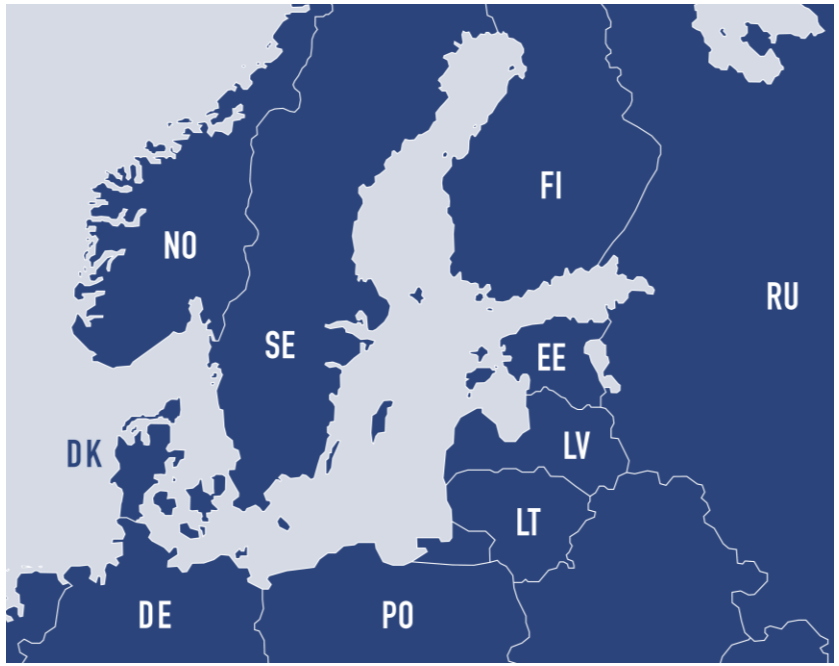
Multiplying Smart water management: how the cities have spearheaded action

Agnieszka Ilola, Union of the Baltic Cities (UBC) Sustainable Cities Commission

Union of the Baltic Cities

- Leading network of cities and municipalities in the Baltic Sea Region established 30+ years ago.
- Today over **70 member cities** in **9 countries** around the Baltic Sea.
- **8 thematic Commissions** focusing on **sustainable development**, urban planning, youth, health, culture, safety, education and business.

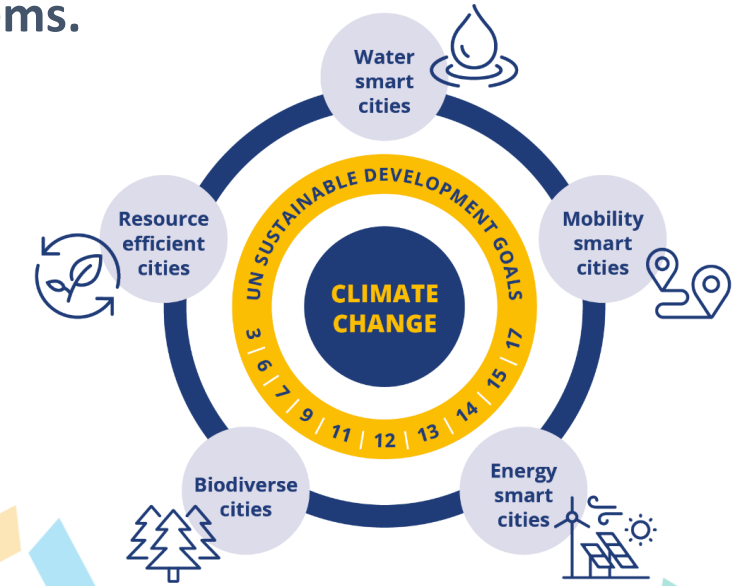


UBC Sustainable Cities Commission

- UBC Sustainable Cities Commission – Secretariat in Turku, Finland.
- Supporting the development of **green, resilient and attractive urban environment.**
- Coordination of the UBC Sustainability Action Programme 2030

