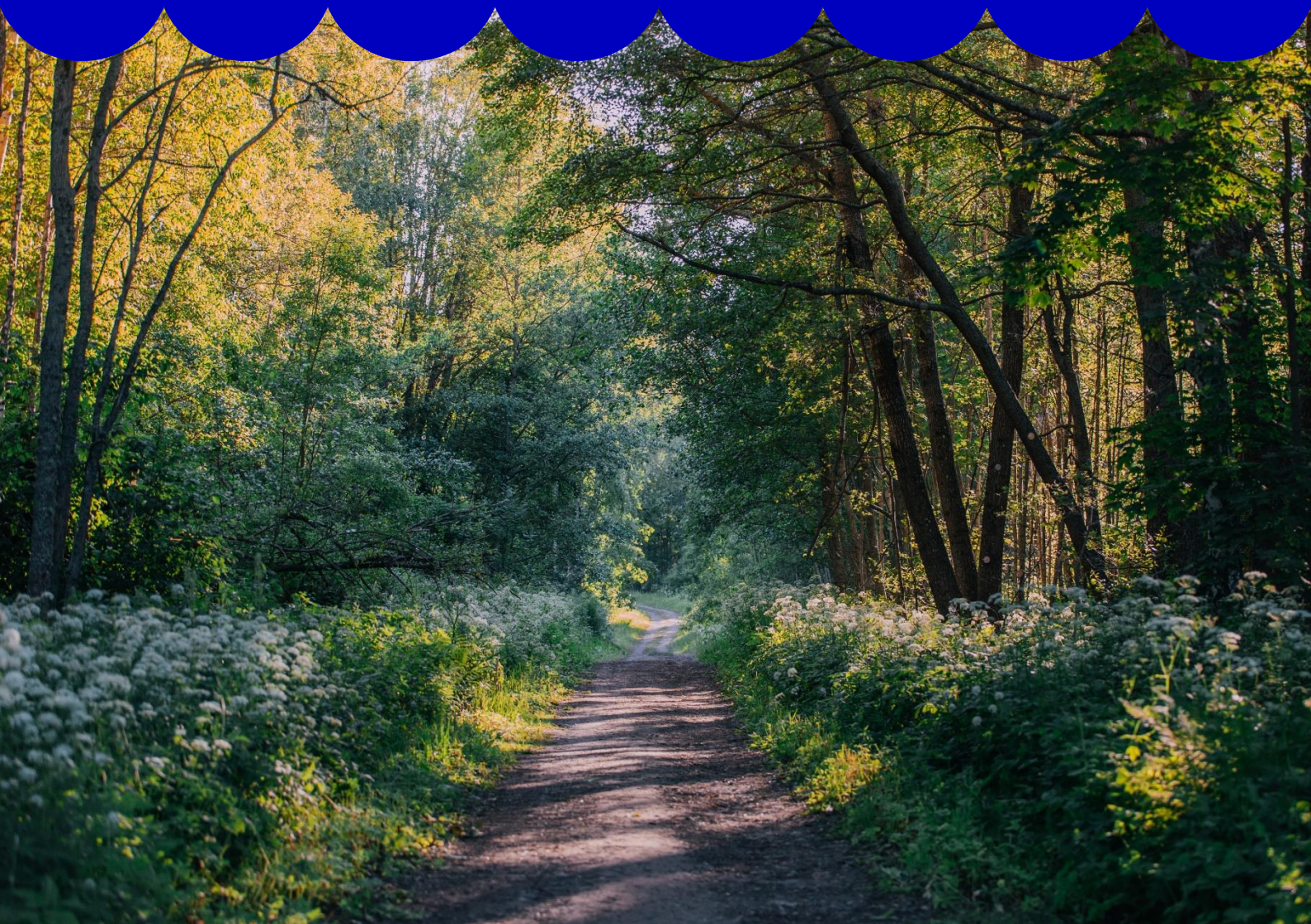
Helsinki

Environmental Report 2020

City of Helsinki



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City of Helsinki Environmental Report 2020
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Address by the Deputy Mayor

This Environmental Report describes the last full year of our council term. It is evident from the report that brisk efforts have been made in matters related to climate and the environment. This is exactly what a city that knows its responsibility should do.

2020 was an exceptional year in many ways, which is also visible in the achievement of our objectives. Emissions decreased considerably from the previous year. A part of this decrease is due to the COVID-19 pandemic and the restrictions that reduced travel, while another part is due to the decrease in coal combustion. In the future, we must ensure that emissions will continue to decrease sufficiently quickly when life starts to return to normal. The closing of the Hanasaari power plant, the results of the Energy Challenge competition, and our work on the emissions from buildings and worksites are promising signs that we will succeed.

We are progressing towards sustainable mobility: in 2020, we decided upon the tram lines in western Helsinki and approved the Cycling Promotion Programme, which will help make cycling safer and more functional for as many people as possible in the future. New electric car charging points were put into service around the city.

In Helsinki, the COVID-19 pandemic and its restrictions have clearly shown how important local nature is to the city's residents. Last year, a record number of people spent time on our beaches and in our parks and forests. This increased the wear to some areas, which requires us to invest more in the areas' maintenance.

The implementation of the Nature Conservation Programme progressed. Four new nature reserves were established in Helsinki: Haltialanmetsä, which is now the largest nature reserve in Helsinki, as well as three small but extremely important bird islets. Biodiversity has been increased by means such as leaving more decaying trees in managed forests. The restoration of the bird wetlands of Helsinki received funding from the Helmi Habitats Programme. The significance of long-term nature conservation work manifested in a glorious manner when a pair of white-tailed eagles nested in our city for the first time. A total of three chicks hatched in the nest.

The exceptional year made our city quieter and our air cleaner as a result of the reduced amount of traffic. Many Helsinki residents took to bicycles and started undertaking more of their journeys on foot. The target for the proportion of sustainable modes of transport was met, although in an unexpected manner.

Helsinki's ambitious environmental work is strongly backed by the residents. Combatting climate change, safeguarding biodiversity and maintaining a green environment are what the residents of Helsinki themselves want.

In order to prevent moving from one crisis to another, we must look beyond the pandemic and continuously do our part in fighting the climate crisis and the diminishing of biodiversity. This is a challenge for the next City Council. In the next four years, Helsinki's climate work will take at least one leap forward with the closing of the Hanasaari coal power plant. And hopefully it is only one leap of many.

Anni Sinnemäki
Deputy Mayor for Urban Environment

Helsinki in a Nutshell

Helsinki is the centre of a rapidly growing large metropolitan city area. Helsinki, together with the municipalities of the Helsinki Metropolitan Area (Espoo, Vantaa, and Kauniainen) and eight neighbouring municipalities, forms an area with a population of over 1.5 million residents, which is referred to as the Helsinki Region. As of 31 December 2020 Helsinki had a population of 656,920. As of the end of 2020 the population density was 3,065.6 residents per land area square kilometre. The city of Helsinki's surface area is 715.48 km2, of which 213.75 km2 (29.9%) is land, 0.86 km² is inland waters, and 500.87 km² sea waters. The majority of the city's green areas are forest (45.9 km²), parks (9.25 km²) and landscape fields or meadows (10.7 km²). There were a total of 448,400 jobs in Helsinki in 2020. Helsinki accounts for 18 per cent of Finland's jobs.

In 2020, the global Covid-19 pandemic affected Helsinki significantly from both health and socio-economic perspectives. Although, the City survived the year 2020 relatively well economically speaking, the long-term consequences of the crisis will only become clear in the future. Especially the most vulnerable citizens are of concern. The crisis increased considerably the level of unemployment in the city as Helsinki's business demographics are strongly service-oriented. The pandemic also inhibited face-to-face meetings with Helsinki's international partners. Nevertheless, the city became increasingly active in international collaboration during the year 2020.

From an environmental impact's perspective, the City of Helsinki is one of the most significant actors at the Finnish scale. In Helsinki, greenhouse gas emissions resulting from energy consumption and other consumption account for approximately seven per cent of Finland's greenhouse gas emissions. The Viikinmäki wastewater treatment plant cleans the wastewater produced by approximately 800,000 people. Additionally, as Finland's largest employer, the City's operations have significant environmental impacts due to the volume of office work, for example.

The Helsinki Group comprises the following entities:

- The City as a parent entity (4 divisions, City Executive Office, Audit Department and 5 municipal enterprises).
- Subsidiary entities, i.e. organisation which are owned directly by the City (82 subsidiary organisations and 12 foundations).
- Associated entities, i.e. companies, foundations and joint municipal authorities in which the City has a 20–50 per cent ownership stake (38 associated companies and 6 joint municipal authorities).
- At the end of 2020, the City employed 39,152 people.

Environmental management and partnerships

Environmental matters are part of the City Strategy, which is supplemented by the City's environmental policy objectives for their part. By monitoring the environmental policy indicators set out in the Environmental Report, we are also partially monitoring the implementation of the City Strategy. In addition to the Environmental Report, comprehensive information on the state of the environment in Helsinki and the load on the environment can also be found in the City's environmental statistics. The Environmental Report and environmental statistics are open data.

Building and auditing of an EcoCompass is underway at numerous locations

The objective of the City's environmental policy is for City organisations to develop their environmental management by adopting environmental management systems or at least following their principles. An EcoCompass is a less formal environmental management system originally developed by the City for SMEs, and it has also been found to be a good fit for the environmental management of City organisations. In 2020, the EcoCompasses of the City of Helsinki Service Centre and Stara were audited and environmental management systems were being built at Pakila Work Centre, Helsinki Art Museum, Helsinki City Museum, Sports Services, Youth Services, Helsinki Biennial, Kannelmäki assisted living facility, the Social Services and Health Care Division and the Urban Environment Division.

Of the City's subsidiary communities, Kiinteistö Oy Helsingin Toimitilat and Helsingin asumisoikeus Oy HASO decided to adopt an EcoCompass, as did Seniorisäätiö sr at the end of the year. The environmental programme of Helsingin Toimitilat covers roughly 20 properties in Helsinki, such as health stations, educational institutions and daycare centres. Through HASO, more than 10,000 residents of Helsinki now live in a building for which an assessment of the environmental impacts of property management has been carried out and for which environmental objectives, measures and indicators have been set and regulator monitoring of the results has been agreed upon. The five nursing homes of the Seniorisäätiö foundation provide care for more than 500 residents. Social responsibility themes, such as well-being, safety and respect, are realised in the nursing work. With EcoCompass, the foundation's new sustainable development working group is able to systematically develop environmental responsibility as part of sustainable development.

The Urban Environment Division grants a 30 per cent discount on the rent charged for the use of its areas against an audited EcoCompass environmental management system in order to encourage events to use the system. Due to the coronavirus pandemic, hardly any events were held in 2020, but the City granted a discount to two events: Helsinki City Running Day and Great Beers – Small Breweries.

Eco-support activity is also active via remote connections

By the end of 2020, the number of eco-supporters working in the Helsinki Group was 1,172, of whom 265 were new additions. In 2020, there were a total of 31 municipalities, joint municipal authorities and other organisations operating in the national eco-support activity network coordinated by the City of Helsinki.

Due to the coronavirus pandemic, all eco-support training was held remotely in 2020. Based on the feedback given by eco-supporters, the online training proved to be functional, and some of the training will most likely continue to be provided online in the future. A total of 12 training sessions were held, with three of them being coaching sessions for new eco-supporters and the rest being further training and other events. As in previous years, some of the training was implemented in cooperation with the eco-support activity network of the Helsinki Metropolitan Area. Eco-support aid was granted for the development of sustainable commuting and sorting, among other things.

Cooperation with companies to promote responsible operating methods

Climate Partners, a cooperation network between the City of Helsinki and the business sector, continued its operations for the eighth year. Over the course of the year, climate knowledge and lessons about responsible practices were shared through Climate Partners events that focused on various themes. The network was also joined by eight new organisations: ESL Shipping Ltd, FCG Finnish Consulting Group Oy, Finlandia Hall Ltd, Gofore Plc, Keva, Korkeasaaren eläintarhan säätiö sr, Metso Outotec Corporation and Sodexo Oy. The network already encompasses almost 90 companies and organisations.

The Education Division has cooperated with the start-up company Tideal, which has developed a community-led climate challenge app for the Carbon-neutral Helsinki course of general upper secondary schools. Additionally, general upper secondary school guidance counsellors met up with representatives of companies involved in clean and smart business activity on a ‘working life date’. This meet-up allowed contacts to be established in order to open up traineeships for general upper secondary school students at companies that promote sustainable development.

One area of the responsibility programme completed in 2020 for Helsinki Marketing, a marketing company owned by the City of Helsinki, is supporting the responsibility work of interest groups. The objective is for the interest groups of Helsinki Marketing to be committed to the responsibility work in Helsinki and take concrete actions towards more sustainable solutions and choices. In 2020, all network events of the Helsingin tekijät (Operators of Helsinki) partnership network were held according to the Sustainable Meeting operating model developed by Helsinki Marketing, and the responsibility theme was included in the programmes of the network’s events and the annual Helsinki tourism seminar.

The Think Sustainably service that helps city residents and travellers make more sustainable choices on the MyHelsinki.fi website has been open to all service providers that meet the minimum requirements of the service criteria since the start of 2020. Helsinki Marketing continued the development of the Think Sustainably criteria with Demos Hel-

sinki. Based on the model for Helsinki, Visit Tampere set out to develop a similar service for Tampere. The Think Sustainably service was awarded the One of the Best Urban Designs of 2020 honourable mention in the Cities category of Fast Company's Innovation by Design Awards.

An extensive City-level working group participated in the reporting on sustainable development Helsinki is committed to promoting the global Sustainable Development Goals under the 2030 Agenda. In autumn 2020, the City launched a second City-level reporting round on sustainable development. An extensive City-level working group took part in the reporting, and the aim of the work was to identify themes in need of development and bring up concrete actions. The report was completed in May 2021.

Environmental management model of the City of Helsinki

The City Council has approved the City Strategy 2017–2021, which is a document that steers the City's operations. In 2012, the City Council also approved the City's environmental policy, which supplements the current City Strategy with regard to environmental protection. The environmental policy sets out the medium-term (2020) and long-term (2050) objectives for environmental protection. The environmental policy is currently being updated. The City's environmental policy objectives are implemented through environmental protection sub-programmes that include the following, among others:

- Carbon-neutral Helsinki 2035 Action Plan (City Board)
- Climate change adaptation policies for 2019–2025 (City Board)
- Noise Abatement Action Plan 2018–2022 (Environment and Permits Sub-committee)
- Air Quality Plan 2017–2024 (Environment and Permits Sub-committee)
- Baltic Sea Action Plan 2019–2023 (City Board)
- Helsinki's Nature Conservation Programme 2015–2024 (Environment Committee)

The City Board and the government have signed the Municipal Energy Efficiency Agreement 2017–2025 and the Action Plan of Rental Housing Communities in the Housing Property Sector 2017–2025, which is related to the Energy Efficiency Agreement of the Property and Building Sector. These set out the energy conservation target for the agreement period. The progress of the target is reported on an annual basis.

The City Board approves the instructions for drafting and following the budget, which include instructions on recording and taking environmental matters into account.

The City's divisions, enterprises and subsidiary communities implement the City Strategy and the City's environmental protection sub-programmes in their operations. Several of the City's divisions, enterprises and subsidiary communities have also adopted environmental management systems. Below is a list of the systems in use:

ISO 14001 environmental management system: Helsinki City Transport, Finlandia Hall Ltd, HELEN Ltd, Palmia Oy, Port of Helsinki Ltd.

EcoCompass environmental management system: City Library, Reaktori event, Environmental Youth Work Unit, Kinapori Senior Centre, Stara, City of Helsinki Service Centre, 11 subsidiary communities.

EcoCompass environmental management system being built: Urban Environment Division, Social Services and Health Care Division, Sports Services, Helsinki Biennial,

Youth Services, Kannelmäki assisted living facility, City Museum and Helsinki Art Museum, Pakila Work Centre, five subsidiary communities.

Green Office system: Education Division administration, three subsidiary communities.

Green Flag or OKKA certificate: 37 schools, daycare centres and upper secondary schools.

There are eco-supporters working in the City's divisions, enterprises and subsidiary communities who promote environmentally sustainable operating methods and increase environmental awareness on top of their own work.

The City's divisions and enterprises have the option of setting binding environmental objectives in the budget. In 2020, such objectives were set by the Urban Environment Division, Helsinki City Transport (HKL) and City of Helsinki construction services Stara.

The City's environmental work is reported on annually in the Environmental Report, which also monitors the environmental policy indicators. The Environmental Report is reviewed by the City Board and City Council.

Eyes on the future

In 2021, the City's environmental policy will be updated, networked environmental cooperation between various City operators will be strengthened and a plan will be prepared for the development of environmental reporting. Additionally, the City's environmental statistics will be revised in the coming years to better serve the various groups of users.

Climate protection

According to the City Strategy for 2017–2021, Helsinki will be carbon-neutral by 2035, and greenhouse gas emissions will be reduced by 60% by 2030. The Carbon-neutral Helsinki 2035 Action Plan was drawn up for the implementation of these targets. Climate protection is strongly associated with several themes of the Environmental Report, which is why it is also addressed in other chapters of this report.

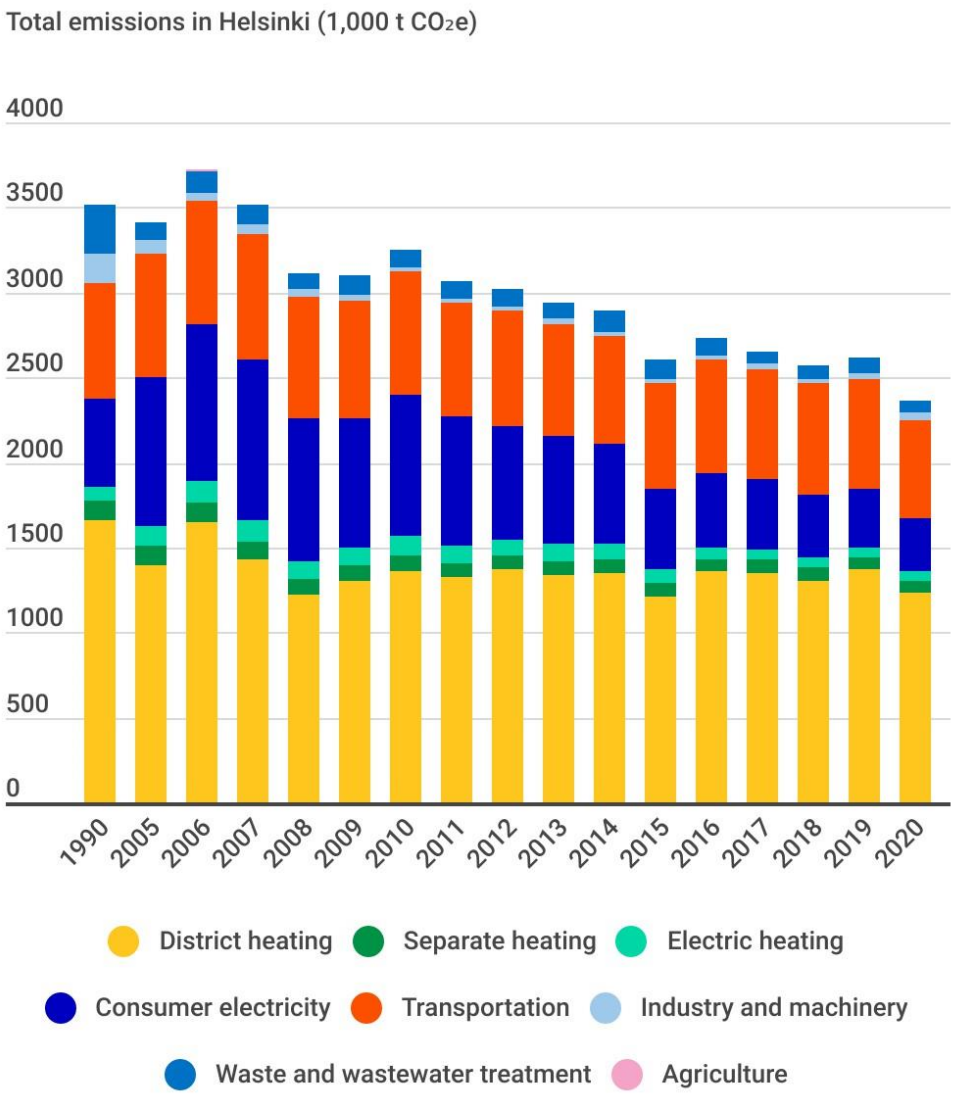
Total greenhouse gas emissions decreased

2020 was the warmest year on record in Finland. In Kaisaniemi, Helsinki, the annual average temperature was 8.7 degrees Celsius, which is 2.8 degrees higher than the temperatures in the comparison period of 1981–2010.

The total greenhouse gas emissions generated by residents, services and industry in Helsinki in 2020 amounted to 2,360,000 t CO2e, decreasing by 9% from the previous year. The decrease in emissions is partly due to the global COVID-19 pandemic, which significantly reduced travel and the energy consumption of workplaces. The key factor, however, was the specific emissions from Helen's district heat generation. They decreased significantly when the relative proportion of natural gas increased clearly while the use of coal decreased. This was for the most part due to a change in the prices of fuels, energy sold and emissions. The proportion of renewable district heat also increased as a result of investments. Compared to 1990, the total emissions in Helsinki were roughly 33% lower than in 1990. Calculated per capita, emissions decreased by 9%, reaching a record low of 3.6 tonnes, which is 50% lower than in 1990.

In 2020, the total consumption of energy in the entire urban area of Helsinki decreased by 2.5%, which is explained by the decrease in the amount of traffic and use of electricity during this exceptional year, as well as by the decrease in the energy consumption of oil heating.

More than half of Helsinki's direct emissions are generated from heating. Because of this, measures related to energy generation in particular are essential in climate change mitigation. Helen's investments in renewable energy will start to affect emissions from heating significantly during the 2022–2023 heating season.



Picture 1. The total greenhouse gas emissions in Helsinki in 2020 amounted to 2,360,000 t CO2e.

Downward trend in energy production emissions

In 2020, Helen Ltd was the first Finnish energy company to commit to the Business Ambition for 1.5°C campaign of the Science Based Targets project. The purpose of the campaign is to urge companies to set emission reduction targets that are in line with the 1.5°C target of the Paris Agreement.

Helen will stop using coal by 2029. With the measures in Helen's investment plan, the specific emissions from district heating will be some 80 g CO_2/kWh in 2025, approximately 40 g CO_2/kWh in 2030 and some 35 g CO_2/kWh in 2035. The current emission level has been approximately 200 g CO_2/kWh.

Renewable energy accounted for 14% of the energy produced by Helen in 2020. Energy was produced with hydropower, wood pellets, wind power and solar power, as well

as with heat pumps by using various surplus energy flows. For more information on Helen's other measures and investments aimed at reducing emissions from energy generation, see the chapter 'Energy efficiency' in this report.

The City looked for solutions to Helsinki's heating challenge through a competition

In March 2020, the City launched the international Helsinki Energy Challenge competition. The goal of the competition was to find new innovations, technologies and solutions with which the coal used in Helsinki's heating can be replaced in an ecologically and economically sustainable way. The competition received a total of 252 proposals from 35 countries. Ten interdisciplinary and international teams made it to the competition's finals in November 2020. An international, independent jury of experts chose the competition's winners, who were announced in March 2021. The elements highlighted in the winning teams included decentralised solutions based on renewable energy, heat pumps and the participation of new operators in heat generation. Helsinki Energy Challenge sought solutions not only to Helsinki's heating challenge but to the energy issue on a global scale as well. Accordingly, Helsinki is committed to openly sharing the results of the competition.

Regional geothermal heat solutions are promoted

As part of the background materials for the update to Helsinki's underground city plan, the City conducted a survey in 2020 on the principles of local geothermal heating solutions in land use planning and implementation. A local geothermal heating solution refers to the shared energy generation solution of several properties. The City wants to encourage the use of local geothermal heating solutions, as geothermal heating must be promoted by all means available in order to achieve the goal of geothermal heating accounting for 15% of all heat generation in Helsinki by 2035.

