HSY

Building environmentally responsible metropolis



Contents

Bearing responsibility for the environment
The Helsinki Metropolitan Area and the Helsinki Region as an operating environment
Environmental services for over one million inhabitants
Co-operation and innovativeness
Aiming for energy self-sufficiency
High-quality drinking water, efficient wastewater treatment, functioning networks
Increasingly efficient waste recovery
Up-to-date information about air quality, climate change, housing and commuting
Summary

Bearing responsibility for the environment

HSY plays an important role in building an environmentally responsible metropolis. Our central duties include production of high-quality drinking water, sewerage and wastewater treatment, undisturbed waste management that meets the environmental requirements, air-quality monitoring and producing current regional and environmental information. We work as cost-efficiently as possible while not forgetting environmental aspects.

One of our strategic aims is to be an environmentally responsible pioneer in co-operation with the municipalities of the region. This requires continuous development of our operations, target-orientation and procedures that go above and beyond legal requirements.

All of our operations are based on a concern for the state of the environment and the consequences of climate change. Our work has direct positive effects on the environment, especially in the fields of wastewater treatment and waste management. However, our operations also produce harmful emissions.

The regional and environmental information that we provide allows us to indirectly influence environmental matters. We help decision-makers, planners and research institutes to create a healthy and pleasant urban environment. The guidance we provide helps people live in a more environmentally-responsible way.

We strive to decrease our greenhouse gas emissions and energy consumption, and to produce more renewable energy. In addition, the investments we have made will significantly improve our energy-efficiency in the next few years.

This environmental responsibility report, HSY's first, covers all HSY operations. The year in review is 2012, but on several occasions data is presented from previous years as well. More detailed and current information will be available on the HSY website at www.hsy.fi/en.

Raimo Inkinen
Executive Director



Picture: HSY / Hannu Bask

Picture: HSY / Mikael Ahlfors

The Helsinki Metropolitan Area and the Helsinki Region as an operating environment

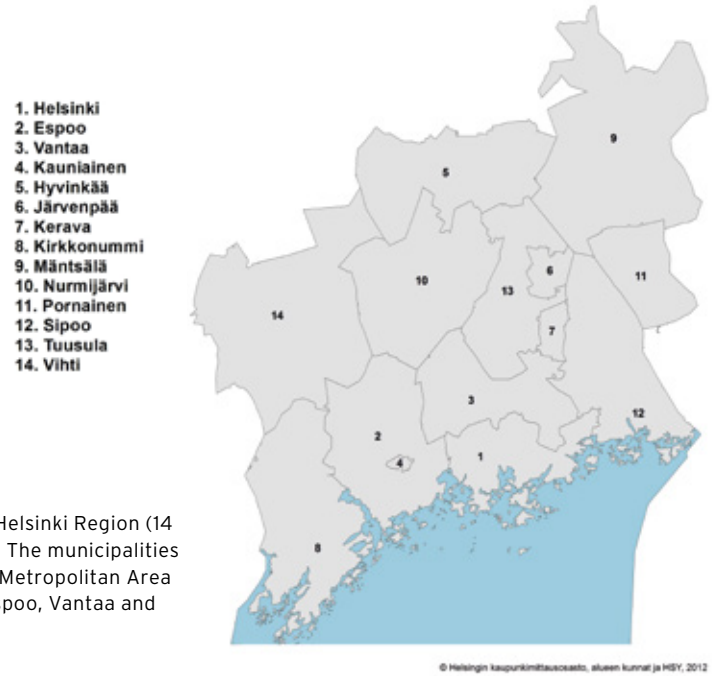


Figure 1. The Helsinki Region (14 municipalities). The municipalities of the Helsinki Metropolitan Area are Helsinki, Espoo, Vantaa and Kauniainen.

The Helsinki Region consists of the Helsinki Metropolitan Area and the ten municipalities surrounding it. It is an increasingly denser populated residential and business area. Migration has stayed busy throughout the be ginning of the 21st century. People have moved from the Helsinki Metropolitan Area to other municipalities in the Helsinki Region. Despite this, the population of the Helsinki Metropolitan Area has constantly increased.

The Helsinki Region is the financial centre of Finland. The region generates 44 per cent of the total turnover of all the companies in the entire country.

At the end of 2012, the Helsinki Metropolitan Area had 1,075,500 inhabitants and 650,000 jobs.

Urban form

Urban form is a functional entity formed by housing, commuting, using services and recreational activities. Also included are roads, railways, traffic terminals and other physical infrastructure of the region, such as networks for energy, drinking water and wastewater.

Urban form changes over the years as the population and quantity of available jobs grow and the built-up area expands. The map in Figure 2 presents the form in 2010 and the changes that have taken place over the last 20 years. Areas that have experienced strong growth are mainly located along rail traffic and other main traffic routes.

The latest large construction projects are Kalasatama and Jätkäsaari in Helsinki. Other new areas of construction include Suurpelto in Espoo and the Ring Rail Line and targets along it in Vantaa. For HSY, construction means organizing waste management and making investments in water services infrastructure.

Land use and housing are planned in a way that integrates the urban form and facilitates the organisation of public transport, reachability of services and preservation of nature areas. A sound and dense urban form plays a large role in promoting energy-efficiency, decreasing environmental load and mitigating climate change.

Read more

www.hsy.fi/en ›› About HSY ›› Urban environment

www.hsy.fi/en ›› About HSY ›› Greenhouse gas emissions

www.pksjatevirrat.fi ›› In English (Waste flows)

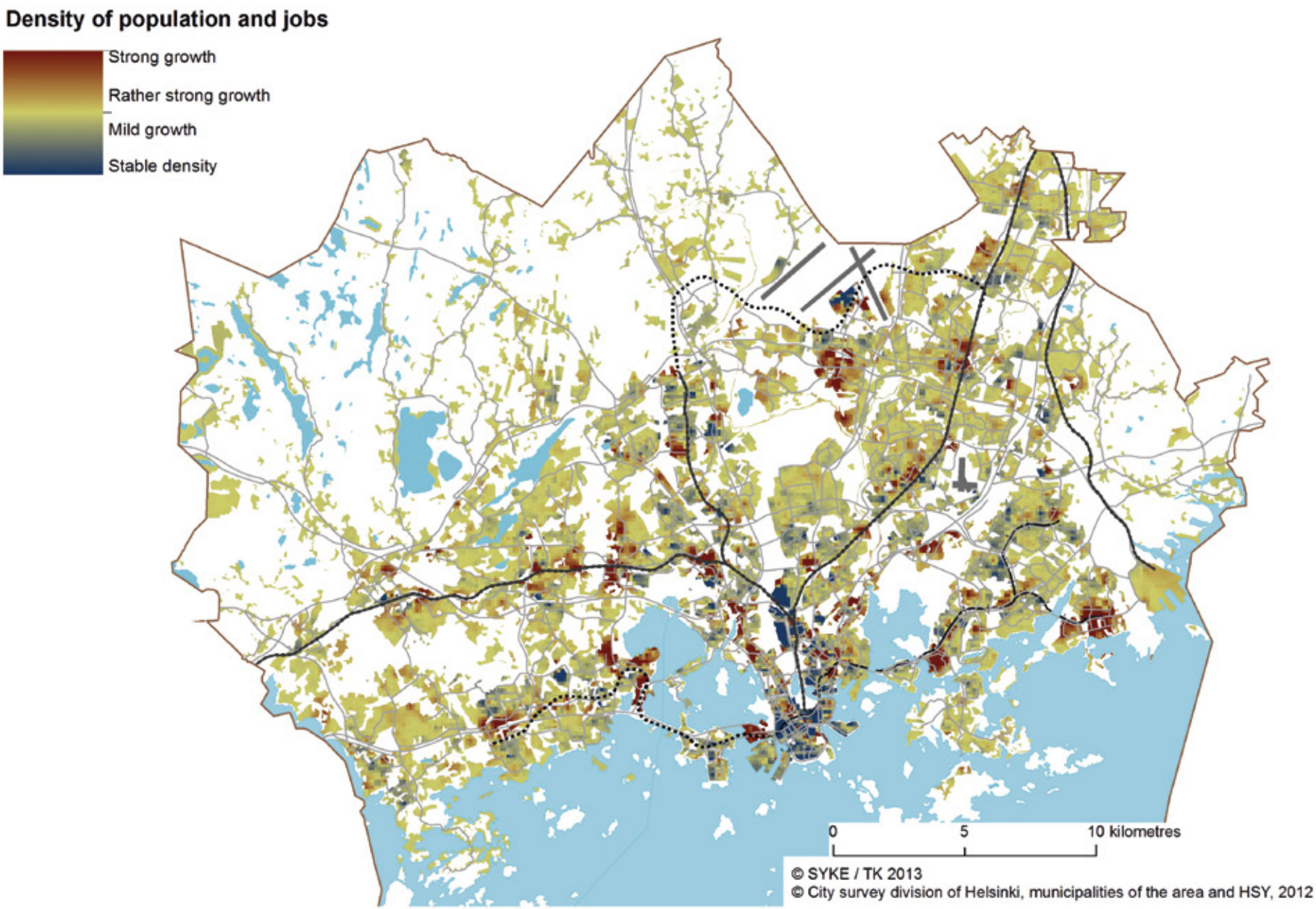


Figure 2. Urban form in the Helsinki Metropolitan Area in 2010 and change during 1990–2010. Density of population and jobs (in squares of 100 m^2). West Metro and Ring Rail Line (via Helsinki-Vantaa Airport) are marked in a dash line due to being under construction.



Picture: HSY / Jenni-Justiina Niemi

Greenhouse gas emissions of the Metropolitan Area

The greenhouse gas emissions of the Helsinki Metropolitan Area were 5.8 million metric tons in 2011, the same as in the comparison year 1990. Of the emissions, 51 per cent were caused by heating buildings, 22 per cent by consumer electricity and 23 per cent by traffic. What is remarkable is that emissions are at the same level as twenty years ago, despite the fact that at the same time the population has increased by over 20 per cent and the heated floor area by approximately by 30 per cent.

Based on preliminary calculations, greenhouse gas emissions remained at the level of the preceding years in 2012. District heating emissions increased, but emissions due to electricity consumption decreased. There were no significant changes in traffic emissions.

The fuels used in the combined production of electricity and heat have a great impact on district heating emissions. Some coal use has been replaced with natural gas and that has been the greatest individual factor decreasing emissions.

Total electricity consumption increased by over 50 per cent between 1990 and 2010. The main reason for this is the overall growth of the region. The growth is also affected by the increased amounts of computers and consumer electronics and the introduction of mobile phones and mobile phone networks.

One-fourth of the region's greenhouse gas emissions are due to traffic. The number of cars has increased and the total volume of road traffic has risen by 40 per cent since 1990. Total traffic emissions have increased by approximately 15 per cent between 1990 and 2010.

Emission quantities are also affected by things such as economic fluctuation, availability of hydropower, electricity import, climate policy and actions along with consumer choices.

Water consumption and wastewater

A total of 93.4 million m^3 of drinking water was produced in 2012. The quantity of invoiced water was 71.4 million m^3, of which 70.8 million m^3 was sold to HSY's operating area.

The residents and businesses of the Helsinki Metropolitan Area generate approximately 130 million m^3 of wastewater per year. The total amount of wastewater is a combination of wastewater generated by water consumption and storm water (rain and melting water). The quantity of storm water strongly depends on the amount of rainfall. In 2012, heavy rains significantly increased the quantity of processed wastewater compared to the year before.

