Case Lounavoima, Salo Finland.

Geothermal heat storage to increase heat plant efficiency and prepare for EU emissions trading system.

Problem:

Combustion-based district heating companies face several significant challenges as climate targets become more stringent

Rising operational costs

With tighter emission standards and higher costs under schemes like the EU Emissions Trading System (ETS), companies relying on fossil fuels face rising operational costs

Meeting climate targets

To meet climate targets, district heating systems need substantial upgrades. This involves integrating renewable energy sources, improving energy efficiency, and potentially switching to technologies like heat pumps

High investment need

The transition requires significant investment. Companies must secure funding for upgrades and new technologies, which can be challenging given the high initial costs and long payback periods.

Lounavoima waste-to-energy plant

Lounavoima is owned by waste management services provider Lounais-Suomen Jätehuolto Oy and district heating company Salon Kaukolämpö Oy. Founded in 2017, Lounavoima's main task is to produce district heating and electricity from municipal waste that cannot be recycled by Lounais-Suomen Jätehuolto.

The Korvenmäki eco-power plant produces around 220 GWh of heating energy from municipal waste every year. However, the plant's efficiency has been seasonal: during the warmer months, the plant produces significant surplus heat. On an annual basis, about a quarter of this is lost as waste heat.

"In line with our strategy, we want to be at the forefront of the circular economy and an active player in reducing CO_2 emissions and improving waste recovery. In achieving these goals, the importance of partners is highlighted. Waste energy recovery and storage makes waste recovery even more efficient." says Petri Onikki, Managing Director of Lounavoima and Salon Kaukolämpö.

35 MW

Waste incineration plant capacity

220 GWh

Annual heating produced

~100 m€

Initial waste incineration plant investment

QHeat Geothermal Heat Storage solution

6

Boreholes with depths varying between **1.6 - 2.0 km.**

14 GWh

Geothermal heat produced annually

6 MW

Peak power capacity

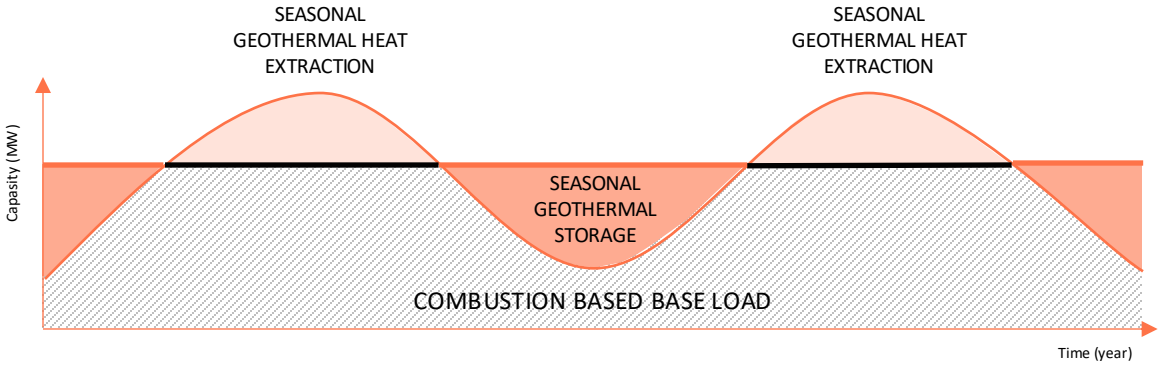
QHeat implemented six 1,6 to 2,0 km geothermal wells at the customer site. This helps Lounavoima store the surplus heat energy generated by the eco-power plant and extract it during the heating season.

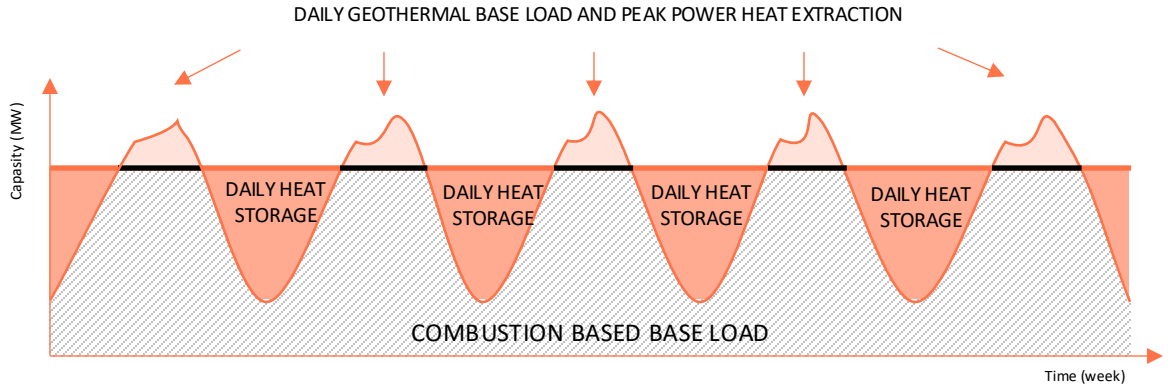
The current geothermal energy management profile enables the customer to manage peak power requirements from the geothermal wells. This is done by running the majority of the wells on constant energy and extracting peak energy from a one or two wells, based on the needs.

”The increase in fuel prices is one of the factors that accelerates the payback of the well investment.“

Petri Onikki - Managing Director of Lounavoima and Salon Kaukolämpö.

Seasonal and daily energy management





Seasonal storage and extraction

With seasonal heat storage we charge the boreholes during the summer months utilising the excess heat generated by the combustion based facility.

This stored heat is extracted during the winter months to enhance the power and longevity of the boreholes.

Daily storage and extraction

The base load required by the district heating system is provided by the combustion based heating solution.

The additional constant heat and peak power are provided by the geothermal boreholes. Based on the heating profile, most of the boreholes in the system provide constant heat and a few provide peak power.

Once the highest demand drops the boreholes swithch to storage mode, storing the excess heat generated by the powerplant.