Climate targets for Helsinki's building stock are implemented ambitiously

In addition to reducing emissions from heat generation, the absolute amount of heat consumption must be reduced. So far, energy efficiency measures have successfully cut the growth in consumption resulting from the growth of the city, but in the future it must be possible to cut consumption in a situation in which the city keeps growing.

The City has set an unprecedentedly strict energy programme for its own buildings, both new and existing ones. In addition to energy efficiency, local generation of renewable energy is also being increased in buildings. For more information on the targets and measures for the City's own building stock, see the chapter 'Energy efficiency' in this report.

Plot conveyance terms can be used to influence the energy efficiency of new buildings and promote their energy conservation and generation. Helsinki has long been using energy efficiency requirements stricter than the national standard in the plot conveyance terms concerning apartment building plots. In 2020, the plot conveyance terms were tightened further, requiring apartment building plots to meet the requirements set for energy efficiency class A2018 in such a way that the E value is equal to or below 75 kWhE/(m^2 year).

In privately owned buildings, the plan is to expedite energy renovations with the Energy Renaissance operating model, which is one of the key measures of the Carbon-neutral Helsinki Action Plan. Completed in 2020, the Energy Renaissance operating model is aimed at reducing the amount of heating energy by several dozen per cent in Helsinki's entire building stock by 2035. At the start of 2021, an Energy Renaissance team started working in the City's Building Control Services. It provides housing companies with information on various energy solutions or helps them put surveys out to tender, for example.

The 'Energy-efficient housing companies through local cooperation' project is a joint project for the Helsinki Metropolitan Area that is coordinated by Helsinki and focuses on improving the energy efficiency of housing companies. The project establishes local cooperation forums, called housing company clubs, for housing companies in the cities. The areas of Helsinki participating in the project include Lauttasaari, Myllypuro, Mellunmäki, Pihlajisto and Kannelmäki. The project is funded by the Ministry of the Environment as part of the municipal climate change solutions programme. The experiences gained from the project will be utilised in Energy Renaissance activities.

In the Climate-friendly Housing Companies project coordinated by Helsinki, solutions were sought to improve the energy efficiency of apartment buildings using digital services and solutions based on housing company data. Based on information obtained from the project, a digital guide for housing companies was published in the spring of 2020. The guide provides information on topics such as the benefits and requirements of digitalisation, as well as practical instructions for implementing various digital solutions in housing companies. The duration of the project was from September 2018 to December 2020.

Low-carbon principles are also taken into account in area construction

To promote low-carbon construction, Helsinki launched the 'Verkkosaari low-carbon green block' plot conveyance competition, in which the carbon footprint, E value and green factor are weighted at 50% of the plot conveyance criteria. The competition entries were submitted in April 2021. A plot conveyance competition in a good location can be used to assess how high the targets related to the criteria can be set in the future and how these key criteria affecting carbon neutrality can be realised at the same time.

In the planning of the Western Boulevard City (Vihdintie) of Helsinki, ways to build the new city structure in a climate-smart manner are being looked into. In addition to the energy efficiency of the buildings and the generation of renewable energy, the planning will take into account emissions from construction and materials as well as the carbon reserved in the materials. The plan is to require approximately half of the residential blocks to be wood-framed. Conducted by Granlund Oy, a survey was commissioned about the area's carbon-neutral energy system. According to the survey, a significant proportion of the energy required in the area could be generated with renewable energy and by utilising waste heat. Building a low-temperature heat network in the area would improve their profitability. The survey results will be utilised in further planning of the area.

Efforts to reduce emissions from ground preparation prior to construction

There are several significant construction projects underway in Helsinki, and low-carbon construction has been set as the target level for area construction in Kuninkaantammi and the former Malmi airport, among other areas. In these areas, special attention has been paid to climate-smart approaches in the planning of ground preparation and foundation engineering. In spring 2020, a stabilisation test was carried out in Kuninkaantammi on binders that are based on recycled materials as part of the UUMA3 project. The emissions from the binders used in the stabilisation test in Kuninkaantammi were found to be 15–36% of the CO_2e emissions generated by a traditionally used lime-cement binder mixture. It has been estimated that approximately 95% of the emissions from the foundation structures and foundation reinforcements of the infrastructure in the area of the former Malmi airport are generated by the manufacturing and transport of deep stabilisation binders if a traditional lime-cement binder mixture is used. In order to reduce emissions from ground preparation, the City launched a survey to find lower-emission and more cost-effective solutions for ground preparation in the Malmi airport area. With alternative solutions, the carbon emissions may even be less than a third of the level mentioned above.

Worksites are becoming emission-free

The City of Helsinki is very determined to reduce the negative impacts of construction sites on city residents. The machinery used at construction sites and heavy transport vehicles related to construction generate emissions that account for a considerable proportion of the carbon dioxide emissions of cities and municipalities, and they also generate noise, dust and local emissions that worsen air quality and are harmful to health. The negative effects of worksites are highlighted in a densely built environment. Reductions in emissions are particularly sought by trying to increase the use of emission-free and low-emission machinery and transport vehicles in construction projects.

In 2020, these efforts progressed considerably when the first low-emission infrastructure construction site pilots were launched in the summer, and in September Helsinki and six other public procurers signed a voluntary Green Deal agreement on reducing emissions from worksites.

The objective of the Green Deal agreement on emission-free construction sites is for worksites to abandon fossil fuels entirely by 2025. Additionally, at least 50% of the machinery used at worksites and worksite transport vehicles will be powered by electricity, biogas or hydrogen by 2030. Worksite emissions covered by the agreement include emissions from machinery, electricity and heating as well as transport vehicles in stages.

In 2020, Stara managed to gather experiences from several low-emission infrastructure contracts, and it has been decided that the criteria for low-emission worksites will continue to be applied to all street projects in the city in the future. The City-level execution of the Green Deal agreement was started by preparing interim targets for each contract type for the coming years. Closer criteria work will also be continued in the form of Green Deal cooperation in the building construction and maintenance working groups.

Emission-free worksites were also promoted in the Ecosystem for Zero Emission Construction Sites (E-ZEMCONS) project funded by EIT Climate-KIC with the help of cooperation and market dialogue between European cities. The duration of the project was from January 2020 to December 2020.

Many development projects are underway in building construction

In 2020 and at the start of 2021, the Re-thinking Urban Housing working group supported the addition of seven projects to the Re-thinking Urban Housing programme. These projects implement the City Strategy and the Carbon-neutral Helsinki 2035 Action Plan in particular. They will be launched once the City Board has decided on the plot. The themes of the projects include various wood construction techniques, the visibility of wood on the interior surfaces of buildings, increasing natural values in wood construction, new urban infill solutions and the adaptability of dwellings, as well as the lifecycle, among other things. At the start of 2021, one new project of the Re-thinking Urban Housing programme, called 0-CO_2 Block, received a plot in Kalasatama. The project's theme is carbon neutrality and comfort of living. According to a follow-up report completed about the 'Comparison of wood and concrete construction' project, the carbon footprint of a wood-framed apartment building was smaller than that of a concrete-framed apartment building in all phases, including the design and construction phase and after the buildings were put into service.

Two different projects in Kalasatama in Helsinki are trying to achieve a positive energy level. A positive energy level means that the properties generate more energy than they need. In the innovative project by Helsinki's housing production, radiant heat from the sun is captured and stored in a district cooling network or utilised directly on the property with the help of a heat pump. Geothermal heat is utilised alongside district heating, and electrical energy is generated with solar panels. Additionally, the building's stairwells are installed with smart glass that allows the amount of cooling and heating energy needed to be adjusted.

The second project is Helsinki's EXCESS building, which is part of a larger European project that seeks solutions for different climate zones. The project receives funding from the EU's Horizon 2020 research and innovation programme. The project combines existing individual technologies and local renewable energy generation, in addition to developing new products and integrating them into a full system.

Helsinki has encouraged builders to practice energy-efficient construction and renewable energy generation by giving discounts on permit fees. Solar panels and the pipes of heat recovery systems have also been released from the obligation to apply for a permit in many respects.

Traffic emissions are reduced by many means

In accordance with the Carbon-neutral Helsinki 2035 Action Plan, the transport sector is pursuing a 69% reduction in greenhouse gas emissions (2005–2035).

The emission reductions of traffic are realised by means such as increasing the popularity of cycling and walking and by increasing the percentage of electric cars, electric buses and rail-based public transport. The Carbon-neutral Helsinki Action Plan includes 30 measures pertaining to transport and traffic. For more information on the promotion of sustainable transport and mobility, see the chapter 'Transport' in this report.

Projects speed up development work

The mySMARTLife project moved on to the project monitoring phase and the implementation of lessons learned. The Helsinki sub-project and its partners saw the pilot containing an autonomous bus trial through to the end and assessed its potential for achieving the carbon neutrality target in the transport sector. In addition to gathering indicators of energy and traffic emissions, the project carried out an assessment by means of an interview survey with the participants in the Merihaka sub-project. Additionally, the project developed an open energy data interface for properties and took part in finishing the Energy Renaissance operating model. The duration of the project is from December 2016 to November 2021. The mySMARTLife project is part of the Horizon 2020 programme, which tries out new innovative and smart city energy solutions and promotes their entry into the market. The cross-cutting theme is the integration of open data and smart information and communications technology into the measures. The goal in the target areas is to reduce energy consumption by 10–20%.

The objective of the Six City Strategy project 'Carbon neutral and resource-wise industrial areas' (HNRY), coordinated by the City of Helsinki, is to develop the industrial areas and worksites of the Cities of Helsinki, Vantaa, Espoo and Turku to be carbon-neutral. Conceptualisation and piloting of operations in the project's target areas promotes methods of reducing emissions from machinery and heavy traffic, enhancing the utilisation of materials and speeding up carbon-neutral business by companies. The lessons learned and operating models created as a result of cooperation between companies, cities and research institutes will be extensively offered for utilisation by various operators through the project's final output. The duration of the project is from May 2019 to May 2021. Helsinki has two focus areas in the project: participation in the conceptualisation of emission-free worksites and the climate work at Vuosaari Harbour.

Indirect emissions roughly double Helsinki's emissions

In addition to the emissions generated in the Helsinki area, it is important to examine the area's indirect emissions, as they roughly double Helsinki's emissions. Indirect emissions refer to the emissions generated from the creation of services and products that are used in Helsinki but produced elsewhere. The greatest sources of emissions are construction materials and food production. The City has reduced emissions from food production by means such as setting the goal for food services that the City organisation must reduce the amount of meat and dairy products it offers by half and reduce food waste. Efforts are being made to reduce emissions from construction materials by means such as examining opportunities to regulate carbon emissions from construction products or favouring recycled materials. One key method of reducing indirect emissions from construction is to favour wood construction. There are opportunities available for reducing indirect emissions systematically and effectively in public procurement, for example.

Climate Watch has proven to be a functional tool

Helsinki's Climate Watch service, which is based on open source code and used to monitor the Carbon-neutral Helsinki 2035 Action Plan, expanded to several Finnish cities, such as Lahti and Tampere. The platform developed for Climate Watch was also utilised in other programmes of the City, such as the Roadmap for Circular and Sharing Economy (Kiertotalousvahti (Circular Economy Watch)) and the Exercise and Mobility Scheme Project (Liikkumisvahti (Physical Activity Watch)). In relation to the scenario

tool being developed as part of Climate Watch, a quick trial was carried out in June in cooperation with Siemens Oy and Kausal Oy on the impact of the pricing of parking facilities and the promotion of electric cars on achieving the emissions target.

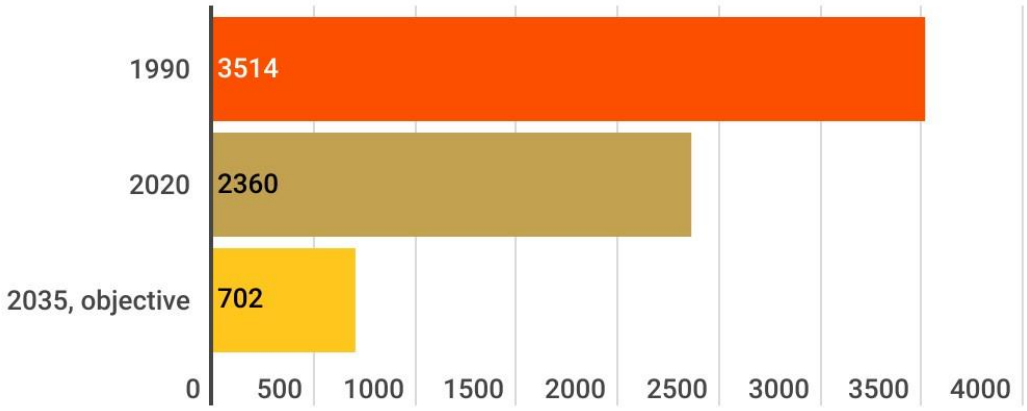
Eyes on the future

The plan is to update the Carbon-Neutral Helsinki Action Plan during the City Council's next period of office. The updating process is intended to start when the new City Council takes up its duties.

As a continuation to the Helsinki Energy Challenge, the City has set out to prepare an energy vision for the City. This work will also involve external experts.

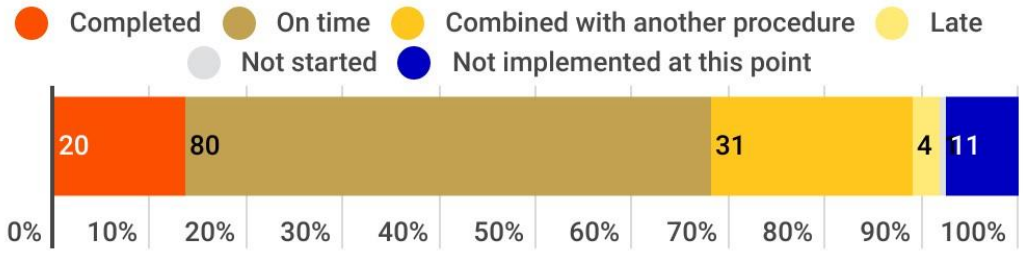
Additionally, the monitoring of emission reductions will continue to be developed in the future. The aim is to establish a clearer connection between the measures and their effects on emissions and develop their visualisation. Through monitoring, the aim is to gain a better big picture of the extent to which the measures are sufficient in relation to the carbon neutrality target.

Emission situation in Helsinki, kt CO2e



Picture 2. Helsinki must reduce its emissions by 1658 kilotonnes of CO2 equivalent from 2020 to 2035 in order to achieve carbon neutrality, an 80% reduction compared to the year 1990.

State of Carbon-neutral Helsinki 2035 procedures on 30 April 2021



Picture 3. The majority of the Carbon-neutral Helsinki 2035 measures progressed on time in spring 2021, and 20 measures had already been completed.

Key measures

State of Carbon-neutral Helsinki 2035 procedures on 30 April 2021

Energy-efficient construction

The City has set strict objectives for its own construction:

- In 2020, the required E value of service building projects was 20% stricter than the national requirement. An energy efficiency requirement was also set for the building improvement projects implemented by the City. It requires that the E value of the service buildings improves by at least 30% in conjunction with a building improvement project.
- The goal for both new construction and building improvement projects is that an amount of electricity equivalent to approximately 10% of the purchased electricity will be produced with solar power if the system is economically viable.
- Reductions in emissions are sought by trying to increase the use of emission-free and low-emission machinery and transport vehicles in construction projects.

Related to private construction projects:

- The requirement of energy efficiency class A was included in the plot conveyance competitions and terms of general plot reservation rounds in 2020.

Transport

- The emission reductions of traffic are realised by means such as increasing the popularity of cycling and walking. Helsinki's Cycling Promotion Programme 2020–2025 was approved in 2020.
- The percentage of electric cars, electric buses and rail-based public transport is increased. There are some 200 public electric car-charging points in Helsinki, of which 58 were put into service at the start of 2020. Helsinki promotes the adoption of electric buses by implementing charging stations at the terminal points of routes.

Heating

- The goal of the international Helsinki Energy Challenge competition was to find new innovations, technologies and solutions with which the coal used in Helsinki's heating can be replaced in an ecologically and economically sustainable way.
- Significant measures taken by Helen in 2020 included increasing the power of the Katri Vala heat pump plant and heat recovery from the internal cooling water circulation at the Salmisaari power plant.

Ikoner: The Noun Project: Byggande: Tippawan Sookruay, Elbil: Christian Jackson, Uppvärmning: ProSymbols

Picture 4. Measures of the Carbon-neutral Helsinki 2035 Action Plan that are related to energy-efficient construction, transport and heating in particular were promoted in 2020.

Adaptation

Adapting to climate change refers to the means of reducing the detrimental effects of climate change and utilising the benefits. According to the City Strategy, ‘Helsinki is a functioning, safe and Adapting to climate change refers to the means of reducing the detrimental effects of climate change and utilising the benefits. According to the City Strategy, ‘Helsinki is a functioning, safe and comfortable city’. Part of this safety is preparedness for the direct and indirect effects of climate change.

Helsinki has assessed the weather and climate risks concerning the city. The city’s key climate risks are stormwater floods caused by heavy rain, inland floods, slipperiness, extreme and abnormal winter conditions, depression symptoms caused by prolonged darkness, heat waves, drought and the eutrophication of the Baltic Sea.

Picture 5. A stormwater structure in Honkasuo, photograph by Pertti Nisonen.

Climate change adaptation policies – a key climate risk management programme

One key programme in managing the city’s climate risks is Helsinki’s climate change adaptation policies 2019–2025, which were approved by the City Board in May 2019. The vision of the policies is ‘Climate-proof Helsinki in 2050’. The adaptation measures are included in the City’s planning and guidance, including city planning, preparation and preparedness planning, the Stormwater Management Programme and the programmes for green area development and nature conservation and management.

Progress of Helsinki's climate change adaptation policies 2019–2025 in 2020

- One of the key starting points of Helsinki's Stormwater Management Programme is climate change adaptation. Several of the programme's measures promote adaptation for their part. Among the measures that progressed in 2020 were the development of stormwater data management and planning tools and plan regulations concerning stormwater as well ascatchment area specific stormwater plans.
- The green factor method is used to create green, comfortable and climate-proof plots in the increasingly dense urban structure, which also promotes the climate change adaptation of urban areas. A plot-specific green factor is used widely in detailed planning. Reviews of the regional green factor have been carried out in the areas of Hermanninranta and the centre of Malmi.
- In 2020, the following surveys were conducted on the effects of climate change and preparedness for them: a survey on the cooling of buildings pertaining to the Social Services and Health Care Division and a survey commissioned by the Urban Environment Division on the effects of climate change on future snow conditions in Helsinki.
- In autumn 2020, the dataset on the Helsinki Metropolitan Area land cover was completed. Its classification divides the land area of the Helsinki Metropolitan Area and Kirkkonummi into impermeable surfaces, green surfaces, outcrops, bare soil and water areas.
- Another survey completed in autumn was the joint survey on carbon sinks and reservoirs that was conducted in the Helsinki Metropolitan Area based on geographical information. The survey also compiled information on the region's green structure.
- The website 'Helsinki's climate actions' was put into service. Adaptation has its own section on the website.
- Projects:
    - The Virtual Verdure project ended in spring 2020. The project created new green infrastructure tools that allow the needs of the city and its residents to be reconciled in planning.
    - The B.Green project partly continues the work started in the Virtual Verdure project and also creates new green infrastructure solutions and digital tools related to these solutions to support city planning. The project will create a participatory city planning model that will help green infrastructure solutions to be applied widely.
    - The CHAMPS project will update the survey of climate-related social vulnerability that was carried out in the Helsinki Metropolitan Area in 2015. The project was launched in autumn 2020.
- As part of Sitra Lab's Nature-based Solutions Programme, a green retrofitting survey was carried out on two block yards of the Helsinki City Housing Company in Länsi-Pasila, and methods suitable for green retrofitting were mapped. Green retrofitting refers to the repair and improvement of existing block yards and residential areas with the help of green structure and natural solutions. The objective is to improve stormwater management and climate resilience and strengthen urban nature. One important part of this is increasing the comfort and well-being of the residents as well as communal spirit.

Helsinki is preparing a Sustainable Energy and Climate Action Plan

Helsinki joined the Covenant of Mayors for Climate and Energy in December 2018. In relation to this climate initiative, Helsinki is preparing a Sustainable Energy and Climate Action Plan

(SECAP) by gathering the programmes required for this undertaking together: the Carbon-neutral Helsinki 2035 Action Plan, Helsinki's climate change adaptation policies 2019–2025, as well as climate risk and vulnerability assessments. SECAP will be drafted by the end of March 2021.

Nature-based solutions yield many benefits

Helsinki promotes and adopts natural solutions in stormwater management and cooling of the city structure's microclimate. The Kuninkaantammi area is a pilot site where stormwater is managed with nature-based solutions and the green structure creates a comfortable and climate-proof living environment. In addition to stormwater management and climate change adaptation, natural solutions also produce many other benefits, such as recreational opportunities and a more verdant living environment.

Helsinki's Stormwater Management Programme promotes systematic and sustainable overall stormwater management. Stormwater is the rain and melted water in built areas that is led away from the ground, roofs of buildings or other such surfaces. The stormwater working group, which monitors the Stormwater Management Programme and comprises experts of the City, released its first report on the implementation of the programme in 2020. The report examined the measures completed between 2019 and 2020 and identified needs for development, such as quality control of stormwater and building an operating model for the City's stormwater management. Stormwater carries harmful substances and nutrients with it to water bodies and the Baltic Sea. In 2020, planning was carried out for the implementation of quality monitoring of the stormwater channelled into the stormwater filtration structure located in Taivallahti and the treatment efficiency of the filtration structure. This monitoring will start in summer 2021.

Eyes on the future

Monitoring climate change adaptation is important in order for the effectiveness of the measures to be assessed and the preparedness and adaptation measures to be targeted and prioritised. The vulnerability of residents and the environment to the consequences of climate change must be reduced, and understanding of and information on groups and habitats sensitive to climate change must be increased. The city must be built in such a way that it meets the requirements of the changing climate, and climate security must be strengthened. Above all, this means preparing for extreme weather phenomena and adapting to a long-term climate change.

Energy efficiency

The production and consumption of energy play significant roles in achieving the carbon neutrality target. The consumption of district heating accounts for 53% of the CO2 emissions of the entire city (urban area), while electricity consumption accounts for 16%. The CO2 emissions of the Helsinki Group account for 14% of the emissions of the entire urban area. Of this percentage, 95% is caused by the energy consumption of buildings.

Helsinki's energy conservation work is based on the Carbon-neutral Helsinki 2035 Action Plan as well as energy conservation plans prepared by the City's divisions, enterprises and subsidiary communities. Helsinki has been involved in the energy efficiency agreements (KETS) made between municipalities and the Ministry of Economic Affairs and Employment since 1993. These agreements are used to implement the measures required by the national energy and climate strategy at the municipal level. For more information on the City's energy efficiency work, see the helsinginilmastoteot.fi/en/ website.

More energy-efficient construction than the national requirement

For several years, it has been required for the City's own new buildings to be made more energy-efficient than the national requirement. In 2020, the required E value of service building projects was 20% stricter than the national requirement. At the beginning of 2020, an energy efficiency requirement was also set for the building improvement projects implemented by the City. It requires the E value of the service building to improve by at least 30% in conjunction with a building improvement project. This requirement is 10 percentage points stricter than the national requirement.

The goal in both new construction and building improvement projects was still for an amount of electricity equivalent to approximately 10% of purchased electricity to be produced with solar power if the system is economically viable. In new buildings, geothermal heat was selected as the primary form of heat generation if it was possible to implement and economically viable based on a survey conducted during the project planning phase. In building improvement projects, changing the heating method from district heating to geothermal heating, for example, was still considered on a case-by-case basis.

Energy consumption causes considerable carbon dioxide emissions

The City accounted for 13% of the consumption of electricity, 17% of the consumption of heat and 3% of the consumption of district cooling in the entire Helsinki urban area. The properties owned by the City rarely use separate heating; they are mainly heated using district heating, meaning that the emissions from energy production are generated by centralised energy production.