The Viikinmäki and Suomenoja wastewater treatment plants treated a total of 152.3 million m^3 of wastewater, which was a 9.5 per cent increase from 2011 and 17 per cent above the average. Of the treated wastewater, 136.4 mil-

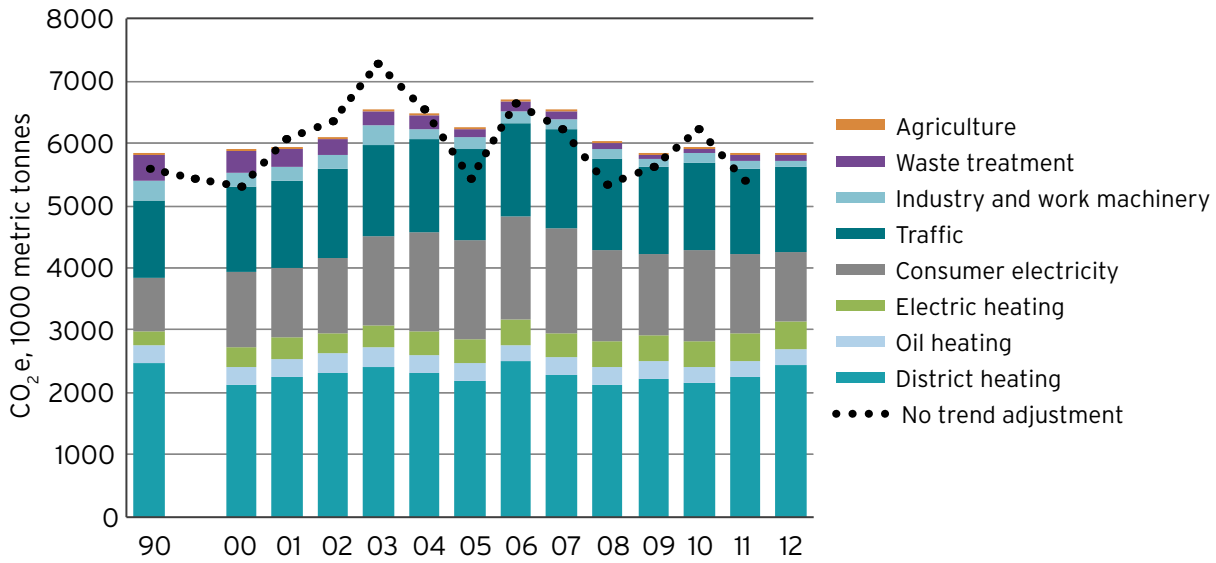


Figure 3. Greenhouse gas emissions calculated as carbon dioxide equivalent (CO_2e) in the Helsinki Metropolitan Area between 1990 and 2011 and the preliminary data for 2012. The dash line presents the actual annual fluctuation, which refers to emissions calculated without annual heating requirement adjustment and to the sliding five-year average of the emission factor for electric power.

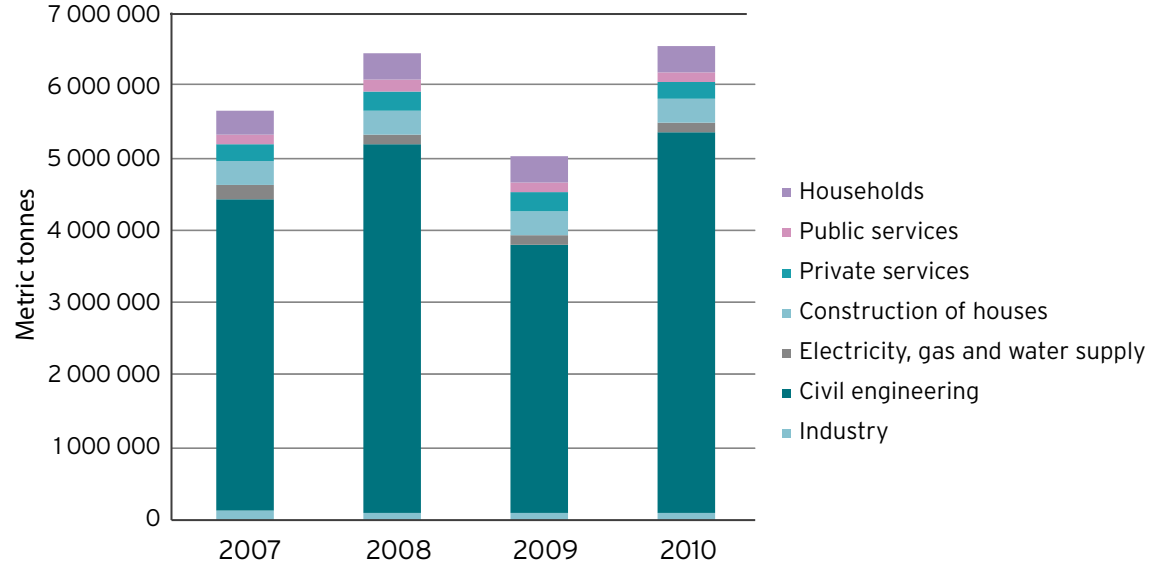


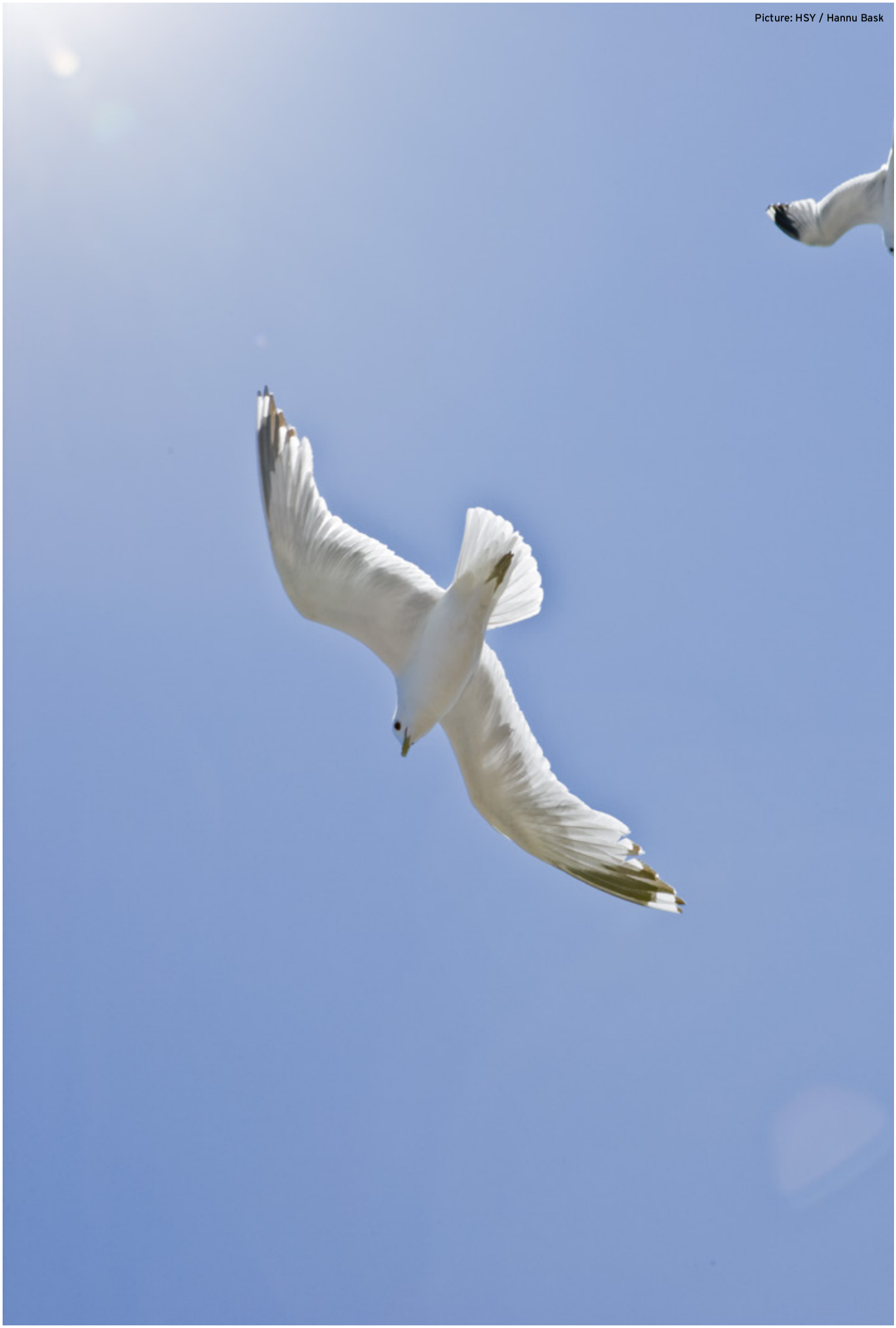
Figure 4. Waste generated in the Helsinki Metropolitan Area in 2007–2010.

lion m³ came from HSY's operating area and 15.9 million m³ came from elsewhere.

Quantity of waste

The Helsinki Metropolitan Area generated approximately 6.5 million metric tons of waste in 2010 and approximately 5 million metric tons in 2009. Households generated 5 per cent of the waste and construction another 5 per cent. Private services generated 4 per cent and public services 2 per cent of the waste. Approximately 80 per cent of the waste generated in the Helsinki Metropolitan Area and Kirkkonummi is soil and dredging material, the quantities of which may vary greatly each year depending on construction projects.

Among other things, HSY is responsible for organising the waste management of residential properties and public administration. Only a fraction of the total waste flow generated in the Helsinki Metropolitan Area is recovered or discharged through HSY.


Picture: HSY / Hannu Bask



Picture: HSY / Jenni-Justiina Niemi

Environmental services for over one million inhabitants

HSY produces water and waste management services for over one million inhabitants in the Helsinki Metropolitan Area as well as for the region's businesses. Waste water is also treated outside the normal operating area for waste management organisations in Central Uusimaa, Sipoo and Kirkkonummi. HSY has an individual waste management agreement with the municipality of Kirkkonummi. HSY also provides regional and environmental information for the Helsinki Region. The air-quality information produced by HSY covers the entire Uusimaa Region.

Operational guidelines

HSY's vision for 2015 is an environmentally responsible metropolis. According to the strategic aims set by HSY's Board of Directors, HSY

- operates as an environmentally responsible pioneer in co-operation with the region's municipalities,
- promotes electronic services and principle of "one-stop shop",
- reaches an economical balance through a long-term tariff policy and operations that are based on life cycle approach,
- strengthens synergic processes and achieves efficiency benefits as well as
- develops staff skills and creates an attractive image as an employer.

The cornerstone of HSY's operations is continuous improvement, which is aimed at ensuring high level quality of products and services and customer orientation. HSY shows its commitment to the principles of sustainable development by taking environment, people and economy into account in its decision-making and operations. HSY invests in the comprehensive management of safety and risks by carrying out danger recognition and prevention and the required measures on a systematic and continuous basis. HSY takes care of the well-being and competence development of its employees by providing clear objectives for work and implementing leadership in open interaction and co-operation with the employees.

HSY's integrated management system was introduced in 2013. It describes the way in which HSY operates. The system covers all divisions of operation. It

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meets the requirements of international standards for quality management, environment and occupational health and safety (ISO 9001, ISO 14001 and OHSAS 18001). The objective is to create shared and clear models for operations in order to support the implementation of the strategy and management.

The realisation of the objectives set in HSY's action plan is monitored annually. Appendix 1 presents the realisation in 2012 of some strategic and operational objectives that are important from the viewpoint of environmental responsibility.

Risk management and contingency planning

The purpose of risk management is to secure HSY's operations and the services provided to customers. The management and identification of risks related to climate change and preparing for them is an important part of risk management. In the management of financial risks, it is important to be prepared for significant investments in waste management and water services in the coming years.

Management groups discuss the assessment of situation and risks (risk position) in their area at least once a year. It includes listing of identified risks, their probability, effects and measures required to eliminate or minimize risks. Action programmes elaborated on the basis of the results of risk mappings will be completed in 2013 along with the creation of joint risk register of HSY.

The aim of monitoring that is included in risk management is to ensure that the organisation is operating according to the management's instructions. Monitoring is carried out throughout the organisation. Action areas include decision-making procedures, different types of operational inspections, approval procedures, verifications, reconciliations, property security measures and work duty separation. The management takes part in preparing and implementing annually updated risk management instructions. HSY's contingency planning project began in early 2012 and will end when the plan is completed in summer 2013.

The inspections that have been carried out have not detected significant shortcomings in internal monitoring or risk management. The observations made during inspections were mainly connected to ways of improving the efficiency of processes and internal practices.

HSY's contingency plan includes operating instructions and outlines participation in executive assistance tasks in crisis situations and special situations with serious impacts. Such situations recognised at HSY include disturbances and interruptions in the supply of electricity and critically important chemicals, wide-scale contamination of drinking water, chemical and biological discharges, storm or flood and pandemic and epidemic.

Values and personnel

HSY operates in a responsible, open, service-oriented and fair manner. These values of HSY, outlined in 2012, guide personnel in situations where no actual guidelines or instructions are available.

HSY conducts an annual personnel survey. According to the results of the 2012 survey, HSY personnel consider HSY an environmentally-responsible operator that produces high-quality services. Personnel's commitment to their work was already good the year before and has continued to strengthen. The personnel believe in their own competence and consider their work interesting and inspiring. Competence and information are actively shared in work communities. Areas for development include the progress of the relatively new organisation's change process, supervisor work, the fair and equal division of work and organisation of daily work tasks.

HSY employed 776 people at the end of 2012. More detailed information on personnel will be presented in the personnel report attached to the annual management report of HSY.

Electronic service

It is expected that electronic service will decrease the need for travelling and paper consumption. HSY has gathered all its electronic services on one web page, on which people can join as customers, order services and manage their own customer information. Electronic service was also adopted for the handling of matters between HSY, trusted representatives and municipalities when the extranet for representatives was launched in spring 2013. The use of electronic materials in publishing activities has been increased; for example, some publications are available in electronic format only. HSY also strives to increase the share of e-invoices in its purchase invoices.

