

City of Helsinki

# Climate- smart Helsinki

**Towards more  
sustainable  
city planning**

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# Towards more sustainable city planning

Both a holistic view and case-by-case solutions are needed when planning the Helsinki of the future. This brochure provides examples of Helsinki's efforts to successfully develop an urban, environmentally smart and climate-smart capital.

Helsinki is a growing capital with good conditions for climate-smart and ecologically rational urban development. The city structure includes a strong network of green areas with forests and seashores, which facilitates resilience and adjusting to climate change.

To reduce harmful emissions, Helsinki's new City Plan emphasises more sustainable modes of transport and densifying the city structure along efficient public transport routes. The city's extensive district heating system, related to electricity production, provides an opportunity for significant emission reductions once the transition is made to low-emission energy production. As the capital of a timber producing country, Helsinki is also in a good competitive position in the development of ecologically sustainable construction practices.

**Helsinki  
is home to  
621,000  
residents**

## **Helsinki is a competent and active designer of an environmentally smart and climate-smart city**

Modern successful urbanism cannot be created without versatile environmental knowledge. Integrating climate-smart solutions into planning pertains to all projects. Helsinki is planning areas that will serve as the driving force of development. In these areas, the quality requirements for reducing carbon emissions and improving energy efficiency are higher than average, and the methods for adjusting to climate change are prominently in use. In land use planning, the environmental targets recorded in the council strategy are put into practice and their realisation is monitored actively in implemented detailed plans and traffic plans.

The objective of planning is to identify and pose the essential environmental questions that can be influenced with land use and traffic planning. A themed range of means has been prepared for versatile city planning, to serve as a checklist in various planning tasks.

Find out more about the climate-smart sites in Helsinki with this brochure and the accompanying map.



# Goals of climate-smart city planning

## 1 Carbon Emissions

Contribute to the lowering of carbon emissions through spatial planning by having a compact city structure and a high quality public transport system. This in turn requires the reduction in private car dependency by giving priority in spatial planning to walking, cycling and public transport in terms of improving the city structure and quality of life.

## 2 Adapting to Change

Anticipate the changes in climate conditions in order to take account of these changes in spatial planning for the future benefit of a resilient city.

## 3 Carbon Neutral City

Create as a precondition of spatial planning that all plans should aim to be carbon neutral and energy efficient in their implementation so that they achieve a carbon neutral city structure in the long term.



## 4

### Quality of the Environment

Develop innovative environmental solutions for the management of a growing city in order to ensure Helsinki is also a healthy city in the future.

## 5

### Helsinki's Green Network

Plan and strengthen the city's nature and recreational green network through its finger-plan structure. Additionally, forward planning of the future green infrastructure will be used as an integrated holistic programme in which nature and green areas are built into new developments through the design of courtyards, green roofs and urban stormwater management systems.

# Helsinki continuously reduces its climate emissions

Urbanisation is an ongoing global trend that shows no sign of slowing down. At present, more than half of the world's population already lives in cities, and this proportion is estimated to approach 70 per cent by 2050.

The concentration of functions enables the growth of human well-being and opportunities for a better life for billions of people. Sustainable urbanisation also involves enormous challenges. Over the coming years and decades, we must find solutions for the greatest environmental problem in human history: climate change. Resolute actions are required against climate change, which progresses simultaneously with urbanisation. This means that climate change will be resolved with solutions made in cities in specific.

Helsinki wants to be involved in these efforts. This means taking active action to reduce city-level climate emissions and providing an example for other rapidly growing cities on how a city's growth and simultaneous determined reduction in climate emissions can be implemented.

Like many other cities around the world, Helsinki is committed to significantly reducing its climate emissions. A target reduction of 60% in climate emissions will be proposed for 2030, and the matter will be decided upon by the City Council. The decision would also make it possible to move up the goal of carbon neutrality to 2040. With more ambitious goals, Helsinki would improve its ability to implement international agreements on reducing emissions.

Construction of a wooden multi-storey building in Pukinmäki.



# Towards a denser city structure and more effective traffic with strategic planning

The City Plan is the city's main long-term strategic plan and a key document that will steer emission reductions over the coming years and decades. Land use planning is directly connected to emissions from traffic: the more dispersed the community structure is, the higher the emissions are. The City Plan steers construction towards a denser city structure and population growth towards the impact area of public transport. Another objective of the City Plan is to reduce regional transport emissions.

