

Helsinki

Helsinki's climate change adaptation policies 2019–2025



The logo for Helsinki, featuring the word "Helsinki" in white text inside a white outline of a speech bubble or callout box.

Helsinki

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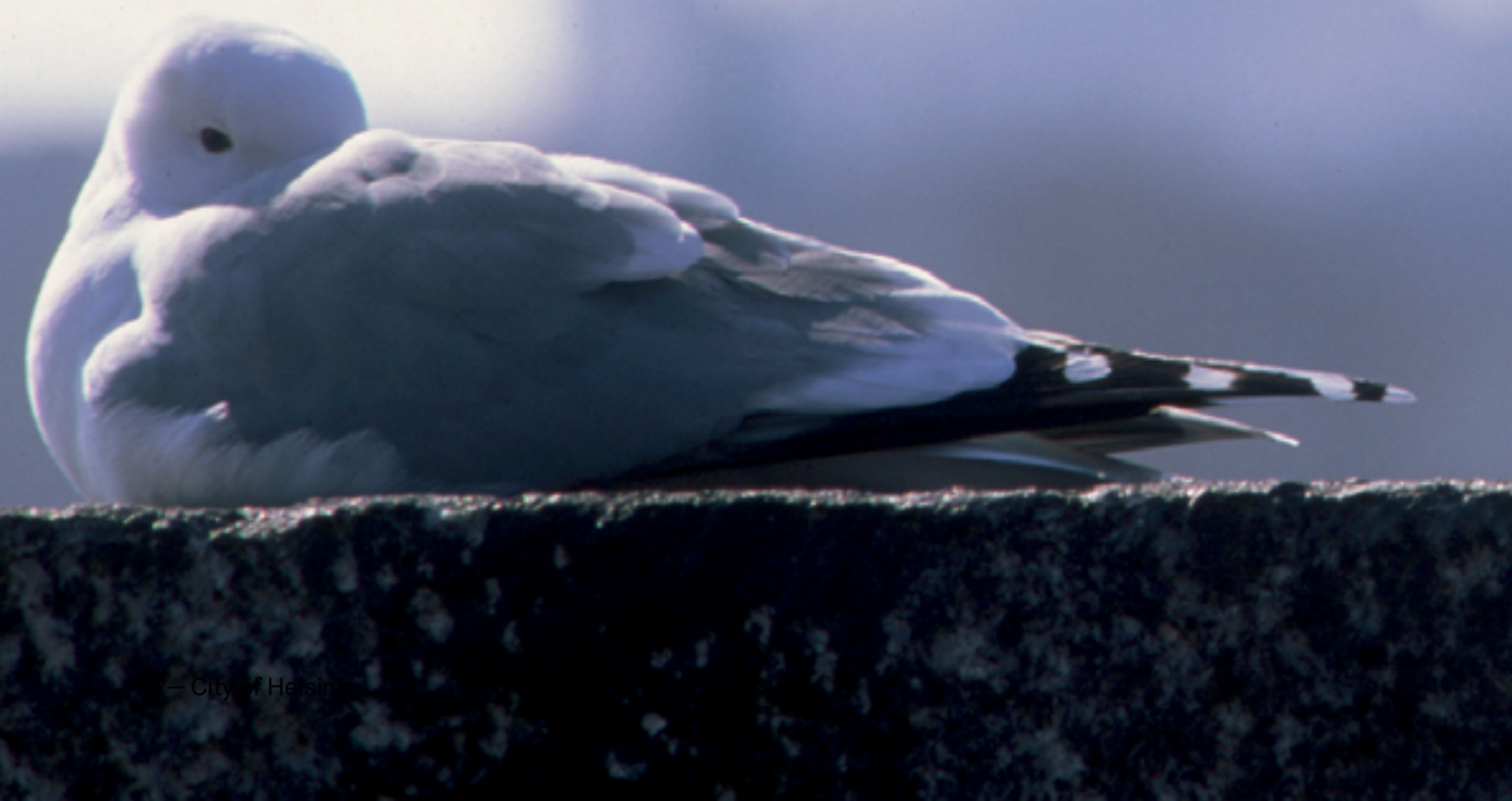
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**Helsinki's climate change
adaptation policies
2019–2025**

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Summary





The climate is changing and Helsinki should be prepared for the coming changes. The goal of climate change mitigation is to prevent dangerous global warming, which current knowledge indicates to be a maximum increase of 1.5–2 °C in the global mean temperature. In Helsinki, this would mean a temperature increase of approximately 2–3 °C by the end of the century. It is important to prepare for the changes in the present situation, as preparing in advance is easier and more viable than repairing the damage.

Helsinki's vision is to be the most functional city in the world. A functional city must also be prepared for the impacts of weather events and climate change. Helsinki's climate change adaptation policies are a strategic plan with which the City can adapt to the changing climate. With the adaptation policies, the City aims to decrease the negative impacts of climate change on societal functionality, the economy, nature and people's everyday lives, and to utilise any benefits resulting from the changing climate.

The adaptation policies will be in effect for two council terms, i.e. 2017–2025. However, the policies involve examining climate change in the long term until the end of the century. The adaptation vision for 2050 involves a medium-term examination and has the same timeframe as the city plan. The adaptation vision presents what a climate-proof Helsinki will look like in 2050. The adaptation vision is divided into four themes: preparedness, integration, development, and overall economy and business opportunities. In order to implement the adaptation vision, priorities have been identified for each theme. The priorities refer to matters that should be the point of focus for the next two council terms. The priorities will be implemented with concrete measures, which are proposed for each council term. The implementation of adaptation will be monitored annually with indicators established in the Environmental Report.

The most significant impacts of climate change include sudden extreme weather events, such as torrential rains, strong winds and long heat waves and droughts. Helsinki's long-term adaptation vision is a climate-proof and safe city. This requires Helsinki to adapt to the changing climate well in advance and prepare for sudden weather events and the global impacts of climate change. In order to implement the adaptation vision, it is important to plan and build Helsinki to meet the requirements set by the future climate in the current situation. Aspects such as controlling the temperatures of dwellings and public buildings such as hospitals and service buildings in summer, as well as managing the moisture levels of buildings, roads and other technical infrastructure, will be increasingly important. On the other hand, the heat consumption of buildings will decrease, for example. It is essential to prepare for many changes in the City's land use and construction plans. Rescue services and social and health care services are also preparing to tackle the new challenges.

At the centre of climate change adaptation is long-term co-operation and integrating adaptation into the City's management and control system. The City has already actively included adaptation in different programmes and created methods and tools. These include but are not limited to the Storm Water Management Plan and the Flood Strategy, the green roof guidelines and the green factor tool. The City organisation bears the main responsibility for coordinating and implementing adaptation in Helsinki and supports the adaptation of the city's residents, businesses and organisations. The different divisions of the City organisation acknowledge their responsibility in preparing for sudden weather events and take the impacts of climate change into consideration in their own preparedness and preparation planning. The adaptation measures will be put into practice through already partially implemented quality and environmental programmes such as Eco-Compass and by including the measures in environmental programmes, among other methods. The City organisation provides information about adaptation methods for residents and businesses and develops adaptation with them. Helsinki participates actively in international co-operation networks and also helps other cities to adapt by highlighting its good practices.

According to the adaptation vision, Helsinki is known as a progressive city in terms of climate-related matters, and the City sets a good example for adaptation in all of its operations and procurements. Helsinki provides businesses and organisations with excellent operating conditions amidst a changing climate. In addition to a safe physical operating environment, the City organisation focuses on providing adaptation-related information and support. The City organisation carries out close co-operation with businesses and other organisations, serving as a platform for adaptation solutions. Development resources are secured

and adaptation is developed based on the latest information and others' experiences, producing new know-how and innovations in the region. This creates new business opportunities and improves residents' quality of life. The adaptation measures favour solutions that increase residents' living comfort and create a healthier living environment. The City's operations are guided by overall economy and long-term planning. Thanks to this, the climate risks are under control and the City is able to utilise the possibilities of adaptation. A society that adapts well to climate change is a society that can actively operate when faced with other changes as well. This obviously includes economic, political and social stability in society, as well as a high level of education and know-how and working infrastructure. A high standard of living protects residents from the negative impacts of climate change as well.

The adaptation policies have been formed for the needs of the City's planning and for preparing the City's strategic objectives. The proposed measures will be included in the City's planning and guidance, for example in city planning, preparation and preparedness planning, the Storm Water Management Programme, the Flood Strategy, and the programmes for green area development and nature conservation and management. Helsinki is a part of several city networks, some of which require the cities to form an adaptation programme.

Helsinki's climate working group (2016–2018), led by Deputy Mayor Pekka Sauri, has been in charge of the adaptation policies. Helsinki's adaptation group, established by the climate working group, has been responsible for producing content for these policies.



1 Introduction



Helsinki must prepare for climate change, which is already taking place. The aim of mitigating climate change is to limit the rise in the mean global temperature to 1.5–2 degrees, avoiding an increase classified as dangerous by current science. Adapting to climate change¹ refers to the means of reducing the negative impacts of climate change and utilising its benefits.

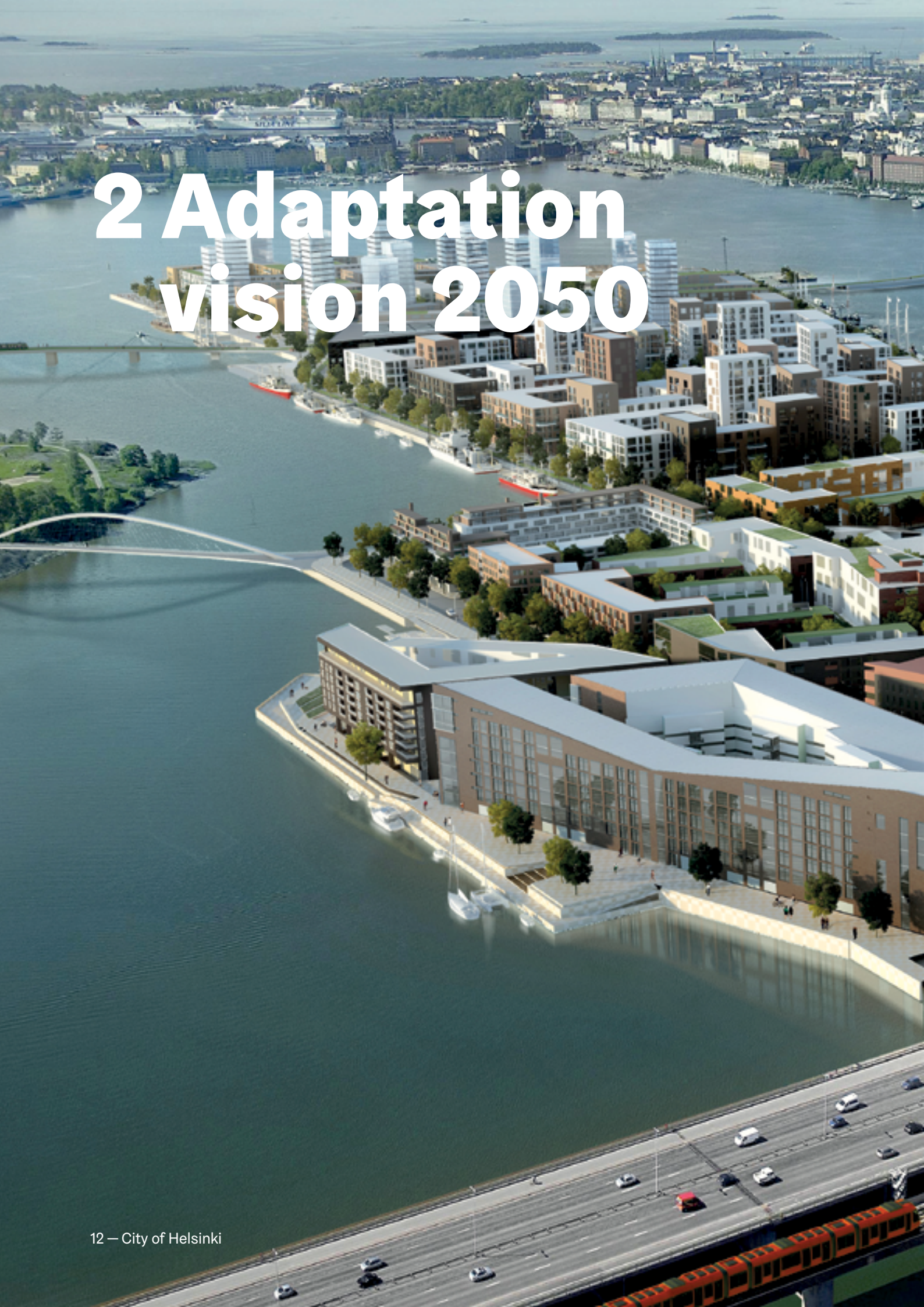
The policies are a plan to help Helsinki adapt to climate change. The plan is in effect for two City Council terms, 2017–2025. The adaptation vision presents what a climate-proof Helsinki will look like in 2050. To make the adaptation vision possible to achieve, actions are needed now. These actions are addressed with four themes. These themes are preparedness, integration, development, and overall economy and business opportunities. Each theme includes key actions or priorities to be focused on during the next two City Council terms (2017–2025). A number of concrete actions have also been determined for the current council term (2017–2021). The implementation of the actions is assessed annually in Helsinki's Environmental Report based on indicators determined for adaptation. When the next council term begins, the plan will be updated, determining new concrete actions for 2021–2025.