Customer satisfaction

According to a survey conducted in spring 2012, customer satisfaction is high. The opening times are suitable, the services are usable and the staff is friendly and service-oriented. The customers consider HSY's activities environmentally responsible. There is some room for improvement in communication about fault situations and taking control during incidents, in service speed and in implementation of "one-stop service" principle, for example. The survey is conducted annually among corporate customers, property managers and consumers in the Helsinki Metropolitan Area.

Environmental criteria for procurement

HSY's objectives for procurement require HSY to act according to social and environmental responsibility. Procurement must support HSY's strategy, which balances economic factors with environmental responsibility. The procurement guidelines confirmed by HSY's Board of Directors came into effect on 1 November 2011. One stated goal of municipalities' energy-efficiency agreement is taking energy-efficiency into consideration in planning and procurement.
HSY signed the agreement in 2012.

Eco-support activities

Eco-support activities are an operating model for observing environmental matters in the workplace. It is implemented with the help of selected and trained eco-support personnel. HSY offers lectures on waste issues and climate change for trainings held in the Helsinki Metropolitan Area. In addition, HSY organises joint further training on water and waste issues for municipalities. In 2013, the trainings will expand to the other municipalities in the Helsinki Region.

Green Office programme

HSY's main office in Pasila has been implementing Green Office programme of World Wildlife Foundation (WWF) since 2010, although joining the programme dates back to the time of the Helsinki Metropolitan Area Council (YTV) in 2007. Green Office involves the implementation of an environmental programme approved by the HSY management team. The programme includes concrete measures for decreasing the environmental load in offices.

Energy consumption per person at the main office has varied during years, but electricity consumption has been decreasing after 2009. The quantity of paper waste decreased significantly in 2010–2012. On the other hand, the quantity of biowaste increased. A total of 12,460 kg of waste was generated in 2012. That is 76 kg per person, less than half of the figure for region's offices which are followed-up using the Petra Waste Benchmarking service.

Responsibility reporting

HSY's first responsibility report concentrates on environmental issues. There is less focus on the economic and social aspects of sustainable development. However, HSY's annual management report, personnel report and several special reports are available on the Web site. These materials are referred to in this publication and Appendix 2, which describes the responsibility-reporting entity in accordance with the Global Reporting Initiative instructions.



Picture: HSV / Kai Widell

Co-operation and innovativeness

HSY's environmental responsibility is also reflected in initiatives for operational developments and co-operation with other operators. HSY has participated in launching several innovative projects, of which this chapter presents only two. Projects and forms of co-operation of specific operational areas will be discussed later.

Climate strategies of the Helsinki Metropolitan Area

Together with the member municipalities, HSY is responsible for strategy work to mitigate climate change and adapt to it. The Helsinki Metropolitan Area Climate Strategy 2030 is a compilation of the area's actions to mitigate climate change. Each year, greenhouse gas emissions are calculated and reported, and information and climate indicators representing mitigation are compiled.

The regional objective reviewed in 2012 is a 20 per cent decrease in emissions from 1990 to 2020 and carbon neutrality by 2050. HSY worked on new paths of change to complement the strategy's method selection in co-operation with stakeholder groups.

Research, development and innovation activities

The basic task of HSY's research, development and innovation activities (RDI) is to support and ensure the realisation of the strategic aims of the authority. The objective also is to support birth of innovations and create an atmosphere and management system which promote innovations in HSY. The RDI programme for 2012–2014 was approved in June 2012.

There are focal points set for RDI activities:
- improving energy-efficiency
- mapping material efficiency
- mitigating climate change
- decreasing greenhouse gas emissions
- promoting the use of renewable energy sources
- adapting to climate change
- promoting innovations.

Read more

www.hsy.fi/en/ >> About HSY >> HSY climate work

A joint climate change adaptation strategy for the Metropolitan Area focusing on built-up urban area was approved in spring 2012. It includes the strategic starting points for adaptation, joint guidelines for the Helsinki Metropolitan Area and short-range procedural guidelines for 2012–2020.

The cities, joint municipal authorities and other regional operators in the Helsinki Metropolitan Area can use the strategy to prepare for and adapt to climate change and the effects of extreme weather conditions.

HSY organises an annual Helsinki Region Climate Seminar which attracts over 200 representatives of different stakeholder groups.

The Climate info service helps city residents decrease their carbon footprint by offering practical tips, instructions and new solutions for a more low-carbon life. Target groups include Helsinki Metropolitan Area residents and small and medium sized enterprises. The main operational themes are energy, travelling, food and consumption. Climate info operations shifted over to HSY at the beginning of 2013. In addition to the cities of the Helsinki Metropolitan Area, the operations are also supported by Helsingin Energia and Helsinki Region Transport.

Baltic Sea Challenge

Helsinki and Turku are committed to improving the condition of the Baltic Sea and have created a joint action programme. The commitment involves a challenge campaign in which HSY is participating.

HSY's Baltic Sea Challenge action programme for 2012–2014 includes a total of 17 projects for improving the state of the Baltic Sea. The subject areas are connected to the control of investments, control of storm water and overflows, decreasing the diffuse load, increasing awareness and international co-operation. Most of the projects, being implemented in sewer system and wastewater treatment, include actions with a direct impact on the load of the Baltic Sea. Some projects are connected to hazardous waste and climate change. Some of the projects are part of national or international environmental co-operation or research co-operation with universities and other research institutes.

Despite efficient treatment, wastewater and diffuse loads cause one of the biggest strains on the sea areas of Helsinki and Espoo. Primary load points include Viikinmäki and Suomenoja wastewater treatment plants' discharge areas off Katajaluoto and Gåsgrundet.

Wastewater effluent is highlighted during overloads or disturbances of sewerage, which can have significant local harmful effects. The capacity of the extensive combined sewerage systems in Helsinki City Centre is not completely sufficient during heavy rains. Another risk factor involves overflows at wastewater pumping stations. Although they only form a small part of the water system load, overflows can impact recreational use of waterways and the living conditions of water organisms, especially during dry spells.

Improving the efficiency of wastewater treatment plants and expanding sewerage in order to decrease the load are investment-heavy, long-term operations. That is why systematic development of water services is a key factor in effective water protection.

In addition to nutrient load, the harmful substances contained in wastewater pose a threat to the water ecosystem. Use of the most hazardous chemicals and waste disposal are regulated by environmental legislation, which effectively decreases the quantities ending up in the sewer. However, most of the hazardous chemicals come from medication and other household chemicals which are put into the sewer by households.

Picture: HSY / Hannu Bask

Picture: HSY / Hannu Bask

Aiming for energy self-sufficiency

HSY's energy consumption increased slightly in 2009–2012. According to preliminary data received in April 2013, energy consumption increased by 4 per cent and the production of renewable energy by 7 per cent in 2012 compared to the year before. HSY is generating more and more energy using renewable sources; in fact, HSY is one of the biggest producers of renewable energy in the Helsinki Metropolitan Area.

In 2012, HSY consumed 201 GWh of energy. The amount is equal to the annual consumption of 10,000 regular detached houses. In 2009–2011 the share of electricity was 63–65 per cent and heating 33–36 per cent of consumption. Production facilities of water services are the biggest consumers of energy within HSY. The electricity consumption of water services is centred on the operations of wastewater treatment plants and pumping stations.

Energy generation

Biogas collected at the Ämmässuo Waste Treatment Centre landfills has previously been delivered to Fortum's heating plant in Kivenlahti, but since May 2010 the biogas has been utilised at HSY's own gas power plant. In 2012, the gas collected amounted to 51.7 million standard cubic metres. A total of 99 GWh of electricity and 6 GWh of heat were produced. A district heating network for recovering the gas power plant's waste heat was completed in 2012.

Wastewater treatment plants produce renewable energy through the anaerobic digestion of wastewater sludge. In 2012, treatment plants produced 50.6 GWh

Energy units

Watt hour (Wh) is equal to the power of one watt for one hour.
Kilowatt hour kWh = 1,000 Wh
Megawatt hour MWh = 1,000 kWh
Gigawatt hour GWh = 1,000 MWh

Read more

www.hsy.fi/en >> Waste management >> Environment >> Waste-to-Energy Plant

www.hsy.fi/en >> Water services >> Environment >> From biogas to energy

of electricity and 26.7 GWh of heat. HSY's own energy generation covered over half of its electricity needs. Both wastewater treatment plants were self-sufficient for heat in 2012. Central projects for increasing renewable energy generation included the new high-efficiency gas engine at the Viikinmäki Wastewater Treatment Plant and the recovery of sludge heat at the Suomenoja Wastewater Treatment Plant. Gasum Oy has been processing the biogas from the Suomenoja Wastewater Treatment Plant since late 2012. The quantity of biogas facilitates fuelling 50 local buses.

Treated wastewater contains a great deal of heat energy, which can be recovered with heat pumps. The wastewater heat at the Viikinmäki Wastewater Treatment Plant is recovered by Helsingin Energia's Katri Vala heat pump plant, which produced 175 GWh of district heating in 2011. However, this is not included in HSY's energy generation figures.

The wastewater heat of the Suomenoja Wastewater Treatment Plant will probably be recovered in the production of district heating by Fortum Power and Heat Oy. A preliminary agreement on the matter was signed in January 2013. The Päijänne water tunnel's vertical inclination between Lake Päijänne and the Silvola reservoir is utilised for electricity generation. The Kalliomäki hydroelectric power plant uses running water to generate approximately 7 GWh of electricity per year.

Objectives of energy conservation and self-sufficiency

HSY signed the municipalities' energy-efficiency agreement in 2012. HSY's aim is to decrease energy consumption by 9 per cent between 2010 and 2016, amounting to approximately 17,000 MWh.

In 2012, HSY was calculated to be 94 per cent self-sufficient in its energy use, and it aims to be completely energy self-sufficient by 2017. Self-sufficiency means that HSY generates as much energy as it consumes.

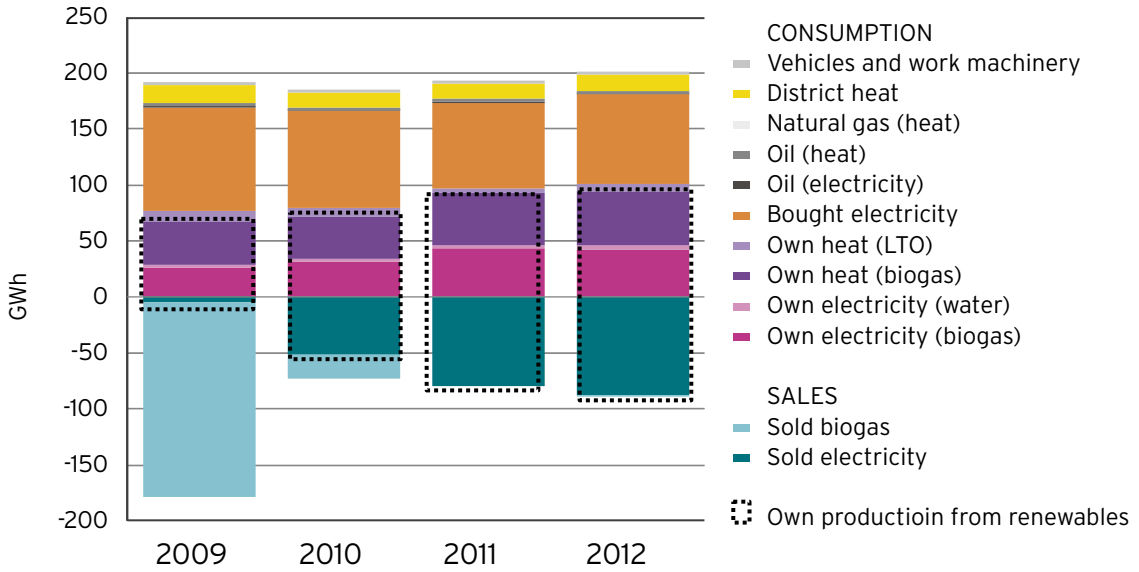


Figure 5. HSY's energy consumption and sales in 2010–2012 and that of similar operations in 2009 in GWh sorted by form of energy. LTO = heat recovery. HSY's in-house energy production based on renewable energy sources (outlined in a dash line) includes production for both own use and for sale.

