CERIS : Civil Engineering Research and Innovation for Sustainability

SMART-PLANT – Scale-up of Low-Carbon Footprint Material Recovery Techniques in Existing Wastewater Treatment Plants

SMART-Plant

Summary

The project will prove the feasibility of circular management of urban wastewater and environmental sustainability of the systems and co-benefits of scaling-up water solutions through Life Cycle Assessment and Life Cycle Costing approaches.

SMART-Plant will scale-up in real environment eco-innovative and energy-efficient solutions to renovate existing wastewater treatment plants and close the circular value chain by applying low-carbon techniques to recover materials that are otherwise lost. 7+2 pilot systems will be optimized for more than 2 years in real environment in 5 municipal water treatment plants, including also 2 post-processing facilities. The systems will be automated with the aim of optimizing wastewater treatment, resource recovery, energy-efficiency and reduction of greenhouse emissions. A comprehensive SMART portfolio comprising biopolymers, cellulose, fertilizers and intermediates will be recovered and processed up to the final end-products.

The integration of resource recovery assets to system-wide asset management programs will be evaluated in each site following the resource recovery paradigm for the wastewater treatment plant of the future, enabled through SMART-Plant solutions. The project will prove the feasibility of circular management of urban wastewater and environmental sustainability of the systems, to be demonstrated through Life Cycle Assessment and Life Cycle Costing approaches to prove the global benefit of the scaled-up water solutions. Dynamic modelling and superstructure framework for decision support will be developed and validated to identify the optimum SMART-Plant system integration options for recovered resources and technologies. Global market deployment will be achieved as right fit solution for water utilities and relevant industrial stakeholders, considering the strategic implications of the resource recovery paradigm in case of both public and private water management. New public-private partnership models will be explored connecting the water sector to the chemical industry and its downstream segments such as the construction and agricultural sector, thus generating new opportunities for funding, as well as potential public-private competition.

The Opportunity for SMART-Plant

- Opportunities for providing state of the art innovative technology the water treatment landscape, as SMART-Plant will address needs of water utilities for reducing overall costs, while improving the quality of treatment and compliance to regulations.
- Opportunities for granting access to new feedstock sources to chemical and its downstream industry, as SMART-Plant will make available a full portfolio of products by in situ biochemical conversion of recovered resources.

SMART-plant will scale-up and demonstrate eco-innovative solutions to upgrade existing WWTPs. 9 pilot low-carbon footprint systems will be applied in the real environment, in five different wastewater treatment plants with the aim of optimizing wastewater treatment, resource recovery, energy-efficiency and reduction of greenhouse gas emissions. Through these processes, a comprehensive portfolio comprising of biopolymers, cellulose, fertilizers and intermediates will be recovered and processed up to the final commercial end products.

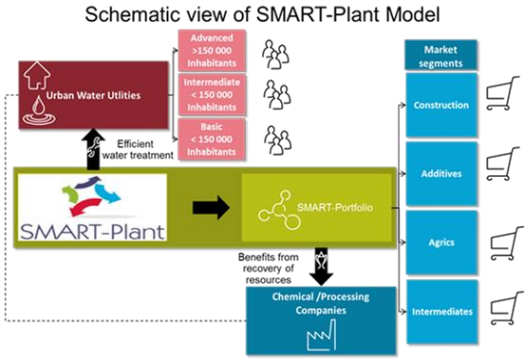
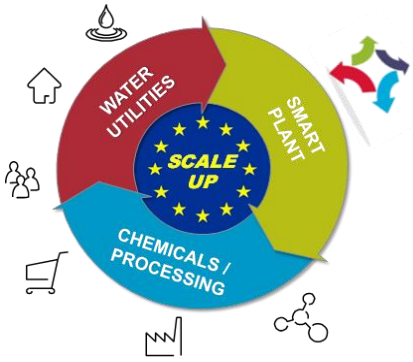


Figure 1. Schematic view of SMART-Plant Model.

The SMART-Plant project promotes the energy efficient wastewater resource recovery concept, through the technology platform developed within existing plants to eventually prompt the development of new products and business opportunities.



Project Reference

Grant agreement ID: 690323

Leading Institution

UNIVPM – Università Politecnica delle Marche (Italy)

Partners

UNIVR – Università degli Studi di Verona (Italy), UR – Università di Roma La Sapienza (Italy), UBRUN – Brunel University (United Kingdom), CU – Cranfield University (United Kingdom), UAB – Universitat Autònoma de Barcelona (Spain), UVIC-UCC – Universitat de Vic (Spain), NTUA – National Technical University of Athens (Greece), KWB – Berlin Centre of Competence for Water (Germany), BIOTR – Biotrend S.A. (Portugal), SOC – Socamex S.A (Spain), BYK – BYK Additives Ltd (United Kingdom), SCAE srl (Italy), AGRB – AGROBICS Ltd (Israel), Salsnes Filter A.S. (Norway), IBET – Instituto de Biologia Experimental e Tecnológica (Portugal), EYDAP – Athens Water Supply and Sewerage Company (Greece), ATS – Alto Trevigiano Servizi S.r.l. (Italy), Mekorot Water Company Ltd (Israel), AdM – Aigües de Manresa S.A. (Spain), CirTec (Netherlands), INNOEXC – Excellence Hub InnoEXC GmbH (Switzerland), Severn Trent Ltd (United Kingdom), Aktor SA (Greece), SBPL – Specialist Building Products Limited T/A Ecodek (United Kingdom), WSC – Wellness Smart Cities, S.L. (Spain)

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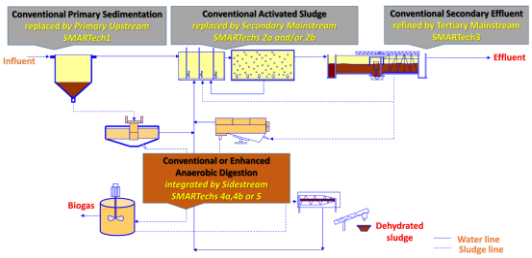
SMART-Plant technology platform: approach for integration in existing conventional wastewater treatment plants.



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2016-2020

Total

7 536 300.02€

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Project Website

www.smart-plant.eu