



## Climate City Contract

# 2030 Climate Neutrality Action Plan

**2030 Climate Neutrality Action Plan of Helsinki**  
**August 2024**

**Helsinki**





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## Summary

### Textual element

The Climate City Contract Action plan is based on the Carbon Neutral Helsinki plan. The plan's mandate comes from the City Strategy 2021-25 (Helsinki- A place for Growth), which sets forth the future guidelines for Helsinki. The City Strategy is updated every council term and adapted by the city council. The strategy states: "Our goal is a carbon-neutral Helsinki that is able to not only meet its environmental objectives, but also act as an example, going beyond its part to play in responding to the crisis. We will zero in on the fastest measures for reaching carbon neutrality, and we will actively seek out big picture-oriented solutions that set us on the path to social justice. Environmentally friendly options will be made more readily available to residents. We will move our deadline for achieving carbon neutrality up five years to 2030 and renew our Carbon-neutral Helsinki Action Plan with measures to reduce construction and traffic emissions, in addition to other changes that are seen as necessary and feasible. A goal to attain carbon zero status by 2040 will also be set, and we will map out a series of scenarios for achieving this milestone. Helsinki will also start planning for a carbon-negative future." (Helsinki 2021).

The actions listed in this document have been approved by the decision-making process of Helsinki and added to the city budget. The actions are chosen on annual basis to enable faster development towards the target.

With the current development in the city and the investments in place by the city owned energy company Helen, it can already be forecasted with a level of certainty that Helsinki will achieve the 2030 goal of 80 % reduction of emissions from the 1990 levels. Therefore, most of the new actions in the plan concentrate on the reduction of transport emissions as that sector will be the biggest source of emissions in the coming years. There is a lot of on-going work in scenario development, large-scale impact assessment and citizen participation in the transport planning but as they have not yet gone through the political decision -making process in the city we cannot publish everything but have tried to give an overall picture of the work, plans and processes and will update this document when we have more public information.

The second large-scale work right now focuses on how to deal with residual emissions. In the last months the city has in collaboration with researchers and consultants produced three reports on the amount of carbon sinks in the city, the future of natural and technical sinks and the possibilities and challenges of compensation programs. These will also go through the political decision -making process and we can talk about them more after this fall. But the idea is to have enough data and understanding of the different possibilities and cost-analysis of each so that informed decisions can be made between additional emission reduction actions, compensation and/or increasing sinks.

\*) Helsinki's emissions in 1990 and 2008 were almost exactly the same: 1990 3514 kt co<sub>2e</sub> compared to 3521kt co<sub>2e</sub> in 2007. We use the year 1990 as the starting point because it has been approved by the city council in 2017.

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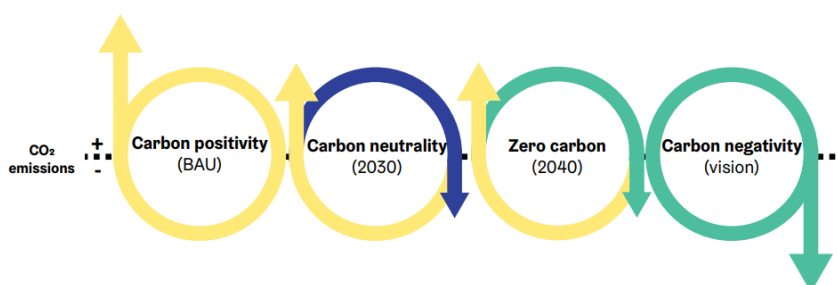
Introduction



**Introduction**

Helsinki states in its City Strategy 2021-25, set by the city council, that its goal is to be carbon neutral in 2030, net zero by 2040 and carbon negative after that<sup>1</sup>. In addition, Helsinki adapts to the changing climate and prepares for changes brought by climate change, for example extreme weather phenomena.

The City Strategy is the highest guiding plan and the city council the highest decision-making body in the city.



The city’s goal is to reduce the direct emissions of the reference year 1990 by at least 80 percent by 2030. But because the emission reduction in the first 18 years were insignificant if we’d use the reference year 2008 it would be almost the same- 1990 3514 kt co2e compared to 3521kt co2e in 2007. The pace has since really picked up, the emission reduction achieved by 2023 is 45 % and 60 % per capita as the city has grown significantly since 1990.

The remaining 20 % of the emissions can be compensated according to the city strategy. Helsinki is right now in the process of looking into how the residual emissions can alternatively be dealt with by carbon sinks in the city or by decreasing emissions further instead of compensation actions as there’s a lot of uncertainties with compensation regulation and programs.

The emission reduction plans cover the entire administrative territory of Helsinki.

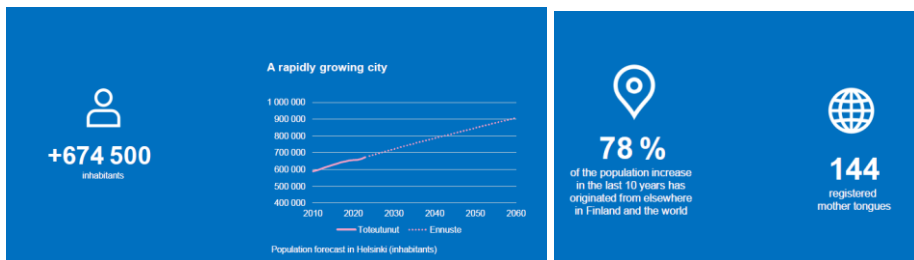
Helsinki is now in the second iteration of the climate plan. The first iteration (2017-2021) set the goal for carbon neutrality to 2035. A large stakeholder participation was organized with 9 workshops and over 300 people collaborating with an additional online tool for those who wanted to participate digitally. The ideas were analyzed and 147 actions were selected, a steering group to oversee the actions was established with participants from all city sectors, city owned companies and external members representing academia, companies and the state. The city also widened its collaboration with the business community through the Climate Partners partnership (established already in 2012) and shared networking events, ideation processes and pledges signed with over 100 companies.

<sup>1</sup> Glossary: *The carbon neutrality objective set for 2030 means that the City’s CO2 emissions must be decreased by 80% from the level of 1990 and the remaining 20% can be compensated for outside the city borders. When transitioning towards carbon zero, the CO2 emissions generated and sequestered by the City must be in balance within the city borders. In turn, carbon negativity means that emissions generated within the city borders must be lower than the City’s ability to sequester carbon through its own actions”*  
*Becoming ‘climate neutral’ means reducing greenhouse gas emissions as much as possible, but it also means compensating for any remaining emissions. This is how a net-zero emissions balance can be achieved. A net-zero emissions balance is achieved when the amount of greenhouse gas released into the atmosphere is neutralised. This can be done by carbon sequestration, i.e. by removing carbon from the atmosphere, or through offsetting measures, which typically involve supporting climate-oriented projects”.*



However, when the plan was analysed after the first four-year period it was clear that the actions were not sufficiently impactful for achieving carbon neutrality- only 6 out of the 147 actions directly cut emissions- and the second iteration was planned accordingly. Also the monitoring and governance model were adapted to drive change in a faster pace and the carbon neutrality goal was set to five years earlier, to 2030 in the new city council approved strategy for 2021-2025 period.

Helsinki is a rapidly growing city which sets challenges to carbon neutrality work, new houses have to be built in order to house the new inhabitants but while doing that the city doesn't want to lose its green areas which work both as a carbon sinks and as places of relaxation and enjoyment for the population. The population growth is coming mostly by people moving into the city which gives new opportunities and challenges to citizen and stakeholder engagement. For example the future transport scenarios are discussed with dedicated citizen panels that represent the population in the city.



Collaboration with Climate partners is still on-going but with more targeted agendas. The Climate Partners include Helen (the city owned energy company that is the main operator able to reduce emissions from heating), the Port of Helsinki but also over 100 other private companies.

**A note to reader about the logic of how this document is written**

Helsinki has been active and target oriented about achieving carbon neutrality for over ten years, it's been a journey of learning and iteration, from understanding which actions will deliver biggest emissions reduction to how to involve stakeholders, decision-makers and employees in the most impactful and inclusive ways. This document tries to tell the narrative of that journey in an understandable way but because of the layout of the template the storyline has to be picked up from the different sections a bit differently that we'd normally tell it. Therefore here's a few explanations to ease the reading experience.

The path to carbon neutrality by 2030 in Helsinki is quite clear, the investments done by the energy company Helen and the long-term investment plans by the city on major infrastructure work together with the impact-oriented action plan for carbon neutrality ensures that the target will be achieved with a 80-83 % reduction in emissions by 2030 from the 1990 level. The portfolio part of this document lists all the actions and investments that have been decided already, each action is presented with the content description, indicator, impact on emissions, cost effects, parties responsible, stakeholders and co-benefits. They are however not linked to barriers. In our understanding a barrier is something that obstructs or at least delays an action. So when the action is accepted by stakeholders as well as politically and financially it has overcome the barrier that formerly was there.

The impact pathways part of this document describes possible actions on the transport sector and residual emissions where decisions have not been made yet. These are linked to identified barriers as there isn't yet a political, financial or stakeholder consensus on the actions that can be taken. The barriers are linked to stakeholders that need to be part of the decision-making process. Some



of the barriers listed look beyond 2030 as a lot of climate planning work in Helsinki is already looking into achieving net zero and even carbon negativity.

It's also important for the reader to understand some specificities of Helsinki as a city. The city has a 6 bn euro budget with a 430.000 surplus and its finances are well taken care of with a long-term investment plan in place which the city self-finances. The city has 40.000 employees and is the biggest employer in Finland and takes care of most services to citizens, including education and health care. The local democracy is strong, 72 % of the people voted in the local elections for the city council. The city council consists of 85 representatives and is the highest decision-making power in the city. They also elect the mayors. The city council accepts the four-year city strategy that is the binding and guiding document for all important actions in the city. The carbon neutrality target for 2030 is set by the city strategy and thus its action plan has mandate over all divisions and employees of the city.

The 2030 carbon neutrality target covers scope 1 & 2 but the city has stated in the strategy that it will also target emissions from the construction sector as Helsinki also has quite a lot of power to act in it as it owns 63 % of the land and 20 % of the buildings in the city and has a planning monopoly, making it possible for the city to also steer and regulate the construction sector. The city also owns the energy company and Metropolitan transport ltd which constructs and operates all major transport infrastructure and both have set the same carbon neutrality target 2030.

When it comes to citizen engagement the city has a lot of both legal and voluntary commitments and actions embedded in the city systems and organisations which are explained in the chapter of systems, barriers and opportunities. There are many channels through which citizen engage with the city and vice versa but carbon neutrality specific social innovations and citizen engagement has been described in those chapters.

**Table I-1.1: Climate Neutrality Target by 2030**

Sectors	Scope 1	Scope 2	Scope 3
Stationary energy	Included	Included	
Transport	Included	Included	
Waste/wastewater	not included as reported regionally	Not applicable	
IPPU	Included but very little significance in Helsinki	Not applicable	
AFOLU	Not included -Very little significance in Helsinki	Not applicable	
Construction sector			Actions are included
Geographical boundary	Same as city administrative boundary		





# 1 Part A – Current State of Climate Action

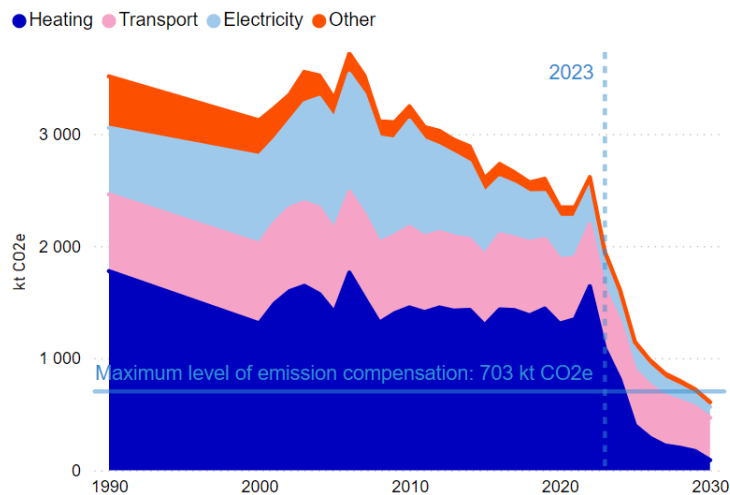
## 1.1 Module A-1 Greenhouse Gas Emissions Baseline Inventory

### GhG Emissions Baseline inventory

#### Total emissions

Helsinki's total direct emissions (kt CO<sub>2</sub>e) by sector in the year 1990 totalled 3,514 kt CO<sub>2</sub>e, which means that to reach the goal of carbon neutrality, at least 2,812 kt CO<sub>2</sub>e must be reduced. In the graphics below you can see achieved reductions for 2000–2023 and the forecast for the years 2024–2030 and the total emissions compensation target of maximum 20 per cent for the year 2030. The sectors are heating, ( which also includes oil heating), electricity consumption, transport and the other sector, which includes industrial and work machines, waste and agriculture.

#### The emission development by sector

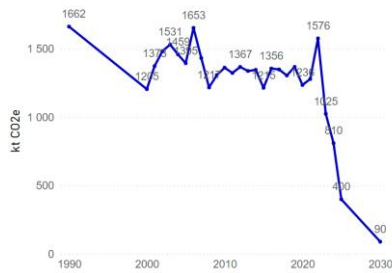


Source: HSY

#### Reduction of emissions from heating



The emissions from district heating



Source: HSY

Emissions by Helen (the city energy company)

A significant proportion of the emissions from heating in Helsinki (91%) comes from district heating consumption. ‘Heating energy’ includes district heating and oil heating, whereas electricity used for heating is included in electricity consumption.

As such, the specific emission factor for district heating production (an indicator in Helen’s development programme) (Helen= The Helsinki Energy company) heavily dominates the emissions development and most of the emission reduction from heating is being done through Helen in stages as stated in their carbon neutrality plan.

1) 2023: at least 40 per cent on the 1990 level

- The Hanasaari power plant will close and halve the use of coal. Helen will replace production with waste heat, sustainable bioenergy, energy storage, as well as nuclear, wind, and solar power.

2) 2024: at least 60 per cent on the 1990 level

- Helen will close the Salmisaari coal-fired power plant and end the use of coal. The company will make a move towards distributed heat production and a sustainable energy system.

3) 2025: at least 80 per cent on the 1990 level

- The heat production will consist mainly of heat pumps utilising waste and environmental heat, electric boilers, energy storage, and sustainable bioenergy. The electricity will be mainly produced with wind, nuclear, hydro, and solar power.

4) 2030: at least 95 per cent on the 1990 level

- Helen will further increase wind and solar power and the amount of non-combustion heat production especially with heat pump solutions. Helen will offset the remaining emissions.

The city also has additional actions for reducing emissions from heating

The energy efficiency of the city’s own building stock is improved, and the amount of renewable energy is increased every time the buildings are renovated, but also through separate energy efficiency renovations.

In the city’s own business premises, district heating will account for 98 per cent of heating in 2023. A small percentage of the buildings are still heated by oil or electricity, but in these properties, heating modes are constantly being upgraded to lower-emission options. The share of heat pumps is also increasing.

In new construction and renovation projects, the profitability of geothermal and air-to-water heat pumps is always assessed. A heat pump is always chosen as the main heating system if it is technically possible and economically viable. A heat pump system is selected in almost all new



construction projects, and in renovations, the share is somewhat lower due to the limitations of existing buildings and their plots.

Actions for privately owned homes

The City of Helsinki’s energy experts provide independent advice for housing companies that are interested in surveying how they could improve their energy efficiency and carry out a financially viable energy renovation. The services are provided by the Energy advisory team.

The City’s advice service is free and unbiased, intended for housing companies in Helsinki. Advice is provided in all stages of the renovation, from idea to implementation. The City’s energy experts can be invited to attend a board of directors meeting or general meeting of the housing company. The experts can also familiarise housing companies with different energy renovation options or present examples of other housing companies’ renovation successes.

Actions include :

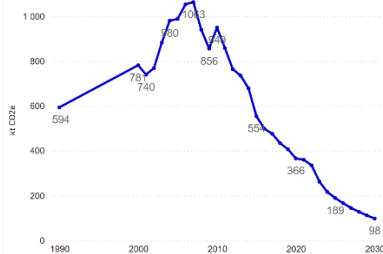
- Establishing what energy procedures are available and possible to the housing company
- Evaluating the energy efficiency survey and contract offers received by the housing company
- Building charging stations for electric cars

Housing companies are still responsible for the actual ordering, implementation and payment of energy efficiency surveys and renovations themselves.

This service has been very successful, with over 640 housing companies and over 19 000 apartments having gone through the renovations, heat pump installations being the most popular action. This has also created a 230 million euro market for private companies in the city.

**Emissions from electricity consumption**

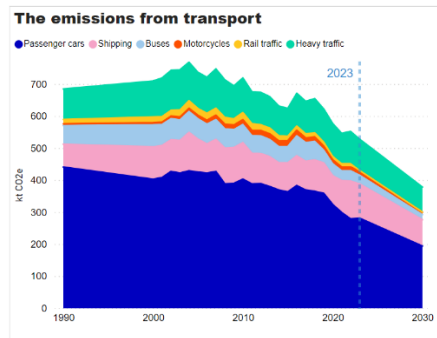
The emission from electricity consumption



Of the direct emissions in Helsinki, 13% come from the consumption of electricity. The emissions from electricity consumption are influenced by the amount of electricity used and the emission factor for electricity production. The emission factor for electricity production is currently decreasing rapidly even now, as much as 67% of electricity produced in Finland is CO2-free. However, electricity consumption will likely increase over time as vehicles and heating are being increasingly powered by electricity, but this increase in consumption will be compensated by the rapidly increasing share of CO2-free electricity production.



**Emissions from transport**



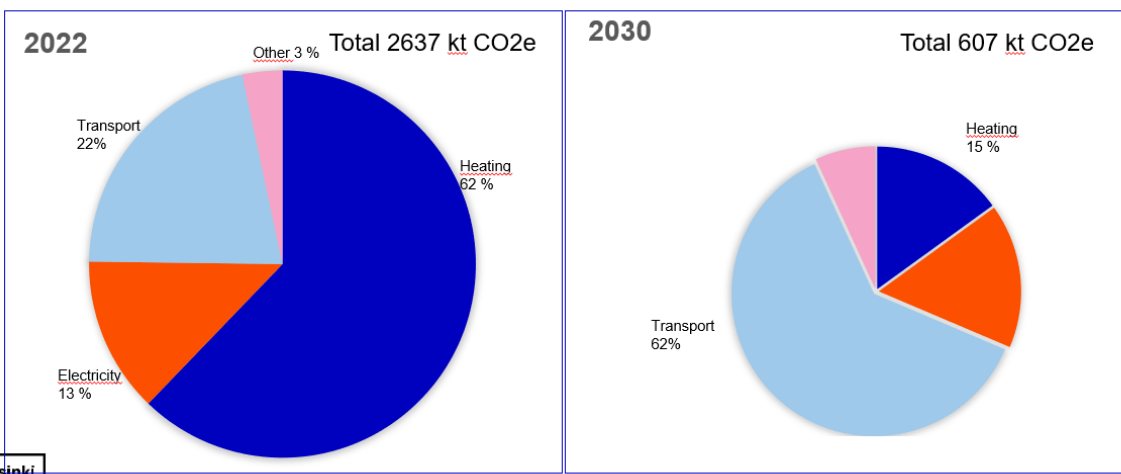
Source: HSY

The second-largest emissions sector in Helsinki is transport (22%). Emissions from transport are influenced not only by mileage, but also the specific emissions of the modes of transport used. Most transport emissions (58% in 2021) come from passenger car traffic, with heavy traffic accounting for 18%, buses for 6% and ship traffic for 16% (HSY 2022). As for mileage, the most impactful measure is reducing the volume of passenger car transport. The specific emissions of modes of transport can best be influenced by moving on to low-emission motive power. The total emissions from transport are already on the decrease, but development without additional actions will lead to a significantly lower emissions reduction than desired for transport by 2030.

Because of the actions and investments done by Helen and the resulting quick reduction of heating emissions transport will be the biggest source of emissions by 2030 (62 %). Therefore more actions in the field of transport are needed. As part of the Carbon-neutral Helsinki program, Helsinki is currently investigating what kinds of traffic reforms could be implemented in Helsinki in order to reduce traffic emissions faster than at present. The Helsinki Urban Environment committee will discuss the results of the analysis in the beginning of 2025.

Helsinki took many steps to reduce its traffic emissions in 2023. Helsinki Region Transport (HSL) achieved its target of 30 per cent electrification of the bus fleet ahead of schedule, and the new high-speed tram Raide-Jokeri started operating. A record number of tramway projects are being planned – over the next ten years, more than 30 kilometres of new tramway will operate in Helsinki.

The share of electric cars has also increased significantly in Helsinki. In 2023, the share of rechargeable cars was approximately 16.7 per cent of all cars actively in traffic, compared to 3.4 per cent in 2020





**A-1.1: Final energy use by source sectors**

Base year			
Unit	GWh in 2023		
	Scope 1	Scope 2	Scope 3
Buildings	6468	461	
(Fuel type/ energy used)	District Heat: coal, natural gas, waste heat, electricity, biomass)		
Transport	2541		
Electricity		3871	
Waste	104(covers the metropolitan area)		
Industrial Process and Product Use (IPPU)	57		
Agricultural, Forestry and Land Use (AFOLU)			

**A-1.3: Emission factors applied**

(Please specify for primary energy type and GHG emission factor according to methodology used).

For calculation in t or MWh of primary energy

The calculation of greenhouse gas emissions in the capital region is based on the international calculation standard Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC). The background is the methodology and calculation parameters of IPCC's national emission inventories and the emission coefficients of the fuel classification of Statistics Finland. The emission calculation takes into account the three most important greenhouse gases: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). The results are presented as carbon dioxide equivalents, whereby methane and nitrous oxide emissions are converted into an amount of carbon dioxide corresponding to their climate warming potential and added to carbon dioxide emissions. The focus of the calculation is on greenhouse gas emissions caused by energy consumption. The inventory includes emissions caused by the following activities in the capital region: heating of buildings, electricity consumption, traffic (car traffic, ports, local trains, trams and subways), waste and wastewater treatment, agriculture, and process emissions and fuels from industry and work machines. The scope of the calculation is scope 2 according to the GPC standard (energy emissions are calculated based on consumption; national grid electricity). The review does not include air traffic, ship traffic outside ports and nearby areas, or indirect emissions caused by food production and the manufacture of consumer goods (scope 3). The



calculation model was developed based on SYKE's and the Municipal Corporation's Kasvener model for the emission calculations of the Capital Region's Climate Strategy 2030 in 2007. After the publication of the strategy, the calculation was further changed regarding the calculation of the national emission factor for electric heating and electricity consumption. The method has been called the Hilma model, after the name of the climate strategy management group. The previous year's greenhouse gas emissions of the capital region's municipalities will be published in the spring, when the final road traffic data is available. This preliminary information is supplemented over the course of the year in small parts so that the final results are updated in connection with the next year's reporting.

Primary energy/energy source	Carbon Dioxide (CO <sub>2</sub> )	Methane (CH <sub>4</sub> )	Nitrous Oxide (N <sub>2</sub> O)	F-gases (hydrofluorocarbons and perfluorocarbons)	Sulphur hexafluoride (SF <sub>6</sub> )	Nitrogen trifluoride (NF <sub>3</sub> )
...	...	...	...	...	...	....
Please mark all gases accounted for in the inventory						

**Helsinki doesn't have separated information on these emissions.**

Base year 1990				
Unit co2e				
		Scope 1	Scope 2	Total
Buildings		1086	37	1123
Transport		528		528
Electricity			225	225
Waste		56		56
Industrial Process and Product Use (IPPU)		14		14
Agricultural, Forestry and Land Use (AFOLU)	Sources (positive emissions)	1		1
	Sinks (negative emissions)	70		70
Total		1615	262	1877



## 1.2 Module A-2 Current Policies and Strategies Assessment

### A-2.1: Description & assessment of policies

#### The main strategies and policy papers that guide carbon neutrality work in Helsinki are:

- 1) Helsinki City Strategy 2021-25 which states that 'We will move our deadline for achieving carbon neutrality up five years to 2030 and renew our Carbon-neutral Helsinki Action Plan with measures to reduce construction and traffic emissions, in addition to other changes that are seen as necessary and feasible.... A goal to attain carbon zero status by 2040 will also be set, and we will map out a series of scenarios for achieving this milestone. Helsinki will also start planning for a carbon-negative future. City decision-makers will consider the impact of all of their decisions from a climate perspective, regardless of the kind of operations in question. When it comes to building projects, energy solutions and transport, climate concerns will be front and centre. Our goal is a carbon-neutral Helsinki that is able to not only meet its environmental objectives, but also act as an example, going beyond its part to play in responding to the crisis. We will zero in on the fastest measures for reaching carbon neutrality, and we will actively seek out big picture oriented solutions that set us on the path to social justice. Environmentally friendly options will be made more readily available to residents.' The City Strategy is the highest guiding strategy and policy paper in the city set by the city council which is the highest decisions-making body in the city. (<https://www.hel.fi/static/kanslia/Julkaisut/2021/helsinki-city-strategy-2021-2025.pdf>) The specific actions are listed in part B of this document

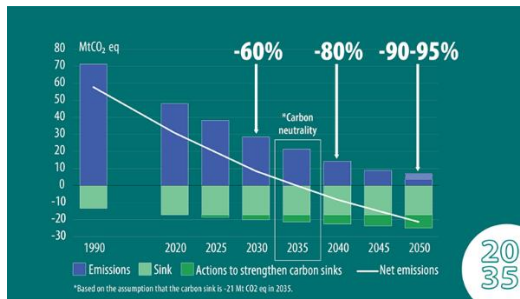
The City Strategy is the binding paper for the city and all departments have to follow the targets and policies stated in the strategy. This gives the carbon neutrality work in Helsinki its biggest mandate.

