

Project Acronym: Cradle-Alp

Project number: ASP0100003

D.3.1.2

Report on transregional event 8/06/2025

WP n°: 3
Task n°: 3.1
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Dissemination level: <PU = public>
Revision: FINAL
Due Date: 31/10/2025
Date of submission: January 2026

Cradle-ALP – Learnings and recommendations for promoting C2C transformation in the selected industrial sectors- D.3.1.2

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1. Executive Summary

The online transregional event “Moving Alpine SMEs ahead on circularity - Cradle-ALPs instruments and SMEs’ support held on September 8, 2025, served as a comprehensive showcase of the results achieved during by the Pilot Activities of the Cradle Alp project, developed by the Project Partners in the last implementation period. During the session, project partners presented strategic industrial roadmaps, a specialized transformation "toolbox," and concrete success stories from pilot actions involving over 130 companies. The event also addressed the critical role of synchronized funding and policy dialogue in ensuring the long-term sustainability of these transborder collaborations.

The following report aims at presenting the results reached by the Pilot Activities, together with the Transformation maps for each sector involved in the project.

- Polymers/Plastic sector
- Wood/Furniture sector
- Chemistry/Materials sector
- Packaging sector

2. Transformation Roadmaps

The central objective of the transformation roadmaps is to orchestrate a systemic shift within the Alpine region's industrial landscape, moving away from linear "take-make-waste" paradigms toward a fully circular economy by 2035.

The transformation strategy, led by Polymeris, followed a robust transnational process designed to ensure both practical applicability and long-term vision. This involved identifying industry-specific barriers—ranging from technical recycling limitations to regulatory gaps—and establishing a collective vision for 2035. This vision was refined through workshops involving a triple-helix of stakeholders: academia, SMEs, and public institutions, resulting in a tiered implementation strategy encompassing short-term (1-2 years), mid-term (3-5 years), and long-term (6-12 years) actions.

1 - Gap and Barrier Identification: Analyzing current obstacles, such as high investment costs, regulatory hurdles, and fragmented value chains, alongside potential drivers like growing market demand and public funding.

2 - Vision Definition: Establishing long-term sectoral goals based on recommendations from a transnational expert support group.

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3 - Actionable Solutions: Conducting workshops with SMEs, academics, and public institutions to identify specific technological, business, and legal solutions categorized by short-term (1-2 years), mid-term (3-5 years), and long-term (6-12 years) perspectives.

Sector-Specific Transformation Paths

The roadmaps specifically address five industrial sectors that are fundamental to the Alpine economy, each with unique transformation requirements:

- **Plastic-based Composites:** Focuses on advancing "design for disassembly" and enhancing the efficiency of specialized mechanical and chemical recycling technologies.
- **Chemistry and Materials:** Emphasizes the replacement of hazardous "substances of concern" with bio-based, non-toxic alternatives and the development of high-performance circular materials.
- **Packaging (Plastics and Paper):** Aims for full recyclability and compostability across various material types, including complex plastic-paper mixtures and biodegradable solutions.
- **Wood and Furniture:** Concentrates on high-quality furniture and construction elements (like panels and partitions), leveraging the region's natural resources to promote carbon-sequestering, long-life products.

Key Strategic Pillars for Implementation

The roadmaps identify three critical levers essential for achieving the 2035 circularity goals:

1. **Technological Innovation & Infrastructure:** Key priorities include upgrading regional sorting and recycling infrastructures, securing sustainable feedstock for the bioeconomy, and enhancing supply chain transparency through **Digital Product Passports** and shared **Life Cycle Assessment (LCA)** databases.
2. **Economic and Business Evolution:** The strategy calls for the promotion of industry-wide best practices, the documentation of successful circular business model case studies to prove viability, and the synchronization of funding landscapes to support innovative circular ventures.
3. **Policy and Regulatory Harmonization:** Transformation is predicated on strong political support, including the standardization of EU-wide circular regulations, the expansion of **Extended Producer Responsibility (EPR)**, and the introduction of economic incentives such as carbon taxes or tax reductions for products with high recycled content.

