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Alpine Space

Cradle-ALP

**Project Acronym: Cradle-Alp**

**Project number: ASP0100003**

# D.1.2.3

# Transnational ecosystem Cradle2Cradle maturity report

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| WP n°: | **1** |
| Task n°: | **A1.3** |
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## Executive Summary

The transnational ecosystem Cradle2Cradle maturity report concludes a set of activities aiming at analyzing the relevance and acceptance of the Cradle2Cradle paradigm in each of the project region and on the partnership level:

- A regional ecosystem maturity analysis, performed in each project region,
- A transnational survey on the consumers' perspective on Cradle2Cradle in the Alpine Space,
- A transnational comparison/ benchmarking in the dimensions policies/ business support, technologies and business models.

In order to ensure a high relevance of the regional ecosystem maturity analysis for a successful implementation of the Cradle-ALP activities, the partners decided to focus the analysis on the industrial sectors to be addressed in the roadmaps to Cradle2Cradle transformation. Those sectors are: polymers/ plastics, wood/ furniture, chemistry/ materials, fibres/ textiles, packaging.

The results of the analysis shall provide the basis for the development of sectoral Cradle2Cradle industrial transformation roadmaps in the five selected sectors (WP2), thus ensuring a smooth transition between WP1 - Capacity building for Cradle2Cradle transformation and WP2 - Roadmaps to Cradle2Cradle transformation.

The results of the analysis show that the concept of circular economy is quite strongly taken up in the relevant national and regional policies. There are also business support measures in place in different forms: clusters, model regions, forums, innovation platforms, etc., which testify a good level of maturity with respect to green transformation and the circular economy.

The transformation towards a circular economy is also eligible in different funding schemes in the project regions. Some of those schemes specifically address the circular economy or resource efficiency, whereas others are broader and tackle circular economy under the umbrella of innovation projects. Strong technology providers in general on topics related to sustainability are present in all project regions, as well as relevant industrial networks. Consequently, the project regions provide a reasonably mature policy and business environment in terms of awareness of the circular economy and cradle-to-cradle models.

However, there are very no specific legal incentives in place which would go beyond waste management and basic recycling aspects. Similarly, the consumer survey performed in the project regions showed that respondents are generally not familiar with the concept of circular economy, and even less with cradle-to-cradle. Notably, individuals in Italy appear to be slightly more acquainted with this system and model compared to respondents in other countries.

A closer look at the specific gaps and barriers identified in the five selected industrial sectors to be addressed more specifically by the project - polymers/ plastics, wood/ furniture, chemistry/ materials, fibres/ textiles, packaging – shows that there are significant real and perceived barriers for a faster transformation towards a more circular economy and more specifically a stronger adoption of cradle-to-cradle approaches. The most common gaps and barriers across sectors are:

- Lack of suitable alternatives (in terms of raw materials) to fossil-based materials,

respectively higher price for alternative materials.

- Lack of strong legal requirements, respectively the uncertainty about existing and upcoming legal requirements
- Lack of acceptance by customers
- Complexity of products, which makes substitution of materials a complex issue along value chains.
- Lack of awareness along the participants of value chains.
- Difficulty of organizing collection and sorting of materials, especially when products are made of a mix of different materials.

On the other hand, some common drivers and potentials across sectors were also identified:

- The legal incentives from the extended producer responsibility and the digital product passport are expected to foster circular developments over time in all sectors.
- R&D activities will provide increasingly new opportunities for fossil-based material substitution.
- Waste separation and recycling processes are improving.
- Economic Incentives (for instance tax incentives) might boost new developments.
- Public awareness and demand are expected to increase.
- Digital technologies can support the emergence of new circular business models.

Building on the learnings form their respective regional analysis and the transnational comparison of their ecosystems, the Cradle-ALP partners have worked out a common basis for moving towards the development of industrial transformation roadmaps.

## Contents

# 1. Introduction to the Cradle-Alp project

Cradle-ALP aims for mainstreaming cradle to cradle (C2C) approaches, circular design and circular substitutions (from the alpine region) for linear products in industrial processes, in different industrial sectors. The Alpine Space has many natural resources and the technologies to substitute fossil raw materials and toxic substances from production with circular and environmentally friendly alternatives. This should lead to the fact that materials and products can be led back into a healthy cycle after use. The focus of this project shall be on the substitution of chemical and fossil based/ unsustainable materials with more circular, sustainable and bio-degradable ones.

First, the partners will build a broad awareness and understanding in the public, the relevant industries as well as among stakeholders from policy and innovation intermediaries, for the opportunities, barriers and mechanisms of the transformation of industrial products towards higher circularity by means of C2C approaches, circular design and circular substitutions. Business support providers shall be trained to accompany the transformation of businesses along more circular value chains.

In a second step, the partners will explore in details and test opportunities for implementing C2C approaches, circular design and circular substitutions along specific value chains in the chemistry/plastics and wood/forestry sectors supported by digital technologies. Building on a thorough multidimensional (technology, policy, economy, etc.) roadmapping exercise, transnational groupings of stakeholders – including businesses – will be installed, with the aim to transfer the C2C roadmaps into industrial practice along exemplary value chains.

Finally, the partners will work towards ensuring a transnational policy convergence towards transnational S4 strategies in the priority sectors of the project and initiate common cross border funding instruments for the industrial C2C transformation.

# 2. Objective and scope of the transnational ecosystem Cradle2Cradle maturity report

The transnational ecosystem Cradle2Cradle maturity report concludes a set of activities aiming at analyzing the relevance and acceptance of the Cradle2Cradle paradigm in each of the project region and on the partnership level:

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**The results of the analysis shall provide the basis for the development of sectoral**

**Cradle2Cradle industrial transformation roadmaps in the five selected sectors (WP2), thus ensuring a smooth transition between WP1 - Capacity building for Cradle2Cradle transformation and WP2 - Roadmaps to Cradle2Cradle transformation.**

*Remark: this practical approach represents a deviation from the Application Form, where the analysis was described as more generic and meant to provide input for capacity building activities to performed in WP1.*

**Scope of the regional analysis in the Cradle-ALP project**

The analysis integrates status quo, gaps and barriers, potentials for transformation, as well as good practices and failures to learn from within the triangle policies/ business support, technologies/ knowledge, and business models/ practices.

It has been performed through a combination of desktop research, building on the knowledge already available among project partners and the previously performed identification of good practices, and interviews/ workshops with regional experts and representatives of companies.

- **Status quo and good practices analysis**

The scope of the status quo and good practices/ failures analysis in the dimensions policies/ business support, technologies/ knowledge, and business models/ practices was aligned with the topics identified as a result of the identification of good practices and lessons learned (D.1.1.2) and the capitalisation workshops (D.1.1.3).

The following table shows the scope of the status quo analysis for the transnational ecosystem maturity analysis:

| Policies and business support | Technologies | Business models and practices |
|---|---|---|
| ▪ Regional strategies/ policies fostering circular economy and more specifically C2C principles (fully closed loops).<br>▪ European and national/ regional strategic documents (e.g. technology roadmaps).<br>▪ Funding schemes<br>▪ Further business support measures | ▪ Significant technology and knowledge providers (Higher education and research organisations, technical centers, pilot infrastructures, innovation platforms, etc.) located in the project regions | ▪ Role model companies<br>▪ Relevant industrial clusters and industrial networks |

The partners performed a mapping for each project region according to the items listed here above.

- **Gaps and barriers – potentials for transformation**

At project level, the identification of gaps and barriers for a better uptake of the cradle to cradle principles in industrial practices, as well as the identification of potentials or opportunities for such a transformation is a core result of the transnational comparison/ benchmarking in the dimensions policies/ business support, technologies and business models.

The partners collected input for the transformation ecosystem analysis by collecting such gaps and barriers as well as potentials for transformation at the regional level. This was done through a series of direct interaction with regional experts and representatives of companies, either in bilateral discussions (interviews) or in the context of event, such as workshops, group discussions and fairs. The partners in each region organized those activities according to their local context. For example, industrial fairs could be used to interview several companies on the same day, cluster board meetings or awareness could be used to have a group discussion with the participants.

**Scope of the transnational survey on the consumers' perspective on Cradle2Cradle in the Alpine Space**

The international consumer survey, products of the circular economy, was mainly carried out by the University of Natural Resources and Life Sciences, Vienna and is funded within the framework of an Interreg project, Cradle-ALP. The focus of the survey is circular economy and it was carried out in Austria, France, Germany, Italy, Slovenia or Switzerland. It got translated into four languages and in total there were 3,763 participants. With the help of this survey, the awareness of consumers about circular economy and more specifically cradle-to- cradle as well as the preferences of the population regarding alternative business models were recorded.

**Scope of the transnational analysis in the Cradle-ALP project**

Building on the results of the regional analysis, a transnational workshop took place during the partner meeting in Linz, on 23 October 2023, focusing on **the identification of gaps and barriers as well as potentials for transformation in each of the five thematic sectors polymers/ plastics, wood/ furniture, chemistry/ materials, fibres/ textiles, packaging**. The results were compiled and integrated to the present deliverable, together with a compilation of the information coming for the different regional ecosystem maturity analysis reports.

The following regional reports were taken into consideration:

| Region | Partners |
|---|---|
| Veneto ((Italy) | LP CCIAA Padova, PP6 UniSMART |
| Baden-Wurttemberg (Germany) | PP2 TZ Horb |
| Bavaria (Germany) | PP3 CCB |
| Upper Austria (Austria) | PP4 BOKU, PP5 Biz up |
| Slovenia | PP7 CCIS |
| Auvergne-Rhone-Alpes (France) | PP8 POL |
| Fribourg (Switzerland) | PP9 HEIA-FR |

# 3. Overall Cradle2Cradle maturity in the project regions

This chapter provides an overview of the C2C maturity in the project regions on regional and national level in the dimensions policies and business support // technologies and knowledge // business models and practices, including the results of the transnational survey.

For almost every topic, the partners also listed strategies, policies, programs, etc. on EU level, which are not included in this report.

## Summary of the findings

The concept of circular economy is quite strongly taken up in the relevant national and regional policies. There are also business support measures in place in different forms: clusters, model regions, forums, innovation platforms, etc., which testify a good level of maturity with respect to green transformation and the circular economy.

The transformation towards a circular economy is also eligible in different funding schemes in the project regions. Some of those schemes specifically address the circular economy or resource efficiency, whereas others are broader and tackle circular economy under the umbrella of innovation projects. Strong technology providers in general on topics related to sustainability are present in all project regions, as well as relevant industrial networks. Consequently, the project regions provide a reasonably mature policy and business environment in terms of awareness of the circular economy and cradle-to-cradle models.

