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1 District cooling is also needed in the winter!

Our reporter visited the new Helsinki Music Centre to find out about its district cooling system.

Pertti Suvanto Photos Pekka Hannila

For people, district cooling does not mean freezing cold but, on the contrary, cool and pleasant indoor air even during a heatwave. An ordinary member of the public will only feel it as a comfortable ambience, but they cannot see or hear it.

– District cooling is produced from cold sea water whenever possible. When the sea water is too warm, district cooling is produced from the thermal energy of cogeneration plants that would otherwise remain unused. In the Katri Vala heat pump plant, on the other hand, district cooling is produced with the world's largest heat pump with a good efficiency ratio, explains Development Manager **Janne Vartiainen** who is responsible for Helsingin Energia's district cooling.

– Over 80 per cent of the entire production is based on local energy, which would otherwise be unused. This amount will not generate any carbon dioxide emissions. The energy efficiency of district cooling is more than five times higher

than that of building-specific cooling. In terms of the environment, it is a superior method to cool the indoor air of buildings, Vartiainen points out.

These days, air conditioning is regarded as an increasingly natural part of life. There is also demand for cooling in the middle of the winter. District cooling is an excellent solution for the new gem of the city centre, the Helsinki Music Centre.

A radiator of 1,800 people

Project Manager **Lasse Lehto** of ISS Proko Oy explains the ins and outs of the cooling system in the Helsinki Music Centre. According to him, it would have been quite impossible to implement the traditional compressor cooling system in the Music Centre.

Aesthetically, the masking of the outdoor units would have required architectural efforts that would have been difficult to imagine on a valuable building

located in the middle of Helsinki city centre. The air- and structure-borne noises caused by the cooling systems would also have been difficult to manage.

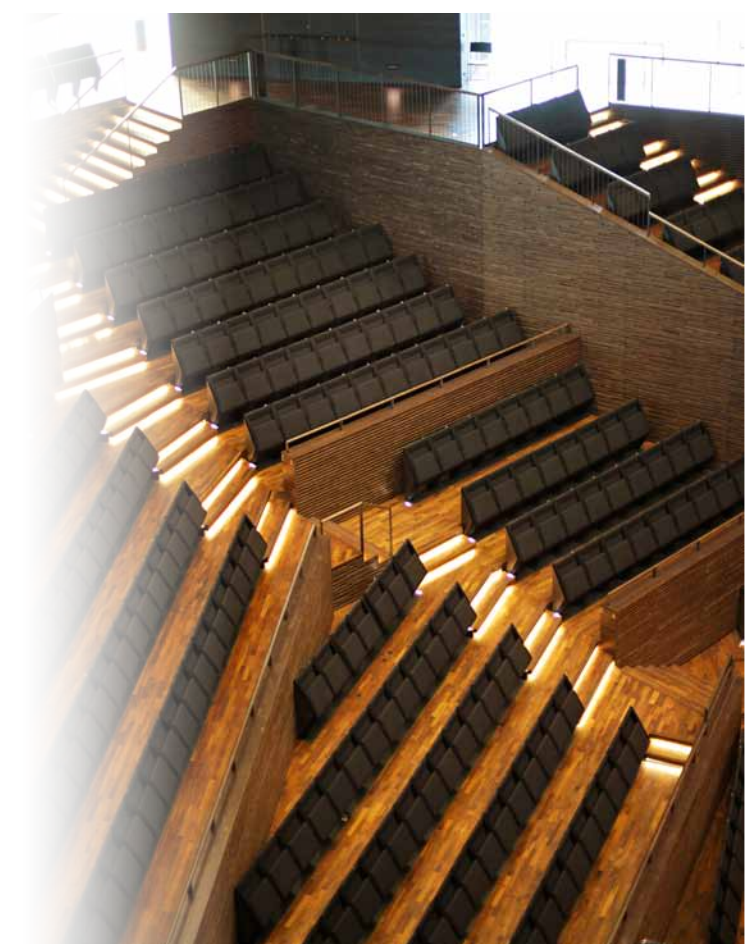
– If we had suggested this to acoustician **Yasuhisa Toyota**, we would have had to revive him with supplemental oxygen. The area to be cooled totals 3.6 hectares and 233,000 cubic metres.

