Baltic Smart Water Hub

International platform sharing your solutions with experts in the Baltic Sea Region

Union of the Baltic Cities Sustainable Cities Commission

MARIIA ANDREEVA

BALTIC SMART WATER HUB

PLATFORM BSR WATER

Interreg Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

BSR WATER platform aims

to enhance cross-sectoral cooperation in the water sector by providing a possibility for

- **transnational experience exchange**,
- **sharing of good practices and solutions,**
- developing regional policy recommendations for storm water management, nutrient recycling and hazardous substances

Platform synthesizes results from seven projects: IWAMA, BEST, iWater, RBR, Manure Standards, Village Waters, CliPLivE

PRACTICE

Collection and synthesis of good practices, solutions and expertise on water management

Aim:

to gather and promote water projects' results as developed tools, tested good practices and technical solutions on the online portal **Baltic Smart Water Hub** for further uptake by the water experts in the region

Main output:

Baltic Smart Water Hub with over 100 cases and innovations published

balticwaterhub.net


Are you familiar with the
Baltic Smart Water Hub?

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

BALTIC SMART WATER HUB

EUROPEAN UNION

WATER HUB BLOG RESOURCES CONTACT

International platform sharing your solutions with experts in the Baltic Sea Region

Fresh water

Storm water

Sea water

Waste water

As the majority of urban water management issues are cross-sectorial, in our city the Hub serves as an online knowledge portal to wide range of municipal specialists dealing with urban planning, environment, climate and urban infrastructure development issues.

— Nika Kotoviča, Urban Planning Expert, City of Riga, Latvia

Explore practices, solutions, tools and innovations

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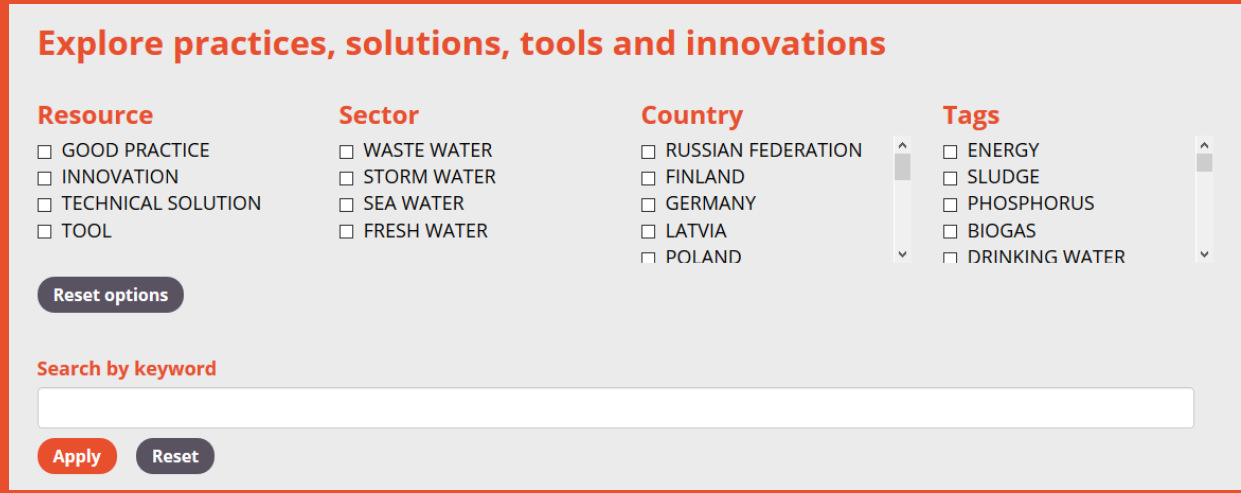
> We hope the Smart Water Hub can be a large "neighbourhood", where we can share practices and information useful for many different actors in the field.
>
> — Markus Raudkivi, University of Tartu

Explore practices, solutions, tools and innovations

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



Results (1 - 12) of 111

Aquacare BioPhree® – Capturing phosphate through absorption
WASTE WATER INNOVATION