- 2) Helen's strategy 2023 which states: 'Helen has drawn up a new strategy, the core of which is to improve the flexibility of the energy system... The goal of carbon-neutral energy production by 2030 remains unchanged. In the short term, we will phase out the use of coal and invest in the production of renewable electricity. In the medium term, we will electrify our heat production, use biomass and seize new growth opportunities. In the long term, we will further increase the use of electricity in heat production and phase out combustion-based energy production by 2040' <https://www.helen.fi/en/about-us/helen-ltd/about-us/strategy> The specific actions are listed in part B of this document

The importance of Helen's strategy is very big for Helsinki's carbon neutrality target as currently emissions from heating are 62 % of the total scope 1 & 2 emissions in Helsinki. Helen's strategy has been evaluated for the city by an outside evaluator and the report states that the investment's made and those in the pipeline are solid and the city can trust that the heating emissions will go down as projected.

- 3) Finland's Carbon Neutrality Strategy 2035

According to the **government programme**, the Finnish Government is committed to meeting emission reduction targets and moving towards carbon neutrality in 2035 followed by carbon negativity. This is done through sector specific low carbon roadmaps (<https://www.climate2035.fi/>)



The national target is used to align policies and regulations, for example on construction-based emissions and transport emissions.

#### 4) EU targets

The EU is committed to reducing its net greenhouse gas emissions by at least 55 per cent by 2030, compared to 1990. This is also the commitment the EU has declared to the Secretariat of the UN Framework Convention on Climate Change for the purposes of the Paris Agreement. Finland’s obligation under EU law is to halve the effort sharing sector’s greenhouse gas emissions (non-ETS) by 2030 (from 2005 levels)

#### Other policies and programmes

##### 5) Helsinki City Environmental Protection Targets 2040

The environmental protection targets for 2040 are a part of the city’s overall sustainable development goals. The document combines the goals for ecological sustainability and sets long-term targets that are fundamental for carrying out environmental protection consistently. Helsinki’s environmental protection targets are based on the city’s environmental policy, which was adopted by the City Council on 26 September 2012 and again in 2024.

Targets have been set for under following sub-areas:

- Mitigating climate change
- Adapting to climate change
- Air protection
- Noise abatement
- Water protection
- Protecting biodiversity
- Soil protection and remediation of contaminated soil
- Promoting the circular and sharing economy
- Promoting responsible procurement
- Promoting environmental awareness and sustainability
- Environmental management

[https://www.hel.fi/static/kanslia/julkaisut/2024/HKI\\_Ymparistonsuojelun\\_tavoitteet\\_ENG\\_valmis\\_saav.pdf](https://www.hel.fi/static/kanslia/julkaisut/2024/HKI_Ymparistonsuojelun_tavoitteet_ENG_valmis_saav.pdf)

The environmental protection targets state the same as the carbon neutrality target but also that Helsinki will develop methodologies for calculating consumption-based emissions. And will at some point set a limit for them but there is not timeline set.

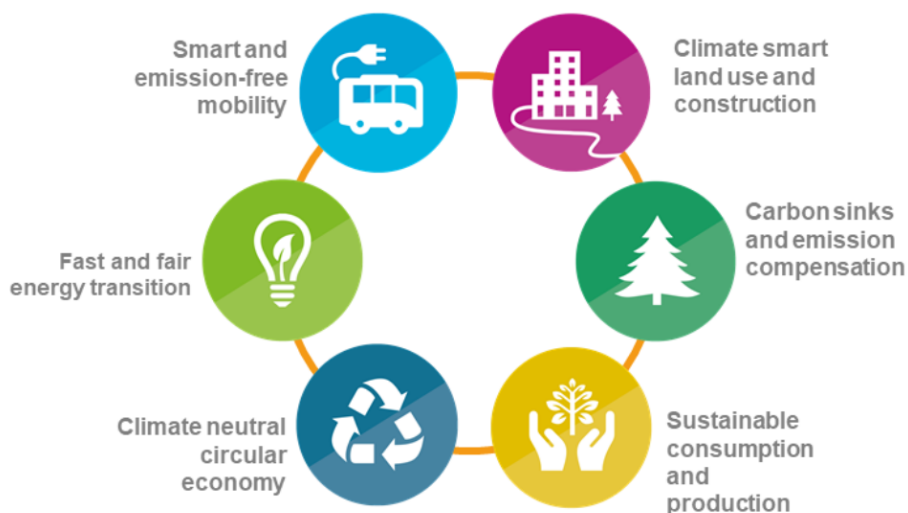




- 6) The City of Helsinki’s roadmap to circular and sharing economy states that the long-term goals is that the City will operate in a carbon-neutral circular economy by 2050. <https://circulareconomy.europa.eu/platform/sites/default/files/the-city-of-helsinkis-roadmap-for-circular-and-sharing-economy.pdf>
- 7) City of Helsinki Biodiversity Action Plan 2021–2028
- 8) City of Helsinki Nature Conservation Programme 2015–2024

The circular economy road maps states goals and actions for city procurement, for construction sector circularity and green waste. They are not binding but will help develop circular economy.

- 9) Helsinki- Uusimaa Regional Council Climate Roadmap <https://uudenmaanliitto.fi/en/development-and-planning/helsinki-uusimaa-regional-climate-roadmap/8>



The regional policies help set regional transport goals as the public transport is run by a regional company. The same goes for waste management and regional land use planning. Otherwise regions are not very powerful in the Finnish system when compared to municipalities and the state

- 10) SUMP Helsinki from 2017 <https://dev.hel.fi/paatokset/media/att/4f/4f73f78c1516bef6717a30401146fb12d34e5bf9.pdf> (only in Finnish)

- 11) SECAP Helsinki  
Helsinki committed to the 2018 Global Covenant of Mayors for Climate and Energy (GCoM), the world's largest urban climate commitment. The commitment requires a Sustainable Energy and Climate Action Plan (SECAP) in accordance with the eligibility requirements of the GCoM Reporting Guidelines set out in this document. Helsinki's urban strategy 2017–2021 outlines that the city will achieve carbon neutrality by 2035, reducing emissions by at least 60 per cent by 2030 and by at least 80 per cent by 2035. Emission reduction work is guided by the Carbon Neutral Helsinki 2035 Operational Program (HNN Program) and adaptation work by the guidelines for adaptation to climate change, which serve as the



starting point for the SECAP action plan. The City Government approved Helsinki's guidelines for adapting to climate change in May 2019. The guidelines are a plan by which Helsinki can adapt to climate change. Helsinki had previously included adaptation measures in various programs and created tools (eg. stormwater program, green roof guidelines, green factor tool). Helsinki has also implemented the guidelines of the Helsinki Metropolitan Area's joint strategy for adaptation to climate change in its own work. The SECAP plan has been approved and its refinement and implementation is monitored annually by the City Board. The implementation and refinement of the plan will also be reported every two years to the Global Covenant of Mayors European Monitoring System

Helsinki has committed to GCoM SECAP plan but as the targets for Helsinki have since been tightened with the new target year 2030 this document is not so relevant anymore.

Several other reports can be found here [Reports | Climate work in Helsinki | City of Helsinki](#)

Altogether these strategies and plans, and especially the first two, are the basis for Helsinki to reach the target of carbon neutrality. As stated in the above sections these plans will decrease Helsinki's emissions by 80-83 % by 2030 and the rest (around 630-700kt) will be solved later by either additional actions, carbon sinks or compensation.

## Helsinki has made a BAU model for 2050

and earlier a transport BAU model for 2030 and 2040 [liikenteen-kasvihuonekaasupaastot-raportti.pdf \(hel.fi\)](#)- only in Finnish

*The report describes the emission sources and sinks for the following emission sectors:*

- heating of buildings,
- electricity consumption,
- transport,
- industry,
- agriculture and forestry,
- waste management,
- other indirect emissions,
- carbon sinks associated with land use.

The report covers direct emissions occurring within the geographical area of the city and indirect emissions caused by activities taking place within the city boundary. Indirect emissions are the result of activities taking place within the city boundary, however, they occur outside the city boundary.

For the legislation in force and the climate actions, the main baseline data for the BAU scenario are:

- The share of the energy content of biofuels from the total energy content of petrol, diesel and biofuels supplied by the distributor must be increased to 30% in 2029 (the distribution obligation).
- The share of biofuel in light fuel oil supplied for consumption will be 10% in 2028 and beyond (the distribution obligation of biofuels).
- The use of coal as a power source for electricity or heat production by power plants and heating plants will be banned in 2029
- Helen Ltd's development programme and any ongoing and planned projects to replace the use of coal with other fuels.
- Helsinki City Plan (master plan)2016 (City of Helsinki 2018), which promotes a densifying urban structure and infill development. No supplementary construction is expected in



planning areas that are not covered by the city plan (Östersundom) or in areas where elements of the plan have been removed. The relevant pending local master plans may change the situation from the estimates of this report.

- Decisions taken on future transport network development projects: Raide-Jokeri, Crown Bridges, Vihdintie light railway, the Pasila–Kalasatama tram line and Sörnäinen tunnel.

The baseline for the scenario does not include objectives or draft resolutions. This means, for example, that the Government resolution on reducing greenhouse gas emissions from air transport (Government 2021), or the draft resolutions on the green public procurement criteria for building work (see Ministry of the Environment 2019) or the emission cap-and trade system for maritime transport (see Honkatukia et al. 2021) have not been used as baseline data for the scenario. The scenarios also take into account three different possible scenarios for how the population of Helsinki will grow, scenarios of the development of jobs in Helsinki.

In addition to the development within the city, the formulation of a long-term outlook for emissions must make baseline assumptions about national and global market trends. For these assumptions, this work is primarily based on the WEM (With Existing Measures) scenario of the National Climate and Energy Strategy and its impact assessment (Koljonen et al. 2021), sector-specific climate roadmaps (Paloneva and Takamäki 2020) and, in the case of indirect emissions, also on the scenarios of measures decided by international organisations (ECAC, IEA, IMO). The models used in the work are PAS 2070 (BIS 2014a), U.S Community Protocol for Greenhouse Gas Emissions (ICLEI 2019) and GPC Version 1.1 (WRI 2021)

Many calculation models are used around the world to calculate the greenhouse gas emissions of cities. The calculation model used in this study combines the approaches of PAS 2070 (BIS 2014a), the U.S Community Protocol for Greenhouse Gas Emissions (ICLEI 2019) and GPC Version 1.1 (WRI 2021) for assessing city greenhouse gas emissions, which take into account both indirect emissions of a city or urban area as well as the direct regional emissions. With regard to emissions generated within a set geographical area, the principles of the calculation model are similar to those applied in previous analyses of emission scenarios carried out in Finland (Lounasheimo 2015, Huuska et al. 2017, Karhinen and Lounasheimo 2021). The activity data and emission factors are assessed separately to implement the calculation. The method of calculation is a simplified version of current emission inventories. Further sources of data on BAU scenario analyses and inter-city comparisons include the Hilma calculation model of Helsinki Region Environmental Services Authority (HSY 2022) and the ALas model for municipal emissions (Lounasheimo 2020) regarding geographic boundaries, and the Kulma (Liljeström et al. 2021) and ALasKulutus (Karhinen et al. 2023) calculation models for consumption-based emissions.

The starting point for the calculation model is the establishment of geographic boundaries as described above. The calculation of GHG emissions for each cross-section year is based on an assessment of the development of the activity data and the emission factors associated with the

$$GHG\ emissions = Activity\ data \times Emission\ factor$$

activity measured:

The amount of GHG emissions is reported in carbon dioxide equivalents (CO<sub>2</sub>e), a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), which describes the relative potency of a greenhouse gas, taking account of how long it remains active in the atmosphere. Activity data are a quantitative measure of a level of activity that results in GHG emissions (e.g., energy used in buildings or kilometres driven). The activity is assessed on the basis of statistical data and other sources, based on the measures of a BAU scenario and the city's general population and employment projections. Demographic development and the related construction, transportation and consumption have the greatest impact on the quantity of activity data. The emission factor converts the activity into carbon dioxide equivalents (CO<sub>2</sub>e)



expressed in weight (e.g., emissions per vehicle-kilometres travelled). Emission factors may be activity-based or life cycle-based (WRI 2013, WRI 2021): – Activity-based emission factors describe the amount of greenhouse gases (GHG) emitted during a specific activity (e.g., fuel combustion during use). Activity-based emission factors are used to calculate scope 1 and scope 2 emissions. Life cycle-based emission factors include all the emissions that occur in the life cycle of a material or fuel (production, transport, combustion). Life cycle-based emission factors are used to calculate scope 3 emissions. With regard to carbon dioxide, bio-based fuels have zero emissions in the calculations. Almost the same amount of CO<sub>2</sub> is considered to be captured by plants through photosynthesis while growing as is released during biomass combustion, which can make biomass a carbon-neutral source of energy. The production of biofuels and noncarbon emissions are nonetheless taken into account as a source of emissions.

Emissions by sector

Table 1. Breakdown by sector of the emission sources included in the report. The items shown in brackets are not covered by the calculation model, typically due to the sub-sectors being accounted for elsewhere.

Sector	Sub-sector	Content	Scope
Energy use of fuels	Heating of buildings	Emissions from district heating of buildings	1
		Fuels used for separate heating of buildings	1
	Electricity consumption	Electric heating	2
		Other electricity consumption	2
	Other stationary sources of emissions	Fuel combustion in construction	1
Fuel combustion in manufacturing industries		1	
Indirect emissions from fuels	Emissions from fuel production	3	
Transportation	Road transport	Direct emissions from road traffic within the city	1
		<i>(Electricity consumption by road and railway transport is described under "Electricity consumption")</i>	(2)
		Emissions from road traffic outside the city resulting from cross-border journeys	3
	Aviation and water transport	Emissions from journeys departing from the airport, with a sub-sector for journeys starting inside the city boundaries	3
Emissions from journeys departing from harbours, with a sub-sector for journeys starting inside the city boundaries <i>(Freight transport by air and water is described under "Other indirect emissions")</i>		3 (3)	
Manufacturing industries	Industrial processes	Emissions from product use in industrial processes (solvents, propellants, coolants)	1
Agriculture and land use	Agriculture	Agricultural emissions from enteric fermentation, cropland and manure treatment	1
	Carbon sinks	Carbon stock changes and carbon sinks as a result of land use changes <i>Changes in carbon stock resulting from using biomass as a source of energy</i>	1 (3)
Waste	Waste	Emissions from wastewater treatment	1
		Emissions from landfill waste	2
		Composting of biowaste and sewage sludge	2
Other indirect emissions	Food consumption	Emissions from food consumed in the city	3
	Building materials	Emissions from building materials used in the construction of buildings and infrastructure	3
	Other consumption	Emissions from other services and goods consumed in the city	3

Here is a short summary of the BAU scenarios based on the above criteria plus additional criteria for each sector- you can read the detailed descriptions in the report.

Heating

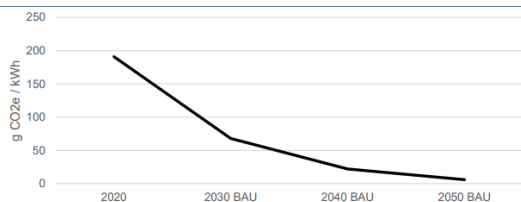


Figure 5. The projected specific CO2 emissions of district heating from the current state to 2050.

The calculation model for the use of energy for the heating of buildings is based on building stock development (floor area, heat sources), energy consumption for the heating of buildings and the specific CO2 emissions of building heat sources (Table 2). The specific CO2 emissions of district heating are especially important as most of the energy used to heat buildings in Helsinki is generated and distributed through the district heat network. The heating energy consumption of the building stock decreases due to the energy efficiency of new construction, renovating the old building stock and climate change.

Energy consumption	2020	BAU 2030	BAU 2050
<b>Building stock</b>		Helsinki City Plan 2016	
<b>Heat sources of buildings</b>	Building and Dwelling Register statistics	Geothermal heat becomes more common. Elimination of oil heating and direct electric heating by 2050	
<b>Consumption of heating energy</b>	Consumption data on city-owned buildings	The impact of renovation construction on the existing building stock, the energy efficiency of new construction and the impact of global warming	
Specific CO2 emissions			
<b>District heating</b>	Energy statistics (HSY 2022)	Replacing coal in heat production by 2029	Replacing the use of natural gas with heat pumps and biofuels

From 2030 onwards, the projected specific CO2 emissions are not based on a plan of action but on general assumptions about the future trends of district heat production. Of the energy sources in use in 2030, the proportion of natural gas is assumed to decrease to zero according to Finnish Energy's low-carbon roadmap (Afry 2020). The energy sources to replace natural gas are assumed to be high-capacity heat pumps, in which case the use of wood-based fuels would not increase from the 2030 level. In the long-term scenario of Finnish Energy's low-carbon roadmap, geothermal energy and other new heat sources are also expected to be put into use.

Scenario baseline assumptions for the BAU scenario for electricity consumption is based on changes in the consumption of the residential, industrial and service sectors and the future trends of the national specific CO2 emission factor of electricity. Residential sector electricity consumption includes forecasts on the use of electricity for heating, transport and other electricity use by households (Figure 7): – The use of electricity for heating is estimated as part of the consumption of heating energy. The scenario takes into account the growth of the building stock floor area, geothermal heat becoming more common as a heat source in buildings and heat pumps in district heat production. – The projected emissions of transport include an estimation of the use of electricity in transport. The scenario factors in changes in traffic volumes, the proliferation of electric cars and the expansion of the rail network. – Other electricity use by households includes cooking, lighting and other electrical devices. Other electricity use is expected to increase in relation to population change. Emissions from electricity generation decrease sharply (Figure 8). The emissions from electricity consumption are calculated using a national source-specific emission factor. The current specific CO2 emissions of



electricity have been determined with Statistics Finland’s average emission factor for electricity generation (Statistics Finland 2021), and long-term development has been estimated according to the base case scenario of Finnish Energy’s low-carbon roadmap (Afray 2020, pp. 12–13). In the emission factors, the emissions from cogeneration have been distributed with a benefit sharing mechanism. The assumption is that electricity generation will change so that the use of coal will end by 2030, and the use of natural gas and peat by 2050. The same source-specific emission factor is applied in the calculation of emissions from electricity use for heating and electricity end-use consumption. Emissions from electricity consumption decrease sharply from the current state due to the reduction in the specific CO<sub>2</sub> emissions of electricity generation (Figure 9). Electricity consumption as a whole will grow by about 1% per year until 2050, mainly due to the electrification of heating and transport, as well as the electricity consumption of services. There is high uncertainty associated with electricity consumption in the services and industrial sectors, in which energy efficiency has not been assumed to improve

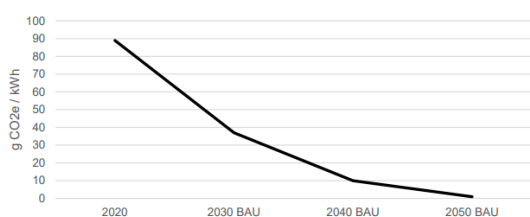


Figure 8. Specific CO<sub>2</sub> emissions of electricity generation from current state to 2050.

### Transport emissions

The BAU scenario for road transport is based on projections of traffic performance measured in kilometres travelled, change in the power source of vehicles, the distribution obligation of biofuels and specific CO<sub>2</sub> emissions of fuels. The baseline assumptions are presented below (Table 5). The kilometres travelled have been estimated by mode of transport on the basis of the data produced using the Helsinki Region Transport forecast model (Supponen and Kyytsönen 2022). The traffic volume trends take into account new land use as suggested in the city plan and any transport development projects approved for implementation at the time of making the calculations. Emissions from road transport decrease due to a strong reduction in specific CO<sub>2</sub> emissions although the number of kilometres travelled increases. The reduction in the specific CO<sub>2</sub> emissions of road transport is especially due to the electrification of transport and the impact of the distribution obligation of biofuels.

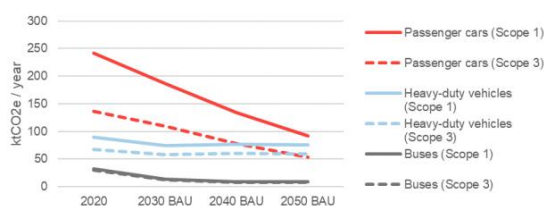


Figure 14. The BAU scenario for emissions from road transport from current state to 2050.

You can see similar projections for air traffic, waste, industry, agriculture, food, construction and goods in the report [BAU Scenario for the City of Helsinki’s Emissions up to 2050: Report](#)

The BAU scenarios were published in February 2023 and some of the documents and plans it used have since changed. The new national government from April 2023, although not changing the carbon neutrality goal of 2035 for Finland, nonetheless decreased actions and changed policies. The



changes will especially weaken the actions on the transport sector especially with the diminished target for the distribution obligations. Therefore the calculations in the next table can not be completely accurate with the transport sector when it comes to BAU and the Helsinki actin plan.

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2030 Climate Neutrality Action Plan



Table A2.1											
	(1) Baseline emissions	(2) Emissions Reduction Target 2030		(3) Emission reduction through other Action Plans		(4) Emissions Gap		(5) Emissions reduction through the CCC Action Plan to address the Gap		(6) Residual emissions	
	Baseline emissions (ideally not older than 2018) - referring to the inventory used for target setting	The emissions reduction target for 2030 ideally achieves a minimum 80% reduction from the baseline, as reported in Section 2 of the Commitments document of the CCC. The overall target should be absolute or net-zero (i.e. including the compensation of any residual emissions).  *)		These are the emissions reductions that would be achieved through existing policies, and plans, outlined in Section A-2.1. Those actions are by definition not part of the action portfolio in section B. If they are fully or partially incorporated in module B-2, their associated reduction potential should be referenced in column (5) and not be included here.  WARNING if the baseline is a BAU scenario: If the BAU modelling includes any of these existing measures, please also do not include the associated emissions reduction in this column as otherwise it would be double counted.  XX		(4) = (2) – (3)		This column is used to present the already quantified emission reduction associated with the action portfolios outlined in module B-2. Ideally, this equals the gap. If there is a difference between the reduction potential of the actions specified in module B-2 (for instance because their reduction potential has not been fully estimated or because additional measures will be identified in future iterations), the CCC AP should be explicit about this difference and explain how the difference will be closed. In principle, as long as the difference has not been addressed, it would be considered as part of the residual emissions.		(6) = (1) – (2)	
	kt co2e/y	(absolute)	(%)	(absolute)	(%)	(absolute)	(%)	(absolute)	(%)	(absolute)	(%)
Buildings-heating	1316 kt co2e	1052 kt co2e	80	896 kt co2e	68%	420	32	330 kt co2e	25	90 kt co2e	7
Electricity	941 kt co2e	752 kt co2e	80	766 kt co2e	81%	175	81	77 kt co2e	8	98 kt co2e	10
Transport	713 kt co2e	570 kt co2e	80	433 kt co2e	61%	280	61	-90 kt co2e	12	370 kt co2e	48
Waste , agriculture and industry =other	148 kt co2e/y	114 kt co2e/y	80	89 kt co2e	60%	59	40	49 kt co2e	33	41	27







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## 1.3 Module A-3 Systemic Barriers and Opportunities to 2030 Climate Neutrality

### A-3.1: Description of urban systems, systemic barriers, and opportunities

As the main sectors of scope 1 & 2 emissions in Helsinki are heating, electricity and transport the systems analysis will cover those in more detail. But first some more general descriptions of systems that influence the climate work in Helsinki.

