



LAHTI REGION

ENVIRONMENTAL REVIEW



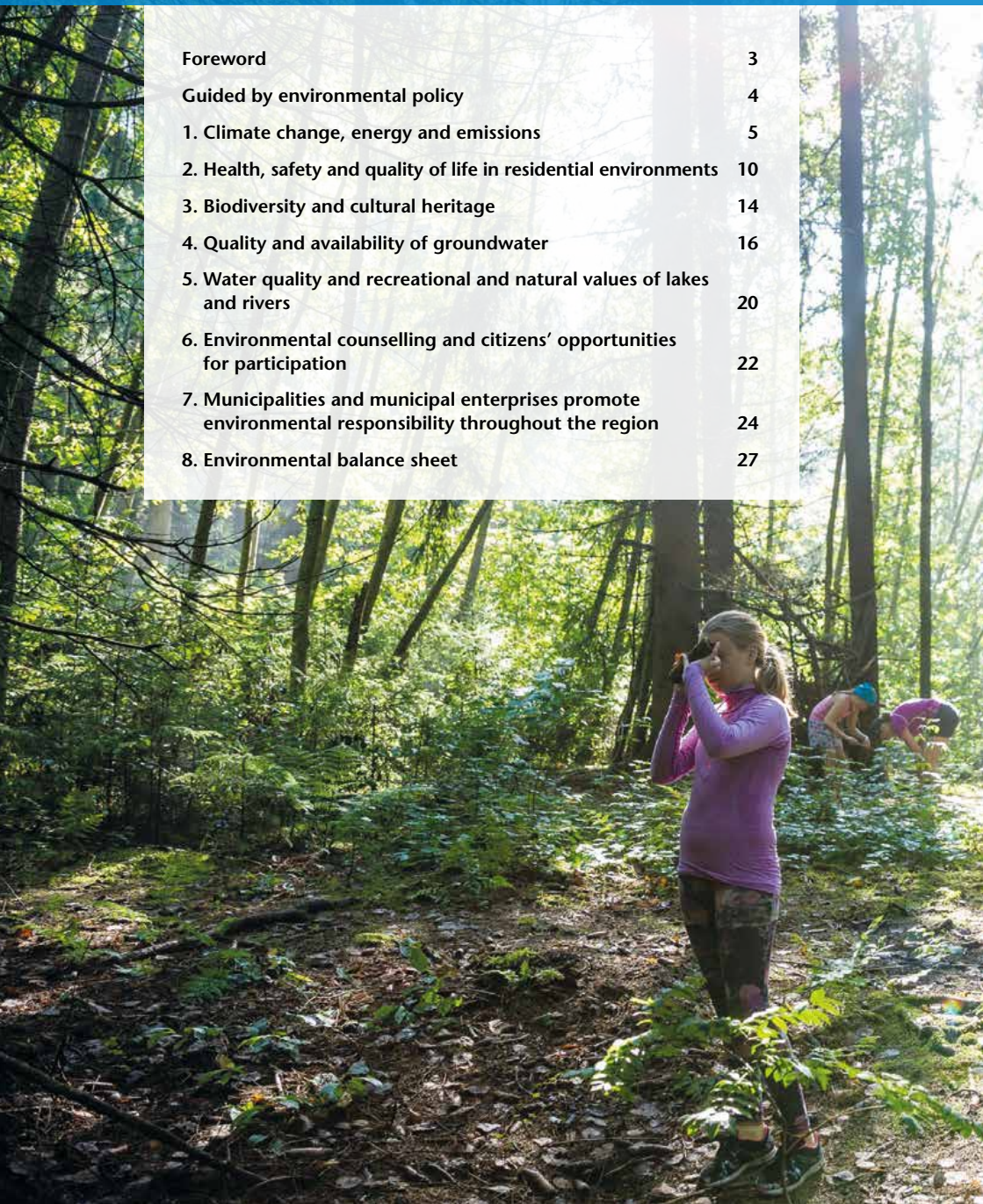
Hollola



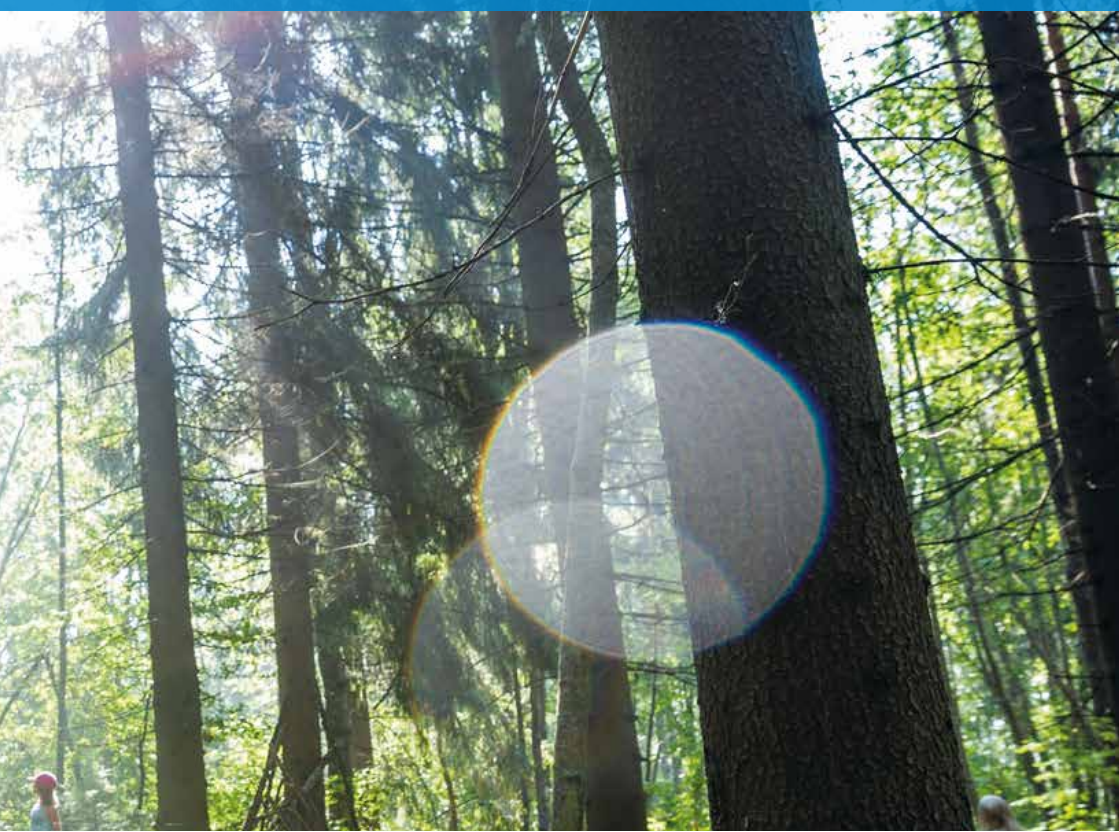
Lahti

CONTENTS

Foreword	3
Guided by environmental policy	4
1. Climate change, energy and emissions	5
2. Health, safety and quality of life in residential environments	10
3. Biodiversity and cultural heritage	14
4. Quality and availability of groundwater	16
5. Water quality and recreational and natural values of lakes and rivers	20
6. Environmental counselling and citizens' opportunities for participation	22
7. Municipalities and municipal enterprises promote environmental responsibility throughout the region	24
8. Environmental balance sheet	27



