

Integrated district heating and cooling helps Helsinki to achieve its climate obligations

Helsinki, Finland
Mayor Jussi Pajunen

In a country where temperatures are below 10°C for half of the year, heating buildings is a crucial basic utility. As a result, Finland has been leading in cogeneration of heat and power (also known as combined heat and power - CHP) since a long time. In Helsinki some 93% of the buildings are connected to district heating. What may be more surprising is that the city has also been seriously investing in cooling solutions for its districts since a few years time. District cooling is now a clearly growing business in Helsinki, already covering a volume of buildings of 11.5 million m³.

Although Helsinki's Sustainable Energy Action Plan focuses on solutions to improve the efficiency of the end-use of energy, an equally important objective is to reduce the CO₂ emissions in energy production. Helsinki's mid-term objective is to increase the share of renewable energy in energy production up to 20%. Jussi Pajunen, Mayor of Helsinki.



Photo: Helsingin Energia

Helsinki joined the Covenant of Mayors in 2009 with the ambition of reducing its CO₂ emissions by 20% by 2020. To this end, one of the strategic objectives of the city was to find alternative ways of producing heat and cold for its districts that accounted for more than 40% of the green house gas emissions.

Ten years ago, the city started a pioneering project called "Helen-IT", which aims at cooling data centers and recovering the heat produced in this process by piping it into the district heating network, to heat buildings and provide them with hot water. This way the heat produced by the computer hall is recycled and not wasted warming up the air outside.



When the operation started, it was based on the estimation that cooling demand would grow rapidly in Helsinki despite the northern climate. The objective was to provide reliable, economical and eco-efficient cooling solutions for all types of property owners. In 2010, some 250 large buildings in the city centre were using the system, most of them being private companies.

In 2015 district cooling in Helsinki is estimated to save about 60,000 tonnes of CO₂ emissions. But the advantages of “Helen-IT” are not limited to the energy savings. The solution is also totally silent and unobtrusive, as the district cooling equipment installed in the clients’ premises takes up much less space than traditional cooling devices. If all the computer halls in Finland operated on this principle, up to 500 MWh of energy could be saved every day. At the same time, a medium-sized town’s worth of buildings could be heated.

Currently there are three district cooling production methods in Helsinki, each of them adapted to the season of the year:

- The absorption technique, in summertime when the sea water is too warm for free cooling. District cooling is produced by using thermal energy that would otherwise be lost in energy generation.
- The heat pump system, that is used to recover thermal energy obtained from district cooling. The heat is transferred to the district heating network for heating buildings and domestic hot water.
- The free cooling method, which produces district cooling from cold sea water between November and May, when the water temperature is below 8°C.

Helsinki is also home to the world’s largest heat pump plant that produces heating and cooling from the waste energy of purified waste water: the Katri Vala plant (see picture). In the winter, the heat of purified waste water is recovered and reused as district heating. In the summer, the thermal energy is obtained from the return water in district cooling, with the heat pumps producing simultaneously district heating and cooling.

Helsinki – Key facts

- Capital of Finland with approx. 600,000 inhabitants
- Joined the Covenant of Mayors on 7 January 2009
- 1,200 km of district heating pipes under Helsinki’s ground
- Vuosaari plant connected to the city-centre by a 30 km district heating tunnel, the longest in Europe
- Helsinki has the third largest and one of the most rapidly growing district cooling systems in Europe.

Contacts & further information

Katri.Kuusinen, City of Helsinki – Energy Management

katri.kuusinen@hel.fi / +358 9 31039163

Covenant of Mayors contact point

media@eumayors.eu / +32(2)5520851