Interreg Baltic Sea Region

Co-funded by the European Union

BORNHOLMS ENERGI & FORSYNING

SUSTAINABLE WATERS WaterMan

The WaterMan project

Final draft of the regional water recycling strategy for Bornholm

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Strategy Overview

➢ Scope of the Strategy

The WaterMan Local Model Strategy for Bornholm positions wastewater as a strategic resource in the island's transition toward climate resilience and a circular economy. It integrates:

- EU and Danish regulatory frameworks (UWWTD, technical water legislation, EU 2020/741)
- BEOF's infrastructure planning of the future WWTPs
- Stakeholder engagement and technical pilots (e.g., Svaneke WWTP)

The strategy is embedded in one active project group:

- Future wastewater structure – includes the theme Wastewater as a resource

➢ Main Goals

- Increase interest and feasibility of wastewater reuse at WWTPs
- Demonstrate practical reuse scenarios (agriculture, PtX, industry, municipal use)
- Support regulatory alignment and contribute to national/EU-level discussions
- Build public trust and stakeholder engagement through workshops, pilots, and open events
- Develop knowledge tools (technology library, wastewater quality data bank)
- Ensure coordination with BEOF's innovation department during WWTP centralization planning.

➢ What Problem / Opportunity Does It Address?

- **Problem**: Wastewater is traditionally treated as a waste product, with limited reuse and environmental discharge impacts.
- **Opportunity**: Reframing wastewater as a valuable resource enables:
  - Sustainable water management
  - Alternative to freshwater sources
  - Integration with energy systems (e.g., PtX)
  - Compliance with evolving EU directives
  - Local innovation and leadership in circular water solutions

Local / Regional Context and Background

➢ **Description of the Region / Organization / Sector**

Bornholm is a Danish island in the Baltic Sea known for its strong environmental ambitions and commitment to sustainability. The local utility, Bornholm Energi & Forsyning (BEOF), plays a central role in water and wastewater management. The WaterMan strategy is developed in collaboration with BEOF, the municipality, and regional stakeholders, positioning Bornholm as a living laboratory for circular water solutions.

The sector focus is on wastewater treatment and reuse, with integration into agriculture, industry, and energy systems (e.g., Power-to-X).

➢ **Existing Relevant Strategies or Frameworks**

- **BEOF's "Clean Waters Surrounding Bornholm" Vision**: A long-term ambition to improve water quality and environmental protection.
- **EU Urban Wastewater Treatment Directive (UWWTD)**: Sets the regulatory foundation for reuse, nutrient recovery, and pollution control.
- **EU Regulation 2020/741**: Establishes minimum requirements for agricultural reuse (used as a reference).
- **Denmark's Technical Water Legislation (2025)**: Enables creation of technical water companies for non-potable reuse.
- **Water Framework Directive**: Guides environmental monitoring and waterbody protection.

➢ **Key Environmental, Socio-Economic, Institutional Conditions Shaping the Strategy**

- **Environmental**: Bornholm's sensitive coastal ecosystems and limited freshwater resources make reuse a strategic necessity.
- **Socio-Economic**:
  - Agricultural interest in reclaimed water for irrigation.
  - Reclaimed water for PtX – potential interest from a company.
  - Economic concerns around infrastructure investment and cost-sharing.
  - Seasonal limitations affecting reuse feasibility.
- **Institutional**:
  - Strong local governance and stakeholder collaboration.
  - Active participation in national working groups (e.g. The Danish water and wastewater association (DANVA)).
  - Embedded in the project groups: "Future Wastewater Structure"
  - Innovation department of BEOF will play a key role in integrating reuse solutions into future WWTP designs.

Development Process

- **Who Led or Contributed?**
  - **Lead Organization**: Bornholm Energi & Forsyning (BEOF)
  - **Contributors**:
    - Bornholm Municipality
    - Danish Ministry of Environment
    - DANVA (Danish Water and Wastewater Association)
    - EnviDan (technical consultant for pilot evaluation)
    - Local stakeholders: farmers, industry, waste company, financial institutions
    - EU-level partners via WaterMan and Interreg South Baltic