#### **Stakeholders and Climate Governance**

As stated earlier this is the second iteration of the carbon neutrality plan in Helsinki. The second, improved iteration, is based largely on the principle of achieving the biggest possible impact on emissions with targeted actions where they matter most.

#### **Principles of the emissions reduction plan**

Because the city is operating on a tight schedule and with limited resources, the effectiveness of the all actions is a priority. The action plans' additionality ensures that resources in the plan are allocated primarily to actions that are not already a part of other workplans in the city or actions that are being done elsewhere. This plan will only include such actions that would not be realized without the support of the plan. The definition of the actions is tied to sector-specific scenarios for direct emissions. With them, the city can ensure that the gap between the BAU development and emissions reduction target is bridged. The actions are divided into three categories based on the effectiveness of the emissions reductions.

1. Actions that reduce emissions: the action has a direct impact on the sectors selected as focal areas; most new actions will be in this category.
2. Required actions that facilitate emissions reduction: the action is a prerequisite for implementing the category 1 actions, even though the action itself does not involve a direct impact on the emissions reductions.
3. Surveys to determine new emissions reduction actions: the actions require additional preparation or studies

The effectiveness of emissions reductions will be defined for category 1 actions that promote direct emissions reductions. For category 2 and 3 actions, the effectiveness is not calculated, as they have an indirect impact on the emissions reductions.



**The distribution of the actions' emissions categorisation**

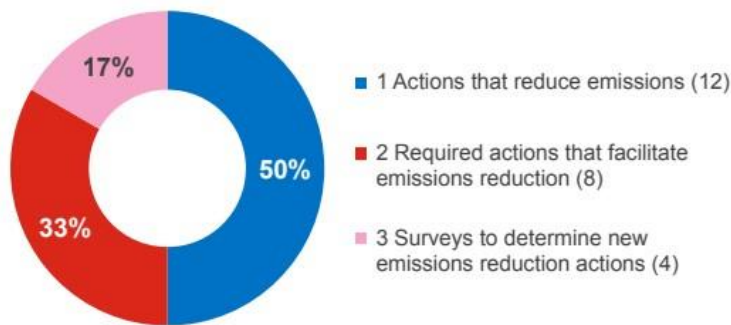


Figure 8. The distribution of the actions' emissions categorisation for both the previous actions and the new actions proposed.

**Overall governance for the carbon neutrality plan**

The Climate Unit is in charge of the coordination, updates, monitoring and continuous development of the Carbon Neutral Helsinki Action plan. “Ambitious climate responsibility, and the “Carbon Neutral Helsinki Action Plan” as a part of it, is one of the City’s four cross administrative strategic programs. The work will be directed by a program group chaired by the mayor.

To ensure the implementation and impact of the actions agreed on and to prevent delays, a Carbon Neutral Helsinki coordination group is formed of the managers in the City organisation who hold decision-making power in the plan’s focus areas. The group is chaired by the City Manager (the highest city servant in the city). The group streamlines the steering of all implementing organisations and monitor the progress of the actions. The steering of the companies owned by the Helsinki City Group is done through Helsinki City Group steering group according to the regulation of the city.

The “Ambitious Climate Responsibility program group” that oversees the carbon neutrality program and the operative “Carbon Neutral Helsinki group” will report on achieved impact to the City Board every autumn, about 6 months before the closing of the city accounts. The reporting will pay special attention to the progress of actions and suggest additional actions when they are needed. The actions in the emissions reduction plan will be updated annually and approved as part of the city’s budget proposal. In connection with this, reports will also be submitted for the realised emissions development by sector and the estimated impact of new actions proposed on future emissions development. In connection with the update, the city will ensure that the new additional actions will support the achievement of the emissions reduction target even if the city has fallen behind on target in the previous periods. This approach corresponds, where relevant to the method used by the City of Oslo called the climate budget.

Actions that influence direct emissions and that are carried out as a part of official work have not been included in the Carbon Neutral Helsinki Action Plan. Also, actions related to indirect emissions have mainly been excluded. They will be supported and monitored through the Environment and Climate Network coordinated by the Environmental Management Team and the Climate Unit of the City’s Urban Environment Division. The network includes experts that are responsible for environmental and climate related work in public divisions and enterprises. HSY will be the primary operator to carry out consumption-related influencing and communication directed at residents, based on the City’s strategic steering. The first Carbon Neutral Helsinki Action Plan (City of Helsinki 2018) included many actions that focused on indirect emissions. Some actions were completed during the first period of the plan. Some actions were integrated into other operations, and their implementation will continue as a part of ordinary official work. The actions that require separate



resourcing and where the implementation is still underway have been transferred to the City's other action plans where relevant. In accordance with the existing ownership strategies, most of the City's subsidiary communities have prepared or are about to prepare carbon neutrality plans, through which they can contribute to the City's carbon neutrality objectives. In the new City Strategy, A Place for Growth (City of Helsinki 2021), it is stated that the energy company Helen must update its own development programme (which they have done in 2024). In addition to this, the Port of Helsinki Ltd (2022), Helsinki City Housing Company Ltd Heka (2022) and Metropolitan Area Transport Ltd (2022) all have their own emissions reduction plans.

#### **Governance and ecosystem management for heating**

Helen, the energy company is a big stakeholder in the plan. Helen Ltd is a company owned by the City of Helsinki and its administration is based on the Limited Liability Companies Act, the Articles of Association, the ownership strategy and the group policy of the City of Helsinki. Helen has the same carbon neutrality goal as the city and are committed to it.

The city owned building stock (about 20 % of all buildings in the city) has its own programs for energy efficiency.

While district heating covers over 90 % of residential buildings in Helsinki there is a slowly growing number of houses that have chosen to install heat pumps. The city has an advisory guidance group for helping housing companies with this change. They also give information about the private renovation companies that can install heat pumps, do other energy efficiency renovations or install e-charging for the lot. Before this year the state also gave subsidies for these renovations.

#### **Governance and ecosystem management for transport**

In the transport sector there are a lot more stakeholders than in the heating sector. First of all, politically it's more difficult to find a consensus, secondly there are a lot of very vocal citizens both for and against any actions that might restrict private car usage or make it more expensive due to parking, road tolls or environmental zones. Thirdly there are many lobbies and interest groups representing inner city commercial interests or the freedom associated with being able to drive easily and quickly anywhere. Fourthly the neighbouring cities want to keep access of driving into Helsinki as cheap and easy as possible. Fifthly there are different commercial interests from companies from the parking companies to e-charging companies. Sixthly many of the decisions are closely linked to the state and their transport policies. Seventhly Helsinki is a port city with a large seaside area and the harbour traffic of big ships and the leisure boat companies deal with very different challenges and resources. Eighthly there's heavy transport and logistics, both the traffic from the ports with trucks and the logistics of the city commerce have different needs and solutions.

All of these aspects fall under the carbon neutrality target. As will be described in section B1.1. there's a scenario work with large scale impact assessment with expert and stakeholder work, including a citizen panel process going on in Helsinki. The political decision-making process will start later this year and will cover most of the aspects mentioned above.

#### **Governance and ecosystem management for electricity**

Finland is part of the Nordic wholesale electricity market, which covers the Nordic countries and the Baltic States. Some 70 per cent of the wholesale trade in electricity takes place in the power exchange located in Oslo. The electricity market is becoming European-wide. Market liberalisation and the Nordic market integration have increased productivity and environmental efficiency, as the Nordic hydropower capacity can now be utilised efficiently, and the market also allows for trading in "green" energy.

As the electricity is becoming green through the market there is very little need to do anything about it.

#### **Governance and ecosystem management for built environment**

The built environment is mostly scope 3 emissions but since the city of Helsinki has quite a lot of power to act on that sector, a lot of measures to reduce emissions have been taken.

The city owns about 63 % of the land in Helsinki, 20 % of the buildings, 1/6 of the residents live in city owned houses and the city has a planning monopoly. The city is also growing rapidly and about 8000 new apartments are needed every year. This means that there's (usually) a lot of construction going on both in the residential building area but also for facilities, like schools, kindergartens, hospitals and infrastructure like new fast tram lines and bike lanes.



There are different ways the city has regulated and guided the construction sector from demanding stricter energy efficiency or use of lower emissions materials to banning the use of lime cement. The city also uses plot conveyance conditions for implementing more e-charging and other measures that help with transport or other emission reductions. The overall regulatory framework for construction is the life cycle limit for emissions on all new residential buildings. This is way ahead of the national regulation and it's been done in collaboration with the construction companies through dialogue and a competition. The main idea behind the lifecycle limit is that it enables the market to develop innovations and doesn't limit it to certain materials or heating systems or worksite processes, but each entity can combine different solutions as long as they stay under the lifecycle limit. This approach has been welcomed by the industry as its very clear but leaves room for different approaches.

### **Governance and ecosystem management for circular economy**

The action plan for circular economy places a lot of emphasis on creating platforms for different companies to collaborate with the city and each other. Since the City of Helsinki has a strong role as a client, a real estate developer and a constructor, the Circular Economy Cluster Program focuses especially on promoting circularity in the construction sector. Achieving a circular economy requires the whole sector to contribute, but there is still a shortage of know-how. The cluster program offers experimentation with new things, research-based information and the sharing of lessons learned. The Circular Economy Cluster Program supports practical experiments and cooperation between operators and helps find new business opportunities. Activities involve, e.g. designing for the circular economy, extending the life cycle, dismantling intact and reusing materials and building components, there's also innovation competition and student collaboration.

### **Other collaboration with stakeholders**

#### **Sustainability partners network (formerly called Climate partners)**

Helsinki has since 2012 organized a collaboration network of over 100 companies that aims for local businesses to participate in making Helsinki carbon-neutral and more sustainable in every way. The main objective is to have joint development work, extend the network and create a more unified understanding of various collaboration methods and innovative projects.

- Encourage Helsinki area-based companies to sustainability work and enable more shared activities to reduce emissions.
- Create sustainable business opportunities and invite small and medium size enterprises to the network that wish to develop their sustainability agenda.
- Support Helsinki area actors to find new and innovative solutions to global challenges according to the strategic city economic policy priority objectives
- Share results, lessons learned and experiences of best practices.

List of partners [Sustainability partners | City of Helsinki](#)

#### **Built environment cluster program**

The City of Helsinki actively promotes smart, energy-efficient, and climate-smart solutions in their renovation and infill construction sites. They are developed and implemented in residential and service construction sites, both in individual buildings as well as at the block level. The Urban Environment Division, the City of Helsinki Housing Production (ATT), and Helsinki City Housing Company (Heka Oy) are central players in these projects. With the help of new, sustainable, and smart solutions, a more functional and enjoyable city will be built for Helsinki residents. Companies participating in the test platform activities can develop their business as the need-based nature and quality of their products and services improve.



## Collaboration with the state

### Regional land use, housing, and transport agreements

The agreements concerning land use, housing and transport are concluded by the State of Finland with the largest urban regions. The purpose of the agreements is to facilitate and support the cooperation between municipalities in urban regions and between municipalities and the State in the guidance related to the urban structure and coordination of land use, housing and transport.

The key aim is to improve the functioning and competitiveness of urban regions and ensure a balanced development of municipalities. The matters specified in the agreements include the objectives for land use development and housing production in the coming years and key development projects concerning the transport network.

The parties to the agreements representing the State are the Ministry of the Environment, Ministry of

Transport and Communications, Ministry of Economic Affairs and Employment, Ministry of Finance, Housing Finance and Development Centre of Finland (ARA), Finnish Transport Infrastructure Agency,

Finnish Transport and Communications Agency Traficom, and the Centre for Economic Development, Transport and the Environment of the region concerned. The agreements concerning the urban regions of Helsinki, Tampere, Turku and Oulu for 2020–2031 have been signed on 2 June 2020

The agreement for 2020-31 state low carbon and sustainable land use , housing and transport as a priority while also looking at balances development between regions and lowering homelessness.

Actions that are co-financed by the state and have an effect on Helsinki's climate plan include :

- Viikki-Malmi fast tram line. The state will pay 30 % of costs no more than than 7,5 million euros
- The Vihdintie fast tram line planning and construction and other sustainable actions connected to it. The state will pay 105 million euros.
- Mobility system improvements in the Helsinki region. State will pay 15 million euros
- Improvements in walking and cycling infrastructures in Helsinki. State will pay 2,5 million to regional improvements and open up new funding for the amount of 4,5 million euros that the regions cities can apply for.
- Helsinki together with Espoo will make improvements to metro lines to increase their capacity.
- 

### Green Deal agreements with the state on several topics

Green Deal is a voluntary fixed-term agreement by which solutions are sought to climate challenges, loss of biodiversity, overconsumption of natural resources and promotion of a circular economy in Finland. The agreement is concluded between the State and the business sector. Agreements can also be concluded with public bodies such as government agencies and local governments. Green Deals bring together parties that have a key role in achieving the desired change. Green Deals can enhance or complement the implementation of current legislation. They can also set more ambitious targets than those laid down by law and contribute to achieving certain targets without further regulation. The agreements offer a more flexible model than legislation for seeking the most efficient, effective and topical solutions for reaching the common goals. The parties to the agreements make ambitious commitments that aim to achieve environmentally and socially significant impacts. Green Deals seek results that can be reached in a relatively short term. The aim is to produce added value compared to the current situation by seeking new solutions and operating models for certain selected challenges among the parties to the agreement. The measures to be taken by the parties



to achieve the objectives and the practices for monitoring the progress towards the targets are recorded in the agreement. Green Deals and the commitments made in these are part of Society's Commitment to

Sustainable Development introduced by the Finnish National Commission on Sustainable Development. Companies and public bodies undertake to promote the objectives and actions set out in the agreements by making a commitment approved by the ministries on the Sitoumus2050 website.

Green Deal on sustainable procurements- Emission-free worksites

- Original parties: Ministry of the Environment and Senate Properties and cities of Espoo, Helsinki, Turku and Vantaa. Helsinki Region Environmental Services HSY, Metropolitan Area Transport Ltd and, in part, Finnish Transport Infrastructure Agency joined the agreement later.
- Period of validity: 2020–2030

The objective of the agreement is to reduce emissions generated in the worksites of the contracting entities such as cities, municipalities, government agencies or other public sector procurement organisations through public procurements on a long-term basis. The aim is also to boost the introduction of new low-emission technologies. By 2025, all new worksites of the contracting entities should be fossil-free and 100% of the non-road mobile machinery used in the worksites of the contracting entity and vehicles used for the internal transport operations of the worksites should be powered by fossil-free fuels. In addition, at least 20% of them should be powered by electricity, biogas or hydrogen. By 2030, 100% of the non-road mobile machinery used in the worksites of the contracting entity and vehicles used for internal transport operations of the worksites and for transport to and from the worksites should be powered by fossil-free fuels. At least 50% of them should be powered by electricity, biogas or hydrogen.

#### **Green Deal on sustainable procurements and reducing harmful substances in procurements for early childhood education and care**

- Parties: Ministry of Social Affairs and Health, Ministry of the Environment, cities of Helsinki, Tampere and Vantaa and procurement organisations Tuomi Logistiikka and Monetra Oulu
- Period of validity: 2020–2025

The objective of the agreement is to reduce children's exposure to harmful substances in early childhood education and care through public procurements. Another aim is to increase the procurement of products and services that carry the Nordic Ecolabel. Under the agreement common procurement criteria are created which the contracting parties will use in their future procurements

### **Collaboration with citizens and business**

#### **The Energy Renovation model for making energy efficiency actions feasible for households**

A ten people team of energy engineers and service designers hired by the city give step-by-step guidance on how to make small and large scale energy efficiency renovations to privately owned housing companies (privately owned apartments, usually between 5-100 apartments together form a housing company) Typically the process starts with making an energy efficiency survey which helps establish what are the different improvement options, their prices and their payback periods. Over 850 houses have gone through the energy efficiency renovations after the team started its work in 2021. Approximate renovation costs 350.000 euros (with a 25 % subsidy from the state ) so the market for renovations done by private companies in Helsinki has grown to over 230 Million euros.

The energy efficiency of nearly all residential blocks of flats in Helsinki can be improved in way that is financially beneficial for the affected homeowners.





A large proportion of the maintenance expenses of housing companies consists of energy consumption, i.e. the heating of rooms and household water and building electricity. Typically, energy and water form 30-40% of maintenance expenses. In best cases, improving energy efficiency and adopting new energy solutions can help housing companies reduce their heating costs by up to 60%.

The adoption of geothermal heat or a heat recovery system, for example, does not need to be carried out as part of major renovation works, as these types of measures can be cost-effective on their own and do not require residents to temporarily move out. That said, major renovations also provide excellent opportunities for improving energy efficiency.

An energy renovation project can often be carried out in a housing company charge-neutral manner. What this means is that the housing company charge (yhtiövastike) does not need to be increased due to the renovations, and the renovations will eventually start providing cost savings.

The service is paid for by the Carbon Neutral Helsinki plan.

<https://energiaremontti.hel.fi/en/>

In the future additional information about climate adaptation renovations to be done simultaneously with energy efficiency renovations (for example about adding nature based solutions to the apartment building grounds /yards to enable storm water management) will be offered.

### Supported climate actions by citizens

are an important part of carbon neutrality actions. There are several ways in which citizens can participate but also innovate in climate actions. These include:

- How to move sustainably- information about incentives, subsidies, shared vehicles, tips for active moving and public transport can be found here <https://helsinginilmastoteot.fi/en/idea/move-sustainably/>
- Emission free small building <https://helsinginilmastoteot.fi/en/idea/emission-free-smallbuilding/>
- Effective climate actions at workplaces including sustainable acquisitions and choice of transport modes, efficient use of facilities, waste reduction and energy-saving operating methods here <https://helsinginilmastoteot.fi/en/idea/climate-actions-workplaces/>
- Information about the effect of food on climate and what kinds of solutions exist here <https://helsinginilmastoteot.fi/en/idea/food-consumption/>
- Climate calculators, tests, commitments and climate games here <https://helsinginilmastoteot.fi/en/idea/tests-commitments-climate-games/>

There are also other participatory actions organized by the city, including the participatory budget which has had some dedicated climate actions.

### Participation and Interaction Model

The City of Helsinki's Participation and Interaction Model seeks to promote resident know-how and knowledge. Building a better Helsinki together – with as many diverse voices represented as possible – is one of the city's main priorities. In Helsinki's new Strategy, the city is seen as a community, in whose development the citizens take an active part. The model for participation and interaction that was approved at the end of 2017 highlights the utilisation of know-how and expertise of individuals and communities, enabling of spontaneous activities and equal participation opportunities as the principles of participation.



Helsinki invites its residents and cooperation partners to join in the development of the city by improving and diversifying its neighbourhoods and services. Helsinki is above all a community, setting for influential events and important encounters.

Municipal decision-making is open and participatory. A functional service culture and interactive communications contribute to a positive city atmosphere and urban experience.

Helsinki residents can participate and influence municipal activities by brainstorming ideas for and voting in the participatory budgeting initiative, sending the city feedback, using the Varaamo booking system and taking part in volunteer opportunities. Borough liaisons that represent each of Helsinki's major districts promote citizen involvement throughout the city

### **Promoting involvement in practice**

The Participation and Interaction Model is reflected in all municipal operations, across each of the city's units, as a more diverse range of opportunities for citizen participation and influence. Each city division has its own committee-approved participation plan, the progress and activities of which are monitored and reported on regularly. The implementation of the programme is also followed closely as part of the Helsinki City Strategy.

### **Advocacy groups provide valuable input**

Finland's laws on local government require its municipalities to maintain councils that represent persons with disabilities and the elderly, in addition to a youth council or equivalent youth advocacy group. In addition to these, the City of Helsinki also has an equality and non-discrimination committee. The city utilises the expertise and skills of these advisory bodies in its efforts to promote equal participation. These groups are also involved in the citizen panels for transport actions.

### **Opening up city venues to the public**

The basic rule at the City of Helsinki is that every one of the city's venues is easily and safely accessible to the public. An effort has been made to open even more municipal facilities to broader public use by making it easier to book premises and equipment for personal use and creating uniform and clear conditions for doing so. The site offers free to use or cheap spaces for meetings, events, sports, hobbies, manufacturing things all over the city in schools, libraries, parks, youth centres etc. An online service for booking municipal premises is available at <https://varaamo.hel.fi/>

### **Educational climate programs**

98 % of schools in Finland are run by municipalities. City of Helsinki has mandatory climate education in all schools. High school students have a class on carbon neutral Helsinki, middle schoolers on circular economy and elementary schools have a special program on sustainability. The learning path starts with early childhood education, which introduces a sustainable lifestyle with the help of a fox family. The KETTU (FOX) model combines climate and environmental education, future literacy and creative learning. For example, the nature relationship will be strengthened with the Outdoor Fox, different futures will be created with the Artist Fox, and circular economy will be studied with the Inventor Fox.

The model was developed together with children, because growing into participation and influence is a key starting point for learners of all ages. The KETTU model is also used as an applied version in grades 1–6 of basic education. The sustainable future learning path continues in secondary school, where sustainable development is studied in lessons of different subjects and across subject borders. To support phenomenon-based learning, the KIERRE model for future skills from circular economy has been developed, combining natural resource awareness, climate understanding, design education and creative learning.

The learning path continues in both upper secondary school and vocational education. In cooperation with the staff and students of upper secondary schools, a cross-curricular climate course was developed under the name Carbon-neutral Helsinki. The title of the course comes from the Carbon-neutral Helsinki 2030 Action Plan. The course is compulsory for all first-year upper secondary school students starting from August 2021.



Helsinki Vocational College has launched the “Professionals of a Sustainable Future” programme, which examines how sustainable development can be strengthened in all study programmes. The vocational college offers training for more than 50 different professions. For example, those graduating as restaurant professionals can influence the carbon and water footprint of thousands of people when designing menus, and construction professionals can promote sustainable and energy-efficient solutions.

**Boosting regional involvement with participatory budgeting, borough liaisons and business liaison**

In participatory budgeting, Helsinki residents come up with ideas for improving their neighbourhoods with city funds and then vote on which ideas to bring to fruition, in accordance with an appropriation approved by the city council. The first round of participatory budgeting in the city took place in 2018-2019, when residents submitted over one thousand proposals for how to use an earmarked sum of 4.4 million euros. The ambitious project is named OmaStadi (MyCity) and the proposals and voting took place on the omastadi.hel.fi digital platform.

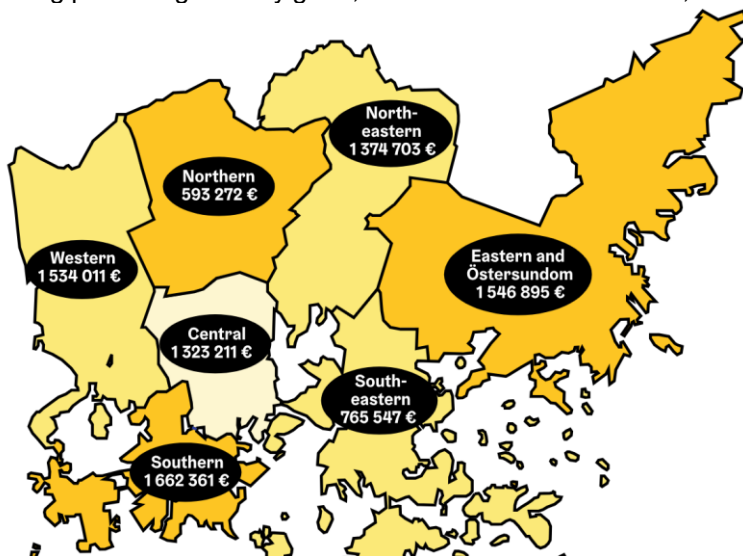
Every resident of the city can propose ideas, after which the authors join with city experts to develop feasible proposals.

All residents over the age of 12 are eligible to vote, giving young people a concrete opportunity to participate in municipal decision-making each year and in general supporting the new core curriculum for comprehensive schools.

All residents over the age of 12 are eligible to vote, giving young people a concrete opportunity to participate in municipal decision-making each year and in general supporting the new core curriculum for comprehensive schools. The budget for the initiative is divided among the major districts of Helsinki according to their populations. One-fifth of the sum is reserved for proposals that would affect the entire city. Along every stage of the process, the city and its residents jointly arrange events to support the initiative and citizen involvement.

There have been several successful initiatives funded through the participatory budget that help climate goals as well, including planting trees and improving biking infrastructure in various neighbourhoods.