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## Policies and business support measures, including funding schemes

### Policies

The following relevant national/ regional policies were identified by the partners:

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| **Innonet Kunststoff (TZ Horb)**<br>**&**<br>**Chemie Cluster Bayern** | **National**<br>Regarding CE, in the region of Baden-Württemberg and Bayern most of the legislation is adopted from the national legislation such as basic waste legislation and waste management requirements. In addition, individual EU directives, such as the Packaging Directive or the Single-Use Plastics Directive are implemented via national law, e.g., for packaging in the Packaging Act (VerpackG) since 2019 or Chemikaliengesetz (ChemG) on chemical substances.<br>▪ Circular Economy Act _ *Kreislaufwirtschaftsgesetz KrWG*, 2012/2023 (Link & BMJ)<br>▪ Waste Shipment Act _ *Abfallverbringungsgesetz AbfVerbrG*, 2023 (Link)<br>▪ Electrical and Electronic Equipment Act _ *Elektro- und* |

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| | *Elektronikgerätegesetz ElektroG* 2015/2023 (Link)<br>▪ Substitute Building Materials Ordinance _ *Ersatzbaustoffverordnung ErsatzbaustoffV* 2021 / 2023 (Link)<br>▪ *Umwelt- und Klimapakt*, 2020 (Link)<br>▪ *Batteriegesetz BattG* 2009 / 2020 (Link)<br>▪ *Altholzverordnung AltholzV* 2002/2020 (Link)<br>▪ Environmental Impact Assessment Act _ *Gesetz über die Umweltverträglichkeitsprüfung UVPG* 2010/2023 (Link) |
| **Innonet Kunststoff (TZ Horb)** | **Regional**<br>▪ State Recycling Management _ *Landes-Kreislaufwirtschaftsgesetz LkreiWiG* 2020 (Link)<br>▪ Climate Protection and Climate Change Adaptation Act _ *Klimaschutz- und Klimawandelanpassungsgesetz Baden-Württemberg*, Feb. 2023 (Link) |
| **Chemie Cluster Bayern** | **Regional**<br>▪ Bavarian Waste Management Act _ *Abfallwirtschaftsgesetz BayAbfG*, 2021 (Link)<br>▪ Bavarian Waste Management Plan _ *Abfallwirtschaftsplan Bayern AbfPV*, 2015 (Link)<br>▪ Bavarian Waste Responsibility Ordinance _ *Abfallzuständigkeitsverordnung AbfZustV*, 2022 (Link) |
| **Business Upper Austria** | **National**<br>▪ Austrian Circular Economy Strategy, Dec. 2022 (Link)<br>▪ Austrian Bioeconomy Strategy, 2019 (Link)<br>▪ Austrian Bioeconomy Action Plan, 2022 (Link)<br>**Regional**<br>▪ #upperVISION2030 _ oö. Wirtschafts- und Forschungsstrategie (Link)<br>○ *Additional plans*<br>○ Upper Austrian Climate and Energy Strategy<br>○ Upper Austrian Waste Management Plan 2017<br>○ Upper Austrian Pesticide Strategy 2023 |
| **Veneto Region** | ▪ Decree no. 257/2012 and n. 1610/2016 of MIUR _ 12 National Technology Clusters (CTN)<br>▪ D.Lgs. 152/2006 e s.m.i., Testo Unico Ambientale (TUA) |
| **CCIS/ Slovenia** | ▪ Environmental Protection Law _ Zakon o varstvu okolja (Link)<br>▪ Waste regulation _ Uredba o odpadkih (Link) |
| **Polymeris** | **National/ regional**<br>▪ Water-Air-Soil Strategy, 2020 (Link) _ For Auvergne-Rhône-Alpes region, the strategy has set objectives to 2040.<br>▪ **State-Region Plan Contract 2021-2027,** which aim to finance projects for the development of the region Auvergne-Rhône-Alpes. |
| **HEIA-FR** | **National**<br>▪ Switzerland does not have yet a dedicated national CE legal framework; |

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| | ordinance on the avoidance and the disposal of waste based on the Environmental Protection Act (*Umweltschutzgesetz*, USG) is considered as a political framework.<br>▪ Parliamentary initiative 20.433 to strengthen the CE (Link)<br>▪ Ordinance on climate disclosures (corporate sustainability reporting directive) which will come in force on 1 January 2024 (Link).<br>▪ Ordinance of beverage packaging target the recycling (Link).<br>▪ 2030 sustainable development strategy targets (Link).<br>▪ ISO 14021: definition of recyclable |

**CE and C2C in national/ regional strategies**

On a generic level, relevant strategic documents on topics related with CE and C2C were identified by the partners, both from national and regional public institutions
(the documents will mostly be only mentioned in English):

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| **Innonet Kunststoff (TZ Horb)**<br>**&**<br>**Chemie Cluster Bayern** | **National**<br>▪ National Circular Economy Strategy – NKWS, 2023 (Link)<br>▪ National Raw Materials Strategy, 2019 (Link)<br>▪ National Strategy for Food Waste Reduction, 2019 (Link)<br>▪ German Resource Efficiency Program – ProgRess, 2020-2023, 2020 (Link)<br>▪ National Bioeconomy Strategy, 2020 (Link)<br>▪ National Biomass Strategy – NABIS, 2022 (Link)<br>▪ German Circular Economy Roadmap, 2021 (Link)<br>▪ National Sustainability Strategy, 2021 (Link)<br>▪ Bioeconomy in Germany, 2022 (Link)<br>▪ National Waste Prevention Programme, 2020 (Link)<br>▪ National Strategy for Food Waste Reduction, 2019 (Link)<br>▪ National Research and Innovation Strategy, 2023 (Link)<br>All national strategies listed above have - in both **REGIONS** - an influence on the activities to establish a CE. |
| **Innonet Kunststoff (TZ Horb)** | **Regional**<br>▪ Innovation Strategy Baden-Württemberg, 2020 (Link)<br>▪ State Strategy for a Sustainable Bioeconomy Baden-Württemberg _ Landesstrategie Nachhaltige Bioökonomie BW, 2019 (Link)<br>▪ Nachhaltigkeitsstrategie Baden-Württemberg, 2007 (realigned by the green-red state government) (Link)<br>▪ Landesstrategie Ressourceneffizienz (Link)<br>▪ Regional Strategy Northern Black Forest (Link) |
| **Chemie Cluster Bayern** | **Regional**<br>▪ Bavarian Bioeconomy Strategy 'FUTURE.BIOECONOMY. BAVARIA.', 2020 (Link)<br>▪ Bavarian Innovation Strategy, Innovationsland.Bayern 2021-2027', 2019 (Link)<br>▪ Bavarian Resource Strategy, 2018 (Link) |

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| | ▪ Bavarian Sustainability Strategy, 2022 (Link) |
| **Business Upper Austria** | **National**<br>▪ Austrian Circular Economy Strategy, 2022 (Link)<br>▪ Bioeconomy Strategy for Austria (Link)<br>▪ Technology Roadmap: Sustainable Plastics Solutions (Link)<br>**Regional**<br>▪ Future Plan Burgenland (Link)<br>▪ Burgenland 2050 Climate & Energy Strategy (Link)<br>▪ Guide Annex Climate and Energy Model Region (Link)<br>▪ Smart City Vienna Framework Strategy 2019-2050 (Link)<br>▪ Vienna 2030 - Economy & Innovation Strategy (Link)<br>▪ Climate and Energy Strategy Styria 2030 (Link) |
| **Veneto Region** | **Regional**<br>▪ Strategia Regionale per lo Sviluppo Sostenibile, 2020 (Link)<br>▪ Il Veneto verso il 2030 (Link)<br>▪ BUR n. 34 (10.03.2023) - Memorandum of understanding for the definition of operational proposals for implementation of the CE in the construction, 2023 (Link) |
| **CCIS/ Slovenia** | **National**<br>▪ Slovenian Smart Specialization Strategy S4 (Link)<br>▪ Roadmap towards the Circular Economy in Slovenia (Link)<br>▪ Slovenian Industrial Strategy 2021-2030 (Link) |
| **Polymeris** | **National**<br>▪ Circular Economy Roadmap, 2019 (Link) |
| **HEIA-FR** | **National**<br>▪ Circularity Gap Report for Switzerland, 2023 (Link)<br>**Regional**<br>▪ Cantonal Sustainable Development Strategy 2021-2031, Fribourg (Link)<br>▪ Circular Strategy in Zurich and other Switzerland' Cantons |

## Funding schemes and further business support measures

A variety of different **funding schemes** at national, federal and regional level addressing CE are available.

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| **Innonet Kunststoff (TZ Horb)**<br>**&**<br>**Chemie Cluster** | **National**<br>▪ innovative SME/ funding area resource efficiency and climate protection _ *KMU-innovativ/ Ressourceneffizienz und Klimaschutz*/ (Link)<br>▪ Fona³ - Framework Program Research for Sustainability _ *Rahmenprogramm Forschung für Nachhaltige Entwicklungen* (Link)<br>▪ Call for funding Resource Efficiency and Circular Economy _ *Förderaufruf* |

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| **Bayern** | *Ressourceneffizienz und Circular Economy* (Link)<br>▪ Deutsche Bundesstiftung Umwelt: Thematic and open project funding (Link)<br>▪ FNR: Funding program Renewable Raw Materials _ *Fachagentur Nachwachsende Rohstoffe: Förderprogramm Nachwachsende Rohstoffe*: project funding (Link) |
| **Innonet Kunststoff (TZ Horb)** | **Regional**<br>▪ InnoGrowth BW, 2023 (Link)<br>▪ Invest BW (Link)<br>*Three Innovation Vouchers* (Link): *Innovation Voucher BW* (max. grant of 7,500 euros at a funding rate of 50%) for scientific activities; *Innovation Voucher Hightech BW* (max. 20,000 euros grant at a funding rate of 50%) for SMEs for scientific activities in the preliminary stages; *Innovation Voucher Start-up BW* (max. 20,000 euros grant at a funding rate of 50%) for start-ups up to a maximum of five years after foundation |
| **Chemie Cluster Bayern** | **Regional**<br>▪ Innovation Voucher Bavaria _ *Innovationsgutschein Bayern* (Link)<br>▪ Regional funding _ *Regionalförderung* (Link)<br>▪ BayTP+ - Bavarian Technology Promotion Program plus _ *Bayerisches Technologieförderungs-Programm Plus* (Link)<br>▪ BayVFP - Bavarian Collaborative Research Program _ *Bayerisches Verbundforschungsprogramm* (Link) |
| **Business Upper Austria** | **National**<br>▪ Austrian Research Promotion Agency (FFG) (Link)<br>▪ Austria Wirtschaftsservice (AWS) (Link)<br>▪ Promotion of waste prevention (Link)<br>▪ FTI Initiative Circular Economy (Link)<br>▪ KEM Bioeconomy and Circular Economy (Link)<br>▪ Production of the future (Link)<br>▪ Austrian Repair Bonus (Link)<br>**Regional**<br>▪ Easy2innovate (Link)<br>▪ Programme to stimulate the first-time cooperation of Upper Austrian companies with an R&D institution (Link)<br>▪ Expanding Horizon Europe (Link)<br>▪ Regional Calls - #upperVISION2030 (Link)<br>▪ ÖKO PLUS (Link) |
| **Veneto Region** | ▪ Regional Funds and PNRR (Next generation EU)<br>▪ Funding schemes of Chambers of commerce |
| **CCIS/ Slovenia** | ▪ SPIRIT Slovenia, Public Agency for Investment, Entrepreneurship and Internationalization: Public call - Support for start-ups, micro, small and medium-sized enterprises in strategically sustainable and circular business transformation in 2022-2025 (Link) |

