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Hybrid system

Energy-efficient and environmentally friendly

Hybrid solutions

Hybrid heating systems utilise several different energy sources for heating and hot water supply during the different seasons of the year. A hybrid system strives to use mainly renewable energy sources and produce heat efficiently.

A hybrid system is a suitable heating and energy form for both individual houses and larger real estates, such as schools, hospitals and other large buildings.

The main components of a hybrid system are:

- a heat pump, which takes care of the major part of heating and all cooling needs
- solar collectors, which produce hot water and supply warm water to the heat pump to achieve a better COP

- a burner, which is used during periods of peak consumption.

Various hybrid solutions are one of the strong competence.

An example of a hybrid solution for a single building







IN SUMMER

The football ground is utilised as a heat source.

IN WINTER

In winter, the artificial grass of the football ground can be heated or refrigerated for use as a skating rink.

The burner is utilised in heating during the coldest period in winter.



The drill wells, which are used to recover heat, can be located under or beside the building. Heat can also be recovered from waterways, or industrial waste heat can be utilised.

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CASE: Helsingin Energia

Components of the hybrid system

- two burners: 500 kW and 1 MW
- 16 solar collectors
- a heat pump of 250 kW
- 21 drill wells

The power company Helsingin Energia will carry out a project utilising a hybrid system in the Sakarinmäki school centre located in Östersundom.

The purpose of the project is to test a hybrid solution combining renewable energy sources, which includes a ground source heat pump, solar collectors and biofuel compatible burners. The system aims to cover over 80% of the annual heating need of the school centre with renewable energy.

The current heating system of the school centre is based on thin oil burners located at the heating station beside the school. With Oilon's burner technology, oil can be replaced with environmentally friendly bio oil. The hybrid system includes two Oilon burners: one of 500 kW and the other of 1 MW. 16 large solar collectors, the most powerful on the market, supplied by a Finnish company, Savo-Solar Oy, will be installed in the sloping ground beside the school. The solar heat system will produce 5% of the annual total energy requirement of the heating system. The third and most important part of the heating system is the Oilon Scancool P 300 heat pump, which utilises the energy stored in the ground. The ground source heat pump will need 21 drill wells. The depth of each drill well being 300 metres, the total drilling depth amounts to 6,300 metres.



The ground source heat pump will cover 79% of the annual energy requirement, 1,200 MWh, of the school centre. Energy produced with the solar collectors can be fully recovered, and the heat energy generated by them will be delivered directly to the heating network, the heat pump or the ground circuit, depending on the conditions. Thus, the solar collectors can increase the temperature of the circulation fluid delivered to the heat pump from the drill wells: this significantly improves the efficiency of the heat pump. During the coldest periods, the hybrid system uses the burners installed to support the heating system.



Heat sources of the hybrid system during different.

Components of the hybrid system

- Burner: power range 900 3,500 kW
- Wood chip boiler 2x750 kW
- Refrigeration and heat pump system, heat pump power range 100 – 500 kW

A hybrid system implemented in the municipality of Jevnaker, near Oslo, Norway, has attracted a lot of attention and is a good example of the diverse possibilities of hybrid solutions.

This energy plant provides refrigeration for Jevnaker's time-honoured speed-skating rink and, at the same time, heat energy for hospitals, schools and households using a heat pump and bio oil and wood chip boilers. Waste heat generating during the cold production is also directly utilised for heating the artificial grass of the football ground.

Oilon has developed the entire system as well as the automation system and delivered the refrigeration and heat pump system and the bio oil burner.

Artificial grass

Skating rink

Sports hall School



CASE: Jevnaker

OIL, GAS AND DUAL FUEL BURNERS





Burners

Capacity: 12 - 80 000 kW

GROUND SOURCE HEAT PUMPS









Ground source heat pumps Capacity: 5 - 170 kW

HIGH EFFICIENCY HEAT PUMPS AND WATER COOLERS



Oilon ChillHeat heat pump family for cooling and heating

Capacity: 110 - 540 kW Solutions ranging up to several megawatts.

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