



City of Helsinki

Environmental Report | Summary 2011

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Content

Review by the Deputy Mayor	2–3
Environmental management in the City of Helsinki	4
Land use, building and nature protection	5
Climate and energy	6–7
Water consumption, wastewater treatment and water protection	8
Waste	9
Traffic and its effects	10
Noise and vibration	11
Procurement	12
Environmental education and awareness	13
Environmental risks	14
Environmental economy	15
Environmental indicators	16

- At the end of 2011, the population of Helsinki was 595,384 (+1.2% from 2010).
- The city covers an area of 716 km² (214 km² of land, 1 km² of inland waters, 501 km² of sea waters).
- Helsinki produces about five per cent of all Finnish carbon dioxide emissions.
- The Viikinmäki wastewater treatment plant takes care of cleaning the wastewaters of approximately 800,000 people.
- At the end of 2011, the city employed 39,438 people (+0.6% from 2010).

Whilst the City of Helsinki is a significant actor in environmental protection, its activities also have notable environmental impacts. The environmental report of the City of Helsinki is a joint report by the departments that make up the organisation of the city, describing the attainment of the city's environmental objectives and the effects of its activities on the environment. The environmental report and the material produced by the administrative branches are available online (web address on the cover).

The information for this report, which was compiled and edited by the Environment Centre, was produced by all 29 city departments and the six public utility companies. The City of Helsinki Group also includes 12 foundations and 94 subsidiary organisations. A total of 65 subsidiaries provided environmental information for this year's report. The report does not include the environmental information of the foundations. Environmental economy figures exclude the environmental information of the subsidiary organisations.

Environmental reporting is co-ordinated by a working group appointed by the mayor, with representatives from the departments and public utility companies that have the most influence regarding the management of environmental effects. Group members: chairperson Päivi Kippo-Edlund (Environment Centre), secretary Johanna af Hällström (Environment Centre), secretary Anna Virolainen (Environment Centre), Markus Lukin (Environment Centre), Seppo Manner (Education Department), Heidi Huvila (Public Works Department), Silja Sarkkinen (Social Services), Mervi Korpela (Health Centre), Eeva Somerkoski (Palmia), Maija Sarpo (Palmia), Rauno Tolonen (Helen), Kaarina Vuorivirta (Port of Helsinki), Katarina Kurenlahti (Real Estate Department), Juha Uuksulainen (HSY), Anna Ruskovaara (HSL), Riikka Jääskeläinen (Stara), Marianne Annanoll (Economic and Planning Centre), Pia Halinen (Economic and Planning Centre), Pälvi Holopainen (Public Works Department), Perttu Pohjonen (Procurement Centre), Elina Tartia (HKL), Sari Hilden (Real Estate Department) and Susanna Saloranta (Real Estate Department).

Climate and environmental policies are strongly interlinked. Climate policy, in particular, has taken increasingly long steps into the strategy programmes of cities in the past few years. Helsinki wants to be an active actor of this development. About three years ago, the City Council declared Helsinki a forerunner in global responsibility issues, which is manifested in, among other things, its actions to fight climate change.

2011 was a year of new winds in Helsinki's climate policy. Together with five other largest Finnish cities, Helsinki established the Mayors' Climate Network, which started out by making six initiatives to strengthen the cities' climate work. In May 2012, we started working on six new sets of measures, the most significant of which is determining how the cities' emission target for 2020 could be tightened to a reduction of 30% instead of the earlier 20%. In the longer term, Helsinki must strive for carbon neutrality in earnest if we truly want to be a forerunner in climate change mitigation.

It is important for the climate policy that the city sets an example in its own activities, such as improving the energy efficiency of city-owned buildings, implementing rail traffic projects and improving the eco-efficiency of procurements. Completed last autumn, the Viikki Environment House is an excellent example of ecological construction, setting an example for the city's future construction projects. In addition to the city's own activities, however, it is at least equally important to establish partnerships with the business life, communities and residents in order to reduce the carbon footprint of the entire city.

To strengthen its climate partnerships, the city established the Climate Partners Network in April 2012, joined by 20 large companies in the first stage. The network aims to increase new, inspiring co-operation to reduce emissions in the city area, create new business opportunities and share knowledge about best climate practices. It is great to see several other companies also

expressing interest in the network – they will get to join it this autumn.

Climateinfo, which was formed to reduce the carbon footprint of citizens and SMEs, has done a good job with good results. Last year, as many as 15,000 residents of the Helsinki Metropolitan Area took part in Climateinfo's events and guidance. It is a common goal for the cities in the area to stabilize the operations of Climateinfo, because no city can comprehensively implement its climate policy without the climate awareness of its residents.

In its assessment report for 2011, the Audit Committee paid attention to the organisation of climate work in Helsinki and the entire metropolitan area. According to the committee, the co-ordination of climate work should be further strengthened and clarified. A peer assessment report between Helsinki and Rotterdam arrived at a similar conclusion a couple of years ago. How this can be achieved in practice will probably be decided by the next City Council after the election.

Traffic and transport are some of the key environmental challenges for Helsinki. As this report shows, although the popularity of public transport has increased, the growing passenger car traffic still causes problems with, for example, air quality and noise. The expansion of rail traffic, the further improvement of the public transport service level and the increasingly strong development of pedestrian and bicycle traffic must remain the cornerstones of traffic policy. Although the cycling conditions have been visibly improved this summer by, among other things, opening the Baana cycling route and the Pyöräkeskus bicycle centre at the Kamppi shopping centre, hard basic work to promote cycling is still necessary in terms of both planning and zoning. In addition, city employees should be encouraged to cycle even more.

Environmental issues involve much more than just climate policy. While condensing the city structure is sensible for climate-related reasons, it must not be done at any cost. If it is necessary to build in



green areas, this must be compensated to the city residents by, for example, restoring green areas elsewhere or improving the quality and service level of such areas.

Green areas and a maritime ambience are increasingly important for the image, attractiveness and competitiveness of Helsinki. Surveys on the attitudes of citizens also indicate that diverse nature and a pleasant city environment are considered factors that improve the quality of life. This shows that taking good care of environmental issues is not fiddling with green values but providing residents with better preconditions for leading a good life.

Protecting the Baltic Sea is one of the priority areas of the city's environmental strategy. In order to succeed in this, we also need to get other parties involved, a good example of which is the Baltic Sea Challenge, led by the cities of Helsinki and Turku. One topic that made the

headlines last year was the wastewater emissions into the River Vantaa, caused by exceptional weather conditions. The City Council demanded strict measures to control these. An important role in this work is played by the Water Protection Association of the River Vantaa and Helsinki Region, the joint representative of all parties affecting the state of the river.

Being a forerunner in bearing global and environmental responsibility is one of Helsinki's strategic goals. The global responsibility strategy and environmental policy are tools that help turn these principles into more concrete goals and guidelines. Everyone is needed for carrying them out: politicians, officeholders, media, companies, organisations, national and international co-operation and, above all, residents.

Pekka Sauri
Deputy Mayor

Long-term steering methods

On the city level, observance of environmental issues is governed by the City Council-approved strategy programme, the city's environmental policy and the City Board-approved common starting points for planning and budget guidelines. The city also has programmes for a number of sectors in the field of environmental protection, all contributing to the environmental management issues of the city. Such programmes include Helsingin Energia's development programme, the noise abatement action plan, the air quality action plan as well as Helsinki's Biodiversity Action Plan.

The strategy programme for 2009–2012 deals with environmental issues in several different sections. According to the city's ethical principles, Helsinki is a forerunner in global responsibility issues, which is expressed in its climate change mitigation measures, envi-

ronmental protection and procurement policies. Ecological approach is also one of the city's six values. The strategy programme's operational policies on environmental issues regard the protection of the Baltic Sea, climate change mitigation measures, saving energy, energy efficiency, promotion of public transport, environmental aspects of procurement and nature protection.

The environmental policy working group, appointed by the mayor, placed its proposal for the city's updated environmental policy in February 2011. The draft was circulated for comments in early 2012. The draft specifies both long-term objectives until 2050 and medium-term objectives until 2020. The objectives cover the following fields: climate protection, air protection, noise abatement, water protection, nature and soil protection, procurement, waste and material efficiency, environmental awareness and responsibility, environmental management and partnerships.

