



**Project Acronym: Cradle-Alp**

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## **D.1.2.1**

# **Regional ecosystem Cradle2Cradle maturity analysis Auvergne-Rhône-Alpes**

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## Executive Summary

This deliverable document the results of the analysis of the ecosystem for the region Auvergne-Rhône-Alpes with respect to circular economy in general and the cradle to cradle principles in particular.

The analysis has been performed in the 3 dimensions covered by the Cradle-ALP project:

- Policies and business support
- Technologies
- Business models

With the aim to take stock of the status quo, identify gaps and barriers for the circular transformation of the economy, as well as opportunities for fostering this transformation.

In each region, the analysis focused on the industrial sectors to be involved later in the project in industrial transformation pilot activities. In the case of the region Auvergne-Rhône-Alpes those sectors are: polymers and textile.

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## 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 regional ecosystem Cradle2Cradle maturity analysis

The regional ecosystem maturity analysis performed in each project region is part of a larger set of activities, building together a transnational ecosystem Cradle2Cradle maturity analysis. The latter comprises:

- 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.

The overarching aim of the transnational ecosystem maturity analysis is to understand the relevance of circular economy and more specifically the Cradle 2 Cradle principles in each of the project region within the triangle: policies/business support, technologies/knowledge, and business models/practices.

### Practical implementation in the context of the Cradle-ALP project

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

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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.**

*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 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:

<b>Policies and business support</b>	<b>Technologies</b>	<b>Business models and practices</b>
<ul style="list-style-type: none"><li>▪ Regional strategies/policies fostering circular economy and more specifically C2C principles (fully closed loops).</li><li>▪ European and national/regional strategic documents (e.g. technology roadmaps).</li><li>▪ Funding schemes</li><li>▪ Further business support measures</li></ul>	<ul style="list-style-type: none"><li>▪ Significant technology and knowledge providers (Higher education and research organisations, technical centers, pilot infrastructures, innovation platforms, etc.) located in the project regions</li></ul>	<ul style="list-style-type: none"><li>▪ Role model companies</li><li>▪ Relevant industrial clusters and industrial networks</li></ul>

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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 regional analysis in the region Auvergne-Rhône-Alpes**

The analysis in the region Auvergne-Rhône-Alpes region focused on the following sectors: polymers and textile. The results of the analysis are displayed in the following chapters of this deliverable.

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### 3. Policies and business support

#### Policies

The following relevant policies were identified:

<p><b>Generic level</b></p>	<p>European level</p> <ul style="list-style-type: none"> <li>▪ The <a href="#">New European Innovation Agenda</a> which aim to help Europe develop new technologies to address key societal challenges such as climate change and achieving circularity. The actions of the EU will notably focus on establishing open innovation test bed, strengthening innovations ecosystem through the Regional Innovation Valley program and supporting skills development.</li> </ul> <p>Regional level</p> <ul style="list-style-type: none"> <li>▪ The <a href="#">water-air-soil strategy</a> has been launched on a national level in 2020 to guide the actions of the State and its operators over the long term: supporting, facilitating and monitoring at both regional and departmental level. It aims to adapt to the specificities of each territory. For Auvergne-Rhône-Alpes region, the strategy has set objectives to 2040: reduce 50% the number of days when pollution exceed the reglementary threshold for air quality, preserve environments by achieving 5% of the region under strong protection, reduce water abstraction by 10% by 2025 and by 25% by 2035.</li> <li>▪ The State-Region Plan Contract 2021-2027 which aim to finance projects for the development of the region Auvergne-Rhône-Alpes has included support to circular economy as a key priority for regional policies with the objective to decrease by 12% the production of household and industrial waste by 2027. Part of this strategy will focus on supporting local authorities and private operators in collecting and recycling priority waste stream such as plastics. The stategy also support the development of low-carbon energies (photovoltaics, methanisation and hydrogen).</li> </ul>
<p><b>Plastics/Polymers</b></p>	<p>European level:</p> <ul style="list-style-type: none"> <li>▪ The <a href="#">Net-Zero Industry Act</a> will help strengthen the European manufacturing capacity of net-zero technologies as part of the Green Deal Industrial Plan’s pillars. To accompany this Net-Zero Industry Act, the Commission proposed the <a href="#">Critical Raw Materials Act</a> to ensure that the EU can rely on strong, resilient, and sustainable value chains for critical raw materials (such as graphene, important material for smart &amp; connected polymers). This Act will reduce the administrative burden, streamlining permitting procedures for critical raw materials projects, but also ensure a strong R&amp;I on advanced materials (among which are polymers) as substitutes to Critical raw Materials.</li> <li>▪ The <a href="#">EU’s Directive on single-use plastics</a> focus on requiring the use of sustainable alternatives easily available and affordable to</li> </ul>