The population density of Helsinki is **2,902** residents / km<sup>2</sup>

The detailed plans prepared in 2016 enable the construction of **8,100** residences in Helsinki

**88 %** of the planned floor area is located within the rail transit zone

Besides transport, other major sources of greenhouse gas emissions in Helsinki include energy production and energy consumption. Strategic city planning enables various low-emission solutions and development paths that support the implementation of emission reductions in the energy system. In the future, achieving the emission reduction targets will require multidisciplinary planning, with the City Plan providing a city-level perspective on land use planning.

In the pursuit of an increasingly climate-friendly city, planners will also be paying more and more attention to the energy-efficiency of the existing building stock. Smart densification of the city also means connecting the energy perspective as a seamless part of the overall development of the city.

**The Helsinki Climate Roadmap** shows how Helsinki can become a carbon neutral city that has adjusted to climate change. It can also make Helsinki an even better place to live, work, visit and conduct business in. The Climate Roadmap shows how each resident of Helsinki can influence climate protection.

## Leaning on the rail transit

The main traffic principle in Helsinki's new City Plan is to lean strongly on the railway network. The existing tram network will be expanded, and a high-quality light rail network will be implemented in connection with the city boulevards.

## Development Plan for Transport (LIIKE)

The Development Plan for Transport specifies eight target policies for the transport system in Helsinki. The targets are based on the city's strategic starting points and divided into three themes: efficient everyday life, vitality and resource efficiency.

The goal is to ensure the efficiency and functionality of everyday transport for residents and commuters while reducing the harmful impacts of vehicle traffic. Sustainable transport is promoted by prioritising walking, cycling and public transport.

Hämeentie will be turned into a public transport and cycling street.



## Changes to the traffic plan for Hämeentie

Thoroughfare by car will be prohibited on Hämeentie, between Hakaniemi and Sörnäinen. Removing thoroughfare will reduce car traffic. This will make it possible to improve the conditions for public transport, walking and cycling, in addition to which the pleasantness of the street area will improve because of the reduced amount of motor vehicle traffic. Hämeentie. [Site 2.](#)



## Raide-Jokeri

Raide-Jokeri will replace bus line 550 and improve the functionality and travel comfort of transverse public transport between Itäkeskus in Helsinki and Keilaniemi in Espoo. A considerable number of new residences can also be built along the Raide-Jokeri route, located along a quick and reliable rail connection. At present, complementary construction accounts for 36% of the residences in detailed plans, i.e. approximately 2,900 residences. Route of bus line 550 in Helsinki, travelling from Itäkeskus to Pitäjänmäki via Viikki, Oulunkylä and Haaga. **Site 1.**



## Electric buses began operation in Helsinki

The aim of Helsinki Region Transport (HSL) is to have a third of the buses in the Helsinki metropolitan area run by electricity by 2025. The first all-electric bus in Helsinki began operation on line 23, between Ruskeasuo and Rautatietori, in spring 2017. The batteries can be charged with a fast-charging device, located at the bus's final stop, while the passengers are boarding. Charging for 2 to 4 minutes is enough for a round trip. With fully charged batteries, the maximum operating range of the bus is 70 kilometres. Rautatietori, a stop on line 23. **Site 3.**

## Robot buses in Helsinki

Automatic electric minibuses have been tested in Hernesaari, Helsinki, since summer 2016. The aim is to make Finland into a pioneer in technological solutions in autonomous transport and to generate new export activities. In addition to Helsinki, testing is also being continued in Espoo and Tampere. Driverless electric transport is also being developed in the new MySmartLife EU project in Korkeasaari and Jätkäsaari.

Hernesaarenranta 4–6. **Site 4.**





## Kruunusillat

Kruunusillat is a new fast bridge connection for trams, cyclists and pedestrians travelling from Laajasalo to Korkeasaari and via Kalasatama to the inner city. The bridge connection also ensures a functional transport connection for the residents of the new Kruunuvuorenranta district and the densifying Laajasalo district in the future.

