

Purified Waste Water Converted into District Cooling

Case History



Since the mid 1980s, Örebro-based E.ON (formerly Örebro Energi/Sydkraft) has employed a policy of re-using purified waste water. Waste water is pumped from a pumping station in Skebäck up to two heating pumps at the Åbyverket CHP plant, where heat is recovered from the cleaned waste water. Once that process is complete, the now cooled waste water is pumped back via Skebäck and released into Svartån River, which flows into Lake Hjälmarén.

In 1998, E.ON also began supplying district cooling to Örebro University Hospital, Örebro County Council and international paper and packaging company Mondi. As by definition the waste water is not clean, it has to be purified. This meant that

E.ON had to invest significant time and resources on site to clean customers' heat exchangers. This was viewed as an unnecessary cost by both customers and the supplier.

When, in 2009, E.ON was awarded the contract to supply district cooling to central Örebro, the decision was taken to build a dedicated heat exchange station adjacent to the pumping station in Skebäck. Waste water is now exchanged via a clean water system that is then distributed to the Åbyverket plant and sent on to district cooling customers. Tranter has supplied two GXD-205 gasketed plate heat exchangers to exchange between purified waste water and district cooling water. Total output is 18 MW (9MW per heat exchanger). Tranter's plate heat exchangers are ideal for applications with close temperature approach. For this particular application, the heat



exchangers were designed with 1 bar pressure drop. The relative high pressure drop maintains channel velocity and shear stress at high level, thus reducing maintenance requirements (important for the waste water).

The energy and power company E.ON, which also provides district cooling in Malmö, Norrköping and Kungsbacka, has supplied district cooling services to Örebro University Hospital for the past 12 years, and market demand for this service is generally



increasing. District cooling is of particular interest when erecting new buildings or renovating office and business premises.

District cooling affords a number of benefits.

For example, district cooling offers a more efficient use of electricity compared to conventional refrigeration locally at multiple sites. In addition to the investment costs associated with conventional refrigeration, district cooling provides, in financial terms, a stable and long-term pricing structure. But perhaps the most important aspect is the benefit to the environment. Unchecked emissions of refrigerants from multiple small chillers contribute towards the degradation of the ozone layer. In terms of the indoor environment in properties, district cooling is quiet and takes up very little space.