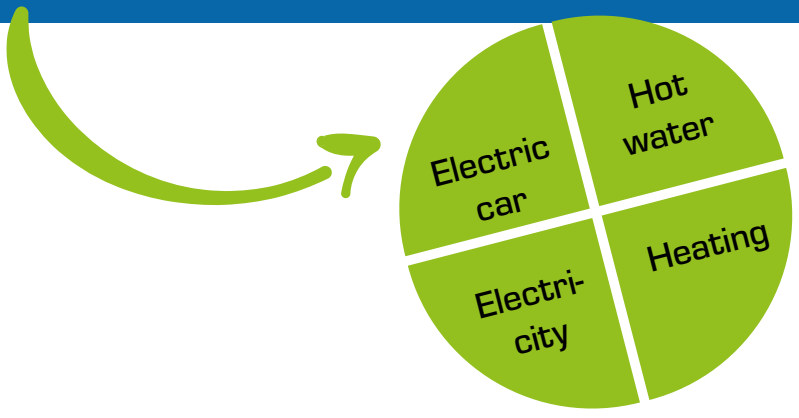
MYPV

Empowering the Solar Future

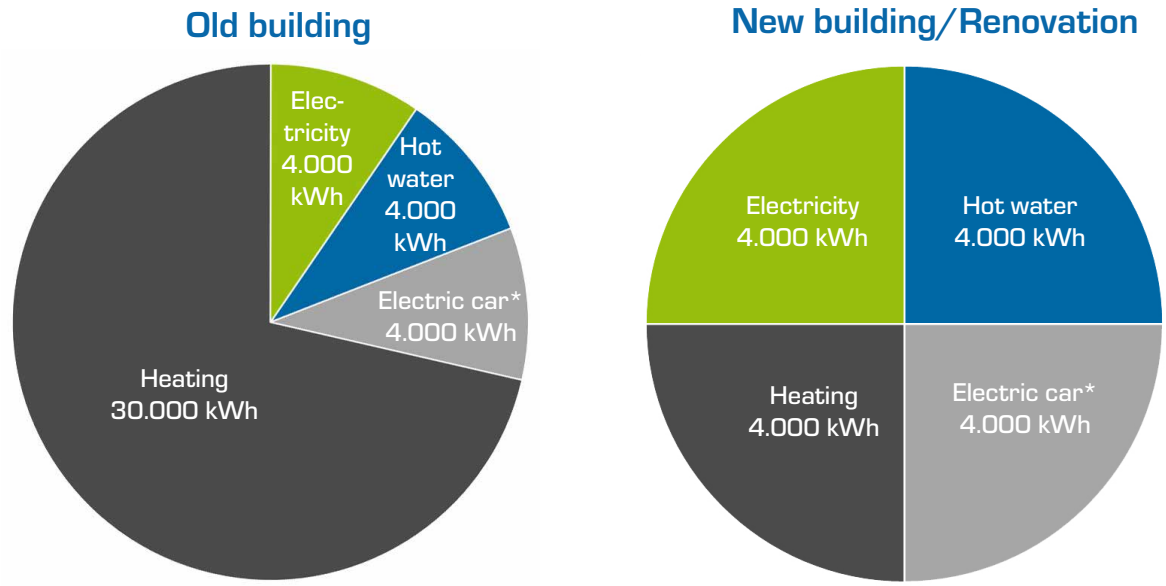
PHOTOVOLTAIC HEAT IN YOUR SINGLE-FAMILY HOUSE

Electricity, hot water, and space heating—all from photovoltaics—are good for you and the environment.



WHY CONSIDER PHOTOVOLTAIC HEAT IN YOUR SINGLE-FAMLY HOUSE?

In recent years, the energy expenditure for heat generation and the cost of photovoltaics have reduced significantly. Therefore, using electricity from photovoltaics for hot water and heating has become energetically justifiable and inexpensive, both in construction and in operation. However, the need for e-charging stations is growing. There is the possibility to directly use the photovoltaic electricity from the roof or the façade for electric cars.



