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Ideal design of the photovoltaic module power depending on the photovoltaic boiler

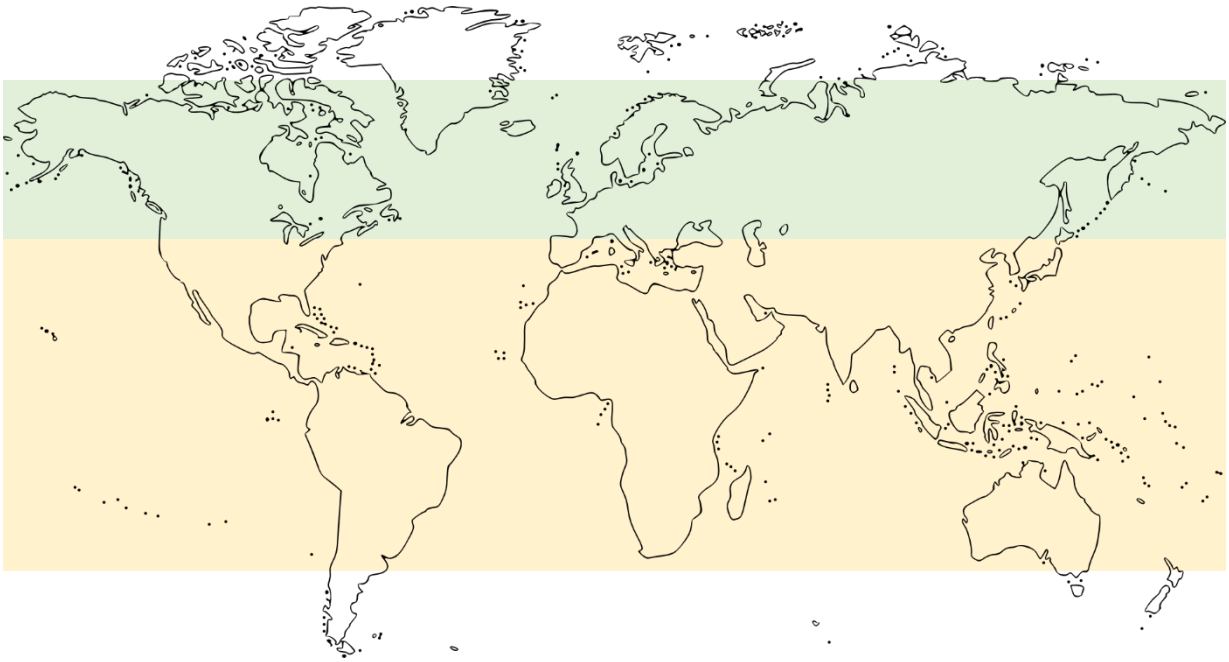
Depending on the volume of the boiler and the required hot water demand, fothermo recommends connecting a different number of photovoltaic modules to the boiler. This overview should serve as a rough guideline. Depending on demand or availability, the number of photovoltaic modules connected can be varied individually.

The following table provides an overview:

Boiler	**Medium solar irradiation** (Germany, Austria, Switzerland, Netherlands, northern France, Sweden, Poland, etc.)	**High solar irradiation** (Italy, Spain, Greece, Northern Africa, Southern Africa, Australia etc.)
10 L Caravan Boiler	1 PV-Module	1 PV-Module
10 L Offgrid Boiler	1 PV-Module	1 PV-Module
30 L Offgrid Boiler	2 PV-Modules	1 PV-Module
80 L Offgrid Boiler	3 PV-Modules	2 PV-Modules
30 L Hybrid Boiler	2 PV-Modules	1 PV-Module
80 L Hybrid Boiler	3 PV-Modules	2 PV-Modules
200 L Boiler	6 PV-Modules	5 PV-Modules
300 L Boiler	9 PV-Modules	6 PV-Modules
Heating Rod	3 PV-Modules	2 PV-Modules

Definition 1 PV module: A standard photovoltaic module usually has an output of between 350 Wp and 450 Wp.

A graphical representation of solar radiation in different regions of the world:



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Overview of the maximum heating power depending on the photovoltaic module voltage

The maximum heating power of the boiler depends on the MPP voltage (operating voltage) of the photovoltaic modules. The higher the voltage, the higher the max. heating power. This is because the maximum current flowing is limited by the ohmic resistance in the boiler. From an MPP voltage of 35 V, the maximum output of the boiler is reached.

Below is a list of the maximum output of the boilers depending on the module voltage.

Photovoltaic module voltage (Vmpp)	Maximum power to be assumed
20 V	174 W
23 V	230 W
26 V	294 W
29 V	365 W
32 V	445W
35 V	532 W
38 V	550 W
41 V	550 W
44 V	550 W

The photovoltaic modules in this blue voltage range are standard photovoltaic modules which can be purchased anywhere. When purchasing photovoltaic modules, make sure that the specified MPP voltage is between 32 V_{mpp} and 35 V_{mpp}, if possible, for best results.

Further information:

- The maximum open circuit voltage (V_{oc} | Open Circuit Voltage) of the photovoltaic modules must not exceed 50 V. Please check the data sheet of the photovoltaic modules before connection.
- All photovoltaic modules are plugged into the photovoltaic boilers in parallel connection. For easy installation, fothermo offers Y-connectors / parallel connectors as accessories. The parallel connection of the photovoltaic modules adds up the current of all connected photovoltaic modules. The voltage of the modules remains the same (< 50V).
- If the current of the photovoltaic modules exceeds 15.5 A, it is limited to a maximum of 15.5 A by the integrated MPP tracker.