SOLUTIONS FOR SUPPORTING THE CIRCULAR TRANSITION

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Acknowledgement

This report has been developed within the framework of the Interreg CENTRAL EUROPE project CIRCOTRONIC – Transnational Network of Circular Labs for EEE.

CIRCOTRONIC is a three-year initiative (2023–2026) dedicated to creating a more circular Electrical and Electronic Equipment (EEE) manufacturing sector across Central Europe. By engaging actors from government, academia, industry, and civil society, the project supports companies in exploring practical approaches to a more resource-efficient and circular economy.

One of the project's major areas of work involved supporting companies in applying circular economy concepts in practice. The piloting activities carried out with businesses pursued two key objectives.

- They aimed to help companies — particularly SMEs and Mid-Caps — improve their circular performance by exploring opportunities in product design, materials use, and business models.
- Second, the piloting made it possible to gather hands-on insights into how well different circularity-related tools work in real business settings, including how relevant and user-friendly companies found them.

The experiences and learnings gained through this collaboration form the basis of the guide at hand. They reflect both the practical challenges companies face and the approaches that proved helpful in supporting circular innovation.

The development of this guide would not have been possible without the collaboration of the participating companies and the commitment of all project partners.

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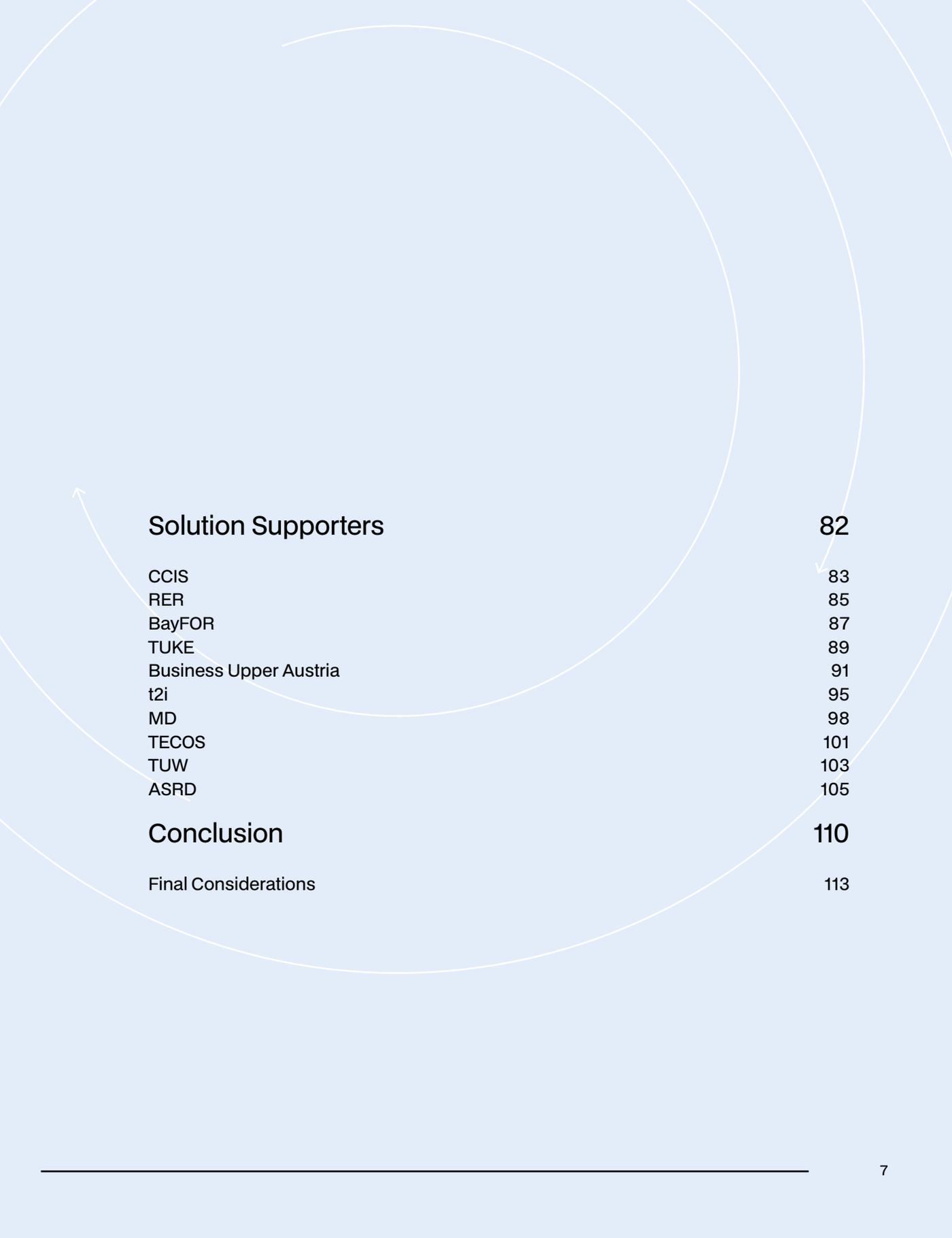# Solution Supporters 82

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Overview

This guide has been developed within the Interreg CENTRAL EUROPE project CIRCOTRONIC – Transnational Network of Circular Labs for EEE.

Its purpose is to provide companies, especially SMEs and Mid-Caps in the Electrical and Electronic Equipment (EEE) sector, with practical insights gained during the piloting of circular economy tools and approaches. The guide highlights what companies found useful, what challenges were encountered, and how circular methods can be applied in real business settings.

The guide begins with a short introduction to the project, outlining how CIRCOTRONIC approached circularity, which thematic areas were addressed, and why circular methods are increasingly relevant for the EEE sector. This creates the background needed to understand the focus and scope of the piloting activities.

A methodology section follows, explaining how the tools were selected, tested, and evaluated. It also clarifies why the depth of insight varies across tools and how these differences influenced the structure of the guide.

Before presenting the individual tools, the guide introduces the evaluation metrics used throughout the tool descriptions—such as tool type, ease of use, and typical areas of application. These categories help readers navigate and compare the tools more easily.

The main part of the guide consists of 15 tool profiles, each structured in the same way for clarity and consistency. Each profile includes: a brief description, application requirements, best-fit company situations, an example use case, recommendations, pros and cons, the expected output, and information on the tool's developer or provider. All tools were either applied directly with companies or reviewed through structured company feedback.

Following the tools, the guide presents the partners involved in the piloting phase, each with a short overview of their mission, services for companies, methodologies, key insights from the piloting, and a contact point for further support. These profiles help companies identify who can assist them in their circular transformation journey.

The guide concludes with a summary of the overarching learnings from the piloting activities and reflections on what the tested tools reveal about opportunities and challenges for advancing circularity within the EEE sector.

Introduction

The WEEE (Waste Electrical and Electronic Equipment) sector lies at the intersection of technological innovation, resource use, and environmental responsibility. As electronic products become ever more embedded in daily life, the resulting waste stream is growing in both volume and complexity. At the same time, WEEE contains valuable and often critical materials, making it a key leverage point for circular economy strategies.

Circularity in the electrical and electronics sector is therefore no longer solely an environmental ambition. It represents a significant economic opportunity and a strategic response to emerging regulatory requirements, increasing resource constraints, and geopolitical uncertainties affecting global supply chains. With multiple EU-level and national regulations in development or implementation, companies are increasingly required to address product design, material use, recovery, and value chain organisation sooner rather than later. Those that act early can not only ensure compliance but also unlock new business opportunities and strengthen resilience.

Within this context, **CIRCOTRONIC** addresses the transition toward circular value chains in the WEEE sector through three interconnected thematic areas: **Design, Materials and Recovery**, and **Circular Business Models and Value Chains**. Together, these areas reflect the full life cycle of electrical and electronic equipment and highlight the systemic nature of circularity.

Design

The design phase sets the foundation for the entire product life cycle. Decisions made at this stage shape key characteristics such as durability and lifespan, ease of repair and maintenance, modularity, upgradeability, and the feasibility of disassembly and recycling. The thematic area Design therefore focuses on topics including the assessment of remanufacturing and recovery potentials, design-in repair and recycling, product life extension, design-out obsolescence, and the reduction of waste and pollution.

Materials and Recovery

While the design phase primarily addresses new or redesigned products, the thematic area Materials and Recovery concentrates on existing products and

systems. It focuses on analysing material use and environmental impacts along the value chain, promoting sustainable and safe material choices, and exploring recovery options specific to electrical and electronic equipment. Key topics include the assessment of material consumption, alternatives to e-plastics, substitution of hazardous substances, and the development of closed-loop and other circular material strategies.

Circular Business Models and Value Chains

Although the transition toward a circular economy was initially perceived mainly as a technological challenge, companies increasingly face questions related to viable business models. These include consumer acceptance of longer-lasting or repairable products, the economic feasibility of take-back systems, and the organisation of closed-loop value chains. The thematic area Circular Business Models and Value Chains therefore focuses on identifying new business opportunities in e-waste management, transforming linear business models into circular ones, and assessing the profitability and scalability of circular approaches.

How to use this document

This document is intended as a practical resource for companies and other stakeholders active in the electrical and electronics sector. It provides an overview of tools, methods, and approaches that support the transition toward circular value chains, structured according to the thematic areas outlined above. Readers can scan the document to identify tools relevant to their specific challenges, learn how and where these tools are applied, and gain first-hand insights from practical experience.

In addition, the document points to sources for further information and highlights location-specific support structures and contact points that can assist companies in applying and implementing the tools in practice. This is intended to support not only strategic orientation but also concrete next steps toward circularity.

It should be noted that while tools and approaches may be assigned to a specific thematic area, their effects often extend across multiple areas. This interdependence reflects the systemic nature of circular value chains and underlines the need for integrated solutions in the WEEE sector.

Methodology – How the tools were tested

To gain practical insights into the applicability and usability of tools supporting circularity in the WEEE sector, each thematic group selected five tools for piloting. The piloting was conducted using two complementary formats: broad piloting and individual piloting, which differed in the intensity of support, depth of application, and level of company engagement.

Broad Piloting

Broad piloting introduced tools in an exploratory way, enabling companies to understand their purpose, benefits, and potential application. While not tailored to a specific company context, broad piloting provided participants with relevant knowledge to assess whether a tool could be useful for them.

Broad piloting took place in two formats:

- Workshops with multiple companies, where general concepts (e.g., eco-design principles or reducing CO_2 emissions) were introduced alongside practical tool demonstrations
- One-on-one meetings, offering detailed explanations of methodology, application process, expected outcomes, and requirements

Individual Piloting

Individual, or holistic, piloting involved hands-on application of a tool in a company-specific context. Support was more intensive and tailored, often extending over a longer period to accompany the company through initial transformation steps. Through this approach, SMEs gained practical experience and provided concrete feedback on usability, process improvements, and measurable effects of tool use.

Depending on the tool, individual piloting ranged from guided use of license-based online tools to interactive workshops requiring preparatory meetings, facilitation, and follow-up. This flexible approach ensured that each tool was piloted in a manner appropriate to its complexity and intended use.

Scope and Insights

The piloting was exploratory in nature and involved companies from Slovenia, Slovakia, Italy, Germany, Poland, and Austria, all SMEs or Mid-Caps active in the production sector of electrical and electronic equipment. While a larger sample would be required for a comprehensive evaluation of tool performance, the piloting provided valuable insights into the practical relevance and usability of each tool.

The experiences collected during piloting directly informed the following sections, which present the tools alongside guidance for their practical application, sources for further information, and support contacts to facilitate their use in different company contexts.

The Tools

The Tools

The following pages present the tools that were piloted or reviewed within the CIRCOTRONIC project. Each tool profile is designed to help companies quickly understand its practical value and determine whether it is suitable for their circular transformation journey. Building on the methodology described earlier, every tool is presented in a consistent format to ensure clarity and comparability.

Each tool profile includes:

- A brief overview – what the tool does and how it contributes to circularity
- Advantages and disadvantages – based on insights from piloting activities
- Practical insights – observations from project partners and participating companies
- Piloting example – a short case showing how the tool was applied

These elements allow companies to assess usefulness, requirements, and relevance at a glance.

Tool Classification (Type)

To make scanning and comparison easier, each tool is assigned a tool type that reflects its general format or approach. These types do not represent thematic groupings; rather, they help readers understand how the tool works and what kind of interaction is required.

- Guide – Documents, PDFs, or whitepapers providing orientation, best practices, or step-by-step instructions.
- Workshop – Interactive formats where companies actively participate to generate ideas, develop strategies, or co-create solutions.
- Canvas – Templates or structured frameworks (e.g., Business Model Canvas), often in paper or digital form, to support analysis or design.
- Interactive Website / Web Tool – Websites where users navigate information, such as checking legal requirements or exploring circularity insights.
- Spreadsheet – Tables into which companies input data, often with automated calculations, visualisations, or summaries (e.g., spider plots).
- Exchange Platform – Online platforms for sharing, exchanging, or sourcing resources, materials, or products between companies.

These classifications help companies quickly identify tools that fit their preferred working style or available resources.

Purpose of the Tool

Each tool is also assigned one or more purpose labels based on the type of circular challenge it helps address. These labels allow companies to quickly identify tools that match their specific needs.

- Overview → I want to understand trends, markets, or legal frameworks.
- Assessment → I want to assess my current state, material flows, or business models.
- Foundation → I want to build a solid base for strategy, design, or material decisions.
- Ideation → I want to generate creative ideas and new concepts.
- Planning → I want to develop roadmaps, implementation strategies, or concrete concepts.
- Action → I want to identify concrete steps and measures I can take.
- Evaluation → I want to measure progress, impact, or potential.
- Collaboration / Decision → I want to align my team, prioritise options, or make informed decisions.

These purpose labels enable companies to navigate the tools based on where they currently stand in their circularity journey.

Ease of Use and Time Requirement

To support realistic planning, each tool is assigned indicators for ease of use and estimated time effort.

EASE OF USE (TRAFFIC-LIGHT RATING):

● Easy to use

● Moderate effort required

● Complex / resource-intensive

TIME REQUIREMENT:

- **Short** – less than 1 day
- **Medium** – 1–2 days
- **Intensive** – multi-week application

These indicators help companies estimate the effort associated with each tool and plan their engagement accordingly.

How to Navigate This Section

Because each tool has several attributes (type, purpose, ease of use), companies can approach this section from different angles:

- **By thematic area** – if you have a certain area in which you want to improve
- **By tool purpose** – if you have a specific challenge (e.g., planning, assessment)
- **By tool type** – if you prefer certain formats (e.g., workshops vs. spreadsheets)
- **By ease of use** – if you need low-effort or quick-start tools

No matter where readers begin, the consistent structure of the tool profiles ensures comparability and easy navigation

TABLE 1 - OVERVIEW TOOLS GIVES AN OVERVIEW OVER ALL THE TOOLS AND CORE ATTRIBUTES.

TG	TOOL	TYPE	PURPOSE	ADDED VALUE	EASE OF USE
DESIGN	Ecodesign – the Legislative Framework	Interactive Website / Web Tool	Overview	🟡	🟢
	Ecodesign+	Interactive Website / Web Tool	Assessment | Foundation | Ideation	🟢	🟢
	Circularity Assessment Tool	Guide | Spreadsheet	Assessment | Foundation | Ideation	🟡	🟡
	Strategy for Circularity and Sustainability	Guide	Assessment | Planning | Action	🟢	🔴
	Future Scenarios	Workshop	Ideation | Planning	🟡	🔴
MATERIALS AND RECOVERY	Cyrkl Tool Marketplace	Exchange Platform	Evaluation | Collaboration / Decision	🟢	🟢
	Ecochain – LCA Tool	Interactive Website / Web Tool	Assessment | Evaluation	🟢	🟡
	Cyrkl Waste Scan	Interactive Website / Web Tool	Assessment | Evaluation | Planning	🟢	🟡
	CIRCitNorden Circular Assessment Tool	Spreadsheet | Interactive Website / Web Tool	Assessment | Action	🟡	🟢
	CircularSupplyChain Workshop Tool	Workshop | Interactive Website / Web Tool	Assessment/ Action	🟢	🔴
CIRCULAR BUSINESS MODELS	Context Map Canvas	Canvas | Workshop	Overview | Foundation	🟡	🟢
	Quickscan Circular Business Models	Guide | Spreadsheet	Assessment | Ideation	🟢	🟢
	Circular Business Model Canvas	Canvas	Ideation	🟡	🟡
	Circular Business Model Guide	Guide | Workshop	Foundation | Planning | Action	🟢	🟡
	Identification and Mapping of Value Streams	Canvas | Workshop	Assessment | Ideation	🟢	🟡

Ecodesign – the Legislative Framework

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Interactive Website / Web Tool	Overview	N/A	🟡	🟢

Description:

The ESPR Legislative Framework Tool is an **online platform** designed to help companies—especially SMEs—navigate the complex web of EU legislation related to sustainable product design. It consolidates directives and regulations such as Ecodesign, Energy Labelling, WEEE, and the new Ecodesign for Sustainable Products Regulation (ESPR) into an easy-to-use interface. Its main goal is to make EU legal requirements accessible and understandable, enabling businesses to integrate sustainability and compliance into product development and strategic planning.