UBC Sustainability Action Programme 2030

- **Guiding document for the whole UBC network** in the work for sustainable development in BSR.
- **Five core topics** and respective proposals of actions.
- **WATER: Healthy and sustainably managed water ecosystems.**



UBC Sustainability Action Programme 2030

Jointly identified **signals, challenges, and goals** for the next decade in the Baltic Sea Region:

- Cities' commitment to **reduce pollution** of the Baltic Sea
- Strengthening **implementation of HELCOM BSAP**
- Protecting the **ecological health of receiving water bodies** (rivers, streams, wetlands, groundwater)
- Increasing application of **integrated stormwater management**
- Strengthening **implementation of blue-green infrastructure** and water centered urban planning

Vision implementation

BSC 2023

BALTIC SMART WATER HUB

Encourage cooperation

Inputs to policy development

Mobilize local commitment

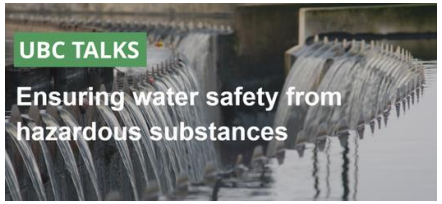
Project management

Networking & exchange

Share knowledge

UBC

Sustainable Cities Commission



HELCOM

COUNCIL OF THE BALTIC SEA STATES

UBC Representation Office in Brussels


UBC UNION OF THE BALTIC CITIES

POLICY POSITIONS

"Climate Change and Sustainable Development Until 2030"

I. Thirty years of striving towards a sustainable Baltic Sea Region

The Union of the Baltic Cities (UBC) has during its whole existence, for 30 years, been focusing on making the Baltic Sea Region more sustainable, attractive and more resilient to challenges in our environment ensuring a good quality of life for its inhabitants – now and for future generations. Environmental protection and sustainable development have been one of the UBC's key pillars since its foundation. In 1996 the Commission on Environment was established in Turku and has since then taken on the coordination of the network's environmental and sustainability activities. The first UBC Local Agenda 21 Action programme was adopted at the General Conference 1999 in Stockholm, followed by the UBC Agenda 21 Action Programme – Roadmap for Sustainable Baltic Cities (2001-2009). UBC Sustainable Development Action Programme – Agenda for Sustainable Baltic Cities (2010-2015) is the current UBC Sustainable Development Action programme – Stairways towards Sustainable Baltic Cities (2016-2021), adopted at the General Conference 2015 in Gdynia, Poland. The main goal for the document is to give strategic direction to the realization of our vision of the UBC cities in the future - creating a smart, safe and sustainable Baltic Sea Region. Currently the UBC Sustainable Cities Commission is coordinating the process of renewing the Sustainability Development Action Programme for the period 2022-2030.

PLATFORM BSR WATER

Interreg Baltic Sea Region

Co-funded by the European Union

SUSTAINABLE WATERS EMPEREST

Connection to the HELCOM Baltic Sea Action Plan (BSAP)

Segment

Eutrophication, Hazardous substances and litter

BSAP Actions

- HT24 Facilitate exchange of information on best available treatment techniques for wastewater treatment plants through cooperation with existing regional digital platform(s) acting as a hub for the best knowledge in the wastewater management sector.
- E25 Encourage educational cooperation with involvement of relevant non-governmental organizations utilizing such regional digital platform(s) to solve problems of municipal sewage in smaller municipalities and scattered settlements.

HELCOM Recommendations

- HELCOM Recommendation 28E/5 on Municipal wastewater treatment
- HELCOM Recommendation 23/5-Rev.1 HELCOM Recommendation on Reduction of discharges from urban areas by proper management of storm water systems

Connection to the HELCOM Baltic Sea Action Plan (BSAP)

HT24 Facilitate exchange of information on best available treatment techniques for wastewater treatment plants through cooperation with existing regional digital platform(s) acting as a hub for the best knowledge in the wastewater management sector.

