



Project WISA

Report on Business models

PROJECT WISA

BACKGROUND

WISA (Water Innovation System Amplifier) is a 3-year project that will contribute to a cleaner Baltic Sea by developing and testing new green technologies to reduce pollution by stormwater from ports and other large hard surfaces.

The Baltic Sea is one of the world's most polluted seas. More than 45 million tonnes of fertilizer pass through the ports of the Baltic Sea annually, and the handling contributes to the release of fertilizers and nutrients into the stormwater. This leads to eutrophication with extensive algal blooms and dead seabed. The main challenge addressed by the WISA project is handling pollutants in stormwater in seaport areas around the South Baltic Sea region. To be able to develop and test new green technologies, in order to reduce pollution discharges we first need to know what is handled and what is in the stormwater. This knowledge will contribute to sustainable development, especially ecological, but also economic as well as social development.

The well-being of the Baltic Sea is a common challenge that needs to be solved in collaboration and in a broad partnership. The project is funded by Interreg South Baltic, and partners in the project are the Port of Åhus, Klaipeda University, Gdansk University of Technology, and Port of Gdynia Authority S.A. Krinova Incubator & Science Park is project owner with a coordinating role.

The project will use the water testbed WISA, where the concept is to use existing infrastructure as a “real life” test environment. In the innovation work, collaboration with various companies and researchers is key to solving the stormwater challenges.

WORK PACKAGE 5: Prototype and business modelling- Co-Effectuate

REPORT PURPOSE

The main objective of WP5 is Co-effectuate: Establish sustainable prototypes and business models for 3 cases or innovation project identified in WP4.

The focus is on capacity building, opening up new collaborations for handling storm water & creating opportunities for further public- private cooperation.

Krinovas proven business methodology was used for identifying economical potential in each of the cases or innovation project. All work supported the concept of circular economy, regional development and the development of green technologies for handling storm water. During WP5 the Wisa process was tested and further developed. All partners participated in the e-learning course and learned how to implement the WISA methodology into their cases or innovations projects.

In this section business models were used as a tool for understanding and discussing aspects of sustainable water management and monitoring development for the WISA project. According to Osterwalder & Pigneur (2010) business models, in its essence, can be described as “the rationale of how an organisation, creates, delivers and capture value”. Osterwalder & Pigneur (2010) designed a tool that made business thinking accessible called the Business Model Canvas (BMC), which is a widely used tool in business development. The BMC illustrates the business model at a given point in time in a qualitative manner. Business models in canvas format are an intuitive tool for business development and a handy graphical format when it comes to displaying interactions and interdependencies in a business environment.

However, the stormwater run-off ecosystem in commercial ports is more complex than most business environments. It includes private companies but also public organisations, it creates value on a



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business level but also on an environmental and societal level. Building on the Business Model Canvas, PPPLab Food and Water developed the Public Private Partnership Canvas (PPP Canvas). Whereas the original BMC is designed solely for mapping company business models, the PPP Canvas has a development focus and pays attention to secondary effects such as environmental benefits.

In this section the PPP Canvas is applied as a tool to display possible stormwater management scenarios/cases. They will be referred to as business models or simply models. The models were designed by Krinova in cooperation with case study representatives. In the process the further application and feasibility of the different treatment option have been discussed and specific attention was put to aligning the case study treatment options with potential business opportunities.