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By integrating these technological, economic, and political actions, the Cradle-ALP roadmaps provide a comprehensive blueprint for maintaining industrial competitiveness while adhering to environmental sustainability in the Alpine region.

3. Presentation of the overall local and transregional activities / matching events and showcases from the SMEs assistance

Complementing the strategic roadmaps, the project executed concrete pilot activities to assist 133 SMEs and 96 other organizations across the Alpine region . These actions included:

Methodological Support: Partners applied tools such as the Sustainable Business Model Canvas (SBMC), Maturity Assessments, and Circularity Compasses to guide individual company strategies .

Transnational Matchmaking: Approximately 130 companies participated in online and onsite matchmaking events designed to overcome the geographic isolation of regional actors and facilitate the formation of circular value chains .

Concrete Showcase Success: A primary achievement was the collaboration between a **Bavarian hemp startup (Rotal Hanf)** and an **Austrian furniture pioneer (Grüne Erde)**, which resulted in a business agreement to supply regional hemp fibers for more sustainable mattress production

More in details, for each sector, the following activities have been developed

3.1 Polymers and plastic / Chemistry and material sector

Polymeris, Chemie-Cluster Bayern, and BOKU University organized a successful transnational initiative held on March 20, 2025, which aimed to facilitate collaboration and innovation within the composite recycling sector. Co-organized by Polymeris, Chemie-Cluster Bayern, and BOKU University, the event served as a digital nexus for 56 participants, representing a diverse cross-section of 16 SMEs, 14 business support organizations, and 12 research institutions. The thematic focus revolved around the Cradle-ALP support framework, upcoming European regulatory requirements, and the integration of Safe and Sustainable by Design (SSdB) methodologies into end-of-life composite waste management.

Technical expertise was showcased through specialized pitches from several innovative companies to showcase specialized recycling technologies:

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- **NMB and Extractive:** Presented processes for **carbon fiber recycling**, including solvent-based methods.
- **Polyloop:** Highlighted advancements in general composite materials recycling.
- **Triangular:** Demonstrated an on-demand process platform.

Measurable Outcomes and Successes

The event's impact was quantified by the facilitation of 27 bilateral B2B meetings—over half of which were transnational—effectively bridging geographic divides in the Alpine region. Furthermore, the initiative yielded immediate research outcomes, including a confirmed carbon footprint study and multiple ongoing R&D negotiations. Serving as the foundation for a broader 2025 event series, this session was instrumental in cultivating a digital community of 128 regional stakeholders dedicated to industrial circularity

3.2 Wood and furniture sector

The sector Wood and Furniture was tested by T2i, expert partner of the Padua Chamber of Commerce, which involved 22 companies within the Alpine region's timber industry providing an in-depth analysis of their circular maturity

The study applies individual online interviews to submit the project's **QuickScan questionnaire**, providing a qualitative basis for analyzing strategic priorities. The analysis revealed a sector that is culturally ready for the circular transition, with almost all participants viewing sustainability as a critical factor for future competitiveness in both B2B and B2C markets. However, technical maturity remains highly heterogeneous: while large enterprises have already implemented structured practices like **ESG certifications** and modular design, micro-enterprises often rely on spontaneous, traditional artisanal practices that lack a formal circular framework.

Strategic Directions and Challenges

The wood-furniture sector is strategically pivoting toward several foundational circular business models, emphasizing the integration of eco-design principles, modularity, and enhanced product durability alongside the development of specialized restoration services to extend lifecycles. Furthermore, there is a burgeoning interest in transitioning from traditional product-based sales toward service-centric frameworks, such as leasing, proactive maintenance, and 'Product-as-a-Service' (PaaS) configurations. Despite this high level of strategic ambition, the systemic transition remains constrained by significant operational impediments, including a deficit in structured life cycle management instruments, limited

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digital maturity among micro-enterprises, and a critical requirement for collaborative networking to facilitate industrial symbiosis.

Technical Showcase Successes

Marlegno SrL, which is pioneering smart monitoring and IoT-integrated timber construction, and **Pavanello Serramenti**, which is exploring "Window-as-a-Service" models through modular design and extended producer responsibility.