The energy consumption and CO2 emissions of the Helsinki Group in 2019 and 2020 are presented in the table below. The Helsinki Group's CO2 emissions decreased by 18%, while energy consumption decreased by 10% from 2019. The decrease in CO2 emissions is partly explained by the decrease in Helen Ltd's emission factors for electricity and district heating, which were used in the calculation.

Tables 2-7. Energy consumption and CO2 emissions of the Helsinki Group in 2019 and 2020.

Premises (owned by the City)	**GWh, 2019**	**CO_2 kilo-tonnes, 2019**	**GWh, 2020**	**CO_2 kilo-tonnes, 2020**	**GWh change%, 2019-2020**	**CO_2 change%, 2019-2020**
Electricity	185	53,8	190	47,0	3 %	-13 %
Cooling	2,09	0,04	2,67	0,00	28 %	>100 %
District heating	374	76	329	61	-12 %	-19 %
Total	**562**	**129**	**521**	**108**	-7 %	-16 %

Premises, Other (subsidiaries)	**GWh, 2019**	**CO_2 kilo-tonnes, 2019**	**GWh, 2020**	**CO_2 kilo-tonnes, 2020**	**GWh change%, 2019-2020**	**CO_2 change%, 2019-2020**
Electricity	231	67,0	205	50,6	-11 %	-25 %
Cooling	2,77	0,05	2,32	0,00	-16 %	>100 %
District heating	877	177	782	146	-11 %	-17 %
Total	**1111**	**244**	**989**	**197**	-11 %	-19 %

Outdoor lighting, traffic lights	**GWh, 2019**	**CO_2 kilo-tonnes, 2019**	**GWh, 2020**	**CO_2 kilo-tonnes, 2020**	**GWh change%, 2019-2020**	**CO_2 change%, 2019-2020**
Outdoor lighting, electricity	43,9	12,74	42,8	10,58	-3 %	-17 %
Traffic lights, electricity	1,24	0,36	1,18	0,29	-5 %	-19 %
Total	**45,2**	**13,10**	**44,0**	**10,87**	-3 %	-17 %

Public areas	**GWh, 2019**	**CO_2 kilo-tonnes, 2019**	**GWh, 2020**	**CO_2 kilo-tonnes, 2020**	**GWh change%, 2019-2020**	**CO_2 change%, 2019-2020**
Electricity	3,15	0,91	3,25	0,80	3 %	-12 %
District heating	2,40	0,48	1,34	0,25	-44 %	-48 %
Total	***5,55***	***1,40***	***4,59***	***1,05***	-17 %	*-25 %*

Traffic	**GWh, 2019**	**CO_2 kilo-tonnes, 2019**	**GWh, 2020**	**CO_2 kilo-tonnes, 2020**	**GWh change%, 2019-2020**	**CO_2 change%, 2019-2020**
Metro traffic, electricity 100% renewable	69,6	0,0	65,0	0,0	-7 %	
Tram traffic, electricity 100% renewable	29,1	0,0	25,1	0,0	-14 %	
Ferry traffic, fuel energy	6,73	1,74	6,64	1,71	-1 %	-1 %
Total	***105***	***1,74***	***96,7***	***1,71***	-8 %	*-1 %*

Vehicles and machinery	**GWh, 2019**	**CO_2 kilo-tonnes, 2019**	**GWh, 2020**	**CO_2 kilo-tonnes, 2020**	**GWh change%, 2019-2020**	**CO_2 change%, 2019-2020**
Vehicles and machinery	20,2	5,2	17,6	4,1	-13 %	-21 %

	GWh, 2019	**CO_2 kilo-tonnes, 2019**	**GWh, 2020**	**CO_2 kilo-tonnes, 2020**	**GWh change%, 2019-2020**	**CO_2 change%, 2019-2020**
Total	***1849***	***395***	***1673***	***323***	*-10 %*	*-18 %*

The CO_2 emissions for 2020 have been calculated by using the emission factors of Helen Ltd, which are the following:

- District heating 187 g/kWh
- Electricity 247 g/kWh (Factor for 2019, the factor for 2020 is not available)
- Cooling 0 g/kWh

The CO_2 emissions for 2019 have been calculated by using the emission factors of Helen Ltd, which are the following:

- District heating 202 g/kWh
- Electricity 290 g/kWh (Factor for 2018, the factor for 2019 is not available)
- Cooling 18 g/kWh

In 2020, the majority of emissions (95%) were caused by the energy consumption of properties. Due to the updating of reporting practices and consumption monitoring systems, the 2019 and 2020 data on the energy consumption and CO2 emissions of properties is not comparable to the data on previous years. Product-specific emission factors for energy products were utilised in the emissions calculation for 2020. For the time being, properties' green electricity contracts have not been taken into account in calculations.

The district heating consumption of both properties and public areas decreased by 10% from 2019 due to a relatively warm winter. Faults were detected in de-icing equipment in 2020, which also lowered the district heating consumption of public areas for its part. The district cooling consumption of service buildings increased due to the increased number of cooled sites. The electricity consumption of outdoor lighting and traffic lights has continued to decrease thanks to systematic energy efficiency measures.

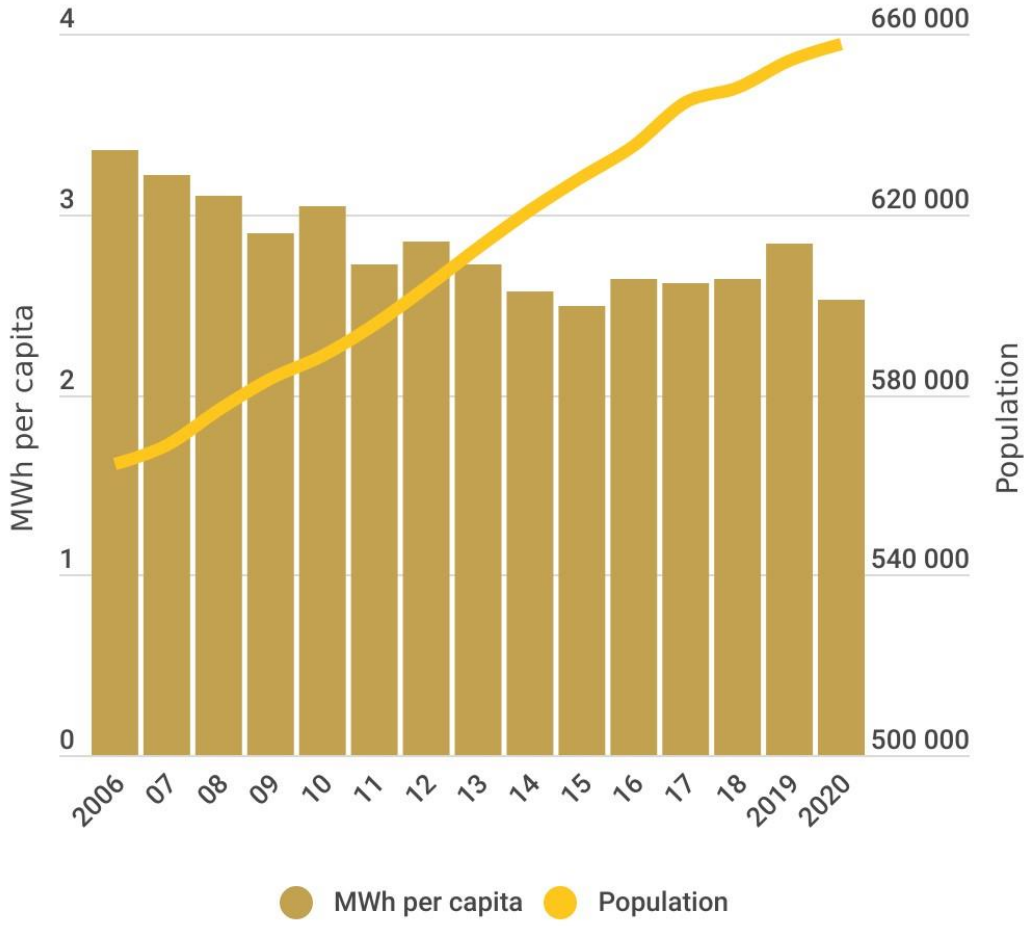
The energy consumption of metro and rail transport decreased by almost 10% from 2019 due to changes caused by COVID-19 in transport arrangements as well as the use of a driver advisory system (DAS).

District heating accounted for 66% of the City's total consumption (1,122 GWh), while electricity accounted for 32% (532 GWh), cooling accounted for 0.3% (5.0 GWh) and fuels accounted for 1.4% (24.2 GWh).

Per capita energy consumption continues to decrease

The per capita energy consumption of the City's own operations has decreased by 11% from 2019. The graph below shows the trends in the per capita energy consumption of the City's own operations for the last 15 years. During the period in question, per capita energy consumption has decreased by 25%. The energy consumption data for 2019 and 2020 is more comprehensive than in the reporting system used from 2006 to 2018, which is why in reality the reduction achieved in per capita energy consumption during the period examined is greater than presented

here.



Picture 6. The development of the per capita energy consumption in the City of Helsinki's own operations and the population of the city in 2006–2020.

Closer consumption monitoring and emissions calculation

The properties under the direct ownership of the City have been connected to the Nuuka system, and their energy consumption is monitored on an hourly basis. The Nuuka system covers approximately one third of the energy consumption of the Helsinki Group's properties. The energy consumption of Helsinki City Housing Company Heka accounts for approximately 56% of the consumption of the Helsinki Group's properties. The energy consumption of the buildings owned by Heka is monitored on a monthly basis. Heka's building electricity has been generated 100% by renewable energy sources since 1 September 2020, which will be taken into account in emissions calculation in the coming years.

The consumption data for the entire Helsinki Group is obtained from Helen Ltd's information system, from which it is retrieved based on a property's connections. Consumption is reported as the total consumption of the locations of use. The list of properties is based on Facta, the building register of Helsinki, from which the properties belonging to the Helsinki Group were picked. The reporting practice deviates from the previous years for 2019 and 2020.

Approximately 41% of the energy conservation target has been achieved

Helsinki is committed to an energy conservation target of 61 GWh in the municipal energy efficiency agreement (KETS), while subsidiary companies of the City that own rental apartments are committed to an energy conservation target of 55.7 GWh in the energy efficiency agreement for rental apartments (VAETS) during the contract period 2017–2025. The contractual obligations are implemented with energy conservation measures, the energy conservation effects of which are reported to Motiva annually.

By the end of 2025, the total energy savings achieved by the known energy efficiency actions (KETS + VAETS) of the City will have amounted to approximately 48 GWh, which is approximately 41% of the total conservation target for the entire contract period. The assessment of the effects of more energy-efficient construction than the national requirement in new and renovation construction is partly still in progress, so the energy conservation effects of all projects have not been taken into account in the reported measures.

Measures for improving energy efficiency

The piloting of the service building lifecycle management model that compiles the City's targets and instructions was continued in 2020 by updating the targets and monitoring report. The preparation of corresponding targets for building improvement projects and the worksite phase is also underway.

In spring 2020, a tender procedure was carried out for a framework agreement on lifecycle planning in building construction projects for the Buildings and Public Areas service entity. This framework agreement makes it possible to obtain top-class expertise in energy and heat pumps, as well as carbon footprint calculation, for future projects. The purpose of lifecycle planning is to ensure that the City's energy efficiency and low-carbon targets will be taken into account in all construction projects of the City.

Planning guidelines promoting energy efficiency and increased use of renewable energy in construction projects were published in 2020. A method was also developed for taking the lifecycle carbon footprint and costs into account in the early stages as part of a service premises network survey, and a process description was formed about the integration of carbon footprint calculation into the lifecycle management of facility projects. Lifecycle carbon footprint calculation is included in the lifecycle planner's duties in all new service building projects. Completed carbon footprint calculations are being compiled into an information bank to support target setting and design control.

The City will install solar power stations in connection with new and renovation construction projects, and as separate investments on existing properties. Surveys related to the profitability of solar power systems were continued in 2020. New solar power systems were installed in service buildings, for a total of 365 MWh. The largest of them in terms of electrical power is Liikuntamylly (380 kWp). The City's subsidiary companies also invested in solar power in 2020. For example, the Port of Helsinki has new solar power systems in Vuosaari and the West Harbour. Their total annual output is 145 GWh.

Every year, Heka procures solar power stations and three exhaust air heat pumps for five locations. The number of Heka's electric car charging points exceeded 100 in 2020. Heka has set the achievement of the VAET targets as a performance bonus criterion,

which has enhanced the implementation of energy efficiency measures and reporting for its part.

In 2020, the features and use of the smart property data platform called the Nuuka system were developed, and issues related to the quality of data were sorted out. The system's hourly energy consumption monitoring covers the service properties under the direct ownership of the City, for a total of over 600 properties. Additionally, data sources related to the properties, such as sensors verifying indoor conditions, were integrated into the Nuuka system. The building automation systems of a little over 20 locations were integrated into the Nuuka system. This allows various control processes to be adopted to optimise the indoor conditions and energy efficiency. The goal is to integrate the building automation systems of a few hundred locations into Nuuka in the coming years.

Various trials and development work to utilise data collected from properties were continued in 2020 to ensure the indoor conditions of properties and the functionality of building services systems and to join the electricity demand response market, but no actual results were achieved for the time being due to COVID-19 restrictions imposed on the use of buildings. For more information on projects and trials, see the helsinginilmastoteot.fi/en/ website.

In energy generation, investments were made in solutions that reduce emissions Together with district heating and district cooling, which is seeing rapid growth, cogeneration of electricity and heating forms the basis of an energy-efficient energy system in Helsinki.

Helen Ltd's goal is to reduce carbon dioxide emissions by 40% from the 1990 level, increase the percentage of renewable energy to 25% and reduce the use of coal by half by 2025. Preparations are being made to abandon the use of coal by 2029 in accordance with the government's policy.

Another goal of Helen is to improve energy efficiency by 5.4% from the 2015 level by 2025. To achieve this target, waste and recycled heat are being utilised more efficiently, production is being optimised and the use of energy generated by power stations for their own use is being enhanced.

Significant measures taken by Helen in 2020 included increasing the power of the Katri Vala heat pump plant, enhancing heat distribution with an optimisation program and utilising artificial intelligence. Heat recovery from the internal cooling water circulation was implemented at the Salmisaari power plant. A heat pump that utilises sea water and process heat is being built at the Vuosaari power plant. The solar panel installed on the roof of the Patola heating plant is used to reduce the plant's own consumption. Helen also invested in the Ruskeasuo geothermal heating plant (well depth 2–3 km) as well as the Vuosaari wood chip heating plant, which will also be fitted with a flue gas condenser and absorption heat pump. Surveys are also being conducted in order to utilise waste heat and sea water heat in Kilpilahti. The process of filling Finland's largest heat reservoir, located in Mustikkamaa, with water has started. 2020 was an interim target year for the energy efficiency agreement, and the target for 2025 must be raised.

In 2020, the efficiency of the Helen Group's energy generation was as high as 95.29% (2019: 94.25%). In addition to the measures mentioned above, this is due to the increase in lower-emission and more energy-efficient production. For more information on Helen Ltd's responsibility, see https://www.helen.fi/en/company/responsibility.

Eyes on the future

In the coming years, the City will also focus more on energy efficiency work carried out outside its own organisation. The start of 2021 saw the launch of the Energy Renaissance operating model, which improves the energy efficiency of privately owned apartment buildings and increases the consumption and generation of renewable energy in housing companies. For more information about the project, see here (www.helsinginilmastoteot.fi/en.

2021 will also see the launch of the Energiaviisas kaupunkikonserni (Energy-wise Helsinki Group) project, which is funded by the Ministry of the Environment. In this project, the City will offer support for the implementation of energy conservation measures by its subsidiary communities.

The City of Helsinki has developed an energy efficiency partnership model in cooperation with other major cities. In the model, a partner company assumes responsibility for the planning and implementation of a building's energy efficiency measures and is responsible for the attainment of the energy savings pursued. The piloting of the model will continue in four service buildings in 2021.

Energy audits will be continued immediately once the COVID-19 restrictions imposed on public buildings are lifted. Additionally, procurements related to the maintenance and upkeep of properties will be developed to take energy efficiency and indoor conditions better into account.

The implementation of Heka's Helena project, which started in autumn 2020, will continue until 2023 with funding from the European Investment Bank. The objective of the project is to reduce the energy consumption of Heka's extensive renovation sites by approximately 40% by carrying out multi-objective optimisation on the sites.

Transport

In the City Strategy, the objective is to lower the emissions of the transport system further and also reduce the emissions harmful to health significantly. In 2020, the COVID-19 pandemic had a major impact on traffic in the Helsinki region. The amount of motor vehicle traffic decreased, particularly when the COVID-19 restrictions came into force and remote work increased. The COVID-19 pandemic also caused changes in public transport passenger numbers.

Bicycle traffic was developed by many means

Helsinki's Cycling Promotion Programme 2020–2025 was approved by the City Board in November 2020. The programme contains a set of measures for developing bicycle traffic in Helsinki.

Kulosaaren puistotie was changed into a cycling street and made part of Itäbaana. On the cycling street, bicycles and cars travel in the same lane, and cars match their speed with cyclists. Thanks to this change, the street is a safer place for everyone, keeping the differences in vehicle speeds moderate and eliminating unnecessary crossing of the street by cyclists.

Itäbaana is part of the Baana network, which is the backbone of Helsinki's cycling network. Itäbaana will become an almost 8-kilometre-long main route for cycling traffic. It will be built in parts, either in conjunction with projects or separately. In 2020, the Urban Environment Committee approved the Oravapuisto section of Itäbaana.

Thanks to the new Road Traffic Act, two-way bicycle traffic was implemented on one-way streets in Kruununhaka, Kluuvi, Kamppi and Etu-Töölö. The general plan for bicycle traffic signs was also completed in 2020.

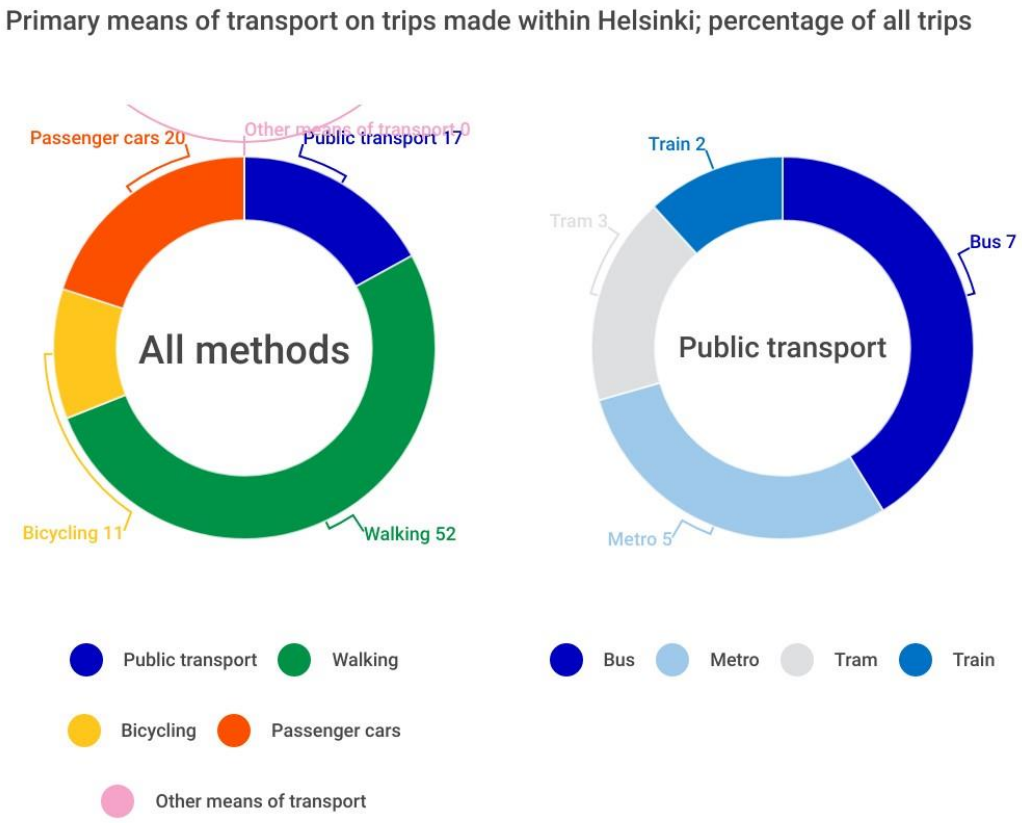
COVID-19 affected public transport and the city bike service

Helsinki Region Transport (HSL) aims to cut local emissions and carbon dioxide emissions from public transport by more than 90% (2010–2025). Another goal is for at least 30% of HSL's buses (approximately 400 units) to run on electricity by 2025. At the end of 2020, 74 of HSL's buses ran on electricity, and 30 of them operate in the Helsinki area.

The COVID-19 pandemic caused changes in passenger numbers from March 2020 onwards. Examined by mode of transport, passenger numbers in the HSL area decreased by 34.8% for the metro, 38.1% for buses and 33.0% for local trains in 2020 compared to 2019. The passenger numbers of trams also decreased by 38.6% from the previous year.

In 2020, there were 241 stations of the city bike service in service. Due to the COVID-19 pandemic, the city bike season was started earlier, on 23 March. The season ended as usual at the end of October. The city bikes were used for approximately 2.6 million journeys in Helsinki. This was approximately 20% less than the previous season.

The Helsinki region ranked third in the international BEST – Benchmarking in European Service of Public Transport survey. The BEST survey compared passenger satisfaction in public transport in nine European cities. 76% of customers in the HSL area were satisfied with public transport in 2020.



Picture 7. The distribution of modes of transport used for journeys within Helsinki in 2020. Walking was the most popular form of transport, accounting for 52%, while the bus was the most popular form of public transport, accounting for 7%.

Progress in the promotion of electric and low-emission transport

Helsinki's goal is for electric cars to account for 30% of the vehicle population of Helsinki in 2035. In October 2020, there were 7,507 rechargeable hybrid cars and 1,379 electric cars in operation in Helsinki, for a total of 8,886 rechargeable cars. Rechargeable cars accounted for approximately 3.6% of all cars in operation, but this percentage is rapidly increasing.

There are some 200 public electric car charging points implemented by Helen Ltd in Helsinki, of which 58 were put into service at the start of 2020. Additionally, there are semi-public and private charging points in Helsinki. The semi-public charging points are

located at service stations and shopping centres, among other places. Private charging points are located on properties, and they are usually related to homes and workplaces.

Helsinki promotes the adoption of electric buses by implementing charging stations at the terminal points of routes. At present, there are six operational charging stations in Helsinki, located at the Central Railway Station and in Hakaniemi, Ruskeasuo, Malminkartano, Koskela and Vuosaari.

The spread of charging points was also promoted in the existing building stock in 2020. In Helsinki, the plot conveyance terms for Kalasatama require at least one in three parking spaces to be equipped with electric car charging equipment. Another requirement is the capability to equip all parking spaces with charging equipment.

There are also projects underway in Helsinki that aim to make worksite machinery and maintenance vehicles electric. Environmental Services commissioned a survey about measures that can be used to encourage city residents to purchase and use low-emission vehicles.

The preliminary surveys commissioned by Helsinki Region Transport (HSL) regarding a road toll system were completed in autumn 2020. The objective of the preliminary surveys, which each emphasise different themes (administrative, technical/functional, and service design), is to support the planning of a road toll system in the Helsinki Metropolitan Area. The surveys were conducted as a continuation to the MAL 2019 plan. MAL 2019 is the strategic Land Use, Housing and Transport Plan for the Helsinki region. It describes how the region should be developed as a whole between 2019 and 2050.

Helsinki also prepared to execute the EU's Clean Vehicles Directive. The directive will come into force on 2 August 2021, and when it does the Member States will be subject to binding obligations to include clean vehicles in their public procurements. Stara Logistics anticipated the entry of the directive into effect by drawing up a roadmap for the electrification of Helsinki's own vehicles for 2021–2027. With the help of the roadmap, Stara will electrify all of its approximately 400 vehicles by 2027.