BSR WATER project – to enhance cross-sectoral cooperation in sustainable water management through

- transnational experience exchange,
- developing regional policy recommendations for **storm water management**, **nutrient recycling** and **hazardous substances**

Based on results from seven projects:
IWAMA, BEST, iWATER, RBR, Manure Standards, Village Waters, CliPlive.

Connection to the HELCOM Baltic Sea Action Plan (BSAP)

EMPEREST – Eliminating Micro-Pollutants from Effluents for REuse STrategies
Duration: January 2023 – December 2025

The holistic approach to the elimination of micropollutants (incl. PFAS) incorporates regional strategies for **monitoring and assessment**, **technological advances** in wastewater treatment, and **risk management assessment** for cities.

interreg-baltic.eu/project/emperest/

- 14 partners: Finland, Estonia, Germany, Poland, Lithuania, Latvia
- science-practise-policy cooperation

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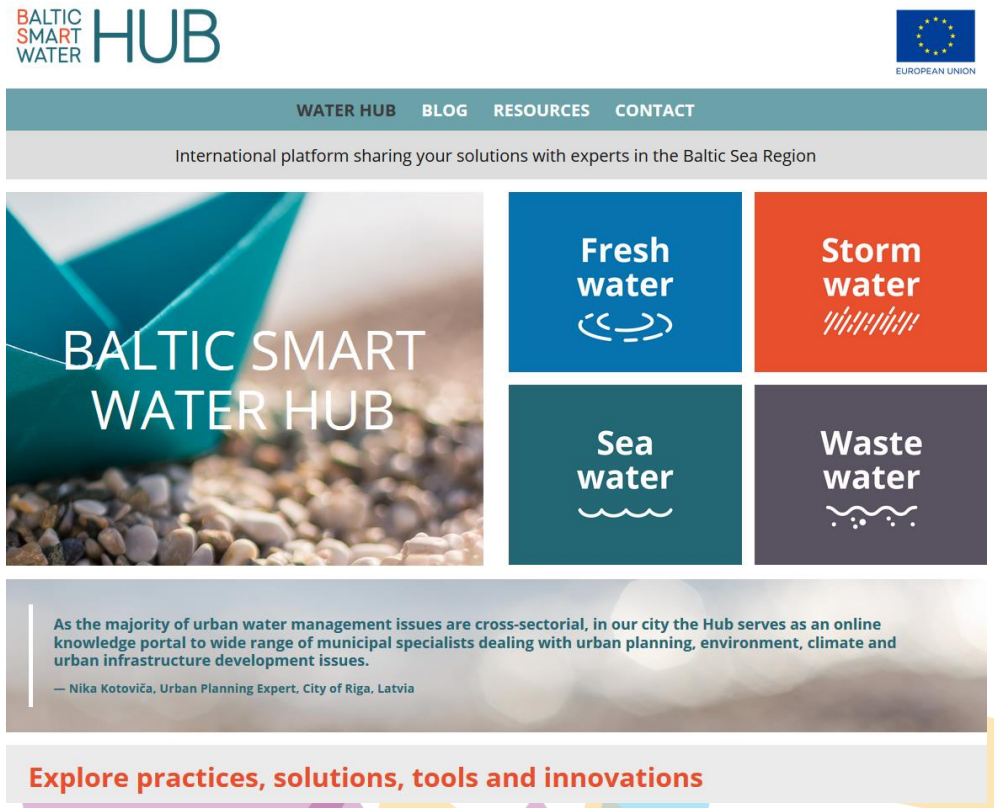
Connection to the HELCOM Baltic Sea Action Plan (BSAP)

HT24 Facilitate exchange of information on best available treatment techniques for wastewater treatment plants through cooperation with existing regional digital platform(s) acting as a hub for the best knowledge in the wastewater management sector.

