



Turku Energia – Ecological heating and cooling with 2 Unitop 50 FY

Client / Plant location

Turku Energia Oy
FI-20100 Turku / Finland

Waste water treatment deep inside the rock

In the hill beneath the former Kakola regional prison in Turku - today a national monument - space has been excavated for what is called the finest waste water treatment plant in Finland. Altogether 490'000 m³ of rock were blasted and then removed to make room for the plant which covers four kilometres of underground caverns. An eight-story building would fit in the space made.

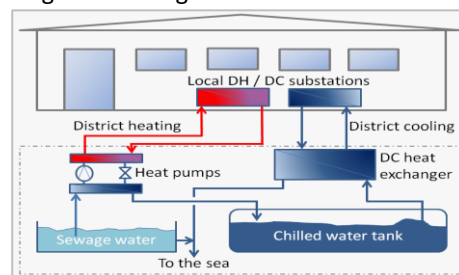
The treatment plant is handling the waste water from Turku, Kaarina, Lieto, Paimio, Rusko, Raisio, Naantali, Masku, Nousiainen and Mynämäki. The initial impulse for building this waste water treatment plant originates from the stricter requirements regarding denitrification, which the older treatment plants owned by the individual municipalities could not anymore fulfil. Planning of the Kakolanmäki treatment plant began in 2003. The plant started operations at the beginning of 2009. It is able to process the waste water from 280'000 people. It is estimated that the overall pollution load from the area will decline by 35 %.

Cleaned waste water is being exploited

Turku Energia Oy, already operating district heating and cooling networks fed by heat from the Naantali power plant via a 14.5 km long tunnel and several conventional and biomass boiler plants took advantage of the potential provided by the central water treatment plant. Instead of pumping the warm waste water directly to the sea, the Kakola heat pump today first exploits the heat. The first Unitop 50FY heat pump operating since 2009 produces both district heat and district cooling for public buildings and homes in Turku. The second unit followed 2013.

To balance daily fluctuations of the district cooling system, a 15'000 m³ chilled water accumulator is located next to the heat pumps. The Kakola heat pump plant increased the total share of renewable energy sources in heat acquisition from 22% to 30%.

The heat produced with the heat pumps corresponds to heat requirements of 20'000 households. Carbon burning is reduced by approx. 42'000 t. The resulting annual reduction of greenhouse gases achieved is about 150'000 t CO₂.



2 Unitop 50 FY heat pumps from Friothersm

Each Unitop 50 FY heat pump consists of a heavy duty industrial type centrifugal compressor at its heart. Together with the heat exchangers and the control system it is especially adapted to comply to 100% with the client requirements regarding flexibility of operation modes, high efficiency and operational reliability. The service friendly design allows limiting service and maintenance work to a minimum while the units are operational for decades.

Main technical data per heat pump unit (2)

Operating Seasons:	Summer	Winter
Heating capacity:	21'200 kW	17'800 kW
Cooling capacity:	15'300 kW	13'035 kW
Hot water in/out:	50/75 °C	40/82 °C
Cold water in/out:	18/4 °C	12/4 °C
COP:	3,6	3,8

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