



PROJECT DESCRIPTION

Single Family Home

System: AC•THOR and Power Meter

Operation mode: Electric Hot water and space heating

Location: Upper Austria



Project data

- 10,98 kWp photovoltaics grid-connected, South-facing, 45° inclination
- 300 l hot water tank, immersion heater 3 kW, linear power control by AC•THOR
- 100 m² living space, electric floor heating, linear power control by AC•THOR
- Space heating energy demand 50 kWh/m²a

Description

In a new single-family home, AC•THOR replaces the conventional building installation and enables both hot water and space heating with solar power. It uses the excessive yields of a grid-connected photovoltaic system on a linearly regulated basis. Missing energy is drawn from the public electricity grid.

Why „cable instead of pipes“?

In a building, which is built or renovated according to today's standards, water-based heating systems are oversized. High cost of material and time for installation are no longer up to date.

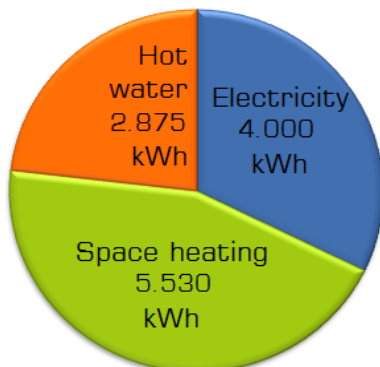
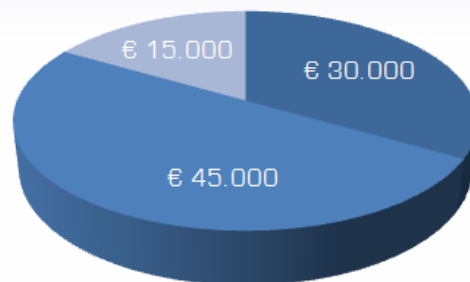


Figure 1: Energy requirement for electricity, hot water and space heating

The 100,000 Euro home

The owners managed to realize their personal living dream with a construction budget of less than 100,000 Euros. This objective could not be achieved with a conventional, water-based heating system. The second goal was to keep the later operation low-cost and sustainable.



- Foundation
- Building (wooden frame, self-made)
- PV und installation incl. E-Boiler and E-heating mats

Figure 2: Investment costs

Builder Thomas Oehl: "Photovoltaic has become so cheap that we decided with conviction to carry out the building installation completely PV powered. It is low-cost and easy to install and we save money in operation."

Functionality

The Power Meter detects energy flows of the PV system. Via Ethernet it transmits excess energy data to the 3 kW AC•THOR PV-Power-Manager. As a result, only energy that is currently available is used to generate heat. Power feed-in is avoided as much as possible. PV self-consumption is maximized and the public power grid is relieved.



Figure 3: The my-PV Power Meter is mounted in the distribution cabinet directly after the utility meter.



Figure 4: AC•THOR display with status indicators

Operating cost

Compared to an installation version with a heat pump, the operating costs can be reduced by more than 30 %.

How can a system with electric direct heating require less electricity from the grid than a heat pump?

A heat pump can "only" generate heat. It offers no benefit for electric appliances. In opposite, photovoltaic power in combination with AC•THOR supplies primarily electric loads, secondarily it contributes to hot water and space heating and reduces operating costs.

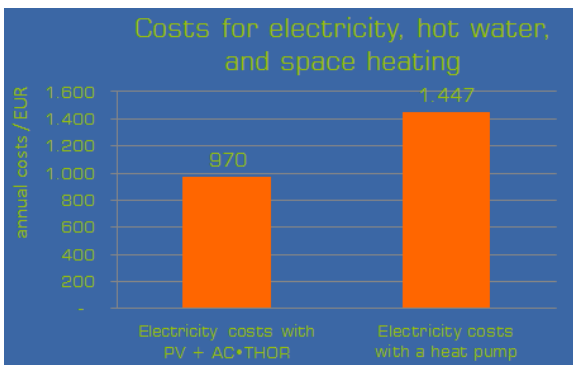


Figure 5: Operating costs for electricity, hot water and space heating compared to building installation with a heat pump

Seasonal performance factor > 5,5

In combination with a 10.98 kWp PV system, a seasonal performance factor of more than 5.5 can be predicted for heat generation.

How can a system with electric direct heating have a seasonal performance factor?

As with heat pumps, the seasonal performance factor describes the ratio of heat output to electric input. However, while a heat pump additionally absorbs energy from the environment, the energy

for AC•THOR comes from the sun through the PV system.

The big advantage is that, instead of heat, electricity is available for energy distribution. "Cables instead of pipes" make the system much easier and less expensive. A feature that also has a significant impact on maintenance costs.

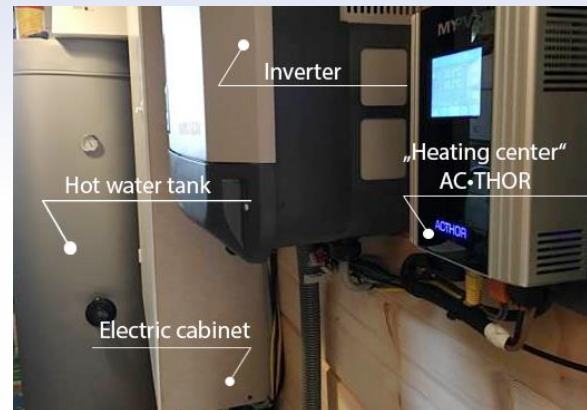


Figure 6: The entire building installation in a very small space

Product details AC•THOR

- 0 – 3,000 W linear power control
- Minimum space requirements
- Maintenance-free by "cable instead of pipes" (less plumbing)
- Easy installation, user-friendly
- Appealing design



Low-energy houses of up to 150 m² can easily and economically be supplied with photovoltaic power by combining the PV system with AC•THOR.

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