MYPV

Empowering the Solar Future

Photovoltaic heat in residential construction

Why consider photovotaics in residential construction?

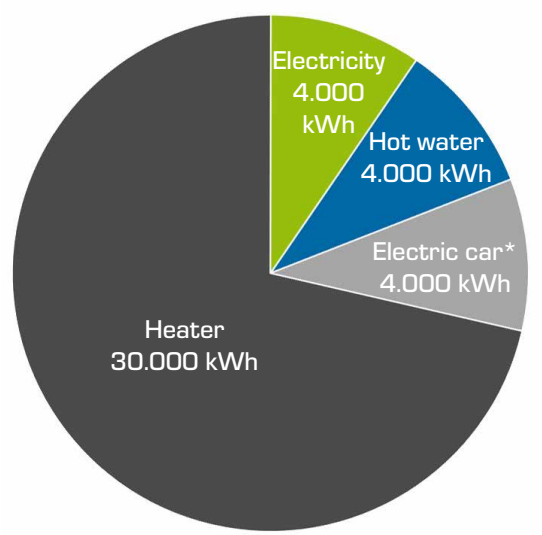
Renewable, cost-effective, easy implementation and good monitoring sound good, right?

WHY CONSIDER PHOTOVOLTAICS IN HOUSING?

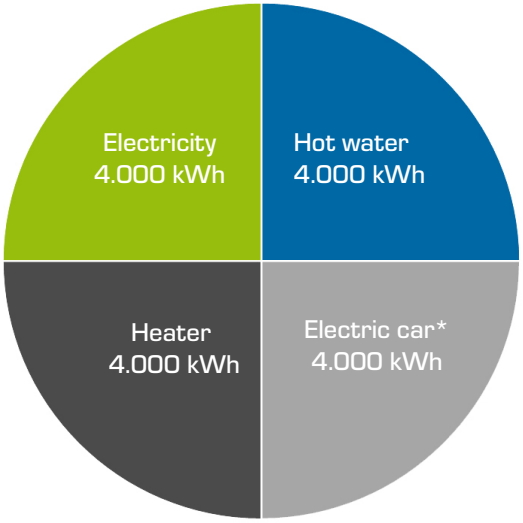
In recent years, the energy required for heat processing and the production costs of photovoltaics have been significantly reduced. Therefore, photovoltaic heat for hot water and heating is now energetically justifiable and cost-effective - both in construction and operation.

However, the requirement to install e-charging stations is also increasing. This offers the opportunity to use the photovoltaic energy generated on the roof or facade directly for electric cars.

Old building



New building / Redevelopment



Rule of thumb for power requirements for photovoltaics:

Hot water & space heating in residential buildings: min. 3 kWp / residential unit

Hot water: 1.5 kWp / residential unit (2 or 3 residents); 2.0 kWp / residential unit (4 to 6 residents)

The use of photovoltaic heat

More and more housing cooperatives recognize through the tightened hygiene measures (legionella) the requirement to build the hot water in residential buildings separately from the heating system, because different temperature levels are necessary. In buildings that have a low-energy standard, hot water and heating with photovoltaics is possible without any problems, if the building height does not exceed 3-4 floors.

Why is the number of floors so important? The ratio of roof area to heat demand must be suitable, so that not too much energy has to be taken from the power grid to provide hot water and heating for a significant portion of the year. As a planning goal, we recommend at least 50% coverage by photovoltaic electricity for hot water and heating.

Good to know: Electricity from photovoltaics cannot be sold as current to tenants in Austria and Germany. If this household electricity is provided to the tenant as heat, then the use of photovoltaic energy is possible for the tenants.