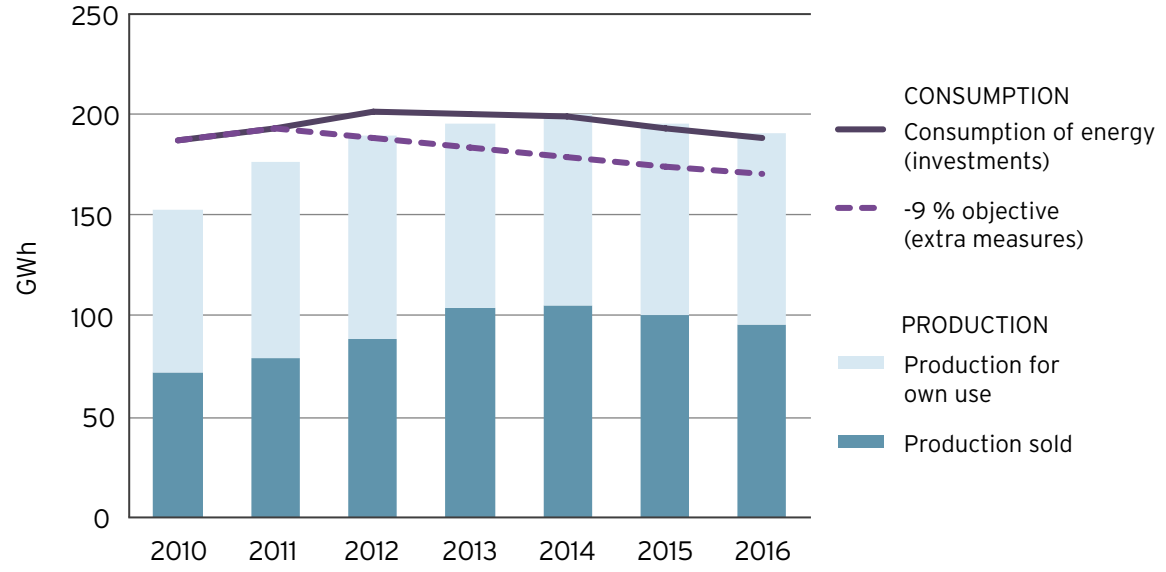


Figure 6. HSY's production of renewable energy, total energy consumption and energy savings in 2010–2016.

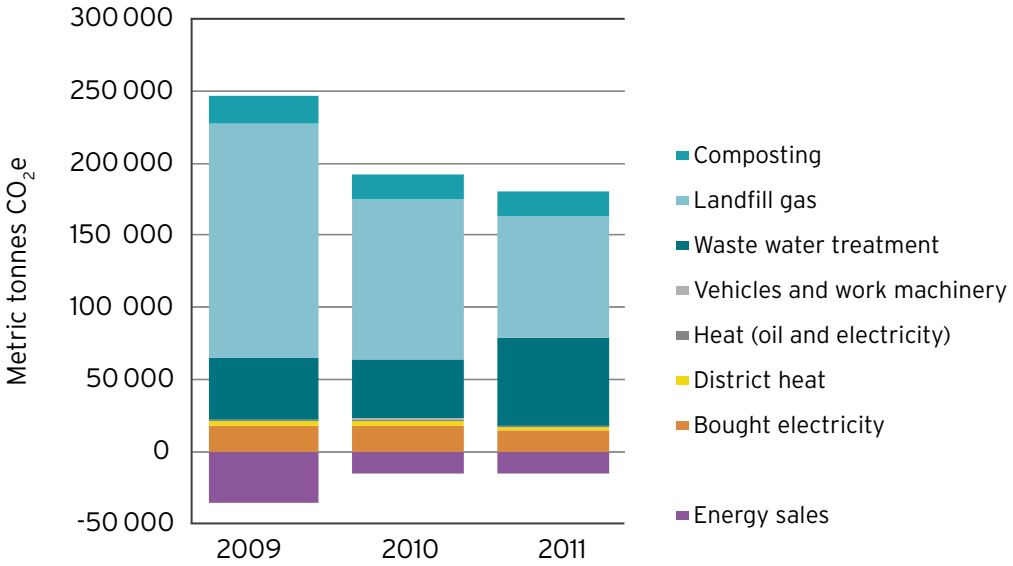


Figure 7. HSY's greenhouse gas emissions in 2009–2011.

When energy generation for own use and for sales is deducted from the total energy consumption, the energy balance is 10,100 MWh. HSY's energy balance will be completely balanced in generated and consumed energy once the biowaste anaerobic digestion plant at Ämmässuo Waste Treatment Centre is completed in late 2014. Approximately 70 per cent of biowaste is conveyed for digestion and approximately 30 per cent is composted. The process minimises wastewater generation.

In the future, the energy balance will also be affected by the increase of heat recovery and potentially also an increased production of wind and solar energy. In addition, HSY strives to conserve energy at properties and improve the energy-efficiency of processes.

The Renewable Energy Solutions in City Areas project (RESCA) aims to develop and increase the generation of renewable energy, exchange the best practices between large cities and create conditions that enable urban operators to start using renewable energy. Participants of the project, which will continue until the end of 2013, include HSY and the cities of Tampere, Vantaa, Turku and Oulu. HSY is conducting five preliminary reviews of renewable energy pilot projects: 1) energy generation at properties using solar energy, 2) electricity generation using solar energy at Ämmässuo, 3) using wind energy at the Metsäpirtti composting field or at Ämmässuo, 4) heat recovery in the wastewater network and 5) heat recovery in raw drinking water at the Pitkäkoski water treatment plant.

Greenhouse gas emissions

HSY's greenhouse gas emissions calculated as carbon dioxide were 180,700 metric tons in 2011, which is a little over 3 per cent of the total emissions in the entire Helsinki Metropolitan Area. Greenhouse gas emissions decreased from 2010 by 6 per cent.

The largest quantities of emissions were created in landfill and wastewater treatment processes (46% and 34%, respectively), composting (10%) and purchased electricity (8%). Without the efficient collection of landfill gas, HSY's greenhouse gas emissions would be much greater. In the future, landfill emissions will further decrease due to mixed waste being directed to an incineration plant. Greenhouse gas emissions from heating are relatively low at HSY due to own heat generation.



Picture: HSY / Kai Widell

High-quality drinking water, efficient wastewater treatment, functioning networks

HSY delivers high-quality drinking water to over one million residents in the Helsinki Metropolitan Area and efficiently treats domestic and industrial wastewater. HSY also continuously expands and renovates the sewer system.

Production of drinking water

Helsinki, Vantaa, Espoo, Kauniainen, Hyvinkää, Järvenpää, Kerava, Kirkkonummi, Sipoo, Tuusula and occasionally Porvoo get their raw water from Lake Päijänne, from which it travels through a 120-kilometre rock tunnel. The Päijänne water tunnel is controlled by Pääkaupunkiseudun Vesi Oy (PSV), an affiliate in which HSY has 80.5 per cent ownership.

The tunnel's capacity is approximately 2 million m^3. The tunnel can also be used as a water reservoir in crisis situations. Since the raw water is taken from a depth of 26 m and at a distance of 350 m from the shore, its temperature varies from 2–12 degrees Celsius a year. This improves water quality and keeps the network in good condition. Water is also led to the Keravanjoki River and Lake Rusutjärvi in Tuusula to improve their water quality.

HSY produced a total of 93.4 million m^3 of drinking water in 2012. Drinking water is produced at Pitkäkoski and Vanhakaupunki water treatment plants in Helsinki. In addition, roughly a third of inhabitants in Espoo get their drinking water from the Dämman plant, which will continue its operation until 2015. The raw water for the Dämman water treatment plant is taken from Lake Pitkäjärvi in Nuuksio.

HSY also has two groundwater plants; the Kuninkaanlähde groundwater plant is located in the Huhtariihi area in Tuusula and the Kalajärvi groundwater plant in Kalajärvi, Espoo. An average of 2,000 m^3 of groundwater is pumped daily at Kuninkaanlähde mainly for the neighbourhoods of Korso, Vallinoja and Vierumäki in Vantaa.

Drinking water quality

The drinking water quality is high and met in 2012 both official quality requirements and HSY's own quality targets. The quantity of organic matter in raw water from Lake Päijänne increased significantly in 2012.

Read more

www.hsy.fi/en >> About HSY >> Drinking water and water quality

www.hsy.fi/en >> About HSY >> Wastewater treatment

www.hsy.fi/en >> About HSY >> Wastewater and environment

www.hsy.fi/en/ >> Water services >> Water management networks

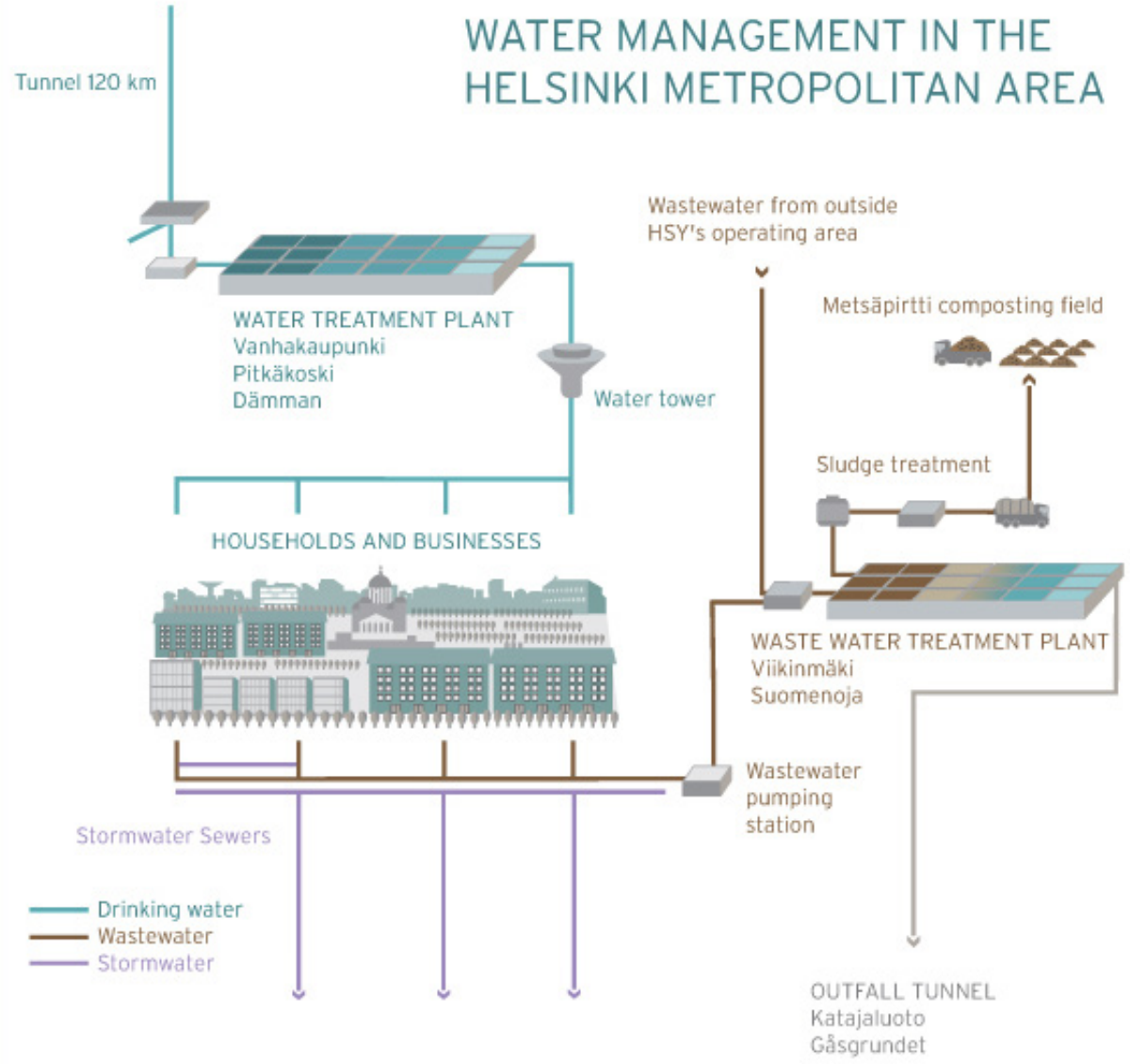


Figure 8. Raw water is taken from Lake Päijänne, purified and distributed to households and companies. Consumed water travels through the sewers to wastewater treatment plants and is finally conveyed through tunnels to the open sea off Katajaluoto and Gåsgrundet.

In the first part of the year, total organic carbon (TOC) level in raw water was approximately 6.5 milligrammes per litre, and in the second half of the year it increased to 7.5 milligrammes per litre. The reason for this was presumably the unusually rainy year which increased the leaching of humus into lake Päijänne. Nevertheless, the treatment process efficiently purified the water, and the TOC level in treated water remained normal (1.7 milligrammes per litre). HSY Water Services regularly monitors water quality in the distribution network by taking water samples at different sampling sites covering the entire network.