Requirements by the tool:

- **Internet Access and Basic Digital Literacy:** The tool is web-based and requires no installation.
- **Company Data Awareness:** Users should know their product categories and design processes to interpret legislative requirements correctly.
- **Optional Expert Support:** While the tool is intuitive, legal consultation is recommended for major product changes or strategic decisions.

Best For companies …

The tool is best suited for companies that need to navigate complex EU sustainability regulations efficiently. It is particularly valuable for SMEs in sectors such as electrical and electronics industry, where compliance requirements are evolving rapidly. Manufacturers, importers, and distributors benefit from using the tool to ensure their products meet ecodesign, labelling,

and circularity standards. Additionally, businesses that are developing sustainability strategies or aiming to align with the EU Green Deal, the Circular Economy Action Plan and the upcoming Circular Economy Act, will find the tool indispensable. Companies that adopt ESPR compliance early can gain a competitive advantage by reducing regulatory risks and positioning themselves as leaders in sustainable product design.

Example Use Case:

One of the SMEs who tested the tool confirmed that it is highly user-friendly and intuitive. The tool proved particularly helpful during the design phase of new products, as it enables producers to determine whether their products need to meet specific requirements related to energy consumption, energy efficiency, noise levels, and power consumption in standby mode, as well as the applicable limits for these requirements. Additionally, the tool allows producers to create energy labels easily using the integrated Energy Label Creator. For most product categories, it also provides a list of harmonized standards that can be applied to ensure compliance.

During the test, a valuable recommendation was received, and implemented immediately: adding information on the date of the last update of the tool to improve transparency and user confidence.

Recommendations on using the tool:

The tool is very simple to use:

- **For SMEs**: It helps understand ecodesign, labelling, and WEEE requirements for new products and check whether a product falls under these legislative frameworks, as not all products are covered.
- **For larger companies:** It is useful for verifying updated ecodesign, labelling, and WEEE requirements to ensure ongoing compliance.
- **For design departments:** It provides guidance on how products should be designed to meet ecodesign, labelling, and WEEE requirements so they can be placed on the EU market or put into service.
- **Future ESPR support:** Once delegated acts under ESPR are adopted, the tool will offer the same level of support for all stakeholders as it currently does for ecodesign and labelling.
- **WEEE compliance check:** The tool also includes information on the WEEE Directive, allowing users to determine whether their products need to be marked with the WEEE symbol.

Pros and Cons

PROS:

- **User-Friendly for Compliance Checks**
  The tool is simple and intuitive, making it easy for producers to verify whether their products comply with current ecodesign requirements and future ESPR and labelling demands.

- **Summarised Key Requirements**
  It provides an extraction of the main legislative demands, with direct links to the full legal acts for deeper research.

- **Additional Resources Included**
  The tool offers links to harmonized standards, guides, frequently asked questions (FAQs) and other Commission communications where available.

CONS:

- **Limited Language Availability**
  Currently, the tool is only available in English and no other EU official languages. Translation would be highly practical for local producers.

- **Risk of Outdated Information**
  There is a possibility that the tool cannot be regularly updated to reflect new requirements and changes introduced by ESPR, due to technical difficulties or a delay in the news cycle.

Output

The tool provides a comprehensive overview of current and upcoming EU legislation relevant to circular product design. It delivers clear compliance guidance by identifying key requirements for ecodesign, labelling, and waste management. Users receive strategic insights that help anticipate future obligations, such as Digital Product Passport (DPP) implementation, enabling them to integrate these requirements into product development processes. The output is designed to support informed decision-making and long-term planning, ensuring companies remain compliant and competitive in a sustainability-driven market.

Developer / Provider:
Chamber of Commerce and Industry of Slovenia (prepared within the CIRCOTRONIC project)

Ecodesign+

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Interactive Website / Web Tool	Assessment | Foundation | Ideation	N/A	🟢	🟢

Description:

ECODESIGN+ is a tool to support companies in product development to understand, calculate, and reduce the Product Carbon Footprint (PCF) of their products.

With this software, product designers, engineers, technicians, students and other users can not only understand and evaluate the PCF, but also quickly identify Ecodesign improvements to minimize greenhouse gas emissions and compare different product variants.

With that in mind, ECODESIGN+ is the ideal tool to prepare for the requirements resulting e.g. from the new Ecodesign for Sustainable Product Regulation (ESPR) or from company decarbonisation targets.

The software enables you to:

- Calculate and communicate the PCF in an intuitive and easy way using the comprehensive environmental database of Ecoinvent
- Reduce the PCF supported by integrated Ecodesign checklists
- Compare the PCF of different possible product variants

ECODESIGN+ is a web-based solution that you can use anywhere requiring no software installation. It's designed for ease of use—even for those without technical expertise. Therefore, the PCF assessment provides an easy introduction to Ecodesign and to the new ESPR.

Requirements by the tool:

Know the life cycle data of your product, including: Material inventory, Process data (energy consumption, waste) distribution scenario, consumption in use stage, end-of-life scenario, and you must be able to calculate your PCF and derive improvement options via using the provided design checklists.

Best For companies …

- that want to assess and reduce the Product Carbon Footprint (PCF) of their products early in the design phase
- that require a user-friendly and quick PCF tool without LCA expertise
- that need to explore improvement options to meet ESPR requirements or internal decarbonisation targets
- that want to compare product variants or evaluate redesign decisions using a life cycle approach

Example Use Case:

Driven by customer expectations and upcoming regulatory requirements (ESPR), a hand-blender manufacturer established a company-wide strategy to reduce its carbon footprint at both the corporate and product levels. To support this effort, the company initiated a Product Carbon Footprint (PCF) assessment for a reference product in parallel with the development of a new product generation.

The predecessor model served as the reference product. Key data - including the bill of materials, production processes, distribution scenario, energy consumption in use and end-of-life treatment - were collected and used to model the PCF in ECODESIGN+.

The final PCF results showed that the raw materials phase was the dominant contributor across the life cycle. Using the design measure recommendations provided in the tool, the team explored the concept of remanufacturing and reusing the electric motor. In ECODESIGN+, the PCF model was duplicated, and a remanufactured scenario - incorporating assumptions for take-back logistics, disassembly, and processing - was created and compared to the reference product.

The comparison revealed a potential 30 % reduction in the total PCF for the remanufactured version, demonstrating a significant opportunity for reducing the product's environmental impact.

Recommendations on using the tool:

- Use at an early design stage if possible
- Very good for training purposes

Pros and Cons

PROS:

- Easy to use for non-experts: The web-based interface and integrated guidance make PCF calculation accessible even without Life Cycle Assessment expertise.
- Supports early-stage design decisions: Integrated ecodesign checklists help identify improvement options and compare product variants quickly.

CONS:

- Not suitable for official communication: Results are simplified and intended for internal decision-making, not for external reporting or certification.
- Depends on data availability: Quality of results relies on the completeness and accuracy of life-cycle data provided by the company.

Output

- All PCF results summarised on one page (total PCF, overview over the life cycle stages, PCF breakdown on process level in the relevant life cycle stages)
- List of possible design measures for improvement
- Comparison of different product variants implementing the proposed improvement options

Developer / Provider:
ECODESIGN company GmbH,
https://ecodesign-company.com/expertise/ecodesign/

Circularity Assessment Tool

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Guide | Spreadsheet	Assessment | Foundation | Ideation	½ day–day	🟡	🟡

Description:

The Circularity Assessment Tool is a structured, workshop-based instrument designed to help companies identify and improve the circularity of their products. It guides teams through selecting an appropriate circular economy (CE) strategy (Step 1), evaluating product design criteria (Step 2), and generating targeted improvement ideas (Step 3). Using a combination of questionnaires, checklists, and best-practice examples, the tool provides a clear pathway from initial assessment to actionable design recommendations.

Requirements by the tool:

- Some knowledge of the environmental and economic aspects of the product being assessed

Best For companies…

- Are beginning their circularity journey and need a structured but low-barrier method.
- Want to identify quick wins and long-term opportunities for circular product design.
- Produce physical products with multiple components, materials, or life cycle stages.
- Aim to integrate circular design principles into existing product development processes.
- Have limited resources and require a low-cost assessment tool.

Example Use Case:

A manufacturer of PV inverters wants to understand the circularity performance of its latest product generation. Because PV inverters contain many high-impact electronic components. Improving circularity has the potential to significantly reduce environmental impacts and extend product value.

STEP 1 – CE STRATEGY SELECTION

Using the six-question CE strategy questionnaire, the tool identifies that the company should primarily focus on the short loop (repair, reuse, and lifetime extension) and secondarily on the medium loop (refurbishment and remanufacturing)

These strategies align with the goal of keeping electronic components in use for as long as possible before considering recycling.

STEP 2 – ASSESSMENT OF DESIGN CRITERIA

From the tool's 34 design criteria, 30 criteria are applicable to the relevant strategies of the PV inverter. During a workshop, experts from product development and production jointly evaluate each criterion in terms of fulfilment level and relevance.

The results show that:

- A large portion of the criteria are fully fulfilled, indicating a robust construction and long operational life.
- However, several criteria are only partly fulfilled, often related to accessibility of internal components, disassembly steps, and replaceability of key modules.
- A few criteria are not fulfilled, highlighting specific gaps that limit repairability and hinder short-loop or medium-loop strategies.

STEP 3 – IDENTIFYING OPTIMISATION POTENTIALS

These "not fulfilled" and "partly fulfilled" criteria become the basis for internal idea generation—supported by best-practice examples provided by the tool. The company can then define targeted design improvements, such as easier disassembly, modular component replacement, or improved access to high-value electronic boards.

The result is a structured understanding of where the product already performs well and where changes could make the PV inverter significantly more circular.

Recommendations on using the tool:

- Work together with colleagues from different departments like product development, business development, production, product management and finance.
- Work together with a facilitator who guides participants through the questions to avoid misunderstandings.

Pros and Cons

PROS

- Free to use: making it accessible for companies of all sizes.
- Fast and efficient: provides results within a half-day workshop.
- Promotes collaboration: improving shared understanding of circularity.
- Flexible: Applicable to various product types and industries.

CONS

- Initial assessment only: does not include detailed life cycle analysis or environmental impact quantification.
- The tool does not give design recommendations, but the assessment clearly exposes where circularity gaps exist.
- Requires knowledgeable participants: inaccurate inputs may reduce relevance.
- Does not prioritise ideas automatically: requires follow-up evaluation for feasibility and impact.

Output

- Selected CE strategy (short, medium, or long loop).
- Clear list of optimisation potentials for improving product circularity.

Developer / Provider:
TU Wien

Strategy for Circularity and Sustainability

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Guide	Assessment | Planning | Action	3 months	🟢	🔴

Description:

The Strategy for Circularity and Sustainability is not a single stand-alone tool, but a structured approach that combines several existing instruments, methods, and digital solutions into one process. The tool leads companies through a structured process that starts with building awareness and understanding of sustainability requirements and circular business models, continues with a baseline and materiality assessment, and results in a long-term sustainability strategy supported by indicators and implementation measures. The method follows a clear sequence: first, internal teams take part in introductory sessions where they receive training, examples of good practices from comparable industries, and insight into relevant regulations such as CSRD and ESRS. This foundation ensures that everyone involved speaks a shared language when evaluating material topics and opportunities for circular innovation. In the second phase, the company carries out a baseline assessment using internal data, interviews, digital tools, and, if needed, external expertise. This step identifies where the organisation stands in terms of energy use, materials, waste, working conditions, social responsibility, market risks, product lifetime, and other circularity factors. The assessment leads into a materiality exercise, where topics are evaluated according to impact, business relevance and stakeholder expectations. The materiality matrix then becomes the core decision-making tool for prioritising future actions. The third stage is dedicated to creating the sustainability strategy. Through workshops and consultations, the company formulates its vision, strategic objectives, KPIs, time horizons, and internal responsibilities. These elements are consolidated into a structured and practical strategy document, typically covering a multi-year period. The final phase focuses on follow-up, where results are reviewed, progress is measured, and the strategic plan is refined over time based on performance and new opportunities.

Requirements by the tool:

For successful implementation, the tool requires leadership commitment, allocation of time for workshops and consultations, and access to relevant data on energy, waste, materials, and social responsibility indicators. A sustainability coordinator or strategic lead is recommended to support communication across departments, and the process benefits significantly from digital tools for data processing, KPI monitoring, or ESG reporting. External support can also accelerate the interpretation of ESRS requirements, improve KPI accuracy and strengthen integration with circularity assessments.

Best For companies …

- Organisations already implementing sustainability actions but lacking a structured long-term strategy or KPIs.
- Companies preparing for CSRD/ESRS reporting, ESG disclosure, or green-finance eligibility.
- Businesses seeking to improve competitiveness, customer trust and innovation capacity through circularity.
- Firms with management commitment and willingness to allocate time, data and internal participation to strategic development.

Example Use Case:

Between December 2024 and March 2025, Elpro Križnič used this tool to transition from strong existing sustainability performance to a fully-defined sustainability strategy. The company already operated with a very good level of resource management, including self-produced solar energy with battery storage, rainwater reuse, more than 85% recycled raw material share, strong employee engagement and ISO-supported management systems. Three Dual Materiality Assessment workshops, supported by several online consultations and an internal Strategic Group for Corporate Social Responsibility, enabled systematic data collection and analysis. Using the Smarthead platform, the company produced a materiality matrix, which prioritised the most relevant sustainability topics.

The outcome of the work was a complete Sustainability Strategy 2025–2030, including strategic goals, KPIs and implementation measures. Elpro established a permanent sustainability governance structure, which now oversees progress and prepares the organisation for future CSRD-aligned reporting. The main challenge during the process involved translating ESRS

requirements into measurable indicators, confirming that companies need clear guidance, analytical support, and continuous learning to work confidently with sustainability data.

Recommendations on using the tool:

To achieve maximum impact, the tool should be used in a participatory way, involving management, operational staff and sustainability coordinators. Data collection should begin early, ideally using digital reporting tools or structured assessment methods. The process should not be seen as a one-off exercise, but as a continuous transition, where KPIs are monitored, reviewed, and strengthened yearly. When companies actively engage with the process, involve different departments and maintain regular follow-up, the tool becomes a strong mechanism for long-term circular transformation.

Pros and Cons

PROS

- Enables companies to consolidate existing sustainability actions into a structured long-term strategy.
- Helps translate materiality results into concrete goals, KPIs and implementation measures.
- Supports CSRD/ESRS readiness and improves credibility with customers, investors and partners.
- Works well when the company already has data, internal awareness and a sustainability vision to build on.

CONS

- Requires experienced facilitation — deep understanding of CSRD, circularity, KPIs and ESG frameworks is critical
- Demands strong internal commitment from the company, access to data, and active engagement across departments
- Not ideal for companies at the very beginning of their sustainability journey or with no internal capacity yet
- Progress and value strongly depend on consistent follow-up — strategy alone is insufficient without execution.

Output

- A structured list of strategic actions and implementation measures, aligned with the materiality results and company priorities.
- Defined governance structures (e.g., sustainability committee, internal working groups) to support implementation and monitoring.

Developer / Provider: Different commercial and free tools were used, such as Smarthead (besmarthead.com) and ESG reporting guidance by the EU. The tool was operated by CCIS.

Future Scenarios

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Workshop	Ideation | Planning	1-2 days	🟡	🔴

Description:

The Future Scenarios Tool is a foresight method that helps organisations explore multiple plausible futures shaped by long-term trends, uncertainties, and systemic changes. Drawing inspiration from scenario approaches used by Arup, the World Economic Forum's global trend insights, and the Copenhagen Institute for Futures Studies, the tool encourages teams to think beyond linear projections and consider how different worlds might emerge.

In the context of circularity, the tool does not prescribe ready-made solutions. Instead, it helps companies understand why circular strategies may become more relevant in various futures — for example due to increasing resource scarcity, tightening regulations, shifts in consumer expectations, or technological disruptions.

This allows organisations to identify opportunities for regenerative models, anticipate risks, and design strategies that are more resilient in a rapidly changing environment.

Requirements by the tool:

- The tool should be facilitated by someone experienced in foresight, speculative methods, systems thinking or art and design disciplines.
- Use verified insights from global trend sources combined with sector-specific knowledge (manufacturing, electronics, supply chains). Include **local signals**, regional policy changes, and company-specific context.
- Allocate enough Time — Ideally a 2-Day Workshop: Day 1: ***Mindset-building:*** trends, uncertainties, systems mapping, mental stretching. Day 2: ***Scenario creation and translation:*** narratives → impacts → circular opportunities → strategic actions.
- Ensure diverse participation by inviting people from different functions, such as design / R&D/ engineering, management, finance, etc.