The adaptation policies have been formed for the needs of the City's planning. The proposed measures will be included in the City's planning and guidance, for example in city planning, preparation and preparedness planning, the Storm Water Management Programme, the Flood Strategy, and the programmes for green area development and nature conservation and management. Helsinki is a part of several city networks, some of which require the cities to form an adaptation programme.

The adaptation policies were directed by Helsinki's climate working group, led by Deputy Mayor Pekka Sauri, which established an adaptation group to produce content for the policies (see Chapter 5 Background and Appendix 1). The adaptation group compiled and analysed the City's management and planning system (Appendix 3), identifying around 60 plans, steering mechanisms, tools and projects with which adaptation is implemented in the City of Helsinki's planning. Accordingly, adapting to climate change should not be seen as a separate matter, but as a fixed part of the City organisation's operations. The work served as the basis for creating the policies, and methods that were not included in the existing plans or programmes were primarily identified for the adaptation policies. The content of the policies was produced at workshops organised by the adaptation group. The adaptation policies were updated in the autumn of 2018. In the update, the status of the actions, the changed City organisation, the new City Strategy, the results of the City's climate risk assessment completed in 2018 and the most recent information on climate change were taken into account. A workshop was organised for updating the policies, and the updated policies were submitted to the adaptation group and other experts for comment.

¹ Adaptation = Capacity of human and natural systems to function in the present climate and prepare for future climate changes and their repercussions. Adaptation aims to prevent or mitigate the adverse impacts due to climate variability and change and to exploit the beneficial consequences. Adaptation may be reactive to situations which have arisen or anticipate these (national adaptation plan).

2 Adaptation vision 2050



Helsinki's long-term adaptation vision:

Helsinki is a climate-proof and safe city. Helsinki has proactively adapted to the changing climate and **prepared** for extreme weather events and the global impacts of climate change. Helsinki has included, i.e. **integrated**, adaptation into the City's planning and continuously **develops** its adaptation actions. The benefits and costs of adaptation are examined from an **overall economy** perspective in the long term. The City promotes the **business opportunities** of adaptation by providing an operating environment that facilitates effortless experimentation and the implementation of solutions promoting adaptation. Helsinki is known as one of the global forerunners in climate change adaptation.

Grounds

In accordance with its adaptation vision, Helsinki adapts to the changing climate with long-term co-operation: the City organisation bears the main responsibility for coordinating and implementing adaptation at its end and supports the adaptation of residents, businesses and organisations. The residents of Helsinki learn to prepare for extreme weather events and long-term climate change, as well as gradual changes and the cross-border impacts of climate change², such as food production difficulties and migratory movements caused by them.

The most significant impacts of climate change include sudden extreme weather events, such as torrential rains, strong winds and long heat waves and droughts. It is essential to prepare for them in the City's land use and construction plans. Rescue services and social and health care services are also preparing to tackle the new challenges. The adaptation measures also promote equality and justice and ensure the adaptation of those in the most vulnerable positions in particular.

In order to implement the adaptation vision, Helsinki is already being planned and built to meet the requirements set by the future climate. Aspects such as controlling the temperatures of dwellings in summer, as well as managing the moisture levels of buildings, roads and other technical infrastructure, will be increasingly

important. On the other hand, the heat consumption of buildings will decrease, for example. In addition to adapting the physical environment, programmes such as education plans and curricula will take the impacts of climate change into consideration and increase understanding of adaptation.

Although the City organisation bears the majority of the responsibility for adaptation, residents' and businesses' independent adaptation is needed as well. Sudden weather events should be prepared for with measures such as taking out appropriate insurance for floods and storms. The City provides advice for independent adaptation, such as how drainage ditches should be maintained on properties, how green structures benefit adaptation or how people can cool their dwellings.

“In social and economic terms, the general stability, sustainable and well-kept built environment and other infrastructure, functioning administration, high level of education and investments in technology and innovation reinforce the capacity to adapt to changes, both in the climate and due to other factors.”

(National Climate Change Adaptation Plan).

²Cross-border impacts refer to chains of events that are initiated outside Finland but which eventually have effects also in Finland (Hilden et al. 2016)



3 Adaptation themes

This chapter describes what concrete actions are required to achieve the adaptation vision. The adaptation vision is divided into four themes: preparedness, integration, development, and overall economy and business opportunities. Each theme's priorities for 2019–2025 and actions for the council term of 2017–2021 are presented. The text is accompanied by 'Threats and Opportunities' boxes, the contents of which have been compiled from the results of the adaptation group's workshops and the climate risk assessment (Pilli-Sihvola et al. 2018).



3.1 Preparedness



Helsinki is preparing for the increase and intensification of sudden weather events by developing the City's infrastructure to be climate-proof and improving people's awareness and preparedness for action. The different divisions of the City organisation acknowledge their responsibility in preparing for sudden weather events and take the impacts of climate change into consideration in their own preparedness and preparation planning. The climate resilience of infrastructure is examined regularly and developed if necessary. The City acts proactively and supports the municipality's residents' independent preparations.

Grounds

Helsinki is preparing for climate change by developing its climate risk³ management. Among the key aspects of climate risk management is assessing which groups of people and parts of the infrastructure are particularly vulnerable to the impacts of climate change now and in the future. Land use planning and the dimensioning of technical infrastructure are used to proactively prepare for climate change. This facilitates preventing future problems and reducing the risk of personal and material damage. Some of the impacts of climate change may be positive for some operators. The possible benefits can include increased hydro power or biomass production and decreased heat consumption in buildings.

The adaptation measures enable businesses to safely establish themselves in Helsinki even when the climate changes, as the business environment (infrastructure and social, political and economic stability) and security of supply⁴ have been secured. As society becomes more digital, it is increasingly dependent of the functionality of the electricity network. In Helsinki, the electricity networks are already protected from storms for the most part, as they are placed under-

ground, and flood protections have been implemented in seashore areas. Up-to-date information is available on the weather over Helsinki's local waters and wave buoy measurements, and a system that warns water buses and small boats of high waves is being created. Climate change adaptation-related co-operation between the City, the business sector and research institutions is increased through the Climate Partners network, for example.

OPPORTUNITIES

- Helsinki's image as a climate-proof city, cool climate and proximity to the sea
- Wind power and energy saving
- Reduced amounts of snow and ice on roads save costs
- More versatile domestic food production
- The health risks caused by cold temperatures are reduced but not eliminated

THREATS

- Increased damage caused by floods and storms to people, buildings, infrastructure and traffic
- Increase in heat-related risks
- Slippery conditions cause a significant health risk and have economic effects
- Tick-borne diseases become more common. Sunlight decreases in the winter months, which may cause exacerbated winter depression
- Increased spreading of plant diseases and insect pests, possible increase in invasive species.
- The Baltic Sea becomes eutrophic and the ice winter becomes shorter

³Climate risks refer to the possible impacts of weather and climate and their development on human activities and nature (Pilli-Sihvola et al. 2018, p. 14)

⁴Security of supply = activities, the purpose of which is to secure the production, services and infrastructure necessary to the population's subsistence in the event of serious disruptions and emergency conditions

Helsinki is preparing for the impacts of climate change that take place elsewhere on the globe and have cross-border impacts in Finland. Two examples of these are increasing migratory pressure, which can be the result of food production and water management problems exacerbated by climate change, and difficulties related to the availability of products.

Priorities for 2019–2025

1. Risk mapping
2. Planning and construction
3. Policy instruments
4. Disruption management
5. Global preparedness and awareness

Actions and implementation (2019–2021)

1. Risk mapping

Preparing for climate change and adapting to it are based on a risk assessment and the actions started based on it.