Rule of thumb for the power requirement for photovoltaics:

Hot water (self-sufficient): 1.5 kWp / Single-family house (2 or 3 residents); 2.0 kWp / Single-family house (4 to 6 residents)

Hot water (grid-connected): min. 5 kWp / Single-family house (4 to 6 residents)

Hot water & space heating (grid-connected): See table on page 9

Use of photovoltaic powered heating

As a basic requirement for photovoltaic heating, it is best to cover the whole roof with PV modules whenever possible. This way, operating costs can be saved, you are less dependent on rising energy prices, and it is environmentally friendly. Depending on your needs, there can also be a distinction made as to whether water and space heating or just water heating with photovoltaics is suitable for a single-family house.

For houses with a heating requirement below 50 kWh/m²a and a living space of less than 150 m², we recommend implementing hot water and room heating using photovoltaic power. For houses with a higher energy demand and/or a larger living area, we only recommend water heating with PV. We recommend planning your PV system to cover at least 50% of your energy demands for electricity, hot water, and possible heating. If an electric car is planned, you are also equipped for that.

Advantages of photovoltaic powered heating in a single-family house

Particular advantages result from the installation of photovoltaic heating systems compared to district heating, heat pumps, or gas central heating:

- The installation effort is minimized by “cables instead of pipes”.
- The installations are low-maintenance.
- No central, large „boiler room“ is necessary. Only a small wall area for the control is necessary.
- There are no thermal losses through distribution and circulation lines.
- The solar energy is converted into heat directly where and when it is needed.
- Energy independence from the power grids through high self-consumption.

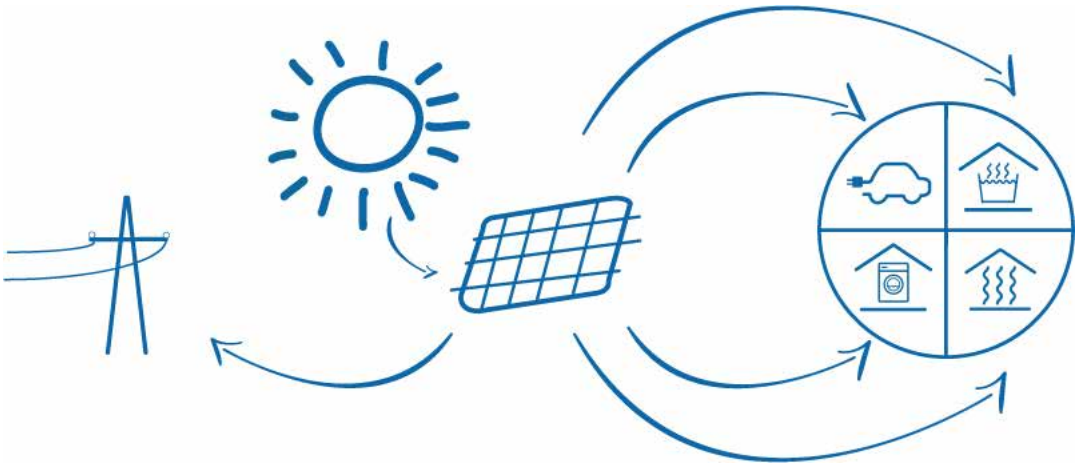
Electrician and plumber – who is doing what?

Which trade supplies what kind of components and works for the advertised projects?

The **electrician** records everything outside of the boiler, including the control of components immersed in water, network technology, electric-heating mats for heating, etc.
The **plumber** will take care of any heating elements, i.e., everything that is in the water cycle.

Perfectly adapted: Three possible solutions for photovoltaic powered heating

1. The photovoltaic modules on the roof are used exclusively for hot water.
2. The photovoltaic modules on the roof are connected to the grid with an inverter. Photovoltaic yields can be used for electricity and hot water. The heating system remains separate from the domestic hot water.
3. The photovoltaic modules on the roof are connected to the grid with an inverter. Photovoltaic yields can be used for electricity, hot water and space heating. Recommended for new buildings.