The water treatment plants' accredited testing laboratory and the health protection authorities monitor water quality. Water fulfils both the legislation and HSY´s own criteria.

The Water Safety Plan (WSP) strives to guarantee safe drinking water for the users in all circumstances. WSP covers raw water supplies, drinking water treatment processes and drinking water distribution to consumers. WSP is a method recommended by the World Health Organisation (WHO) for ensuring the safety of drinking water. The WSP of water treatment was completed and audited in 2012. The next audit will be in 2013. Drafting of a WSP programme for the network department began in 2012, and WSP instructions for controlling the main risk targets will be implemented in 2013.

Wastewater treatment

Over 20 per cent of Finland's population live in the sewerage areas of HSY wastewater treatment plants. The Viikinmäki treatment plant processes the wastewater of approximately 800,000 residents of Helsinki, central and eastern parts of Vantaa, Kerava, Tuusula, Järvenpää, Sipoo, Pornainen and southern Mäntsälä. Today, the Suomenoja Wastewater Treatment Plant treats the wastewater of over 310,000 people from Espoo, Kauniainen, western Vantaa and Kirkkonummi.



Figure 9. Co-operation in raw water intake in the Helsinki Metropolitan Area. Of the municipalities named on the map, Sipoo is not a member of PSV.

Blominmäki Wastewater Treatment Plant

Scheduled for completion in 2020, the Blominmäki Wastewater Treatment Plant will process the wastewater of Espoo and Kauniainen as well as Kirkkonummi, Siuntio, western Vantaa and possibly Vihti. The new plant will replace the Suomenoja Wastewater Treatment Plant, whose processing capacity is becoming insufficient as the number of inhabitants and the nutrient load increase. In October 2009, after the assessment of the environmental impact and analysis of the urban form, Espoo City Council decided to place the treatment plant in Blominmäki. The plant's process basins and most of the other facilities will be positioned in caverns to be excavated underground. Rock excavation will probably start in 2015 and the actual construction work will start in 2017.



Figure 10. Conveying and processing wastewater in cross-municipal co-operation.

Wastewater is pumped to the Viikinmäki Wastewater Treatment Plant via the KUVES sewage tunnel of the Central Uusimaa water protection joint municipal public utility, through a so-called sea sewage pipe. In case of situations where the use of the tunnel is interrupted, there is an above-ground main sewer connection to Viikinmäki through Vantaa.

The quantities of wastewater have been rising constantly. This is partly due to the increase in water consumption, but the main cause is the increase of rain. On average, 30–35 per cent of the processed wastewater is rainwater that got mixed in with the wastewater.

In 2012, the Viikinmäki and Suomenoja wastewater treatment plants processed a total of 152.3 million m^3 of wastewater, which was a 9.5 per cent increase from 2011 and 17 per cent over the average. Quantities of wastewater consist of wastewater from consumed domestic water, infiltration water and rainwater from the combined sewerage area. The quantity of infiltration heavily depends on the amount of rainfall. In 2012, heavy rains significantly increased the volume of processed wastewater compared to the long-term average. There are signs of increasingly extreme weather events which greatly increase the need for a higher treatment capacity at wastewater treatment plants. HSY has prepared for this at the sewerage areas of both its wastewater treatment plants.

HSY's wastewater treatment plants treat wastewater using a mechanical-biological-chemical method which produces sludge and biogas as by-products. Sludge is refined into soil. HSY sold 100,400 m^3 of soil and soil conditioner in 2012.

Various limitations have been imposed on wastewater treatment by EU directives and national legislation. In addition, wastewater treatment plants are obligated to meet the regulations of their individual environmental permits. The authorities monitor the implementation of the treatment requirements by means of annual and quarterly reports. Furthermore, the Viikinmäki

Wastewater Treatment Plant is obligated to meet the quality requirements set forth in the Helsinki City Council's definition of policy regarding the Baltic Sea.

Load on water systems

Wastewater treated by HSY carries 30–40 metric tons of phosphorus and 1,100–1,300 metric tons of nitrogen to the Baltic Sea each year. The nutrient load caused by HSY's wastewater treatment plants is approximately 1.3 per cent of Finland's total phosphorus load and approximately 1.6 per cent of Finland's total nitrogen load.

At the Viikinmäki Wastewater Treatment Plant, all solid and oxygen-consuming substances as well as 95 per cent of the phosphorus and 90 per cent of the nitrogen are removed from wastewater. Wastewater treatment plants achieved the aims set in their environmental permit conditions in 2012. The wastewater treatment load on the sea was 38 metric tons for phosphorus and 1,234 metric tons for nitrogen. However, HSY's internal target value, which is stricter than the permit conditions, was not reached.

Overflow of wastewater occurs when untreated wastewater escapes from the sewer system to a body of water. The most harmful effects include a decrease in the water's hygienic quality and oxygen content, which may cause the deaths of water organisms. Overflows also harm the recreational use and fishing industry of River Vantaa.

In order to prevent harm, HSY, other water services facilities in the area and the Water Protection Association of the River Vantaa and Helsinki Region have opened a dialogue with people involved in fishing, in order to prevent harm. The aim is to bring an end to wastewater overflows into River Vantaa. This will require large investments, such as renovating the water services network and wastewater pumping stations. Prevention of wastewater effluent is being developed in a two-year co-operation project.

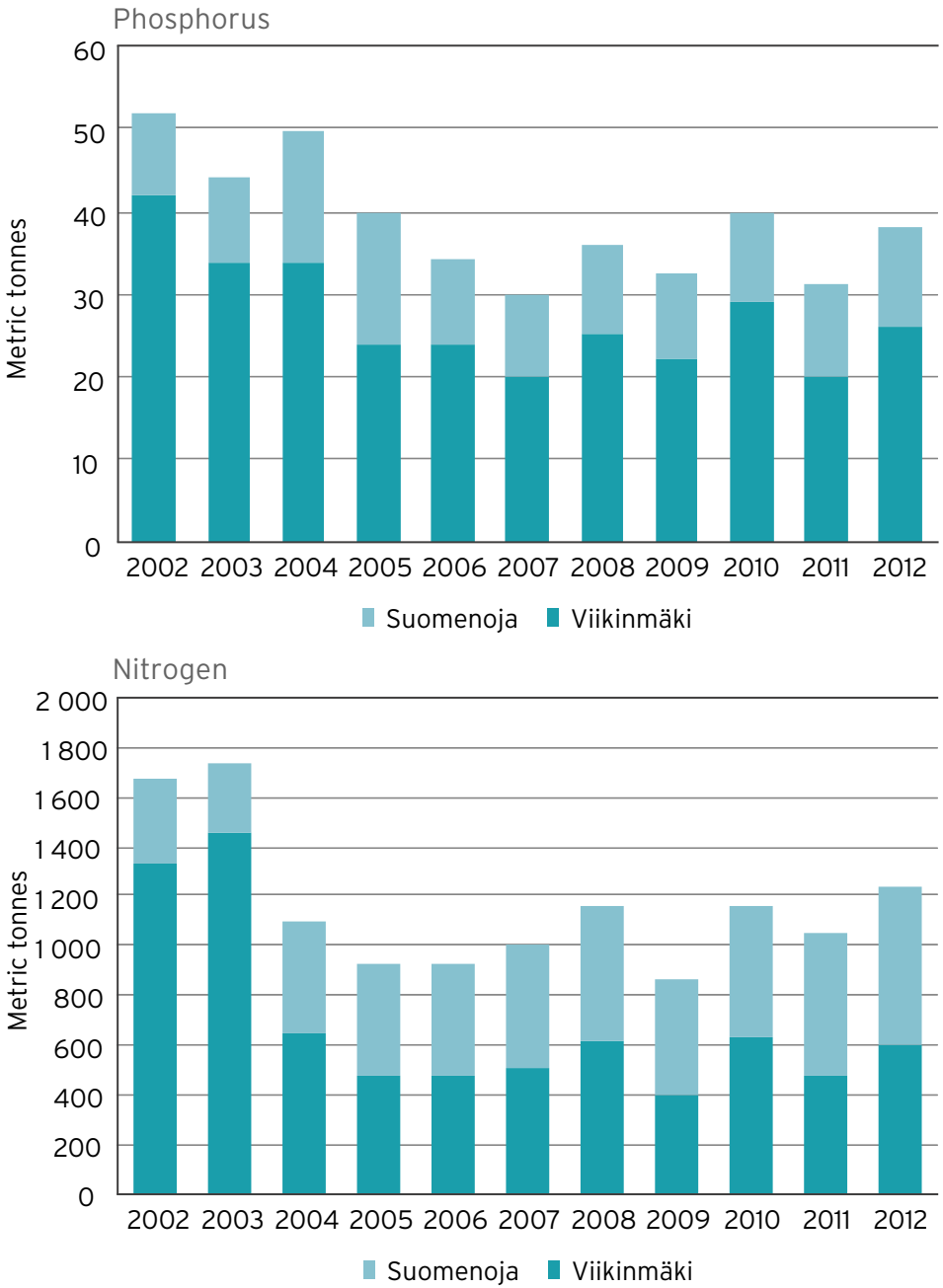


Figure 11 and 12. The phosphorus and nitrogen load on the sea of HSY's wastewater treatment plants in 2002–2012.

Water services network

The Helsinki Metropolitan Area has a total of 7,720 kilometres of water and sewage pipes. In 2012, HSY built 111 kilometres of new water services network. Important new construction projects in Helsinki included Jätkäsaari, Kalasatama, the Lallukantie area, Jollas, Linnanpelto, Suopelto and Alppikylä. Construction projects in Espoo included the Espoo Centre, Suurpelto and Tapiola and targets connected to the Ring Rail Line in Vantaa. A total of 141 kilometres of the water services network was built or renovated in 2012.

Water services network	Total length of network	New network built in 2012	Old network renovated in 2012
Water pipes	2 980 km	40 km	6 km
Waste-water and combined sewers	2 720 km	32 km	19 km
Storm drains	2 020 km	39 km	5 km
Total	7 720 km	111 km	30 km

Table 1. Water services network of the Helsinki Metropolitan Area in 2012.



Picture: HSY / Mikko Harma

Water supply network

The total length of the water supply network is 2,980 km. Of this, approximately 300 km is water mains that convey water to water towers and large consumption centres. Some of the water main connections have been secured by means of water pipes installed in rock tunnels.

The water supply network has been built in a circular shape in order to guarantee the water supply. The network is equipped with shut-off valves to ensure that water supply interruptions caused by pipe breakage are limited to the smallest possible area.

Construction and renovation projects

- Construction of the Western Espoo water main is ongoing and will be completed in 2015.
- Plans for the pipe tunnel under Leppävaara are ready and the project will be completed in 2015.
- Renovation of the Haukilahti water tower was completed in 2012.
- At Pitkäkoski, construction of the basin for purified water began in 2012 and will be completed in summer 2014.
- The water main leading to Vantaan Energia's waste-to-energy plant was completed in 2013.
- The Tilkka-Käpylä joint-use tunnel water pipe was completed in 2012.

Sewer system

The overall length of the sewer system is approximately 4,740 km. Outside Helsinki city centre and in Espoo, Vantaa and Kauniainen, there is a separate sewerage system where only wastewater is conveyed through the sewers to the wastewater treatment plant. Most of Helsinki city centre, on the other hand, belongs to an area served by a combined sewerage system where both wastewater and rainwater are conveyed to the wastewater treatment plant through the same sewer. The combined sewerage system represents approximately 10 per cent of the wastewater sewers.

The wastewater sewerage system is designed, as much as possible, in such a way that the wastewater flows to the wastewater treatment plant by gravity. However, due to the relief of the terrain, this is not always possible and wastewater pumping stations are needed. HSY's operational area contains over 500 pumping stations, most of which are located underground and only 30 or so above ground.

Construction and renovation projects

- Plans for the Mäntymäki-Vallila sewage tunnel are complete and the work will start in summer 2013.
- Work on the Merikannontie sewage tunnel is ongoing and will be completed in spring 2014.
- Sewer renovations in Töölö and Kamppi were completed in 2012.
- Renovation of the Pukinmäki pumping station in 2012–2013.
- Work on line 9 at the Viikinmäki Wastewater Treatment Plant started in spring 2013 and will be completed in summer 2014.
- Investments in accordance with the energy-efficiency program, projects are ongoing and carried out yearly.



Picture: HSY / Jenni-Justiina Niemi

Increasingly efficient waste recovery

HSY is responsible for the waste management duties appointed to municipalities in the Waste Act in the Helsinki Metropolitan Area and Kirkkonummi. HSY provides waste management services for residential properties with approximately one million inhabitants, public corporations, health and social services and educational activities.

