- make sure you have installed all the required libraries (requirements.txt)

- open the file in any IDE (Ex: PyCharm) and run the file

- A Graphical User Interface (GUI) window appears for inputs

- Use the example inputs for reference in the images provided

Contents:

The windpowerlib is a library that provides a set of functions and classes to calculate the power output of wind turbines. (https://windpowerlib.readthedocs.io)

This Graphical User Interface helps to generate an annual hourly feed-in timeseries profile with normalised power output for a location with weather data using Windpowerlib python. The output can be used to model OEMOF simulation.

Weather data file: browse and upload

- hourly weather data in .csv format must contain temperature, pressure, wind speed data for every hour in the year
- See example.csv file for reference

(make sure that the data must be cleaned and no null values are present)

Temperature column and height: Column name for the data containing values of air temperature in C along with the height in meters at which the measurement is made.

Pressure column: Column name for the data containing values of air pressure in Pa at surface level.

Wind speed column and height: Column name for the data containing values of wind speed in m/sec along with the height in meters at which the data is measured.

Surface roughness length: the height above ground in meters at which the wind speed is theoretically equal to zero. Based on your location choose your roughness length from the following links.

http://www.wind101.net/wind-height/index.htm

https://www.researchgate.net/figure/Typical-surface-roughness-lengths_tbl1_316971044

Start date: Start date of your data, must be specified in the same format

Time zone: Specify the time zone of your location

Turbine type: model and type of your wind turbine from the OEBD list.

https://openenergy-platform.org/dataedit/view/supply/wind_turbine_library

Hub height: height of hub for the selected turbine, can also be found in the above list.

While entering the column names, please make sure you enter the names as in the dataset.

Modelchain parameters: In case if you are not sure of your inputs in this section, leave them untouched and all the default inputs are fed into program.

Wind speed model: choose a model from the list to calculate the wind speed at hub height.

Density model: choose a model from the list to calculate the density of air at hub.

Power output model: choose a model from the list to calculate the power output.

Density correction: choose weather you need a density correction or not for the simulation.

Obstacle height: Height of obstacles in the surrounding area of the wind turbine.

“Hellman parameters are only applicable if your wind speed model is Hellman”

Hellman exponent: The Hellman exponent, which combines the increase in wind speed due to stability of atmospheric conditions and surface roughness into one constant.

`hellman_exponent`=1 / ln(hub_height/roughness_length)

Hellman Z0: roughness length to calculate the Hellman exponent.

Then, press the load “Load inputs” so that your inputs are fed to program.

After verifying your inputs in the text area, press the “Simulate” button.

After you close the plot, the normalised output of your simulation is automatically saved into the current working directory, where your current project is running.

Please note:

- Only these inputs can be given by the user and the rest were set to defaults for valid reasons.
- You can simulate only 1 turbine not a cluster with this tool.
- This simulation results correspond to a turbine that is running for every hour in an year, but in reality most of the turbines are operational for only 30-35% of time due to several reasons. So, in practical the output numbers may be smaller.