Wind turbine telemetry

Telemetry from a single turbine on the Orkney Isles (Rousey island if anyone is interested): turbine\_telemetry.

Columns:

* Timestamp: the datatime in UTC of the measurement (the timestamp is situated at the end of the measurement period)
* Power\_kw: average power in kW during the measurement period
* Setpoint\_kw: the mean maximum-allowed generator output during the measurement period
* Wind\_ms: mean wind speed at the turbine during the measurement period.

The setpoint of this turbine indicates whether the turbine is being forcibly curtailed by the network operator — the turbine controller is programmed to ensure that turbine output is always less than or equal to the setpoint. For example, if the setpoint is at the generator’s maximum output (900 kW), the generator can be assumed to be uncurtailed.

Load data

One year of aggregated residential electricity demand data, aggregated over several thousand households in order to remove personally identifying information (PII): residential\_demand.

Columns:

* Timestamp: the datatime in UTC of the measurement. The timestamp is situated at the end of the measurement period
* Demand\_mean\_kw: the mean demand of the sample of households during the measurement period
* N\_households: The number of households included in the aggregate statistics of the measurement period.

Case questions

The first step in determining whether there is a business case for the above sustainable solution is to estimate the total value that might be generated from an Orkney wide DR scheme. The value of anything can only be measured relative to the cost of the alternative. We shall therefore set the incumbent situation on Orkney as our baseline and measure this against the relative value of a DR scheme. The metric of measurement will be the amount of energy curtailed in a year and the value of this energy.

* 1. How much energy is currently curtailed annually across the Orkney Isles?
  2. How much can this be reduced by different levels of DR penetration?
  3. How many local households would need to be on our DR scheme in order to supply this level of DR?