The primary duties of HSY Waste Management are collecting and safely disposing municipal waste or directing it for reuse or other processing. In addition, HSY is responsible for waste guidance, preparation of waste management regulations and the collection of waste fees. HSY's Board of Directors functions as the waste management authority, according to the Waste Act.

Operating principles

HSY Waste Management takes controlling the environmental impacts and decreasing harmful impacts into consideration in all its operations. They are guided by legislation, regulations and environmental permits. In addition to statutory requirements, HSY also voluntarily takes action to improve the state of the environment.

HSY Waste Management follows these operating principles: HSY observes and promotes in all its activities the waste management order of priority and accordingly strives to reduce the quantity and harmfulness of generated waste. The generated waste is recycled as material or recovered as energy. The waste that is not suitable for recovery or recycling is processed using the best method concerning environmental impacts and using technically and economically feasible method. HSY follows all these duties on all organisational levels throughout the entire chain of operations whenever possible, including subcontracting work.

HSY Waste Management uses an activity management system that covers both environmental and quality matters. The environmental management system (ISO 14001) has been in use since 1997 and the quality management system (ISO 9001) since 1999. Continuous improvement in environmental matters is monitored with internal and external audits and reports and by recognising, valuing and inspecting environmental aspects annually. The last external audit was carried out in October 2012. The activity management system

Read more

www.hsy.fi/en >> About HSY >> Waste management's operations and statistic

www.hsy.fi/en >> About HSY >> Waste management and environment

www.hsy.fi/en/fiksu (It's smart with less waste)

www.hsy.fi >> About HSY >> HSY Climate Work >> Material Efficiency >> Petra Waste Benchmarking

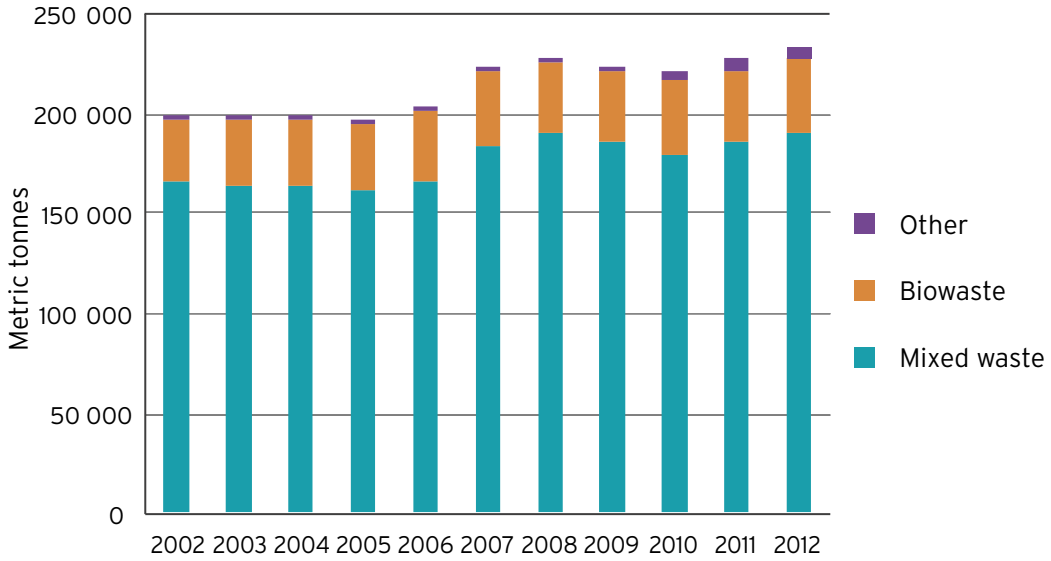


Figure 13. Waste collected at HSY's customer properties in 2002–2012.

of waste management will be merged with the management system that is built in the whole of HSY during 2013.

Waste transport tendering

Waste transport services are tendered regularly to ensure cost-efficiency, consideration of environmental aspects and low emissions of waste transport vehicles. The vehicles are required to meet the Euro 4 or Euro 5 emission standards at a minimum and use OECD-category oils that are at least 90 per cent biodegradable. In addition to eco-efficient engines in collection vehicles, special attention has been paid to collection logistics. Dense collection areas facilitate efficient collection at properties, minimising the vehicle kilometres required for collection driving. In 2012, 14 contract areas were tendered.

Transport progress is monitored in real time using a logistics system. It shows when waste collection has been completed at a property, for example. The information can be utilised in many ways, including customer service situations.

In 2012, approximately 7.1 million waste containers were emptied at approximately 76,000 customer properties of HSY Waste Management. A total of 233,000 metric tons of waste was transported, which is a 2.6 per cent increase from 2011. Of the transported waste, 189,500 metric tons was mixed waste, 37,800 metric tons was biowaste and 5,700 metric tons was other types of waste.

Waste sorting possibilities

HSY built ten new collection points in 2012. HSY's 124 collection points, Sortti stations and collection vehicles that go around in the spring collected a total of 74,173 metric tons of waste in 2012. The touring vehicles collected hazardous household waste, electric and electronics equipment and scrap metal at almost 300 stops in the Helsinki Metropolitan Area and Kirkkonummi. Vehicles collected over 420 metric tons of waste altogether, over half of which was waste from electric and electronics equipment.

The customer volumes at Sortti stations increased. The Sortti stations at Kivikko, Konala and Ämmässuo and the Munkinmäki Waste Station were visited by approximately 337,600 customers in 2012. A new Sortti station is being built in Ruskeasanta, Vantaa. It is estimated to be completed in 2014.

In 2012, collection points for hazardous waste, Sortti stations, pharmacies and touring collection vehicles collected a total of 1,167 metric tons of hazardous waste generated by households.

A brushwood collection trial was carried out at 600 properties in Vantaa. The brushwood was chipped for recovery. The trial was well received and the brushwood collection was made part of HSY's standard services.

There will be significant improvement in recycling possibilities at residential properties. A separate collection of glass and metal will begin on 1 January 2014 at properties with at least 20 housing units according to waste management regulations. Smaller residential properties may also voluntarily join in the collection. The obligation to sort cardboard packages will expand to include residential properties with 10 or more housing units.

Ämmässuo Waste Treatment Centre

The Ämmässuo Waste Treatment Centre contains the only operating landfill in the Helsinki Metropolitan Area. Its other operations include biowaste processing, treatment of contaminated soil and collection and reuse of landfill gas. The waste treatment centre also has a Sortti station.

A baling and intermediate storage area that supports creating energy from mixed waste was completed in 2012. Baling of mixed waste was

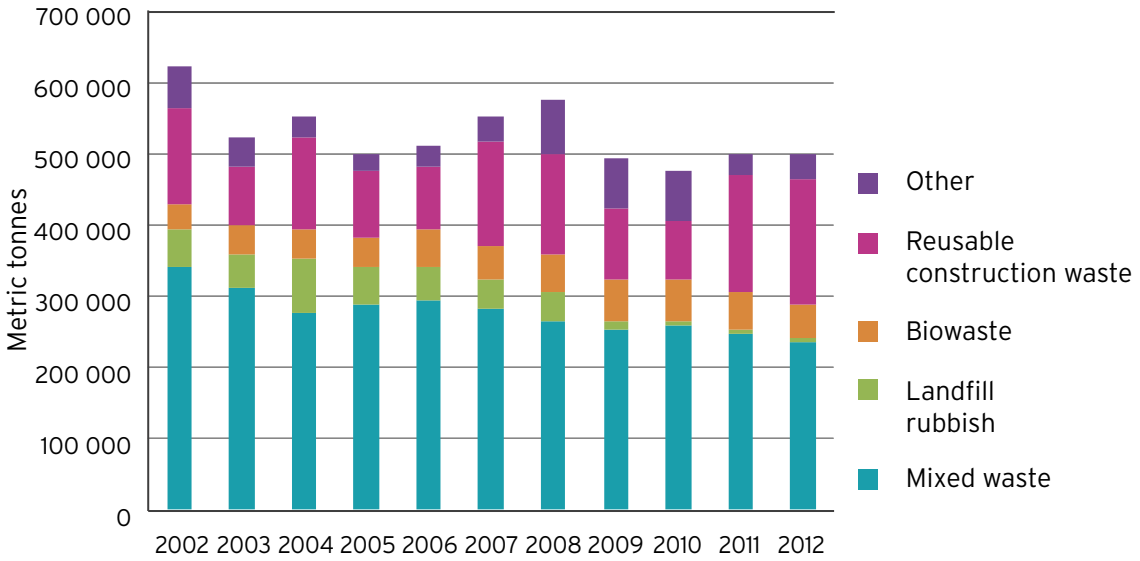


Figure 14. Quantity of waste received at Ämmässuo Waste Treatment Centre (excluding soil and hazardous waste) in 2002–2012.

started in spring 2013. In addition, approximately 4.6 hectares of new bioreactor landfill area was built. So called ash cell was built for the reception and disposal of ash generated by the waste-to-energy plant.

The processing capacity for biowaste will be increased by building a new biowaste anaerobic digestion plant in connection with the composting facility at the end of 2014. At the anaerobic digestion plant, biowaste will be used to produce renewable energy and raw materials for soil products.

Received waste

The Ämmässuo Waste Treatment Centre received 589,970 metric tons of waste and soil in 2012, which was a 7 per cent decrease from 2011. Of the received waste, 238,272 metric tons was mixed waste, 177,083 metric tons was recovered construction waste, 86,373 metric tons was soil and 48,512 metric tons was biowaste. Approximately 79 per cent of the received mixed waste and biowaste was collected at properties using waste collection services which HSY has tendered.

In particular, quantities of received industrial biowaste and soil decreased in 2012. There was 7.7 per cent less industrial biowaste received than in 2011 because some industrial waste from trade and industry was directed to other facilities for treatment and recovery.

A treatment facility for contaminated soil has received soil since August 2011. Reception volumes of slightly and heavily contaminated soil decreased from the 2011 levels by 56 per cent on average. The decrease is mostly explained by the increase in local treatment capacity and decrease in reception prices.

Monitoring environmental impact

Environmental impact at Ämmässuo Waste Treatment Centre is mainly due to waste treatment,

Waste-to-energy plant

Recovering energy from mixed waste will begin at Vantaa Energy's waste-to-energy plant in spring 2014. It will generate approximately 600 GWh of electricity and 920 GWh of district heating per year. Incineration will create approximately 60,000 metric tons of bottom ash (slag) and 5,600 metric tons of boiler and fly ash per year. HSY is responsible for processing the ash. Purification of flue gas will create approximately 13,000 metric tons of reaction products (APC waste) per year. Vantaa Energy is requesting tenders for the treatment of APC waste.

The quantity of waste that is directed to and processed at the Ämmässuo Waste Treatment Centre will decrease significantly once the waste-to-energy plant starts utilising 260,000 metric tons of non-reusable mixed waste per year, collected in HSY's operating area. The plant will also receive waste from the Western Uusimaa waste management company Rosk'n Roll Ltd.

The overall efficiency ratio of waste recovery will increase significantly due to the waste-to-energy plant and improved sorting possibilities at properties. The landfill will require less space and have its environmental impacts reduced. Its emissions of methane will also decrease.



Picture: HSY / Jenni-Justiina Niemi

traffic, construction and landfill processes. The environmental impact is monitored in accordance with environmental permit regulations and other official decisions. HSY also carries out voluntary monitoring activities that help guide the operations of the waste treatment centre and monitor their quality. There are biannual environmental reports published on the operations of the Ämmässuo Waste Treatment Centre.

The content and quality of the received waste is monitored to ensure that only waste allowed by the permit is placed at the landfill. The supervising authority is notified of any significant shortcomings in sorting at the original location.

Landfill water, groundwater and surface water are monitored regularly. Wastewater formed at the landfill is conveyed through a water station to the Suomenoja Wastewater Treatment Plant. In 2012, landfill water amounted to approximately 602,600 m^3. Limit values for water discharged into the sewer system were not exceeded.

Clean storm water from the waste treatment centre is used for irrigation, cleaning, dust binding and fire extinguishing. Part of the clean storm water is led into the ground.

The effects of HSY operations on the quality of surface water, groundwater, wastewater and water in wells is monitored in accordance with the Ämmässuo-Kulmakorpi joint monitoring programme together with the other operators in the region. In addition to joint monitoring, the quality of the water fractions at the waste treatment centre is also monitored using automated continuous measurements and regular field measurements.

The effects of the landfill level and water recycling at the old landfill and the bioreactor landfill are monitored according to a separate monitoring programme. The 2012 monitoring results did

not indicate any significant changes at the waste treatment centre area.

HSY strives to prevent the discharge of greenhouse gases and odours into the atmosphere and environment, and their concentration is measured regularly. In 2012, 86 per cent of landfill gas was collected, of which 89 per cent was used in energy generation.