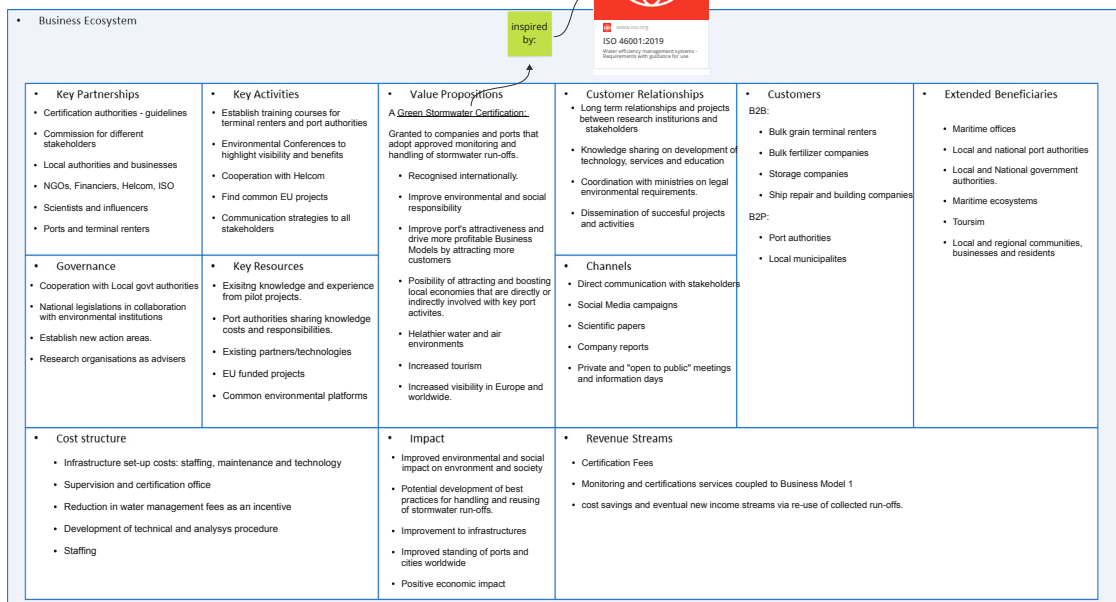
BUSINESS MODEL 1: A Green Stormwater Certification

Challenge: Throughout the Baltic ports environment, there is a lack of clear policy as well as recommendations and management strategies regarding how to monitor and handle contaminants and pollutants that accumulate in private and common port areas and that are discharged into the sea during rain events or dispersed in the air by winds. Existing practices, for stormwater management as well as administration, technical solutions, mapping of run-offs and treatment are often implemented ad hoc by local ports and are restrained by local regulations, time and logistical requirements on the part of the local port authorities and terminal renters, as well as financial and infrastructure challenges.

How do we establish common guidelines, good practice, strategies, and applications for monitoring and handling storm water run-offs in the entire Baltic port region?

The proposed business model addresses the challenge by introducing the concept of a Green Stormwater Certification Program that is research-based, environmentally conscious and considers the entire Business Ecosystem that exists in and around the port areas; from governance to extended beneficiaries and, of course, the overall impact on the entire environment.

Business Model 1: a green stormwater certification



Business model "Green Stormwater Certification" See larger business model below.



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The Value Proposition is at the core of this model. It is based on current research and our workshops from the WISA project and takes inspiration from established programs such as the ISO 46001:2019 Water efficiency management systems (<https://www.iso.org/standard/68286.html>) or Helcom's Holistic Assessment program (<https://helcom.fi/baltic-sea-trends/holistic-assessments/>)

A Green stormwater Certification System is at the core of the Value Proposition: it will be granted to companies and ports that adopt approved monitoring and handling of stormwater run-offs as a way of certifying best practice policies. The Value delivered is multi-fold and will lead to positive environmental and economical developments by incorporating sustainable actions at every step of the processes.

Part of the workshops in the project were dedicated to developing a pitch based on the PPP Canvas and the value proposition. We use the NABC pitch model, created by the Stanford Research institute.

NABC PITCH: HAT: A GREEN STORMWATER CERTIFICATION

Need

Pollution from industrial areas, including ports is discharged daily into the Baltic Sea along with stormwater. It negatively impacts not only on the flora and fauna of the Baltic Sea, but consequently many sectors of the economy, including tourism, the fishing industry, human health and other industries.

Pollution sources are distributed across the port facility and are mainly related to cargo transshipment and transportation. Some pollutants are also connected with the further transport of goods (mainly by trucks or rail include: fertilizers, pesticides, automotive fluids, oil, trace metals, pesticides, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and other pollutants. Most of them can be introduced into the aquatic environment with stormwater. To limit the pollutants discharge from ports area with storm water several actions are needed. Companies undertaking activities in this area and implementing protection actions may obtain a green stormwater certificate.