**Site 5.**

## Walking conditions in the city centre

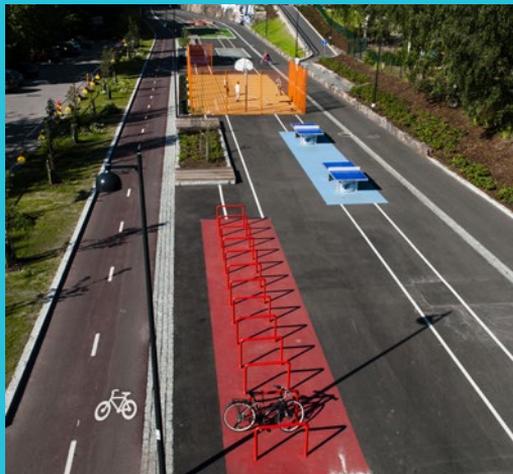
The aim is to improve the conditions and connections for walking in the inner city area in particular. Opportunities for expanding the existing pedestrian centre and the impacts of this expansion are being investigated. The political decision-makers will make a decision on expanding the pedestrian centre in the inner city once all investigations are complete.

Helsinki inner city. **Site 6.**

## Baana network

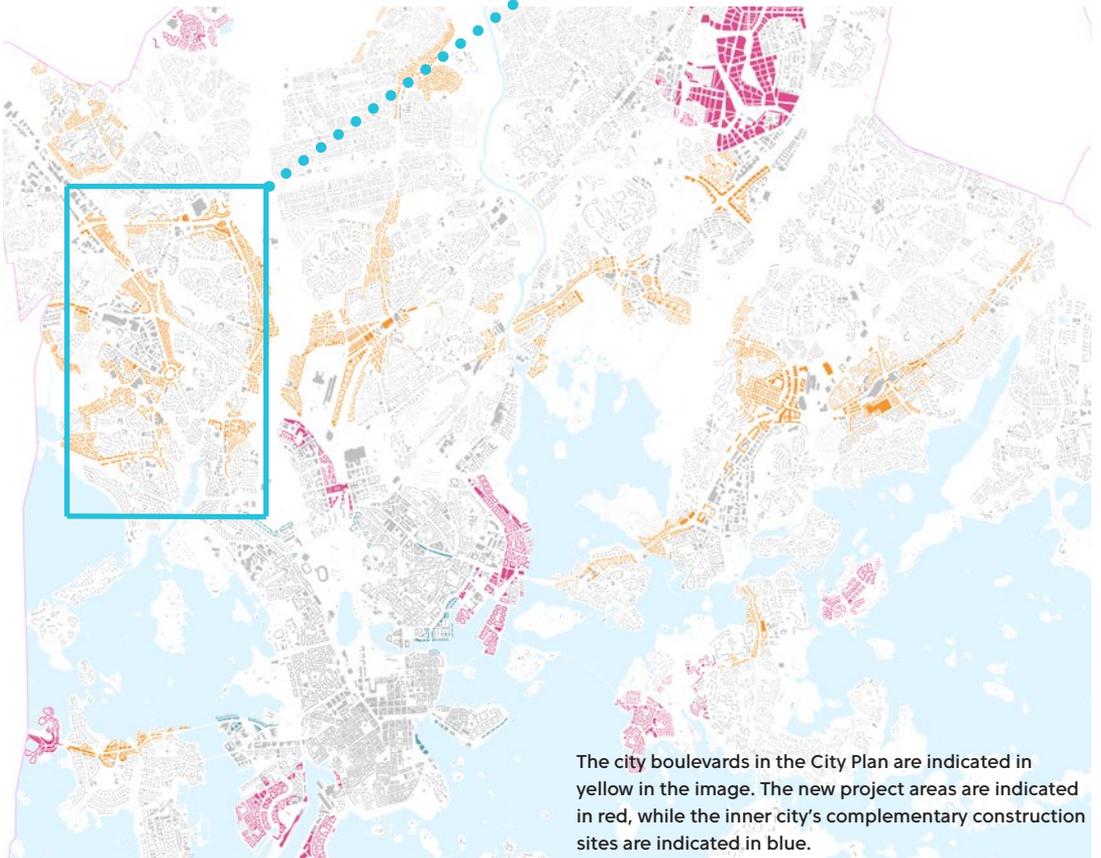
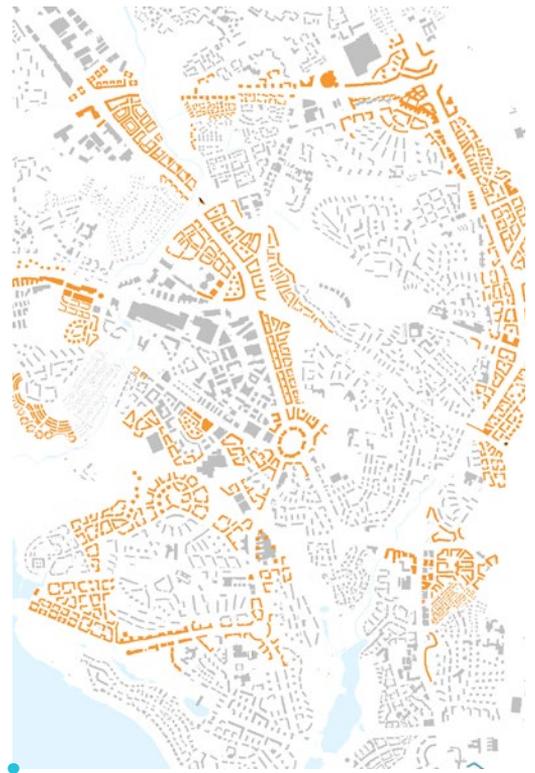
In the future, the Baana network will connect the largest residential areas to the city centre and other hubs of employment with comprehensive and high-quality bicycle paths. The Baana network will enable fast and direct bicycle traffic. The first Baana route travels along a former railway cutting from Kiasma to Ruoholahti. The express bicycle route is 1.3 km long.

