Wind Turbine Data

Introduction

This report is an analysis the relationship between wind speed through a turbine (in m/s) and energy it generates over a fixed time period in kWh. In this case data was taken over 10 minute intervals.

Results

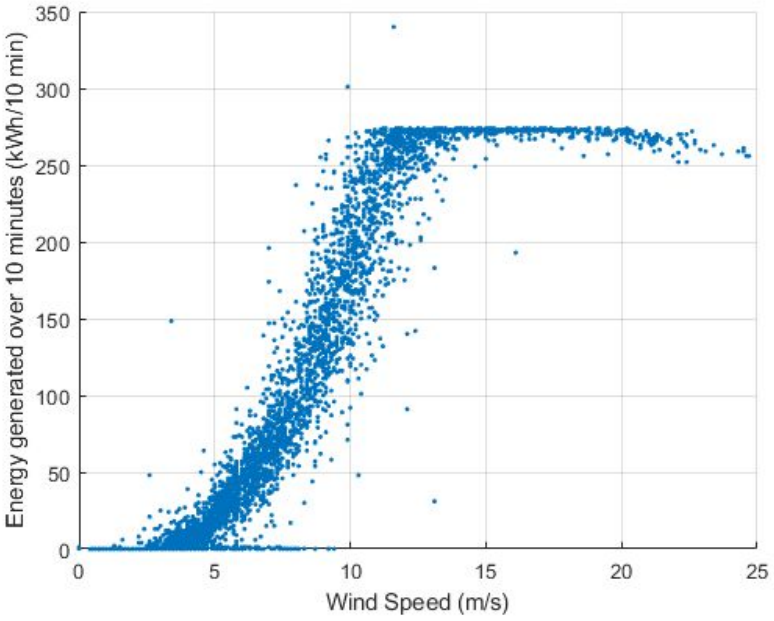

Figure 1: Power Curve A

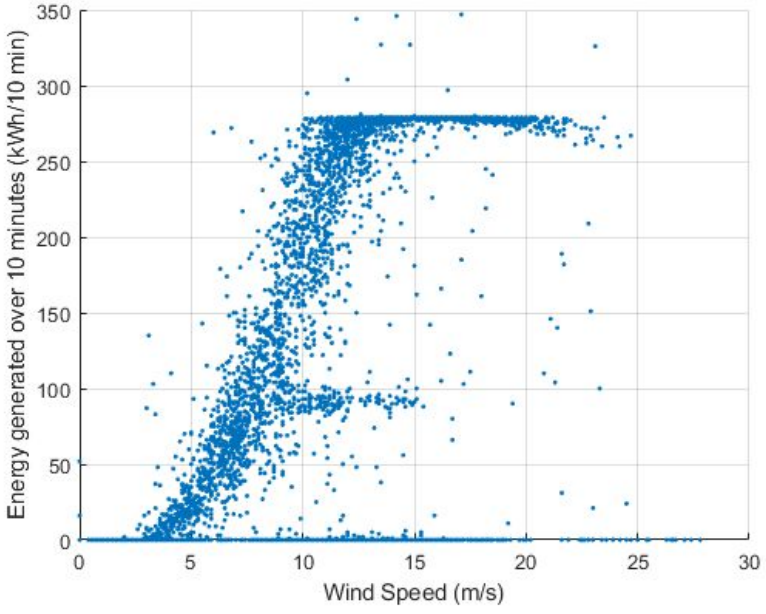

Figure 2: Power Curve B

The turbine power increases with wind speed until they reach their rated power output. These turbines appears to have a rated power output of 275 kWh over the course of 10 minutes which converts to 1650 kW.

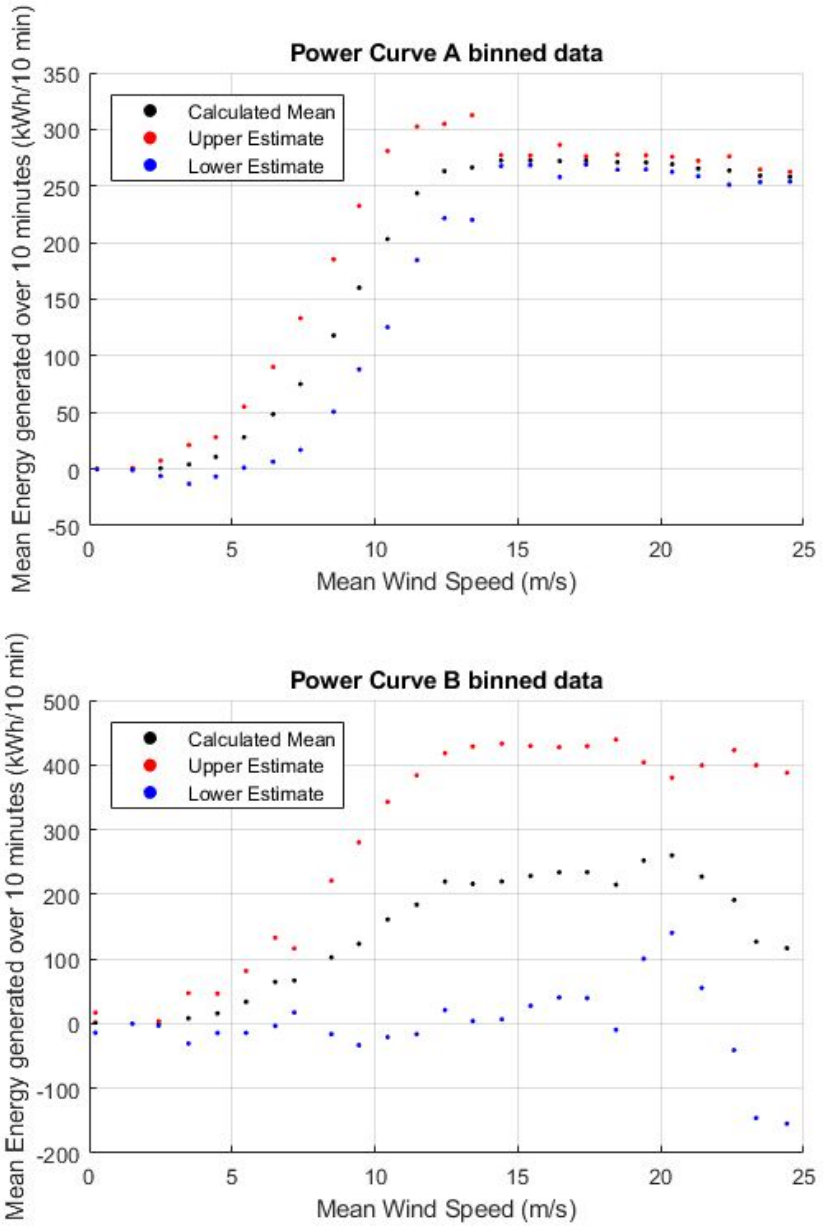

Figure 3: Binned mean Wind Speed against Binned Mean Energy

In Figure 3, data was sorted into 1 m/s wide binned, with a mean being calculated for each bin. This was plotted against the mean energy generated for that bin, with a confidence interval of 95% to estimate the upper and lower bounds of the mean. In bins towards the middle of the data set, there were many more samples in a single bin. The outcome is that the estimate of the mean is much less precise in these bins, and the mean could lie in a much greater range of values, such as in the 13-14 m/s bin.