Division of the action	Implementation	Schedule	Responsibilities
1. Climate risk mapping that covers the entire city is carried out	<p>a) A risk mapping report is written</p> <p>b) The climate risks found in the report are included in updates to the Helsinki Group's preparedness instructions, the divisions' preparedness plans and risk management plans, the rescue service plan, as well as the Social Services and Health Care Division's instructions, nature management policies, etc.</p> <p>c) A climate risk know-how bank is established to provide the divisions with support for the assessment of climate risks in their preparation work.</p> <p>d) Vulnerability mapping is developed in co-operation with the cities of the Helsinki metropolitan area, the Helsinki Region Environmental Services Authority HSY and research institutions</p>	<p>a) 2018</p> <p>b) –2021</p> <p>c) 2019–</p> <p>d) 2019–</p>	<p>a) Services and Permits / Environmental Services</p> <p>b) Executive Office, Urban Environment, Education, Social Services and Health Care, Culture and Leisure</p> <p>c) Services and Permits / Environmental Services</p> <p>d) Services and Permits / Environmental Services, HSY</p>
2. Determining the storm water flood risk management process in already built areas	<p>a) Updating the Storm Water Management Plan</p> <p>b) Inclusion in the description of the operation model of the Storm Water Management Plan</p>	<p>a) 2017–2018</p> <p>b) 2019</p>	<p>a) Land Use and City Structure / Urban Space and Landscape Planning</p> <p>b) Storm water working group</p>
<p>3. Preparing for floods</p> <ul style="list-style-type: none"> o The Flood Strategy (2008) is updated with new information, e.g. the Finnish Environment Institute SYKE's new minimum building heights; the 2016 Turvalliset rakentamiskorkeudet Helsingin rannoilla (Safe building heights on Helsinki's shores) study; the Centre for Economic Development, Transport and the Environment's new flood maps; the protection measures carried out by Helsinki; updates to legislation; flood insurance. o Storm water flood risk mapping o Areas prone to flooding are prioritised based on the impacts 	<p>a) In connection with updating the Flood Strategy</p> <p>b) Storm water flood risk mapping</p> <p>c) Follow-up study on the prioritisation of areas prone to flooding</p>	<p>a) –2021</p> <p>b) 2018</p> <p>c) 2020</p>	<p>a) Land Use and City Structure / Strategic Urban Planning</p> <p>b) Land Use and City Structure / Urban Space and Landscape Planning</p> <p>c) Services and Permits / Environmental Services</p>
4. Comprehensive models are used in assessing the water management system	HSY's water management planning and control system	2018 –, continuous operations	HSY

2. Planning and construction

Division of the action	Implementation	Schedule	Responsibilities
Climate resilience is ensured in the planning, building and maintenance of construction, the energy network, the traffic system and other infrastructure.	The need for change caused by climate change is included in the planning systems	2019–, continuous operations	Urban Environment, Helen, HSL, HKL, HSY

3. Policy instruments for promoting the adaptation measures of properties and resident

Division of the action	Implementation	Schedule	Responsibilities
1. Guidance through knowledge 2. Identifying economic incentives and sanctions that cause change in the residents and businesses of the area 3. Promoting the separation of storm waters in areas with a combined sewer system and reducing the amount of storm water generated on properties by using nature-based solutions 4. Managing the temperatures of properties	a) Producing materials for residents, communication about preparing for climate change and matters such as managing the temperatures of properties b) Separate report c), d) continuous operations	a) 2019–, continuous operations b) 2019–2020 c), d) 2019–, continuous operations	a) Services and Permits / Environmental Services, Ilmastoinfo b) Services and Permits / Environmental Services c) Land Use and City Structure / Building Control d) On the City's own properties: Buildings and Public Areas, Social Services and Health Care, Heka

4. Disruption management

Division of the action	Implementation	Schedule	Responsibilities
1. Preventing water bodies from becoming contaminated by storm water floods 2. Preparing for heat waves (e.g. cooling dwellings, home care) 3. Anticipating the impacts of climate change on the city's safety 4. Taking changing conditions into consideration in environmental permits	Taken into consideration in connection with updates: in the Helsinki Group's preparedness instructions, the divisions' preparedness plans and risk management plans, the rescue service plan, in the preparedness and contingency plan for the energy maintenance system, Helen's short-term production planning		Stara, Rescue Department, Services and Permits / Environmental Services, Social Services and Health Care, Heka, Executive Office

5. Global preparedness and awareness

Division of the action	Implementation	Schedule	Responsibilities
1. Preparing for cross-border impacts 2. Increasing awareness about impacts taking place in other parts of the world, utilising research information and distributing it	a) Taken into consideration in connection with updates: in the Helsinki Group's preparedness instructions, the Social Services and Health Care Division's instructions, etc. b) Seminars, communication, participation in research and projects	a) 2019–, continuous b) 2019–, continuous	a) Executive Office, Social Services and Health Care d) Services and Permits / Environmental Services, HSY

3.2 Integration



Helsinki is creating a climate-proof urban structure that is ecologically and socially sustainable. Helsinki integrates its adaptation measures into its land use and construction, education and teaching, nature management, recreation, social and health care services, industrial policies and preparedness and contingency planning. The City's divisions include measures that promote adaptation in their annual economic and operational planning. The adaptation measures are part of the quality and environmental management systems. Know-how is ensured and sufficient resources are targeted at implementing the measures.

Grounds

Climate change affects Helsinki's built infrastructure especially with increased precipitation, which requires sustainable and new cost-efficient methods for storm water management. Green construction in public areas and on privately owned properties is a nat-

ural way to support adaptation. It also leads to the creation of a more comfortable and diverse environment.

The most important aspect of the policies is including, i.e. integrating adaptation into the City's existing management and control system (Appendix 3). The measures will be put into practice through already partially implemented quality and environmental programmes such as the EcoCompass and by including the measures in environmental programmes, among other methods.

Adaptation planning is made easier and clearer: at what stage and how adaptation must be taken into account in different processes. The instructions and provisions concerning adaptation are made more ambitious and their implementation is monitored. Existing tools that make adaptation easier are utilised (e.g. the tools on the Ilmastotyökäytä.fi website) and new ones are developed. Adaptation measures have been identified as regards the best-built environment. More information is needed regarding other sectors' actions, such as those related to education, teaching, recreation, social and health care services and the business sector. The City organisation increases the acceptability of adaptation by connecting the adaptation solutions to the residents' living comfort and a healthier living environment.

THREATS

- No staff have been trained and no instructions created
- The lack of preparedness causes unforeseen costs, e.g. as the result of floods
- Society's operating reliability has weakened
- Storm waters are not taken care of

OPPORTUNITIES

- A new kind of and more attractive urban environment
- Improved quality of living
- Helsinki's close proximity to the sea and nature increase tourism

Priorities for 2019–2025

1. Integrating adaptation into the City's management and control system
2. Planning storm water management comprehensively
3. Preventing adverse impacts caused by changes in land use

Actions and implementation (2019–2021):

1. Integrating adaptation into the City’s management and control system

Division of the action	Implementation	Schedule	Responsibilities
1. Identifying and creating process diagrams to describe the City’s planning system as wholes and in terms of parts that are relevant to the adaptation measures	Connected to and serving as continuations of the process diagrams created in connection with the organisational change, separate report	2019	Climate steering group, Services and Permits / Environmental Services
2. Integration into operational planning o Included by the divisions in their annual economic and operational planning, and measures that promote adaptation are included in the action plan of the strategy o The adaptation measures are included as part of the divisions’ operational, quality and environmental systems	Annually selecting the most significant adaptation goals and measures that serve the designated organisation, which are included in the organisation’s management system	2019–2021	Executive Office, Urban Environment, Education, Social Services and Health Care, Culture and Leisure
3. Creating a website that serves the City’s planners in particular. The website provides the City’s adaptation-related processes, to which programmes, instructions, tools, etc. are connected	a) Including the creation of the website as part of the Stadin ilmasto website b) Taking the instructions into a resource planning system (e.g. QPR)	a) 2019 b) 2019–, continuous operations	a) Services and Permits / Environmental Services b) Executive Office, Urban Environment, Education, Social Services and Health Care, Culture and Leisure

2. Planning storm water management comprehensively

The City of Helsinki’s Storm Water Management Plan was approved by the City Board in 2018, a monitoring group has been appointed for the Plan, and storm water coordinators have been appointed for the services. Actions included in the Plan are already being implemented. Comprehensive storm water management progresses through implementing the actions of the Plan. The majority of the actions have been integrated into current operational processes in the new organisation. Comprehensive storm water planning and implementation are proceeding in accordance with the Storm Water Management Plan.

Division of the action	Implementation	Schedule	Responsibilities
1. Storm water management o The damage caused by storm water floods will not increase despite increasing precipitation o Planning storm water management with the water catchment areas serving as a starting point, identifying areas that require special attention and setting aside space for regional solutions o Planning and implementing primarily nature-based storm water management actions in accordance with the priority order of the Storm Water Management Plan o The storm water management of the existing built environment is taken into consideration when developing old areas and making them denser.	Implementation of the Storm Water Management Plan, in connection with regional planning	2018–	Storm water working group, Urban Environment, Executive Office, HSY


3. Preventing adverse impacts caused by changes in land use

Building green infrastructure and avoiding sealing the ground surface improves the storm water management required by increasing precipitation, prevents the urban heat island event from intensifying and prevents nutrients and impurities from being transferred into water bodies. Preserving the diversity of the existing urban wildlife and nature plays an important role in achieving these goals.

Division of the action	Implementation	Schedule	Responsibilities
1. The green and blue infrastructure (green area and water body network) of the urban area is mapped and developed in regional co-operation	VISTRA development plan for the green and recreational network of Helsinki (in connection with an update)	-2021	Land Use and City Structure / Urban Space and Landscape Planning, HSY
2. Utilising the control system <ul style="list-style-type: none"> o Requiring measures aimed at climate change adaptation and resilience in detailed plans and plot conveyance, such as nature-based storm water management, construction of green roofs, the use of the green factor and a sufficient amount of versatile urban green space o Implementing the actions of the City of Helsinki's green roof policy approved by the City Board 	Plan regulations, plot conveyance terms, green roof policies	2019-	Storm water working group, Land Use and City Structure / Urban Space and Landscape Planning, Detailed Planning, Land Property Development and Plots
3. Green structures and infiltration <ul style="list-style-type: none"> o Adding more green structures into the urban environment o Adding more street trees and preserving existing large trees o Increasing the use of absorbing and permeable surfaces if the underground structures allow it. Planning and implementing street water drainage in a more ecologically and economically sustainable manner o Developing and maintaining the green areas of public areas with climate change taken into consideration 	Urban space instructions, use and management plans, regional planning method instructions, area plans, policy for the use of the plants in built areas and street tree policy. Additionally, the green factor of public areas is developed	2019-	Land Use and City Structure / Urban Space and Landscape Planning, Buildings and Public Areas / Maintenance, Services and Permits / Environmental Services, Building Control

3.3 Development and expertise





Helsinki is known as a progressive city when it comes to climate matters. The City of Helsinki's operations are developed based on the latest information and others' experiences, producing new know-how and innovations in the region. The development resources are secured. Helsinki participates actively in international co-operation networks and also helps other cities to adapt by highlighting its good practices. Helsinki provides information about adaptation methods for residents and businesses and develops adaptation with them.

Grounds

The City is aiming for more efficient implementation of the adaptation measures and utilising the flow of information and know-how facilitated in part by the City's new management system and organisation.

THREATS

- Due to a lack of resources, the City suffers from the impacts of floods, torrential rains and the urban heat island event
- There is insufficient information about the impacts of climate change
- Helsinki has lost its opportunity to act as a forerunner

As a public operator and the capital of Finland, Helsinki plays an important role in paving the way and setting an example. Other cities' adaptation work is learned from and utilised in developing Helsinki's climate change adaptation. Allocating resources to education and communication increases the know-how level of the City's workers.

OPPORTUNITIES

- New innovations are used to resolve unwanted impacts of climate change
- Adaptation know-how is Helsinki's export speciality
- The city's living comfort has improved due to increased blue and green structures
- Participation has improved, residents take more responsibility for adaptation

Increasing residents' awareness helps them understand aspects such as why storm water management systems are built in green areas and how they can prepare for the changing climate. Information about climate change and adapting to it is added to schools' curricula. The City can contribute to it through concrete learning environments and by presenting adaptation solutions.

