

Project Acronym: Cradle-Alp

Project number: ASP0100003

D.2.1.2

Transnational sectoral working groups (TSWG)

WP n°:	2
Activity n°:	2.1
TSWG:	Packaging
Author(s):	Mija Sežun (CCIS) Urška Spitzer (CCIS)
Contributors:	Andrea Galeota / LP CCIAA Padova Raphaela Hellmayr / PP4 BOKU Valentina Scandola / PP6 Unismart Stefano Giulitti / PP6 Unismart
Dissemination level:	PU
Revision:	FINAL
Due Date:	30/04/2024
Date of submission:	30/04/2024

Table of content

1.	Introduction to Cradle-ALP project	2
2.	Objectives and scope of the sectoral Cradle2Cradle industrial transformation roadmaps	2
3.	Transnational Sectoral Working Groups implementation	4
4.	TSWG PACKAGING	5
4.1	Composition.....	5
4.2	Internal preparatory meetings.....	5
4.3	Sectoral ecosystem analysis	7
4.4	External expert support group workshop.....	8
4.5	Organization of the TSWG roadmapping workshops.....	9
4.5.1	Workshop 1.....	9
4.5.2	Workshop 2.....	18
4.5.3	Workshop 3.....	22
5.	Conclusion.....	26
6.	Annexes	27

1. Introduction to 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. Objectives and scope of the sectoral Cradle2Cradle industrial transformation roadmaps

By the end of period 2 (April 2024) the Cradle-ALP partners will elaborate **5 circular transformation roadmaps** for the 5 industrial sectors identified as key sectors for the Alpine space:

- Chemistry/Materials
- Polymers/Composites
- Packaging
- Textiles/Fibres
- Wood/Furniture

The roadmap methodology was prepared by Chemie Cluster Bayern, leader of WP2 **Roadmaps to Cradle2Cradle transformation**, and Polymeris, leader of Activity 2.1 **Develop sectoral Cradle2Cradle industrial transformation roadmaps in five selected sectors**, with the support of all Cradle-ALP partners.

Roadmapping is a process that generates information on the status of products and technologies in an innovation context at a specific point in time and on the type, speed and direction of

possible research and technology developments, aggregating possible challenges and translating them into activities, requirements and milestones. The goal of the Cradle-ALP Transformation roadmaps is to have a structured guidance on how to foster the transformation of industrial practices towards circularity & cradle-to-cradle approaches in the 5 key industrial sectors for the Alpine Space.

The first step of the Cradle-ALP roadmapping process was to define a vision that aligns the stakeholders from each of the 5 industrial sectors (businesses, public authorities, academics etc.) on a joint understanding of what is the ideal scenario for the future in their industrial sector, in a given time-frame. It refers to a clear and inspirational description of the future state that an industry aims to achieve in order to become more circular.

To do so, the partners first worked on analyzing their industrial sector ecosystem in the Alpine Space region with respect to circular economy in general and the cradle to cradle principles in particular. Based on the information collected by each partner within its region, the TSWG leader elaborated a sectoral ecosystem analysis that was then presented to the experts during the expert's workshops in order to engage discussion and collect input and recommendation (for more information see D2.1.1). Experts from each sector gave input and recommendation on the ecosystem analysis but also on the definition of an overall and realistic goal that the Cradle-ALP partners could set for each of the 5 transformation roadmaps.

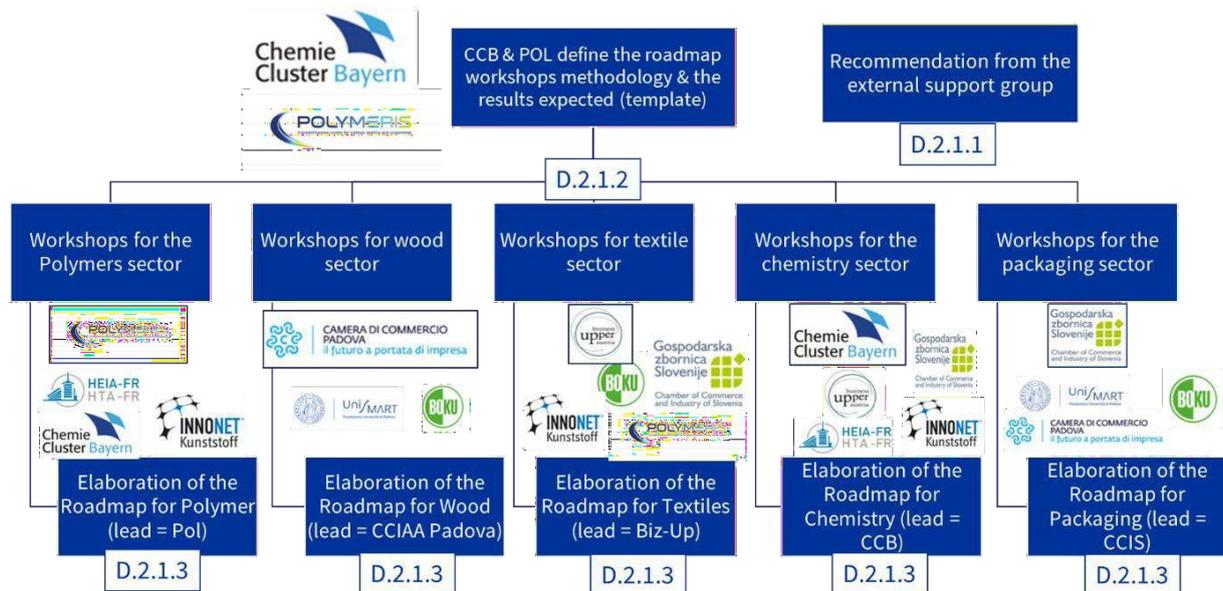
Following the exchanges and collection of input from the experts, each TSWG gathered to reflect and identify, based on the information collected, a common vision to set for their industrial circular transformation roadmap. It was also decided to organize 3 roadmapping workshops focusing on the 3 main level of the industrial value-chain : the first workshop was dedicated to materials & resources, the second one to circular product design and the third one to value-recovery & the management of the products' end-of-life.

The 3 workshops followed the same roadmapping process and engaged the participants on 3 key exercises:

- 1) Identifying potential gaps and barriers in knowledge, technology limitations, market structural barriers, regulatory limitations, public acceptance or other gaps and barriers preventing the industry to achieve the vision set-out following the experts' workshop.
- 2) Defining solutions and key activities to implement in order to overcome the gaps and barriers previously identified. Those key activities must concern each component of the industrial sector, including technology development and deployment, development of business models and market opportunities, development of regulations and standards, policy formulation, creation of financing mechanisms, and public engagement
- 3) Assigning the solutions and key activities according to their field (Technology, Business Model, legal/political) and their time-frame (short-term, mid-term, long-term) and voting on the activities that are the most important to implement and achieve.

3. Transnational Sectoral Working Groups implementation

In order to implement the roadmap methodology, 5 transnational sectoral working groups were established and composed of partners with an expertise on the industrial sectors. The composition of the 5 TSWG is illustrated below, in figure 1.



