Environmental Report

2019

Helsinki

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Helsinki

Contents

Address by the Deputy Mayor

The coronavirus pandemic and the restriction measures necessitated by it have highlighted the importance of our natural areas more brightly than anything in a long time. Over the course of the spring, our shores and forests have been visited by more people than perhaps ever before.

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. In fact, we have managed to make many important decisions and carry out many important actions to protect our unique nature in Helsinki.

In 2019, we took both small and big steps to protect nature, from establishing conservation areas to transplanting oaks from construction sites of the Jokeri Light Rail project to new locations.

Helsinki's Nature Conservation Programme was implemented more actively than in many previous years. Our newest conservation areas are the Kallahti bank, the Maununneva expansion and Korkeasaarenluoto. The Kallahti bank is Helsinki's only underwater conservation area, and it is home to the underwater meadows of Kallahdenharju and their species. The Centre for Economic Development, Transport and the Environment is still processing founding proposals concerning the Haltiala forest and four small, important bird islets: Madeluoto, Pormestarinluodot, Kajuuttaluodot and Morsianluoto.

Helsinki is carrying out systematic and long-term work to prevent climate change on all possible fronts. Even though our emissions are decreasing according to plan, we must get a firmer grip on district heating emissions. We must ensure that our emissions keep decreasing every year, including the years preceding the shutdown of the Hanasaari coal plant. However, we made important decisions in 2019 regarding investments in solar power, and in terms of energy efficiency, we are far ahead of the national requirements.

In order to seek new perspectives, we are currently holding an international challenge to find sustainable alternatives to coal. Our hope is that finding usable solutions to the most pressing issue of our time will help not only Helsinki, but the world at large. In 2019, we introduced an internationally unique climate work monitoring service called Climate Watch. Thanks to the service, anyone can monitor the progress of the measures and their effect on Helsinki's carbon emissions.

In 2019, we also began work to restore Vanhankaupunginlahti. The area is an internationally significant wetland bird conservation area, and restoring the area helps to protect its endangered birdlife. We began monitoring visitors to conservation areas last year and found that Lammassaari island, located in the Vanhankaupunginlahti bay area, was visited by more than 138,000 people. This number will surely be exceeded by far this year. I am especially glad and thankful for the five newcomers in the area: a family of white-tailed eagles on Klobben island – a concrete indication of the value of long-term protection work.

Anni Sinnemäki
Deputy Mayor for Urban Environment

Environmental key figures 2019

Greenhouse gas emissions have decreased by **26%**

from 1990 but increased **2%** from 2018

City bikes were used **3 million** times

35 new forests inhabited by flying squirrels were found

The water consumption of Helsinki residents was **180** litres/day/resident

Lammassaari had more than

138,000

visitors

Environmental investments totalled

€135 million

More than

27,000

city residents took part in a voluntary spring cleaning event

The residents and Heka decreased the calculated amount of mixed waste by

1,500 tonnes

A total of

21

species of bumblebee were observed in the pollinator monitoring of green areas

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 2019 Helsinki had a population of 653,835. As of the end of 2019 the population density was 3,059 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 445,000 jobs in Helsinki in 2019. Helsinki accounts for 17 per cent of Finland's jobs. The business demographics of the city are similar to other European capitals – strongly service-oriented: the service sector provides approximately 90 per cent of all jobs.

From an environmental perspective the City of Helsinki is amongst the most significant actors. 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, the City is Finland's largest employer, due to which the City's operations have significant environmental impacts because of the volume of office work, for example.

The Helsinki Group comprises the following communities:

- The City as a parent community (4 divisions, City Executive Office, Audit Department and 5 municipal enterprises)
- subsidiary communities, i.e. organisation which are owned directly by the City (83 subsidiary organisations and 12 foundations)
- associated communities, i.e. companies, foundations and joint municipal authorities in which the City has a 20–50 per cent ownership stake (53 associated companies and 6 joint municipal authorities)

At the end of 2019 the City employed 37,459 people

Helsinki

Population
653,835

Population density
3,059/km²

Surface area
715.48 km² of which

Land	Water
30%	70%

Jobs
445,000
17% of Finland's jobs

Environmental management and partnerships

Environmental matters are a part of the City Strategy, which is complemented by the environmental policy of the City. When monitoring the environmental policy indicators shown in the Environmental Report, we are also partially monitoring the implementation of the City Strategy. The information in the environmental report and statistics is open data. The environmental management in the City organisation is described on the next page.

The EcoCompass environmental management system was audited in 2019 at Helsinki City Library and Kinapori Senior Centre. Construction of the EcoCompass systems was under way in Sports Services and Youth Services, as well as the Urban Environment Division. Three City of Helsinki subsidiary communities began to build the EcoCompass system in 2019.

The Helsinki Events Foundation decided to introduce EcoCompass in all of its operations. This means that goal-oriented environmental work will soon cover many events familiar to the residents of Helsinki, from the Helsinki Festival and LUX Helsinki to the Helsinki Baltic Herring Fair and the Mayor's Independence Day Celebration for fourth graders. The operating model is new, and instead of certifying individual events, the goal is to have a systematic environmental programme and an EcoCompass certificate that covers the Event Foundation's entire event production.

Helsinki City Theatre introduced EcoCompass at the end of the year. The City Theatre's EcoCompass programme will be built to cover the Big Stage and the Small Stage, as well as Studio Pasila, the Arena Stage and Lilla Teatern. The City Theatre's strength lies in its informed staff, and systematic environmental work makes it possible to have a positive effect on staging materials, procurements for the building, people's mobility and environmental awareness alike.

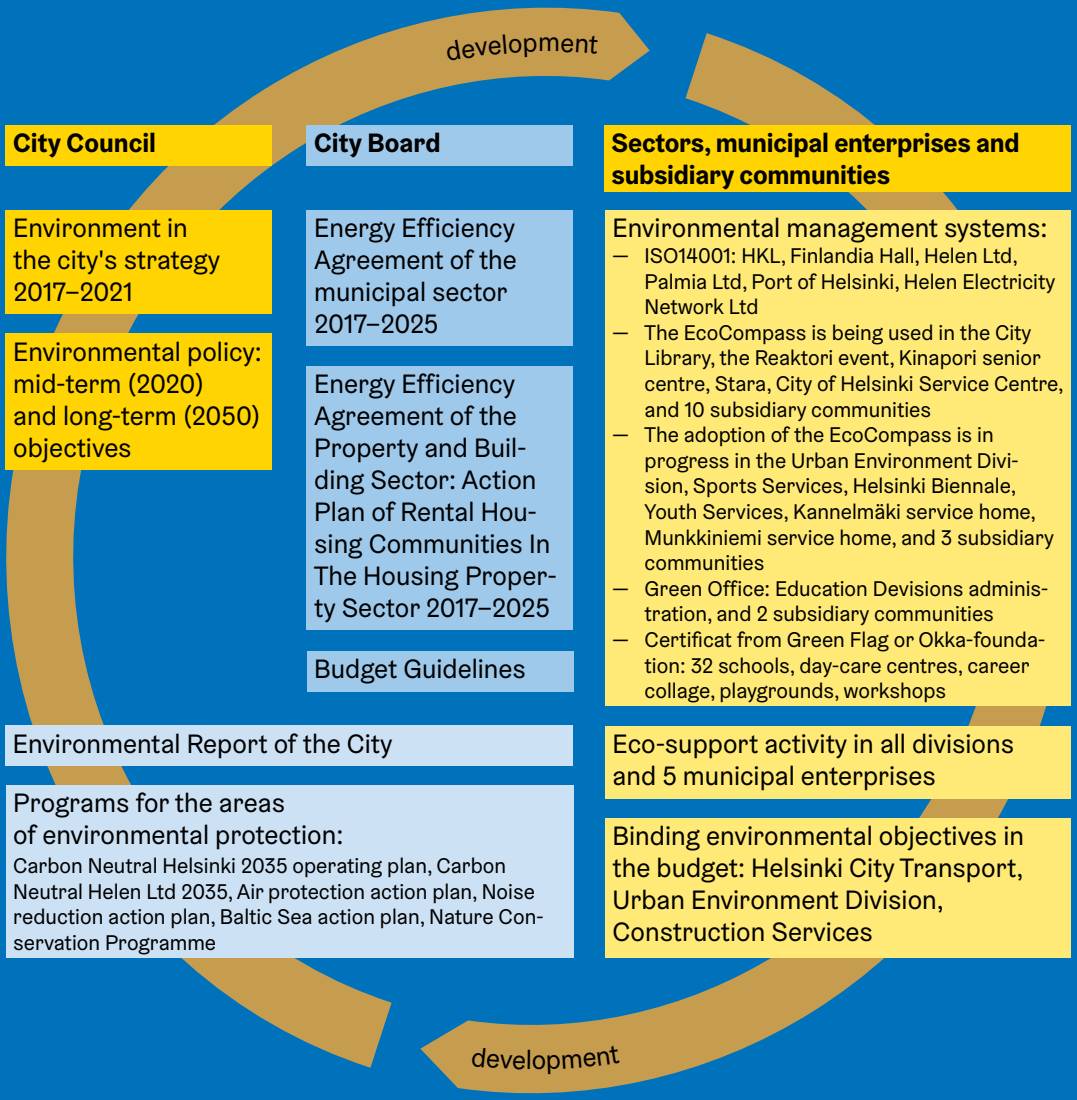
Kiinteistö Oy Kaapelitalo provides facilities for numerous cultural events and operators at the Cable Factory and in the Suvilahti area. Kaapelitalo decided to introduce EcoCompass in its operations at the end of the year. Among the key aspects of Kaapelitalo's EcoCompass are reducing the environmental effects of old and valuable properties and supporting the environmental responsibility of event organisers, lessees and other co-operation partners.

Three City of Helsinki subsidiary communities began to build the EcoCompass system in 2019.

The City granted a discount of 30% on the rent charged for area use for an audited EcoCompass environmental system to six events: the Helsinki City Running Day, Citroën Naisten Kymppi – Women's Fun Run, the Flow Festival, the World Village Festival, Great Beers – Small Breweries and Slush The Borough.

The City's parent organisation had 765 trained eco-supporters and approximately 220 appointed eco-supporters by the end of 2019. Several subsidiary communities also had trained eco-supporters. By the end of 2019, the operations had spread from Helsinki to 22 Finnish municipalities. Additionally, the operating model is used by the Uusimaa Centre for Economic Development, Transport and the Environment; the Helsinki Region Environmental Services Authority (HSY); the Helsinki-Uusimaa Regional Council; the U.S. Embassy in Finland; the Eteva

Model for City of Helsinki's Environmental Management



The observance of environmental issues in Helsinki is governed by the City Strategy and the environmental policy approved by the City Council, as well as the budget guidelines approved by the City Board. The City also has several programmes for a number of sectors in the field of environmental protection which all direct the environmental management. The environmental work of the divisions, public enterprises, departments and subsidiary communities supports the environmental management of the City. The eco-supporters have a major role in putting the actions into practice.

Joint Municipal Authority and the Finnish National Board of Education.

In 2019, the eco-support activities continued the previously developed form of support for developing environmental matters at workplaces: eco-support aid. The aid was distributed based on the applications of the eco-supporters for projects such as a environmental education, cleaning local nature, developing waste sorting and promoting sustainable transport.

Helsinki also wants to engage businesses in practising environmental responsibility and reducing their emissions. Over the course of the year, a total of four events were organised for businesses that have joined the Climate Partners network and other parties interested in the matter. The common thread of the events was the Carbon-neutral Helsinki 2035 programme. At the beginning of the year, the action plan's economic effects were discussed with the Climate Partners. In the autumn, the focus was on finding solutions at the Climate Partners' annual seminar and Accelerate Helsinki, among others. First-time events included the Circular Economy in Construction market dialogue event, which proved highly popular.

In July 2019, Helsinki submitted its first voluntary report on the realisation of the Agenda 2030 sustainable development goals to the UN. In connection with the realisation report, the City Strategy and its top projects, as well as the Carbon-neutral Helsinki 2035 action plan, were assessed in relation to the UN's objectives on sustainable development. In terms of the aforementioned, several objectives could be identified through which Helsinki participates in promoting the UN's objectives on sustainable development. In fact, a significant portion of realising the UN's objectives on sustainable development takes place at local level. This being the case, Helsinki and New York have inspired several other cities to take part in carrying out voluntary realisation reporting.

Helsinki's work on sustainable development is also supported by the City's ethical principles, which were approved by the City Board in October 2019 and complement and open the City's values. In accordance with the ethical principles, the City emphasises sustainable development in its operations and fights climate change, among other things.

In September 2019, the Helsinki City Council approved the goal of halving the City's production of meat and dairy products by 2025. This decision complements the Carbon-neutral Helsinki 2035 action plan, which focuses primarily on reducing direct emissions produced within the city. However, the City must also be able to reduce its consumption-related emissions.

Food aid-related emissions will also be reduced in Helsinki in the future, as the City Council granted funding for establishing a food waste terminal. Logistics related to distributing food waste can be centred to the terminal, reducing the emissions generated from storing and transporting food waste. Social work provided to food aid customers will also be developed and increased at the same time.

Tourism is one of the most rapidly growing sectors in the world, and this growth can be seen in Helsinki as well. The City began drawing up a sustainable tourism programme in 2019. The programme will define a long-term vision for 2030 and more detailed procedures until 2025. The programme will be completed in 2020.

Eyes on the future

The City's environmental policy will be updated in 2020 and environmental co-operation between the City's different operators will be strengthened. In environmental management system work, the long-term goal is to establish division-specific environmental management systems, and EcoCompass has been found to be a functional system, although the ISO 14001 system also meets the City's goals for environmental management.


Smart & Clean

Smart & Clean

In its third year of operation, the Smart & Clean Foundation has continued its work on creating and orchestrating effective climate solutions. A report published by the Intergovernmental Panel on Climate Change (IPCC) in the autumn of 2018 affirmed the need to urgently find systemic solutions to limit global warming to 1.5 °C. Cities play a key role in creating and realising such solutions.

As its top project, the Foundation started a scheme aiming at significant climate impacts and a permanent change. The project focuses on a closed circulation system for all plastics used in the Helsinki metropolitan area, implemented in co-operation between public and private operators. Only six percent of virgin plastics coming to the Helsinki region and Lahti are recycled for reuse as materials. The goal is to increase the recycling rate to 60%. This would decrease carbon dioxide emissions by 336,000 tonnes, which is estimated to be equivalent to the average emissions of 80,000 people living in Helsinki. To support this change, the Foundation has implemented a dynamic data model used to assess total flows of packaging plastic throughout the entire system from raw material import to recycling.

The City of Helsinki is involved in the Task Force management group of the Circulating All Plastics process together with the City of Espoo, Fortum, HSY, Lassila & Tikanoja, Siemens and VTT. The City's goal is to carry out effective procedures especially through means that promote the recycling of plastics in public procurements and on construction sites. The work will continue in 2020.

As part of the Carbon-neutral Helsinki 2035 action plan, the Foundation and the City have been involved in producing an action plan for smart and clean (S&C) growth. The first phase involved creating a description of the S&C sector and a list of S&C businesses for monitoring turnover and jobs.

Over the course of the year, the Foundation's operating model received international recognition. It has been recognised as the world's leading co-operation model in which cities can build strong cross-sectoral partnerships with businesses and accelerate the change towards a 1.5 °C world. The account was produced by the C40 Cities Climate Leadership Group, the Climate Disclosure Project (CDP) and the World Business Council for Sustainable Development (WBCSD). In 2020, these leading networks will launch a global City-Business Climate Alliance programme between cities and businesses, which the Foundation has consulted on through knowledge accumulated over three years.

Over the course of the year, six Smart & Clean change projects were completed. The projects realised focused on new traffic solutions, city food, smart property renovation construction, storm water quality control, indoor air quality, air quality measurement and using biofuel in buses and machinery. More than 150 businesses and all of the cities in the Helsinki region were involved in the projects. A significant portion of the businesses were SMEs and start-up companies, for which domestic market references and international growth are important. The projects resulted in approximately 20 international references for businesses.

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

Climate protection

According to the City Strategy 2017–2021, Helsinki will be carbon-neutral by 2035, and greenhouse gas emissions will be reduced by 60% by 2030. In December 2018, the City Board approved the Carbon-neutral Helsinki 2035 action plan, the implementation and monitoring of which began in full force in 2019. Even closer co-operation on climate matters was built both within the City and with other important stakeholders, with a focus on openness and transparency.

Near the end of the year, Helsinki's Climate Watch service, with which anyone can monitor how the City is proceeding in its climate goals and procedures, was launched. A contact person has been appointed for each of the 147 Carbon-neutral Helsinki procedures. The contact persons will compile information about their procedures and their progress into Climate Watch on a regular basis. All the underlying assumptions and calculations, based on which the emissions are estimated, will also be made public in the future. Climate Watch describes the magnitude and effectiveness of each measure in achieving carbon neutrality. The service can also be used to search through and view Helsinki's climate actions according to theme and operator. Political decision-makers can use Climate Watch when assessing whether the procedures are progressing as agreed. Thanks to open data, researchers can assess the impact of the measures, as well as the assumptions and calculations behind the actions. Climate Watch has generated plenty of interest in other cities, both in Finland and internationally. A civic group called the Helsinki Climate Guard Dogs has also formed around the service. Climate Watch is open source code and can be freely used by other cities as well. In addition to the City of Helsinki, it has been funded by the EIT Climate-KIC programme.

Over the course of 2019, Helsinki prepared a key Carbon-neutral Helsinki procedure called the Energy Renaissance programme, the purpose of which is to expedite energy renovations carried out in privately owned buildings. The goal is to decrease the amount of heating energy by tens of per cent in Helsinki's entire building stock by 2035. Among other things, Helsinki develops energy renovation implementation advice services for residents and businesses and designs its city districts increasingly in accordance with the carbon neutrality objective.

Helsinki's Climate Watch service, with which anyone can monitor how the City is proceeding in its climate goals and procedures, was launched.

Helsinki is piloting the formation of regional housing company networks in the Myllypuro area. This trial is being incrementally expanded to cover the entire city. Helsinki has also participated in extensive energy audits focused on buildings typical of their age, and the information obtained from these audits can be used to recommend energy efficiency renovations to similar housing companies. The Energy Renaissance programme will be completed in 2020.