Priorities for 2019–2025

1. Making climate change adaptation part of the management of the City of Helsinki
2. Education and communication
3. The City as an example
5. Research and development
6. Co-operation

Actions and implementation (2019–2021):

1. Making climate change adaptation part of the management of the City of Helsinki

Division of the action	Implementation	Schedule	Responsibilities
1. Identifying key parties and ensuring their commitment, ensuring the management's commitment 2. Building a management and operational method model for adaptation matters, which includes identifying responsibilities and processes and how adaptation is integrated into planning and administration	a) The steering group determines how climate work is coordinated b) Carrying out an audit/peer review between different cities' adaptation policies	a) 2019– b) 2020	a) Climate steering group b) Services and Permits / Environmental Services

2. Education and communication

Division of the action	Implementation	Schedule	Responsibilities
1. The City's workers are educated and provided with information about adapting to climate change <ul style="list-style-type: none"> o Mapping the education needs of the City's different divisions o Organising education programmes tailored to the different divisions, organising training for communicators 2. Strengthening know-how in the City's management (e.g. targeted adaptation seminars) 3. Preparing communication materials for different target groups and distributing them	a) Mapping education needs, adaptation seminar for management, tailored education programmes with Eco-support, for example b) Complementing the web pages with climate change preparedness c) Highlighting adaptation in Helsinki's climate network, communicating about adaptation in a coordinated manner	a) 2019 b) 2019 c) 2019–2021	a) Climate steering group a) c) Services and Permits / Environmental Services, Urban Environment Administrative and Support Services and Communication b) Executive Office / Safety

3. The City as an example

Division of the action	Implementation	Schedule	Responsibilities
The City sets an example of adaptation in all of its own locations	The City co-operates with other operators annually to carry out trial and pilot projects	2019–2021	Executive Office, Urban Environment, Education, Social Services and Health Care, Culture and Leisure

4. Research and development

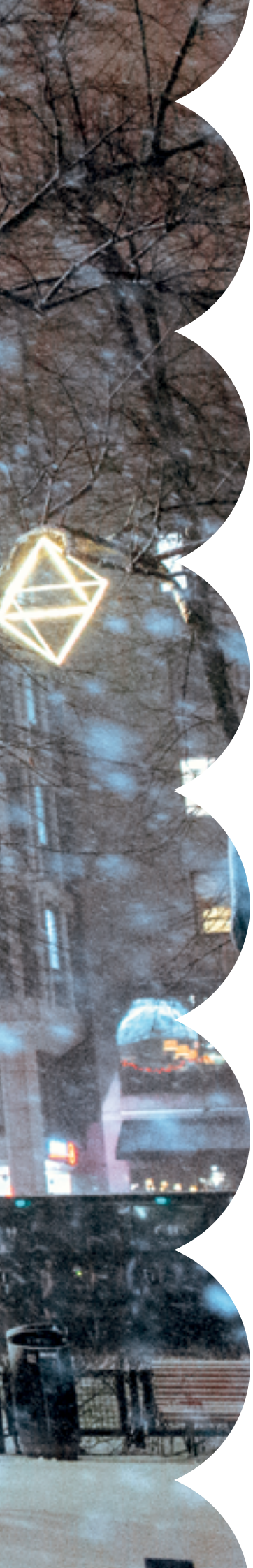
Division of the action	Implementation	Schedule	Responsibilities
<ol style="list-style-type: none"> 1. Securing financing for research and development. 2. Increasing awareness of adaptation-related calls and increasing co-operation between and within the City's divisions 3. Helsinki develops its adaptation know-how, taking other societal and global changes and megatrends into consideration as well 	Carrying out co-operation and co-operation projects with universities and research institutions, applying for project funding from sources such as the EU.	2019–	Executive Office / Economic Development, Services and Permits / Environmental Services

5. Co-operation

Division of the action	Implementation	Schedule	Responsibilities
<ol style="list-style-type: none"> 1. Utilising other cities' adaptation work in developing Helsinki's adaptation 2. Investing in close co-operation with other operators at City level and international level alike 	Participating in co-operation networks' events and utilising their full potential (Covenant of Mayors, ICLEI, Eurocities, ClimateKIC, Six Cities, HSY).	2019–	Executive Office / Economic Development, Services and Permits / Environmental Services

A photograph of a snowy city street at night. The scene is filled with snowflakes falling from the sky. In the foreground, several large, bare trees are decorated with glowing, geometric light ornaments in shades of orange, yellow, and blue. A multi-story building with many lit windows is visible in the background. The name 'MANNING SPILLMAN' is partially visible on the building's facade. A few people are walking on the snow-covered sidewalk, and a car is visible in the distance. The overall atmosphere is festive and wintry.

3.4 Overall economy and business opportunities



Helsinki is a pioneer in adaptation, setting an example of adaptation in all of its own operations, locations and procurements. The City organisation carries out close co-operation with businesses and other organisations. The City serves as a platform for new Smart & Clean solutions. This creates new business and export opportunities and improves residents' quality of life. The City's operations are guided by overall economy and long-term planning. Thanks to this, the climate risks are under control and the City is able to utilise the possibilities of adaptation.

Grounds

Helsinki provides businesses and organisations with excellent operating conditions amidst a changing climate. In particular, this includes taking care of the infrastructure and safety, providing education and training and having a long-term approach in the City's planning and guidance. The overall economy aspect includes an analysis of adaptation costs and benefits, which is used to assess the potential of the actions in terms of increasing society's well-being by comparing the overall benefits and costs over the course of the actions' life cycle. The overall economy aspect includes long-term cost savings resulting from the elimination or reduction of a risk. For example, preparing for storm water flooding and the systems built for the purpose are a cost, while the benefits consist of the costs of damages prevented.

THREATS

- The City does not have the resources to implement adaptation
- The planning solutions do not correspond with reality, old ways are relied on
- The City has no policy for adaptation measures, causing bouncing back and forth and thus confusion in construction, for example
- Helsinki does not fare well in the competition.
Businesses and tourists go away

OPPORTUNITIES

- Helsinki has created a climate-proof city brand, which can be seen in the urban environment
- New business opportunities
(construction, energy production, food, IT solutions, local hiking and entrepreneurship related to it)
- The adaptation measures have saved a considerable amount of money and other resources

Priorities for 2019–2025

1. Adaptation is integrated into urban development and business co-operation
2. Helsinki serves as a trial and innovation test area for Smart & Clean solutions
3. Developing an overall economic assessment of adaptation in investments

Actions and implementation (2019–2021):

1. Adaptation is integrated into urban development and business co-operation

Division of the action	Implementation	Schedule	Responsibilities
1. Climate Partners' adaptation is promoted 2. Identifying procurements that are significant in terms of adaptation and taking adaptation into consideration in them 3. Promoting innovations and trials that promote adaptation, e.g. by increasing co-operation with educational institutions in the City's projects	a) Introducing adaptation-related actions as part of the Climate Partners' commitments b) Creating adaptation criteria for the City's (construction) procurements c) Researching the City's possibilities in terms of promoting adaptation business	a) 2019– b) 2019– c) –2021	a) Services and Permits / Environmental Services b) Services and Permits / Environmental Services, Proc, Urban Environment / Administrative and Support Services 3. Executive Office / Economic Development, Financial and Planning Division

2. Helsinki serves as a trial and innovation test area for Smart & Clean solutions

Division of the action	Implementation	Schedule	Responsibilities
1. All operations of the Smart & Clean Foundation of the metropolitan area support adaptation and are aimed at creating new business activities 2. New operating models that support adaptation are developed in Helsinki as part of the Helsinki metropolitan area test area 3. Promoting the provision of trial platforms to co-operation partners, such as businesses and educational institutions	Carrying out close co-operation with the Smart & Clean Foundation and other similar operators. Promoting the development of new business activities as part of the entire Smart & Clean community together with businesses, research institutions, the cities of the region and governmental operators, utilising financial instruments in adaptation-related innovations	2019–	Executive Office / Economic Development, Financial and Planning Division, Services and Permits / Environmental Services, Smart & Clean Foundation

3. Developing an overall economic assessment of adaptation in investments

Division of the action	Implementation	Schedule	Responsibilities
1. Identifying investments that affect adaptation and implementing, based on an overall economic analysis, actions that prevent costs caused by climate risks 2. Analysing adaptation solution options in terms of overall economy so that both the investment and life cycle costs are taken into consideration	Conducting a study regarding key adaptation investments and assessing their costs and benefits in the City of Helsinki	–2021	Services and Permits / Environmental Services

4. Monitoring

Adaptation monitoring allows the City and its divisions to ensure that the goals and actions are up-to-date, functional and appropriately targeted and dimensioned, and that adaptation progresses in the desired direction.

Monitoring and evaluation are also used to collect information that can promote the organisation's learning and improve its ability to react to changes and cope with the impacts and damage caused by weather events and climate change.

Adaptation monitoring is not straightforward, as there is no one definite unit of measurement for adaptation (such as CO₂ emissions for mitigation), nor are there clear threshold values for good or successful adaptation. Adaptation is often a process that requires constant changes and adjustments, and adaptation measures are almost always part of broader societal or environmental goals. One part of the benefits of adaptation are the costs avoided, i.e. adverse impacts of climate change that were avoided thanks to adaptation. Assessing these is difficult, as without implemented measures,

the extent of the impacts is often difficult to estimate. Individual adaptation measures can also have unwanted impacts and, for example, increase greenhouse gas emissions or hinder adaptation in another location.

The indicators describing adaptation can be divided as follows, for example:

- indicators that describe processes and the realisation of measures
- indicators that describe changes in the ability to adapt and vulnerability
- indicators that describe conditions (climate change, impacts and exposure)


In addition to monitoring the implementation of actions, it is necessary to develop adaptation indicators in order to obtain an overall view of the City's adaptation ability and climate resilience, as well as the progress of adaptation. HSY will begin the indicator monitoring of adaptation in 2019, and it can also be used in monitoring the adaptation of Helsinki. It may also be necessary to develop some city-specific indicators.

Division of the action	Implementation	Schedule	Responsibilities
An operating model for annual reporting is created for monitoring the Helsinki Group's operations and economy as part of climate reporting and, for example, to be part of environmental reporting		2019–	Climate steering group Executive Office / Financial and Planning Division, Services and Permits / Environmental Services
Introducing new evaluation tools that facilitate closer monitoring of the implementation, costs and benefits of actions, as well as the state of vulnerability.	Developing adaptation and vulnerability indicators in co-operation with different parties	2019–	Services and Permits / Environmental Services Six Cities, HSY

5 Background

The climate working group appointed by the mayor on 10 February 2016 was tasked with determining the climate goals for the 2017–2021 council term, as well as compiling the climate goals and presenting a model for coordinating and monitoring climate work and promoting the goals. The climate working group appointment letter states the following:

“Mitigating climate change and adapting to it require comprehensive and systematic goals and actions from the City of Helsinki.” In order to promote adaptation, the climate working group appointed an adaptation group to create adaptation policies in June 2016. The members of the adaptation group are presented in Appendix 1.



The starting points for the adaptation policies were the City's environmental policy, the Council's strategy for 2013–2016, the adaptation strategy for the Helsinki metropolitan area and Helsinki's Climate Roadmap 2050.

The environmental policy (City Council 2012) proposes the following:

- Adaptation to climate change will be integrated into the operations of all city departments in order to minimise risks.
- The impacts of climate change and the measures that can be taken to prepare for it will be communicated to municipal residents and companies.

The City's Strategy Programme (City Council 2013–2016) proposes the following:

- Improving flood water, storm water and snow management, as well as preparing for extreme weather events. The necessary space reservations are taken into consideration in urban planning.
- Diverse vegetation compensates for the greenhouse gas emissions produced by built areas.

