

# UBC cities' adaptation actions to extreme weather events

Report based on CDP Cities Questionnaire 2019 results





"Over 50% the world's population live in cities and it's here that the transition to a sustainable future will be won or lost. But we are already seeing unprecedented engagement and action on climate change in our cities and Baltic cities are no exception. We are proud to be partnering with UBC and to jointly help cities learn from each other by showcasing their climate leadership in the region and beyond."

**Kyra Appleby** | Head of CDP's cities program

## Profile of CDP and UBC

**CDP** provides the world's only global natural capital disclosure system. Currently over 641 cities, across 90 countries, 120 states and regions, and more than 6800 companies from 80+ countries – representing 81% of the global 500 and over 50% of the market capitalization of the world's largest 30 stock exchanges – use the system to report, share and take action on climate change every year. CDP analyses the data provided by the companies, governments and cities to create knowledge and provide reports on the findings. The insights this brings enables investors, companies, cities and governments to understand and act on the business case for reducing impacts on the environment and natural resources. Over 2000 institutional investors representing over a third of the world's invested capital rely on the CDP system. CDP is a global not-for-profit organization, founded in 2000 and headquartered in London.

[www.cdp.net/en](http://www.cdp.net/en)

**Union of the Baltic Cities (UBC)** is the leading network of cities in the Baltic Sea Region (BSR). UBC mobilizes the shared potential of its member cities for democratic, economic, social, cultural and environmentally sustainable development of the Baltic Sea Region. UBC works for the attainment of its vision of the Baltic Sea Region as a dynamic, innovative and attractive global growth center, where success is based on smart, green, resource-efficient and sustainable economic and social development. UBC wants to see the Baltic Sea Region cities becoming increasingly recognized as global forerunners in Climate-smart development creating a high quality living environment for their inhabitants. UBC was founded in 1991 in Gdansk, Poland and it has around a hundred member cities from all 10 countries from the Baltic Sea Region – Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia and Sweden.

[www.ubc-sustainable.net](http://www.ubc-sustainable.net)

**CDP is the leading global organisation for voluntary climate reporting, providing a unified system for disclosing and managing environmental data. Working through a process of measure – disclose – manage, the data provided is analysed by CDP in order to create knowledge and understanding that enables companies, cities, local and national governments, and investors to better tackle the challenges and seize opportunities provided by climate change. Using the tools provided by CDP, all stakeholders can identify potential actions for e.g. increased energy efficiency, resulting in a more sustainable and economical organization. Formed in 2000, over 6800 companies, 641 cities, and 120 states and regions now report to CDP, with the numbers constantly increasing.**

# Foreword

Recently, more and more extreme weather events such as heavy rainfall, flooding and heatwaves have been reported across the Baltic Sea. Due to this, it is more and more significant that our UBC member cities engage in disclosing their climate-change related data to platforms such as CDP. The CDP disclosure process can be used as more than just a reporting tool, rather it can work as a tool for strategic decision making and benchmarking that helps decision makers get an overview of what is being done and what should be done for climate action in their cities.

The UBC cities face the same kind of challenges related to climate and are tackling climate change impacts every day. This report showcases some of the good practices and solutions performed by the UBC member cities with the aim of sharing these with the other cities in the network so that we can learn from each other and increase city resilience.

Some of the actions the cities are taking are world-class solutions that could inspire other cities in the Baltic Sea Region and beyond.

**Björn Grönholm** | Head of UBC SCC



*Image credits: Mariia Andreeva, UBC Sustainable Cities Commission Secretariat*

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Important notice:

The UBC has prepared the analysis in this report based on responses to the CDP 2019 cities information request that was the basis of the UBC and CDP MOU. All information and views expressed herein by UBC are based on its judgment at the time of this report and are subject to change without notice due to economic, political, industry and city-specific factors.

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# Introduction

*“Cities are the key actors in making a change: with smart city planning, smart use of resources including the human resources of their inhabitants, the use of new technology and new ways of working and cooperation this can be possible! It can be done by protecting the urban environment, water bodies and water supplies and planning for sustainable mobility.”*

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UBC Sustainability Action Programme 2016-2021, p. 8

The Union of the Baltic Cities started to cooperate with CDP back in 2017 in order to encourage UBC member cities to take more action in the field of climate change mitigation and adaptation. Back in 2016, only 6 UBC cities disclosed their climate-related data and actions via CDP. Now, in 2019, we are honored to announce that 26 active UBC cities disclosed to the CDP Cities Questionnaire 2019 and provided insight into what is being done in their cities and how they view climate adaptation and mitigation.

We would like to thank the cities who have been involved in the disclosure process from the beginning and are now reaping the benefits of continuous disclosure for strategical decision making in their municipalities and cities, keep up the good work!

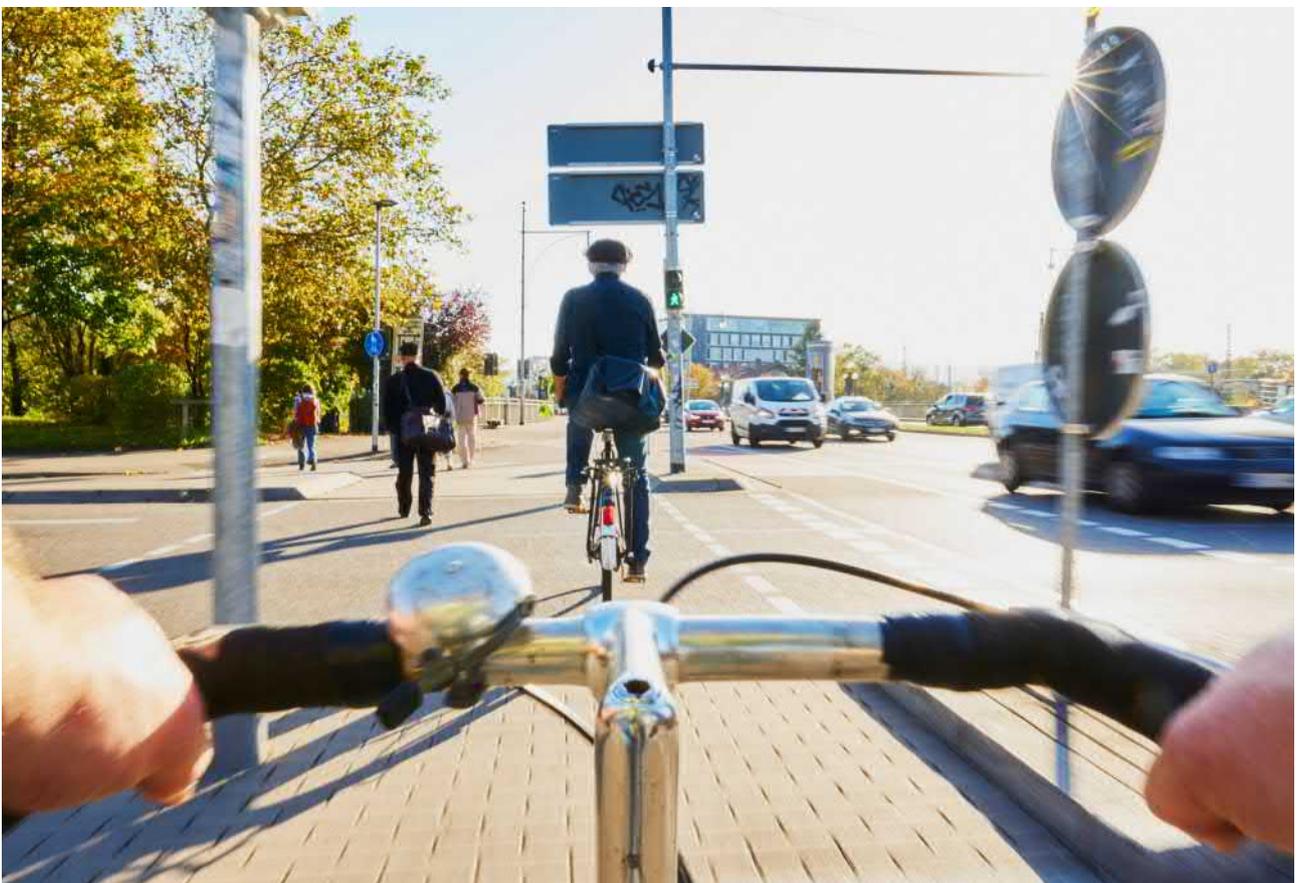


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## Cities disclosing in 2019 were:

