

Municipal Wastewater Reclamation - opportunities, challenges, barriers

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Water scarcity is a global phenomenon severely impacting numerous communities worldwide. In 2022 alone, over 2 billion people lacked access to safely managed water. Furthermore, the problem of water shortages is projected to be intensified by the climate change-related rise of global temperatures, growing population, and increasing water demand (Kehrein et al., 2021, UN DESA, 2023). Undoubtedly, there is a growing need for solutions addressing the issue of freshwater shortages and providing both sustainable and accessible water supply in the future. Such solutions include municipal wastewater reclamation, which is tapping into the potential of turning hazardous waste into a valuable resource.

The essence of water recovery is to eliminate contaminants within 0.1% of substances that are not water (Fig. 1). Due to the different characteristics of wastewater treated, the methods of removing contaminants should be selected to suit local conditions and its surroundings.

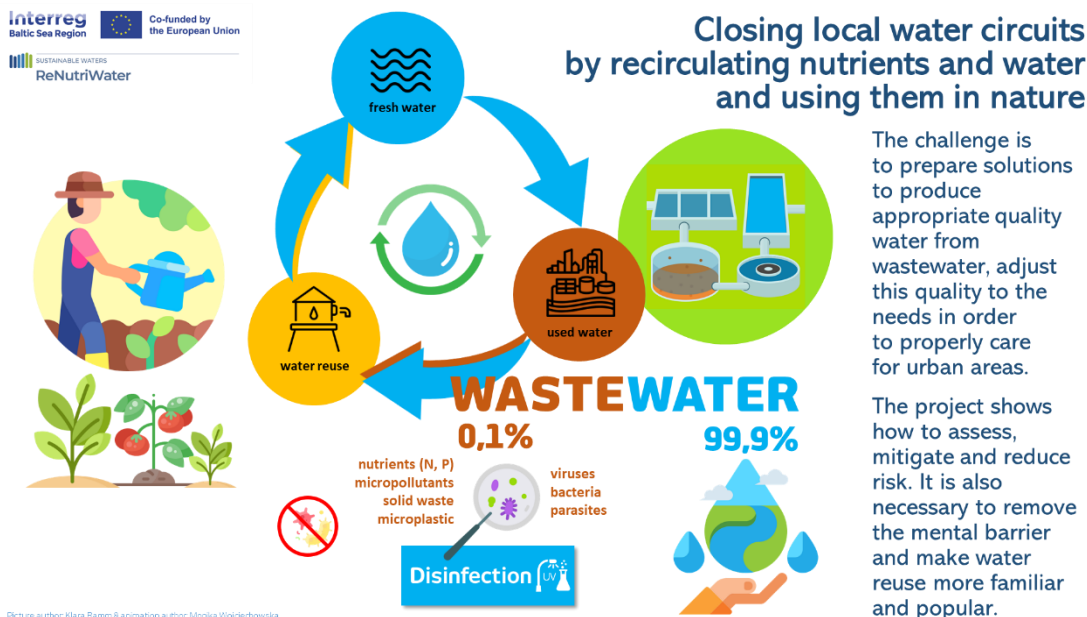


Figure 1 Closing local water circuits by recirculating and using nutrients and water in nature.

Water recovery technologies are very different; several processes are usually combined and selected for a specific purpose of water use. When choosing a technology, it is essential to consider three main aspects: 1) ecological, 2) economical, 3) regulatory. Well-selected technology removes various pollutants, including micropollutants (heavy metals, pharmaceuticals, pesticides, biocides, perfluoroalkyl substances, and microplastics). It also allows for the destruction of living and spore forms of pathogenic organisms and prevents their secondary development. Simultaneous recycling of water and nutrients is also possible, i.e. selecting the amounts and chemical forms of nitrogen, phosphorus, and potassium.

Recovering water from wastewater is a concept that is becoming interesting for urban WWTPs operators. Most operators close internal circuits or use treated wastewater in the technological processes of plants. However, external use, e.g., washing streets or watering public green areas, is still unpopular. The potential is most significant here due to saving resources (drinking water). In the ReNutriWater project, the possibility of using reclaimed water is assessed depending on the local conditions of a given WWTP, as presented in Fig. 2. This issue

will be the topic of the proposed poster. Particular attention will be paid to the challenges faced in the context of water recovery from municipal wastewater.

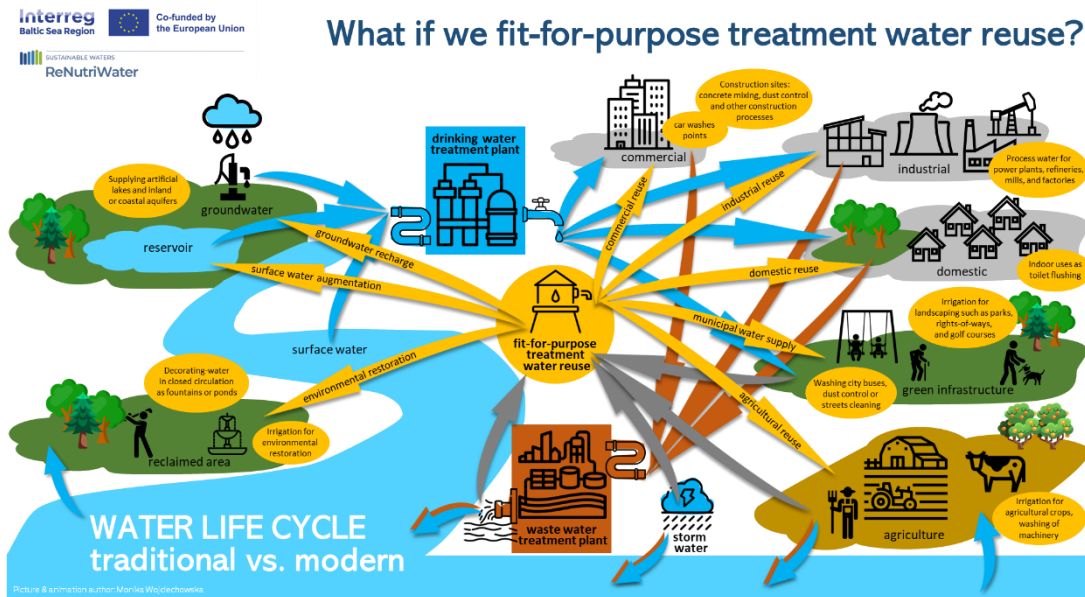


Figure 2 Fit-for-purpose treatment water reuse - modern water life cycle in Circular Economy

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