Helsinki's Climate Roadmap 2050 includes the following adaptation-related aspects:

- Helsinki will be a climate-proof city by 2050
- Helsinki has reason to prepare for a four-degree increase in the global mean temperature.
- The infrastructure being built now must be planned so that it can withstand the changing climate as well.
- The residents of Helsinki are aware of how they can prepare for the global impacts of climate change.
- Increased rainwater levels, rising sea levels and increased cooling needs are taken into account in building control.
- The extensive green area network offers a habitat for many species and preserves biodiversity.
- Green yards, parks and urban forests sequester carbon, help with the management of increased rain and melt water, and cool the city in summer heat waves.
- Helsinki's nature is diverse, and thanks to active voluntary work, invasive species have been prevented from moving into the area.

Adaptation strategy for the Helsinki metropolitan area (HSY Board 2012)

HSY; the Cities of Helsinki, Espoo, Vantaa and Kauniainen; Helsinki Region Transport (HSL) and other regional operators will create joint policies and guidelines for adapting to climate change in the Helsinki metropolitan area. The actions and policies of the strategy are divided into two groups: regional and joint strategic starting points for climate change adaptation and short-term (2012–2020) action policies. The action policies are designated for the following sectors and cross-sectoral subjects: 1) Land use, 2) Traffic and technical networks, 3) Building and climate resilience of the local environment, 4) Water and waste management, 5) Rescue services and safety, 6) Social services and health care and 7) Co-operation in information production and distribution.

5.1 Climate change in Helsinki

Climate change is taking place and its impacts can already be seen in Helsinki. Helsinki has yet to sufficiently adapt to the current climate. A sudden torrential rain could cause sizeable damage, as has already happened in several Nordic cities.

The goal of the Paris climate change agreement, which entered into force in October 2016, is to limit the warming of the global climate to clearly less than 2 °C, and to aim to limit the warming to 1.5 °C by the end of the current century. The latest report (IPCC 2018) of the Intergovernmental Panel on Climate Change (IPCC) states that an increase of no more than 2 °C globally will have significant negative impacts on human and nature-based systems. With the current global emissions, the warming is expected to increase by 3–4 °C compared to the pre-industrial era. In Helsinki, this would mean a temperature increase of around 6 °C by the end of the century.

Helsinki's mean temperature will rise 2,3 to 3,4 centigrades by 2050 according to climate scenarios and compared to the period of 1971–2000

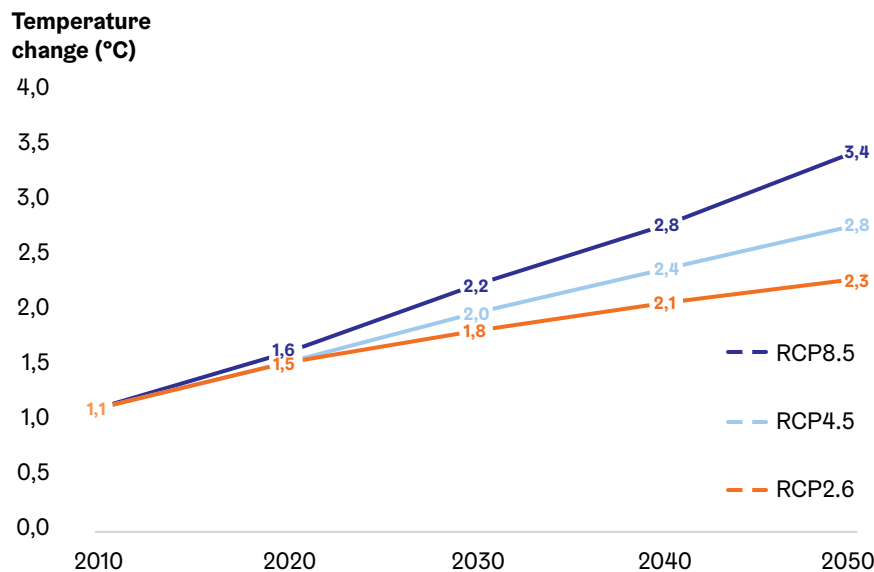


Figure 1. Change in Helsinki's mean temperature by 2050 compared to the period 1971–2000 in accordance with different climate scenarios. The RCP8.5 scenario represents major greenhouse gas emissions, RCP4.5 represents emissions complying with reasonably successful climate policies, and RCP2.6 represents very minor emissions. Image: Finnish Meteorological Institute

Helsinki's mean precipitation will rise 6,9 to 11 % by 2050 according to climate scenarios and compared to the period of 1971-2000

Temperature change (°C)

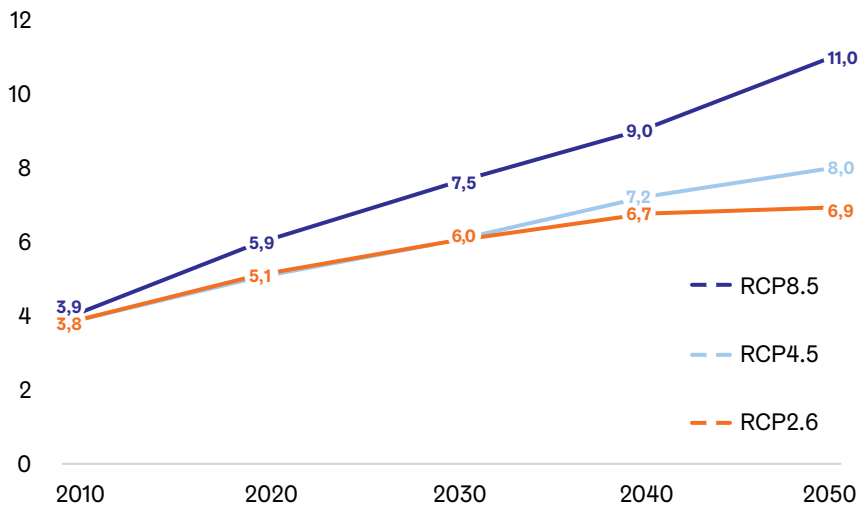


Figure 2. Change in Helsinki's mean precipitation by 2050 compared to the period 1971–2000 in accordance with different climate scenarios. The RCP8.5 scenario represents major greenhouse gas emissions, RCP4.5 represents emissions complying with moderately successful climate policies, and RCP2.6 represents very minor emissions. Image: Finnish Meteorological Institute

With the current global greenhouse gas emissions, there will be a clear change in the climate in Helsinki by the end of the century. The temperature will rise in all seasons, but most notably in winter. There will be an increase in the mean and highest precipitation alike. Torrential summer rains are estimated to increase by more than 10%, whereby the kind of torrential rain experienced approximately once every 20 years in the late 20th century will be

experienced more often than once a decade by the end of this century, and the kind of torrential rain experienced once a century will be experienced approximately once every 30 years in the future. In winter, precipitation will increase clearly from the current level and there will be less sunshine, making winters darker than before. (Mäkelä et al. 2016)

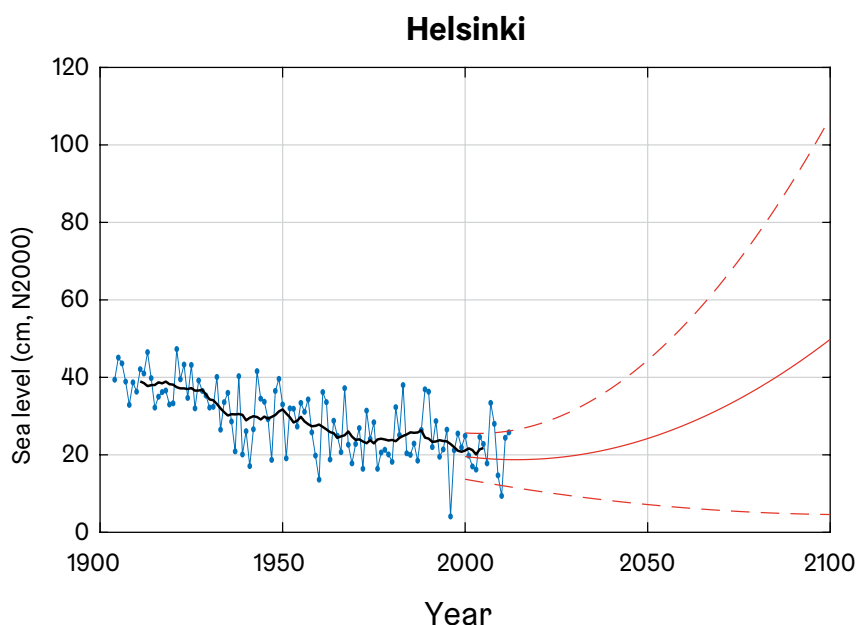


Figure 3. Mean sea water level in Helsinki. The blue line indicates the observed annual mean water levels, the black line indicates the long-term mean calculated based on the observations, and the red lines indicate the future mean sea level scenario with a 5–95% uncertainty threshold. The future scenario was calculated by combining several of the latest forecasts of the rise in ocean levels, land uplift and an estimate of the impact of the changing wind climate on the sea levels on the Finnish coast. The most significant uncertainty has to do with how the ice sheet of West Antarctica will react to global warming. (Johansson et al. 2014)

In summer, the highest daily temperatures will rise at the same rate as the mean temperatures. This means that if the mean temperature has risen by 1.5 °C compared to the current climate by the middle of the century, the highest summer temperatures measured will also be 1.5 °C higher than now.

The mean sea level by the coast of Helsinki will rise due to the combined effect of the heat expansion of the oceans, melting continental glaciers, winds on the Baltic Sea and land uplift. According to the best current estimate, there will be a rise of 30–40 cm by the end of the century.

The City is being planned from a time perspective of ten years. Preparing for the changing climate in advance is more reliable and viable than reacting after the fact.

The impacts of climate change can be divided into sudden weather conditions and changes in long-term mean conditions. The former category includes events such as floods caused by torrential rains, while the latter includes construction restrictions caused by the gradual rise in the sea level.

The most significant changes in the climate of the Helsinki region are its warming, increased precipitation, increased and more intense extreme weather events and shorter snowy winters. The difference between the current and future climate will be greatest in the winter months.

Potential impacts of climate change are presented in figure 4. The majority of the impacts are adverse, but some are also beneficial. The end result will depend on how well we can decrease the negative impacts and increase the benefits: for example, increasing precipitation can cause urban floods, but with good planning, the rain water can be incorporated into an enjoyable, diverse urban environment.

Climate change is connected to other global megatrends, and the impact of climate change can often not be specified in different situations. Adaptation makes it possible to influence the consequences of climate change as well. A society that adapts well to climate change is a society that can actively operate when faced with other changes as well.



Figure 4. The impacts of climate change in Helsinki (Image: Helsinki’s Climate Roadmap 2050)

5.2 Climate risk assessment

Weather conditions and the climate set many restrictions on the City's operations and have consequences for people, society and the environment. The changing climate poses additional challenges, as the changes and their consequences are estimated to have a wide variety of impacts on society and our environment. The impacts of climate change occurring in other parts of the world can also be reflected in Helsinki and prove significant.

According to the Intergovernmental Panel on Climate Change (IPCC), the weather and climate risk and its impacts consist of a hazard, vulnerability and exposure, which vary and change over time. Reducing vulnerability and exposure are key measures in reducing the weather and climate risk. (Gregow et al. 2016)

Climate risks increase and should be integrated into decision-making at all levels. The Finnish Meteorological Institute and the City's experts assessed the climate risks affecting Helsinki (Pilli-Sihvola et al. 2018). Helsinki's most significant hazards posing a risk are probably floods and extreme winter conditions. The risks affecting urban nature are significant as well, as Helsinki's nature is

under great pressure as it is. Risks caused by heat will also increase, as high summer-time temperatures will become more common due to climate change at the same rate as the mean temperatures. The summer of 2018 may have served as a taste of this.