FOREWORD



This is a joint environmental review for Lahti and Hollola. Many of the indicators have been monitored regionally for a long time, and this long-term data provides a good perspective into our development. Highlighting future goals and challenges makes it easier to address and monitor them.

The environment is a very relevant theme in many ways. This was particularly emphasised before the Finnish parliamentary elections that were held in April. This theme is also relevant because, for the third time, Lahti is one of the finalists running for the Environmental Capital of Europe. Should Lahti be the successful candidate, various measures will be implemented across a broad area. The decisions made during the spring will introduce discounts on season and value tickets on local buses for children, young people and students, also encouraging young people to use public transport.

Strategically important MAL (land use, housing and transport) negotiations with the Finnish gov-

ernment were carried out in 2018. The land use, housing and transport agreement stands at the core of sustainable development and the negotiations are important for the entire Päijät-Häme region.

A particularly positive development in this review period was the end of the growth of electricity consumption. In the future, we should increase the recycling rate and adopt a circular economy, which can be challenging.

Clean air, groundwater, lakes, rivers and forests are important for Lahti and Hollola alike. The climate change challenges all players at the individual and collective levels to take action. Collaboration in these matters of essential importance will continue in the future.

Pekka Timonen
Mayor of Lahti

Päivi Rahkonen
Mayor of Hollola

Guided by environmental policy

In 2018, the vision of the City of Lahti's strategy was summarised as follows: 'Lahti – a bold environmental city'. The guidelines specified in the strategy are always applied in the operations and development of the city. The strategy is implemented in practice through key projects specified for each year. In 2018, the environmental goals included in the strategy were promoted by means such as a stormwater management project carried out in co-operation with the Smart & Clean foundation, and an extensive key project on sustainable mobility. The projects and their results were presented at various international conferences during the year. Lahti also adopted a new environmental policy in 2018, the mayor signed the EU Covenant of May-

ors for Climate & Energy for the new period, and Lahti decided to enter the contest for the European Green Capital Award. The winner of the award will be announced at Midsummer 2019.

Hollola adopted a new municipal strategy in 2018. Its core value is responsibility. Hollola is a strong municipality, with recreational areas and clean waterways supporting the residents' well-being and the municipality's vitality. A culture of development and experiment is promoted to prepare the municipality for future changes. In 2018, in connection with the Carbon Neutral Municipalities (Canemure) project, Hollola joined the collaboration to prepare a new climate policy for the region and implement energy- and climate-related measures.



1 Climate change, energy and emissions



Lahti and Hollola aim for energy savings

At the premises of City of Lahti Facility Centre, specific heat consumption was 40.0 kWh/m³ and specific electricity consumption 15.9 kWh/m³. The respective figures for Hollola were 41 kWh/m³ and 21 kWh/m³. Specific electric consumption decreased slightly in both municipalities. The figures for Lahti do not include temporary portable buildings with separate electricity connections, but buildings that were under renovation or otherwise underused in 2018 are included. Lahti continues its participation in the Energy Efficiency Agreement for Municipalities with the Finnish Ministry of Employment and the Economy, and Hollola is considering joining the agreement to qualify for energy grants. Both municipalities participate in the Canemure EU project. The Päijät-Häme subproject is developing a climate roadmap and climate actions for the region.

Municipal-level electricity consumption decreased year-on-year in Lahti and Hollola alike.

From coal to renewable energy

The energy-related goals of Lahti Energy reached an important milestone in December 2018: a coal ship sailing into the Port of Hamina carried the last load of coal. The recent heating season was the last one during which coal was used for heating in the Lahti region. Construction of the Kymijärvi III biothermal power plant has progressed according to plan. In the next heating season (2019–2020), it can use mainly renewable biofuel for power production. In order to ensure the availability of renewable fuel, Lahti Energy has acquired a bioterminal in Kouvola. The design of

the Kymijärvi III power plant takes eco-friendliness and energy-efficiency into account in many ways. Lahti Energy has particularly invested in cutting emissions into the air and water and reducing the noise impact.

Proportion of wind power doubled

In addition to reducing emissions from power generation, Lahti Energy's strategy aims for a reduction of emissions from its vehicles. At year-end 2018, Lahti Energy had ten electric cars and two cars running on gas. However, the majority of Lahti Energy's cars are diesel-operated. In December, Lahti Energy was among the first in Lahti to fill cars up with Neste My biodiesel, manufactured 100% from waste and food residues from industrial processes. Starting in January 2019, Lahti Energy's personnel are instructed to use biodiesel for their diesel-operated shared cars and company cars whenever possible. Use of biodiesel significantly reduces greenhouse gas, particle and nitrogen oxide emissions.

Efficient recovery and reuse of ashes continued in 2018. A specific interim storage area was established at the Miekka ash landfill site, through which ashes have been forwarded to be used as fertiliser and for excavation work. Use of ash from old piles for road construction was tested.

Lahti Energy has considerably increased the proportion of wind power in its acquisition of energy through cooperative energy producers. The amount of wind power electricity doubled from 2017. Lahti Energy continues to invest in profitable renewable power production and energy-efficiency projects.

New energy management and efficiency services

In 2018, Lahti Energy particularly invested in the development of a new software-based energy management solution and energy-efficiency expert services. In summer 2018, Lahti Energy and Pori Energia acquired a majority holding in e-Protech Oy, a company providing energy efficiency services for properties. Also in 2018, the first Kaukolämpö 2.0 district heating agreements were signed, with Lahti Energy providing housing complexes with heating as a service. The product also includes possible energy efficiency investments in the production method and use of energy. At first, the service will only be available to housing complexes with Lahti Energy as their comprehensive energy service partner.