Sludge recycling by hydrothermal carbonization with TerraNova® Ultra technology
WASTE WATER INNOVATION

Rūjiena Culture House – Dry River and Rain Gardens
STORM WATER GOOD PRACTICE

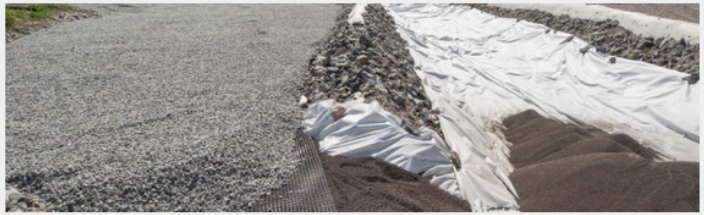
Piloting phosphorus recovery by RAVITA process
WASTE WATER INNOVATION

Turning wastewater into green energy at Marselisborg WWTP, Denmark
WASTE WATER GOOD PRACTICE

Extreme Weather Layer (EWL)
STORM WATER TOOL

Removal of microplastics and nutrients causing eutrophication
SEA WATER GOOD PRACTICE

Modification of marine engine to DME fuel for less emission from diesel engine
SEA WATER TECHNICAL SOLUTION



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

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

Space for networking with **24 experts** providing support in the Hub

Exchange of practical experiences, promotion of local achievements and lifelong learning on the international level

Stefan Rettig

Research fellow at the Chair of Urban Water Management, Technische Universität Berlin

Experience in implementation of research projects

- BSR WATER – Platform on Integrated Water Cooperation
- IWAMA – Interactive Water Management

Selected topics:

- Energy efficient wastewater treatment
- Online sensors for wastewater quality,
- Odour and corrosion in sewer networks,
- Optimization studies at WWTP and
- Treatment of wastewater from aquaculture

Experiences in project development in EU-Interreg and German national funding programmes.

Special focus on cooperation with partners from the Baltic Sea region incl. Belarus and Russia.

Water Blog

Energy management in wastewater treatment

Energy consumption of the wastewater treatment process is an important aspect of the modern wastewater treatment plant (WWTP) management. IWAMA project developed comparative benchmark in energy management, launched self-audit tool and several investments in energy efficiency.

Related Hub cases

- Smart Energy Management Self Audit (SEMSA) concept and self audit tool
- Monitoring and evaluating the energy consumption of the treatment process at Daugavpils WWTP
- Energy optimized control of WWTP in Kaunas
- Decision-making tool for optimized process operation and mass flow management

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Contact person by email

Areas of experties
Waste water

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Waste Water

Since many of the environemnal problems of the Baltic Sea are connected to the unefficient treatment of sewage and sludge handling, wastewater management is a key field of interest to may actors in the region. Municipalities and their water companies are often forerunners in water protection by implementing voluntary actions in treatment of municipal wastewater and uncreased efficiency of nutrient removal. Leader cities will see the potential of the concept "from waste to resource" when dealing with for example sludge and manure. The Hub's section on wastewater treatment presents best practices and expamples of such implemented actions.

See all Waster water examples

Good practices for Waste 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 Waster water good practices | Share a Good Practice

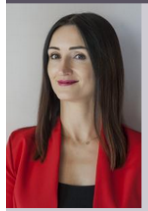
Technical solutions for Waste water

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 Waste water technical solutions | Share a Technical solution

Tools for Waste water

Expert of the WASTE WATER



Marzena Smol
Mineral and Energy Economy Research Institute, Polish Academy of Sciences