Advantages of photovoltaic heat for housing cooperatives

When housing cooperatives install photovoltaic heat systems, the following advantages arise compared to systems with central heat generation - such as district heating, heat pumps or a gas central heating system:

- There are no thermal losses through through ringmains. The drinking water tanksare located in the apartments. This means that the solar energy is converted into heat where it is needed.
- The installation effort is minimized by „cables instead of pipes“.
- The installations are low maintenance.
- No central, large „boiler rooms“ are necessary. Only a small technical room is required for the controls.
- Heat billing for hot water and heating is much easier with electric meters.
- Thermal disinfection of the drinking water system is completely unnecessary.

Electrician and plumber - who does what?

Which trade supplies which components and operations for tendered projects?

The **electrician** covers everything that is outside the boiler; the control of the components in the water, network technology, electric heating mats for heating, etc.

The **plumber** will take care of any heating element or the ELWA, i.e. everything that is in the water circuit.

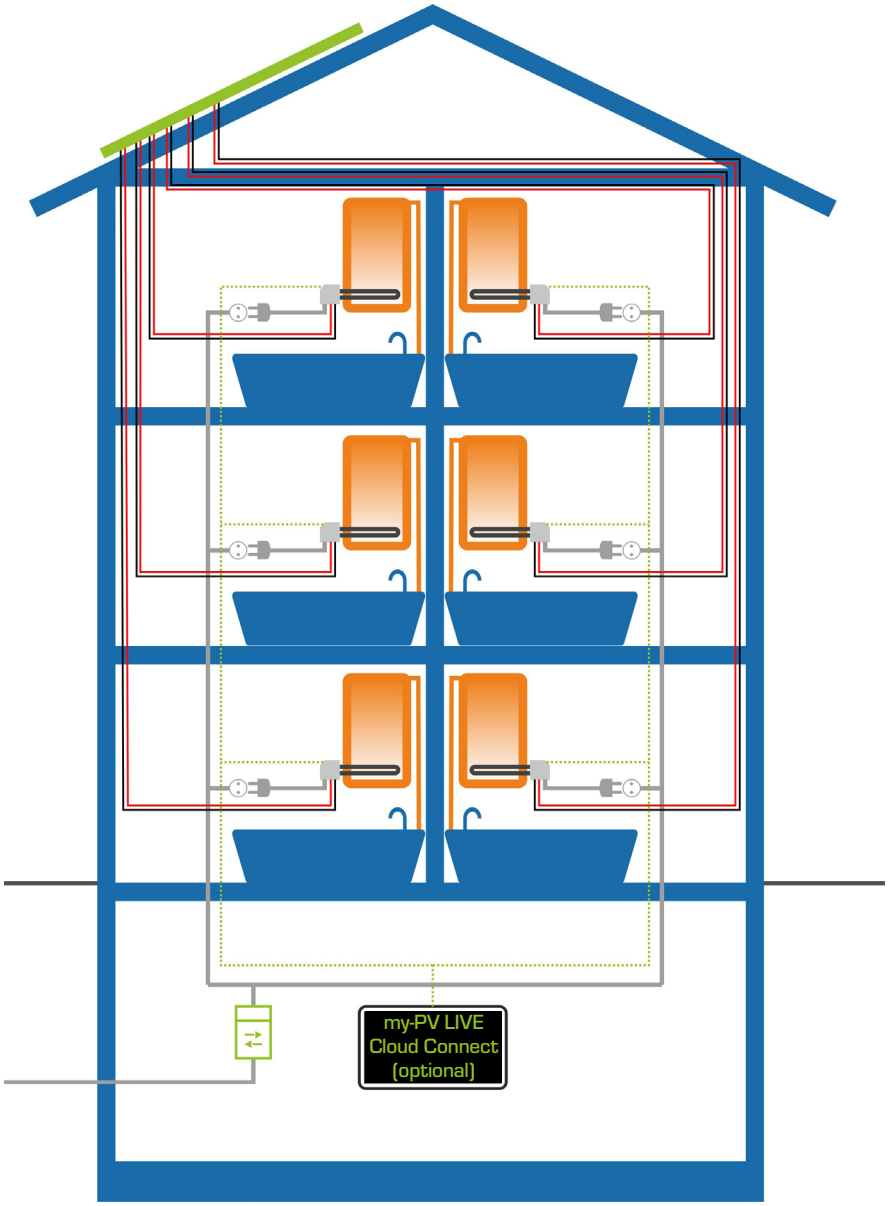
Three possible solutions for photovoltaic heat