Additionally, Lahti Energy has developed other services for e-cars, including a service providing properties with charging infrastructure. Lahti Energy provides six public charging points for electric cars in Lahti, located in front of Lahti Energy's office on Kauppakatu, in the Sibelius Hall car park, and at the Sports Centre.

Renewable fuels accounted for 35.69 per cent and fossil fuels for 64.31 per cent of district heat production for the energy network. CO₂-free electricity accounted for 64.47 per cent of electricity sales (17.03 per cent renewable and 47.44 per cent nuclear power).

Carbon dioxide emissions from industry and power production increased from the previous year. However, emissions will decrease significantly in the future, as the Kymijärvi 1 coal power plant saw its last full year of operation in 2018.



Key figures for monitoring	Reference year	2013	2014	2015	2016*	2017**
<i>Electricity consumption (kWh/resident/year)</i>						
Lahti	2000: 8,620	8,712	8,780	8,497	9,142	9,138
Hollola	2007: 8,178	7,777	7,446	7,331	8,280	7,861
Nastola	2007: 13,127	11,943	11,551	-	-	-

*Nastola ja Lahti yhdistyivät vuodesta 2016, samoin kuin Hollola ja Hämeenkoski

**Sähkön kuntakohtaisia kulutustietoja 2018 ei saatavissa keväällä 2019

Key figures for monitoring	Reference year 2001	2014	2015	2016*	2017	2018
<i>Specific electricity consumption in municipal premises (kWh per cubic meter)</i>						
Lahti	18.2	16.9	15.7	16.9	16.3	15.9
Hollola		24.15	23.60	22.66	22.65	21
Nastola		17.88	26.59	-	-	-

*Nastola and Lahti were consolidated in 2016

Heat consumption in municipal premises (kWh per cubic meter)	Reference year 2001	2014	2015	2016*	2017	2018
Lahti	52.1	40.7	39.1	40.6	40.3	40.0
Hollola**		31.22	31.47	40.3	40.1	41
Nastola		41.32	42.63	-	-	-

*Nastola and Lahti were consolidated in 2016, as well as Hollola and Hämeenkoski

**The figures for Hollola are not weather-normalised, those for Lahti are

Carbon dioxide emissions from power plants and industries, Lahti (tonnes)	1997	2014	2015	2016	2017	2018
	691,300	566,232	495,220	520,287	452,749	574,714

Circular economy

The circular economy in the Päijät-Häme region and the Kujala company ecosystem are excellent examples internationally. In 2018, the search started for the location of a new recycling area in Orimattila or Hollola through the EIA and regional plan processes.

Landfill gases are recovered from the closed landfill. All recovered gas was used as energy in 2018. Compared with the previous year, days where odour was detected were observed slightly more frequently in the vicinity of the Kujala waste management plant, in the daily monitoring to which

residents may also contribute. Landfill seepage water was led to the wastewater treatment plant, with approximately two cubic metres of overflow into the terrain. In other respects, the load was in permit regulations and normal.

Similar to previous years, most of the waste received by Päijät-Häme Waste Management Ltd (PHJ) was utilised as material or energy. Separately collected energy waste and mixed waste were treated in LATE sorting facility and plastics and metals were separated. SRF fuel was made in MURRE crushing facility and sent to Lahti Energy Kymijärvi II gasification



plant and Stora Enso co-incineration plant. Rest of the waste was sent to other waste incineration plants.

Biowaste was processed at LABIO Ltd's digestion and composting plant, where it was converted into biogas and compost. Market conditions for plastic were poor in 2018, which prevented the achievement of the planned material recycling target. SRF-, wood- and logging residue-based recycled fuels were sent to be burned as planned. In particular, demand for wood-based fuels was very high.

In 2018, the utilisation rate of municipal waste received by PHJ amounted to 97%. Of this waste, 30 per cent (161 kg/resident) was utilised for material and 67 per cent (355 kg/resident) for energy production, while 3 per cent (17 kg/resident) of the waste ended up in landfill. The strategic goal of PHJ is to increase the recycling rate of municipal waste in its area to 50 per cent. This can be achieved through extensive at-source sorting of waste as well as correct processing methods and their efficient use. Increased recycling will reduce the use of waste for energy. In addition, PHJ aims to improve the use of renewable energy sources in its operations. In autumn 2017, two solar power plants were built on the roofs of the Waste Centre. In 2018, they generated 71 MWh of electric power. This saved 17,700 kg in carbon dioxide emissions. Lighting at the Waste Centre was renovated in spring 2018. Now the area is equipped with LED lighting and smart lighting control, which further improves the energy efficiency of the Waste Centre.

The solar power project continued in 2018 in co-operation with Lahti Energy. The objective is to

enable the building of two larger-scale solar power plants on top of the closed landfill at Kujala Waste Centre. PHJ has signed the Society's Commitment to Sustainable Development and has committed itself to using 100 per cent renewable energy in all of its facilities and operations. In addition, PHJ aims for 50 per cent energy self-sufficiency by 2030.

Lahti Aqua provides water services for approximately 140,000 people and carries out environmentally important water treatment. Residents of Lahti use approximately 120 litres of water per person per day. The wastewater treatment plants remove 98 per cent of the organic matter and phosphorus and over 70 per cent of the nitrogen contained in water. In 2018, wastewater produced by Lahti, Hollola and Nastola amounted to 12.3 million cubic metres. Sand and solids are removed from wastewater mechanically, and organic matter and nitrogen biologically and phosphorus chemically. Wastewater is hygienised with UV light before discharging it into the Porvoonjoki river. Hygienisation eliminates nearly 100 per cent of bacteria in the water. Follow-up studies show that bacterial load of faecal origin has decreased considerably in the Porvoonjoki river after the commencement of hygienisation.

Organic matter is decomposed mostly into biogas by the digesters of the Kariniemi and Ali-Juhakala treatment plants. Some of the biogas is used for heating the treatment plants and the rest goes into the district heating network. After this, the sludge goes into the composting plant of Labio Oy to become soil conditioner.