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	<p>the 10 single-use plastic products identified in the directive (cutlery, plates, food containers, beverage containers etc.) and limiting the use of other single use plastic products. Specific targets: incorporating 25% of recycled plastic in PET beverage bottles from 2025 &amp; 30% in all plastic beverage bottle from 2030.</p> <p>National level:</p> <ul style="list-style-type: none"> <li>▪ A decisive national policy for ensuring a more circular economy in the polymer sector is the <a href="#">Extended Producer Responsibility</a> meaning that the economic actors are responsible of the entire life cycle of the products they put on the market (from their eco-design to their end of life). The first policies started in 1992, targeting household packaging. The manufacturer must take care of the waste generated but also ensure eco-design, repairing, re-using of their products etc. They must implement a recycling system, either by their own mean or by the implementation of a recycling structure common to the sector (paid by taxes on their products). Concerning the polymer products, several sectors are targeted by current national regulation: household packaging, tyres, automotive, furniture, toys, building, outdoors &amp; leisure, food-service packaging (implemented in 2023).</li> </ul> <p>Regional level:</p> <ul style="list-style-type: none"> <li>▪ The <a href="#">AUVERGNE-RHONE-ALPES 2022-2028 plan for the economy, employment, training and innovation</a> is the regional policy for economic development &amp; planning of the region. The regional Authority identified 4 fields of excellence in its industry, one of them being sustainable materials which include the advanced polymer material industries. The regional policy is supporting R&amp;D&amp;I projects and infrastructures, and the development and transfer of technology through the creation of high-tech companies.</li> </ul>
<p><b>Textiles/fibers</b></p>	<p>European level :</p> <ul style="list-style-type: none"> <li>▪ Textile is one of the 14 main industrial ecosystem identified in the <a href="#">EU industry strategy</a> with the main focus being on developing a more resilient and sustainable textile industry with 3 main priorities : developing recycling hubs, supporting local manufacturing within the EU and diversification of sales channels.</li> </ul> <p>National level:</p> <ul style="list-style-type: none"> <li>▪ A decisive national policy for ensuring a more circular economy in the textile sector is the <a href="#">Extended Producer Responsibility</a> meaning that the economic actors are responsible of the entire life cycle of the products they put on the market (from their eco-design to their end of life). The first policies started in 1992, targeting household packaging. The manufacturer must take care of the waste generated but also ensure eco-design, repairing, re-using of their products etc. They must implement a recycling</li> </ul>

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	<p>system, either by their own mean or by the implementation of a recycling structure common to the sector (paid by taxes on their products). The textile sector is under the Extended Producer Responsibility since 2007 (textiles, shoes and household linen)? Refashion is the eco-organism in charge of applying the state’s requirements to ensure the uptake of circular measures by the French manufacturer of this sector.</p>
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### National/regional strategic documents

The following relevant European and national/regional strategic documents identified:

Generic level	<p>National level</p> <ul style="list-style-type: none"> <li>▪ The national <a href="#">Circular Economy Roadmap</a> sets out the operational details of the transition from a linear model to a circular model that integrates the entire life cycle of products, from eco-design to waste management including their consumption by limiting waste. Key measures include: support the development of digital platform to map repairing &amp; reusing services, support open data from organism in charge of favouring circular economy in each sector, simplify and harmonise waste collecting rules (all packaging will be in one bean)</li> </ul>
Polymer	<p>European level</p> <ul style="list-style-type: none"> <li>▪ The <a href="#">European Plastic Pact Roadmap</a> is an initiative bringing together leading countries and private organisations from the entire plastics value chain across Europe with four aspirational objectives to achieve better lifecycle management of plastics: reusability and recyclability, responsible use of plastics, collection, sorting and recycling &amp; use of recycled plastics. The European Plastic pact is supported by the Ellen MacArthur Foundation.</li> <li>▪ <a href="#">Extended Producer Responsibility (EPR) in Review: A summary of key literature on the advantages, disadvantages, opportunities and limitations of EPR</a> : produced by the European Plastic Pact and supported by the Ellen MacArthur Foundation.</li> <li>▪ <a href="#">ReShaping Plastics : pathways to a circular, climate neutral plastics system in Europe</a> is an independent report commissioned by the European association Plastic Europe developed by SYSTEMIQ aimed to critically evaluate current progress and assess the potential of different levers to help transition towards the EU’s net zero carbon emissions and circularity goals by 2050.</li> </ul>
Textile	<ul style="list-style-type: none"> <li>▪ <a href="#">Plastic in textiles: towards a circular economy for synthetic textiles in Europe</a> : a roadmap developed by the European Environment Agency.</li> <li>▪ The European project <a href="#">New Cotton project</a> had the goal to demonstrate a circular model for commercial garment production and to act as an inspiration and steppingstone for further circular initiatives in the textile</li> </ul>

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	<p>industry going forward. They produced several white paper, one of them treating of <a href="#">Circular Business models in the textile industry</a>. 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 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.</p>
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### Funding schemes and further business support measures

The following relevant funding schemes were identified:

Generic level	<p>European level:</p> <ul style="list-style-type: none"> <li>▪ <a href="#">Circular Bio-Based Europe Joint Undertaking</a>: CBE JU is a €2 billion partnership between the European Union and the Bio-based Industries Consortium (BIC) that funds projects advancing competitive circular bio-based industries under Horizon Europe, the EU's research and innovation program.</li> </ul>
Polymers	<p>European level:</p> <ul style="list-style-type: none"> <li>▪ <a href="#">POLREC</a>: The goal of POLREC (Supporting a green and resilient Europe through POLYmer RECYcling) Euroclusters Innovation Open call is to financially support SMEs from plastics, rubbers and composites industries in recycling their polymer waste through 3 sub-topics : Mechanical Recycling, Mechanical Recycling and Digitalisation. Funding are between 20k and 30k€ per SMEs. Other open calls dedicated to training and networking will be open in 2024.</li> </ul> <p>National level :</p> <ul style="list-style-type: none"> <li>▪ <a href="#">Innovative solutions for improving the Recyclability, Recycling and Reincorporation of Materials (RRR)</a> : calls open to enterprises and research centers on 6 topics: sorting technologies, plastics, strategic metals, paper and cardboard, textiles, composite materials for 1 to 2M€ per application (consortium of 5 partners)</li> <li>▪ <a href="#">ORMAT calls</a>: provides financial support for the production of recycled raw materials (RRM) and their incorporation into products. It contains 2 axes : the first one offers funding for enterprises between 50k to 100k€ dedicated to feasibility studies. The 2<sup>nd</sup> axe offers funding to enterprises (minimum 5 partners in a consortium) for up to 2M€ dedicated to finance investment to adapt manufacturing processes to the use of materials from recycling.</li> </ul>

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	<ul style="list-style-type: none"> <li>▪ <a href="#">Recycling of plastics, composites and elastomers</a> supports the investment needed to industrialise new capacities in the plastics, composites and elastomers recycling chain, from sorting to the incorporation of recycled materials.</li> </ul> <p>Regional</p> <ul style="list-style-type: none"> <li>▪ <a href="#">INNOV'R</a> is a regional funding for the development of eco-innovative projects to help startups and SME get their project off the ground, finance their R&amp;I and provide a testing ground under real-life conditions. The funding is 5M€ maximum for individual or collaborative projects on circular economy, bioeconomy.</li> </ul>
Textile	<p>Regional :</p> <ul style="list-style-type: none"> <li>▪ <a href="#">Re Fashion Challenge Innovation</a> : Refashion is the eco-organism in charge of insuring the circularity of the textile sector in France and respect the regulation's objectives for this sector. It organizes every year a call for R&amp;D projects to optimize the recycling of non-reusable used textiles and footwear and to accelerate the circular development of the sector in France and Europe. 4 projects were selected in 2022.</li> </ul>