Poland

Profile of the expert

Related Good practices

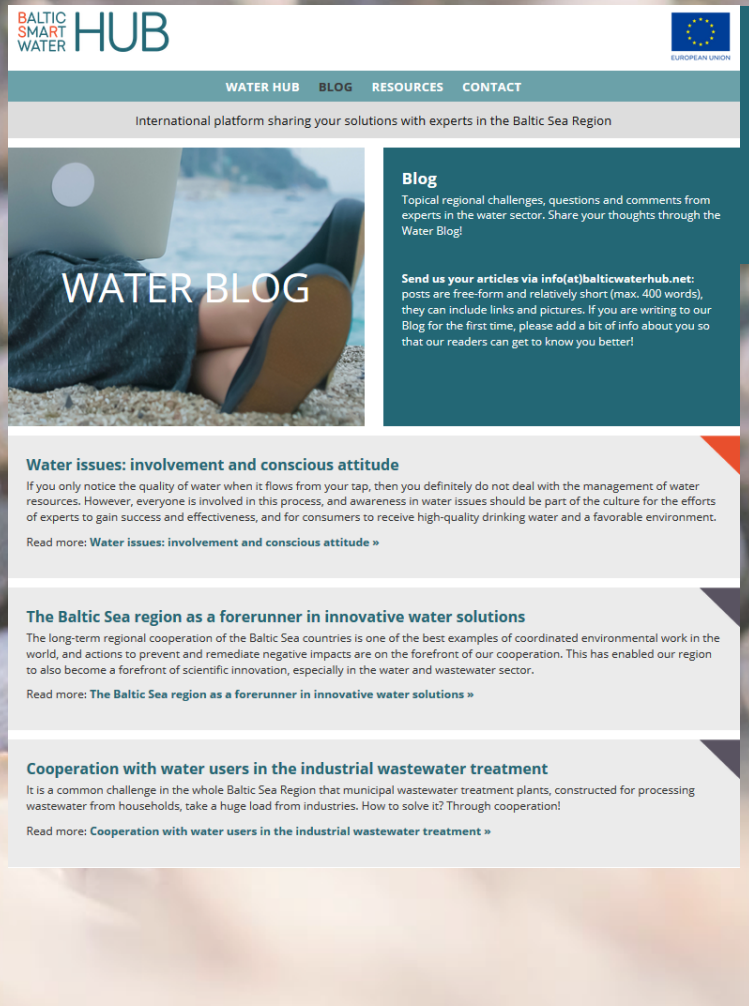
Construction of Molodezhnoye WWTP with modern membrane wastewater treatment technologies

Upgrade and extension of Warsaw WWTP, Poland

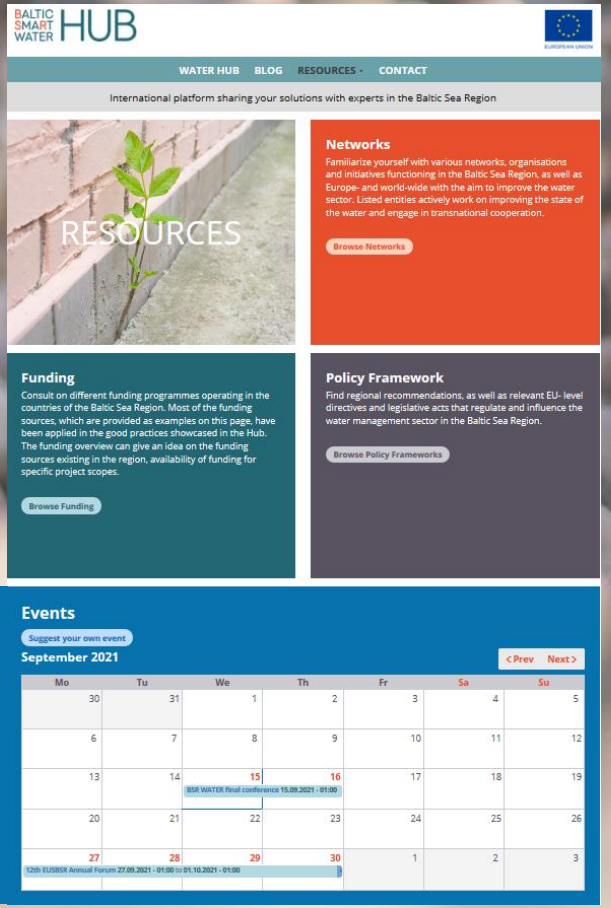
Related Tools

Training Materials Package for wastewater treatment

Smart Sludge Management Audit (SSMA)



