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

- download the excel file 'power_curve.xlsx' into the same directory as the 'wind_tool_gui_v2.py' file

- open the python 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:

- Weather data
- Wind speed column
- Start date
- Height of measured wind speed
- Terrain roughness coefficient
- Turbine name
- Wind speed cell number
- Power values cell number
- Hub height
- Cut in speed
- Cut out speed

This tool help to generate annual feed-in timeseries data of a wind turbine output for any available weather data. A normalised output of power can be created that can be used to solve OEMOF simulations.

Weather data: browse and upload

- hourly weather data in .csv format must contain 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)

Wind speed column: Column name for the data containing values of wind speed in m/sec.

Start date: start date of your data in the same format.

Height of measured wind speed: the height at which wind speed data is measured.

Terrain roughness coefficient: Based on your terrain and surroundings choose the α value from the below table:

Area type	α
Smooth hard ground, calm water	0.10
Short grass on untilled ground	0.14
Level country with foot-high grass, occasional tree	0.16
Tall row crops, hedges, a few trees	0.20
Many trees and occasional buildings	0.22 – 0.24
Wooded country – small towns and suburbs	0.28 – 0.30
Urban areas with tall buildings	0.4

[Ali K Resen et al 2020 IOP Conf. Ser.: Mater. Sci. Eng. 881 012161]

Turbine name: Choose the turbine model you want to work with from the excel sheet 'power_curve.xlsx' file and enter the name.

Wind speed cell number: from the excel file 'power_curve.xlsx' enter the corresponding cell number containing the wind speed data of the selected wind turbine.

Power values cell number: from the excel file 'power_curve.xlsx' enter the corresponding cell number containing the power curve values of the selected wind turbine.

Hub height: Enter the height of hub for your turbine in meters.

Cutin speed: Enter the Cutin speed of your turbine in m/sec, below which the turbine cannot produce any electricity.

Cutout speed: Enter the Cutout speed of your turbine in m/sec, above which the turbine cannot produce any electricity.

Then, press the load "Upload 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.
- The tool needs both python file and excel file to be in the same directory to work.
- You can work with your own turbine data by simply adding the power curve values to corresponding windspeeds into excel file and follow the same process.
- The tools accuracy depends on the accuracy of power curve values.
- This simulation results correspond to a turbine that is running for every hour in a year, but most of the turbines in practical are operational for only 30-35% of time due to several reasons. So, in practical the output numbers may be smaller