The following relevant business support measures were identified:

Generic level	<ul style="list-style-type: none"> <li>▪ <a href="#">ADEME</a> (Agence de l'Environnement et de la Maîtrise de l'Energie) is a public industrial and commercial establishment responsible for advising public authorities, local and regional authorities, businesses and private individuals. It is placed under the authority of the Ministries of Ecological Transition and Solidarity, and Higher Education, Research and Innovation. The Agency is involved in the fight against climate change, the development of clean transport, energy saving, air quality, the reduction of waste production, the development of renewable energies and materials, the rehabilitation of polluted sites and soils, etc. Its mission is to support the ecological and energy transition, in particular by financing projects or research on this topic.</li> <li>▪ <a href="#">ACTIF</a> is a national interactive platform developed by the Chambers of Commerce and Industries that aims to stimulate and organise the exchange of resources and flows (materials, energy, skills) on a territorial scale. It geo-locates the resources identified in a territory, detects possible synergies and ensures their follow-up. The latest version is accessible to enterprises so that they can directly exchange their excess flows. They can offer or publish requests for: any type of raw materials from waste (cardboard packaging, pallets, polystyrene, biomass, production waste etc.), human resources (legal assistant, administrative assistants etc.), energy resources (water, electricity etc.) equipment and services, lands.</li> </ul>
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Polymers	<ul style="list-style-type: none"><li>▪ <a href="#">Polymeris</a> is the French competitiveness cluster for plastics, rubbers and composites. It gathers 400 members these industries and aim to foster innovation by bringing together the industrial and the academic world. Polymeris' support its members on access to funding, European &amp; international cooperation and development of innovative projects on 3 strategic axes: advanced materials, industry 4.0 and circular economy.</li></ul>
Textiles	<ul style="list-style-type: none"><li>▪ <a href="#">Techtera</a> is the French competitiveness cluster for the textile and fiber industry. It gathers 269 members from the textile industry and aim to foster innovation and collaboration between industrial and academic/research actors.</li></ul>

### 4. Technologies and knowledge providers

#### Technology and knowledge providers

The following relevant technology and knowledge providers were identified:

Polymers	<ul style="list-style-type: none"> <li>▪ IPC: The French Industrial Technical Centre for Plastics and Composites, known as IPC, plays a key role in the promotion and innovation of plastics and composite materials and processes in the French industry. With its expertise and network of experts throughout the country, IPC supports industrial companies in a range of areas, from studies and the establishment of protocols to feasibility and technology transfer. IPC has developed the <a href="#">DIS30 platform (for Sustainable (S), Intelligent (I) and Secure (S) Plastics by 2030)</a>. This platform is partly funded by the Auvergne Rhône-Alpes region and the European Regional Development Fund (ERDF). It set up facilities that combine innovation, technology and expertise to address the Circular Economy issues faced by manufacturers in the plastic sector. Manufacturing industries can use this platform to test their plastic products and ensure their recyclability before putting them on the market. IPC is also building on the results of the different testing to list measures of eco-design and recommendation to the whole plastic industry in order to achieve a better recycling rate and incorporation of recycled materials into plastics products. Their work and research are relevant to the polymer sector circular transformation within Cradle Alp project.</li>   <li>▪ INSA is the National Institute of Applied Sciences and a leading engineering school based in Lyon. The institute has developed <a href="#">IMP Laboratory</a> (Polymers Material Engineering) focusing on applied fundamental research activities, ranging from synthesis and formulation of polymers to the determination of polymer based materials' structural properties. The laboratory developed many research projects focusing on polymer recycling, biosourced materials and circular economy applied to polymers.</li>   <li>▪ <a href="#">CEA-Liten</a> is an European research institute based in Grenoble and a driving force behind the development of the sustainable energy technologies of the future. The institute focuses its activities and expertise on limiting Europe's dependency on fossil fuels and reduce greenhouse gas emissions in three key areas: renewable energy, energy efficiency/storage and development of materials. The CEA's Green Chemistry and Environmental Processes Platform draws on skills in chemistry, synthesis, chemical and physico-chemical processes and materials shaping. It also has expertise in eco-innovation and life cycle analysis.</li> </ul>
Textile	<ul style="list-style-type: none"> <li>▪ <a href="#">IFTH</a> is the Technical Industrial Center for textiles and clothing in France aiming to foster the scientific and technical</li> </ul>