The last round is almost done, ending with a co-creation with the residents for the 45 chosen ideas “In Helsinki, 41 962 people voted, representing 7,1 percent of the city’s residents. These results show that the OmaStadi participatory budgeting initiative is a concrete, important opportunity for the people of Helsinki to play a part in the development of our city. I am especially pleased to see that the voting percentage of young people improved. On an international level, Helsinki’s participatory budgeting voting percentage is very good,” said **Johanna Sinkkonen**, the City of Helsinki’s Participation Manager.



**The results of the co-creation are now ready**

The citizens and city experts have co-created together 45 voted proposals during the spring. You can now find out what kind of plans were created during joint development, and how the planning and implementation of the projects will continue later.

[Get to know the results →](#)



## Barriers and opportunities

**Most of the issues described below can not be categorized as either opportunities or barriers because sometimes barriers can create new opportunities: for example when people learn to be more energy conscious because the prices are higher and thus have been able to keep costs on a decent level and while regulation has been tightened for construction companies and they've had to create new solutions this has also made the sector more competitive in new markets.**

### Heating

The pathway to carbon neutral heating looks clear in Helsinki because of the investments and decisions made in the energy company, the increased heat pump installations and the energy efficiency renovation models used for both public facilities and private apartment buildings.

However some risks and barriers remain. For 2030 Helen will be using biomass with a mixture of renewables. There are some risks involved with the use of biomass, one of them the price of biomass as imports from Russia stopped after the war, The second risk is using biomass decreases carbon sinks. Helen will over time move away from burning and into some other form of heat production, and this can provide challenges with the expense of future investments and how sustainable district heating pricing will be for citizens. But these are the risk assessments of the company and there's very little the city can do.

When it comes to city owned building stock most of the energy renovations will be done when other renovations are needed. As a rough estimate a regular renovation for a school for example will cost about 3000-4000 e /m2 and the energy efficiency measures are only about 100 euros /m2 so doing them is very wise.

For the private housing company renovations, the city advisory service gives a lot of information about how quickly the renovations are paying themselves back in terms of lowered energy bills.

### Transport

There are many barriers and challenges when it comes the transport sector. Electrification of the fleet, while picking up speed in Finland, is still not fast enough. At the same there are barriers from demand exceeding supply and the wait times for electric cars being very long. But the most critical barrier is the price of the new electric cars, causing inequality among residents. This becomes an issue of climate justice because if the regulatory changes for environmental zones become reality some residents will not be able to drive into the city. A similar cost challenge is also present when talking about road tolls or increased parking fees.

The charging infrastructure is also not increasing quickly enough but the city is looking for new models of procurement to speed up the instalment of commercial charging stations.

Emissions from heavy vehicles is another systemic issue but a different kind from personal car use.

The industry renews its equipment about once in 5 years and they follow the newest technology for the best and most economic solutions which can be electric or hydrogen based in the future. But this development can be harder for smaller business owners to follow and lead them to an unequal situation.

The regulatory framework on EU and national level could push the change quicker but it's also important to financial programs to help less advantaged private car users and SME's.

The port of Helsinki has its own carbon neutrality plan but most of ships on the Baltic Sea produce a lot of emissions both at sea and while in the harbour. But here international treaties and the technological innovations will hopefully help.

The boats running in the archipelago around Helsinki in the summer are mostly family-owned, very small companies that only have the short summer season to make their income from tourists. The fleet is very old. Helsinki has some plans to help with incentives and subsidies the companies to change into emission-free (or low emission) boats but this can still be too expensive for some or even most the companies



## Electricity

Emissions from electricity are becoming lower with the use of renewable sources and nuclear energy in the Nordics but there are other risks involved. After the war in Ukraine started the energy prices became very high and while it's been good for the market to find more domestic and Nordic sources of energy the geopolitical risks still remain. Renewable energy is reliant on the weather and also the nuclear plants have interruptions meaning that the energy prices fluctuate a lot and people have become a lot more scared about how much their energy bills will be. On the other hand, because of this people have become a lot more energy conscious and have changed their energy bills to follow dynamic pricing which they can more easily control but there are very cold winter days when electricity has been so expensive that people have had to stop heating their homes.

## Construction

It's expensive to build in Finland with hard winters and with a lot of regulation on safety measures in place. The energy efficiency regulations and now the new lifecycle limit on emissions for all new residential buildings have required the construction sector to come up with a lot new innovative ways to do business. Some of the solutions can be expensive, at least in the beginning, meaning that the houses will also be expensive for buyers. This can create inequality among residents. Taking this into account was also the reason the limit wasn't set lower, Helsinki didn't want to create a market for only expensively built houses.

On the other hand this creates opportunities for new business, for example when the regulation for low carbon concrete was set there were no companies in Finland who could provide that and it had to be bought from abroad. Now there are several companies providing GWP85 concrete.

## Barriers for climate actions

by sector and type of barrier

### Heating

#### 1. Financial:

- Helen is moving from burning coal to burning biomass. While biomass at the moment is considered emission-free that categorization can change in the future and thus jeopardize the investments made
- The price of biomass has since the war in Ukraine gone up as imports from Russia are not allowed.
- While right now over 90 % of buildings are connected to the Helen district heating system there have been more and more residential buildings choosing to install heat pumps to lower their heating costs. This can at some point jeopardize the business model of Helen.
- Helen's future investments (beyond 2030) are still under consideration and can be very expensive to realise. They have talked about BECCS and SMR. They are very expensive investments and can therefore risk the business model.
  
- Possible solution : too early to say with the fast technological development in the field
- Stakeholders: Helen, city as the owner, citizens, Eu, National government

#### 2. Acceptance and regulatory barriers

- Burning anything is already a climate risk and many people find it unacceptable for the future. This might get more people to find other solutions, like heat pump installations, to district heating.
- Biomass also uses the same material that makes up the natural carbon sinks and this can become a problem for countries like Finland.



- Future investments in heating infrastructure, especially SMR, can be difficult to get acceptance for whether by regulatory bodies or people in general.
- Possible solution :
- Stakeholders: EU, National government, IPCC; Helen, city, citizens

## Transport /mobility

### **3.Acceptance**

- Both political and citizen opinions are very diverse and often contrary. Finding the needed consensus for making decisions can be difficult. This is especially true when it comes to environmental zones in the city, road tolls and other restrictions for cars in the city.
- Helsinki is the capital and the neighbouring cities, and the region make up a huge percentage of journeys inside Helsinki. Any restrictions for entering Helsinki causes worried and even angry protests from the surrounding cities' administration. Only about 50 % of Helsinki residents own a car and 77 % of all journeys in Helsinki are taken by foot (39%), bicycle (9%), public transport (29%) or other (1%) while journeys by car make up about 22 %.
- The chamber of commerce and many inner city companies feel strongly that any restrictions to private car usage will jeopardize the liveability of shops and the service sector in the downtown area and have been very vocal about any restrictions for car usage (for example during the pilot period of closing down one lane in the central Esplanade street, the pilot lasted only 2 years (2023-24) and will not continue due to the huge outcry of businesses and many residents).
- Possible solution : Increased stakeholder engagement before solutions are decided. The citizen panel on transport actions that was held in the spring and summer of 2024 was a good start.
- Stakeholders: citizens, commercial entities, chamber of commerce, political parties, city

### **4.Socioeconomic /social justice**

- While e-vehicles are easily accepted by most people and enable quite a lot of freedom for private car usage in the city the price of e-cars is a barrier to many and create inequality among residents
- There's a similar issue with road tolls or anything that increases the costs of driving, whether for private use or for companies
- Possible solution : Incentives, tax cuts, supporting other modes of transport
- Stakeholders: Citizens, city, car industry, EU, National government

### **5.Governance**

- E-vehicles on both land and sea need a good charging infrastructure. Helsinki has been too slow in putting the infrastructure in place but there are several plans (see actions) for speeding up the process.
- Possible solution : Adding more charging infrastructure by the city but also enabling private sector companies to add more chargers in the city infra
- Stakeholders: City, commercial entities, national government



## 6. Financial

- The Helsinki archipelago is serviced with a lot of private family-owned water busses /boats that are approximately 70 years old and quite polluting. As they only operate during the summer months the costs for renewing their fleet is very expensive. T
- Possible solution :The city is considering an incentive and financial aid program to speed up the change, piloting of this starts next year
- Stakeholders: Small family-owned companies, city

### Residual emissions: Compensation/new natural and technical carbon sinks

## 7. Regulatory

- It's very difficult at the moment to know for sure which compensation actions will be acceptable according to upcoming regulation. For example double counting will present several restrictions to compensating in other countries /other municipalities. For example, buying forests in either another country or another municipality in Finland will not help as those will be counted as carbon sinks in the area where they are located (and only additional actions can be counted for Helsinki's benefit). Also lowering emissions in another area, waste management for example, will also most likely be counted as emissions reduction in the area where it is located. There are also problems with verifying the real emission reduction /increased carbon sinks in many programs.
- Possible solution : Having a common regulatory framework for all cities, on both national and EU level
- Stakeholders: EU, National government, city, IPCC

## 8. Acceptance

- Due to aforementioned reasons, it can be hard to convince politicians or citizens for compensative actions. On the other hand, if the other possibility is additional actions in for example mobility sector the choice can be difficult. Using a cost-impact analysis for all possible actions on residual emissions is what Helsinki is implementing at the moment.
- Possible solution : Increased stakeholder engagement to find acceptable solutions. Also comparative cost-analysis for all actions so that the city can make financially sound decisions
- Stakeholders: Citizens, political parties, city

## 9. Financial

- All actions for residual emissions are somewhat costly and some much more than others. For example, the most impactful action, investing in BECCS, DACCS or bio char facilities is extremely expensive but while adding natural sinks is quite impossible in a growing city and compensation is not possible after 2030, technical sinks (CCS/CCU) will be the only possible means for dealing with residual emissions.
- Cost for many of the possible actions for increasing sinks are uncertain. For example, biochar is a good means for capturing CO<sub>2</sub> but its availability in large amounts and future price are uncertain
- While adding more natural sinks in the city would have many co-benefits: cleaner air, more shelter from climate change, the costs for reducing land for building new residential areas is a cost that the growing city probably doesn't want to take. Also in terms of how much more new forest land would be needed Helsinki calculated that in order to offset all current emissions the city would need 4 times the land area it now has and all of that (including the current city) would just need to be forests. On top of that trees are emitters of carbon until they have grown for at least 20 years.



- Possible solution : Too early to say, technological development is fast in the CCS/CCU sector
- Stakeholders: Helen, Industry, city, citizens, political parties

**A-3.2: Systems & stakeholder mapping**

System	Stakeholders	Influence on the city's climate neutrality ambition	Interest in the city's climate neutrality ambition
Heating	Helen( the city owned energy company) City of Helsinki Residential housing companies Individuals Energy efficiency and renovation companies	Helen's carbon neutrality plans and the investments they've made will make the biggest impact on heating emissions in Helsinki. But also the privately owned building stock can make impact thought energy efficiency renovations or heat pump installations.	-The Helen and the city both have binding carbon neutrality 2030 plans - For Helen the interest is also on making the district heating affordable and attractive -For housing companies the interest is in finding the cheapest and most reliable heating solution, which can be installing heat pumps or affordable district heating -for renovation companies the energy efficiency and heat pump installation market is very attractive
Transport system in the city	HSL (the regional public transport company), the city, public transport users, private car users, parking companies, EV charging companies, local entrepreneurs, logistics companies Chamber of commerce, national and regional authorities, the neighbouring cities	Stakeholder engagement, political debate and collaboration with state and region are all extremely important components for reaching the target of transport emission reduction.	-transport is a field with many countering interests:  - The amount of public transport users and the source of income from them is very important to HSL -The city mobility plan promotes 1.walking, 2.cycling, 3.public transport 4. cars -less than 50 % of residents of Helsinki own a car but some of the owners are very vocal about any possible restrictions





			<p>or increase in parking fees</p> <ul style="list-style-type: none"> <li>-the neighbouring cities residents use a lot of services and work in Helsinki and want to drive into the city and therefore oppose restrictions like road tolls</li> <li>-parking companies get their income from people driving into the city, on the other hand they gain from higher parking fees</li> <li>-EV charging companies want to city to enable more charging infrastructure</li> <li>-chamber of commerce and local business are often worried about the center of the city businesses if private car use is restricted</li> </ul>
<p>Construction</p>	<p>City planning, construction companies, residents, state</p>	<p>As the city is growing rapidly the collaboration between construction companies and the city is crucial. The stricter regulatory framework for emission reduction on the construction sector can however not increase the price of living in the city.</p>	<ul style="list-style-type: none"> <li>-Innovations in energy efficiency, material production wood and low concrete building</li> <li>-state is looking into Helsinki's example of the lifecycle limit on emissions before setting the national limit</li> <li>-affordable living and how that is maintained in the city</li> </ul>



## 2 Part B – Pathways towards Climate Neutrality by 2030

Part B represents the core of the CCC Action Plan, shaped by local authorities, local businesses, and stakeholders, comprising of the most essential elements: scenarios, strategic objectives, impacts, action portfolios and indicators for monitoring, evaluation, and learning.

### 2.1 Module B-1 Climate Neutrality Scenarios and Impact Pathways

#### B-1.1: Impact Pathways

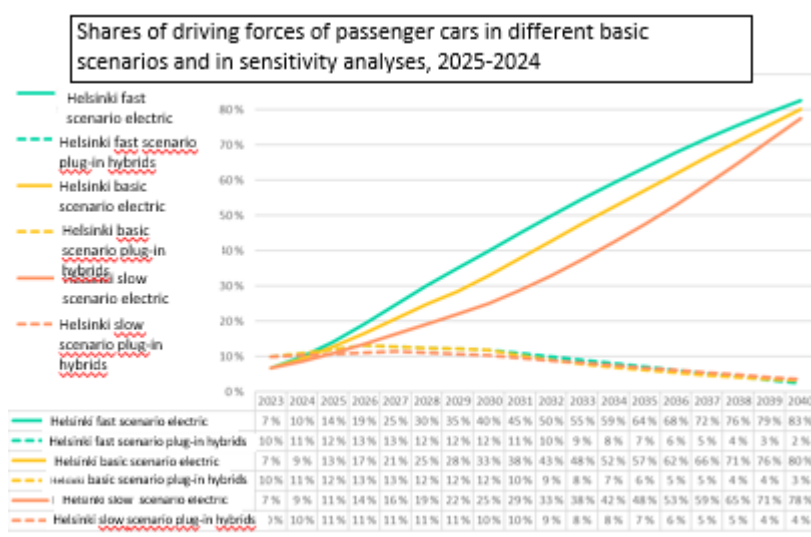
##### Mobility Sector

##### Background:

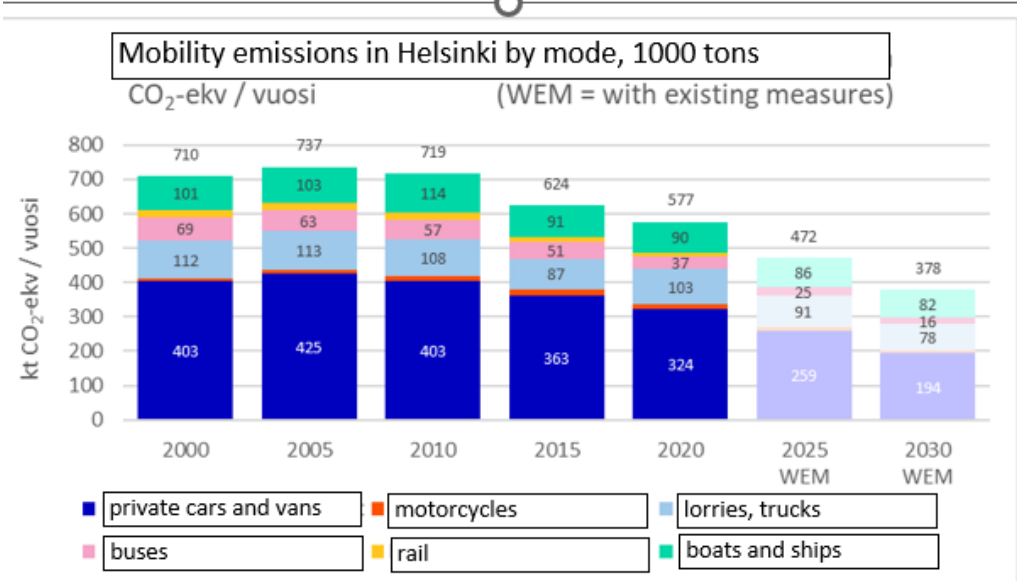
1. **WEM scenario updated.** The last update was from 2022 and this was updated in 2024 to include new actions from the state

2. **Updated models for how the car fleet in Helsinki will change.** Three different databases and models used (1. Aalto university Scenario analysis for electrification of the fleet 2. Peikko-WEM scenarios for national data for fleet changes 3. University of Tampere Local changes in fleet, according to national predictions and electrification models). Scenarios in Helsinki als take into account

- General development of the economy and employment
- Prices and availability of vehicles and different modes of fuel
- Attitudes of citizens and companies
- Prognosis for increase of inhabitants in Helsinki



The diagram gives different scenarios for rapid electrification (green), rapid increase of hybrid vehicles (green dash line) BAU for electrification (yellow) BAU for hybrids (yellow dash) slow electrification (red) and slow hybrids (red dash)



This diagram explains emissions from mobility according to WEM (private cars – blue, motorcycles- red , busses -pink, lorries, trucks – light blue , boats and ships -green and rail -yellow)

**3. Citizen panel (May-September 2024)**

5000 invitations were sent by using random sample method to over 18-year-olds in Helsinki. 64 people were chosen from those who accepted by making sure that they represent people in Helsinki by age, occupation, income, modes of transport used and areas of living. On top of those 6 representatives came from the senior council, youth council and disabled council. The panel operates according to deliberative democracy principles.



The panel met in person three times with different questions being discussed, among them the best ways to reduce emissions, how to make equal decisions about mobility, how to make city mobility as efficient and functioning as possible. The panelists were also given lots of information about emissions and city plans. The panel will meet once more in September 2024 and then make a



statement that will be presented to the Urban Development board and used as part of the work on choosing the actions for reducing emissions from the mobility sector.

#### 4. Impact assessment for different scenarios

All the possible pathways for cutting mobility emission have gone through impact assessment which looked into the following aspects:

##### Social impacts

- Impacts on the possibilities of mobility
- Impacts on the competitiveness of sustainable modes of mobility
- Harmful impacts of mobility: noise, air quality, safety
- Health benefits of active mobility
- Liveability of the urban environment
- Impacts on different socioeconomical groups

##### Economic impacts

- Local economy
- Adaptability of the market and impacts on companies.
- Liveability of the local area
- Cost effects and division of costs
- Resource efficiency

##### Accessibility

- Functionality of the traffic system
- Logistics and heavy transport
- Capacity of the public transport system
- Area and national impacts
- Security of the supply system

##### Methods used were

- Mobility prognosis system (Helmet)
- Local economic modelling
- Expert workshops and expert feedback and analysis
- Literary review

The analysis was done by WSP consulting, Aalto University Economic Institute with large stakeholder interviews and workshops from different sectors of the city and outside stakeholders with an external reviewing body consisting of three other research centers.

As the results of the impact assessment are not public yet (have not gone through the process of political decision making ) we can not publish them here but can update the plan when the process is done.



## The scenarios

Fields of action	Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions)	Indirect impacts (co-benefits)
Environmental zones phased in- for both private cars and heavy traffic	Governance			-40-80.000	Better air quality, less noise
Co2-free private cars	Governance, technology			-50-60.000	Better air quality
Infrastructure for electrification	Technology, Governance, Finance				Better air quality
Street infrastructure for sustainable mobility	Finance, Governance,			-20-25.000	Health benefits, Liveability in the city, Less noise, Better air quality
Parking policy actions	Governance			-15-20.000	Liveability n the city , Less noise, Better air quality
All mobility actions in Helsinki favor sustainable mobility	Governance, Finance, Technology			stops increase of emissions	Health benefits, Less noise, Liveability, Better air quality
Water transport emissions reductions	Finance, Governance, Technology			-15.000	Better water safety, Less noise, Better air quality

The barriers related to transport emissions are listed in the barriers section as acceptance, socioeconomic/social justice, governance and financial barrier with some possible solutions for each.

## Residual emissions

In 2024 Helsinki has in collaboration with researchers and consultants produced three reports on the amount of carbon sinks in the city, the future of natural and technical sinks and the possibilities and challenges of compensation programs. These will also go through the political decision-making process and we can talk about them more after this fall. But the idea is to have enough data and understanding of the different possibilities and cost-analysis of each so that informed decisions can be made between additional emission reduction actions, compensation and/or increasing sinks.

The barriers related to residual emissions are listed in the barriers section as regulatory, financial and acceptance barriers with some possible solutions for each



**Because this work hasn't undergone the political decision making process in Helsinki we can not be publish more information about the scenarios and their impacts. When the process has been done we will update this sections**



**B-1.2: Description of impact pathways**

The transport sector is a complicated sector to due to many contracting views from citizens, politicians and companies and therefore needs a lot of data, research and participatory methods to understand how the city can best approach the needs, barriers and gaps in our in the system. The work is explained above.

In the other sectors the actions have been easier to define and are thus introduced in the portfolio part of this document.

## 2.2 Module B-2 Climate Neutrality Portfolio Design

Fields of action	List of actions
Heating	Helen's strategy for carbon neutrality 2030
	Actions in city budget and carbon neutrality plan 2023-25 City actions for city owned buildings
	Actions for energy efficiency and renovations for privately owned buildings
Electricity	Actions in city budget and carbon neutrality plan 2023-25
Mobility/transport	Actions in city budget and carbon neutrality plan 2023-25
Green infrastructure & nature-based solutions	Green area factor, tree canopy cover and hydrological models linked to new green infrastructure projects
Built environment	A limit value for the lifecycle carbon footprint of new residential blocks of flats since 2023
Built environment	Steering preconstruction and infrastructure construction toward low carbon materials Low-carbon concrete in infrastructure projects Banning lime concrete in stabilization



	Pilot project to reduce preconstruction emissions by 50% compared to BAU
Built environment	Improving the energy efficiency of current building stock Energy information team provides free guidance to housing corporations to complete energy renovations (since 2021)
Built environment	Promoting low-carbon construction also in city's own building projects New city facilities need to achieve 30% better energy efficiency than national standard Renovations to achieve ~30% energy efficiency improvement
Waste & circular economy	Helsinki city roadmap for circular and sharing economy

**B-2.2: Individual action outlines**

The following actions have been approved in the city's budget negotiations in the last three years and up until 2025. The city goes through an annual process where all actions that require financing submit their applications to the finance department in the spring of each year and a normal process of negotiations takes place. The budget then goes through a political process and is approved in late fall each year. Only large scale investments are approved for a multi-year framework. Those are included in this section after the actions.

Helsinki cannot present all investments and cost scenarios until 2030 due to how the city is governed and functions but also because the actions are chosen annually after the results of the past years' emission reduction is reported. The actions chosen for the following year have to guarantee that the carbon neutrality target is achievable. Another reason for why all actions are not defined yet is that technological development and innovations are constantly emerging and it would be unwise to decide now what is the best way to move forward in, for example, 2028.

Most of the actions are tasks for the Urban Environment Division of the city. Therefore no specific roles or responsibilities are mentioned as while the responsible party might be a the mobility department, city facilities department or city planning department, they all fall under the same leadership and the same overseeing political entity, the Urban development board. The actions that are part of the Carbon neutrality plan of Helsinki are also overseen by the Carbon neutrality programme group headed by the mayor. All actions that are part of the Carbon neutrality plan are also included in the city budget and therefore have gone through the normal process of negotiations with the finance and strategy departments of the central administration. The Urban Environment Division bears the main responsibility for the implementation of the measures of the Carbon Neutral Helsinki Action Plan. The division also



plays a key role in improving the energy efficiency of the City's property stock and private housing companies, as it administrates a large proportion of the City's properties in use, while the Energy Renaissance team supports private housing companies in energy renovations and surveys. The division also exerts significant influence over construction emissions through aspects such as carbon footprint steering for apartment buildings implemented in detailed planning and plot conveyance operations, E value targets, emissions reduction measures in infrastructure construction, and the Green Deal for emission-free worksites.

When the actions have other actors from either other city divisions or outside the city these are explained in more detail.

## Heating

### **ACTION 1: Helen's strategy for carbon neutrality 2030**

Helen Ltd is a company owned by the City of Helsinki and its administration is based on the Limited Liability Companies Act, the articles of association and the group policy of the City of Helsinki. Helen Ltd provides electricity, heating and cooling to its customers, as well as diverse services for energy microgeneration, energy usage and optimised consumption.

Steps towards carbon neutrality

1) 2023: at least 40 per cent on the 1990 level

- The Hanasaari power plant will close and halve the use of coal. Helen will replace production with waste heat, sustainable bioenergy, energy storage, as well as nuclear, wind, and solar power.