Each industrial sectoral group is composed of partners from at least 3 different regions in order to insure cross-regional exchanges in the elaboration of the Transformation roadmap workshops. The only exception was for the Wood/Furniture sector which gather partners from Italy and Austria, so the Cradle-ALP partners agreed to all participate in participating to the TSWG and promoting the workshops within their own ecosystem in order to gather enterprises from different Alpin Space regions. The lead partner in charge of implementing the TSWG methodology is framed for each industrial sector. This composition of each TSWG was definitively validated by all partners during the Ljubljana project’s meeting in July 2023.

Alongside the roadmap methodology, Chemie Cluster Bayern and Polymeris elaborated a workflow process with key deadlines and activities to follow by each TSWG in order to implement the roadmapping methodology in their industrial sector.

The TSWG roadmap workflow and methodology is schematized in the figure below.



Each TSWG had to follow the same methodology in order to define joint procedures for the elaboration and testing of the industrial transformation roadmaps.

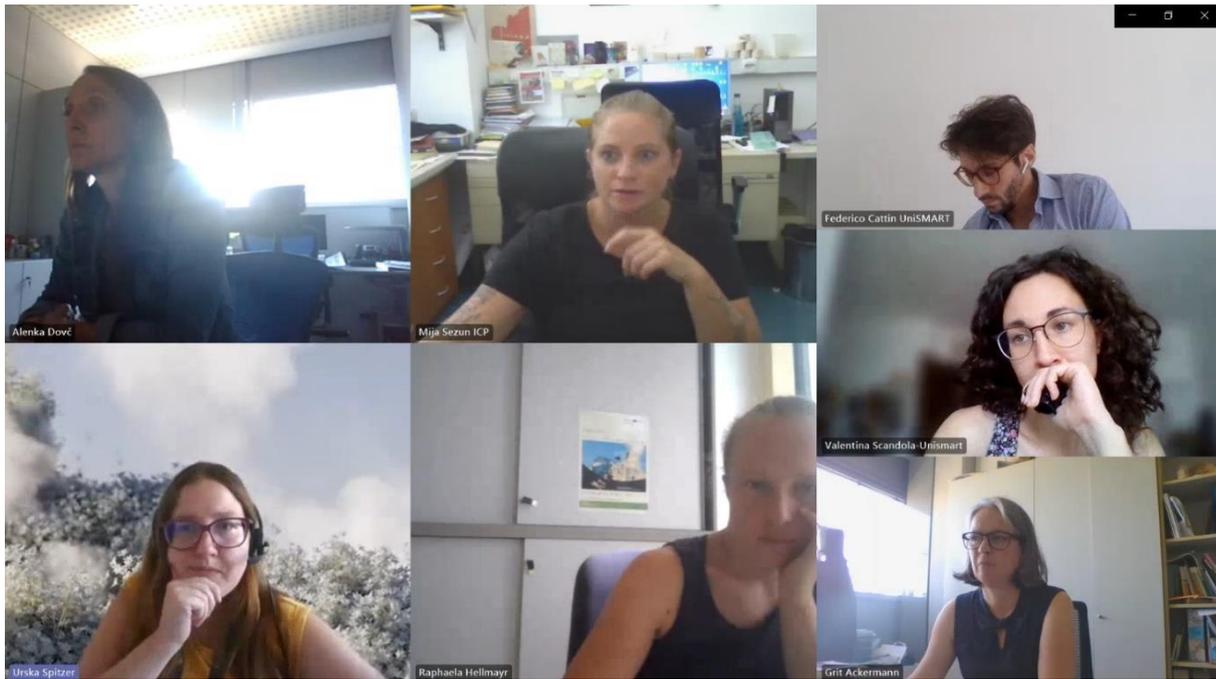
4. TSWG PACKAGING

4.1 Composition

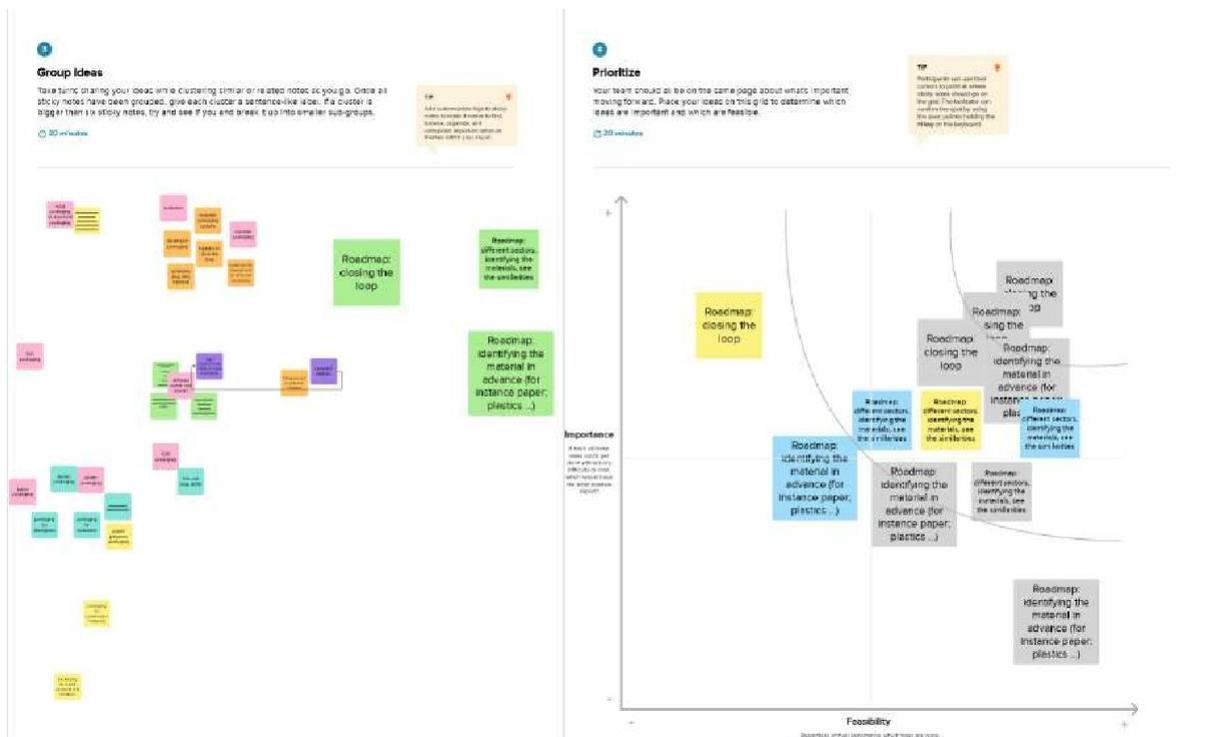
In TSWG Packaging, there are four partners: two from Italy, including the Padova Chamber of Commerce and Industry and UniSmart; one from Austria, BOKU - University of Natural Resources and Life Sciences Vienna; and one from Slovenia, the Chamber of Commerce and Industry of Slovenia, which also leads this TSWG.