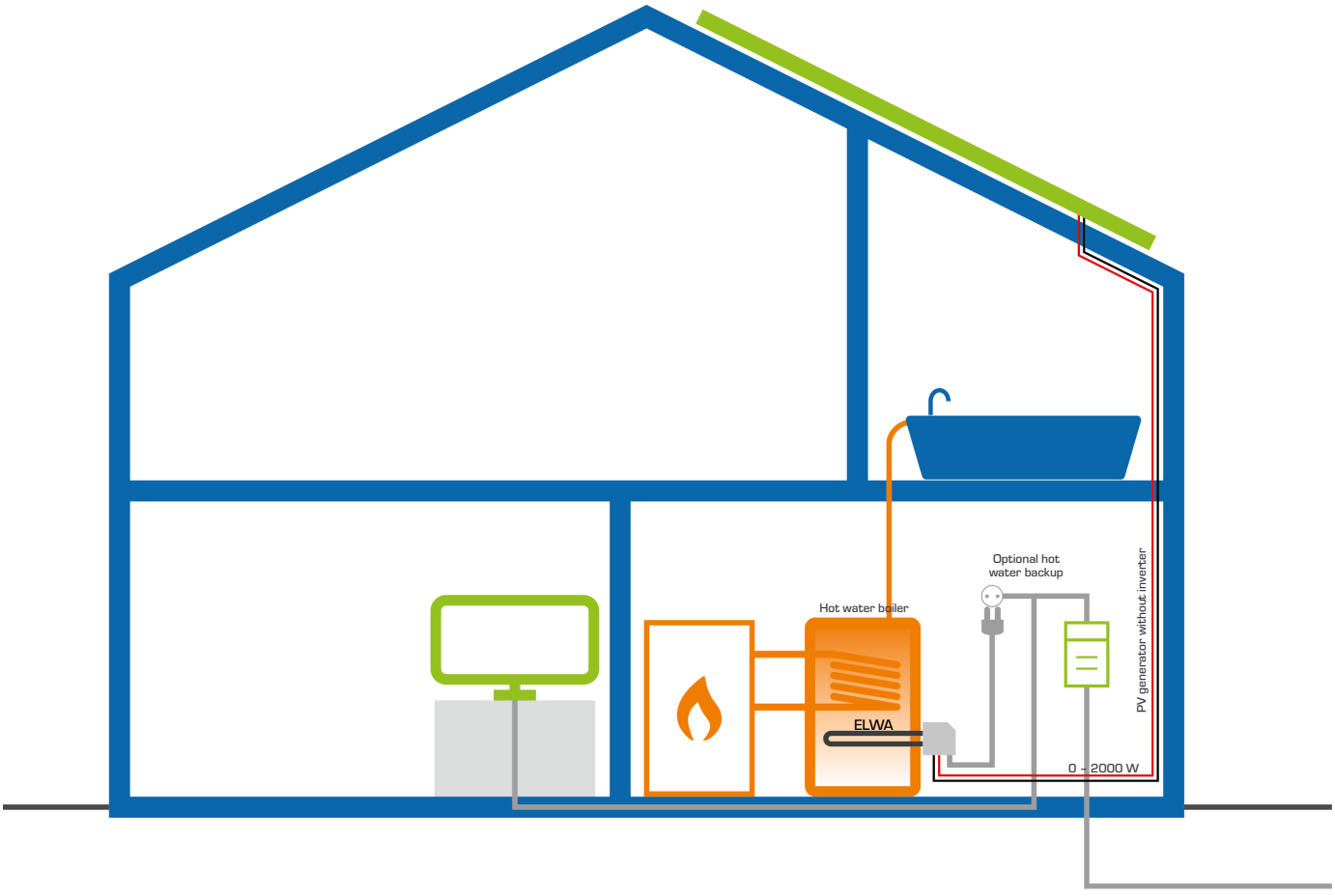
EXAMPLE 1: PHOTOVOLTAIC MODULES ON THE ROOF ARE USED EXCLUSIVELY FOR HOT WATER

For the self-sufficient hot water solution from my-PV, only 4 – 8 photovoltaic modules are required, which are installed on the roof or placed on the facade. The energy is used exclusively by ELWA, our heating element, and the electricity is converted heat and transferred to the water in the water tank.