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| | ▪ SRIP – Circular Economy: Annually, they publish tenders for the financing of selected circular investments (Link) |
| **Polymeris** | *No funding schemes identified* |
| **HEIA-FR** | **National**<br>▪ The programs of the Federal Office for Territorial Development (Link) support projects that meet the UN's sustainable development goals.<br>▪ Swiss National Science Foundation (SNSF) (Link)<br>▪ Swiss innovation agency (Innosuisse) (Link)<br>**Regional**<br>▪ Novel Regional Policy (NRP) of the canton of Fribourg (Link)<br>▪ HES-SO Ra&D Funds (Link)<br>▪ Zewil startup Accelerator funding program (Link)<br>▪ Minerva Stiftung Foundation (Link)<br>▪ Mava foundation (Link) |

**Relevant business support measures**

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| **Innonet Kunststoff (TZ Horb)** | ▪ *RegioClusterAgentur Baden-Württemberg* _ RegioClusterAgency Baden-Württemberg (Link)<br>▪ Startup BW – THE Start-up LÄND (Link) |
| **Chemie Cluster Bayern** | ▪ Cluster Initiative Bavaria, 2006 (Link)<br>▪ BayPat (Link)<br>▪ planB Gründerwettbewerb, 2014 (Link)<br>▪ BayStartUP (Link)<br>▪ BayFOR (Link)<br>▪ Bayern Innovativ (Link)<br>▪ Invest in Bavaria (Link)<br>▪ Circular Republic (Link) |
| **Business Upper Austria** | **National**<br>▪ Circular Economy Forum Austria (Link)<br>▪ Bioeconomy Austria (Link)<br>**Regional**<br>▪ TIM – Technology and Innovation Management (Link)<br>▪ The Circular Region OÖ initiative in Upper Austria (Link)<br>▪ Business Upper Austrian (Link) is the Upper Austrian government's location agency<br>▪ GRAND GARAGE (Link) – Innovation factory and open to all companies<br>▪ Model Region Bioeconomy and Circular Economy "Steirisches Vulkanland" (Link)<br>▪ Platform for Green Transformation & Bioeconomy (Link)<br>▪ Austrian Institute of Technology – AIT (Link) |

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| | ▪ Glacier (Link)<br>▪ Circular Futures (Link)<br>▪ Circular Economy Forum Austria – CEFA (Link)<br>▪ Circularity in the Climate Lab (Link)<br>▪ ÖGUT (Link) |
| **Veneto Region** | ▪ PID (Digital Enterprise Point - Chambers of Commerce)<br>▪ Digital platform for the exchange of by-products (Link) |
| **CCIS/ Slovenia** | ▪ **Chamber of Commerce and Industry _** it offers their members consultations and workshops on CE and green transition. It also offers a participation in different European or national projects with an aim of helping them to implement green transition. E.g.: CIRCI (Norwaygrants) (Link); CIRCOTRONIC (Interreg CE) (Link)<br>▪ SPIRIT Slovenia, Public Agency for Investment, Entrepreneurship and Internationalization (Link)<br>▪ ECO sklad (Eco Fund, Slovenian Environmental Public Fund) (Link) |
| **Polymeris** | **National**<br>▪ ADEME (Agence de l'Environnement et de la Maîtrise de l'Energie) (Link)<br>▪ ACTIF (Link) |
| **HEIA-FR** | ▪ Circular Economy Transition (Link)<br>▪ Zero Waste Innovation Lab (Link)<br>▪ Swiss Recycle Platform (Link)<br>▪ La fabrique circulaire (Link)<br>▪ Zero carbon academy (Link)<br>▪ Go for impact (Link)<br>▪ Sanu Durabilitas (Link)<br>▪ CE123: Toolbox for the promotion of CE in companies (Link)<br>▪ EPEA Switzerland (Link) |

## Technology and knowledge providers

For the further development of a CE R&D organisations, technology and knowledge providers are important stakeholders to drive the development of novel and innovative processes and technologies. Next to universities and non-academic research organisations, this includes technical centers, pilot infrastructures, innovation platforms too.

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| **Innonet Kunststoff (TZ Horb)** | The following relevant technology and knowledge providers were identified in BW. Considering the size of the region, the selection was limited to actors close a sufficient and known readiness for cooperation with TZ Horb<br>▪ Pforzheim University – the Institute for Industrial Ecology INEC, 2010 (Link)<br>▪ IZWW - Innovation Center for Science and Economy Northern Black Forest (Link) |
| **Chemie Cluster Bayern** | The following list will give an overview on the organisations most active in circular and bioeconomy:<br>▪ Ressourceneffizienz-Zentrum Bayern (REZ) - Center for Resource |

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| | Efficiency Bavaria, 2016 (Link)<br>▪ Bifa Umweltinstitut GmbH, Augsburg (Link)<br>▪ University of Augsburg, Resource Lab (Link)<br>▪ Technische Hochschule Deggendorf, Research Focus ‚Sustainable Materials' (Link) |
| **Business Upper Austria** | ▪ Johannes Kepler Universität Linz – The Institute for Integrated Quality Design (IQD), 2015 (Link)<br>▪ FH Oberösterreich - University of Applied Sciences Upper Austria_ Faculty of Engineering and Applied Sciences (Link)<br>▪ Höhere technische Bundeslehranstalt Wels - HTBLA Wels (Link)<br>▪ Woodkplus (Link)<br>▪ FTI projects and COMET competence centers (Link)<br>▪ ARA Circular Economy Barometer (Link) |
| **Veneto Region** | No organisation mentioned |
| **CCIS/ Slovenia** | ▪ 3ZEN d.o.o. (Link)<br>▪ MOVECO platform (Link)<br>▪ CIRCI (Link)<br>▪ Circular Change platform (Link) |
| **Polymeris** | *No one identified* |
| **HEIA-FR** | **National**<br>▪ Research Program sustainable Economy: resource-friendly, future-oriented innovative NPR 73 (Link)<br>▪ University of St. Gallen - Laboratory for Applied Circular Economy (LACE) (Link)<br>▪ Swiss Federal Institute of Technology (EPFL) (Link) _ (TECH4IMPACT (Link); Advanced Studies in Circular Value Networks (Link)<br>▪ EMPA (Link) the Swiss Federal Laboratories for Materials Science and Technology<br>▪ ZHAW - Institute of Product Development and Production Technologies IPP (Link) (Center for International Industrial Solutions; Institute of sustainable development, institute of natural resource sciences and center for product and process development, LCA research group; Master in Circular Economy)<br>▪ HES-SO - University of Applied Sciences and Arts Western Switzerland) (Link)<br>▪ HEIA-FR develops several collaborative projects with industrial partners towards circularity goals within our institutes Biofactory Competence Center (BCC) (Link)<br>▪ HEG-FR proposes a certificate of advanced Studies CE towards circular business models and transition to a linear to circular value chain (Link)<br>▪ Innovation Booster Applied Circular Sustainability, 2021 to 2024 (Link) |

## Business models and practices

### Role model companies

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| **Innonet Kunststoff (TZ Horb)** | No organisation mentioned |
| **Chemie Cluster Bayern** | No organisation mentioned |
| **Business Upper Austria** | ▪ Brantner (Link) _ With more than 2,700 employees the Brantner Group is one of the most successful national and international waste management and logistics companies. |
| **Veneto Region** | ▪ Galileo Visionary District (Link) _ innovation company managing SID - Italian Design School, competence center for eco-design. |
| **CCIS/ Slovenia** | *No one identified* |
| **Polymeris** | *No one identified* |
| **HEIA-FR** | ▪ Metawaste – Genius (Link) _ the first Digital waste management platform launched in Fribourg in 2022. |

### Relevant industrial groupings and networks

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|---|---|
| **Innonet Kunststoff (TZ Horb)** | **Regional**<br>▪ RegioClusterAgency Baden-Württemberg _ RegioClusterAgentur Baden-Württemberg (Link) |
| **Chemie Cluster Bayern** | **Regional**<br>▪ Bavarian Expert Council for Bioeconomy _ Sachverständigenrat Bioökonomie Bayern, 2015 (Link)<br>▪ CirculaTUM - TUM Mission Network Circular Economy (Link)<br>▪ Fraunhofer Circonomy Hub (Link) |
| **Business Upper Austria** | **National**<br>▪ Reuse Austria (Link)<br>▪ Industry 4.0 Austria (Link)<br>**Regional**<br>▪ Stakeholders of the sustainable plastics solutions (Link)<br>▪ Plastic Cluster Business Upper Austria (Link)<br>▪ Circular Region Upper Austria (Link) |
| **Veneto Region** | **Regional**<br>▪ Veneto Green Cluster Regional Innovative Network (Link) |

| | |
|---|---|
| **CCIS/ Slovenia** | **National**<br>▪ Strategic Research and Innovation Partnership – Networks for the transition into circular economy - SRIP Circular Economy (Link)<br>▪ Strategic Research and Innovation Partnership MATerials as end PROducts - SRIP MATPRO (Link) |
| **Polymeris** | **Regional**<br>▪ ÉCONOMIE CIRCULAIRE EN AUVERGNE-RHÔNE-ALPES - ÉCLAIRA (Link) |
| **HEIA-FR** | No organisation mentioned |

## Consumer perspective

The University of Natural Resources and Life Sciences created a consumer survey based on six scenarios on alternative business models for circular economy. This research aimed to capture the wishes and preferences of the population concerning these alternative approaches. Furthermore, it got translated into four languages, German, French, Italian, Slovenian and engaged participants from six different countries, Austria, France, Germany, Italy, Slovenia and Switzerland. Through a cooperation with a panel provider, there were quotas for age and gender, resulting in the participation of 670 individuals from Austria, 621 from France, 644 from Germany, 583 from Italy, 669 from Slovenia as well as 576 from Switzerland.

Three scenarios presented business models where individuals purchase a product and the other three presented models, where participants rent a product. The focus was on using a new business model, which aimed at saving raw materials. After buying or renting the product, individuals have the option to return it when it's no longer needed and receive a partial refund based on the condition of the product. This approach promotes the reuse of entire products, individual parts, or the material, contributing to the closure of the resource cycle. The products mentioned in the texts were a cabinet, a storage tin for leftover food and a jacket. After reading one of these texts, the participants were asked to share their preferences and answer questions on various topics and always to refer to the scenario which was described before. These topics included intention to use, perceived usefulness, perceived ease of use, perceived ownership, value for money, benefit convenience, performance risk, psychological risk, social risk, experience with product service systems, new vs. reused products, green scale, familiarity with circular economy and cradle to cradle, design and trust in eco-labels. Additionally, the survey structure included an attention check following the scenario, a manipulation check in the middle and questions related to demographic date at the end.

The four question groups, intention to use, experience with PSS, new vs reused and familiarity with circular economy and Cradle to Cradle, will be described and visually presented in the following graphics and paragraphs. It is important to mention that these results are not based on the final analysis but have been only by a descriptively analysis. A more detailed evaluation will follow.

## 1) Intention to use

The intention to use buying and renting systems for the three following products, cabinet, storage tin and jacket is displayed in Figure 1. Evidently, the acceptance of purchasing these products is significantly higher than of renting across all countries. Furthermore, there are only marginal differences, both among the three products and between the different countries. Notably, there is only a slightly higher acceptance for renting systems in France, Italy and Slovenia. Moreover, it is important to note that, due to a programming error, there are no results from the scenario about renting a jacket in Germany, which is causing a gap in the graph.