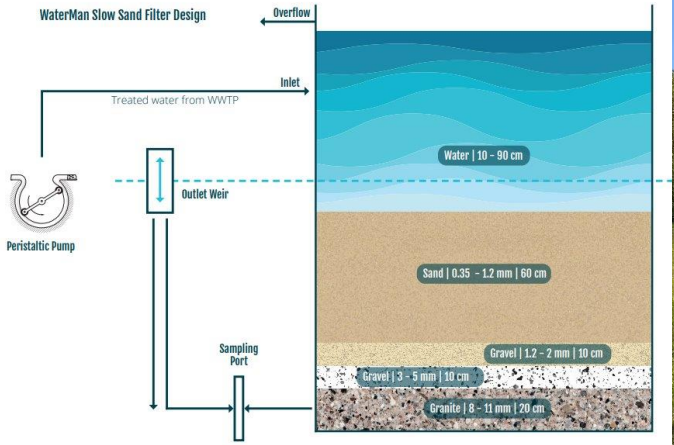
- **Stakeholder Engagement and Consultation Process**
  - **Workshops**:
    - *"Wastewater as a Resource"* workshop (March 20) with farmers, consultants, municipality, and BEOF
  - **Site Visits**:
    - Svaneke WWTP and greenhouse irrigation pilot
    - Municipality Environmental department
  - **Public Events**:
    - Symsites sister project General Assembly
    - Interreg South Baltic Annual Event visit (Sept 24)
  - **Consultations**:
    - Participation in national hearings and EU roundtables
    - Input to DANVA backing group regarding the implementation of the new UWWTD

- **Timeline / Milestones in Strategy Elaboration**
  - **2023–2024**: Initial mapping of reuse scenarios, contaminants, technologies, and potential end-users of recycled water
  - **2024**: Launch of Svaneke WWTP pilot and stakeholder workshops
  - **Spring 2025**: Public engagement and greenhouse irrigation demonstration
  - **Summer 2025**: New Danish technical water legislation enters into force
  - **September 2025**: International exposure via Interreg event

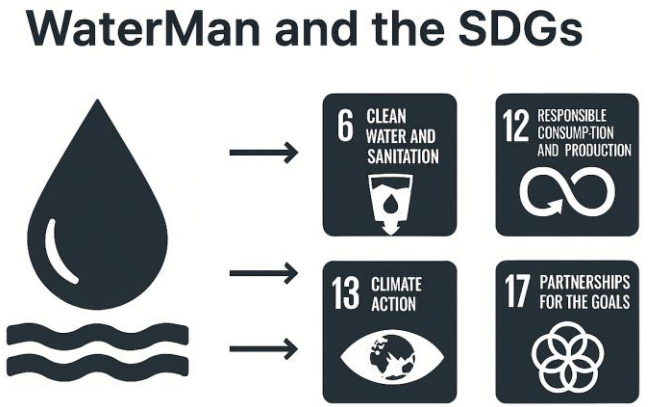
Core Components

- **Main Objectives and Focus Areas**
  - **Reframe wastewater as a resource** within the broader water cycle.
  - **Enable practical reuse** at WWTPs for:
    - Agricultural irrigation
    - Internal reuse at the WWTP and sewer inspection and flushing.
    - Power-to-X (PtX) hydrogen production
    - Municipal applications
  - **Align with EU and Danish regulations** (UWWTD, technical water legislation, EU 2020/741).
  - **Build public trust and stakeholder engagement** through transparent communication and demonstration.
  - **Develop knowledge tools** to support decision-making:
    - Technology library
    - Wastewater quality data bank

- **Key Actions, Measures, Initiatives**
  - **Pilot Project**: Slow sand filter at Svaneke WWTP for agricultural reuse.
  - **Workshops & Events**:
    - "Wastewater as a Resource" workshop (March 2025)
    - Symsites GA
    - Interreg South Baltic Annual Event site visit (Sept 2025)
  - Explore **practical distribution models** for agricultural reuse (e.g., water trucks, pipe-in-pipe systems).
  - **Stakeholder Mapping**: Identification of potential water consumers and contaminant contributors.
  - **Technology Evaluation**: Comparative analysis of treatment options (e.g., MF, UF, sedimentation).
  - **Environmental Monitoring**:
    - Wastewater and waterbody contaminant mapping by investigating national databases (KemiData, MIljøGIS)
  - **Governance Anchoring**:
    - Embedded in project group: *"Future Wastewater Structure"*
    - Dynamic documentation and regular follow-up



Expected Impact / Outcomes



➢ Links to Policy Goals / Sustainable Development Targets

The WaterMan strategy supports multiple EU and global policy objectives:

- **EU Urban Wastewater Treatment Directive (UWWTD)**: Promotes water reuse, nutrient recovery, and pollution reduction.
- **EU Circular Economy Action Plan**: Encourages resource efficiency and reuse of treated wastewater.
- **UN Sustainable Development Goals (SDGs)**:
  - **SDG 6** – Clean Water and Sanitation
  - **SDG 12** – Responsible Consumption and Production
  - **SDG 13** – Climate Action
  - **SDG 17** – Partnerships for the Goals