Kansalaistori – Länsilinkki. **Site 7.**



## City boulevards

A key solution for new city districts in the City Plan is city boulevards. For a city in Finland, Helsinki is built rather densely, and the alternative solutions considered for city boulevards were either to build extensive green areas or to landfill a considerable area of the seashores for construction. These alternatives do not meet the objectives of the growing city as sustainably as turning the city's inner motorway areas into new districts that connect the existing city structure. Because of this, city boulevards are a very important ingredient in the recipe for a sustainably growing city. The goal of complementary construction and joint planning of city boulevards is to make the city more sustainable. For example, the current Vihdintie will be turned into a city boulevard in the future.



The city boulevards in the City Plan are indicated in yellow in the image. The new project areas are indicated in red, while the inner city's complementary construction sites are indicated in blue.

# City planning that mitigates climate change

## Planning ecologically sustainable area construction sites

Home to approximately 2,000 people, the Eko-Viikki district was a leading European project in area construction in the 1990s, following the principles of sustainable development. Viikinoja is an early site of the natural treatment of run-off water in Helsinki.

The new districts of Kuninkaantammi (5,500 residents) and Honkasuo (2,000 residents), which emphasise climate-smart solutions, are under construction. Themes taken into account in the detailed plans include energy efficiency, production of renewable energy, city blocks with wooden buildings, green efficiency and diverse solutions related to delaying run-off water in yards, streets and green areas, among other things.

***Eko-Viikki, site 8. Kuninkaantammi, site 9 (bottom image), and Honkasuo, site 10.***

## Car-free blocks

Efforts have been made to reduce the energy consumption of transport and the dependence on cars by planning blocks without parking spaces in ***Kalasadama (site 11)*** and ***Jätkäsaari (site 12)*** – areas with particularly efficient public transport services.

## Energy-efficiency and renewable forms of energy

When handing over plots it owns, Helsinki requires better energy efficiency than is required at a national level. In certain cases, the provisions in detailed plans require high energy efficiency and the production of renewable energy. A low-temperature district heating system has also been built in Honkasuo to recycle return water from the district heating network.





## Material efficiency

The use of energy-intensive materials (such as concrete or aluminium) should be reduced whenever possible until they can be produced in a more environmentally friendly manner. In the current situation, their manufacture is a major source of climate emissions. Wood construction reduces energy consumption that results from both the manufacture of building materials and construction, and it also stores carbon.

The first wooden passive multi-storey building in Helsinki was built in the new district of wooden buildings planned in Honkasuo. Wooden multi-storey buildings have also been built elsewhere in Helsinki, namely in Viikki, Omenämäki and Pukinmäki. Furthermore, a district dominated by small wooden buildings has been built in **Myllypuro (site 13)**.

An automated vacuum waste collection system has been adopted in Jätkäsaari, Kalasatama and **Kruunuvuorenranta (site 14)** to enhance waste management and contribute to the high degree of waste sorting. The use of recycled materials is on the rise in street construction. Local mass balance may become a major opportunity for saving transport energy when the leftover soil is utilised for soil preparation before construction or for shaping the terrain in the planned area. This was the case in Kuninkaantammi, for example.