Approach

We are planning to prepare the roadmap how to obtain the green stormwater certificate and why it is beneficial for environment and companies, mainly related to maritime sector but also others.

To obtain the green stormwater certificate several steps are needed.

- First – Audit of possible sources (hotspots) and contaminants possibly realized by a certain company and discharged with stormwater to the sea (H).
- Second – A list of actions, which need to be prepared and further implemented (in the 'fit-for purpose' manner) as a part of the pollution prevention approach. (A)
- Third – Following steps 1 and 2, training and seminars for employees and contractors will be prepared and conducted, to make them familiar with the problems and benefits connected with the reduction of pollution hotspots etc. (T)
- Fourth – after introducing and implementing a 'solutions plan', the company will be granted a green stormwater certificate. The certificate will be reviewed every two years. (green)
- We also plan to stay in touch with the certificated company, to jointly solve appearing problems and share the current knowledge and best practice in this area.
- To raise the importance of a green stormwater certificate for the enterprise, it needs to be wider known by general public, ports authorities, business partners and NGOs that cares about the environment and seen by as a needed quality brand. Some benefits for companies that are granted by green stormwater certificate are also needed.

The certificate can be called GREEN HAT look like a (green mirror of the blue sea)



Benefits

The green stormwater certification allows not only to protect the waters of the Baltic Sea, but also generates financial/economic profits for companies, such as:

- it limits the cargo lost.
- it improves the image of the company/port among customers, business partners, enterprise and NGOs, that cares about the environment, as well as by local/national authorities.
- It gives a wide possibility of development through the use of the latest technical solutions, including reloading, transport, storage, etc., which allows the company to stay modern, innovative and sustainable.

A significant benefit is the opportunity to exchange experiences during joint training, seminars and creation of green stormwater community. It allows us to be more responsible for our individual activities, which in turn translates into the activities of the entire enterprise.

The certificate enables sustainable activities, including the balance between profit, employee safety and environmental protection.

From the holistic point of view, as a consequence, environmental protection allows for economic profit by limiting climate change, for which we bear high costs.

Competition

Most of the certificates only point out errors without pointing any specific solutions. The green stormwater certification is kind of community, where we jointly look for solutions and constantly improve our competences (certification unit + certified company), analyze implemented solutions and improve / optimize them in 'fit-for-purpose' way.

The actions connected with the green stormwater certificate are important steps in preserving the heritage of the Baltic Sea for future generations. Activities under the certificate allow all persons related to the company's operations to feel that their actions have a beneficial impact on environment, and that investments in technical development will ultimately allow for a significant economic profit for the companies.

- **Market size:** The certification can serve to the needs of several stakeholders within the ports but also directly connected to them, like local businesses and residents.
- **Improve infrastructure and impact:** The certification will be a catalyst for improving the local marine environment, it will create opportunities to improve existing or develop new economic models based on sustainability and development of local areas as attractive centres for commercial port operations and as travel destinations. Monitoring and treatment facilities can be tested, implemented and the concept exported beyond the Baltic Region.
- **Unlocking value:** A green stormwater certification will standardise operations, train specialised personnel, build and improve close relations between local government, port authorities and private companies. It will deliver an open approach to problem solving and promote sustainable solutions.

WISA CASE STUDIES IN PLAY

Research (such as the output from WISA) in the scope of ecology and sustainability is the corner stone of the business model. Guidelines methodology, infrastructure and trained personnel enable new opportunities within the business model, one such opportunity is the ability to install on site monitoring stations as well as run-off treatment in the vicinity of the cargo handling areas. These case studies will be described in more detail in the third Business Model proposed in this report.