Environmental management on an annual level

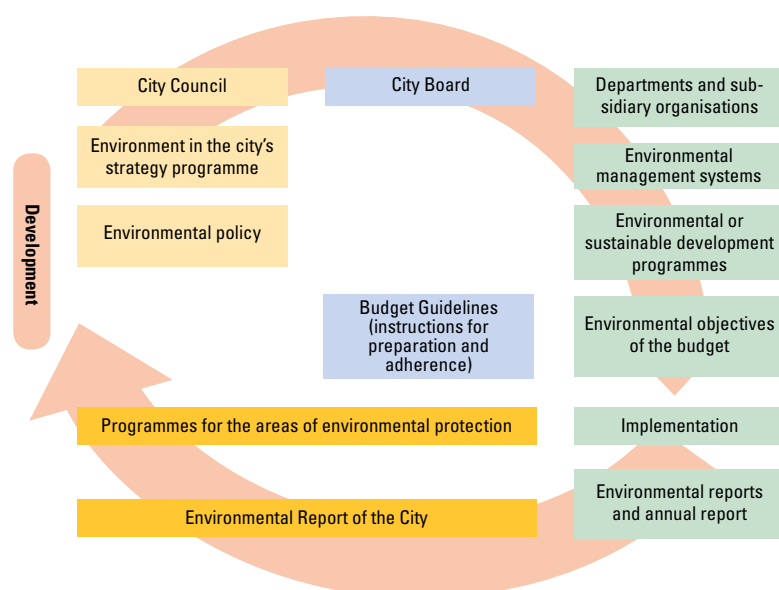
The city budget for 2011 included 11 goals connected to environmental issues, six of which were achieved fully and one partially. The goals achieved pertained to concentrations of street dust, the reliability of metro traffic, the share of public transport in morning traffic headed to the city centre and the implementation of the energy-efficiency agreement.

Good progress was made in 2011 in the environmental management and programme work at the city departments. ISO 14001 standard was in use in the Port of Helsinki, Palmia, and Helsingin Energia's power plants, heating plants and district heating operations. Other environmental management systems were used by five departments. A total of 14 departments had environmental or sustainable development programmes and four departments are currently drafting ones.

Many departments consider eco-support activities a natural part of the implementation of environmental management systems and programmes. By the end of 2011, 882 eco-supporters had been appointed and trained for the working communities of the city. Eco-support activities create an environmentally responsible operating culture and contribute to turning the city's environmental strategies and objectives into tangible actions.

The environmental work and reporting by the subsidiary organisations have clearly developed in the past few years. Several of these organisations are using, or preparing, an environmental management system or at least an environmental programme or objectives. ISO 14001 was used by four subsidiary organisations, and three were planning to implement one. Four organisations utilised other environmental management systems. Many of the subsidiary organisations monitor their consumption of resources and organise environmental training for their staff.

Figure 1: Environmental management in the City of Helsinki.



Helsinki's growing population needs more housing, jobs and services. More space is created for these by condensing the city structure, zoning new areas and restoring contaminated soil for new uses. The preservation of biodiversity is important because a comfortable and stimulating natural environment is essential to the well-being of residents. Diverse nature is also better able to adapt to changing temperature and humidity conditions.

The objective of city planning is to arrange land use and construction in a manner that establishes the prerequisites for a good living environment and promotes development that is ecologically, economically, socially and culturally sustainable. The action plan for land use and housing for 2008–2017 (MA programme) is a key instrument in guiding the development of residential construction in the city. Nature management is carried out in accordance with the City Board-approved objectives of nature management and LUMO-programme (City of Helsinki Nature Conservation Programme 2008–2017) as well as the Plan for Nature Management, approved by the Public Works Committee in 2011.

Green city planning

From an environmental perspective, the key achievement in city planning was the completion of the draft plan for Kuninkaantammi. The draft plan includes several regulations concerning environmental objectives, covering areas like low-energy construction, rain gardens and green roofs. Kuninkaantammi is also a pilot location for the city's urban storm water strategy. Town plans for Lapinlahti and Tuomarinkylä Manor were also completed. Preparations were made for the comment stage of the town plan for Saukonlaituri, ensuring the achievement of the environmental objectives by means of, among other things, a green roof regulation.



City of Helsinki Media Bank

Other city's actions promoting sustainable construction in 2011 included starting co-operation with the University of Helsinki in the Fifth Dimension green roof project, determining section-specific development principles for the general plan for the Helsinki Park and preparing the development plan for the Eastern Helsinki cultural park. Public transport conditions were improved by, for example, developing public transport systems in co-operation with HSL and implementing projects to promote pedestrian traffic and cycling.

Securing biodiversity

The implementation of the LUMO-programme has proceeded well in the first three years. Nearly 90 per cent of the procedures at the City Planning Department's responsibility are currently under way, and the same goes for about 80 per cent of the Public Works Department's procedures and 60 per cent of those at the Environment Centre's responsibility are currently under way. A few procedures, however, are behind the planned schedule.

In 2011, a survey of forests owned by the City of Helsinki was carried

out in accordance with the Forest Biodiversity Programme for Southern Finland (METSO). The total area of the sites meeting the ecological criteria of the METSO programme was about 1,150 hectares. Most of the sites found are groves, rocky forests and coniferous forests with many rotting trees.

Restoration of contaminated soil

In 2011, the majority of the city's contaminated soil restoration projects concerned sites to be converted into residential areas. The most significant restoration projects were the decommissioned shooting range in Viikinmäki, the former gas plant area in Suvilahti as well as the former port areas of Jätkäsaari and Kalasatama. Also ongoing was the post-monitoring of the restoration of the former landfill in Myllypuro. In 2011, a total of 265,110 tonnes of contaminated soil was transported to 20 different processing or landfill sites, of which 152,228 tonnes were from the city's projects and the rest from private restoration projects.

Helsinki's climate work was governed in 2011 by the city's strategy programme and Helsingin Energia's development programme. In addition, the city has committed itself to a number of agreements and declarations, including the city's energy-efficiency agreement (KETS) and the Covenant of Mayors. The environmental policy will compile the key environmental and climate objectives into a distinct whole.

Greenhouse gas emissions on the decrease

The main objective of Helsinki's climate policy is to reduce emissions by 20 per cent from the 1990 level by 2020. In 2011, the total emissions were about 4 per cent lower compared to 2010 and about 15 per cent lower compared to 1990. The favourable development of emissions in the longer term is explained, in particular, by the increased use of natural gas instead of coal.

Of the greenhouse gas emissions based on the Helsinki region's consumption in 2011, 43 per cent were generated by district heating, 25 per cent by consumer electricity consumption and 22 per cent by traffic. All these emissions decreased from the previous year. The year was good for hydroelectric power, which also showed lower emissions from electricity production in Finland. Greenhouse gas emissions from traffic in Helsinki were influenced by the decreased traffic volumes and the continued improvement of the energy efficiency of vehicles.

CO₂ emissions from energy production went down by 11 per cent from the previous year. Factors contributing to this were the reduced use of fuels at power plants and heating plants located in Helsinki – the use of coal went down by about eight per cent and the use of natural gas by about 13 per cent from the previous year. CO₂ emissions in the Helsinki region totalled about 3.3 million tonnes, and those from power shares outside the Helsinki region and purchased electricity were about 0.2 million tonnes. In

2011, Helsingin Energia's CO₂ emissions were almost 200,000 tonnes below the annual emission allowances for the 2008–2012 emissions trading period.

The proportion of renewable energy in the electricity, district heating and cooling procurement by Helsingin Energia in 2011 increased to the level of five per cent thanks to

Figure 2: Consumption-based greenhouse gas emissions in Helsinki 1990–2011.
*Advance information. Source: HSY.