**Pärnu** and **Tartu** from Estonia, **Espoo, Helsinki, Kemi, Lahti** and **Turku** from Finland, **Greifswald** and **Rostock** from Germany, **Riga** from Latvia, **Panevezys, Taurage, Klaipeda** and **Siauliai** from Lithuania, **Arendal** and **Kristiansand** from Norway, **Gdansk** and **Gdynia** from Poland and **Malmö, Trelleborg, Visby, Växjö, Karlskrona, Västervik, Umeå** and **Örebro** from Sweden. Even though there were **26 cities disclosing this year**, this report is based on the results of 25 cities who disclosed their climate change related data publicly - thus, making the data available to analysis.

The number of cities disclosing globally in 2019 has not yet been published by CDP, yet the number has been growing constantly year by year. In 2018, a total of 641 cities around the globe disclosed their climate related data.

## Reporting on actions on the local level

The structure for this year's UBC-CDP cooperation report has been somewhat changed. We have taken into account the feedback from our UBC member cities and have included more good examples and comments from the local level and less global/regional comparison.

**The focus areas** of the report are the extreme weather events that can have costly impacts on our cities' infrastructure – such as properties, transport, health and well-being, to name a few. In the Baltic Sea Region, we have seen for example **heavy rainfall causing roads and metro lines to be shut down** due flooding, **contamination incidents** due to mixing of wastewater and stormwater and **record high temperatures**.

Elsewhere in Europe, heatwaves have caused fatalities and hardships for the locals, having to endure temperature as high as 41.8C. This also caused the shutdown of some thermal power stations in France and Germany due to the river water temperature being too hot for cooling. Extreme weather events, such as tornadoes, have been rare in Europe but in Luxembourg in August 2019 tornadoes caused destruction. These might not be the reality in the Baltic Sea Region today but can be so in the future. Thus, **long-term perspective in climate action** is needed to help avoid catastrophic impacts.

The report this year highlights **nature-based solutions** as well as **adaptation planning activities** from the cities – these so-called “blue-green solutions” are gaining momentum and are becoming more and more important in the face of the changing climate. Hopefully, these concrete examples (few of many resulting from the CDP Cities Questionnaire 2019 responses) inspire others and help make UBC cities more resilient to different kinds of climate hazards. If you wish to include your city's good practices in future reports, you could disclose to CDP or contact us directly.

There are still **evident challenges to the UBC-CDP joint campaign** - it is difficult to reach the right people and get them to disclose the city data on time.

Also, the quality of responses submitted by the cities could be improved - **more interdepartmental collaboration is needed** to answer the questionnaire. Climate action should be considered in many city departments (e.g. environment, urban planning, transport, strategy, water) in order to provide valuable insights also internally to the cities from the CDP disclosure process. The fastest way to get help with this and save time is to contact other cities and UBC SCC for recommendations.

**Thus, we encourage UBC cities to improve their methods for CDP disclosure and provide more insightful responses to CDP Cities Questionnaire 2020 once the disclosure period opens next spring.**

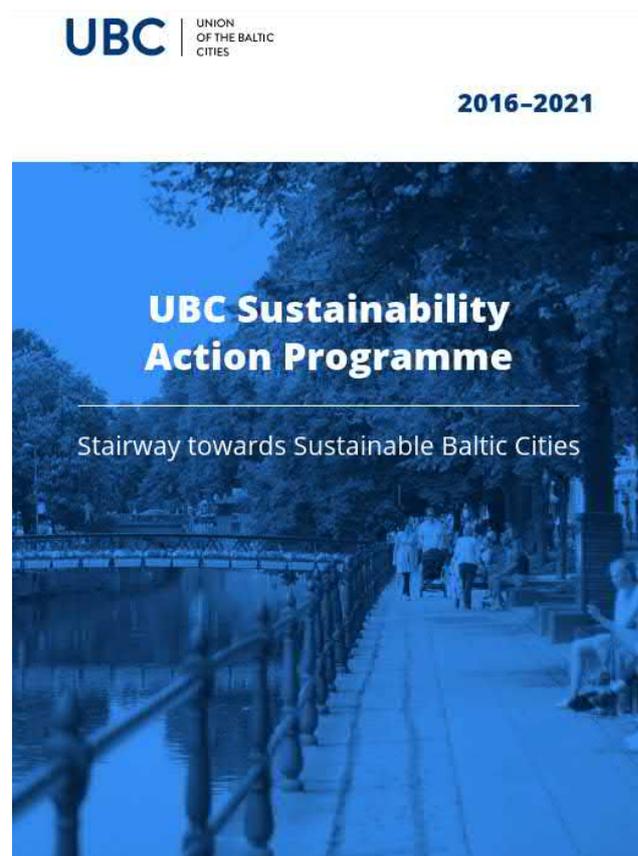
## Background of UBC's commitment to climate action

Climate work in UBC started already in 2007 when the **first UBC Resolution on Climate Change** was adopted during the UBC General Conference in Pärnu, Estonia. Now, a new UBC Sustainability Action Programme is published every five years. **The UBC Sustainability Action Programme for 2016-2021** is highlighting four core topics that guide the sustainable development work in UBC cities.

- **Green urban economies;**
- **Climate-smart Baltic cities;**
- **Sustainable urban ecosystems and natural resources,** and
- **Healthier Baltic Sea** (specific topic "**Baltic Sea and its catchment area**").

The cooperation between UBC and CDP supports the aims and objectives outlined in this UBC Sustainability Action Programme. Furthermore, UBC adopted the "**UBC Resolution on United Nations Agenda 2030 for Sustainable Development Goals**" during the XIV UBC General Conference in Växjö, Sweden in October 2017 that supports collaboration for "**creating more resilient and climate smart cities and regions**" as well as highlighting the importance of using the city network's potential more for helping the

member cities "**to benchmark and support each other in order to set and reach ambitious goals**".



