Interreg CENTRAL EUROPE

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CURIOST

Circular design and development of sustainable products in 4 key sectors in Central Europe

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Internal capacity building and creation of a joint vision

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1. Initial situation for drawing a joint vision

To accelerate progress in the green transition, it is crucial to establish strategic pathways. Therefore, in CURIOST all project partners and external experts collaboratively worked together to draw a joint vision for sustainable and circular product development. The aim of this vision is to achieve a more sustainable and circular product design and development by 2030 and beyond.

This joint vision is essential as it aligns companies as well as policy stakeholders (regional, national and EU) towards a common goal: it fosters collaboration, innovation and shared responsibility, which are crucial for achieving significant advancements in sustainable and circular product development.

The preparatory work and the development of the joint vision ensures that all partners are well-equipped to guide companies through the upcoming activities within CURIOST:

- *D1.4.3 Strategy uptake workshops with large number of SME and small midcaps*
- *D2.3.2 Two-stage pilot with prototype creation and testing, and business modelling*

2. Internal capacity building

The internal capacity building within D1.3.1 can be regarded as an essential preparatory step for developing the joint vision. It equips the project partners involved with the necessary skills and knowledge to effectively contribute to the vision. By strengthening internal capabilities, project partners can better understand sustainable product development and research, making the joint vision more attainable and impactful.

2.1. Webinars with experts

Basis and preparatory work for the joint vision were seven webinars with experts who operated as teachers for project partners about new trends and benefits of related (digital) circular business cases as well as best practices:

Webinar date	Webinar title	Expert(s)	Number of Participants	Duration
17.02.2025	Sharing best practice examples between project partners (BI)	Project partners presentation of following companies as best practices for (digital) sustainable product development: • Perndorfer Maschinenbau GmbH, AT (Biz-up) • General plastic a.s., SK (UEBA) • Holcim Ltd., HU (PBKIK) • IMG Építő Ltd., HU (PBKIK) • Termoplast, HU (PBKIK)	18	1h

		• Magnus Aircraft Private Ltd., HU (PBKIK) • Linab Group, PL (SPC) • DRACO Pro, HR (STEP RI) • Prima Industry Group, IT (MESAP) • Re-Sport, IT (ENVI) • Lindner Group, DE (BI) • REHAU Group, DE (UCB) • MURPLAST d.o.o., HR (MJC)		
27.02.2025	Big Picture of the Green Transition (CPU)	Benjamin Englert Senior Consultant economy & innovation, ConPlusUltra GmbH	17	1h 15 min.
21.03.2025	Plastic Recycling in Austria – Current Status and Innovations (Biz-up)	• Clemens Kitzberger Business Development Manager post consumer recycling, EREMA Group • Dieter Schuch Head of Technical Services / R&D Altstoff Recycling Austria AG	20	1h 11 min.
16.04.2025	New materials: bioplastics (UCB)	Christina Zegowitz Manager Projects Cluster of Environmental Technologies Bavaria	17	17 min.
16.04.2025	Clean Industrial Deal and regulatory framework that will affect SME (CPU)	Minea Tatić Consultant, economy + innovation ConPlusUltra	17	32 min.
17.04.2025	New processing/product technologies (MESAP)	▪ The role of digital technologies in the 5Rs of the circular economy Claudia Franzè, CIM 4.0 ▪ How additive manufacturing contributes to circular economy principles Chiara De Crescenzo, CIM 4.0	19	1h

		▪ Traceability as a key element of the circular economy: Digintrace & Trineflex Andrea Rovella, DGS Spa		
05.05.2025	New materials in construction – timber-concrete composite structures (PBKIK)	Tamás Juhász Lecturer at the University of Pecs	25	1h

Webinar "Sharing best practice examples between project partners", 17.02.2025, organized by Bayern Innovativ (BI)

The Best Practice Webinar took place on February 17, 2025. Each of the 11 project partners presented one best practice example. All four sectors — Mechanics & Mechatronics, Plastics, Packaging, and Construction — were represented. The following insights were gained from the webinar with regard to circular product development:

The systematic integration of circular principles, such as the 10R model, creates both economic and ecological value. Companies like Perndorfer Maschinenbau demonstrate that these approaches not only help reduce costs and increase customer value but also uncover new innovation potential — a crucial foundation for digital development processes.