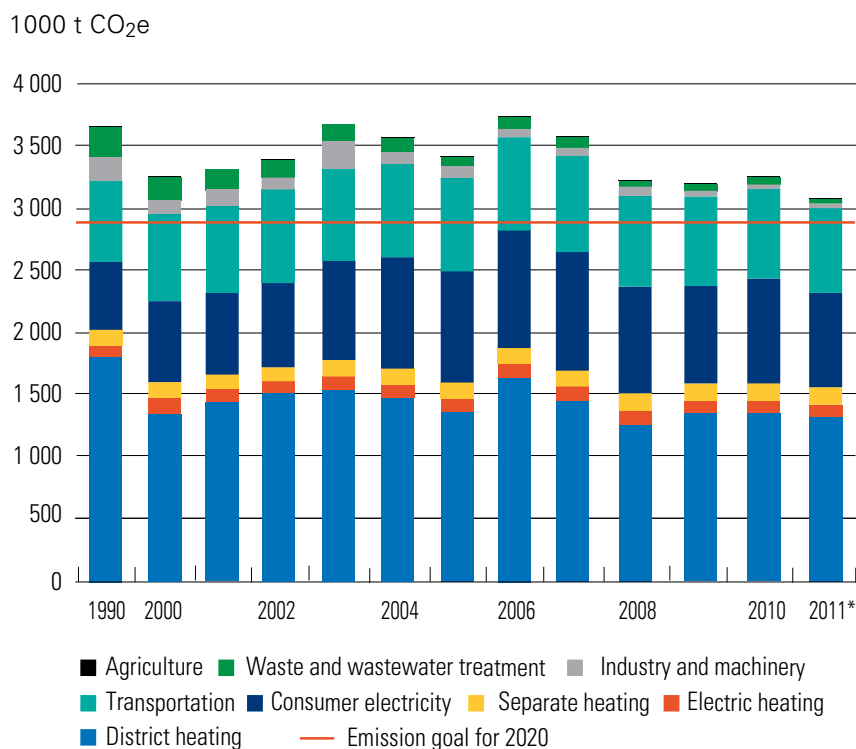
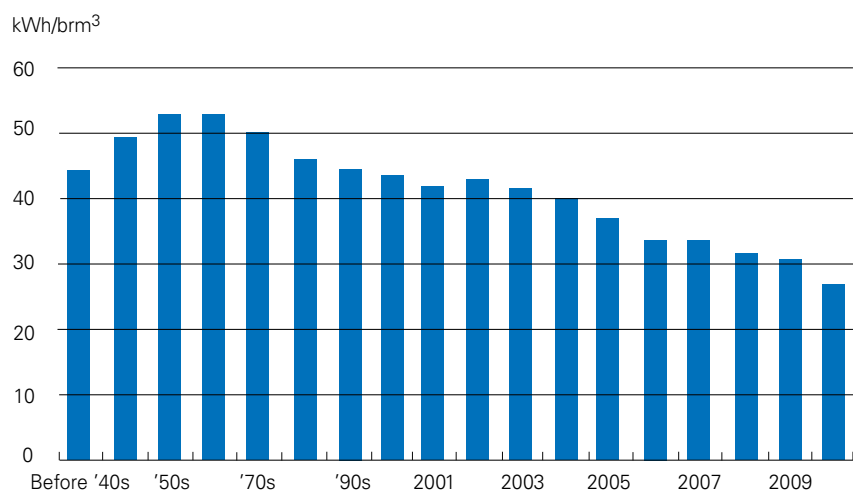


Figure 3: Heat consumption of district-heated residential buildings in Helsinki by construction year. Source: Helsingin Energia.



the good year for hydroelectric power. Three per cent of district heating and eight per cent of electricity procured were based on renewable energy sources in 2011.

Relative energy consumption going down

The total consumption of energy in the Helsinki city area in 2011 was about 14,700 GWh (about 24,600 kWh per capita), which is 0.7 per cent less than in 2010. This was the result of, in particular, a decrease in the use of traffic fuels and electricity. Whilst the total consumption of energy has increased by 17 per cent from 1990, energy consumption per capita has decreased by three per cent. The volume of district heating sold was 6,441 GWh being about 12 per cent less than the previous year due to the warm period late in the year.

The heat consumption of district-heated residential buildings in Helsinki continues to decrease rapidly thanks to stricter national building regulations and Helsinki's own plot allocation conditions. The development has been particularly rapid with blocks of flats. Of the permits granted by the Building Control Department in 2011, as much as 44 per cent of them were for the most energy-efficient energy class A, whereas the proportion in 2009 was about five per cent.

In 2011, the weather-adjusted specific heat consumption of city-owned buildings was 150.1 kWh per gross m² per year, which is two per cent less than in the year before. The specific electricity consumption of city-owned buildings was 59.7 kWh per gross m² per year, marking a seven per cent decrease from the previous year.

A year of climate action

Several significant climate actions took place in 2011. The preparation of Helsinki's ecologically sustainable construction programme for 2012–2018 was continued. The planning and implementation of low-energy projects were also continued. In



City of Helsinki Media Bank

addition, the year saw the completion of general instructions for passive-energy construction, and survey work for the construction of near-zero-energy buildings was started.

A working group appointed by the mayor prepared a survey (PEK survey) of the best practices for energy efficiency to assess various means of achieving the energy-efficiency objectives in both the public and the private sector. The survey concluded that energy consumption will remain at the current level until 2020 without new actions by the city, despite the increasing population and economic activity. As a result of the 31 actions proposed by the working group, energy consumption may be reduced by more than 10 per cent by 2020 and by a further third by 2030, compared to the 2010 level.

In 2011, the City of Helsinki introduced its own plot allocation condi-

tions, according to which construction on city-owned residential plots must from now on meet the requirements of energy-efficient energy class A. Since the city owns the majority of the plots in Helsinki, the plot allocation conditions are an efficient steering method.

On 15 February 2011, the mayors of Helsinki, Espoo, Tampere, Vantaa, Turku and Oulu and the Finnish Innovation Fund Sitra founded the Mayors' Climate Network. 2011 was also the first whole operating year of Climateinfo, which focuses on advising citizens and SMEs. Climateinfo is a joint effort by the cities of Helsinki, Espoo and Vantaa, HSY Helsinki Region Environmental Services Authority, HRT Helsinki Regional Transport Authority and Helsingin Energia. Preparation of the Climate Partner Network between the City of Helsinki and the business life was also commenced in 2011.

Water consumption and treatment

The amount of water pumped into the water supply network in HSY Water Services' operational area in 2011 totalled 93.0 million m³. Water consumption per capita in Helsinki was 199 litres per day, which is four litres more than in 2010.

The Viikinmäki wastewater treatment plant treats the wastewater of about 800,000 residents of the metropolitan area. In addition to Helsinki's wastewater, it also treats wastewater from the central and eastern parts of Vantaa and from Kerava, Tuusula, Järvenpää, Ohkola (Mäntsälä), Pornainen and Sipoo. In 2011, the Viikinmäki met all permit conditions in all calculation periods for both content and removal efficiency requirements. One per cent of the wastewater that was led to Viikinmäki bypassed the regular treatment process; however, all the water that bypassed the plant was treated with chemicals.

On an annual level, Viikinmäki achieved a treatment efficiency of 97 per cent for phosphorus, 98 per cent for biological oxygen demand and 90 per cent for nitrogen. The

nutrient load released into the sea decreased from 2010. In 2011, the phosphorus load from Viikinmäki into the sea area in front of Helsinki was 20,000 kg/a and the nitrogen load 473,000 kg/a.

Protection and state of waters

The amount of algae in the outer and inner archipelagos of Helsinki was normal in summer 2011. Although cyanobacteria accumulated at times on the shores, surface blooms of cyanobacteria occurred only occasionally in Helsinki's sea areas. During the 2011 swimming season, the quality of the swimming water was good on Helsinki's public beaches.