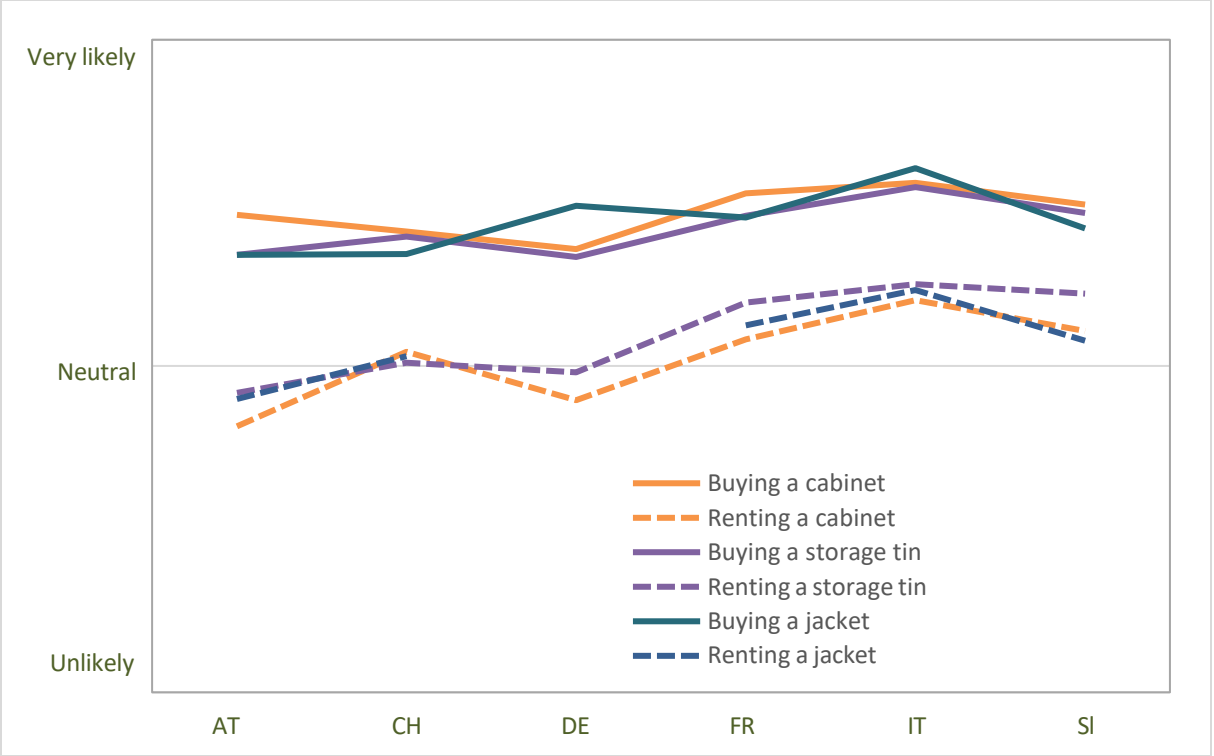
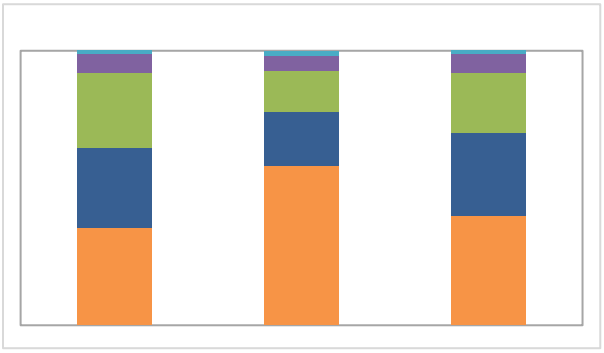


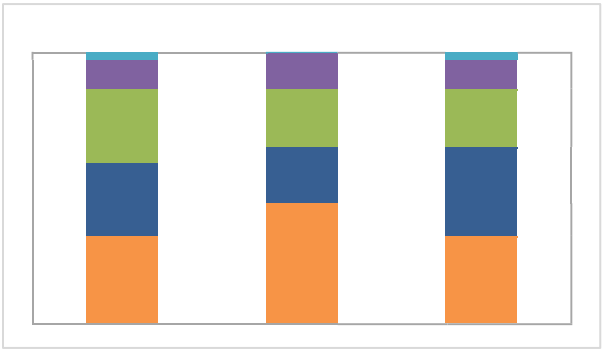

*Figure 1: Intention to use*

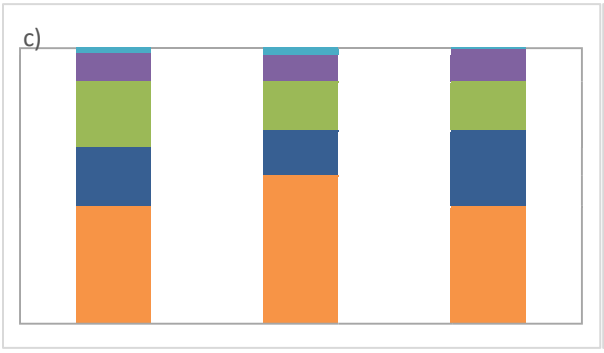
## 2) Experience with product service systems (PSS)

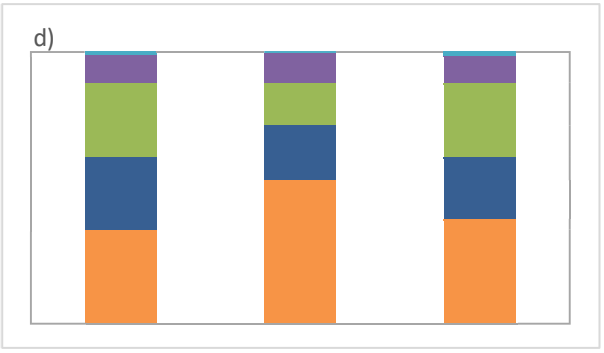
In the survey, the aim was to gather insights into experiences with product service-oriented systems. The participants got specifically asked about their frequency of using product-, use- and result-orientated services. In the graphs (Figure 2) it is clearly visibly that the majority of the respondents, regardless of their country of origin, have never used these alternative business models before. Additionally, these charts describe that in nearly every country individuals use product-oriented services, like maintenance contract or insurance for purchased products such as electrical appliances, more often than the other types, but still very unfrequently. The least utilized service is the use-oriented services like leasing or renting tools, cars, scooters, bicycles, with approximately half of the participants in every country having never used such services. Remarkably, there are minimal differences between countries in the use of result-oriented services, such as laundry, cleaning, and taxi services, except that people from Italy tend to use them more often than those from all the other countries.



b)





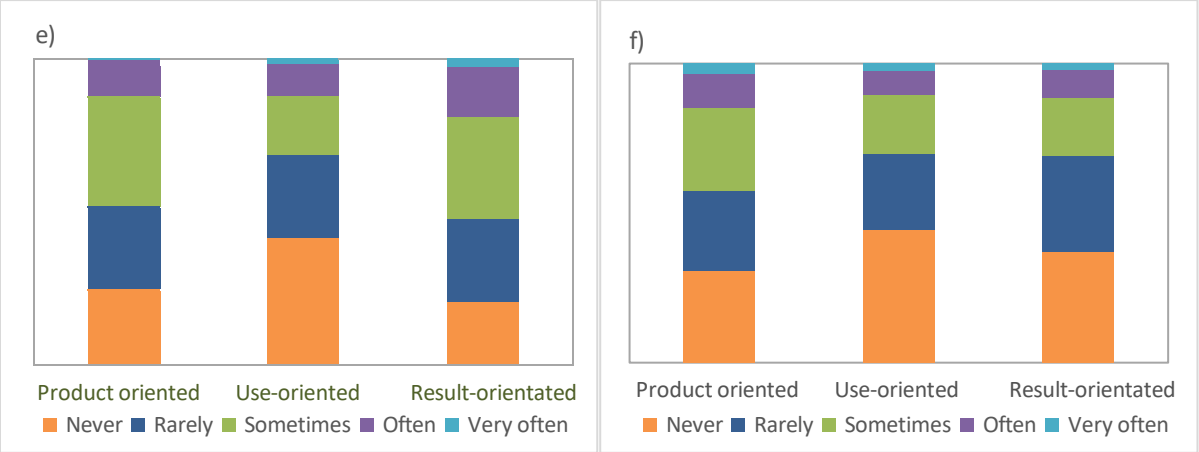



*Figure 2: Experience with PSS in (a) Austria, (b) Switzerland, (c) Germany, (d) France, (e) Italy and (f) Slovenia*

The willingness to get a product, whether it is new or made of reused parts, recycled materials, or have been used before, is displayed in Figure 3. The data indicates that respondents are generally open to acquiring products that are reused, repaired, refurbished, remanufactured, repurposed, and recycled. Interestingly, in all countries surveyed except for France, where it is close, the willingness to getting a product made of recycled materials is higher than the willingness to buy a new product. It is also visible that the acceptance of products made from reused parts is lower compared to other categories. Additionally, acquiring a product that has been used before shows the lowest willingness among participants, however, there is still a notable willingness to consider such products.

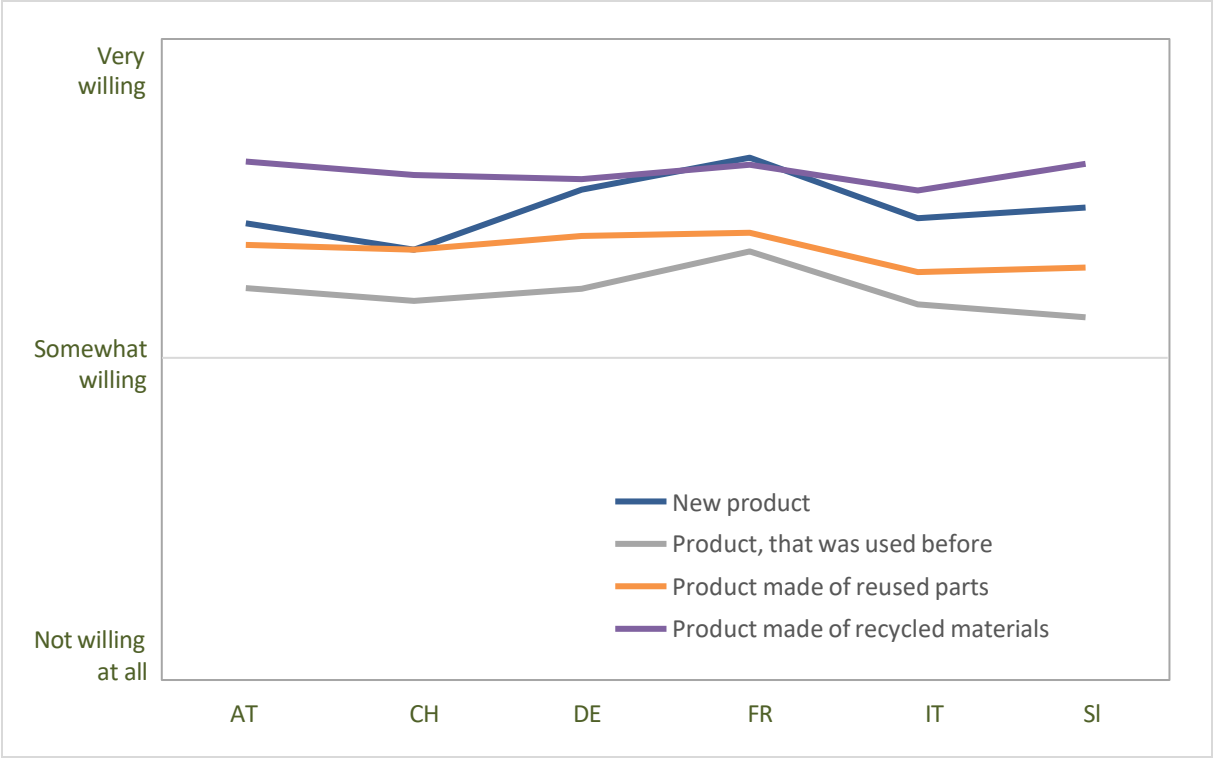



*Figure 3: Willingness of getting new vs reused products*

Figure 4 shows the low overall familiarity with both the circular economy and cradle-to-cradle concepts across all surveyed countries. It is evident that respondents generally have more knowledge about circular economy than cradle-to-cradle, however, their familiarity with the circular economy is still not high. Notably, individuals in Italy appear to be slightly more acquainted with this system and model compared to respondents in other countries.

