Application Note - How to Design a SolarEdge System Using PV*SOL

Version History

- Version 2.0, March 2018 – for PV*SOL Premium 2018:
  - Addition of SolarEdge inverters
  - Incorporation of SolarEdge system design rules
  - Ability to design multi-orientation strings
- Version 1.0 – Initial version, for PV*SOL Premium 2017 and lower

Valentin Software’s PV*SOL® is a simulation software used by PV designers worldwide. This application note describes how to simulate a SolarEdge system in PV*SOL.

The SolarEdge system advantages become clear when designing a 3D shading scene using PV*SOL, and comparing the same design to that using a traditional inverter. String azimuth, tilt or partial shading does not limit system design when designing a SolarEdge system.

NOTE: This application note assumes the reader has prior knowledge of the basic use of PV*SOL.

NOTE: PV*SOL performs basic SolarEdge design validation. However it is recommended to use the SolarEdge Site Designer for string sizing and inverter and power optimizer selection.

You may configure the PV system for using one of the two methods offered by PV*SOL:

- **With 3D shading visualization**: The system is designed visually. Electrical design and a shading simulation is achieved by constructing the 3D scene
- **Without 3D shading visualization**: The system is designed by filling in the electrical parameters

Starting a New Project

1. Go to File menu → New Project

2. Optional: fill in the **project data** parameters

3. Click the **Continue** arrow or the **System Type, Climate and Grid** button in the tool bar:

4. Select the **Country** and **Location**:

If you would like to specify a location that is not on the list, click on the **Open climate data selection** button.
The MeteoSyn application window opens. Click on *Create Climate Data for new Location*. In the new window, zoom-in on the desired location and right-click to place a marker. Fill in the location name and press *ok*. Press *ok* again in the MeteoSyn application to be transferred back to PV*SOL with the new location selected.

5. Proceed to system planning with or without 3D visualization as detailed in the next two sections.

**System Planning with 3D Visualization**

1. In the Type of Design section, check Use 3D Design:

2. In the *Type of System*, select the Grid Connected PV system.

3. Click on the *Continue* arrow or press the *3D Design* button in the toolbar.

4. In the 3D Design section, click the *Edit* button to design the system.

Proceed with creating the 3D model of the project and place the modules in the scene. For help with 3D model building and project setup in PV*SOL, refer to the PV*SOL help and manuals available on the Valentin Software website ([http://www.valentin.de/en](http://www.valentin.de/en)).

The following is an example 5.7kWp project with two orientations and partial shading from a chimney. The system comprises 19 X 300W modules (12 modules oriented south and 7 modules oriented west). The SolarEdge system will have one string of 19 X P300 power optimizers, spanning both orientations, connected to an SE5000H single phase HD-Wave inverter.

5. Select the *Module Configuration* tab to configure the SolarEdge power optimizers.

6. Click the *Configure all Unconfigured Modules* button.

7. The SolarEdge system allows multiple orientations in the same string. To create such a design we first need to instruct PV*SOL to treat both orientations as one array. In the inverter configuration window Ctrl-click to select both “Roof Area South” and “Roof Area West”, then click “Configure module areas together”.

8. Check “Polystring Configuration”, then from the inverter drop-down menu, select SolarEdge as the inverter manufacturer. Select the desired inverter, then select the appropriate power optimizer to fit the chosen module (in this case, the SE5000H inverter mated with the P300 using a 1:1 connection). Please refer to the SolarEdge Site Designer to find the correct power optimizer for the modules in your project.

9. The correct design for this roof is one string of 19 modules, spanning both orientations. Click on “Add Row” to insert an additional orientation and check the option “Connect strings with the same number in series”. Make sure the new row refers to the same string (in this case, “String 1“). The final electrical design will look like this:
Click OK to return to the main 3D interface. The modules now indicate the string design (in this case, one string only):

![Image](image-url)

10. Close the 3D interface window to return to the main project screen.

11. Click on **Results** button to run the simulation:

![Image](image-url)

12. Click the **View Presentation** button, and choose the format to which you would like to export the results.

![Image](image-url)

**System Planning without 3D Visualization**

1. In the **Type of Design** section, deselect the checkbox **Use 3D Design**

![Image](image-url)

2. In the **Type of System**, Select the Grid Connected PV system.

3. Select the **PV Modules** button in the toolbar:

![Image](image-url)

4. There are 2 Module Areas (i.e. orientations) that need to be created: South (with 12 modules) and West (with 7 modules). Insert the following parameters for Module Area 1 (South):

   a. Module manufacturer and model: Jinko Solar JKM300M-60 (the modules used in this example)
b. Number of PV modules: 12

c. Orientation: 180°

d. Inclination: 27°

e. Installation type: In this case, you can select Roof Parallel

5. To create the other Module Area (the 2nd orientation), click the Copy button:

![Copy button](image)

6. Enter the following parameters for the 2nd orientation:

a. Module manufacturer and model: Jinko Solar JKM300M-60

b. Number of PV modules: 7

c. Orientation: 270°

d. Inclination: 30°

e. Installation type: In this case, you can select Roof Parallel

7. Select the **Inverters** button in the tool bar:

![Inverters button](image)

8. In the inverter Configuration window Ctrl-click to select both "Module Area 1" and "Module Area 2", then click "Configure module areas together".

![Configure module areas together](image)

9. Check "Polystring Configuration", then from the inverter drop-down menu, select SolarEdge as the inverter manufacturer. Select the desired inverter, then select the appropriate power optimizer to fit the chosen module (in this case, the SE5000H inverter mated with the P300 using a 1:1 connection). Please refer to the SolarEdge Site Designer to find the correct power optimizer for the modules in your project.

10. Similar to the case above using the 3D shading scene, the correct design here is one string of 19 modules, spanning both orientations. Click on “Add Row” to insert an additional orientation and check the option "Connect strings with the same number in series”. Make sure the new row refers to the same string (in this case, “String 1”). The final electrical design will look like this:
11. Upon configuration completion, click the **Results** button to run the simulation:

![Results button](image1)

12. Click the **View Presentation** button, and choose the format to which you would like to export the results.

![View Presentation](image2)