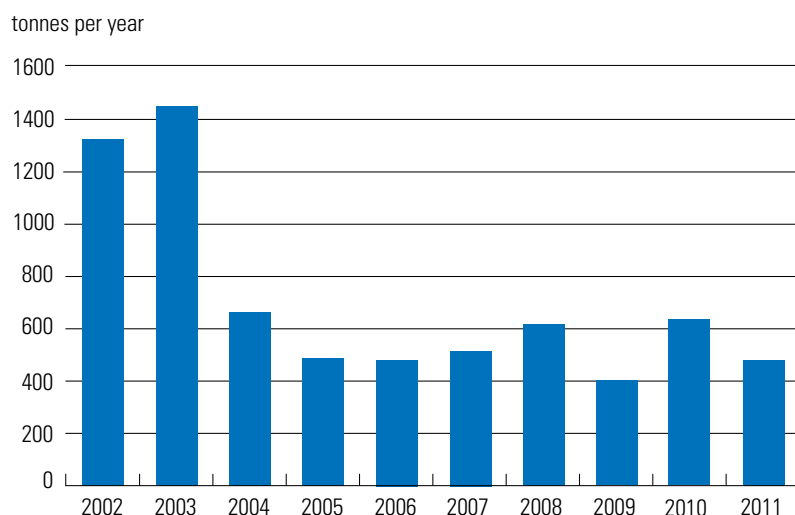
According to its ecological classification, the current state of the River Vantaa is satisfactory. The EU objective for the good ecological status of waters is unlikely to be achieved for the River Vantaa by 2015. Eutrophication of the river is caused by phosphorus and nitrogen, whose major emission sources are agriculture, the treated wastewater led into the river and overflow from wastewater pumping stations. Trouble is also caused by the urban stormwa-

ter problem resulting from the increasing concentration of the population. Phosphorus removal was improved in the 1980s, resulting in a significant reduction in the amount of phosphorus. Although nitrogen removal has only improved more recently, some decrease in the nitrogen levels has also been achieved.

The load caused on water systems by wastewater was followed through co-operative monitoring between the cities of Helsinki and Espoo. In addition, the effects on water systems and the fishing industry have been monitored near sea dumping areas, for example. The search for a new sea dumping area and environmental impact assessment also started in 2011.

Protecting the Baltic Sea is one of the focal points of the city's environmental strategy. In the Baltic Sea Challenge, led by the mayors of Turku and Helsinki, cities strive to reduce the load that their own activities place on water systems and to challenge other parties to join the protection efforts. By the end of year 2011, the Baltic Sea Challenge had been accepted by 183 organisations.

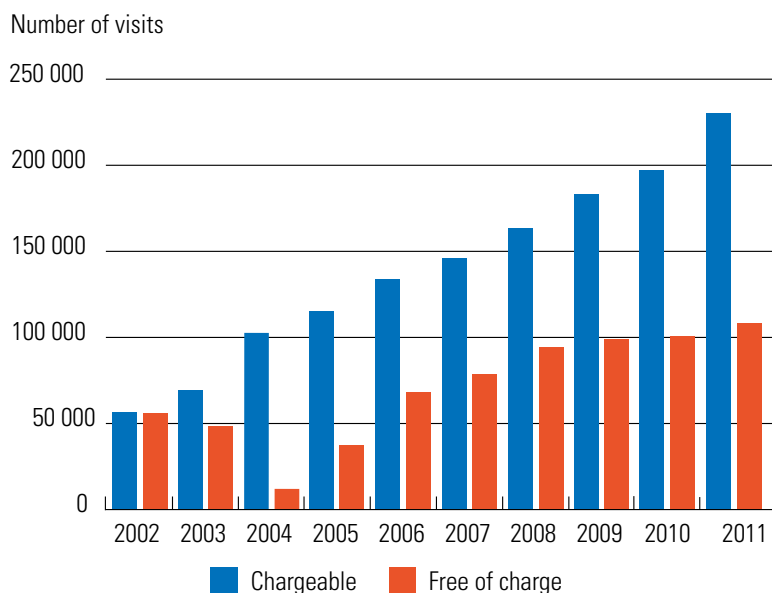
Figure 4: Nitrogen loads channelled to the sea from the Viikinmäki treatment plant in 2002–2011. Source: Helsinki Water/HSY Water Services.



HSY Waste Management provides waste management services for residential buildings and public administration in the Helsinki Metropolitan Area, collects recyclable waste and hazardous waste and provides the waste management regulations guiding the sorting of wastes sorting, for example. Waste is collected on a building-specific basis, Sortti recycling stations, regional collection points and collection lorries operating in the spring.¹

The only operating landfill for municipal waste in the Helsinki Metropolitan Area is located at the Ämmässuo waste treatment centre. In 2011, the Ämmässuo received a total of 613,700 tonnes of waste and soil, which is the same amount as in the previous year. Of the waste and soil received, 65,900 tonnes of it was used for shaping and structuring the old landfill, and the amount of waste placed in the landfill for final disposal was 270,200 tonnes. The volume of landfill gas collected within the year was 56.6 million normal cubic metres, and of its energy content was about 10 per cent lower than in the year before.

Figure 5: Customer visits to Sortti stations in 2002–2011. Source: HSY.



Waste sorting is still increasing in popularity, just as it did throughout the 2000s. The popularity of recycling shows in, among other things, the increased numbers of visitors to Sortti recycling stations, which accept small loads of domestic waste. The number of customer visits in 2011 totalled 336,071 (13% from 2010). According to a 2011 survey conducted by HSY, 93 per cent of Helsinki residents regularly sort their paper waste, and the corresponding figures are 66 per cent for biowaste, 80 per cent for cardboard, 70 per cent for glass and 47 per cent for household metal waste.

HSY continued its collection point reformation project. At the beginning of 2012, there were 38 recycling points in Helsinki and a total of 113 in the HSY region. The reformation project is to continue until 2013. In addition, HSY organised 12 composting training courses in Helsinki and sponsored the school co-operation programme for the fifth year running.

The waste management development project for the city's institutional buildings was continued in 2011 with a review of the buildings' waste management agree-

ments and arrangements. The goal was to reduce the waste volumes and costs and to expand the co-operation towards the city departments, HSY and other providers of waste management services. In addition, the monitoring of the waste volumes of schools was continued. The results show that the objective of reducing basic waste volumes by 10 per cent between 2010 and 2011 was achieved for one third of the schools.

¹⁾ In addition to HSY, the Helsinki Metropolitan Area also has other waste management operators. Their waste volumes are not included in the section of this report that deals with municipal waste.



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Traffic and its effects

Helsinki's strategy programme for 2009–2012 sets the objective of developing the traffic system to promote sustainable forms of traffic, by developing rail traffic, improving the public transport service level and increasing opportunities for pedestrian traffic and cycling. In addition, the intention is to unify the urban structure by expanding the rail transport network.

The City of Helsinki has an air quality action plan for 2008–2016, including long-term activities aimed at reaching the air quality limit values and improving the air quality. The cities constituting the Helsinki Metropolitan Area have a short-term action plan for a sudden deterioration of air quality, approved in 2010. In addition, the final report by the street maintenance development group as set by the mayor was completed in 2011. The report includes 50 development proposals, several of which also support the air quality improvement objectives.

Development of traffic

The number of public transport trips within the city in 2011 totalled 237.9 million (2% from 2010). The proportion of rail traffic of public transport trips within the city was 57 per cent. The largest increase in the number of passenger (about 9%) was for bus trips within Helsinki using regional services. Whereas the passenger volumes of metro traffic increased by almost eight per cent, those of tram traffic and VR's commuter trains decreased from the previous year.

2010 saw the launch of the Helsinki cycling project, intended to improve cycling conditions and increase the emphasis of bicycle traffic in all decision-making. Improvements have been started in the city centre area. Key planning and construction projects for cycling in 2011 included Mannerheimintie, the Baana route, Länsilinkki, Aurora Bridge and the "bicycle pockets" marked in 15 intersections.

Effects of traffic on air quality

The dust season lasted about one month, and the situation was the worst in the second week of April, about two weeks later than average. The daily limit values for particle levels were exceeded 28 times at the mobile monitoring station on Mäkelänkatu and 19 times at the permanent monitoring station on Mannerheimintie, which means that the statutory limit values were not exceeded.

The annual limit value for nitrogen dioxide ($40 \mu\text{g}/\text{m}^3$), which came into force in 2010, was clearly exceeded at Mäkelänkatu's mobile monitoring station in 2011, but levels at the Mannerheimintie monitoring station remained just below the limit. The exceeding of the limit value was due to traffic emissions. While Helsinki intended to achieve the acceptable limit value for nitrogen dioxide in early 2010, the limit value is still exceeded in the busy street canyons in the city centre.

One of the actions aimed at improving air quality is the parking benefit for low-emission vehicles, which was introduced in Helsinki in April 2011. Passenger cars meeting the low-emission criteria will receive a 50 per cent discount on parking fees and resident and company parking permit fees. By the end of 2011, the parking benefit had been granted to 236 vehicles.

