



Figure 1. Aerial photo of Imatra, Finland

Source: Imatra.kuvat.fi

## Functional District Heating System – Platform to Decarbonisation

Imatran Lämpö Ltd needed a cost efficient and an environmental heat source to replace the natural gas used as primary energy source of Imatra's district heating. The use of renewable energy sources has increased to 98% of total fuel mix in only five years. And the number of customers rises.

Imatra is a city in the South-Eastern part of Finland close to the Russian border (figure 1). The population of 27,000 lives in a cold Nordic arctic climate. In Imatra a large-scale pulp and paper industry, specialised steel industry and hydro power plants live in harmony with the beautiful nature of lake Saimaa and the Vuoksi river. Consequently, the city's economy relies on industry, logistic, trade and tourism.

### Imatran Lämpö Oy – Heating Company

Imatran Lämpö Oy (Ltd) is a limited company owned by Imatra city since January 1st, 2014. Prior to the incorporation Imatran Lämpö functioned 50 years as a department in the city administration. Imatran Lämpö Oy maintains, designs and constructs district heating (DH) generation plants and DH networks as well as gas distribution network.

About 50% of the citizens in Imatra are clients of the DH services and respectively 8% gas supply services. Excluding large industrial premises almost 90% of public and commercial buildings are connected to the DH system. Imatran Lämpö Oy's district heating sales was €9.7 million (153 GWh) and the total turnover €12.8 million in the year 2019. The peak load of the entire DH system equals to 60 MW(th). The company is a middle-size Finnish DH company.



The heating company is an important element in the circular economy in the entire Imatra district.

The significant cut in consumer prices was warmly welcomed by the residential and commercial customers. Competitive heat prices attract new businesses and residents to the city. This is exactly in line with the strategy set by the city's administration.

The heating company, operates on fully commercial bases on the competitive non-regulated heating markets. Imatran Lämpö strengthened its position on the market due to the outcome of the decarbonisation investment. The number of DH customers (buildings) has increased from 670 in 2014 to 724 by the end of 2019. Additionally, in spite of the investment cost and the decreased prices, the company still makes profit and generates earnings for its owner, the city.

### Part of national safety system

District Heating is an important element of the national safety system. Security of supply and preparedness became even more important issue, when Covid-19 virus

appeared. Heating must be functional in all conditions including long periods with arctic weather. This is a responsibility of the heating company. Biofuels are purchased in Finland. Generation and distribution have been ensured with backup power machines also in the event of disturbances and exceptional situations in power supply. In order to ensure the generation of district heating, natural gas is used as peak and backup fuel and light fuel oil is used as secondary backup fuel. Consequently, the DH system provides flexibility for fuel changes and to optimise fuel mixes.

Typical district heating consumer installations are long-lasting, simple, reliable and can fit in small space. If necessary, delivery times for spare parts are short and they are well available. The customer's district heating equipment does not pose an environmental risk because the circulating medium is water. Electricity demand of the pumps and valves of consumer installations is low and can thus be replaced even with small backup power in the event of a power failure. Finnish DH companies know their clients and are able to take

care of customers' equipment including security of supply aspects.

### Consumer installations – core of the Finnish DH system

Very energy efficient and “easy-to-operate-and-maintain” consumer installations are one of the key-factors for the success of DH in Imatra and generally in Finland.

The current Finnish district heating concept (figure 4) itself is the core of the system and admired worldwide. When technical, commercial and institutional characteristics of the consumer end are known and transparent, heat generation and distribution can be built, operated and maintained cost efficiently and ecologically. With the same concept, the energy source can be changed, and the energy services developed, to meet environmental and client requirements varying with time and local circumstances. Imatran Lämpö Oy did the conversion from fossil fuels once and can do a conversion again when an even more economical and ecological heat energy source becomes available. The company continuously follows options of applicable and feasible new heat generation methods such as excess process heat, biogas, geothermal heat, small scale nuclear heat, wind and solar energy and various applications of utilising heat storages.

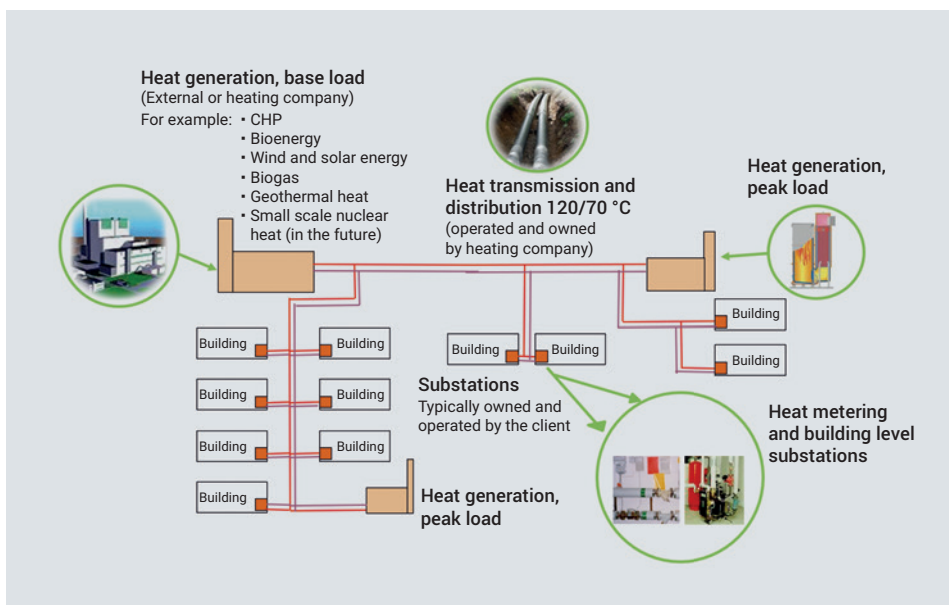


Figure 4. Basic layout of a Finnish District Heating System

Vesa-Pekka Vainikka  
CEO of Imatran Lämpö  
vesa-pekka.vainikka@  
imatra.fi  
[www.imatranlampo.fi](http://www.imatranlampo.fi)



Kaisa Heino  
Deputy Mayor of Imatra  
kaisa.heino@imatra.fi  
[www.imatra.fi](http://www.imatra.fi)