A central element is design for recycling and material recovery, as demonstrated by companies like Lindab, Rehau, and Muraplast. Digital product passports and traceability systems enable data-based life cycle assessments and robust evaluations of circularity.

Digital manufacturing technologies, such as additive processes with powder recovery, facilitate the reuse of materials and significantly reduce waste and energy consumption. Even for complex materials — in sectors such as sports or construction — new solutions are emerging thanks to innovative recycling technologies and digital scaling platforms, for example from RE-SPORT or DRACO Grupa.

Moreover, digital platforms and circular business models — such as buy-back or rental systems — promote the practical implementation of the circular economy. Digitalization is essential in this context to make material flows measurable and manageable.

In the construction sector, it becomes particularly clear how modular approaches, material tracking, and CO_2 accounting can contribute to the reduction of emissions through circular solutions. Thus, digital circular product development relies on the interplay of technology, design, and new business models to unite ecological and economic sustainability.

Webinar "Big Picture of the Green Transition", 27.02.2025, organized by ConPlusUltra (CPU)

The webinar „Big Picture of the green transition" gave an overview and background information regarding the green transition. Hence, about the "why" (green transition) and the "what".

The main goal was to provide a deeper understanding of the green transition: what is going on in the world (what is happening around us and in our environment) and what affects us (due to the changes in our environment, like floodings respectively stark rain events, the melting of polar ice caps and glaciers; but also droughts leading to water shortage and fires; loss of biodiversity etc.). However, the economic aspect could not be ignored. Europe is highly dependent on resources and thereby vulnerable to supply chain disruptions and/or political disputes. All these points led to the conclusion that something had to be done,

culminating to the announcement of the European Green Deal in 2019. The aim was and remains to combine both: overcoming resource dependence and shaping the transition from a linear to a circular economy. In connection with CURIOST, the webinar presented concrete examples for the individual industries, particularly mobile phones in the field of mechanics and mechatronics, the packaging and plastic bottle of a cleaning product manufacturer in the field of plastics and packaging, and plasterboard in the field of construction.

The webinar also tried to remind that circularity does not only mean recycling but impacts all aspects of the economy and a product's life cycle: from resource extraction to transportation, production, distribution, use, and end-of-life management. The core message is: product design must receive greater attention. It is crucial for the entire life cycle of a product: from the production process to efficiency, durability respectively longevity, repairability or reuse, and disassembly to recycle parts and materials or resources for use as spare parts or in new products. This reduces costs, increases efficiency, saves resources and energy, and leads to a reduction in CO2 emissions, waste, and environmental pollution.

Webinar "Plastic Recycling in Austria – Current Status and Innovations", 21.03.2025, organized by Business Upper Austria (Biz-Up)

The main topics included the latest innovations in mechanical recycling, presented by Clemens Kitzberger from EREMA, and the anticipated effects of implementing a deposit system on the Austrian plastics recycling industry, presented by Dieter Schuch from ARA (Altstoff Recycling Austria).

The presentation by EREMA highlighted the latest advancements in mechanical recycling technologies, which are crucial for improving the efficiency and effectiveness of plastic recycling processes. ARA discussed the potential impacts of introducing a deposit system in Austria, which could significantly enhance the collection and recycling rates of plastic materials, thereby supporting circular economy goals.

The webinar provided valuable insights into the current state and future potential of plastic recycling in Austria. It emphasized the importance of technological innovations and policy measures, such as deposit systems, in driving circularity in the plastics sector.

Specific examples of new mechanical recycling technologies were discussed, showcasing how these innovations can improve recycling efficiency. The anticipated effects of a deposit system were illustrated with potential scenarios, highlighting the benefits and challenges of such an implementation.