The City of Helsinki's employer-subsidised public transport tickets were used by about 25,000 people in 2011, which is 5,000 more than in the year before.

Figure 6: Passenger volumes by mode of transport in public transport within Helsinki in 2007–2011. Source: HRT.

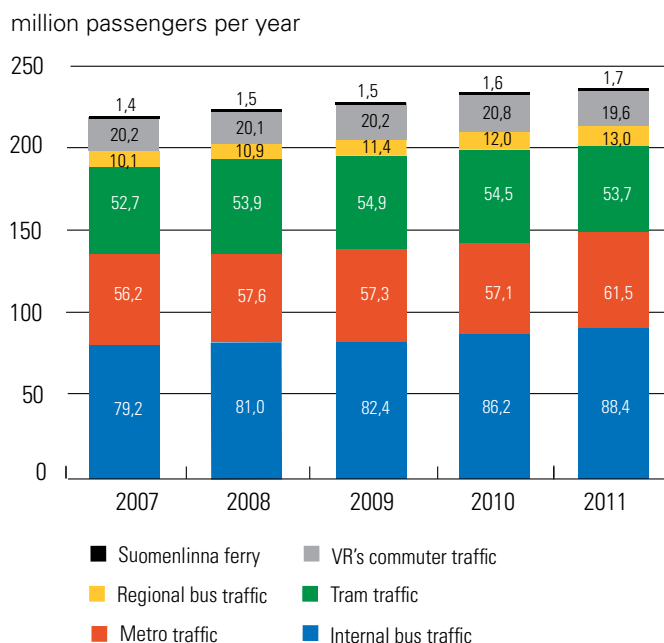
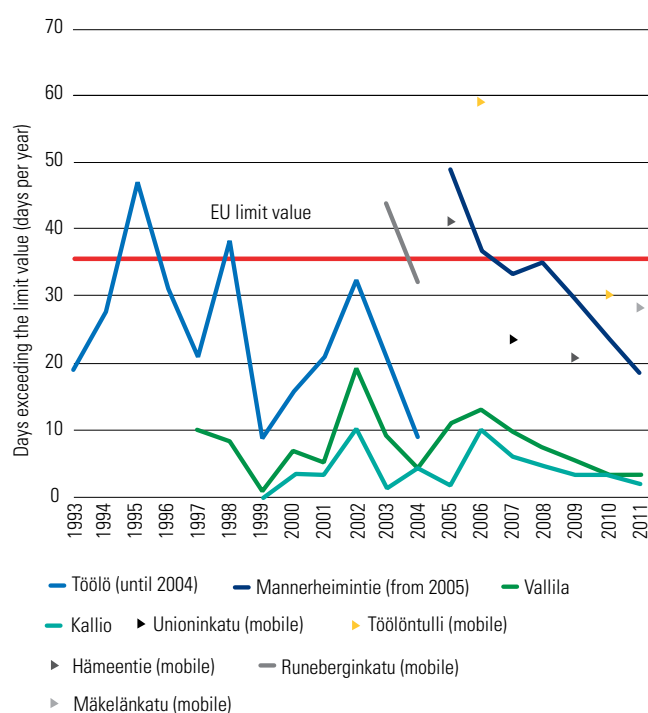


Figure 7: Number of days when the level of particulate matter (PM_{10}) exceeded the limit value ($50 \mu\text{g}/\text{m}^3$) at Helsinki's air quality monitoring stations from 1993. The limit value level may be exceeded on 35 days per year before the EU limit value is exceeded. Source: HSY.



¹⁾The limit value is exceeded if there are more than 35 days in a year on which the average particle content exceeds the limit of $50 \mu\text{g}/\text{m}^3$.

Numerous sources of noise

The most significant cause of noise problems in Helsinki is traffic. About 34 per cent of city residents are exposed to road traffic noise exceeding 55 dB. High-noise areas with housing include the busiest streets and incoming routes to the city centre and the vicinity of the intersection of Ring I and Tuusulanväylä. Noise is also caused by various events, industrial and power plants as well as construction work.

In 2011, the city completed the noise barriers on the Porvoonväylä–Suurmetsäntie section of Lahdenväylä (National Road 4) in co-operation with the Uusimaa Centre for Economic Development, Transport and the Environment (ELY). Also completed was the elevation of the noise barrier on Tapaninkyläntie, between Sidekuja and Rintamasotilaantie.

The City of Helsinki continued implementing its noise abatement action plan. In 2011, low-noise road surface material with smaller grains was used on Lauttasaarentie, up to Lauttasaari Bridge. Other actions taken to mitigate noise problems caused by traffic included the installation of dual insulation in four intersections to reduce rail noise.

2011 also saw the start of a traffic noise analysis in accordance with the Environmental Noise Directive (2002/49/EC), as a joint effort between the municipalities in the Helsinki Metropolitan Area and the Uusimaa Centre for Economic Development, Transport and the Environment. The analysis was completed in June 2012. According to the analysis, the number of residents in Helsinki's noise zones, where the day-evening-night noise level L_{den} of road traffic exceeds 55 dB, was 282,060 in 2011, whereas it was 237,500 in 2007. The reasons for this increase include the city's increased population, changed traffic data and the development of the calculation parameters and modelling principles, which now yield systematically higher results.

The permit and notification procedure is used with the aim of en-

suring the sufficiency of noise abatement in advance. The number of statutory decisions on temporary activities causing particularly disturbing noise was 204, which was 38 decisions less than in 2010. Of these, approximately 66 per cent concerned construction and the rest were various events. Construction projects causing the greatest challenges were work that had to be performed near housing at night for compelling reasons. Large supervision areas included, for example, the excavation works at Kalasatama and the underground premises of the Parliament as well as the excavation works of the West Metro project.

The number of events organised in the city in 2011 was as large as in the year before. Big concerts were organised in Kyläsaari, at the Olympic Stadium, in Kaisaniemi Park, on Hietaniemi beach and in the former power plant area of SuviLahti. While efforts were taken in co-operation with the organisers to tackle noise

problems caused by the concerts, resident complaints were received, in particular, for the several-day Flow Festival, the outdoor concert at mid-summer and the concert on Hietaniemi beach that lasted longer than planned.

Vibration caused by traffic

Condensation of the urban structure has worsened the problems caused by traffic vibration. In difficult locations, the effects of traffic vibration must be assessed at various stages of land use planning, from zoning to building design. Due to high costs, vibration analyses for planning and building areas are sometimes insufficient.

Vibration problems caused by traffic were addressed by taking part in the two-year research and development project carried out by VTT Technical Research Centre of Finland, "Wireless sensor platform for monitoring environmental vibrations (VibPlat)".



City of Helsinki Media Bank

The sustainable development action plan for procurement, aiming to support the city departments in taking account of sustainable development in their procurement activities, proceeded in line with the implementation of the procurement strategy. Among other things, the action plan covers department-specific procurement analysis and training on sustainable procurement activities.

The City of Helsinki Procurement Centre takes care of the procurement, storage and distribution of joint procurement products. In 2011, there were 19 bidding competitions for joint procurements, resulting in agreements totalling around EUR 71.5 million. The value of bidding competitions including criteria in line with sustainable development was EUR 62.3 million, 87 per cent of the value of all bidding competitions (39% in 2010). Where the number of joint bidding competitions is concerned, eight of the 19 bidding competitions – that is, 42 per cent – involved environmental criteria (28% in 2010).

Stara, the City of Helsinki's provider of construction services, is responsible for the city's joint procurement of vehicles, machinery, fuels, transport services and building supplies. In 2011, the total value of Stara's bidding competitions for products and services was EUR 27 million. The value of bidding competitions, including environmental criteria, was EUR 17 million, which is 63 per cent of the value of all bidding competitions. Where the number of bidding competitions is concerned, four of the 16 bidding competitions – that is, 25 per cent – involved environmental criteria.

Co-ordinated by HSY and funded by the EU Life+ programme, the Julia 2030 project involved the development of CO₂ calculators for the procurement of product groups such as office paper, tissue paper, laptops, toiletries and office chairs. In addition, the project has involved the development of comprehensive instructions for the consideration of sustainable development in public procurement activities. Training in the use of the calculators was pro-

vided to almost one hundred employees of the cities in the HSY region.