*The purpose of the UBC Sustainability Action Programme 2016-2021 is to guide the whole network of the UBC towards development of a smart and sustainable Baltic Sea Region.*

Read it here: <http://bit.ly/2QuacSv>

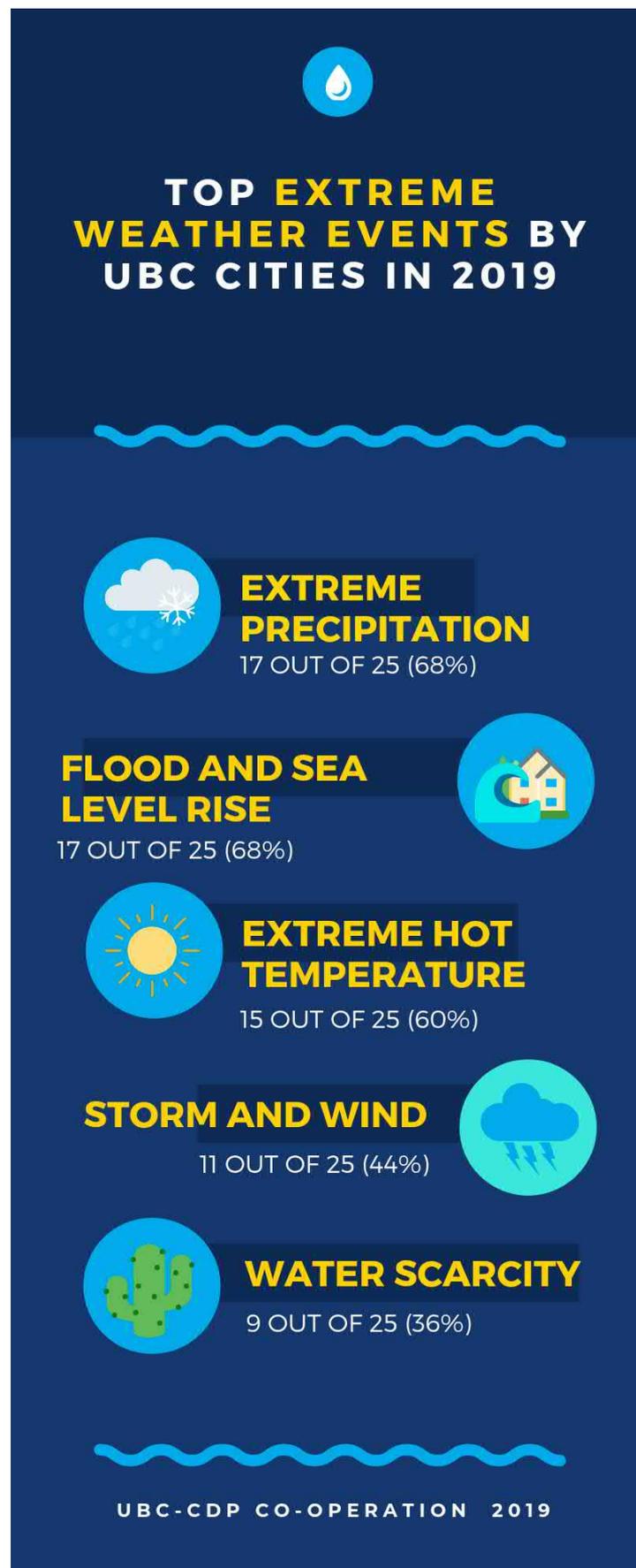
**The UN Sustainable Development Goals** incorporate climate action, sustainable cities as well as partnerships and collaboration among other goals that UBC's work supports.

In the Baltic Sea Region, HELCOM, CBSS Baltic 2030 and other actors are advocating for more cooperation in the field of climate work in different sectors. For example, **the Baltic 2030 agenda** was created by the CBSS Expert Group on Sustainable Development and it is an agenda that is specifically created for the Baltic Sea Region to guide macro-regional stakeholders through the implementation of the SDGs.

This agenda provides a "common vision" for sustainable development in the Baltic Sea Region. **The vision UBC has for its cities** fits well into the Baltic 2030 Agenda. The encouragement for cities to disclose to CDP, to help them to understand where they stand and how well they are doing in the field of sustainability that incorporates sustainable urban mobility, brownfields, water and climate resilience and many other fields that support the cities' sustainability (check: [UBC Sustainable Cities Commission](#)) is seen as one part of UBC's activities.

*"Promote cooperation and exchange of experiences between cities in the BSR to advance and deliver sustainable urban solutions and quality of life, and so to bring added value for them." - One of the aims of the UBC outlined in the UBC Strategy*

2016-2021



The infographic highlights the top extreme weather events indicated by the disclosing UBC cities in 2019.

# Extreme weather events and adaptation actions disclosed

*“Once a distant concern, climate change is now an existential threat and the greatest challenge facing this generation. It is abundantly clear that business as usual is no longer good enough. Rapid, deep and transformative change is needed throughout society - not only to reduce emissions and stabilize global temperatures, but to build safer, healthier and more prosperous future for all.” - Patricia Espinosa, Executive Secretary of UN Climate Change*

The United Nations Climate Change Secretariat published a report “Climate action and support trends - Based on national reports submitted to the UNFCCC Secretariat under the current reporting framework” in 2019 that highlighted the most often reported climate hazards by nations. The same climate hazards (floods, drought, extreme weather events, changing seasonal patterns as well as changes in disease distribution and species as well as the melting of permafrost and the glaciers) affect cities everywhere to a different level - some areas are impacted more, some less, some frequently and some never.

The UBC cities have disclosed information regarding climate hazards, prospective impacts and current experiences as well as actions (not all that were disclosed are included in this report) that these cities are taking at the moment or have taken to make the cities more resilient.



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## Extreme precipitation

Extreme precipitation includes **heavy rainfall, rainstorm, fog, heavy snow** and other similar weather events. Out of 17 cities who indicated extreme precipitation as a climate hazard, **94% indicated rainstorm, 41% indicated heavy snow, 5.8% indicated fog** as the climate hazards with an impact to their cities.

### City infrastructure-related challenges

The challenges posed by extreme precipitation (both from heavy rainfall as well as heavy snow and fog) and its impacts to the city infrastructure are visible. The stormwater management and drainage systems **capability to cope with the extreme amounts of water** can be under pressure during intensifying rainstorms. The main consequences or impacts of extreme precipitation that could be seen in the urban environment could be identified as follows:

- **damage to the city infrastructure** due to flooding
- **properties could also be under risk** of flooding
- **heavy water run-off** that affects every aspect of urban life - from transport and logistics to residential sector and public health



*Image credits: [www.stock.adobe.com](http://www.stock.adobe.com)*



## Commentary from the UBC cities

*"In recent years, there has been an increase in the number of heavy rainfalls, and the intensity of rainfalls (water volume) has also increased. So far, rainwater has primarily caused problems in transport and the movement of people with reduced mobility (flooded street sections). However, so far, no significant damage due to rainwater has occurred, but the risk is increasing as the tendency continues." - Estonian city*

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*"Flooding in houses, factories and warehouses in low level areas in town and smaller urban areas. This will probably be much worse in the future with assumed climate changes with more intensive rain (after periods of drought)." - Swedish city*

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*"Heavy snow occurs in the city already. It causes problems for both private and public traffic. Furthermore, heavy snows cause power failures if the snow breaks power lines. People living in rural areas are the most vulnerable to power failures, since fixing the problems might take longer compared to more urban areas. Heavy snows are especially harmful for forestry and might cause significant economic losses. Heavy snow breaks branches and damages trees. The situation is especially problematic when the freezing-melting cycle changes and the snow masses become heavy and freeze on the trees." - Finnish city*

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*"Changes in fog conditions have not been studied in Finland. It is possible that due to climate change, fog conditions will increase in winter due to milder and more wet winters." - Finnish city*

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*"Large snowfall is when the snow flows are so large that normal preparedness fails to keep the roads runnable or take care of large snow levels on buildings. Large snowfall will reduce road accessibility, as well as trees that destroy power lines and cause loss of power in a larger or smaller area for a shorter or longer period, usually with a drop in mobile telephony as a consequence." - Norwegian city*



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# Adaptation actions in UBC cities

## City of Umeå, Sweden

### **Action title: Prioritized streets and roads for snow clearance**

**Action status:** operation

**Co-benefit area:** Reduced GHG emissions, social inclusion, social justice, improved resource quality (e.g. air, water), improved public health

#### **Action description:**

From a cost point of view, it is not reasonable for the municipality to have the resources to immediately snowplow the municipal streets throughout the urban area at the same time. Therefore, there is a prioritized road network which, for example, includes bus and main streets, the center and the eastern and western districts. In the same way, priority is given to municipal pedestrian and bicycle paths where the need is considered to be the greatest. Cyclists and pedestrians should seek out these routes during the winter period. Every year, this road network is reviewed.