4.2 Internal preparatory meetings

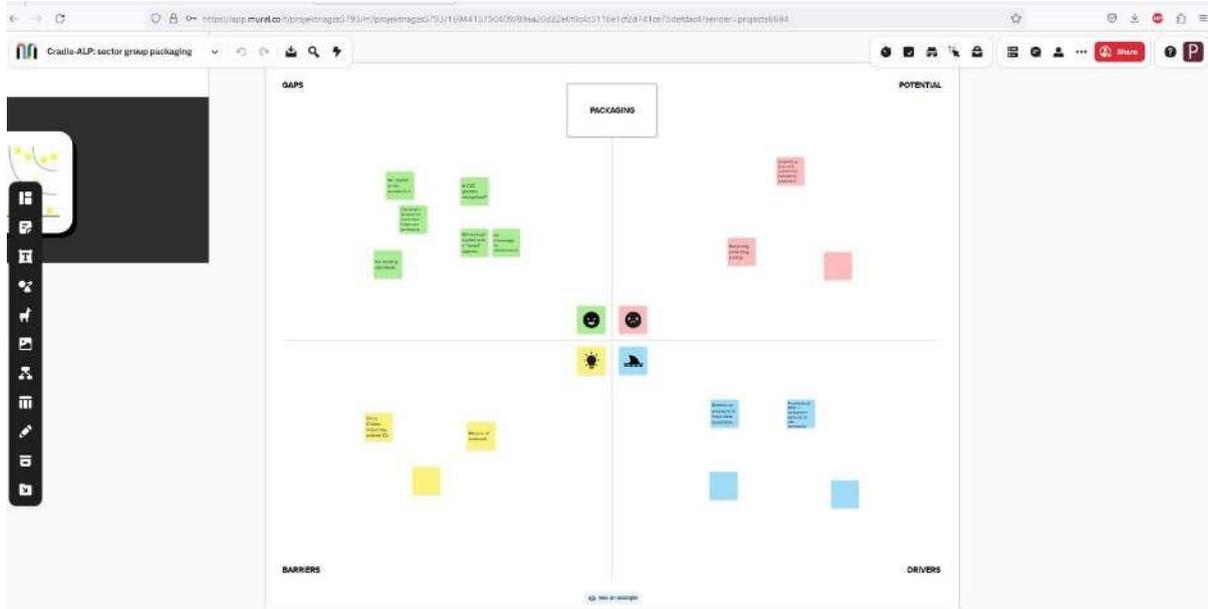
Each TSWG leader was responsible for organizing a virtual “kick-off” meeting with all the partners involved in its sectorial group before the 15th of September. The goal of this meeting was to identify the sub-sectors on which each TSWG will focus for the roadmapping activities (ACT2.1) and the Pilot action (ACT2.2), to identify a list of tools that would be of interest for assisting SMEs in the Pilot action and to start the reflexion on potential SMEs and experts to involve in the roadmapping workshops and Pilot actions.



TSWG Packaging met for the first time on September 11th 2024. We used a Mural Whiteboard to collect ideas for our focus topic. It turned out that the packaging sector itself isn't easy to tackle, since there are many different materials that can be used for the packaging. We decided to organize additional TSWG meetings after the consortium meeting in Linz to come up with the final decision.



The results of the kick-off meeting were presented during the Cradle-ALP project meeting organized in Linz on the 23rd and 24th of October 2023. After this meeting, TSWG Packaging met for two more times regarding the final decision (November 8th and November 28th). In these meetings, we agreed on two groups of materials: **cardboard + paper** and **polyethylene + polypropylene**. We have also started by identifying gaps and barriers + potential and drivers:



The 4th meeting of the group, held on January 10th, was organized for the partners to decide on how to organize the roadmapping workshops with the invited companies and experts. CCIS sent out the possible dates for the organization of our roadmapping workshops. All partners agreed on March 1st, 8th, and 15th between 11.30 and 14.00.

4.3 Sectoral ecosystem analysis

Following the identification of sub-topics of focus for the Transformation roadmap and in line with the D1.2.1 ecosystem analysis conducted by each partner in their regional ecosystem, CCB and POL organized a workshop during the Linz project meeting to develop a sectoral ecosystem analysis. Each TSWG gathered gaps, barriers, drivers and potential for their industrial sector and the TSWG leader was in charge of elaborating a transnational sectoral ecosystem analysis taking into consideration the input from each region and partner. This analysis enabled the partner to better define the scopes and objectives of the Transformation roadmap and served as a basis for discussion with the external support group workshop in order to define a vision for each sector.



4.4 External expert support group workshop

The external expert support group workshop was organised online on Dec 7th 2023 with the objective to discuss with experts the roadmap vision for the five sectors, among them, the packaging sector. We have presented the gaps and barriers we came up with and asked the experts to add their thoughts. This was our conclusion:

Gaps:

- 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:

- 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 -

<https://www.mckinsey.com/industries/industrials-and-electronics/our-insights/sustainability-in-packaging-five-key-levers-for-significant-impact>

- E-commerce needs: The growth of online retail has increased the need for packaging, which can make it difficult to reach sustainability goals -

<https://wasteadvantagemag.com/5-challenges-in-sustainable-packaging-and-how-businesses-overcome-them/>

Drivers/Potential:

- Supporting local and sustainable packaging producers.
- Recycling, collecting, sorting.
- Bottom-up pressure to have a clear legislation.
- Promotion of C2C -> consumers' demand for c2c packaging.
- 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 -
<https://www.conai.org/download/packaging-business-models-in-europe-english-version/?tmstv=1700142068>

4.5 Organization of the TSWG roadmapping workshops

Once the vision was elaborated, the TSWG decided on the dates and organization of the 3 roadmapping workshops. A MURAL template was designed by CCB in order to provide guidelines and roadmapping exercises to the TSWG, CCB and POL organized a training session the 31st of January 2024 for all the partners in order to present the template, the exercises and provide guidance in the roadmapping methodology. The session was recorded and available on the project internal collaborative tool (Trello).

4.5.1 Workshop 1

Focus topic:

The focus of our first workshop was on materials and resources used in packaging sector. Since there are many possibilities regarding use of the packaging materials, we have focused on 1) paper + cardboard (below: paper) & 2) polyethylene and polypropylene (below: plastics).