Best For companies …

- that want to explore long-term trends, uncertainties, and possible future developments to inform strategic decision-making.
- that aim to understand how circularity, regulation, resource constraints, or market shifts might affect their business in the future.
- that need a structured way to generate future-oriented ideas, challenge assumptions, and broaden strategic thinking.

Example Use Case:

We conducted a one-day workshop with Elektryka Morska, students from the Design Faculty, consultants, and two small and medium-sized manufacturing companies (SMEs). The session was facilitated by Katarzyna Asnosowicz, an expert in strategic foresight. Participants were divided into three teams, each tasked with creating a scenario and potential solution based on pre-prepared data relevant to the electrical and electronic sector.

The workshop highlighted a common challenge: SMEs rarely actively shape long-term futures, often following the strategic directions of larger companies or reacting flexibly to market changes. Day-to-day operational pressures limit their capacity for structured futures thinking.

To address this, the workshop demonstrated the value of broadening participation. By including representatives from clusters, sectoral organisations, and value-chain networks, mid-cap companies and SMMs could collaborate, exchange insights, and learn from each other's approaches. This mixed-group format enriched the scenario-building process, producing more realistic, actionable, and strategically relevant outcomes.

Pros and Cons

PROS

- **Collaborative Learning:** Mixing SMMs, mid-caps, students, and consultants fosters knowledge exchange and mutual learning.
- **Realistic Scenarios:** Including representatives from clusters or value chains ensures scenarios reflect broader industry dynamics.
- **Strategic Awareness:** Helps SMMs move beyond day-to-day operations to consider long-term trends and opportunities.
- **Sector-Specific Insights:** Pre-prepared data on the electrical and electronic sector provides a concrete foundation for scenario creation.

- **Engaging Format:** Team-based scenario and solution development encourages active participation and creativity.

  CONS

- **Limited SMM Future Literacy:** SMMs may struggle with structured futures thinking due to operational pressures and short-term focus.
- **Time Constraints:** A one-day workshop may not allow enough depth for full scenario exploration or detailed strategy planning.
- **Dependence on Facilitation:** Outcomes heavily rely on the skill of the facilitator to guide discussions and challenge assumptions.
- **Data Preparation Requirement:** High-quality, sector-specific data must be collected and synthesised in advance.

Output

- 3 - 4 scenario narratives for strategic foresight
- a concept for a new product/service

Developer / Provider: Media Dizajn Association

Cyrkl Tool Marketplace

| TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Exchange Platform	Evaluation | Collaboration / Decision	1-2 hours for initial offer preparation	🟢	🟢

Description:

Cyrkl Tool Marketplace (Cyrkl Digital Waste Market) is an online B2B platform that connects waste producers, processors, recyclers, and manufacturers of secondary raw materials. It focuses on optimizing the handling of waste and by-products—materials move from those who need to dispose of them to those who can use them as inputs. Cyrkl is the largest digital marketplace for waste and secondary raw materials in Europe, with more than 21,000 registered entities and hundreds of realised circular economy projects. The platform uses modern digital technologies and machine learning to recommend suitable partners and offers expert consultancy aligned with waste legislation.

Requirements by the tool:

- Registration on the Platform – Company account at www.cyrkl.com. Free registration, free up to 5 offers/year, €24/month for unlimited use.
- Basic Data on Waste / Materials – EWC code, description, composition, quantities, logistics limits.
- Internal Approval for Trading Waste – Compliance, contracts, safety, transport approvals.
- Internet Access and Basic Digital Skills – No installation needed.

Best For companies …

- Firms generating larger waste volumes or by-products.
- Companies seeking alternative input materials from recyclates.
- Businesses wanting to reduce waste costs by 15 – 45% and lower CO_2.
- Firms requiring transparent and compliant waste trading.
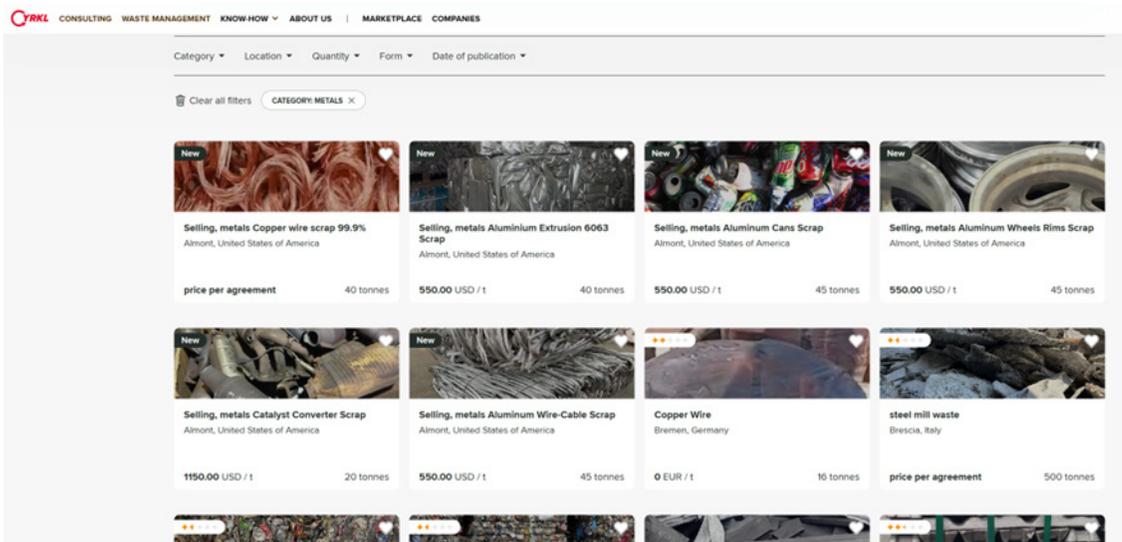
SOURCE:

Example Use Case:

A cable manufacturer wants to reduce waste-management costs and increase circularity by finding new material-recovery options for its mixed plastic fractions and copper-containing production residues. These materials were previously landfilled or energetically recovered, generating high costs and CO_2 emissions.

STEP 1 – WASTE STREAM IDENTIFICATION AND STRATEGY SELECTION

Using Cyrkl Marketplace, the company identifies which waste streams have the highest economic and environmental improvement potential. Through this initial screening, the tool shows that the company should focus on:

- Mixed plastic fractions (PVC, PE, PP, silicone, PEX) – high volume + potential for material recycling.
- Residual materials with valuable content (e.g., copper emulsions, metallic residues) – market demand exists.
- Clean process by-products that could be reused by other industries (construction materials, pallet production, etc.).

This step clarifies which waste streams can realistically be commercialized through the marketplace and which require technical treatment before sale.

STEP 2 – ASSESSMENT OF MARKET FIT AND MATERIAL DATA QUALITY

The company uploads detailed information into the platform — material description, EWC codes, photos, chemical composition, granulometry — allowing Cyrkl's algorithm and database to identify relevant buyers.

During this phase, it becomes clear that:

- Several material streams are immediately market-ready, with high demand among recyclers or manufacturers using secondary raw materials (e.g., producers of plastic pallets, construction materials).
- Some streams are only partially suitable due to mixed polymer content, presence of additives, or lack of data (e.g., flame retardants, PVC content).
- A few streams are currently not marketable, because their composition or form requires pre-treatment (e.g., drying, grinding, separation).

This structured assessment shows which waste streams are commercially viable, which need refinement, and which require future process changes.

STEP 3 – IDENTIFYING OPTIMISATION POTENTIALS AND MATCHES

Based on the analysis, Cyrkl Marketplace generates real matches and supports the company in identifying:

- Specific buyers interested in the waste (e.g., companies producing urban furniture, recyclers of mixed plastics, granulate producers).
- Material improvements needed to reach higher-value applications (e.g., better separation of fractions, stable grain size, reduced contamination).
- Economic and environmental benefits, including avoided disposal fees and potential CO_2 savings.

These insights allow the company to define targeted next steps:

- improving sorting at source,
- reducing contamination,
- renegotiating waste-handling contracts,
- or shifting selected waste streams from disposal to material recycling.

Recommendations on using the tool:

- Start with the "top 3" largest waste streams – Identify materials with highest volume or highest disposal cost.

- Document materials well – Photos, technical sheets, chemical analyses (if available); this greatly increases the chances of finding a partner.
- Combine the marketplace with Cyrkl Waste Scan – Especially when more complex materials require in-depth analysis (e.g., specific plastics, sludge, sediments).
- Involve multiple departments – Procurement, environment, production, logistics—to identify real opportunities and set contract conditions.

Pros and Cons

PROS

- Largest EU marketplace for secondary raw materials – High chance of finding a partner due to extensive network across Europe.
- Transparent pricing and market insight – Price and market information support better negotiation and planning.
- Direct environmental impact – Demonstrable CO_2 savings and landfill reduction.
- Low entry barrier – Online registration, no installation, free basic usage.

CONS

- Dependence on internal data quality – Without proper material description, finding serious buyers is difficult.
- Market risk – Success depends on current demand; some specific waste types may not find a buyer immediately.
- Internal approval processes – Companies must align internal compliance, contracts, and environmental responsibility.

Output

- Concrete matchmaking of offers and requests – New contractual relationships between waste producers and recipients.
- Reduced waste management costs and additional revenue from selling waste/secondary raw materials.
- Measurable CO_2 savings and data for ESG / CSRD reporting.
- Creation of an internal portfolio of recyclable streams and overview of their market value.

Developer / Provider:
Cyrkl Digital Platform, s.r.o., www.cyrkl.com

Ecochain – LCA Tool

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Interactive Website / Web Tool	Assessment | Evaluation	Initial set-up: 1–3 days per product; iterative use and refinement over weeks to months, depending on data and product count	🟢	🟡

Description:

Ecochain Mobius is a cloud-based Life Cycle Assessment (LCA) and Product Carbon Footprint (PCF) software that enables companies to translate bills of materials, process data and logistics information into quantified environmental footprints. Through a browser-based interface, users can build product models that reflect real materials, energy use, transport and waste flows, and then run calculations to understand the environmental impact across the life cycle. The tool visualises hotspots, such as particularly carbon-intensive materials or process steps, and allows users to compare alternative scenarios – for example switching from one frame material to another, changing packaging concepts or adjusting logistics routes. Results can be exported in commonly used formats (PDF, CSV, XLS), making it easier to document decisions, share findings internally and align with external reporting or customer requests.

Within CIRCOTRONIC, the focus was on the Ecochain Mobius Professional plan (up to around 100 objects), which was piloted with SMEs in the electronics and battery sectors to test whether such a quantitative LCA/PCF platform can be integrated into real product development workflows. In practice, the tool was used to model existing and alternative product configurations, confirm or challenge assumptions about "green" design options, and build a clearer understanding of where environmental improvements are most effective. Pilots with companies showed that, once initial data structures and workflows are set up, Ecochain Mobius can significantly streamline PCF work compared to traditional, one-off LCA studies, while at the same time raising internal awareness and providing a more systematic basis for ecodesign decisions, procurement discussions and sustainability communication.

Requirements by the tool:

To use Ecochain Mobius effectively, a company needs at least a basic overview of its products, materials and production processes. In practice this means having reasonably structured Bills of Materials (BOMs) for the selected products, with information on main components, materials and quantities, as well as basic data on energy use for production, assembly, testing, and, where relevant, regeneration. Additional information on inbound and outbound logistics, packaging and waste streams is required, since these elements can significantly influence the product carbon footprint and other impact categories. It is also important to allocate internal resources for learning the tool, selecting the right datasets from the database and manually entering larger BOMs. Ideally, one internal person coordinates data collection and acts as the main Mobius user. Because the interface is in English and Ecochain is a web-based solution, a stable internet connection, basic understanding of technical terms in English and readiness to participate in short onboarding or training sessions are essential.

Best For companies …

Ecochain – LCA Tool is best suited for companies that want to move from qualitative assessments to quantitative understanding of the carbon footprint and life cycle impacts of their products. It is particularly relevant for manufacturers of electronics, industrial equipment, batteries and other complex products who already have, or are willing to build, structured BOMs and some internal data on energy use and logistics. The tool is a good fit for organisations experiencing customer or regulatory pressure to substantiate environmental claims and report product-level impacts in a transparent way. It is especially valuable where companies need to compare existing and alternative materials or product concepts—such as plastic versus wooden frames, different packaging designs or regenerated versus new components—and gradually integrate PCF results into product development, procurement and sustainability communication.

Example Use Case:

The first company example was a German medium-sized electronics manufacturer of industrial PC panels and custom-made keyboards for workspaces. Ecochain Mobius was used to compare the product

carbon footprint of a standard touch panel with a plastic frame against an alternative design with a wooden frame. The company had previously carried out a full LCA through a lengthy and resource-intensive process and wanted to see whether Mobius could streamline PCF calculations. The results helped confirm the potential of the tool to simplify assessments, highlighted the main hotspots and showed how PCF insights could be used more systematically in future material and design decisions.

Another company example was a Slovenian SME active in Li-ion cell regeneration and second-life battery products. Here, Mobius was used to calculate the PCF of key products. Together with an external expert organisation, the company first defined the functional unit and system boundaries, then entered key materials, energy use for assembly and testing, transport, waste and packaging into the tool. The initial models provided quantified PCF results and clear hotspots, and led to the creation of a practical internal checklist. This checklist now supports ongoing data collection and helps embed PCF checks into development gates for future products.

Recommendations on using the tool:

Experience from the pilots suggests that companies should start with one or two representative products rather than attempting to model the entire portfolio at once. It is helpful to first tidy and structure BOMs and basic process data, and to nominate an internal "PCF/LCA champion" who coordinates inputs from development, production, procurement and suppliers. Using simple checklists for materials, energy, transport, waste and packaging makes it easier for colleagues to provide the right data from the start. The tool works best when it is linked to existing decision points—such as design reviews or gate meetings—so that PCF results influence actual choices instead of remaining a one-off exercise. Given the English interface and the breadth of the database, companies should plan a brief training and familiarisation period, during which users get used to the data structure, terminology and result visualisations.

Pros and Cons

PROS

- Delivers quantitative and detailed PCF and LCA results for products and variants.
- Provides clear visualisation of environmental hotspots across the life cycle.
- Supports scenario comparison (e.g., alternative materials, suppliers, packaging concepts).

- Allows exporting results in standard formats (PDF, CSV, XLS) for internal reports and customer communication.
- Offers a more efficient and repeatable alternative to one-off, consultant-driven LCA studies.

CONS

- Requires internal effort, including staff time for training, data gathering, and model building.
- Larger Bills of Materials may still need to be entered manually.
- Matching specific materials and processes to database datasets can be challenging.
- English-only interface may be difficult for some users.
- Higher initial threshold for very small companies or those at the beginning of their sustainability journey.

Output

Using Ecochain – LCA Tool, companies obtain quantified product carbon footprints and life cycle assessment results for individual products and variants, expressed per defined functional unit. The outputs include a breakdown of impacts by life cycle stage and key process or material, making it clear where emissions and other environmental burdens are concentrated—whether in raw materials, energy use, logistics, packaging or waste handling. The tool also generates comparative results for alternative design or sourcing scenarios, helping to identify the most effective improvement options. Results and diagrams can be exported as reports and data tables (PDF, CSV, XLS) for use in internal strategy documents, supplier discussions or benchmarking against other PCF platforms. In the pilots, an additional outcome was the development of simple internal checklists and workflows for continuous data capture, so that PCF assessment becomes part of everyday product development and decision-making rather than a one-off activity.

Developer / Provider:
Ecochain – LCA Tool is developed and provided by Ecochain Technologies B.V., a company specialised in software and services for quantitative assessment of environmental impacts and product carbon footprints.

Insights

Impact per item in kg CO2eq
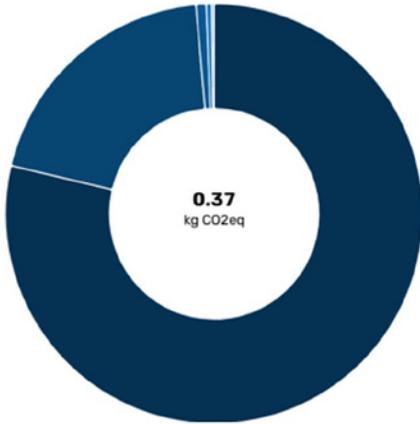
Printed circuit board	0.29 kg CO2eq
Electricity	0.07 kg CO2eq
Textile, recycled fibre (generic)	0.00289 kg CO2eq
Transport, truck unspecified	0.00149 kg CO2eq
Corrugated board, at plant	0.00061 kg CO2eq
Housing, wood (hardwood)	0.00012 kg CO2eq
Metal scrap (nickel offcuts)	$2.76 \cdot 10^{-9}$ kg CO2eq

0.37 kg CO2eq

View all items

PICTURE OF THE ECOCHAIN MOBIUS TOOL USED IN THE CIRCOTRONIC PILOTS, SHOWING THE MODELLING OF THE PRODUCT INVENTORY AND THE RESULTING IMPACT BREAKDOWN IN KG CO_2EQ.