Better climate risk management requires information and adaptation measures, and climate risks must be taken into consideration in the City at all levels. Many preparatory measures have already been carried out, but there are still areas in which the growing risk has not been taken sufficiently into account. In particular, management of health risks caused by heat and storm waters and impacts on nature should be developed. The City of Helsinki also plays an important role in risk communications, as it is of utmost importance that residents and businesses prepare for disruptions caused by weather and climate. The economic efficiency of risk management and adaptation measures should also be assessed when selecting adaptation measures. It is also important to assess how the impacts and measures are targeted towards different groups of people and areas, and to take the perspectives of justice and equality into consideration. (Pilli-Sihvola et al. 2018).

THESE FACTORS CONSTITUTE WEATHER AND CLIMATE RISK

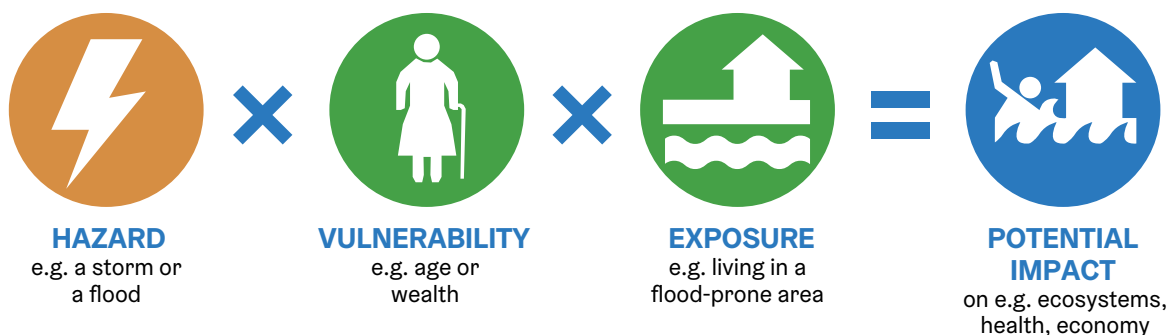


Figure 5. Formation of the weather and climate risk. Image: Finnish Meteorological Institute.

5.3 National and international goals for adaptation

In addition to mitigation, the Paris climate change agreement⁵ places great emphasis on adaptation. The agreement also obligates Finland to increase societies' capacity to adapt to the impacts of climate change and support the adaptation of developing countries. According to the agreement, cities and other local and regional operators play a crucial role in the successfulness of adaptation. Cities are tasked with increasing their adaptive capacity, decreasing vulnerability to the adverse impacts of climate change and promoting co-operation. This requires tools for assessing the efficiency and success of adaptation measures, among other things.

The general goal of the EU Adaptation Strategy⁶ (2013) is to promote a Europe that is better suited to coping with climate change by improving coordination and creating a unified approach to adaptation. Regions and cities bear a great responsibility in terms of successfully adapting to climate change. The EU provides financial support for local-level adaptation through the LIFE financial instrument and the Horizon 2020 framework programme. More information is needed, especially on the costs and benefits of adaptation, as well as regional and local-level risk assessments. In particular, methods are needed for supporting decision-making, monitoring different adaptation actions and assessing their efficiency. The National Climate Change Adaptation Plan (Ministry of Agriculture and Forestry 2014) states that a significant proportion of practical adaptation actions are carried out at the local and regional level. In accordance with the Adaptation Plan, climate resilience reports must be introduced as part of municipalities' preparedness and security of supply planning. Extreme weather events, such as floods

and storms, are the most likely situations to which municipalities must adapt. Examples of important adaptation actions include the planning and implementation of flood protection actions in flood risk areas. Green areas and the small-scale urban greenery formed by street trees and other plantings are mentioned as an important way for cities to adapt the built environment.

The National Climate Change Adaptation Plan acknowledges the need for local and regional assessments of the impacts of climate change, climate risks and factors affecting vulnerability and the adaptive capacity. Necessary background information for risk and vulnerability assessments is produced through regional climate factors (such as precipitation). In particular, there is a need for better information regarding 1) the costs and benefits of climate change and opportunities to influence them with adaptation actions; 2) adaptation as a broader societal and social change factor simultaneously with other societal change factors; 3) the reflection of international impacts of climate change in Finland and adapting to them; 4) the nature of extreme weather events, such as short-term torrential rains and changes in the snow cover.

The Adaptation Plan mentions information distribution and openness as prerequisites for efficient adaptation. As an example of good information provision, the Plan mentions the planning tools of Helsinki's Climate-proof City – Tools for Planning (ILKKA) project (<http://ilmastotyokalut.fi/>), which are related to developing the City's planning system, storm water management, securing carbon sinks, managing the urban heat island phenomenon and increasing urban greenery (e.g. the green factor).

⁵ Paris Agreement 2015 <http://www.ym.fi/pariisi2015>

⁶ EU Adaptation Strategy 2013 https://ec.europa.eu/clima/policies/adaptation/what_en

5.4 Helsinki's participation in city networks from the perspective of adaptation

In November 2015, Helsinki joined the global Compact of Mayors network. The member cities must openly report on their emissions and adaptation measures and create climate change mitigation and adaptation programmes within three years of joining the network.

Since the beginning (2008), Helsinki has been involved in the EU Covenant of Mayors network's climate initiative, which only pertains to climate change mitigation until 2020. It was reformed in 2015, and for new cities joining the agreement, it also pertains to adapting to climate change (Covenant of Mayors for Climate and Energy). New network members must set an emission goal for 2030 and create an adaptation plan. Helsinki joined the reformed initiative in November 2018.

Helsinki is a member of ICLEI (Local Governments for Sustainability) and has joined ICLEI's new climate campaign Green Climate Cities, which replaces the almost 20-year-old Cities for Climate Protection campaign. Through ICLEI, Helsinki participates in various projects and events and is involved in developing tools for adaptation.

In June 2016, Helsinki became a Core Member of the Climate-KIC Nordic network, the goal of which is to expedite the creation and spreading of new climate innovations. Climate-KIC is an innovation network that promotes mitigating climate change and adapting to its impacts. The network is also intended to produce economic benefits. It was established in 2010.

Helsinki is a member of Finland's six largest cities' climate network of mayors. It was established in 2011 as the result of an initiative by the Finnish Innovation Fund Sitra, and its purpose is for the cities, through jointly determined initiatives, to implement each other's good practices and develop their climate work in co-operation. The network has taken 11 initiatives that aim at more sustainable and eco-efficient municipal development.

⁷National Climate Change Adaptation Plan 2022 https://mmm.fi/documents/1410837/5120838/MMM-_193086-v1-Finland_s_National_climate_Change_Adaptation_Plan_2022.pdf/582041ee-3518-4a63-bf60-7133aed95a9c/MMM-_193086-v1-Finland_s_National_climate_Change_Adaptation_Plan_2022.pdf



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Appendix 1. Adaptation working group

Kimmo Kuisma (Chair)	Executive Office
Jari Viinanen (Secretary)	Services and Permits / Environmental Services
Kajsa Rosqvist	Services and Permits / Environmental Services
Jouni Kilpinen	Land Property Development and Plots / Strategic Urban Planning
Jari Rantsi	Land Property Development and Plots / Traffic and Street Planning
Suvi Tyynilä	Land Property Development and Plots / Detailed Planning
Paula Nurmi	Land Property Development and Plots / Urban Space and Landscape Planning
Heikki Takainen	Land Property Development and Plots / Urban Space and Landscape Planning
Pia-Liisa Orrenmaa	Services and Permits / Building Control
Aninka Urho	HSY Vesihuolto
Susanna Kankaanpää	Services and Permits / Environmental Services
Maaria Parry	HSY Seututieto
Anssi Vuosalmi	Executive Office
Raimo Joensuu	Rescue Department
Ilkka Vähäaho	Land Use and City Structure / Geotechnical Division
Sirpa Hintzell	Social Services and Health Care
Annukka Kokkonen	Social Services and Health Care
Tapio Vauhkonen	Stara
Sonja-Maria Ignatius	Services and Permits / Environmental Services
Ville Hahkala	Services and Permits / Environmental Services
Heidi Huvila	Urban Environment / Administrative and Support Services
Pirjo Pekkarinen-Kanerva	Services and Permits / Building Control
Risto Niinimäki	Land Property Development and Plots/Land Property Development and Plots
The following have also taken part in the work:	
Mira Jarkko	Services and Permits / Environmental Services
Viliina Evokari	Services and Permits / Environmental Services
Petteri Huuska	Services and Permits / Environmental Services
Jussi Karmala	Services and Permits / Environmental Services
Markus Lukin	Urban Environment / Administrative and Support Services
Lotta Ruokanen	Services and Permits / Environmental Services
Auni Haapala	Services and Permits / Environmental Services

Appendix 2. Background surveys

- Sään ja ilmastonmuutoksen riskit Helsingissä (Risks Caused by Weather and Climate Change in Helsinki) (Finnish Meteorological Institute, 2018)
- Ilmastonmuutos pääkaupunkiseudulla (Climate Change in the Helsinki Metropolitan Area) report (updated in accordance with IPCC's new standards) (IL 2016:8)
- Pääkaupunkiseudun Ilmastonmuutokseen sopeutumisen uudet haasteet (The New Challenges of Climate Change Adaptation in the Helsinki Metropolitan Area) (2017)
- Ilmastonmuutokseen sopeutumisen sisältyminen Helsingin kaupunkisuunnitteluun – Tilannekatsaus vuosien 2015–2016 kaavaehdotuksiin ja suunnitteluprosessin eri vaiheisiin (Inclusion of Climate Change Adaptation in Helsinki's Urban Planning – an Overview of Plan Proposals in 2015–2016 and the Different Phases of the Planning Process) (Auni Haapala, report 2016, City of Helsinki Environment Centre)
- Kustannusten ja hyötyjen arviointi (Cost and Benefit Assessment) (work by Climate-KIC expert Daniel Benko)
- Sopeutumista edistävät ja estävät tekijät Helsingin kaupungilla (Factors Promoting and Preventing Adaptation in the City of Helsinki) (Viliina Evokari, master's thesis 2016 – University of Helsinki / Environment Centre)
- Sosioekonominen sopeutuminen (Socio-Economic Adaptation) (master's thesis – University of Helsinki / HSY)

Appendix 3. Integrating climate change adaptation measures into Helsinki's management and planning system

The adaptation group analysed how adaptation measures have been included in (integrated into) the City's control and planning system. This was done using an Excel file in which the information has been compiled. The file was used when analysing what should be developed and whether there is a need to update the control or planning system. The Excel table was updated in the autumn of 2018.