## Treating run-off water

The natural treatment of run-off water is becoming more common in Helsinki. **Viikinoja (site 15)** has been transformed into a naturally meandering stream, in which the vegetation cleans the water before it is carried to the receiving body of water. **The natural bio-filtering area in Maunula (site 16)** protects the living conditions of the trout stock in Haaganpuro. The high-level system in Kuninkaantammi will also enrich the cityscape, as run-off water will be delayed with methods suitable for the urban environment: green roofs and rain gardens on plots, pools and streams along the streets as well as cascades in green areas and dammed park ponds. Soil sealing is avoided by replacing some of the asphalt with permeable surface materials, such as grass pavers and stone dust.



## Green roofs

Helsinki's green roof policy promotes the planning and construction of green roofs at new sites to prevent run-off water and urban heat island phenomena, increase the biodiversity of urban nature and utilise roofs as a functional, economical and aesthetic resource. Green roofs have been a requirement in several detailed plans in recent years. Completed sites can be found in **Viikki (site 8)**, **Kalasatama (site 11)** and **Meilahti sports park (site 17)**.



## The green factor method is a city planning tool

Created specifically for the conditions of Helsinki, the green factor is the ratio between a plot's qualitatively weighted green area and the total area. Various elements, such as vegetation, seedbeds and storm water solutions, are assigned a factor, which is determined from the perspectives of ecology, functionality, landscaping and maintenance. The green factor makes it possible to evaluate and develop methods to build a dense and green city structure that has adapted to climate change. It also helps take into account the social and aesthetic values of a yard environment.

## The green network and the densifying city structure

A climate-smart city supports ecologically sustainable consumer choices in everyday transport and recreation. To achieve this goal, the green and recreational network must span across the entire city structure. Green areas that improve the residents' quality of life, health and well-being are attractive and easily accessible. They connect the different parts of the city together, offer recreational services and are accessible on foot, by bicycle and by public transport, providing residents with an opportunity for outdoor activity in all seasons. The outdoor trails and ski tracks of **Central Park** start in front of the **Maunula hiking lodge**. Metsäläntie 9. **Site 18**.

The ski trails in Central Park can be reached by public transport.





With its diverse landscapes and nature, natural shores, absorbent forest floors and waters, the green network plays a key role in sustainability and flexibility in preparing for and adapting to climate change.

In addition to the new Helsinki City Plan, a strategic green area development vision (VISTRA) has also been prepared. The most recent part of the work, the development plan for Helsinki's green and recreational areas, presents an overall view of the future of Helsinki's green network. The aim is to develop the densifying city's green areas, other public outdoor areas, shores and the archipelago as a network-like entity that provides diverse opportunities for recreation in all the city's districts. Development is based on each area's characteristics and

diverse cultural and natural values, such as the valuable environments that are located within the green areas and the forest network that maintains biodiversity.

One defining characteristic of Helsinki is the coexistence of waters, the natural landscape and a dense city. The aim is to preserve and strengthen this characteristic further. For maritime Helsinki, this involves unifying the seaside route, developing water transport from one island to another and nurturing natural shores, among other things. Core contents of the entire city's developing green network can be sensed by visiting Central Park, for example, as it is one of Helsinki's green fingers, i.e. vast radial green zones.

Humallahti is part of the western green finger of Helsinki. It provides opportunities for rowing and SUP boarding.



# The energy system of Helsinki is part of the dense city structure

The crisscrossing tunnels and thousands of kilometres of pipes and cables under the city are used to transfer energy to buildings and from buildings back to the network. Thanks to the dense city structure, the amount of energy lost is minimal.

## Vuosaari power plants

Most of the electricity and district heating in Helsinki is generated at the Vuosaari natural gas power plants. Thanks to the advanced technology, the power plants' degree of efficiency is, at best, 93 per cent.

Year of completion: A 1991, B 1998

Käärmeniementie 6–8. [Site 19](#).



## Hybrid heating system of Sakarinmäki School

The heating system at Sakarinmäki School comprises geothermal heat, an oil heating plant and solar thermal collectors. The solution makes it possible to generate no less than 80% of the school's heating with renewable energy. The students and teachers at the school were involved from the start, coming up with ideas on how the new energy solution could also be utilised in learning.

Year of completion: 2014

Knutersintie 924. [Site 20](#).



## Suvilahti electricity storage facility

The Suvilahti electricity storage facility comprises 15,000 lithium-ion batteries, which corresponds to the batteries of approximately 100,000 mobile phones. The storage facility is used for levelling out consumption peaks, among other things.