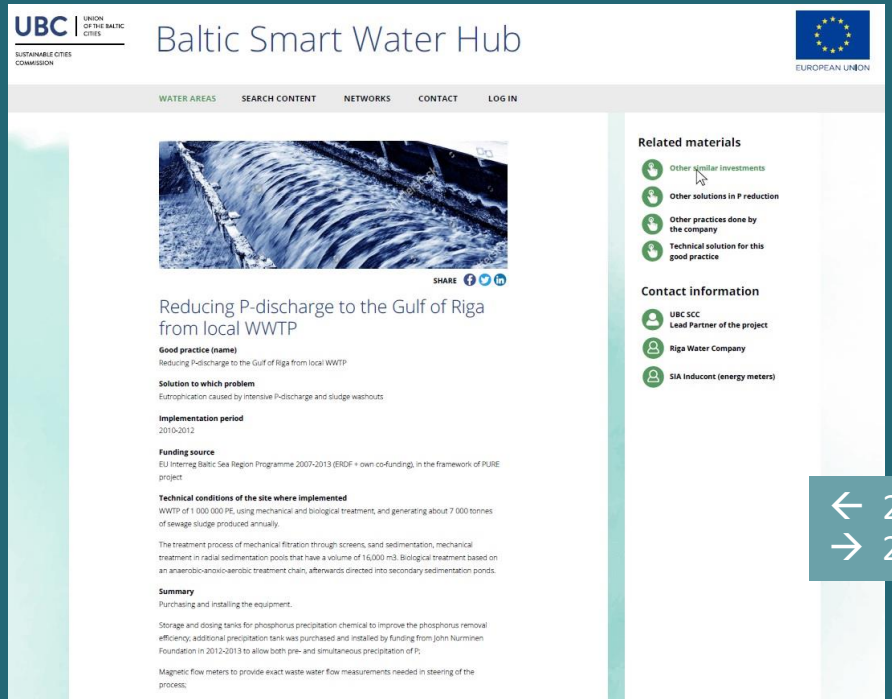
Topical regional challenges, questions and comments from the experts in the water sector



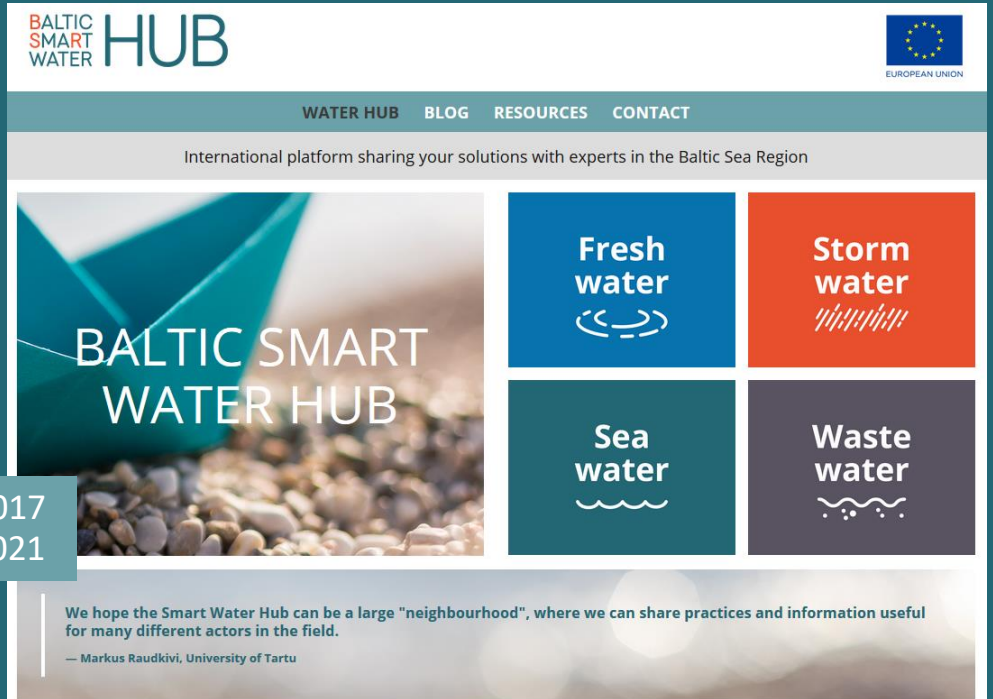
Informing about the existing funding instruments, regional policy framework and potential networking associates

