



Wood2Wood

Wood-to-Wood Cascade Upcycling Valorisation Approach

Transforming wood waste into valuable
resource for a greener future



Why W2W

The construction and demolition waste (CDW) sector generates 30-40% of global solid waste and consumes 40-50% of global raw materials, straining natural resources. Despite its potential, with over 75% of CDW having residual value, much of it remains untapped, neither reused nor recycled. In Europe, CDW is a significant waste stream, containing 20-30% of materials like wood, making it a key focus in European waste policies.



What is W2W

Wood2Wood, an EU-funded project, transforms contaminated wood waste from construction and demolition (C&D), and furniture sectors into high-value products. To improve circular flow of secondary materials, W2W leverages advanced sorting and separation technologies, digital tools, and supportive policies to create efficient recycling and upcycling processes. This approach fosters sustainable value chains and supports a circular economy.



Key Pillars of W2W

W2W's multi-dimensional cascade valorisation approach consists of four key pillars:

- Advanced Separation and Sorting Technologies
- Upcycling Processes and Technologies
- Digital Tools for Improving Circular Flows of Secondary Materials
- Supportive Framework in Policy, Market and Skills



How does it work

The framework evaluates and optimises wood feedstock processing by assessing existing and new technologies. It assesses available feedstock by conducting Life Cycle Assessments (LCA) and considering factors like supply, demand, and logistics. The aim is to optimise resource recovery and foster industrial symbiosis grounded in circular economy principles.

W2W

Technologies



Advanced Separation and Sorting Technologies

To efficiently separate and sort wood waste, the system uses advanced imaging, robotic grippers, and Human-Robot collaboration. This approach leverages the dexterity of human workers and the endurance of collaborative robots to maximise the value recovered from wood waste.



Upcycling Processes and Technologies

W2W improves resource efficiency and waste reduction through three main themes: cascade refinement, chemical and bioremediation processes, and energy/gas/ashes valorisation. This supports circular economy practices by sustainably processing C&D wood waste, removing additives, and exploring energy and gas recovery when recycling isn't feasible, ensuring high-quality and safe recyclates.



Digital Tools for Improving Circular Flows of Secondary Materials

W2W will develop two main tools: an LCA-based tool to assess wood product reuse options and a Supply Chain Management tool to optimise upcycling. These will be supported by a Digital Product Passport (DPP) providing detailed lifecycle and environmental impact information on wood products.

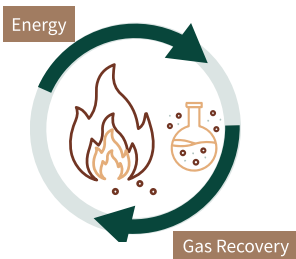
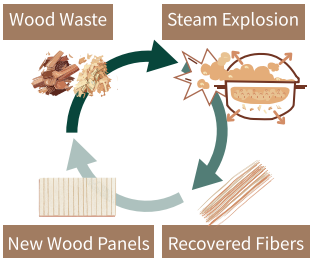
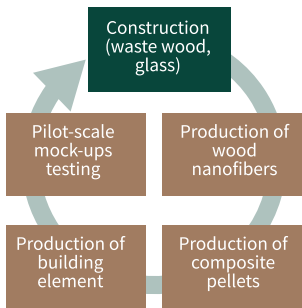


Supportive Framework in Policy, Market and Skills

W2W aims to enhance industry competitiveness and certification by promoting circular and sustainable practices. This involves integrating skills development through social partnerships, aligning training with circular economy hubs, designing collaborative programs, and advancing standardisation.



Use Cases



Three distinct Use Case scenarios will be employed to assess the effectiveness and sustainability of these value chains.

Cascade Refinement Technologies for Wood Waste Upcycling

Use Case 1 will create durable composite building materials from wood waste. By combining lignocellulose fibres with biodegradable PLA, stabilised with anti-hydrolysis agents, this approach aims to increase the use of secondary raw materials by 30% and cut waste and GHG emissions by 20% and 30%, respectively. These composites will be tested for use in facades and wallboards, offering a more sustainable alternative to current methods.

Chemical and Bioremediation Technologies for Wood Waste Upcycling

Use Case 2 will enhance sustainable waste management in the pulp, paper, and chemical sectors by employing innovative chemical and bioremediation techniques. It focuses on removing wood pollutants via steam explosion, detoxifying wastewater, and converting mixed waste into polyols. This approach aims to increase secondary raw material use by 30% and reduce waste and GHG emissions by 30% and 70%, respectively.

Energy & Gas Valorisation Technologies for Contaminated Wood Waste

Use Case 3 will demonstrate the practical potential of recovering energy and gas from construction and demolition waste (CDW) using hydrothermal carbonisation, gasification, and ash valorisation. The process converts syngas, composed of H₂ and CO₂, into valuable long-chain carbon compounds for the detergent industry. This approach aims to increase the use of secondary raw materials by 50%, while reducing waste and GHG emissions by 30% and up to 70%, respectively, compared to current methods.



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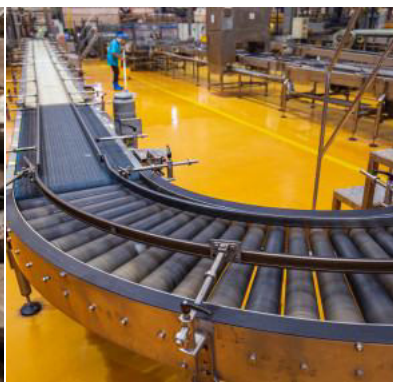
Project Coordinator

Institute of Communication and Computer Systems (ICCS);
Dr. Angelos Amditis- Research & Innovation Director;
E-mail: a.amditis@iccs.gr

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Consortium Partners





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