1. The photovoltaic panels on the roof are used exclusively for hot water.
2. Photovoltaic modules on the roof are set up grid-connected with inverter. Photovoltaic yields can be used for general electricity and hot water. The heating system is separate from the hot water.
3. Photovoltaic modules on the roof are connected to the grid with an inverter. Photovoltaic yields can be used for general electricity, hot water and space heating.

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

Description: 4-8 photovoltaic modules are installed per apartment. This energy is used directly by the ELWA.
This product converts almost 100 % of the available energy into hot water and stores this energy in the hot water hot water boiler of each apartment. As a result, there are no ringmain losses and each residential unit has its own „photovoltaic hot water system“ on the roof.

Experience has shown that approx. 1.5-2 kWp per apartment are reasonable.
No central monitoring is necessary. The hot water backup energy is provided by the resident‘s household electricity and therefore does not need to be centrally billed.



THE FACTS

Advantages of this system

- Simple building services
- No grid connection for the photovoltaic system
- No metering fee for the photovoltaic system
- No energy management between the apartments

Disadvantages of this system

- If one apartment is not occupied, this energy cannot be transferred to other apartments. As a result, yields may not be consumed entirety. However, experience shows that this only accounts for 6-8% of the energy.
- Hot water tanks are necessary, which must be compatible with the ELWA.

When do we recommend this simple application?

In residential buildings with less than 10 apartments, because the effort is very low and no energy management and no billing are necessary.

We have a suitable reference here: GWG project in Linz

What is necessary per apartment?

- 1 x ELWA
- 1 x ELWA Modbus interface (incl. external temperature sensor, incl. plug-in power supply (alternative to the central 24 V power supply)

What is necessary once per project, if a central acquisition is desired?