Year of completion: 2016

Parrukatu 2. [Site 21.](#)



## Salmisaari wood pellet heating plant

The heating plant generates district heating from wood pellets. The plant's capacity is 100 MW, and it generates an amount equal to the consumption of 25,000 two-room flats annually.

Year of completion: 2018

Porkkalankatu 9-11. [Site 22.](#)

## Katri Vala heat pump plant

The rock cave under Katri Vala Park houses the world's largest heat pump plant, which produces heating and cooling. The plant produces low-emission energy from purified wastewater and return water from district cooling.

Year of completion: 2006

Katri Vala Park. [Site 24.](#)

## Esplanadi district cooling plant

The rock cave located under Esplanadi houses a large pool in which district cold is stored. The district cooling plant is part of the third largest district cooling system in Europe. The heat pumps that will be completed in 2018 will increase the generation of low-emission heating and cooling in Helsinki.

Year of completion: Cold storage 2015.

Esplanadi. [Site 23.](#)



## Kivikko solar power plant

The solar power plant on the roof of the Kivikko ski hall is one of the largest solar power plants in Finland. The power plant houses 3,000 solar panels that are rented as designated panels to consumers.

Year of completion: 2016

Savikiekontie 4. [Site 25.](#)

## Smart Kalasatama

Smart Kalasatama represents a new type of smart urban development, in which an area is developed flexibly by experimenting. Smart Kalasatama is implemented in cooperation between residents, companies, the city and other actors.

Everyday life is made easier by smart services and new solutions of the future. The smart energy systems at Smart Kalasatama are an important theme, and they – for instance, the flexible shared facility rental system – are part of the terms for handing over a plot. In fact, the first model area of smart energy systems in Finland will be built in Kalasatama. The area features one of the largest solar power plants in Finland, smart energy storage, eco-efficient district cooling, a smart remote-controlled transformer substation, a fault-tolerant ring network and an electric car network.

Start year: 2013

Smart Kalasatama Living Lab, Sörnäisten Rantatie 22, building 1 (power plant), entrance E, 3rd floor. **Site 26.**

## Pirkkola sports park

An annual energy saving of 5 per cent was achieved in Pirkkola sports park with energy optimisation. Key measures included appropriate use and remote control of saunas, optimisation of cooling in the ice hall with building automation, controlling lighting and utilising natural light, sealing windows, and committing the personnel to the energy saving measures. New energy saving measures are continuously being explored.

Time: 2010–2012

Pirkkolan metsätie 6. **Site 27.**

Smart charging points for electric cars in Kalasatama.



## Low-energy renovation of Käpylä Comprehensive School

Built in 1950, the comprehensive school was renovated into a low-energy building in 2012. The school is attended by 700 students and comprises five separate buildings. The school's insulation was improved, the windows were replaced, the roof was insulated and an energy-efficient decentralised ventilation system was installed.

The school also implemented a heat recovery system in the shower facilities, a ventilation control system in the classrooms and the gym based on CO<sub>2</sub> levels, presence detectors, motion detectors and natural light sensors for enhancing the lighting. The investment costs were approximately six per cent greater than normal, but energy efficiency improved by 20 to 30 per cent.

Year of implementation: 2012

Mäkelänkatu 93. [Site 28.](#)



## Optimisation of ventilation at Konala Comprehensive School

Steps were taken to optimise the ventilation at Konala Comprehensive School as needed, based on the indoor air quality and number of visitors. In total, the efforts achieved 13 per cent savings in electricity and heat in a cost-efficient manner. On an annual level, the school saves 62 MWh in heating and 20 MWh in electricity. The building's annual energy costs decreased by thousands of euros and the CO<sub>2</sub> emissions by 26,500 kg. A similar solution will be implemented in stages in all 150 similar school gyms in Helsinki.

Start year: 2011

Riihipellonkuja 2. [Site 30.](#)

