Boarding House Potsdam

Over a net floor area of 3248 square meters a heat pump cascade system provides warm water, pleasant room temperatures and enough energy for the catering business on the ground floor of the new holiday home.

Key facts

**Building**
- **Location**: Potsdam, Germany
- **Construction**: 2013
- **Heat distribution**: floor heating
- **Heated area**: 3.248 m² living
- **Level of insulation**: XXX

**Heat pump and source**
- **Number of**: 3
- **Installed power**: 3 x 37.7 kW
- **Operation mode**: cascade
- **Heat source**: outside air, ice storage

**Heating system**
- **Heat demand**: 182000 kWh/a
- **Heating temperature**: Between 8 and 12°C

**Domestic hot water**
- **Type of system**: XXX
- **Max. temperature**: XXX
- **Circulation system**: yes/no?

**Lessons learned**
- Use of innovative heat source - ice storage connected with solar thermal absorbers works very well for multi-family buildings
- Comprehensive concept including PV modules lets increase the energetic independent of the buildings.

The new building with 37 high quality apartments and a restaurant is located directly on the Havel. Contamination of the soil meant that the originally planned geothermal probes could not be used in combination with a brine / water heat pump. Alternatively, a concept was implemented with the air + brine / water heat pump hybrid system ThermSelect from MHG. A cascade of 3 ThermSelect 34 with a heating capacity of 37.7 kW each was used. Instead of the geothermal probes, a solar ice storage system with 2 x 50,000 liters of ice storage was installed to cover the peak load at low outside temperatures.

The ice storage tanks are regenerated by solar collectors. The system controller integrated in the hybrid heat pumps ThermSelect decides which heat source is used, depending on the heat source temperatures. Primarily, the outside air is used as a heat source. If the outside temperature falls below the temperature of the ice storage system, this is connected in parallel and compensates for the deficit of the air.
Due to its proximity to the water, three brine-to-water heat pumps were originally intended to supply the boarding house with heat. However, initial exploration drilling revealed severe contamination of the soil, which prevented the use of geothermal heat at that location. Instead, the planners opted for a system consisting of a hybrid heat pump system, the associated outdoor units, two ice storage tanks with two integrated heat exchanger systems, and an outside air absorber.

The heat pumps extract heat from the water via a heat exchanger. It initially cools down to the freezing point. As soon as the water begins to freeze, ice changes its state of aggregation from liquid to solid, heat of crystallization is released, which is used for heating. The second heat exchanger is connected to the outside air absorber on the roof of the building.

Once the outside temperature rises or the sun shines, the absorber uses the ambient heat to melt the frozen water in the ice storage. If the water is liquid again, the cycle starts again. If the absorber does not generate hot water over a longer period of time, the ice storage units automatically switch off. Then only the heat pumps take over the heat supply.