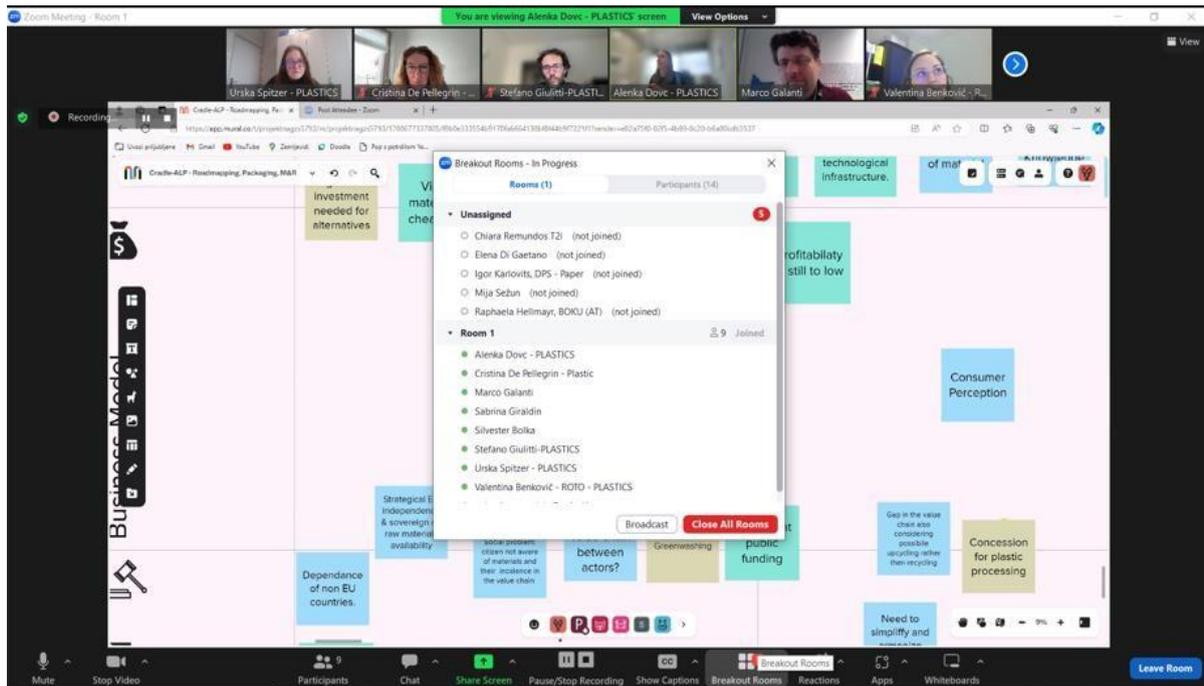
Date: 01.03.2024, 11:30–14:00

Experts invited from: Austria, Italy and Slovenia

Experts registered: 13

Experts participated: 12

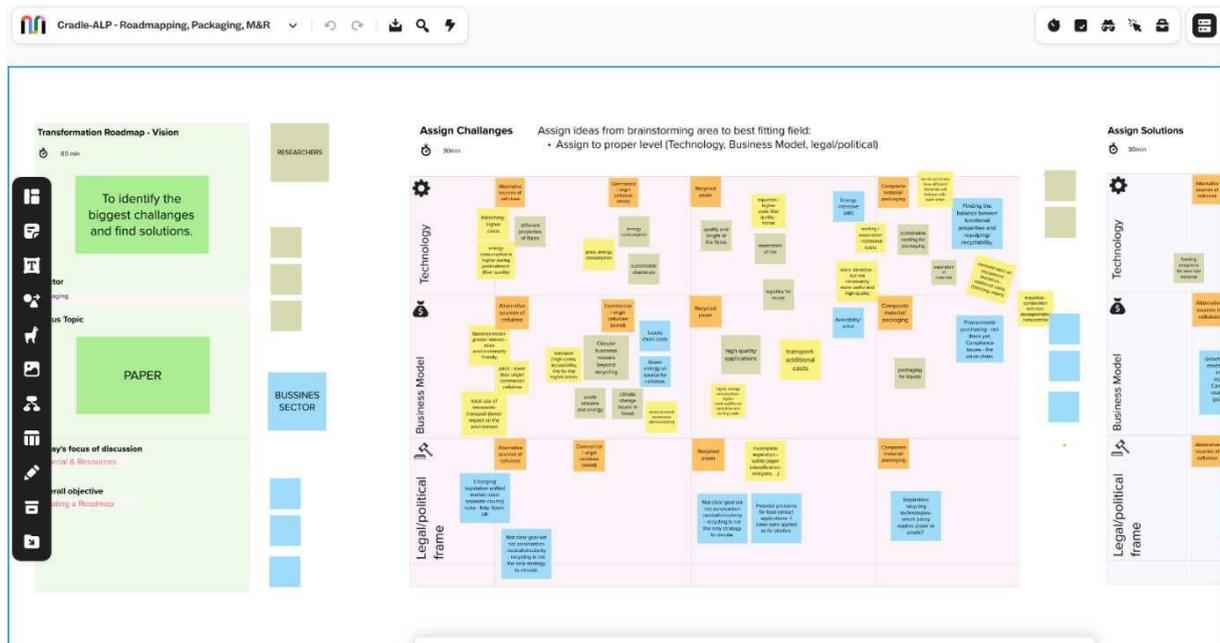
Cradle-Alp partners participated: 6



Before we started with the workshop, the facilitators already prepared Mural with some post-it's based on the internal workshops and a workshop with the experts. Since we have decided to work on two different materials, we had decided prior to the workshop to prepare two canvases, one for the experts on paper packaging, one for the experts on plastics packaging.

PAPER

The group working on a paper packaging focused on 4 preselected topics – alternative sources of cellulose, commercial / virgin cellulose, recycled paper, and composite material in packaging. The participants were asked to assign firstly challenges and later the solutions in the frame of these topics in the fields of technology, business model and legal/political frame.



Participants identified the following challenges regarding:

1. alternative sources of cellulose:

In the field of technology:

- additional bleaching required – requires higher costs
- different properties of fibres
- energy consumption is higher during pre-treatment (fibre quality)
- consumption of large amounts of chemicals
- technologies adapted to alternative sources (upgrading of existing ones)
- unknown area - we do not yet know the possible complications

In the field of business model:

- greater interest from the customer - more environmentally friendly
- lower price than virgin cellulose
- local use - lower transport costs and environmental impact
- poor customer awareness of the benefits of using alternative sources

In the field of legal/political frame:

- Changing legislation unified market rules/separate countries rules- Italy, Spain, UK
- Not clear goals set net zero/carbon neutral/circularity/recycling is not the only strategy to circular

2. commercial/virgin cellulose (wood)

In the field of technology:

- consumption of suitable chemicals
- high energy consumption
- the price of virgin cellulose is higher

In the field of business model:

- consideration of sustainable chains
- climate change – deforestation
- waste streams & energy
- high costs – transport
- environmentally unfriendly behavior (forests and environmental impacts)

In the field of legal/political frame:

/

3. recycling paper

In the field of technology:

- ink removal - deinking process (additional cost) - additional equipment
- low fibre quality - shorter fibres
- a lot of impurities - additional disposal costs/ additional equipment
- contamination of equipment (glues, additives) - additional costs
- sorting and collection - additional cost
- logistics more complicated

In the field of business model:

- circular business models beyond recycling
- greater interest from the customer - more environmentally friendly
- lower price than virgin cellulose
- poor customer awareness of the benefits of using recycled paper

In the field of legal/political frame:

- not clear goals set net zero/carbon neutral/circularity/recycling is not the only strategy to circular
- incomplete legislation, waste paper (classification, analyses, ...)
- potential problems for food contact applications if same rules applied as for plastics

4. composite material/packaging

In the field of technology:

- suitable coatings for specific packaging/material
- sorting of materials – recycling
- we do not know exactly what materials the packaging is made of

- we do not know all the materials - there may be problems during recycling

In the field of business model:

- we do not know the materials - providing information to customers
- customers incomplete information about materials
- poor knowledge - business with composite packaging

In the field of legal/political frame:

- separation recycling technologies - which policy applies paper or plastics

Participants identified the following solutions regarding:

1. alternative sources of cellulose:

In the field of technology:

- funding programs for new raw material
- remove/reduce low chemical intensity, low energy intensity pulping (due to lots of lignin).