Key figures for monitoring	Reference year 2001	2014	2015	2016	2017	2018
Amount of mixed waste produced by Lahti municipal departments (tonnes)	1,304	929	806	828	725	668
Amount of municipal waste to be disposed by landfilling in PHJ area (kg per capita)	234 (1999)	20	35	15	26	17
Reuse rate of municipal waste received by PHJ (incl. energy use) (%)	51	95	92	96	95	97
Recycling rate of municipal waste received by PHJ (reuse as materials) (%)		31	31	29	32	30

Key figures for monitoring	Reference year 1997	2014	2015	2016*	2017*	2018*
Loading of wastewater from Lahti and Hollola into the Porvoonjoki river (tonnes) and efficiency of purification (%)						
Phosphorus	5.8	2.6 (97.7 %)	1.8 (98.3 %)	1.9 (98.2)	2.3 (98.0%)	1.9 (98.3)
Nitrogen (NH ₄)	28.8	14.4 (98.1 %)	16 (98 %)	4.7 (99.4)	11 (98.8%)	17 (98%)
BHK ₇	140	73.0 (98.4 %)	52 (98.9 %)	43 (99.1)	60 (98.9%)	30.7 (99.3%)

*Calculation of the loading takes into account the fact that, since 2016, treated wastewater from Kariniemi and Ali-Juhakkala are led into the Nikula detention basin, hygienised and then led into the Porvoonjoki river. Before this, the treatment plants had separate discharge points.

	2014	2015	2016	2017	2018
Loading of the Nastola treatment plant into the Palojoki river (tonnes) and efficiency of purification (%)					
Phosphorus	0.19 (98.6 %)	0.16 (98.7 %)	0.25 (98.0)	0.37 (98.2)	0.22 (98.1%)
Nitrogen (NH ₄)	0.2 (99.7 %)	0.58 (99.2 %)	0.73 (99.0)	1.1 (98.9)	0.7 (99.1%)
BHK ₇	2.8 (99.5 %)	2.0 (99.6 %)	2.2 (99.6)	2.19 (99.6)	2.5 (99.4%)

Future plans and challenges

- Continuing climate change mitigation, while preparing for the changes already under way.
- Hollola continues to implement back-up power solutions for public facilities.
- Lahti Aqua is running a project to improve monitoring and energy efficiency and to acquire solar panels.
- The PHJ energy infrastructure development project continues. Improvement of plant functionality.
- Increasing the number of cars running on biogas and electricity.



2 Health, safety and quality of life in residential environments



Research has shown that a varied environment of green areas and woods provides residents with health and recreational benefits. Urban nature has direct health effects: According to the results of a University of Helsinki research project led from Lahti, even brief contact with forest soil improves the diversity of microbiota in the intestine and on the skin and decreases the abundance of bacteria that cause illnesses. In addition, the level of beneficial substances that control the immune response was found to increase along with the increased diversity of microbiome in the body. These tests performed on day-care children and adults are the first in the world to demonstrate a direct causality between immune response and exposure to nature.

The pleasantness and safety of environments in which people live and move around were extensively surveyed in 2018 at OmaLahti ('My Lahti') events included in the Lahti Direction work. The material collected through the My Everyday Places and Travel Experience in Lahti survey will be used for the development of a sustainable transport plan, the city master plan and more detailed land use planning. The completed city master plan and sustainable transport plan will be adopted in 2020.

About 100 hiking trips and 16 Explore Nature lectures were offered in 2018. This is possible in cooperation between municipalities, citizens and associations.

Key figures for monitoring	2013	2014	2015	2016	2017	2018
<i>Percentage of parks and green areas within the city planning areas (%)</i>						
<i>Lahti</i>	30	29.9	29.9	29	29	29
<i>Hollola</i>	25	25	25	24	21	23
<i>Nastola</i>		19	19.4	-	-	-
<i>Lots planned in noisy areas in relation to all planned single-family house lots (%)</i>	0	-	0	2.2	3.3	0
<i>Percentage of apartments in noisy areas relative to all planned apartment square metres (%)</i>	24.9	-	34.9	50.6	75	17.7

Number of journeys on public transport increased again

In 2018, a total of 7,414,744 journeys were made on public transport in the Päijät-Häme region. This equates to approximately 36.9 journeys per resident, with the population of Päijät-Häme amounting to 200,681.

In addition, it is worth noting that the Lassi minibuses were introduced in cross-town traffic within Lahti in 2018.

The relative change index for vehicle traffic was not obtained for 2018 because of technical problems at the monitoring points.



Relative change index for vehicle traffic	Reference year 2001	2013	2014	2015	2016*	2017	2018
<i>Lahti (10 observation points for traffic volume monitoring)</i>	100	109.0	106.2	105.7	-	110.4	-
<i>Car dependency: Number of passenger cars on the road / 1,000 residents</i>							
<i>Lahti</i>	387	502	507	513	512	523	526
<i>Hollola</i>	392	606	615	631	6613	623	632
<i>Nastola</i>	422	614	621	642	-	-	-

*Nastola and Lahti were consolidated in 2016, as well as Hollola and Hämeenkoski

Air quality

In 2018, Lahti monitored air quality with five monitoring stations. EUR 15,000 was invested in 2018 in an analyser of nitrogen oxides. The automatic stations monitor the levels of nitrogen oxides, ozone, inhaled particles and fine particles. In addition, there are three passive tubes at different locations, exchanged every two weeks, for the detection of volatile organic compounds (VOCs).

In 2018, a four-month measurement of particle-bound PAH compounds was carried out. PAH compounds result from incomplete burning of organic matter, such as wood. Many PAH compounds are carcinogenic or mutagenic. The levels were high, and guidance for residents was initiated as a further measure. The measurements are also being continued.

In 2018, there were 35 days during which the air quality in Lahti was poor or very poor at a minimum of one station for at least one hour.



Key figures for monitoring	Reference year 1997	2013	2014	2015	2016**	2017	2018
Number of days with poor air quality (EU: <30)	2002: 14	32	26	35	28	21	35
NOx emissions from transportation (LIISA 2012 model) (kg/resident)							
Lahti	12	4.6	4.4	5.1	5.0	4.6	*
Hollola	25	9.8	9.6	8.6	7.6	8.1	*
Nastola	30	11.7	11.5	10.4	-		
CO2 emissions from transportation (LIISA 2012 model) (kg/resident)							
Lahti	1,458	1,455.0	1,448.8	1,393.62	1,684	1,491.6	*
Hollola	2,816	2,828.6	2,838.3	2,527.7	2,792.7	2,653.6	*
Nastola**	3,109	3,267.8	3,284.5	2,981.7	-	-	

*Figures for 2018 were not available in spring 2019. **Nastola and Lahti were consolidated in 2016, as well as Hollola and Hämeenkoski.

Promoting cycling

The CitiCAP project, funded by the EU's Urban Innovation Action, will build a modern, easy and safe cycling route between the Travel Centre and Apilakatu. Its routing was discussed with residents in 2018. After the decision on routing, street planning began. Planning work also continued to develop a personal emissions trading application that encourages sustainable mobility.

Instead of only promoting cycling, the emphasis is on smart transportation: people in different situations must be allowed to make rational decisions with regard to the duration of the transport, health promotion and need to transport goods. For instance, attention should be paid to the quality and maintenance of cycle paths, as well as the levels of comfort and safety of the walking environment.