ELWA transfers almost 100 % of the available energy into heat, and the resulting hot water acts as a thermal battery and stores the solar energy in the hot water tank. In this example, other areas of the home that require electricity, such as household appliances, are not supplied by the PV system.

Experience shows that a photovoltaic system with approximately 1.5–2 kWp makes the most sense purely for hot water preparation.

Would you like to see a schematic representation?



THE FACTS

Advantages of this system

- Simple building technology
- No grid connection for the photovoltaic system
- No meter fee for the photovoltaic system

Disadvantages of this system

- Once the hot water tank has heated up, no more energy can be used. However, experiences show that this accounts for only 6–8% of the energy.
- Hot water tank required, which must be compatible with ELWA.

When do we recommend this simple application?

When retrofitting on a small budget.

We have a suitable reference here: Singe family house in Upper Austria

What is necessary?

- 1 x ELWA

What must be in the house?

- Photovoltaic system and DC cabling to the ELWA
- A socket (optional for hot water backup)
- Safety precautions according to local regulations
- Water installations

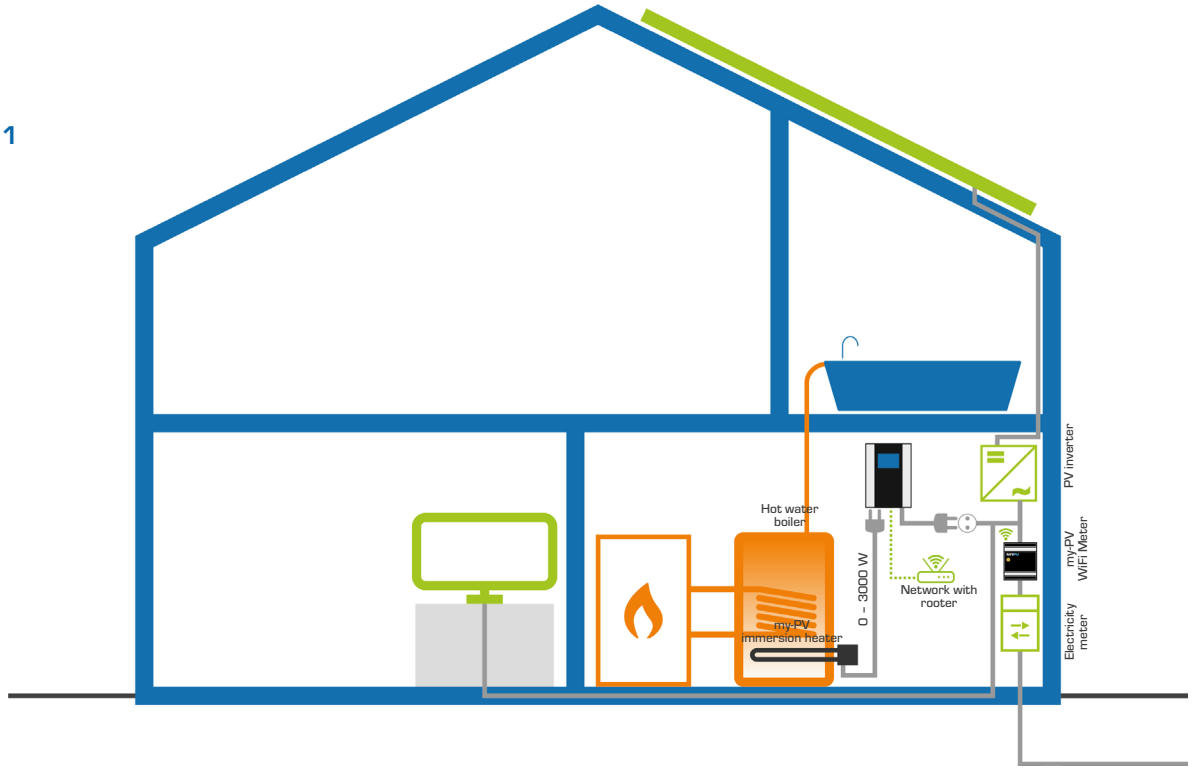
EXAMPLE 2: PV MODULES ON THE ROOF ARE USED FOR ELECTRICITY AND HOT WATER

In a house with a grid-connected photovoltaic system, a my-PV device is linked with a measuring instrument installed at the feed-in point.

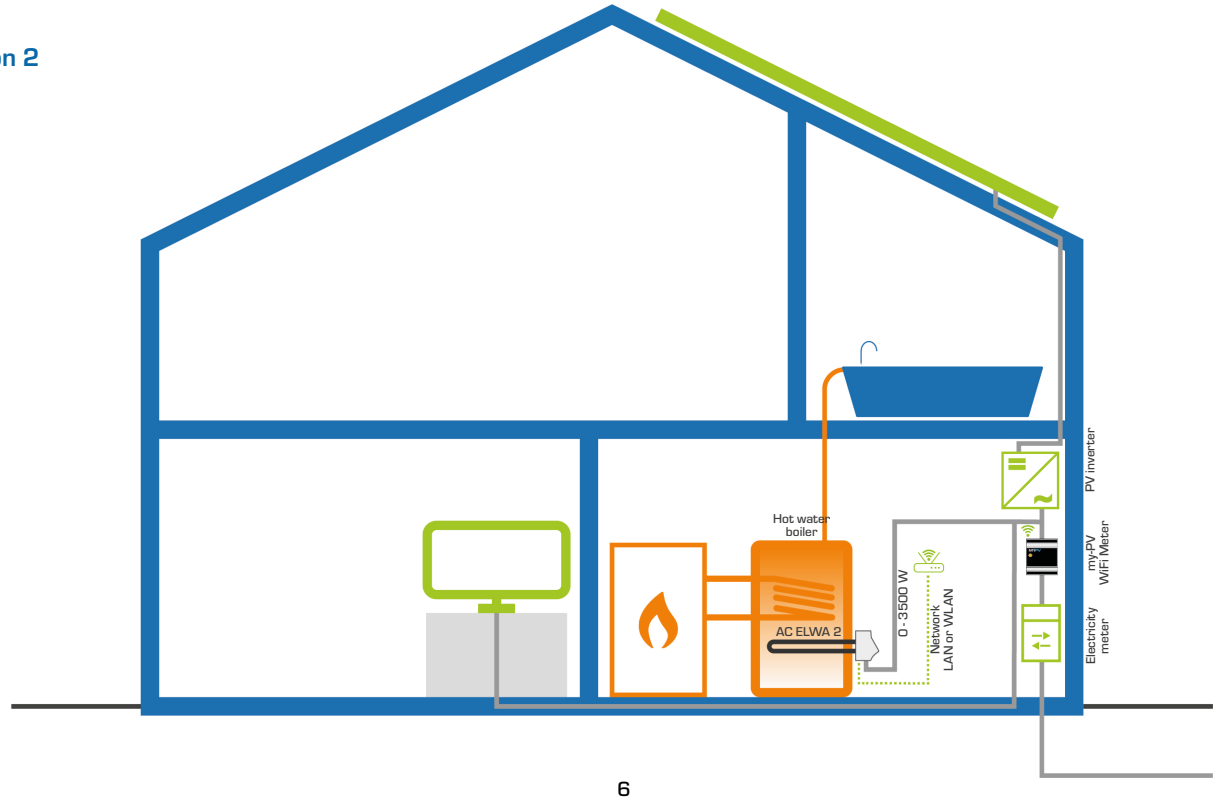
In the house, there is a commercially available hot water tank or heating buffer tank, with a heating element that is linearly controlled with a PV power-manager AC•THOR or AC•THOR 9s (option 1).