In the Climate-smart Housing Companies project coordinated by Helsinki, solutions are sought to improve the energy efficiency of apartment buildings using digital services and solutions based on housing company data. Since the spring of 2019, temperatures, air humidity and carbon dioxide concentrations have been measured in a total of seven housing companies in Helsinki and Vantaa. As a trial over the course of the spring of 2020, the measured data and other housing company information will be shared and utilised through a data hub developed in the project.

Here is how a carbon-neutral Helsinki was promoted in 2019

The

Climate Watch

service for monitoring emissions and climate actions was launched

The

Energy Renaissance

programme was being prepared

The development of

emission-free worksites

was started

59

public electric car charging stations were built

Circular and sharing economy roadmap

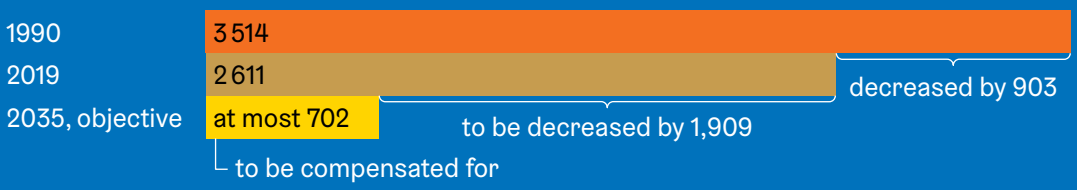
was being prepared

Solar power systems with a total power rating of more than

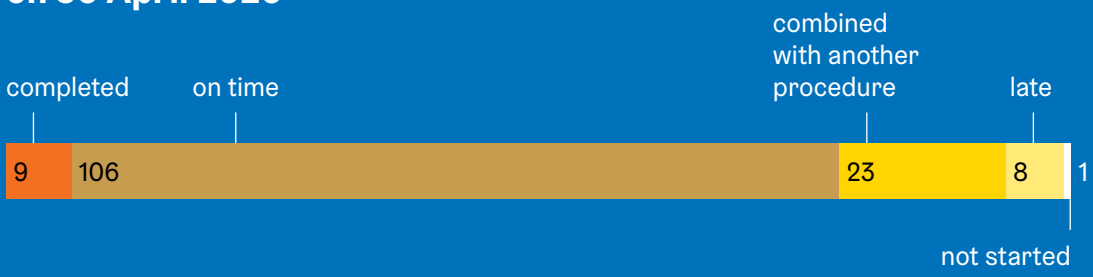
1,100 kWp

were installed at six service buildings

Emission situation in Helsinki, kt CO_2e



State of Carbon-neutral Helsinki 2035 procedures on 30 April 2020



Other procedures

A **Carbon-neutral Helsinki 2035 steering group** was appointed.

Travel instructions that emphasise low emissions came into effect in May 2019.

Service properties' **energy consumption data** was opened for public access.

A survey on **shortening the schedule of the carbon neutrality objective** was conducted for the Urban Environment Division and Stara.

The City's **climate change adaptation policies** were approved in May 2019.

The **Carbon-neutral Port of Helsinki by 2035** programme was approved in October 2019.

Emission criteria were tested in a binder procurement for infrastructure construction.

10 responsible procurement development projects were implemented.

Helen set its carbon neutrality goal to 2035 to match the City's goal.

An energy survey and the pre-construction carbon footprint for a **carbon-neutral Malmi Airport area** were carried out.

The City's own **E value targets in new construction were tightened** to be at least 20% lower than the regulatory level.

The **Tavarat kiertoon** recycling system was launched.

134 contact persons were appointed for the procedures of the programme.

16 training courses for using the Climate Watch and measuring actions were held.

Development targets

Faster realisation of the cycling network and cycle transport's role as part of the urban environment and urban culture.

Development of know-how in low-carbon construction.

Implementation of the energy renaissance.

As part of the project, in February 2020, HSY published an energy-themed online course intended for housing companies. The goal of the course is to increase residents' and board members' awareness of the energy consumption of their respective housing companies.

Based on information obtained from the project, a digital guide for housing companies will be published in the spring of 2020. The guide will provide information 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 will be from 9/2018 to 12/2020.

The City's plot reservation conditions were tightened in 2019, making them the strictest in Finland.

In accordance with the Carbon-neutral Helsinki 2035 action plan, the energy consumption of new buildings in the Helsinki area must decrease significantly, local renewable energy production must increase and emissions from centralised energy production must decrease considerably. The City carried out an extensive investigation into the emission of and cost effects of the new area in the Malmi Airport area. As a basis for designing the energy system of the area and in order to meet the carbon neutrality goals, an energy survey was carried out concerning the carbon-neutral Malmi Airport area. The survey contains various scenarios, based on which the design and energy solutions of the area can be guided and developed. The survey focused in particular on the energy consumption of new buildings in the area, the emission-free state of regional energy production and the life cycle costs of different solution alternatives. The survey was first started with a focus on zoned areas (Nallenrinne and Lentoasemankorttelit), but the solutions presented can be scaled over the entire planning area, which will be built in stages. The goal is to implement a carbon-neutral energy system in the Malmi Airport area that provides energy that is as low-emissions as possible from the start of the construction. According to the survey, instead of a conventional district heating solution, the area should feature a system that better utilises renewable energy and waste heat in order to reduce emissions from energy use. As a result of the survey, the best alternative turned out to be geothermal heat utilised in heating that is connected to the heating network of the area. In this alternative, the emissions and life cycle costs were the lowest. Additionally, the survey indicates that heat recovery from sewage plays a significant role in emission reductions. Matters to be taken into consideration in further planning include but are not limited to having a low-heat regional heating distribution network, possible locations for geothermal heat production in areas such as parks, and feasibility assessments. The City of Helsinki and Helen will develop the energy system of the area in co-operation in 2020.

In addition to regional energy systems, the City's key control measures in planning a carbon-neutral city are zoning, plot conveyance terms and land use agreements. The City's plot reservation conditions were tightened in 2019, making them the strictest in Finland, the A2018 energy efficiency level became obligatory in quality and price competitions, and carbon neutrality supports plot reservation on other plots as well.

In December 2019, Helsinki joined the World Green Building Council's zero-carbon construction commitment. The City commits to ensuring that energy use on all properties under its own control will be carbon-neutral by 2030 and that the City will develop its construction guidelines towards carbon-neutral buildings by 2030.

In 2019, six new projects were approved to be part of the 'Evolving block of flats' programme, all of which have sustainable construction as their development theme. The projects will be carried out on the City's land. In Oulunkylä, three buildings will be built in the same block: Kestävä kerrostalo ('Sustainable Apartment Building'), Elävä talo ('Living House') and Tulevaisuuden puukerrostalo ('Wooden Aparment Building

of the Future'). The main themes of Kestävä kerrostalo are massive brick construction and gravity-based ventilation. In Elävä talo, the goal is to create a long-lasting building stock that serves the residents' diversifying needs. Tulevaisuuden puukerrostalo is a project that compares three wooden apartment buildings implemented with different construction technologies. In Kalasatama, construction will begin on an EXCESS plus energy apartment building, and Jätkäsaari will feature a circular economy block that is planned, built and occupied in accordance with the ten principles of sustainable urban living (CO-10). Jätkäsaari will also house the Village Co-Living + LiM project, the development themes of which include comprehensive sustainability measurement. As the projects are completed, final and follow-up reports will be written on them.

In Helsinki, developers have been encouraged towards energy-efficient construction for several years by being offered an opportunity to receive a 30% discount on the building permit fee of a residential building project if the building is designed to have a low energy level. In 2019, a policy was also created to remove the permit fee for smaller geothermal heating systems drilled less than 300 metres deep.

In 2019, the Urban Environment Division and Stara carried out a joint survey on making their operations carbon-neutral. The goal was to establish the costs and procedures that would facilitate achieving carbon neutrality before 2035. The results of the survey support decision-making by describing the efficiency and the costs of the procedures.

When assessing the effects of climate change mitigation procedures, in addition to emission reductions, it is essential to also assess the impacts on health, nature and society, as well as direct and indirect economic impacts. Such perspectives are important in terms of decision-making. Finland's six largest cities, HSY, the Ministry of the Environment and the Finnish Environment Institute joined forces in the KILTOVA project to survey how impact assessments that also cover aspects other than green-

house gas emissions could be carried out on cities' climate programmes while also specifying greenhouse gas emission assessments. The project involved surveying what kind of methods and tools for assessing the impacts of various important aspects are available and how they could potentially be

Together with other Nordic and Finnish cities, Helsinki has begun to develop a concept for emission-free worksites.

combined into a tool for versatile impact assessments. The final report on the project was published in the Finnish Environment Institute's publication series. Additionally, there are plans for a follow-up survey in which individual but representative example procedures by cities will undergo a comprehensive impact assessment.

Together with other Nordic and Finnish cities, Helsinki has begun to develop a concept for emission-free worksites. The objective is to reduce construction machinery's greenhouse gas emissions, as well as their negative impact on the comfort and health of local residents, passers-by and workers. The most important methods for reducing emissions are the electrification of machinery and switching to renewable fuels. The emission-free worksite concept is being piloted in the Carbon-neutral and Resource-wise Industrial Areas project coordinated by the City of Helsinki on the City's infrastructure worksites and in their bidding competitions. The project also involves surveying the current state of the climate work of businesses in the Port of Helsinki area and the potential for reducing the emissions of heavy machinery, among other things. The duration of the project is from May 2019 to February 2021.

The mySMARTLife project, which approaches climate protection through the themes of smart urban development, continued development work on energy-efficient properties, decentralised energy production and the electrification of traffic. Monitoring of the heating control system utilising smart thermostats, which was installed in 2018, was continued in Merihaka, at the residential property located on Haapaniemenkatu 12. Based on the energy efficiency surveys carried out on the two housing companies in the area and the entire area in 2018, information exchange was continued with the housing companies in the area, as was surveying the possibility of utilising sea thermal energy as recommended in the energy efficiency survey. The possibilities of building a sea thermal energy plant in Merihaka will open up as the infrastructure work carried out in the area is completed in 5–7 years.

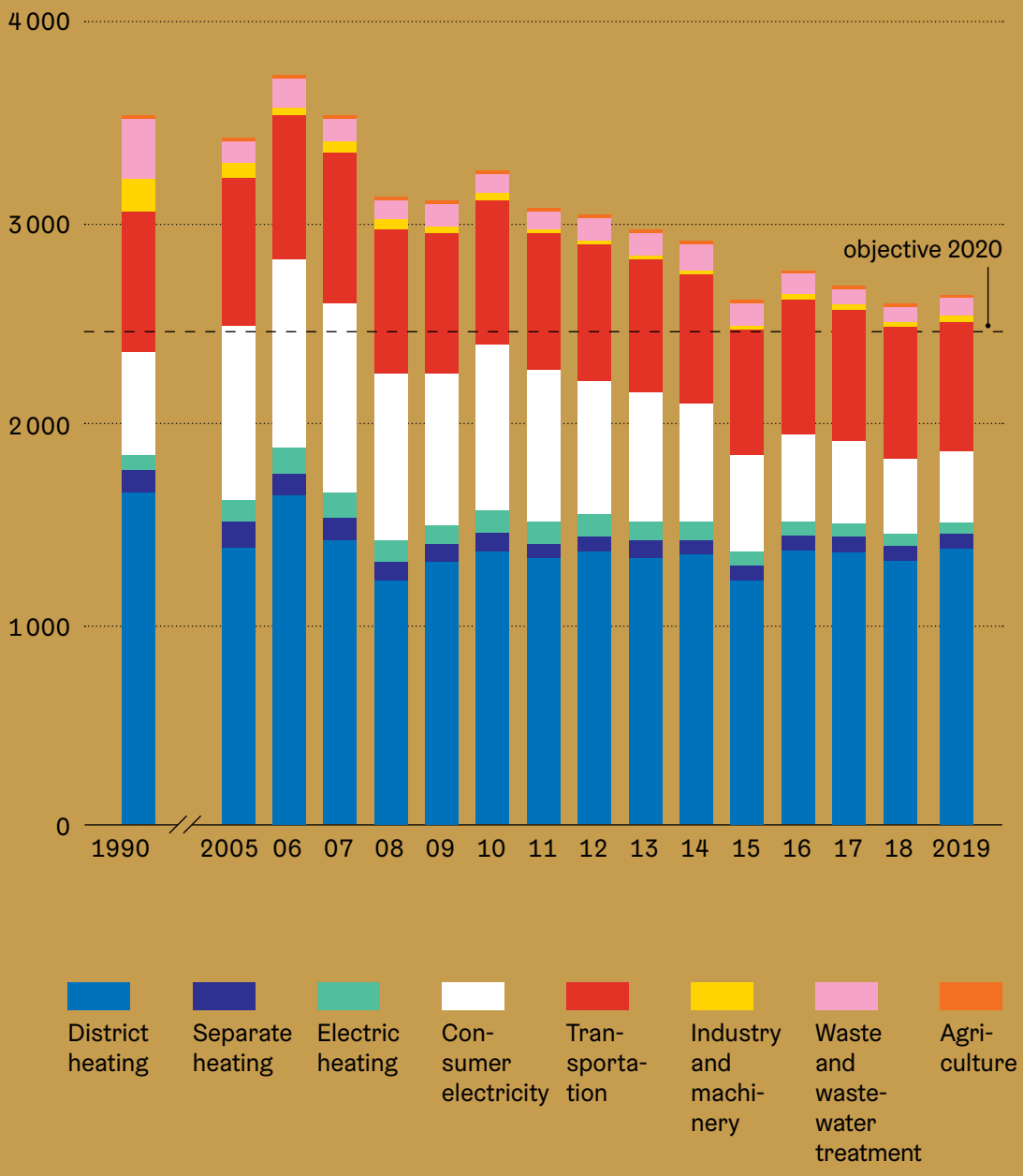
The mySMARTLife project is part of the Horizon 2020 programme, which tries out new innovative and smart city energy solutions and promotes their entrance onto the market. The operations are aimed at enhancing the energy efficiency and comfort of living in the existing and new building stock, increasing the percentage of renewable energy production, developing the City of Helsinki energy grid and electricity storage for renewable energy, as well as upgrading electric transport and electric public transport. The cross-sectional theme is the integration of open data and smart information and communication technology in the operations. The goal in the target areas is to reduce energy consumption by 10–20%.

The Kansalaiskide project involved co-operation with Open Knowledge Finland to develop ways to structure discussions concerning difficult questions into so-called knowledge crystals. The project involved testing different methods that enabled the participants to better understand the facts and values related to the questions, as well as their relevance and truthfulness. One subject was the Carbon-neutral Helsinki action plan, with a particular focus on questions related to sustainable transportation. In several workshops, participants got to test a newly developed online tool for structuring discussions. The Kansalaiskide project made it to the final round of the esteemed Uutisraivaaja Media Innovation Challenge of the Helsingin Sanomat Foundation.

The City of Helsinki Service Centre's remote care service and transportation

Greenhouse Gas Emissions

1,000 t CO_2e



conveyance service promote wiser and environmentally friendlier transportation. Helsingin Matkapalvelu's transport conveyance service for the elderly and the disabled has been rationalised so that customers travelling in the same direction at the same time are transported in the same vehicle where possible. In 2019, a total of more than 2,100,000 driving kilometres were saved thanks to combining transports and the remote care service.

In 2019, greenhouse gas emissions from Helsinki's residents, services and industry amounted to 2,611,000 t CO_2e, increasing by two per cent from the previous year. The increased emissions are explained primarily by a 5% increase in district heating emissions, as the proportion of coal increased while the proportion of natural gas decreased. Emissions from industry, machinery fuels and waste processing also increased slightly. In other sectors, emissions decreased. In particular, emissions from electricity consumption (–6%) and electric heating (–7%) decreased as nationally produced electricity continued to become cleaner. Traffic emissions also decreased as fuel consumption decreased (–2%). The total emissions of Helsinki were approximately 26% lower than in 1990. The emissions calculated per capita increased by 1% to four tonnes, ending up being 44% lower than in 1990.

Renewable energy accounted for 12% of the energy produced by Helen in 2019. Energy was produced with hydropower, wood pellets, wind power and solar power, as well as with heat pumps by using various surplus energy flows.

In 2019, energy consumption in the entire Helsinki urban area grew by 0.5%, which is explained by an increase in the population, as energy consumption per capita decreased by 0.6%. Per sector, electricity consumption (+2%) increased, as did the electricity consumption of industry and machinery (+51%). There are major statistical fluctuations in the fuel consumption of industry and machinery every year, but the large number of construction projects is likely to have increased the fuel consumption of machinery. Warm winters and improved energy efficiency have decreased the consumption of oil heating (-3%) and electric heating (-5%). A highly positive development is the continued decrease in the energy consumption of traffic (-2%) in a city with a growing population, which is an indication of the popularity of sustainable modes of transport and the improved energy efficiency of vehicles.

In 2019, the global temperature was the second-highest ever measured, and June was the warmest in 140 years (Source: NOAA). The past five years have been the warmest, while 2010–2019 was the warmest decade. In Kaisaniemi, Helsinki, the annual average temperature was 7.4 degrees, which is 1.5 degrees higher than the temperatures in the comparison period of 1981–2010. The record for the highest temperature measured at the Kaisaniemi measurement station was broken on 28 July, when the temperature rose to 33.2 degrees.

Eyes on the future

Having been prepared in 2019, the international Helsinki Energy Challenge competition will close in March 2021. The goal of the competition is 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 winner will be selected by an international, impartial jury of experts, and the prize is one million euros. Helsinki Energy Challenge seeks solutions not only to Helsinki's heating challenge, but to the energy question on a global scale as well. Accordingly, Helsinki has committed to openly sharing the results of the competition.

Adaptation

Adjusting 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 the safety is preparedness for the effects of climate change.

Helsinki has surveyed the weather and climate risks pertaining to the city. According to the evaluation report, the city's key climate risks are storm water 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.