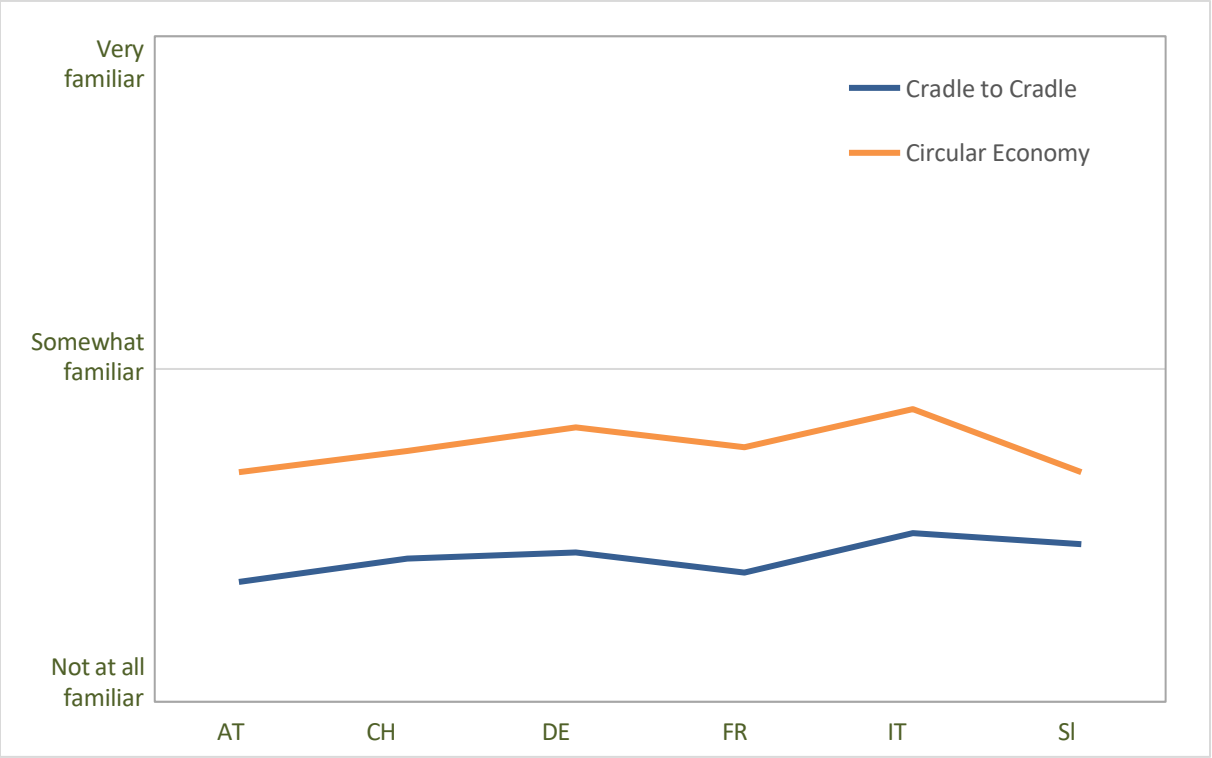



*Figure 4: Familiarity with circular economy (CE) and cradle-to-cradle (C2C)*

# 4. Transnational comparison – polymers sector

The following partners have contributed to the analysis in the polymers sector in their respective regional maturity analysis reports:

| Region | Partners |
|---|---|
| Baden-Wurttemberg (Germany) | PP2 TZ Horb |
| Bavaria (Germany) | PP3 CCB |
| Auvergne-Rhone-Alpes (France) | PP8 POL |
| Fribourg (Switzerland) | PP9 HEIA-FR |

Their contributions to the dimensions policies and business support, technologies and business models and practices are compiled hereafter.

## Summary of the findings – gaps/barriers and drivers/potentials

In the following table, the results of the transnational comparison workshop performed during the partner meeting in Linz, October 2023, are summarized. They shall provide the basis for the roadmapping process to be performed in WP2.

**Gaps: What is missing from our regional ecosystems to achieve circularity in the Polymer/plastics industry?**

- Clear legal requirements/better understanding of the requirements
- Acceptance from customer
- More funding for scaling up advanced technologies (chemical recycling etc.)
- Knowledge about potential plastic waste streams not recycled at the moment
- Mature technologies to sort & recycle complex materials
- Implementation/expertise on eco-design from the businesses
- Expertise on circular business models

**Barriers: What are the current obstacles that prevent the actors from our regional ecosystems to achieve circularity in the Polymer/Plastic industry?**

- High price of bio-based materials & fluctuant price of recycled material
- Regulatory hurdles
- Negatives stereotypes toward sustainable plastics properties
- Material/products specifications are unpredictable
- High investment cost with a limited growth potential
- Fragmented value-chains
- Mis-management of waste
- Difficulties to identify waste streams and its composition
- Small waste streams with no economically viable solutions

**Drivers/Potential: What are the main challenges to focus on in the future to allow our regional ecosystems to achieve circularity in the Polymer/Plastics industry?**

- Public awareness towards environmental issues/ growing market demand

| |
|---|
| ▪ Up-coming legal requirements (strong focus on polymer industries)<br>▪ Corporate identity<br>▪ Common resources available for SMEs (eg : Recycling pilot platforms to prepare for recyclability)<br>▪ Reduce CO2 foot print for incineration<br>▪ Reduce use of natural resources |

## Policies and business support measures, including funding schemes

### Policies

| | |
|---|---|
| **Polymeris** | **National level**<br>A decisive policy for ensuring a more CE in the polymer sector is the **Extended Producer Responsibility** meaning that the economic actors are responsible of the entire life cycle of the products they put on the market. (Link)<br>**Regional level**<br>The **AUVERGNE-RHONE-ALPES 2022-2028 plan for the economy, employment, training and innovation** is the regional policy for economic development & planning of the region in 4 fields of excellence in its industry, one of them being sustainable materials which include the advanced polymer material industries (Link). |
| **HEIA-FR** | *No specific policies identified* |
| **Innonet Kunststoff (TZ Horb)**<br>**&**<br>**Chemie Cluster Bayern** | **National**<br>▪ Einwegkunststofffondsgesetz EWKFondsG 2023 - Single-Use Plastic Fund Act (Link)<br>▪ Neues Verpackungsgesetz 2021 - new Packaging Act (Link)<br>*No specific regional policies identified* |

### Strategic documents

| | |
|---|---|
| **Polymeris** | *No specific strategic documents identified* |
| **HEIA-FR** | *No specific strategic documents identified* |
| **Chemie Cluster Bayern** | ▪ SVB (2021) - Substitution of fossil raw materials - materials for a bio-based way of life and economy (Link) |
| **Innonet Kunststoff** | *No specific strategic documents identified* |

| | |
|---|---|
| **(TZ Horb)** | |

**Funding schemes**

| | |
|---|---|
| **Polymeris** | **National**<br>▪ Innovative solutions for improving the Recyclability, Recycling and Reincorporation of Materials (RRR) (Link)<br>▪ ORMAT calls (Link)<br>▪ Recycling of plastics, composites and elastomers (Link)<br>**Regional**<br>▪ **INNOV'R** is a regional funding for the development of eco-innovative projects to help startups and SME. (Link) |
| **HEIA-FR** | *No specific funding schemes identified* |
| **Chemie Cluster Bayern**<br>**Innonet Kunststoff (TZ Horb)** | **National**<br>▪ FNR_ Funding program Renewable Raw Materials _ Fachagentur Nachwachsende Rohstoffe: Förderprogramm Nachwachsende Rohstoffe: project funding (Link) |
| **Chemie Cluster Bayern** | **Regional**<br>StMWi – Bavarian Ministry of Economic Affairs, Regional Development and Energy: **Neue Werkstoffe in Bayern**/New Materials in Bavaria (Link) |
| **Innonet Kunststoff (TZ Horb)** | **Regional**<br>*No specific funding schemes identified* |

**Support measures**

| | |
|---|---|
| **Polymeris** | ▪ Polymeris (Link) |
| **HEIA-FR** | *No specific support schemes identified* |
| **Chemie Cluster Bayern** | ▪ Cluster Neue Werkstoffe (Link)<br>▪ Kunststoffnetzwerk Franken (Link) – platform for exchange in the plastics industry of Franconia. |
| **Innonet Kunststoff (TZ Horb)** | *No specific **regional** business support schemes beyond cluster policies* |

## Technology and knowledge providers

| | |
|---|---|
| **Polymeris** | ▪ IPC - French Industrial Technical Centre for Plastics and Composites (Link). IPC has developed the DIS30 platform (for Sustainable (S), Intelligent (I) and Secure (S) Plastics by 2030).<br>▪ INSA - National Institute of Applied Sciences, Lyon (Link) _ IMP Laboratory – Institute for Polymers Material Engineering (Link)<br>▪ CEA-Liten _ European Research Institute, Grenoble (Link) |
| **HEIA-FR** | ▪ CHAMPION: a Research and Innovation Action (RIA) aiming to replace conventional polymers with novel bio-based polymers for their application in coatings, textiles, home care uses and structural adhesives. (Link)<br>▪ IRAP - Institute of Applied Plastics Research, Fribourg (Link)<br>▪ PICC - Plastics Innovation Competence Center, Fribourg (Link)<br>▪ ETH Zurich: SusTec - Group for Sustainability and Technology (Link) |
| **Chemie Cluster Bayern** | ▪ Fraunhofer Institute for Silicate Research (ISC), Würzburg (Link)<br>▪ Fraunhofer IGB (Link)<br>▪ University of Bayreuth (Link)<br>▪ TUM & TUMCS (Link)<br>▪ Technische Hochschule Nürnberg Georg Simon Ohm (Link)<br>▪ Technology Centre Weißenburg (Kunststoffcampus Bayern) (Link) |
| **Innonet Kunststoff (TZ Horb)** | ▪ Fraunhofer ICT – Core competence polymer engineering (Link)<br>▪ Fraunhofer ICT - Environmental engineering (Link)<br>▪ SKZ – German Plastics Center (Link): In addition to its headquarter in Würzburg, the SKZ has five other locations in Halle, Peine, Horb, Selb and Obernburg.<br>▪ Reutlingen University (Link) |