Implementation of Helsinki's intelligent transport system development programme was continued

The gathering of up-to-date traffic data was promoted by increasing the amount and availability of open data in real time and by launching the implementation of an open data collection and sharing platform for traffic. Data is collected in Helsinki's Azure data pool, from which it can be retrieved for use by situation awareness, monitoring and statistical systems related to traffic and transport.

In conjunction with the Jätkäsaari Mobility Lab project supporting innovation and experimentation related to intelligent transport, approximately ten new trials related to functional, safe and sustainable transport and mobility were launched in 2020. Additionally, the results of the robot bus transport trials carried out in Helsinki between 2018 and 2019 were analysed as part of the European mySMARTLife project.

Transport projects progressed

The redevelopment of Hämeentie was almost completed in 2020. In late 2020, tram traffic was able to return to Hämeentie, and the cycling streets were completed

In 2020, the Urban Environment Committee made the following decisions that promote the sustainable mobility network in Helsinki:

- Selection of alliance partners for the Kalasatama tram line project
- Cycling Promotion Programme
- City Logistics Action Plan
- Approval of the general plan for the western Helsinki tram lines

In autumn 2020, the MAL agreement for 2020–2031 was signed between the municipalities in the Helsinki region and the government. In this agreement, the government undertook to participate in funding the Vihdintie light rail line.

Picture 8. Passenger numbers in car and public transport decreased on all calculation lines in 2020.

The amount of motor vehicle traffic decreased on the calculation lines in 2020

In 2020, the amount of motor vehicle traffic (i.e. passenger cars, vans, lorries, trucks, buses and trams) in Helsinki decreased by 9% at the peninsula border and, similarly, by 8% at the inner city border in comparison to the previous year. On the crosstown calculation line, the amount of motor vehicle traffic decreased by 9% in 2020 compared to 2019.

On an average weekday in June 2020, the border of the Helsinki peninsula was crossed by 34,400 cyclists, which is 1.3% less than in 2019.

The number of Helsinki residents owning a car increased by 1.47% (422 cars/1,000 residents) and the number of cars in operation increased by 1.73% (334 cars/1,000 residents) compared to the previous year. The number of cars per 1,000 residents has increased by 4.45% in the last five years, while the number of cars in operation per 1,000 residents has increased by 1.71% in the same period.

Eyes on the future

The population of Helsinki is growing and land use is becoming denser, which is why it is particularly important to control the harmful impacts of traffic. The impacts of COVID-19 will continue, and the increase in remote work will reduce the need for commuting on a more permanent basis. Electrification of the transport system is promoted strongly both by the Finnish government and the EU, and Helsinki serves as a forerunner in the transition to a more sustainable transport system. Key factors include land use planning, promoting sustainable modes of transport and introducing a vehicle traffic pricing system, among other things. Digitalisation is being utilised in developing smarter traffic data and traffic management methods, among other things. Additionally, sustainable transport options are facilitated with the help of data.

Air protection

In the City Strategy, the objective is to lower the emissions of the transport system further and also reduce the emissions harmful to health significantly. The air quality in Helsinki has improved over the last few decades, and it is fairly good at an international level. However, the annual limit of nitrogen dioxide, specified in the EU's Air Quality Directive, is in danger of being exceeded in the city centre's street canyons. The reason for this is the exhaust emissions from traffic, in particular diesel vehicles. Air quality is also worsened by inhalable particles, i.e. dust, especially in spring and in the vicinity of large construction sites. There is also still a risk that the limit value for street dust will be exceeded. In dense detached house areas, the air quality is decreased by small-scale burning of wood in fireplaces and sauna stoves. In the Helsinki Metropolitan Area, small particle emissions from fireplaces are even greater than those from traffic.

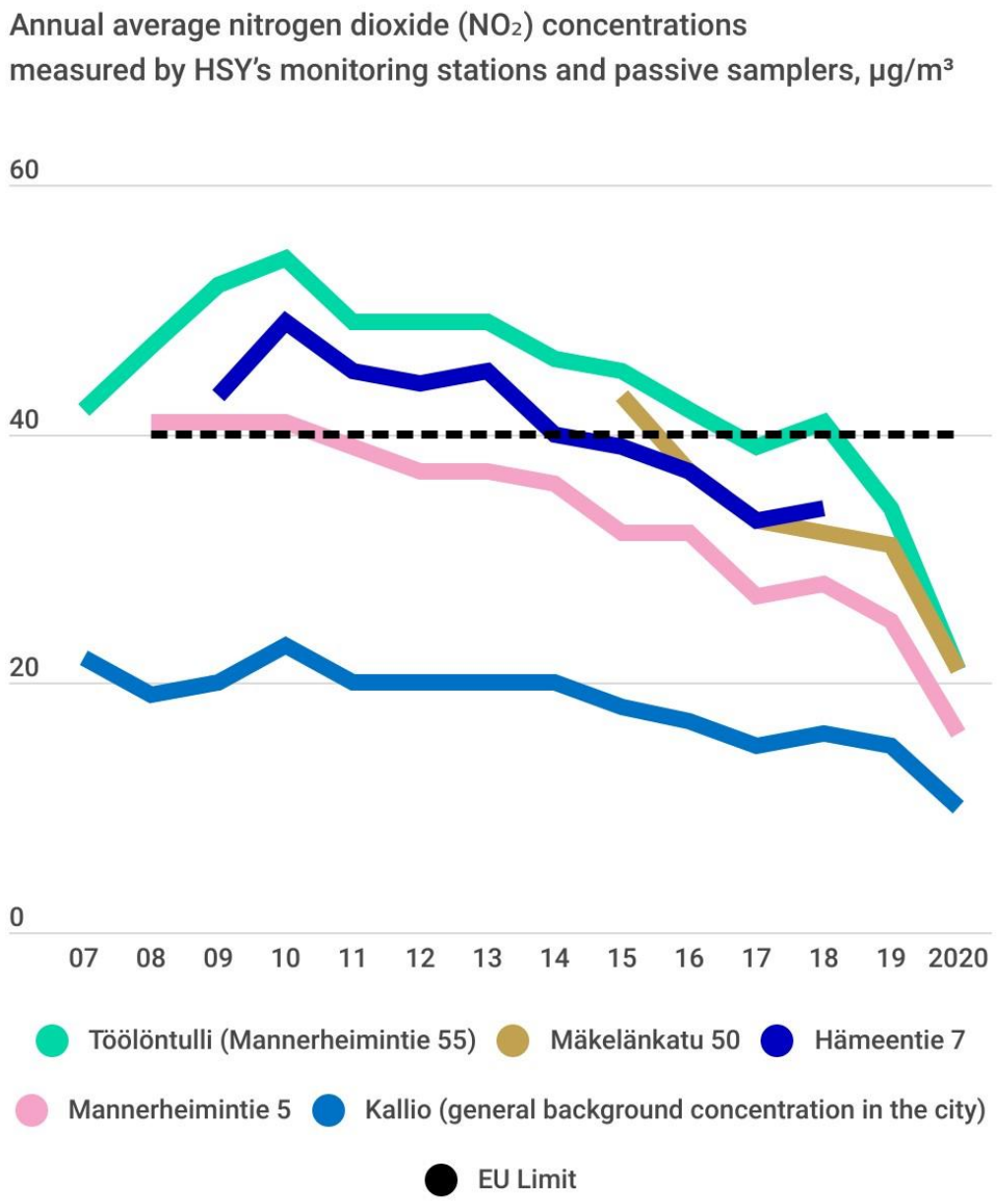
The purpose of the City's Air Quality Plan is to reduce nitrogen dioxide emissions from traffic so that the emissions will fall below the annual limit as soon as possible. In addition to decreasing exhaust gas emissions, the plan's other focus areas are street dust and small-scale burning of wood. The plan contains a total of 48 measures to be implemented in 2017–2024.

In 2020, the air quality in Helsinki was good or satisfactory most of the time. The concentrations of nitrogen dioxide (NO_2) and street dust (PM_{10}) were exceptionally low in 2020 as a result of the weather conditions and reduced amount of traffic. Small particle ($PM_{2.5}$) concentrations were also slightly lower than usual. However, the air quality worsened to passable or poor in areas with busy traffic at times.

Nitrogen dioxide concentrations decreased

In total, the nitrogen dioxide concentrations in 2020 were approximately a third lower than in the last few years. No values exceeding the limit value were measured in 2020. The concentrations have decreased due to the car stock and the Helsinki Region Transport (HSL) bus fleet becoming lower-emission. The mild and windy weather conditions of winter 2020 also contributed to the

decrease in exhaust gases in the city air.



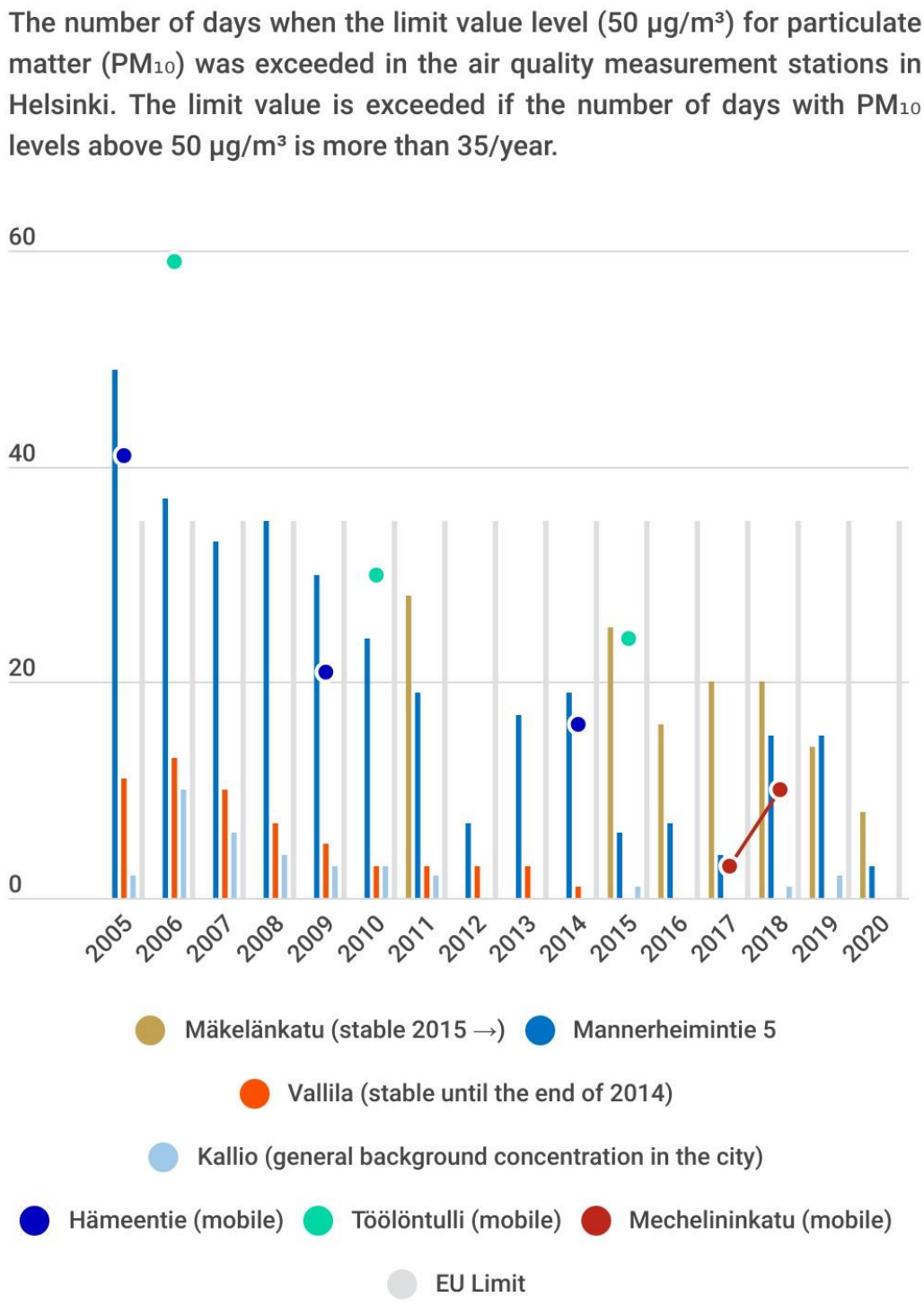
Picture 9. Nitrogen dioxide concentrations have decreased at all measuring stations.

Efforts to prevent street dust must be continued

The amounts of inhalable particles (PM10) were clearly below the limit values in 2020. The street dust season was easier than usual starting from early spring due to the reduced amount of traffic as well as the exceptionally warm and snowless winter.

The PM10 limit values have not been exceeded since 2006, but the WHO guideline value for street dust continues to be exceeded year after year.

Continuous efforts towards preventing street dust and developing methods to reduce it are highly important. Street dust can be reduced by mitigating the amount of traffic and promoting the use of non-studded winter tyres. In autumn 2020, Helsinki campaigned for the use of non-studded winter tyres.



Picture 10. The street dust concentration has decreased at all measuring stations, being significantly below the EU limit value of 35 µg/m³.

Construction sites and small-scale burning of wood worsened the air quality locally

The impact of large construction sites on local particle concentrations has been measured in recent years. In 2020, measurements were carried out in Jätkäsaari. Efforts are being made to prevent dust emissions in cooperation with contractors, and new methods are being developed in the HOPE project coordinated by Helsinki, among others.

Efforts are being made to find ways to decrease emissions from small-scale burning of wood by means such as research projects in which the City is involved. Additionally, residents have been extensively provided with information on ways to influence how cleanly wood burns. The burning method and the dryness of the wood have a major effect on the formation of emissions.

Eyes on the future

In 2020, the amount of traffic decreased in Helsinki due to the coronavirus pandemic. This was also widely evident in the form of better air quality. It remains to be seen what type of permanent impact things such as increased telecommuting will have on the amount of traffic and air quality in Helsinki.

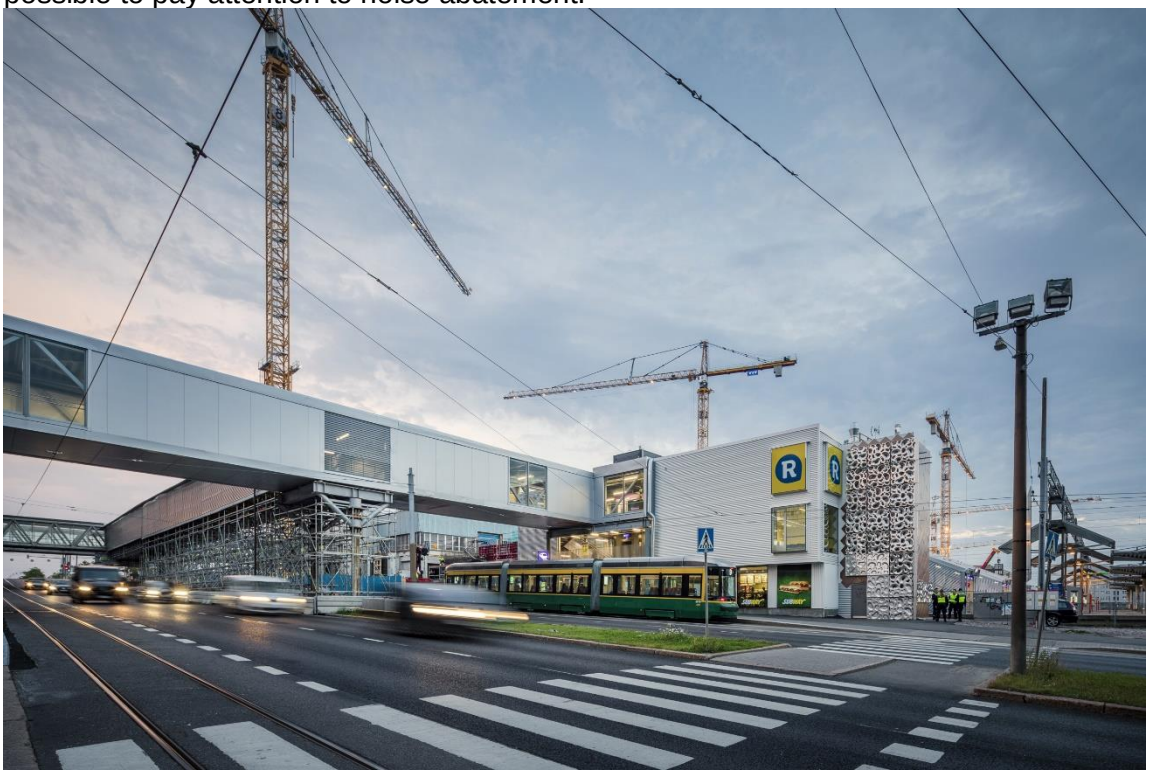
Street dust remains a challenge despite the number of low-emission cars in the car stock increasing, which is why promotion of the use of non-studded winter tyres and dust prevention will continue to be essential measures in the future. Emissions from wood-burning will continue to worsen the air quality in detached house areas in the future.

Noise abatement

Environmental noise is a significant factor that lowers the quality and comfort of the living environment in Helsinki. Continuous loud noise may also cause health hazards. Road traffic is the primary source of harmful noise in Helsinki. 37 per cent of the residents of Helsinki live in areas where the noise level caused by road traffic exceeds the limit value of 55 dB during the day. Noise is locally caused also by construction and repair work, public events and restaurants, for example.

The noise abatement efforts by the City of Helsinki are directed by the Noise Abatement Action Plan for 2018–2022. It contains measures related to urban planning, affecting the noise source, and structural noise abatement, among other things.

Harmful noise is also prevented through land use and transport planning. Transport investments and land use are always planned together in Helsinki, which also makes it possible to pay attention to noise abatement.



Picture 11. Traffic is the primary source of harmful noise in Helsinki. Construction also causes noise locally. Photograph by Kuvatoimisto Kuvio Oy.

The soundscape was improved

In 2020, driving speeds were mitigated by increasing the number of speed cameras and building speed bumps, among other measures. The noise-absorbing road surface was renewed on

Kauppakartanonkatu (920 m) and in the section of Roihuvuorentie between Abraham Wetterin tie and Tulisuontie (950 m). The City also campaigned for the use of non-studded winter tyres. More information on the promotion of sustainable and noiseless mobility is provided in the 'Transport' chapter of this report.

Approximately EUR 1 million is allocated to the noise barriers along the streets in Helsinki annually. In 2020, approximately half a million euros from this appropriation were used to complete the noise barrier in Tapanilankaari and plan a noise barrier for Vanha Porvoontie. Highway noise abatement is primarily the responsibility of the Uusimaa Centre for Economic Development, Transport and the Environment and the Finnish Transport Infrastructure Agency. The draft plans prepared for the improvement of Hämeenlinnanväylä and the Kuninkaantammi interchange were made available in late 2020. The purpose of the project is to streamline traffic and improve noise abatement. The implementation of the Herttoniemi metro noise barrier is delayed because of the City's financial situation.

The exceptional year quieted the city

The exceptional year 2020 was reflected in the soundscape of Helsinki at least in some places. Particularly in the spring months, the amount of traffic at measuring points decreased considerably. The amount of traffic increased towards the end of the year but fell below the numbers for 2019.

Recreational areas were in heavy use due to the city residents seeking out peaceful environments. Quiet or peaceful places are very important to the residents of Helsinki, as indicated by the results of the resident survey published in autumn 2020. In the survey, the respondents marked places that they found to be quiet and peaceful around the city. These particularly included green areas and places near bodies of water.

With regard to events, 2020 was quieter than usual due to the cancellation of large outdoor concerts. In contrast, construction and demolition operations continued as usual in the city. Of the major projects, the renovations of Hämeentie and the Olympic Stadium were completed. The construction of Jokeri Light Rail will continue for a few more years. A great number of residents are exposed to noise from the construction along the tracks. The construction of the Jokeri Light Rail is primarily supervised by the Uusimaa Centre for Economic Development, Transport and the Environment. It has been noted in the Jokeri Light Rail and Hämeentie projects that the harmful noise experienced by the residents has been successfully mitigated with efficient information sharing, scheduling of the work and noise abatement measures.

Eyes on the future

As the city becomes denser, it is also important for attention to be paid to the soundscape and noise abatement in the future. Extensive infrastructure projects and local construction projects will continue for several years.

Water protection

The water areas in Helsinki include extensive marine areas as well as the freshwater areas of the Vantaa River, various creeks, ditches, ponds and springs. In accordance with the City Strategy, the state of the small water bodies and coastal waters of Helsinki will be improved, and attention will be paid to the revival of the migratory fish stock. The significance of the sea will be strengthened and opening the nearby archipelago to public use will be continued. In addition to the environmental policy, water protection in Helsinki is regulated by the Small Water Bodies Programme, the Stormwater Management Programme, the Instructions on Prevention and Control of Floods and the Baltic Sea Action Plan.

Classification of the city's small water bodies and mapping of the biota

Cities' small water bodies are important habitats and migratory routes for various organisms, and they have recreational value for residents. Taking small water bodies into account in city planning and city ecology is important, as is monitoring the water quality of creeks and ponds with annual sampling.

A large area of impermeable surface in the catchment area and great fluctuations in the water flow are characteristic of creeks in Helsinki. Other challenges posed to the lotic ecosystem include occasional large amounts of solids in the creek water, hygiene problems, stream bed displacements and modifications, and a decrease in the natural vegetation of the shores. The water quality of small water bodies is affected by land use in the catchment area, the load caused by stormwater, and the soil characteristics, among other things.

In 2020, long-term work was launched to classify the small water bodies and map the biota, among other things. The objective is to identify the creeks that require special protection. In Helsinki, information is available on brown trout (Salmo trutta) populations in various city creeks, but sufficient information is not available on other valuable and threatened organisms. The objective of the work of the blue network is to produce information on the blue network's natural values for use in land use planning and environmental monitoring and to make this information more accessible in the form of geographical information. The blue network survey contributes to the objectives of the City Strategy regarding climate change adaptation and promotion of biodiversity.

Efforts to improve the water quality of city creeks were also continued in 2020, as a large amount of deviations in water quality were detected, similarly to previous years. Because of this, project funding was sought for the 'Tools for Improving Construction Site Water Quality' project. The Ministry of the Environment will make the decisions on funding in 2021. The project would support the EU's goal of having surface waters reach 'good status' by 2027 and the objectives of the EU Biodiversity Strategy for 2030, which is currently being prepared.

Several research projects are underway in the catchment area of the Vantaa River

Over a million people live in the impact area of the Vantaa River, and the river winds for over 100 kilometres from Riihimäki to the bay in Vanhakaupunki. The load on the Vantaa River has decreased, and the ecological condition of the river is classified as satisfactory overall. The Kytäjoki river area and the upper reaches of the Kerava River are in ecologically good condition. Good ecological condition would also be achievable in the lower reaches if the annual median of the overall phosphorus concentration were to reach a level of 60 µg/l. Phosphorus and nitrogen enter the Vantaa River from wastewater and agriculture.

Several water protection projects are currently underway in the catchment area of the Vantaa River. The two-year RAKUVE project, which ended in 2020, studied the effects of nutrient fibre and structural lime on the erosion and nutrient loading of fields. The studies found that soil conditioners efficiently reduced erosion and washout of phosphorus, and adding soil conditioners to fields can be recommended from water protection perspectives.

The occurrence of harmful perfluorooctane sulphonate (PFOS) and PFAS-based compounds is monitored in the catchment area of the Vantaa River through the PFAS project from 2020 to 2021. Based on samples taken between 2016 and 2017, the PFAS concentrations in the Vantaa River were found to be clearly higher than in the other rivers in Finland and Sweden.

Another project launched in 2020 was a project studying the anadromous behaviour of sea trout and European whitefish. This project involves attaching radio transmitters to fish and determining how sea trout and European whitefish behave in the Vanhankaupunginkoski rapids before and after the restoration of the eastern branch. Anadromous behaviour will be monitored for three autumns.

Picture 12. Kayaking on the Vantaa River. Photograph by Maija Astikainen.