Cyrkl Waste Scan

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Interactive Website / Web Tool	Assessment | Evaluation | Planning	1-3 days	🟢	🟡

Description:

Cyrkl Waste Scan is a consultancy service that analyzes a company's waste and material streams and identifies opportunities for circular valorization using data analysis, recycling technology expertise, and Cyrkl's partner network. Outputs include:

- Current waste management assessment
- Economic and environmental impacts (costs, savings, CO_2)
- Overview of contacted partners and responses
- Optimisation recommendations and next steps

Requirements by the tool:

- Internal waste data (EWC codes, quantities, costs)
- Technical material information (composition, photos, samples)
- Dedicated contact person/team
- Management support

Best For companies …

- Industrial firms with complex waste streams.
- Companies with high waste disposal costs.
- Businesses preparing ESG/CSRD reports or decarbonisation strategies.
- Firms evaluating investments into new recycling technologies.

Example Use Case:

A manufacturer of electrical cables wants to understand how circular its current waste-management system is and identify concrete opportunities for improving recycling rates and reducing environmental impact. The company generates several complex waste streams, including mixed plastics, metal-rich emulsions, and specialised residues from production.

STEP 1 − CIRCULARITY STRATEGY SELECTION BASED ON WASTE SCAN DATA

Using the Waste Scan methodology, Cyrkl identifies which circular strategies are feasible for each waste stream. The needs analysis shows that the company should focus on:

- Short loop strategies (waste minimization, internal reuse, improved sorting) for high-volume plastics.
- Medium loop strategies (material recycling, secondary raw material markets) for residues with metal content or high-quality polymers.
- Long loop strategies only in restricted cases where no immediate recycling market exists (e.g., energetic recovery for certain contaminated fractions).

This targeted prioritization ensures that the company focuses efforts where the highest financial and environmental returns can be achieved.

STEP 2 − ASSESSMENT OF WASTE PROPERTIES AND MARKET BARRIERS

Cyrkl conducts a deep analysis of each waste stream, including site visit, material sampling, chemical analysis, and outreach to external partners.

The results show that:

- Some materials are fully suitable for material recycling, such as clean polymers or residues with high copper content.
- Several streams are only partially suitable, mainly due to:
  - mixed polymer composition,
  - high moisture (e.g., sediments after vacuum evaporation),
  - absence of consistent granulometry,
  - or missing chemical certificates for construction-sector applications.
- A few streams are currently not suitable, because the market requires minimum volumes, certification, or additional purification (e.g., plastic mix from cable stripping with inconsistent PVC content).

This analysis clarifies technical, legislative, and market-related barriers that might limit circular use.

STEP 3 – IDENTIFYING OPTIMISATION POTENTIALS AND ACTIONABLE SOLUTIONS

Based on the "not suitable" and "partially suitable" categories, Cyrkl generates 3 optimisation strategies.

1. Technical adjustments - improved fraction separation, drying or stabilization of sediments, pre-processing (e.g., shredding, granulation).
2. Market pathways - construction materials (cement plants, asphalt producers, ceramic factories), recyclers of technical plastics, manufacturers of pallets, profiles, or urban furniture.
3. Strategic recommendations - introduction of better in-house sorting, piloting small-volume material tests with identified partners, exploration of reuse scenarios outside the waste regime (e.g., artificial stone, technical composites).

The final Waste Scan delivers a structured overview of which materials are already circular, where targeted improvements could unlock new recycling opportunities, and where long-term strategic changes are required.

Recommendations on using the tool:

- Start with 1–3 priority waste streams.
- Combine with marketplace for partner matchmaking.
- Provide high-quality samples and analyses.
- Apply results to internal process improvements.

Pros and Cons

PROS:

- Deep, tailored analysis.
- Real-market connections.
- Clear economic and environmental assessment.
- Supports investment decisions.

CONS:

- High data/time demands.
- Not always immediate solutions.
- Should be repeated for dynamic waste portfolios.

Output

- Detailed report and presentation.
- List of contacted partners and responses.
- Concrete valorization scenarios.
- Decision-support materials for management and ESG/CSRD.

Developer / Provider: Cyrkl Digital Platform, s.r.o., www.cyrkl.com
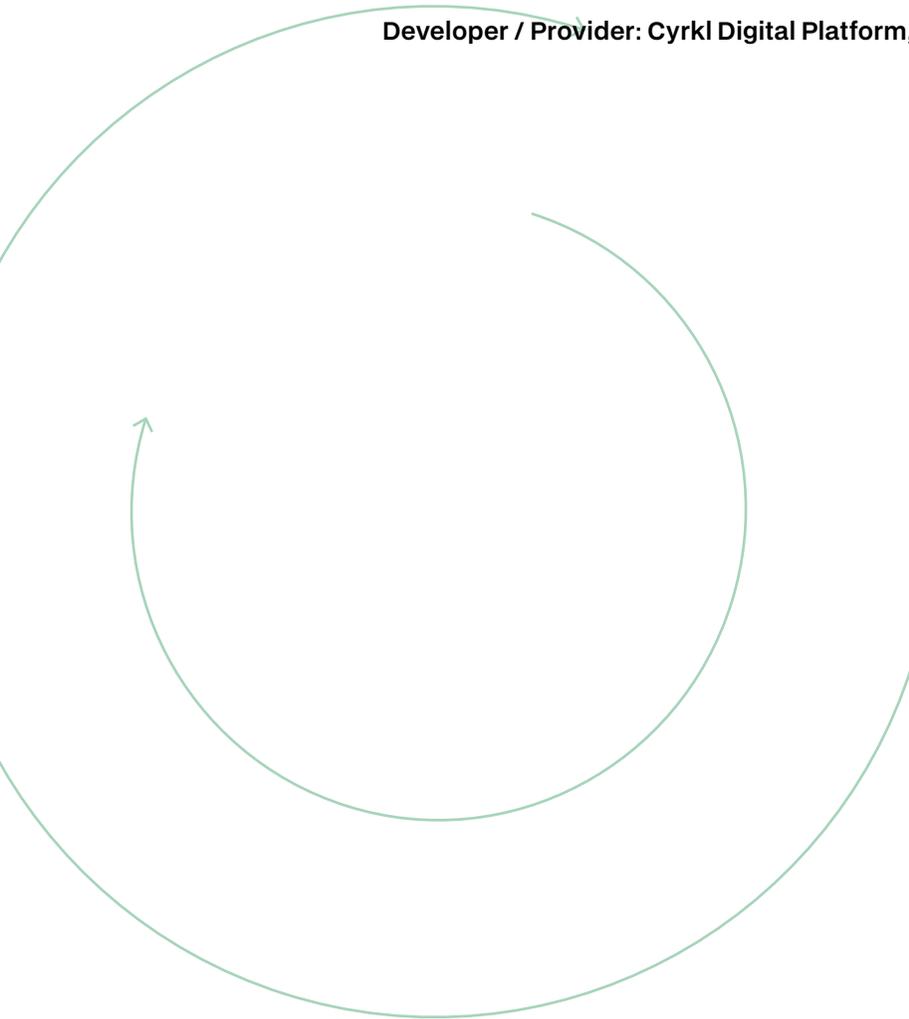
CIRCitNorden Circular Assessment Tool

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Spreadsheet | Interactive Website / Web Tool	Assessment | Action	30 – 60 minutes (Tool assessment) + 6-12 month (Actions)	🟡	🟢

Description:

The Circular Assessment Tool is developed by the research project of Nordic countries called CIRCitNorden that took place from 2017-2021 with the objective to support the Nordic industry to discover and implement the opportunities of Circular Economy, through the development, testing and implementation of science-based tools. The project was part of the Nordic Green Growth Research and Innovation Programme funded by NordForsk, Nordic Energy Research and Nordic Innovation. The project covered 6 focal areas and focus area 3 "Including circular strategies and assessment scan to implement while in early product development" was adopted. The tool is essentially a Spreadsheet tool and a guidebook available to be downloaded for free from the project website.

Requirements by the tool:

It is recommended before applying the tool to read through the guidelines and instructions. With the Circularity Assessment Tool, a company can evaluate three or more circular ideas or concepts based on how well they fulfil important 9R guidelines. After the assessment a Total Circularity Potential Score is the sum of the scores for each guideline and should be as low as possible and represents the priority actions for a company (the lower – the better). The tool can be used to compare different circular concepts and actions and provide a clear rating of the concepts against each other.

BayFOR has made the tool more user-friendly by adapting it to be used in a concept board (a web tool for better collaboration online in workshop setting where the participants are remotely connected) with all the 6 steps required to implement the rating explained in the concept board. For a company to smoothly implement the tool, it is essential that a list of three or more circular concepts or materials for the electronic product is selected.

Best For companies …

This tool is advised for companies that have already started some measures for circularity or sustainability. Once the tool is applied, it can be an incentive to start measures and actions within the company to save energy consumption, use less hazardous products or to optimise the performance of the electronic equipment. It is best suited for the following companies:

- Assessment of circular concepts → if companies would like to assess their circular options and prioritise these options or strategies, this is a good tool.
- Identifying measures and taking action → for companies that would like to take actions and measures to support circular, non-hazardous and less toxic materials. Also, it is practical to implement energy efficiency measures for electronic companies.
- Evaluation and reporting of key actions → companies that would like a graphical presentation of their priorities to also be included in reporting such as CSRD reports.

Example Use Case:

In the case of the circularity assessment tool by CIRCitNorden, BayFOR has tested it with a mid-cap company producing large soldering machines for the manufacturing industry. The company had provided us with three different solutions for energy and process efficiency before the meeting. BayFOR did some initial research about these alternatives, prepared a presentation and discussed these 3 alternatives with the Circular Assessment Tool by CIRCitNorden as set up in the concept board. The three options were mapped in the tool and one pathway was selected which was most cost-effective with maximum impact on efficiency of the machines. The other measures were saved for another time, depending on the availability of funding.

Recommendations on using the tool:

- Prepare a list of 3-4 circular concepts or measures for electronics production, use or disposal / recovery
- Prepare a list of alternative, non-hazardous and non-toxic materials that you could use in the electronic product
- Read the guidelines of the tool before using it for the first time

Pros and Cons

PROS

- Well structured and easy to understand: the priorities for which choice of materials or actions for circular concepts can be reached quite fast.
- **Clear prioritization for circular concept**s: The score gives a fast assessment of circular strategies and where to start.
- **Can be implemented easily**: Can be implemented within 30-45 minutes when the circular concepts are available.

CONS

- Tool description with 9-R could be challenging: Requires some assistance and explanation of the rating systems.
- **Might need input from advisors:** Some steps are not easy to follow and some input by advisors could help for ease of use.

Output

A rating system and spider diagram visual of the three or more circular strategies that are being considered by a company is the concrete and visual output of the tool. These visuals can be used for CSRD-reporting and for internal documentation.

Developer / Provider:
The developer of the tool is the consortium behind the CIRCitNorden research project. Some of the authors who have published information on the tool are:

Sasha Shahbazi and Anna Karin Jönbrink, (2020) in the scientific paper "Design Guidelines to Develop Circular Products: Action Research on Nordic Industry." Sustainability.

Kravchenko, M., Pigosso, D., and McAloone, T. (2020) in the paper "Developing a Tool to support Decisions in Sustainability Related Trade-Off Situations: Understanding Needs and Criteria" Proceedings of the Design Society: DESIGN Conference, 1, 265-274.

State your selected circularity goals:

General design guidelines	Importance to developing the product Really important (3) Moderately important (2) Slightly important (1) Not important (0)			Level of fulfillment (1) yes, the guideline has been completely fulfilled by this concept (3) somehow but can be improved (5) no, the guideline has not been fulfilled by this concept and it has to be			Circularity Potential Scores 15: Vital and imperative 10 and 9: improvement are necessary 6 and 5: Potential circularity improvements 3, 2 and 1: No change required 0: Not a concern		
	Concept A	Concept B	Concept C	Concept A	Concept B	Concept C	Concept A	Concept B	Concept C
Focus mainly on functionality and quality performance	2	3	3	1	3	5	2	9	15
Think about activity supports in the operational stage	2	2	2	1	5	5	2	10	10
Focus to fulfill the customer's requirements and value creation	3	2	3	1	3	3	3	6	9
Try to use digitalization, ICT and IoT solutions	3	3	3	1	3	3	3	9	9
Make it easy to inspect the product and components	2	2	2	1	3	3	2	6	6
Make it easy to clean the product and components	3	1	3	1	5	3	3	5	9
Make exchanging of faulty components easily accessible	3	1	3	5	5	5	15	5	15
Make it easy to dismantle the product nondestructively	3	1	3	3	3	3	9	3	9
Think about boundary management	2	1	3	5	1	3	10	1	9
Think about incumbent configuration	3	1	3	1	1	3	3	1	9
Think about complementary capabilities	3	1	3	1	5	3	3	5	9
Design using renewable materials	1	1	3	1	5	3	1	5	9
Design using recyclable and secondary (recycled) materials	2	3	2	1	1	3	2	3	6
Consider toxicity and other environmental aspects of materials	2	2	3	5	1	3	10	2	9
Favor cleaner production, processes, machines and equipment	2	1	1	1	1	1	2	1	1
Treat production (pre-consumer) wastes appropriately	3	3	1	5	1	5	15	3	5
Design for reduced energy consumption and usage of renewable energy	2	3	1	3	1	5	6	3	5
Design standardized components across different products and models	2	3	1	3	1	5	6	3	5
Design standardized tools required across different products and models	3	1	1	5	1	5	15	1	5
Use durable and robust components and materials	3	1	1	3	1	5	9	1	5
Design in modular construction	3	2	2	3	1	5	9	2	10
Provide manuals and documentation	2	2	2	5	1	5	10	2	10
Make spare parts and exchanging components easily available	1	1	2	3	3	5	3	3	10
Consider timeless design, emotional attachment and compatibility	1	2	3	3	3	5	3	6	15
Investigate current and upcoming laws and regulations	1	1	3	3	3	5	3	3	15
Use joints and connectors that can be easily opened and closed multiple times	1	3	3	5	1	3	5	3	9
Minimize the number of different incompatible or dissimilar materials	3	2	2	5	3	3	15	6	6
Make it easy to identify the materials and relevant information	1	3	3	5	1	3	5	3	9
Total Circularity potential Score with inclusion of the effect (the smaller the better)							174	110	243

Concept B is more circular

PICTURE OF THE TOOL BY CIRCITNORDEN IN CONCEPT BOARD FOR PILOTING WITH SMES GIVING THE EXAMPLE OF CIRCUIT BOARDS (AS DEVELOPED FOR CIRCOTRONIC BY BAYFOR).

Option A

Leiterplatte aus Papier (CirCel paper: https://circel...)

Option B

Leiterplatte aus Naturfaser (Soluboard: https://www.ji...)

Option C

Konventionale Leiterplatte

CircularSupplyChain Workshop Tool

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Workshop | Interactive Website / Web Tool	Assessment/ Action	2-day workshop + flexible implementation	🟢	🔴

Description:

The CircularSupplyChain Workshop Tool was designed by the CIRCOTRONIC focus group materials and recovery to foster a comprehensive understanding and re-evaluation of electronics supply chains through the lens of sustainability and circular economy principles. Especially since electronic parts and components are imported to the EU from China and other Asian countries, it is important for OEMs to have a visualisation of their global reach with regard to supply chains. The tool focuses on helping companies identify and implement circular economy practices within their supply chains, thus reducing environmental impact and improving supply chain resilience and efficiency. The tool includes an expert consultancy on their specific supply chain according to the bill of materials (BOM), which will result in the visualisation of parts of their supply chain or specific material streams on the website Open Sourcemap. The objective of the CircularSupplyChain workshop tool is to encourage SMEs to reassess their traditional approaches to sourcing materials and producing goods with a focus on the materials used and the global supply chains they depend on.

Requirements by the tool:

The tool requires initially the bill of materials data sheet (BOM) of one product in the electronics production from the company as a starting point. If there are multiple BOMs , it is advised to focus on one product and prepare the BOM as appropriate for that product. This product's BOM as a baseline, it is possible to map the suppliers on an open access map called open.sourcemap.com. The participants will gain a comprehensive view of their supply chain, highlighting the interconnectedness of suppliers, processors, manufacturers, retailers, and distributors. Leveraging data obtained from prior life cycle assessments or materials assessments done by the company, the supply chain workshop

facilitates discussions around inefficiencies, environmental impacts, and social risks present in the current supply chains. Based on the workshop, key areas can be identified to be addressed in the short, medium and long term. This could involve mitigating risks associated with complex and global supply chains, transitioning to a more regional supply chain or finding synergies with companies having the same challenges and joining forces with them.