Paper consumption in the city's organisations has been decreasing steadily since 2006. In 2011, paper consumption per employee decreased by almost eight per cent from the previous year. Key reasons for this are assumed to be

the increased use of electronic information systems, particularly the transfer to the Ahjo case management system in 2011, and electronic meeting systems. Eco-support activities have succeeded in improving general environmental awareness and increasing the popularity of double-sided printing and copying, for example.

Figure 8: Joint procurements by the Procurement Centre – percentage of bidding competitions involving environmental criteria of the number and value of all bidding competitions in 2009–2011. Source: Procurement Centre.

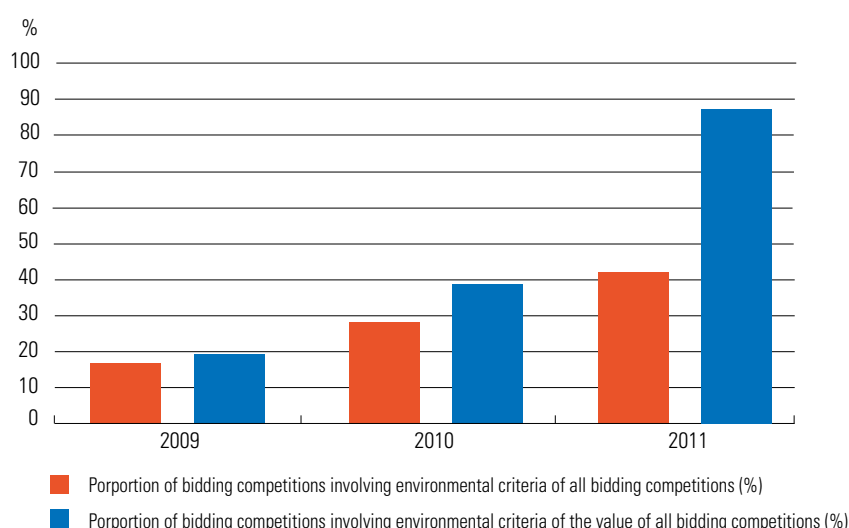
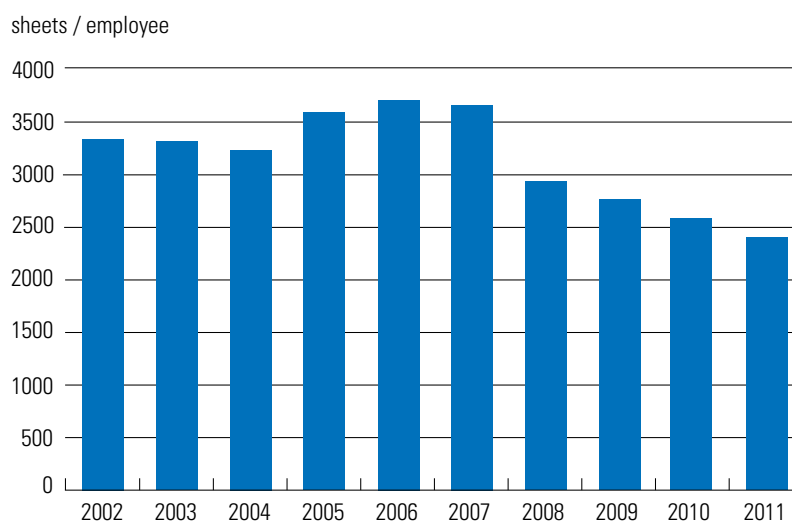


Figure 9: Paper consumption by city personnel in 2002–2011. Source: Procurement Centre.



Environmental education

Environmental education events organised in 2011 attracted a total of about 74,000 visitors, 12 per cent of the residents of Helsinki. This number is clearly higher than in the year before. The growth is explained by, in particular, the introduction of new activities in the Nature School Arkki and Harakka Island.

Spring cleaning events remained popular, with almost 31,000 people attending in 2011. The development of park volunteer activities also continued; a volunteer co-ordinator started at the Public Works Department in 2011 with the duties of planning, developing and organising park volunteer activities. The electronic park volunteer register included 355 people in 2011.

The Helsinki Zoo's Easter Island event attracted around 15,000 visitors. The Nature School Arkki was attended by 800 pupils in grades 3–6 of Helsinki schools and by 65 of their teachers. Also organised by the Helsinki Zoo were theme weeks, summer camps, the Night of the Cats, a conference for school-children as well as international ice and sand sculpture competitions.

Harakka Nature Centre provides environmental education services for the general public and more targeted services for day care centres and schools. Of all the people visiting Harakka, 6,040 took part in various guidance and education events. The nature school organised by Harakka were attended by a total of 1,806 pupils (97 classes). Harakka also organised 48 island adventures and six environmental education courses for teachers and day care personnel.

In 2011, Gardenia organised nature school activities, nature recreation days, nature-themed courses and environmental events. The Töyhöhyppä Nature School was attended by 884 pupils and 69 teachers. Gardenia organised guided nature expeditions ordered by the City of Helsinki Environment Centre, a total of 27 expeditions to various parts of Helsinki that were attended by 975 people, which is an average of 36 people each.

Climate and energy advice

Climate and energy advice reached as many as about 136,000 residents in 2011, corresponding to 23 per cent of all Helsinki residents. This was a substantial increase on the previous year's figure.

Helsingin Energia provided guidance on energy use to over 125,000 customers via phone calls, the website and physical visits to Sähkötalo. Helsingin Energia was also actively involved in social media. Mass installations of remotely read electric meters were started in suburban areas in September 2011.

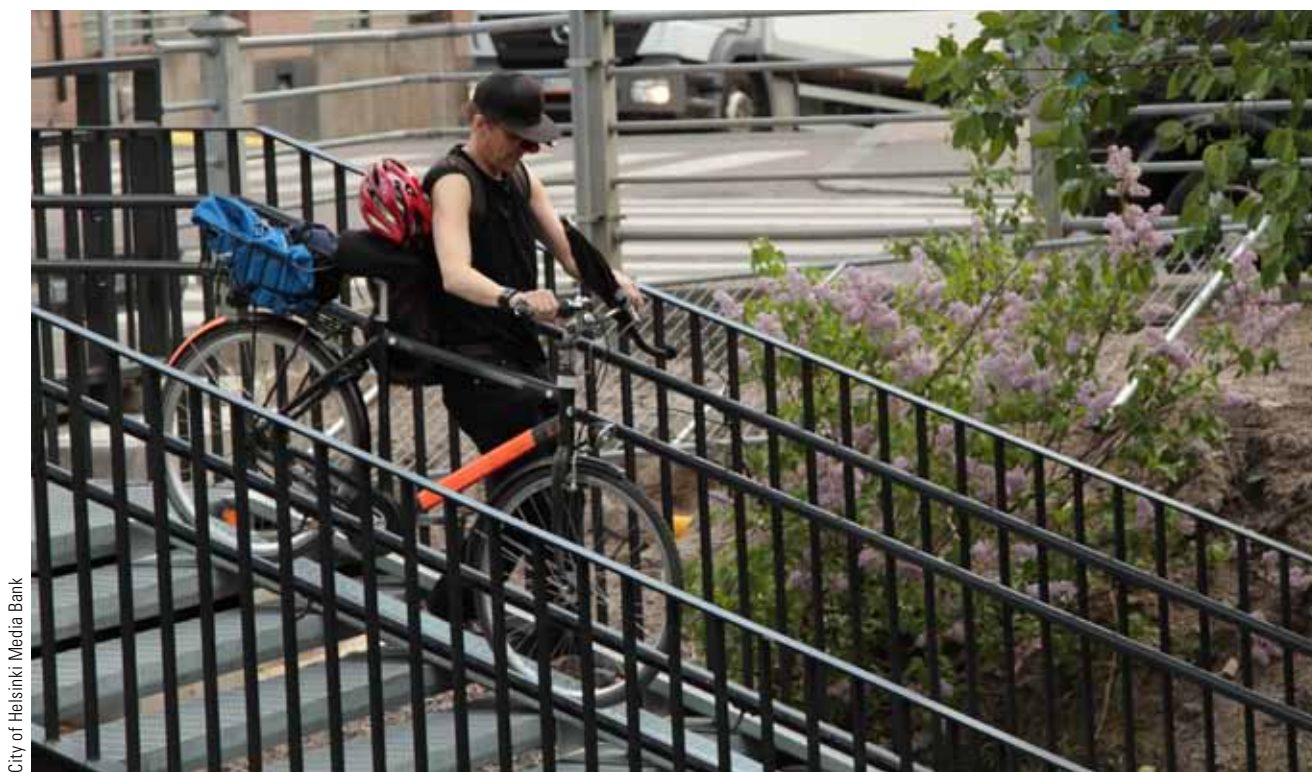
Climateinfo provides city residents and other parties with practical instructions and guidance towards a low-emission lifestyle. The service is provided by the cities of Helsinki, Espoo, Vantaa and Kauniainen, Helsingin Energia, HSY and HRT. In 2011, Climateinfo's En-

ergiatehdas (Energy Plant) event reached about 750 Helsinki residents, and the Shopping Basket of Your Life exhibition attracted almost 2,900 visitors. Climateinfo was also actively involved in social media.