The state of Helsinki's marine areas is relatively stable, but harmful substances are found in the seabed and biota

The state of Helsinki's marine areas is being monitored in accordance with an extensive joint monitoring programme. The changes in sea water quality and seabed biota have been relatively moderate in recent years. A reduced external nutrient load keeps the overall state of Helsinki's marine areas relatively stable, and their ecological condition varies from passable to satisfactory when moving from the coast towards the open sea. The water quality and state of the aquatic environment in smaller, closed-off bay areas with a poor water turnover rate are still poor for the most part due to the nutrient and solids load carried by stormwater from built areas to the sea. In early 2020, several instances of heavy rainfall caused the wastewater system to overflow, which weakened the quality of coastal waters in places.

The sea water temperature was exceptionally high in early summer, which led to a decrease in the oxygen content of the water near the seabed in the deep basins near the coast, as well as an increase in the concentrations of soluble phosphate, indicating the vulnerability of the coastal marine areas of the Helsinki Metropolitan Area to climate change. However, the cooler and windier weather in late summer prevented extensive cyanobacteria blooms from forming in the marine areas. Nonetheless, local algae blooms occurred in Seurasaarenselkä.

The occurrence of harmful substances in the marine areas of the Helsinki Metropolitan Area was mapped more closely in 2020. Harmful substances are found in the seabed and biota, particularly in urbanised areas affected by land runoff and intensive human activity.

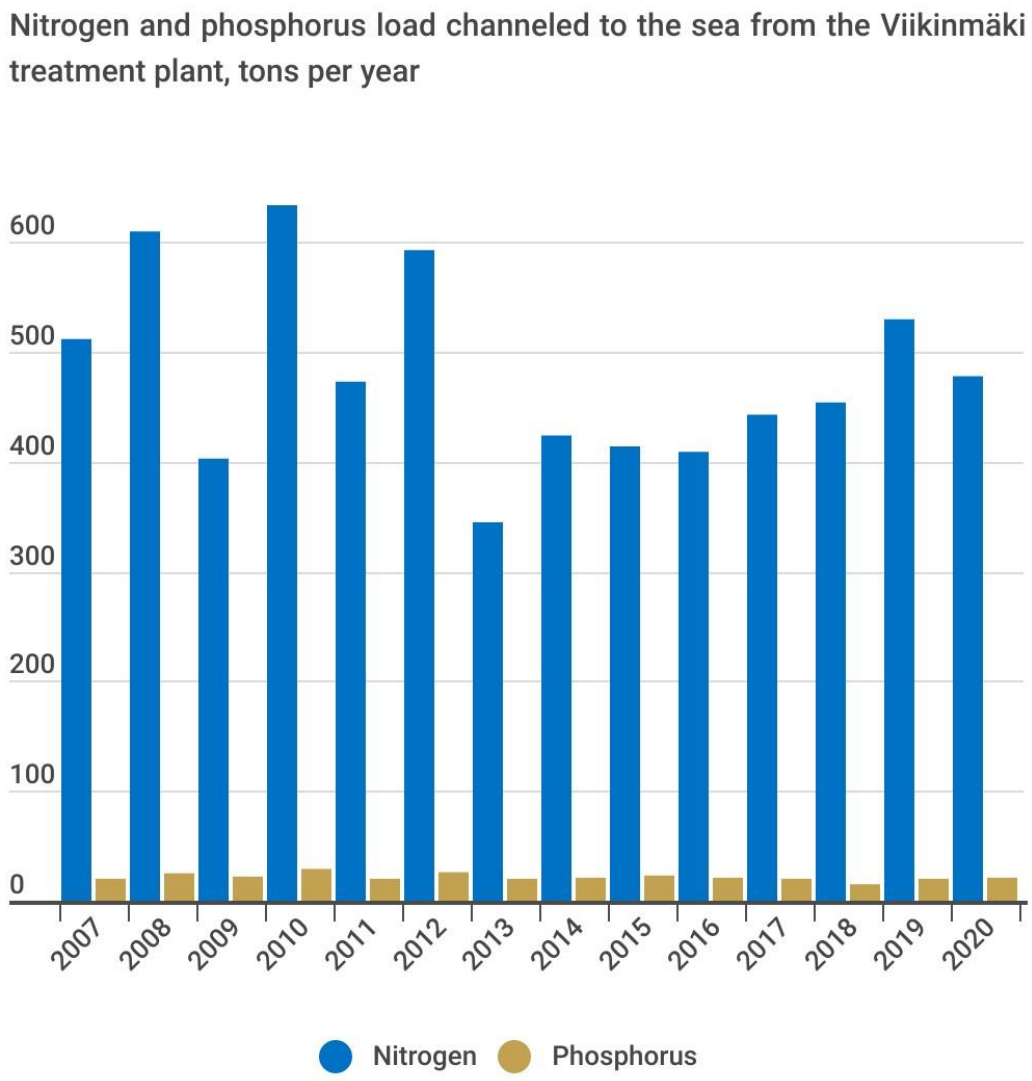
Wastewater was treated efficiently and instructions were prepared for the treatment of water generated by geothermal drilling

The amount of water pumped into the water supply network in 2020 was 95 million cubic metres in the Helsinki Region Environmental Services Authority's (HSY) water supply area, while 53 million cubic metres were pumped into the Helsinki network.

The total amount of wastewater channelled to the Viikinmäki wastewater treatment plant was 110 million cubic metres, of which 79 million cubic metres originated from Helsinki. The amount of wastewater was slightly greater than the previous year. The Viikinmäki wastewater treatment plant complied with all the environmental permit regulations. Combined sewer network overflows amounted to 0.09% of the total amount of wastewater.

The removal efficiency achieved in Viikinmäki in 2020 was 97% for phosphorus, 98% for biological oxygen demand and 91% for nitrogen. The wastewater treated at the Viikinmäki treatment plant is conducted through rock tunnels to the open sea, about eight kilometres away from the shore. The phosphorus load caused by the Viikinmäki wastewater treatment plant on the marine areas in front of Helsinki was 21 tonnes (+5% from the 2019 level), and the nitrogen load was 478 tonnes (-9.8% from the 2019 level). For eutrophication, the nitrogen load is more significant because nitrogen is a minimum

nutrient in the waterways in the Helsinki region.



Picture 13. The nitrogen and phosphorus load caused by the Viikinmäki wastewater treatment plant on the Baltic Sea in 2007–2020.

The environmental hazards caused to creeks from the drilling of geothermal wells have kept the environmental supervision authorities busy for several of the last few years. The challenge was met by preparing joint instructions for the treatment of water generated from geothermal drilling with HSY and the municipalities in the Helsinki Metropolitan Area. Drilling entrepreneurs were also heard during the preparation of the instructions. The instructions were published at the start of 2021.

In 2020, a water management development plan was prepared for 2021–2030. During the year, different courts issued several decisions regarding the application of the Water Services Act on applications for an exemption from the connecting obligation. Because of this, resources had to be focused on tasks pursuant to the Water Services Act, which

was reflected as a decrease in other water protection monitoring. In addition to this prioritisation, the COVID-19 pandemic also contributed to the considerable decrease in the number of control inspections carried out in nature.

Speedy experiments were carried out in the Baltic Sea Challenge, and Baltic Sea Day was celebrated

Together with Turku, Helsinki is committed to implementing a third Baltic Sea Action Plan in 2019–2023. The action plan contains 117 water protection measures that take factors such as the EU Strategy for the Baltic Sea Region and the UN's Sustainable Development Goals into account. The measures are divided between five objectives: clear coastal waters, a healthy marine habitat, clean and safe water transport, systematic use of water areas and active participation by the residents in the Baltic Sea region. The measures are divided extensively among the City divisions, in addition to which Stara, HSY and the Port of Helsinki are also involved. The implementation of the measures is monitored regularly, and 88 measures had been started, were underway or had been completed in Helsinki by the end of 2020.

The measures that have progressed include many measures related to nutrient removal, management of harmful substances, port operations and private boating, cooperation with companies and international cooperation as well as the development of the activities of the local-level Baltic Sea panel, among other things. Separate funding related to Finland's Presidency of the Council of the European Union was used to carry out speedy experiments in the Baltic Sea Challenge. In these experiments, four companies tested new methods of preventing plastic litter and combatting plastic litter in the sea in the coastal and marine areas of Helsinki. Bloft Design Lab built a large 3D printer to turn plastic waste collected from the sea into SUP boards. Clewat Oy tested a new type of litter collecting vessel that also allows macroplastics and microplastics to be collected efficiently from challenging places. Bioharbour Ltd studied how much plastic litter is carried into the sea with food waste generated by cruise ships, while Innogreen tested the ability of a green wall to filter plastics that are generated by traffic and carried by stormwater.

In the Baltic Sea Challenge, Helsinki and Turku also support other operators in implementing new water protection and Baltic Sea activities. In 2020, five new members joined the Baltic Sea Challenge partner network and eight partners updated their commitment. In the summer, two communications campaigns were carried out for recreational boaters: the Toxin-free Baltic Sea campaign with Tukes and the Keep the Archipelago Tidy Association, and a campaign about underwater noise with students of the University of Helsinki.

On 27 August 2020, Helsinki participated in the Baltic Sea Day by holding a virtual Baltic Sea Day carnival with numerous cooperation partners, in addition to participating by other means. The carnival was streamed from the City Hall. On Baltic Sea Day, the City of Helsinki Service Centre's catering services served fish from the Baltic Sea to all customer groups, from children in daycare to the residents of senior centres. A total of 4,500 kg of fish was used during the day.

Water protection was promoted with international cooperation

The objective of the international 'BEST – Better Efficiency for Industrial Sewage Treatment' project coordinated by Helsinki was to improve cooperation between industrial

businesses, wastewater treatment plants and environmental authorities and develop industrial sewage processing solutions in the Baltic Sea region. The project involved Finnish, Estonian, Latvian, Polish and Russian project partners. The project lasted from October 2017 to September 2020, and its main provider of funding was the Interreg Baltic Sea Region Programme of the European Regional Development Fund.

In 2020, the project completed recommendations on the management of industrial sewage channelled to municipal wastewater treatment plants, among other things. The goal of the recommendations is to provide consistent guidelines for good practices not only throughout the Baltic Sea region but nationally to individual countries as well. In addition to the recommendations, a practical and approachable toolkit was published on the project's investments in industrial sewage treatment and other good practices at https://bestbalticproject.eu/.

Helsinki was also a partner in the international BSR WATER Platform project between October 2018 and December 2020. The purpose of the project was to promote cooperation between different sectors of society in water protection and, through this, influence decision-making related to water protection. The project gathers the results of various projects and best practices together in the Baltic Smart Water Hub, which is open to all. The main provider of funding for the project was the Interreg Baltic Sea Region Programme of the EU.

Eyes on the future

The close proximity of the sea is a very important success factor for Helsinki and a part of our identity. Most of the city area is sea, and there are 300 islands in this area. The state of the marine environment must be taken into account as a source of competitiveness and well-being for the city, its residents and organisations.

Although water protection efforts have been carried out persistently and extensively in the Helsinki Group, the state of the local water bodies and the sea is concerning. Eutrophication remains the greatest issue, which is highlighted in the marine area in front of Helsinki, partly through the characteristics of the sea and its bays and partly through the load brought by the Vantaa River from its extensive catchment area. The state of small water bodies and the sea is also threatened by littering and harmful substances such as consumer chemicals, which have been studied more closely and become a topic of debate in recent years. Additionally, the significance of stormwater as a route through which many types of problematic loads enter the sea in the city area is only now becoming clear. The effects of climate change hinder the efforts to reduce loading. It is important for the parties involved in climate change mitigation, the circular economy and water protection to join forces.

Because of the COVID-19 pandemic of 2020, the significance of local nature increased. Beaches and the Helsinki archipelago also became more attractive as outdoor and recreational areas. The projects that have advanced through the Maritime Strategy have facilitated the recreational use of beaches and islands for their part. We hope that the two large maritime projects of the City that were postponed from 2020 will be implemented in 2021. In cooperation with the Finnish Environment Institute, Marine Nature 2021 will bring inventories and mapping of underwater biodiversity more broadly to the marine areas of Helsinki. The objective is to identify the underwater gems of Helsinki and support the development of the use of the archipelago, with due consideration to the sensitive maritime nature.

The maritime biennial in Vallisaari also had to be postponed. The biennial will serve as an example of how to organise a responsible event, and its aim is to be carbon-neutral. The environmental theme will be taken into account in many ways in the art to be featured at the event, with 40 visual artists drawing inspiration from the maritime environment and archipelago.

Securing biodiversity

Helsinki's Action Programme for Securing Biodiversity 2021–2028 was completed and approved in spring 2021. A key objective of the programme is to take biodiversity into consideration in all operations of the City.

The threatened habitat types, valuable plant sites and species of Helsinki have been mapped

Between 2017 and 2020, the survey of threatened habitat types produced information on threatened and near-threatened habitat types. The survey serves as a basis for identifying Helsinki's most valuable and representative habitat type sites.

There are 319 sites with threatened, near-threatened or otherwise notable vascular plants registered in the Nature Information System, and 33 of them are valuable cultural plant sites. Cultural plants refer to neophytes and cultivated plants that were introduced to Finland during the period between the 17th century and the year Finland became independent (1917).

According to a study conducted in 2020, there are 20 nationally threatened vascular plant species, 31 nationally near-threatened species and 40 regionally threatened species found in Helsinki.

During the updating of the list of mammal species sighted in Helsinki, five new species had been sighted since 2013: the Siberian flying squirrel, the serotine bat, the soprano pipistrelle, the wolf and the wolverine. Two species, the European polecat and the Baltic ringed seal, are thought to have disappeared in the 1990s.

The Siberian flying squirrel habitat network was supplemented based on a new Siberian flying squirrel habitat survey conducted in 2020. The materials take into account the core areas and habitats of Siberian flying squirrels and the routes between these areas. An operating model was also developed for taking Siberian flying squirrels into account in the City's operations.

The pollinating insect censuses launched in the city's green areas in 2019 were continued in 2020. The observed number of bumblebee species remained the same (approximately 20), but the number of individual bumblebees was found to have clearly increased compared to the previous year. In contrast, the number of individual western honey bees decreased by half compared to the previous year in several areas. The numbers of individual Papilionoidea were exceptionally low, similarly to 2019. The numbers of species and individual butterflies were very low on the lines inside Ring I in particular. The Papilionoidea year was also poor elsewhere in Southern Finland.

Bird censuses continued in Vanhankaupunginlahti, Östersundom and the archipelago. The censuses found that machine mowing had increased the number of birds observed in these areas in the autumn. For the first time, a white-tailed eagle nested in Vanhankaupunginlahti. The nesting was a big success, and all three chicks grew up. The nesting site is most likely the most urban place a white-tailed eagle has ever nested in.

Biodiversity is taken into account in planning and construction

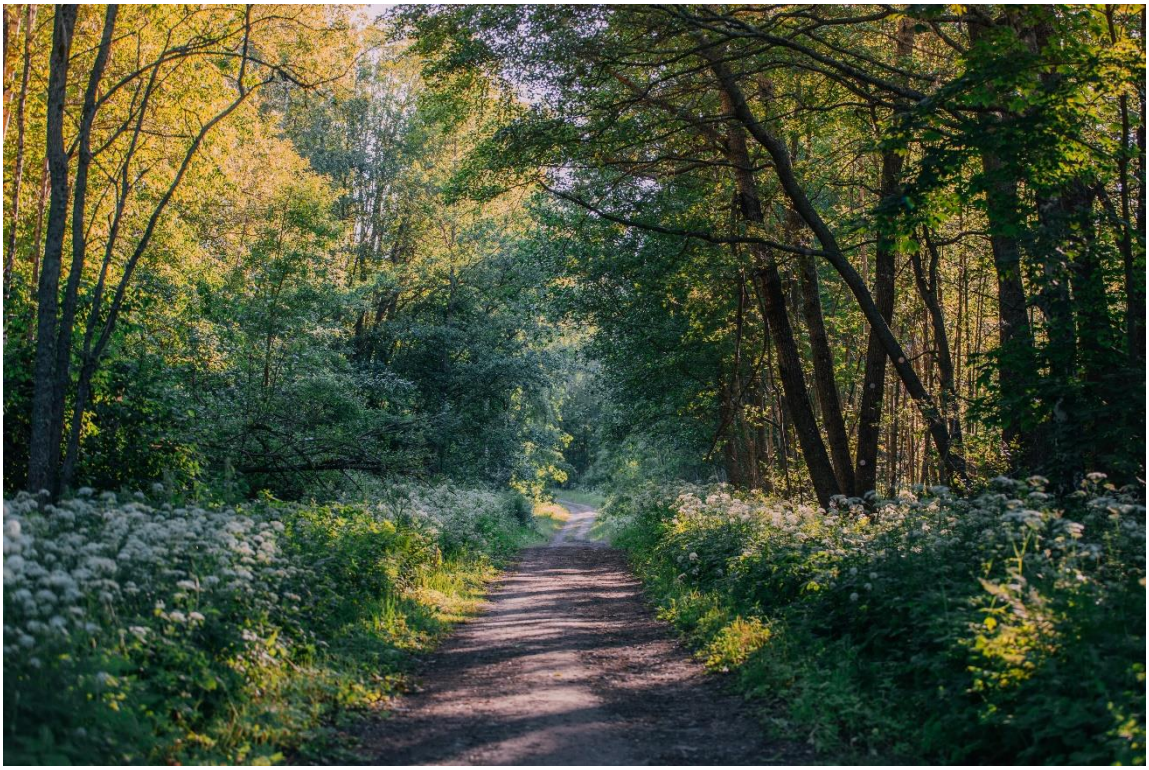
The objectives of the green network, which covers the entire city, are presented in the city plan and taken into account in detailed planning. A consistent green structure promotes both biodiversity and recreational opportunities. The ecological networks of Helsinki include the network of urban forests and wooded areas, the meadow network and the blue network. The information on the current state and future of the city's network of urban forests and wooded areas was supplemented in 2020. The meadow network also started its work in spring 2020.

The Urban Environment Committee reviewed the preliminary report on the National Urban Park of Helsinki in spring 2020. In addition to examining three areas of different sizes, the report includes an option covering the whole city. The report also reviews the City's measures for achieving the objectives in line with the criteria for national urban parks with regard to recreation and nature networks.

In detailed planning, biodiversity is taken into account in the definition of starting points and objectives, planning solutions and plan regulations as well as the development of methods. For areas with natural values, appropriate nature surveys will be conducted as a basis for planning.

Of the key detailed planning projects, the parts of the forests with the most diverse natural values and the most elevated outcrop areas have been spared from construction in Karhunkaataja, for example. Additionally, plots must meet the green factor target level, stormwater must be treated in ground-supported block yards, and trees and shrubs of different sizes must be planted. Unbuilt parts of plots must be preserved in their natural state, reserved as agricultural land for the residents or planted with plants. A green roof must be built for all one-storey sections of buildings and canopies. In the detailed plan for the Maria start-up campus, roof gardens are used to promote the biodiversity of urban nature. The detailed plan solution for New Laakso Hospital also lays down regulations regarding the trees to be retained and added as well as green roofs.

A nature reserve has been established in the detailed plan area of Vallisaari and Kuninkaansaari, and any valuable natural environments, with their landscape values and unique characteristics, must also be retained elsewhere in the detailed plan area. The plan also lays down regulations regarding the management of the area in such a way that its environment will be retained in a semi-natural state, trees will be retained and they will retain their vitality. Conservation of the living conditions of bats must be taken into account in alteration work.



Picture 14. A path on Vallisaari island. Photograph by Julia Kivelä.

The aim for the detailed plan area of Hermanninranta and Kyläsaari is to turn the area into an ecologically sustainable district built of wood, in which green infrastructure, stormwater management and biodiversity play a key role. The aim is to make the Hermanni shore park into a biodiversity park, the purpose of which is to support biodiversity and largely rely on its own ecological and hydrological processes.

Efforts have also been made to secure biodiversity by utilising industrial areas undergoing a change in their purpose of use and commercial plots without any existing natural values in additional construction in city planning.

Due consideration of the impacts on nature have played a key role in the construction of Jokeri Light Rail. Thick-shelled river mussels, which are classified as endangered, were moved from below the railway bridge in the Vantaa River. The state of Haaganpuro, Mustapuro and Mätäjoki has been improved in conjunction with construction by building spawning beds, increasing open water routes and improving the delaying of stormwater. Felled trees have been taken elsewhere and been left lying on the ground to secure the deadwood continuum. Topsoil peeled off during construction has been utilised in recycled substrate, which has allowed the soil seed bank to be retained and ensured that the substrate contains soil biota.

The biodiversity of green areas is increased

The Helsinki Urban Plant Life Guide, which provides instructions on the use of vegetation, was updated and revised in 2020. The Urban Plant Life Guide includes recommendations on plant species and information on the potential use of plants in various locations. The guide also lists plants that are not used, with the most important of them being invasive alien species. Through the revision, the guide now also includes information about plants that can be used to promote the biodiversity of urban nature.

A project called ‘Transforming lawns into flower fields and urban farms – helping the climate, pollinators and the Baltic Sea’ was implemented as part of participatory budgeting (OmaStadi). The project selected ten parks and traffic areas around the city and let the lawn in them grow into a meadow. Additionally, a new flower meadow was established at Maaherranpuisto park.

The number of decaying trees is increased in nature management and invasive alien species are combatted

One of the key objectives of the public area plans and nature and landscape management plans prepared in 2020 was to secure biodiversity and increase it systematically, particularly in forests and forested areas. These plans include the area plan for Oulunkylä and Maunula and the public area plans for Herttoniemi and Vuosaari as well as Malmi and Pukinmäki. Nature and landscape management plans at the implementation level include the plans for Pakila and Tuomarinkylä as well as Mellunkylä and Vartiokylä.

In the implementation of nature plans, biodiversity is increased by leaving decaying trees and groves for animals in managed forests, among other measures. Extensive forest areas have also been excluded from management measures as planned. In addition to the city area, this practice has also been followed in recreational areas owned by Helsinki in Nuuksio, for example.

Invasive alien species have been combatted in green areas primarily in connection with other management measures and through voluntary work events in cooperation with residents, educational institutions and organisations. A working group made up of prisoners from the open prison in Kerava was also utilised in combatting invasive plant species. Rugosa rose was combatted on bird islets in the archipelago in autumn. The plants were cut down and the plant waste was transported to the mainland and burned with mixed waste. Hogweed populations are monitored and combatted as necessary. Invasive alien plant species were also combatted in worksites in conjunction with the construction of Jokeri Light Rail.