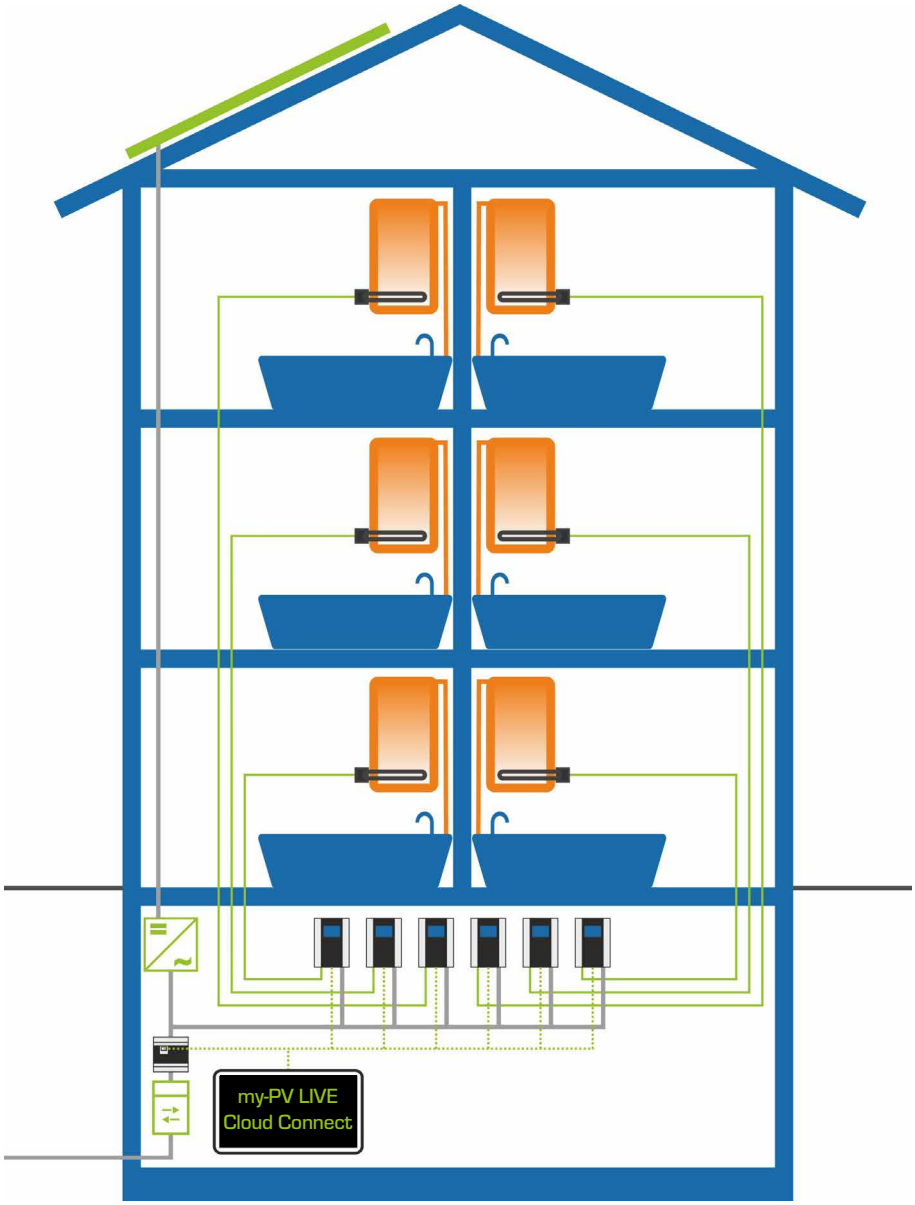
- my-PV.LIVE Cloud Connect incl. remote commissioning, settings and 2 months monitoring included free of charge
- Optional monitoring (remote diagnostics, remote settings, info in case of failures)
- Data cable 5-pole for Modbus RTU and 24 V power supply; Alternatively: 3-pole data cable, if power supply of the interfaces is decentralized via the plug-in power supply unit (second socket required)
- Router and Internet connection

What must be available on site?

- E-installation and sockets, wiring of the components (ELWA, temperature sensor per WW storage tank); two sockets (1 x hot water backup, 1 x optional power supply via plug-in power supply unit (preferred over central 24 V supply due to operational safety)
- Photovoltaic system and DC cabling to ELWA
- Safety precautions according to local regulations
- Water installations

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

Description: A centralized, grid-connected photovoltaic system is linked to a meter installed at the feed-in point. Each apartment has a commercial hot water tank, whose heating element is controlled by a photovoltaic power manager from my-PV. By means of measuring instruments, this energy is counted in order to be able to carry out energy billing.



THE FACTS

Advantages of this system

- A grid-connected photovoltaic system with an inverter and a feed-in point.
- Photovoltaic energy can also be used for general electricity, such as stairway, elevator and underground parking.
- No tenant electricity organisation model is needed because energy is sold as heat, not electricity.
- Energy can be passed between apartments when there is an absence.
- Use of standard boiler with integrated electric heating element is possible.
- Energy consumption for hot water can be easily measured per apartment owner using a meter.

Disadvantages of this system

- Central energy management is necessary to supply the apartments according to priorities.
- It is necessary to account which apartment unit received how much energy.

When do we recommend this simple application?

- For more than 10 apartments

We have a suitable reference here: Housing project Styria (even with battery storage)

What is necessary per apartment?

- 1 piece AC•THOR incl. 1 piece temperature sensor each for hot water measurement in the boiler
- 1 piece immersion heater 3 kW (if no heating element is integrated in the standard boiler)
- 1 piece my-PV Power Meter (60 A current transformer for energy metering per apartment)

What is necessary once per residential project?