Best For companies …

The workshop tool is best suited to companies that have already taken some initial steps toward improving their supply chain transparency and mapping. The participating companies will develop actionable strategies to transition towards more sustainable, resilient, and circular supply chain practices after the workshop has been implemented. It is best suited for those companies that are

- Identifying measures and improvements on the supply chain and taking action → for companies that would like to take actions and measures to enhance supply chain transparency, improve their supply chain resilience and seek synergies and co-creation with other electronics companies.
- Supply chain resilience → suited for those companies that intend to transition to local / European suppliers in order to be independent and resilient to supply chain disruptions experienced in Asia and USA.

Example Use Case:

The Circular SupplyChain Workshop has been held by PP3, BayFOR with an electronics manufacturing services (EMS) provider in Bavaria, Germany. As a starting point all measures that the company is taking toward supply chain transparency and sustainability were identified. It turned out that the company was taking sustainable action by using only 99% recycled tin in their products. They are also in a collaborative network called 'symtronics' which collaborates to to manufacture high-performance products in their partner network and develop products that are made exclusively from recycled or renewable materials. After mapping the supply chain and discussing the challenges coming from the cheaper products made in Asia, the company identified 7 levers of action by which they are able to monitor their progress. They were able to recycle 2600 Kg of e-waste cables and test a water-based fluxing agent instead of the alcohol-based ones. Additionally, they are committed to start an initiative on a recyclable PCB - made in Germany. However, for a small company the challenge remains with competing parts which are cheaper from Asian markets and the lack of producer responsibility in these countries. Also,

often the supply chain is not traceable to the mines and quarries where the raw materials or metals are mined. This becomes more complicated the more parts the electronic product has, since each part comes from a different supplier.

Recommendations on using the tool:

The following two steps will ease the tool implementation considerably when preparatory work is done and an expert is involved to map the supply chain of the products from the distributor, the retailer and to the company.

- Understanding and gathering data on the existing supply chain of products or at least one product to start with (bill of materials);
- Review and integrate the product data, if available, on life cycle assessments/ product carbon footprints/ materials analysis /alternative materials replacements and packaging suppliers in the region.

Pros and Cons

PROS

- Good to implement when baseline data is available: the key for a good result is the preparation and the collection of supply chain data with the company before the tool is applied.
  - **Supply chain transparency:** The tool offers better supply chain transparency.
  - **Can be implemented within 0.5 or 1 working day:** when the company has provided the bill of materials and the background research is done, the tool can be used within half a day or one working day to identify clear levers for action.

CONS

- **Tool is in Open Source:** companies that do not want to provide details on their supply chain companies might not want to use an Open Source tool and publish this openly.
- **Input from supply chain expert required:** since the electronics supply chain is complicated and global, it is not easy to map all suppliers. Also all distributors are not willing to provide information about their parts, therefore a supply chain map might be incomplete. An expert could help to assess the missing data.

Output

The key outputs from this tool is an mapping of the supply chain on the website of sourcemap <u>Open Sourcemap</u> (reference for the company Fairphone: <u>Fairphone Supply Chain Fairphone 4 on Sourcemap</u>) This is a good free tool to visualise the global sources of metals that are built in electronic products such as gold ore, tungsten ore, plastics, semiconductors, plastic and so on. At the final stage of the workshop it is possible to visualise on a chart or on Miro board or Concept board what the key actions could be to develop cooperative synergies on circular actions with other companies and initiatives within the ecosystem.

Developer / Provider:
The developer of this workshop format is BayFOR , using the sourcemap to visualise the supply chains. In addition an expert has been appointed to identify the supply chain bottlenecks and research more local options. The expert is the editor of the book Michael D'heur, 2015, Sustainable Value Chain Management: Delivering Sustainability Through the Core Business, Springer (<u>available online here</u>).

Circular Value Chain Mapping
Circular Value Chains Require Collaboration to Close the Loop

Commit to a CE Mindset
– Management commitment
– Assign people to get it done
– Follow-through

Accelerate Circular Designs
– Design for Circularity: Design for longevity, recyclability and use of recycled content.
– Material & component substitution
– Design circular business models.

Get Operations "CE-ready"
– Decarbonise Operations
– Enable CE product manufacturing

GX Ultimate e-Bike Motor

Create Circular Materials Markets
– Circular materials regulation & policies
– Circular material brokerage
– CE Sourcing policies

CO₂ Impact of Virgin Material Mining

Enable CE at Customer Operations
– Offer new circular business models and incentivise demand for circular products.
– Recover, Repair, Redeploy
– Fast and efficient reverse logistics

e-Bike Assembly

Enable Recovery, Refurbishment and Material Harvesting
– Component/Module recovery services
– Sorting, Grading, Recycling & Parts harvesting
– Investment in recycling technology

Motor Refurbishment

Offer Usership & Extended Product Lifetime
– Circular business models: Product as a Service
– Lifetime extension: Repair, Refurbishment, …
– 2nd life: Reuse in other applications

Enjoying the Ride

Become a Collaboration Champion
– Cross-functional
– Cross-industry

Source: sust.biz (2023)

Circular Value Chain Mapping | Proprietary and Confidential | © sust.biz 2025

PICTURE SHOWING THE VALUE CHAIN MAPPING OF COLLABORATION NEEDED TO CLOSE THE LOOP (SOURCE: MICHAEL D'HEUR, SUST.BIZ 2023)

Context Map Canvas

Type	Purpose	Duration	Added Value	Ease of Use
Canvas | Workshop	Overview | Foundation	Half-day workshop	🟡	🟢

Description:

The Context Map Canvas is a strategic tool that helps companies visualise and understand the external environment in which they operate. It supports the identification of trends, regulations, competitive pressures, technological developments, customer behaviour shifts, and uncertainties that may affect current and future business operations.

Within the project, the tool was applied in a workshop format to enable SMEs to systematically map environmental factors and make informed decisions when transitioning toward more circular business models.

By placing the company at the center of the map, the tool guides participants through a structured exploration of the most relevant external influences and reveals the main opportunities and threats affecting the business model.

Requirements by the tool:

To use the Context Map Canvas effectively, the following elements are recommended:

- A clear understanding of the company's activities (business model, main products or services, key processes).
- If feasible, participants with diverse internal knowledge (technical roles, management, sustainability, operations, sales).
- Basic familiarity with market, regulatory, and technological trends, either from internal experience or preparatory research.

- A facilitated workshop setting, including a printed canvas, sticky notes, and guiding questions to stimulate discussion.
- Time allocated for reflection and consolidation, ideally 1.5–2 hours.

Note: the tool does not require specific datasets or advanced analytics, making it suitable for SMEs at an early stage of their circular transition.

Best For companies …

The Context Map Canvas is especially suitable for companies that:

- Are operating in changing or uncertain environments and need clarity on external influences.
- Are beginning or planning a transition to circularity and require a structured overview of contextual factors that shape circular opportunities and constraints.
- Need to identify strategic priorities, risks, and external drivers for transformation.
- Want to engage different departments in a collaborative strategic reflection.

Note: it is particularly useful for SMEs that lack extensive strategic tools but benefit from visual, discussion-based methods.

Example Use Case:

The tool was applied with ALFARAEE, a small Italian company specialised in the dismantling, testing, and recovery of WEEE (Waste Electrical and Electronic Equipment). ALFARAEE extracts components and materials and transforms waste into Secondary Raw Materials (SRMs), collaborating with certified third-party suppliers.

Key insights generated with the Context Map Canvas included:

- Demographic Trends: Growth in digital device usage and increasing flow of printers, servers, routers, and IT equipment entering their facility.
- Rules and Regulations: Impacts of the WEEE Directive, the Critical Raw Materials Act, new ecodesign rules, future sustainability reporting (ESG), and possible CBAM implications for electronics.
- Economy and Environment: Circular repair and reuse expected to increase due to climate policies, ESG financing, and higher public awareness.
- Competition: Emerging reuse centers with lower administrative burdens,

and some competitors. Consortia handling large volumes do not yet prioritise refurbishment.

- Technology Trends: Opportunities for automation of disassembly via robotics for specific steps, improving efficiency.
- Customer Needs: Growing interest in product passports and B2B and B2C demand for tested used products at lower price points.
- Uncertainties: Regulatory timing, evolution of industrial production in Europe, and impact on waste availability.
- Top threats identified:
  - Simplified reuse legislation enabling new low-cost competitors.
  - Instability in European industrial production, reducing the inflow of waste streams.
- Top opportunities identified:
  - Increased demand for circular materials and reused components.
  - New regulations (e.g., product passports) that support traceability and sustainable practices.

Note: this use case demonstrated how the tool supports companies like ALFARAEE in anticipating trends and preparing for future circular business opportunities.

Recommendations on using the tool:

To ensure efficient and meaningful application:

1. Gather basic information on market trends, regulations, and competitors relevant to the company.
2. Include staff from technical, operational, commercial, and management roles to ensure a holistic view.
3. For each section (demographics, regulations, technology, etc.), prepare prompts that stimulate idea generation.
4. Encourage participants to write ideas on sticky notes and cluster them into themes.
5. At the end of the workshop, identify the top two opportunities and top two threats and feed them into a SWOT analysis.
6. Use the insights as input for circular business model development, strategic planning, or risk mitigation.

Pros and Cons

PROS

- Easy to use and highly visual: Suitable for SMEs with limited strategic planning experience.
- Encourages cross-functional collaboration: Facilitates shared understanding across teams.
- Supports circular business model development: Highlights external drivers essential for circular strategies.
- Helps identify clear opportunities and threats: Useful precursor to SWOT and strategic prioritization.

CONS

- Quality depends on participants' knowledge: If key insights or stakeholders are missing, the canvas may be incomplete.
- May require facilitation: SMEs might benefit from moderation to guide discussion and maintain structure.
- Outputs are qualitative: It provides direction but not quantitative evaluation, so further analysis might be needed.

Output

The main output of the Context Map Canvas is a visual map that consolidates the external factors shaping the company's business model. It highlights relevant trends, regulatory drivers, technological developments, competitive dynamics, customer behaviour shifts, key uncertainties, top opportunities, and threats. This information acts as a strategic foundation for designing or adjusting a circular business model.

Developer / Provider:
The Context Map Canvas applied in this project is based on the Circular Business Model Innovation Toolkit by McDermott et al., adapted for use within the CIRCOTRONIC project by the project team and workshop facilitators.

Quickscan Circular Business Models

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Guide | Spreadsheet	Assessment | Ideation	~ 30 –60 (with introductory parts) minutes	🟢	🟢

Description:

The Quickscan Circular Business Models is a structured tool aimed at helping companies assess their current position in relation to circularity and identify suitable circular business model strategies. It is built around a two-phase process: the first part helps organisations reflect on their existing practices and level of ambition, while the second suggests one or more business models based on the organisation's profile.

The tool is based on a classification of seven circular business model types and is intended primarily for companies in the manufacturing sector, though it is adaptable to others. It is available as both a downloadable guide and an interactive version online. The format is designed for quick use (typically under one hour) and is suitable for users with or without prior experience in circular economy concepts.

Requirements by the tool:

- Basic knowledge of the company's operations, strategy, and product or service offering.
- Ability to reflect on current sustainability practices and future ambitions.
- Participation from one or more individuals familiar with business development or management.
- No technical expertise or prior knowledge of circular economy frameworks is required.
- For the digital version, internet access is needed; otherwise, the tool can be used in print or PDF format.

Best For companies …

- At the early or intermediate stages of exploring circular economy strategies.
- Looking for a structured starting point to assess their circular readiness and identify suitable business models.
- Wanting to raise internal awareness and initiate strategic discussions on circularity.
- Needing a low-threshold tool that does not require technical expertise.
- For more advanced companies, the tool can support reflection on their current model and identify potential areas for further development or adjustment.

Example Use Case:

An SME manufacturing electronic subassemblies for industrial automation systems used the Quickscan to explore how it could contribute to circular economy goals within the constraints of its role as a subcontractor. While the company had little influence over end-product design, it faced increasing pressure from OEM clients to document material content, reduce waste, and improve process transparency.

Through the Quickscan, the company identified its strongest contribution areas as aligning with Resource and End-of-Life models. It began to assess how it could support client-led circular initiatives—for example, by improving documentation of material composition for recyclability, offering take-back options for defective batches, and collaborating on safe dismantling procedures. The tool also helped structure internal discussions about tracking production waste and exploring new business opportunities related to component recovery or requalification.

Recommendations on using the tool:

- Use the tool in a small internal workshop with key staff from management, production, and business development.
- Prepare basic information about the company's products, clients, and current sustainability-related activities.
- Take time to discuss each question collectively—the value often lies in the internal dialogue it generates.
- If operating as a subcontractor, consider how your company can support or align with clients' circular strategies rather than focusing only on independent initiatives.

- For more insight, combine the Quickscan with follow-up tools such as circular design checklists, life cycle assessments, or supply chain mapping—especially when moving from reflection to planning.

Pros and Cons

PROS:

- Easy to use and accessible; no prior experience with circular economy frameworks is needed.
- Encourages structured internal discussion on circularity, helping align different perspectives within the company.
- Based on a well-defined classification of circular business models, which provides a solid conceptual foundation.
- Versatile in application; suitable for different sectors and for companies in supporting roles within the value chain.

CONS:

- The tool is qualitative and exploratory; it does not provide technical recommendations or quantitative analysis.
- Limited depth for operational planning; it should be complemented with more detailed tools for implementation.
- Companies already advanced in their circular transition may find the tool too general unless used for strategic review or team alignment.

Output

- A qualitative self-assessment of the company's current positioning in terms of circularity and sustainability.
- A clearer understanding of internal ambitions and readiness to engage with circular business models.
- Identification of one or more suitable circular business model types aligned with the company's profile.
- A foundation for further strategic planning, internal alignment, or client discussions on circular opportunities.
- Optionally, a documented summary of the assessment (if the tool is used in its digital or facilitated version).

Developer / Provider:
Originally developed by Jan Jonker, Niels Faber, and Timber Haaker.
Published as a whitepaper with the support of the Dutch Ministry of
Economic Affairs and Climate Policy (2022). The interactive version is
available via the Business Model Lab platform:
https://businessmodellab.nl/tools.

A digital, AI-supported version is currently being developed and
published by t2i to enhance accessibility and guided use, particularly for
SMEs and innovation networks.

Circular Business Model Canvas

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Canvas	Ideation	1–2 working sessions (variable, depending on use case)	🟢	🟡

Description:

The Circular Business Model Canvas (CBMC) is a visual tool adapted from the traditional Business Model Canvas, specifically designed to incorporate circular economy principles. It helps businesses explore, design, or reconfigure their business models to reduce waste, retain value, and regenerate natural systems.

The canvas typically extends or modifies building blocks such as Value Proposition, Customer Relationships, Channels, Key Activities, and Revenue Streams to include elements like material loops, product-as-a-service options, resource recovery, and shared value creation. The tool is particularly useful in the early ideation phase or to revisit existing models with a circular lens.

Requirements by the tool:

- A clear understanding of the current business model
- Internal team members from relevant departments (e.g., design, production, business development)
- Basic knowledge of circular economy principles (or facilitation support)
- Physical or digital canvas template
- Time and willingness to explore alternatives and rethink value creation logic

Best For companies ...

- At the concept or redesign stage of a product or service
- Exploring new value creation logics aligned with circular economy principles
- Engaging internal teams in collaborative strategy sessions
- Needing to visualise and compare traditional vs circular models
- In manufacturing sectors where materials, products, and life cycle impacts are central to business value

Example Use Case:

An electronics component manufacturer used the Circular Business Model Canvas during an internal innovation workshop to rethink how it might engage more deeply in life cycle services. The team explored shifts from pure product delivery to long-term service-based offerings, integrating diagnostics, repair, and potential take-back schemes. The exercise revealed new potential partnerships and led to the development of a pilot proposal for a monitoring and maintenance service bundle.

Recommendations on using the tool:

- Use it in workshops with cross-functional teams to encourage diverse perspectives
- Start with a simplified case study or known business model before applying it to your own
- Combine it with circular value mapping or life cycle thinking tools for deeper insights
- Consider external facilitation for first-time users

Pros and Cons

PROS

- Encourages systems thinking and long-term value creation
- Adaptable to a wide range of industries and business sizes
- Helps identify circular opportunities beyond product redesign
- Supports collaborative engagement across teams

CONS:

- Requires time and internal commitment
- May be abstract without real product or customer focus
- Needs adaptation to specific industry or business context for full relevance

Output

- One or more visualised circular business models, tailored to the company's context
- Clearer understanding of the value logic in circular systems
- Identification of new roles, partners, or revenue models
- Foundation for further development, feasibility testing, or stakeholder engagement

Developer / Provider:
Originally conceptualised through the Ellen MacArthur Foundation's work on Circular Economy and Business Model innovation, and adapted by various innovation agencies, consultancies, and academic institutions. Variants exist, including those developed by TU Delft and PA Consulting as part of the Circular Business Model Design Guide.