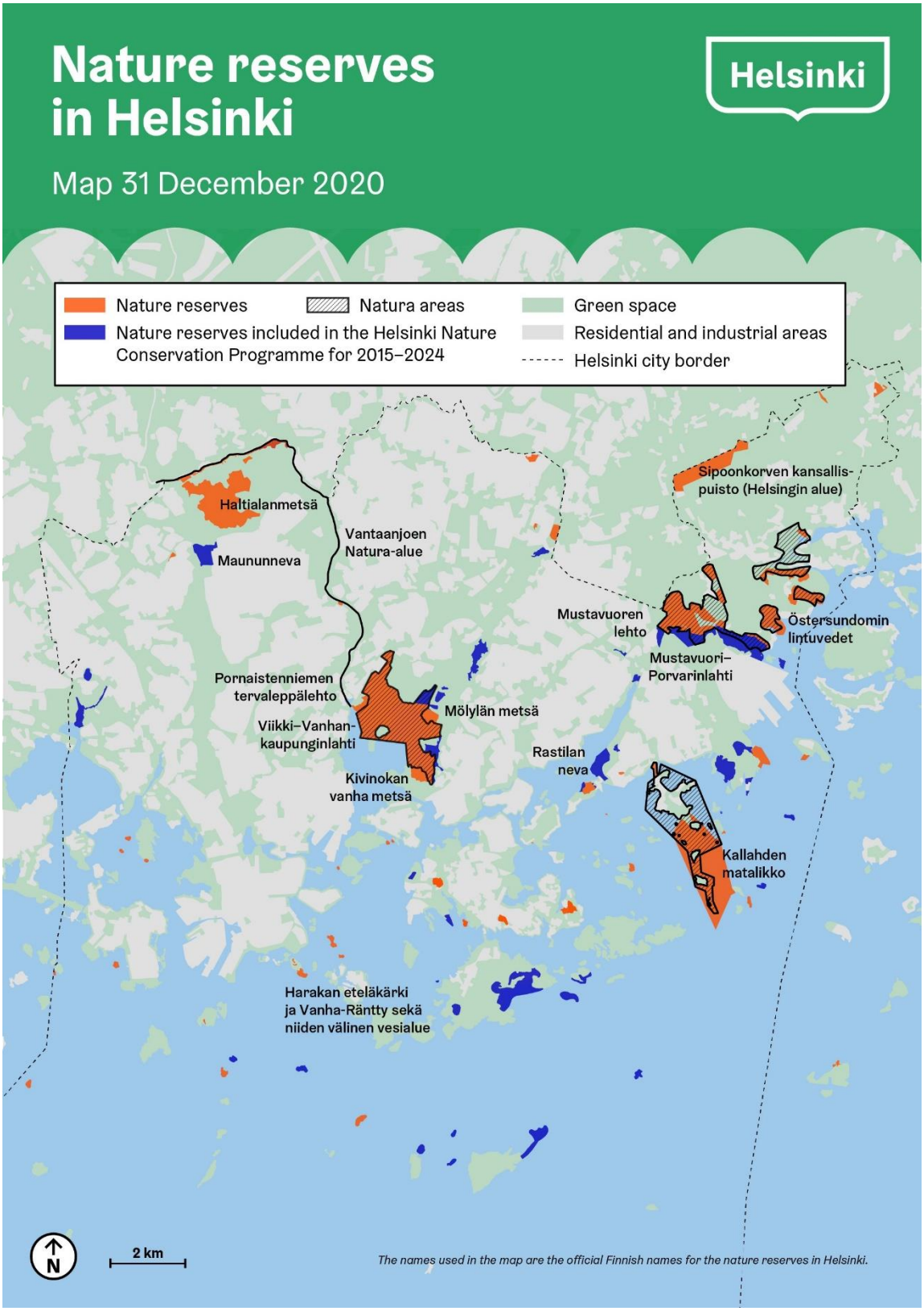
The number of nature reserves increased and funding was received for the restoration of natural areas

Currently, 3.2% of all land area is nature reserves, as compared to 0.93% of water areas. When including protected habitat types, species protection areas, and Natura areas not protected by the Nature Conservation Act, the total protected area amounts to 4% of Helsinki’s land area and 1.4% of water areas. The new proposed nature reserves will increase the percentage of protected land area to 5.6%.

In 2020, the Uusimaa Centre for Economic Development, Transport and the Environment made a founding decision and approved management and utilisation plans for four nature reserves in Helsinki. Haltialanmetsä is the largest of them, with a total area of 137 hectares. The other areas were bird islets. The Ministry of the Environment provided Helmi project funding for the restoration of the wooded mire of Haltialanmetsä for 2020–2022. The updating of the management and utilisation plan for the Niskala arboretum was also completed in 2020 and approved by the Environment and Permits Subcommittee in early 2021. In 2020, the restoration of the bird wetlands of Helsinki received funding from the Helmi Habitats Programme for mowing the bird wetlands. In addition to mowing, the use of the wetlands as pastures will be expanded. The aim is to restore reeded areas to open coastal meadows. In 2020, Lammassaari island, which is

surrounded by the bird wetland of Vanhakaupunki, was visited by approximately 200,000 visitors, which is approximately 45% more than the previous year. Helmi project funding was also received for nature management of the Bengtsår grove nature reserve owned by Helsinki in Hanko. The project will manage temperate deciduous forests and restore traditional biotopes from 2021 to 2022.

Erosion of the areas was increased in early 2020 by a winter of little snow and an increased interest in outdoor activity and nature reserves caused by the COVID-19 pandemic. Fences were built and signage was increased in the most popular areas in order to guide people away from sensitive natural areas.



Picture 15: Currently, 3.2% of all land area is nature reserves, as compared to 0.93% of water areas.

The COVID-19 pandemic restricted Korkeasaari Zoo's operations

2020 was, above all, marked by the COVID-19 pandemic, which affected the operations of Korkeasaari Zoo in many ways. The zoo was closed to the public for 2.5 months in the spring and was again closed in December. The pandemic also quieted the supply of animals, but Korkeasaari Zoo still gained new species and individual animals: golden lion tamarins, a pygmy marmoset, an emperor tamarin, a white-rumped shama, common agamas, African mantises, giant African olive millipedes, Chinese pond turtles, common gundis, Sambava tomato frogs and giant day geckos. New species in the aquariums included pinstripe dambas, red cherry shrimps, peacock gudgeons, reticulated hillstream loaches and tomato clownfish, while cardinal tetras made a comeback. Many new offspring were born and hatched at Korkeasaari Zoo in 2020. Species that reproduced for the first time on the island included pancake tortoises, fennec foxes, black-tailed prairie dogs, Malaysian forest scorpions and Bali starlings. The total number of species at Korkeasaari Zoo is 155, of which 34% are classified as threatened.

The pandemic posed challenges to the implementation of conservation programmes, as it was not possible to travel abroad for field work in 2020. However, WildForestReindeerLIFE, a project to reintroduce Finnish forest reindeer to the wild, continued in Finland. 12 forest reindeer were released in both Seitseminen and Lauhanvuori National Parks. Of these forest reindeer, Joiku and Juolukka were born in Korkeasaari Zoo.

In 2020, Korkeasaari Zoo's Wildlife Hospital treated 1,704 animals. Approximately 25% of the patients were rehabilitated and returned to the wild. Korkeasaari Zoo participates in the conservation of animal species in the wild as part of a network formed by zoos and conservation organisations. In 2020, Korkeasaari Zoo and the Korkeasaaren ystävät ry association raised a total of EUR 72,714 for projects to conserve threatened species.

Nature trails were developed in projects

The Urban Eco Islands project operating with EU funding promoted the sustainable use of recreational areas by building new resting areas and a new nature trail on Vasikkasaari island. The environmental awareness of city residents and schoolchildren about urban nature was increased through means of citizen science by guiding people in using the iNaturalist nature application, which helps users identify species. Nature information is now also available about Vasikkasaari on the citynature.eu website.

A project that created two nature trails in the area of Pajamäki and Tali was implemented as part of participatory budgeting (OmaStadi). The Patterinmäki nature trail and the garden tour of Mätäjoki and Tali can be found on the citynature platform.

Eyes on the future

The positive trend in efforts to secure biodiversity will be continued, and this aspect will be taken better into account in all operations of the City. The green and blue network will be developed persistently, and erosion and the spread of invasive alien species will be prevented efficiently. We will prevent the erosion of nature and the spread of invasive alien species efficiently. Additionally, information on important species will be increased, and the habitats of these species will be secured.

Restoration of contaminated soil and landfill sites

The most significant contaminated soil restoration sites managed by the City were the Verkkosaari and Vilhonvuorenkatu as well as Työpajanpiha sites. There were also other large restoration sites in the Jokeri Light Rail construction area and the construction areas in Keski-Pasila and Jätkäsaari. In addition to the large sites, several individual small sites were inspected and restored in 2020. Soil was restored at a total of approximately 67 different restoration sites.

The soil restoration was usually carried out during the other construction work in the areas. The soil condition database created by the Ministry of the Environment features the details of 887 areas in Helsinki where research has shown the soil to be contaminated, where the soil has been assessed as being potentially contaminated or where the soil has been restored.

Former landfill sites in Helsinki are restored pursuant to environmental protection legislation. The restoration of the Vuosaari landfill site will conclude in 2021, and the City is preparing to restore the Iso-Huopalahti landfill site in the coming years.

Soil was decontaminated in the same way as in previous years, primarily by excavating the soil containing harmful substances and transporting it elsewhere for appropriate treatment. Soil was also restored by isolating the contaminated soil on site. Below is an overview of how the contaminated soil was transported for treatment or final disposal in Helsinki in 2017–2020.

The total amount of soil transported for treatment or final disposal in 2020 was approximately 298,800 tonnes, which is approximately 169 per cent more than the previous year. The costs generated by the restoration of contaminated areas and landfill sites decreased slightly from the previous year.

In 2020, 1,476,500 tonnes of uncontaminated excavated earth and aggregate were used at public construction sites. 161,500 tonnes of uncontaminated excavated earth were delivered to external recipients.

Table 8. The contaminated soil transported for treatment or final disposal in Helsinki, as well as the costs incurred by the City from the restoration of contaminated soil and landfills in 2017–2020.

	2017	2018	2019	2020
Soil, tonnes	182 300	109 100	111 000	298 800
Costs in euros	19 671 000	17 878 000	25 004 000	24 221 000

Procurements

The annual volume of the City of Helsinki's procurements is approximately EUR 4 billion, making Helsinki the largest public procurer in Finland. Helsinki is committed to promoting environmental, social and financial responsibility in its procurements. The significance of procurements is strongly highlighted in both the City's emissions reduction plan and the Roadmap for Circular and Sharing Economy, published in May 2020. In 2020, the focus in procurements was on revising the procurement strategy, reducing the climate emissions of procurements and promoting social responsibility.

On average, the environmental criteria were used in around 56 per cent of the procurements of the City's divisions and enterprises in 2020 when examined as individual procurements. However, there are differences between the City's divisions and enterprises in their use of the environmental criteria: for example, 86 per cent of the Service Centre's procurements, 84 per cent of the Education Division's procurements and 81 per cent of Stara's procurements included environmental criteria in 2020. Some of the City divisions faced major challenges in monitoring the environmental criteria. As in the previous year, the criteria used the most were criteria related to low emissions and environmental management systems. Other criteria that were highlighted included energy and material efficiency, eco-label criteria and reduction and sorting of waste. Other key aspects besides the Helsinki brand in the design of Helsinki products have included ecological aspects, ethics, social responsibility and the circular economy. The City's objective of reducing disposable plastic products has also been taken into account in the product range.

Helsinki gained a more responsible procurement strategy

The City Board approved a new procurement strategy for the City of Helsinki in December. The procurement strategy was revised concurrently with the drafting of the Finnish National Public Procurement Strategy. The three main themes of the procurement strategy of Helsinki are a functional market and promotion of innovations; effectiveness and responsibility; and management of procurement and procurement skills. Responsibility and effectiveness in particular are emphasised more.

Emissions from worksite operations and harmful chemicals were reduced with a Green Deal agreement

In 2020, Helsinki signed two Green Deal agreements for procurements. Green Deal is a voluntary agreement between the government and the public sector or businesses. The aim of the Green Deal agreement for emission-free worksites is to reduce the emissions generated by worksites. The Green Deal agreement for reducing harmful substances in early childhood education aims to reduce harmful substances in procurements made in early childhood education, in addition to increasing the procurement of products that have earned the Nordic Eco-label. Besides Helsinki, both agreements involve a large number of Finnish cities and other public procurers, which is why the agreement has the potential to have a great impact on the market.

Helsinki continued working in the European Commission's Big Buyers cooperation groups, which developed emission-free worksites, electric worksite machinery and construction following circular economy principles. Helsinki actively participated in peer learning events and cooperation groups organised by ICLEI. In the autumn, Helsinki participated in Nordic market dialogue and development work for improving responsibility in smartphone procurements.

A criteria bank was created to facilitate the use of responsibility criteria

The City's shared criteria bank was created to facilitate the preparation of procurements. The bank collects successful examples of responsibility criteria utilised in procurements. The monitoring of the agreement management system's responsibility criteria was also revised to cover not only the environmental criteria but also various responsibility perspectives more broadly.

Operating models for responsible procurement were refined

A Procurement Services unit was prepared for the Urban Environment Division in 2020, and it started its work at the turn of 2020 and 2021. An operating model for responsible procurement has also been in development for the division in order to make responsible procurement more systematic in this division, which has a considerable environmental impact.

Six of the Helsinki Group's procurement units have participated in the KEINO Competence Centre's Programme for the Development of the Management of the Impact of Procurements. The purpose of the programme is to help public organisations recognise the impact of their procurements and plan and direct them more efficiently from the perspective of the organisation's own strategy.

Climate impacts are taken better into account in various procurements

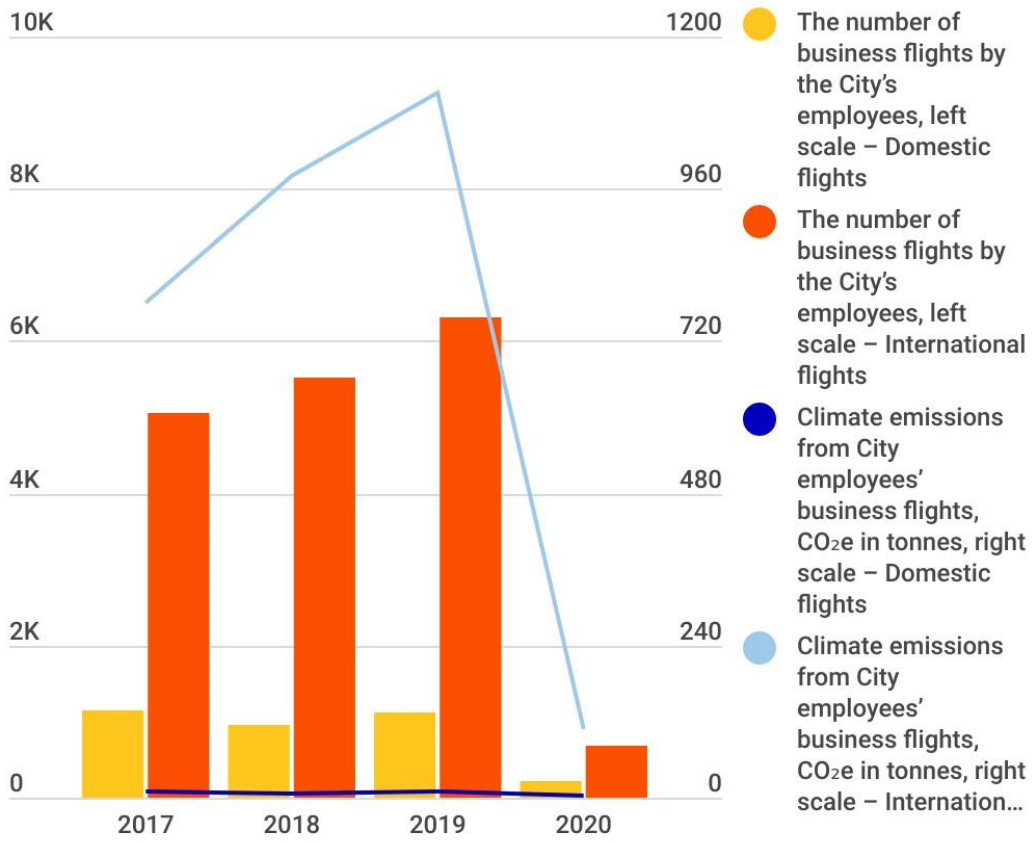
The development of the City's low-emission procurements continued under the six-year Towards Carbon Neutral Municipalities and Regions (Canemure) project. Helsinki's subproject examines nine different procurements that have a significant climate impact. The possibility of taking the carbon footprint into account is assessed during their preparation.

In Kontula, a multi-objective optimisation was carried out on apartment buildings to identify an option optimised in terms of costs, energy efficiency and emissions for the implementation of the buildings' renovation. An emissions calculation was carried out in street and water supply planning in Arabia, and the recommendations of the resource-wise option were determined for the contract to be implemented in the future. In spring 2020, a report was completed on climate-friendly alternatives to plastic in infrastructure construction. As for repaving contracts, the trends in the industry's emissions calculation were examined and the consideration of the environmental impact of contracts was monitored.

The development of food service procurements continued with a series of workshops, the aim of which was to unify the City's responsibility and climate criteria. In December, Helsinki, together with Vantaa and Espoo, organised a 'Tasty and sustainable fish and vegetarian dishes!' market workshop for the purpose of working with the market to find solutions for improving the availability of ingredients and the acceptability of the food.

In the autumn, a report was prepared with the City of Helsinki Service Centre and Stara on the lifecycle impacts of workwear procurements. The report examined differences between the procurement of services and products. A similar report is currently being prepared about the lifecycle impacts of the procurement of ICT equipment. The reports will increase the City's understanding of procurement methods that promote the smart use of resources and are smart in terms of the lifecycle impact.

The climate work related to procurements can be followed through Climate Watch, and the consideration of the circular economy can be monitored through Circular Economy Watch, which opened towards the end of the year.



Picture 16. One of the forms of procurement followed in the Environmental Report is business trips by air by City employees. The COVID-19 pandemic decreased their number in 2020.

Eyes on the future

Management of responsible procurements, training and operating models will be made more systematic with the implementation of the procurement strategy. The areas to be developed next include the responsibility of mobile device procurements, better consideration of social and financial responsibility and the protection of biodiversity through procurements. The procurement work will focus more on creating an impact.

Circular economy

As stated in Helsinki City Strategy for 2017–2021, the City's goal is to implement emissions reductions and circular economy projects in Helsinki in cooperation with the corporate world and residents. The City of Helsinki's Roadmap for Circular and Sharing Economy was approved in spring 2020. The roadmap's focus areas are construction, procurements, green waste, the sharing economy and new business opportunities in the circular economy. The roadmap includes 31 concrete measures, and their implementation was launched in autumn 2020. A service for monitoring the measures, called Kiertotalousvahti (Circular Economy Watch), was published in December.

In autumn 2020, the mayor signed the European Circular Cities Declaration, which aims for a transition from a linear economy to a circular economy.

Demolition instructions were prepared for the City's demolition projects

In 2020, demolition instructions that take the circular economy into account were completed for the demolition of the City's service buildings. Two pilot sites focused on a demolition materials survey conducted in the planning phase were also launched. At two other demolition sites, a survey was conducted on the implementation of the reuse of movables and building components through the City's reuse centres. The demolition instructions and demolition survey have also been piloted at demolition sites related to housing production. The guidance towards the reuse of building components is partly carried out in cooperation with Uusix workshops. In January 2020, a new construction project was launched with the purpose of raising and renovating apartment buildings to be energy-efficient by following circular economy principles.

Resource-efficient solutions were utilised actively in infrastructure construction

An action plan implementing the City of Helsinki's principles of utilising excavated earth, rock material and demolition material has been actively put into service in several construction projects. In 2020, a total of 1,476,541 tonnes of excavated earth and rock material was used in the construction of public areas. Thanks to reuse, approximately EUR 8 million and 1,300,000 litres of fuel were saved, in addition to which emissions were reduced by 3,100 t CO2e. A database-based earth mass management tool was completed, allowing the transfer of masses based on data to be optimised, thereby reducing emissions and costs. The mass management tool will be linked through an open interface to the SeutuMassa database developed by the Helsinki Region Environmental Services Authority (HSY), among other things.

New resource-efficient solutions are continuously sought in infrastructure construction; between 2019 and 2020 an experimental land reclamation structure was built in Tritoninpuisto park in Jätkäsaari. It tested crushed concrete as fill material and the suitability of dynamic compaction for compacting fill located partly below sea level. In spring 2020, a stabilisation test was carried out in Kuninkaantammi on binders that are based on recycled materials.

Other material flows that form in infrastructure construction and that need their circulation to be enhanced have also been identified in Helsinki. These material flows include green waste that forms in the management of public areas as well as paving stones left over from construction sites, for example. Stara manufactures recycled substrate products in the Kivikko processing field and the Tali soil farm, using topsoil originating from the City's worksites and composted green waste. Recycled substrates are utilised in the City's own construction sites. In 2020, an integrated operating model plan was prepared for the production of recycled substrates at the processing locations in Kivikko and Tali. Additionally, a working group was set up for the City in 2020 and tasked with creating an operating model for the reuse of recycled paving stones. Stara also has an ongoing pilot that is testing the suitability of reeds as mulch material in parks. Reeds are gathered away from the city's shores to prevent eutrophication.

Circular economy ecosystems were strengthened in the CircVol project

Helsinki participated in the CircVol project (August 2018 to December 2020) of the Six City Strategy. The purpose of the project was to promote business activities that follow circular economy principles and the utilisation of earth masses and large-volume industrial side streams. The Helsinki sub-project mapped large-volume biomasses and bio-based side streams in the Helsinki region, prepared a recommendation for the City's operating model in strengthening the industrial and urban symbioses of the bioeconomy and circular economy, and developed tools to promote the circular economy in city planning. Envisioning the future, the project profiled areas such as existing industrial areas from the perspective of circular economy business potential, in addition to compiling a training package for land use planners.

The reduction of food waste and the utilisation of edible leftover food were enhanced

The City of Helsinki Service Centre has carried out a great amount of development work to reduce food waste. One important factor has been the examination of the entire supply chain, from the planning of menus and logistics to storage and serving. In 2020, causes of food waste were identified at different points of the food preparation chain, and solutions were considered for developing the operations.

The City of Helsinki Service Centre has developed its food waste monitoring systems, and in autumn 2020 schools adopted a software-based solution. The use of the monitoring system was expanded to other sites in early 2021. Another area focused on in 2020 was communications and pupil participation. During Food Waste Week, pupils weighed the uneaten food left on plates and recorded the daily numbers on a poster on the wall of the school restaurant. Menus and the selection of food are developed in active cooperation with City divisions. At schools, pupils can also influence meal-related matters through the schools' restaurant committees.

In addition to the reduction of food waste, new ways of utilising edible leftover food are being developed. Some locations allow leftover food to be purchased after serving has ended, in addition to which leftover food is regularly donated to the parish and other third sector operators for food aid.

In 2020, the City of Helsinki and Parish Union of Helsinki partnered to establish the Stadin safka food waste terminal in Tapulikaupunki. The food waste terminal allows the left-

over food of the trade industry, wholesalers and the food industry to be utilised more efficiently, widely and professionally through food aid. The food waste terminal started operating in December 2020. At the end of the year, Stadin safka was picking up food waste from approximately 30 stores or wholesalers as well as locations of the City of Helsinki Service Centre. Leftover food was delivered to approximately 30 food aid operators around Helsinki. Stadin safka also participated as a partner in an experimental project funded by the Ministry of the Environment that piloted the utilisation of schools' leftover vegetarian food as a resource for the local communities.

Picture 17. Stadin safka's food waste terminal started operating in December 2020. Photograph by Virpi Velin.

Additionally, a survey was conducted in 2020 regarding barriers to and opportunities in the utilisation of leftover food within the City of Helsinki. The need for the survey came to light through the eco-supporters working in the City's early childhood education in particular.

The City developed the reuse of its own movables

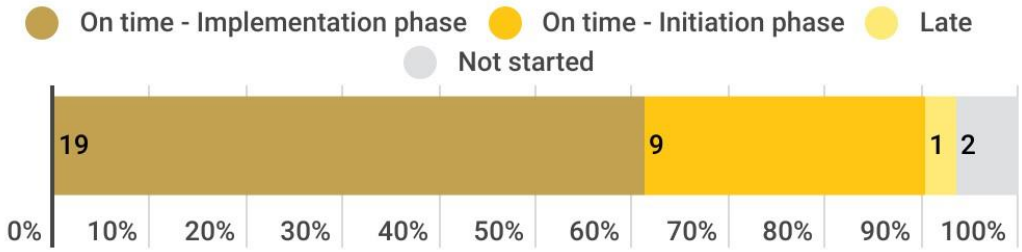
Management of the City's own movables and the promotion of their reuse are continuously being developed. New instructions on the handling of the City's unused movables and assets came into force in March 2020. The instructions instruct the City's Tavarat kiertoon recycling system to be used in making unused furniture and movables available to other operators of the City, among other things.

Eyes on the future

Circular economy thinking is continuously increasing in Helsinki. The European Circular Cities Declaration provides a vision of what a circular city is and defines the direction

which the Declaration's signatories commit to take. This is supported for its part by the national Strategic Programme for Circular Economy and the City's Roadmap for Circular and Sharing Economy, the implementation of which is already well underway. Through experiments and pilots, the objective is to find good circular economy practices that can be implemented as part of the City's operations. Achieving the objectives requires a significant focus on communications and cooperation, both between City divisions and with companies, residents and other interest groups.