## Business models and practices

### Role model companies

| | |
|---|---|
| **Polymeris** | ▪ Carbios, Clermond-Ferrand (Link)<br>▪ Gerflor, Lyon (Link) |
| **HEIA-FR** | ▪ Huhtamaki's (Link)<br>▪ Ponera Group' (Link)<br>▪ ReCircle (Link)<br>▪ Early bird ski (Link)<br>▪ Coop (Link)<br>▪ BioApply (Link)<br>▪ Re-source program by SCOTT (Link) |
| **Chemie Cluster Bayern** | ▪ Südstärke GmbH (Link)<br>▪ HP-T Höglmeier Polymer-Tech GmbH & Co. KG (Link)<br>▪ Biofibre GmbH (Link) |

| | |
|---|---|
| **Innonet Kunststoff (TZ Horb)** | ▪ Fischer Greenline (Link) - The fisher group |

**Relevant industrial groupings and networks**

| | |
|---|---|
| **Polymeris** | ▪ Working groups composed of Polymeris' members _ Life cycle of materials working group; innovation and medical working. |
| **HEIA-FR** | ▪ ClusterProcess4sustainability (Link)<br>▪ Cleantech-alps (Link)<br>▪ Bio-Alps Association (Link) western Switzerland Life science Cluster<br>▪ Swiss Plastics Cluster (Link) created in 2005 in collaboration with the university of Engineering and Architecture of Fribourg.<br>▪ Innosquare (Link) is a platform. |
| **Chemie Cluster Bayern** | ▪ Kunststoffnetzwerk Franken (Link) |
| **Innonet Kunststoff (TZ Horb)** | ▪ INNONET Kunststoff network (Link) |

# 5. Transnational comparison – chemistry/materials sector

The following partners have contributed to the analysis in the chemistry/materials sector in their respective regional maturity analysis reports:

| **Region** | **Partners** |
|---|---|
| Baden-Wurttemberg (Germany) | PP2 TZ Horb |
| Bavaria (Germany) | PP3 CCB |
| Upper Austria (Austria) | PP5 Biz up |
| Slovenia | PP7 CCIS |
| Fribourg (Switzerland) | PP9 HEIA-FR |

Their contributions to the dimensions policies and business support, technologies and business models and practices are compiled hereafter.

## Summary of the findings – gaps/barriers and drivers/potentials

In the following table, the results of the transnational comparison workshop performed during the partner meeting in Linz, October 2023, are summarized. They shall provide the basis for the roadmapping process to be performed in WP2.

**Gaps: What is missing from our regional ecosystems to achieve circularity in the Polymer/plastics industry?**

- Lack of material data sheets with sufficient information on recycled/biobased material
- Lack of alternatives to fossil materials
- Suitable additives for circular/biobased products
- Precise analysis of compounds in waste/recycled materials
- Lack of targets and requirements for circular products
- Lack of obligatory design specifications for products
- Acceptance from customers

**Barriers: What are the current obstacles that prevent the actors from our regional ecosystems to achieve circularity in the Polymer/Plastic industry?**

- Complexity/Diversity of products
- Complexity of value chains
- Mix of fossil and biobased chemicals
- Uncertainty regarding legal requirements for declaration of recycled materials
- Existing waste regulations restrict use of residual materials (current regulations not aligned with C2C/CE)
- Virgin material is cheaper
- Profitability is still too low
- Insufficient public funding to quickly improve technology dev. and tech transfer

**Drivers/Potential: What are the main challenges to focus on in the future to allow our regional ecosystems to achieve circularity in the Polymer/Plastics industry?**

- Functionality vs. Sustainability
- Chemical recycling of polymers
- Improved processes for waste separation
- Strengthening the enforcement of waste regulations/laws
- Increase gradually and predictably prices for undesirable economic practices
- Mandatory quotas for recycling
- Suitable funding programs for companies & university research
- Advantages in the allocation of project funds for CE project
- economic incentives (e.g. as done for energy savings, tax incentives)

## Policies and business support measures, including funding schemes

### Policies

| | |
|---|---|
| **HEIA-FR** | *No specific policies identified* |
| **Chemie Cluster Bayern**<br>**Innonet Kunststoff (TZ Horb)** | **National**<br>▪ ChemG – Chemikaliengesetz Chem G 2013/2021 (Link & BMJ)<br><br>*No specific regional policies identified* |
| **CCIS/ Slovenia** | ▪ Zakon o kemikalijah (Chemicals law) (Link) |
| **Business Upper Austria** | ▪ Upper Austrian Pesticide Strategy 2023 (Link) |

### Strategic documents

| | |
|---|---|
| **HEIA-FR** | *No specific strategic documents identified* |
| **Chemie Cluster Bayern**<br>**Innonet Kunststoff (TZ Horb)** | ▪ SVB (2022) - Circular Economy in the context of bioeconomy (Link)<br>▪ Agora Energiewende (2023) - Chemicals in transition (Link)<br>▪ VCI (2023) - Chemistry4Climate (Link)<br><br>*No specific regional strategic documents identified* |
| **CCIS/ Slovenia** | *No specific strategic documents identified* |
| **Business** | ▪ National Actionplan POP - Persisten Organic Pollutants (Link) |

| | |
|---|---|
| **Upper Austria** | |

**Funding schemes**

| | |
|---|---|
| **HEIA-FR** | *No specific funding schemes identified* |
| **Chemie Cluster Bayern & Innonet Kunststoff (TZ Horb)** | ▪ BMWK – Federal Ministry for Economic Affairs and Climate Action: Förderprogramm Industrielle Bioökonomie/Funding program Industrial Bioeconomy (Link)<br>▪ SPRIND – Circular Biomanufacturing (private national funding program) (Link)<br><br>**Bayern**<br>▪ StMWi – Bavarian Ministry of Economic Affairs, Regional Development and Energy: Bioökonomie-Scale-Up/Bioeconomy Scale-Up (regional funding scheme) (Link)<br><br>*No specific funding schemes identified in BW* |
| **CCIS/ Slovenia** | *No specific funding schemes identified* |
| **Business Upper Austria** | *No specific funding schemes identified* |

**Support measures**

| | |
|---|---|
| **HEIA-FR** | *No specific support measures identified* |
| **Chemie Cluster Bayern** | ▪ Chemie-Cluster Bayern (CCB) (Link)<br>▪ The Cluster Nanotechnologie (Link) provides a network for stakeholders in the nanotech field.<br>▪ TUM Venture Labs (Link) |
| **Innonet Kunststoff (TZ Horb)** | *No specific support measures identified* |
| **CCIS/ Slovenia** | *No specific support measures identified* |
| **Business Upper Austria** | *No specific support measures identified* |

## Technology and knowledge providers

| | |
|---|---|
| **HEIA-FR** | ▪ Institute of Chemical Technology _ ChemTech (Link)<br>▪ Innosuisse 105.737IP (Link)<br>▪ Biofactory Competence Center (BCC) (Link)<br>▪ COUNTLESS (EU program): a cost-effective production of lignin platform chemicals extending the biobased chemicals portfolio. (Link) |
| **Chemie Cluster Bayern** | ▪ Fraunhofer IGB, Straubing Bio-, Elektro- und Chemokatalyse BioCat (Link)<br>▪ University of Bayreuth, Faculty of biology, chemistry & earth sciences (Link)<br>▪ Technical University Munich (TUM) (Link)<br>▪ TUM Campus Straubing for Biotechnology and Sustainability (Link)<br>▪ Hof University of Applied Sciences, Institute for Circular Economy of Bio:Polymers (ibp) (Link)<br>▪ TH Rosenheim, Faculty of Chemical Technology and Economics Campus Burghausen (Link)<br>▪ FAU University Erlangen-Nürnberg (Link)<br>▪ BioCampus MultiPilot (BMP), Straubing-(Link)<br>▪ Fraunhofer UMSICHT, Sulzbach-Rosenberg (Link) |
| **Innonet Kunststoff (TZ Horb)** | ▪ Fraunhofer ICT (Link) |
| **CCIS/ Slovenia** | ▪ National Institute of Chemistry (Link)<br>▪ University of Maribor – Faculty for chemistry and chemical technology (Link)<br>▪ University of Ljubljana – Faculty for chemistry and chemical technology (Link) |
| **Business Upper Austria** | *See role model companies* |

## Business models and practices

### Role model companies

| | |
|---|---|
| **HEIA-FR** | ▪ Impossible Materials is a deep-tech spinoff company from the Chemistry Department at the University of Cambridge (UK). (Link)<br>▪ Bloom Biorenewables SA, 2019 (Link)<br>▪ Bcomp (Link)<br>▪ UCB Farchim SA (Link) |
| **Chemie Cluster Bayern** | **Enterprise**<br>▪ Wacker AG, Burghausen (Link)<br>▪ Clariant Produkte (Deutschland) GmbH (Link)<br>▪ Baerlocher GmbH (Link) |

| | |
|---|---|
| | **SMEs**<br>▪ SWC Südwest Chemie GmbH (Link)<br>▪ LXP Group GmbH (Link)<br>▪ PRUVIA GmbH (Link)<br>▪ APK AG (Link)<br>▪ Biolog Heppe GmbH (Link)<br>**Start-ups**<br>▪ Mk2 Biotechnologies GmbH (Link)<br>▪ ESY-Labs GmbH (Link)<br>▪ Treemera GmbH(Link)<br>▪ Additional start-up companies: Circular Carbon (pyrolysis), Carbonauten (pyrolysis), Lignopure (lignin) Global Sustainable Transformation (sustainable oleaginous materials) |
| **Innonet Kunststoff (TZ Horb)** | *No company identified yet.* |
| **CCIS/ Slovenia** | ▪ AquafilSLO (Link) |
| **Business Upper Austria** | ▪ Werner & Mertz (Link)<br>▪ NaKu (Link)<br>▪ MKV Oberflächenbeschichtung (Link) |

**Relevant industrial groupings and networks**

| | |
|---|---|
| **HEIA-FR** | ▪ Cluster Food Nutrition (Link)<br>▪ Innosquare (Link) |
| **Chemie Cluster Bayern** | ▪ VCI Bayern - Bavarian chemical associations (Link) |
| **Innonet Kunststoff (TZ Horb)** | The chemical and pharmaceutical industry mainly extends along the High Rhine in the districts of Lörrach and Waldshut as well as across the border in Northwestern Switzerland.<br>*No specific cluster initiative in Baden-Württemberg* |
| **CCIS/ Slovenia** | *No specific groups identified* |
| **Business Upper Austria** | *No specific groups identified* |

# 6. Transnational comparison – wood/furniture sector

The following partners have contributed to the analysis in the wood/furniture sector in their respective regional maturity analysis reports:

| Region | Partners |
|---|---|
| Veneto ((Italy) | LP CCIAA Padova, PP6 UniSMART |
| Upper Austria (Austria) | PP4 BOKU, PP5 Biz up |
| Fribourg (Switzerland) | PP9 HEIA-FR |

Their contributions to the dimensions policies and business support, technologies and business models and practices are compiled hereafter.

## Summary of the findings – gaps/barriers and drivers/potentials

In the following table, the results of the transnational comparison workshop performed during the partner meeting in Linz, October 2023, are summarized. They shall provide the basis for the roadmapping process to be performed in WP2.

