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RESOURCE RECOVERY FROM SOURCE-SEPARATED DOMESTIC WASTEWATERS AND FOOD WASTE, EXPERIENCES FROM 4 EUROPEAN DEMO-SITES

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Current fertiliser production practices are not sustainable. Phosphate rock is a non-renewable resource, and the nitrogen-based fertilisers production is highly energy-intensive, currently relying on the use of fossil fuels. There is increased recognition that domestic wastewater carries resources that can be recovered for reuse, contributing to the circular economy: nutrients, carbon, energy and water. This requires a paradigm shift in domestic wastewater management, as resource recovery from diluted sewage is not efficient. Optimal wastewater resource recovery and reuse should become an integral part of the urban design, separating different wastewater flows and employing existing and innovative technologies in the best combinations.

The Horizon 2020 project Run4Life demonstrates the recovery of fertiliser products, biogas and clean water from source-separated domestic wastewaters and food waste, at four sites in Europe. The larger size of the demonstration sites, from 100-1800 i.e., and the involvement of stakeholders along the entire value chain show that domestic wastewater with source separation is becoming a mature resource management system. This is done at newly developed neighbourhoods Nieuwe Dokken in Ghent (Belgium) and Oceanhamnen/RecoLab in Helsingborg (Sweden), existing houses in Sneek, the Netherlands and existing office buildings in Vigo (Spain).

Toilet wastewater (black water), other domestic wastewater (grey water) and food waste are collected and processed separately for optimal resource recovery. At three of the sites vacuum toilets are used to ensure a highly concentrated black water flow. The used resource recovery technologies differ between the sites, as the characteristics of each location require tailor-made solutions. Recovered products include e.g. biogas, struvite, ammonium sulphate, organo-mineral fertiliser pellets, industrial process water, and hygienised liquid and solid digestate.

Apart from developing and implementing innovative technological solutions for optimal resource recovery, in Run4Life also socio-economical and legislative aspects are investigated. These are of the utmost importance in the applicability of resource recovery concepts, as well as hygienic safety, heavy metals and organic micropollutants. At the demonstration sites new fertiliser products are harvested and characterised. By presenting the four demonstration sites and an overview of results that are so-far obtained in the project, it becomes clear that source separation and decentralised treatment of domestic wastewaters for resource recovery have matured into a viable alternative for large-scale centralised treatment.

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