) is located on Prince Edward Island (PEI), Canada. PEI has a peak load of 260 MW and an installed wind capacity of 204 MW, which produces over 40% of the Island's load. During high load and low wind, the 200 MW interconnect to the mainland is overloaded and local diesel peaker plants are used to offload the submarine cable. WEICan owns and operates a 10 MW Wind R&D Park, which includes a 1 MW/2 MWh Battery Energy Storage System (BESS). The BESS has been used in a variety of use-cases to understand the technical and economic impacts of a storage system on a grid. WEICan has begun a collaboration with Sandia National Laboratories to determine the optimal use of our BESS for the PEI grid. Sandia has technical expertise in the technical and economical evaluation of grid tied energy storage systems including an Energy Storage Test Pad (ESTP) able to evaluate performance of energy storage systems up to 1MVA. By leveraging the existing energy storage system at the WEICan Wind R&D Park, the models and algorithms developed by Sandia to optimize the use cases of energy storage can be validated and refined.

## Objective

This collaborative effort would lead to increased knowledge and improved services to the energy storage industry. This project will perform the following

- Develop Initial Energy Storage Use Cases using Sandia PYOMO
- Evaluate Initial Energy Storage Use Cases on WEICan Wind R&D Park
- Optimize Energy Storage Use Cases Based on Modeling and Testing

Table: Wind R&D Park

Wind R&D Park Characteristics	
Wind R&D Park Capacity	10 MW
Number of Wind Turbines	5
Model	DeWind D9.2
Storage Capacity	2 MWh
Storage Rating	1 MW
Inverter Model	S&C Purewave
Battery Model	GE Durathon
Temperature Range	-30°C to +27°C
Topography	10 m cliffs and 300° ocean exposure