Circular Business Model Guide

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Guide | Workshop	Foundation | Planning | Action	6-12 months	🟢	🟡

Description:

The Circular Business Model Guide is a structured, step-by-step framework designed to support small and medium-sized enterprises (SMEs) in transitioning from linear to circular business models. It provides a minimalistic yet comprehensive approach that integrates strategic reflection, stakeholder engagement, and practical tools to guide companies through the transformation process.

The guide is built around a sequence of interconnected steps, beginning with the assessment of company philosophy and current business models, and culminating in the definition, stress testing, and implementation of a circular business model. It emphasizes collaboration across departments and encourages the formation of a core team to ensure shared understanding and commitment.

Key concepts such as the 10R strategies (Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, Recover) and the four circular ecosystem patterns (Close the Loop, Improve the Loop, Monetize the Loop, Excite the Loop) are introduced to help companies identify opportunities for value retention and circular innovation.

The guide is not only a planning tool but also a strategic compass, helping organisations align their sustainability goals with economic viability. It includes templates such as the Business Model Canvas, Context Map Canvas, Value Mapping Tool, and stakeholder value proposition tables to facilitate ideation, analysis, and implementation.

Requirements by the tool:

- **Cross-functional collaboration:** The guide requires the involvement of multiple departments (e.g. finance, production, sales, logistics) to ensure a holistic understanding and successful implementation. A core team should be formed to coordinate the process and invite relevant stakeholders as needed.
- **Basic strategic and operational knowledge:** Users should have a good understanding of their current business model, processes, and market context. This includes familiarity with internal workflows, customer segments, and value creation mechanisms.
- **Facilitation skills:** While the guide can be used individually, many steps benefit from workshop settings. A facilitator who can guide discussions and ensure inclusive participation is recommended.
- **Time and resource commitment:** The guide is comprehensive and requires dedicated time to work through its steps meaningfully. It is not a quick-fix tool but a strategic framework for long-term transformation.
- **Openness to change:** The tool assumes a willingness to rethink existing structures and embrace new circular opportunities. This includes readiness to challenge current practices and explore alternative business models.
- **Access to templates and visual tools:** To fully utilize the guide, access to templates such as the Business Model Canvas, Context Map Canvas, Value Mapping Tool, and stakeholder tables is necessary. These are included in the guide and should be printed or digitised for collaborative use.

Best For companies …

- that are seeking a structured and strategic approach to transition from a linear to a circular business model.
- that want to align sustainability goals with economic viability and integrate circular principles into their core business strategy.
- that are willing to involve multiple departments and foster cross-functional collaboration to rethink their value creation and delivery mechanisms.
- that need guidance in identifying circular value opportunities and translating them into actionable business model innovations.
- that are open to iterative development and want to test, refine, and monitor circular strategies over time.
- that aim to build resilience against regulatory, environmental, and market changes by embedding circularity into their operations.
- that are looking for a comprehensive yet adaptable framework that includes practical tools like the Business Model Canvas, Context Map, Value Mapping, and stakeholder engagement templates.

Example Use Case:

A company developing electric motors with second-life potential, applied selected elements of the Circular Business Model Guide to explore circularity within its operations. Although the product concept already aligned with circular principles, structured processes and internal knowledge was limited.

The company conducted three targeted workshops using the Context Map Canvas, Value Mapping Tool, and Circular Business Model Canvas. These sessions helped identify environmental trends, assess current processes, and draft a first circular business model.

The experience showed that the guide offers a well-thought-out structure and valuable orientation. However, it also revealed the effort required to apply it meaningfully—especially when circularity is not yet embedded in the company's mindset. The technical background of the team and limited prior knowledge led to additional time needed for explanation and reflection.

The case highlights that **every company has its own starting point,** and the guide can flexibly support different levels of readiness. While no operational changes were implemented yet, the process strengthened internal understanding and laid the groundwork for future steps.

Key lessons:

Just scratching the surface is not effective. On the one hand, excellent organisation and integration into the company is required. Above all, however, participants must engage with the creative processes in the workshops.

Recommendations on using the tool:

The Circular Business Model Guide is most effective when used as a strategic framework in a collaborative setting. To ensure meaningful results and successful implementation, the following are recommended:

1. **Form a dedicated core team:** Assemble a cross-functional team with representatives from key departments (e.g. production, finance, sales, logistics). This ensures diverse perspectives and shared ownership of the transformation process.
2. **Work through the guide sequentially:** While skipping steps is possible if prior groundwork exists, following the full sequence helps build a coherent and aligned circular strategy. Each step builds upon the previous one.

3. **Use workshop formats for key steps:** Steps such as value mapping, stakeholder engagement, and process mapping benefit from interactive workshops. Use printed templates, Post-its, or digital collaboration tools to facilitate discussion and visualisation.
4. **Document and revisit outputs:** Treat canvases and diagrams (e.g. Business Model Canvas, Context Map, Value Mapping Tool) as living documents. Revisit and update them as new insights emerge or conditions change.
5. **Apply the 10R framework to explore circular opportunities.** Use the 10R strategies (Refuse, Rethink, Reduce, etc.) to identify where circularity can be embedded in your business model. This helps uncover hidden opportunities and reduce negative impacts.
6. **Conduct a stress-test before implementation.** Use the guide's stress-test framework to identify cultural, regulatory, economic, and technical barriers. Addressing these early increases the likelihood of successful implementation.
7. **Monitor progress with suitable indicators.** Select appropriate KPIs (e.g. repairability, material circularity, CTI indicators) to track performance and guide continuous improvement. Transparency in monitoring fosters stakeholder trust.

TIPS:

- Use alternating formats (small group vs. plenary) to balance depth and alignment.
- Involve external experts (e.g. legal, sustainability consultants) where needed.
- Keep the process iterative — circular business model innovation is not a one-time exercise.

Pros and Cons

PROS

- **Comprehensive and structured:** Offers a clear step-by-step approach that guides companies through the entire transformation process.
- **Supports collaboration:** Encourages cross-departmental teamwork and stakeholder engagement.
- **Flexible application:** Can be adapted to different company sizes, sectors, and maturity levels.

CONS

- **Time-intensive:** Requires significant time and resource investment to work through all steps meaningfully.
- **Requires facilitation:** Some steps are best done in workshops, which may need external moderation or internal coordination.
- **Not a plug-and-play tool:** The guide is not a quick solution but a strategic transformation framework — superficial use may lead to limited results.

Developer / Provider:
Developed by Biz-up in the context of the CIRCOTRONIC project, the Circular Business Model Guide integrates insights from multiple academic and practical sources. It builds on foundational work from:

- **Bocken, N., Ritala, P., Short, S., Evans, S.** – including the Value Mapping Tool and Circular Business Model Strategy Framework
- **Haines-Gadd and Charnley** – Taxonomy of Value for a Circular Economy
- **PA Consulting, Ellen MacArthur Foundation and University of Exeter** – Circular Business Model Design Guide
- **Takacs, Stechow and Frankenberger** – Business Model Innovation for the Circular Economy
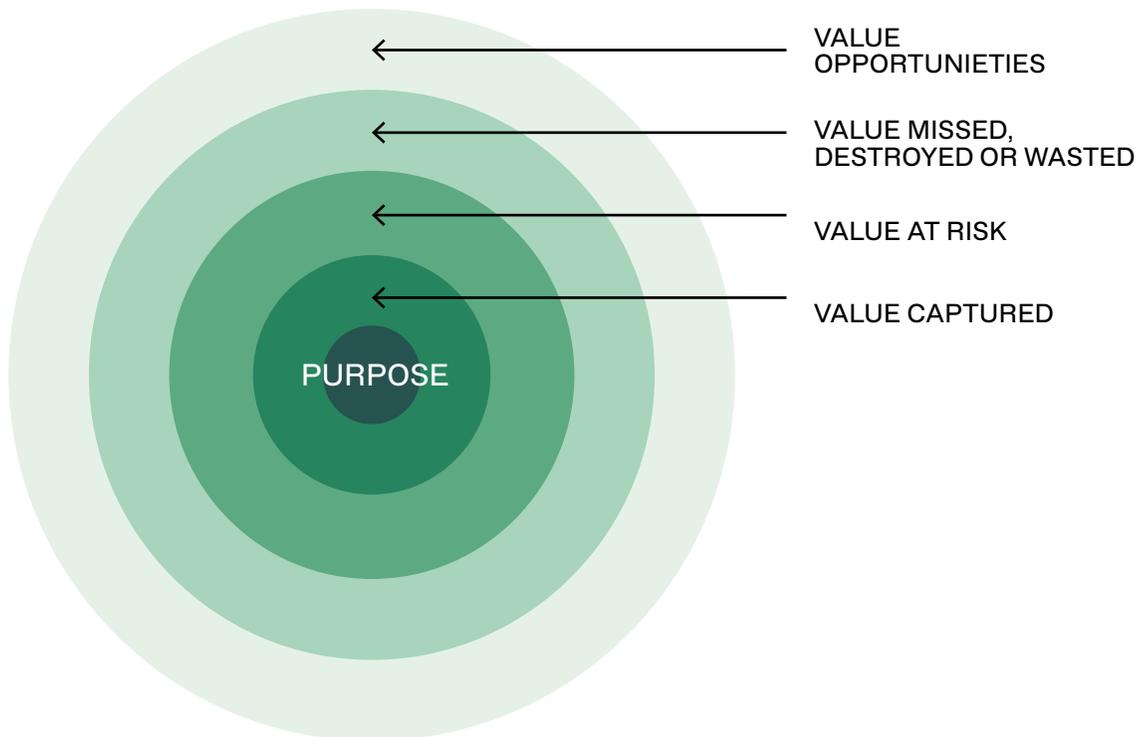- **Jonker, Faber and Haaker** – Quickscan Circular Business Models

The guide was piloted and adapted by Biz-up to suit the needs of SMEs and is designed to be used in workshop settings or internal strategy processes.

Identification and Mapping of Value Streams

TYPE	PURPOSE	DURATION	ADDED VALUE	EASE OF USE
Canvas	Workshop	Assessment	Ideation	Half-day workshop	🟢	🟡

The tool is based on the work from Bocken et al. and Haines-Gadd- and Charnley (cited below), adapted and respectively framed in a workshop by Biz-up.

The map as suggested by the below mentioned sources was depicted as follows in the workshop led by Biz-up.

VALUE OPPORTUNIETIES

VALUE MISSED, DESTROYED OR WASTED

VALUE AT RISK

VALUE CAPTURED

PURPOSE

Description:

The Value Mapping Tool helps companies develop and refine sustainable value propositions within their business models. It uses a qualitative approach to stimulate discussion and idea generation, rather than relying on detailed quantitative analysis (e.g., Life Cycle Assessment or scenario modeling). The proposed Value mapping by Bocken et al. has been simplified within the piloting and provided the basis for companies to question current or future values in terms of their resilience and ability to be transferred into a circular business model or process.

Requirements by the tool:

- A good market and business context knowledge is required to be able to assign values in a useful manner.
- The tool can best be used within a workshop, thus a person with facilitation skills that does not need to contribute is required.

Best For companies …

- seeking an overview of captured, missed, destroyed, or at-risk value in their current business model.
- who want to identify values that could be used to increase circularity within their own business processes.

Example Use Case:

The Value Mapping Tool was tested with a start-up producing void detection systems for non-destructive testing of materials, primarily in the aerospace sector. While the company already contributes to resource efficiency, it aimed to identify opportunities to make its business model and products more sustainable.

In a workshop setting, participants used the tool to assess current processes and identify potential entry points for increasing circularity. The exercise highlighted areas for improvement, but due to limited time and resources, the company could not implement changes immediately. Regulatory constraints, such as the waste shipment regulation, also limited the reuse of certain components.

The company retained the canvas as a living document, to be revisited when resources allow. They noted that using the tool earlier in the company's development would have been even more valuable, as there would have been greater flexibility to adjust processes and business models.

Recommendations on using the tool:

The Value Mapping Tool is most effective when used in a workshop setting, bringing together colleagues from different departments to jointly explore how value is created, missed, or destroyed in the company's activities. To get meaningful and actionable results, the following steps are recommended:

1. DEFINE THE SCOPE OF YOUR MAPPING.

Before starting, decide what part of your business you want to analyze.

- If your company has a single core process or product, it can make sense to look at the entire organisation.
- If your company operates across different business units or value delivery processes, start with one (promising/ well known) area — for example, a specific product line, customer segment, or service. This ensures the exercise remains manageable and focused while still generating useful insights.

2. MAP YOUR KEY PROCESSES − WITH THE RIGHT LEVEL OF DETAIL.

Identify the main processes within the chosen scope (e.g. sourcing, production, delivery, after-sales). Map them in sufficient depth to reveal how value flows—such as key activities and inputs—without becoming overly complex. A useful rule of thumb is that the level of detail is appropriate as long as participants can clearly explain how each process creates or exchanges value.

3. IDENTIFY AND LIST THE VALUES THAT MAKE THESE PROCESSES POSSIBLE.

Consider what allows each process to function effectively:

- Which knowledge or expertise is required?
- Whose relationships or contacts are essential (e.g., for repair, sourcing, or service delivery)?
- Which materials or resources are used, reused, or lost?

4. MAP THESE VALUES ON THE VALUE MAP.

Use your knowledge of your business environment and stakeholder context to locate each value on the map — distinguishing between positive value creation, potential risks, or areas where value is currently missed.

5. EXPLORE CIRCULAR OPPORTUNITIES USING THE 10 R (*SEE FIGURE 1*).

Apply the circular economy framework (Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle, Recover) to identify:

- How lost or missed value can be captured,
- How negative impacts can be reduced, and
- Where new circular opportunities can be created in your business model.

TIPS:

- Engage a facilitator to guide the process and ensure diverse perspectives are heard. Combining operational knowledge with strategic insight helps identify practical, high-impact circular opportunities.
- Alternate between small-group and plenary discussions. Working in pairs or small teams allows participants to dive deeper into details and give everyone a chance to be heard, while group discussions help consolidate and align findings.
- Involve all key people linked to the process under review. Make sure everyone who contributes to or depends on the process is represented in the workshop — from operations to sales, procurement, and management — to ensure a complete understanding of value creation and capture.

