**PV system Components**

Due to the limited size of the solar cell it only delivers a limited amount of power under fixed current-voltage conditions that are not practical for most applications. In order to use solar electricity for practical devices, which require a particular voltage and/or current for their operation, a number of solar cells have to be connected together to form a solar panel,

also called a PV module. For large-scale generation of solar electricity solar panels are connected together into a solar array.

Although, the solar panels are the heart of a PV system, many other components are required for a working system, that we already discussed very briefly above. Together, these components are called the Balance of System (BOS). Which components are required depends on

whether the system is connected to the electricity grid or whether it is designed as a stand-alone system. The most important components belonging to the BOS are:

• A mounting structure is used to fix the modules and to direct them towards the sun.

• Energy storage is a vital part of stand-alone systems because it assures that the system can deliver electricity during the night and in periods of bad weather. Usually, batteries are used as energy storage units.

• DC-DC converters are used to convert the module output, which will have a variable voltage depending on the time of the day and the weather conditions, to a fixed voltage output that e. g. can be used to charge a battery or that is used as input for an inverter in a grid-connected system.

• Inverters or DC-AC converters are used in grid connected systems to convert the DC electricity

originating from the PV modules into AC electricity that can be fed into the electricity grid.

• Cables are used to connect the different components of the PV system with each other and to the

electrical load. It is important to choose cables of sufficient thickness in order to minimise resistive

losses. Even though not a part of the PV system itself, the electric load, i.e. all the electric appliances that are connected to it have to be taken into account during the planning phase. Further, it has to be considered whether the loads are AC or DC loads.