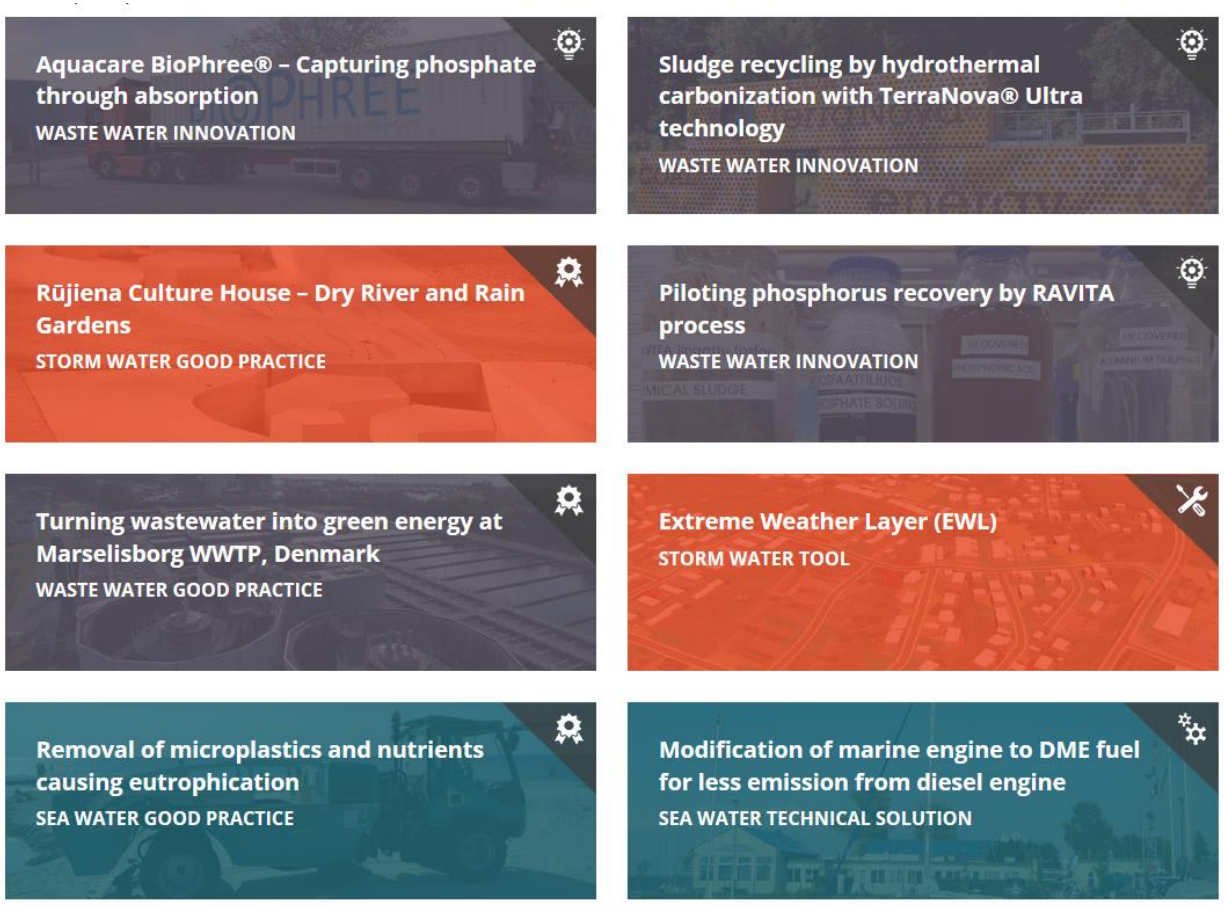
Baltic Smart Water Hub – online portal enabling exchange of practical experience and promotion of local achievements in the region.

Showcasing **116 good practices**, **technical solutions**, **tools** and **innovations** in four water areas.

balticwaterhub.net



Baltic Smart Water Hub – tested solutions for local uptake



- Synthesized results of **15 transnational projects** from different funding sources.
- Space for networking with **25 experts** providing support in the Hub.
- **Showcasing best available techniques for waste-, storm- and freshwater treatment.**

BSC 2023

Storm water

Smart urban planning in water issues in cities helps inhabitants and businesses to enjoy clear waters. Many municipalities in the region are forerunners in implementing Integrated Storm Water management and flood mitigation measures. In this section of the Hub users can learn about successful examples and techniquest that make Baltic actors climate change leaders in Europe and globally.