Water Hub development through the BSR WATER

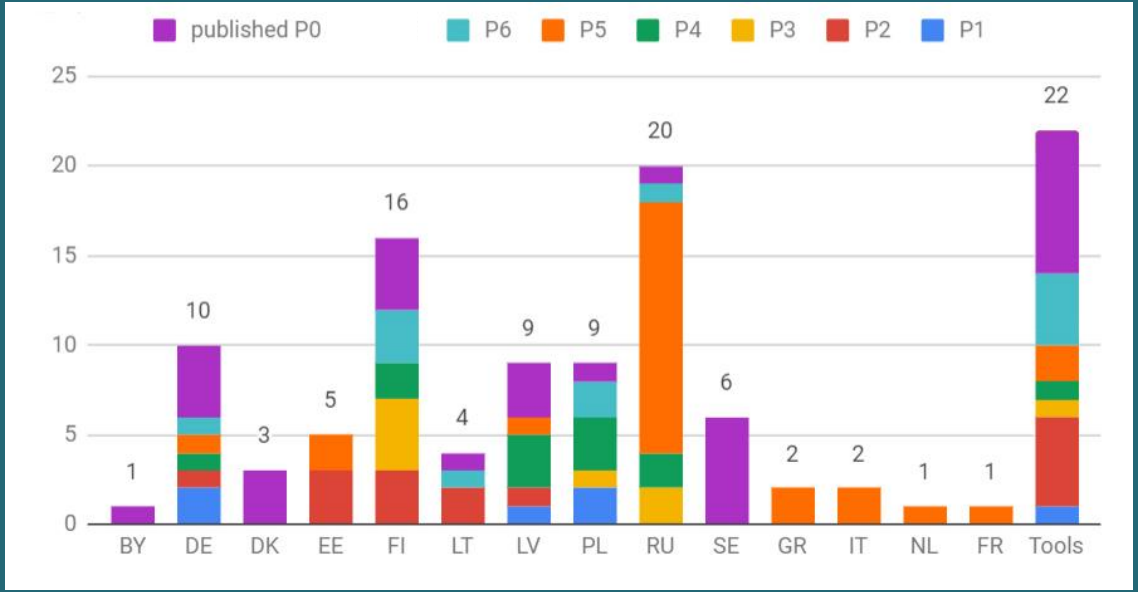
Improved layout and usability



← 2017
→ 2021



Collected examples of smart operation



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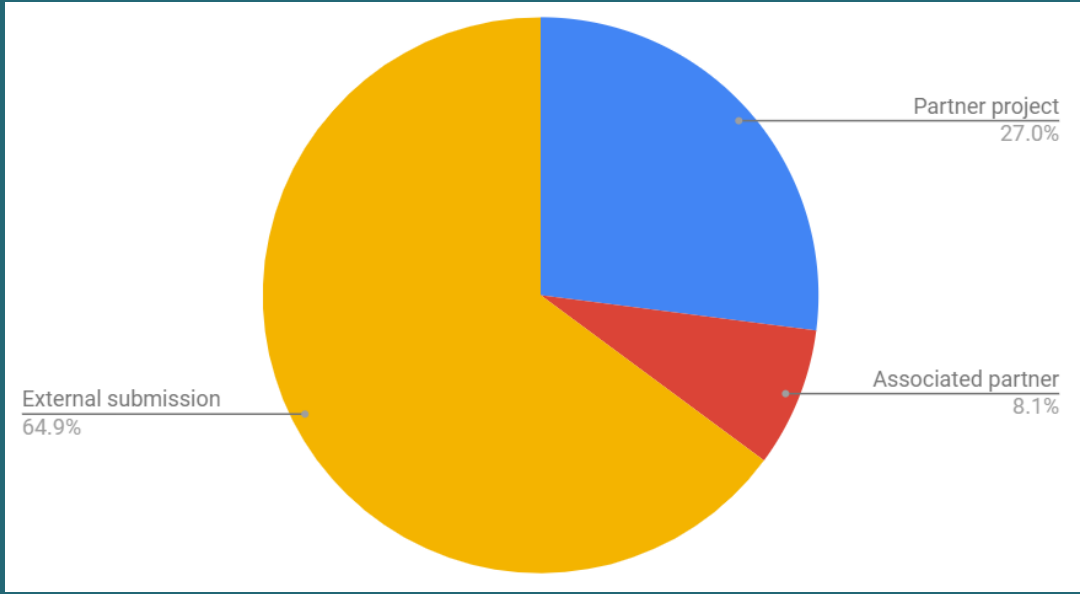
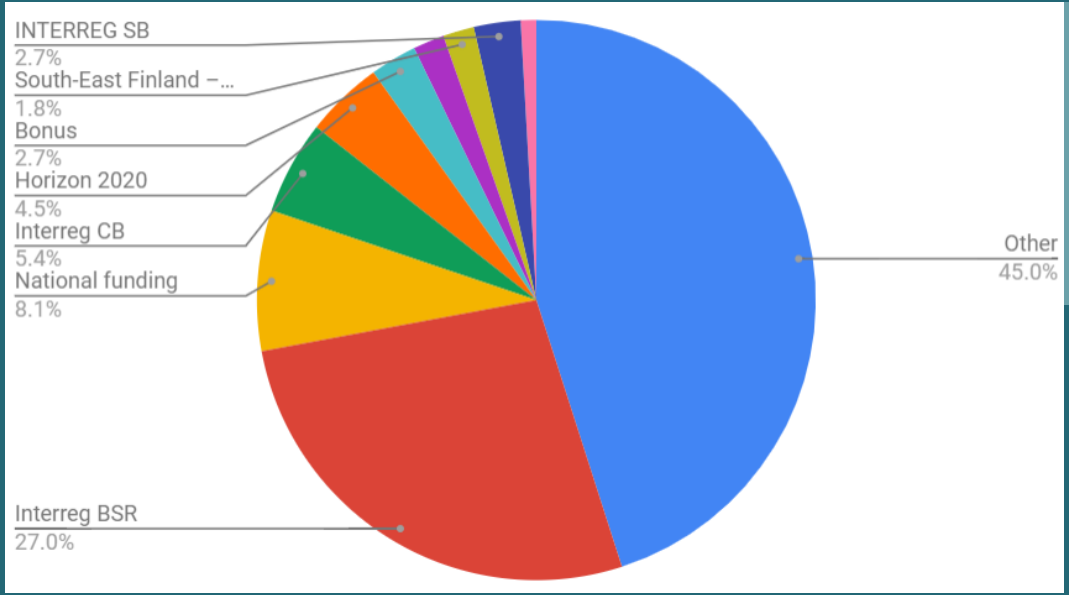


Involving over 15 transnational projects and showcasing different funding sources



The platform integrates results of other projects funded through different EU funding instruments

For you as a Hub user:

- Inspiration and knowledge from the Baltic Sea Region
- Both small- and large-scale investments; from infrastructure to stakeholder involvement
- Wider outreach and promotion of your organizations' qualifications and excellence
- Promotion of your solutions at international events and webinars (regional conferences and fora, webinars)
- International expert network – discuss, cooperate, co-create!

The cooperation doesn’t stop here –

We welcome you to submit cases to the Hub and promote your expertise in the region!

www.balticwaterhub.net

Thank you!

CONTACT

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UBC Sustainable Cities Commission

Stefan Rettig
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