



The Problem

Urban areas, generating large amounts of waste, need to collaborate closely with nearby industries to reduce CO₂ emissions, improve waste management, and enhance the use of secondary materials. Such cooperation strengthens circularity and supports progress toward a zero-waste, carbon-neutral society.

In this transition, European process industries play a key role by transforming waste and by-products into valuable materials. To enable this systemic shift, the Processes4Planet (P4P) partnership and the EC have created Hubs4Circularity (H4C) - regional platforms connecting local actors and industries to deploy innovative circular economy solutions.

THESEUS Objectives

The Theseus H4C sets forth six strategic objectives to drive systemic transformation in the Attica region and beyond:

- Transforming Attica into Greece's First H4C
- Closing Circular Loops in Resource Management
- Enhancing Water and Energy Circularity
- Digitalizing Circular Economy Processes
- Scaling and Replicating Circularity Models
- Promoting Collaboration and Market Acceptance

Expected impacts

The Theseus H4C initiative will drive resource efficiency, waste reduction, and low-carbon transformation across sectors. By fostering collaboration between industries, municipalities, and communities, it will:

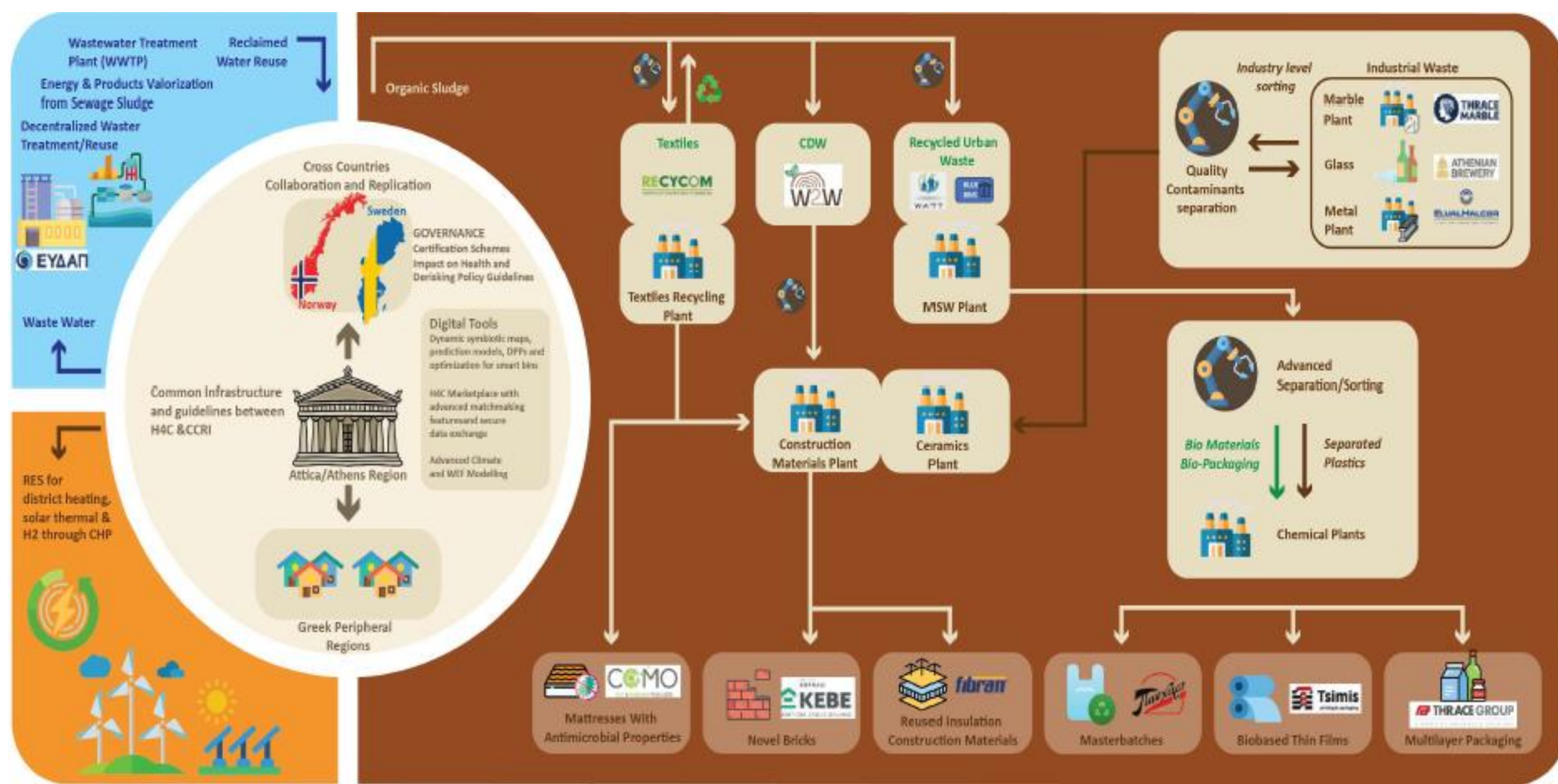
- Reduce reliance on virgin materials and cut textile and construction waste.
- Enable sustainable supply chains in fashion, manufacturing, and construction.
- Promote circular urban development and energy efficiency, lowering carbon emissions and fossil fuel use.
- Support renewable energy integration and symbiotic energy exchanges between regions.
- Expand reclaimed water use in agriculture, cities, and industry, reducing flood risks and wastewater impacts.

Overall, Theseus H4C will deliver replicable frameworks for sustainable resource, energy, and water management, aligned with regional and EU circular economy goals.

The Project

At the core of Theseus H4C is Industrial-Urban Symbiosis (I-US), promoting collaboration between municipalities, regions, and industries to manage resources, waste, energy, water, and infrastructure. This first-of-its-kind initiative in Greece, based in Athens/Attica, aims to establish a national circular economy model aligned with European strategies under the P4P partnership.

Theseus will develop and implement innovative solutions in water, energy, and materials, using digital and robotic technologies to meet regional needs. Its systemic approach combines governance innovations and collaborative frameworks, supporting pilot projects, scaling, and ecosystem growth. By focusing on major material, energy, and water flows, Theseus ensures its solutions are replicable across Europe, contributing to climate neutrality by 2050.



The Approach

The Theseus H4C adopts a systemic, interdisciplinary, and phased approach to establish Greece's first H4C in the Attica region. Integrating technological, digital, and governance innovations, it leverages I-US to enhance circularity in water, energy, and materials.

Key Steps:

- Assess best practices from other H4Cs and map Attica's circular opportunities.
- Develop tailored solutions using advanced sorting, robotics, and digital tools for streams like textiles, glass, and biobased packaging.
- Implement and validate Theseus innovations in real-world settings.
- Apply Material Flow Analysis (MFA) and Life Cycle Assessment (LCA) to replicate and scale solutions to other regions.

By integrating knowledge and tools from existing H4C, CCRI, and I-US initiatives, the methodology ensures the development, validation, and large-scale upscaling of innovative circular solutions across Europe.

The Project Partners



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