A significant discussion point was the use of water in recycling processes, particularly in washing plants. The importance of water treatment and reuse was emphasized, with insights into how companies manage water resources efficiently. The discussions also touched on the economic and environmental implications of recycling innovations and deposit systems, providing a comprehensive understanding of their broader impacts.

The knowledge gained from the webinar can be applied by adopting the latest mechanical recycling technologies to enhance recycling processes. Insight into the benefits of deposit systems can guide policymakers and industry stakeholders in implementing similar systems to improve recycling rates.

Continuous innovation in recycling technologies is essential for achieving circularity in the plastics sector. Implementing effective policy measures, such as deposit systems, can significantly boost recycling efforts and support the transition to a circular economy. The importance of collaboration among industry stakeholders and the sharing of best practices and innovations was highlighted as crucial for driving progress in circular product development.

Key takeaways and conclusions:

- Technological Advancements: Continuous innovation in recycling technologies is essential for achieving circularity in the plastics sector.

- Policy Measures: Implementing effective policy measures, such as deposit systems, can significantly boost recycling efforts and support the transition to a circular economy.
- Collaboration and Knowledge Sharing: The importance of collaboration among industry stakeholders and the sharing of best practices and innovations was highlighted as crucial for driving progress in circular product development.

Webinar "New materials: bioplastics", 16.04.2025, organized by Umweltcluster Bayern (UCB)

The webinar on Bioplastics which was hold by Christina Zegowitz from the Cluster of Environmental Technologies Bavaria covered the following topics:

- Definition of relevant terms like bioplastics, bio-based materials, biodegradation, compostability
- Introduction of the three main material type groups (bio-based + not biodegradable, bio-based + biodegradable, not bio-based + biodegradable)
- Presentation of different product examples which are made from bioplastics (e.g. drinking bottle made of bio-based PET, bolt-on climbing hold, degradable growth protectors)
- Challenges, benefits and opportunities which are related to bioplastics (e.g. higher price, but smaller carbon footprint compared to fossil-based materials; regional biomass sourcing for bio-plastic production needs to be expanded)

The topic of bioplastics is not only of high relevance for the cross-sectional sector plastics, but also for the sector packaging (e.g. for food and non-food packaging) as well as building & construction (e.g. windows, doors, pipes, cables, floor coverings and thermal insulation made from bioplastics or biocomposites like natural fiber reinforced plastics).

Regarding circular product design and development with the focus on material selection, bioplastics play a very important role besides the usage of recycled plastics. Bioplastics can show different benefits like its independency of fossil resources, its low GHG emissions, its bases on renewable biomass and its possibility of biodegradability or recyclability.

In general, a shift from primary fossil-based plastic to bio-based plastic or to recyclate is recommended. If bio-based or recycled materials are recommended, highly depends on the product. Aspects like cost structure, material requirements, product features like durability, end-of-life infrastructure need to be assessed on product level. The CURIOST project can support companies on these assessments.

Webinar Clean Industrial Deal and regulatory framework that will affect SME, 16.04.2025, organized by ConPlusUltra (CPU)

Second webinar held by CPU was about "Clean Industrial Deal and regulatory framework that will affect SMEs." It was a webinar devoted mostly to analysing new policy papers that were published by European Commission in the last months.

Since project partners already had an insight into certain directives and regulations that were closely linked to Clean Industrial Deal, such as CSRD, CSDDD and Eco design for Sustainable Product Regulation, this webinar was an opportunity to present updates expected for these policies. The topic was relevant for all sectors, since Clean Industrial Deal recons changes to all companies operating in the European Union market, with special emphasis on building and construction and mechanics and mechatronics, since the focus is on by bringing changes to the reporting standards in such energy-intensive and clean-tech industries.

Clean Industrial Deal is relevant in the context of CURIOST project, but also in the context of circularity, since it gives more attention to circularity, aims to reduce waste and extend the life of materials by

promoting recycling, reuse and sustainable production. It also sets target of making 24% of all materials circular by 2030. Project partners were informed through the presentation that Circular Economy Act is expected to be adopted by 2026, which will detect actions and measures that allow transformational steps toward circularity, which is where CURIOST project results can provide expertise and useful propositions.