One key climate risk management programme is Helsinki's climate change adaptation policies 2019–2025, which were approved by the City Board in May 2019. The measures required for attaining the adaptation vision of 'Climate-proof Helsinki in 2050' are divided into four themes in the policies: preparedness, integration, development, and overall economy and business opportunities. The measures will be included in the City's planning and guidance, for example in city planning, preparation and preparedness planning, the Storm Water Management Programme, the Flood Strategy, and the programmes for green area development and nature conservation and management.

Helsinki joined the Covenant of Mayors for Climate and Energy climate initiative in December 2018. Committing to the initiative requires cities to create a Sustainable Energy and Climate Action Plan (SECAP) within two years of joining. Helsinki has all the programmes required for the commitment, the Carbon-neutral Helsinki 2035 action plan and Helsinki's climate change adaptation policies 2019–2025, as well as climate risk and vulnerability assessments. The SECAP action plan will be prepared by the end of 2020.

The City's detailed planning requires the use of the green factor tool whenever possible. The green factor can be used to ensure that the plot has enough green infrastructure. The Virtual Verdure project involved trying out the regional green factor developed in Sweden in the planning of the Kyläsaari area. The instructions for and the worksheet of the regional green factor have been translated into Finnish, and they will also be published on the new 'Helsinki's climate actions' online pages.

In 2019, the climate network of the mayors of the six largest cities approved an initiative regarding preparing for risks caused by climate change in urban areas. The initiative proposed that cities carry out climate risk surveys and modelling when preparing for the increasing risk of urban floods and intermittent heat waves. Additionally, the cities are planning how to create a toolset for planners and different planning situations based on the aforementioned.

In 2019, Helsinki was involved as a partner in the Adaptation of European Landscapes to Climate Change (AELCLIC) project coordinated by Aalto University. The project involved co-operation with local stakeholders to develop principles and content for a local adaptation plan in the Malmi Centre area. The results of the work have been utilised in planning the Malmi Centre vision.

In 2019, principles of climate-proof shoreline construction were created for Isosaari and the Vartiokylä bay. The goal has been to find out what factors and procedures could affect the ability to plan and build shore areas in a manner that is as climate-proof as possible and that takes the environment into consideration.

The Social Services and Health Care Division had solar protection installed in the Laakso Hospital buildings and their effects on the indoor temperatures monitored. Additionally, transportable cooling devices were acquired for critical locations. The

locations and solutions were selected based on the 2019 survey *Ilmastonmuutokseen sopeutuminen sosiaali- ja terveystoimialalla* ('Adapting to climate change in social services and health care').

Helsinki's Storm Water Management Plan promotes systematic and sustainable overall storm water management in the long term and also helps with preparations for the future by taking the impacts of climate change, the denser structure of the city and the changing legislation into account. Storm water is the rain and melted water in constructed areas that is led away from the ground, roofs of buildings or other such surfaces.

The Storm Water Management Plan works as an integrated programme, meaning that its procedures are implemented and developed as part of the City's planning and construction and their various related processes. The Storm Water Management Plan features 37 procedures, some of which are continuous operations, such as space reservations for storm water structures in street planning and zoning and using the green factor as a tool to determine the green efficiency of block areas. Some of the procedures are project-based tasks. One of the projects started in 2019 was the HUTI project, which develops storm water-related information management and knowledge. The project is coordinated by HSY, and representatives of Helsinki are involved in its steering and project groups. Development of the City's storm water management operating model has started. In 2019, the storm water groups of the Helsinki metropolitan area held two shared training courses that focused on storm water management in street areas and quality issues related to storm water. Development work on the Storm Water Management in Detailed Planning Tool was started, and a working group consisting of experts from the Urban Environment Division was formed for it.

A filtration container was built in Taivallahti to purify the dirty storm waters of street areas. The filtration container was built in the Smart & Clean solution project for controlling storm water, which was funded by the Helsinki-Uusimaa Regional Council. The filtration container was connected to the network in May, whereupon the monitoring of storm water quality with constantly operating gauges began. The monitoring could only be carried out for a short time within the project time frame, so the results obtained cannot yet be considered very reliable. WSP Finland and Aalto University conducted an internationally unique survey on microplastics in storm water and how well the filtration container captures them for the City. Planning work for further monitoring of the filtration container's operation was started near the end of the year. In 2020, the hope is to begin long-term monitoring that would indicate how effective the filtration container is as a purifier and where else it should be applied.

Eyes on the future

Nature-based solutions and conserving existing green structures and soil in construction locations promote climate change adaptation and produce other ecosystem services. They also promote climate change mitigation by conserving carbon reserves and strengthening carbon sinks. In addition to synergies, building a denser and growing city can create conflicts between mitigation and adaptation. They must be assessed and solutions to them must be developed. The City must already be built to meet the requirements of the changing climate.

Energy use

As a procedure to implement a responsible energy policy, the City of Helsinki has set a binding energy saving target for its own operations. The division-specific binding energy saving target for 2020 is 5% of the energy consumption of 2015.

The City of Helsinki's energy saving work is coordinated by the energy conservation work group appointed in 2018, whose operations continue the work of the advisory board for energy conservation operating 1974–2017. The executive director of the Urban Environment Division serves as the chair of the energy conservation work group, and members have been appointed from all divisions, as well as Helen, Palmia, Stara, the Port of Helsinki, Heka, HKL and HSY.

The production and consumption of energy play significant roles when working towards emissions reductions. Of all CO_2 emission of the City, heating accounts for 52% and electricity consumption for 16%. The emissions of the Helsinki Group account for 12% of the emissions of the entire City. Of this percentage, approximately 94% is caused by the energy consumption of buildings.

The Energy Efficiency Directive requires that, starting in 2018, all public buildings must be constructed as near zero-energy buildings. The energy planning instructions for public service buildings, aiming for close to zero energy, have been integrated into the City's general HVAC design instructions for service buildings.

The E value targets set by the City of Helsinki for its own new construction projects have been tightened starting from projects launched in the autumn of 2019 to a level that is at least 20% better than the national requirement. The requirements related to the production of renewable energy have been clarified as well. The goal in both new and renovation construction projects is that an amount of electricity that is equivalent to approximately 10% of purchased electricity is produced with solar power if the system is economically viable. In new buildings, geothermal heat has been chosen as the primary heating production method, and its feasibility and economic viability must be surveyed in each project as part of the project planning. In renovation projects, changing the heating method from district heating to geothermal heating, for example, is still considered on a case-by-case basis.

The proportion the City itself accounts for of the consumption of electricity in the Helsinki urban area amounted to 13%, its consumption of heating amounted to 16% and its consumption of district cooling amounted to 3%. The premises owned by the City rarely use separate heating; they are mainly heated using district heating. Because of this, the emissions from the energy consumption of the City premises are created in centralised energy production.

The energy consumption and CO_2 emissions of the City in 2018 and 2019 are presented in the table on the next page. The City's CO_2 emissions increased by 10% from the previous year, due to a change in the calculating principle for the emission factor of district heating. In 2019, the majority of the emissions (95%) were caused by the energy consumption of properties.

The total energy consumption of the Helsinki Group in 2019 was at 1,638 GWh, which is 5% less than in 2018. Due to development work on reporting practices and consumption monitoring systems, the 2019 energy consumption information of properties is not fully comparable to that of previous years.

The district heating consumption of public areas decreased by up to 65% from 2018 due to a relatively warm winter. The consumption of district cooling decreased by 5% from 2018 due to a consumption spike caused by the summer 2018 heat wave.

District heating amounted to 64% of the

Energy consumption and CO_2 emissions of the City of Helsinki in 2019 and 2018

	2019		2018		Change % 2018–19	
	GWh	CO_2, kilotonnes	GWh	CO_2, kilotonnes	GWh	CO_2, kilotonnes
Premises						
Electricity	414	79,1	445	85,1	–8 %	–7 %
Cooling	5,00	0,09	5,24	0,32	–5 %	–72 %
District heating	1043	207	1081	174	–4 %	19 %
Premises, total	**1462**	**286**	**1531**	**259**	**–5 %**	**10 %**
Outdoor lighting, traffic lights						
Outdoor lighting	43,9	8,39	45,6	8,70	–4 %	–4 %
Traffic lights	1,24	0,24	1,31	0,25	–5 %	–5 %
Outdoor lighting, total	**45,2**	**8,63**	**46,9**	**8,95**	**–4 %**	**–4 %**
Public areas						
Electricity	3,15	0,60	3,84	0,73	–22 %	–18 %
Heating	2,40	0,48	3,97	0,64	–65 %	–26 %
Public areas, total	**5,55**	**1,08**	**7,81**	**1,37**	**–41 %**	**–21 %**
Traffic						
Metro traffic*	69,6	0,0	68,7	0,0	1 %	0 %
Tram traffic*	29,1	0,0	32,8	0,0	–13 %	0 %
Ferry traffic	6,73	1,74	6,54	1,65	3 %	5 %
Traffic, total	**105**	**1,74**	**108**	**1,65**	**–3 %**	**5 %**
Vehicles and machinery	**20,2**	**5,20**	**17,80**	**4,59**	**12 %**	**13 %**
Total	**1638**	**302**	**1712**	**276**	**–5 %**	**10 %**

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

District heating	198 g/kWh**	
Electricity	191 g/kWh	The factor for 2019 is not available
Cooling	18 g/kWh**	

* The electricity used by Helsinki City Transport for transport operations is 100% renewable

** The specific emissions from district heating and cooling were calculated based on the primary energy method (SFS-EN-15316-4-5) in 2005–2018. Since 2019, the calculations have been based on the benefit distribution method.

The CO_2 emissions for 2018 have been calculated by using the emission factors of Helen Ltd, which are the following:

District heating	161 g/kWh
Electricity	191 g/kWh
Cooling	61 g/kWh

City's total consumption (1,045 GWh), electricity amounted to 34% (561 GWh), cooling amounted to 0.3% (5.0 GWh) and fuels amounted to 1.6% (26.9 GWh).

The energy consumption per capita of the City's own operations decreased by 4.3% from 2018. CO_2 emissions per capita, on the other hand, increased by 8% due to a change in the calculating principle for the emission factor of district heating produced by Helen. Helsinki's population increased by 0.9% in the same time period.

The energy efficiency agreements (KETS) made between the municipalities and the Ministry of Economic Affairs and Employment are used to implement the actions required by the national energy and climate strategy. The instructional energy conservation goal in the municipal energy efficiency agreement of the City of Helsinki for 2017–2025 is a minimum of 7.5% from the level of 2015.

By the end of 2025, the total energy savings achieved by the known new energy efficiency actions of the City will have amounted to approximately 9.8 GWh, which is 16% of the total savings target for the duration of the agreement. Assessing the effects of more energy-efficient construction than the national requirement in new and renovation construction is still in progress, so their energy saving effects have not been taken into account in the reported procedures.

As defined in the intermediate goals of the energy efficiency agreements, the City of Helsinki should have achieved verified energy savings of 32.7 GWh by the end of 2020; 30% of this was achieved by the end of 2019. Achieving the energy savings goals requires systematic implementation of the energy savings actions and investments in the coming years.

In 2019, low-carbon construction was promoted by looking into software on the market for calculating the carbon footprint of the lifecycle of buildings. In early 2020, work began to develop a method for taking the lifecycle carbon footprint and costs into account in the early stages as part of a service premises network survey. In several new construction projects, calculating the lifecycle carbon footprint is already included in the lifecycle planner's duties.

In early 2019, a lifecycle management model that the compiles the City's objectives and instructions was piloted in several projects. The model was simplified based on the experiences from the pilots, and the simplified model was put to pilot use in all new projects started in the autumn of 2019. Development of the model continues in terms of further developing the objectives, and work to create similar objectives for renovation projects and the worksite phase is under way.

The City will install solar power stations in connection with new and renovation construction, and as separate investments on existing properties. The peak effect of a typical solar power station is 40–50 kWp. Thanks to solar power, the consumption of a building's purchased electricity is typically reduced by 2–20%.

In 2019, solar power systems were installed in the following service buildings:

- Roihupelto Metro depot 480 kWp
- LPK Neulanen 23 kWp
- Expansion to Vesala comprehensive school 43 kWp
- Puistopolku comprehensive school 44 kWp
- Arabia community centre 143 kWp

In 2019, Heka installed solar power systems in five buildings, the total power rating of which is approximately 50 kWp. An exhaust air heat pump was also installed in one building.

In addition to these, power stations are being built in locations such as Liikuntamylly (384 kWp). The campus of Metropolia University of Applied Sciences in Myllypuro will get a solar electricity station in multiple stages. New potential sites for solar power are constantly being sought and implemented. When taking into account sites that are known and that will be finished in the near future, an electricity production capacity of approximately 3.5 MW becomes closer to being a reality (in which case the calculated annual production would be around 3.2 GWh).

The development of the energy consumption of the City's own operations, divided by the City population

The figure presents the development of the energy consumption per capita in the City's own operations and the population of the City in 2006–2016. The population has grown by 16 % during this period. At the same time, energy consumption per capita has decreased by 25 %.

The Property Manager service piloted in 2018 by Helen and Heka was made available across Finland in 2019. Typically, the service produces 5–10% savings in heating costs. The Property Manager service provides Heka with better information on the conditions of its apartments, enabling the company to improve its residents' living conditions and increase energy efficiency.

A modern real-time property data platform, called the Nuuka system, was introduced in 2019. Over the course of the year, a total of 600 service properties owned directly by the City were added to the hour-level energy consumption monitoring. Additionally, data sources related to the properties, such as sensors verifying indoor conditions and an application measuring user satisfaction, were integrated into the Nuuka system. The building automation systems of approximately 20 locations were integrated into the Nuuka system, whereby all the automation data points can be read in the system. The goal is to the integrate the building automation systems of a few hundred locations into Nuuka in the coming years.

Over the course of 2019, various trials and development work were launched related to utilising data collected from properties to confirm indoor conditions, ensuring the functionality of building technology systems and joining the electricity demand response market. These trials will continue in 2020.

Over the course of 2019, threats and opportunities related to opening property-related data were surveyed, and based on the survey, development work on an open interface to open data classified as safe to open was started. The energy consumption data of the service buildings was opened in April 2020 in the HRI open data service.

The Energy Wise Cities (Ekat) project continued the work started in 2018 on the energy efficiency and data of service buildings. Possible visualisations of the energy and condition information were charted, building users' needs were surveyed and two information visualisation trials were

started. Existing energy efficiency partnership models and their development needs were charted, after which newly developed models were created and published for piloting. To develop a virtual power plant, a background survey on the buildings' potential and technical capacities was conducted, after which piloting was started in two service buildings. The objectives of the construction project life cycle management model were clarified and compiled into a visual presentation. In 2020, the project work will focus on piloting and collecting results, as well as communication. The progress of the project can be monitored through the websites *energiaviisaat.fi* and *ilmastoteot.fi*, as well as the project newsletter. The project will be continued through to the end of 2020.

Helen is constantly striving to improve the energy efficiency of its energy production and distribution. Helen's goal for the production and procurement of electricity and heating is to increase the proportion of renewable energy to 25%, reduce greenhouse gas emissions by 40%, and halve the use of coal by 2025. The use of coal will end completely in 2029 as decreed by the national act on prohibiting the use of coal for energy. Helen's long-term goal is to achieve carbon-neutral energy production by 2035.

In Helen's co-production of district heating and electricity, the consumption of fuel amounted to 11,525 GWh in 2019. This equals 59% of the volume of fuel needed to produce electricity at condensation power plants and heating at property-specific plants. The estimated savings amounted to approximately 7,900 GWh last year, which equals approximately 700 tonnes of heavy fuel oil.

In 2019, the efficiency of Helen's energy system was 94.25%. In 2019, Helen increased the production of renewable energy with wood pellets and heat pumps. The percentage of renewable energy in Helsinki was at the same level as last year, i.e. 12%. In 2019, investment decisions were made on expanding the Katri Vala heat pump plant and the Vuosaari seawater heat pump.

Eyes on the future

In the budget for 2020, a total of 4.5 million euros is allocated to the effort to increase solar power as included in the Carbon-neutral Helsinki programme. Solar power stations will be built at the City of Helsinki's owned and new stock of business premises and service buildings.

The City of Helsinki is developing an energy efficiency partnership model in co-operation with other major cities. In the model, a partner company assumes responsibility for the planning and implementation of a building's energy efficiency procedures and is responsible for the attainment of the energy savings pursued. The model will be piloted in 2020.

The impact of the coronavirus will be observable in the City's energy consumption. During the pandemic restrictions, Helsinki's total electricity consumption has decreased by up to 15% compared to normal conditions. A portion of the public sector's consumption has crossed over to households as services and offices have been closed and people have switched to working from home.

Transport

In accordance with the City Strategy, the percentage of sustainable modes of transport is being increased in Helsinki. 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. Helsinki paves the way for a strong surge in the number of e-vehicles by enabling the market-driven construction of a public charging infrastructure.

By the end of 2019, there were a total of 97 public electric car charging stations in Helsinki, 59 of which were built in 2019.

Helsinki is a pioneer in creating a comprehensively functional smart transport system and serves as a test platform for commercialising new smart transport services and promoting future technologies.

The Carbon-neutral Helsinki 2035 action plan contains 30 procedures pertaining to reducing emissions from transport. The City's goal is to reduce the greenhouse gas emissions from traffic by 69% from the 2005 level by 2035. The actions are related to increasing the number of charging stations for electric cars; promoting sustainable modes of transport such as walking, cycling and public transport; reducing the emissions from heavy traffic and harbour operations; further studies on a pricing system for vehicle traffic; raising the prices for parking; introducing new mobility services and densifying the city structure.

By the end of 2019, there were a total of 97 public electric car charging stations in Helsinki, 59 of which were built in 2019. In addition to this, the city features semi-public charging stations in locations such as private parking facilities, as well as private charging stations owned by properties, for example.

The low-emission criteria for vehicles were updated in 2019, and survey work on developing the criteria further will be carried out in 2020. Low-emission vehicles will receive a discount on parking fees, among other things.

The City of Helsinki prepared programmes to promote cycling and walking in 2019, and the programmes will be submitted to the Urban Environment Committee in spring 2020.