	<p>development of the fashion and textiles sectors, including technical sectors. It is a technology centre with a dual mission: to provide technical, technological and specific solutions to companies' problems and to nurture the textile ecosystem in order to encourage growth, sustainable development and the relocation of local activities.</p> <ul style="list-style-type: none"><li>▪ <a href="#">TechteraFab</a> is a collaborative innovation platform, hosting collaborative textile industrialisation projects from different applications sectors with the aim to provide an infrastructure to help the industrial acceleration of the textile projects, including those based on achieving circularity.</li><li>▪ <a href="#">Axel'One</a> is a collaborative innovation platform created in 2011 to pool services, tools and skills aiming at reducing the costs and risks of industrial scale-up. The experiments conducted on the platform range from basic research to the pre-industrial stage. They aim to meet the market challenges in areas where the Auvergne-Rhône-Alpes region has strengths: energy efficiency, process optimization, lightweight and bio-sourced materials. Axel'One is participating to EU projects aiming to develop solutions for textile integrated Circular Economy which results and activities will be useful for the textile sector of Cradle Alp project.</li></ul>
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### 5. Business models and practices

#### Role model companies

The following role model companies were identified:

Polymers	<ul style="list-style-type: none"> <li>▪ <a href="#">Carbios</a>, based in Clermond-Ferrand, has developed an enzymatic recycling process uses an enzyme capable of specifically depolymerizing the PET (polyethylene terephthalate) contained in various plastics or textiles. This allows to recycle complex and soiled plastics and recover all PET waste, including waste that cannot be recovered using current recycling technologies.</li> <li>▪ <a href="#">Gerflor</a>, based in Lyon, is a flooring enterprise which has set-up ambitious targets for achieving circularity and sustainability in 2025 (30% of recycled material reincorporated in Gerflor products, 10% of biosourced materials, -20%kg of the 2020 carbon footprint etc.). It has obtained the C2C certification on its contract floor covering for heavily-used areas in public buildings</li> </ul>
Textile	<ul style="list-style-type: none"> <li>▪ <a href="#">MAPEA</a>, based in the Loire department, is an enterprise specialized in the formulation of plastics. Its strategy is based on the circular economy of plastics and its creates plastic materials by recovering plastics and textiles, whether scrap or used. For example, they collect used soccer jersey to recycle and revalorize them into plastic football field cups.</li> </ul>

#### Relevant industrial groupings and networks

The following industrial groupings and networks were identified:

Generic level	<ul style="list-style-type: none"> <li>▪ <a href="#">ÉCLAIRA</a> gathers the regional stakeholders (enterprises, public stakeholders, academics etc.) active on circular economy topics and is animating this network to foster circular initiatives.</li> </ul>
Polymers	<ul style="list-style-type: none"> <li>▪ EUPC (<a href="#">European Plastic Converter</a>) is the professional representative body of plastics converters in Europe, whose activity embraces all sectors of the plastics converting industry, including recycling. In collaboration with its member organisations, and in support of the European Commission's Plastics Strategy, EUPC developed a unified monitoring tool for the plastics converting industry: <a href="#">MORE platform</a>. The aim is to register 10 million tons of recycled polymers reused in products annually by 2025 – 2030 (excl. internal production scrap).</li> <li>▪ Life cycle of materials working group composed of Polymeris' members with a bottom-up and peer-learning approach. The innovation and medical working group run by Polymeris is also very active on implementing circular approaches: with the</li> </ul>

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	support of Polymeris, the members of this WG received funding to implement a feasibility study on the recyclability of medical packaging.
Textile	<ul style="list-style-type: none"><li>▪ <a href="#">ECOSYSTEEX</a> : With 26 EU-funded member projects focusing on textile sustainability, ECOSYSTEEX, the European Community of Practice for a Sustainable Textile Ecosystem, has been formally launched in early 2023, with a mission to accelerate collaboration in the textile sustainability and circularity field.</li></ul>

### 6. Gaps and barriers – potentials for transformation

The following table summarises the gaps and barriers as well as potentials for an industrial transformation towards an economy following the cradle to cradle principles in the relevant sectors for the region Auvergne-Rhône-Alpes.