See all Storm water examples

Good practices for Storm water

Good practice cases presented in the Hub illustrate processes of implementing investments, piloting or innovative solutions that certain actors have experienced and sharing of which is beneficial for Hub's target users. From a good practice description you would find who did what and why, over what period of time, what was the result, how much did it cost and where the funding came from. Additionally, good practice might elaborate on a specific setting and prerequisites of the process and influencing regulatory factors.

See all Storm water good practices | Share a Good Practice

Technical solutions for Storm water

Technical solutions describe specific technologies that can be used in order to improve certain process or solve a specific problem. Technical solution is usually offered by a supplier, and you can learn about how exactly it functions, what prerequisites are needed, approximate cost. Brief examples of where it has been implemented and with what results can be found from a solution's description, or elaborated in more details as a good practice.

See all Storm water technical solutions | Share a Technical solution

Tools for Storm water

Tools available via the Hub are self-standing instruments that can be downloaded or reached through the source and immediately applied by the end users. If available, descriptions of the process and results of systematic application of certain tools will be described as good practices.

See all Storm water tools | Share a Tool

Innovations for Storm water

Innovation cases highlight new technologies and approaches with high implementability in the Baltic Sea Region. As new approaches need laboratory and pilot scale testing before reaching full maturity, technologies with high potential but no final results or financial analysis are mainly highlighted here.

See all Storm water innovations | Share an Innovation

Exchange ideas with experts in Storm water area

- Matthias Barjenbruch, Technische Universität Berlin
- Klara Ramm, Chamber of Commerce Polish Waterworks
- Magdalena Hanna Gajewska, Gdańsk University of Technology
- Miitta Rantakari, City of Helsinki
- Jurijs Kondratenko, Grupa93 Ltd. and Cleantech Latvia
- Nora Sillanpää, Sitowise Oy
- Kajsa Rosqvist, City of Helsinki

Expert of the STORM WATER

Kajsa Rosqvist
City of Helsinki
Finland

Profile of the expert

Related Good practices

Natural treatment of storm water on a large-scale in Lahti

Improved storm water quality in an industrial area in Helsinki

Related Tools

The Climatemeter

ClimateCafé

Related Technical solutions

SURFF - Operational flood warning system, Copenhagen

Bioswale in a parking lot

Related Innovations

High Voltage Nanosecond Pulsed Electric Field (HINaPEF)

Micro plastic analytics - mass content approach

Natural treatment of storm water on a large-scale in Lahti

Solution to which problem

Previously all storm water from the downtown area of the city of Lahti was discharged untreated to Lake Vesijärvi where it worsened the quality of water with nutrient and heavy metal loads. Suspended solids, hydrocarbons, microplastics and PAHs were also detected from the stormwater. Especially phosphorus was a problem in Vesijärvi. It was estimated that around 35 % of the external phosphorus load coming to the Enonselkä basin, adjacent to the city, originated from storm water discharge.

Technical conditions

In order to improve the quality of water in Vesijärvi, it was decided that part of the storm water from downtown would be conveyed to another part of the city, Hennala, which is located about 3 km away. This transfer of storm water was possible due to the already existing backup/emergency sewer line. During autumn 2018 a dedicated pumping station was built for downtown storm water in another project (Hulevesien hallintaa kustannustehokkailla hybridiratkaisuilla / Storm water management via cost-effective hybrid solutions). The Hennala area, which was chosen to house the treatment system for the storm water conveyed from the city's center, is part of a recently decommissioned army garrison, slated for city planning and development in the coming years. The storm water system is located at the center of this developing area. In addition to cleaning the storm water the system will serve as a recreational area for the future residents.

The storm water treatment system consists of a sedimentation basin, biofiltration field, wetland basin and a channel, which connects them (see attached overview picture).

