



HELSINKI

news

1 / 2012



Minna Nummelin / City of Turku

Sustainable Helsinki

Baltic seals. The Cities of Helsinki and Turku have declared the Baltic Sea Challenge to save the environmentally troubled sea. The cities set an example by their own actions and challenge others to act. www.balticseachallenge.net

A global leader by environmental standards, Helsinki seeks to set an example by its own best practices.

Helsinki Deputy Mayor **Pekka Sauri**, responsible for environmental affairs, envisions that Helsinki should take a lead in the global community of cities in sustainable development by using the city's many merits in sustainability as examples. He lists public transportation, especially by rail, district heating and district cooling saying, "These can make a real impact in cities worldwide."

Cities are in the core of achieving environmental improvement and mitigating climate change. Home to more than half of the global population and emitting almost 80 percent of global carbon dioxide, they are places where the biggest cuts can be achieved.

To respond to the challenge of climate change, Helsinki is developing an energy-efficient city structure involving high densities especially on rail lines to fight urban sprawl. Mixed-use communities allow people to live and work in the same neighbourhoods, minimizing needs for commuting.

Today 72 percent of Helsinki's morning rush-hour commuters to the city centre use public transportation. The inner city

“ *Helsinki actively fights climate change and promotes innovations in energy production and consumption that enable lower emissions.* ”
– Excerpt from City strategy

is served by a dense and expanding tram network. About two-thirds of public transportation to the Helsinki central business district, and about half in the Helsinki metropolitan area, is by rail. Helsinki plans to increase these shares: an extension to the existing metro rail system is scheduled for completion in 2015.

Helsinki produces electricity, district heat and district cooling in an eco-efficient co-generation process. District heating and cooling in Helsinki incorporate and support many pioneering innovations. These include recovery of heat from data centres and treated wastewater, as well as cooling of data centres with district cooling resulting in impressive savings in both costs and carbon dioxide emissions.

Helsinki sets standards in wastewater treatment at its Viikinmäki plant, built into bedrock and totally underground. The plant removes 95 percent of phosphorus and 90 percent of nitrogen, discharging the effluent into the sea 8 kilometres off Helsinki.

Some of the highlights of Helsinki's ongoing year as World Design Capital are service design projects intended to make a better city. Many of the projects are aimed at building a sustainable society.

Co-generation produces eco-efficient city energy

One of Helsinki's particular strengths in terms of sustainable development is widespread district heating and co-generation of electricity, heating and cooling in a single process. District heating and cooling are highly efficient and sustainable forms of heating and cooling.

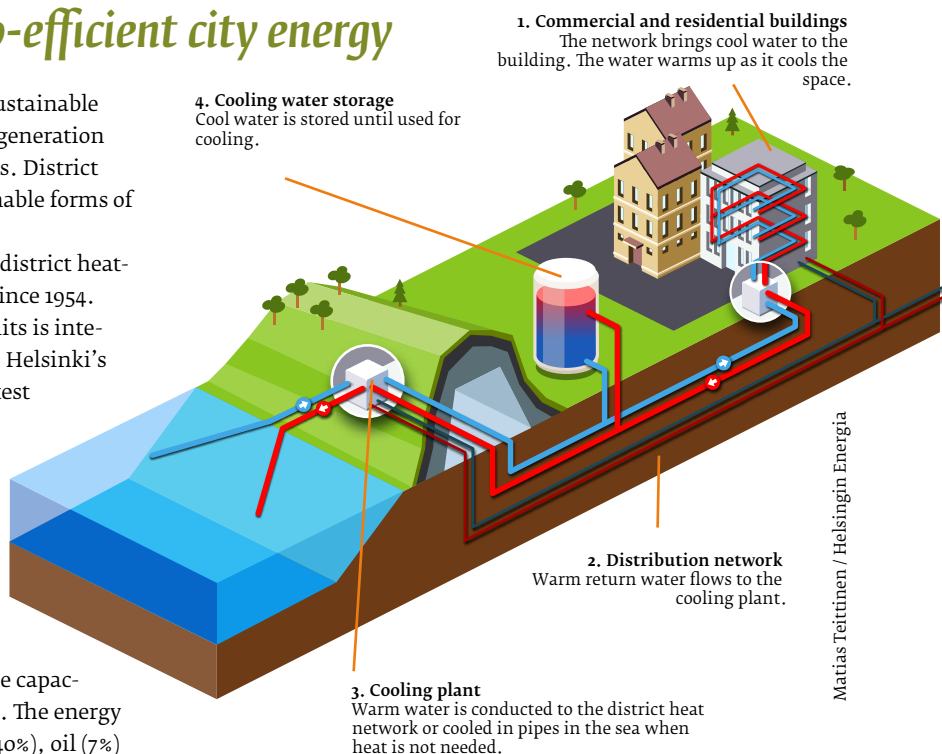
Helsinki is one of the pioneers in comprehensive district heating, having developed the network systematically since 1954. Today 93 percent of the heated space within city limits is integrated into the municipal district heating network. Helsinki's district cooling network is the third largest and fastest growing grid in Europe.