Project partners were informed about planned establishment of Trans- Regional Circularity Hubs that will promote smart specializations, circular economy, economies of scale for recycling among member states and economic actors. Webinar gave new relevant information on what are the next steps in creating industrial transformation of European Union and provided updates on existing directives (CSRD, CSDDD, EcoDesign Regulation, Circular Economy Act), which rose interest to continue to follow the development of legal documents linked to it.

Lessons relevant for CURIOST are, in this sense of development Clean Industrial Deal, putting the circularity as a priority and setting out targets of circular materials, as well as using it as a tool for reducing dependence on the unreliable suppliers. Therefore, we can consider CURIOST as a pioneer project; with policy analysis aspect, action planning, strategy building, joint vision creation and pilot projects including SMEs and small midcaps in circular economy practices, significantly contribute to the creation of future provisions of legal framework and propose concrete actions and measures for transformation to circular economy.

Knowledge gained from webinar will be used in future deliverables that will derive from CURIOST project and will provide continuing follow-up of legislative process regarding Clean Industrial Deal:

- information about changes that are about to be made as part of the Clean Industrial Deal
- information about policy amendments and its effect on SMEs and small midcaps
- materials for future analysis and questions on what can be expected in the future as well as developed critical thinking.

Webinar "New Procession / Production Technologies", 17.04.2025, organized by MESAP Innovation Cluster (MESAP)

The webinar provided insights into digital circular product development, with particular representation from the mechanics and mechatronics sector, alongside cross-cutting contributions from the plastics and advanced manufacturing fields. The focus was on how digital technologies, additive manufacturing (AM), and traceability tools are driving innovation in circular product design, production, and lifecycle

management. The webinar was structured around three thematic panels, each one on a different aspect of digital circular product development.

The first panel focused on the integration of digital technologies into the 5Rs of the circular economy (Reduce, Reuse, Recycle, Repair, Refurbish), highlighting how data-driven tools support new circular design strategies and service-based business models. Emphasis was placed on the need to redesign products for durability, modularity, and easier maintenance. Tools like digital twins, smart labelling, and intelligent product design platforms were showcased as key enablers. Key takeaways include the importance of data infrastructure and skills development, especially for SMEs who face challenges around interoperability and investment capacity. However, when successfully deployed, these tools allow companies to reduce both environmental impact and operational inefficiencies.

The second panel explored how additive manufacturing (AM) can contribute to circularity by allowing for on-demand production, material efficiency, and the rethinking of end-of-life strategies. The panel also addressed how digital design, and AM can reduce reliance on virgin raw materials and minimize waste. This opened up reflections on the importance of collaboration across the value chain and new models of product customization, reuse, and localized production. Case studies spanned multiple sectors, including GE Aviation

with single-part jet fuel injectors, Bugatti with lightweight titanium brake calipers, Adidas with customizable 3D-printed soles and Siemens with AM-based turbine blade repairs.

The third panel, centred on traceability and digital product passports (DPPs), delved into how blockchain and other decentralized digital infrastructures can boost transparency across the supply chain. The DigInTraCE project was presented as a key example of how smart tags, real-time sensing, and immersive tech can trace materials and support circular flows, particularly for secondary raw materials. Meanwhile, the Trineflex project showed how advanced digital platforms can support energy-intensive industries in decarbonizing their operations, with the aluminium case (REFIAL) demonstrating real-world application of circular principles using secondary materials.

Across all three panels, a common thread was the growing importance of interoperable, transparent data systems that support both business value and regulatory compliance. These insights are highly relevant for CURIOST, especially in terms of developing ecosystems where stakeholders—from producers to recyclers—can exchange verified, meaningful data to close the loop.

Key takeaways include:

- Digital technologies are not just enablers for SMEs, but essential infrastructure for the circular economy.
- Additive manufacturing can be fundamental for spare parts and product regeneration, for producing parts with difficult geometries, and for lowering the production costs: furthermore, in perspective, to be used in series production.
- Traceability and transparency are becoming regulatory imperatives, not just optional features.
- Cross-sectoral and community-based approaches can help regions build resilient, circular, and low-carbon industrial ecosystems.

