Assignment - Supply Forecasting

Goal

As a Balance Responsible Party (BRP), Vandebron is responsible for maintaining supply and demand on the energy market within its own portfolio. In order to do so, the Data Analytics team develops and maintains forecasting pipelines that predict supply and demand of our producer and customer base.

In this exercise, we would like you to develop a model that predicts the energy production of one of our wind producers. We are interested in having **short-term** forecasts (i.e. 24h in advance) of the energy production from the wind farm, with a 15 minutes resolution.

Please spend between 2 to 3 hours on the exercise. The purpose of this exercise is not to produce a 'final' or finished product, but rather to provide a high level overview of how you would approach the topic and communicate it.

Data

Characteristics of the asset:

- Location: (lat, lon) = (52.454120, 5.6456304)
- Turbine model name: V80/2000 (Vestas manufacturer)
- Number of turbines: 9

The assignment data is provided in the attached CSV files - units reported in the column names:

- Allocation data (`allocation.csv`):
  - 3 years of actual production data
  - PTU resolution (15 minutes intervals)
- Weather forecast data at the wind farm location (`weather_forecasts.csv`)
  - 3 years of weather forecast data (KNMI Harmonie-40 model)
  - Hourly resolution
- Weather actuals data at the wind farm location (`weather_actuals.csv`)
  - 3 years of weather actuals data (KNMI Stations)
  - Hourly resolution
- Power curve (`power_curve.csv`)
  - Power output VS wind speed, specific for the V80/2000 turbine model.

Outcome

As an **outcome** of this assignment, we would like to see:

- A prediction model, based upon the provided data that you find relevant
- An evaluation (based on error metrics and relevant plots) of the forecasts from your prediction model
- The source code (in any language you find suitable) used for data analysis, modeling and evaluation
- An explanation on your thought process. Why did you make certain (modeling) decisions? Why did you come to certain conclusions?