Co-generation can utilize the energy contained in the fuel almost fully, which means high efficiency and substantial reductions in overall emissions compared to conventional energy production. If heat and power were produced separately, fuel use and carbon-dioxide emissions would be 40 percent higher in Helsinki.

Co-generation processes make up 85 percent of the capacity of Helsinki's energy company Helsingin Energia. The energy sources for district heat are natural gas (51%), coal (40%), oil (7%) and heat pumps that recover heat from processed wastewater and district cooling return water (2%).

District cooling is produced with free cooling from seawater in winter, waste heat from energy production in summer, and heat pumps throughout the year. The ecological efficiency of district cooling is approximately five times higher compared to building-specific cooling systems.

The Katri Vala heating and cooling plant is a unique and the world's largest heat pump plant, placed 25 metres deep in Helsinki's bedrock. The heat pump retrieves heat both from wastewater and from return district cooling water, utilizing the energy to produce both district heat and cooling in a single process.



Helsinki's climate goals and achievements

Helsinki's strategic goal is to reduce greenhouse gas emissions by 20 percent from 1990 levels by 2020. Means to the goal include energy-efficiency and renewable fuels. Today Helsinki's electricity sources are natural gas (54%), coal (21%), nuclear energy (18%) and renewable energy (7%). The share of renewable energy will be increased to one-fifth by 2020.

Helsinki's Energy company Helsingin Energia is committed to becoming carbon neutral by 2050. Means to the goal include the renewable energy sources sea wind power, forest-based pellets, bio coal and bio gas. Further eco-efficiency will come from carbon-capture technologies.

Helsinki was the first European capital to institute a sustainable development action plan in 2002. The plan included 70 actions to be implemented by 2010. Helsinki was successful in one of the main goals, which was to cut greenhouse gas emissions. Total emissions decreased by 10 percent from the 1990 level, exceeding the goal set by Helsinki City Council, which was at the 1990 level.



Helsinki cut greenhouse gas emissions by 10 percent from 1990 to 2010 and aims at a 20-percent cut from the 1990 level by 2020.

However, achievement of another major goal, cuts in traffic volumes, was less successful: traffic volumes increased, although use of public transportation also increased.

A heavy focus on rail in Helsinki

When the first apartment buildings were still months away from completion in Helsinki's new Jätkäsaari inner-city district, Helsinki tram line 8 was extended to the district and started service at the beginning of 2012. The district will eventually be served by two tram lines.

Trams have been an integral and uninterrupted part of Helsinki since the late 19th century. Today the inner city is served by a dense network of 12 tram lines, which are the main form of public transportation in the inner city serving 200,000 passengers per day (Helsinki's total population is 600,000). The rush hour frequency is 5–10 minutes.

The main ongoing public transportation rail project in the Helsinki region is the extension of the metro rail system to the west, scheduled for completion in 2015. New suburbs are planned to rely heavily on public transportation by rail.



A Helsinki city tram

Bicycling promoted with a new service centre

The City of Helsinki will build a bicycle service centre for the cycling season of 2012.

Operating at a central public square adjacent to a major public transportation hub in Kamppi and run by local entrepreneurs, the centre will especially serve commuters on buses and rail, offering safe 24-hour bicycle parking. The centre will also offer bicycle rental, instant repair services and information.

The 2012 season will serve as a test period. The City aims to continue the operation in upcoming years.

The bicycle service centre is one of the means by which Helsinki seeks to promote sustainable means of transportation. Helsinki's goal is to raise the share of cycling from the current 9 percent to 15 percent of all journeys in the city by 2020.