This webinar broadened the view of what's possible when digital transformation and circular economy ambitions come together. The integration of design, digitalization, and material traceability presents a powerful pathway to realizing the circular economy—not only as an environmental strategy, but as a business opportunity.

Webinar "New Materials in Construction – Timber-Concrete Composite Structures", 05.05.2025, organized by Chamber of Commerce and Industry of Pécs- Baranya (PBKIK)

Project partner PBKIK organized a webinar titled "New Materials in Construction – Timber-Concrete Composite Structures", that was held on May 5, 2025.

The lecture primarily focused on the building and construction industry and highlighted innovative solutions for sustainable architectural design. The lecturer was Mr Tamas Juhasz, who is a faculty member at the University of Pecs with extensive experience in structural engineering and a strong commitment to sustainability and architectural heritage preservation.

The main topic was the architectural application and structural mechanism of timber-concrete composites, particularly in rehabilitating historic timber floors. Mr. Juhasz provided insights into how these composites, which have been successfully implemented since the 1930s for strengthening timber beams, serve as sustainable solutions in modern architectural practices. This approach not only enhances structural integrity but also contributes to reducing environmental impacts associated with traditional construction methods.

The webinar also fostered discussions about sustainability in building design, revealing new insights into how the integration of timber-concrete composites can lead to environmentally friendly construction practices. Attendees learned that the transition toward such sustainable solutions necessitates collaboration between academia and the industry, which could pave the way for future innovations in building materials.

Although the content of the webinar affirmed existing knowledge about the benefits of sustainable materials, it shifted the perspective on practical applications of timber-concrete composites in heritage building rehabilitation and their potential to address modern construction challenges.

Discussions following the presentations emphasized the importance of ongoing knowledge sharing and explored how experiences from the webinar could be practically applied in various construction projects. The most important takeaway from the lecture was to enhance partnerships to facilitate the adoption of environmentally responsible materials and practices and that timber-concrete composite is not only applicable in the restoration of old buildings but also for the construction of new houses using about the third of the usual amount of concrete.

2.2. Key future-oriented learnings for (digital) circular product development and design in the four sectors of the manufacturing industry

Based on the content and learnings from the webinars held, the joint vision focuses on these key future-oriented learnings for digital circular business modelling in the four sectors of the manufacturing industry:

- **Circular principles** create economic and ecological value, reduce costs, increase customer value, and enable innovation.
- **Design for recycling** through digital product passports and traceability systems.
- **Circular Business Models** to promote practical implementation of circular economy through buy-back or rental systems.
- **Construction innovations** like modular approaches, material tracking, and CO_2 accounting reduce emissions and support sustainability.
- **Digital manufacturing** supported by data-driven tools to facilitate material reuse, reduce waste and energy consumption, and offer solutions for complex materials.
- **Additive Manufacturing**: Contributes to circularity through on-demand production and material efficiency.
- **Policy frameworks** require circularity and foster innovation.
- **Cross-Sectoral Approaches** help to build resilient and circular industrial ecosystems.

The following joint vision 2030+ for the four sectors mechanics & mechatronics, plastics, packaging and building & construction of CURIOST project partners has been drawn.

3. Joint Vision

Our joint vision within CURIOST is to **lead the transformation of SMEs and small midcaps towards a sustainable, circular economy** in Central Europe by **pioneering innovative, digital and circular product development and design** across all four sectors. Therefore, we **focus a transformative journey** where companies become conscious of sustainability, designing **products that are high-quality and innovative** but also **environmentally and socially responsible**.