Sector	Gaps and barriers	Potentials for transformation
Polymers	<p>High territorial concentration of enterprises working on the same business (for e.g.: extruders in Haute-Loire, injection molders in Oyonnax). They see others enterprises as competitors hence the difficulty to establish collaboration and circular local value-chains.</p> <p>Low acceptance from business clients (B2B) and resistance to change. Customers refuses to changes their consumption practices by for example trying to repair their products instead of throwing it away.</p> <p>Not enough solutions to properly recycle biobased materials.</p> <p>Difficulty for the recyclers to find relevant waste stream (enough quantity of the same type of plastic) to scale-up their recycling technology.</p> <p>High price of the recycled material compared to the fusel-based material (high volatility of the prices markets) can be discouraging for SMEs.</p> <p>High price of bio-based raw materials.</p> <p>Low availability of bio-based materials and recycled material (for eg : Carbios is struggling to find more PET waste stream to open another recycling unit but has already an important list of customers/large groups wanting to buy its recycled material).</p> <p>Legal requirements and legal approval time can be long and discouraging.</p> <p>Not enough technologies available and at an industrial scale for recycling complex materials or composites.</p>	<p>Strong legal incentives for some plastic sectors (food packaging, toys, construction) which have to comply with the Enlarged Responsibility of Producer requirements.</p> <p>Availability of funding for circular transformation projects at a regional, national and European level. More funding dedicated to improving chemical recycling technologies need to be available.</p> <p>Market demand for C2C products and sustainable products strongly increasing.</p> <p>Large company driving the transformation along a specific value chain (e.g. for recyclable packaging in cosmetic in Haute-Loire, implementation of a partnership with innovative SMEs to recycle tires from Michelin group and close the loop).</p> <p>Testing pilot platform made from industries and public partnership such as the IPC mechanical recycling platform allows plastic manufacturers to improve the eco-design of their products and ensure their recyclability.</p> <p>Circular value-chains or circular model can help save money: for example, implementing a common frame for collection and recycling of plastic waste between enterprises working on a same sector (eg: injection molders in Oyonnax) enable to lower the price of these services per quantity of plastic recycled.</p> <p>Solution to the plastic bashing.</p>

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Textile	<p>Low acceptance from business clients (B2B) and resistance to change. Customers refuses to changes their consumption practices by for example trying to repair their products instead of throwing it away. Higher prices and doubts on the quality of the textile made from biosourced or recycled material can also be a barrier for implementing a more circular industry.</p> <p>Not enough technologies mature enough for industrial scale and available for recycling mixed fibers. Difficulty to mechanically recycle the textiles.</p> <p>Not a good common collecting system implemented for textiles. Sorting of textiles is complicated, especially dark textiles (more used in technical wear) as some traditional sorting technologies such as optical sorting does not work.</p>	<p>Availability of funding for circular transformation projects at a regional, national and European level. More funding dedicated to improving chemical recycling technologies need to be available.</p> <p>Strong legal incentives for the textile sector which has to comply with the Enlarged Responsibility of Producer requirements. The eco-organism refashion is very active on promoting circular models and drive the circularity measures implemented in the textile sector.</p> <p>Market demand for C2C products and sustainable products strongly increasing.</p> <p>To reduce the number of different types of polymers and fibers used to produce a single textile item in order to facilitate its recyclability.</p> <p>Digital passport products technologies will enable a stronger traceability of the textile material and its recyclability.</p>
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### 7. Conclusions

The regional maturity analysis of Auvergne-Rhône-Alpes region focused on the polymers and textile sector. With 28% of the national jobs in textile industry localized in Auvergne-Rhône-Alpes region, it is a key component of the region's ecosystem. Plastics industry, which represent in the region 22% of the national volume of employment in the industry, is also a key sector, hence the decision for Polymeris to focus on those 2 sectors in the frame of the ecosystem maturity analysis.

