**ABSTRACT**

The main advantages of wind turbines, beside the contribution to the environment, include an unlimited, free, renewable resource, economic value, maintenance cost, and placement of wind harvesting facilities. The project aims to investigate the performance criteria of wind turbines and the effect of wind speed on power generated turbines. Wind turbine efficiency and the cost of manufacturing a turbine are subject to the wind regime planning. The driving force behind the project is to understand if the wind turbine is operating at optimal conditions based on the telemetry data. Our undertaking is to empower EnerjiSA to enhance their wind control ventures, so that the company could construct more proficient wind turbines.

**OBJECTIVES**

- Examining the fault records of the system and the loss of energy because of non-optimised planning.
- Translating the distinctions on power curves of the turbines, analyzing the power changes in absence of productivity under various circumstances.
- Enable EnerjiSA to improve the working efficiency of the wind turbines, procrastinate the maintenance times of the turbines and minimize the costs related to the maintenance processes.

**METHODOLOGY**

To examine these problems and come up with a conclusion, the following steps must be considered:

- The selection of the turbine that intended to be examined; from the BARES Fault List, according to the fault duration, date and maintenance duration.
- The examination of the power curves and noises of the turbine before and after the fault and maintenance.
- Selection of different periods for the turbine to compare and contrast the properties, characteristics, changes and similarities.
- Comparing cumulative distributions of power data with cross validation. (By determining a specific control turbine, compare 2016 and 2017 to see how much they correlate)
- The generation of the MATLAB code to check and plot the graphs of the clean turbine data.
- The turbines with the smallest difference from the average power output of all the turbines are chosen as “Control Turbines” as representatives of the wind farm and the others are chosen as “Target Turbines”.

**PROJECT DETAILS**

The daily power generation data of 52 turbines for 10-min intervals during years 2016 & 2017 and the fault list of the turbines were provided by the company. In order to reach the clean data of the turbines, the dates that contain faults are excluded from the excel sheet by defining binary numbers to compare the past and current power outputs by cross check validation.

**REFERENCES**

- Etherington D. “Google says it will hit renewable energy by 2017.” Techcrunch, December 6, 2016