Another possibility is easily implemented with the retrofittable AC ELWA 2 (option 2).

Option 1



Option 2



THE FACTS

Advantages of this system

- Photovoltaic energy can be used for electricity for household appliances (lightning, devices, etc.)
- Energy can be fed into the grid in case of absence or when the desired target temperature is reached.
- It is possible to use a standard boiler with an integrated electric heating element.

When do we recommend this simple application?

- For photovoltaic systems > 5 kWp

We have a suitable reference here: Increased self-sufficiency in a two-family house

What is required per house?

Option 1

- 1 x AC•THOR incl. 1 x temperature sensor each for hot water measurement in the boiler
- 1 x immersion heater 3 kW (if no heating element is integrated in the standard boiler)
- 1 x my-PV WiFi Meter (75 A current transformer for energy measurement at the feed-in point)

Option 2

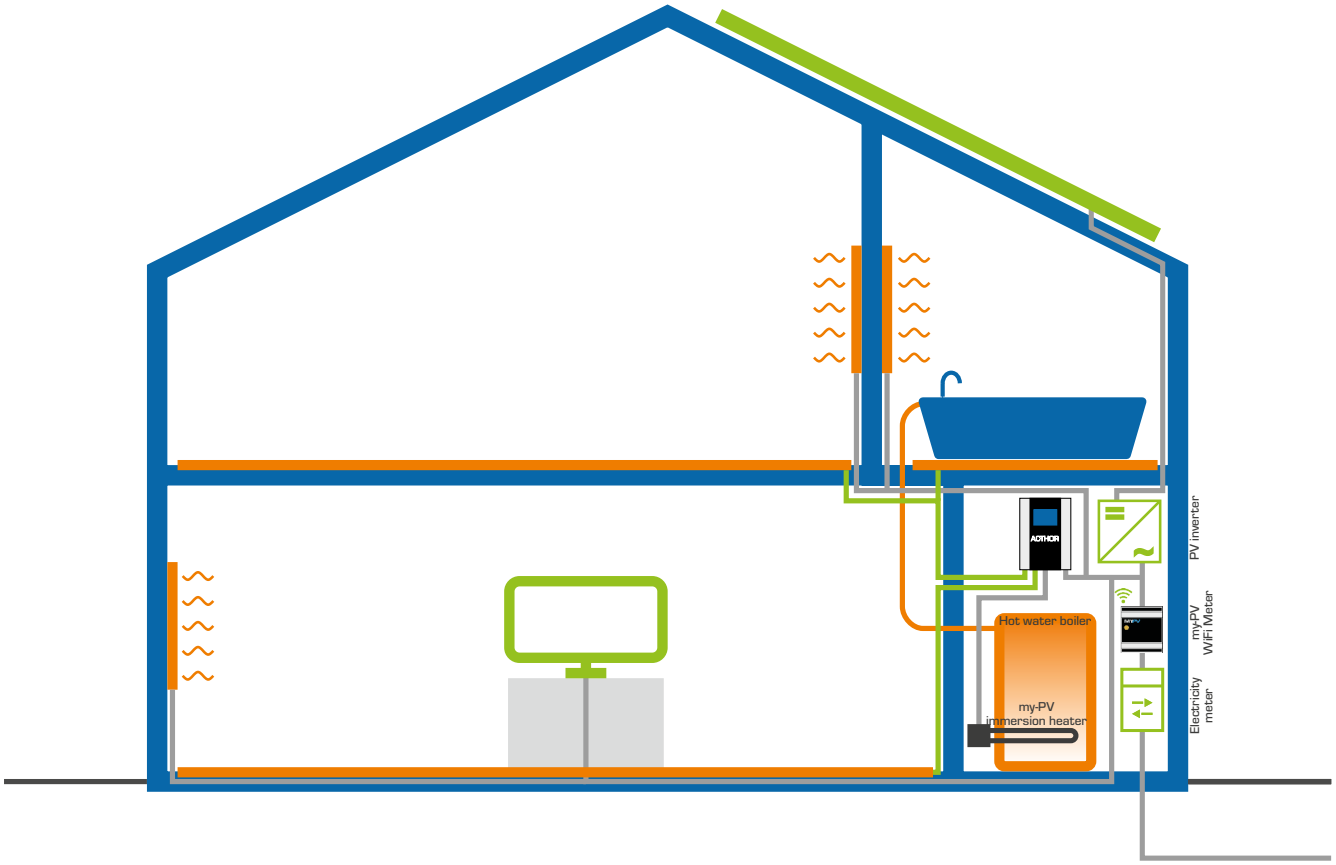
- 1 x AC ELWA 2
- 1 x my-PV WiFi Meter (75 A current transformer for energy acquisition at the feed-in point)