In 2019, Helsinki was accepted into an EU project called Handshake. The project is a 'best practice' project focusing on developing cycling traffic, and nine other European cities are taking part in addition to Helsinki. Helsinki's mentor in the project is Copenhagen, which has extensive experience in developing an urban environment that is friendly to cyclists and people in general. In addition to Copenhagen, Amsterdam and Munich are serving as mentor cities in the project.

The goal of Helsinki Region Transport (HSL) is to reduce the local emissions of public transport that affect air quality, as well as the carbon dioxide emissions, by over 90% from the level of 2010 by 2025. The goal is also for at least 30% of HSL's buses (approximately 400 units) to run on electricity by 2025. At the end of 2019, 50 of HSL's buses ran on electricity, and one quarter of these operate in the Helsinki area.

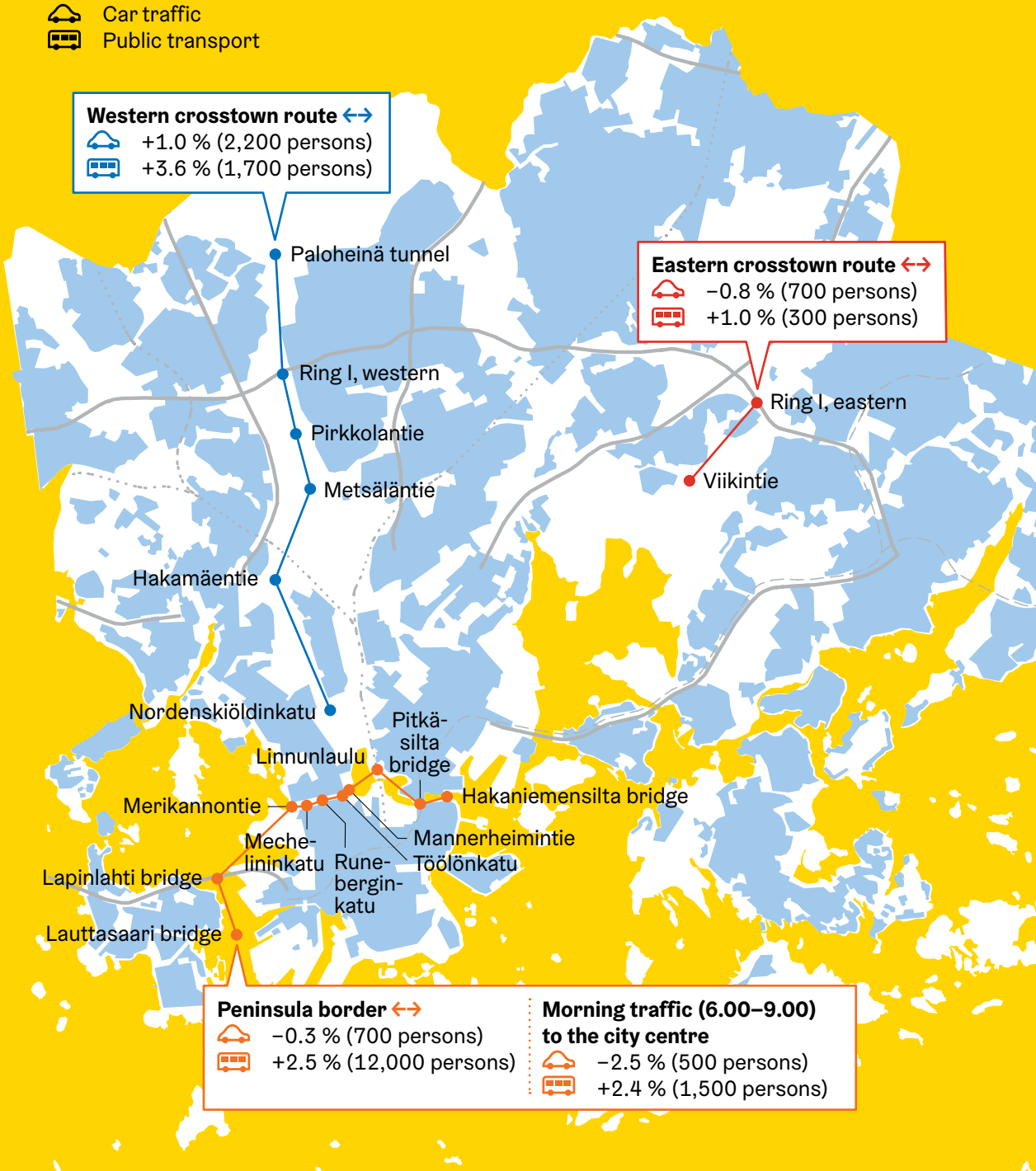
The Helsinki region was ranked second in the international BEST ranking, for the fifth year in a row. In the BEST survey, customer satisfaction ratings of the public transport of eight European cities were compared. 76% of customers in the HSL area were satisfied with public transport in 2019.

HSL's tickets and zones were revised in April 2019. The zone revision has brought more customers to public transport and increased ticket sales. The number of passengers increased throughout 2019, but the increase was clearly stronger after the zone

Passenger numbers

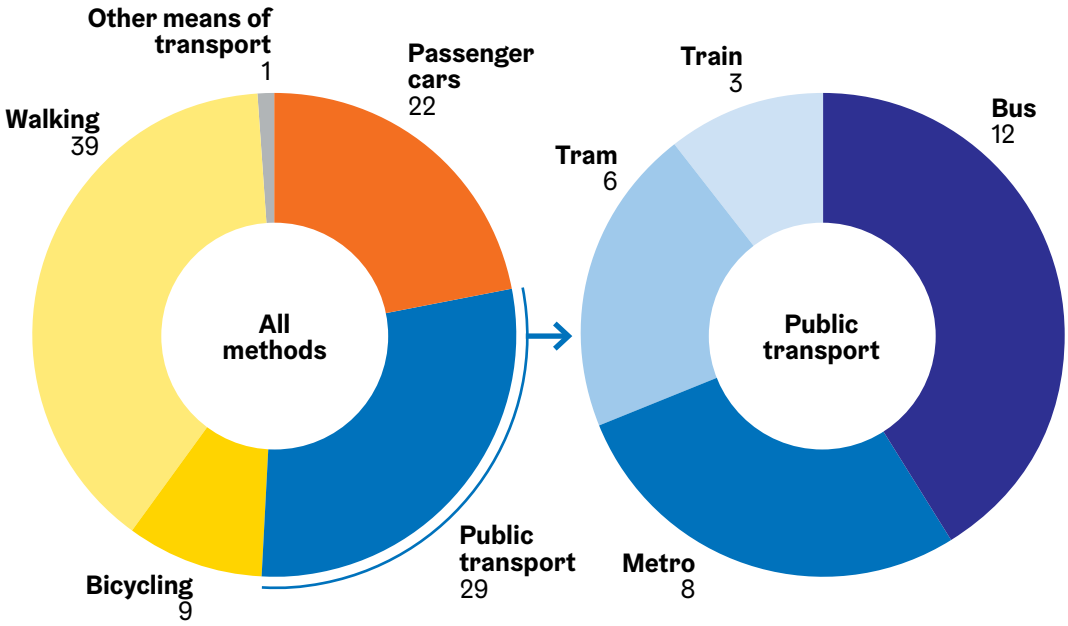
Changes in the number of passengers using cars and public transport on Helsinki's calculation lines on an autumn weekday in 2019 compared to the previous year

↔ Two-way traffic
Car traffic
Public transport



Distribution of modes of transport

Primary means of transport on trips made within Helsinki; percentage of all trips



Source: Transport behaviour of Helsinki residents 2019

revision. Before the new zones, there was a 1.9% increase, whereas after the revision, there was a 3.4% increase from May to October when compared to the same period in 2018.

In terms of the different modes of transport, the number of passengers increased by 4.5% on the metro, 4.7% on buses and 5.4% on local trains in the HSL area in 2019 (situation in mid-December). The number of tram passengers decreased, but this was caused in part by the extensive special traffic arrangements in Sörnäinen caused by renovation of Hämeentie. Buses have had more passengers especially at stops in zones A and B. Due to the revision, the popularity of single-use tickets has decreased as customers have switched to season and one-day tickets. With the zone revision, ticket prices decreased in many areas. The average price reduction was 1.3%.

The city bike service was expanded in 2019. In addition to its existing 150 stations and 1,500 city bikes, Helsinki introduced 88 new stations and 880 new bikes in an extended area. The city bike season began in April and ended at the end of October. The popularity of city bikes increased from the previous year, with approximately 3 million journeys made in Helsinki.

In 2019, the City of Helsinki provided its staff with an opportunity to use city bikes in their working and leisure time. The new staff benefit was provided to everyone with at least a one-month employment relationship with the City. The benefit was thus available to the City's thousands of summer workers and substitutes.

In 2019, new mobility services were introduced in the streets of Helsinki, as many electric scooter businesses began to provide the residents with electric scooters. HSL also piloted its own scooter system in the Vuosaari district of Helsinki as part of the IdeaLab project.

The MAL 2019 plan was approved in March 2019. The plan was created in collaboration by the entire Helsinki region, covering land use, housing and traffic in the area. The plan lists numerous concrete measures

to make the region low-emission, attractive, vital and flourishing by 2030. Based on the MAL 2019 plan, a new MAL agreement between the municipalities of the Helsinki region and the state for 2020–2023 is being prepared.

In the summer of 2019, the EU approved the update to the Clean Vehicles Directive to promote clean and energy-efficient road vehicles. With the revised directive, the member states will have binding obligations to include clean vehicles in their public procurements.

The redevelopment of Hämeentie began in March 2019. The section of Hämeentie between Siltasaarenkatu and Helsinginkatu is being redeveloped into a pedestrian, cycling and public transport street. The redevelopment will make the roadside more pleasant, as decreased car traffic means less noise and street dust, as well as improved air quality. The redevelopment will also increase pedestrian and cycling safety and expedite public transport.

Construction of the Jokeri Light Rail, a light rail connection to be constructed from Helsinki's Itäkeskus to Espoo's Keilaniemi, began in June 2019. With the Jokeri Light Rail, the urban structure will become denser, the need for private cars will decrease and traffic emissions will be reduced significantly.

Helsinki's smart transport development plan for 2030 was approved by the Urban Environment Committee in September 2019. The goal of the project is a low-emission, functional and safe transport system and a thriving city.

Helsinki's smart mobility umbrella project Jätkäsaari Mobility Lab began in 2019. The project is an innovation platform for new mobility services and technologies, implemented in the Jätkäsaari area.

Robot bus transport entered its second year of service in Helsinki as a self-driving robot bus operated in Helsinki's Kalasatama from May to the end of November. The Helsinki RobobusLine trials were part of the EU-wide mySMARTLife project.

In 2019, the volume of motor vehicle traffic (i.e. cars, vans, lorries, trucks, buses and trams) in Helsinki increased by one per cent at the peninsula border and decreased by one per cent at the inner city border in comparison to the previous year. On the cross-town calculation line, the volume of motor vehicle traffic remained almost unchanged from 2018 to 2019.

On an average weekday in June, the Helsinginniemi peninsula was crossed by 34,900 cyclists, marking a 4% increase from 2018.

The number of Helsinki residents owning a car increased by 0.5% (415 cars/1,000 residents) and the number of cars in traffic use decreased by 0.3% (328 cars/1,000 residents) compared to the previous year. The number of cars per 1,000 residents has increased by 3.5% in the last five years, while the same number for cars in traffic use has decreased by 0.3% in the same period.

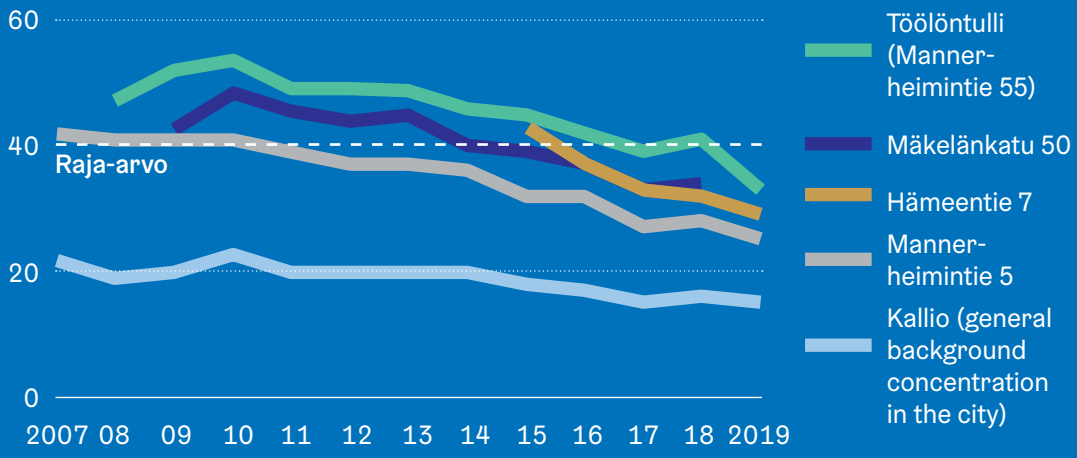
Eyes on the future

The population of Helsinki is growing and the land use is becoming denser, which is why it is particularly important to control the harmful impacts of traffic. Key factors include land use planning, promoting the public transport system and sustainable modes of transport and implementing and introducing a vehicle traffic pricing system. Additionally, conditions must be created for increasing the use of low-emission vehicles and the functionality of city logistics must be improved. Digitalisation is being utilised in developing smarter traffic data and traffic management methods, among other things.

Air protection

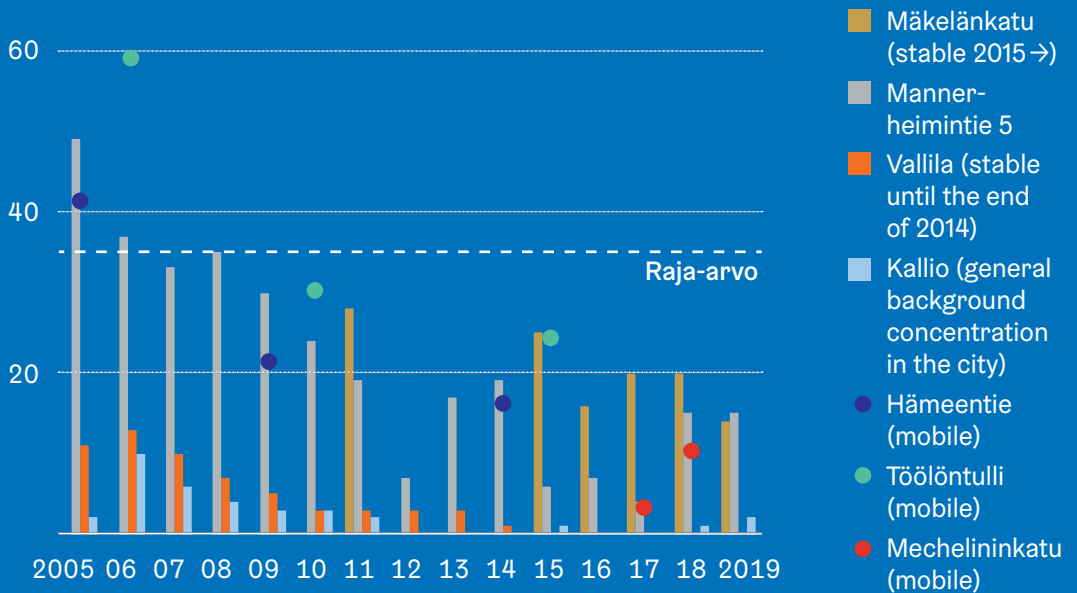
Nitrogen dioxide (NO_2) concentrations in ambient air

Annual average nitrogen dioxide (NO_2) concentrations
measured by HSY's monitoring stations and passive samplers, µg/m³



Particulate matter (PM_{10}) concentrations in ambient air

The number of days when the limit value level (50 µg/m³) for particulate matter (PM_{10}) was exceeded in the air quality measurement stations in Helsinki. The limit value is exceeded if the number of days with PM_{10} levels above 50 µg/m³ is more than 35/year.



In the City Strategy, the goal 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 health-based annual limit of nitrogen dioxide, specified in the EU's Air Quality Directive, is still exceeded or is in danger of being exceeded in places 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 respirable particles, i.e. dust, especially in spring and in the vicinity of large construction sites. There is still a risk that the limit value for street dust will be exceeded. In dense single-family dwelling areas, the air quality is decreased by the 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 City's Air Protection Plan 2017–2024 is intended to reduce nitrogen dioxide emissions from traffic so that the emissions will fall below the annual limit as soon as possible. The plan focuses also on street dust and the small-scale burning of wood.

On average, air quality was better in 2019 than in the previous year, and at several measurement locations, the concentrations of contaminants were lower. The concentrations of nitrogen dioxide have decreased especially in recent years, and the annual limit's exceedance area is estimated to have decreased. In the previous year, no values exceeding the threshold values were measured at HSY's measurement stations or passive collection stations. The concentrations have decreased due to the car stock and HSL's bus fleet becoming lower-emission. The weather conditions were also good for air quality last year.

In 2019, the concentrations of respirable particles (PM10) were clearly below the limit values. Due to effective dust prevention, the limit values have not been exceeded since 2006. However, street dust continues to worsen the general air quality and cause significant health hazards in the spring, and the risk of exceeding the limit exists in particular in street canyons with heavy traffic. Continuous efforts towards preventing street dust and developing reduction methods are highly important.

The impact of large construction sites on local particle concentrations has been measured in recent years. In 2019, measurements were carried out in Jätkäsaari. Efforts are made to prevent dust emissions in co-operation with contractors, and new methods are being developed in the HOPE project coordinated by Helsinki, among others. The aim is to produce more diverse data on air quality, as well as actions for improving air quality. Pollutant concentrations have been measured by means such as sensors carried by residents in different types of environments.

Efforts are being made to find ways to decrease emissions from the 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.