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SWOT ANALYSIS of Business Model 1:

Strengths:

- Continuous development and improvement of capabilities
- Create a community through the Certification system
- Better implementation and optimisation of solutions
- Greater chance for common environmental protection strategies

Weaknesses:

- No universal solution: every port environment had its own challenges
- It may be difficult and costly to retrofit existing infrastructures to new solutions
- Short-term losses V long-term gains

Opportunities:

- Restoring and preserving the Baltic Heritage environments
- Future proof Business and economic models based on sustainability, technology, and rationalisation.
- Improved collaboration between all actors within the port environments
- Improved social standing with the local communities as well as potential new markets

Threats:

- Resistance to the project due to economic factors
- Lobbying to maintain the status quo.



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Business Model 1: a green stormwater certification



www.iso.org
ISO 46001:2019
 Water efficiency management systems -
 Requirements with guidance for use

inspired by:

<ul style="list-style-type: none"> Business Ecosystem 	<ul style="list-style-type: none"> Key Partnerships <ul style="list-style-type: none"> Certification authorities - guidelines Commission for different stakeholders Local authorities and businesses NGOs, Financiers, Helcom, ISO Scientists and influencers Ports and terminal renters Key Activities <ul style="list-style-type: none"> Establish training courses for terminal renters and port authorities Environmental Conferences to highlight visibility and benefits Cooperation with Helcom Find common EU projects Communication strategies to all stakeholders Key Resources <ul style="list-style-type: none"> Existing knowledge and experience from pilot projects. Port authorities sharing knowledge costs and responsibilities. Existing partners/technologies EU funded projects Common environmental platforms Governance <ul style="list-style-type: none"> Cooperation with Local govt authorities National legislations in collaboration with environmental institutions Establish new action areas. Research organisations as advisers 	<ul style="list-style-type: none"> Value Propositions <p>A <u>Green Stormwater Certification</u>:</p> <ul style="list-style-type: none"> Granted to companies and ports that adopt approved monitoring and handling of stormwater run-offs. Recognised internationally. Improve environmental and social responsibility Improve port's attractiveness and drive more profitable Business Models by attracting more customers Possibility of attracting and boosting local economies that are directly or indirectly involved with key port activities. Healthier water and air environments Increased tourism Increased visibility in Europe and worldwide. Customer Relationships <ul style="list-style-type: none"> Long term relationships and projects between research institutions and stakeholders Knowledge sharing on development of technology, services and education Coordination with ministries on legal environmental requirements. Dissemination of successful projects and activities Channels <ul style="list-style-type: none"> Direct communication with stakeholders Social Media campaigns Scientific papers Company reports Private and "open to public" meetings and information days 	<ul style="list-style-type: none"> Cost structure <ul style="list-style-type: none"> Infrastructure set-up costs: staffing, maintenance and technology Supervision and certification office Reduction in water management fees as an incentive Development of technical and analysis procedure Staffing Revenue Streams <ul style="list-style-type: none"> Certification Fees Monitoring and certifications services coupled to Business Model 1 cost savings and eventual new income streams via re-use of collected run-offs. 	<ul style="list-style-type: none"> Customers <p>B2B:</p> <ul style="list-style-type: none"> Bulk grain terminal renters Bulk fertilizer companies Storage companies Ship repair and building companies <p>B2P:</p> <ul style="list-style-type: none"> Port authorities Local municipalities Extended Beneficiaries <ul style="list-style-type: none"> Maritime offices Local and national port authorities Local and National government authorities. Maritime ecosystems Tourism Local and regional communities, businesses and residents
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BUSINESS MODEL 2: A Green Monitoring and Advisory Team

Challenge: Current economic models are mostly based on time driven operations to maximise cargo movement volumes. These models prioritise financial benefits and economic growth, they focus on direct supplier-to-client needs but are often in direct contrast to environmental and social responsibilities. Moreover, they overlook the diverse opportunities that can be created by improving cargo handling facilities, monitoring loss of cargo, avoiding conflict and penalties as well as implementation and effectivization of routines and procedures that lead to cost savings, greater attractiveness, increased competitiveness and a positive impact on the environment and society.