The Public Works Department organised a wide variety of climate and energy guidance activities in 2011. The "Energiaa tokaluokkalaistalle" (Energy for second-graders) campaign continued in 2011. The year also saw a new energy campaign for pupils in grades 3 and 4, during which the pupils received the book "Hei, mistä saadaan energiaa?" (Hey, where does energy come from?). Internal energy and environmental guidance was carried out by the City of Helsinki in several ways, including the training of eco-supporters. Other visible efforts included the ENGAGE project and the "Kevyin askelin" (Light footsteps) campaign.

Table 1: Environmental education and guidance by the City of Helsinki in 2009–2011.

	2009	2010	2011
Environmental education	52 732	50 267	73 998
Harakka Nature Centre (Environment Centre)	3 718	5 023	7 916
Gardenia	5 116	4 665	4 184
Helsinki nature expeditions	1 102	1 085	1 107
Young People's Nature House at Meriharju (Youth Centre)	2 814	1 234	1 739
Fallkulla petting zoo (Youth Centre)	4 756	4 160	5 849
Park walks and park volunteers (Public Works Department)	950	1 600	1 100
Energiatehdas event (HKR)	0	0	750
Spring cleaning events (Public Works Department)	21 000	23 500	30 530
Uncle Blue (HKL)	4 500	4 500	4 500
Nature School Arkki and Easter Island (Zoo)	8 776	4 500	16 323
Climate and energy guidance	116 607	113 616	135 501
Energy for second-graders and other (HKR)	1 300	800	1 380
Climateinfo Total	0	0	8 725
Climateinfo (Visitors to Sanoma House)	0	0	2 625
Energiatehdas event	0	0	750
Shopping Basket of Your Life exhibition	0	0	2 850
Environment days at Ruoholahti Citymarket	0	0	1 200
Other events	0	0	1 300
Helsingin Energia Total	115 307	112 816	125 396
Face-to-face guidance	6 389	9 486	9 002
Guidance by phone	40 073	41 099	43 685
Guidance by e-mail	851	899	1 051
Loan of energy consumption meter	1 652	1 706	2 061
Internet (Energy Centre + energy advisor)	66 342	59 626	69 597
total	169 339	163 883	209 499



City of Helsinki Media Bank

Adaptation to climate change

The common climate change adaptation strategy of the Helsinki Metropolitan Area was prepared in 2011 and approved by HSY's Board of Directors in spring 2012. The strategy was devised as part of the EU-funded BaltCICA project, which ended in 2011.

The project helped recognise some adaptation needs common to all sectors, including the integration of climate change adaptation into the entire organisation's operations and increasing general awareness of the subject. The most significant costs from the viewpoint of the city were estimated to be the construction of green areas for the stormwater drain system, the maintenance of green areas as the climate changes and species evolve, and the planning and maintenance of the road network.

Climate change adaptation measures that were prepared included actions in line with the City of Helsinki's stormwater strategy and flood strategy. For example, flood

protection structures for Marjaniemi and the northern part of Sarvas were completed in 2011.

In 2011, the City of Helsinki determined its significant stormwater flood risk areas. Based on several different data collection methods, the survey located around 290 different stormwater flood sites, but none of these exceeded the statutory threshold for significance.

The significance of flood risk areas in water systems was assessed by the Uusimaa Centre for Economic Development, Transport and the Environment. On the basis of the survey, the Ministry of Agriculture and Forestry determined the entire Helsinki and Espoo coastal area as a significant flood risk area. Preparation of a flood risk management plan is already under way, co-ordinated by the Regional Council.

Oil spill prevention

There were 432 oil spills in the Helsinki region in 2011, of which 22 occurred in water systems, 17 in important groundwater areas and 393 in other areas. While the

number of spills in water systems and important groundwater areas was slightly lower than in 2010, spills in other areas were higher (367 in 2010).

The Rescue Department's oil spill prevention and response capabilities were improved in 2011 by acquiring oil booms of different heights and lengths. The development of anchoring equipment for open-sea booms was also started. New training efforts included training in the operation and maintenance of Expandi boom equipment.

The Rescue Department started using two new Class B oil spill response vessels. An oil spill response van was completed in December 2011. Other acquisitions included an MABS multi-purpose oil collector, an OBS brush/shovel collector and a 12-metre working raft for the daily use of the Sports Department, also equipped with oil spill prevention and response capabilities. In addition, 24 motor pumps were acquired for the prevention of flood damage.

Helsinki's environmental costs in 2011 (including amortisations) added up to a total of EUR 143.4 million, three per cent of all operating costs of the city. The most significant costs were the taxes on electricity and fuels, levied on an environmental basis, and the expenses caused by waste management and climate protection. The environmental costs increased from the previous year by 49 per cent, mostly due to raised taxes and the increase in the amount of money spent on climate protection.

Helsinki's environmental income in 2011 totalled EUR 7.5 million; equalling 0.4 per cent of the city's all operating income. The environmental income increased by 13 per cent from 2010. The greatest source of income was the ticket sales of the Helsinki Zoo.

Helsinki's environmental investments in 2011 totalled EUR 33.3 million, about five per cent of the city's total capital expenditure. The total volume of investments decreased from the previous year by around EUR 2.8 million. The most significant investments were made in the treatment of contaminated soil and in climate protection.

The total value of environmental responsibilities in the financial statements on 1 January 2011 was EUR 42.6 million. The responsibilities concerned the water damage in the metro tunnel, the demolition of the Hanasaari A power plant, provision for the treatment of contaminated soil and after-care of landfills.

Figure 10: Environmental costs of the City of Helsinki in 2011.

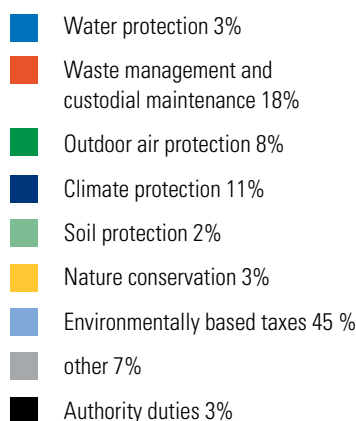
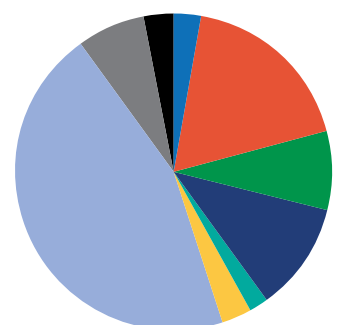
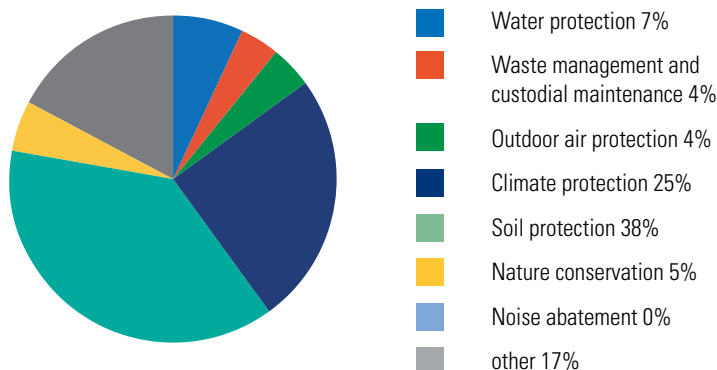


Table 2: The city's environmental income, costs and investments in 2010 and 2011 (EUR 1,000).