- 1 piece my-PV Power Meter (for the energy registration of the photovoltaic surplus at the feed-in point)
- 3 pieces of current transformers 200 A for the energy registration of the photovoltaic surplus at the feeding point (up to 600 A possible)
- my-PV.LIVE Cloud Connect incl. remote commissioning, settings and 2 months monitoring included free of charge
- Optional monitoring (remote diagnostics, remote settings, info in case of failures)

What must be available on site?

- Wiring of components (AC•THOR, temperature sensor in WW tank, meters)
- Network wiring
- Switch with enough ports
- Router and internet connection
- Water installations
- If the AC•THORs are installed in a central technical room: the wiring of the temperature sensors

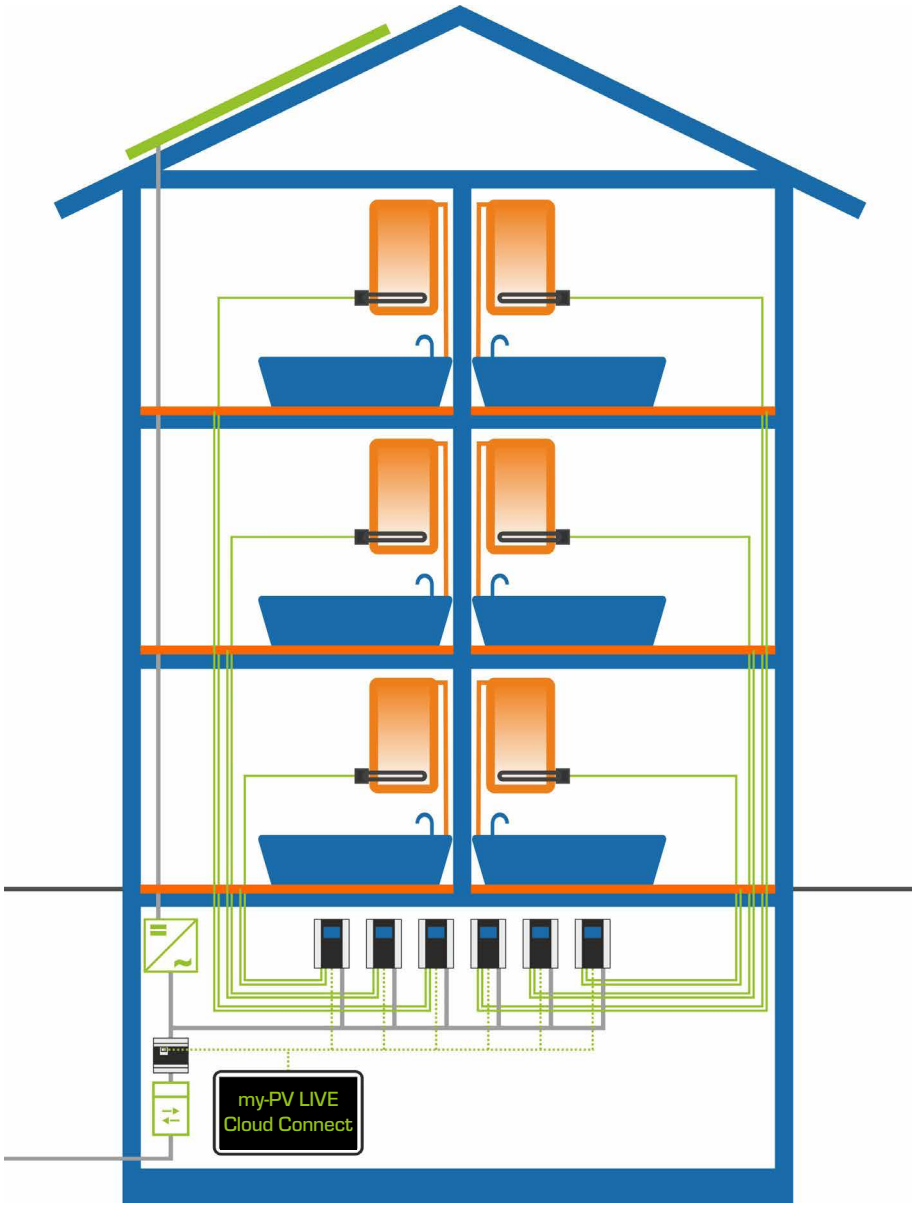
EXAMPLE 3: PHOTOVOLTAIC MODULES ON THE ROOF ARE USED FOR GENERAL ELECTRICITY, HOT WATER AND SPACE HEATING