## Viikki Environment House

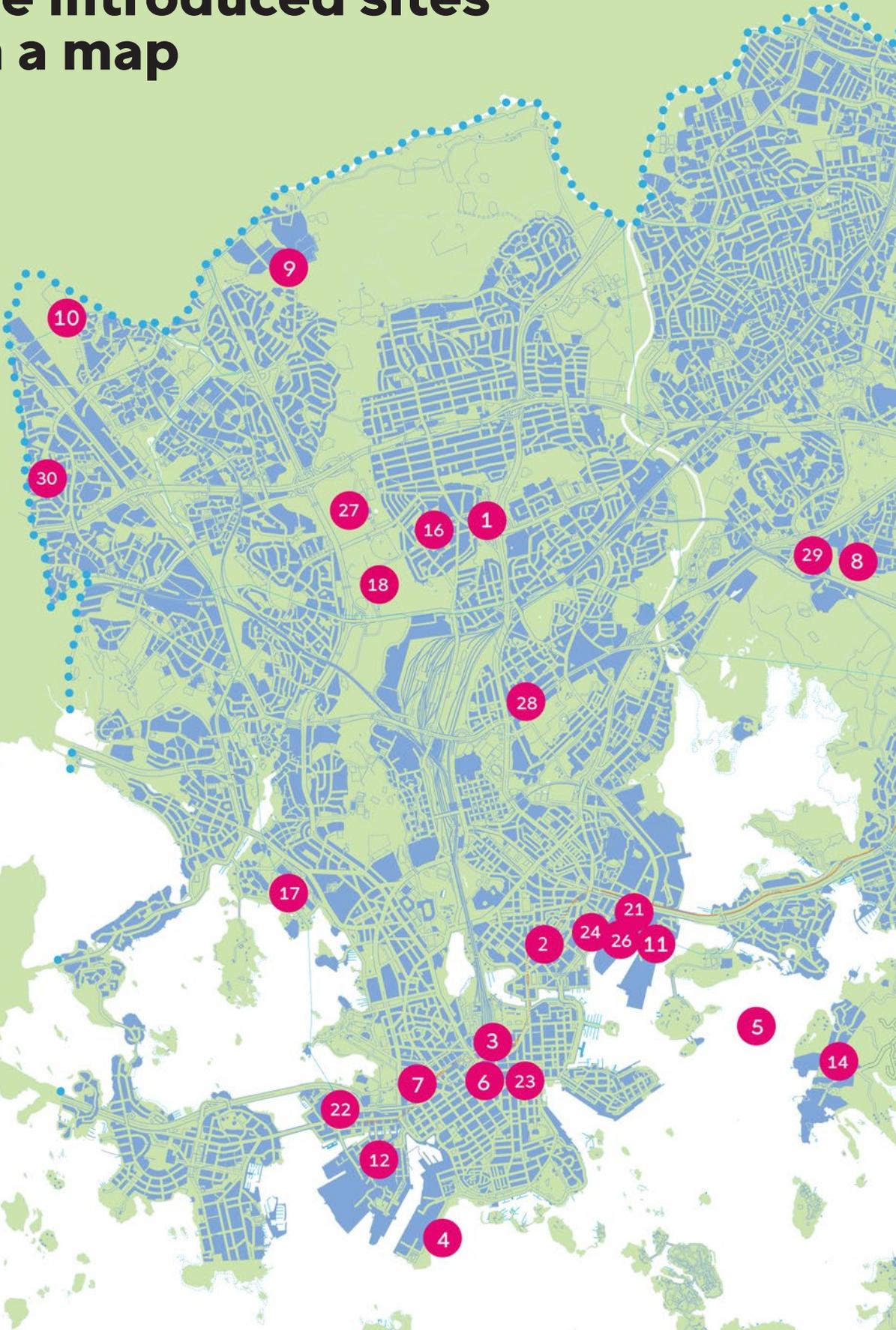
Viikki Environment House was awarded as the most energy-efficient business premise in Finland in 2013 (the Green Building Council Finland award). Solutions included photovoltaic panels, a fast-charging point for electric cars, free cooling (boreholes in rock), an electricity storage facility, a passive building and bioclimatic energy planning. The E value is 90 kWh/m<sup>2</sup>. The building employs approximately 250 people.

