CASE STUDY
Projects

CASE STUDY OVERVIEW

The customer maintains and operates a district heating net in the Basel, Switzerland.

Oil and gas boilers create most of the energy, supported by a heat pump. The customer wished to increase the amount of renewable energy used for the district heating so installed a larger heat pump and new woodchip burners

The heat pump supplies the base load of the district heating and is the sole heat generator active over the summer.

HEAT PUMP REQUIREMENTS

- ➔ Heating capacity 835 kW to 1,600 kW
- ➔ Cooling water temperatures 2°C to 19°C depending on time of year
- ➔ Cooling water flow rate 126 m³/hr
- ➔ Hot water temperatures 40°C to 75°C

CHALLENGES

- ➔ Cooling water flow rate 48 m³/hr to 138 m³/hr
- ➔ Cooling water inlet temperatures and flow rates can vary suddenly
- ➔ Hot water return temperatures and flow rates can vary suddenly
- ➔ Maximum installation width (to suit plant room layout) 1,800 mm

SWISS ROLE FOR J & E HALL HEAT PUMP SYSTEM

HIGH PRESSURE HALLSCREW SINGLE SCREW COMPRESSOR PLAYS KEY PART IN AMMONIA-BASED HEAT PUMP SYSTEM DESIGNED BY J & E HALL

The installation of a new J & E Hall high pressure compressor has been heralded as a great success in a district heating system in Switzerland. The new HallScrew HSO 5200 compressors can operate at much higher pressures than before and have been installed to help supply low-cost hot water to homes and businesses in the Basel area.

The new compressor is a key part of an ammonia-based heat pump system designed and by J & E Hall for the utilities plant situated on an island in the River Rhine. The customer wanted to supply hot water locally in environmentally conscious way by using waste heat generated by the plant.

THE J & E HALL SOLUTION

J & E Hall rose to the challenge as the customer did not want to use HFC refrigerants with global warning potential (GWP) in their system. J & E Hall suggested a natural alternative and the customer opted for zero GWP ammonia instead.

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SWISS ROLE FOR J & E HALL HEAT PUMP SYSTEM

ZERO GWP AMMONIA

Ammonia is a good choice for systems operating on a large scale. It is versatile, effective and an efficient natural refrigerant that does not deplete the ozone layer. Moreover, it has excellent thermodynamic qualities, providing a wide temperature range.

The F-Gas Regulations are forcing the pace of change in the refrigeration industry and the latest round will lead to F-Gas emissions reduced by two-thirds by 2030 (compared with 2014 levels). The industry is moving away from high GWP HFCs and looking to low GWP alternatives like ammonia.

J & E Hall designs, manufactures and installs ammonia-based refrigeration systems. The company employs cutting-edge technology and some of the finest refrigeration brains in the world to build the best systems. J & E Hall has a proven track record with ammonia installation and offers a bespoke package of measures to customers to ensure that all is in place safety wise before and after the job is completed.

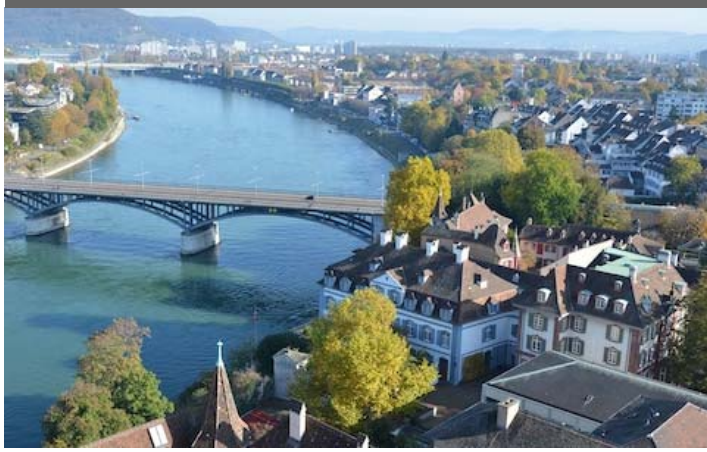
HOLISTIC APPROACH TO ENERGY USE

J & E Hall Director of Process Systems and Marine Graham McDermott said: "We are very pleased with the results of this installation in Switzerland. The new compressor has been designed to operate at a pressure of 40 bar and this allows it to condenser gases at a much higher temperature than before. In this case a temperature of 70°C was needed for the district heating system.

"The heat pump is used to cool down the water used to cool electrical generators from 25°C to 20°C. The recovered heat can be used to heat the district heating water circuit to a supply of 70°C. This increased hot water is then used to supply homes and businesses in the area.

This holistic approach to energy use not only protects the environment but also cuts down on energy bills for the plant operators and consumers. "The heat pump system is already making significant energy savings," added Graham.

"It is 5% to 6% more efficient than predicted and four times more efficient when compared to a natural gas boiler."



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