The proposed business model addresses the challenge by introducing the concept of a monitoring and advisory team that is research based and grounded on practical experience. It can be considered as the next step or a natural development from Business Model 1 in the form operational teams that can evaluate, report and advice on appropriate measures to achieve the right efficiencies both in terms of sustainable impact and economic growth.

Business Model 2: a monitoring and advisory team

Business Ecosystem					
<p>Establish an independent monitoring, handling and advisory team to support companies and authorities.</p>					
<ul style="list-style-type: none"> Key Partnerships Technology partners, to develop test beds and pilot projects. Research institutes. European and Baltic Port organisations Local Authorities Communication specialists. 	<ul style="list-style-type: none"> Key Activities Situation analysis of locations Develop and implement customised strategies and technologies. Find the right expertise: external, independent. Engage authorities, municipalities, and the public. Build relationships Legal: contract procurements, client commitments etc. 	<ul style="list-style-type: none"> Value Propositions <u>En independent stormwater monitoring, handling and advisory team to support companies and authorities.</u> Online monitoring, education and priority identification to assist companies and ports deliver sustainably competitive services. Development and implementation of the latest solutions and technologies for handling cargo discharge. Customer based effective solutions Environmentally safer solutions Parallel circular BM with waste Civic responsibility Citizen/visitor centred infrastructure development and improvements. 	<ul style="list-style-type: none"> Customer Relationships B2B and B2P: <ul style="list-style-type: none"> Open and transparent Common Sustainability goals Aware of sensitivities Long term partnership with steady, reachable common strategies Channels B2B and B2P: <ul style="list-style-type: none"> Direct contact Official Communications Conferences and seminars Social Media and other marketing activities to reach extended beneficiaries 	<ul style="list-style-type: none"> Customers B2B: Public stakeholders: <ul style="list-style-type: none"> Port Authorities Local municipalities B2C: <ul style="list-style-type: none"> Container Handling Companies Ship Repair and building Bulk fertilizer cargo loading companies. Container handling Ro-RO and other cargo companies. 	<ul style="list-style-type: none"> Extended Beneficiaries B2B: Public stakeholders: <ul style="list-style-type: none"> Local municipalities Local and regional ministries Environmental Authorities Local residents Tourists Local businesses related to both tourism as well as products & services to residents.
<ul style="list-style-type: none"> Governance Strategy team: <ul style="list-style-type: none"> Involve and include key partners in a strategic Board that includes, politicians, companies, EPA authorities, researchers Operational Team: <ul style="list-style-type: none"> Implement strategies via partners projects, test beds etc. A joint effort to inform stakeholders on improvements, issues benefits and challenges. 	<ul style="list-style-type: none"> Key Resources Findings and expertise from WISA Partnership with established projects like The Green Port project in Klaipeda University/institute facilities and researchers Existing projects and test facilities. Current IT and technology Relationships with companies and authorities 	<ul style="list-style-type: none"> Impact Cleaner, more effective cargo handling Greener Ports Increased business attractiveness Healthier water ecosystems improved relations between ports and cities Increase in overall economic activities and tax revenues 	<ul style="list-style-type: none"> Revenue Streams Initial external funding through EU funded projects Management fees from Terminal renters Support from municipalities through projects aimed at lowering air pollution. 		
<ul style="list-style-type: none"> Cost structure Management/operational team costs Pilot projects and test beds training and education costs Technology & equipment 					

Business model "A Green Monitoring and Advisory Team". See larger business model below.

The Value Proposition at the core of this model, based on current research and our workshops from the WISA project, proposes the establishment of small local, regional, or even national based advisory teams with knowledge and expertise on national and European guidelines and certification requirements (BM 1).

A mobile team of experts is called in to assess the local port environment and infrastructure and current procedures. Port authorities, maritime offices and terminal users/renters are invited and engaged in the assessment process where challenges are mapped out, strategies are developed to monitor storm water run-offs according to current guidelines and legislation but also considering the unique challenges of each port, their terminal renters, and the connected environments; geographical, social and political.