The acoustic solutions have an impact on everything, Lehto pushes the wall of the concert hall that forms the core of the Music Centre.

– The wall should move because it stands on columns on a rubber base. All pipework is also equipped with flexible connectors and supports. The pipes and equipment of the district cooling system are also silent.

In the Concert Hall, Lehto points under a seat where you can see a metal grille. Through these grilles, cool air is blown in at a speed of ten

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litres a second. Under the seats, there is a large air exchange chamber. The grilles divide the air evenly into the concert hall. Fouled and warmed up air is sucked away at the ceiling level because, according to the physics textbook, warm air rises upwards.

Without cooling the control rooms would be hot as a sauna

The lighting power and other heat produced by the technology are substantial. The concert audience of just over 1,700 people and the 80-strong symphony orchestra with its conductor act as the source of heat.

– Depending on the method of calculation, every person produces 60–90 watts of thermal power, as much as a bright incandescent light bulb, Lehto explains.

Every separate room has air conditioning beams which have been designed with care in the factory's simulation room. The building is full of studio technology, which is a huge source of heat. Without cooling, the studios and control rooms would be as hot as a sauna.

– 15–20 square-metre rooms may have thermal power of 20 kilowatts. This equals the thermal power needed by three detached houses at a temperature of -27 degrees below zero, Lehto calculates.

Lehto then shows us round the Organo Hall. Cooling radiators are also used a great deal for the drying of supply air. For example, the cooling beams work better with dry air. By the end of the summer, they would stop working completely if the air was not pretreated.

In the Organo Hall, there is a church organ built in 1892 representing the romantic style and acquired from Glasgow by the Sibelius Academy. Water from the supply air is condensed by the cooling radiator, after which it is heated to the correct temperature. In the winter, the air is humidified.

Wood changes its form according to moisture and has an effect on the sound of the organ, and therefore moisture and heat are kept at a standard level throughout the year.

– We have had no problems whatsoever with the district cooling of the Music Centre. In terms of maintenance, it is a considerably more carefree solution than traditional building-specific cooling, the HVAC professional praises.

2 A hundred years of street lights

We Helsinki residents have been able to enjoy municipal electric street lighting for a hundred years. On the 16th of September 1911, the first electric lights were installed in Heikinkatu. Indeed, it was very early even on the global scale when the first electric light was lit up in Helsinki in December 1877, as well as in the following summers in the form of lighting exhibitions in the Kaivopuisto Park.

Along with new technology, such as LED lights, outdoor lighting is taking huge leaps forward. There are a total of 84,000 light points in Helsinki. Mercury light fittings have been replaced with more energy-efficient discharge lamps, partly also with LEDs. Overall, about one-third of the 46,000 mercury light fittings have already been replaced.

The current trend in lighting is energy efficiency. In the past decade, the total power consumption of street lighting fell by more than one megawatt to 14 megawatts, corresponding to about half of the main machine power of a cruise ship to Sweden. In the next few years, overall consumption will fall further to about 12 megawatts despite the fact that the outdoor lighting network will expand by a thousand light points a year as the city grows. Lighting design and lighting network technology, such as optics and light sources, have developed hugely in the last few

years. In this work and in the improvement of energy efficiency, Helsingin Energia is carrying out co-operation with Aalto University and various manufacturers.

In addition to streets and squares, there is also lighting on buildings, bridges, statues and parks in Helsinki. The objective is that we should all feel safe to live and move around in the city also after dark. In Helsinki, street and park lights are not switched off at night. Moreover, safety is not compromised, for example, by switching off every other street light. Instead, we use controls so that in the quiet moments of the night the lights are adjusted to half their normal output where it is technically possible and safe in terms of traffic.