In the field of business model:

- growth linear business model - biodiversity - ensure stable replenishment
- combination with reusables - unified goals, not sector based
- better awareness of the importance of using waste biomass (agro waste, food waste) devoting research into the characterization of different types of waste biomass

In the field of legal/political frame:

- inclusion in legislation - alternative sources
- unified policymaking with no sector-based exemptions (material neutral)
- EU needs to define is burning biomass green energy
-

2. commercial/virgin cellulose (wood)

In the field of technology:

- replacement with alternatives (paper mills) - restriction on use (virgin C.)
- shifting to future resources
- multioutput biorefinery

In the field of business model:

/

In the field of legal/political frame:

/

3. recycling paper

In the field of technology:

- research on high quality and sustainable recycling
- more environmentally friendly technologies and material
- local collection
- improvement cleaning technologies - more environmentally friendly (less chemicals)
- improve energy efficiency - biggest challenge

In the field of business model:

- increase the municipal take back (currently low - 50 %)

In the field of legal/political frame:

- paper and plastic packaging unified legislation

4. composite material/packaging

In the field of technology:

- explore the most common materials used in composites and their combinations compatible/suitable
- upgrade of current technologies/processes
- Separating functions material neutral - not change everything to paper

In the field of business model:

- collaboration of paper and plastic companies

In the field of legal/political frame:

- clear legislation regarding recycling and roles and responsibilities

PLASTICS

The group working on a plastic packaging took the same approach, but with some other topics in the focus: virgin material, recycled plastic in packaging, composite material in packaging.



Participants identified the following challenges regarding:

1. virgin material:

In the field of technology:

- high initial investment needed for alternatives
- consumers demand for convenient single-use packaging
- virgin material is cheaper

In the field of business model:

- lack of awareness and knowledge by the consumers, specially among younger generations
- gap in the value chain between actors
- social problem: citizens not aware of materials and their incidence in the value chain
- greenwashing

In the field of legal/political frame:

- dependence on non-EU countries
- no binding standards
- greenwashing

2. recycled plastic packaging

In the field of technology:

- lack of adequate technological infrastructure
- availability of material
- lack of knowledge
- change of production process
- biochemical, mechanical characteristics not always at the right level
- non-constancy of chemical-physical characteristics
- contamination

In the field of business model:

- profitability is still too low
- gap in the value chain, considering possible upcycling rather than recycling
- plastic processing concession

In the field of legal/political frame:

- need to simplify and harmonize legislation
- plastic processing concession

3. composite material/packaging

In the field of technology:

- mixture of materials
- difficult to separate different materials for next recycling
- combination of different materials may create challenge for recycling

In the field of business model:

/

In the field of legal/political frame:

- Social problem: awareness on how to separate garbage

Participants identified the following solutions regarding:

1. virgin material:

In the field of technology:

/

In the field of business model:

- trainings
- use product to spread the right info
- examples of good practices in commercial chains
- a connection between companies and institutions to create a shared voice to explain to stakeholders the importance of changing the habits

In the field of legal/political frame:

- strategical EU independence & sovereign on raw materials availability

- use circulating packaging to empower recycled plastics and increase % in blended plastics products
- extended producer responsibility
- develop EU directives to empower local chains

2. recycled plastic packaging

In the field of technology:

- degradation during recycling and processing - solution: up-cycling of recycled material
- identify right products in which the lack of constancy of technical proprieties is less impacting
- make companies aware that alternatives exist and that implementation is possible
- favour batch consistency by strict gates (1) increase research, (2) non-constancy of chemical-physical characteristics
- a change in the way of thinking: one batch of material is limited, a smaller quantity; recycled material is only for a specific product, not for all similar products

In the field of business model:

- a connection between companies and institutions to create a shared voice to explain to stakeholders the importance of changing the habits
- impact consumer perception / make people understand why green transition is also good for them
- bring innovation in the use of alternatives (competitive advantage)
- consider upcycling rather than recycling
- develop a dynamic circularity that holistically considers all forms: recycling, upcycling etc.
- collection of plastic by type and waste, plastic stock exchange

In the field of legal/political frame:

- consider upcycling rather than recycling
- develop a dynamic circularity that holistically considers all forms: recycling, upcycling etc.
- collection of plastic by type and waste, plastic stock exchange

3. composite material/packaging

In the field of technology:

- a change in the way of thinking: one batch of material is limited, a smaller quantity; recycled material is only for a specific product, not for all similar products
- up-cycling with addition of compatibilizers

In the field of business model:

- separation of plastic waste material by type (this can be second step); first needed step is to unify type of plastic for packaging

In the field of legal/political frame:

/

4.5.2 Workshop 2

Focus topic:

The focus of the second workshop was on **ecodesign** (design that enables and fosters recycling) in packaging sector. Once again, we have focused on 1) paper + cardboard & 2) plastic (polyethylene and polypropylene).