What must be in the house?

- Wiring of the components
- Network cabling
- Router
- Water installations

EXAMPLE 3: PHOTOVOLTAIC MODULES ON THE ROOF ARE USED FOR ELECTRICITY, HOT WATER AND ROOM HEATING

In a house with a grid-connected photovoltaic system, AC•THOR 9s is linked with a measuring instrument installed at the feed-in point. In the house, hot water and two heating circuits are steplessly supplied with photovoltaic heat, e.g. kitchen and living room. In rooms such as the bedroom, where normally rather low temperatures are desired, the heating circuit is connected to an ordinary room thermostat and carried out in an unregulated manner.



THE FACTS

Advantages of this system

- Photovoltaic energy can be used for electricity for household appliances (lightning, devices, etc.)
- Energy can be fed into the grid in case of excess
- Use of a standard boiler with an integrated electric heating element
- No technical/utility room required for control.
- Renewable heating technology for environmentally conscious homeowners

When do we recommend this kind of application?

- For buildings with very good insulation with a maximum hot water demand of 50 kWh/m²year, based on the climate region.

How big should the photovoltaic system be?

- This is determined by the heated area as well as the heating demand. The suggested sizing factors and a calculation example are provided below.

Hot water demand	Factor [kWp / m² living area
> 45–50	0,1
> 40–45	0,08
> 35–40	0,07
> 30–35	0,06
> 25–30	0,05
<= 25	0,04

Beispiel: 150m² living space, hot water demand 40 kWh/m²year: minimum output PV=150 x 0.08 = 12kWp

We have a suitable reference here: Electrical house in the Mühlviertel

What is necessary?

- 1 x AC•THOR 9s with 1 x sensor for hot water and 2 x sensors for space heating (not included)
- 1 x immersion heater 3 kW (if no heating element is integrated in the standard boiler)
- 1 x my-PV WiFi Meter (75 A current transformer for energy measurement at the feed-in point)

What must be in the house?

- Wiring of the components
- Network cabling
- Router
- Water installations

What is the correct process?

1. Planning of the house is completed, energy certificate or heating requirement is determined
2. Planning of the photovoltaic system is completed
3. Simulation carried out with my-PV Power-Coach (https://www.my-pv.com/en/applications/mypv-power-coach/)
4. The electrician has designed the two controllable electric heaters (heating mat or infrared) (two heating circuits each max. 3 kW, 230 V heat generator, my-PV recommends the kitchen and living room here).
5. Performance of the heating element for hot water confirmed (max. 3 kW, 230 V heat generator)
6. If necessary, send my-PV the data for a final review (info@my-pv.com)
7. Implement it!

ARE YOU A PREFAB HOUSE MANUFACTURER, PLANNER, ENERGY CONSULTANT, OR INSTALLER FOR SINGLE-FAMILY HOUSES?

Then get in touch with us!

Provide us with the following information and receive a project assessment:

- Location of the building
- Number of people per house (important for hot water requirements)
- Heated area per house (model apartment in this property)
- Heating requirement kWh/m²a
- Size of PV system and orientation

We would be happy to check the feasibility of „photovoltaic heat“ for your project!

Disclaimer* my-PV does not have a planning license.

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