2) 2024: at least 60 per cent on the 1990 level

- Helen will close the Salmisaari coal-fired power plant and end the use of coal. The company will make a move towards distributed heat production and a sustainable energy system.

3) 2025: at least 80 per cent on the 1990 level

- The heat production will consist mainly of heat pumps utilising waste and environmental heat, electric boilers, energy storage, and sustainable bioenergy. The electricity will be mainly produced with wind, nuclear, hydro, and solar power.

4) 2030: at least 95 per cent on the 1990 level

- Helen will further increase wind and solar power and the amount of non-combustion heat production especially with heat pump solutions. Helen will offset the remaining emissions.

### **The city actions for reducing emissions from heating**

The energy efficiency of the city's own building stock is improved, and the amount of renewable energy is increased every time the buildings are renovated, but also through separate energy efficiency renovations.

In the city's own business premises, district heating will account for 98 per cent of heating in 2023. A small percentage of the buildings are still heated by oil or electricity, but in these properties, heating modes are constantly being upgraded to lower-emission options. The share of heat pumps is also increasing.





In new construction and renovation projects, the profitability of geothermal and air-to-water heat pumps is always assessed. A heat pump is always chosen as the main heating system if it is technically possible and economically viable. A heat pump system is selected in almost all new construction projects, and in renovations, the share is somewhat lower due to the limitations of existing buildings and their plots.

**ACTION 2: Heating method change for all oil and direct electricity heated city owned office and service buildings.**

Will be done during 2024-25

- Indicator: Saved energy in the facilities
- Impact on emissions reductions: Depends on the heating method, when its oil it will be significant
- Cost effect: 600.000 euros, cost positive due to saved energy costs
- Party responsible: Urban Environment Division
- Stakeholders: City departments and facility operators
- Co-benefits: cost savings, air quality

**ACTION 3:** Planning and implementing City facilities and service buildings so that the E value will be - 30% of the national threshold value for the use class

**ACTION 4:** Renovation projects on City facilities and service buildings will be implemented so that the E value will decrease by 34% of the buildings' original E value.

**ACTION 5:** Requiring energy class A of residential blocks of flats (highrise class 2) in the property conveyance conditions.

**ACTION 6:** Requiring energy class A of residential blocks of flats (highrise class 2) in detailed planning.

**ACTION 7:** In detailed planning, buildings other than residential ones will be required to be of a class that is 20% of the national norm set for that type of building.

**ACTION 8:** The main heating system selected for the City's facilities and service buildings will be a heat pump system if its repayment period is under 15 years and its implementation is technically feasible.

- Indicator: Saved energy and heating emissions in the facilities
- Impact on emissions reductions: saved energy and heating emissions
- Cost effect: regulatory in nature, will be done by official work
- Party responsible: Urban Environment Division
- Stakeholders: City departments and facility operators
- Co-benefits: cost savings

**ACTION 9:** Adjusting the ventilation in City facilities to an appropriate level

Controlling ventilation according to demand is an essential action to take between renovation projects to improve the energy efficiency of buildings. Appropriate use of the system refers to that the ventilation system will not be used at night when there is no one in the building, and as such, there are no sources of humidity. It also refers to controlling the air flow based on the number of people in the room. Ventilation requires heating energy to increase the air supply temperature to the



desired level. When the ventilation machines are not running while there are no activities or people in the building, a significant amount of heating energy can be saved, and good indoor air quality can still be ensured when the buildings are occupied. The potential of adjusting the operating hours of ventilation systems has been studied together with the divisions. Based on the study, the most cost-effective way is to equip facilities that operate outside regular hours with carbon dioxide meters based on which the ventilation is controlled.

- Indicator: Facilities that can be booked outside regular hours will be prioritised, and carbon dioxide meters will have been installed in all such sites by the end of 2025.
- Impact on emissions reductions: -20,000 tCO<sub>2</sub>e/year in comparison to a situation where the ventilation system is running full-time. There is no information available on the current usage rate of the ventilation systems.
- Cost effect: -11 million euros/year in comparison to a situation where the ventilation system is running full-time. There is no information available on the current usage rate of the ventilation systems.
- Party responsible: Urban Environment Division
- Stakeholders: City departments and facility operators
- Co-benefits: cost savings, noise reduction

#### **ACTION 10: Lowering temperatures in City-controlled facilities**

Helsinki employs guidelines approved in October 2020 and based on the National Supervisory Authority for Welfare and Health's guidelines for applying the Housing Health Act. These guidelines offer instructions on controlling temperature conditions in various facilities and weather conditions. The guidelines also include target temperatures. At the same time, the City will perform energy surveys on dozens of service buildings and implement the necessary energy conservation measures on them. In addition to this, the Urban Environment Division has launched planning on what sort of quick and, if necessary, temporary additional measures can be implemented in the coming autumn and winter to cut down energy consumption and costs so that working conditions will remain at a sufficiently good level. To ensure rapid action, a clear decision will be made on how and in which locations temperatures will be decreased.

- Indicator: Decision to be made by the end of 2022 on how temperatures will be lowered wherever possible.
- Impact on emissions reductions: The consumption of district heating in properties directly owned by Helsinki was 391 GWh in 2021. If the temperature could be decreased by 2°C in half of the properties, the consumption of district heating would drop by 5%, or 20 GWh (with the assumption that a drop of 1°C in indoor temperature corresponds to a drop of 5% in heating energy consumption). With the emissions of 2021, the drop equals an emissions reduction of 3.7 kt CO<sub>2</sub>e.
- Cost effect: To be carried out as official work. Lowering the temperature will reduce the consumption of heating energy. When calculated using the assumptions above, the savings achieved would be 5% of the district heating costs of properties directly owned by the City. The action is cost-positive.
- Party responsible: Urban Environment Division
- Stakeholders: City departments and facility operators
- Co-benefits: cost savings

#### **Actions for privately owned homes**



**ACTION 11:** Launching Energy Renaissance guidance services.

**ACTION 12:** Allowing the construction of geothermal heating systems in public areas.

The City of Helsinki's energy experts provide independent advice for housing companies that are interested in surveying how they could improve their energy efficiency and carry out a financially viable energy renovation. The services are provided by the Energy advisory team of Building Control Services

The City's advice service is free and unbiased, intended for housing companies in Helsinki. Advice is provided in all stages of the renovation, from idea to implementation. The City's energy experts can be invited to attend a board of directors meeting or general meeting of the housing company, for example. The experts can also familiarise housing companies with different energy renovation options or present examples of other housing companies' renovation successes Actions include :

- Establishing what energy procedures are available and possible to the housing company
- Evaluating the energy efficiency survey and contract offers received by the housing company
- Building charging stations for electric cars

Housing companies are still responsible for the actual ordering, implementation and payment of energy efficiency surveys and renovations themselves, however. These are done by private companies.

This service has been very successful, with over 640 housing companies and over 19.500 apartments having gone through the renovations, heat pump installations being the most popular action. This has also created a 230 million euro market for private companies in the city.

The second action "Allowing the construction of geothermal heating systems in public areas" means that the city allows residential buildings that either don't own the land their building is on or don't have enough space to install heat pumps to do so on city land. The principle has been approved by Urban Environment Committee 1 February 2022.

- Indicator: number of homes /apartment buildings that have gone through energy efficiency renovations
- Impact on emissions reductions: depends on the actions done. Heat pumps enable very low emission heating, other measures save the amount of energy the house uses
- Cost effect: 1 MEUR/year for the cost of running the system (10 employees)
- Party responsible: Climate Unit
- Stakeholders: Private housing companies, residents, energy efficiency experts, heat pump facilitators, Energy renovation team
- Co-benefits: cost savings for the housing companies, better air quality, market open for innovations

#### **Explanation for how thermal heat compares to district heating**

District heating [50 for the years 2024–2073]:

**Helen:** 0.024 kgCO<sub>2</sub>e/kWh

Direct emissions

According to Helen's scenario, estimating that from 2030 onwards the emission factor will remain at the level of 0.016 kgCO<sub>2</sub>e/kWh.

Through the rapid drop in emissions, e.g. a site that is completed in 2028, the factor for 50 years would only be 0.017 kgCO<sub>2</sub>e/kWh



**SYKE (Finnish Environmental Institute) :** (CO2data.fi): 0.064 kgCO<sub>2</sub>e/kWh

Lifelong and conservative value

Correspondingly, for a site to be completed in 2028, the factor for 50 years would be 0.056 kgCO<sub>2</sub>e/kWh

Geothermal (electricity) [50 for the years 2024–2073]:

SYKE (CO2data.fi): 0.018 kgCO<sub>2</sub>e/kWh.

Calculated with Syke's electricity emission factor 2024-2073, which is 0.0544 kgCO<sub>2</sub>e/kWh (lifetime, conservative value)

Correspondingly, this coefficient should be updated to a newer scenario of a drop in electricity emissions

Geothermal efficiency assumed to be 3.0.

Correspondingly, for a site to be completed in 2028, the coefficient for 50 years would be 0.016 kgCO<sub>2</sub>e/kWh

## **Actions for electricity**

### **ACTION 13: Replacing the City's outdoor lights with LEDs by 2030.**

The area of Helsinki currently has about 70,000 outdoor light sources that use technology other than LED. Even now, all new lighting fixtures are automatically built to be based on LED technology. In addition to this, existing outdoor lights will be replaced so that the number of LED lights increases by about 4,000 pieces annually. A LED light source consumes about 80% less electricity than the existing lamps based on discharge technology. The service life of LEDs is remarkably long, which also allows us to save in maintenance costs. The repayment period of adopting LEDs is 5–7 years, depending on the type of fixture. This supports the adoption of LEDs also from a financial standpoint with regard to the average service life. The increasingly strict EU legislation will also make it more difficult to access the discharge lamps that are currently in use. To realise the action, the number of lamps being replaced by LEDs should double.

- Indicator: Number of lamps replaced by LEDs per year in relation to the annual target (8,000 pcs/year).
- Impact on emissions reductions: Direct impact on emissions reductions in relation to the City's total target for emissions reductions: less than 1%. The energy saving estimated for a single lamp is 50–75% compared to a discharge-based light source.
- Cost effect: additional cost €2.5 M/year in 2023–2025 and €2 M/year in 2026–2030. Depending on the type of lighting fixture, the repayment period is 5–7 years. The lifecycle costs will be added.
- Party responsible: Urban Environment Division
- Stakeholders: City facility operators, maintenance crews, suppliers
- Co-benefits: cost savings, better light

### **ACTION 14: Establishing a tendering process for the energy solutions for city-owned facilities.**



During the work on the City's Roadmap for Carbon-neutral Heating, one of the measures identified as being within the City's sphere of influence was that the City would open the implementation of the heating systems in its facility complexes and area construction sites for tendering. At the moment, heating solution providers do not have the opportunity to offer their solutions due to the missing process phase. The current process does not support the business development objectives or ensure the realisation of best heating solutions in the City's own properties. We will establish and implement a process that allows the providers of various energy solutions to offer their solutions to the City's facilities and area construction sites.

- Indicator: Process to be established and implemented by 30 June 2023.
- Impact on emissions reductions: Support for emissions reduction measures; no direct impact on emissions reductions.
- Cost effect: No cost effect; to be carried out as official work.
- Party responsible: Urban Environment Division
- Stakeholders: City procurement dept, private companies offering the services
- Co-benefits: better environment for innovation and competition between companies. cost benefits, air quality

**ACTION 15: Energy-efficiency actions on all city owned facilities.**

- Impact: 5-30 % reduction of energy usage
- Cost: 2,5 MEUR but it's a cost positive because savings from energy cover all costs
- Party responsible: Urban Environment Division
- Stakeholders: City facility operators
- Co-benefits: cost benefits

**ACTION 16: Energy-management system for all city owned facilities**

All buildings the city runs will go through an energy efficiency review during 2024–2026. Actions stemming from these reviews will be sped up and the most cost-efficient and emissions reducing actions will be chosen. (the city owns about 20 % of the building stock in Helsinki, although this figure includes residential buildings that are not part of this action)

The energy management system will add data and monitoring to the system.

- Indicator: The energy saving after the measures have been taken
- Impact on emissions reductions: 5-30 % energy saving in total energy usage in buildings. From monitoring about 5 % decrease in energy use
- Cost effect: 1.9 MEUR but the savings from energy usage will make a positive cost impact in 1-5 years. Monitoring costs:250.000 euros but the saving will cover the costs.
- Party responsible: Urban Environment Division
- Stakeholders: City facility operators
- Co-benefits: cost benefits

**Actions for transport /mobility**

**ACTION 17: Implementing the Bicycle Action Plan**

Construction of the inner city target network in 2025-26: 50.0 km (target of 140 km); construction of the Baana cycling network: 18.3 km (target of 150 km); modal share of cycling: 9% (target 20 %)



- Indicator: that the target km are implemented by 2026
- Impact on emissions reductions: Facilitation of emissions reduction measures; no direct reduction of emissions.
- Cost effect: Building the network 20 MEUR in 2025, 30 MEUR in 2026
- Party responsible: Urban Environment Division
- Stakeholders: Construction companies, mobility dept, city planning department. citizens, biking promotion associations
- Co-benefits: health benefits from active mobility, better air quality, less noise

**ACTION 18: Reprogramming the implementation plan for the Baana cycling network and target network up to 2030.**

Moving the carbon neutrality target forward from 2035 to 2030 also means that the target for cycling as a mode of transport must be achieved five years earlier. The programming on the Baana cycling network and the target network must be accelerated at the same pace.

- Indicator: Reprogramming to be carried out
- Impact on emissions reductions: Facilitation of emissions reduction measures; no direct reduction of emissions.
- Cost effect: No cost effect; to be carried out as official work.
- Party responsible: Urban Environment Division
- Stakeholders: city planners

**ACTION 19: Ensuring that the number of charging stations for electric cars will grow in the City area, in line with the predicted increase in electric cars.**

A new procurement process for increasing the amount of charging stations in the city area.

- Indicator: 850 new stations by 2030
- Impact on emissions reductions: Facilitation of emissions reduction measures; no direct reduction of emissions.
- Cost effect: No cost effect; to be carried out as official work.
- Party responsible: Urban Environment Division
- Stakeholders: mobility department, charging infra suppliers, citizens
- Co-benefits: better air quality, less noise, health benefits, biodiversity

**ACTION 20: Implementation of electric car charging stations on the city's properties** so that the delay in the electrification of the vehicle stock can be compensated for

The city has decided that by 2025 all cars that the city uses (756 ) will be e-cars. Most of these cars are used by social and health services, Helsinki City Construction Services, parking control etc. The program has not moved in accordance to the plan due to the lack of charging stations but will move forward faster once the charging network development moves forward

- Indicator: The amount of new charging stations



- Impact on emissions reductions: Facilitation of emissions reduction measures; no direct reduction of emissions.
- Cost effect: 600.000
- Party responsible: Urban Environment Division
- Stakeholders: City facility operators, mobility dept
- Co-benefits: better air quality, less noise, health benefits,

**ACTION 21: The plot conveyance conditions** will require that new sites' parking spaces be implemented so that they are electrified and one third of the spaces are equipped with a charging stations.

For the predicted development of vehicles becoming electric, there must be a sufficient number of charging stations for electric cars. In the coming years, the number of charging stations will also determine the emissions reduction realisation of plug-in hybrids: if there are no charging stations, motorists will use the combustion engine, and the predicted emissions benefits will not be achieved. Most passenger cars will be charged at the parking areas and car parks of residential buildings, but this is not possible everywhere in the city. Charging stations are also needed for public and commercial properties, public areas, and parking areas. The city must also prepare for acquiring an electric fleet of its own. The city applies various methods to promoting the construction of charging stations. For example, there is an existing process for the charging stations to be implemented in public areas, but not all types of charging stations have such a plan. The number of different types of charging stations around the city varies, which should be considered when implementing the action.

With city owned buildings the principles of financing and building the charging stations have been agreed on in spring 2024.

A new plan for procurement rules for privately built new charging stations on streets will be decided upon in fall 2024.

- Indicator: Annual number of charging stations in relation to the forecast on electric cars..
- Impact on emissions reductions: Facilitation of emissions reduction measures; no direct reduction of emissions.
- Cost effect: The direct costs incurred by the City come from the implementation of the charging stations in the City's own properties.
- Party responsible: Executive Office/ Urban Environment Division
- Stakeholders: Private housing companies, citizens, charging infra suppliers
- Co-benefits: better air quality, less noise, health benefits, biodiversity

**ACTION 22: Promoting the definition of impactful regional emissions reduction measures on mobility.**

The regional emissions from transport are also highly influenced by traffic across the city's borders. We will actively promote the definition of impactful regional emissions reduction actions through the shared land use, housing and transport planning (MAL) for the Metropolitan Area. Helsinki will actively promote such measures that are in line with the City's own emissions reduction target for transport.

- Indicator: The most impactful emissions reduction measures for regional transport are to be defined.
- Impact on emissions reductions: Support for emissions reduction measures; no direct impact on emissions reductions.



- Cost effect: No cost effect; to be carried out as official work.
- Party responsible: Urban Environment Division/City Executive Office
- Stakeholders: City decision makers, state, regional cities, citizens
- Co-benefits: better air quality, less noise, health benefits, biodiversity

### **ACTION 23 : Electrification of water bus line to Pihlajasaari**

The city board decided in June 2022 that in order to speed up the electrification of water transport in Helsinki new principles will be decided upon in order to guide the market towards emission-free solutions so that 50 % of the water transport in Helsinki will be emission-free in 2030. As the first step the board decided to electrify the Pihlajasaari route and gather feedback and experience in order to move forward with other routes.

The charging of the boats requires 350 kW charging stations in two locations and for that also some harbour infra needs renovations.

The city will use different incentives and subventions to help the private boat operators with the change and also take care of charging infrastructure needed. The city will also develop the procurement models and agreements.

- Indicator: That the water bus route to Pihlajasaari is electrified.
- Impact on emissions reductions: about 50.000 annual passengers emission-free travel
- Cost effect: charging infra 400.000 /charging stations (2 needed) plus planning 40.000, cost for running the route 60.000/boat/year
- Party responsible: Executive Office/ Urban Environment Division and Culture and Leisure division
- Stakeholders: charging infra suppliers, private boat operators
- Co-benefits: less pollution on water and air, less noise

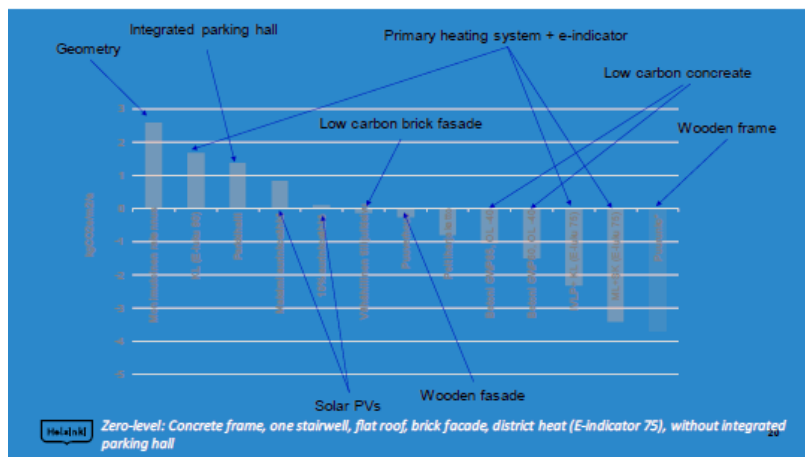
## **Actions for built environment**

### **ACTION 24: A limit value for the lifecycle carbon footprint of new residential blocks of flats since 2023**

In the summer of 2023, Helsinki became the first city in Finland to introduce a limit value for the lifecycle carbon footprint of new residential blocks of flats. The limit value for residential blocks of flats is used as a requirement in new local detailed plans. In addition to the plans, the city can set out carbon footprint requirements, for example, in plot competitions and plot transfer terms. The introduction of the limit value was based on the need to control the emissions from residential construction in a material and technology-neutral manner, because the high volume of residential construction makes it a significant source of emissions. In the future, the aim is to set limit values also for other use categories.

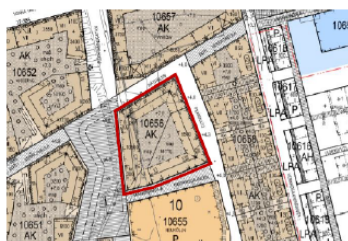
The process was carried out by first researching over 60 buildings for what increases or decreases emissions in buildings (materials, heating methods, garages etc).





The city then held a competition for all construction companies offering a very attractive lot where a low emission residential building would be built. The competition was judged 50 % for architectural merits and 50 % for low carbon footprint. The competition was very popular and the three winning buildings all reached a very low carbon footprint through many various combinations (wood frame/low emission concrete frame, solar panels, heat pumps, green roofs etc).

## About the competition



The competition block forms the central block of the northern part of Verkkosaari. The block includes efficient housing and commercial spaces.

The competition was held for developers and their design teams (formed by the developers).



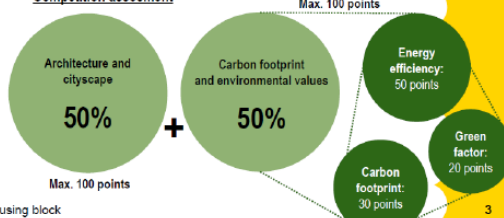
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Green and low-carbon housing block

### The aim of the competition was

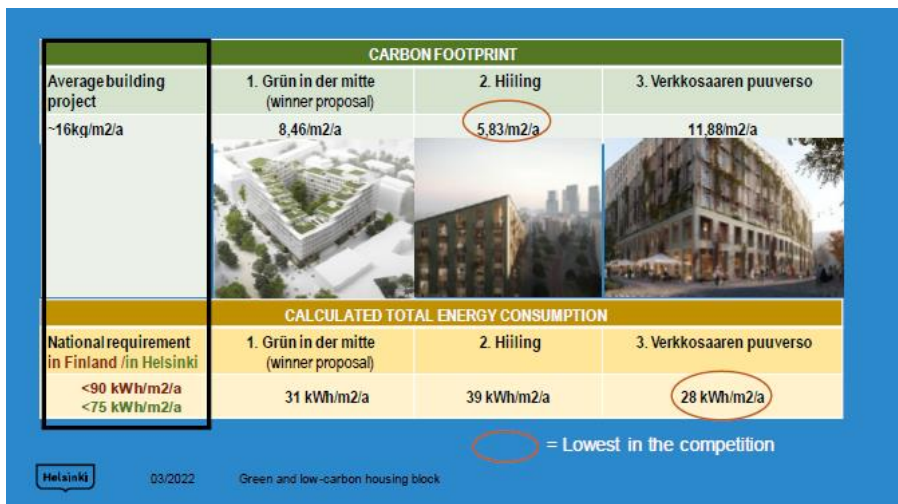
- to create a feasible, architecturally high-standard, low-carbon and highly energy efficient green block, which forms interesting new cityscape,
- to meet the Carbon Neutral Helsinki 2030 target, and
- to select a contractor and a designer to build the apartment building plots in the competition area.

### Competition assessment



The best three were very different combinations of solutions. each of the three was an awarded a lot in Helsinki and they will all be built.

Through the competition and dialogue with companies it was clear that many different combinations of solutions could reach low lifecycle emissions and as the results and the market dialogue with companies was very successful the limit was set to **16kg co2e /m²/a in 50 year timeframe**



- Indicator: regulation in place
- Impact on emissions reductions: Enables reductions, doesn't directly have an impact.
- Cost: consultants work 45.000 euros
- Party responsible: Climate Unit
- Stakeholders: Construction companies, energy providers, circular economy providers, material providers, planners, designers, citizens
- Co-benefits: market innovations, new companies

**ACTION 25: All infrastructure projects commissioned by the City will use low-carbon concrete that meets the class GWP.85 requirements as defined by Betoniyhdistys. The class required of low-emission concrete will be reviewed and updated annually, at the minimum.**

Most of the carbon footprint of concrete-intensive infrastructure comes from the use of concrete. For example, 92% of emissions from the construction of the Jokeri Light Rail came from the materials' emissions, and in turn, 50% of these came specifically from the emissions of concrete. Since the volume of concrete used is often high, especially in infrastructure that requires subgrade reinforcement or concrete tiles, large reductions in Scope 3 emissions can be achieved by reducing the emissions from concrete. Often, there are not many alternatives for concrete in infrastructure construction, which is why using low-emission concrete is the simplest and quickest way of reducing the emissions of infrastructure construction. The Betoniyhdistys concrete industry association has published classifications for low-emission concrete. By using this classification, it is possible to set comparable and consistent criteria for low-emission concrete. The classification also makes it easier to hold tendering processes for concrete. As such, it can also influence the procurement costs. Betoniyhdistys studied the availability of GWP.85-class concrete and discovered that all types of concrete used in infrastructure are available from multiple suppliers, so availability will not become a problem (Betoniyhdistys, to be published in spring 2022). Along with the criteria for low-carbon construction, the supply of low-emissions concrete will also grow. The decisions of the City of Helsinki also have a wider impact on society, since the City's requirements as a major client set incentives and pressure for the construction product industry to develop their products and production processes. The pioneer status of a leading operator has a wider impact on the construction market beyond the operator's own actions.