**Learn more:** <http://bit.ly/2pv7PnK>

## City of Malmö, Sweden

### **Action title: Cloudburst mapping in Malmö**

**Action status:** operation

**Co-benefit area:** Disaster risk reduction, enhanced resilience, disaster preparedness, enhanced climate change adaptation, improved access to and quality of mobility services and infrastructure

#### **Action description:**

There is a map that shows low points where water will gather, and which directions water will go when cloudbursts happen. This map will help us in the future city planning and when deciding where we should implement cloudburst actions.

**Learn more:** <http://bit.ly/2psokkr>

## City of Helsinki, Finland

### **Action title: Stormwater risk mapping**

**Action status:** operation

**Co-benefit area:** Enhanced resilience, enhanced climate change adaptation, improved resource quality (e.g. air, water), improved access to data for informed decision making

#### **Action description:**

Urban flood areas are identified, the flood risk area mapping is completed. No significant stormwater flood risk areas were identified in the study and mapping, but for some priority areas, further analysis will be carried out.

**Learn more:** <http://bit.ly/2o4Yti9>

## Nature-based solutions

### City of Turku, Finland

**Action title:** Blue-green factor

**Action status:** pre-implementation

**Co-benefit area:** Enhanced resilience, enhanced climate change adaptation, reduced GHG emissions, ecosystem preservation and biodiversity improvement

**Action description:**

The blue-green factor is being piloted in city planning. Implementation of the blue-green factor in city planning has several advantages - stormwater management, flood risk reduction, cooling effect, improving the biodiversity of the city's ecological systems, improving the well-being of the citizens.

**Learn more:** <http://bit.ly/2o5aQe5>

## Adaptation planning activities

### City of Tartu, Estonia

**Action title:** Compilation of Tartu's Energy and Climate Action Plan

**Action status:** scoping

**Co-benefit area:** Enhanced climate change adaptation, reduced GHG emissions

**Action description:**

In October 2018 started the compilation of the city's Energy and Climate Action Plan. It is planned to be presented to the City Council for approval in November-December 2019.

**Learn more:** <http://bit.ly/2nTbvQ1>

## Extreme hot temperature

**Heat waves (87%)** and **extremely hot days (13%)** are reportedly challenging **60% of the disclosing UBC cities**. The demand is predicted to increase for public services, especially for the health providers during extremely hot weather events in the northern hemisphere.

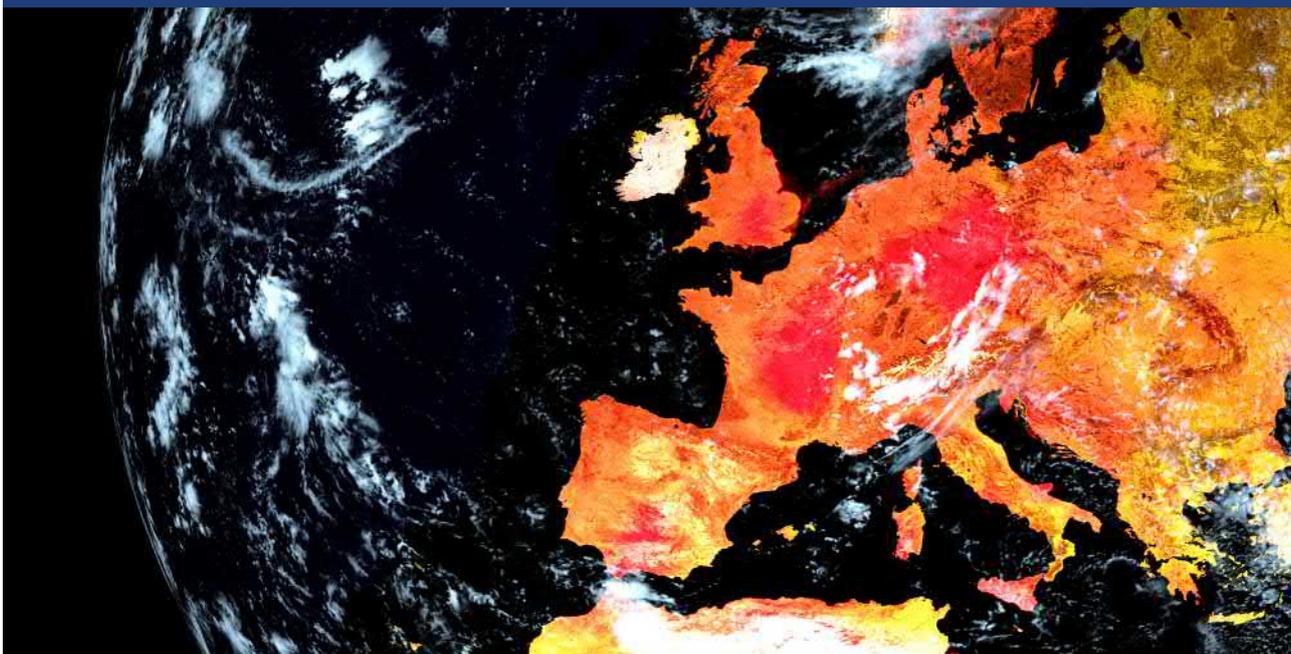
### City infrastructure-related challenges

Temperature increase and heatwaves can increase **the “heat island” effect** that includes:

- **melting asphalt**
- **increased asphalt rutting** due to material constraints
- **thermal expansion** affecting bridge joints and paved surfaces, also,
- **damage** to bridge structure materials.

The demand for **public health services** is increasing since it is more difficult for the elderly, children, people with chronic diseases and of low socio-economic background to cope with the heat waves. It impacts the daily life of the inhabitants and distribution of services. An increase in resources and public services will be needed. Also, **energy, residential** and **transport** sectors will be affected by the heatwaves.

Recent summers have brought hot temperatures to many European countries - including the Baltic Sea Region where heatwaves were experienced.



