

## Python GUI Example: IEEE Test Case 8500-Node

This document describes the main feature of a simple Python file (*IEEE8500\_Gui\_Example.py*) that produces a Graphical User Interface (GUI) to execute some simple actions on the IEEE Test Case 8500-Node. In particular this GUI is designed to connect a 3 phase generator, with user defined features, in the IEEE Test Case 8500-Node network and then run a power flow in such conditions.

### HOW TO RUN THE EXAMPLE

The program *IEEE8500\_Gui\_Example.py* has been realized in *Python 2.7.11* in *Windows 7 (64 bit)* using the compiler *PyCharm Community Edition 5.0.4*. However, to execute this program it is possible to both open the file in *PyCharm* and run it from there or use the command window as detailed below:

1. Open Command Window as administrator
2. Digit ***cd PathWhereIEEE8500\_Gui\_ExampleIsLocated*** (1 in Figure 1)
3. Press Enter
4. Digit ***python IEEE8500\_GUI\_Example.py*** (2 in Figure 1)<sup>1</sup>
5. Press Enter

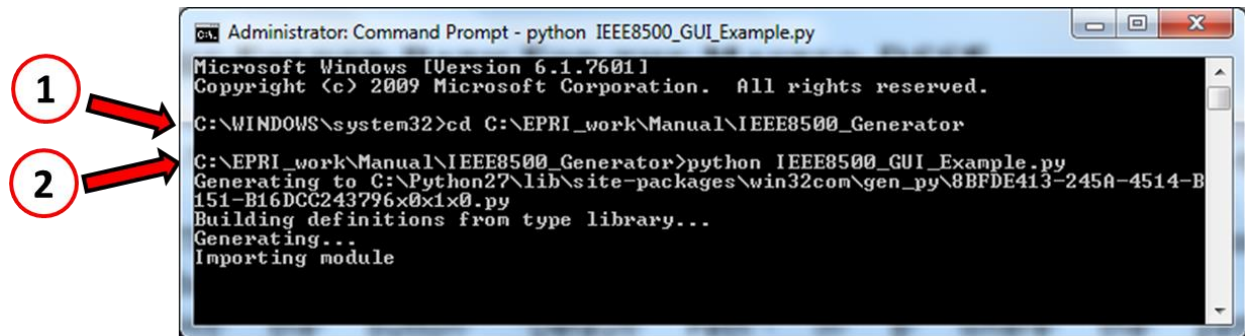


Figure 1 How to load the GUI file for the IEEE 8500 Test-Case

The *IEEE8500\_Gui\_Example.py* adopts the following modules:

```
win32com.client  
sys  
Tkinter *  
gc  
numpy  
tkMessageBox
```

Except numpy these modules are typically already installed. However, if it is not the case (Python will through out an error message as “No module named XX was found”), a module can be installed adopting the following procedure:

1. Open Command Window as administrator
2. Digit ***cd C:\Python27\Scripts***
3. Press Enter
4. Digit ***pip install ModuleName***

<sup>1</sup> To use the command window in this way it might be needed to add python to the environmental variables of Windows. Several guide explains the process as: <http://pythoncentral.io/add-python-to-path-python-is-not-recognized-as-an-internal-or-external-command/>

## FIRST GUI WINDOW: SET THE FOLDER PATH

The first window that will be opened requires the user to indicate the path where the IEEE Test Case 8500-Node is located (field 1 in Figure 2). Once the path is inserted the user can choose to:

1. Hit the button “IEEE-8500 Power Flow: Base Case” (2 in Figure 2): A power flow in the default condition will be run. At the end of the process the following 3 windows showing results will be opened: Summary – Voltage Profile – Event log
2. Hit the button “IEEE-8500 Power Flow: With generator” (3 in Figure 2): In this case the user will be introduced to a second window in which the generator features can be inserted (next section).

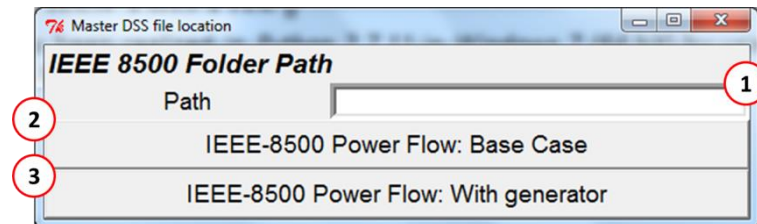


Figure 2 First window: define the path and decide which power flow carry on

## IEEE-8500 POWER FLOW: WITH GENERATOR

In case the user hit the button 3 in Figure 2 a second window (Figure 3) will be opened.

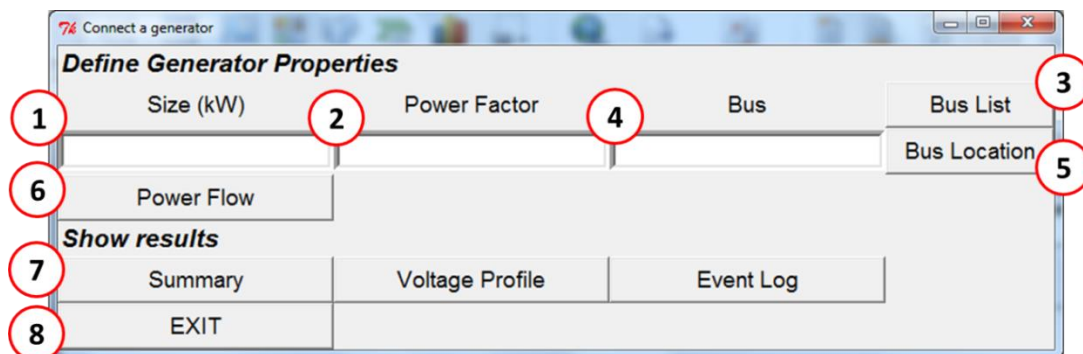


Figure 3 Second window: define generator properties

The user is required to:

- A. Insert the Size (in kW) of the generator in the field “Size kW” (1 in Figure 3);
- B. Insert the Power Factor of the generator in the field “Power Factor” (2 in Figure 3);
- C. Hit the button “Bus List” (3 in Figure 3). A window will be opened reporting the name of the buses in which the generator can be connected<sup>2</sup>;
- D. Copy and Paste (CTRL+C and CTRL+V keyboard button respectively) the name of the chosen bus from the bus list to the “Bus” field (4 in Figure 3). The bus position within the network can be shown by hitting the “Bus Location” button (5 in Figure 3);
- E. The power flow can then be solved hitting the button “Power Flow” (6 in Figure 3);
- F. The results can be visualized by pressing the buttons “Summary” – “Voltage Profile” – “Event Log” (7 in Figure 3);
- G. The user can repeat the previous steps how many times desires
- H. Press the button “EXIT” (8 in Figure 3) to close the two GUI windows (Figure 2 and Figure 3).

<sup>2</sup> The buses in which the generator have a base voltage of 12.47 kV and three phase