In Lahti, amount of cycle ways separated from cars and pedestrians was 2 km.

Key figures for monitoring	Reference year	2013	2014	2015	2016*	2017	2018
Combined pedestrian and cycling paths, km							
Lahti	2001: 344	392	401	403.3	458	538	538
Hollola	2008: 49	66	70.8	70.8	69	72	72
Nastola	2006: 55	48	50.2	57	-	-	

*Nastola and Lahti were consolidated in 2016, as well as Hollola and Hämeenkoski.

Future plans and challenges

- *Achieving a change in modes of transport:
In 2030, over 50 per cent of journeys are made sustainably*
- *Increasing the comfort and safety of the urban environment*
- *Ensure investment funding for main cycle paths/dedicated cycling routes*
- *Completion of the modern cycling route developed by the CitiCAP project and deployment of the emissions trading application*
- *Reduction of noise and its harmful effects*



3 Biodiversity and cultural heritage

The Kintterö (72 hectares) and Sammalsillansuo (22.8 hectares) nature conservation areas were established in Lahti in 2018. Nature conservation areas and their services were also improved and maintained. Maintenance work was carried out in nearly all of the nature conservation areas. In addition, several biota and LUMO area surveys were carried out and preparations for the establishment of a new nature conservation area began. Nearly all of the areas protected as habitats are small (24 areas, totalling 34.3 hectares).

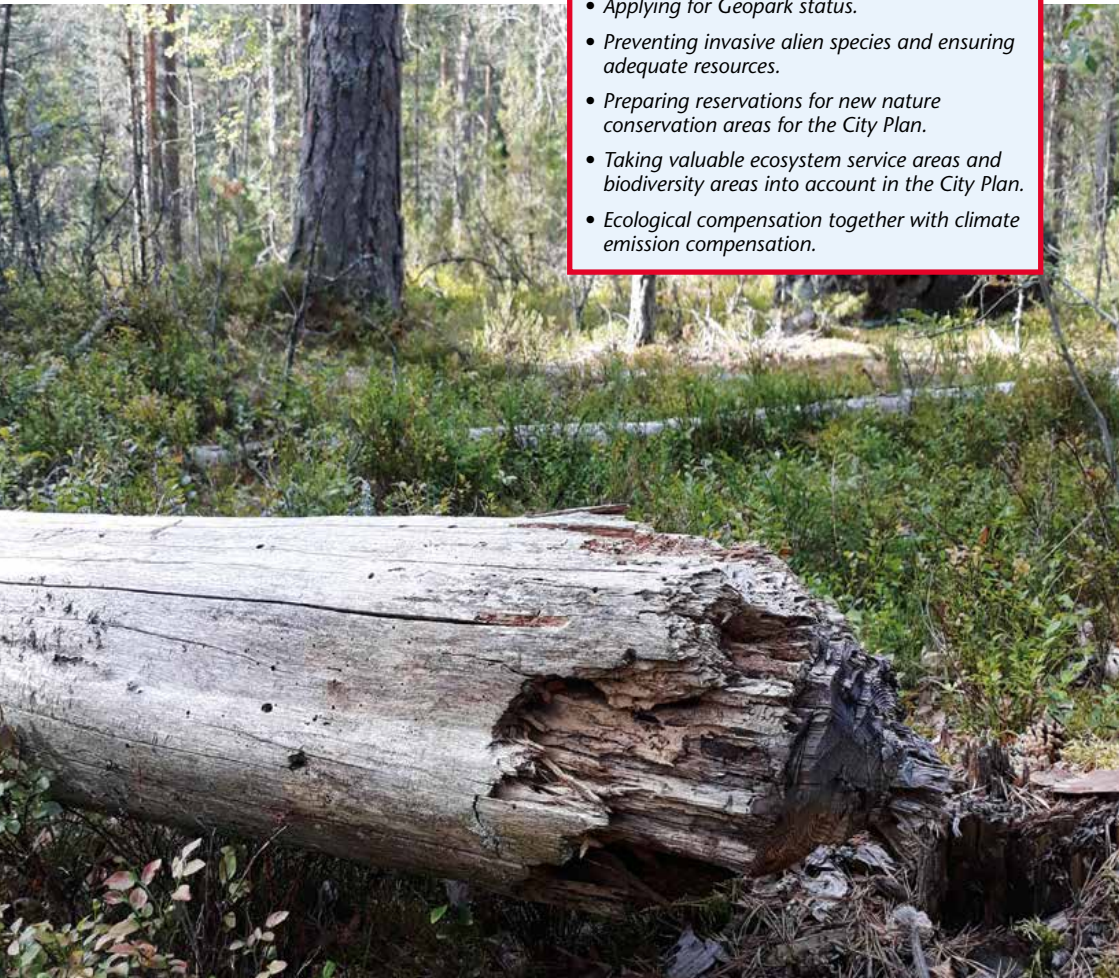
Hollola has a total of 1,610 hectares of natural conservation areas. The figure does not include Esker Conservation Programme areas and Natura areas, as these partially overlap with other nature conservation areas.

In addition to conservation areas, municipalities have independently established LUMO biodiversity sites. The total area covered by LUMO sites in Lahti increased as a result of the municipal merger to approximately 1,500 hectares. The LUMO biodiversity sites partially overlap with the other nature conservation areas.

The prevention of invasive alien species is an important part of forest and park management as well as resident activities. Climate change will make the prevention and its resourcing even more important.

Future plans and challenges

- *Better signposting for nature conservation areas. Better signposting for geological sites.*
- *Applying for Geopark status.*
- *Preventing invasive alien species and ensuring adequate resources.*
- *Preparing reservations for new nature conservation areas for the City Plan.*
- *Taking valuable ecosystem service areas and biodiversity areas into account in the City Plan.*
- *Ecological compensation together with climate emission compensation.*





Key figures for monitoring	2014	2015	2016*	2017	2018
<i>Areas protected under the Nature Conservation Act (hectares)</i>					
Lahti (1995:256)	513	513	915	915	993
Hollola	1,284	1,284	1,337	1,610	1,610
Nastola	297	297	-	-	-

*Nastola and Lahti were consolidated in 2016, as well as Hollola and Hämeenkoski

Habitat sites protected under the Nature Conservation Act (hectares)	2014	2015	2016*	2017	2018
Lahti	23.6	23.6	34.3	34.3	34.3
Hollola	19.2	19.2	25.4	25.4	25.4
Nastola	12.2	12.2	-	-	-