The core of the treatment system is the biofiltration field. It is divided into three different sections, each using a different filtration material. To prevent the cross-section movement of water, partition walls made of clay are used to separate the sections. In addition, the sections have their own under drains so that water samples

Good Practice
STORM WATER

Contact information

Mr. Juhani Järveläinen

City of Lahti

City website

Country

Finland

Cost

122 000 EUR

- Construction and basic materials: 92 000 EUR
- Filtration materials: 30 000 EUR

Funding

The pilot was implemented in a project "Uudet hulevesien hallinnan Smart & Clean ratkaisut (Hule S&C)", financed by the Helsinki-Uusimaa Regional Council

sections. In addition, the sections have their own under drains so that water samples can be taken from each of the sections in order to be able to compare the treatment efficiency of the filtration materials. Filtration materials are basic filter sand (grain size 0,2 – 2 mm, used as a benchmark), expanded clay aggregate (Lecatm) and Filtralite P (a special clay aggregate, developed for phosphorus removal).

The treatment system is designed to receive runoff from a three-year, 10-minute design rainfall (intensity 160 l / s * ha, impact of climate change is taken into account) on the Lahti city center where the storm water is directed to the treatment system.

Due to permit reasons, at least during the first years, the volume of storm water arriving to the treatment system is limited to 3 000 m^3 per day.

Before any storm water is directed through the treatment system, vegetation planted there needs to grow for about a year. Vegetation prevents erosion, improves the permeability of the filtration structure and makes it more efficient by absorbing nutrients.

The filtration materials for the biofiltration field were chosen based on preliminary laboratory tests carried out during the planning phase of the stormwater treatment system by the University of Helsinki as a part of the project. In the laboratory tests, the University of Helsinki tested five different filtration materials without and with plant cover on their ability to retain suspended solids, phosphorus, nitrogen and heavy metals.

Tested materials were basic filter sand, Filtralite P (a special clay aggregate, developed for phosphorus removal), expanded clay aggregate, spruce based biochar and concrete aggregate. Plant used was ribbon grass (Phalaris arundinacea). Strom water used in the tests was snow collected from heavy trafficked road in Lahti. It contained a lot of suspended solids (5g/l), which all tested materials retained effectively, 96-100 %. Strom water used in the test contained also a lot of phosphorus and metals, which were mainly absorbed in solid particles. 75-100 % of these were retained. Filtralite P and concrete aggregate were best in retaining liquid phosphorus. Filtering through these materials increased the pH to 12 while other materials kept the pH between 7-8. Seep water contained as much or more nitrogen than the incoming storm water thus the materials of the structure increased the amount. Plants helped retaining the nitrogen. Biochar retained nitrogen but phosphorus was leached through it.

Implementation

The aim of the pilot in Hennala was to develop the expertise and knowledge in storm water quality management and improve the attractiveness, healthiness and safety of the urban environment. A storm water treatment system was implemented in the Hennala area in order to improve the quality of storm water created in Lahti downtown and thus prevent the storm water from polluting Lake Vesijärvi. As a solution, part of the storm water from Lahti downtown will be directed to the

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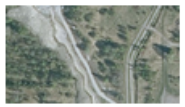
Gallery