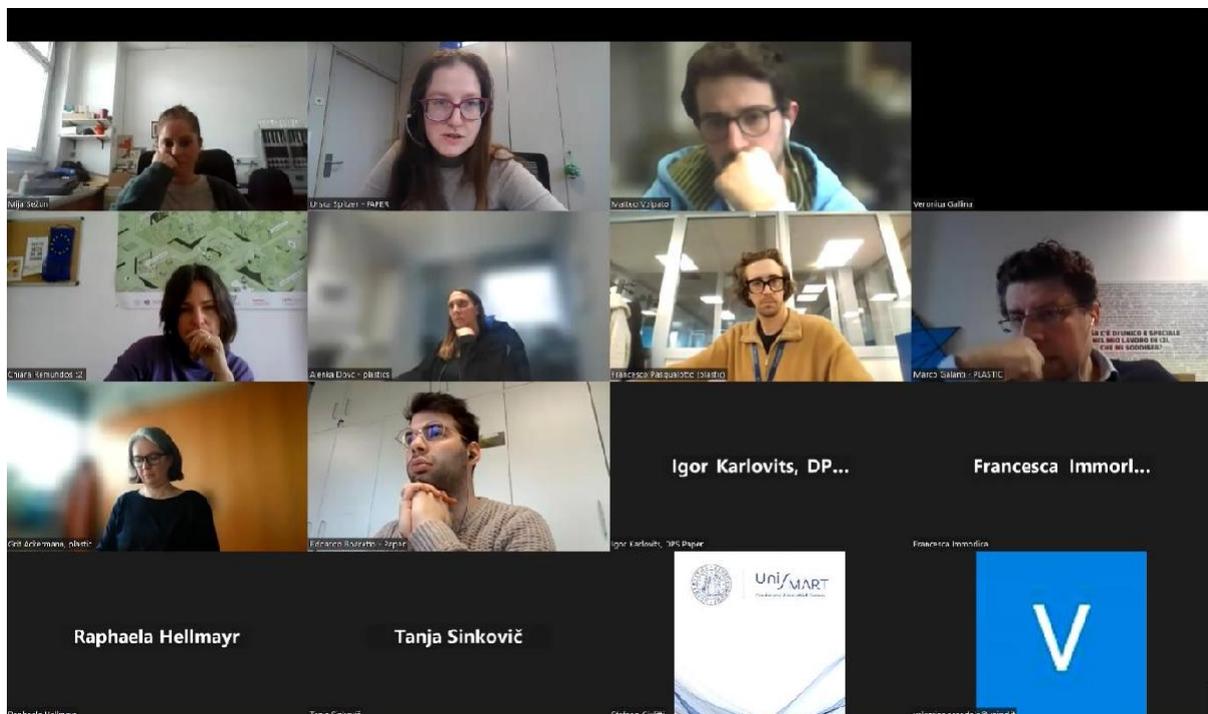
Date: 08.03.2024, 11:30–14:00

Experts invited from: Austria, Italy and Slovenia

Experts registered: 21

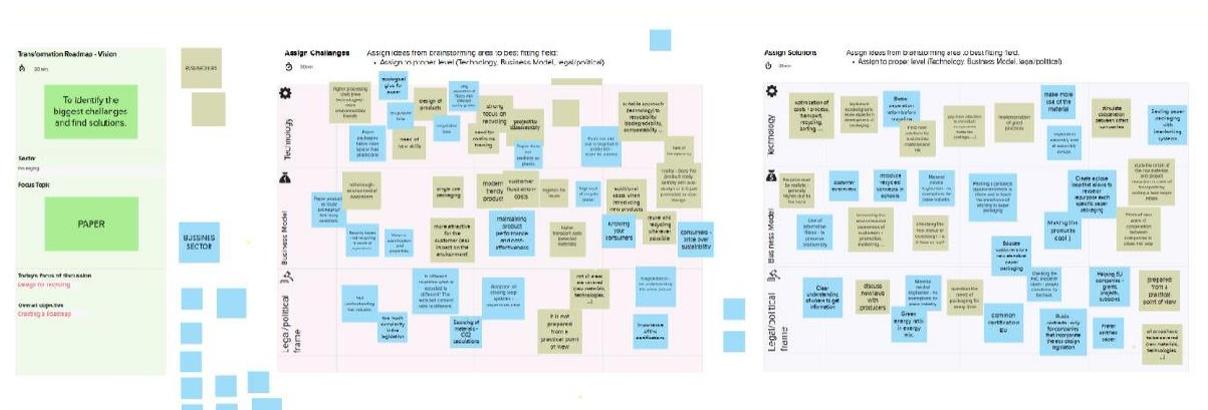
Experts participated: 11

Cradle-Alp partners participated: 8



PAPER

At the beginning of the second workshop, we made a short recap of the first one. Afterwards, we continued with the main topic of the second workshop: ecodesign. As before the first workshop, we had also prepared Mural for the second one. This time we asked our participants to choose their post-its from two colours – brown for the researchers, blue for the representatives of the business sector (SMEs, BSOs). This gave us a chance to see the difference in their understanding of the topic and the specific problems they are facing. Once again, we asked our participants to think about the main topic within three fields: technology, business model, and legal/political framework.



The researchers identified the following challenges:

In the field of technology:

- higher processing costs
- design of products
- need of new skills
- need for continuous training

In the field of business model:

- not enough environmental awareness
- single use packaging
- logistics for the reuse
- consumer – need of an attractive, modern, trendy product
- costs: higher costs for the consumer, higher transformation costs, additional costs when introducing new products
- promotion: does the product really comply with ecodesign or is it just prompted as ecodesign

In the field of legal/political frame:

- it is not prepared from political point of view
- not all areas are covered (raw materials, technologies ...)

The researchers identified the following solutions:

In the field of technology:

- optimization of costs – process, transport, recycling, sorting ...
- implement ecodesign and reuse aspects in development of packaging
- find new solutions for sustainable coatings and ink
- pay more attention to individual components (materials, coatings ...)
- implementation of good practices
- cooperation between companies

In the field of business model:

- setting a realistic price
- increasing the environmental awareness of costumers – promotion, marketing
- checking the real status of ecodesign – is it real or fake
- study the origin of the raw materials and project reduction in costs of transports by sorting a best origin mix
- thinking of new ways of cooperation between companies to close the loop

In the field of legal/political frame:

- discuss new law with producers
- question the need of packaging for every item
- prepare from a practical point of view
- all areas need to be covered (raw materials, technologies ...)

The representatives of the business sector identified the following challenges:

In the field of technology:

- paper packaging takes more space than plastic one
- ecological glue for paper
- recyclable inks
- easy separation of fibres with different quality grades
- paper does not perform as plastic
- exact mix ratio due to large batch production – easier for plastics

In the field of business model:

- paper products as reuse packaging – not many examples
- reusing boxes – not recycling
- material specification and properties
- maintaining product performance and cost-effectiveness
- high cost of recycled paper
- knowing your costumers
- consumers – price over sustainability

In the field of legal/political frame:

- not understanding the industry
- too much complexity in the legislation
- in different countries different legislation (the recycled content ratio is different)
- sourcing of materials – CO2 calculations
- adoption of closing loop systems is expensive and new
- fragmentation – not understanding the whole picture
- importance of the certifications

The representatives of the business sector identified the following solutions:

In the field of technology:

- better separation ration before recycling
- make more use of the materials
- implement assembly and di-assembly design
- sealing paper packaging with interlocking systems

In the field of business model:

- use of alternative fibres – to preserve biodiversity
- customer awareness / educate customers
- introduce recycled concepts in schools
- material neutral legislation – no examples for paper industry
- planning periodical events to inform and to teach the importance of switching to paper packaging
- making the products cool
- create a close loop that allows to reuse or repurpose each specific paper packaging

In the field of legal/political frame:

- clear understanding of where to get information

- green energy ratio in energy mix
- material neutral legislation
- common certification EU
- checking the FSC and other labels – people sometimes try to cheat
- public contracts – only for companies that incorporate that ecodesign legislation
- helping EU companies – grants, projects, subsidies
- preferring certified paper

4.5.3 Workshop 3

Focus topic:

The focus topic of the third workshop was **sorting, collecting, and recycling**. We decided to merge both groups together, as we realized in the first two workshops that the challenges and solutions of both groups intersect. Additionally, we wanted to enable people from different sectors to see the challenges and solutions that others face, and perhaps find ideas for their own sectors as well.

Date: 05.03.2024, 11:30–14:00

Experts invited from: Austria, Italy and Slovenia

Experts registered: 20 (+5 Cradle-ALP partners)

Experts participated: 8

Cradle-Alp partners participated: 7

The screenshot displays a Zoom meeting interface with a shared screen showing a mind map titled "PAPER AND PLASTICS". The mind map is divided into two main sections: "Technology" and "Business Model".

Technology Section:

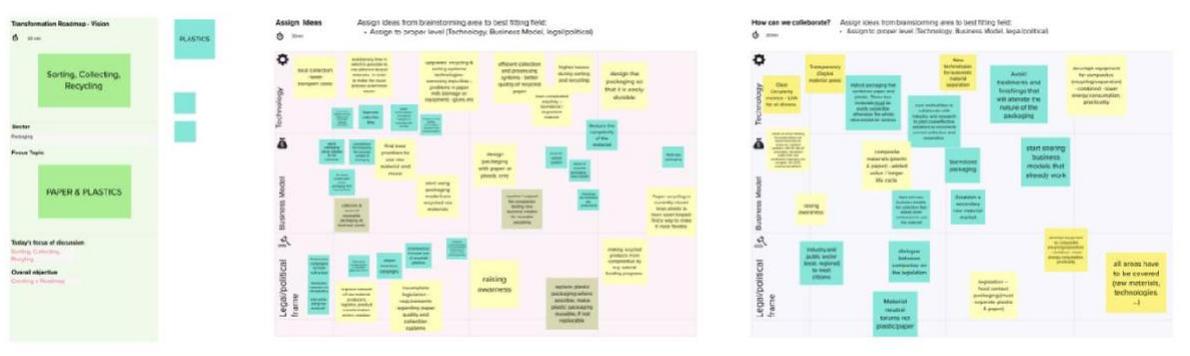
- Lower transport costs
- efficient collection and processing systems - better quality of recycled paper
- higher losses during sorting and recycling
- more complicated recycling - biomaterial / degradable material
- sorting systems/ technologies - removing impurities - problems in paper mills (damage on equipment) - glues, etc
- Separate collection bins
- plastic packaging clearly labelled for the consumer
- commitment for increasing the recycled content in packaging
- study
- product really comply with eco-design or is it just promoted as eco-design
- Good way to start educating final users to make more responsible choices
- deposit-refund system