State of Helsinki's circular and sharing economy measures on 30 April 2020



Picture 18. Most of Helsinki's circular and sharing economy measures have progressed well according to their schedule.

Key measures

State of The City of Helsinki's Roadmap for Circular and Sharing Economy on 30 April 2021

Demolition measures

- The demolition instructions for the demolition of the City's service buildings, which pay special attention to the circularity, have been finalized. The instructions have been put in use and they are currently being updated, with the learnings from on-going pilot projects.
- There are a few on-going pilot demolition projects in service buildings that focus on the survey of demolition materials in the planning phase.
- The aim of the pilot projects is to develop operating models for the reuse of movables and building components.

Procurement

- A new procurement strategy for the City of Helsinki has been published. Adecision has been made regarding the purchase of furniture, according to which the unused furniture and movables that are still in good condition and that can still be utilized in the city organization, should be redirected for use through the City's Tavarat kiertoon recycling system.
- The development of criteria promoting the sustainability of the procurement of the ICT equipment has been carried out as a market dialogue, and a study has been conducted on the lifecycle impacts of the procurement of ICT equipment.

Ikoner: The Noun Project: Rivning: Petai Jantrapoon och Upphandling: Nithinan Tatah

Picture 19: Measures of the Roadmap for Circular and Sharing Economy that are related to demolition measures and procurements in particular were promoted in 2020.

Environmental awareness and responsibility

Helsinki wants to be a forerunner in environmental education and provide a range of services that support a sustainable lifestyle for the residents of Helsinki by making environmental choices easy to make.

Sustainable future is taken into account in teaching and early childhood education

In the City of Helsinki Education Division, pedagogy for a sustainable future has been strengthened with the KETTU and KIERRE models as well as the Carbon-neutral Helsinki course. The 'KETTU – Sustainable future in early childhood education and basic education' model combines climate and environmental education, futures literacy and design-based learning. The 'KIERRE – Sustainable future from the circular economy' model is a cross-curricular model that examines the circular economy from the perspective of phenomena. The model combines awareness of natural resources, climate awareness and design-based learning. A cross-curricular course called Carbon-neutral Helsinki has been developed together with general upper secondary schools. It will become a mandatory course for all first year students of general upper secondary schools starting from August 2021.

Young people consider environmental matters to be important

The cooperation of Youth Services in the EcoCompass environmental management system has allowed an increasing number of young people to participate in environmental activity. Despite the COVID-19 pandemic, numerous nature excursions, camps, events, clubs, nature school days, animal cafés and cooking sessions using food waste and vegetables were successfully held around the city.

In the Ruutibudjetti data collection carried out at all youth work units, young people were asked about their environmental concerns and desire to take action for the environment. 64% of the almost 2,500 young people felt that environmental matters are important or very important in their own life, while 27.5% felt that environmental matters are somewhat important and only 8.5% felt that they are of minor importance or not at all important. With regard to their residential areas, young people were the most concerned about littering, the disappearance of local forests and green areas, and climate change. Elements that came up in the answers included the desire to take action for a litter-free environment and nature, vegetarian dishes, contributing to the mitigation of climate change, and matters related to consumption. Local youth work units will develop their activities together with young people based on the answers.

In 2020, the Environmental Youth Work Unit developed new types of environmental education activities by adopting the Löytöretkeilijät (Explorers) operating concept, among other things, and setting up a young people's climate change mitigation group called Harkiten henkariin, which is implemented in cooperation with WWF. In the summer, many youth work units joined forces to develop the Youth Island Gallery, a new centre

of environmental and cultural activity for young people, at the stables on Vartiosaari island. The location hosted camps, open workshop days and, in late summer, a beautiful exhibition of art by young people. The Youth Eco Café operated as part of the Youth Island Gallery for the whole summer. Young people from the Herttoniemi youth work unit participated in the Agenda – Art 2030 event in Töölönlahti with their work of performing arts/spatial art. For their work, these young people selected two of the 2030 Agenda's Sustainable Development Goals: reduced inequalities and climate action.

A great amount of distance lessons and materials were produced to support environmental education

When the COVID-19 pandemic closed the schools in March 2020, the Helsinki Region Environmental Services Authority (HSY) started to produce environmental education tools for distance learning in collaboration with its long-term partner, Helsinki Metropolitan Area Reuse Centre Ltd. In April, six advisory digital games were completed for use by pre-schoolers and comprehensive school pupils. The themes of the games are vital water as well as sustainable consumption and the circular economy. The games are available to teachers free of charge, and they can be found in the Seppo shop. Distance lesson versions are also available of the games. During the year, the digital games had a total of approximately 3,500 players.

HSY and the Reuse Centre edited the outdoor lessons to be more coronavirus safe and converted a few of the lessons into distance lessons. In the autumn, both outdoor lessons and digital game sessions were held for 5–6-year-olds, while outdoor lessons, distance lessons and digital game sessions were held for educational institutions.

In 2020, Korkeasaari Zoo was closed for 3.5 months due to the COVID-19 pandemic. During the period when it was closed, Korkeasaari Zoo produced a great amount of digital material for environmental education, which delighted distance learning pupils in particular. Various tasks, videos and games were compiled on the Korkeasaari Zoo website about topics such as threatened animals, baby animals and what animals get up to at different times of the year. The tasks page had over 8,600 users during the year, and the games were played more than 7,000 times. A fun and educational game called Etäkevätretki Korkeasaareen (Remote spring excursion to Korkeasaari Zoo), which was played by 221 classes, was also released in the spring.

In the summer and autumn after the COVID-19 restrictions were eased, Korkeasaari Zoo was visited by more than 4,500 schoolchildren and approximately 3,500 pre-school-aged children, Nature School Arkki held 39 nature school days, and four environment and animal-themed summer camps were held for children in June.

Independent exploration of nature was supported

As an exception, Harakka Nature Centre was not opened to the public until the start of June due to the COVID-19 restrictions. Instructor-led activities were not held at all during the spring season, with the exception of two environment study days in February. During the autumn season, 21 nature school days were held. Only 13 island adventure days were held for daycare children, as daycare centres were banned from using modes of public transport. In total, 961 children and young people with their teachers participated in the nature school and island adventure. 16 private excursions were held, and they were attended by 167 visitors.

On Helsinki Day, people had an opportunity to enjoy the beautiful views of Harakka and the fierce life of seagulls via a livestream. In July, visitors were introduced to Harakka's operations and the underwater life of the Baltic Sea in the lobby of Central Library Oodi.

The nature excursions intended for city residents did not start until the beginning of June because of the pandemic. The total number of excursions held was 16, and they had 439 participants. Participants had to sign up in advance for all of these excursions.

Independent exploration of nature was facilitated by producing a video series called Ode to the Nature of Helsinki. The series takes viewers to seven nature sites in Helsinki and is available on the Helsinki channel. Additionally, city residents were encouraged to observe nature and engage in citizen science in the Helsinki bumblebee contest implemented via the iNaturalist application. The contest received 269 photos of bumblebee sightings.

The 'Ode to the Nature of Helsinki' exhibition on display from June to November was implemented in participation space Brygga in Central Library Oodi. The exhibition, which inspired interest in the rich nature of Helsinki and nature information, was visited by 21,900 people.

Residents took part in taking care of their own environment

In 2020, a record number of new Park Pals signed up for Park Pals activity, in which volunteers mainly pick up litter in their own immediate environment. Due to COVID-19, green areas had more visitors and littering in the areas increased, which inspired many people to want to participate in keeping the environment clean. In 2020, approximately 400 new Park Pals signed up, and at the end of the year there were approximately 1,500 registered Park Pals involved in Park Pals activity.

Picture 20. Park Pals gathering litter in their own neighbourhood. Photograph by Shoot Hayley.

In contrast, volunteer-based environmental events such as clean-up events and invasive alien species prevention events suffered from the effects of COVID-19. The number of clean-up events held by residents was only a fourth of the number for a normal year. There were 39 clean-up events, and the estimated number of participants was 3,580. The greatest impact was visible when schools skipped their traditional spring clean-up events. Other environmental clean-up events in which the City is the main organiser were also skipped because of COVID-19.

The City held alien plant species prevention events eight times from June onwards in Pornaistenniemi, Lammassaari, Uutela and Kallahdenniemi. The species combatted were the Himalayan balsam and the rugosa rose. In open volunteer events, the participant numbers were smaller than in previous years, but the volunteers still managed to do a lot. One volunteer event was held in cooperation with Helsinki Vocational College and Adult Institute as part of the institute's education in invasive alien species. The number of invasive alien plant species events organised by residents was slightly higher than in previous years, which shows that awareness of invasive alien species and their harmfulness has increased among the residents.

Climateinfo communicated information and trained actively

In early 2020, Climateinfo managed to hold four energy events for housing companies in Helsinki, focusing on the themes of geothermal heat and switching from oil heating to renewable energy sources. Housing company club meetings were also held live as part of an energy expert course, for example. COVID-19 led to a switch to webinars, which proved to be successful.

In early 2020, Climateinfo also actively communicated information about the effects of eating too much protein on health, wastewater treatment and the eutrophication of the Baltic Sea; the topic was also widely featured in the news. This protein campaign will also continue in 2021. Climateinfo themes were also featured in the new Ilmastoterapia (Climate Therapy) podcast series and in The Feel Good Challenge on Instagram. Tap water campaigns related to major events were cancelled because of COVID-19.

Ekoekspertti activity involves residents in environmental work

In 2020, Helsinki City Housing Company (Heka) carried out the 'Ekoekspertit' (Eco-experts) project funded by Sitra and the Housing Finance and Development Centre of Finland (ARA), which developed a new type of digital application for involving residents in environmental work. Any resident who owns a smartphone or tablet and is interested in the environmental affairs of their home building can become an eco-expert. In the Ekoekspertti application, residents and building communities of Heka compete against each other by completing challenges related to environmentally friendly living and collecting points. In addition to challenges, the application shares current information about environmental matters such as waste management costs and reducing them.

Environmental risks

Due to climate change, extreme weather conditions will increase and forecasting will become more difficult. Invasive alien species also cause harm, and the risk of an oil incident in the Baltic Sea is great. From the City's perspective, the most significant environmental risks are fires, oil and chemical spills, soil and water contamination, diminishing biodiversity, deterioration of air quality and the challenges posed by extreme weather phenomena. Preparing for these risks is done through organised actions.

In Helsinki, the Rescue Department is in charge of the response to accidents caused by exceptional weather conditions. The situations caused by exceptional weather conditions are often wide-scale and long-term in nature and require cooperation and external resources. In 2020, cooperation was developed with both the City's internal and external operators. The City's preparedness for various weather conditions is also developed through various working groups, which gained representatives of the Rescue Department in 2020. As a concrete exercise, Stara organised a training exercise to erect a flood wall in Tattarisuo in autumn 2020.

In the event of an oil spill, preventative actions will be carried out in accordance with the oil spill prevention plan in effect in the Helsinki Rescue Services' area. The participants in oil spill response training include several representatives of interest groups, and cooperation with volunteers in oil spill prevention is being developed. In 2020, the longest-term and most laborious prevention work was carried out in Kivikko sports park, where fuel was repeatedly carried by stormwater to the creek. All in all, the efforts to prevent fuel continued for a month, but the source of the fuel remained unclear.

At the start of 2021, the national Strategy for Preventing Environmental Offences 2021–2026 was updated. The strategy is implemented in Helsinki through close collaboration between bodies such as environmental supervision authorities and the police. Several incidents that lead to suspicion of environmental offences occur in Helsinki every year. The range of offences is wide, and environmental offences often also constitute financial offences when the offences are committed for financial gain, for example by neglecting waste management costs or investments that are significant in terms of environmental protection. The police and environmental supervision authorities of the City also carry out joint supervision projects when resources allow. Other key partner authorities cooperating with Helsinki's environmental supervision authorities include the Regional State Administrative Agency for Southern Finland; Uusimaa Centre for Economic Development, Transport and the Environment; the Finnish Environment Institute; Customs; the Tax Administration and the Prosecutor's Office of Helsinki.

Table 9. Oil spills in Helsinki in 2017–2020.

Öljyvahingot Helsingissä	2017	2018	2019	2020
In water bodies	75	13	52	25
In important groundwater basins	11	11	2	11
In other areas	278	366	329	325
Total	**364**	**390**	**383**	**361**

Smart & Clean

The Helsinki Metropolitan Area's Smart & Clean Foundation is a joint five-year change project between cities, companies, universities and research institutes in the Helsinki region as well as the Finnish Government. The project involves 29 partners from the public and private sectors. During its forth year of operation, the foundation continued its work to create and speed up 1.5ºC climate solutions. The climate crisis cannot be solved with individual sector- or operator-specific changes alone – changes must be made in joint ecosystems comprising public and private operators, and the impacts must alter the structures of society and business. It is also important to understand the overall picture of climate emissions and what types of solutions are needed in order to considerably reduce local and consumption-based emissions.

The foundation's Circulating All Plastics spearhead project is an example of this type of project that is intended to cover the entire lifecycle of plastic, from product design to collection and from reprocessing to new products. The plastics project is led by a working group whose activities the City Of Helsinki is involved in. The recycling of plastics can only grow to the required level if the entire value chain and the plastic product market operate in tandem. To describe the systemic change required for the recycling of plastics, the foundation has used a data model it has created to help understand the areas required for the change, the measures related to them and their implementers. The model also makes it possible to illustrate the interdependencies between different areas and the effect chains of the changes.

Additionally, the foundation has produced several reports for use by various operators. The mapping of measures has focused on the recycling solutions of households, the recycling solutions of the service and trade sector, the recycling of construction plastic and enhancing of the recycling of plastic packaging, among other things. The City of Helsinki's goal is to carry out effective measures, especially through means that promote the recycling of plastics in public procurements and at construction sites.

Picture 21. Plastic Mama performance at Kansalaistori Square. Photograph by Vesa Laitinen.

In 2020, the foundation, besides developing the focus area of plastics, also worked with ITS Finland as part of the National Growth Programme for the Transport Sector on developing a model for affecting the sustainability of the transport system and promoting the achievement of the 1.5ºC climate target in particular.

The Smart & Clean cooperation between companies and the public sector and the foundation's neutral role as orchestrator garner a great deal of interest internationally. Orchestrator is a key role in change management, the principle of which is to get the right people and organisations to work with each other in a dependent ecosystem. For example, the world's leading climate network, C40, has been building a global City-business Climate Alliance (CBCA) programme for 96 cities together with its partners, World Business Council for Sustainable Development and CDP. It has utilised the foundation's experience and operating method as a model in the planning of its own activities. The CBCA was launched in summer 2020, and the foundation serves as the programme's Fellow partner.

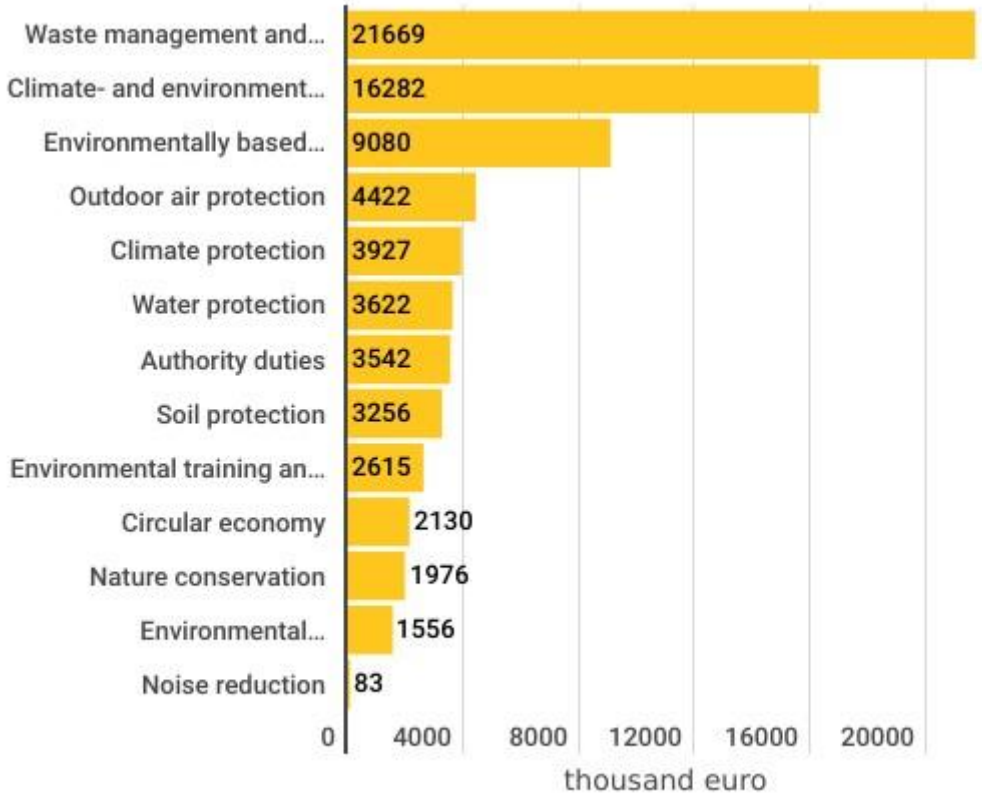
In 2020, the foundation also served as an expert and mentor in numerous projects and networks of Helsinki, advancing the cooperation of the public and private sectors.

Smart & Clean is the world's leading community focused on building effective climate solutions. New mobility, housing, energy and circular economy solutions mitigate climate change and create new business.

Environmental economics

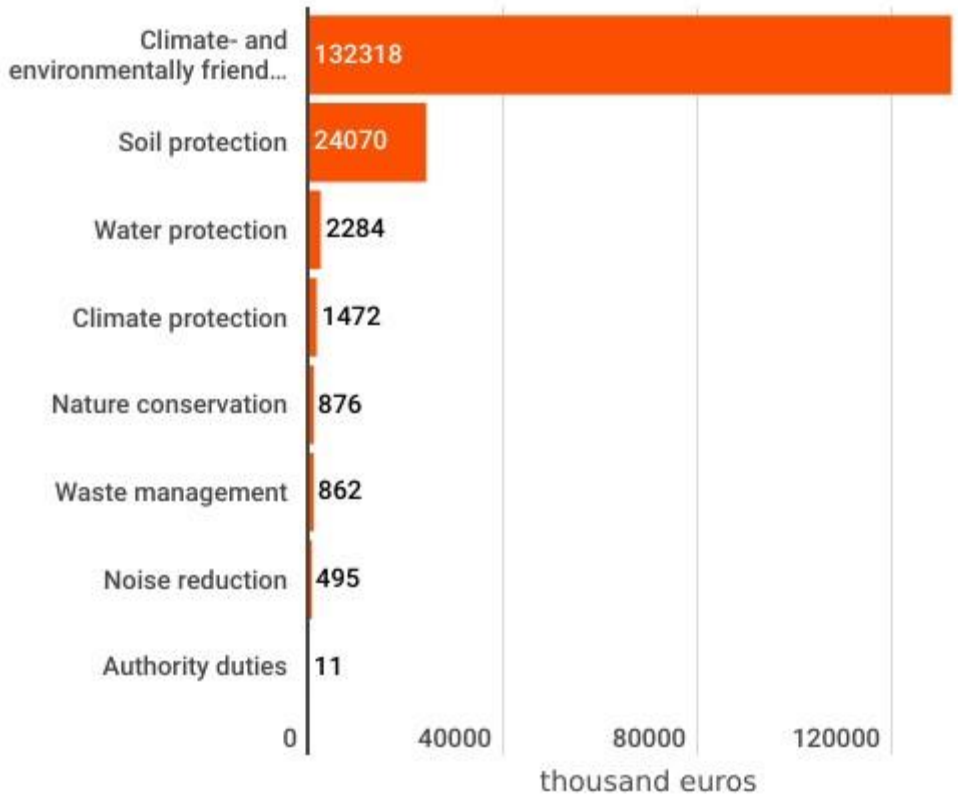
Environmental economy includes the income, costs and investments primarily arising from environmental reasons. The information is presented for the parent organisation, meaning the City's divisions, enterprises and departments.

The environmental costs, including amortisations, totalled EUR 74.2 million (+1% from 2019). The environmental costs accounted for 1.6% of the City's total operating costs, equalling 113 euros per capita. The City's largest expense items were the costs of sanitation and waste management of the areas (29%) and promotion of climate and environmentally friendly transport (22%).



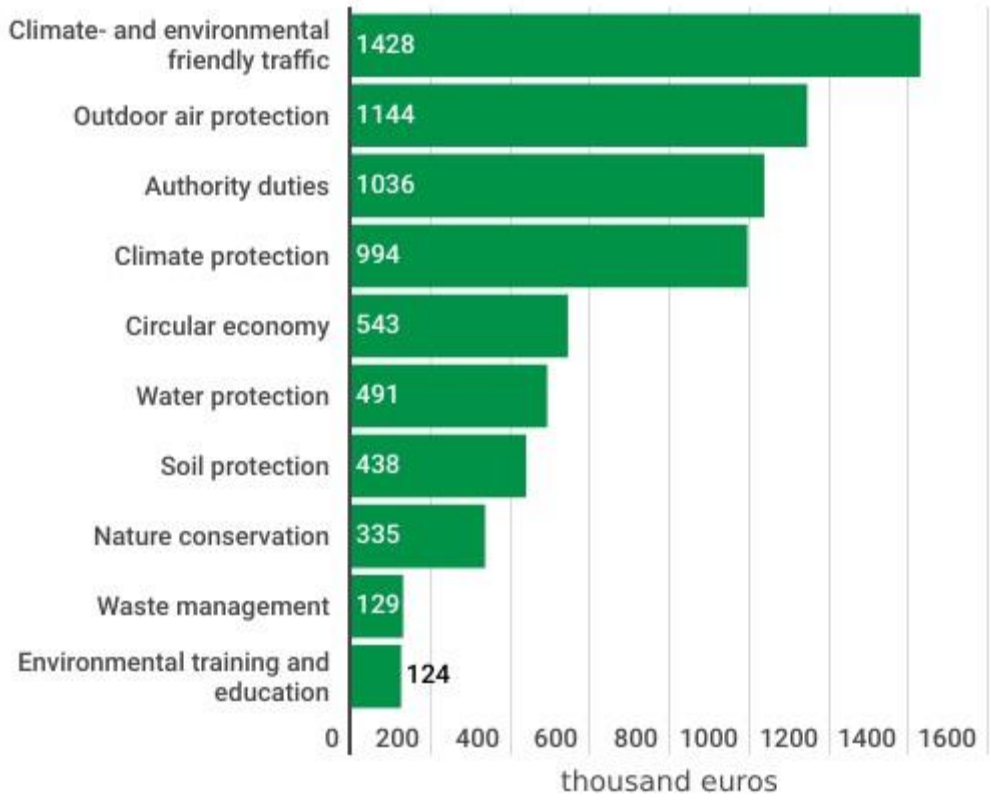
Picture 22. The City's environmental costs were €74,160,199 in 2020.

The environmental investments added up to EUR 162.4 million, which was 18.8% of the total capital expenditure of the City and 247 euros per capita. The City's environmental investments increased by 20% from the previous year, and the largest investments were related to the promotion of climate and environmentally friendly transport – including HKL's investments in public transport (81%) – and the restoration of contaminated soil (15%).



Picture 23. The City's environmental investments were €162,388,170 in 2020.

The internal environmental income added up to some EUR 6.6 million (-20% from 2019). The internal environmental income accounted for 0.6% of the total operating income of the City and was 10 euros per capita. The most significant income was generated from city bikes (20%) and vehicle transfer fees in connection with street cleaning (15%).



Picture 24. The City's environmental income was €6,661,886 in 2020.

The value of environmental responsibilities in the financial statements on 31 December 2020 was EUR 20.2 million. The responsibilities concerned preparing for the restoration of old landfills and decontaminating soil.