Areas protected under the Nature Conservation Act, percentage of the municipal land area (%)

Lahti	3.32	3.47	1.79	1.79	1.9
Hollola	2.41	2.41	1.84	1.84	1.84
Nastola	0.82	0.82	-	-	-

*Nastola and Lahti were consolidated in 2016, as well as Hollola and Hämeenkoski

Key figures for monitoring	Reference year	2014	2015	2016*	2017	2018
<i>Valuable areas protected by city planning regulations, Lahti (number of lots)</i>	1983: 60	1,023	1,027	1,247	1,269	1,294
<i>Number of protected buildings, Lahti</i>	1979: 3	302	300	350	385	390
<i>Traditional landscapes (hectares)</i>						
Lahti	1995: 26.6	26.6	26.6	36.5	36.5	36.5
Hollola	2007: 54.9	54.9	54.9	80.3	no information	no information
Nastola	2007: 9.9	9.9	9.9	-	-	-

*Nastola and Lahti were consolidated in 2016, as well as Hollola and Hämeenkoski

4 Quality and availability of groundwater



Lahti and Hollola are located above the significant I Salpausselkä groundwater reserves. Groundwater issues related to the construction of the Lahti southern ring road have been discussed with planners, Lahti Aqua Ltd, the authorities (Centre for Economic Development, Transport and the Environment; Regional State Administrative Agency) and the Urban Environment Service Area. The project entails the lowering of groundwater surface levels on the west side of Sokeritoppa by several metres from its natural level during construction. At this site, the groundwater surface level will be permanently lowered by approximately two metres. In the Liipola area, groundwater levels must be lowered by several metres because of tunnel construction, and the same applies to Patomäki.

In 2018, Lahti expanded the practice started in central Lahti in 2017 to use potassium and sodium formate as a replacement for de-icing salt to prevent slippery road surfaces. The impact of this change on groundwater quality will be monitored in the city centre over the coming years. The planning of joint monitoring of groundwater continued, and the

monitoring will commence in the Lahti and Renkomäki groundwater areas in 2019.

On the basis of the hydrogeological surveys performed, the Centre for Economic Development, Transport and the Environment removed Kolava from the groundwater area classification. Ruoriniemi and Harvasaari were included as new groundwater areas. The Lahti groundwater area was redefined with respect to the Niemi area. Minor changes were also made in the Villähti groundwater area as well as the Nastonharju–Uusikylä A and B groundwater areas.

Water acquisition by Lahti and Hollola is solely based on groundwater reserves. The volume of water pumped for consumption in Lahti and Hollola totalled 25,000 m³ per day in 2018. All water samples taken met the quality requirements and recommendations set for household water, but the chloride content of some samples was above the quality recommendation level. Approximately 100,000 m³ of groundwater is formed in the Lahti groundwater reserves every day, which is around four times the daily consumption. Altogether, 23% of the groundwater areas are classified as being in a poor state.





	2014	2015	2016	2017	2018
<i>Groundwater conductivity ($\mu\text{S}/\text{cm}$) Groundwater conductivity indicates the total amount of salts dissolved in the water. The limit value is 2,500 $\mu\text{S}/\text{cm}$.</i>					
<i>Lahti, Jalkaranta</i>	186	184	183	186	185
<i>Hollola, Ruoppa</i>	104	106	106	107	77
<i>Nastola, Mälkönen abstraction site</i>	200	210	213	220	195
<i>Atrazine levels in groundwater ($\mu\text{g}/\text{L}$) The limit value for any particular pesticide in household water is 0.1 $\mu\text{g}/\text{L}$.</i>					
<i>Lahti (HP137, trackside)</i>	1.2	1.8	2.6	3.15	3.7
<i>Nastola, Uusikylä (observation point GA1)</i>	1.0	0.8	0.3	0.3	0
<i>Groundwater areas classified as being in a poor state (%)</i>	29	29	26	26	23

There have been no major changes in water consumption over the last few years. The specific consumption figure includes water consumed by residents and industry as well as loss caused by leakage. The figures for Lahti include Nastola and the figures for Hollola include Hämeenkoski.

Water consumption (L/resident/day)	2014	2015	2016	2017	2018
<i>Lahti, specific consumption</i>	183	179	187	181	179
<i>Hollola, specific consumption</i>	150	150	153	158	155
<i>Nastola, specific consumption</i>	211	216	-	-	-
<i>Lahti, household consumption</i>	122	121	120	119	120

Future plans and challenges

- The effects of climate change on groundwater quality and quantity (the RAINMAN project).
- More efficient utilisation of modelling for the planning of groundwater protection.
- Expansion of the joint monitoring programme.
- Construction of the ring road below the groundwater surface level in Laune.
- Monitoring the impact of the new de-icing method on chloride levels in groundwater.
- Cleaning the groundwater areas that are in a poor chemical state
- The need for water supply network renovations will increase as the pipelines built during Lahti's years of rapid growth in the 1960s and 1970s will reach the end of their life cycle.



5 Water quality and recreational and natural values of lakes and

Lahti Environmental Services continued the maintenance of Lake Vesijärvi and smaller lakes as part of the Vesijärvi programme prepared together with the Vesijärvi Foundation. Lahti Environmental Services were responsible, among other things, for the management of fish stocks in the Vesijärvi and Kymijärvi lakes, oxygenation of Vesijärvi, water sampling in lakes and ditches, and the maintenance of ten automatic water quality monitoring stations. The management fishing catch from Vesijärvi and Kymijärvi totalled 129 tonnes, of which approximately 26.5 tonnes could be utilised. Bream was particularly used as raw material for fish steaks and roaches for the production of canned food. A permit application plan was prepared for stopping the regulation of Lake Iso-Kukkanen and for the restoration of the Kumianjoki river.

A rapids area on the Seestaanjoki river was restored. At the same time, a submerged dam at the head of the rapids was modified to enable fish to pass. After this, there are no known fish migration obstacles on the Seestaanjoki river.

A key project led by the University of Helsinki and funded by the Ministry of the Environment tested a novel application of hypolimnetic withdrawal in Lake Kymijärvi. Various reports were prepared in 2018 relating to the condition and loading of water bodies as well as their bottom feeder and fish populations. Populations of eel and trout were introduced to Lake Vesijärvi.

Storm water management is guided by the city's storm water programme, and its application is coordinated by the city's storm water working group. Measures related to the storm water key project were implemented in the Ranta-Kartano and Länsi-Hennala areas. This key project of the government programme for water and marine management is funded by the Ministry of the Environment. The AIKO-funded Hule Smart&Clean project, coordinated by the City of Lahti, developed new methods for storm water quality management in co-operation with cities, companies and universities. The quality of storm water was continuously monitored at two automatic monitoring stations in the Vesijärvi area.