Business Model Section:

- collection & return of reusable packaging as business model
- design packaging with paper or plastic only
- voucher / support for companies testing new
- incentives to increase of recycled plastics
- citizen
- Awareness
- raising
- competitive by

The Zoom interface shows a video grid at the top with participants: Urska Spitzer - Paper, Maja Sežun, Alenka Dovc - plastics, Stefano Giullitti, Matteo Volpato, and Grit Ackermann. The bottom toolbar includes options like Unmute, Stop Video, Security, Participants, Chat, Share Screen, Summary, Pause/Stop Recording, Show Captions, Reactions, Apps, Whiteboards, Notes, More, and End.

PAPER AND PLASTICS



The representatives of the paper industry mentioned the following ideas:

In the field of technology:

- local collection – lower transport costs
- avoid mixing materials, design packaging where materials can be easily separated
- upgraded recycling and sorting systems + technologies for removing impurities; problems in paper mills (damage on equipment)
- efficient collection and processing systems- better quality of recycled paper
- biomaterial and degradable material is more difficult to recycle

In the field of business model:

- find best practices to use raw material and reuse
- start using packaging made from recycled new materials
- design packaging with paper or plastics only
- paper recycling in currently closed loop, plastic is more open looped – make it more flexible
- collection & return of reusable packaging as business model
- voucher / support for companies
- testing new business models for reusable packaging

In the field of legal/political frame:

- Improve network of raw material producers, logistics, product transformation actors, retailers
- incomplete legislation - requirements regarding paper quality and collection systems
- raising awareness
- making recycled products more competitive by e.g. special funding programs
- replace plastic packaging where possible, make plastic packaging reusable, if not replaceable

The representatives of the plastic industry identified the following challenges:

In the field of technology:

- color-codes plastics can help citizens and automatic garbage recognition
- separate collection bins
- better technologies / increased capacity in recycling and sorting
- projects on new sorting technologies (research & implementation)
- reduce the complexity of the material

In the field of business model:

- plastic packaging clearly labelled for the consumer
- commitment for increasing the recycled content in packaging
- eliminate “problematic” plastic packaging from portfolio
- deposit-refund system
- return of reusable packaging – new market
- incentives for collection (for consumers)
- multi-use packaging

In the field of legal/political frame:

- awareness campaigns by local authorities (e. g. on microplastics)
- foster use of reusable plastics on substitutes (glass, aluminium ...)
- incentives to increase use of recycled plastics
- Incentivize companies based on recycled plastic amount and on products 100%

How can we collaborate?

In the field of technology:

- clear circularity metrics + LCA analysis
- transparency (digital material pass)
- hybrid packaging that combines paper and plastic. These two materials must be easily separable otherwise the whole idea would be useless
- new technologies for automatic material separation
- local multiutilities to collaborate with industry and research to pilot cost-effective solutions to increment correct collection and separation
- avoid treatments and finishings that will alternate the nature of the packaging
- develop equipment for composites (recycling/separation) - combined - lower energy consumption, practicality

In the field of business model:

- find best practices to use raw material and reuse
- start using packaging made from recycled new materials

- design packaging with paper or plastics only
- paper recycling in currently closed loop, plastic is more open looped – make it more flexible
- collection & return of reusable packaging as business model
- voucher / support for companies
- testing new business models for reusable packaging

In the field of legal/political frame:

- Improve network of raw material producers, logistics, product transformation actors, retailers
- incomplete legislation - requirements regarding paper quality and collection systems
- raising awareness
- making recycled products more competitive by e.g. special funding programs
- replace plastic packaging where possible, make plastic packaging reusable, if not replaceable

In the field of legal/political frame:

- awareness campaigns by local authorities (e. g. on microplastics)
- foster use of reusable plastics on substitutes (glass, aluminium ...)
- incentives to increase use of recycled plastics
- Incentivize companies based on recycled plastic amount and on products 100%

How can Cradle-ALP help (representatives of plastic and paper sector together)?

In the field of technology:

- encourage collaboration between companies
- support feasibility studies

In the field of business model:

- workshops to create a common understanding of circular packaging for companies
- bring different actors together in workshop
- sharing best practices / use cases
- help to obtain C2C certificate
- encourage collaboration between companies
- where possible, share the improvements of the other business realities in order to inspire the other ones
- inclusion in new joint projects regarding this topic

In the field of legal/political frame:

- information about latest legislative requirements

- understand the industry needs and limitations especially when there is a gap between policies and real scenario
- lobby for circular economy
- collecting companies /stakeholders needs and present them to policymakers
- help companies understand legislation
- expert support on new technologies or legal framework
- workshop on legal framework

5. Conclusion

The roadmapping process within the Cradle-Alp project encountered several challenges, particularly in ensuring diversity of expertise and maintaining focus across multiple workshops. Despite these hurdles, the project succeeded in engaging a sufficient number of experts from industry and academia across different Alpine countries, fostering productive discussions on circular economy and cradle-to-cradle concepts. We also managed to keep the number of participants more or less the same at all three workshops.

One initial difficulty was selecting specific subtopics from a broad range of potential materials for packaging, including paper, cardboard, plastics (polyethylene, polypropylene), glass, metals, hybrid materials, and more. Eventually, the decision was made to focus on paper/cardboard and plastics (polyethylene, polypropylene), with all partners agreeing to ensure participation from experts and entrepreneurs in their respective countries.

The decision to cover three levels (technologies, business models, legal/political framework) and three separate topics within three workshops was common across all 5 Transnational Sectoral Working Groups (TSWGs). Each group however implemented its own approach. With the first workshop, TSWG Packaging decided to focus on identifying challenges and proposing solutions for paper and plastics separately, primarily centred around material and resources. The second workshop, centred on ecodesign, divided participants within each material group further into business and academia groups. This gave us the opportunity not only to gain insights on ecodesign but also to explore differences and similarities between different stakeholders. Finally, the third workshop brought everyone together to discuss common ideas on sorting, collecting, and recycling, as well as collaboration possibilities.

The TSWG Packaging leader recognized the importance of effective moderation and task distribution among partners to ensure smooth workshop proceedings. Alternating moderation responsibilities and assigning roles for note-taking and technical support proved beneficial. Adjusting the workshop formats based on internal workshops, workshops with external experts, and the first and second roadmapping workshops proved beneficial, as we were able to explore the topic in detail and avoid repeating the same ideas for challenges and solutions.

Summarizing outcomes and identifying actionable solutions proved challenging at times, especially in understanding ideas presented on sticky notes comprehensively. However,

presenting results in plenum and assigning a timeline for further discussion helped to clarify and refine ideas.