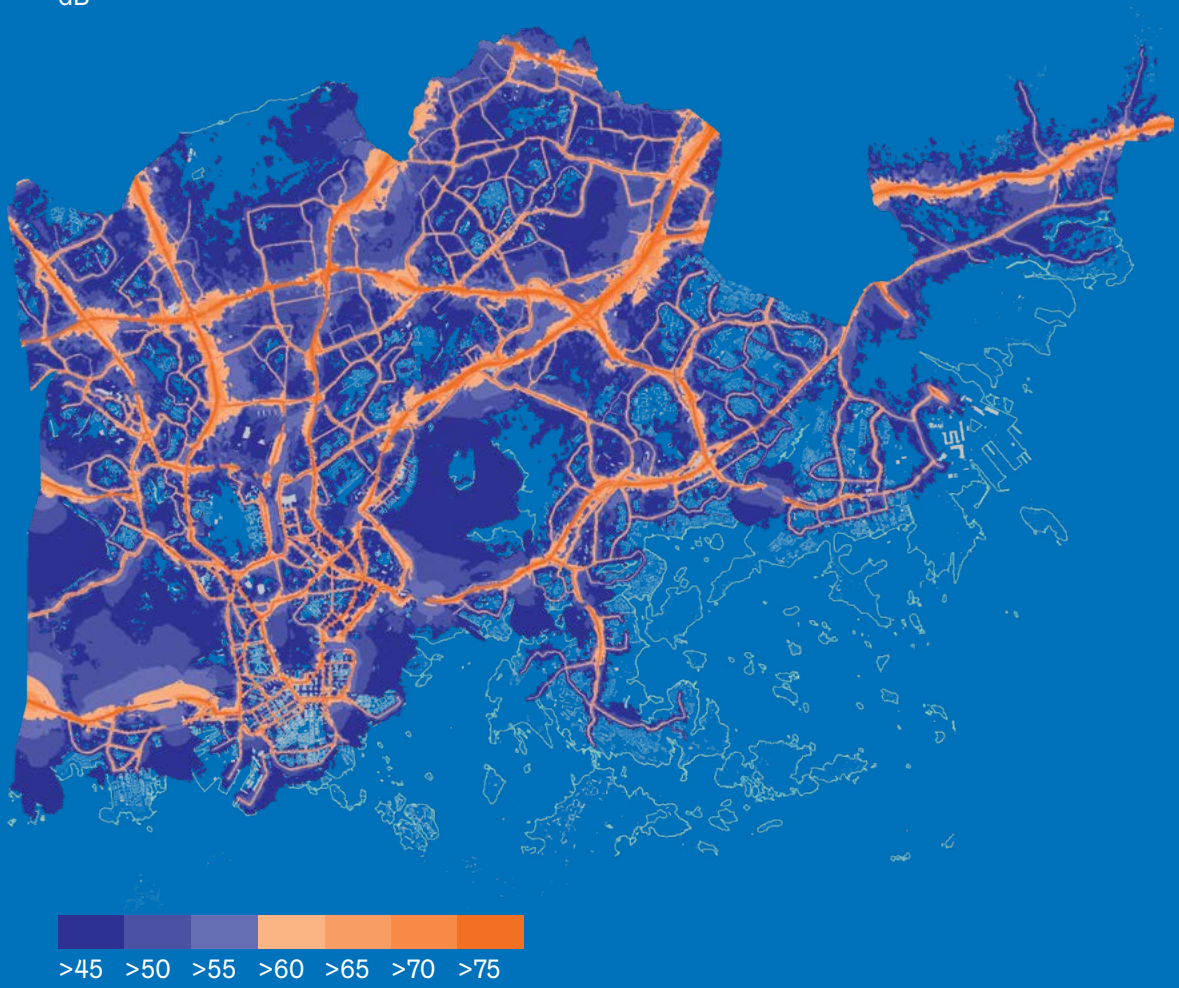
Eyes on the future

Helsinki's air quality has improved due to the movement restrictions imposed in March 2020 and increased remote work due to the coronavirus. In particular, nitrogen dioxide concentrations have decreased considerably. It remains to be seen whether traffic will return to its growth trajectory after the state of emergency ends or whether remote work will increase enough to affect traffic volumes, for example. Street dust remains a challenge, so influencing winter tyre choices and dust prevention are highly important actions. The emissions from burning wood will continue to decrease air quality in single-family dwelling areas since the use of bioenergy will increase, the residential areas will have new buildings and the fireplace stock is slow to renew.

Noise abatement

Day-time average noise level

dB



Environmental noise decreases the quality and comfort of the living environment in Helsinki. Continuous loud noise also causes health hazards. Road traffic is the primary source of harmful noise. 37% 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, for example, by construction and repair works, public events and restaurants.

Map: City of Helsinki noise mapping 2017

In accordance with the City Strategy, traffic investments and land use are always planned together in Helsinki, which makes it possible to pay attention to noise abatement. The noise abatement operations in the City of Helsinki are directed by the noise abatement plan 2018–2022. Land use and transport planning are also used to prevent harmful noise.

Speed limits were lowered in several street locations in 2019.

In addition to prevention, noise abatement actions are needed: these include noise-absorbing road surface materials, lower speed limits and reducing the use of studded tyres. The principles for defining speed limits were approved in 2018, and speed limits were lowered in several street locations in 2019. The use of speed cameras and speed screens has been increased in the City. In 2019, noise-absorbing road surface materials were used on the street section between Kontulantie and Kivikonkaari. HKL has started a general plan to improve the Herttoniemi metro noise barrier.

By improving the prerequisites of public transport, pedestrian traffic and cycling, the aim has been to steer traffic towards more sustainable forms of transport. The most significant change, redeveloping the section of Hämeentie between Siltasaarenkatu and Helsinginkatu into a pedestrian, cycling and public transport street, was started in the spring of 2019. The work will be completed in late 2020. Sustainable transport was also promoted by means such as the Kulkuri project of the City's Environmental Services, the target group of which were children and their families.

The preparation of the noise reporting decisions regarding large outdoor concerts used end-time policies with which the disturbances experienced by the local residents by large and late music events could be diminished. The policies define maximum numbers allowed for late concerts. The policies concerned the venues in Kaivopuisto, Hietaniemi, Wholesale Market-Teurastamo, Suvilahti, Kyläsaari, Kaisaniemi, Töölönlahti Park, Mäntymäki Field, the Ice Hall parking area, Malmi Airport and Kansalaistori Square. Good prior provision of information has been shown to reduce the noise disturbance experienced by residents.

The City's project to monitor the environmental hazards of construction continued in 2019 in regional construction sites in Keski-Pasila, Kalasatama, Jätkäsaari, Kruunuvuorenranta and Kuninkaantammi. Aspects such as noise were under intensified monitoring in these locations. At these sites, a lot of pile driving, excavation and crushing continued to be carried out, concerning which noise disturbance notifications were made. To prevent the construction site noise that will last for years from being unreasonable to the residents living in these areas, conducting the noisiest work in evenings or at weekends without a legitimate reason was not allowed.

Construction of the Jokeri Light Rail began in the summer of 2019. The work will last several years, and there is a great number of residents living by the track and being exposed to noise. The construction of the Jokeri Light Rail is primarily supervised by the Uusimaa Centre for Economic Development, Transport and the Environment. The harmful noise experienced by the residents has been successfully mitigated with efficient information provision, scheduling of the work and noise abatement procedures.

Eyes on the future

In a densifying city, attention must be paid to noise abatement and the soundscape. Extensive infrastructure projects and local construction projects will continue for several years.

Water protection

In accordance with the City Strategy, the state of the small water bodies and coastal waters of Helsinki will be improved and the revival of the migratory fish stock will be paid attention to. The significance of the sea will be strengthened and opening the nearby archipelago to public use will be continued.

The water areas in Helsinki include extensive marine areas, as well as the freshwater areas of the Vantaa River, various streams, ditches, ponds and springs. The water quality of the City is affected by the impurities in storm water, nutrients brought by scattered loading, cleaned sewage led to the outer archipelago, human activities, the muddy waters flowing from the Vantaa River, and the state of the Gulf of Finland. In addition to the environmental policy, water protection in Helsinki is regulated by the Small Water Bodies Programme, the Storm Water Strategy, the flooding instructions and the Action Plan for the Baltic Sea Challenge.

Cities' small water bodies are important habitats and migratory routes for various organisms, and they have recreational value for residents. The ecological, recreational and scenic value of small water bodies has increased significantly in recent years, and taking small water bodies into account in urban planning and ecology is important. The water quality of creeks and ponds is monitored with annual sampling.

A large area of impermeable surface in the catchment area, great fluctuations in the water flow, 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 shore are characteristic of creeks in Helsinki.

In 2019, a quality survey regarding the quality of storm water directed into creeks was started with continuous measurements and by analysing the waste material accumulating in storm water wells.

The two-year Urban Waters project was completed in 2019. The objective of the project was to improve the water quality of local water bodies by purifying cities' storm waters. The project involved building two biochar-based storm water filtration structures in locations in Helsinki and Espoo in which storm waters had been observed to load nearby water bodies. The objective was to test biochar as a filtration material and obtain construction and usage experiences with biochar solutions. Another goal was to produce structures that purify storm waters and are suitable for a dense urban environment and viable for implementation in other urban locations as well.

In Helsinki, the biochar filtration area was implemented as a shallow filtration basin in a side stream of the Maunulanpuro creek in Metsälä. Because of small industry, this side stream is especially susceptible to harmful substance leaks and oil spills, for example. The last significant oil spill occurred in the autumn of 2016. Oil and other harmful substance leaks endanger the naturally procreating population of Atlantic salmon in Maunulanpuro.

After the filtration basin was completed, its operation and purifying effect on storm water was monitored by taking water samples before and after the carbon filtration. The filtration was discovered to efficiently remove phosphorus from storm waters, but in terms of nitrogen, the benefits were less significant. Various harmful substances occurring in cities' storm waters, such as heavy metals, oil hydrocarbons and polyaromatic hydrocarbons, were also efficiently caught in the filtration process. A significant portion of the removal of harmful substances was due to the elimination of solids. The monitoring of the operation of the filtration basin will be continued in the spring of 2020 with funding from the Ministry of the Environment.

Over a million people live in the impact area of the Vantaa River, and the river winds for over 100 kilometers from Riihimäki to the bay in Vanhakaupunki. The river is a valuable and attractive fishing location where Atlantic

salmon and Brown trout travel up to spawn. The load on the Vantaa River has decreased, and the ecological condition of the river is classified as satisfactory. The Kytäjoki river area and the upper reaches of the Kerava River are in ecologically good condition. A good condition would be achievable in the lower reaches as well 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 sewage and agriculture.

In connection with the Pienet AVL 20-99 puhdistamot ('Small AVL 20-99 treatment plants') project of the Water Protection Association of the River Vantaa and Helsinki Region, visits were made to five properties located in Helsinki. When operating inadequately, property-specific treatment plants may pose a considerable loading risk to the environment. Sewage systems falling between those of detached houses and treatment plants requiring an environmental permit in terms of their load are used in locations such as campgrounds and course centres or business premises located outside sewer systems. The advisory visits involved surveying the functionality of the properties' sewage systems and providing the treatment plant technicians with advice on maintaining the systems. The visits resulted in the creation of a guide that provides procedure recommendations to treatment plants and municipalities responsible for supervision in the area. Shortcomings, the remedying of which requires follow-up monitoring, were observed in the majority of the locations in Helsinki.

The condition of Helsinki's marine areas is being monitored in accordance with an extensive joint monitoring programme. Changes in the quality of sea water have been relatively moderate in recent years, and the condition of the fauna of the seabed has remained relatively unchanged in the 2010s. A reduced external nutrient load keeps the overall condition of Helsinki's marine areas relatively stable. The ecological condition of Helsinki's marine areas varies from passable to satisfactory when moving from the coast towards the open sea. However, individual events, such as the operational failure of the Suomenoja treatment plant in the summer of 2019, continue to have local adverse effects on the water quality.

The blue-green algae blooms occurring in 2019 were not as extensive and long-lasting as those in 2018. In the wake of 2018, a service called Levämittari *(hel.fi/merivesi),* which indicates the amount of algae and blue-green algae floating in the water on a scale of 0–100, was released for the residents of the municipality. The value of the indicator is updated daily in the swimming season, providing valuable information to residents in the marine areas.

In 2019, the condition of the underwater vegetation by the coast was surveyed more extensively. Surveying the condition of the underwater vegetation supports the implementation of the City's Maritime Strategy by surveying the occurrence of valuable underwater nature sites. In the 2010s, the condition of the underwater vegetation in Helsinki's marine areas has been stable, but relatively poor. For example, occurrences of the key species bladder wrack are in poor condition and fewer than in the previous decades. Closer to the coast, intensive construction in shore areas and the use of the marine areas keep the seabed silted, and the water has grown cloudier in recent years, which has an adverse effect on the condition of the underwater vegetation.

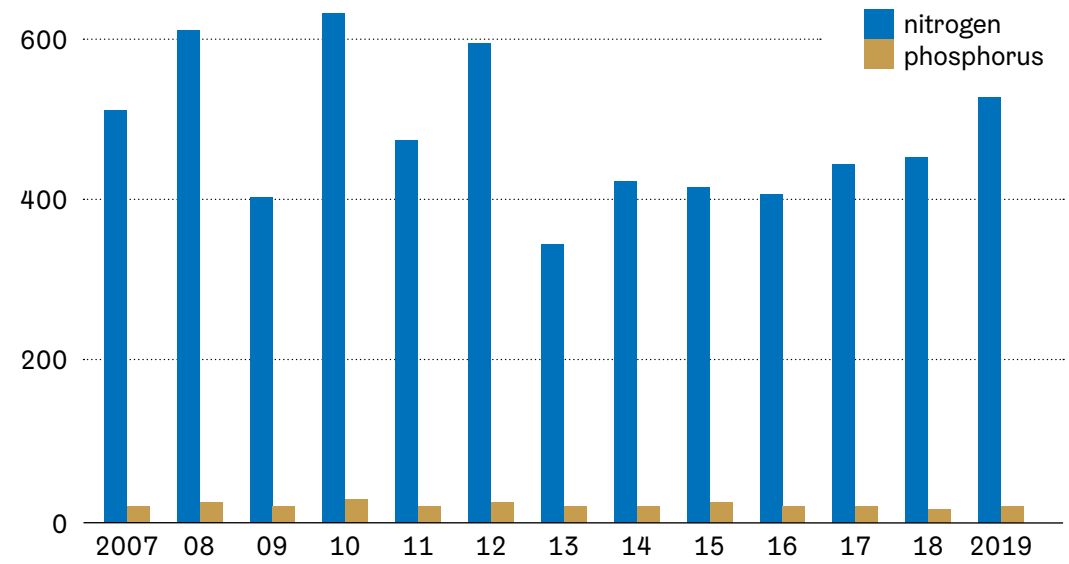
In 2019, 96 million m^3 of water was pumped into the water supply network of the HSY water supply area, while 42 million m^3 was pumped into the Helsinki network. The water consumption per capita in Helsinki was 180 litres per day, which was the same as in 2018.

A total of 107 million m^3 of sewage was delivered to the Viikinmäki sewage treatment plant for treatment, of which 78 million m^3 came from Helsinki. The amount of sewage was greater than in the previous year. The Viikinmäki sewage treatment plant met all the environmental permit regulations. Combined sewer network overflows amounted to 0.19% of the overall amount of sewage.

The 2019 treatment efficiency for phosphorus in Viikinmäki was 97%. For biological oxygen demand, the removal efficiency was 97%, and for nitrogen, 90%. The sewage

Load to the Sea

Nitrogen and phosphorus load channeled to the sea from the Viikinmäki treatment plant, tons per year



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 from the Viikinmäki sewage treatment plant on the sea areas in front of Helsinki was 20 tonnes (+33% from the 2018 level), and the nitrogen load was 530 tonnes (+17% from the 2018 level). For eutrophication, the nitrogen load is more significant, because nitrogen is a minimum nutrient in the waterways in the Helsinki region.

Work related to litter accumulating on beaches was continued by the City in co-operation with the Finnish Environment Institute and the Keep the Archipelago Tidy Association. Site formation, dredging and shoreline construction increase litter. In 2019, litter caused by fill worksites was controlled better than before. The sea fill projects on Koirasaari in Kruunuvuorenranta and Ahdinallas in Jätkäsaari were carried out in an area limited with a protective curtain. There were no other sea fill work sites in 2019.

The winners of Helsinki's snow handling innovation contest were chosen in 2019. The City will continue trying out and developing solutions with four businesses that fared well in the contest. Different alternatives will also developed for snow handling, such as new piling sites and snow melting alternatives, in co-operation with the City's other operators. The Ministry of the Environment will publish its report on dumping snow into the sea in 2020.

Together with Turku, Helsinki is committed to implementing a third Baltic Sea Action Plan in 2019–2023. The Baltic Sea Action Plan contains 117 water protection procedures that take factors such as the EU's Baltic Sea strategy and the UN's objectives on sustainable development into account. The procedures are divided between five objectives, which are 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 procedures are distributed extensively among the City's different divisions, but in addition to them, Stara, HSY and the Port of Helsinki are also involved. The implementation of the procedures is monitored on a regular basis, and the aim is to improve resourcing by means such as creating projects.

In 2019, the Baltic Sea challenge network was joined by ten new members, including

the municipality of Sipoo. A national Baltic Sea challenge seminar was held for the network members in November. In addition to this, the Baltic Sea challenge organisation organises various events in co-operation with the network members on a regular basis. For example, a climate camp event open for everyone was held during the Helsinki Design Week event. The activities of the Baltic Sea challenge have also been presented at international and local events.

The objective of the international BEST – Better Efficiency for Industrial Sewage Treatment project coordinated by Helsinki is to improve co-operation between industrial businesses, sewage treatment plants and environmental authorities and develop industrial sewage processing solutions in the Baltic Sea region. The duration of the project will be from October 2017 to September 2020.

In 2019, the project involved a Baltic Sea-wide survey on the current state of industrial sewage treatment. The survey focused in particular on industrial plants that direct their sewage to municipal sewage treatment plants. Legislation, regulations and official supervision that bind industrial plants were compared in different countries, and efforts were made to chart the differences between countries and bring up both good practices and bottlenecks.

Recommendations concerning the management of industrial sewage directed to municipal sewage treatment plants covering the entire Baltic Sea region are also being prepared. The goal of the recommendations is to provide unified guidelines for good practices not only in the Baltic Sea region, but nationally to individual countries as well.