Control system	Party responsible	Identified shortcomings in terms of adaptation	Update	Document available / link	Other related information
HSY Board 2012: Helsinki metropolitan area climate change adaptation strategy	HSY (Urban Environment, Rescue Department, Executive Office)	Region-level action policies: land use, construction, technical networks, water management, waste, rescue services and safety, information production, social and health care services, municipalities' joint adaptation	Action policies for social and health care services, development of monitoring and effectiveness assessments. Changing and new needs	New challenges 2016–2017, the Helsinki metropolitan area adaptation strategy is updated in connection with the sustainable urban life programme coordinated by HSY	https://www.hsy.fi/sites/Esitteet/EsitteetKatalogi/Julkaisusarja/10_2012_paakaupunkiseudun_ilmastonmuutokseen_sopeutumisen_strategia.pdf (in Finnish) New Challenges report: https://www.hsy.fi/sites/Esitteet/EsitteetKatalogi/Pks_ilmastonmuutokseen_sopeutumisen_uudet_haasteet.pdf (in Finnish)
Helsinki Group's preparedness instructions 2015	Executive Office / Safety and Preparedness Unit			(Confidential, Act on the Openness of Government Activities 24.1.8)	
Divisions' preparedness plans	Divisions, services	Taking climate risks into consideration		2018–2019	Not public
Helsinki City Rescue Department's strategy programme 2015–2018	Rescue Department	The focus point of operations and resources is moved to the prevention of accidents and guidance for the independent preparedness of citizens.		http://dev.hel.fi/maatokset/media/att/65/652b1fd-85193449dc5338264500be-5d955e04107.pdf (in Finnish)	
City Board 2014: City of Helsinki's rescue service plan	Rescue Department	Rescue services refer to actions carried out by different authorities, City departments, enterprises, subsidiary communities and volunteer organisations, the goal of which is to protect and rescue people, property and the environment, and to limit and mitigate damage in accident and hazard situations		(Confidential, Act on the Openness of Government Activities 24.1.8)	
Management 2009: Flood Strategy 2008 + instructions for preparing for floods (The instructions are viable in their current state. No need for updating yet. Included in the Flood Strategy.)	Land Use and City Structure	Sea, river, torrential rain floods and pipe breakages	The Finnish Environment Institute SYKE's new minimum building heights; the 2016 Turvalliset rakentamiskorkeudet Helsingin rannoilla (Safe building heights on Helsinki's shores) study; the Centre for Economic Development, Transport and the Environment's new flood maps; the protection measures carried out by Helsinki; updates to legislation, flood insurance. The flood height frequencies are not permanent in relation to the theoretical mean water level due to climate change, etc. As regards long-term new buildings, the lowest recommended building height should be reassessed approximately once a decade.	By 2021	http://www.hel.fi/hel2/ksv/julkaisut/yos_2010-1.pdf (in Finnish)
Real Estate Department 2016: Safe building heights on Helsinki's shores 2020, 2050 and 2100 (Wave reports)	Land Property Development and Plots / Geotechnical Division	Information on the sea levels and wave heights is necessary in order to be able to define safe heights for construction on the shores above which the water will not rise.	The water height and wave models will be specified further especially in the West Harbour area and Seurasaarenselkä based on new measurements		'Safe building heights' publication: https://www.hel.fi/static/kv/turvalliset-rakentamiskorkeudet.pdf (in Finnish) Scalable web map that can be used to examine any point on the coast and gain information about the safe building height https://www.hel.fi/static/kv/Geo/Vesi/Poijut.htmlhttp://www.hel.fi/static/kv/turvalliset-rakentamiskorkeudet.pdf
System for improving water traffic safety in Marine Helsinki	Land Property Development and Plots / Geotechnical Division	Provides up-to-date measurement information about the weather situation on the sea in Helsinki and generalised situational information near the measuring stations, as well as forecast information about the weather on the sea around Helsinki for the next few days.	Forecast section complemented. The SMS service works, as does the two-day forecast. Increasing the length of the forecast period is being surveyed.		www.marinehelsinki.fi http://Meri.hel.fi
Centre for Economic Development, Transport and the Environment 2015: Flood risk management plan for the Helsinki and Espoo coast	Centre for Economic Development, Transport and the Environment, Land Use and City Structure, Rescue Department, HSY	Taken into consideration in the plan. Incl. a chapter on climate change.	For the next round, climate change and adapting to it must be examined more extensively.	Update 2019-. More information: Centre for Economic Development, Transport and the Environment / Kari Rantakokko	http://www.ymparisto.fi/download/noname/%7BA AFC10C7-A604-4DC0-9297-91D740A5683E%7D/103399 (in Finnish)
Defining flood locations – preliminary study (2007)	Land Use and City Structure	Based primarily on preparing for climate change. Prevents damage caused by climate change. Without climate change taking place (max. flood height in January 2005), the flood location definition work would not have commenced. In flood locations, storm waters are delayed with storm water reservoirs, minimising the pumping need during periods of flooding		Locations are implemented within the framework of the budgetary appropriation	http://www.hel.fi/static/hkr/julkaisut/tulvakohteet/tulvakohteet_esiselvitys.pdf (in Finnish)
Flood risk management plan for the Vantaanjoki river basin 2015	Centre for Economic Development, Transport and the Environment (Helsinki not involved in the group)	The impacts of climate change on floods. On average, the maximum precipitation for rains lasting six hours and for five days will increase by 25% in Finland and up to more than 50% in some areas.		More information: Centre for Economic Development, Transport and the Environment / Olli Jaakonaho	http://www.ymparisto.fi/download/noname/%7BD662FDF9-0697-497F-A28B-41DFBE1D433C%7D/114610 (in Finnish)
'Storm water flood risk areas and storm water flood-prone areas' report 2012	Public Works Department	The sizing rains use a +15% precipitation level provided by SYKE,	20% is currently recommended for taking climate change into account.	N/A	Public Works Department
Storm water flood risk mapping	Land Use and City Structure	Identifying and modelling storm water flood risk locations, also presented as geographical information	Climate change not taken into account (not required by law)	2018	
Preparedness and contingency plan for the energy management system	Helen	Preparing for emergency conditions		2016	Internal document
Long-term energy production planning	Helen	Assessing the development of the need for heat, cooling and electricity		Twice a year	Internal document
Short-term production planning	Helen	Preparing for short-term exceptional situations, e.g. storms		(Operative activities)	-

Integration 1/2

Control system	Party responsible	Identified shortcomings in terms of adaptation	Update	Document available / link	Other related information
City plan	Land Use and City Structure	A summary of the city plan's effects on ecological sustainability and climate is provided in Chapter 3.2.7 of the city plan account. New construction has been designated for the seashore and Vantaanjoki flood risk area, but Chapter 3.3.2 of the account states that taking the currently valid height level recommendations into consideration and the necessary protection measures must be taken care of in city planning, other planning and construction. Chapter 6 of the technical and financial appendix report of the plan account discusses preparing for floods.	The city plan involves only a scant examination of adapting to climate change.	approx. once a decade	
City plan implementation programme	Land Use and City Structure				https://www.hel.fi/static/liitteet/kaupunkiymparisto/julkaisut/julkaisut/julkaisu-12-17.pdf (in Finnish)
Partial city plans	Land Use and City Structure	Various reports are created in connection with creating a partial city plan, some of which are also connected to adapting to climate change.			
Detailed plans	Land Use and City Structure	Detailed planning pays attention to aspects such as storm water management, flood routes, green areas and street trees, as well as planted areas and preserving/renewing trees on properties.		Continuous process	
Regional planning method instructions; repair and construction method instructions	Land Use and City Structure, Buildings and Public Areas				http://www.hel.fi/www/helsinki/fi/asuminen-ja-ymparisto/rakentaminen/uudisrakentaminen/alueelliset-suunnittelu (in Finnish)
Plot conveyance terms	Land Use and City Structure / Land Property Development and Plots	Case-specific, no instructions or common method			
City Board 2018: Storm Water Management Plan	Land Use and City Structure	Helsinki's storm water management principles and actions		Updated (2008 strategy) 2016–2018 (iWater)	http://www.hel.fi/static/hkr/julkaisut/2008/hulevesistrategia_2008_9.pdf (in Finnish) https://www.hel.fi/static/liitteet/kaupunkiymparisto/julkaisut/julkaisut/julkaisu-03-18.pdf (in Finnish)
Catchment area-specific storm water plans	Land Use and City Structure / Urban Space and Landscape Planning	Sizing rains use a +20% increase. Modelling the combined impacts of sea water and storm water floods in sea mouth areas and analysing the results.		Haaganpuro in progress. A couple of others are being planned. Newest storm water study and plan for the Kumpulanpuro catchment area	https://www.hel.fi/static/liitteet/kaupunkiymparisto/julkaisut/julkaisut/julkaisu-14-18.pdf (in Finnish)
				More information: Centre for Economic Development, Transport and the Environment / Olli Jaakonaho	http://www.ymparisto.fi/download/noname/%7BD662FDF9-0697-497F-A28B-41DFBE1D433C%7D/114610 (in Finnish)
Mapping of natural and recreational values that depend on storm waters 2014	Land Use and City Structure / Urban Space and Landscape Planning	One important goal of creating the programme was to find solutions for processing storm waters by nature-based means, and for locations with significant natural value that are in danger of drying out.	The report does not actually mention climate change adaptation.	N/A	http://www.hel.fi/hel2/hkr/julkaisut/ohjeet/aluasuunnitelman_lahtoaineisto/hulevedet/HKR_hulevesi_arvokohteet.pdf (in Finnish)
Green maritime Helsinki 2050, VISTRA PART 1: starting points and vision	Land Use and City Structure / Urban Space and Landscape Planning	Recreational areas are utilised actively in adapting to climate change. River valleys and seashores serve as adaptation zones. Processing storm waters by nature-based means is used to prepare for extreme weather events and improve environmental diversity and water quality. Small water bodies are a resource of the local environment			http://www.hel.fi/hel2/ksv/julkaisut/aos_2013-4.pdf (in Finnish)
Development plan for the green and recreational network of Helsinki, VISTRA PART 2	Land Use and City Structure / Urban Space and Landscape Planning	"Storm water management and development of the blue network, storm waters as a whole, topsoil permeability, urban green as a landscape structurer"	Co-operation related to improving resilience in climate change adaptation, regional green efficiency, storm water structures		http://www.yleiskaava.fi/wp-content/uploads/2016/10/VISTRAII_10102016.pdf (in Finnish)
City of Helsinki Nature Conservation Programme 2008–2017 (LUMO) (Environment Committee 2008, City Board 2010)	Environmental Services	Taken into consideration in the programme.	For the next round, climate change and adapting to it must be examined more extensively based on new information. The update to the programme could better highlight the perspective of substitutive environments, such as nature-based storm water structures in built areas, green roofs and walls and combating invasive species.	2018–2019	http://www.hel.fi/static/ymk/esitteet/lumo-ohjelma.pdf (in Finnish)
Helsinki's Nature Conservation Programme 2015–2024 (Environment Committee 2015)	Environmental Services	Taken into consideration in the programme.	The need for protection as regards seashore nature types and its connection to adaptation should be surveyed		http://www.hel.fi/static/ymk/lso.html (in Finnish)
Helsinki's invasive species policy (Environment Committee 2015)	Environmental Services	Exacerbation of the invasive species problem due to climate change and the need to intervene early on are taken into consideration. An action programme related to Helsinki's policy has been created for 2015–2019.	The programme created for the next term must pay special attention to combating species spreading from nearby areas early on and risk management plans.	2019	http://www.hel.fi/static/ymk/lumo/helsingin-vieraslajin-jaus-2015-2019.pdf (in Finnish)