In conclusion, while the roadmapping process faced various challenges, the Cradle-Alp project succeeded in fostering collaboration and generating valuable insights for advancing circular economy principles in the packaging sector (paper, plastics). The challenges and solutions identified in the workshops will serve as a basis for a roadmap that will leverage solutions proposed in the workshops to enhance sustainability and competitiveness.

6. Annexes

Annex 1: Invitation to the workshops

(screenshot, was send as an e-mail)



Annex 2: registration form

CradleAlp - roadmapping workshops Packaging: application form

1. Company / institution
2. Full name of participant
3. Email address
4. Country
5. Job title/position
6. I want to participate in workshop:
 1.3.2024 11:30 – 14:00: Material & Resources
 8.3.2024 11:30 – 14:00: Product Design (Design for Recycling)
 15.3.2024 11:30 – 14:00: Closing the loop / Recovery (Collection, Sorting, Recycling)

Nikoli ne izdajte svojega gesla. [Prijavite zlorabo](#)

 Microsoft 365

To vsebino ustvari lastnik obrazca. Podatki, ki jih predložite, bodo poslani lastniku obrazca. Microsoft ni odgovoren za zasebnost ali varnostne prakse svojih strank, vključno s praksami lastnika tega obrazca. Nikoli ne izdajte svojega gesla.
Microsoft Forms | Raziskave, preskusi znanja in ankete, ki uporabljajo umetno inteligenco [Ustvarite svoj obrazec](#)
Lastnik tega obrazca ni predložil izjave o zasebnosti, kako bo uporabil vaše podatke o odzivih. Ne posredujte osebnih ali občutljivih podatkov.
| Pogoji uporabe

Annex 3: Registrations

1.3.2024 11:30 – 14:00: Material & Resources

Company / institution	Full name of participant	Country	Job title/position
Danfoss Power Solutions	Igor Karlovits	Slovenia	Packaging consultant
Pulp and Paper Institute Ljubljana	Mija Sežun	Slovenia	researcher
BOKU	Raphaela Hellmayr	Austria	Researcher
Pulp and Paper Institute	Urška Kavčič	Slovenia	Researcher
CCIS	Urška Spitzer	Slovenia	Project Manager
Pulp and Paper Institute	Gregor Lavrič	Slovenia	Researcher
National Institute of Chemistry	Mirica Karlovits	Slovenia	Project coordinator
Jamnik d.o.o.	Tanja Sinkovič	Slovenia	Marketing manager
Roto ECO d.o.o.	Valentina Benkovič	Slovenia	New process and product development
FTPO	Silvester Bolka	Slovenia	Head of Centre for Cooperation with Industry
Fibran d.o.o.	Matej Lesar	Slovenia	
t2i	Marco Galanti	Italy	Innovation Manager
Extra3D	Gioia Della Giustina	Italy	Head of materials dev
UniSMART	Valentina Scandola	Italy	EU project manager
Unismart	Stefano Giulitti	Italy	Head of unit
t2i	Chiara Remundos	Italy	trainer
	Cristina De Pellegrin	Italia	Consultant
Kering Eyewear	Edoardo Boaretto	Italy	

8.3.2024 11:30 – 14:00: Product Design (Design for Recycling)

Company / institution	Full name of participant	Country	Job title/position
Danfoss Power Solutions	Igor Karlovits	Slovenia	Packaging consultant
Kssena	Eliana Colzani	Slovenia	volunteer
Pulp and Paper Institute Ljubljana	Mija Sežun	Slovenia	researcher
BOKU	Raphaela Hellmayr	Austria	Researcher
Pulp and Paper Institute	Urška Kavčič	Slovenia	Researcher
CCIS	Urška Spitzer	Slovenia	Project Manager
Pulp and Paper Institute	Gregor Lavrič	Slovenia	Researcher
National Institute of Chemistry	Mirica Karlovits	Slovenia	Project coordinator

Cradle-ALP – D2.1.2 Transnational sectoral working groups (TSWG)

Jamnik d.o.o.	Tanja Sinkovič	Slovenia	Marketing manager
Roto ECO d.o.o.	Valentina Benkovič	Slovenia	New process and product development
t2i	Marco Galanti	Italy	Innovation Manager
Axtra3D	Gioia Della Giustina	Italy	Head of materials dev
Unismart	Stefano Giulitti	Italy	Head of unit
	Cristina De Pellegrin	Italia	Consultant
Kering Eyewear	Edoardo Boaretto	Italy	
Koerber Technologies	Marco Morandin	Italy	Sales
CARLO SESSA SPA	ALESSANDRO	ITALIA	commerciale
Zoppas Industries	Francesco Pasqualotto	Italy	R&D Sustainability Analyst
Tecnopool	Francesca Catalano	Italy	Impiegato tecnico
Kering Eyewear	Edoardo Boaretto	Italy	Junior Sustainability Specialist
Waypoint S.r.l.	Matteo Volpato	Italy	Industrial Designer
	Veronica Gallina	Italy	Student
Way Point Srl	Alberto Baesso	Italy	Innovation Manager
Way Point s.r.l	Francesca Maria Immorlica	Mirto	Junior Industrial Designer
	Veronica Gallina	Italy	Student
WayPoint-light	Giuseppe	Italy	Sustainability Manager

15.3.2024 11:30 – 14:00: Closing the loop / Recovery (Collection, Sorting, Recycling)

Company / institution	Full name of participant	Country	Job title/position
Danfoss Power Solutions	Igor Karlovits	Slovenia	Packaging consultant
Pulp and Paper Institute Ljubljana	Mija Sežun	Slovenia	researcher
BOKU	Raphaela Hellmayr	Austria	Researcher
Pulp and Paper Institute	Urška Kavčič	Slovenia	Researcher
CCIS	Urška Spitzer	Slovenia	Project Manager
Pulp and Paper Institute	Gregor Lavrič	Slovenia	Researcher
Jamnik d.o.o.	Tanja Sinkovič	Slovenia	Marketing manager
Roto ECO d.o.o.	Valentina Benkovič	Slovenia	New process and product development
FTPO	Silvester Bolka	Slovenia	Head of Centre for Cooperation with Industry
Fibran d.o.o.	Matej Lesar	Slovenia	
t2i	Marco Galanti	Italy	Innovation Manager
UniSMART	Valentina Scandola	Italy	EU project manager
Unismart	Stefano Giulitti	Italy	Head of unit
	Cristina De Pellegrin	Italia	Consultant
Kering Eyewear	Edoardo Boaretto	Italy	
Koerber Technologies	Marco Morandin	Italy	Sales
CARLO SESSA SPA	ALESSANDRO	ITALIA	commerciale

Cradle-ALP – D2.1.2 Transnational sectoral working groups (TSWG)

EcoLoop	Alberto Valente	italy	sales eng.
Tecnopool	Francesca Catalano	Italy	Impiegato tecnico
Kering Eyewear	Edoardo Boaretto	Italy	Junior Sustainability Specialist
Waypoint S.r.l.	Matteo Volpato	Italy	Industrial Designer
	Veronica Gallina	Italy	Student
Way Point Srl	Alberto Baesso	Italy	Innovation Manager
	Francesca Maria		
Way Point s.r.l	Immorlica	Mirto	Junior Industrial Designer
	Veronica Gallina	Italy	Student
WayPoint-light	Giuseppe	Italy	Sustainability Manager