Description: a centralized, grid-connected photovoltaic system is linked to a meter installed at the feed-in point. Each apartment has a commercial hot water tank, whose heating element is controlled by a photovoltaic power manager from my-PV. The photovoltaic energy is now used as needed to provide the water heaters and electric space heaters (shown in orange in the graphic) in the apartments with photovoltaic energy on a priority basis and steplessly.

By means of measuring instruments this energy is counted, in order to be able to carry out an energy account.

For each apartment, the hot water and two heating circuits are continuously supplied with photovoltaic heat, e.g. kitchen and living room.

Rooms such as bedrooms, where low temperatures are normally desired, are connected to a room thermostat on the heating circuit and not regulated, but are also measured and therefore also billed.



THE FACTS

Advantages of this system

- Photovoltaic energy can be used for general electricity, such as stairway and underground parking.
- No tenant electricity organisation model is needed, because energy is sold as heat and not as electricity.
- Energy can be passed between apartments in case of absence.
- Use of standard boiler with integrated electric heating element is possible.
- No piping or circulation for heating therefore low or no maintenance.
- Only a small technical room is required for the controls.
- Renewable heating technology for environmentally conscious tenants and owners.

Disadvantages of this system

- Central energy management is necessary to supply the apartments according to priorities.
- It is necessary to account which housing unit received how much energy.

When do we recommend this simple application?

- When the building is energetically below 50 kWh/m²a and when enough photovoltaic panels are installed (at least 3 kWp per apartment)
- Especially for facade integrated photovotaics

We have a suitable reference here: Housing project ENOIKO in Styria

What is necessary per apartment?

- 1 piece AC•THOR 9s incl. 1 piece each. Temperature sensor for temperature measurement in the boiler
- 1 piece immersion heater 3 kW (if no heating element should be integrated in the standard boiler)
- 1 piece my-PV Power Meter (60 A current transformer for energy recording per apartment)
- One room sensor for each of the two heating circuits.

What is required once per residential project?

- 1 piece of my-PV Power Meter (for the energy detection of the photovoltaic surplus at the feed-in point)
- 3 pieces of current transformers 200 A for the energy detection of the photovoltaic surplus at the feed-in point (up to 600 A possible)
- my-PV.LIVE Cloud Connect incl. remote commissioning, settings and 2 months monitoring free of charge
- Optional monitoring (remote diagnostics, remote settings, info in case of failures)

What must be available on site?

- Wiring of components (AC•THOR, temperature sensors in HW storage, room thermostats, meters)
- Network wiring
- Switch with enough ports
- Router and internet connection
- Water installations
- If the AC-THORs are installed in a central technical room: the wiring of the temperature sensors

ARE YOU A HOUSING DEVELOPER, PLANNER, ENERGY CONSULTANT OR INSTALLER FOR HOUSING PROJECTS?

Then get in touch with us!

Based on the following information, we can provide you with a project estimation:

- Location of the building
- Number of apartments
- Number of persons per apartment (important for hot water demand)
- Heated area per apartment (sample apartment in this object)
- Heating demand kWh/m²a
- Size of PV system and orientation

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

Additional info: my-PV has no planning concession.

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Subject to changes and printing errors. Photos and graphics: my-PV
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