WISA CASE STUDIES IN PLAY

Problem: Significant amounts of stormwater pollutants, especially nutrients and heavy metals are



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directly discharged into receiving water bodies (like the heritage listed Curonian Lagoon). Residents of the port neighbourhood express discontent with the increased air pollution generated by dust sediments blown from the port. Therefore, the attitude of environmental institutions and residents to any new activities by Klaipeda port companies are viewed with caution, and in some cases, these activities are restricted.

Solution: Based on expert research and monitoring at the port sites, an advisory team will propose and outline measures and solutions to identify the runoff of pollutants. One such measure may be the installation of automatic ambient air and stormwater monitoring stations; in case the indicators are exceeded a pollution reduction plan be established.

Actions can vary from relatively quick and inexpensive bulk cargo handling and loading procedures to major infrastructure rebuilding or introduction of stormwater collection and filtering systems at strategic points in the port. Other measures could lead to channelling and recycling of stormwater sediments to other purposes leading to circularity in the entire model.

Benefits: Reliable data on emissions in both air and water environments; effectivization and long-term costs savings in terms of resources (human and infrastructure) and energy consumption. Increased competitive advantages and attractiveness of port services towards current and potential new customers by becoming a HAT certified green port.

A greater openness and trust with the local communities, municipalities, and environment authorities that may lead to favourable opportunities to develop other business activities for the entire local economy.

SWOT ANALYSIS of Business Model 2:

Strengths:

- Positive public attitudes towards reduced pollution
- Support from EU structural funds.
- Positive attitude and initial steps from port authorities (a green port concept has been developed and measures to reduce pollution are currently being specified in Klaipeda, for example).
- Government's ambition to implement EU green deal strategies.

Weaknesses:

- Reluctance of companies to invest or to allow access to the advisory teams.
- Reduced business opportunities due to current geopolitical situations
- High energy costs.

Opportunities:

- EU guidelines and funds for modernisation of port monitoring system and implementation of pollution reduction measures.
- Need for unified international / regional (HELCOM) regulations concerning stormwater-sampling procedures, parameters to be tested relevant to the nature of the activity
- Education and sharing of knowledge of the best stormwater management practice.

Threats:

- Further decline in cargo activities and bankruptcy of some companies.
- Unwillingness of companies to reduce pollution and to cooperate in monitoring and regular reporting on environment performance indicators,



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Business Model 2: a monitoring and advisory team

<ul style="list-style-type: none"> Business Ecosystem 					
<p>Establish an independent team with expertise on stormwater monitoring & management, to monitor, advise, educate companies and port authorities.</p>					
<ul style="list-style-type: none"> Key Partnerships Technology partners, to develop test beds and pilot projects. Research institutes. European and Baltic Port organisations Local Authorities Communication specialists. 	<ul style="list-style-type: none"> Key Activities Situation analysis of locations Develop and implement customised strategies and technologies. Find the right expertise: external, independent. Engage authorities, municipalities, and the public. Build relationships Legal: contract procurements, client commitments etc. 	<ul style="list-style-type: none"> Value Propositions En independent stormwater monitoring, handling and advisory team to support companies and authorities. Online monitoring, education and priority identification to assist companies and ports deliver sustainably competitive services. Development and implementation of the latest solutions and technologies for handling cargo discharge. Customer based effective solutions Environmentally safer solutions Parallel circular BM with waste Civic responsibility Citizen/visitor centred infrastructure development and improvements. 	<ul style="list-style-type: none"> Customer Relationships B2B and B2P: <ul style="list-style-type: none"> Open and transparent Common Sustainability goals Aware of sensitivities Long term partnership with steady, reachable common strategies Channels B2B and B2P: <ul style="list-style-type: none"> Direct contact Official Communications Conferences and seminars Social Media and other marketing activities to reach extended beneficiaries 	<ul style="list-style-type: none"> Customers B2P: Public stakeholders: <ul style="list-style-type: none"> Port Authorities Local municipalities B2B: <ul style="list-style-type: none"> Container Handling Companies Ship Repair and building Bulk fertilizer cargo loading companies. Container handling Ro-RO and other cargo companies. 	<ul style="list-style-type: none"> Extended Beneficiaries B2P: Public stakeholders: <ul style="list-style-type: none"> Local municipalities Local and regional ministries Environmental Authorities Local residents Tourists Local businesses related to both tourism as well as products & services to residents.
<ul style="list-style-type: none"> Governance Strategy team: <ul style="list-style-type: none"> Involve and include key partners in a strategic Board that includes, politicians, companies, EPA authorities, researchers Operational Team: <ul style="list-style-type: none"> Implement strategies via partners projects, test beds etc.. <p>A joint effort to inform stakeholders on improvements, issues benefits and challenges.</p>	<ul style="list-style-type: none"> Key Resources Findings and expertise from WISA Partnership with established projects like The Green Port project in Klaipeda University/institute facilities and researchers Existing projects and test facilities. Current IT and technology Relationships with companies and authorities 	<ul style="list-style-type: none"> Impact Cleaner, more effective cargo handling Greener Ports Increased business attractiveness Healthier water ecosystems Improved relations between ports and cities Increase in overall economic activities and tax revenues 	<ul style="list-style-type: none"> Revenue Streams Initial external funding through EU funded projects Management fees from Terminal renters Support from municipalities through projects aimed at lowering air pollution. 	<ul style="list-style-type: none"> Cost structure Management/operational team costs Pilot projects and test beds training and education costs Technology & equipment 	

