

R3VOLUTION brochures showcase circular water solutions for industries

The EU-funded R3VOLUTION project has released a series of four demonstration case brochures highlighting how advanced water reuse, resource recovery, and energy valorisation technologies are being implemented across four key European industries: petrochemical, biochemical, steel, and pulp & paper. The brochures demonstrate how the project enables water-intensive industries to recover water, valuable resources, and energy from process streams, supporting more circular and resource-efficient operations.

Petrochemical Industry: Towards Zero Liquid Discharge

At the Repsol petrochemical complex in Puertollano, Spain, the project addresses water scarcity and increasingly strict discharge requirements. The demonstration combines advanced pre-treatment technologies, reverse osmosis, membrane distillation, bipolar electrodialysis, and ammonia recovery systems to achieve more than 90% reclaimed water reuse while recovering valuable chemicals including hydrochloric acid, caustic soda and ammonium sulphate.

Biochemical Industry: Recovering Water and Valuable Organic Fractions

The biochemical demonstration, led by Bloom, focuses on wastewater generated during the production of bio-based ingredients and chemical intermediates. By integrating nanofiltration, reverse osmosis and membrane distillation, the system targets 90% water recovery while generating a concentrated organic stream with a recovery potential exceeding 45%, enabling valuable materials to be reused or reintroduced into production processes.

Pulp & Paper Industry: Closing Material and Water Loops

At the Felix Schoeller site in Weißenborn, Germany, the project tackles the challenge of managing large volumes of process water and complex contaminants. The demonstration employs multi-stage membrane filtration and reverse osmosis to reduce fillers and organic substances and recover valuable solutes, facilitating water reuse and low-grade waste heat recovery. The approach supports a closed-loop production model with significant reductions in freshwater demand.

Steel Industry: Enhancing Resource Efficiency

The steel demonstration case, run by project partner Celsa, focuses on maximising water reuse and resource recovery in one of Europe's most water-intensive manufacturing industries. Through advanced treatment technologies such as reverse osmosis, nanofiltration and membrane distillation, the project targets over 90% water reuse, focusing on producing high-quality water suitable for more demanding production processes, thereby reducing freshwater intake and demonstrating the potential for circular resource management within steel production facilities.

Delivering Impact Beyond the Demonstration Sites

The newly released brochures provide stakeholders with detailed insights into the industrial challenges, technology solutions, and expected impacts of each demonstration case, supporting the wider adoption of circular water management practices throughout Europe. You can download the brochures and other project materials free of charge here: <https://r3volution.eu/results/>

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