#### 1) Policy framework

Strong political and regulatory measures can significantly drive circular transformation in the polymers sector. The implementation of Enlarged Responsibility of Producer requirements for specific plastic sectors provides a clear regulatory framework that compels businesses to adopt circular practices. This encourages greater responsibility in product design, use, and end-of-life management. The anti-waste law for a circular economy (AGEC) adopted in 2020 reinforced this framework by not only focusing on managing waste but on reducing it and acting on the whole life cycle of products in order to ensure a more circular approach by the industries. In 2022, 24 sectors in France were concerned by the Extended Responsibility of Producer regulation among which are the products from agriculture supply (2001), households packaging (1993), textiles (since 2007) and toys (2023). 5 additional sectors should be covered by 2025 among which will be the sports and leisure products, industrial packaging, sanitary textiles. But despite this political incentive, the industries are struggling to keep up with the requirements due to several different factors: lack of technologies economically viable available, difficulties to collect and sort the plastic and textile waste and difficulties to connect recyclers with recycling waste stream, lack of information on the type of plastics waste. One of the main difficulties identified by the industries is the lack of information on the type of materials used in manufacturing some products. For example, manufacturing of sports and leisure products in plastics is usually outsourced outside of France by the brands, making it difficult to understand how to recover the materials at the end of the product's life. The difficulty to identify the volume and types of waste streams is shared by the textile industry as well, especially for clothing with too many different types of materials.

Mismanagement of waste is also still a big issue in France as well as in the Auvergne-Rhône-Alpes. According to a recent estimate by CITREP, almost 40% of the PET bottles are still throw in the wrong bin and end up in landfill even though there is a well-established and functioning recycling system for this type of plastic waste in France. Collecting textiles also remain a challenge in the region. Sorting technologies (like infrared) can also be inefficient for dark textiles, which is a very common tone used in technical textiles.

#### 2) Funding and Business models

Access to funding for circular transformation projects is critical for the textile and polymer sector. With funding available at regional, national, and European levels, businesses have the financial support needed to implement circular business models and improve recycling technologies. The Auvergne-Rhône-Alpes region has allocated several types of funding, together with national funding scheme, to support businesses and industries in their circular transition. Businesses can access financial support to develop and implement circular business models or improve circular and recycling technologies with specific funding focusing on several key industrial sectors such as the plastics and textiles. However, after conducting this ecosystem analysis, there seem to be a lack of funding available for enterprises wishing to

implement an internal recycling system as the funding usually focus on collaborative projects with different actors across the value-chain or on solution implemented by a service-provider and not by the enterprise itself. Some enterprises also pointed out the lack of enough funding for scaling-up chemical recycling technologies which enable to recycle complex or soiled materials but are more expensive and less easy to use on an industrial scale than mechanical recycling technologies.

The market demand for Cradle to Cradle (C2C) products and sustainable options is on the rise, especially for sectors such as plastics and textiles which suffers from a degraded public reputation in terms of their impact on the environment, creating new opportunities for businesses to meet consumer expectations and enhance their market position. Some enterprises from the plastic industry have pointed out that they can be reluctant to communicate on their new circular and/or bio-based products as they are afraid of being accused of green-washing. A good assessment of the environmental impact of the plastics and textiles products and industrial activities and a better understanding on the market demand and on how to communicate adequately could be a driver for the circular transformation of the industries.

### 3) Technologies

Overcoming technological challenges is vital for the polymers and textiles sectors' transformation. These sectors needs to address technological gaps and issues such as the lack of mature technologies for recycling complex materials, mixed fibers and composites, the difficulty in finding relevant waste streams for scaling recycling operations, the difficulty to scale-up chemical recycling technologies and the lack of solutions for recycling bio-based plastics. Investing in research and development to create and optimize recycling technologies, especially for challenging materials, is a key driver. Collaboration between industry stakeholders and investment in research and development can lead to breakthroughs in recycling techniques, making it easier to recycle challenging waste and improve sorting systems. The presence of strong regional innovative enterprises but also of the cluster for plastics, rubbers and composites (Polymeris), the textile cluster (Techtera), the technical center for Plastics and composites (IPC) and recognized universities and research centers enable a strong technological innovation potential. Strengthening the collaboration among those regional stakeholders but also with national and European key players to share knowledge and expertise will help accelerate technological advancements for the circular transformation of the polymers and textiles sectors.