Helsinki's bicycle service centre

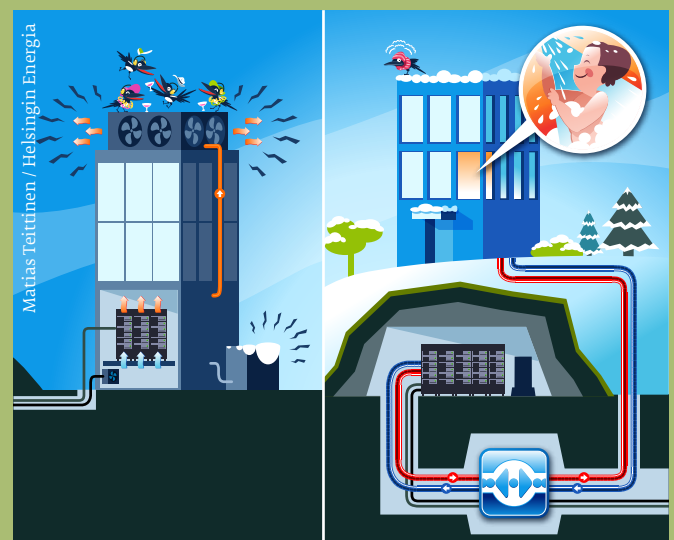
Green cloud computing in Helsinki: The world's most efficient data centres

A new top-of-the-class data centre was commissioned in Helsinki's Suvisaari in mid-December 2011, marking the second phase in an innovative energy concept begun by the Uspenski underground data centre, which opened in 2010. Servers are cooled by Helsinki's district cooling network, and the heat produced by the servers is recovered and used as district heat.

The data centres, developed and run by Helsingin Energia and the Finnish ICT service provider Academica, are hailed as the world's most advanced in terms of energy solutions. Their carbon footprint is only a fraction compared to conventional data centres.

Data centres produce vast amounts of heat, which is wasted in conventional centres. Cooling at conventional centres typically consumes as much energy as the computing. If all data centres in Finland operated on the green cloud computing principle, enough energy could be saved each day to heat a medium-sized town in Finland.

Did you know? Data centres represent up to 2 percent of the total world electricity consumption, half of it used for cooling. This is roughly equal to the electricity consumption of the United Kingdom.



A conventional data centre (left), cooled by a building-specific system, and the new data centre (right), which recovers the heat and is cooled by eco-efficient district cooling.



Rhinoceros / City of Helsinki

Helsinki Environment Centre's office building in Viikki

Helsinki Environment Centre tackles climate change with an eco-efficient building

The City of Helsinki Environment Centre lives out its mission to fight climate change. Since last autumn, the centre has operated in a new custom-designed building which achieves the lowest energy consumption of any office building in Finland, featuring less than half of the energy consumption of the best new office buildings in Helsinki.

The building generates 20 percent of its electricity from renewable sources, mostly with solar panels placed on the southern, double façade and roof. Additional power comes from roof-top wind turbines. Cooling in summer is provided by cold water lifted with solar power from 250-metre-deep wells. About 93 percent of the cooling energy used by the building is produced from renewable sources.

The double façade protects the building from heat loads in summer and retains heat in winter. Insulation is enhanced and water consumption minimized. Natural light is utilized efficiently, and lighting is implemented with energy-efficient technology.

The building seeks to become carbon neutral by 2015.

Social services to build sustainable society

Helsinki is World Design Capital 2012, so nominated for its vision and accomplishments in the use of design as a tool to improve life and to build a better society.

Seizing the theme, Helsinki's Social Services Department joins World Design Capital Helsinki 2012 with development projects aimed at steering Helsinki onto a more socially sustainable course.

Faced with a rapidly aging population, Helsinki seeks new ways to help the elderly to cope with everyday life routines. In line with the theme, one of the development projects builds a customer-oriented service network for the elderly. Those who receive the Social Services Department's standard services can swap these services for others provided by any service provider, public or private, within the same budget allocated by the Department for these customers. The goal is to match needs with the right services. Key terms of the new system are personal budgeting and novel care management.

The customer-oriented service network is being built using methods inherent in design processes: video clips of the elderly customers' everyday lives are used to analyze their needs, and their current home-care services are visualized and studied with cartoons.

Another project, *Functional Homes*, helps the elderly to stay in their own homes for as long as possible with the help of new solutions and technologies that make homes accessible and safe. The technologies include robotics and Finnish innovations.

Art to promote responsible energy consumption

Helsinki's energy company Helsingin Energia explores all means to fight climate change. One of them is public art.

In winter 2012, Helsinki's district heat consumption is visibly evident to citizens: the 35-metre-tall stack of the central Alppila district-heat reserve station is illuminated according to district heat consumption in Helsinki in real time: colours projected onto the stack vary on a scale from 1 to 9, from green symbolizing low consumption levels to red symbolizing peak consumption.



Juha Eskelinen / Helsingin Energia

Red light signifies peak consumption.

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Helsinki News is an international newsletter published by the City of Helsinki Communications Office four times a year.

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