	2010	Change (%)	2011
Environmental income	6 621	13	7 502
Outdoor air protection	0	100	767
Climate protection	577	11	643
Water protection	300	-37	188
Waste management	688	59	1 092
Soil protection	761	-57	330
Nature conservation	68	13	77
Environmental administration	339	200	1 018
Environmental management	363	-28	262
Environmental education and awareness	2 769	7	2 952
Actions to improve eco-efficiency	755	-77	173
Environmental costs	95 902	49	143 352
Outdoor air protection	12 298	-6	11 532
Climate protection	9 231	68	15 493
Water protection	2 979	25	3 738
Waste management	18 686	37	25 686
Soil protection	1 408	138	3 351
Noise abatement	304	-19	246
Nature conservation	2 754	39	3 841
Environmentally based taxes	34 426	88	64 612
Authority duties in environmental protection	3 707	16	4 300
Environmental management	5 592	-3	5 403
Environmental education and awareness	2 701	60	4 327
Actions to improve eco-efficiency	1 817	-55	822
Environmental investments	36 085	-8	33 267
Outdoor air protection	466	173	1 272
Climate protection	687	1 097	8 226
Water protection	3 604	-36	2 318
Waste management	3 681	-66	1 259
Soil protection	14 865	-16	12 469
Noise abatement	2 384	-96	87
Nature conservation	1 368	33	1 821
Other	9 031	-36	5 815

Figure 11: Environmental investments of the City of Helsinki in 2011.



Indicators monitored in the environmental report

Realisation of the objectives set for 2011

Indicator	Objective	Average 2005–2010	2011	Trend
ENERGY AND CLIMATE				
Greenhouse gas emissions based on consumption in Helsinki (1,000 t CO ₂ -e)	-20% from the 1990 level by 2020 (report on the energy policy definitions of Helsinki)	3 388	3 081	-9%
Greenhouse gas emissions based on consumption in Helsinki per capita (t CO ₂ -e per capita per year)	4.3 t CO ₂ -e per capita by 2030 (metropolitan area climate strategy)	5,9	5,2	-12%
Energy consumption of the community per capita (kWh per capita per year)	Total consumption of energy begins to decrease by 2020 (national climate and energy strategy)	25 614	24 610	-4%
Electricity consumption of the community per capita (kWh per capita per year)	Electricity consumption per capita begins to decrease (strategy programme 2009–2012)	7 783	7 489	-4%
Share of renewable energy of the electricity, district heating and cooling procurements by Helsingin Energia (%)	20% in 2020 (energy policies of Helsinki)	4,7	5,0	6%
Share of district heating in buildings (%)	Share of district heating increases (energy policies of Helsinki)	85,6	86,0	0%
Specific consumption of electricity in buildings owned by the city (kWh/m ²)	Saving 9% by 2016 (municipal energy-efficiency agreement)	65,2	59,7	-8%
Specific heat consumption in buildings owned by the city (kWh/m ²)	Saving 9% by 2016 (municipal energy-efficiency agreement)	153,0	150,1	-2%
Share of energy -efficiency class A of building permits granted for residential buildings by the Building Control Department (%)	Improving the energy efficiency of new buildings (energy class A requirement in the city's plot allocation conditions, Real Estate Committee decision 2011)	11,1 (2009-2010)	47,7	330%
Specific heat consumption of new district-heated buildings (kWh/m ³)	20% improvement in the energy efficiency of new buildings required by the 2010 regulations (national energy regulations 1 July 2012)	33,0	26,0	-18%
Energy inspections of service buildings owned by the City of Helsinki (%)	80% in 2010 (municipal energy-efficiency agreement), 100% by 2016 (municipal energy-efficiency agreement action plan)	79,8	81,0	2%
TRAFFIC, AIR QUALITY AND NOISE				
Distribution of the methods of transport in Helsinki, walking + cycling + public transport (%)	+3% in walking + cycling + public transport by 2012 (strategy programme 2009–2012)	74,7 (2008)	72,3 (2010)	-3%
Motorisation (number of passenger cars per 1,000 residents)	Transport system is developed to promote sustainable forms of transport (strategy programme 2009–2012)	382	403	5%
Number of public transport trips (per capita per year)	Share of public transport as a transport mode is increased (strategy programme 2009–2012)	389,8	399,5	3%
Carbon dioxide emissions of road traffic in Helsinki (1,000 t CO ₂)	-16% by 2020 (national climate strategy), -20% by 2030 (metropolitan area climate strategy)	545,0	518,6	-5%
Carbon dioxide emissions of passenger cars registered for the first time in Helsinki (g CO ₂ /km)	New passenger cars registered within the EU reach the objective for average emissions (130 g CO ₂ /km) between 2012 and 2015 (EU regulation)	167,9	144,6	-14%
Share of public transport in morning traffic headed to the city centre (%)	> 72.5% in 2011 (binding operational objective of the City Planning Department)	71,3	72,5	2%
Share of public transport in cross-sectional traffic (%)	20% in 2011 (binding operational objective of the City Planning Department)	17,2	18,9	10%
Daily development of cycling volumes in relation to the 2000 level (2000 = 100%)	Doubled by 2015 (cycling doubling programme, City Council 2003)	127,60	158,80	24%
Annual average of nitrogen dioxide (µg/m ³)	40 µg/m ³ in 2010 (air quality decree 38/2011)	41,4	39,0	-6%
Number of days when the limit value level of particulate matter was exceeded in Helsinki (per year)	Max. 35 days per year in 2011 (air quality decree 38/2011 and common binding operational objective of the Environment Centre and Public Works Department)	28,2	24,0	-15%
Construction of noise barriers to protect new residential areas (km)	New residential areas are protected against noise (noise abatement action plan)	0,4	1,2	185%
Construction of noise barriers to protect current land use (km)	New noise barriers presented in the action plan (noise abatement action plan)	2,0	0,0	-100%
Use of low-noise surface materials (km)	Increasing the use of low-noise surface materials (noise abatement action plan)	1,5	1,6	8%
NATURE AND WATER				
Nitrogen emissions into the sea from the Viikinmäki wastewater treatment plant (tonnes per year)	Nitrogen less than 500 tonnes per year in 2009–2011 (city budget objective)	526	473	-10%
Phosphorus emissions into the sea from the Viikinmäki wastewater treatment plant (tonnes per year)	Phosphorus less than 30 tonnes per year in 2009–2011 (city budget objective)	24,0	20,0	-17%
ENVIRONMENTAL RESPONSIBILITY AND WASTE				
Paper consumption of city employees (A4 sheets per employee per year)	Reduced amount of waste (Waste Act to prevent the creation of waste)	3116	2424	-22%
Share of environmental criteria in the centralised procurements of the City of Helsinki (%)	25% in 2010, 50% in 2015 (principle decision by the Government)	21,9 (2009-2010)	42,0	92%
Participation in environmental education organised by the city (% of population)	Increasing the environmental awareness of city employees and residents (environmental policy)	8,8 (2009-2010)	12,4	41%
Utilisation of domestic waste in the metropolitan area as materials (percentage)	50% utilised as materials in 2016 (national waste management plan 2008)	48,8	49,0 (2010)	0%
Amount of domestic waste in the metropolitan area (kg per capita per year)	Decreasing the total amount of waste (national waste management plan 2008)	342,9	340,0 (2010)	-1%
Amount of domestic waste utilised, biowaste (kg per capita per year)	50% utilised as materials in 2016 (national waste management plan 2008)	52,4	50,3	-4%

The trend describes the situation of the past year compared to the average of the previous five years.

The highlighted entries are joint indicators of six cities (Helsinki, Espoo, Vantaa, Turku, Tampere and Oulu).



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Helsingin kaupungin keskushallinnon julkaisuja 2012:18

City of Helsinki - Environmental Report 2011 - Summary

ISBN 978-952-272-289-8 (printed publication)

ISBN 978-952-272-290-1 (electronic publication)

Layout: Raoul Charpentier, Guassi Oy

Cover picture: Seppo Laakso

Year of publication 2012

Print run 300 copies

Print: Kirjapaino Uusimaa

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Keywords: environmental reporting, environmental management, environmental economy

