

## The maxx-solar-online-academy

### Intermediate Course: On-grid 100kWp rooftop

#### *Learning Goals and Content of the Course*

| Course Content as per Modules   | Learning goals / Short description  |
|---|---|
| <b>Module 1 – Introduction</b>  | <p>You will get an introduction to the maxx-solar-online-academy and the course itself.</p>   |
| <b>Module 2 – Recap of the Basic course</b> <ul style="list-style-type: none"> <li>○ Electrical concepts</li> <li>○ Basic overview of PV technology</li> <li>○ Solar resource</li> <li>○ System performance and yields</li> </ul>   | <p>You are reminded of the key concepts of solar PV technology as shared during the Basic course.</p> <p>You are informed of what your anticipated level of understanding should be.</p>  |
| <b>Module 3 – Components and their functions</b> <ul style="list-style-type: none"> <li>○ Solar PV modules <ul style="list-style-type: none"> <li>▪ Electrical characteristics</li> <li>▪ Temperature performance</li> <li>▪ Warranties</li> </ul> </li> <li>○ Rooftop mounting system <ul style="list-style-type: none"> <li>▪ Penetrating systems</li> <li>▪ Non-penetrating</li> <li>▪ Integrated</li> </ul> </li> <li>○ PV inverters <ul style="list-style-type: none"> <li>▪ MPPT</li> <li>▪ Efficiency</li> <li>▪ Grid following/forming</li> <li>▪ Inverter classes</li> <li>▪ Inverter loading</li> </ul> </li> </ul> | <p>You will understand the components and their functions in more detail.</p> <p>The PV module and its overall characteristics will be explained in detail.</p> <p>You will understand how to integrate the different PV system components.</p> |
| <b>Module 4 – On-grid system configurations</b> <ul style="list-style-type: none"> <li>○ Embedded generation</li> <li>○ Exporting energy</li> <li>○ With diesel generators</li> </ul>   | <p>You will understand the solar PV system in relation to the electricity grid.</p> <p>The energy flows in the systems will be explained.</p> <p>Operation of PV systems in conjunction with diesel generators will be clarified.</p>           |

|   |   |
|---|---|
| <p><b>Module 5 – Site assessment</b></p> <ul style="list-style-type: none"> <li>○ Energy and tariffs</li> <li>○ Desktop assessment</li> <li>○ Site assessment</li> </ul>  | <p><b>You will understand the energy impact that a PV system will have.</b></p> <p><b>You will learn about the key aspects of a site visit to allow you to design the PV system post visit.</b></p>   |
| <p><b>Module 6 - Design</b></p> <ul style="list-style-type: none"> <li>○ Energy needs assessment</li> <li>○ Step by step design <ul style="list-style-type: none"> <li>▪ Specific yield</li> <li>▪ Design target</li> <li>▪ PV inverter ratio</li> <li>▪ PV string design as function of temperature and a PV inverter</li> </ul> </li> <li>○ Design exercises</li> <li>○ Rules of thumb</li> </ul> | <p><b>All the knowledge that has been shared will be utilised to perform a step-by-step design.</b></p> <p><b>The manual design approach will make it clear how the various pieces of information are used in a design.</b></p> <p><b>You will design your own PV system.</b></p> <p><b>You will be given rules-of-thumb for quick assessments.</b></p> |
| <p><b>Module 7 – Simulation tool overview</b></p> <ul style="list-style-type: none"> <li>○ Solar information resources online</li> <li>○ Calculation and Design Tools commercial</li> <li>○ Calculation and Design Tools from manufacturers</li> </ul>  | <p><b>You know now what tools and resources are available online</b></p> <p><b>You know which design and simulation tools to use for which application.</b></p> <p><b>You know about the simulation tools that are available from specific equipment manufacturers.</b></p>   |
| <p><b>Module 8 – Software-based system design</b></p> <ul style="list-style-type: none"> <li>○ Entering Project/Site Data</li> <li>○ Dimensioning Solar Panels array</li> <li>○ Adding Keep Outs and Shadows</li> <li>○ Selecting the Inverter</li> <li>○ Single Line Diagram</li> <li>○ Final Report</li> </ul>  | <p><b>You are able to use an online design and simulation tool to design a grid-tied solar system.</b></p> <p><b>You are able to create solar panel layouts on roofs according to the size, orientation and inclination of the roof.</b></p> <p><b>You are able to generate energy yield simulation reports for a specific solar system.</b></p>        |
| <p><b>Module 9 – Electrical design and protection</b></p> <ul style="list-style-type: none"> <li>○ Interconnected electrical system</li> <li>○ DC cabling</li> <li>○ DC combiners</li> <li>○ Inverter input protection</li> <li>○ Inverter output protection</li> <li>○ Metering</li> <li>○ Monitoring</li> </ul>   | <p><b>You will be able to determine and calculate the DC cable requirements.</b></p> <p><b>You will understand the key protection elements in a PV system.</b></p> <p><b>Safety in a PV plant is paramount. The participant will learn about safety.</b></p>  |

**Module 10 – Best practices**

- PV modules
- Mounting system
- PV inverter
- Combiner boxes
- Cable routing

**You will understand critical and detailed aspects of why best practices for each of the components and interconnecting equipment need to be observed.**

**You will learn about the negative impact of not following best practices.**

**You will understand how the best practices will achieve the lowest Operation and Maintenance costs for a PV system that has a 20-year operating horizon.**

**Do you have any questions? Please write to:**

**CHRISTINE LEFFLER**

maxx-solar-online-academy | Manager

**Mail** [christine.leffler@maxx-solar.de](mailto:christine.leffler@maxx-solar.de)

**Web** [www.maxx-academy.org](http://www.maxx-academy.org)

**MAXX SOLAR & ENERGIE GmbH & Co. KG**

Eisenacher Landstraße 26, 99880 Waltershausen