Helsinki continued as a partner in the BSR WATER project started in 2018. The project compiles completed and still running flagship projects of the EU's Baltic Sea strategy, the goal being to take forward and refine the results of the projects. In 2019, Helsinki took part in particular in the storm water work of the project. The project involves surveying the current state of storm water management and creating policy recommendations for storm water management. Helsinki collected information on local storm water management from cities, compiled an account of Finnish legislation concerning storm water and took part in the work to update HELCOM's storm water recommendations. In addition to the storm water recommendations, the project involves collecting materials for recommendations concerning the recycling of phosphorus and harmful substances. Helsinki's case examples of natural storm water quality management were shared in the Baltic Smart Water Hub online portal maintained in the project.

Eyes on the future

In 2020, the City of Helsinki will continue charting valuable underwater nature sites together with the Finnish Environment Institute and Metsähallitus. Even though the underwater nature of Helsinki's marine areas is in poor condition in some places, there are also beautiful and valuable sites in the areas. Highlighting their existence is important to preserve underwater nature. The protection of valuable marine nature sites should be taken into consideration when planning the use of the areas.

In the coming years, it will also be important to survey occurrences of valuable underwater nature types in the waters and acquire deeper knowledge of species occurring in small water bodies. This will facilitate creating appropriate protection and restoration procedures and maintaining biodiversity.

Securing biodiversity

In accordance with the City Strategy, Helsinki treasures its valuable nature and works to increase the diversity of urban nature. The ecological quality, accessibility and health effects of green areas will be secured, the Nature Conservation Programme will be implemented and the forest network will be strengthened. The systematic increase of diversity in forests and forested areas is the central objective of the treatment. The green surface area will be increased in the city structure to promote cost-effective management of storm waters, and the diversity of the City's parks will be increased.

Helsinki's action programme for securing biodiversity has been prepared by the Urban Environment Division in co-operation with experts and residents. The challenge of the work lies in how biodiversity can be maintained as urban growth and climate change alter the environment. The goal is to maintain biodiversity by improving green and blue networks as well as the conditions of species and nature types.

Biodiversity has been taken into consideration in several significant local detailed plan projects, such as the detailed plans of Karhunkaataja, the Laajasalo tram block, Nallenrinne, Lentoasemakorttelit, Huopalahdenportti, Kutomotie 1 and 9 in Pitäjänmäki, Hakaniemenranta, the Maria start-up campus and Hernesaari, as well as the planning principles for Vartiokylänlahti.

The charting of endangered nature types in 2017–2019 has provided information on the occurrence of critically endangered, endangered, vulnerable and near-threatened nature types in Helsinki. The materials are used to identify Helsinki's most valuable and representative nature type sites.

According to a survey conducted in 2019, the population of an endangered and important species covered by the EU Habitats Directive, the flying squirrel, has continued to increase rapidly in Helsinki. 35 new forests inhabited by flying squirrels were found, and a total of 124 such forests have been found in recent years. The information has been entered into the City's Nature Information System. The City also conducted a survey on the relationship between the habitats of flying squirrels and their connections and existing and planned land use.

The monitoring of pollinating insects in the City's green areas began in the spring of 2019. Bumblebees, European honey bees and butterflies were counted with a horizontal alignment calculation method. A total of 21 species of bumblebee were observed. The numbers of species of butterfly and individual butterflies were low, apparently because of drought. Repeating the calculations will produce information on changes to the populations of pollinators in Helsinki.

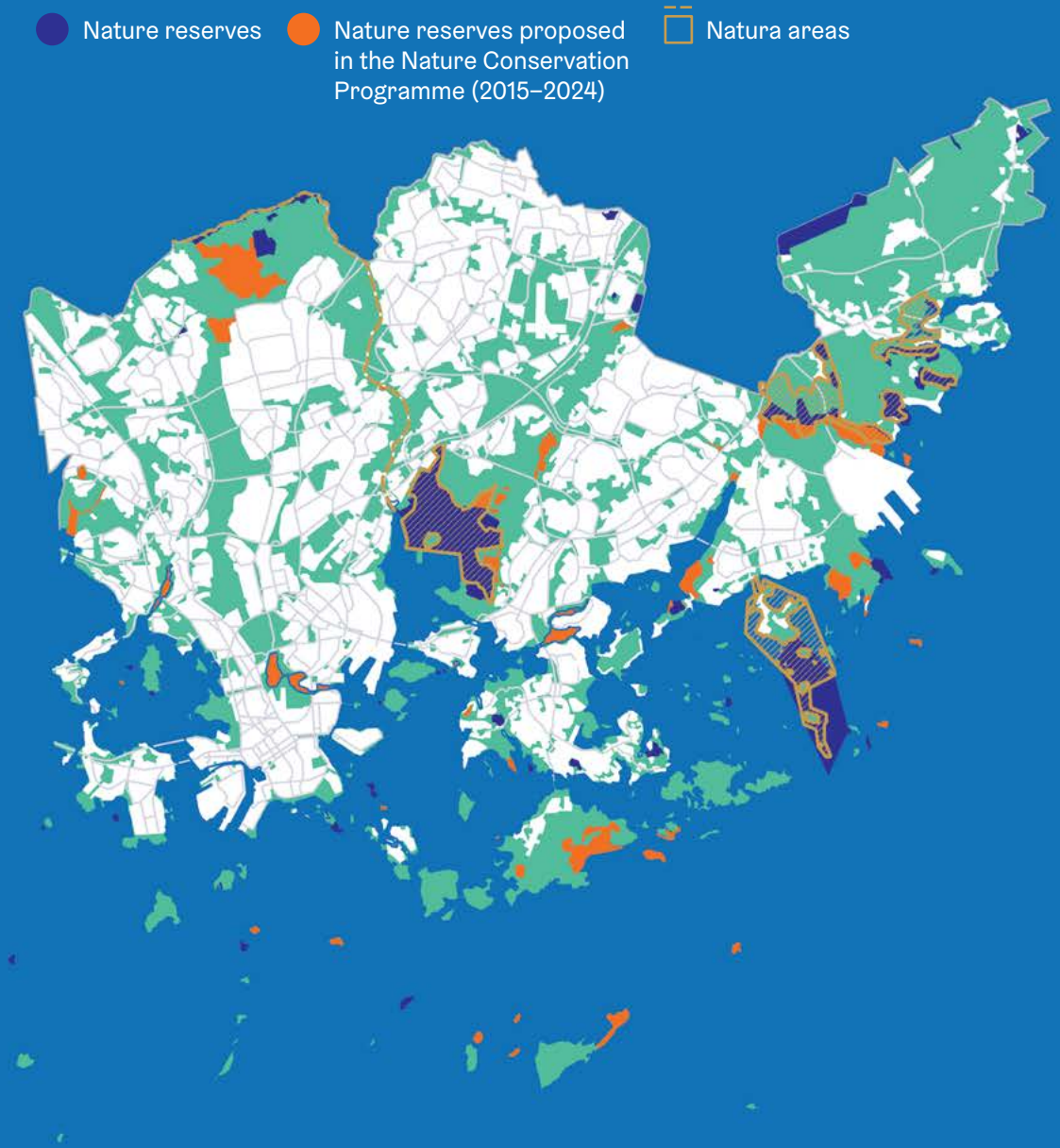
As the result of inventorying valuable corticioid fungus areas, the City outlined one new valuable corticioid fungus area in a hazel grove located in southern Hallainvuori.

In 2019, the City and Natural Resources Institute Finland collaborated to plan the monitoring of nature, especially forests, and nature indicators. The monitoring of visitors to conservation areas was started as well. The first results were obtained in the Vanhankaupunginlahti area. In 2019, Lammassaari had more than 138,000 visitors.

The monitoring of the nature impacts of archipelago tourism was started in a co-operation project with the Biodiversity Centre of the Finnish Environment Institute. The project examines the wear on vegetation and changes to the occurrence of species caused by nature tourism.

The implementation of the Nature Conservation Programme progressed rapidly. In 2019, the Uusimaa Centre for Economic Development, Transport and the Environment made a founding decision and approved care and use plans for three locations. These are the Kallahti bank, the Maununneva expansion and Korkeasaarenluoto. The Kallahti bank is Helsinki's only underwater conservation area, and it is home

Nature Reserves in Helsinki



The map indicates the 57 currently existing nature reserves in Helsinki, the new nature reserves proposed in the Nature Conservation Programme (2015–2024) and the Natura areas. Currently, 2.2% of all land area is nature reserves, as compared to 0.95% of water areas. When including protected nature types, species protection areas, and Natura areas not protected by the Nature Conservation Act, the total protected area amounts to 3.3 per cent of Helsinki's land area and 1.5 per cent of water areas. The new proposed conservation areas will increase the percentage of protected land area to 5.3%.

to the underwater meadows of Kallahdenharju and their species. The total area of this extensive area is 228 hectares. At the end of 2019, conservation areas comprised 2.2% of Helsinki's land area and 0.95% of its marine areas.

The Environment and Permits Sub-committee of the Urban Environment Committee forwarded the founding proposals and care and use plans for five new conservation areas for the City Board and the Uusimaa Centre for Economic Development, Transport and the Environment to process. The areas are Haltialanmetsä and four bird islets: Madeluoto, Pormestarinluodot, Kajuuttaluodot and Morsianluoto. The extensive 137-hectare area of Haltialanmetsä forms the core of an old forest conservation area, and it is firmly connected to other protected sites. Collectively, all the conservation areas form a diverse whole of forests and wildernesses. In accordance with the care and use plan, the nature types of Haltialanmetsä will be restored while also securing their recreational use. Protecting valuable bird islets will ensure peaceful nesting conditions for birds as water transport increases.

Care and use plans will also be created for Särkkäniemi in Uutela and the future Rudträsk, Uutela forest and Skatanniemi conservation areas, as well as Hallainvuori. All of these areas are in active recreational use. Efforts will be made to conserve natural values while also taking the pressures of increasing recreational use into account.

Nature surveys were conducted in future conservation areas in Tahvonlahdenharju and Kruunuvuorenlampi, in the Laajasalo and Jollas areas. The condition of existing conservation areas was charted in the Stansvik grove and mine area, the Jollas swamp and Itäniityntaakso, as well as the nature type site of the Kruunuvuori linden forest. Nature surveys were also conducted in the future conservation areas of Veräjämäki and the noble deciduous tree grove of the Oulunkylä shore park.

A preliminary survey for a national urban park was prepared in 2019. The survey contains three preliminary national urban park examination areas of different extents and an alternative covering the entire city, which presents the City's own procedures for meeting the goals prescribed in the national urban park criteria in terms of implementing recreation and nature networks, among other things. Decision-making concerning the matter is still in progress.

Helsinki Zoo celebrated its 130th anniversary with 13 new species in 2019. The new species were the Anthony's poison arrow frog, the turquoise dwarf gecko, the Dumeril's boa, the crested gecko, the Amur leopard cat, the black lemur, the margay, the common Suriname toad, the crested partridge, the Mexican red rump tarantula, the king baboon tarantula, the black-tailed prairie dog and the common kestrel. All in all, Helsinki Zoo has 155 species, with mammals forming the largest group. 28% of the species are classified as endangered.

More than 90 animal babies were born in the Zoo in 2019. Part of Helsinki Zoo's protection work involves returning animals to nature. Born in Helsinki Zoo, the 4-year-old Przewalski's wild horses Hanna and Helmi were freed among their kind in Mongolia in 2019. The horses' journey to freedom via practice pens took a year and a half. Successes were also had in the MetsäpeuraLIFE project, the goal of which is to restore the European forest reindeer to its former habitats. Over the course of the year, a total of 21 European forest reindeer were released into the wild from practice pens. Two of the freed reindeer were born at Helsinki Zoo.

The Wildlife Hospital treated more than 1,000 wild animals, a third of which were rehabilitated and returned to nature. Helsinki Zoo and the Friends of Helsinki Zoo Association joined forces to raise a record-breaking €140,000 for different protection projects.

Helsinki has issued instructions for using recycled soil for seedbeds, which are followed in park and green construction projects. Efficient utilisation masses facilitates the utilisation of local species of plants and a seed bank, creates cost savings and reduces transport distances and thus emissions. Examples of implemented sites include Vuosaari Top and Alakivenpuisto.

Construction of the Helsinki metropolitan area's first light rail, the Jokeri Light Rail, began in the summer of 2019. The environmental effects of the project have been surveyed extensively, and the actual construction will be carried out with the environment taken into consideration as well as possible. Trees will be felled only where necessary for the construction. Felled

trees have been transported to untouched forests to secure the deadwood continuum. From Pitäjänmäentie, trees were transplanted to a new location instead of felling. The felling of trees is scheduled so that the nesting season of birds is not disturbed. The Jokeri Light Rail will also feature grass rails that increase the green area in the street space and improve living comfort. The project has involved moving the strictly protected thick shelled river mussels from the NATURA site of the Vantaa River upstream to protect them from the construction project, and the impacts on the core habitats of flying squirrels have been minimised. The Jokeri Light Rail project has also involved acquiring nest boxes for flying squirrels in the future conservation area of Hallainvuori and designing an underpass for small animals in Viikki.

Legislation concerning combating invasive species was tightened on 1 June 2019. The new growing prohibition prescribed in it pertains to the Nootka lupine; the Aleutian ragwort; the Bohemian, the Japanese and the giant knotweed; the Canadian waterweed; the large-leaved lupine; the rugosa rose and the orange jewelweed (Government Decree on Managing the Risk Caused by Alien Species 704/2019, Annex B). The Persian hogweed and the Himalayan balsam were already on the list of invasive alien species of Union concern, and releasing them into nature is prohibited. Invasive species have been combated primarily in connection with other care procedures and through voluntary work events in co-operation with educational institutions, businesses and organisations. Among other measures, invasive species were also combated by taking part in the Healthy Steps into Nature project of the Allergy and Asthma Association of Finland. The Rugosa rose, lupines, the Himalayan balsam and other invasive species have been combated at work sites of the Jokeri Light Rail project. In several locations, sunlit environments for the plants and insects of fields and meadows have been planned on the slopes of the railway. The sunlit fields also combat the spread of invasive species. Invasive mammal species, such as muskrats and raccoon dogs, have been combated primarily in conservation areas. Plenty of Prussian carp have been removed from the largest pond of Vanhankaupunginlahti by fishing, and the local waterfowl populations appear to be recovering there. However, operators in Helsinki have not yet been able to act in a manner required by the new invasive species legislation.

The EU-funded Urban Eco Islands project was started in 2019. A visitor survey concerning the recreational use of Vasikkasaari, the pilot site of the project, was conducted. The project will involve trying how new, innovative and smart solutions can make it possible to develop the delicate archipelago nature to make it suitable for recreational use. The wear on nature was monitored with drone photography, a visitor counter was installed on the island and visitors' environmental awareness was increased with a live camera installed on the island.

The City of Helsinki, Natural Resources Institute Finland and the University of Helsinki started a research project in the Luukki recreational area, in which endangered species of polypore fungus are transplanted onto felled spruce trees. Natural Resources Institute Finland and the University of Helsinki are monitoring the spread of mycelia in the tree trunks and accompanying species with DNA analyses and the occurrence of fruiting bodies with ground inventorying. The objective of the project is to promote the diversity of forests and restoring endangered species of fungus to their natural growth sites.

Eyes on the future

Securing biodiversity and sustainable use of natural resources must be brought in as part of all of the City's operations better than before. The development of green and blue networks must be expedited, and wear on nature and the spread of invasive species must be prevented effectively.

Restoration of contaminated soil and landfill sites

The most significant contaminated soil restoration locations managed by the City were the project areas of Kalasatama and Jätkäsaari that were to be transformed into residential use. Additionally, other large restoration sites were in the centre of Vuosaari and Herttoniemenranta. In addition to the large projects, several individual small sites were inspected and restored in 2019. Soil was restored at approximately 40 different restoration locations.

The soil restoration was usually done during the other construction work in the areas. The soil condition database created by the Ministry of the Environment features the details of 878 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.

The restoration of the Vuosaari landfill is underway, and the City is preparing to restore the Iso-Huopalahti landfill in the coming years.

The soil was cleaned in the same way as in previous years, primarily by excavating the soil containing harmful substances and transporting it elsewhere for appropriate processing. Soil was also restored by isolating the contaminated soil matter on site. Below is an overview of how the contaminated soil matter was transported for treatment or final disposal in Helsinki in 2016–2019.

The costs generated by the restoration of contaminated areas and landfill sites increased from the last few years. Below are details of the costs caused by the restoration of contaminated soil and landfill sites in 2016–2019.

A total of approximately 111,000 tonnes of contaminated soil was transferred to be processed or disposed of, which is approximately 20% more than last year.

In 2019, 1,869,600 tonnes of unspoiled excavated earth were used at public construction sites. 192,500 tonnes of unspoiled excavated earth were delivered to external recipients.

Contaminated soil matter transported for treatment or final disposal in Helsinki and the costs for the City of Helsinki caused by the restoration of contaminated soil and landfill sites 2016–2019

	2016	2017	2018	2019
Land, tonnes	300 000	70 100	92 700	111 000
Costs in euros	23 480 000	19 671 000	17 878 000	25 004 000

Procurements

The City of Helsinki aims to promote responsible procurements in its strategies and policies. As a rule, the City's environmental policy requires the examination of environmental impacts when making procurements that exceed the national threshold value. Over the course of 2019, the significance of procurements in promoting responsibility and climate goals has been recognised better. The perspective has become wider than environmental responsibility, with social and economic responsibility also taken into account better. It was also decided to promote more comprehensive monitoring of the use of both environmental and social responsibility criteria in monitoring procurement agreements. On average, the environmental criteria were used in around 67% of the procurements of the City's divisions and enterprises in 2019 when examined in euros and in 45% when examined as individual procurements. This marked an improvement of a few percent from 2018. The most commonly used environmental criteria were those related to low emissions or those related to environmental programmes and plans.

The Carbon-neutral Helsinki 2035 action plan that steers the climate objectives sets ambitious goals to promote responsible procurements. The programme lists a total of 23 procedures to improve the management and effectiveness of procurements and develop construction, transport and food service procurements towards lower impacts on the climate. The procedures have successfully expedited responsible procurements, and several smaller working groups have been formed around the procedures to develop aspects such as food services and area projects. Additionally, work to develop a joint responsibility criterion bank began in 2019.