- Indicator: The requirement of using low-carbon concrete is to be added in the procurement criteria. The requirement will enter into force on 1 January 2023. The level of the requirements will be reviewed annually.



- Impact on emissions reductions: -15% (GWP.85) compared to conventional concrete.
- Cost effect: +10–20% compared to conventional concrete. The estimate is based on the experiences from the **Kalasadama**–Pasila project. As competition increases, the price difference is expected to diminish. Furthermore, it must be considered that the price of concrete is only a fraction of a project's total costs. In the pilot site, the cost effect of low-emission concrete was only parts per thousand in the overall costs of the project. The price of conventional concrete will increase in the future, which will reduce the price difference even further.
- Party responsible: Urban Environment Division  
Stakeholders: material providers, planners, designers, citizens
- Co-benefits: market innovations, new companies

**ACTION 26: The emissions of the preconstruction of the former Malmi Airport will be reduced by 50% in 2020–2030, compared to the preliminary preconstruction plan.**

The former Malmi Airport is located on clay soil typical of the Metropolitan Area. Before such areas are constructed on, the City of Helsinki will carry out preconstruction following a procedure developed in the 1970s–80s. The emissions estimate for the preconstruction in the former airport area is based on the preliminary preconstruction plan from 2017. In the preliminary plan, the preconstruction is assessed to be carried out mainly by deep-stabilising the soft clay layer to control dents formed during use. Preconstruction by pillar stabilisation has been widely used in Helsinki since the 1980s, at which time the use of a burnt lime and cement mix ('compo') as a stabilisation binding agent started. When calculated in this fashion, the emissions of preconstruction were estimated to be 340 kt CO<sub>2e</sub>. Based on the calculation, the most significant source of emissions is the production and transport of the binding agent for deep stabilisation, the proportion of which is 95% of the emissions. By replacing the binding agent used for the stabilisation with an available recycled agent, emissions can be reduced by 60–70%. When using binding agents in the commissioning phase, the emissions reduction potential is even greater. Recycled binding agents are already being piloted at the first preconstruction sites in Malmi. By developing the stabilisation methods, emissions can further be reduced in the 2020s. In terms of the preconstruction that is underway in the area, it has been estimated that a cumulative emissions reduction target of 50% could be possible compared to the conventional solution by 2030. As materials, technologies and subgrade reinforcement methods develop, the level of the emissions reduction target can be reassessed.

- Indicator: Emissions reduction in preconstruction (-50%) compared to the conventional solution.
- Impact on emissions reductions: Direct impact on emissions reduction: a minimum of 64,000 tCO<sub>2e</sub> by 2030 (-50% from the reference level of 2020–2030).
- Cost effect: Lower-carbon preconstruction will likely incur lower costs than the conventional option. The costs of the preliminary option for a preconstruction plan are increased due to the costs of burnt lime increasing along with the emissions trading in the EU. The objective will not affect the construction schedule.
- Party responsible: Urban Environment Division
  - Stakeholders: Construction companies material providers, planners, designers, citizens
- Co-benefits: market innovations, new companies

**ACTION 27: Abolishing the use of lime cement as a ground reinforcement binding agent**



- Indicator: lime cement will not be used as a binding material for foundation work on construction sites
- Impact on emissions reductions: 50-60 % less emissions compared to using lime cement
- Cost effect: Positive due to expensiveness of lime cement in emissions trading
- Party responsible: Urban Environment Division
  
- Stakeholders: Construction companies, , circular economy providers, material providers, planners, designers, citizens
- Co-benefits: health benefits, cost benefits

**ACTION 28 : Mainstreaming what is learned in Malmi to all construction sites in the city**

- Indicator: the work is done
- Party responsible: Urban Environment Division
  - Stakeholders: Construction companies, material providers, planners, designers, builders

**ACTION 29: Reducing emissions for the construction phase of all city owned facilities**

Construction phase emissions come from used materials, transport and site activities. Diminishing emissions during the construction phase any actions that go beyond the emission-free construction site Green deal agreement and using materials that produce less emissions will be valid. At the same time actions that are most cost-efficient for most decrease of emissions will be evaluated.

- Indicator: The pilot projects are chosen and included in the city investment plan
- Impact on emissions reductions:
  - o Construction site emissions can be brought to zero with these additional measures meaning that there would be a 60 kg CO<sub>2</sub>e /m<sup>2</sup> saving on emissions meaning that a construction of a a 10.000 m<sup>2</sup> new school building construction site could decrease emissions by 600 tCO<sub>2</sub>e
  - o For materials the decrease depends on the chosen material but for example using low carbon concrete could diminish emissions by 300 tCO<sub>2</sub>e for a school of 10.000 m<sup>2</sup>
- Cost effect: 600.000 e
- Party responsible: Urban Environment Division
  - Stakeholders: Construction companies, circular economy providers, material providers, planners, designers, builders

**ACTION 30 Low emissions guidance for demolition work**

There's not enough information on emissions from demolition work so in order to guide this work well a report on demolition impacts and best practices is needed

- Indicator: Report ready and follow up actions will decided by 12/2025
- Impact on emissions reductions: no direct emission reduction
- Cost effect: 50–60 000 €
- Party responsible: Urban Environment Division



- Stakeholders: Construction companies, , circular economy providers, material providers, planners, designers, citizens
- Co-benefits: market innovations, new companies

### **ACTION 31 Guidance for architectural competitions on low emission criteria**

- Indicator: Report ready and follow up actions will be decided by 12/2025
- Impact on emissions reductions: no direct emission reduction
- Cost effect: will be done through official work
- Party responsible: Urban Environment Division
  - Stakeholders: Architects, City planning dept, Construction companies, energy providers, circular economy providers, material providers, planners, designers
- Co-benefits: market innovations, new companies
- 

### **ACTION 32 Analysis and report on over- construction**

An analysis will be done whether the construction sector uses too much materials compared to what is needed for safety, insulation and other factors.

- Indicator: Report ready and follow up actions will be decided by 12/2025
- Impact on emissions reductions: no direct emission reduction
- Cost effect: will be done through official work
- Party responsible: Urban Environment Division
  - Stakeholders: Engineers, architects, city planning dept, Construction companies, energy providers, material providers, planners, designers
- Co-benefits: cost savings, market innovations, new companies

## **Actions for green infrastructure and nature based solutions**

### **ACTION 33: The green area factor**

The partially EU-funded ARVO – Valuation and Strengthening of Urban Green Spaces in Landscape Planning in Cities project (2023-2024) focuses on strengthening the green infrastructure in detailed planning. The project will develop a regional green area factor as a continuation of the city's lot-specific green area factor, extending the green area factor from lots to larger public areas. The green area factor is a tool used in landscape planning to assure a sufficient amount of green infrastructure. The lot-specific green area factor is included in the new building regulation approved in the summer of 2023 and thus mandatory when applying for a construction permit. Currently, the lot-specific green area factor is updated to further strengthen climate change adaptation and biodiversity aspects

In addition, the city is currently working with assessing a level of preparedness for cloudbursts, which means to make a climate change adaptation statement for which kind of rain events the city will prepare for in the future. A big part of the work is to assess possible rain scenarios and to build a hydrological model for predicting possible outcomes, needed solutions and their costs. When the statement has been made, it will bring forth several largescale green infrastructure projects and nature-based solutions to cover for increasing rain amounts.

- Indicator: Green factor value is set
- Impact on emissions reductions: no direct emission reduction



- Cost effect: will be done through official work
- Party responsible: Urban Environment Division
- Stakeholders: City planning dept, architects, citizens
- Co-benefits: Climate adaptation actions for heat waves and storms

**ACTION 34: Tree canopy cover**

Another action for strengthening the green infrastructure is assessing of the current tree canopy cover for city districts and neighbourhoods in Helsinki. Once done, a minimum level for the cover (%) on district of even neighbourhood level will be set.

- Indicator: minimum level of tree canopy set
- Impact on emissions reductions: impact is on climate adaptation
- Cost effect: will be done through official work
- Party responsible: Urban Environment Division
  - Stakeholders: City planning dept, architects, citizens
- Co-benefits: Climate adaptation actions for heat waves and storms

**Actions in circular economy (35)**

Action	Party responsible	Schedule
<p><b>1.</b> Providing the various actors in City construction (from land use planning to the maintenance of infrastructure and buildings) and building users with customised training on the basics of circular economy; collecting practical examples and options of circular economy solutions for construction. We will also extend education and information to political decision-making.</p>	<p>Services and Permits / Environmental Services / Building Control, Buildings and Public Areas / Built Assets Management / Construction Contracting / Housing Production / Maintenance, Land Use and City Structure, Heka, Divisions</p>	<p>2020–2021</p>
<p><b>2.</b> Defining the promotion of circular economy as a key premise in land use and urban planning.</p> <ul style="list-style-type: none"> <li>• Influencing preservation of existing building frames and parts through markings in the detailed plans, orders and incentives. Incentives may include the volume of building rights, for example.</li> <li>• Taking circular economy into account when repurposing buildings.</li> <li>• Directing actors to low-carbon construction through detailed planning.</li> <li>• Enabling low-carbon pre-construction and infrastructure construction.</li> <li>• Planning urban structure that supports circular economy.</li> </ul>	<p>Land Use and City Structure, Buildings and Public Areas / Built Assets Management / Construction Contracting, Services and Permits / Environmental Services, Executive Office / Area Construction</p>	<p>2020 →</p>
<p><b>3.</b> Piloting the use of circular economy criteria in plot conveyance conditions. Adopting functional solutions.</p>	<p>Land Use and City Structure, Executive Office / Area Construction</p>	<p>2020–2025</p>



<p><b>4.</b> Creating an internal operating model for the City concerning the use of surplus materials (excluding land masses), for example via the City’s recycling website.</p>	<p>Stara, Land Use and City Structure, Buildings and Public Areas / Maintenance</p>	<p>2020–2021</p>
<p><b>5.</b> Studying the opportunities for reducing the amount of concrete and using low-emission concrete or substitutes for concrete in the City’s infrastructure. Similarly, promoting the use of binding agents made of recycled materials in deep stabilisation, which will reduce the use of high-emission cement and burnt lime as binding agents.</p>	<p>Buildings and Public Areas / Built Assets Management, Land Use and City Structure, HKL</p>	<p>2020–2022</p>
<p><b>6.</b> Reducing the use of plastic filter cloths. Studying the opportunities for using recycled plastic or other recycled materials in technical structures, such as noise barriers, and piloting them at sites selected separately.</p>	<p>Land Use and City Structure, Buildings and Public Areas / Built Assets Management / Construction Contracting, HKL</p>	<p>2020–2022</p>
<p><b>7.</b> Implementing lifecycle pilots for four different types of areas: 1) Railway, 2) Street, 3) Park, 4) Pre-construction.</p> <ul style="list-style-type: none"> <li>• Defining circular economy goals for each area and scoring them in calls for tenders.</li> <li>• Implementing projects, starting from goal-setting and project planning, in extensive collaboration between various actors, from planning to maintenance.</li> <li>• Calculating the lifecycle costs and carbon footprints of the options.</li> <li>• Implementing light market dialogues.</li> </ul>	<p>Buildings and Public Areas / Built Assets Management / Construction Contracting / Maintenance, Land Use and City Structure, HKL</p>	<p>2020–2022</p>
<p><b>8.</b> Transferring good and functional practices into processes, instructions and models that will also steer future projects, based on the experiences of Actions 5–7.</p> <ul style="list-style-type: none"> <li>• Including aspects such as climate change prevention and mitigation, promoting circular economy, and protecting natural diversity into the maintenance classification of public areas.</li> </ul>	<p>Buildings and Public Areas / Built Assets Management / Maintenance, Land Use and City Structure, Development Services, HKL</p>	<p>2022–2024</p>
<p><b>9.</b> Promoting the development of national emissions calculations for infrastructural construction in collaboration with the Ministry of the Environment, the Finnish Transport Infrastructure Agency, the Finnish Environment Institute and experts (universities, consultants, etc.).</p>	<p>Buildings and Public Areas / Built Assets Management</p>	<p>2020 →</p>



<p><b>10.</b> Studying the opportunities for reducing the amount of concrete and using low-emission concrete or substitutes for concrete in the City's building construction.</p>	<p>Buildings and Public Areas / Built Assets Management / Construction Contracting / Housing Production, Heka, HKL, Services and Permits / Environmental Services</p>	<p>2020–2021</p>
<p><b>11.</b> Planning and implementing new construction and renovation projects that follow the principles of circular economy.</p> <ul style="list-style-type: none"> <li>• The planning will focus on the following circular economy criteria: smart use of building materials, flexible modifiability, modularity, use of recycled and repurposed materials, maintainability and repairability, ease of demolition and reusability.</li> <li>• Calculating the lifecycle costs and carbon footprint of each project.</li> </ul>	<p>Buildings and Public Areas / Built Assets Management / Construction Contracting / Housing Production, Heka, HKL</p>	<p>2020–2025</p>
<p><b>12.</b> Adding circular economy requirements to the planning and implementation of service buildings and housing, based on experiences of Actions 10–11.</p>	<p>Buildings and Public Areas / Built Assets Management / Construction Contracting / Housing Production, Heka, HKL</p>	<p>2021 →</p>
<p><b>13.</b> Compiling comparable data on the lifecycle costs of construction projects, based on Action 11. This data will be used as the basis for decision-making in future construction projects.</p>	<p>Buildings and Public Areas / Built Assets Management / Construction Contracting / Housing Production, Heka, HKL</p>	<p>2021 →</p>
<p><b>14.</b> Adding circular economy requirements to demolition contracts.</p>	<p>Buildings and Public Areas / Built Assets Management / Construction Contracting / Housing Production, Heka</p>	<p>2020–2021</p>
<p><b>15.</b> Preparing and adopting an operating model for reusing furniture and building parts from demolition and renovation projects.</p>	<p>Buildings and Public Areas / Built Assets Management / Construction Contracting / Housing Production, Heka, Services and Permits / Building Control</p>	<p>2020–2023</p>





<p><b>16.</b> Preparing an organisation-wide policy on the catering in meetings and events. The purpose of the policy will be to reduce food waste from catering, reduce the environmental impact of the food served, and reduce the use of disposable plates and cutlery.</p>	<p>Services and Permits / Environmental Services</p>	<p>2020</p>
<p><b>17.</b> Before procuring new indoor or outdoor furniture, the client will examine the furniture available on the City's recycling website and primarily use this recycled furniture. Next, the client will examine the opportunities of procuring the furniture second-hand, through renting or as a service. This policy will be included in the City's procurement strategy and the division-specific procurement instructions.</p>	<p>Procurements and Tendering, all divisions and City enterprises</p>	<p>2020–2021</p>
<p><b>18.</b> Preparing instructions on supply procurements that will concern the entire City organisation and that will be specified for each division. The purpose of the instructions will be to optimise order volumes, make the use of supplies more efficient, and thus reduce unnecessary consumption and waste.</p>	<p>Environmental Group for Procurements, all divisions and City enterprises</p>	<p>2020–2021</p>
<p><b>19.</b> Studying the lifecycle impact of alternative materials used in outdoor furniture. Procurement criteria will be prepared based on this study in order to pilot the use of the materials. Alternative materials will be surveyed in the planning and market survey phase of procurements.</p>	<p>Land Use and City Structure, Buildings and Public Areas / Maintenance, Services and Permits / Environmental Services</p>	<p>2020–2022</p>
<p><b>20.</b> Adding criteria that promote the sustainability of products (such as furniture, machinery, vehicles, ICT equipment) to the City's procurements. The criteria may be related to the lifecycle, maintainability of the materials, guarantee period, repairability and recyclability. The criteria may be minimum requirements or grounds for comparison.</p>	<p>Procurements and Tendering, all divisions and City enterprises</p>	<p>2020–2025</p>
<p><b>21.</b> Studying the product groups in which service procurement is a better option compared to product procurement, in terms of lifecycle impact. Service procurements will be used for these product groups.</p>	<p>Services and Permits / Environmental Services, Environmental Group for Procurements, all divisions and City enterprises</p>	<p>2020–2025</p>
<p><b>22.</b> Preparing procurement criteria through which the use of unnecessary disposable products and single-packed products will be reduced.</p>	<p>Environmental Group for Procurements, all divisions and City enterprises</p>	<p>2020–2025</p>

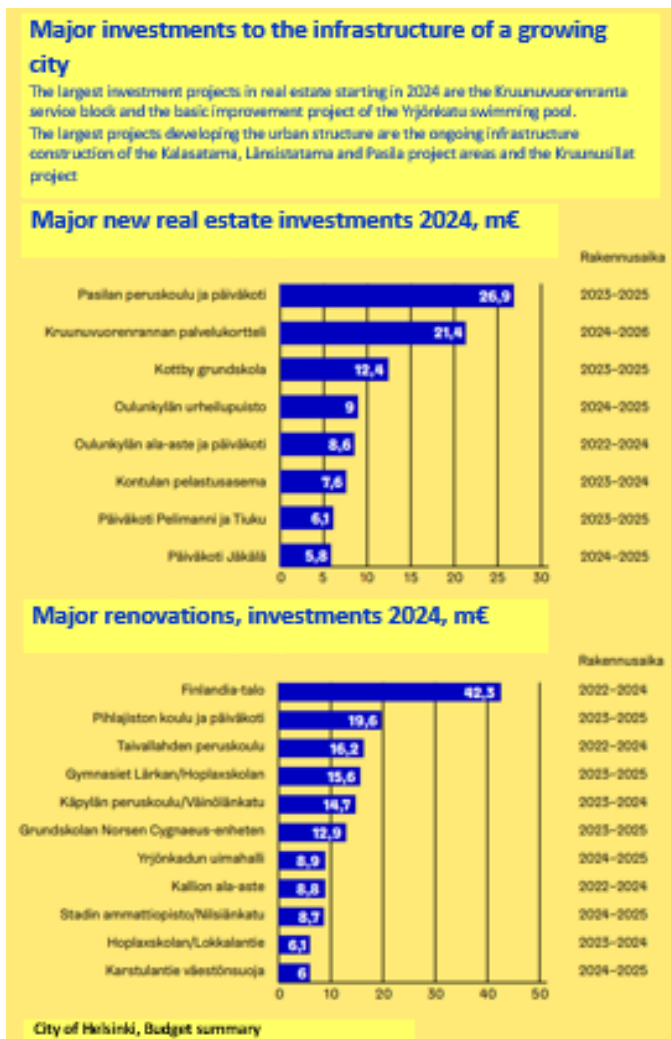


<p><b>23.</b> Piloting new technologies for the sustainable utilisation of green waste.</p> <ul style="list-style-type: none"> <li>Continuing the collaboration with HSY to use the pyrolysis process for the City's green waste. In the pilot phase, the invasive species waste from Stara's operations will be offered for testing purposes.</li> <li>Examining the possibility of participating in the 'city refinery' demonstration project of Helen, VTT and Lassila &amp; Tikanoja.</li> </ul>	<p>Buildings and Public Areas / Maintenance, Stara, HSY, Executive Office, Helen, Services and Permits / Environmental Services</p>	<p>2020–2025</p>
<p><b>24.</b> Participating in projects that study and promote the use of biochar.</p> <ul style="list-style-type: none"> <li>We will actively monitor the preparation of the national guidelines on the use of biochar.</li> <li>We will network with other operators, for example via the biochar map of the Finnish Biochar Association.</li> </ul>	<p>Land Use and City Structure, Buildings and Public Areas / Maintenance</p>	<p>2020 →</p>
<p><b>26.</b> Preparing the principles for promoting sharing economy in detailed planning. We will require:</p> <ul style="list-style-type: none"> <li>Neighbourhood-specific plans for shared premises and shared and rentable electric car charging points.</li> <li>Facility reservations for sharing economy services in land use planning.</li> <li>At the minimum, cables for smart locking systems in buildings and carparks.</li> </ul>	<p>Land Use and City Structure, Executive Office / Area Construction</p>	<p>2020–2022</p>
<p><b>27.</b> Preparing a guide on circular and sharing economy services available for residential buildings. The guide will provide support for identifying the building's and residents' needs and purchasing and using the services that meet these needs.</p>	<p>Forum Virium, Heka, Services and Permits / Environmental Services</p>	<p>2020–2021</p>
<p><b>28.</b> Preparing City-level planning instructions for premises used by residents. The instructions will concern the City's new service buildings and those to be renovated.</p> <ul style="list-style-type: none"> <li>The instructions will include policies on smart locking solutions, facility compartmentalisation, and connecting building automatics to the reservation systems.</li> </ul>	<p>Buildings and Public Areas / Built Assets Management, Culture and Leisure, Heka</p>	<p>2020–2022</p>



<p><b>29.</b> Creating a monitoring system for the use of the City’s premises, with the aim of using the premises more efficiently.</p> <ul style="list-style-type: none"> <li>Integrating a monitoring system into the facility reservation systems.</li> <li>Integrating facility reservation systems into the building automation in new buildings and those to be renovated.</li> </ul>	<p>Buildings and Public Areas / Built Assets Management, and the group under the management model for facility reservations (all divisions)</p>	<p>2020–2022</p>
<p><b>30.</b> The planning of the City’s service buildings will include active seeking for solutions that can make the utilisation of the premises more efficient and avoid unnecessary construction.</p> <ul style="list-style-type: none"> <li>Building flexibly modifiable multi-purpose spaces.</li> <li>Testing solutions similar to “school as a service,” in which rarely used premises are rented from other operators.</li> </ul>	<p>Education, Culture and Leisure, Social Services and Health Care, Buildings and Public Areas / Built Assets Management</p>	<p>2020 →</p>
<p><b>30.</b> The planning of the City’s service buildings will include active seeking for solutions that can make the utilisation of the premises more efficient and avoid unnecessary construction.</p> <ul style="list-style-type: none"> <li>Building flexibly modifiable multi-purpose spaces.</li> <li>Testing solutions similar to “school as a service,” in which rarely used premises are rented from other operators.</li> </ul>	<p>Education, Culture and Leisure, Social Services and Health Care, Buildings and Public Areas / Built Assets Management</p>	<p>2020 →</p>
<p><b>31.</b> Preparing the City’s model for strengthening the ecosystem of bio-economy and circular economy companies. The goal is to create conditions for industrial and urban symbioses where operators add value for each other by efficiently using each others’ side flows, technology, services and energy.</p>	<p>Executive Office / Economic Development / Area Construction, Land Use and City Structure</p>	<p>2020–2021</p>

## Biggest investments 2024

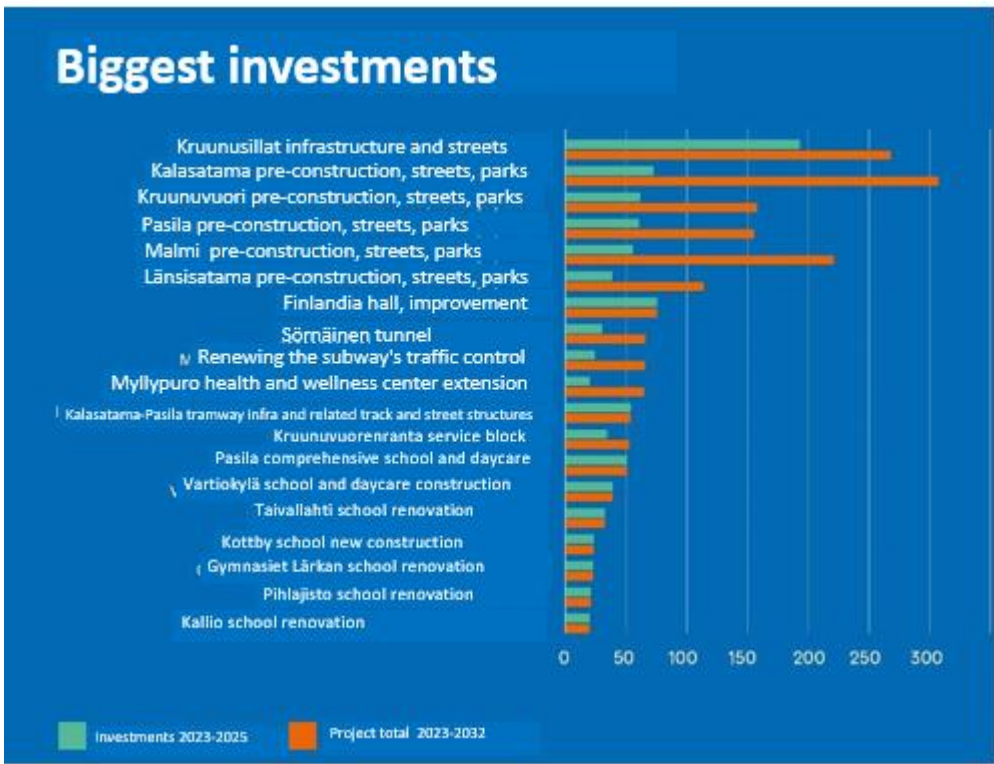


This is a list of the biggest investments in the city, the first category for new buildings and the second for renovations.

