Recycling municipal wastewater for commercial use

Feasibility study - summary

Interreg
Baltic Sea Region

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Feasibility Assessment of Water Reuse from Large-Scale Wastewater Treatment Plants in Berlin-Brandenburg

Summary of main findings and feasibility assessment

Background and scope

Within the WaterMan project, the Berlin Centre of Competence for Water (KWB) investigated the feasibility of reusing treated municipal wastewater from two wastewater treatment plants (WWTP) in the Berlin-Brandenburg region: (1) The WWTP Ruhleben, focusing on industrial and commercial applications, and (2) Stahnsdorf, focusing on agricultural irrigation. The study examined potential applications, water quantity and quality, treatment requirements, infrastructure costs, stakeholder involvement, and associated microbial health risks.

Main findings

(1) WWTP Ruhleben: Industrial, commercial and urban reuse

WWTP Ruhleben offers substantial water availability and potential applications in industrial processes, car washing and urban irrigation. Car washing and industrial cooling were identified as relevant applications due to comparatively high assumed water demands. However, engagement with nearby businesses revealed limited confirmed demand, with no concrete reuse opportunities established. An assessment of surrounding green spaces identified considerable irrigation potential, particularly during dry years. The quantitative microbial risk assessment (QMRA), conducted using data from WWTP Ruhleben, demonstrated that the investigated treatment configuration, including planned upgrades, does not reliably achieve acceptable microbial health risks across the assessed reuse scenarios and reference pathogens. Additional treatment barriers may therefore be required to ensure safe reuse. Economic feasibility is constrained by substantial distribution infrastructure costs, highlighting the importance of proximity, reliable demand and fit-for-purpose treatment solutions.

(2) WWTP Stahnsdorf: Agricultural irrigation

At the WWTP Stahnsdorf, a technical concept for agricultural water reuse targeting Class B reclaimed water under EU Regulation 2020/741 for agricultural irrigation was developed, combining filtration, activated carbon treatment, UV disinfection and buffer storage. The assessment indicates that water reuse is technically feasible in principle, but economic viability is currently limited by high treatment and distribution costs and seasonal irrigation demand. The future WWTP offers greater potential for economic feasibility, particularly through optimised infrastructure and additional water users to increase plant utilisation. Implementation remains dependent on meeting regulatory and water quality requirements, securing sufficient demand and establishing suitable operational arrangements.

Cross-cutting conditions and overall feasibility assessment

The feasibility study indicates that water reuse is technically feasible in principle at both WWTP, while implementation remains subject to technical, economic, regulatory and operational conditions. At WWTP Ruhleben, the main constraints are limited confirmed demand to date and substantial distribution costs to be borne by end-users. At WWTP Stahnsdorf, economic viability is constrained by high treatment and infrastructure costs and seasonal irrigation demand, although the future WWTP offers more favourable prospects. At both sites, implementation depends on reliable end-user demand, adequate treatment performance and suitable operational arrangements. Optimising distribution infrastructure, leveraging synergies with the EU Urban Wastewater Treatment Directive and securing committed end-users are key factors for improving feasibility. Further site-specific assessments and stakeholder coordination are required to advance implementation.

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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.

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