Development work on the Urban Environment Division's procurements is guided by a new procurement strategy, which provides a framework for creating an operating model for responsible procurements in a designated procedure group. This work was started by reviewing the environmental criteria used in the Division's procurements by procurement group. After that, a list was created of objectives in the Carbon-neutral Helsinki 2035 action plan, the Division's environmental programme, the Real Estate Strategy and other programmes that affect similar categories. After these phases, each procurement group's significance was assessed in terms of climate, environmental and social criteria alike. The plan is to promote the operating model in the future through a separate project plan.

The environmental network for the City of Helsinki's procurements was expanded in 2019 with several persons, and co-operation with enterprises and subsidiary companies has increased as well. The network's task is to make the City's internal co-operation closer and information exchange between parties responsible for the City's procurements more frequent, as well as to highlight good practices. Procurements are also developed in several EU-funded projects that have brought more resources to implementing sustainable and climate-friendly procurements.

In 2019, Helsinki began its work on the six-year long Towards Carbon Neutral Municipalities project whole (the Canemure project) coordinated by the Finnish Environment Institute. The massive national project involves implementing practical climate change mitigation procedures with 22 partners. The City of Helsinki's subproject involves promoting low-carbon procurements and delving into how the carbon footprint could be taken into consideration in procurements better than at the moment.

Helsinki was the first city in Finland to have its carbon footprint calculated by the

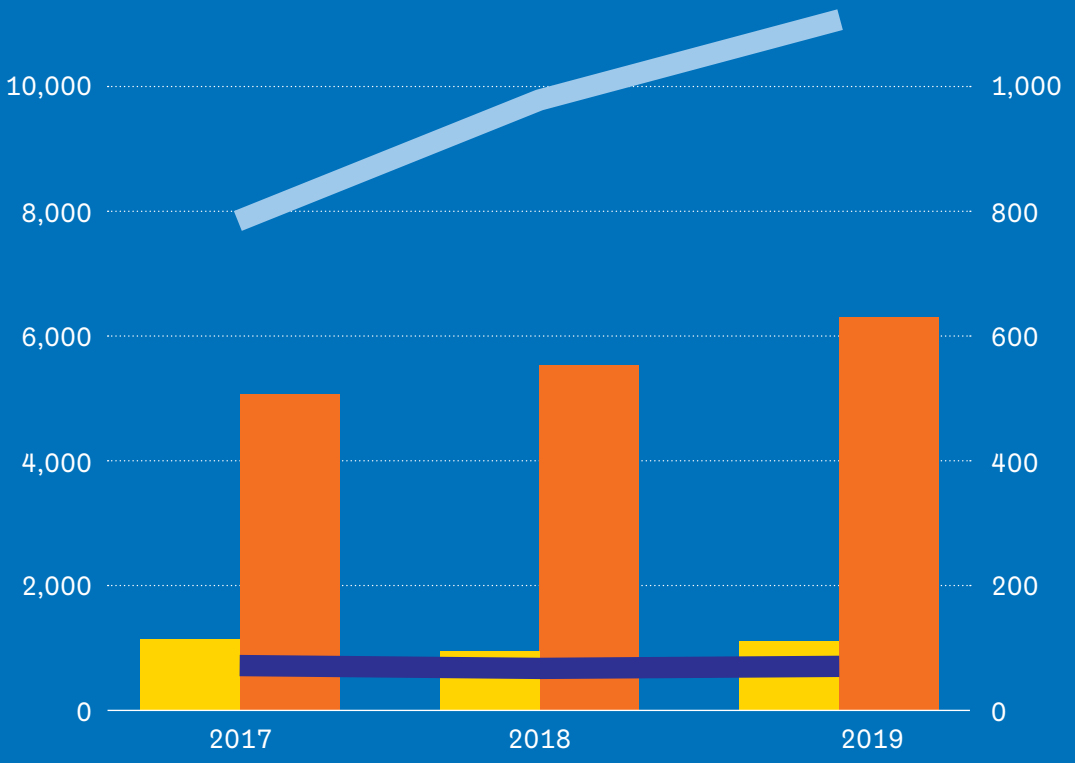
City employees' flights

The number of business flights by the City's employees, left scale

International flights
Domestic flights

Climate emissions from City employees' business flights, CO_2e in tonnes, right scale

International flights
Domestic flights



The City of Helsinki's new travel instructions came into effect on 24 May 2019. They state that when planning business and duty travel, factors to be taken into consideration include but are not limited to the necessity of the travel, as well as carbon neutrality and low-emission perspectives, meaning that the travel must be arranged in a manner that loads the environment as little as possible. They also state that the possibility of holding meetings through remote connections should be looked into as an alternative, and that domestic work-related travel should be primarily be carried out by means other than flying. The City Board would like to have annual reporting on the numbers of journeys and the effects of the new travel instructions, in particular on the numbers of flights. A bidding competition is currently being held concerning the City's travel agency services, and one possibility is that in the future, climate emissions from the business travel of the City's employees will be automatically compensated for through the travel agency in connection with making a travel reservation. Flights taken in 2017–2019 and their emissions are presented in the image. The number of flights has steadily increased in recent years, and the impact of the new travel instructions is not yet evident in the figures.

In 2018, the calculated carbon footprint of Helsinki's procurements was 0.81 million tonnes of CO_2e. In terms of climate impacts, the most significant procurement groups were building investments, building and maintenance services and the heating and electricity consumption of buildings and premises.

Finnish Environment Institute as part of the Canemure project. In 2018, the calculated carbon footprint of Helsinki's procurements was 0.81 million tonnes of CO_2e. In terms of climate impacts, the most significant procurement groups were building investments, building and maintenance services and the heating and electricity consumption of buildings and premises. In addition to these procurement groups, the City is looking into opportunities to also reduce emissions in service procurements, the percentage of which in euros is likely to increase further in the future.

In 2019, a total of eight pilot procurements were started in the Canemure project. All of the pilot procurements have a large carbon footprint, but they also have an opportunity to reduce emissions. In the tendering phase, carbon footprint calculation was piloted in a design-build project organised by the City's housing production unit. The preparation of dairy and meat product procurements was carried out in co-operation with the procurement experts of the Service Centre, and in connection to that, market experts were invited to discuss the possibilities of involving taking responsibility criteria, especially for decreasing climate impacts and the carbon footprint, into consideration in future bidding competitions. Additionally, carbon footprint calculation was attached to the agreement period of the restaurant services in the Urban Environment Division building.

The Carbon-neutral and Resource-wise Industrial Areas project was started in the summer of 2019. In the project, one of Helsinki's development subjects is the development and piloting of procurement criteria for emission-free worksites. The development work began in late 2019, and a market dialogue event was held for infrastructure contractors in December.

Helsinki is actively involved in national and international development work for sustainable procurements. In 2019, the Six Cities' climate network of mayors presented a new initiative, which states that cities should assess the most significant procurement groups in terms of climate impacts at the city-level, taking procurement group volumes and the lifecycle-long climate impacts of procurements into consideration. Helsinki has also been involved in preparing the Green Deal for emission-free worksites in co-operation with the state and four other cities and has taken part in the KEINO Competence Centre's various developer groups, as well as a procurement management training programme at the KEINO Academy. Regional co-operation on sustainable procurements was also continued in the sustainable procurement group of the Helsinki metropolitan area.

In 2019, Helsinki was involved in the Big Buyers network, which operates under ICLEI and features three groups developing an emission-free worksite, electric machinery and construction following the principles of circular economy. Furthermore, Helsinki has continued as an active member of the Procura+ network, among others. The food delivery service entity, for which the Service Centre held a bidding competition in 2018, received international visibility as an example of the European

Commission's good practices for green public procurements.

Helsinki has been a Fairtrade city for six years. In 2019, the Service Centre consumed 1,120 kg of Fairtrade certified coffee, while Palmia consumed 9,730 kg. Both operators consumed 3,910 kg of Fairtrade certified bananas. Other Fairtrade products consumed included tea, tofu, honey and cane sugar.

The City is involved in the UUMA3 new land construction project, which promotes aspects such as emission calculation instructions and implementation in infrastructure construction, as well as developing the service chains for recycled materials, such as the recycled binders used in deep stabilisation, and testing them in real-life conditions. In Helsinki and other coastal areas, deep stabilisation plays a significant role when building on clay soil, and greenhouse gas emissions from its cement and lime-based binders have been observed to be very high. The test pillar stabilisation to take place on the clay soil of the Kuninkaantammi area construction project in the spring of 2020 is an important part of this whole. The mass stabilisation of the Konala scenic embankment carried out in the winter of 2019 produced experience with using the emission criteria when procuring binders. The goal is that in the future, the greenhouse gas emissions from deep stabilisation binders will only be a fraction of those from the lime cement that is currently in common use. The goal is also for the percentage of recycled materials to be significantly higher in the future than in, for example, a lime cement mixture, in which the percentage of recycled materials is 0–25%, depending on the mixture ratio and cement quality. Currently, there are binders in which the percentage of recycled materials is almost 100% in the productisation phase.

Eyes on the future

More goals for responsible procurements than before have been prepared in the City's environmental policy, which is currently being updated. The goal is to improve the effectiveness of procurements and the assessment thereof, as well as develop the monitoring of the realisation of the criteria used.

Work to update the City of Helsinki's procurement strategy will start in 2020. The strategy will be updated in co-operation with the strategy work department for Finland's national public procurements.

The categorisation of procurements, using uniform criteria and developing monitoring during agreement periods are central themes in developing procurements. In the future, in addition to the Carbon-neutral Helsinki 2035 action plan, the development of sustainable procurements will be guided by a circular and sharing economy roadmap, which will emphasise procurements that are resource-wise and sensible in terms of their lifecycle impacts. When making procurements with significant environmental effects, the goal will be to take their carbon footprint into consideration in the future, yet without forgetting their other environmental impacts. Know-how will also be developed through projects.


GRADALL

Circular economy

As stated in Helsinki City Strategy for 2017–2021, the City's goal is to implement emission reductions and circular economy projects in Helsinki in cooperation with the corporate world and residents. The Carbon-neutral Helsinki 2035 action plan features around twenty procedures concerning circular economy. One of them is the creation of a circular and sharing economy roadmap. Based on the kick off event held in the spring of 2019, four themes were selected for the roadmap: construction, procurements, green waste, and sharing economy and the new business opportunities of circular economy. Workshops were held for each theme and used as a basis for creating the procedures of the roadmap. The Urban Environment Committee approved the roadmap in May 2020.

Awareness of the significance of circular economy in attaining the City's climate goals has clearly increased over the course of 2019.

Helsinki took part in the EIT Climate-KIC Circular Cities project, the objective of which was to expedite the introduction of circular economy as part of cities' processes. A report was published based on the work package led by Helsinki. Among other things, the report identifies potential bottlenecks in including circular economy solutions in construction procurements and proposes solutions to them. The report also contains a case catalogue that lists construction projects following the principles of circular economy across Europe. The implementation schedule for the project was from May 2018 to December 2019.

Awareness of the significance of circular economy in attaining the City's climate goals has clearly increased over the course of 2019. This is especially evident in the construction sector, in which the City has utilised different methods to find ways to promote circular economy in procurements such as those related to construction. In the autumn of 2019, Helsinki joined the working group for circular economy in construction established by the European Commission. The operating term of the group is one year, and its goal is to share information and experiences concerning circular economy projects and influence the promotion of circular economy in construction.

In 2019, the City was involved in piloting the demolition charting method of the Ministry of the Environment in one demolition project and began creating demolition instructions that take circular economy into account. Additionally, Helsinki is involved in the HYPPY project coordinated by Green Net Finland. The objective of the project is to develop and provide the municipalities involved with operating models aimed at better circulation of the construction and demolition materials of demolition or renovation construction sites. The duration of the project will be from September 2019 to January 2022.

Efforts are made to improve the recycling of furnishings and materials within the City organisation as well. The *Tavarat kiertoon* recycling system *(kierratys.hel.fi)* was introduced in late 2019. The system enables users to examine the property and materials recycled within the city.

In September 2019, the Urban Environment Committee approved the principles of utilising excavated soil, rock materials and demolition materials created by the City's soil working group, as well as an action plan for implementing the aforementioned. The principles will guide, clarify and unify the City's operations, while the action plan is aimed at improving the Urban Environment

Division's key processes in accordance with the objectives.

In 2019, a total of 1,869,603 tonnes of excavated earth mass and rock material was used in the construction of public areas. Thanks to reusing, ca. 11.3 million euros and 1,560,000 litres of fuel were saved and emissions were reduced by 3,689 t CO_2e. The City has seven temporary recycling sites where crushed rock, excavated earth, demolition materials and contaminated soil are temporarily stored and processed in accordance with environmental permits.

Helsinki has issued instructions for using recycled soil for seedbeds, which are followed in park and green construction.

More effective reusing of various biomass flows has been identified as a significant theme in Helsinki when aiming at carbon-neutrality. In the autumn of 2019, a survey was conducted on the quality and volumes of green waste generated from the maintenance of public areas. The survey also examined the current processing processes for different green waste fractions and identified alternative methods with which transport operations could be optimised and the benefits obtained from materials improved.

Helsinki is involved in the CircVol project coordinated by Turku Science Park. The objective of the project is to promote business activities that follow the principles of circular economy and the utilisation of land masses and large-volume industrial effluents. The duration of the project will be from August 2018 to December 2020. In Helsinki's sub-implementation, the City creates a path for the realisation of an industrial-scale integrated bioeconomy undertaking. An extensive placement and service need survey concerning bioeconomy and circular economy businesses, as well as a regional biomass survey, were conducted in 2019. The results of the surveys were presented and refined at an event held for businesses in December 2019.

The City of Helsinki Service Centre is making active efforts to reduce food waste. Over the course of 2019, the City of Helsinki

Service Centre was involved in the *Lukeloki* pilot organised by Natural Resources Institute Finland, the objective of which was to survey the amount of food waste generated at serving lines. 2019 also saw the launch of the *IoT–Älyvaaka* development project, which measures the amount of lunch leftovers at schools, utilising smart technology. Additionally, the City of Helsinki Service Centre took part in the demand monitoring data visualisation project coordinated by the Economic Development Division of the City Executive Office.

Some of the City of Helsinki Service Centre's locations sell take-away leftover food from the serving line after the meal time has ended. Additionally, a few locations have introduced the Lunchie mobile application in their leftover food sales. In late 2019, the Service Centre organised a campaign with the goal of activating the sales of leftover food from serving lines.

From the autumn of 2018 to the spring of 2019, the Service Centre was involved in the Urban Food change project, the goal of which was to combine the supply of and demand for food waste with digital platforms and services. The pilot was carried out at Etu-Töölö Upper Secondary School, where leftover lunch food was sold at an affordable price to a previously agreed upon target group through an application.

In 2019, efforts were also made to develop waste management, as the service properties administrated by the City began having waste surveys conducted with the help of eco-supporters. In 2018 and 2019, Heka Oy introduced plastic container collection bins at almost all of its apartment buildings. Due to the residents' increasing enthusiasm for waste sorting, the calculated amount of mixed waste produced by residents in 2019 decreased by more than 1,500 tonnes when compared to 2018.

Eyes on the future

The greatest circular economy opportunities in Helsinki are in construction, sharing economy, procurements and sustainable biological cycles. The circular economy aspect must be taken into account when planning areas. These themes are also delved into in aspects such as the circular and sharing economy roadmap, which is expected to be launched in the spring of 2020. The map is designed to establish circular economy thinking more strongly in the City's key functions.

Clarifying the shared goals and increasing circular economy know-how require active training of and interaction among the City's staff. Globally, a lot is happening in circular economy. This is why efforts should be made to promote and incorporate networking and information provision at the local, regional and national levels alike.

Environmental awareness and responsibility

In June, the City's subsidiary company Helsinki Marketing Oy launched the Think Sustainably service on the MyHelsinki website. The service helps residents and tourists choose more sustainable ways to live in and enjoy Helsinki. The Think Sustainably service was Helsinki Marketing Oy's most extensive marketing communication campaign in 2019, as well as a central content marketing theme throughout the entire year. The company actively engages local service providers in responsibility work through the Think Sustainably service.

At the Climate School event held at the City Hall in September 2019, each lesson built understanding of how climate change can be affected. Over the course of a week, the Climate School aimed at residents and businesses examined transport, housing, food and construction, as well as various challenges, societal phenomena and contexts that affect what kind of solutions we can use to build the future. With design, the different pieces eventually formed a unified whole: a Climate Change Map. The Climate School was organised by the City of Helsinki and Helsinki Design Week in co-operation with Aalto University and the University of Helsinki.

More than a dozen households in Helsinki took part in a trial organised by the City of Helsinki and D-mat Oy, the goal of which was to support households in reducing their own carbon footprint. The actions carried out over the month-long trial period reduce the participants' carbon footprint by an average of 15% when these actions become a habit. In the initial situation, the average carbon footprint of households was 6.9 t CO_2e annually, with a material footprint of 25.1 tonnes.

In early 2019, the Max 22 campaign by Ilmastoinfo asked the question: "How warm is it in your home?" The campaign generated plenty of discussion and media visibility through factors such as celebrities involved in the campaign. 75 housing company energy experts graduated from energy expert courses held in the Helsinki metropolitan area. Resident evenings were held with themes such as the following:

- solar power for homes
- from oil to renewable fuels (detached house residents)
- energy-effective housing company maintenance
- methodical building management by housing companies
- taking energy efficiency into account in renovations

The percentage of residents with a foreign background is rapidly increasing in the Helsinki metropolitan area. Different operators have identified the need to develop environmental communications aimed at those with a foreign background. In 2019, Heka and HSY collaborated with residents with an immigrant background to produce sorting videos in Finnish, Arabic, English, Somali and Russian. Additionally, a 'Housing and Environment' section was created for the Immigrants Helsinki website.