BUSINESS MODEL 3: A Bio Filtration Pond

Challenge: “More than 44 million tons of fertilizers are transported via the harbours of the Baltic Sea annually. Fertilizer transportation leads to spoilage, some of which will directly eutrophicate the Baltic Sea. Nutrient discharges happen in the loading stage, as dust from the cargo and fertilizers end up in the sea, either directly or with the runoff waters from the loading docks”. (The many threats faced by the Baltic Sea: <https://johnnurmisenfaat.io/en/the-baltic-sea/threats-faced-by-the-baltic-sea/>)

Several projects and a number of established monitoring and spillage cleaning solutions in some of the ports are attempting to mitigate and reduce the amount of spoilage and discharge at ports however, we will never reach a zero-spoilage scenario in our ports.

Business Model 3: a bio filtration pond

Business Ecosystem					
<ul style="list-style-type: none"> Key Partnerships Technical and Construction consultants. Specialist companies for removing and reusing of filtered chemicals Construction companies, maintenance companies. Local government and authorities International bodies 	<ul style="list-style-type: none"> Key Activities Applications and permits Environmental assessments Analyse and decide on the correct water runoffs. Test filtering systems and methods Optimisation 	<ul style="list-style-type: none"> Value Propositions A Bio filtration Pond. Directly linked to stormwater runoffs. Located within or adjacent to the port. An extra layer of filtration that allows chemicals and minerals from runoffs to be naturally filtered and collected. Possibility of collecting certain chemicals, like fosorus, and re-selling to other industries. 	<ul style="list-style-type: none"> Customer Relationships Direct communication and reports Long term impact studies Private and "open to public" meetings. 	<ul style="list-style-type: none"> Customers Possibly project based to start with: <ul style="list-style-type: none"> Local municipalities Water processing authorities Port Authorities. Companies that require chemicals and minerals for their operations Export concept throughout other ports. 	<ul style="list-style-type: none"> Extended Beneficiaries B2P: Public stakeholders: <ul style="list-style-type: none"> Local municipalities Local and regional ministries Environmental Authorities Local residents Tourists Local businesses related to both tourism as well as products & services to residents.
<ul style="list-style-type: none"> Governance Technical and Construction consultants. Specialist companies for removing and reusing of filtered chemicals Construction companies, maintenance companies. Local government and authorities International bodies 	<ul style="list-style-type: none"> Key Resources Knowledge on water polluting substances and infrastructure Technological Solutions Partnership with local authorities Test filtering systems and methods Monitoring and maintenance know-how 	<ul style="list-style-type: none"> Impact A greener port environment Improved status in the community A leader in Circular Models 	<ul style="list-style-type: none"> Channels Direct communication and lobbying with stakeholders Social Media campaigns Scientific reports Environmental statement reports Private and "open to public" meetings. 	<ul style="list-style-type: none"> Revenue Streams Fees to Terminal renters Sales of concept to other ports and cities 	
<ul style="list-style-type: none"> Cost structure Consulting and construction costs Consulting costs and technology implementation Operating cost Maintenance 					