*Image credits: www.stock.adobe.com - An image by NASA depicting the heatwave of 2019 from space.*

## Commentary from the UBC cities

*"Mortality in hospitals and elderly homes increases when temperature is above 24 °C day-round. Energy demand rises and stresses energy system when cooling is turned on in many households, offices and hospitals. Heatwaves can damage agriculture, food production, and food poisonings are more possible. Stress to ecosystems and water bodies, including groundwater. New invasive alien species or diseases. More irrigation needed and rain water storages. Strong apposition in lakes can create lack of oxygen in some levels."*

- Finnish city

—

*"We have had a few summers with unusually high temperatures over long times. Households that are not connected to municipal water supply experienced problems with dry wells. Farmers could not get enough water to their cattle (and their harvests were not enough - also causing less income for them). Higher risk for forest fires. And actually, an indirect increase of fossil fuel use in the energy system, since it was impossible to use machinery in the forests, because there were alarming risks of igniting forest with sparks from the machines."*

- Swedish city

—

*"The summer of 2018 was very hot and very dry. Especially elderly people and small babies could easily get dehydrated. Because of the lack of precipitation, crops and harvests failed. The ground water levels of 2019 are still lower than average, and if we get another summer like the one in 2018, there is a risk of a serious water scarcity."* - Swedish city



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# Adaptation actions in UBC cities

## City of Kemi, Finland

**Action title:** Portable cooling units to eldercare sheltered homes and city hospital

**Action status:** operation

**Co-benefit area:** Disaster risk reduction, improved public health

**Action description:**

The need of cooling units and increased ventilation has been noticed in the eldercare shelters and they have pre-ordered new units.

## City of Växjö, Sweden

**Action title:** Analyzing heat resistance in public buildings

**Action status:** pre-implementation

**Co-benefit area:** Enhanced resilience, enhanced climate change adaptation, improved public health

**Action description:**

Together with regional authorities we are in a project where we are analyzing a few public buildings (school, kindergarten, elderly home). The aim is to identify the challenges these kinds of buildings have during heatwaves, and what actions are needed to maintain normal indoor temperature. Children and older people are the ones at risk of suffering the most from high temperatures. Experiences from this pilot will then be used in other public buildings.

## Nature-based solutions

### City of Lahti, Finland

**Action title:** Tree planting and/or creation of green space

**Action status:** operation

**Co-benefit area:** Climate change adaptation, reduced GHG emissions, ecosystem preservation and biodiversity improvement

**Action description:**

Increasing amount of green in Lahti, bettering the park tree network and cycle lane tree network.

These have a cooling effect, trees and plants capture the impurities in the air and reduce strong winds.

**Learn more:** <http://bit.ly/2n4nqK6>

## Adaptation planning activities

### City of Espoo, Finland

**Action title:** Incorporating climate change into long-term planning documents

**Action status:** pre-implementation

**Co-benefit area:** Enhanced resilience, enhanced climate change adaptation, improved public health

**Action description:**

As a part of Covenant of Mayors for Climate and Energy, Espoo has committed to produce a Sustainable Energy and Climate Action Plan (SECAP) by 2020. The SECAP plan includes also an adaptation action plan.

### City of Örebro, Sweden

**Action title:** Incorporating climate change into long-term planning documents

**Action status:** pre-implementation

**Co-benefit area:** Disaster risk reduction, enhanced resilience, disaster preparedness, enhanced climate change adaptation, improved access to data for informed decision-making

**Action description:**

Within the frame of the work on the climate adaptation plan, “heatwaves” have been identified as a risk that will increase in frequency in the future and where the measures also will increase.

## Flood and sea level rise

The climate hazards included **coastal flood (59%), flash/surface flood (47%), river flood (29%)**. Flood is one of the extreme weather events that could cause a **national or local emergency situation** when occurring unexpectedly in a magnitude that exceeds predictions. Thus, **prevention and disaster preparedness are important** for the cities that are located near any water body, and especially so for the cities located in the low-lying high flood risk areas.

### City infrastructure-related challenges

A lot of UBC cities are located by the Baltic Sea and that poses additional risks for flooding especially to low areas. **All areas of the urban infrastructure are affected** - from transport to well-being of the local inhabitants.

The urban floods can cause disturbances in everyday life by damaging the infrastructure (official buildings, resident properties etc.). Accessibility can be disturbed. Floods can also cause the mixing of sewage and drinking water due to water pipe system's incapability to handle large amounts of water - this in turn, can cause both health issues as well as additional repair and maintenance costs.

The impacts are multi-faceted and can affect many different sectors at different points of time. **Preparation is key!** Also, educating the local inhabitants to be prepared in the face of a flood event could also prove useful.



*Image credits: www.stock.adobe.com*

## Commentary from the UBC cities

*“A part of the territory constantly suffers from floods, which causes considerable economic and moral damages to the owners of the flooded areas. Furthermore, due to climate changes caused by global heating, the risks of floods and coastal erosion in the city territory are still growing. Considering the geographical, hydrogeological and climate situation of the city, the following three types of natural causes of river flood can be distinguished: 1. River flood caused by strong wind. 2. Spring river flood. 3. Flood caused by intense rainfall and rising groundwater level. The city may be threatened by a combination of several causes of flooding, i.e. increased flooding can be caused by a sea surge caused by a storm in combination with a relatively large flow rate in the river. Thus, the territories that are threatened by probable floods have been identified in the city in order to protect the inhabitants, cultural or historic value, economic activities etc.” - Latvian city*

—

*“Flood will normally only affect infrastructure or cause disturbances in everyday life in a small settlement area over a short period of time. Economic expenses for the municipality will be linked to the maintenance of municipal roads and other infrastructure.” - Norwegian city*

—

*“Heavy rains are expected more often and that can create urban floods. Stormwater floods damage infrastructure and properties. They can also pollute groundwater and surface waters. In agriculture, the crops will fall, the nutrients and pollutants start moving to waterbodies and have eutrophication impact or polluting impact. So, water protection and groundwater protection measures are needed, and the costs of management will rise.” - Finnish city*

—

*“Flooding during more increased precipitation during autumn/winter and less snow, more often heavy rainfall, less often frozen ground, will have a negative impact on the built environment and infrastructure. It will also have a negative impact on soil structure in arable land, for agriculture and forestry the expected raised production in a warmer climate can soon be turned to losses if both the planting and the harvesting seasons are too wet.” - Swedish city*

—

*“If water level rises over critical level then some residential areas, hotels and wastewater treatment plants will be flooded.” - Estonian city*

—

*“Now we must have a 100-year coastal flood (about 100 years apart but may also come more often or less) to experience injury. If the forecasts from climate scientists turn into reality, then we will have a coastal flood with a great potential of damage more often than every 20 years (20-year-old-storm).” - Norwegian city*

# Adaptation actions in UBC cities

## City of Växjö, Sweden

### **Action title: Inventory of calculated highest flows**

**Action status:** operation

**Co-benefit area:** Disaster risk reduction, enhanced resilience, disaster preparedness, enhanced climate change adaptation

### **Action description:**

A simulation of highest flows of streams, rivers as well as water levels in lakes, based on 100-year rainfalls has been performed. This information has been entered into the GIS map of Växjö, and it helps planning department identifying where it may be riskier to exploit for buildings. New guidelines have been incorporated in the city planning process based on this.

## City of Växjö, Sweden

### **Action title: Coordination team for high flows and dams (crisis management including warning and evacuation systems)**

**Action status:** operation

**Co-benefit area:** Enhanced resilience, disaster preparedness

### **Action description:**

Whenever a high flow occurs, action is needed very fast. Various stakeholders from different parts of the municipal organization are needed, as well as successful communication with the dam owners, land owners, home owners. This has been in operation and tried out a few times. It has been successful. Not at least, the public were happy to be informed very soon about what challenges may occur within the nearest time, to help them prepare. Communication is held with the dam owners to inform them about their responsibilities in case they are not managing their dams properly and if that would lead to negative consequences for others.