3.1. Commitment and vision statement

COMMITMENT

We initiate the **integration of circular principles in SMEs and small midcaps** to create economic and ecological value, reduce costs, and increase customer value. Therefore,

- We encourage companies to **develop products in a sustainable manner,**
- we enable companies to **focus on (digital) sustainable product design as a business opportunity** and **more transparent value chains**,
- we emphasize the **importance of political frameworks** such as the Clean Industrial Deal for companies. Continuous **follow-up on legislative processes** will support SMEs and small midcaps in circular economy practices,
- we support companies in a **cross-sectoral and community-based approach** to building resilient and circular industrial ecosystems,

VISION STATEMENT

Our project focuses on **(digital) sustainable product development** within SMEs and small midcaps in the four sectors of the manufacturing industry, **setting a benchmark for eco-friendly innovation and responsible manufacturing**, while **integrating circular principles and digital solutions** to create value, enhance **transparency** and **support policy frameworks**.

3.2. Key pillars and objectives

Project partners have identified five key pillars that will guide efforts across the four sectors. By focusing on these areas, we aim to transform industries mindset and secure Europe's industrial and economic position:

TECHNOLOGICAL INNOVATION AND INTEGRATION

- **Mechanics and mechatronics:** Embrace advanced technologies (e.g. IoT, AI) with recycled materials to enhance product lifecycle management and resource efficiency.
- **Plastics:** Focus on product design, e.g. the use of recycled or biobased plastics, the use of mono materials for better recycling, and innovative (branch-specific) take-back systems (e.g. agricultural film take-back programs) to optimize material use and reduce environmental impact.
- **Packaging:** Develop high-quality, durable, and recyclable packaging solutions, push for reusable packaging, leveraging digital tools for efficient tracking and lifecycle management
- **Building and construction:** Innovate in sustainable construction practices, integrating recycled materials and energy-efficient technologies to reduce CO_2 emissions and improve resource use.

COLLABORATIVE PARTNERSHIPS AND STAKEHOLDER ENGAGEMENT

- **Foster strong partnerships across the value chain**, including suppliers, recycling facilities, and technology providers, to create a cohesive and resilient circular economy.
- **Engage customers and stakeholders through educational campaigns and transparent communication** to build a community committed to sustainability.

REGULATORY COMPLIANCE AND GOVERNMENT SUPPORT

- Stay informed and compliant with evolving environmental regulations and standards at both national and EU levels to ensure sustainable practices are embedded in business operations.
- Leverage government grants, subsidies, and EU funding programs to support innovation and the adoption of circular economy principles.

TRANSPARENCY AND CONTINUOUS LEARNING FOR SMEs AND SMALL MIDCAPS

- Position as drivers in sustainable product development by continuously innovating and adopting best practices.
- Invest in ongoing research and development to stay ahead of sustainability trends and continuously improve products and processes.
- Maintain clear and honest communication with customers and stakeholders about a strong commitment to environmental and corporate responsibility.

ECONOMIC AND FINANCIAL RESILIENCE

- Through the development of resource efficient and waste reduced business models, to ensure long-term economic sustainability.
- Through politics that secure funding (green tenders and sustainable investment programs) to drive research and development in sustainable manufacturing technologies of SMEs and small midcaps.

3.3. Impact

By piloting (digital) circular product development and design within CURIOST as well as beyond the project scope, we aim to demonstrate that SMEs and small midcaps can **lead the way in sustainable product development**, driving positive change for the environment, society, and the economy. The aim of CURIOST is to **improve the knowledge of manufacturing companies and stakeholders about sustainable manufacturing and product design and to inspire them to design and adopt (digital) circular practices.**

Policy makers have a profound impact on our vision by shaping the framework for sustainable practice, e.g. by establishing strong and long-term environmental policies that drive significant investments in research and development. Their **support through green tenders, subsidies, and regulatory measures** facilitates the implementation of circular economy practices, ensuring that the **manufacturing industry can innovate and adopt sustainable strategies effectively**. By matching regulations with sustainability goals, policy makers make it easier for SMEs and small midcaps to succeed in a circular economy.

Together, we will drive the CURIOST project forward, **fostering innovation and sustainability** across all sectors to **achieve our joint vision** of a (digital) circular economy.

4. Annex

- Presentations of all webinars

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