Pros and Cons

PROS

- Supports Collaborative Processes
- Holistic Perspective is taken into account
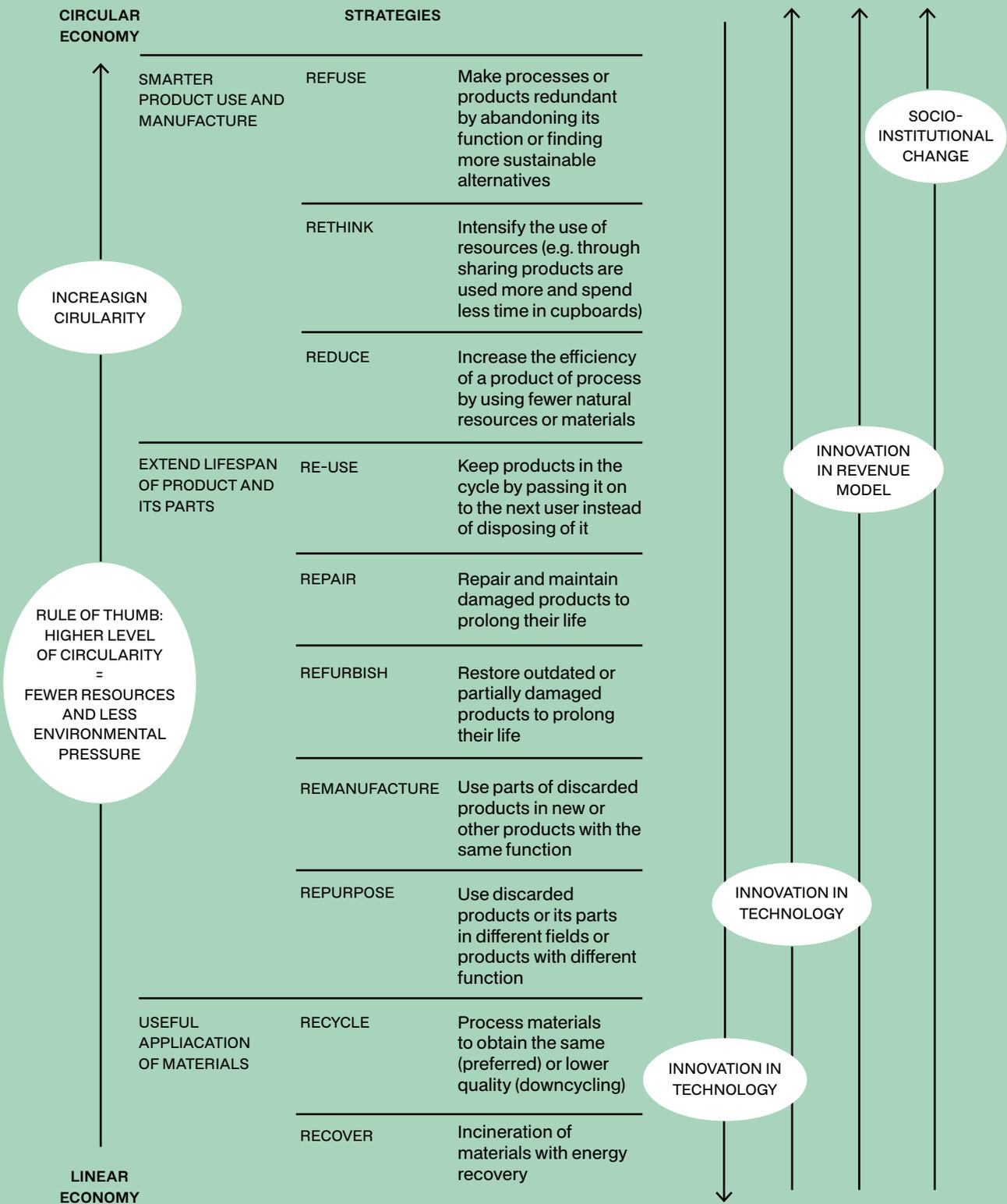- Can be treated as a living canvas, updated regularly and identifying areas to look at next

CIRCULAR ECONOMY

STRATEGIES

SMARTER PRODUCT USE AND MANUFACTURE	REFUSE	Make processes or products redundant by abandoning its function or finding more sustainable alternatives
	RETHINK	Intensify the use of resources (e.g. through sharing products are used more and spend less time in cupboards)
	REDUCE	Increase the efficiency of a product of process by using fewer natural resources or materials
EXTEND LIFESPAN OF PRODUCT AND ITS PARTS	RE-USE	Keep products in the cycle by passing it on to the next user instead of disposing of it
	REPAIR	Repair and maintain damaged products to prolong their life
	REFURBISH	Restore outdated or partially damaged products to prolong their life
	REMANUFACTURE	Use parts of discarded products in new or other products with the same function
	REPURPOSE	Use discarded products or its parts in different fields or products with different function
USEFUL APPLIACATION OF MATERIALS	RECYCLE	Process materials to obtain the same (preferred) or lower quality (downcycling)
	RECOVER	Incineration of materials with energy recovery

INCREASIGN CIRULARITY

RULE OF THUMB: HIGHER LEVEL OF CIRCULARITY = FEWER RESOURCES AND LESS ENVIRONMENTAL PRESSURE

SOCIO-INSTITUTIONAL CHANGE

INNOVATION IN REVENUE MODEL

INNOVATION IN TECHNOLOGY

INNOVATION IN TECHNOLOGY

LINEAR ECONOMY

FIGURE 1 – BASED ON RLI 2015, EDITED BY BIZ-UP

- Qualitative Nature
- Resource Intensive, filling it in the template superficially is pointless
- Context Information has to be provided for participants to be able to work meaningfully

Output

- Living document that provides overview in which state, values relevant to the company, currently are
- Points to areas where circular strategies (10 R's) could capture lost value or reduce negative impacts.
- Captures how well current processes and value flows can adapt to changes or be incorporated into a circular approach.

Developer / Provider:
Concept based on Bocken, Nancy and Short, Samuel and Rana, P. and Evans, Steve. (2013). A value mapping tool for sustainable business modelling. Corporate Governance International Journal of Business in Society. 13. 482-497. 10.1108/CG-06-2013-0078. and Creating a Taxonomy of Value for a Circular Economy by Haines-Gadd- and Charnley published in the book "Sustainable Design and Manufacturing 2019".
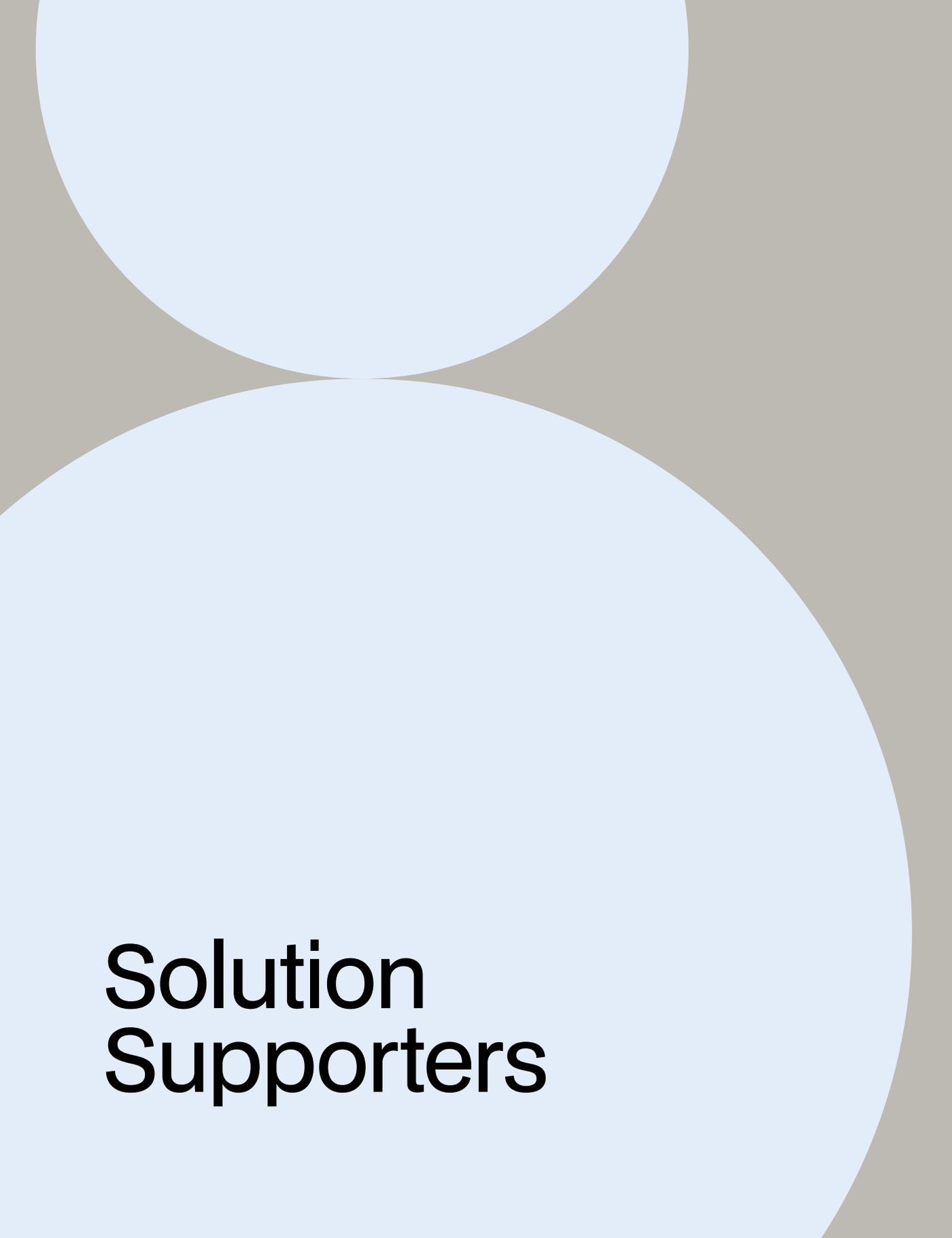
Solution
Supporters
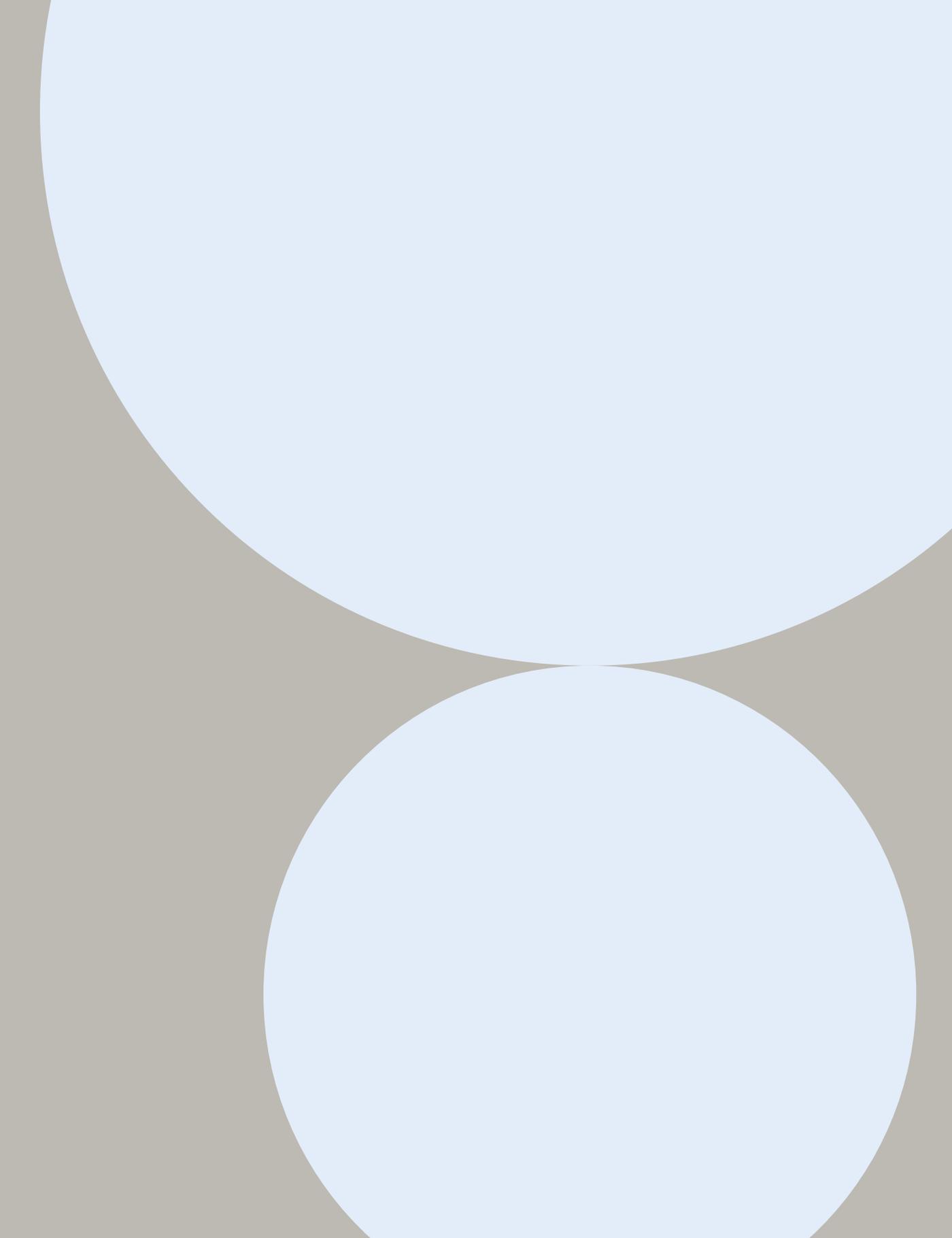
Solution Supporters

This chapter presents how the project partners plan to continue offering the tools and services developed within the CIRCOTRONIC project. Beyond the piloting phase, these partners support companies in implementing circularity practices, from strategy and assessment to concrete action and evaluation.
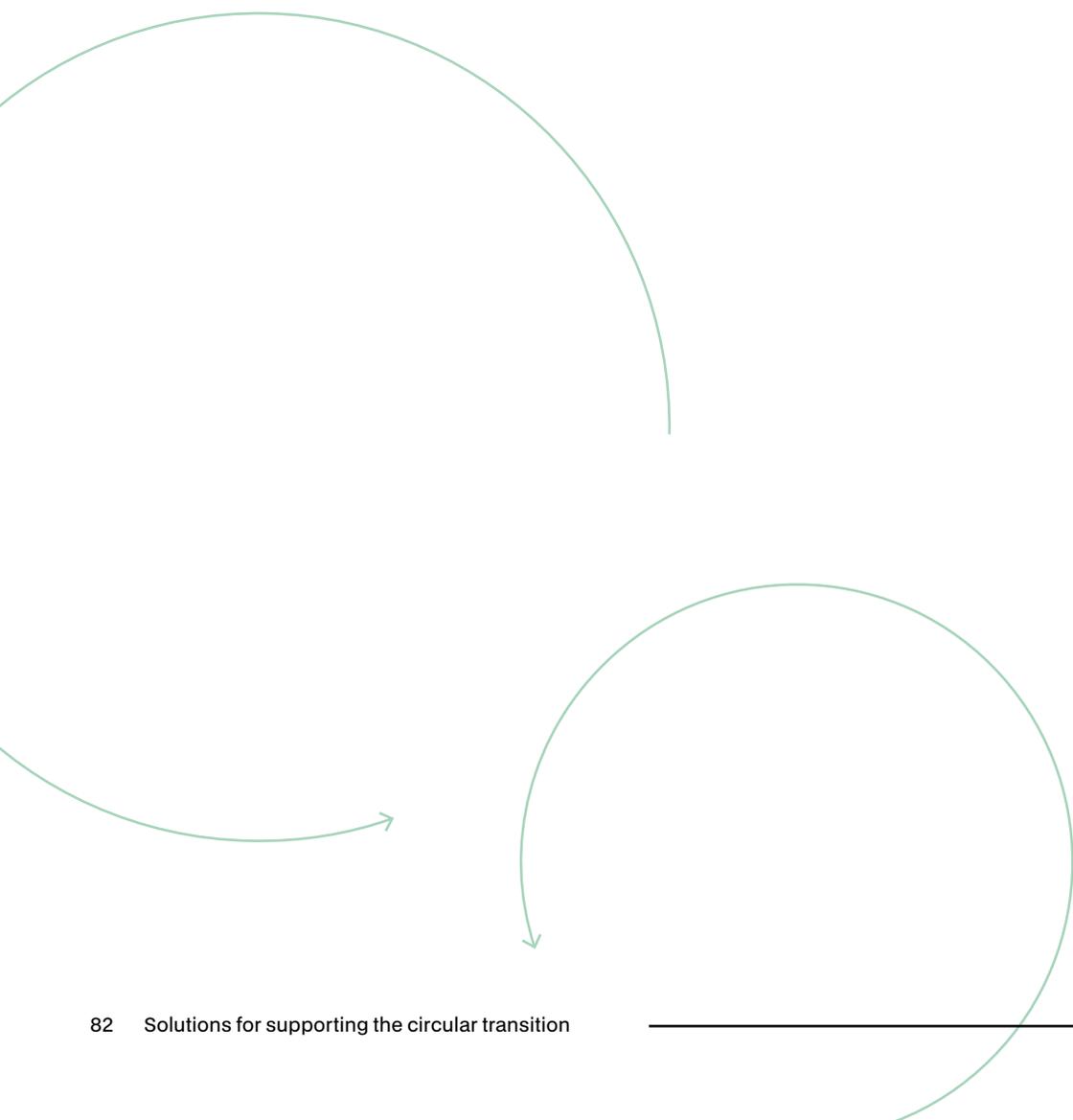
CCIS

Overview / Mission

The Chamber of Commerce and Industry of Slovenia (CCIS) is the national business organisation representing Slovenian industry and supporting its competitiveness, innovation and sustainable transition. Through CIRCOTRONIC, CCIS has integrated the developed tools directly into its internal service structure and into its Regional Circular Lab, making them permanently accessible to all sectoral manufacturing associations within CCIS.

Our role is to actively guide companies in translating circularity into business results — supporting them in understanding where to start, how to prioritise, and how to implement circular measures step by step. The tools are also embedded in the Slovenian Center for Circular Economy (SCKG), ensuring visibility and continuity, but CCIS and its Regional Lab remain the primary delivery points for companies.

Core Services for Companies

CCIS supports companies in understanding circular opportunities, interpreting regulatory developments, and identifying strategic directions. We facilitate structured reflection, help define priorities and next steps, and offer access to tools and methods to build internal capacity. Where relevant, we accompany companies as they move from awareness to implementation, connecting them with knowledge, peers and support networks.

Tools and Methodologies

Tools tested at CCIS: Sustainable legislative framework, strategy for circularity and sustainability, Future scenarios, and the CircularSupplyChain workshop.