Embracing the dark season with the power of lighting,

Olli Markkanen, Head of Unit,
HelenOutdoorLighting



100 years of electric outdoor lighting

A hundred years ago this autumn, Helsinki got its first municipal electric street lights. Before that, the streets were lit up first with tallow lanterns, then with gas lights.

In the early stages, streets were lit up to indicate the differences between the provinces and the capital and between the gentry and the common people. Later, street lights were needed to help and safeguard the evening outings of the high society.

Gas and electricity side by side

In 1860, Finland's first gas light was lit up at the southern end of Mannerheimintie. On the 16th of September 1911, the same street was lit up by electric lights for the first time. Before that, some experiments on the functioning of outdoor electric lights had been carried out in Helsinki.

Before that Second World War, electricity was also utilised in the lighting of harbours, railway and bus stations, and airports. For long, gas was used in addition to electricity, and in 1946 the last gas lamps were taken out of use.

In the 1930s, the Helsinki streetscape turned more colourful along with commercial neon lights. At the same time, remote control of street lights was also introduced, and the big task of converting the electricity distribution system from a direct current into an alternating current began.

Christmas lights now LEDs

The Aleksanterinkatu Christmas lights were switched on in the traditional ceremony on 20 November. To commemorate the 100th anniversary of outdoor lighting, Helsingin Energia has donated the LED lights of the Aleksanterinkatu Christmas lights. They have a total of 6,500 light fittings. As originally the power of one incandescent light bulb was 25 watts, a LED light bulb uses only 1 watt of power.

The wonderful lights in the Esplanade Park will also put the people of Helsinki in the Christmas spirit. For these lights, Helsingin Energia donated 100,000 LEDs two years ago.



Lux Helsinki 2012 to illuminate the city

The light event Lux Helsinki will create an atmosphere of light in Helsinki in the New Year. Senate Square, Finlandia House, the tower of the Olympic Stadium and Hesperia Park will be decorated with light installations and illuminated works of art.

Lux Helsinki will utilise energy-saving techniques. The contributors of the light and environmental art installations include light artists **Jukka Huitila, Matti Jyväskylä, Juha**

Rouhikoski and **Mikko Hynninen** together with the Canadian writer **Daniel Canty**. Artist **Kaisa Salmi** and a group of art students will create a park of lanterns in the trees of Hesperia Park. On the Twelfth Night, fire artists will perform in the amphitheatre of the Finnish National Theatre.

The event will be organised by the City of Helsinki with Helsingin Energia as the main partner.

Lux Helsinki 31 December – 9 January at 16–22
www.luxhelsinki.fi

The right lamp for the right place!

If you're not sure which light bulb to choose, come to the Energy Centre to take a look at the new light bulb exhibition with the latest compact fluorescent, halogen and LED bulbs on show. You can compare the fittings, outputs and the light quantity and colour of light bulbs.

Incandescent light bulbs will no longer be available by autumn 2012. When buying replacements for incandescent bulbs, it is worth looking at the luminous flux value, or lumen value, in addition to the wattage. That will tell the quantity of light emitted by the bulb. The value is stated on the bulb packaging.

Further information:
www.lamputtieto.fi,
www.helen.fi/energiansaasto/oppaat.html
www.ec.europa.eu/energy/lumen/index_fi.htm



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Fault reports

Breakdowns in electricity supply
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Breakdowns in district heating supply 08001 60602

Faults in outdoor lighting 08001 73173

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Call charges for numbers beginning with 010:

- from landlines: 8.28 c/call + 5.95 c/min.
- from mobile phones, all operators:

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Our free e-services are available on our website: www.helen.fi

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Advice on how to choose and use domestic appliances. You can also borrow energy, moisture, structural, surface temperature and light meters from us:
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