Integration 2/2

Nature management policies (Environment Committee 2011)	Land Use and City Structure / Urban Space and Landscape Planning	The policy places special emphasis on the significance of vital forests in adaptation. The programme features a dedicated chapter on preparing for exceptional situations and damage. One of the goals of nature management (7 in total) aims at adaptation (goal 5).	When the policy is updated, adapting to climate change must be examined more extensively, taking aspects such as the significance of small water bodies, invasive species and pest control and the range of species of forests into consideration.		http://www.hel.fi/static/hkr/julkaisut/2011/luonnonhoito_web.pdf (in Finnish)	Reforming the nature management policies, the urban tree policy and other plans concerning vegetation from the perspective of climate resilience
Nature management work instructions: Forests	Land Use and City Structure / Urban Space and Landscape Planning	The work instructions complement the nature management policy, instructions for managing vital forests in practice.	When the work instructions are updated, adapting to climate change should be examined in closer detail, as is the case with the nature management policies as well (see Section 12)		http://www.hel.fi/static/hkr/luonnonhoitosuunnitelmat/luonnonhoidon_tyoojhe_18032016.pdf (in Finnish)	
The City of Helsinki's policy for the use of the plants in built areas (Environment Committee 2009)	Land Use and City Structure / Urban Space and Landscape Planning	The purpose of the plant use policy is to ensure that the significance and values of the plants in built green areas are preserved in the future as the environment, climate and conditions change.			http://www.hel.fi/hel2/hkr/julkaisut/ohjeet/kasvien_kayton_linjaus.pdf (in Finnish)	Benchmarking ways to increase urban greenery, increasing the number of green structures in the urban environment, increasing the number of large trees and amount of other forms of urban greenery in public areas, increasing the number of street and urban trees, increasing the use of useful plants in the city
Control system	Party responsible	Identified shortcomings in terms of adaptation	Update	Document available / link	Other related information	
Urban tree policy 2014	Land Use and City Structure / Urban Space and Landscape Planning	The four target states of the policy highlight the fact that climate change adaptation is taken into consideration when selecting urban tree species.			http://www.hel.fi/static/hkr/tuote_palvelulinjaukset/kaupunkipuulinjaus/Kaupunkipuulinjaus_A4_SUOMI_lowres.pdf (in Finnish)	
Baltic Sea Action Plan set out by the Cities of Helsinki and Turku for the period 2014–2018	Services and Permits / Environmental Services	The actions to prevent and combat eutrophication listed in the 'clear coastal waters' goal, e.g. in the City's agricultural operations, promoting the nature-based processing of storm waters, managing green and recreational areas, etc. are directly related to adaptation (e.g. rainier winters). Furthermore, the 'systematic use of water areas' goal naturally guides operators towards versatility, coordinating interests, etc. and the 'active participation by the residents in the Baltic Sea region' goal involves developing various forms of co-operation and the City's internal services.	E.g. more concrete city-level numerical nutrient recycling or footprint goals.	Updated, new programme for 2019–2023 approved	http://www.itamerihaaste.net/files/910/Helsingin_ja_Turun_Itameri-toimenpideohjelman_2014-2018_FINAL_pienennetty.pdf (in Finnish) http://www.itamerihaaste.net/files/2045/Itamerihaaste-tpo_2018_210x210_FINAL_251018_web.pdf (in Finnish) http://www.itamerihaaste.net/	http://www.hel.fi/static/public/hela/Ymparistolautakunta/Suomi/Esitys/2016/Ymk_2016-09-20_Ylk_14_EI/5231B8A9-6EF6-C53B-87E8-56E018C00000/Liite.pdf (in Finnish)
Development programme for the management and future of Helsinki's seashores 2004–2013	Land Use and City Structure / Urban Space and Landscape Planning	Climate change issue not taken into account.	Must be taken into account when updating the programme, shore areas in a special position in terms of adaptation, plenty of construction pressure on the shores	N/A	Land Use and City Structure / Urban Space and Landscape Planning	
Helsinki's Small Water Bodies Programme 2007	Land Use and City Structure / Urban Space and Landscape Planning	Adaptation not mentioned, but incl. in the adaptation flow rate changes.		Update 2020	http://www.hel.fi/static/hkr/julkaisut/Pienvesiohjelma.pdf (in Finnish)	
Helsinki water management development plan for 2017–2026	Executive Office, Land Use and City Structure, HSY	Climate change taken into consideration in operational reliability and HSY's procedure pertaining to stopping the use of combined sewers	A procedure pertaining to simultaneously examining the sea water and storm water flood situations in the combined sewer area is missing	Next time in 2021	https://www.hel.fi/static/liitteet/kaupunkiymparisto/julkaisut/julkaisut/julkaisu-04-18.pdf (in Finnish) Approval decision concerning the plan: https://www.hel.fi/helsinki/fi/kaupunki-ja-hallinto/paatoksenteko/lautakunnat-ja-johtokunnat/kaupunkiymparisto-asiakirja?-year=2018&ls=11&doc=Kymp_2018-09-25_Kylk_25_Pk (in Finnish)	
Helsinki's ecologically sustainable construction programmes A and B	Built Assets Management		In practice, these programmes are dead (A and B part) and need to be updated in their entirety in order to be implemented	Not planned	http://www.hel.fi/static/hkr/julkaisut/ekorak_2012_2018.pdf (in Finnish)	
Urban space instructions	Executive Office, Land Property Development and Plots		Does not include adaptation as such, but this whole will be reviewed from the environmental perspective, whereby the work in question can be carried out.	Updated in 2018	http://kaupunkitilaohje.hel.fi/	
Area plans	Land Use and City Structure / Urban Space and Landscape Planning	"The area plans have introduced an ecosystem service perspective (piloted in the Vanhakaupunki area plan) that presents the infiltration factors of the partial catchment areas of the planning area, i.e. the relationship between the built and non-built surface. Blue and green infrastructure is taken into consideration."	Currently pertains to public areas only, but could take more of a stand on properties as well.	Every 10 years	https://www.hel.fi/helsinki/fi/asuminen-ja-ymparisto/kaavoitus/kehittamissuunnitelmat/aluesuunnitelmat (in Finnish)	
City Board 2016: Green roof policies	Land Property Development and Plots	Climate change adaptation has been one of the themes of the policy in question. Adaptability of the urban environment, i.e. mitigating the impacts of increasing extreme conditions, flexibility and quick recovery.			https://dev.hel.fi/paatokset/media/att/08/08ad9d722e-708c4e5ff9aeb3a8c291137aeeab6f.pdf (in Finnish)	
Bridge maintenance policies 2012	Buildings and Public Areas		Report focused on the present. Climate change could be included, e.g. as a 'Risks' chapter, when the report is updated.		http://www.hel.fi/static/hkr/julkaisut/2012/siltojen_toimintalinjat_web.pdf (in Finnish)	
Worksite water instructions	Environmental Services	Adaptation not mentioned, but the instructions obligate worksites to take matters such as appropriate storm water drainage into consideration.		More information: Environment Centre / Sini-Pilvi Saarnio		

Use and management plans	Land Use and City Structure / Urban Space and Landscape Planning					
Street plans	Traffic and Street Planning					
Park plans	Land Use and City Structure / Urban Space and Landscape Planning					
City Council 2010: Building regulation	Services and Permits / Building Control	Shoreline construction (Sections 26–27), storm waters (Sections 14–16, 43). An account of the construction/functionality of a storm water and foundation drying system must be attached to a permit application concerning construction or renovation.			http://www.hel.fi/static/rakvv/Rakennusjarjestys.pdf (in Finnish)	
Environmental protection regulations	Environmental Services	Processing of contaminated waters. Does not include adaptation-related matters as such.		2016	http://www.hel.fi/www/Helsinki/fi/asuminen-ja-ymparisto/ymparistonsuojelu/ymparistonsuojelumaaraykset (in Finnish)	
Snow reception options until 2050, report 2015	Buildings and Public Areas	Adaptation is not mentioned as such, but the matter has been brought up in the report due to snowy winters and a denser cityscape. Aspects such as whether wintertime precipitation will increase due to climate change are not taken into consideration.		Snow handling instructions		

Development and know-how

Control system	Party responsible	Identified shortcomings in terms of adaptation	Update	Document available / link	Other related information
Safety pages	Executive Office	Different disruptions, preparation	Impacts of climate change		http://www.hel.fi/www/turva/fi
Assessment tool for eco-efficiency (KEKO)	Land Use and City Structure	Tool for assessing the eco-efficiency of planning	Can be applied to assessing adaptation, from this perspective the assessment will focus on changes to land use, but not on the details of delaying storm waters, etc.		http://keko.ymparisto.fi/etusivu (in Finnish)
The Urban Environment Division's environmental programme 2018–2021, draft	Urban Environment / Administrative and Support Services	Chapter on climate goals, including adaptation			http://helmi.hel.fi/kymp/maatoksenteke/johtoryhmat/kympinjory/Kympjoryn_muistiot/2018/KYMP_johtoryhma_hallinnollinen_14_-_18.6.2018/Liite_2_Kymp_Ymparistohjelma_luonnos.docx (in Finnish)
Environment Centre 2014: Climate-proof city – tools for planning	Environmental Services	Green factor, storm water management, heat island, good practices	Only includes adaptation	Website updated as needed	http://ilmastotyokalut.fi/
Environment Centre 2012: Ways to adapt to climate change in Helsinki (BaltCICA final report)	Environmental Services	State of Helsinki's adaptation assessed	Only includes adaptation	Not updated	http://www.hel.fi/static/ymk/julkaisut/julkaisu-02-12.pdf (in Finnish)
iWater project	Environmental Services	Developing the green factor to focus more on storm waters, integrated storm water programme	Only includes adaptation	Website created in 2016–2018	http://www.integratedstormwater.eu/ https://www.turku.fi/iwater (in Finnish)
CITYWATER project	Environmental Services	Tool for implementing sustainable storm water solutions. Example locations, Helsinki's first biofiltration area implemented in Maunulanpuisto	Project limited to specific matters	Maintenance at least in accordance with the financier's requirements	https://www.waterprotectiontools.net/index.php/en/decision-making-implementation/storm-water-solutions/ and www.citywater.fi
Helsinki's environmental awareness co-operation plan	Environmental Services	A co-operation network that facilitates improving the adaptation-related environmental awareness of many target groups and by various means		Every year or two	http://www.hel.fi/static/ymk/esitteet/yhteistyosuunnitelma.pdf (in Finnish)
Climate Street	Environmental Services	Applying the green factor to the planning and design of courtyards that adapt to climate change and mitigate its negative impacts. Planning work in progress in two locations (Iso Roobertinkatu 26, Annankatu 6), yard plan implementation in 2017. Planning: Taina Suonio, Rosling Manor Gardens			

Overall economy and business opportunities

Control system	Party responsible	Identified shortcomings in terms of adaptation	Update	Document available / link	Other related information
Climate Partners	Environmental Services, Economic Development	A co-operation network between the City of Helsinki and the business sector. Commitment to climate change mitigation measures	Adaptation brought up and joint projects in the future		http://www.ilmastokumppanit.fi/
Smart & Clean Helsinki Metropolitan	Economic Development	Tasked with creating test areas for smart and cleantech solutions. New technologies and services are tested in different parts of the cities of the area. The best solutions create successful business activities in Finland, which are then exported to other countries.	Adaptation projects for areas of focus		https://smartclean.fi/fi/smart-clean-2/

Helsinki