Most of the new buildings are schools. The biggest renovation project is the Finlandia hall, a big event and concert hall, the rest are schools and a swimming pool.

## Long-term Infrastructure projects

Below you can see the list of the 20 biggest investments in the period 2023-2032 that will take place in Helsinki. The green line shows the investments (in millions of euros) in the next three years and the red line in the next 10 years. The first one is a huge bridges + tram project, the next five are new areas to be built (pre-construction, parks and streets) but there are also investments into extension of the metro lines and new tram lines, the last seven are new schools to be built. Except for the co-financing from the state which is stated in the next chapter, 88,9 % of the investments of 893 million this year is financed through tax revenue.



Eur million	Investments 2023-2025	Project total 2023-2032
Kruunusillat infrastructure and streets	192,6	267,3
Kalasatama pre-construction, streets, parks	72,3	306,5
Kruunuvuori pre-construction, streets, parks	61,3	157,5
Pasila pre-construction, streets, parks	60,3	155,0
Malmi pre-construction, streets, parks	55,6	220,4
Länsisatama pre-construction, streets, parks	38,4	113,8
Finlandia hall, improvement	75,2	75,2
Sörnäinen tunnel	30,0	66,0
Renewing the subway's traffic control system	24,1	65,6
Myllypuro health and wellness center extension	20,0	64,4
Kalasatama-Pasila tramway infra and related track and street structures	53,6	53,6
Kruunuvuorenranta service block	34,1	52,4
Pasila comprehensive school and daycare	50,5	50,5
Vartiokylä school and daycare construction	38,8	38,8
Taivallahti school renovation	32,4	32,4
Kottby school new construction	23,2	23,2
Gymnasiet Lärkan school renovation	22,8	22,8
Pihlajisto school renovation	21,0	21,0
Kallio school renovation	20,0	20,0



## National co-financing on long-term infrastructure projects

The agreements concerning land use, housing and transport are concluded by the State of Finland with the largest urban regions. The purpose of the agreements is to facilitate and support the cooperation between municipalities in urban regions and between municipalities and the State in the guidance related to the urban structure and coordination of land use, housing and transport.

The key aim is to improve the functioning and competitiveness of urban regions and ensure a balanced development of municipalities. The matters specified in the agreements include the objectives for land use development and housing production in the coming years and key development projects concerning the transport network.

The parties to the agreements representing the State are the Ministry of the Environment, Ministry of Transport and Communications, Ministry of Economic Affairs and Employment, Ministry of Finance, Housing Finance and Development Centre of Finland (ARA), Finnish Transport Infrastructure Agency, Finnish Transport and Communications Agency Traficom, and the Centre for Economic Development, Transport and the Environment of the region concerned. The agreements concerning the urban regions of Helsinki, Tampere, Turku and Oulu for 2020–2031 have been signed on 2 June 2020

The agreement for 2020-31 state low carbon and sustainable land use , housing and transport as a priority while also looking at balances development between regions and lowering homelessness.

Actions that are co-financed by the state and have an effect on Helsinki's climate plan include :

- Viikki-Malmi fast tram line. The state will pay 30 % of costs no more than than 7,5 million euros
- The Vihdintie fast tram line planning and construction and other sustainable actions connected to it. The state will pay 105 million euros.
- Mobility system improvements in the Helsinki region. State will pay 15 million euros
- Improvements in walking and cycling infrastructures in Helsinki. State will pay 2,5 million to regional improvements and open up new funding for the amount of 4,5 million euro that the regions cities can apply for.
- Helsinki together with Espoo will make improvements to metrolines to increase their capacity.



The biggest investment project **Kruunusillat ( bridges and tramway-460 MEUR)** has calculated emissions from construction and use phase:

## Kruunusillat-raitiotie



Kruunusillat calculated the climate impacts of the tramway project. The calculation generated significant emission calculation data for infrastructure projects, which was handed over to the Finnish Environment Institute's CO2 database for use.

The calculation included three new bridges, approximately eight kilometres of new tramway with technical systems, and the emissions estimated to be generated from the use and maintenance of the tramway over 50 years\*. The total emissions would be around 129,000 tCO<sub>2</sub>e\*\*. During construction, approximately 97,800 tCO<sub>2</sub>e (76%) of these are generated, and during operation, maintenance and the end-of-life phase, approximately 31,200 tCO<sub>2</sub>e (24%).

The combined emissions correspond to the annual emissions of about 12,900 average Finns, or about two months' emissions of the Hanasaari coal power plant in Helsinki, which was decommissioned a year ago.

The most significant emissions are caused by the production of materials during construction, for example concrete, steel, asphalt and crushed stone, and the energy consumption during operation of the tramway.

Construction emissions have been reduced at the construction site in the following ways: by choosing low-emission concrete, recycled stone products and other construction materials, by making good use of construction site masses within the construction site, and by using renewable diesel in work machines.

It is not possible to unequivocally state an emission figure based on which Kruunusillat would be good or bad in terms of emissions. Without the new bridge connection to Laajasalo, it would not have been possible to plan new apartments for nearly 20,000 residents. Thus, the real carbon footprint comparison option would be related to where and how these 20,000 people would live instead of Laajasalo and how they would move. This would be very difficult to calculate.

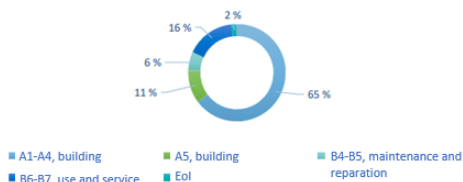
In turn, ferry traffic, which is often presented to the public as climate-friendly, would not have met the service goals set for Laajasalo's new public transport.

In addition, the Kruunusillat tram forms part of the city's network-like public transport, and it is not meaningful to look at it alone. It is part of a functioning whole. The Kruunusillat tram, among other things, prevents overloading of the East Metro.

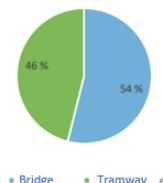


\*50 years was chosen as the review period for operation and maintenance because it is a common way to calculate the life cycle emissions of infrastructure projects. It is still good to note that, for example, Kruunuvuorensilta's technical service life is 200 years.

Kruunusillat project CO2 lifecycle emissions by phase (128983 tCO2e)



Share of total emissions (128983 tCO2e)

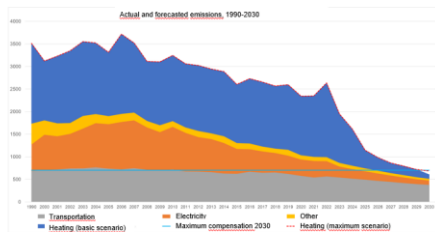


Construction phase (green) and operational (blue)

Bridges (green) tramway (blue)

### B-2.3: Summary strategy for residual emissions

**Emissions are projected to decline by 80% by 2030 (compared to 1990)**



In 2030 total emissions will be 607-687 kt CO<sub>2</sub>-e

- heating (2030) 90-170 kt CO<sub>2</sub>-ekv
- The decrease from year 1990 (or 2008 as they are practically the same ) will be **81-83%**

Helsinki is at the moment making scenarios for the remaining 17-19 %. The city has conducted three separate consultant analysis' in this field

- Calculation of the existing carbon sinks in Helsinki
- Possibilities of increasing natural sinks and a look into the feasibility of technical sinks in Helsinki
- Compensation programs, regulation, challenges and costs

The natural carbon sinks in Helsinki are about 3-4% of the current emissions and about 10 % of the remaining emissions in 2030 (about 70kt co<sub>2</sub>e). There's very little possibilities of increasing them in a rapidly growing city.

The scenarios and calculations cannot yet be published as they haven't been through the political process but we have made cost-impact analysis of all possible means, including various compensation programs, technical sinks and additional actions in emission reduction. The political decision-making process will decide which combination Helsinki will use.





## 2.3 Module B-3 Indicators for Monitoring, Evaluation and Learning

B-3.1: Impact Pathways						
Outcomes/ impacts addressed	Action/ project	Indicator No. (unique identified)	Indicator name	Target values		
				2025	2027	2030
Overall impact on CO <sub>2</sub> e in scope 1 & 2 emissions		1	CO <sub>2</sub> e emissions in the city	1166kt CO <sub>2</sub> e (from 1947 in 2023)	905 kt CO <sub>2</sub> e	600-687 kt CO <sub>2</sub> e
Actions for decreasing emissions from heating	actions 1-12	2	Overall emissions from heating	400 kt CO <sub>2</sub> e (from 1086 in 2023)	220 kt CO <sub>2</sub> e	90 kt CO <sub>2</sub> e
Actions for decreasing emissions from transport	Actions 17-22	3	Overall emissions in transport	510 -kt CO <sub>2</sub> e (from 528 in 2023)		370 kt CO <sub>2</sub> e
		4	-Share of journeys taken by private cars of all journeys		485 kt CO <sub>2</sub> e	
		5	-Share of sustainable journeys out of all journeys in the city -Increased bike lanes			



		6	<p>-Improved e-charging infrastructure</p> <p>-Proportion of electric and gas cars of the passenger car population</p>	currently the number is 14%		<p>140+140 km</p> <p>800 new chargers</p>
Actions for decreasing emissions from electricity	actions 13-16	8	<b>-Overall emissions from electricity</b>	189 kt co2e (from 262 in 2023)	145 kt co2e	98 kt co2e
Actions for decreasing emissions from built environment	Actions 24-32	9	-A limit value for the lifecycle carbon footprint of new residential blocks of flats set	16kg co2e /m <sup>2</sup> /a		Has not been set yet
		10	-The requirement of using low-carbon concrete is to be added in the procurement criteria. The requirement will enter into force on 1 January 2023. The level of the requirements will be reviewed annually.			
		11	-The emissions of the preconstruction of the former Malmi Airport will be reduced by 50% in 2020–2030, compared to the preliminary			



			preconstruction plan.			
Actions for green infrastructure and nature based solutions	Actions 33-34	12 13	-The green area factor -Tree canopy cover	has not been set yet		
Actions for circular economy	Action 35	14	Increase of circularity in the city			

The key indicator for monitoring is the development of the City’s total emissions. The progress on the target will also be monitored through the following sector-specific indicators:

- specific emission factor for district heating (an indicator in Helen’s development programme)
- total heating consumption;
- total emissions of transport
- emissions of electricity consumption (including the volume of electricity consumed and the emission factor for electricity production).

In addition to this, the distribution of the actions’ emission categorization and the progress on individual actions will be monitored when this is necessary for seeing the strategic overview, maintaining situational awareness and allocating resources appropriately. The indicators for individual actions are defined when the action is established. An essential indicator to follow is the development of total direct emissions in Helsinki. Emissions are being monitored by using a verifiable calculation model. To ensure the availability of up-to-date information, the aim is to accelerate the assessment cycle. At the moment, the realization of direct emissions (Scopes 1 and 2) is being monitored through the shared GHG emission calculation system of the Metropolitan Area, produced by the Helsinki Region Environmental Services Authority (HSY). The monitoring is based on the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) and built on the framework of the IPCC’s calculation methods and parameters for national emission inventories and emission factors for fuel classifications as defined by Statistics Finland (more information on the method: HSY 2022A). The plan’s sector-specific estimates for emissions development will be carried out so that they are compatible with HSY’s emissions monitoring. The development of the specific emission factor for district heating was assessed by HSY based on the production scenarios delivered by the energy company Helen (HSY 2022B). The development of specific emissions from electricity consumption is based on Fingrid’s growth forecast for electricity consumption in Finland and on Finnish Energy’s (2020) forecast for the development of



specific emissions from electricity consumption. The emissions development for transport is based on an estimate by WSP (WSP Finland Oy 2022).

<b>B-3.2: Indicator Metadata</b>	
(For each indicator selected)	
Indicator Name	<b>CO2e emssions in the city</b>
Indicator Unit	kt CO <sub>2</sub> equivalent
Definition	GHG emissions in the city
Calculation	HSY report on emissions in Helsinki
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	co2e
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	CoM
Data requirements	
Expected data source	HSY annual calculations of emissions in the capital region cities
Is the data source local or regional/national?	regional
Expected availability	updated annually in June
B-3.2: Indicator Metadata	
(For each indicator selected)	
Indicator Name	<b>overall emissons from heating</b>
Indicator Unit	kt CO <sub>2</sub> equivalent
Definition	GHG emissions from heating
Calculation	HSY report on emissions in Helsinki
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	District heating, geothermal heat,
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	Specify co-benefit
Is the indicator useful for monitoring the output/impact of action(s)?	[yes/no]
If yes, which action and impact pathway is it relevant for?	Actions 1-12



Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	CoM
Data requirements	
Expected data source	HSY annual calculations of emissions in the capital region cities
Is the data source local or regional/national?	Regional/local
Expected availability	June every year

**B-3.2: Indicator Metadata**

(For each indicator selected)

Indicator Name	Overall emissions from transport
Indicator Unit	co2e
Definition	GHG emissions from heating
Calculation	Helen /HSY

**Indicator Context**

Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	transport
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	actions 17-22
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	yes CoM

**Data requirements**

Expected data source	Helen/HSY
Is the data source local or regional/national?	local/regional
Expected availability	June every year

**B-3.2: Indicator Metadata**

(For each indicator selected)

Indicator Name	share of journeys taken by private cars of all journeys+ share of sustainable journeys out of all journeys in the city
Indicator Unit	percentage

Definition	measures the amount of sustainable transport in the city, a target level is set for bike journeys /all journeys to increase from current 9 % to 20 % by 2030. Other journeys are monitored without a set target
Calculation	

**Indicator Context**

Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	transport
Does the indicator measure indirect impacts (i.e., co- benefits)?	yes



If yes, which co-benefit does it measure?	sustainable modes of transport increase wellbeing and activity
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	actions 17-21
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
<b>Data requirements</b>	
Expected data source	city/HSL data collection
Is the data source local or regional/national?	local/regional
Expected availability	annually
<b>B-3.2: Indicator Metadata</b>	
(For each indicator selected)	
Indicator Name	Increased bike lanes
Indicator Unit	km
Definition	new bike lanes built in the city
Calculation	km of new bike lanes
<b>Indicator Context</b>	
Indicator Context	Proportion of electric and gas cars of the passenger car population
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	transport
Does the indicator measure indirect impacts (i.e., co- benefits)?	yes
If yes, which co-benefit does it measure?	better air quality, less noise
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	actions 19-21
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
<b>Data requirements</b>	
Expected data source	city data collection
Is the data source local or regional/national?	local/regional
Expected availability	annually
<b>B-3.2: Indicator Metadata</b>	
(For each indicator selected)	
Indicator Name	Increased bike lanes
Indicator Unit	km
Definition	new bike lanes built in the city
Calculation	km of new bike lanes
<b>Indicator Context</b>	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	Fields of action according to GHG inventory format – Module A-1
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	Specify co-benefit
Is the indicator useful for monitoring the output/impact of action(s)?	yes



If yes, which action and impact pathway is it relevant for?	actions 19-20
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
<b>Data requirements</b>	
Expected data source	city data collection
Is the data source local or regional/national?	local
Expected availability	annually
<b>B-3.2: Indicator Metadata</b>	
(For each indicator selected)	
Indicator Name	overall emissions from electricity
Indicator Unit	co2e
Definition	Amount of GHG emissions from electricity consumption
Calculation	HSY data for GHG emissions in the capital region
<b>Indicator Context</b>	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	Electricity
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	actions 13-16
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	yes CoM
<b>Data requirements</b>	
Expected data source	HSY
Is the data source local or regional/national?	regional /local
Expected availability	Annually in June
<b>B-3.2: Indicator Metadata</b>	
(For each indicator selected)	
Indicator Name	A limit value for the lifecycle carbon footprint of new residential blocks of flats set
Indicator Unit	Regulatory action
Definition	The binding regulation for lifecycle limit for emissions is set
Calculation	
<b>Indicator Context</b>	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	Actions for built environment
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	Specify co-benefit
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	action 24



Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
<b>Data requirements</b>	
Expected data source	City reporting
Is the data source local or regional/national?	Local
Expected availability	Annually, in environmental report of the city
<b>B-3.2: Indicator Metadata</b>	
(For each indicator selected)	
Indicator Name	Requirement of using low-carbon concrete is to be added in the procurement criteria.
Indicator Unit	Regulatory action
Definition	Low-carbon concrete is the requirement used in city procurement
Calculation	
<b>Indicator Context</b>	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	action 25
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
<b>Data requirements</b>	
Expected data source	City reporting
Is the data source local or regional/national?	Local
Expected availability	Annually, in environmental report of the city
<b>B-3.2: Indicator Metadata</b>	
(For each indicator selected)	
Indicator Name	The emissions of the preconstruction of the former Malmi Airport will be reduced by 50% in 2020–2030
Indicator Unit	Co2e
Definition	The emissions of the preconstruction of the former Malmi Airport will be reduced by 50% in 2020–2030
Calculation	City data
<b>Indicator Context</b>	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	Action 26
Does the indicator measure indirect impacts (i.e., co- benefits)?	no
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Action 26
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
<b>Data requirements</b>	





Expected data source	Data collection of the city
Is the data source local or regional/national?	Local
Expected availability	Annually in Environmental report of the city
<b>B-3.2: Indicator Metadata</b>	
(For each indicator selected)	
Indicator Name	Green area factor
Indicator Unit	no of building permits that have used green area factor
Definition	no of building permits that have used green area factor
Calculation	City data from building permits
<b>Indicator Context</b>	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	Actions for green infrastructure and nature-based solutions
Does the indicator measure indirect impacts (i.e., co- benefits)?	yes
If yes, which co-benefit does it measure?	Green areas in the city help with adaptation actions and also linked to better health
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	action 33
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
<b>Data requirements</b>	
Expected data source	City data
Is the data source local or regional/national?	Local
Expected availability	Annually in Environmental report of the city
<b>B-3.2: Indicator Metadata</b>	
(For each indicator selected)	
Indicator Name	Tree Canopy in the city
Indicator Unit	Percentage
Definition	A minimum level for the cover (%) on district of even neighborhood level will be set.
Calculation	From city data
<b>Indicator Context</b>	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	Actions for green infrastructure and nature based solutions
Does the indicator measure indirect impacts (i.e., co- benefits)?	Yes
If yes, which co-benefit does it measure?	Linked to adaptation actions in the city. Also linked to better air quality and liveability
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Action 34
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
<b>Data requirements</b>	



Expected data source	City data
Is the data source local or regional/national?	Local
Expected availability	Annually in Environmental report of the city
<b>B-3.2: Indicator Metadata</b>	
(For each indicator selected)	
Indicator Name	Increased level of circularity in the city
Indicator Unit	Measurement of material flows in the city
Definition	Measurement of material flows in the city
Calculation	City data, possibly with external expertise used
<b>Indicator Context</b>	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	Circular economy
Does the indicator measure indirect impacts (i.e., co- benefits)?	yes
If yes, which co-benefit does it measure?	Circular economy links to many other fields, including resource smartness, planetary boundaries etc
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Action 35
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	no
<b>Data requirements</b>	
Expected data source	Not defined yet
Is the data source local or regional/national?	Local
Expected availability	Not known yet

The city also measures many other things which are linked to air quality, noise level, health, soil and water protection. The are calculated on an annual basis and compared to previous years but no specific target has been set. Therefore they are described here separately from the previous indicators.



### Indicators for air protection

Indicator	2022	2023	Definition
The annual average nitrogen dioxide concentration at the Mannerheimintie measurement station (limit value of 40 µg/m <sup>3</sup> , as specified in the EU directive)	18.9 µg/m <sup>3</sup>	17.0 µg/m <sup>3</sup>	The indicator has improved
The annual average nitrogen dioxide concentration at the Mäkeläinkatu measurement station (limit value of 40 µg/m <sup>3</sup> , as specified in the EU directive)	22,0 µg/m <sup>3</sup>	21,0 µg/m <sup>3</sup>	The indicator has improved
Number of days when the limit value level of particulate matter was exceeded at the Mannerheimintie measurement station in Helsinki (EU directive: max. 35 days per year)	11 pcs/a	20 pcs/a	The indicator has deteriorated
Number of days when the limit value level of particulate matter was exceeded at the Mäkeläinkatu measurement station in Helsinki (EU directive: max. 35 days per year)	19 pcs/a	27 pcs/a	The indicator has deteriorated
Annual average amount of inhalable particles (PM10) at the Kallio measurement station	9.4 µg/m <sup>3</sup>	9.07 µg/m <sup>3</sup>	The indicator has improved
Annual average of fine particles (PM2.5) at the Kallio measurement station	5.1 µg/m <sup>3</sup>	4.89 µg/m <sup>3</sup>	The indicator has improved

### Indicators for noise abatement

Indicator	2022	2023	Definition
Number of residents exposed to road traffic noise (over 55 dB LAeq7-22) based on the noise survey made every five years	256,541 (2022)	-	

### Indicators for environmental awareness

Indicator	2022	2023	Definition
Number of new eco-supporters who completed basic training (persons/a)	53 persons	62 persons	The indicator has improved
Proportion of environmentally certified Helsinki educational institutions, schools and daycare centres of all	8 %	7 %	The indicator has deteriorated

### Indicators for circular economy

Indicator	2022	2023	Definition
Amount of soil masses utilised (t/a)	659,751 t	790,000 t	The indicator has improved
Number of employees who participated in circular economy training (persons/a)	202 persons	175 persons	The indicator has deteriorated



### Indicators for environmental management and partnerships

Indicator	2022	2023	Definition
Proportion of divisions, public enterprises and subsidiary communities where environmental management is at least at the level of the lighter environmental management systems (proportion of all).	56 %	53 %	The indicator has deteriorated

### Indicators for water protection

Indicator	2022	2023	Definition
Nitrogen emissions to the sea from Viikinmäki Wastewater Treatment Plant (t/a)	605 t/a	707 t/a	The indicator has deteriorated
Phosphorus emissions to the sea from Viikinmäki Wastewater Treatment Plant (t/a)	22 t/a	26 t/a	The indicator has deteriorated
Proportion of Helsinki's coastal waters in good condition	0 %	0 %	No changes in the indicator's development
Proportion of Helsinki's groundwater basins in good condition	80 %	80 %	No changes in the indicator's development

### Indicators for nature protection and soil

Indicator	2022	2023	Definition
Share of nature reserves of total land area	4,0 %	4,4 %	The indicator has improved
Change in the number and area of nature reserves (from previous year)	+4 pcs ja +42.1 ha	+5 pcs ja +73.4 ha	The indicator has improved
Total land area of water-permeable areas in Helsinki (available every second year)	64 %	-	The indicator will next be calculated in 2024.
The area of forests and wooded areas or their relative proportion of all land areas (available every second year)	42 %	-	The indicator is calculated every second year, the next time being in 2024.
Change in the number of natural areas (compared to previous year)	The total area of nature areas in 2022 was 8,399 ha (39% of the city's land area).	(not available)	Data on the amount of nature areas in 2022 produced comparably for the first time.
Change in the number of bumblebee specimens	-61 % (from 2021)	+41 % (from 2022)	The indicator has improved. (It must be noted that annual fluctuations in insect populations are normal, and a distinct trend can only be observed in the long term.)
Change in the number of European honeybee specimens	-28 % (from 2021)	-2 % (from 2022)	No substantial change in the development of the indicator.