More Hub cases

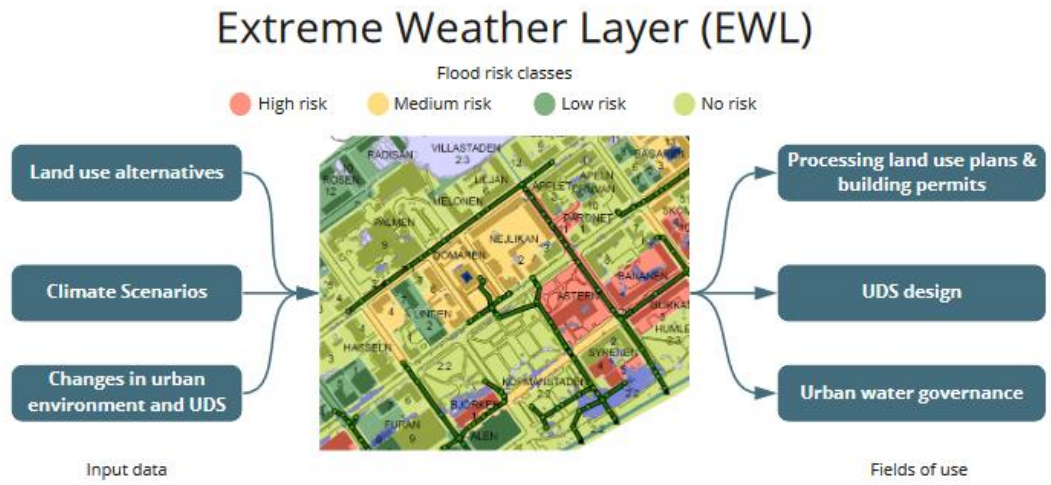
Rūjiena Culture House – Dry River and Rain Gardens

Biofiltration in Maunulanpuisto Park in Helsinki, Finland

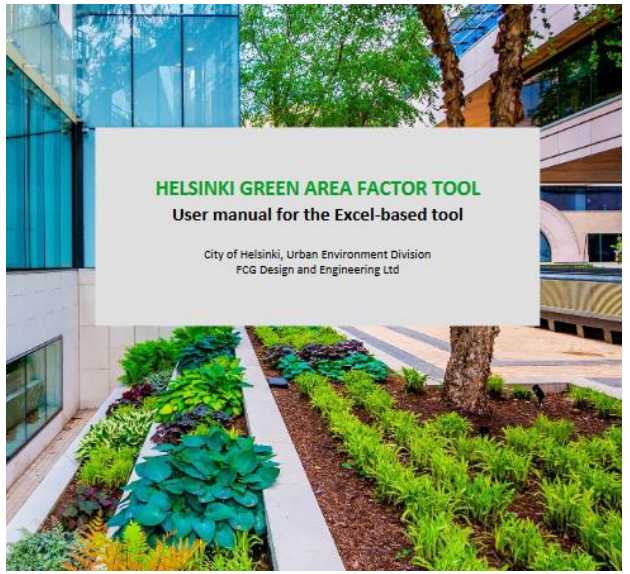
Share your Good Practice

balticwaterhub.net

Implementation of validated tools: Extreme Weather Layer, Green Area Factor



EWL tool for spatial planning and flood risk mitigation, reduce overflows of nutrients and harmful substances into receiving water (NOAH project).



Green Area Factor tool for planning of sufficient green infrastructure in a dense urban environment (iWATER project).

INSPIRING OTHERS

The **Baltic Smart Water Hub** intention has been to collect and take forward concrete actions that have been developed and successfully implemented in different cities.

By showcasing already tested solutions and tools we aim to promote a discussion and communicate existing good practices and success factors.

Welcome to submit your solutions to the Hub through an online form and share it with your peers!

Hub international expert network – discuss, cooperate, co-create!

CHALLENGES TO OVERCOME

The challenges are usually the same, independently what country we are in:

1. Lack of clear vision and goal for actions, weak coordination and follow-up
    - Based on lack of information, solutions, tools. This is usually a result of weak networking capacities (weak access to best possible excellence & knowledge)
2. Lack of resources
    - Funding is usually available then the business plan is done but it is dependent on point 1.

The challenge to overcome is to increase the interaction between stakeholders and expert organizations.

ALWAYS ROOM FOR IMPROVEMENT

1. Beside the national discussion and interaction, look for good practices and success factors on the international arena! The *technological* and *good practice* development take place in many different locations.

2. Baltic Sea is a common shared resource and needs collective action from all stakeholders (local, regional and national authorities, academia, practitioners, private sector and citizens); strengthen the dialog with your local water stakeholder ecosystem.

3. We have the tested and validated practices and solutions, but we need to accelerate local application. We don´t know everything but we know enough to act!

Thank you!