Realisation of environmental policy in 2012-2020

The City Council approved the environmental policy on 26 September 2012. The environmental policy complements the City Strategy with regard to environmental protection. The environmental policy sets out the City's environmental protection objectives for the medium term (2020) and long term (2050). The target year for the medium term has been reached, and this chapter serves as a separate section of the report, assessing the realisation of the City's environmental policy between 2012 and 2020. The full environmental policy can be found in Finnish at www.hel.fi/ymparistopolitiikka. The environmental policy will be updated during 2021.

Climate protection

With regard to the mitigation of climate change, matters have progressed rapidly in terms of both targets and practical measures. Climate matters have also been incorporated into the City Strategy 2017–2021 and given more emphasis. The most significant elements have been bringing the carbon neutrality target forward from 2050 to 2035 and the Carbon-neutral Helsinki 2035 Action Plan that supports the achievement of this target.

Helsinki's greenhouse gas emissions have decreased by 33% from 1990. Renewable energy amounted to 24,5% in 2020. The goal of the international Helsinki Energy Challenge competition held by the City was to find new innovations, technologies and solutions with which the coal used in Helsinki's heating can be replaced in an ecologically and economically sustainable way. Helsinki is committed to sharing the competition results openly with other cities.

Great efforts have been made to promote energy efficiency. For example, the City has set very high energy efficiency targets for its own new construction and repair sites. For new business premises, the E value representing the building's energy efficiency must be 20% lower than required in Finnish legislation. Similarly, the E value should be no more than 80% of the requirements of Finnish legislation after the renovation of premises. New residential buildings commissioned by the City will belong to energy efficiency class A. In the City's own building stock, locally generated renewable energy such as geothermal and solar energy will be strongly invested in. Energy efficiency class A is also required in the plot conveyance terms, and the Energy Renaissance operating model has been launched to support energy renovations of the private building stock.

The integration of climate change adaptation into the City's operations has progressed slowly. The City has prepared climate change adaptation policies, but the implementation of the policies is still in its early stages. The Stormwater Management Programme has been successfully integrated into the City's operations, and the City has identified the weather and climate risks posed to Helsinki.

Medium-term targets, Climate protection:

- Greenhouse gas emissions (consumption-based) will have decreased by at least 20% by 2020 due to improved energy efficiency and a switch to energy production with low lifecycle emissions (reference year 1990). The requirements for raising the emissions target to 30% will be investigated.
- Renewable energy will account for at least 20% of the total energy production in 2020.
- Energy efficiency will have improved by at least 20% by 2020 (measured by energy consumption per capita, reference year 2005).
- Adaptation to climate change will be integrated into the operations of all organisational departments in order to minimise risks. The impacts of climate change and the measures that can be taken to prepare for it will be communicated to municipal residents and companies.

Air quality

Air quality in Helsinki has improved in the last few years. The number of days on which the limit value for inhalable particles (PM10, i.e. street dust) has been exceeded per year has not risen above the maximum limit (35 days) since 2006. The long-term target of the environmental policy is to reduce the number of days on which the limit value for inhalable particles is exceeded by half, to less than 18 per year. This has been achieved at the majority of the measuring stations. Of air contaminants, the annual limit values for nitrogen dioxide (NO2) were last exceeded in 2016 and 2018. However, the limit value for NO2 is still at risk of being exceeded in street sections spanning a total of 4.2 kilometres in the inner city area. The most important factor reducing the amount of nitrogen dioxide is the replacement of the car population and bus fleet, which the City can promote with the electrification of the transport system and incentives for using low-emission cars.

Medium-term targets, Air quality:

- The limit values for air quality have not been exceeded since 2015. The concentrations of air contaminants (including fine particles) will have decreased further since then.
- The target values and national reference values for air quality will not be exceeded.

Noise abatement

The number of residents exposed to traffic noise exceeding the reference value of 55 dB in Helsinki has not decreased since 2012, even though a number of noise abatement measures have been taken. For example, speed limits have been lowered in many places, and nine noise barriers have been built since 2012 to protect residential areas that are home to many people exposed to loud noise. In the planning of new residential areas, noise abatement is taken into account in sound insulation, building masses and the placement of sensitive sites in areas protected from noise, among other things.

Medium-term targets, Noise abatement:

- Exposure to noise will have been reduced so that, by 2020, the number of people living in areas where the average level of noise exceeds 55 dB during the day is at least 20% lower than in 2003 (old residential areas; no new residents exposed to noise).
- Exposure to loud noise in particular will have been reduced so that, by 2020, no residents are exposed to average noise levels exceeding 70 dB during the day and 65 dB at night (old residential areas).
- The average daytime noise level of 60 dB is not exceeded in the play and outdoor areas of locations for the most noise-sensitive population groups, such as daycare centres, play parks, schools and nursing homes (old locations).

The Baltic Sea and small water bodies

The status of the marine environment in front of Helsinki is not good. However, the distance to good status is known for various variables and water bodies. Achieving good status for Helsinki's coastal water bodies by 2027 is challenging due to the naturally slow recovery rate of the marine ecosystem. However, current and new marine and water resources management measures are used to advance towards a better status for the coastal waters. Through the Baltic Sea Action Plan for 2019–2023, the intention is to develop the operations of the City and its extensive partner network, while simultaneously reducing the City's own load.

Helsinki's oil spill prevention and response preparedness at sea, on the coast and in small water bodies is at a good level, as is the management of exceptional situations in small water bodies.

The implementation of water resources management is underway for the key recreational islands. The construction of public infrastructure in Vallisaari and the implementation of the plan has started. There are plans to connect Vasikkasaari to municipal infrastructure via Kruunuvuorenranta around 2025.

The conversion of Helsinki's combined sewers into separate sewers is progressing slowly. The alteration work is the responsibility of the Helsinki Region Environmental Services Authority (HSY). Frequent rainy weather greatly affects combined sewer network overflows.

Barriers to fish passage have been successfully removed, but there is still work to be done. In fact, the intention is not to remove all barriers, as the City also wishes to protect other identified natural values from being preyed on by fish (in Haltiala, for example). In principle, however, the City's aim is to ensure unobstructed flowing water for the biota. The restoration of the eastern branch of Vanhankaupunginkoski is currently underway.

Mid-term targets, Protection of the Baltic Sea:

- Helsinki's surrounding waters will reach good status by 2020 in accordance with the EU Marine Strategy Framework Directive.
- The good status of Helsinki's coastal water bodies will be achieved by 2027 with additional measures in accordance with the water resources management plan.
- The effectiveness of Helsinki's own oil spill prevention and response measures on the amount and extent of oil reaching inhabited shorelines will be significant under most natural conditions. Helsinki also aims to make the oil spill prevention and response assistance provided to the islands in the Baltic Sea highly effective.

Medium-term targets, protection of the surface waters of Helsinki

- A centralised water management system will have been built on the main recreational islands of Helsinki.
- The number of times the combined sewer network overflows will have been reduced by 20% from the current level.
- Barriers to fish passage will have been removed by 2020.
- Oil spill prevention and response measures will prevent oil from spreading, and oil collection from water surfaces and shore protection will be effective. The city has a sufficient number of trained people for beach clean-up operations.

Protection of nature and soil

Helsinki's nature is essentially diverse: forests, meadows, wetlands, beaches, islands, creeks and parks. During the monitoring period, the development of the green network has progressed well, but precise information on its ecological functionality is unavailable.

There are 20 nationally threatened vascular plant species, 31 nationally near-threatened species and 40 regionally threatened species found in Helsinki. Since 2013, five new mammal species (the Siberian flying squirrel, the serotine bat, the soprano pipistrelle, the wolf and the wolverine) have been observed in Helsinki.

Compensation of construction in green areas was not implemented during the monitoring period.

Not all old landfills in the city area have been restored, and the implementation of these projects has in part been postponed because of funding. Many of the city's contaminated areas have been restored, and these efforts continue as construction progresses.

The City has started manufacturing recycled substrate products, which secures the existing soil's seed banks and microbiota.

Medium-term targets, Nature:

- The ecological functionality of the extensive green network will be ensured as part of the regional whole.
- Established biomes and species will be preserved through care and restoration, as necessary.
- The natural structural characteristics of forests and mires will be preserved.
- The biodiversity of cultural landscapes will be preserved through renovations and long-term care.
- Construction in areas designated as green areas will be compensated in planning and green area planning by means such as improving the functionality and ecological quality of green areas, restoring natural sites or by creating new local green environments.

Medium-term targets, Soil:

- Old landfill sites in the city will be restored.
- The natural characteristics and functions (biological, chemical and physical) of soil will be preserved in green areas.
- The preservation of significant geological sites will be secured.
- The ecological functionality of the extensive green network will be ensured as part of the regional whole.

Procurement, waste and material efficiency

Many of the City's divisions and enterprises achieved the 50% target in the use of the environmental criteria for procurement. However, the target for 2020 was not achieved, as, on average, environmental criteria were used in 56% of the procurements by the City's divisions and enterprises when examined as individual procurements. There are significant differences between the City's divisions and enterprises in their use of the environmental criteria. Of the procurements made by the City of Helsinki Service Centre, Stara and the Education Division, more than 80% included environmental criteria in 2020.

Monitoring of sustainable procurements has been challenging, and the monitoring data is not reliable in all respects at the moment, even though monitoring linked to an agreement monitoring system has been developed. Since the setting of the percentage target, it has also been noted that the use of the environmental criteria is not appropriate in every procurement. Procurements with a considerable impact have been a focus in the use and development of the environmental criteria.

The development of sustainable procurements has been active, and the procurement criteria have been developed intensively. However, there are still challenges in the integration of the development work into the basic functions in procurements. Training in sustainable procurement has been held on an annual basis, but a systematic training programme has not yet been created.

The City organisation's size and the management of waste management agreements poses challenges to waste volume monitoring. Some of the City's operations are located in premises rented from parties outside the organisation and waste costs are included in the rent, meaning that the waste volumes cannot be determined.

The volume of mixed waste generated by the City organisation has not decreased significantly during the monitoring period. In 2020–2021, plastic collection has been increased in properties owned by the City. Extensive waste surveys were also conducted in properties by eco-supporters in 2019–2020.

The volume of municipal waste generated in the area of the Helsinki Region Environmental Services Authority (HSY) decreased by 9.22% per capita during the monitoring period.

Centralised coordination of earth masses has saved EUR 55 million, 8.2 million litres of fuel and 20,200 tonnes of carbon dioxide equivalents since the position of mass coordinator was established in 2014.

Medium-term targets, Procurements:

- 50% of the City's procurement processes will include environmental criteria by 2015.
- 100% of the City's procurement processes will include environmental criteria by 2020. Environmental criteria can be either absolute requirements or benchmarks.
- All organisational departments and subsidiary communities will be trained in making sustainable procurements.

Medium-term targets, Waste:

- The amount of municipal waste produced by the City organisation will stabilise to the 2013 level, and the amount of waste per employee will have decreased by 10% by 2020.
- The material utilisation rate of the municipal waste produced by the City organisation will have increased by 10 percentage points by 2020.
- The amount of municipal waste produced within the city will stabilise to the 2013 level, and the amount of waste per resident will have decreased by 10% by 2020.
- The logistics of earth masses required for construction, surplus soil and contaminated soil will be organised in an economical and eco-efficient manner.

Environmental awareness and responsibility

The environmental attitudes of the people of Helsinki and Vantaa were studied in 2017. The respondents' attitudes were very positive. Approximately 80% of the respondents put more emphasis on the environment than economic growth if these two were contradictory, and almost as many believed that environmental protection and economic growth are possible at the same time. This percentage has grown since the last survey, and especially young people believed in simultaneous environmental protection and

economic growth. The survey also asked the respondents about their personal willingness to pay for environmental protection. According to the responses, a clear majority would be willing to pay higher taxes or fees if the money was directed to nature protection, water protection, combatting climate change or improving air quality.

In 2018, the City commissioned a safety survey in which 66% of the respondents expressed concern over climate change. The percentage of concerned people has clearly increased compared to the survey conducted in 2015. The respondents highlighted global and city-wide concerns more than just concerns related to their own life. Climate change was a shared concern for all respondents, regardless of age. The greatest growth in the number of concerned persons was among the young respondents.

In transport, sustainable modes of transport have been prioritised more and large investments have been made in cycling and rail transport, for example. City bikes were introduced in Helsinki in 2016, and the service has been one of the most popular city bike services in the world when compared internationally.

Eco-supporters promote environmentally sustainable operating methods in their workplaces and increase environmental awareness. Eco-supporters have been trained for the City organisation relatively comprehensively, but it has been found based on annual surveys that eco-supporters do not have enough time for their work. It is also important for the eco-supporter's supervisor to be committed to environmental work, and this is not always the case. Based on annual surveys, 65% of eco-supporters feel that the activities have affected their workplace practices. Between 2012 and 2020, a total of 745 eco-supporters have been trained for the Helsinki Group, and 1,788 people have participated in further training.

Harakka Nature Centre, Nature School Arkki of Korkeasaari Zoo, Meriharju Nature House, and the Helsinki Metropolitan Area Reuse Centre's Environment School Polku offer nature school services and support educators with environmental education courses. The Helsinki Region Environmental Services Authority provides the schools in its area with the opportunity to apply for a school-year-long mentee school programme.

For several yeas, Climateinfo has been supporting and training residents and companies in the Helsinki Metropolitan Area in more sustainable everyday solutions. In 2019, Helsinki Marketing Oy Ltd launched the Think Sustainably service, which helps people choose more sustainable ways to live and spend time in Helsinki. The Helsinki Metropolitan Area Reuse Centre serves residents of the Helsinki Metropolitan Area at nine second-hand stores and a nationally operating online store.

Medium-term targets, Environmental awareness and responsibility

- Helsinki will be a pioneer in environmental education.
- Every work community will have a trained eco-supporter.
- The city's range of services will support the sustainable lifestyle of the city's residents and make environmental choices easy.
- City employees are aware of environmentally responsible practices and take them into account in their work.
- The good environmental awareness of decision-makers will lead to environmentally responsible decision-making.

Environmental management and partnerships

The City enterprises with the largest environmental impact will have implemented an audited environmental management system. Of the City divisions, the Social Services and Health Care Division and the Urban Environment Division are building a division-level EcoCompass environmental management system. In the Culture and Leisure Division, almost all service entities are either building or already implementing an audited environmental management system. The administration of the Education Division and some of the educational institutions and daycare centres have an environmental management system. 24 of the City's subsidiary communities utilise an environmental management system to reduce their environmental impact.

The process of integrating environmental management into the bonus scheme has not progressed. In the old City organisation, the objective had already been realised in more than 45% of the City's departments and enterprises. During the current organisation, the realisation of the objective has shown a downward trend.

Since the approval of the environmental policy, the City has set up the Climate Partners network. The network is intended for companies that wish to participate in the creation of a carbon-neutral Helsinki. The companies that become Climate Partners sign a climate commitment with Helsinki, in which the companies specify their own climate targets. Currently, the City has almost 90 Climate Partners.

The Baltic Sea Challenge network of the Cities of Helsinki and Turku has so far been joined by 315 operators that are committed to protecting the Baltic Sea alongside the Cities.

The EcoCompass environmental management system was originally developed by the City of Helsinki as a tool for SMEs. The management of EcoCompass and the trademark were transferred to the Finnish Association for Nature Conservation in 2018. At present, EcoCompass is the fastest growing environmental management system in Finland in terms of the number of users.

The Urban Environment Division has granted a 30% discount on the rent collected for the use of its areas to events that are using an EcoCompass environmental management system. The EcoCompass system of the Helsinki Events Foundation was audited in late 2020. Thus, environmental aspects are taken into account in all significant public events of the City of Helsinki, such as Helsinki Festival, Lux Helsinki, Helsinki Day, Helsinki's New Year's Eve celebration, Helsinki Baltic Herring Market and Helsinki Christmas Market.

Medium-term targets, Environmental management:

- The City's enterprises will have implemented an audited environmental management system.
- City departments and subsidiary communities will include environmental management in their operations in accordance with the principles of lighter environmental systems.
- Environmental management will become a part of the bonus schemes and other reward systems used by the City's departments and enterprises.

Medium-term targets, Partnerships:

- The City will actively seek partnerships and network with companies and other interest groups in order to achieve the targets and objectives set out in its environmental policy, while simultaneously supporting the implementation of the City's business strategy.
- The EcoCompass system will become a well-known tool for improving environmental management among SMEs, and it will become available to all SMEs operating in the Helsinki Metropolitan Area.
- The Baltic Sea Challenge will have been accepted by 300 operators, whom the City will support in order to realise high-quality action plans that enhance the protection of the Baltic Sea.
- An environmental programme or plan will be drawn up for all major events organised in the city.

Environmental indicators

The tables below show the indicators monitoring the implementation of the city's environmental policy for 2012, 2016 and 2020.

Table 10. Indicators for environmental management and partnerships

Object	2012	2016	2020
The share of administrative branches (out of all administrative branches) that carry out environmental management at least in accordance with the criteria for streamlined environmental systems will be 100 % by 2020 (environmental policy).	14%	45%	58%
Number of administrative branches (of administrative branches that use bonus schemes) where environmental management is part of the bonus scheme will be 100 % by 2020 (environmental policy).	-	29%	17%
The combined number of audited EcoCompass companies, Climate Partners companies and organisations that have accepted the Baltic Sea Challenge will increase (environmental policy).	257	404	614

Table 11. Indicators for climate change mitigation

Object	2012	2016	2020
Greenhouse gas emissions in the Helsinki region to fall by 30% from the 1990 level by 2020 (Strategy Programme 2013–2016) and by 60% by 2030. Helsinki to be carbonneutral by 2035 (Strategy Programme 2017–2021).	-14 %	-25 %	-33 %
Per capita greenhouse gas emissions in the Helsinki region.	5,0 (t CO_2-ekv.)	4,3 (t CO_2-ekv.)	3,6 (t CO_2-ekv.)
Per capita greenhouse gas emissions in the Helsinki region to fall by 39% from the 1990 level by 2030 (Helsinki Metropolitan Area Climate Strategy).	-30%	-42%	-50%
Greenhouse gas emissions from energy production to fall by 20% from the 1990 level by 2020 (Strategy Programme 2013–2016) and by 40% by 2025 (Carbon Neutral Helen Ltd 2035) Energy consumption per capita in the Helsinki area to fall by 20% from the 2005 level by 2020 (Environmental Policy).	0,4% -7 %	-3,9% -12 %	-20,7% -18,3 %
Renewable energy in the urban area to account for at least 20% of total energy production by 2020 (Environmental Policy).	14 %	18 %	24,5 %

The proportion of renewable energy of energy production to reach 20% by 2020 (Strategy Programme 2013–2016) and 25% by 2025 (Carbon Neutral Helen Ltd 2035).	6,8%	11,6%	14,5%
The energy savings in the City's own operations (public buildings, vehicles, street lights) will be 61 GWh by the end of 2025. The energy savings of City-owned residential buildings will be 55.7 GWh by the end of 2025.	- -	- -	16,3 GWh (26,7% of the objective) 31,7 GWh (56,9% of the objective)
Object Greenhouse gas emissions in the Helsinki region to fall by 30% from the 1990 level by 2020 (Strategy Programme 2013–2016) and by 60% by 2030. Helsinki to be carbonneutral by 2035 (Strategy Programme 2017–2021).	**2012** -14 %	**2016** -25 %	**2020** -33 %
Per capita greenhouse gas emissions in the Helsinki region.	5,0 (t CO_2-ekv.)	4,3 (t CO_2-ekv.)	3,6 (t CO_2-ekv.)

Table 12. Indicators for traffic

Object	2012	2016	2020
The proportion of sustainable modes of transport to increase (City Strategy 2017–2021).	75 %	77 %	80 %
The number of public transportation trips will increase (strategy programme 2013-2016).	405 trips/ resident/a	379 trips/ resident/a	205 trips/ resident/a
The carbon dioxide emissions of road traffic in Helsinki to decrease by 20% from 1990 to 2030 (Helsinki Metropolitan Area Climate Strategy). Greenhouse gas emissions to decrease by 69% by 2035 (Carbon-neutral Helsinki 2035).	-8 %	-18 %	-16 %
Carbon dioxide emissions of passenger cars registered for the first time in Helsinki will reach the objective for average emissions 95 gCO_2/km by 2020 (EU regulation).	140 g CO_2/km	118,9 g CO_2/km	98,3 g CO_2/km
Share of cycling as a transport mode will be 15 % by 2020 (the Brussels Convention 2009).	11 %	10 %	11 %

Table 13. Indicators for air protection

Object	2012	2016	2020
Annual average nitrogen dioxide concentration on the Mannerheimintie monitoring station will not exceed 40 mikrog/m³ (EU directive).	49 µg/m^3	32 µg/m^3	16 µg/m^3
Annual average nitrogen dioxide concentration on the Mäkelänkatu monitoring station will not exceed 40 mikrog/m³ (EU directive).	50 µg/m^3	37 µg/m^3	21 µg/m^3
Number of days when the limit value level of particulate matter exceeds on the Mannerheimintie monitoring station will be max 35 days per year (EU directive).	7 pcs/a	7 pcs/a	3 pcs/a

Number of days when the limit value level of particulate matter exceeds on the Mäkelänkatu monitoring station will be max 35 days per year (EU directive).	No measurement.	16 pcs/a	8 pcs/a
The annual average amount of inhalable particles (PM_{10}) is decreasing.	13 µg/m^3	13 µg/m^3	11 µg/m^3
The annual average amount of fine particles ($PM_{2.5}$) is decreasing.	7,4 µg/m^3	5,9 µg/m^3	5,5 µg/m^3

Table 14. Indicators for noise reduction

Object	2012	2016	2020
Noise barriers to protect current land use will be constructed as presented in the operating plan.	0 m/a	0 m/a	0 m/a
Anti-noise coating will be used as presented in the noise operating plan. The operating plan includes a target network of 50 sites, including a total of 35,960 meters of anti-noise coating.	1 410 m	1 580 m	1 870 m

Table 15. Indicators for water protection

Object	2012	2016	2020
Nitrogen emissions to the sea from the Viikinmäki waste water treatment plan will reduce (t/a) (environmental policy).	593 t/a	409 t/a	478 t/a
Phosphorous emissions to the sea from the Viikinmäki waste water treatment plant will be reduced (t/a) (environmental policy).	26 t/a	21 t/a	21 t/a
Number of combined sewer network overflows will reduce 20 % from the current level by 2020 (environmental policy).	Reference year	70%	-41%

Table 16. Indicators for nature protection

Object	2012	2016	2020
Share of nature reserves of total area (City of Helsinki Nature Conservation Programme 2008–2017). The nature reserves proposed in the City of Helsinki Nature Conservation Programme will increase the protected area to 5.6%.	2,20%	2,20%	3,20%
The change in the number and area of nature reserves.	-	-	+4 pieces and 140.3 hectares from 2019
The surface area of water-permeable areas in Helsinki (the urban run-off water strategy for the City of Helsinki).	60 %	60 % (2015)	61 %
The proportion accounted for by nature areas of all land areas and the change in this proportion.	-	36,1% (data for 2015, when the share was calculated for the	Not calculated.

		first time).	
The relative area of forests and wooded areas of all land areas.	-	-	43 %
The number of bees and the change in the number.	-	-	About 20 species, no change from the previous year.

Table 17. Indicators for procurements and waste

Object	2012	2016	2020
Share of environmental criteria in the centralized acquisitions of the City of Helsinki will be 50 % by 2015 and 100 % by 2020 (environmental policy).	37 %	75 %	49 %
Amount of communal waste produced in the Helsinki metropolitan area per capita will reduce 10% by 2020 (environmental policy).	293 kg/resident/a (Reference year)	282 kg/resident/a	266 kg/resident/a

Table 18. Indicators for environmental awareness

Object	2012	2016	2020
The number of eco-supporters in the city organisation will increase, so that every work community will have a dedicated eco-supporter (environmental policy).	1139	1285	1474
The share of citizens who have taken part in the environmental education events and climate and energy guidance provided by the city will increase, so that the environmental awareness of city personnel and citizens will be improved (environmental policy).	12 %	30%	20 %