# Adaptation actions in UBC cities

## City of Trelleborg, Sweden

**Action title: Coastal protection strategy**

**Action status:** pre-feasibility study

**Co-benefit area:** Disaster risk reduction, enhanced climate change adaptation, economic growth

**Action description:**

Decision about financing a strategy about coastal flood and rising sea level have been made in the Municipality board.

**Learn more:** <http://bit.ly/2pvYegs>

## City of Turku, Finland

**Action title: Promoting the sense of community (community engagement/education)**

**Action status:** pre-implementation

**Co-benefit area:** Enhanced resilience, disaster preparedness, social inclusion, social justice

**Action description:**

Extreme weather events may cause regionally extensive exceptional conditions which the current resources do not allow to be addressed quickly enough. For instance, a rainstorm in August 2012 blocked the emergency response centre. In exceptional and unpredictable situations, the preparedness of city residents for independent initiative, knowing one's own environment and knowing the people that may need help is critical. Thus, supporting a sense of community is an excellent way to prepare for exceptional conditions and simultaneously help advance the realization of other objectives listed in the Action Plan 2029. In addition to the measures discussed above and to support them, it is important to further elaborate an overall view of adaptation measures. Furthermore, it is crucial to strengthen coordination as part of climate policy steering and implementation and as part of management and operations of divisions and city group's subsidiaries. Preparation for climate change and adaptation measures widely concern the city's operation and affect the wellbeing of citizens particularly in situations where climate risks become reality.

## Storm and wind

The storm and wind events were categorized as **severe wind (36%)**, **storm surge (27%)**, **lightning/thunderstorm (18%)**, **tornado (9%)** and **extra tropical storm (9%)**. Surprisingly, windy weather events were not highlighted as much as it was predicted - after all, strong winds have impacts on infrastructure such as housing, road blocks and power outages caused by fallen trees, possible fatalities when trees fall or the lightning hits.

### City infrastructure-related challenges

Extreme winds and storms can cause **damages to road infrastructure** and increase maintenance costs. The fallen trees caused by strong winds can **block the roads** or **damage the critical infrastructure** such as **powerlines** and **technical installments**, also, **danger exists to inhabitants** to get hit by flying debris, objects or trees, thus, impacting the everyday mobility and safety.

Spring and autumn often brings strong winds and high waves to the coastal areas whereas summer is the time when the lightning strikes.



*Image credits: www.stock.adobe.com*

## Commentary from the UBC cities

*“Most dangerous weather phenomena experienced in Finland are due to thunderstorms. In the urban environment, and within the city, the damages to for example energy networks are minor as they are mostly underground, but the wind gusts can cause damages and danger to people in public spaces (falling trees and branches, shelters and roofs etc.). The intensity and possibly also frequency of (dangerous) thunderstorms are expected to increase in the future with climate change.” - Finnish city*

—

*“Power distribution faults, property damage, forest damage, traffic problems, flooding due to short-term sea-level variations caused by wind.” - Finnish city*

—

*“Objects struck by lightning has led to water outage, power outage, difficulties in communications technology, injuries on individuals, damage and death to animals or livestock. Impact varies from no notable consequences at all to very serious consequences depending on what is struck by lightning.” - Swedish city*

—

*“In 2013 we had a storm which made the water in the strait rise to almost 2 meters above normal. Lots of traffic had to be cancelled and roads were flooded. Infrastructure were damaged and the price to repair everything was very high.” - Swedish city*

—

*“It impacts functioning of the inhabitants and distribution of services.” - Polish city*



Image credits: [www.stock.adobe.com](http://www.stock.adobe.com)

# Adaptation actions in UBC cities

## City of Örebro, Sweden

**Action title:** Hazard resistant infrastructure design and construction

**Action status:** operation

**Co-benefit area:** Disaster risk reduction, enhanced resilience

**Action description:**

Expanded the resilience and resistance in critical infrastructure connected to functions of high societal value such as water production, electricity and energy.

## City of Turku, Finland

**Action title:** Underground cabling of the power grid

**Action status:** implementation

**Co-benefit area:** Enhanced resilience, disaster preparedness, job creation

**Action description:**

Underground cabling is already implemented in Turku to improve the city's resilience to storms and heavy winds. Underground cabling is monitored by the city's energy company Turku Energia. However, underground cabling is not totally problem-free: the costs of underground cabling are high and in cases of disturbances the errors are more difficult to find.

**Learn more:** <http://bit.ly/33c9D3G>

## City of Lahti, Finland

**Action title:** Strengthening the expertise of construction control staff in licensing and control functions (resilience and resistance measures for buildings)

**Action status:** implementation

**Co-benefit area:** Enhanced climate change adaptation, reduced GHG emissions

**Action description:**

Climate change adaptation and mitigation awareness and knowledge raising among officers and builders and private home-owners in Lahti. For example, ongoing Canemure Project is implementing these.

**Learn more:** <http://bit.ly/2oEXeGD>

## Water scarcity

Only one climate hazard regarding water scarcity was indicated by the UBC cities - **drought (9)**. This hazard has been affecting some of the cities already and is expected to increase in both intensity and frequency in the future. It has been thought to mostly affect **food production and agriculture** - vital industries that produce goods for the inhabitants living in the cities.

### City infrastructure-related challenges

Droughts will affect different parts of the city infrastructure, from **food production to the well-being of biodiversity and ecosystem services** in the urban areas. Droughts and heatwaves often appear together, yet sometimes the spring/summer period may have extremely low precipitation without the constantly present extremely hot temperatures.

**Droughts affect the well-being of a city: from food production to the well-being of its citizens, biodiversity and ecosystem services**



*Image credits: [www.stock.adobe.com](http://www.stock.adobe.com)*

## Commentary from the UBC cities

*“The drinking water quality and the availability of drinking water are affected by prolonged drought, which can lead to low groundwater levels, sintering wells and low water flow in streams. Even though the city is able to cope with longer droughts, water supply in the future should be ensured and also in order to help neighboring municipalities with the drinking water supply.” - Swedish city*

—

*“There are few studies of impacts of drought in the city. Drought is expected to increase in the spring in the future, which will have negative impacts to agriculture and also to parks, urban forests, green areas in the city. During the drought of 2002-2003, many trees died in the city.” - Finnish city*

—

*“Because of drought city trees suffer under these conditions. In case of losses of trees this influences climate adaptation.” - German city*

—

*“Short winter - not much snow - dry summer of 2018 - no rain, low water levels in wells, decreased food production. This will probably be much worse in the future with assumed climate changes.”  
- Swedish city*



Image credits: [www.shutterstock.com](http://www.shutterstock.com)

# Adaptation actions in UBC cities

## City of Visby, Sweden

**Action title:** Water butts/rainwater capture

**Action status:** operation

**Action description:**

In order to manage the water shortage, Region Gotland decided upon irrigation bans and runs the campaign "Save Water" with information and ads, among other things an education campaign at schools and a video shown at the cinemas and the ferries' TV-monitors together with other ads. The campaign has also comprised a variety of ads, signs and some infotainment material. The campaign has yielded very good results when the increased awareness among municipal citizens and visitors, so that less water is consumed. (Region Gotland, annual report 2017 from water and sanitation department). Water-saving campaign is a combination of regulative and informative measures. Information available at monitors on the ferry to Gotland - works both for visitors and for reminding locals. Communication via web, water bills and local media to the locals are other paths.