➢ Anticipated Environmental, Social, Economic Impact

Environmental

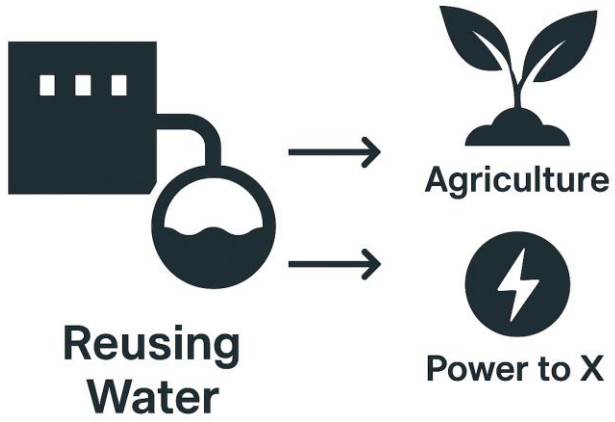
- Reduced discharge of nutrients and contaminants into sensitive coastal waters.
- Lower freshwater abstraction through reuse.
- Enhanced biodiversity protection via improved water quality.

Social

- Increased public awareness and acceptance of reuse.
- Strengthened local engagement through workshops and open-door events.
- Improved water security for agriculture and municipalities.

Economic

- Cost savings for water-intensive sectors (e.g., farming, PtX).
- Potential for new business models (e.g., technical water companies).
- Long-term infrastructure efficiency through centralized planning.



Implementation Considerations

➢ Enabling Conditions for Implementation

To successfully implement the WaterMan strategy, the following conditions are essential:

- **Regulatory Frameworks**:
  - Full implementation of the revised EU Urban Wastewater Treatment Directive (by July 2027).
  - Entry into force of Denmark's technical water legislation (summer 2025).
- **Institutional Support**:
  - Continued engagement from BEOF, Bornholm Municipality, DANVA, and national ministries.
  - Active coordination within project group (*"Future Wastewater Structure"*).
- **Technical Capacity**:
  - Access to appropriate treatment technologies (e.g., sand filters, MF/UF, disinfection).
  - Integration of monitoring data from national platforms (KemiData, MiljøGIS).
- **Stakeholder Engagement**:
  - Ongoing workshops, site visits, and public events to build trust and awareness.
  - Inclusion of farmers, industry, and citizens in planning and feedback loops.
  - Continuous dialogue with regulatory bodies (National Authorities, DANVA) to streamline approvals.

➢ Potential Challenges / Barriers

- **Infrastructure Limitations**:
  - Lack of distribution systems for reclaimed water.
  - Agricultural irrigation faces logistical challenges; distribution options under evaluation include mobile water supply and integrated piping.
  - Seasonal constraints
- **Economic Concerns**:
  - Unclear cost-sharing models (who pays for reuse infrastructure and operations).
- **Regulatory Hurdles**:
  - Long processing times for environmental permits.
  - Uncertainty around the implementation of EU Regulation 2020/741 in Denmark.
- **Public Perception**:
  - Need for clear communication to address safety concerns and build acceptance.

Active Coordination

within project group ('Future Wastewater Structure')

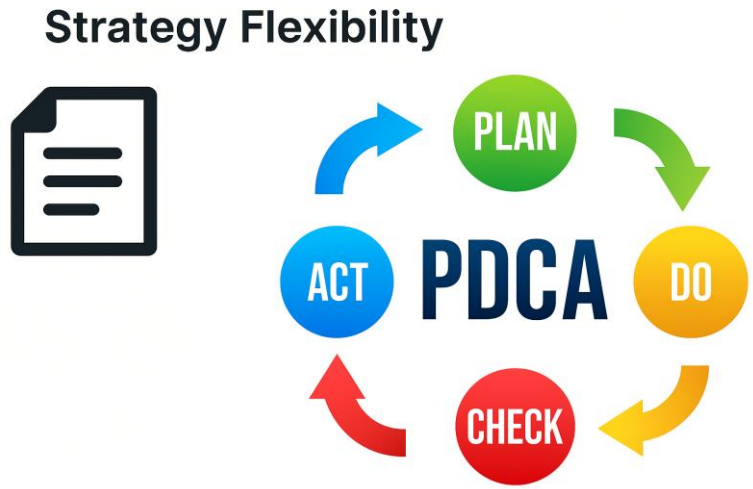
Adaptability

➢ Flexibility of the Strategy

The WaterMan strategy is designed as a **living framework**, allowing for adaptation to:

- **New regulations** (e.g., updates to UWWTD, technical water legislation)
- **Emerging contaminants** (e.g., PFAS, pharmaceuticals, microplastics)
- **Technological advancements** in treatment and monitoring
- **Stakeholder feedback** from workshops, pilots, and consultations

Its modular structure enables integration of new reuse scenarios, data sources, and pilot results without disrupting the overall strategic direction.