Business model "A Bio Filtration Pond" See larger business model below.

The Value Proposition: This model proposes the installation of Bio Filtration Pond(s) within or directly adjacent to the port areas. The pond will collect runoff water from identified problem areas (high frequency loading areas) and use plants as well as microorganisms within its environment to filter and collect hazardous chemicals, before some of the clean excess water is reintroduced at sea or to existing sewage treatment facilities. Bio filtration ponds are extensively used worldwide in, for example high motor vehicle traffic areas such as large car parks. An example of a Bio Filtration system can be seen here:

<https://watersensitivecities.org.au/wp-content/uploads/2016/06/AGSBS-A2-How-does-stormwater-bio-filtration-work.pdf>

WISA CASE STUDIES IN PLAY

Problem: We recognize the need to dramatically slowdown the production and transportation of fertilizers. We know today that the negative impacts of fertilizers on our entire environment as well as the health and wellbeing of humans and animals, are beginning to outweigh the positive effects on agriculture (<https://climate.mit.edu/explainers/fertilizer-and-climate-change>) Scientist and the global community are working on technological solutions to minimise fertilizer production and consumption without sacrificing crop yields. In the meantime we have an obligation to minimise harm.

Solution: Bio Filtration ponds are well established method of reducing hazard from pollutants in heavily trafficked areas. The ponds use “the power of nature” via plants that feed and thrive on pollutants, to clean the waters and at the same time create enjoyable environments.

Åhus Harbor today releases 150 kg of phosphorus as well as other chemicals like nitrogen. To reduce the negative impact on the Baltic Sea, the stormwater needs to be cleaned. To do this, the port authority identified which stormwater outlets have high emissions of fertilizers. The "hot-spot" outlets are led to a sedimentation pond that cleans particle-bound substances.

The water is then led on to a biopond where the phosphorus is separated with filters and the nitrogen is taken up by vegetation.

Benefits: This process enables the removal of nitrogen that cannot be removed with other types of purification processes such as filters. Purified water is released back into the Baltic Sea and the port fulfill its obligations from the local authorities while protecting our local environment.

SWOT ANALYSIS of Business Model 3:

Strengths:

- Relatively inexpensive
- Customizable
- “Organic” although it may have occasions when other measures are needed
- Knowledge of the catchment area
- Parts are proven and studies are available

Weaknesses:

- Fully functioning only at certain times of the year
- Nitrogen purification is temperature dependent
- Space-consuming
- Limited capacity to receive large amounts of water

Opportunities:

- Easy to develop and tailor to specific needs of local areas.
- Scalable, to some extent
- Increased restrictions and guidelines from authorities require multi-channel solutions

Threats:

- The performance of other existing solutions is improving
- Space is a very important factor.



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Business Model 3: a bio filtration pond

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<ul style="list-style-type: none"> Cost structure Consulting and construction costs Consulting costs and technology implementation Operating cost Maintenance 					

Project WISA

WISA (Water Innovation System Amplifier) is a 3-year project that will contribute to a cleaner Baltic Sea by developing and testing new green technologies to reduce pollution by stormwater from ports and other large hard surfaces.

The Baltic Sea is one of the world's most polluted seas. More than 45 million tonnes of fertilizer pass through the ports of the Baltic Sea annually, and the handling contributes to the release of fertilizers and nutrients into the stormwater. This leads to eutrophication with extensive algal blooms and dead seabed.

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