## Nature-based solutions

### City of Västervik, Sweden

**Action title:** Water-delaying measures in a changed climate

**Action status:** implementation

**Co-benefit area:** Disaster risk reduction, improved resource efficiency (e.g. food, water, energy), promote circular economy

**Action description:**

Mitigation measures aiming to decrease water flow intensity and to store more water in the landscape are already implemented to some extent, but more efforts are needed. A resilient and robust landscape also increases the possibilities for an agricultural production with small environmental impact. Planning and implementation of measures relies on long-term cooperation between municipality, landowners, users and stakeholders. The project is focusing on small catchments, and construction of irrigation ponds, bio coal ditches, phosphor ponds, multifunctional urban pond, two-stage ditches, integrated riparian zones, restoration of wetlands in agricultural landscapes.

**Learn more:** <http://bit.ly/2ncYWi0> - Study from Swedish University of Agriculture

# Challenging and supporting factors of climate adaptation by UBC cities

More than **half (60% or 15 out of 25)** of the disclosing UBC cities have brought forward a list of 68 factors that affect their city's ability to climate change adaptation with **budgetary capacity (8)**, **land-use planning (7)**, **environmental conditions (6)** and **community engagement (5)** were highlighted the most. Out of the 68 factors, 29 (43%) were see **as challenging** and 39 (57%) as **supportive factors**.

Examples of the most often highlighted factors, both supportive and challenging:

## Budgetary capacity

### Supportive

*"Many adaptation measures need more maintenance costs. These are considered in yearly budgeting and applying the supporting projects." - Finnish city*

### Challenging

*"The costs of adaptation will be high, but probably even higher if no measures are being implemented. Distribution of responsibility for costs of measures is a huge challenge." - Swedish city*

## Land-use planning

### Supportive

*"Climate adaptation is already an important part of the city planning. There is a good knowledge especially when it comes to hazards related to rainfall and flood." - Swedish city*

*"High importance of long-time spatial planning for climate changes and adaptation - this is both a challenge and opportunity for the municipality." - Swedish city*

*"The City's Master Plan includes measures to adapt to climate change." - Estonian city*

*"A well-planned city/society is more resistant to natural disasters and may even prevent some of its effects." - Swedish city*

*"The municipal budget needs to be shared between different priorities. And climate hazards may occur unexpectedly." - Swedish city*

*"City has different challenges and needs to fulfil. The need for different investments is great and therefore it is not possible to carry out all the necessary activities for the desired time." - Estonian city*

## Environmental conditions

### Supportive

*“Developing urban green space networks includes protection of existing green spaces, creation of new spatial forms and restoration and maintenance of connectivity among diverse green spaces.*

*In addition to ecological and biodiversity factors green spaces offer ecosystem services for the inhabitants.”*

- Finnish city

*“Biodiversity: diverse ecosystems are more resilient to changes.”* - Finnish city

### Challenging

*“The city crosses the river and quite a large part of the city is located in low areas. This fact leads to additional risks - flood risks.”* - Estonian city

*“The green space network and ecological corridors are insufficient to maintain the existing biodiversity. Clay soils.”* - Finnish city

## Community engagement

### Supportive

*“People are getting more aware of climate change because of the changes in the weather. Increased awareness of local changes leads to acceptance of climate actions.”* - Norwegian city

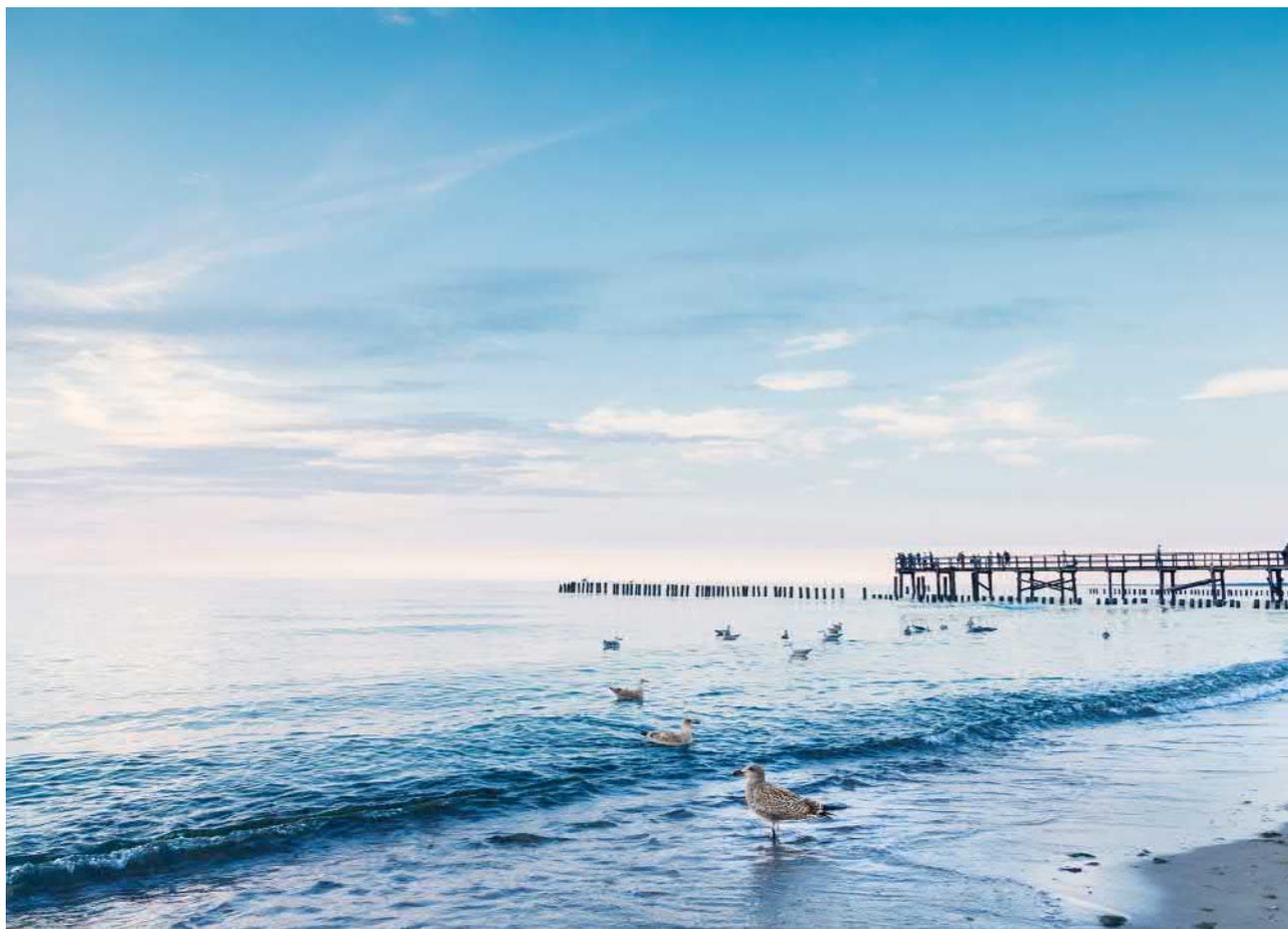
*“The City Government has highly appreciated and always favored the involvement of citizens in decision-making. It is very important to have high general awareness and in cooperation it is possible to solve many problems significantly easier.”* - Estonian city

### Challenging

*“Community engagement in new consumption patterns, altered modes of transport, living and tourism will be determining.”* - Swedish city

The following factors (both supporting and challenging) are important to acknowledge so that appropriate solutions can be found for more effective climate change adaptation work in UBC cities. The behavioral change is not going to be easy, as emphasized by the cities and will need persistent and constant educational work with the local inhabitants as well as the city departments themselves. The budgetary capacity was highlighted often as a challenging factor - it is an issue of prioritization in the UBC cities, whether to **allocate more resources for climate action** or not. If climate adaptation and mitigation efforts are being ignored or underfinanced, it might happen so that the impacts of the climate hazards might cause unexpected and surprising damages that will be very costly and the city will anyhow need to allocate money for the repairs - which will be taken from some other sector, presumably, anyhow.