Key figures for monitoring	Reference year	2014	2015	2016	2017	2018
<i>Lake water chlorophyll a, measured in August (µg/L)</i>						
<i>Vesijärvi, Lankiluoto in the Enonselkä Basin</i>	1995: 10	8.7	10	12	12	20
<i>Hollola, Arkionmaanjärvi</i>		4.6	3.2	5.0	4.9	4.8
<i>Nastola, Salajärvi</i>		9.5	8.1	8.9	8.4	7.9
<i>Lake water transparency measured in August (m)</i>						
<i>Vesijärvi, Enonselkä</i>	2001: 1,9	1.7	2.0	2.0	2.5	1.8
<i>Alasenjärvi</i>		3.0	-	4.0	3.0	2.7
<i>Hollola, Arkionmaanjärvi</i>		2.0	-	2.5	2.3	2.0
<i>Nastola, Salajärvi</i>		1.8	-	1.0	1.6	2.3
<i>Vesijärvi management fishing catch (tonnes/year)</i>	2001: 86	140	113	108	121	109
<i>Kymijärvi power plant's heating load into Vesijärvi (TJ)</i>	1995: 722	877.4	600	519	278	806
<i>Percentage of lakes in good or excellent condition (% of total lake surface area)</i>		11	11	11	11	11



Future plans and challenges

- *Reducing the external and internal load on Lake Vesijärvi.*
- *Planning a rehabilitation method for cutting down the internal load on Lake Kymijärvi.*
- *Achieving the target levels (good or excellent) outlined in the Water Framework Directive for all lakes.*
- *Decreasing the storm water load of Lahti city centre.*
- *Reducing the adverse effects caused by the excessive fluctuation of the water level of lakes in the Nastola area.*

6 Environmental counselling and citizens' opportunities for

In 2018, citizens of Lahti participated in the land use planning and commented on it. A total of 32 land use planning-related events were arranged for citizens of Lahti, with approximately 2,000 participants. Opportunities for participation were actively communicated through traditional means and social media alike. Many of the events could be followed through live tweets or video.

In spring, shopping centres around Lahti arranged a series of events called *My Everyday Places and Travel Experience*. At these events, 350 residents of Lahti described their travel as well as their experience of the everyday environment. In addition, over 500 residents of Lahti participated in a map survey. The information obtained has been used for the preparation of a draft City Plan and the Sustainable Urban Mobility Plan. The information will also be available later for more detailed planning through the geographic information system.

In 2018, the CitiCAP project arranged 17 events and three surveys. A total of 2,047 Lahti citizens were reached through the events and surveys. To invite citizens to participate, the organisers went to various everyday places, such as public transport vehicles, libraries and grocery stores. At the events, the organisers listened to citizens' views to find out what they were willing to do to reduce their personal carbon footprint. A further objective was to survey factors that might prevent citizens from performing pro-environmental acts. This information was used in the development of the Kulkukauppa emission trade pilot.

In 2018, events for residents were also arranged on themes such as additional construction projects in Lahti city centre, improvement of the Rakokivi shopping centre and planning of the new Ranta-Kartano area. Participants in the events were also asked about measures to adapt to climate change. The Siisti biitsi ('Clean beach') event on Enonsaari in May was arranged to clean the island's shores of plastic waste to prevent it from turning into microplastics.

Environmental education was continued in schools and day care centres. Geology theme was highlighted in the Geopark project, especially in kindergartens. As a result of the environmental education projects carried out by the project personnel, the number of children reached increased by approximately 45 per cent from the previous year. Altogether, environmental counselling physically reached 14,180 people in 2018 through various events.

PHJ and the Lahti 4H Association arranged composting courses in spring 2018.



Key figures for monitoring	Reference year	2013	2014	2015	2016	2017	2018
Number of environmental counselling events for residents	2001: 53	178	179	102	100	101	100
Number of environmental counselling events for children			136	117	158	207	289
Number of children reached by environmental counselling	2001: 2,750	2,652	3,602	3,197	4,660	4,823	7,000
Events for residents related to land use	2000: 49	15	20	21	24	27	32
Satisfaction percentage from resident questionnaires, Technical Services	2001: 70	69	71	71	69	70	-



Future plans and challenges

- Increasing the environmental know-how and responsibility of residents and the city personnel, particularly in climate issues.
- Open data and the associated opportunities.
- Supporting residents' activity.
- Informing people about good examples.
- Applying UNESCO Geopark status



7 Municipalities and municipal enterprises promote environmental responsibility throughout the region



Lahti Procurement Services prepared and published the new strategic Procurement Programme 2018. It focuses on innovative procurement and promoting the circular economy in procurement. In addition, a procurement working group was established to promote more versatile procurement criteria.

Päijät-Häme Catering Services particularly focused on offering new vegetarian options. The development of vegetarian recipes and increased variety in vegetarian dishes has encouraged customers to increasingly choose a vegetarian lunch. The story behind the food has a great significance for customers' meal choices. Customers want to know where their food comes from.

The popularity of takeaway food continues to grow. After the lunch hour, excess food can be bought to take away at an affordable price. This reduces food waste. The value achieved by Päijät-Häme Catering Services through the promotion of a sustainable food system in 2018 amounted to EUR 26,000. The price of a lunch was EUR 3.99.

Lahden Talot Group continued to apply an energy-efficient approach to new building projects and renovations. All new projects have been planned and implemented in energy class A or B as nearly zero energy buildings with energy consumption below 100 kWhE/occupied square metre/year.