Young people's concerns over littering of the environment resulted in the three-year SATAKOLKYT project launched by the Youth Services as an organisational collaboration. The goal was to get the residents of Helsinki moving while cleaning the entire 130-km shoreline of litter. Over the course of the year, a 67-km portion of the shoreline was cleaned, resulting in a total of almost two million steps taken. Thousands of Helsinki residents were involved, including school classes, work communities, resident associations and youth groups.

Young people's opportunities to influence Youth Services' environmental activities were further reinforced as the building of the EcoCompass environmental management system began at the level of Youth Services in their entirety, and young people took part in selecting the themes of the environmental programme. Young people wanted more attention to be paid to the ethicality and environmental friendliness of procurements. Young people want to be involved more extensively in influencing the consideration of environmental matters in society and the world.

The Environmental Youth Work Unit strengthened thousands of young people's relationship with nature in many ways. The Unit provided access to campgrounds and islands it maintains for organising young people's camps, produced nature school and adventure activities and provided young people with environmental activities with animals, eco-cooking and trips as per their wishes. One of the summer's top events was the Ecotrip bicycle trek in the Turku Archipelago, the idea for which came from young people themselves. Young people wanted to highlight ecological travel that is simultaneously fun, experiential and communal.

In 2019, the City of Helsinki Environmental Services implemented the *Kulkuri* project, an environmental education project focusing on sustainable transport. The goal of the project was to increase awareness among children, young people and their families regarding sustainable transport and the environmental impacts of their own transport choices. The environmental education aspect was carried out primarily as school visits, which reached more than 1,900 pupils from 31 different schools in 2019. Visits were also made to two upper secondary schools and various events. The project involved communication as an influencer community, among other things, and produced various materials that schools and other parties will be able to use in the future as well. The project received government subsidies for steering mobility.

Harakka Nature Centre celebrated its 30th anniversary by joining forces with Harakka artists to design an exhibition named *Näkyvä ja näkymätön mer*i ('The Visible and Invisible Sea') and organise a two-day Baltic Sea NOW seminar. In the Nature Centre, 78 nature school days were organised for Helsinki schools, 38 of which were nature study days for lower stages, while 40 were environment study days for upper stages and upper secondary schools. For children in day care, 61 island adventure days were organised, and island adventure trips for families with children were held on seven summer Sundays.

During the summer season, Harakka held guided island tours every Sunday, and 35 on-demand tours were also organised. A sea-themed event with free transport to the island was held on Helsinki Day. Three camps were organised: an archipelago camp for children and two international Gulf of Finland camps for teachers and young people. For educators, four environmental education courses were held. Of these courses, the Helsinki's Wonderful Nature as a Learning Environment course had more applicants than the course had room for.

In 2019, 32 nature trips were organised, with more than 1,280 residents participating. The most popular nature trips were those centred around the Maunula hazel grove and new life in a storm damage area, the reed warblers and other night-time singers of Viikki, and summer night scents and singers in Uutela.

Helsinki Zoo provides an excellent setting for school and early childhood education groups all year round. Helsinki Zoo was visited by more than 23,800 school children and more than 11,200 pre-school children, Nature School Arkki held 44 nature school days, and in March, a three-day conference for school children was held for the 13th time, followed by four environment and animal-themed summer camps for children in June.

In 2019, as facilitated by HSY, day care centres and pre-school groups held 1,930 environmental education moments for children aged 5–6 and 1,050 environmental education lessons for educational institutions.

Environmental risks

Due to climate change, extreme weather conditions will increase and forecasting will become more difficult. Invasive 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, deterioration of air quality, diminishing biodiversity, disruptions in the railway network, and the challenges posed by extreme weather phenomena to healthcare, in particular. Preparing for these risks is done through organised actions.

Climate change was named one of the fifteen risk categories in the Helsinki Group's assessment of significant risks in 2019. The report describes the current and new risk management methods, as well as the effectiveness, probability and urgency of the risks and the management's opportunities to influence them. Recognising climate change as its own risk category promotes integrating climate change adaptation work as part of the City's risk management whole.

In 2019, the Helsinki City Rescue Department hired a fire marshal, a significant portion of whose working time is related to exceptional weather conditions.

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. Several co-operation partners will participate in the operations as agreed. The Helsinki City Rescue Department's oil spill prevention depot is located in Santahamina. Helsinki Zoo's responsibility to act in the event of an oil spill was defined in connection with the international BALEX oil spill exercise in 2012. Since 2014, the Zoo's vet has acted as the WWF's Chief Veterinarian in regard to oil spills. In 2019, an oil spill response exercise was organised at Helsinki Zoo in co-operation with the WWF, the Helsinki City Rescue Department, the Finnish Environment Institute and Metsähallitus.

The national strategy for preventing environmental offences is implemented in Helsinki through close collaboration between bodies such as environmental supervision authorities and the police. The police and environmental supervision authorities of the City also carry out joint supervision projects when resources allow. In 2019, several suspected environmental crimes affecting water bodies were investigated in co-operation with the police. Other environmental monitoring authorities co-operating with the Helsinki's environmental supervision authorities include the Regional State Administrative Agency of 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.

Oil spills in Helsinki

	2016	2017	2018	2019
In water bodies	31	75	13	52
In important groundwater basins	10	11	11	2
In other areas	303	278	366	329
Total	**344**	**364**	**390**	**383**

Environmental economy

Environmental economy includes the income, costs and investments made primarily for environmental reasons. The information is presented for the parent organisation, meaning the divisions, public enterprises and departments.

The environmental costs, including amortisations, added up to a total of 97 million euros (+0.9% from 2018). The environmental costs made up 2.1 per cent of the City's total operating costs, equalling 148 euros per capita. The City's largest expense items were the costs of climate protection (29%), sanitation and waste management of the areas (21%), and promoting climate-friendly and environmentally friendly transport (19%).

The environmental investments added up to 135 million euros, which was 18.2% of the total capital expenditure of the City and 206 euros per capita. The City's environmental investments remained at the same level as the previous year, and the largest investments were related to promoting climate and environmentally friendly transport (HKL's public transport investments) (76%) and soil decontamination (18%).

The internal environmental income added up to some 8.3 million euros, which made up 0.7 per cent of the total operating income of the City and 13 euros per capita. The most significant income was generated from vehicle transfer fees in connection with street cleaning (22%) and city bikes (20%).

The value of environmental responsibilities in the financial statements on 31 December 2019 was 22.2 million euros. The responsibilities concerned preparing for the restoration of old landfills and decontaminating soil.

Environmental income*

8,309,833 euros

Environmentally friendly and ecologically sustainable transportation
2,461.0 +31 %

Air protection
1,904.6 +54 %

Authority assignments related to environmental protection
1,345.1 –4 %

Climate protection
1,057.1 +194 %

Actions that improve eco-efficiency
501.0 –7 %

Soil protection
318.9 +176 %

Water protection
299.2 +99 %

Waste management
215.3 +12 %

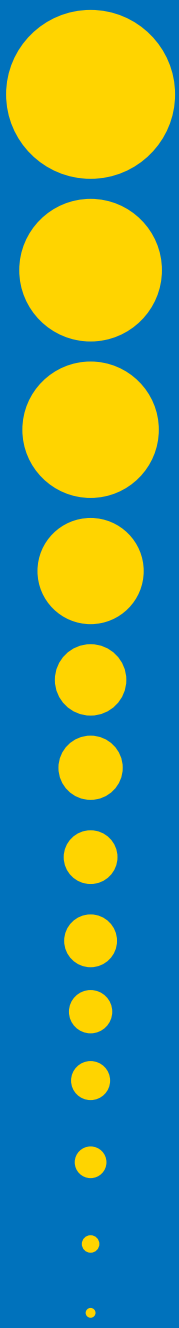
Environmental training and education
172.5 +163 %

Nature protection
35.2 –68 %

* In the city organisation in 2019, thousand euros
The change from the previous year is expressed as a percentage

Environmental costs*

96,652,250 euros



Climate protection
28,004.1 –7 %

Waste management and keeping the areas clean
19,966.0 –5%

Environmentally friendly and ecologically sustainable transportation
18,264.3 +15 %

Environmentally based taxes
11,064.0 –5 %

Air protection
5,007.3 +5 %

Water protection
4,052.5 +21 %

Authority assignments related to environmental protection
2,836.5 –7 %

Environmental training and education
2,739.6 +116 %

Nature protection
1,839.2 +4 %

Environmental management
1,495.3 +3 %

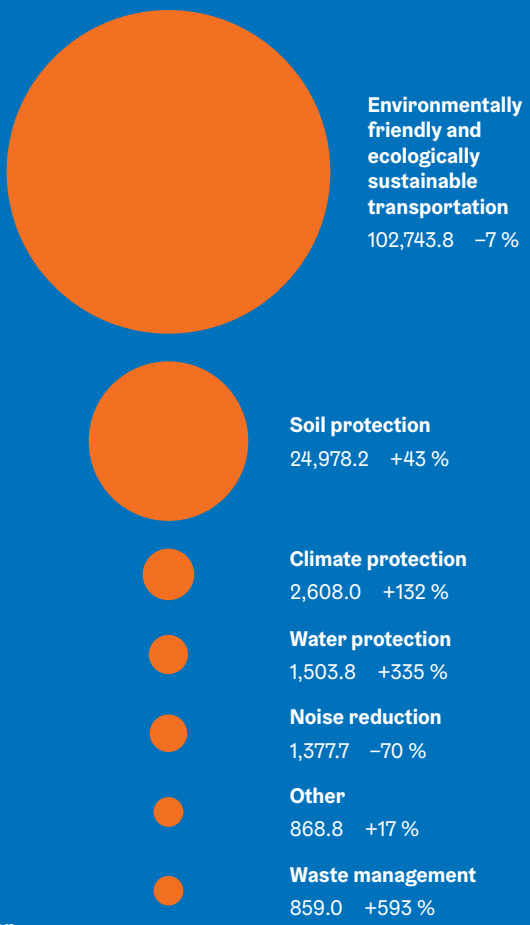
Actions that improve eco-efficiency
986.6 +29 %

Soil protection
301.7 –52 %

Noise reduction
95.1 +21 %

Environmental investments*

134,939,394 euros



Environmentally friendly and ecologically sustainable transportation
102,743.8 –7 %

Soil protection
24,978.2 +43 %

Climate protection
2,608.0 +132 %

Water protection
1,503.8 +335 %

Noise reduction
1,377.7 –70 %

Other
868.8 +17 %

Waste management
859.0 +593 %

Indicators

- The objective is reached or is about to be reached
- The realisation of the objective is proceeding
- It is challenging to reach the objective

Indicators for environmental management and partnerships

Object

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)	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)	18 %	
The combined number of audited EcoCompass companies, Climate Partners companies and organisations that have accepted the Baltic Sea Challenge will increase (environmental policy)	479 pieces	

Indicators for climate change mitigation

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 carbon-neutral by 2035 (Strategy Programme 2017–2021)	–26 %	2020: 2030: 2035:
Per capita greenhouse gas emissions in the Helsinki region to fall by 39% from the 1990 level by 2030 (Helsinki Metropolitan Area Climate Strategy)	–44 %	
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)	–3 %	2020: 2025:
Energy consumption per capita in the Helsinki area to fall by 20% from the 2005 level by 2020 (Environmental Policy)	–16 %	
Renewable energy in the urban area to account for at least 20% of total energy production by 2020 (Environmental Policy)	24 %	
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)	12 %	2020: 2025:
Energy savings in the City's own operations (public buildings, vehicles, street lights): 61 GWh (KETS 2017–2025)	11 GWh (18 % of the objective)	
Energy savings of City-owned residential buildings: 55.7 GWh (VAETS 2017–2025)	9,8 GWh (18 % of the objective)	

** The forecasts for 2020 take the impact of the coronavirus pandemic into account. Emissions from energy production have significantly decreased in Finland, and Helsinki's motor vehicle traffic volumes and electricity consumption have decreased dramatically from March to May 2020. Without the impact of the coronavirus pandemic, the energy consumption target and the 30% emission target would probably be challenging to achieve.*

Indicators for air protection

Object

Annual average nitrogen dioxide concentration on the Mannerheimintie monitoring station will not exceed 40 mikrog/m³ (EU directive)	25 µg/m³	
Annual average nitrogen dioxide concentration on the Mäkelänkatu monitoring station will not exceed 40 mikrog/m³ (EU directive)	29 µg/m³	
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)	15 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)	14 pcs/a	

Indicators for traffic

Object

The proportion of sustainable modes of transport to increase (City Strategy 2017–2021)	77 %	●
The number of public transportation trips will increase (strategy programme 2013-2016)	325 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)	–11 %	2030: ● 2035: ●
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)	113.2 g CO_2/km	●
Share of cycling as a transport mode will be 15 % by 2020 (the Brussels Convention 2009)	9 %	●

Indicators for noise reduction

Object

Noise barriers to protect current land use will be constructed as presented in the operating plan	0 m	●
Anti-noise coating will be used as presented in the noise operating plan	650 m	●

Indicators for water protection

Object

Nitrogen emissions to the sea from the Viikinmäki waste water treatment plan will reduce (t/a) (environmental policy)	530 t/a	●
Phosphorous emissions to the sea from the Viikinmäki waste water treatment plant will be reduced (t/a) (environmental policy)	20 t/a	●
Number of combined sewer network overflows will reduce 20 % from the current level by 2020 (environmental policy)	+18 %	●

Indicators for nature protection

Object

Share of nature reserves of total area (City of Helsinki Nature Conservation Programme 2008–2017)	2.2 %	●
The surface area of water-permeable areas in Helsinki (the urban run-off water strategy for the City of Helsinki)	60 % (2015)	●

Indicators for procurements and waste

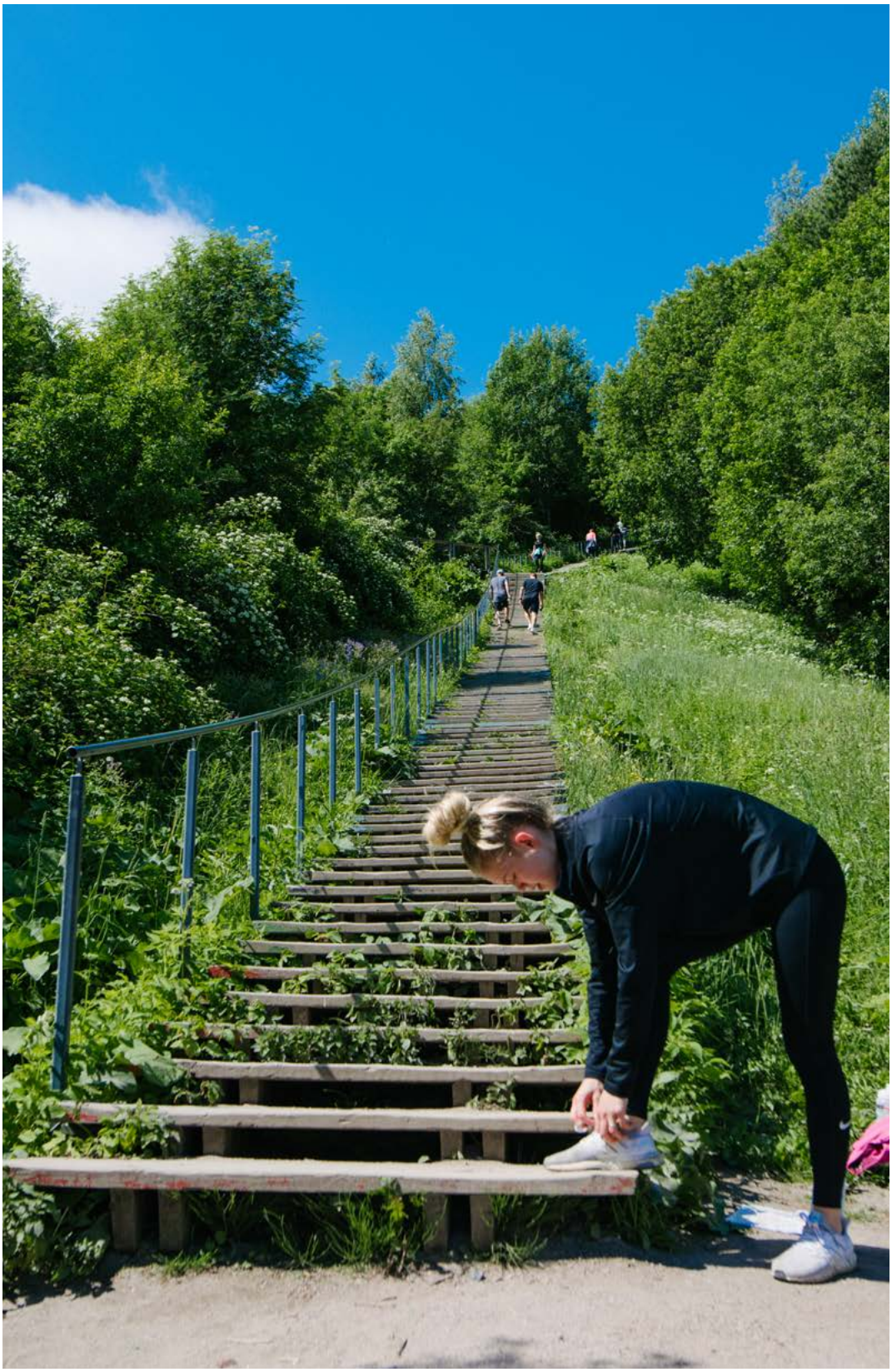
Object

Share of environmental criteria in the centralized acquisitions of the City of Helsinki will be 50 % by 2015 and 100 % by 2020 (environmental policy)	53 %	●
Amount of communal waste produced in the Helsinki metropolitan area per capita will reduce 10% by 2020 (environmental policy)	275 kg/resident/a (2018)	●

Indicators for environmental awareness

Object

The number of eco-supporters in the city organisation will increase, so that every work community will have a dedicated eco-supporter (environmental policy)	1,401 eco-supporters	●
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)	30 %	●



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All four of the City's divisions, five public enterprises, the City Executive Office and the inspection department have produced information for the report compiled and edited by the environmental management team of the Urban Environment Division. The Helsinki Group also includes 12 foundations and 83 subsidiary organisations, 63 of which submitted information for the Environmental Report.

City of Helsinki
Environmental Report 2019

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Urban Environment Division

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