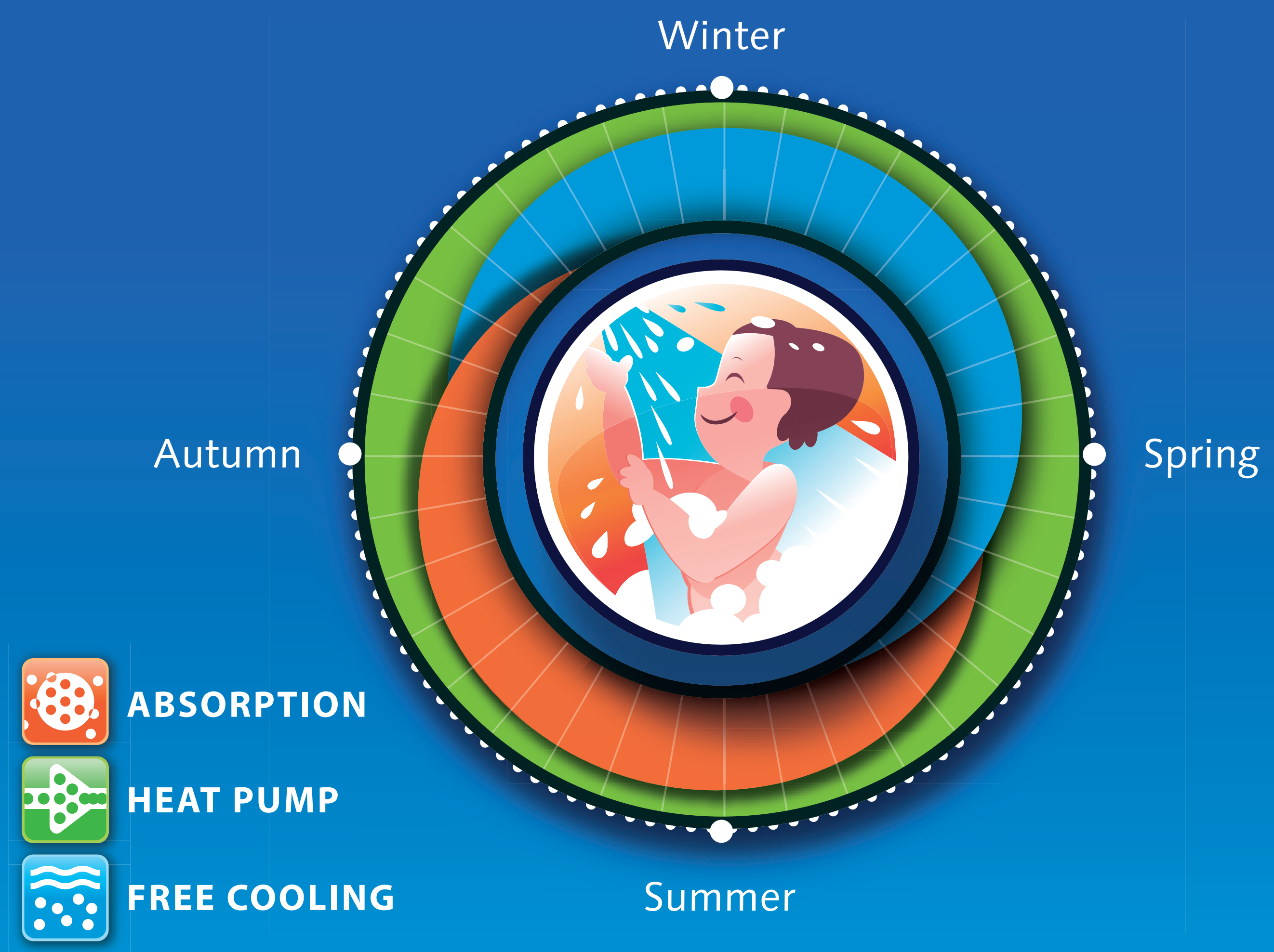
The world's most eco-efficient computer hall from Helsingin Energia

Helsingin Energia

District cooling production methods



Eco-efficiency for computer halls

Helsingin Energia's new solution takes computer halls into an eco-efficient age: the computers are cooled by district cooling, and the heat produced by the machines can be piped into the district heating network to heat buildings in Helsinki and to provide them with hot water.

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.

Beneath central Helsinki lies a ready-made district cooling and -heating network and plenty of subterranean spaces for eco-efficient computer halls.

1. A conventional cooling solution consumes a lot of electricity, and the thermal energy goes to waste. The equipment is also very noisy. The roof structures of buildings are not usually designed to take the loads of condensing units, so they may need to be reinforced. A condensing unit on a roof does not add beauty to the facade of the building, and it also requires a lot of room.

2. The computer hall solution that Helsingin Energia offers allows the thermal energy produced by the computers to be recovered, while being totally silent and unobtrusive. The carbon footprint is only a fraction of the alternative solution. The district cooling equipment to be installed in the client's premises takes up much less room than traditional cooling devices. The need for servicing and maintenance is reduced, and the risks and worries of the client's own cooling provision are eliminated.

3. The reserve power generator container must often be installed outdoors. A container reduces people's enjoyment of the yard.

4. The reserve power generator container can be placed underground adjoining the computer hall.

5. The recovered thermal energy can be transferred to the Helsingin Energia district heating network covering the whole city area.

6. District heating is used to heat buildings and domestic hot water.

7. The heat produced by the computer hall is recycled and not wasted to warm up the air outside. The carbon footprint of the computer hall is substantially reduced.

8. Compressor-operated cooling devices have used cooling agents, such as HCFC compounds which are classified as destructive of the ozone layer in the atmosphere.

9. No cooling agents are used in a district-cooled computer hall.

10. Compressor-operated cooling equipment increases power consumption considerably. The output of a conventional cooling system cannot be increased, but a second unit must be installed on the roof, if increased output is required.

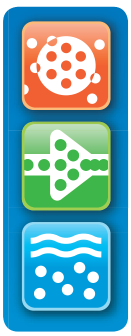
11. With the Helsingin Energia cooling solution, output is never inadequate and can be raised steplessly at any time. Our production capacity already exceeds 100 MW and more is being built to respond to growing demand. One hundred percent of the capacity and electric energy of the electrical connection can be used for computing. None of the client's electricity is used for cooling.

12. District cooling is produced by a total of 15 mutually independent production units in three separate plants. Two of the production plants are in Salmisaari, and the third is the Katri Vala Heating and Cooling Plant in Sörnäinen. The Katri Vala plant and one of the Salmisaari plants are situated in premises excavated underground.

13. In a conventional solution, power transmission lines and data communication links run along the street network, subjecting them to external risk factors, such as diggers etc.

14. Underground energy tunnels provide a secure route and an unbroken supply for important connections. Helsingin Energia has a tunnel network of almost 60 km in Helsinki. Premises excavated into bedrock ensure the highest possible physical security.

District cooling production methods



The absorption technique is employed to produce district cooling using thermal energy that is otherwise wasted in energy generation. The absorption machinery operates in summertime, when sea water is too warm for free cooling.

A heat pump 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 in Helsinki.

Free cooling produces district cooling from cold sea water between November and May, when its temperature is below 8°C. The cooling is produced direct from sea water whenever possible.

Additional information:
Juha Sipilä
Tel. +358 40 334 6663
juha.sipila@helen.fi

www.helen.fi/index_eng.html

Helsingin Energia
00090 HELEN
Tel. +358 9 6171
www.helen.fi