The City's services promoted environmental awareness among residents of all ages .Helsinki residents participated actively in taking care of the tidiness of the environment. In 2023, residents, residents' associations and schools organised a total of 189 environmental cleaning sessions, in which more than 30,000 volunteers participated. The City's Park Pal activities attracted nearly 500 volunteers to pick up litter across Helsinki. The number of environment-themed books borrowed from libraries' 'eco-shelves' increased to 4,141 from 3,000 in the previous year. A challenge entitled Library Encourages Activism was launched in the spring. The challenge encourages people to engage in



environmental activities by means of an activist diploma. The City's libraries also held several events in cooperation with environmental associations. Stoa Cultural Centre invited East Helsinki residents of different ages to delve into themes of a sustainable future through art-based environmental education, gallery activities and community art. Local forests served as outdoor classrooms and venues for nature immersion for babies, wintertime forest adventures for preschoolers, nature art courses for school pupils, environmental empathy workshops for young people, and performative relaxation sessions for adults alike. Libraries carried out the Forest Visiting letter exchange programme at service houses, involving elderly people and children in daycare encountering each other under a forest theme. In 2023, Stoa's environment-themed courses and workshops were attended by 3,500 people, performances by 1,600 people and exhibitions by 11,700 people. Youth Services' environmental and climate education activities were attended by nearly 36,000 young people. Of the young people taking part in the activities, the largest age group was ages 10–12 (31.7%), followed by ages 13–15 (30.4%). Of all the environmental activities provided, activities produced by young people comprised a total of 21 per cent. Early in the year, the management of Youth Services approved the department's environmental programme for 2023–2025. The objectives of the programme are connected to the Helsinki City Strategy.

### Evaluation and learning

Helsinki's City Strategy for 2021–2025, entitled *A Place for Growth*, states that Helsinki will have a good future when it is based on sustainable growth. Sustainable growth is in harmony with ecological boundary conditions and creates socially, economically, and culturally sustainable wellbeing. One focus of the strategy is ambitious climate responsibility and nature conservation. The objective is to facilitate a carbon-neutral Helsinki that achieves its goals, sets an example and does more than its fair share in preventing climate change. The city is adapting to the consequences of the planet's climate crisis by preparing for extreme weather phenomena and their indirect impacts. Helsinki is continuing its shift towards a circular economy and is actively protecting and cherishing its diverse nature. The City is ensuring that all residents will continue to have local nature sites only a short distance away. Helsinki cherishes the Baltic Sea and its shores and is decreasing emissions into the sea.

The indicators set for the city's environmental protection objectives for 2040 and the carbon neutrality plan 2030 also partially monitor the implementation of the City Strategy. In addition to the Environmental Report and the annual check for the carbon neutrality plan indicators, Helsinki Environmental Statistics also offer multifaceted information about the City's environmental status. The information in the Environmental Report and statistics is open data. The City of Helsinki's objective is to make continuous improvement of environmental and climate change management a natural part of all management operations. The objectives are set for the City's divisions, as well as enterprises and subsidiaries with significant environmental impacts, to have an audited environmental management system and/ or a responsibility programme that takes the UN Sustainable Development Goals extensively into account. The City also aims to have its other enterprises and subsidiaries include environmental management in their operations by adhering to the principles of lighter environmental management systems and/or creating a responsibility programme for themselves by 2025. The Helsinki Group uses the EcoCompass, Green Office and ISO14001 environmental management systems, as well as the Eco-Schools programme and the OKKA certificate for sustainable development for educational institutions and daycare centres.

Helsinki continued its active work towards achieving the Sustainable Development Goals of the 2030 Agenda. The city submitted its third Voluntary Local Review to the UN and took part in the UN's High-Level Political Forum (HLPF) on sustainable development in July 2023. Helsinki's third review painted an overall picture of the City's state and progress in the realisation of the Sustainable Development Goals. Helsinki is very successful in realising many social sustainability objectives, but the city has plenty of challenges with themes of ecological sustainability, such as coordinating material flows and the city's growth with biodiversity. A City-level sustainable development working group took part in creating the review, as did a number of the City's sustainability specialists, who highlighted the City's



successes and areas in need of development. The Voluntary Local Review can be read on the Sustainable Helsinki website (<https://www.hel.fi/static/kanslia/Julkaisut/2023/from-agenda-to-action-2023.pdf>)

The SDG voluntary review also gives recommendations to the city on how to improve. These recommendations are taken into account by the city council and all the divisions in the city.

### Recommendations based on the results of the report:

- 1.** Helsinki should set more longer-term sustainability targets that go beyond the council term, as well as progress indicators and target values for its sustainability indicators.
- 2.** The understanding of sustainability issues and knowledge-based management must be developed at all levels, from strategic management to the provision of different services, for example by using the sustainability management tools of the six cities -network.
- 3.** The links between the Sustainable Development Goals should be better identified, and the most relevant strategic actions should be identified for more effective implementation as part of key processes, such as economic, operational, land-use and construction planning.
- 4.** Conflicting goals should be addressed more thoroughly, different impacts identified, and goals transparently reconciled, for example in relation to the growth of the city and the reconciliation of nature values.
- 5.** Effective implementation of sustainability goals and active monitoring of their achievement must be strengthened, and long-term thinking must be increased. Attention must also be paid to the effectiveness of measures and indicators at a more operational level.
- 6.** Helsinki should invest even more in promoting ecological sustainability and combating climate change and also pay attention to global impacts. Ecological impacts and planetary boundary conditions should be better integrated into the assessment and decision-making process.
- 7.** There should be clearer coordination between the many ecological sustainability programmes, for example through updating environmental policy and enhancing environmental management.
- 8.** Sustainable economy should be promoted in the long term by assessing lifecycle costs and investing in circular and sharing economy and preventive services.
- 9.** Local nature and the pleasantness of urban space should be invested in, and their diverse impacts on people's health and wellbeing, the city's attractiveness and biodiversity should be better identified and valued.
- 10.** A clearer integration of the equality and non-discrimination perspective into core functions, such as the different levels of economic and operational planning and the impact assessment of decisions, would be important.
- 11.** Cooperation with and the participation of residents, companies, research operators and the third sector should be further developed and made more effective in order to address sustainability issues.

The City Council has approved the City Strategy for 2021–2025, which is a document that steers the City's operations. The City Board has approved the City's environmental protection objectives for 2040, which complement the current City Strategy with regard to environmental protection. The environmental protection objectives set are medium-term and long-term, and they are pursued through the programmes of various environmental protection sectors, the most significant of which are listed below with the body that decided on the programme in parentheses:

- Carbon-neutral Helsinki Emissions Reduction Plan (City Board)
- Climate change adaptation policies for 2019–2025 (City Board)
- Noise Abatement Action Plan 2018–2022 (Environment and Permits Sub-committee)
- Air Protection Plan 2017–2024 (Environment and Permits Sub-committee)
- Baltic Sea Action Plan 2024–2028 (City Board)



- City of Helsinki Nature Conservation Programme 2015–2024 (Environment Committee)
- City of Helsinki Biodiversity Action Plan 2021–2028 (Urban Environment Committee)
- Action Plan for the Circular and Sharing Economy (City Board)
- Littering Mitigation Action Plan 2022–2025 (City Board)

The carbon neutrality target is measured mainly through the decrease of emissions and checked annually. If the expected annual decrease is not realised additional actions will be added to the following years action plans and the city budget. The monitoring is done by carbon neutrality steering group that has representation of the mayors, the highest city officials and experts.

### 3 Part C – Enabling Climate Neutrality by 2030

#### 3.1 Module C-1 Governance Innovation Interventions

**C-1.1: Description or visualisation of the participatory governance model for climate neutrality**

See section A-3.1 for Helsinki’s participatory governance model and Carbon neutrality plan governance.

**C.1.2: Sample Table: Relations between governance innovations, systems, and impact pathways**

Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
Alliance model and Breem framework for big infrastructure projects like trams (the model is used for many projects but the examples are from tramline Pasila-Kalasadama)	City as the buyer, the construction companies, designers and evaluators working together with joint goals and KPI’s	-Sub-optimization -Different KPI’s clashing -financial targets clashing with environmental targets	Metropolitan Area Transport Ltd, city, construction companies, design companies, analysts	Alliance model enabled several goals to be kept at the same time. The primary goal was good public transport service level but they we able to look into green areas, noise reduction, lighting, circular economy and other factors	Co-benefits included : Long life-cycle of materials, environmental impact and good city-scape.



<p>Collaboration with national government. Joint role in decreasing transport emissions</p>	<p>A lot of the most impactful actions in transport need collaboration with the state. These include road tolls, lowering of speed limits congestion charges and mandatory mixing biofuels with fuel</p>	<p>Most of the barriers in this category are regulatory but they are also dependent on how equality for higher prices is seen or how politically important keeping private car use as liberal as possible is seen. Also some technical barriers exist, like cheaper e-vehicles, and especially the heavy transport sector's ability to use alternative fuels or electricity</p>	<p>State, region and cities in the capital region, citizens</p>	<p>A lined up set of policies between the state and cities would enable a lot quicker change of regulation and policies.</p>	<p>Air quality, noise reduction, active mobility</p>
<p>Collaboaration with the construction sector</p>	<p>While Helsinki holds a lot of power to change the regulatory framework for construction it's nonetheless important to have an open dialogue with construction companies to see what is really possible in the field. The collaboration with the state is also important</p>	<p>There are many barriers that exist in the construction sector : price of materials, avaiability of materials, knowhow of how to calculate emissions from different materials, new ways of working (the know how of construction workers), knowhow of circularity and its impact</p>	<p>Construction companies, research institutes, construction sector interest groups, the state, city planning and construction departments, climate unit</p>	<p>With collaboration and constant feedback loops the process can be smooth and also enable the Helsinki based companies to be fore-runners in the field of emission-friendly construction</p>	<p>New innovations, new companies, good city-scape, climate adapation actions</p>





**Description of governance innovation interventions**

**The alliance model.** using the Breem framework used for big infrastructure projects like the new tramways enables the city and city owned Metropolitan area transport ltd to steer the project in a way that keeps various goals at the same time

**Project objectives**



The Breem framework to keep track of all the different aspects

**BREEAM Infrastructure framework guided operations**



In accordance with the responsibility goals of the client and the project, the aim has been to promote low-carbon infrastructure construction. This has been supported by the client's commitment to the Carbon-neutral Helsinki and Carbon-neutral Urban Transport 2030 targets, as well as to the Green Deal for an emission-free construction site. To monitor and verify the objective, an LCA calculation was performed on the project at the beginning and end of the design. Criteria for construction site machinery and cars as well as fossil-free site electricity were created for the project during the design phase. A view of the site's renewable fuel monitoring tool was brought to the Situational Picture Wall, which was used as a project management tool. By using renewable fuel, the project reduced its emissions from the construction site by approximately ninety per cent. Construction emissions were also reduced by using lower-emission concrete in selected structures. By using low-carbon concrete products, the project saved more than seventeen percent emissions. Emissions were also reduced through resource-wise planning and implementation, such as circular economy and structures that require less material. In accordance with the BREEAM Land Use and Ecology criteria, an ecological survey was carried out for the project area. The survey identified the vegetation to be protected and presented suggestions for improvement to increase the diversity of biota in the area. Alien species in the area were removed based on the survey. The area was designed to be a high-quality, comfortable street environment with sustainable solutions. Recycled materials were used in the project area and diverse vegetation was realised. The requirements of climate change were taken into account in the selection of vegetation.



The project also used Responsible Procurement model

The goal of the client and the project was to promote responsible and environmental friendliness in material procurement. The project organised workshops on responsible procurement, where the principles of responsibility in procurement were sought and a set of criteria for principles of responsible procurement was drawn up from them. An environmental declaration (EPD), PVC-free plastic-free, mandatory criteria related to machinery and machinery were requested, and an obligation to commit to the project's responsibility principles in the procurement of subcontracts.

The project also looked into cityscape issues



Many different aspects in the cityscape were taken into consideration and improved. These include biodiversity

## Urban green - diverse, resilient vegetation

### Abundant species and seasonal diversity

Vegetation very diverse and different from traditional street vegetation, biologist involved in planning



### Consideration of local and characteristic vegetation

Mapping of vegetation in the area and exploitation of the local seed bank: *ruderate* areas, steppe plantations and seaside vegetation



### Biodiversity

Utilization of trees felled from the project area as decaying wood in various sculptural compositions



Bird and insect nests in the retaining wall, insect hotels in the Vallila Valley and flowering food plants of pollinators



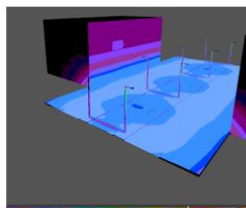




## Comfortable lighting – even during construction

**Well-designed lighting creates a pleasant environment and a sense of security and does not cause disturbing light**

Interference light is minimized. The lighting calculation ensured that no light was directed outside the street area to the windows of the apartments or up into the sky.



The lighting is uniform and there are no dark blind spots in the area. Lighting creates a safe urban environment. The lighting is glare-free and creates an unobstructed environment.



The Hermannin rantatie "secret route" creates atmosphere with bollard lamps. The vine columns illuminated from the inside support the scale of a pleasant walking environment in Kalasantama.



The planning and control of lighting in traffic areas during work creates usability in the area. In addition, the generation of disturbance light during the construction phase and during operation was examined.



## Pleasant soundscape along the tramway

All street green and green tracks have been proven to reduce noise.



In Vallilanlaakso, plenty of trees will be planted next to the tramway. At the western end of the Vallila valley, a gentle earthen rampart and a forest zone separating the street and park will be restored.



The noise analysis of Hermannin rantatie revealed that the volume will not increase, so noise walls are not needed. Vines reduce the perception of noise.



Rakennamme maailman toimivinta kaupunkia  
**KALASATAMASTA PASILAAN** 



## Accessibility

### Stop areas

Hermannin rantatie and Junonkatu piloting:

Longitudinal guiding tracks for the visually impaired at the stop platforms



Special level of accessibility pedestrian crossings.



### There are enough ergonomic and accessible seats in the area

The furniture complies with the furniture instructions and accessibility guidelines have been taken into account in their placement.



Feedback on the plans was received during an accessibility walk with the visually impaired and wheelchair users



### Social interaction and stakeholder cooperation: communal art projects

The Open Art School and graffiti art students painted works on a plywood construction site fence along Kalasadamankatu and Capella Parkway



Rakennamme maailman toimivinta kaupunkia  
**KALASATAMASTA PASILAAN**

### Collaboration with national government. Joint role in decreasing transport emissions

The collaboration model with the state and region on transport innovations is very important as legal and regulatory framework doesn't allow the cities to single handedly set up all the possible actions. The state is also responsible for emission reducing actions like increasing the percentage of distribution/mix of sustainable renewable fuels to replace motor gasoline, diesel oil and natural gas in traffic

### Collaboration with the construction sector, stakeholder collaboration model

As Helsinki is growing rapidly there's a lot of construction going on. In order to diminish the emissions from the construction sector the city has in an open dialogue with the companies set the lifecycle limit for emissions. The feedback from the companies has been that this is a very good model because it doesn't specify the materials, heating systems or other items but let's the market find the best ways for



staying under the limit. This is also enabling lots of new material providers and energy providers to enter the market with new innovations.

### 3.2 Module C-2 Social Innovation Interventions

C.2.1 Sample Table: Relations between social innovations, systems, and impact pathways					
Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
Helsinki Energy Challenge	Helsinki launched a 1 MEUR competition in 2019 to find new, innovative ways to reduce burning in heating	While burning biomass is calculated as emission-free right now, the future can change that. Also biomass can become too expensive and using it is a threat to carbon sinks	252 teams from 35 countries submitted their solutions, also many individuals but the most initiatives came from teams combining research institutions and companies. The jury consisted of an international panel and city officials. Some of the solutions were immediately incorporated into the energy system, others have had impact on future plans.	The competition was done in two phases: the first as an open innovation competition and the second as a co-design phase with the teams. There was a set of criteria including innovativeness, financing, impact on nature, reliability, team structure etc. The results of the competition showed that the solutions can come from various combinations but also showed trends including electrification and storing of heat energy, optimization, energy efficiency measures, lowering the temperature of the district heating system, two-way district heating systems etc. The winning solutions can be seen at <a href="https://energychallenge.helsinki.fi/results-helsinkienergy-challenge">here</a>	Enabling real interaction and participation in the future modes of energy production for lots of companies, students, citizens and researchers
Citizen panel on the future of transport	As reducing transport emissions	Many systemic barriers hinder the	64 citizens, chosen by the representativeness of the	The citizen panel is part of the overall scenario and impact assessment work done for the future of transport in the city	The citizen panel is part of



	<p>need a larger societal understanding of the best and most acceptable ways a representative citizen panel on transport is being held in the spring-fall of 2024 in Helsinki</p>	<p>reduction of transport emissions in the city. Different political views, different mobility needs or preferences of downtown companies, technological development of e-transport, impact of costs on different citizens groups: Needs of those with restricted abilities to use all modes of transport, needs of the elderly and the young.</p>	<p>overall population in Helsinki, 6 representatives from youth, senior and people with disabilities. Also, many different departments from the city, including dept of mobility, city planning and climate.</p>		<p>the overall scenario and impact assessment work done for the future of transport in the city</p> <p>Including the co-benefits and impacts listed in B.1.</p>
<p>Carbon neutral Lauttasaari and other Neighbourhood associations climate plans and collaboration with the city</p>	<p>Different neighbourhood associations have started their own carbon neutrality plans and are working closely with stakeholders (schools, day care centres, shops, cafes etc)</p>	<p>Getting people interested and active in climate actions, including individual actions, housing company level actions and the whole neighbourhood level actions can be very difficult and the</p>	<p>Neighbourhood associations (volunteers) shops, schools, day care centers, city experts, church, energy company</p>	<p>The associations have been very active in promoting big scale energy efficiency renovations, and smaller scale individual actions. But they have also challenged 70 other city districts to join the campaign and promoted their work to the national level.</p>	<p>Cost savings from renovations, increased community feeling, empowering different citizens.</p>



		collaboration with neighbours can diminish the challenges			
Carbon negative Helsinki boardgame	Climate unit developed a boardgame to make it easier to understand what needs to change as we approach carbon negative future	Understanding what it means for people, city systems, animals and ecosystems to live in a world where carbon sinks are bigger than emissions-meaning that the per capita limit for consumption drops from the current 10 000 co2e/year to 100 k co2e/year.	Game sessions were organised in libraries, youth centres and city events	For people to understand the limited option of consumption a carbon negative world enables them to look at the future and make conscious choices	Biodiversity, non-human rights.

**C-2.2: Description of social innovation interventions**

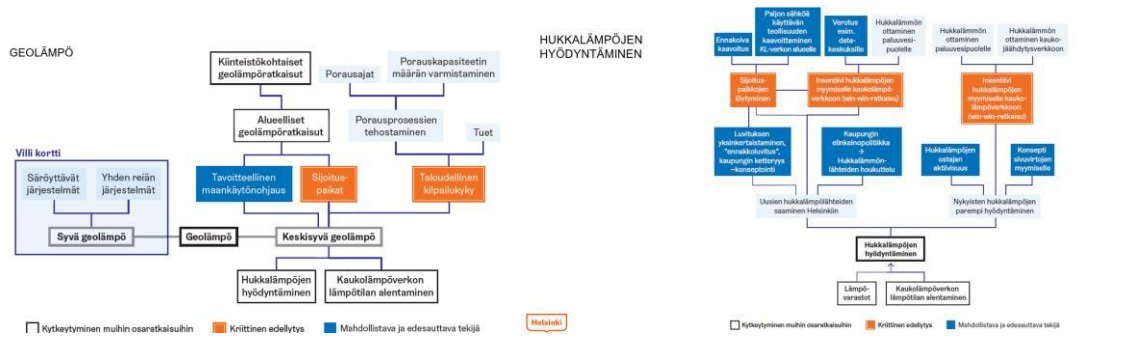
**Helsinki Energy Challenge** The Helsinki energy company Helen produces energy with a diverse range of energy sources: coal (over 50 % of heating energy produced), natural gas, nuclear power, hydropower, heat pumps, biomass, oil, wind power, solar energy, and biogas. Finland has banned the use of coal from 2029 so the large heating plants must close in Helsinki and new energy sources have to be figured out. For the purpose of finding out the best energy mix and with the objective of not wanting to burn anything (wood pellets, waste etc) the city opened a global challenge called the Helsinki Energy challenge with a winning price of 1 million euros. it used the innovative public procurement framework to run it. The competition was done in two phases: the first as an open innovation competition and the second as a co-design phase with the teams. There was a set of criteria including innovativeness, financing, impact on nature, reliability, team structure etc. 252 teams from 35 countries submitted their solutions, also many individuals but the most initiatives came from teams combining research institutions and companies. There were 10 finalist teams, with more than 100 people from over 40 organizations, from 12 countries who proceeded to the co-creation phase, and further developed their ideas. The results of the competition showed that the solutions can come from various combinations but also showed trends including electrification and storing of heat energy, optimization, energy efficiency measures, lowering the temperature of the district heating system, two-way district





heating systems etc. The winning solutions can be seen at here <https://energychallenge.hel.fi/results-helsinkienergy-challenge>

The competition results were next taken into a large stakeholder /expert review process that lasted 6 months organised by the city in 2022 . First a systems analysis was made looking into all the factors that affect the future of heating, including what’s happening in the market, with geopolitical crises, with consumer behaviour changes, electrification, technological innovations and a look into the future with individual choices enabled by new incentives and possibilities making the field more scattered. The different solutions were mapped with different critical pieces identified and their relationships were analysed.



The pictures above are part of the series of solutions and their system mapping ( there are similar mappings for each). The two examples here are for geothermal heat and excess heat. They show all the factors that need to be considered including financing, taxes, regulatory features, space in the city, information flows, storages, company incentives etc. The orange boxes are seen as critical and in many cases have to happen simultaneously which make them harder to guide ( for example for the market to move a solution needs to be competitively priced and there to be available space in the city at the same time). The blue boxes show where city action will have an important push for the needed change and these include planning regulation changes, city public space use changes, pricing, economic development actions to reach out to the companies, new concepts developed for selling excess heat energy etc.

The next phase was moving the most impactful actions to the carbon neutrality plan. The following three actions in the carbon neutrality plan came from this process:

1. The main heating system selected for the City’s facilities and service buildings will be a heat pump system if its repayment period is under 15 years and its implementation is technically feasible.
2. Launching Energy Renovation guidance services.
3. Allowing the construction of geothermal heating systems in public areas.

**Citizen panel of the future of transport**

5000 invitations were sent by using random sample method to over 18-year-olds in Helsinki. 64 people were chosen from those who accepted by making sure that they represent people in Helsinki by age, occupation, income, modes of transport used and areas of living. On top of that 6 representatives came from the senior council, youth council and handicapped council. The panel operates according to deliberative democracy principles.



The panel met in person three times with different questions being discussed, among them the best ways to reduce emissions, how to make equal decisions about mobility, how to make city mobility as efficient and functioning as possible. The panelists were also given lots of information about emissions and city plans. The panel will meet once more in September 2024 and then make a statement that will be presented to the Urban Development board and used as part of the work on choosing the actions for reducing emissions from the mobility sector.

#### **Lauttasaari neighborhood association carbon neutrality work**

The most important tool of the project is information. The better we know ourselves and each other, the better we know how to initiate the right measures to help us reduce our carbon footprint. In December 2021, the market research company Kantar conducted an initial survey, in which the attitudes, beliefs, practical actions and wishes of 500 residents of Lauttasaari were investigated in a telephone survey regarding the fight against adverse effects of the climate. Since September, the project's WOTT survey terminals in the island's shops, library and community school have been recording residents' answers to the "climate question of the week".

The carbon-neutral Lauttasaari 2030 is a bottom-up project, meaning that we, the residents, define our own goals and decide what kind of climate action we will take in our own economy. The members of the project group aim for an active discussion with officials and researchers responsible for regulation. Climate change is solved by cooperation. The carbon-neutral Lauttasaari 2030 is a test platform. Responsible climate work has been done for a long time in large companies, where Lauttasaari's new kind of resident-oriented concept has been noticed. Although we are the first to move, we are not alone. The store's central stores, the parish and our own energy company have financially supported the initial survey. The Ministry of the Environment is processing our application to become the first district member of the Hinku project. We have challenged 70 districts of Helsinki to climate work. In Helka ry, which represents the city districts, a climate working group has been established, whose meetings are the beginning of working together; for good questions and for presenting and scaling successful and implemented projects.

The goal of the project is for our district to be carbon neutral by 2030. The policy is that no one is blamed or blamed, that there are no climate actions that are too small, and that everyone decides about their own finances.

## 4 Outlook and next steps

### Plans for next CCC and CCC Action Plan iteration



As emissions from mobility will become the main sector of emissions (in scope 1 & 2) the work on scenarios, impact assessment and citizen+ political collaboration will be the focus of the next years. Another important aspect is the scenario work on residual emissions, on finding the right pathway for a combination of additional emission reductions, compensation and carbon sinks. The third aspect will be to understand scope 3 emissions better and where the power to act from the city side can make real impact.

## 5 Annexes

**The annexes contain any textual or visual material** to the 2030 Climate Neutrality Action Plan as necessary.