The Ämmässuo air-quality monitoring stations monitor the air quality (concentrations of total reduced sulphur compounds, thoracic particles and fine particles and weather parameters such as wind speed and direction, temperature and precipitation) at the waste treatment centre and in the area surrounding it. Air-quality and weather measurement results are presented at the HSY website in an hourly basis.

In addition to thoracic particles and odours, noise levels and the local birdlife are also monitored at the waste treatment centre and its surrounding areas. The area is maintained appropriately to keep a neat general appearance. The waste treatment centre hosts a few meetings for environmental stakeholder groups in the Ämmässuo area each year.

Waste management guidance

The aim of HSY's waste management guidance is to decrease the quantity and harmfulness of generated waste and to improve the efficiency of waste sorting. The aim is to have approximately 80 per cent of residents report that they regularly sort their waste in 2015. The sorting activity level was 77 per cent in 2011 and 78 per cent in 2012. Sorting activity is monitored with an annual questionnaire.

Waste management guidance helps, in various ways, people act in a more environmentally-responsible way and use materials more efficiently. The primary target groups of guidance are households, educational institutes, public administration and property managers. Key methods include campaigns, education, tools and materials and close co-operation with stakeholder groups. Information about responsible waste behaviour is distributed in the media, events and the Internet.

In 2012, HSY put together and coordinated a national campaign on hazardous waste in co-operation with the Finnish Solid Waste Association and the Finnish Water Utilities Association. Before Christmas, consumers were encouraged to give different types of gifts, such as services, with the theme "Give immaterial experience gifts".

A networking meeting for teachers was organised in the school co-operation programme, and nine new schools were selected for the programme in 2012. The sorting game was sent to over 300 Finnish- and Swedish-language comprehensive schools and vocational schools. A hazardous waste workshop, Swedish-language sorting game and word-explaining game were added to the selection of guidance materials available for loan.

In 2012, HSY reached almost 30,000 listeners at educational institutes, day care centres and events for residents, along with visitors guided at waste treatment centre. Information aimed at waste reduction was also shared at other events, such as fairs and an event for property managers which HSY organised.

Project for material efficiency in waste management

HSY's project for material efficiency in waste management aims to reduce the quantity of waste, promote recycling and recovery and increase environmental awareness and competence.

The project duration is from 2011 to 2013.

In 2012, one of the central aims of the projects was reducing the quantity of food waste. A pilot campaign on cooking with leftover food raised the awareness of households in Leppävaara, Espoo. After the campaign, 82 per cent of respondents felt that the quantity of food waste generated by their household could be reduced. In spring 2013, the campaign expanded to cover the entire Helsinki Metropolitan Area. Positive experiences with reducing food waste gained at HYY Ravintolat restaurant services will be utilised in a 2013 campaign targeting institutional kitchens. The Hospital District of Helsinki and Uusimaa and the Association of Finnish Local and Regional Authorities also carried out measures to reduce waste and examined measures' effects on costs and environmental impact.

The educational sector was supported with new teaching materials and updates of HSY's electronic study materials. HSY produced for schoolchildren exercises used on interactive whiteboards and an activity book for children in preschool.

A report on monitoring waste quantities at schools, which was implemented in co-operation with municipalities in 2011, was completed in 2012. Based on the results, the quantity of mixed waste has decreased as schools have improved the separate collection of biowaste, cardboard, paper and energy waste. The school co-operation programme for comprehensive schools was developed within the Kukko project in 2010–2012.

HSY also gave property managers support in the form of waste guidance at properties. Because the number of foreign language speaking residents is increasing in the Helsinki Metropolitan Area, the project developed visual instructions for waste-container storage areas.

Petra Waste Benchmarking is a web application that companies and public organisations in the Helsinki Metropolitan Area and Kirkkonummi can use to monitor the amount of waste created, level of recycling and recovery and greenhouse gas emissions. The data can be compared with the averages of the same line of business or same property type. One achievement of HSY's project for material efficiency in waste management is expanded use of Petra in the operating areas of Päijät-Hämeen Jätehuolto Oy (Lahti region) and Turun Seudun Jätehuolto Oy (Turku region).



Picture: HSY / Jenni-Justiina Niemi

Up-to-date information about air quality, climate change, housing and commuting



Figure 15. The Helsinki Metropolitan Area has 15 air-quality monitoring stations.

HSY produces reliable and up-to-date regional information to promote a good urban environment. HSY monitors air quality, carries out strategy work for mitigating and adapting to climate change and produces, refines and distributes regional information.

Air quality monitoring

HSY's duties include monitoring air quality in the Helsinki Metropolitan Area and the related research, planning, training and education. In addition, HSY carries out contract-based air quality monitoring duties in Uusimaa and takes care of the necessary air quality monitoring for the energy generation plants, ports and airport in the Helsinki Metropolitan Area in accordance with their environmental permits.

Up-to-date air quality measurements are available at the HSY website and on displays in trams and the metro, among other places. HSY also regularly distributes information about air quality in newspapers and on the radio and television.

The Helsinki Metropolitan Area is among the cleanest metropolitan areas in Europe in terms of air quality. However, the nitrogen dioxide concentration occasionally exceeds the EU limit value in areas with heavy traffic. The concentrations of thoracic particles are elevated in the spring, although the limit values have not been exceeded in the street network since 2006. The concentrations of fine particles are low in the Helsinki Metropolitan Area, but studies have shown that even low concentrations can have harmful effects on health.

The most important factors affecting air quality in the Helsinki Metropolitan Area are traffic and small scale wood burning in fireplaces. Their effect on air quality is emphasized because of low emission height and because the emissions are discharged in residential areas.

HSY, the municipalities of the Helsinki Metropolitan Area and the Helsinki Region Transport (HSL-HRT) have prepared air quality action plans for improving air quality and bringing concentrations down to below the limit values. In addition, the City of Helsinki is in the process of compiling a report on measures to reduce nitrogen dioxide concentrations. HSY is participating by modelling the effects of these measures on concentrations.

Street dust weakens air quality especially in the spring when the snow melts and the sun dries street surfaces. The cities of the Helsinki Metropolitan Area have been

Read more

www.hsy.fi/en >> Regional and environmental information

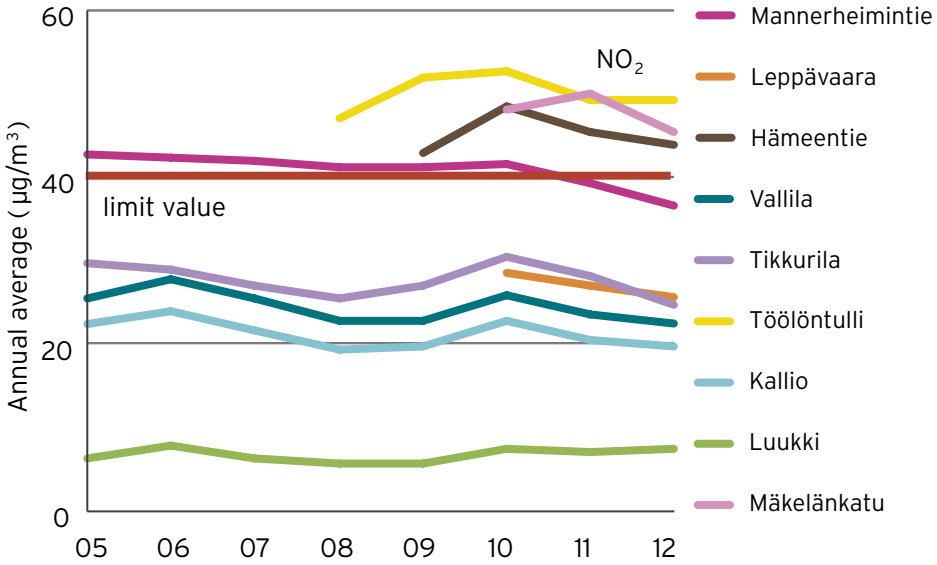


Figure 16. Nitrogen dioxide concentration decreased very little in 2005–2012, and the limit value is still occasionally exceeded in Helsinki city centre.

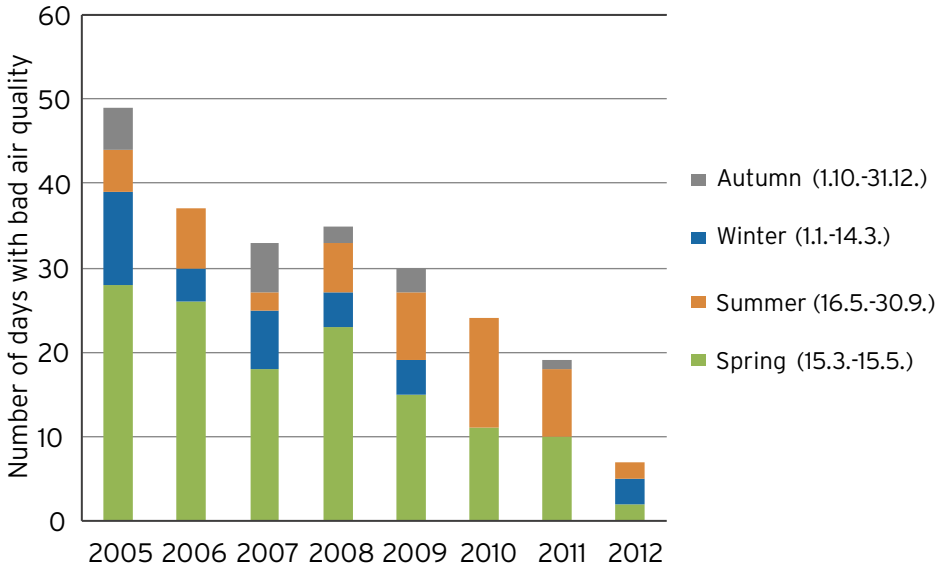


Figure 17. Cities have managed to reduce street dust and the number of days with bad air quality, and air quality has clearly improved in Helsinki city centre (Mannerheimintie monitoring station).

able to decrease the amount of resuspended dust by improving the efficiency of street maintenance and cleaning and by dampening streets with a calcium-chloride solution on days with heavy dust. This has significantly decreased the number of days with bad air quality in the spring.

HSY promotes the use of air-quality information in the planning of a healthy and pleasant urban environment. The aim is to have air quality taken into consideration in city and traffic planning.

HSY is participating in several research projects aimed at improving air quality and increasing people's awareness of the sources and effects of air pollution. The REDUST project coordinated by the City of Helsinki Environment Centre, for example, seeks cost-efficient methods for decreasing street dust and promoting the use of those methods. HSY and the municipalities of the Helsinki Metropolitan Area are campaigning about the effects of street dust and how residents can mitigate street dust. In the project also a text message service was developed that gives warnings for bad air quality, helping residents minimise their exposure to air pollution. In 2011–2013, the STUD research programme investigated whether reducing the use of studded winter tyres could improve air quality and decrease the health risks posed by street dust without compromising traffic safety.

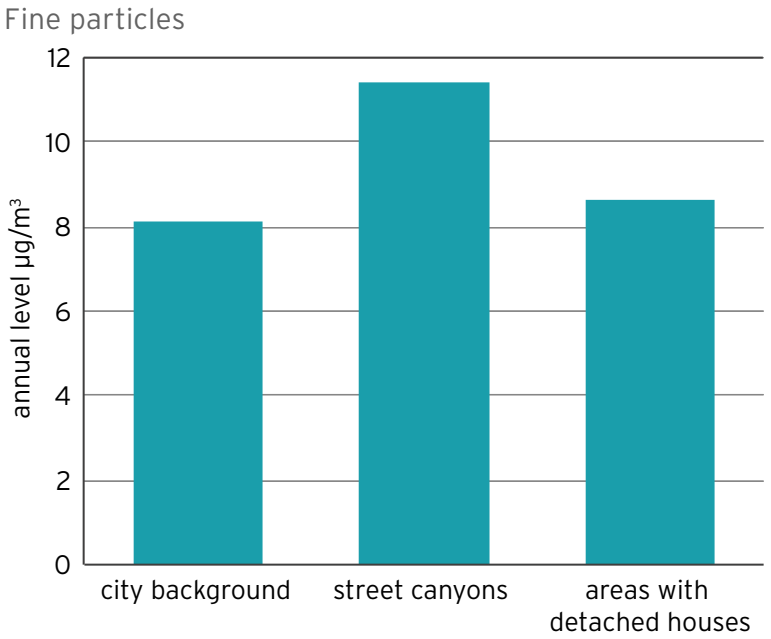
The Helsinki Metropolitan Area has over 60,000 detached houses, 90 per cent of which have a fireplace. Wood is mainly used for secondary heating. Burning wood may significantly weaken air quality at areas with many detached houses from time to time. In addition to low-emission fireplaces, methods for decreasing harmful effects include storing and burning wood in the right way. HSY organised the campaign "Use your fireplace correctly" in co-operation with the municipalities of the region, the Central Association of Chimney Sweeps and the Finnish Environment Institute. As part of the campaign, the chimney sweeps handed out approximately 60,000 copies of HSY's Guide for Burning Wood during the 2012–2013 heating season and instructed residents in the correct use of fireplaces.

