

PROJECT DESCRIPTION

District heating from PV

System: 12 AC•THORs control 12 my-PV Immersion heaters with 3kW each

Control: superordinate EMS

Operation mode: Hot water 3kW

Operator: KELAG Energie und Wärme

Location: Vienna, Austria



Project data

- 47 kWp photovoltaics, grid-tied, East/West orientated, 13° inclination
- 800 litre storage tank with connection to the district heating system
- 12 my-PV Immersion heaters with 3 kW each, linearly power controlled by 12 AC•THORs



Figure 1: The AC•THOR power controllers

Description

In a residential complex in Vienna, the energy from a 47 kWp photovoltaic system is used to support the district heating network. Due to the limitation of the feed-in power by the grid operator, the solar power generated is converted into heat in an 800 litre buffer storage tank before the PV power is shut off.

Photovoltaics are now so inexpensive that even the solar district heating support has become solar electric.

Heat pumps were out of the question due to the high temperature in the heating network. In addition, their drive power cannot be regulated, which is a basic prerequisite for combination with photovoltaics. Only heating elements in combination with the power controllers from my-PV meet these requirements. With the AC•THORs, their output can be regulated linearly. A property that is essential for PV heat applications.

This not only generates clean thermal energy, but also mitigates one of the biggest problems of decentralized power generation: the public power grid is under increasing pressure to regulate the many small energy suppliers and maintain the voltage. By reducing solar electrical surpluses, the power grids are relieved and the electricity generated is used efficiently on the spot.

Due to the fluctuating generation of solar power, exact power control of electrical heat generators is a basic requirement for combination with photovoltaics.

How it works

The superordinate energy management records the energy at the inverter and reports it to the AC•THORs. These then ensure the precisely regulated output of the heating elements. The implemented control system also helps to precisely maintain the desired flow temperature in the district heating network.



Figure 2: Storage tank with my-PV immersion heaters



Figure 3: Transfer to the district heating network

There has not been anything comparable yet

The use of PV electricity for water heating in residential buildings is a young issue in itself, but supporting a district heating network is something completely new. This project opens another application for heat with photovoltaics. In recent years, technology has almost replaced classic solar thermal energy in residential buildings, but this has not yet been the case for large-scale systems (industrial process heat, district heating). However, due to the continuing decline in module prices, such projects can now also be realised with PV.

With the further expansion of photovoltaics in the cities, the use of PV surpluses will from now on also include the possibility of feeding into district heating networks.

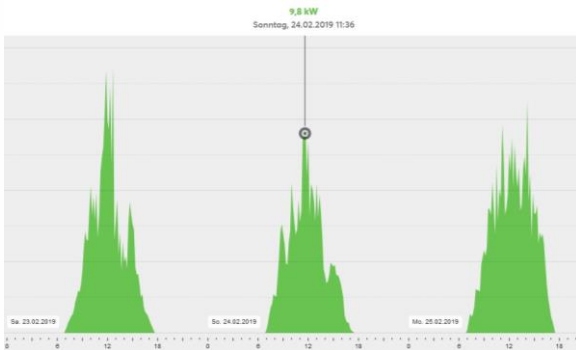


Figure 4: Power modulation of the heating elements

Advantages compared to solar thermal systems

The technical advantages are manifold. "Cables instead of pipes" facilitate installation and operation considerably and even high target temperatures can easily be achieved without drastically increasing losses. Compared to solar thermal systems, 90% less copper is required. Pipes, pumps, valves, expansion vessels, antifreeze etc. are no longer required, which greatly simplifies solar thermal technology.



Figure 5: 47 kWp on a Viennese housing estate

Product details AC•THOR

- 0 – 3,000 W linear power control
- Maintenance-free by "cable instead of pipes"
- Minimum space requirements
- Flexible control by various inverters, battery systems and Smart Homes
- Easy installation, user-friendly
- Enables affordable living also in residential construction



Product details my-PV Immersion heater 3kW

- For linear power control by Photovoltaic-Power-Manager AC•THOR
- Manually adjustable target temperature
- 1,5-inch standard thread
- 2,8 m power cord
- 230 Volt, 3 kW, single-phase



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