The first MiniMoi! contest, encouraging residents to change their consumption habits and reduce their carbon footprint, ended in spring 2018. As a result of the contest, the CO₂ emissions of 96

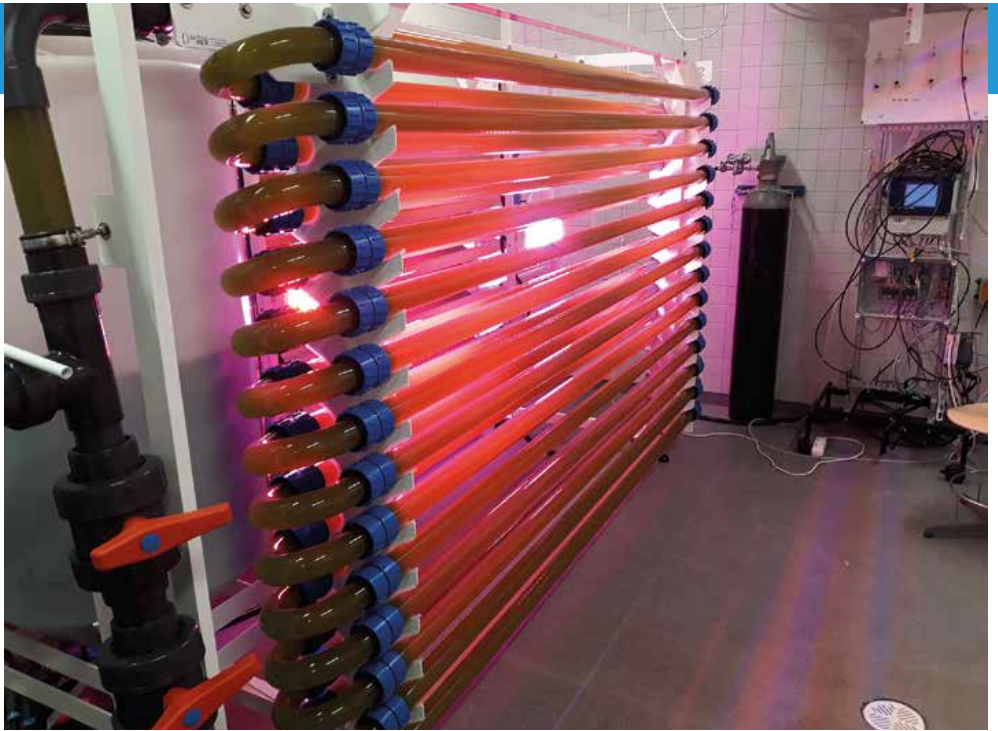
properties reduced by 4.7 per cent, or 652 tonnes, from the previous year. The amount of mixed waste included in the calculation of total emissions continued to decrease. The result, 19.3 litres/person/week is a clear improvement.

Environmental education and research in the region

LUT university has popular Master's programmes in Lahti. In the application round ending in January 2018, four Master's programmes attracted 1174 applicants. There were 125 study places in the Master's programmes starting autumn in 2018.

The year 2018 was characterised by the merging of LUT and LAMK at the turn of the year and the further expansion of LUT's activities in Lahti. In 2019, an amendment to the law changed the name of Lappeenranta University of Technology to Lappeenranta-Lahti University of Technology. And for the year 2019, the amount of Master's programmes rose to six.

The **University of Helsinki's** main branches of research in Lahti include aquatic and soil ecology, urban ecosystem studies, environmental microbiology, environmental biotechnology, exotoxicology and environmental chemistry. The circular economy has become a very relevant theme. Related training is included in the BSc degree programme in environmental science as well as various MSc programmes, primarily those in environmental change and global sustainability.





Environmental maintenance training provided by *Education Centre Salpaus* focuses on the maintenance, repair and condition assessment of various types of urban environments. Students can choose to specialise in repair and maintenance operations, waste management, water maintenance operations or environmental communication and counselling. Salpaus's Asikkala facility has been awarded a sustainable development certificate. A sustainable development working group relating to environmental education was established. It decides on sustainable development actions to be taken in accordance with the certificate. The indicators include, for example, electricity and water consumption as well as the amount of biowaste produced. These issues are also discussed as part of the education.

The new building project (7,900 m²) of the Salpaus joint municipal board, completed on Vipusenkatu in 2018, received Green Municipal Funding. The project has taken into account the energy efficiency and green values of the new buildings. The site has a geothermal heating system; the rest of the energy required is produced by solar panels and peak consumption is covered by district heating. The structural planning has implemented insulation that improves energy efficiency and provides insulation results that exceed the minimum requirements. Education Centre Salpaus uses the building technology and the technical facilities as a learning environment for environmentally friendly technology in heating, plumbing and air conditioning education. The next major learning environment renovation has begun on the Lahti City Centre campus.



Future plans and challenges

- *Implementation of the strategic procurement programme and training of personnel. Consideration of the ethical aspects of procurement.*
- *Promoting corporate environmental awareness and working for the climate through means such as the development of climate partnership activities.*
- *Utilisation of international visibility, such as the European Green Capital contest.*
- *In 2019, Salpaus started planning a joint environmental competence module for all Salpaus students as part of the common studies included in the degree programmes.*
- *Informing people about good examples.*

8 Environmental balance sheet

The financial statements of the City of Lahti for 2018 include a compilation of environmental indicators of the city and the City Corporate Group's area. Data for this environmental balance sheet has been collected from all the city's service sectors and functional balance sheet units. The Lahti Environmental Programme 2018 also includes indicators in euro that are monitored using the environmental balance sheet.

The City Corporate Group calculation includes, among others, Lahti Aqua Ltd, Lahti Energy Group, Päijät-Häme Waste Management Ltd and Lahden Talot Ltd. Environmental expenses for the entire City Group amounted to EUR 42.5 million and environmental income to EUR 34 million. Environmental investments amounted to EUR 16.5 million.

Hollola has not collected environmental balance sheet figures after the dissolution of the joint environmental unit.



Environmental balance sheet 2018 summary, EUR 000s	City of Lahti and balance sheet units			Lahti Group as a whole		
	Income	Expenses	Investments	Income	Expenses	Investments
1. Air and climate protection	90.5	133.2	15.2	90.5	5,295.2	5,116.2
2. Water protection and wastewater treatment	484.7	576.0	934.7	14,559.6	10,152.4	6,608.3
3. Waste management and litter prevention		1,568.8		18,978.0	23,753.0	2,919.0
4. Soil and groundwater protection	8.3	60.5	4.0	8.3	95.5	82.0
5. Noise and vibration abatement		7.7	50.0		23.7	50.0
6. Nature and landscape conservation	52.9	152.6		52.9	152.6	
7. Administrative functions related to environmental protection	364.9	1,261.0		364.9	1,261.0	
8. Promotion of environmental protection		6.7			296.1	1,732.0
9. Environmental taxes and levies		1 039.7			1 469.2	
TOTAL	1,001.3	4,806.1	1,003.9	34,054.2	42,498.7	16,507.4
Interest						
Environmental provisions					173.0	
Change in environmental provisions (addition -, reversal +)					-298.0	
Contingent environmental debt (estimated cost):					-298.0	

Please note: the classification does not match the sections in this review.



More information

Lahti Group Administration

Askonkatu 2, 15100 Lahti
Environmental Director Saara Vauramo, saara.vauramo@lahti.fi.
Edited by Sustainable Development Coordinator Eira Rosberg,
eira.rosberg-airaksinen@lahti.fi, tel. +358 44 416 3499

www.lahti.fi

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