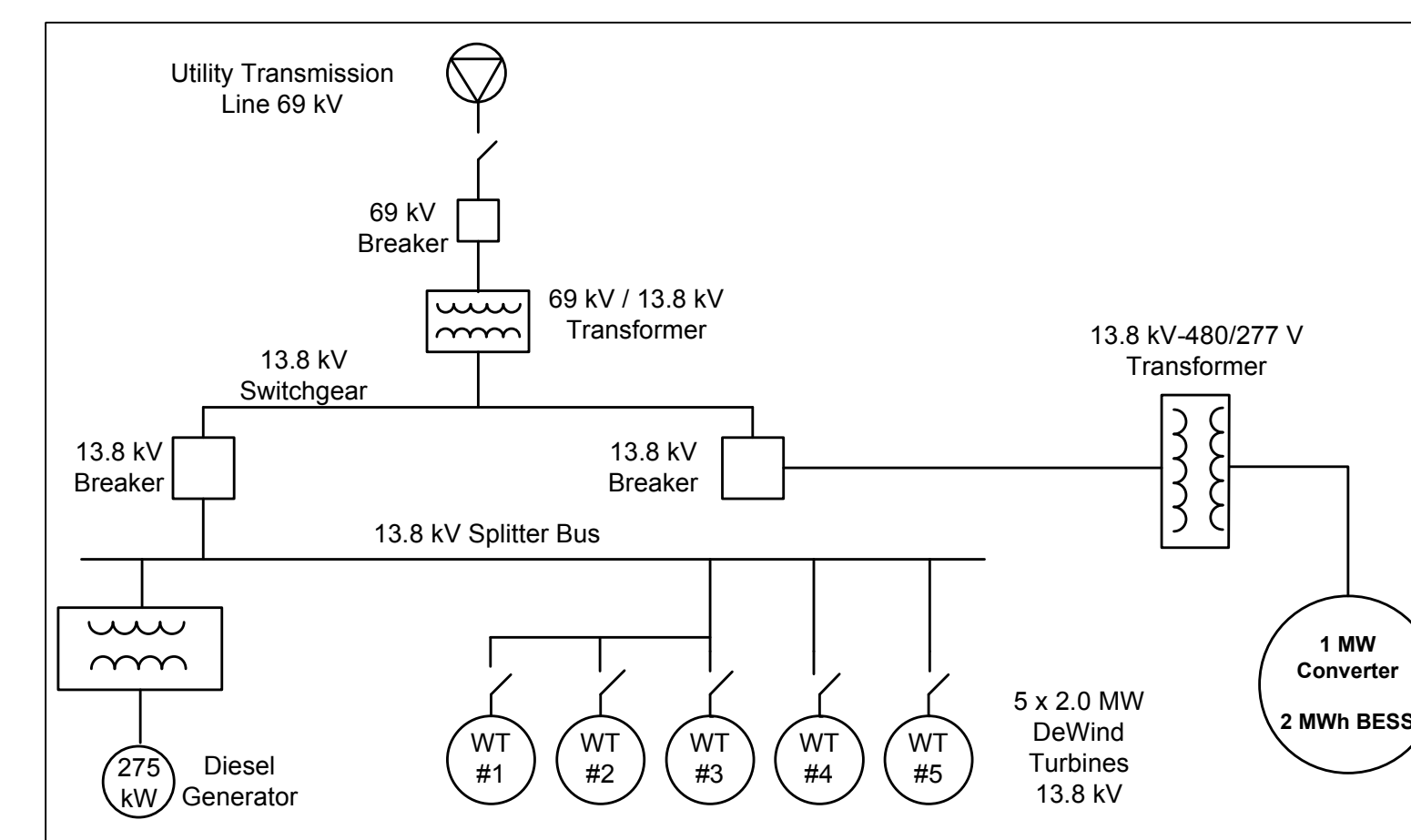


Figure 1: Wind R&D One-Line Diagram

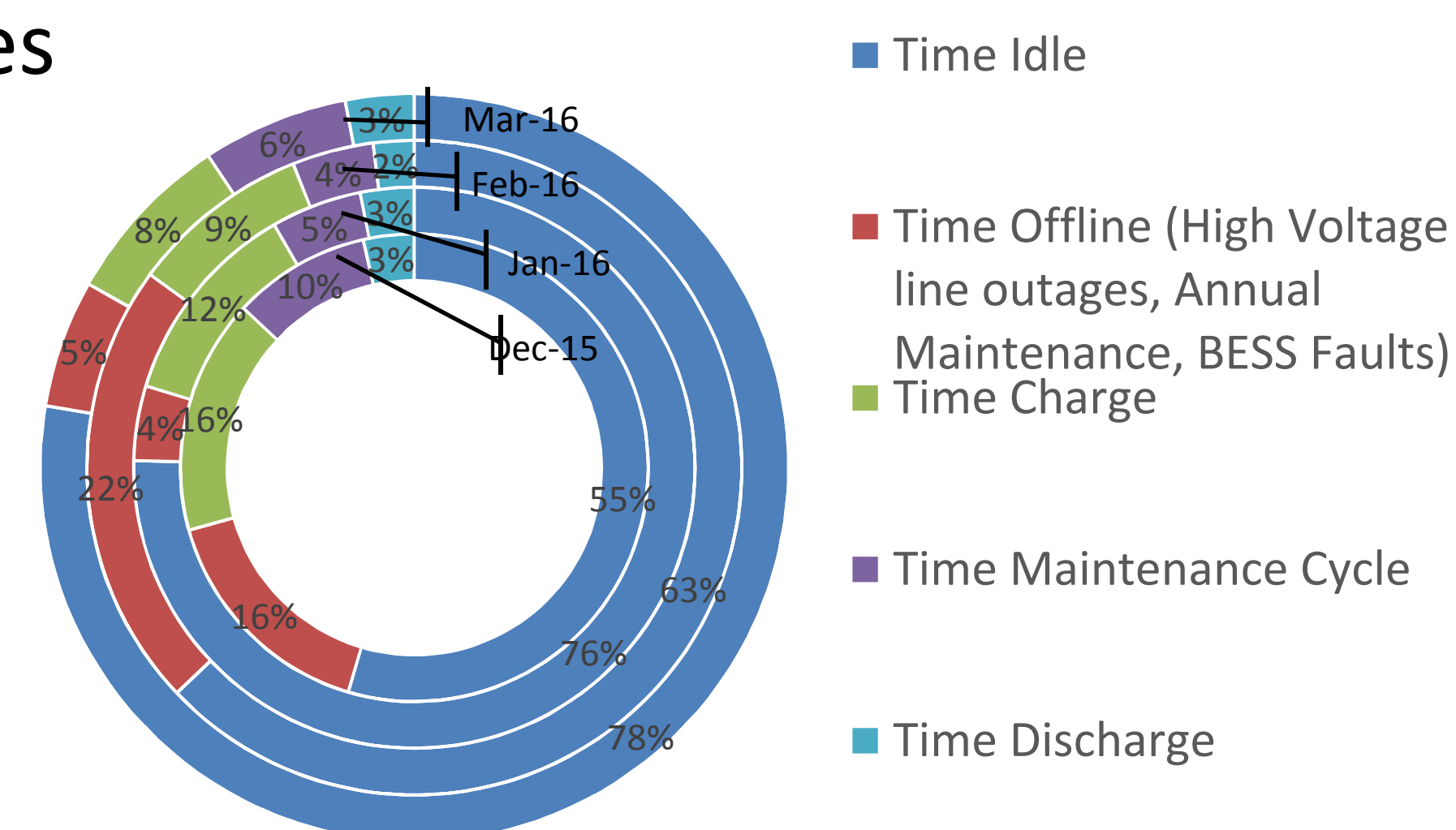


Figure 2: Energy Storage Power Schedule for Displacing Diesel Peaker Plants