2nd Press Release Circular-C Project

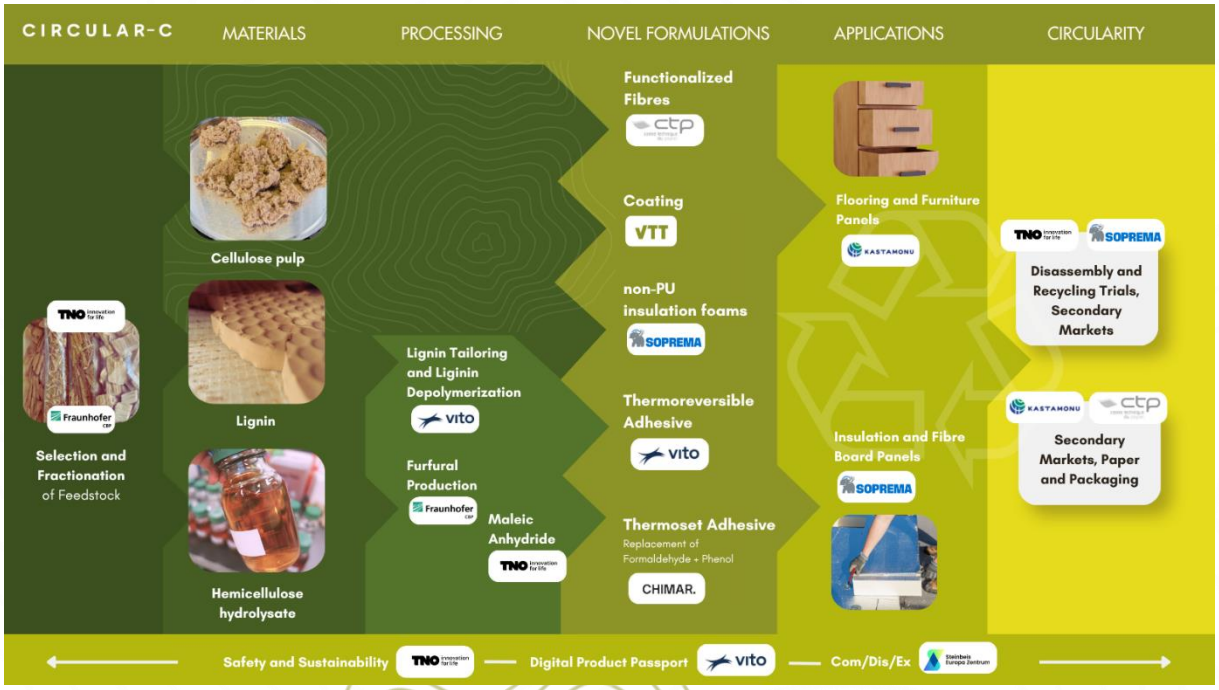
Circular-C Marks First-Year Progress in Developing Biobased Solutions for Circular Construction Materials

Circular-C is a research and innovation project driving the development of a new generation of circular, sustainable and bio-based adhesives, coatings, foams and functionalised fibres for wood and fibre panels. These are intended for use in flooring, furniture and insulation materials. The project is funded by the European Commission under Horizon Europe.

The Steinbeis Europa Zentrum successfully supported the consortium in preparing the application. The evaluation resulted in a score of 15 out of 15. As one of the ten project partners, it is now responsible for communication, dissemination, stakeholder engagement and, together with Soprema, the exploitation of the project results.

On 10 June 2026, the consortium convened online for its Month 13 meeting, marking the successful completion of the project's first year. Partners from seven countries shared progress, discussed challenges and opportunities, and aligned on next steps.

About Circular-C



To develop the Circular-C formulations, sustainable biomass from agricultural and forestry residues is first fractionated into cellulose pulp, hemicellulose hydrolysate, and lignin. Via lignin tailoring (fractionation) and depolymerisation, as well as the production of furfural and maleic anhydride from hemicellulose sugars, high-performance components are created. These building blocks have the potential to replace formaldehyde and phenol in thermoset adhesives, create thermoreversible adhesives and replace fossil-based components in the synthesis of PU foams and fossil-based coatings. The project's goal is to facilitate the recycling of wood and fiber

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boards, thereby reducing pressure on virgin wood in the construction sector. Secondary markets will be explored for the low-quality streams, resulting from recycling wood and fiber boards.

To facilitate recycling and bring transparency to the entire value chain, a digital product passport is introduced. Safety, sustainability and end-of-life assessments accompany the entire process.

First results

Building on its first year, Circular-C has advanced from sustainable feedstock processing to early material development. Beech, birch, wheat straw and miscanthus were fractionated into cellulose pulp, hemicellulose sugars and lignin, providing the basis for biobased resins, coatings, adhesives and foams. Partners progressed lignin tailoring via fractionation and depolymerisation as well as furfural production, routes towards maleic anhydride, while also testing pulp refining and chemical modification methods. First results include lignin-based thermoset adhesives meeting relevant performance standards, thermoreversible adhesive systems with promising reprocessability, self-extinguishing fire-retardant coatings, and antibacterial lignin nanoparticle dispersions. Partners have started on integrating lignin with cyclic carbonate linkers to form crosslinked foam networks, in order to produce non-PU insulation foams.

Building circular value chains and visibility

The consortium has also laid important groundwork for disassembly, recyclability, traceability and stakeholder engagement as well as established synergies with similar initiatives to identify suitable technologies for the mechanical disintegration of panels. While first tests with lower-quality recycled streams indicate potential for paper sheets and moulded cellulose products, including packaging applications, Circular-C also reached a milestone in the development of its Digital Product Passport. In a dedicated stakeholder workshop the basis of the product information system was established. First mock-ups, prototypes and product tag concepts have been generated, while different labelling routes to support future transparency across the supply chain are explored.

Meeting highlight: TNO workshop on sustainability assessment

A highlight of the Month 13 meeting was the workshop conducted by TNO on safe-and-sustainable-by-design (SSD) assessment. The boundaries of the techno-economic assessment, key process assumptions and reference systems for the project's value chains were established, to identify improvement areas early on, including solvent use or critical raw materials. This ensures that sustainability considerations are embedded throughout all developments targeted in Circular-C.

Next steps

In the coming months, the consortium will further optimize the different processes and materials, among others biomass fractionation, material formulations, recycling pathways and product information systems, preparing selected results for larger-scale validation and future exploitation.

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More Information

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