# Conclusions



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The extreme weather events and other climate hazards are becoming more intense and happening more frequently meaning that UBC cities need to be prepared when the rainstorms, thunderstorms, strong winds and flooding hits. Preparing in advance means that city infrastructure becomes more resilient to the hazards and will be able to guarantee the daily functions (e.g. clean water, on-time public transport, electricity and heat in our homes) often taken for granted today.

**Public disclosure to CDP helps us to promote and showcase the good work done in our member cities. UBC wants to see the Baltic Sea Region cities becoming increasingly recognized as global forerunners in Climate-smart development creating a high quality living environment for their inhabitants.**

# Inspiration and resources



- **Baltic Smart Water Hub**

[www.balticwaterhub.net](http://www.balticwaterhub.net)

Find different good practices and examples from the BSR cities regarding fresh water, waste water, storm water and sea water. Also, you can become an expert and contact with other experts in the Baltic Sea Region.

- **Green Factor tool**

[www.integratedstormwater.eu/material/green-factor-tool](http://www.integratedstormwater.eu/material/green-factor-tool)

The Green Factor tool is a practical and user-friendly Excel-based tool for urban planning. It ensures sufficient green infrastructure when building new lots in a dense urban environment. The Green Factor is calculated as the ratio of the scored green area to lot area. You can download Green Factor Excel tool and user manuals for free!"

- **Integrated stormwater management toolbox**

[www.integratedstormwater.eu/iwatertoolbox](http://www.integratedstormwater.eu/iwatertoolbox)

The Integrated Stormwater Management Toolbox introduces the most commonly used approaches and concrete tools for urban stormwater management.

- **Guide: Towards integrated and partnership-based planning of brownfield areas**

[www.balticurbanlab.eu/materials](http://www.balticurbanlab.eu/materials)

The guide is targeted to urban planners and other experts interested to learn more on how to develop brownfield areas in cooperation with citizens, NGOs, land-owners, developers and other stakeholders.

## Ongoing projects at the UBC Sustainable Cities Commission

### **cities.multimodal**

cities.multimodal project brings together 10 partner cities who want through different activities and measures to make it easier and smoother for their citizens to combine walking, cycling, the use of public transport as well as shared mobility (bikes, cars, e-cars and bikes) as a more sustainable alternative to individual private car use. The consortium of cities, NGO's, universities and expert partners are applying low threshold approach for sustainable urban mobility, attractive and easy to adopt for follower cities. Within the project, the partner cities define a pilot area, in which they implement different activities and measures on multimodality and mobility management.

**Website:** [www.cities-multimodal.eu](http://www.cities-multimodal.eu)

**Social media:** #citiesmultimodal

## **BSR Water**

BSR Water brings together partners representing diverse projects that have generated through transnational cooperation many replicable as well as unique outputs, covering broad variety of water-related issues (smart nutrient management and sludge handling, stormwater management, domestic and industrial waste water treatment, manure management and energy efficiency). The platform facilitates development of policy recommendations based on the common experiences of participating projects.

**Website:** [www.bsrwater.eu](http://www.bsrwater.eu)

**Social media:** Twitter @BSR\_Water

## **HUPMOBILE**

HUPMOBILE - Holistic urban and peri-urban mobility project focuses on holistic and sustainable urban mobility solutions for the port areas in the Baltic Sea Region. City authorities, infrastructure operators and transport providers are able to assess and integrate innovative mobility options into their mobility management plans and policies concerning: smart production and urban logistics, the use of intelligent transport systems (ITS) solutions, multimodality in urban transport and travel-to-work, new operating models for public-private mobility services, logistics flows in and around ports, co-creation of mobility services and urban planning with residents. Pilot cities are Tallinn, Turku, Riga and Hamburg (Altona).

**Website:** [www.hupmobile-project.eu](http://www.hupmobile-project.eu)

**Social media:** Twitter @HUPMOBILE\_BSR

*Is your city experiencing mobility issues in the port areas? Become a Follower City to test and give feedback on the solutions, guidelines and frameworks developed during the project.*

## **CIVITAS ECCENTRIC**

The project focuses on sustainable mobility in suburban districts and innovative urban freight logistics, two important areas that have previously received less attention in urban mobility policies. The project demonstrates in five living lab areas (Ruse, Turku, Munich, Madrid and Stockholm) the potential and replicability of integrated and inclusive urban planning approaches, innovative policies and emerging technologies. Clean vehicles and fuels are being tested, new regulations and services formulated, and consolidation solutions developed in close partnership with the private sector.

**Website:** [www.civitas.eu/eccentric](http://www.civitas.eu/eccentric)

## **CIVITAS SUMP<sub>s</sub>-Up**

The CIVITAS SUMP<sub>s</sub>-Up brings together eight partner organizations and seven partner cities, all of whom are seeking to help European cities to introduce cleaner and more sustainable mobility. The project assists planning authorities to overcome barriers that prevent or make it difficult to implement SUMP<sub>s</sub>: capacity building, tailored information, and support during development and implementation phase will equip them with the necessary knowledge and skills to do so. The project organizes several webinars on the sustainable urban mobility planning during autumn 2019 - more information on project's website as well as [www.ubc-sustainable.net/events](http://www.ubc-sustainable.net/events)

Webpage: [www.sumps-up.eu](http://www.sumps-up.eu)

## CASCADE

CASCADE - Community Safety Action for Supporting Climate Change Adaptation project brings together civil protection specialists and climate change adaptation experts to build resilience in the Baltic Sea Region. CASCADE aims to improve the capacity to understand, assess, and treat current and future climate change related risks on the local level, focusing on the particular Baltic Sea Region conditions.

Website: [www.cascade-bsr.eu](http://www.cascade-bsr.eu)

# SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY



2 ZERO HUNGER



3 GOOD HEALTH AND WELL-BEING



4 QUALITY EDUCATION



5 GENDER EQUALITY



6 CLEAN WATER AND SANITATION



7 AFFORDABLE AND CLEAN ENERGY



8 DECENT WORK AND ECONOMIC GROWTH



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



10 REDUCED INEQUALITIES



11 SUSTAINABLE CITIES AND COMMUNITIES



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



14 LIFE BELOW WATER



15 LIFE ON LAND



16 PEACE, JUSTICE AND STRONG INSTITUTIONS



17 PARTNERSHIPS FOR THE GOALS



More about the UN Sustainable Development Goals

[www.un.org/sustainabledevelopment](http://www.un.org/sustainabledevelopment)

**All steps in climate adaptation are important - we can all do our share!**

**Thank you for sharing your City's climate action with UBC!**

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