**Gaps: What is missing from our regional ecosystems to achieve circularity in the Polymer/plastics industry?**

- **Sustainable Sourcing and Deforestation:** Addressing the issue of illegal logging and deforestation, which accounts for about 30% of wood used in the EU.
- **Circular Economy and Tech Education:** Need for more training on circular economy principles and Industry 4.0 technologies.
- **Transparency in Material Safety:** Lack of disclosure regarding hazardous substances in products.
- **Availability of Spare Parts and Repair Instructions:** Difficulty in obtaining spare parts and lack of guidance for furniture repair.
- **Recycling and Reuse Systems:** Limited focus on reuse compared to recycling, incineration, and landfill (cradle to grave approach).
- **Reverse Logistics:** Challenges in collection and reverse logistics systems.
- **Regulatory Clarity:** Ambiguity in regulations, often not treating wood-furniture waste appropriately.
- **Greenwashing Practices:** Proliferation of misleading claims about environmental practices.

**Barriers: What are the current obstacles that prevent the actors from our regional ecosystems to achieve circularity in the Polymer/Plastic industry?**

- **Cost and Price Disparity:** The price gap between new and used furniture is not significant enough to encourage sustainable purchasing behaviors. High costs of repair and refurbishment.

| |
|---|
| ▪ **Quality and Durability Concerns:** Perceptions about the quality of recycled or sustainably sourced wood products.<br>▪ **Complex Supply Chains and Traceability:** Difficulty in tracing wood origins and ensuring sustainability.<br>▪ **Market Competition:** Intense competition with low-cost, non-sustainable furniture producers.<br>▪ **Technological Gaps:** Lack of efficient technology for recycling and repurposing wood materials.<br>▪ **Design Limitations:** Traditional design practices not aligned with circular principles. |
| **Drivers/Potential: What are the main challenges to focus on in the future to allow our regional ecosystems to achieve circularity in the Polymer/Plastics industry?**<br>▪ **Growing Environmental Awareness:** Increasing consumer awareness and demand for sustainable and circular furniture products.<br>▪ **Integration of Industry 4.0 Technologies:** Adoption of IoT, cloud computing, data analytics, and artificial intelligence in the wood-furniture sector.<br>▪ **Policy and Regulatory Support:** Implementation of supportive policies and regulations encouraging circular practices.<br>▪ **Innovation in Materials and Processes:** Development of new materials and processes that enhance circularity.<br>▪ **Collaboration and Partnerships:** Increased collaboration between manufacturers, suppliers, and recyclers.<br>▪ **Sustainable Design Education:** Promoting eco-design principles in the furniture design and manufacturing process.<br>▪ **Circular Business Models:** Development of business models focusing on product-as-a-service, leasing, or take-back schemes. |

## Policies and business support measures, including funding schemes

**Policies**

| | |
|---|---|
| **Veneto Region** | ▪ National Italian Forest Strategy (Legislative Decree No 34 of 3 April 2018) (Link)<br>▪ Whitebook for territorial policies in the fields of wood and furniture presented by Federlegno (Link) |
| **Business Upper Austria** | ▪ European Wood Policy Platform – woodPoP (Link) **-** The platform was initiated by Finland and Austria and the kick-off event was in December 2022 in Innsbruck. |
| **HEIA-FR** | *No specific policies identified* |

**Strategic documents**

| | |
|---|---|
| **Veneto Region** | *No strategic documents identified* |
| **Business Upper Austria** | ▪ Guideline for a circular economy planning and design (Link)<br>▪ Circular construction industry (Link) |
| **HEIA-FR** | *No strategic documents identified* |

**Funding schemes**

| | |
|---|---|
| **Veneto Region** | ▪ Cluster Made IN Italy (Link) |
| **Business Upper Austria** | ▪ Österreichische Holzinitiative - THINK.WOOD.Innovation (Link)<br>▪ Waldfonds – Action 9: Increased use of wood as a raw material (Link) |
| **HEIA-FR** | *No strategic documents identified* |

**Support measures**

| | |
|---|---|
| **Veneto Region** | *No support measures identified* |
| **Business Upper Austria** | ▪ Bioeconomy Austria (Link)<br>▪ Circular economy in the Austrian wood sector (Link) |
| **HEIA-FR** | ▪ PUSCH: In collaboration with the Migros Pioneer Fund, Pusch launched the MAKE FURNITURE CIRCULAR (MFC) initiative in 2019. (Link) |

## Technology and knowledge providers

| | |
|---|---|
| **Veneto Region** | ▪ Cluster MinIT "Made in Italy" (Link)<br>▪ Venetian Green Building Cluster (Link)<br>▪ Federlegno Arredo (Link)<br>▪ CNA (Confederazione Nazionale dell'Artigianato e delle Imprese) - CNA Veneto Ovest (Link) |
| **Business Upper Austria** | See role model companies |
| **HEIA-FR** | ▪ BFH _ Bern University of Applied Sciences _Institute of Material and Wood Technology (Link) |

| | |
|---|---|
| | ▪ ETH Zurich institute of building material: Sus.Lab brings sustainability research into practice in building construction (Link) |

## Business models and practices

### Role model companies

| | |
|---|---|
| **Veneto Region** | ▪ Consorzio Rilegno (Link)<br>▪ ETEX ITALIA S.R.L. (Construction sector) (Link)<br>▪ JVP (Link) |
| **Business Upper Austria** | ▪ Stora Enso (Link)<br>▪ Bene (Link)<br>▪ Hempstatic (Link)<br>▪ BauKarussell (Link) |
| **HEIA-FR** | ▪ Swico Recycling (Link)<br>▪ Swiss National Railway SBB (Link) |

### Relevant industrial groupings and networks

| | |
|---|---|
| **Veneto Region** | ▪ Federlegno, Association of the Wood Furnitue Companies (Link)<br>▪ Distretto della Sedia/ Italian Chair District (Link)<br>▪ Distretto del Mobile Livenza/ Furniture District (Link)<br>▪ Euteknos - Regional Innovation Network for artistic manufacturing (Link)<br>▪ Lignum Verona (Link) |
| **Business Upper Austria** | ▪ Association of the Austrian Wood Industries (Link)<br>▪ Forest Association Austria (Link)<br>▪ FHP (Link) |
| **HEIA-FR** | *No special groups identified* |

# 7. Transnational comparison – fibres/textiles sector

The following partners have contributed to the analysis in the fibres/textile sector in their respective regional maturity analysis reports:

| Region | Partners |
|---|---|
| Baden-Wurttemberg (Germany) | PP2 TZ Horb |
| Upper Austria (Austria) | PP4 BOKU, PP5 Biz up |
| Slovenia | PP7 CCIS |
| Auvergne-Rhone-Alpes (France) | PP8 POL |

Their contributions to the dimensions policies and business support, technologies and business models and practices are compiled hereafter.

## Summary of the findings – gaps/barriers and drivers/potentials

In the following table, the results of the transnational comparison workshop performed during the partner meeting in Linz, October 2023, are summarized. They shall provide the basis for the roadmapping process to be performed in WP2.

**Gaps: What is missing from our regional ecosystems to achieve circularity in the Polymer/plastics industry?**

- Value chain of end-of-life products is not unified or fully developed
- Feedstock for recycling
- A lack of adequate infrastructure for textile recycling
- Not enough technologies for recycling mixed fibers
- Collection and separation
- Application of 10R strategy
- Sorting of dark textiles
- People might not go for more expensive yet sustainable products
- Value chain especially extra-EU

**Barriers: What are the current obstacles that prevent the actors from our regional ecosystems to achieve circularity in the Polymer/Plastic industry?**

- Material mixtures of textiles
- Fast fashion
- Collection system of H&M and co
- Energy demand
- Too many different types of textiles and polymers in 1 clothing
- Consumer demand for cheap products

**Drivers/Potential: What are the main challenges to focus on in the future to allow our regional ecosystems to achieve circularity in the Polymer/Plastics industry?**

- Customers want it

| |
|---|
| ▪ Upcoming regulatory affairs<br>▪ Sustainable fashion start-ups<br>▪ Material quality<br>▪ Strong legal incentives (extended producer responsibility) |
| ▪ Cooperation with R&D + Funding<br>▪ Long-term use<br>▪ High potential start-ups<br>▪ Chemical recycling of clothing<br>▪ Regional value chain<br>▪ Supporting local/EU sustainable textile producers<br>▪ Digital product passports |

## Policies and business support measures, including funding schemes

### Policies

| | |
|---|---|
| **Business Upper Austria** | ▪ An excerpt from the Upper Austrian Waste Management 2017 (Textile):<br>Textiles, old textiles incl. shoes are valuable recyclable material, which is mainly given directly to social institutions by citizens in Upper Austria. A part is collected via public collection facilities. |
| **Polymeris** | **National**<br>A decisive national policy for ensuring a more circular economy in the textile sector is the Extended Producer Responsibility . |
| **Innonet Kunststoff (TZ Horb)** | **National**<br>▪ Textilbündnis (Link) - Partnership for Sustainable Textiles (PST)<br><br>*No specific regional policies identified* |
| **CCIS/ Slovenia** | *No specific national/ regional policies identified* |

### Strategic documents

| | |
|---|---|
| **Business Upper Austria** | ▪ Incentives for a Sustainable Circular Economy in the Textile and Clothing Sector in Austria - Analysis of Framework Conditions, Instruments and Perspectives for Action (Link)<br>▪ Secondary raw materials for the Austrian textile industry (Link) |
| **Polymeris** | ▪ Plastic in textiles: towards a circular economy for synthetic textiles in Europe _ a roadmap developed by the European Environment Agency. (Link)<br>▪ The European project *New Cotton project* (Link) produced several white papers, one of them *Circular Business models in the textile industry*. (Link) The aim is to educate the reader on the large number of circular business models which exist in the body of knowledge, focusing on examples and |

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|---|---|
| | applications in the textile and fashion sector, and is a must read for the future activities concerning the circular business models planned in Cradle Alp project. |
| **Innonet Kunststoff (TZ Horb)** | *No specific national/ regional strategic documents identified* |
| **CCIS/ Slovenia** | *No specific national/ regional strategic documents identified* |

**Funding schemes**

| | |
|---|---|
| **Business Upper Austria** | ▪ Incentives for a Sustainable Circular Economy in the Textile and Clothing Sector in Austria (Link) |
| **Polymeris** | ▪ Re_Fashion Challenge Innovation (Link) |
| **Innonet Kunststoff (TZ Horb)** | *No specific national/ regional funding scheme identified* |
| **CCIS/ Slovenia** | *No specific national/ regional funding scheme identified* |

**Support measures**

| | |
|---|---|
| **Business Upper Austria** | ▪ GRAND GARAGE – Textile Factory (Link)<br>▪ Smart Textile Platform (Link) |
| **Polymeris** | ▪ Techtera _ French competitiveness cluster for the textile and fiber industry. (Link) |
| **Innonet Kunststoff (TZ Horb)** | *No specific regional business support schemes beyond cluster policy* |
| **CCIS/ Slovenia** | *No specific national/ regional business support schemes identified* |

## Technology and knowledge providers

| | |
|---|---|
| **Business Upper Austria** | ▪ Kunstuniversität Linz _ Department of textile·art·design (Link) & Design and technology department (Link) |
| **Polymeris** | ▪ IFTH _ Technical Industrial Center for textiles and clothing in France (Link)<br>▪ TechteraFab _ collaborative innovation platform (Link)<br>▪ Axel'One_ collaborative innovation platform (Link) |