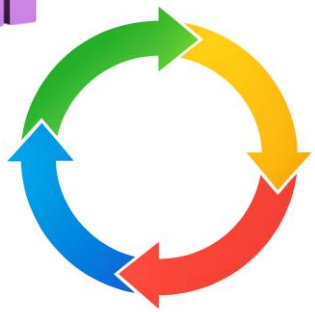


➢ Provisions for Updates / Revision

- **Dynamic Documentation**: Continuously updated to reflect:
  - Regulatory changes
  - Pilot findings (e.g., Svaneke WWTP)
  - Technological evaluations
  - Stakeholder input
- **Regular Follow-Ups**: Conducted within the anchor project group:
  - *"Future Wastewater Structure"*
- **Knowledge Tools**: The technology library and wastewater quality data bank are designed for ongoing expansion and refinement.

This ensures the strategy remains **relevant, responsive, and scalable** over time.

Relation to Other Strategic Documents and Scalability



➢ How Does the Strategy Complement Existing Plans?

The WaterMan strategy is closely aligned with and supplements several key frameworks:

- **BEOF's "Clean Waters Surrounding Bornholm" Vision**: WaterMan provides the technical and stakeholder roadmap to realize this ambition.
- **EU Urban Wastewater Treatment Directive (UWWTD)**: WaterMan supports early implementation and contributes practical insights to national working groups.
- **Denmark's Technical Water Legislation (2025)**: The strategy anticipates and prepares for the operationalization of technical water companies.
- **EU Regulation 2020/741**: WaterMan uses it as a benchmark for agricultural reuse standards.
- **Water Framework Directive**: Environmental monitoring and contaminant mapping are aligned with its goals.

➢ Potential for Scaling or Replication

Yes — the strategy is designed to be **scalable and transferable**:

- **Regional Replication**: Insights from Bornholm's pilot (e.g., Svaneke WWTP) are being processed into the **BSR Water Reuse Toolbox** (Deliverable D2.5), enabling peer learning across the Baltic Sea Region.
- **Sectoral Expansion**: Reuse scenarios can be adapted for:
  - Agriculture
  - PtX energy systems
  - Municipal landscaping and cleaning
- **Knowledge Tools**: The technology library and wastewater quality data bank are structured to support other utilities and municipalities.

Bornholm serves as a **model region**, demonstrating how small-scale, integrated strategies can inform broader national and EU-level planning.

Final Reflections

➢ **Biggest Surprise During Elaboration**

The **level of genuine interest from local stakeholders**, especially farmers and municipal actors, was a pleasant surprise. The March 20 workshop revealed a strong appetite for sustainable water solutions — not just in theory, but in practice.

➢ **A Moment of Doubt**

There was a point when the **regulatory uncertainty** around EU Regulation 2020/741 and the long permitting processes made it feel like progress might stall. However, by anchoring the strategy in active project groups and focusing on low-tech pilots like the **Svaneke sand filter**, momentum was regained through practical demonstration and stakeholder dialogue.

➢ **Tips / Insights / Recommendations**

- **Start with a pilot**: Even small-scale demonstrations can build trust and generate valuable data.
- **Engage early and often**: Stakeholder involvement from the beginning ensures relevance and buy-in.
- **Build flexible tools**: A living strategy with dynamic documentation allows for adaptation.
- **Use existing data platforms**: National tools like KemiData and MiljøGIS are invaluable for planning and compliance.
- **Engage innovation teams** early to align technical solutions with infrastructure plans.

➢ **Wish for the Strategy**

If we could wish for anything, it would be **a streamlined regulatory pathway for reuse projects** — one that balances environmental protection with innovation. This would accelerate implementation and unlock the full potential of wastewater as a resource across Denmark and beyond.

Farmer quote:

"The workshop gave us a real chance to speak openly, and it's clear that change is possible when we work together. I'm leaving with renewed energy and a sense that our input actually matters."

BORNHOLM

A MODEL REGION FOR CIRCULAR WATER SOLUTIONS

Interreg Baltic Sea Region

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SUSTAINABLE WATERS WaterMan

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The „BSR Water Recycling Toolbox" was elaborated as part of the WaterMan project, which is co-financed by the European Union (European Regional Development Fund) and implemented within the Interreg Baltic Sea Region Programme. More information:

eurobalt.org/WaterRecyclingToolbox
interreg-baltic.eu/project/waterman

WaterMan promotes a Baltic Sea Region-specific approach to water recycling, which makes use of the alternation of too much and too little water that has become typical for humid areas in the EU to strengthen the resilience of local water supply. Building on this approach, the project supports municipalities and water companies in adapting their water supply strategies.