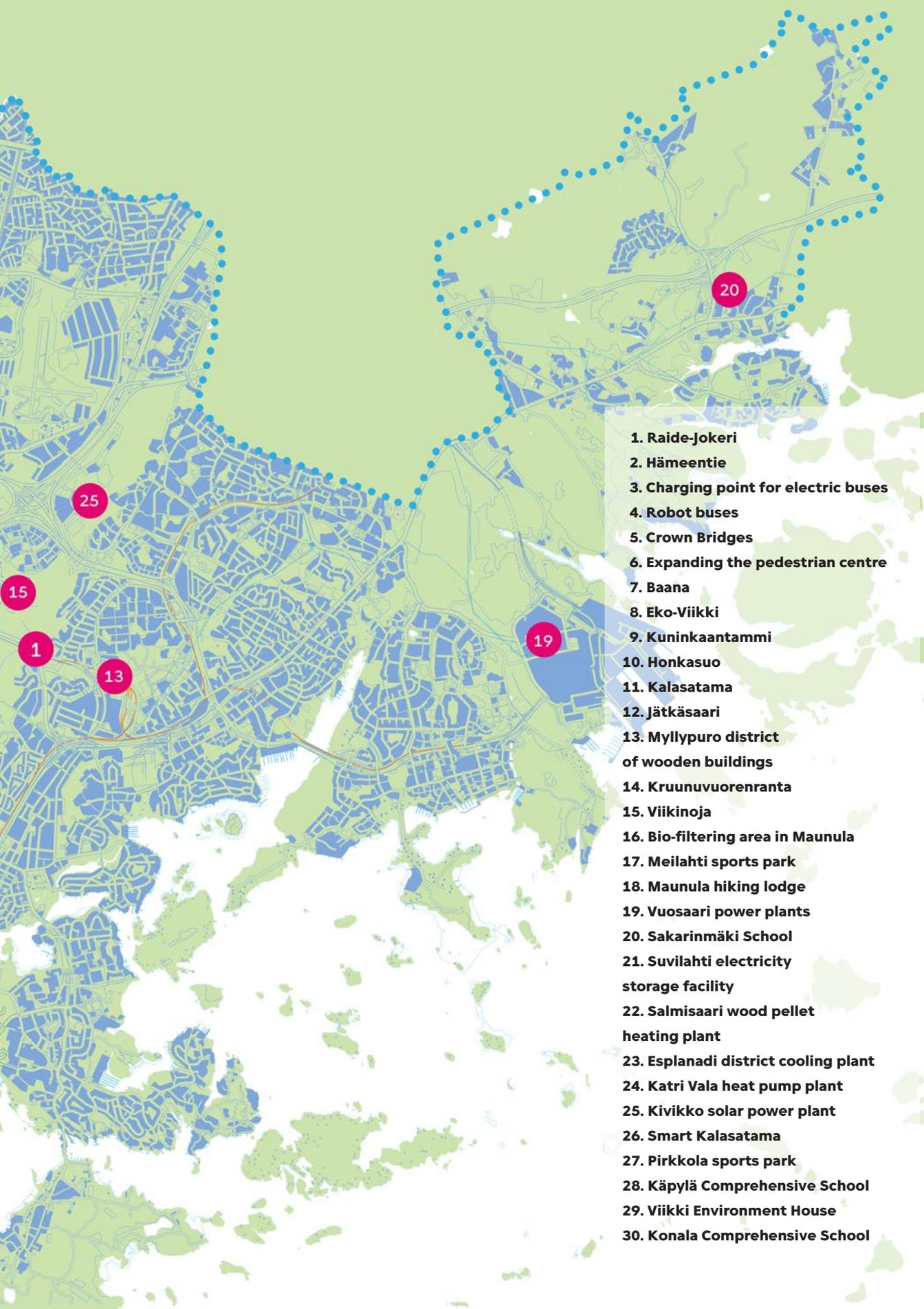
Year of completion: 2011

Viikinkaari 2. [Site 29.](#)



# The introduced sites on a map





1. Raide-Jokeri
2. Hämeentie
3. Charging point for electric buses
4. Robot buses
5. Crown Bridges
6. Expanding the pedestrian centre
7. Baana
8. Eko-Viikki
9. Kuninkaantammi
10. Honkasuo
11. Kalasatama
12. Jätkäsaari
13. Myllypuro district of wooden buildings
14. Kruunuvuorenranta
15. Viikinoja
16. Bio-filtering area in Maunula
17. Meilahti sports park
18. Maunula hiking lodge
19. Vuosaari power plants
20. Sakarinmäki School
21. Suvilahti electricity storage facility
22. Salmisaari wood pellet heating plant
23. Esplanadi district cooling plant
24. Katri Vala heat pump plant
25. Kivikko solar power plant
26. Smart Kalasatama
27. Pirkkola sports park
28. Käpylä Comprehensive School
29. Viikki Environment House
30. Konala Comprehensive School

# Further information on planning

The ongoing construction projects can be found in the Helsinki Map Service at [kartta.hel.fi](http://kartta.hel.fi). You can also subscribe to receive email notifications of any plans and traffic plans to be published at [www.hel.fi/suunnitelmavahti](http://www.hel.fi/suunnitelmavahti).

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