A major outcome of this work was the development of an **AI-based QuickScan tool**. Recognizing that the original Excel-based format was difficult for SMEs to use autonomously, the project created a ChatGPT-style interface that allows for natural language interaction, making circularity assessments faster, more interactive, and more accessible for small businesses

3.3 Packaging sector

The responsible partner of the packaging sector is the Chamber of Commerce and Industry of Slovenia (CCIS) which focuses on the practical application of the **Sustainable Business Model Canvas (SBMC)** to help startups and small enterprises transition to a circular economy.

The SBMC was selected as a primary tool because its simple, visual nature allows small companies to integrate environmental and social sustainability directly into their core business strategy. Two Slovenian showcases utilized this methodology:

1. CPS Project (Slovenia)

- **Focus:** A startup developing circular packaging for the food and cosmetics industries.
- **Innovation:** Creating recyclable coffee capsules made from non-wood fibers (lignocellulosic biomass).
- **Outcome:** Using the SBMC early in the development phase allowed the company to gain clarity before starting production, define a value proposition compliant with EU regulations, and identify essential regional partners.
- **Key Lesson:** Success depends on the entire business ecosystem, not just the technical recyclability of the material.

2. Zavod Prostori (Slovenia)

- **Focus:** A startup aiming to connect design and sustainability with local communities.

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- **Innovation:** Developing sustainable packaging alternatives by replacing conventional plastics with a hybrid "textile paper".
- **Outcome:** The SBMC helped the company identify potential eco-brand customers and transition from pure creativity to a viable, scalable business model .
- **Key Lesson:** Material innovation must be supported by structured testing for usability and circularity to be market-ready.

Key Learning Conclusions and takeaways

The findings from the packaging sector showcases emphasize that the successful commercialization of sustainable innovation requires a strategy-first approach. It is imperative for enterprises to establish a robust and sustainable business model prior to committing significant capital to laboratory testing or industrial production, thereby ensuring a definitive pathway to market viability. Furthermore, the transition from material innovation to market adoption necessitates a holistic integration of customer demand, logistical feasibility, and stringent regulatory compliance, rather than a narrow focus on the technical novelty of the material itself. Ultimately, a structured business framework serves as a critical indicator of maturity, signaling to potential investors and stakeholders that technical advancements are underpinned by a circular, fiscally sound, and strategically aligned commercial foundation.

4 Funding opportunities to strengthen SME's circularity processes

Some useful tips and recommendation to help SMEs accessing to funding opportunities for their circular process

Core Strategy: Transregional Cooperation

While regional and national funding exists, individual regions often lack the "critical mass" needed for systemic industrial change. Transregional cooperation bridges these gaps by facilitating knowledge exchange, gaining external know-how, and strengthening regional innovation ecosystems.

Synchronized Funding Model

A key feature of the Cradle-ALP approach is **synchronized funding**, which aims to facilitate cross-border projects without creating new bureaucracy. The model operates under three "No's":

- **No new funding programs** need to be established.
- **No new legal frameworks** are required.
- **No cross-regional transfer of funds** occurs; money stays within its originating region.

The "AlpsConnect 2.0" Framework

Building on previous Interreg projects (ARDIA-Net and INNOBIOVC), t

1. **Cooperation Between Single Projects:** Linking existing projects in different regions for knowledge sharing.
2. **Cross-Regional Cooperation Projects:** Identifying regional/national programs that allow foreign partners to join a consortium (though typically without being funded by the foreign region).
3. **Joint Synchronized Calls:** The highest level of coordination, where regions align strategic priorities and call timelines top-down.

Current Results and Success Stories

- **Comparative Maps:** The project produced a comprehensive "snapshot" of existing regional and national funds specifically for the chemistry, packaging, polymers, wood, and textile sectors.

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- **Swiss Coordinated Call:** A brand-new success was announced involving four Swiss Universities of Applied Sciences (Fribourg, Management, Social Work, and Nursing) . This synchronized call for R&D in sustainable transformation launched on September 9, 2025, and encourages consortia to seek international impact through the Cradle-ALP network.