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|---|---|
| **Innonet Kunststoff (TZ Horb)** | ▪ DITF Denkendorf (German Institutes for Textile and Fiber Research) (Link) _ united are _ Institute for Textile and Process Technology Denkendorf (ITV), Institute for Textile Chemistry and Chemical Fibers Denkendorf (ITCF) and the Center for Management Research (DITF-MR)<br>▪ Hohenstein Institute (Link)<br>▪ Further relevant scientific partners of the textile industries are Reutlingen (Link) and Albstadt-Sigmaringen (Link) Universities of Applied Sciences. |
| **CCIS/ Slovenia** | ▪ IRSPIN platform (Link) |

## Business models and practices

### Role model companies

| | |
|---|---|
| **Business Upper Austria** | ▪ Lenzing (Link)<br>▪ Wolford (Link)<br>▪ Paptex Textilhandels GmbH (Link)<br>▪ Fahnen Gärtner (Link) |
| **Polymeris** | ▪ MAPEA (Link) |
| **Innonet Kunststoff (TZ Horb)** | ▪ Trigema (Link)<br>▪ Mey (Link) |
| **CCIS/ Slovenia** | ▪ RESYNTEX project (Link)<br>▪ BENEDETTI LIFE (Link) |

### Relevant industrial groupings and networks

| | |
|---|---|
| **Business Upper Austria** | ▪ Association of Textiles (Link) |
| **Polymeris** | ▪ ECOSYSTEX (Link) |
| **Innonet Kunststoff (TZ Horb)** | Around 200 textile and apparel companies with 24,000 employees are located in Baden-Württemberg, particularly in the technical textiles, apparel and home textiles sectors.<br>▪ Cluster Technical Textiles Neckar-Alb, 2012 (Link)<br>▪ Biomastec (Link) _ cluster initiative |
| **CCIS/ Slovenia** | *No specific national/ regional groups identified* |

# 8. Transnational comparison – packaging sector

The following partners have contributed to the analysis in the packaging sector in their respective regional maturity analysis reports:

| Region | Partners |
|---|---|
| Veneto ((Italy) | LP CCIAA Padova, PP6 UniSMART |
| Bavaria (Germany) | PP3 CCB |
| Upper Austria (Austria) | PP4 BOKU, PP5 Biz up |
| Slovenia | PP7 CCIS |

Their contributions to the dimensions policies and business support, technologies and business models and practices are compiled hereafter.

## Summary of the findings – gaps/barriers and drivers/potentials

In the following table, the results of the transnational comparison workshop performed during the partner meeting in Linz, October 2023, are summarized. They shall provide the basis for the roadmapping process to be performed in WP2.

**Gaps: What is missing from our regional ecosystems to achieve circularity in the Polymer/plastics industry?**

- SMEs: Not enough capital or no access to it
- Lack of adequate technological infrastructure
- Ignorance of the C2C concept among the consumers
- Ignorance of the C2C concept among the producers
- Consumers' demand for convenient single-use packaging
- No knowledge, no infrastructure among SMEs
- No binding standards

**Barriers: What are the current obstacles that prevent the actors from our regional ecosystems to achieve circularity in the Polymer/Plastic industry?**

- Not enough influence on value chains – especially outside EU
- Mixture of materials.
- Need for Cross-Function Collaboration: Achieving sustainable packaging goals requires collaboration across different company functions such as product development, manufacturing, and marketing. Varied levels of awareness and commitment in these areas can be a significant barrier.
- E-commerce needs: The growth of online retail has increased the need for packaging, which can make it difficult to reach sustainability goals.

**Drivers/Potential: What are the main challenges to focus on in the future to allow our regional ecosystems to achieve circularity in the Polymer/Plastics industry?**

| |
|---|
| ▪ Supporting local and sustainable packaging producers<br>▪ Recycling, collecting, sorting<br>▪ Bottom-up pressure to have a clear legislation<br>▪ Promotion of C2C -> consumers' demand for c2c packaging<br>▪ Producer Responsibility Organization (PROs) mission: PROs can help the large-scale adoption of best practices, thanks to their role in complying with the Extended Producer Responsibility schemes on behalf of the obliged companies. |

## Policies and business support measures, including funding schemes

### Policies

| | |
|---|---|
| **CCIS/ Slovenia** | ▪ Uredba o embalaži in odpadni embalaži (Decree on packaging and packaging waste (Slovenia)) (Link) |
| **Veneto Region** | *No national/ regional policies identified* |
| **Business Upper Austria** | *No national/ regional policies identified* |
| **Chemie Cluster Bayern** | ▪ Packaging Act _ VerpackG – Verpackungsgesetz 2017/2023 (Link & BMJ)<br>▪ Einwegkunststofffondsgesetz EWKFondsG 2023 (Link) |

### Strategic documents

| | |
|---|---|
| **CCIS/ Slovenia** | *No national/ regional strategic documents identified* |
| **Veneto Region** | *No national/ regional strategic documents identified* |
| **Business Upper Austria** | ▪ Packaging regulation amendment 2021 (Link) |
| **Chemie Cluster Bayern** | ▪ SVB (2022) - Circular Economy in the context of bioeconomy (Link) |

### Funding schemes

| | |
|---|---|
| **CCIS/ Slovenia** | *No national/ regional funding schemes identified* |
| **Veneto Region** | *No national/ regional funding schemes identified* |

| | |
|---|---|
| **Business Upper Austria** | ▪ New installation and adaptation of reverse vending machines (Link)<br>▪ Reusable Systems (Link)<br>▪ Sorting plants for plastic packaging (Link) |
| **Chemie Cluster Bayern** | ▪ BMEL – Federal Ministry for Food and Agriculture: Programm zur Innovationsförderung/Program to Promote Innovation (Link)<br>▪ FNR _ Funding program Renewable Raw Materials _ Fachagentur Nachwachsende Rohstoffe: Förderprogramm Nachwachsende Rohstoffe: project funding (Link) |

**Support measures**

| | |
|---|---|
| **CCIS/ Slovenia** | *No national/ regional strategic support measures identified* |
| **Veneto Region** | *No national/ regional strategic support measures identified* |
| **Business Upper Austria** | *No national/ regional strategic support measures identified* |
| **Chemie Cluster Bayern** | ▪ Umweltcluster Bayern (Link)<br>▪ Kunststoffnetzwerk Franken (Link) |

## Technology and knowledge providers

| | |
|---|---|
| **CCIS/ Slovenia** | ▪ FTPO - Faculty of Polymer Technology (Link)<br>▪ TECOS – Technological centre in the area of the development of new products, moulds and technologies (Link)<br>▪ ICP- Pulp and Paper Institute (Link)<br>▪ IOS Maribor (Link) |
| **Veneto Region** | ▪ UCIMA - Italian Packaging Machinery Manufacturers' Association (Link)<br>▪ IPACK-IMA MILANO (Fair) (Link)<br>▪ Galdi Srl –(Link) |
| **Business Upper Austria** | See role model companies |
| **Chemie Cluster Bayern** | ▪ Fraunhofer Institute for Process Engineering and Packaging IVV (Link)<br>▪ SKZ - German Plastics Center, Würzburg (Link)<br>▪ Zentrum für Lebensmittel- und Verpackungstechnologie e.V. (ZLV) (Link) |

## Business models and practices

### Role model companies

| | |
|---|---|
| **CCIS/ Slovenia** | ▪ PLASTA d.o.o. (Link)<br>▪ KIMI d.o.o. (Link)<br>▪ EVEGREEN d.o.o. (Link)<br>▪ Making paper from Japanese knotweed – project "Applause" (Link) |
| **Veneto Region** | ▪ Consorzio Rilegno (wood packaging) (Link)<br>▪ Owens- Illinois San Polo di Piave (Link) - Gold Label C2C- food packaging |
| **Business Upper Austria** | ▪ Gugler (Link)<br>▪ Greiner (packaging (Link)<br>▪ EREMA Group (Link)<br>▪ Werner & Mertz GmbH (Link)<br>▪ Mondi (Link)<br>▪ Mayr-Melnhof Packaging (Link) |
| **Chemie Cluster Bayern** | ▪ Weimako GmbH (Link)<br>▪ Landpack GmbH (Link)<br>▪ pacoon (Link)<br>▪ Treemera (Link)<br>▪ LIFOCOLOR (Link)<br>**Start-ups**<br>▪ Fungarium (Link)<br>▪ Proservation GmbH (Link) |

### Relevant industrial groupings and networks

| | |
|---|---|
| **CCIS/ Slovenia** | ▪ TECOS (Link) |
| **Veneto Region** | ▪ UCIMA - Italian Packaging Machinery Manufacturers' Association (Link) |
| **Business Upper Austria** | ▪ PROPAK (Link)<br>▪ Austropapier (Link)<br>▪ Austrian Institute für Packaging (Link)<br>▪ 4evergreen (Link) |
| **Chemie Cluster Bayern** | *No national/ regional groups identified* |

# 9. Conclusions

The concept of circular economy is quite strongly taken up in the relevant national and regional policies. There are also business support measures in place in different forms: clusters, model regions, forums, innovation platforms, etc., which testify a good level of maturity with respect to green transformation and the circular economy.

The transformation towards a circular economy is also eligible in different funding schemes in the project regions. Some of those schemes specifically address the circular economy or resource efficiency, whereas others are broader and tackle circular economy under the umbrella of innovation projects. Strong technology providers in general on topics related to sustainability are present in all project regions, as well as relevant industrial networks. Consequently, the project regions provide a reasonably mature policy and business environment in terms of awareness of the circular economy and cradle-to-cradle models.

However, there are very no specific legal incentives in place which would go beyond waste management and basic recycling aspects. Similarly, the consumer survey performed in the project regions showed that respondents are generally not familiar with the concept of circular economy, and even less with cradle-to-cradle. Notably, individuals in Italy appear to be slightly more acquainted with this system and model compared to respondents in other countries.

A closer look at the specific gaps and barriers identified in the five selected industrial sectors to be addressed more specifically by the project - polymers/ plastics, wood/ furniture, chemistry/ materials, fibres/ textiles, packaging – shows that there are significant real and perceived barriers for a faster transformation towards a more circular economy and more specifically a stronger adoption of cradle-to-cradle approaches. The most common gaps and barriers across sectors are:

- Lack of suitable alternatives (in terms of raw materials) to fossil-based materials, respectively higher price for alternative materials.
- Lack of strong legal requirements, respectively the uncertainty about existing and upcoming legal requirements
- Lack of acceptance by customers
- Complexity of products, which makes substitution of materials a complex issue along value chains.
- Lack of awareness along the participants of value chains.
- Difficulty of organizing collection and sorting of materials, especially when products are made of a mix of different materials.

On the other hand, some common drivers and potentials across sectors were also identified:

- The legal incentives from the extended producer responsibility and the digital product passport are expected to foster circular developments over time in all sectors.
- R&D activities will provide increasingly new opportunities for fossil-based material substitution.
- Waste separation and recycling processes are improving.

- Economic Incentives (for instance tax incentives) might boost new developments.
- Public awareness and demand are expected to increase.
- Digital technologies can support the emergence of new circular business models.

Building on the learnings form their respective regional analysis and the transnational comparison of their ecosystems, the Cradle-ALP partners have worked out a common basis for moving towards the development of industrial transformation roadmaps.

# 10. Annexes

No Annexes