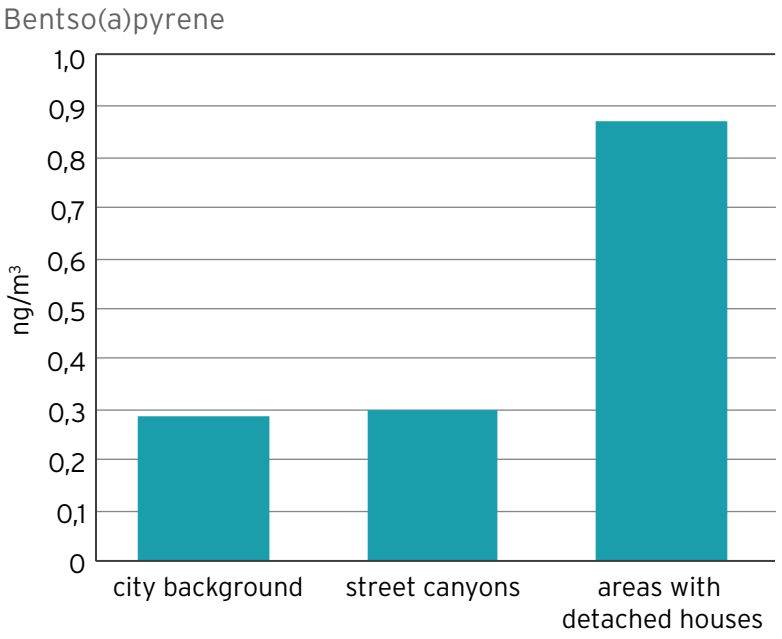
Helsinki Metropolitan Area strategy work on mitigating and adapting to climate change

HSY and its member municipalities conduct joint regional strategy work on mitigating and adapting to climate change. HSY promotes and monitors the realisation of climate goals and energy-efficiency in the Helsinki Metropolitan Area.

The Helsinki Metropolitan Area Climate Strategy 2030 contains several methods for mitigating climate change. Implementation of the strategy is monitored annually by calculating and reporting the greenhouse gas emissions of the Helsinki Metropolitan Area and compiling information and trends related to mitigating climate change. According to a 2012 review, most of the 120 methods listed in the strategy have been implemented.

The objective of the strategy was reviewed in 2012. The regional objective is a 20 per cent de-





Figures 18 and 19. Residential wood burning and traffic have a significant impact on air quality. Bentso(a)pyrene is a carcinogenic compound contained in fine particulates from residential wood burning in particular.

crease in emissions from 1990 to 2020 and carbon neutrality by 2050. The comparison year is 1990.

A climate change adaptation strategy was approved in spring 2012. It includes the strategic starting points and guidelines for adapting to climate change and short-range procedural guidelines for 2012–2020. The cities, joint municipal authorities and other operators in the Helsinki Metropolitan Area can use the strategy to prepare for and adapt to climate change and the effects of extreme weather events.

Information co-operation

HSY produces, compiles and refines regionally uniform register and spatial data and information on population, housing, commuting, business activities, urban form and land use that describes the region's development.

By compiling and harmonising all information in one place and offering it in an easy-to-use and analysed form facilitates the work of planners and decision-makers. The information in the regional basic register is utilised in city and land-use planning, traffic and public transport planning, information services and research tasks, among other things.

The municipalities of the Helsinki Region and the state signed a preliminary agreement on land use, housing and traffic (MAL) for 2012–2015 in summer 2012. The purpose of the agreement is to integrate urban form, promote the housing market and sustainable modes of transport and especially the use of rail transport in the region. The municipalities of the Helsinki Region will draw up a joint land use plan that aligns the development of the regional structure and urban form and the traffic system.

HSY, Uusimaa Regional Council and Helsinki Region Transport compile monitoring materials for the preliminary agreement together, and HSY is responsible for compiling joint monitoring reports. HSY maintains and provides information about the land available for construction in the Helsinki Metropolitan Area. In addition to monitoring the preliminary agreement, information about the available land is also widely used in planning and research.

Geographical information for the needs of regional planning

Regional basic register SePe: information in the form of harmonised geographical information, including buildings, properties, plans, population, companies and business facilities along with land available for construction

SePe user interface SeutuRuutu: an easy-to-use browser-based map application

SeutuCD compact disc: an annually compiled collection of the central geoinformation to facilitate planning

Open data: free-to-use materials generalised from SeutuCD compact disc.



Picture: HSV / Jenni-Justiina Niemi

Summary

The Helsinki Metropolitan Area gets its water supply from Lake Päijänne. Drinking water is produced at water treatment plants in Pitkäkoski and Vanhakaupunki. Approximately one third of inhabitants of Espoo get their water from Lake Pitkäjärvi in Nuuksio after the water is treated at the Dämman water treatment plant.

The drinking water is of high quality and excellently meets the requirements and recommendations of the decree relating to water for households, as well as HSY's own, stricter quality requirements. The reliability of the water supply is very good.

Wastewater is treated efficiently at the Viikinmäki and Suomenoja treatment plants. HSY aims for continuous improvement in treatment results to protect the Baltic Sea and other water systems. The by-products and energy generated in the treatment process are recovered as efficiently as possible.

Wastewater treatment plants met the requirements of their environmental permits in 2012, although HSY's own, stricter requirements were not met due to the unusually rainy year.

Water services are developed in co-operation with the member cities. The plan for 2013–2022 focuses on recognising needs due to changes in urban form and need for water services in areas outside of the current networks.

The network renovations ensure the high quality of drinking water and the functioning of the water supply and sewerage. The network is extended whenever cities make decisions on building residential and business areas.

HSY collects municipal waste and directs it to reuse. Non-recovered waste is disposed safely. HSY provides waste management services for residential properties, public corporate bodies, health and social services and educational activities in the Helsinki Metropolitan Area and Kirkkonummi.

Decreasing the quantity of waste, sorting of waste at location and recycling are important parts of HSY's operating policy. Waste management regulations and waste guidance help ensure a high level of recycling and prevent unnecessary waste. Management of environmental impact and decreasing harmful effects are taken into consideration in all activities.

The issues of energy generation and consumption are central in several ways. HSY consumes energy in processes while also generating energy from renewable energy sources. In 2012, HSY was 94 per cent self-sufficient in its energy use, and aims to be completely energy self-sufficient by 2017. HSY joined municipalities' energy-efficiency agreement in 2012 and set the own goal of decreasing energy consumption by 9 per cent by 2016.

HSY calculates its own energy balance and monitors greenhouse gas emissions of the Helsinki Metropolitan Area.

HSY, the municipalities of the Helsinki Metropolitan Area and Helsinki Region Transport have created action programmes for improving air quality and bringing concentrations down to below

the limit values. HSY is participating in several research projects aimed at improving air quality and increasing people's awareness of the sources and effects of air pollution.

The municipalities of the Helsinki Region and the state have signed a preliminary agreement on land use, housing and traffic for 2012–2015. The aim is to integrate the urban form, promote the housing market and sustainable modes of transport and especially the use of rail transport. HSY is responsible for reporting connected to monitoring the preliminary agreement. The implementation of the Helsinki Metropolitan Area Climate Strategy 2030 is monitored annually by calculating and reporting greenhouse gas emissions and compiling information related to mitigating climate change. The climate change adaptation strategy includes the strategic starting points and guidelines and short-range procedural guidelines for 2012–2020.

This report focuses on information from 2012 and winter 2013. However, some issues are presented in longer time series. Review of longer time spans often highlights annual fluctuations and reveals development trend. This helps in the detection of decreased coastal nutrient loads, for example. Opportunities for waste recycling and people's activity to sort waste have increased significantly. The measures taken by the cities have decreased street dust and air quality has clearly improved in the centre of Helsinki, among other places. There has been success in avoiding increase of greenhouse gas emissions in the Helsinki Metropolitan Area despite the constantly growing number of residents and jobs in the area.



Picture: HSY / Jenni-Justiina Niemi

Appendix 1. Realisation of objectives

HSY's action plan and financial statement for 2012 include strategic and operational objectives whose realisation is being monitored.

Obective: HSY's greenhouse gas emissions and energy consumption will be smaller than in 2011.
Realisation: Energy consumption increased by 4 per cent (preliminary information in April 2013). (Information on HSY's greenhouse gas emissions was not yet available.)

Objective: The climate strategy aim has been reviewed according to cities' wishes and an implementation plan has been drawn up for the adaptation strategy.
Realisation: The climate strategy aim was reviewed.

Objective: The carbon footprint of the Helsinki Metropolitan Area has been calculated during the work of emission calculations for 2011.
Realisation: Not realised. The Kuhilas project for calculating the carbon footprint, co-ordinated by the Finnish Environment Institute, was not completed on schedule.

Objective: The greenhouse gas emissions and energy consumption of outsourced operations in water services will be mapped. Energy review of properties will be started. The energy consumption monitoring system will be in use. Measures that arose during decrease mappings will be initiated.
Realisation: Realised.

Objective: Sorting of waste for recovery will become more efficient so that in 2014, 72 per cent of Helsinki Metropolitan Area residents will report that they regularly sort their waste.
Realisation: Realised. The sorting level is 78 per cent.

Objective: The use of environmental criteria in HSY's procurement process will be increased.
Realisation: Realised, as environmental criteria were used in one-fourth of procurement decisions.

Objective: The share of refuse collection vehicles with Euro 4 or lower emissions will be 48 per cent of the entire refuse collection fleet.
Realisation: Realised.

Objective: An operating model for encouraging residents and organisations to act in a more environmentally responsible way will be created and implemented, and planned projects and campaigns will be executed.
Realisation: Partially realised. Campaigns and projects were executed. Finalising the operating model was postponed to 2013 along with investigating a possible reorganisation of guidance.

Objective: Basic information on monitoring land use, housing and traffic (MAL) has been prepared and its implementation has begun.
Realisation: Realised.

Appendix 2. Contents in accordance with the Global Reporting Initiative (GRI) guidelines

HSY's first environmental responsibility report meets the requirements of GRI G3 (application level C).
The table includes references to pages of this environmental responsibility report (Rep) and the 2012 financial statement (Sta) in Finnish.

Strategy and analysis		**Included**	**Refefences**
1.1	Executive director's statement	Yes	Rep 3, Sta 3–4
Organisational profile			
2.1–2.6	Services, structure, company type, etc.	Yes	Rep 11–12, 23–39, Sta 25
2.7.	Areas of operation	Yes	Rep 24–25,31
2,8	Personnel, net revenue. services, owners	Yes	Rep 11–12, Sta 16, 61–62
2,9	Changes in size, activities, ownership	Yes	Sta 3, 6, 25
2,10	Awards received during the reporting period	Yes	(no awards in 2012)
Report			
3.1–3.4	Report description	Yes	Rep 13, back cover
3,5	Defining content (relevance assessment, etc.)	No	
3.6–3.7	Setting report boundaries and special limitations	Partly	Rep 13, appendix 2
3,12	GRI table of contents	Yes	Rep appendix 2
Governance, commitments and engagement			
4.1–4.4	Governance structure	Yes	Sta 5–6, 16
4.14–4.15	Stakeholder groups	Partly	Sta 5
Environmental (EN), economic (EC) and social (SO) operating indicators			
EN3	Direct energy consumption	Yes	Rep 19–20, appendix 1
EN5	Energy conservation	Yes	Rep 20–21
EN6	Services based on renewable energy sources Yes	Yes	Rep 19–21, 41
EN16	Direct and indirect greenhouse gas emissions	Partly	Rep 21
EN18	Decreasing greenhouse gas emissions	Yes	Rep 21, appendix 1
EN21	Emissions into water	Yes	Rep 27
EN26	Decreasing harmful environmental impacts	Yes	Rep chapters 4–7
EN28	Fines based on env. legislation and regulations	Yes	(no fines in 2012)
EC1	Revenue, expenses, personnel expenses	Yes	Sta 22–24
SO PR5	Customer satisfaction	Yes	Rep 13

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441 002
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Building environmentally responsible metropolis
HSY's publications 1/2014
ISSN-L 1798-6087
ISBN 978-952-6604-80-0 (nid.)
ISBN 978-952-6604-81-7 (pdf)
ISSN 1798-6087 (nid.)
ISSN 1798-6095 (pdf)

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