We can help you if, …

…you are a manufacturing company in Slovenia looking for orientation, awareness or training on circular economy topics.

...you would benefit from networking, peer exchange and access to sector-specific knowledge and support.

...you need guidance in understanding priorities, regulatory developments or emerging circular trends.

...you are exploring circular practices, new business approaches or want to build internal capacity step-by-step.

Partner Insight: 3 Lessons we learned from Piloting

Circular economy is still economy — numbers must work.

Companies rarely change because they "believe in green", but because the business case is clear. Circular solutions must make economic sense in terms of savings, risk reduction, productivity or new market potential, to be implemented meaningfully.

Engagement is strongest among larger SMEs — smaller firms are harder to activate.

Mid-sized and more advanced companies show readiness for circular tools, while smaller firms often lack time, capacity or awareness to engage without additional motivation or support

Tools alone are not enough — facilitation drives outcomes.

Materiality, strategy and assessment need structured moderation, interpretation and guidance.

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Antonija Božič Cerar
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RER

Overview / Mission

The Emilia-Romagna Region is strongly committed to supporting innovation, sustainability, and the transition towards circular economy models across the regional industrial ecosystem. Through the collaboration with ART-ER, i.e. the regional consortium for innovation, and the CircularER Laboratory developed with ART-ER and ENEA, the Region promotes advanced research projects, experimental initiatives, and the development of emerging value chains linked to sustainability.

ART-ER's Sustainable Development Unit represents the regional ecosystem in several national and European networks relevant to circular economy and renewable resources (e.g., National Technology Clusters, EIT Raw Materials, Vanguard Initiative), with the goal of fostering frontier projects for ecological transition.

Core Services for Companies

Together, the Emilia-Romagna Region and ART-ER support the circular transformation of regional companies through:

- Promotion and management of regional funding schemes supporting green innovation and circular economy and creating the conditions for companies to innovate, experiment, and adopt circular practices.
- Facilitation of industrial ecosystems and supply chains through regional cluster associations
- Support for innovative SMEs and start-ups, including access to testing environments, living labs, and demonstrators.
- Capacity building and training activities on circular business models, sustainable finance, and compliance with emerging regulations.
- Matchmaking and networking among companies, research centres, and technology providers.
- Monitoring and analysis of regional innovation trends to identify strategic opportunities for circular transformation.

Tools and Methodologies

The tools piloted within the project were: Context Map Canvas, Circular Business Model Canvas, Circular Business Model Guide, and ECODESIGN+.

We can help you if, …

...you are an SME, start-up, or industrial company in Emilia-Romagna looking for guidance, opportunities, or connections to support your circular transition.

...you operate within a regional supply chain and seek collaboration with research centres, technology providers, or other companies.

...you need orientation on circular strategies, upcoming regulations, innovation trends, or access to regional and European initiatives.

...you are exploring new business models, technological upgrades, or partnerships to increase circularity and environmental sustainability.

Partner Insight: 3 Lessons we learned from Piloting

Tools foster strategic clarity and help SMEs connect circularity with their real business priorities. Across all piloted tools, SMEs reported that structured reflection (via canvases, guides, and mapping exercises) made it easier to articulate where circular opportunities exist in their operations—whether in product design, service models, supply chain dynamics, or regulatory pressures. The tools helped companies translate sustainability ambitions into ideas/plans of concrete actions and priorities.

A step-by-step approach reduces complexity and removes perceived barriers to circular transformation. Many SMEs initially felt overwhelmed by regulations, design requirements, or the idea of shifting to circular business models. Tools such as ECODESIGN+ or the Circular Business Model Guide helped break the process into manageable phases, enabling companies to focus on short-, medium-, and long-term goals rather than attempting to "do everything at once or randomly."

Cross-department and cross-ecosystem collaboration is essential for successful implementation. Piloting showed that the best results emerged when different internal roles (technical, managerial, sustainability, operations) and external ecosystem actors (suppliers, recyclers, repair centres, clusters) were involved. Circularity is not a standalone activity: it requires alignment across product development, financial planning, compliance, and market strategy, as well as synergies within regional value chains.

Company Contact Point:
Regione Emilia-Romagna – CIRCOTRONIC Project Team

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- **Giovanna.Romano@regione.emilia-romagna.it**

BayFOR

Overview / Mission

The Bavarian Research Alliance GmbH (BayFOR) is a public company to support Bavaria as a hub for research and innovation within the European research and Innovation Area.

Core Services for Companies

BayFOR supports and advises Bavarian SMEs, start-ups, scientists and stakeholders from the public sector in applying for regional, national and European research, development and innovation funding programmes such as Horizon Europe, Eureka, MSCA, Erasmus+ and the European Innovation Council.

Tools and Methodologies

The Tools tested by BayFOR in the project are: Circular Assessment Tool by CIRCitNorden, EcoChain PCF Tool, and Ecodesign - the regulatory framework.

We can help you if, ...

> ...you are a start-up, SME, research institute, looking for orientation on circular strategies and we help you identify funding opportunities.

Partner Insight: 3 Lessons we learned from Piloting

There is plenty of advisory available for free from previous research project, so take some time to do some research!

Do not worry if you are not able to implement all circular measures at once, prioritizing tools can be used for short, medium and long-term goals.

Collaborate with (electric) companies within your ecosystems and seek synergies with them.

Company Contact Point:

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The main contacts for the CIRCOTRONIC team are Natalia Garcia Mozo, Nivedita Mahida-Königsdörfer and Susanne Hirschmann.

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Susanne Hirschmann
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TUKE

Overview / Mission

Technical University of Košice (TUKE) is the leading public technical university in Slovakia with more than 70 years of experience in education, applied research, and innovation. TUKE's mission within circular economy projects is to support companies and public stakeholders in translating sustainability and circularity principles into practical, implementable solutions, strengthening regional innovation capacity through close cooperation with industry, public authorities, research institutions, and civil society.

Core Services for Companies

TUKE supports companies through applied research, advisory services, and facilitated innovation processes focused on circular economy, green transition, and digital enablement. Services include support in circular strategy development, product and process optimisation, ecosystem building, stakeholder moderation, and piloting of circular solutions. Through its interdisciplinary teams, TUKE helps companies connect technological solutions with business, regulatory, and environmental perspectives.

Tools and Methodologies

TUKE applies a combination of analytical tools, participatory workshops, and pilot-based methodologies to support circular transition. These include circularity assessments, circular business model development, value-chain and ecosystem mapping, and impact monitoring (based on Life Cycle Assessment).

We can help you if, …

> … the company/organisation is at the early or intermediate stage of circular transition, seeking to identify feasible circular opportunities, partners, and next steps.

Partner Insight: 3 Lessons we learned from Piloting

- Translation into business language matters: Technical or environmental concepts must be clearly linked to business (financial) value, feasibility, and regulatory context to ensure company engagement.
- Pilots accelerate learning: Small-scale pilots and testing phases help companies reduce uncertainty, build internal capacity, and move faster from concepts to implementation.
- Iterative testing enables faster adjustment: Cooperative piloting creates rapid feedback loops, allowing tools to be quickly adapted to company needs and reducing the risk of misalignment with real operations.

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E-mail: dev.ekf@tuke.sk

Business Upper Austria

Overview / Mission

Business Upper Austria is the Business Agency of Upper Austria, dedicated to strengthening the region's competitiveness and supporting innovation. Business Upper Austria connects companies, research institutions, and public decision-makers, helping them collaborate effectively to drive innovative economic development.

In the context of the circular transformation, the team (Cleantech- and Mechatronic Cluster) that has been active in the CIRCOTRONIC project acts as a regional facilitator and enabler – supporting companies in understanding circular opportunities, fostering innovation partnerships, and implementing circular strategies within their operations.

Core Services for Companies

Business Upper Austria offers a wide range of services for companies interested in circular economy and sustainable innovation. These services can be grouped along the stages of a company's circular journey:

INFORMATION AND INSPIRATION

- Educational events and networking opportunities through the Cleantech and Mechatronics Cluster.
- Quarterly knowledge exchanges on Circular Economy, showcasing best practices, trends, and new business opportunities.

STRATEGY AND ASSESSMENT

- Workshops and consulting sessions to identify circular opportunities, assess business models, and develop roadmaps for transformation.
- Use of tested tools such as the Context Map Canvas, Circular Business Model Guide, Circular Business Model Canvas, and Value Mapping Tool to structure insights and strategies.

IMPLEMENTATION SUPPORT

- Support in finding funding opportunities and project partners for circular initiatives.
- Guidance in aligning company activities with relevant regulations and cluster initiatives.

Some services are free when funded through projects; others are offered on a fee basis.

Tools and Methodologies

Business Upper Austria offers a range of practical tools and methodologies to help companies explore and advance their circular potential. The selection is tailored to the company's goals and workshop objectives.

Tools tested in the CIRCOTRONIC project:

- Value Mapping Tool – visualise how value is created, missed, or at risk within your business model.
- Circular Business Model Canvas / Guide – rethink or redesign your business model toward circularity.
- Context Map Canvas – understand your company's environment, trends, and stakeholder relationships.

Additional approaches:

- Design Thinking Methodology – foster creative problem-solving and idea generation.
- Lego® Serious Play® – facilitate team alignment, engagement, and strategic discussions.

The choice of tools and methodologies is guided by the workshop objectives, desired outcomes, and company context. Business Upper Austria can also support related services, such as identifying funding opportunities or advising on intellectual property and patents.

We can help you if, ...

...you want to identify areas where your business processes can become more circular or resource-efficient.

...you are looking to develop new circular business models or value propositions.

...you need moderation and facilitation to align different departments around sustainability goals.

...you want to connect with partners, experts, or funding opportunities to implement circular ideas.

...you're just getting started and need orientation and practical tools to plan your circular journey.

Partner Insight: 3 Lessons we learned from Piloting

During the CIRCOTRONIC project, we tested several circular business modelling tools with local companies. Key takeaways include:

1. No one-size-fits-all approach: Each circularity initiative needs to be tailored to the company's goals, the participants involved, and the specific industry context.
2. Participatory formats are essential: Engaging colleagues from different departments generates more robust insights and ensures actionable outcomes.
3. Canvases are living documents: Revisiting and updating the tools over time, and questioning whether set goals still hold, helps companies continuously advance their circular strategies.
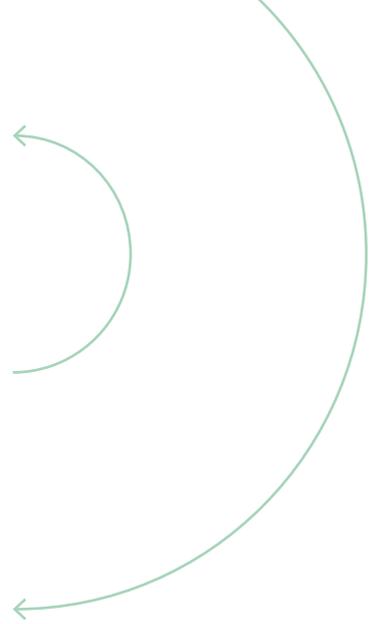
Company Contact Point:

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t2i

Overview / Mission

t2i – trasferimento tecnologico e innovazione is an innovation agency supporting the growth and competitiveness of enterprises through technology transfer, applied research, and strategic innovation services. Founded by the Chambers of Commerce of Veneto, t2i acts as a bridge between research, business, and public institutions, fostering innovation ecosystems across industries.

Its mission is to guide companies—especially SMEs—through technological, digital, and sustainable transitions. This includes supporting product and process innovation, promoting skills development, and helping businesses adopt circular economy models. Through partnerships with European networks, universities, and policy actors, t2i plays a proactive role in regional and EU innovation strategies.

Core Services for Companies

t2i offers a comprehensive range of services designed to support innovation, sustainability, and digital transformation in businesses, with a focus on small and medium-sized enterprises (SMEs). Its core services include:

- Technology Scouting and Transfer – Identifying and integrating new technologies to enhance competitiveness.
- Support for Research and Development Projects – Assistance with design, funding, and management of R&D and innovation projects at national and EU level.
- Digital and Sustainability Transition – Guidance on adopting Industry 4.0 technologies, digital tools, and circular economy models.
- Training and Skills Development – Customized programs on innovation management, digital skills, sustainability, and entrepreneurship.
- Intellectual Property Support – Assistance with patents, trademarks, and IP valorization.
- Business Modelling and Market Access – Support in defining sustainable business models, go-to-market strategies, and internationalization.
- Laboratory Services – Accredited laboratories offering testing, validation, and metrology services for product compliance, performance, and quality assurance.

Tools and Methodologies

t2i employs a diverse set of tools and methodologies to support innovation, digital transformation, and the transition to circular economy models. These include structured approaches for business model design, sustainability integration, and technology foresight.

As part of its participation in the CIRCOTRONIC project, t2i has tested and applied several tools focused on circular business development, including the Quickscan Circular Business Models, the Circular Business Model Canvas, and the Sustainable Legislative Framework Tool.

These methodologies are integrated into t2i's broader consulting and training activities, supporting SMEs in aligning innovation processes with regulatory trends, market expectations, and sustainability goals.

We can help you if, …

…you are a company looking to integrate sustainability and circularity into your business strategy.

…you want to understand how digital and regulatory trends impact your innovation processes.

…you need support identifying funding opportunities and managing R&D or innovation projects.

…you are exploring new technologies or need assistance transferring research into practice.

…you require product testing, metrology, or compliance support through accredited laboratories.

…you are an SME seeking practical tools and expert guidance to navigate the circular transition.

Partner Insight: 3 Lessons we learned from Piloting

- Start from the value chain, not just the product. Many component manufacturers and subcontractors operate upstream, where decisions about circularity are made elsewhere. Tools like the Quickscan work best

when used to explore how a company can align with client strategies and position itself as a circular partner—not just a supplier.

- Use circularity to open strategic conversations. Piloting showed that the tools are most effective when used as a conversation starter within companies. Rather than providing immediate answers, they create space to question assumptions, clarify ambitions, and initiate cross-functional dialogue.
- Simplicity enables action. Tools don't need to be complex to be useful. The most impactful moments came when companies used simple tools like the Quickscan or Circular Canvas to build shared understanding and take first steps—without needing full expertise or data upfront.

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The main contacts for the CIRCOTRONIC team are
Marco Galanti and Chiara Remundos

MD

Overview / Mission

Media Dizajn Association, founded on 13 February 2009, supports the creation and implementation of ideas that foster aesthetic, wise, and sustainable living. Its ambition is to be a recognized international expert in innovative solutions for the creative sector, supported by a network of specialists, experts, and researchers across Poland and Europe.

Core Services for Companies

MD is focused on three major services:

1. **Running a Culture Incubator.** Operating a dedicated incubator that supports young creative studios in developing their ideas, strengthening their business skills, and entering the creative market. The incubator fosters collaboration, mentorship, and access to industry networks.

2. **Innovation and Sustainable Design Workshops.** Hands-on workshops that help SMEs identify innovation opportunities, integrate sustainable design practices, and build future-oriented business strategies. The sessions use tools such as design thinking, service design, and speculative design to support strategic transformation.

3. **Circular and Social Innovation Advisory.** Advisory services that help SMEs create socially responsible and circular solutions—from product redesign and user-centric service improvements to regenerative business models. The support also includes guidance on EU sustainability directives and emerging circular economy requirements.

Tools and Methodologies

Future Scenarios, Quickscan Circular Business Models, the Circular Business Model Canvas, and the Sustainable Legislative Framework Tool.

We can help you if,...

... you want to understand future trends, evaluate your circular potential, or redesign your business model to meet upcoming sustainability requirements.

...your company is ready to explore new opportunities, improve resource efficiency, or prepare for EU sustainability regulations.

...you aim to innovate, strengthen your value proposition, and build resilient, future-proof solutions within the creative or manufacturing sector.

Partner Insight: 3 Lessons we learned from Piloting

1. START SMALL

Testing showed that taking small steps makes entering circularity more achievable. Simple tools—such as the Quickscan, Circular Canvas, or step-by-step guides—reduced feelings of being overwhelmed and allowed companies to focus on immediate, realistic actions. Breaking the process into short-, medium-, and long-term goals helped avoid chaos and the misconception that everything must be implemented at once. These tools also became catalysts for conversations, clarifying ambitions, and building shared understanding within teams.

2. FIND RESOURCES IN THE "WASTE"

Circularity becomes strategic when companies start by looking carefully at what they already have—even what was previously considered irrelevant or waste. Tools helped SMEs identify new opportunities in organisational structures, client relationships, underutilized resources, and even existing regulations. Many valuable insights are available for free in reports and past research projects—simply leveraging these resources can accelerate circular transformation.

### 3. EXPAND YOUR VIEW TO UNKNOWN PATHS

The greatest impact appeared when companies looked beyond the product itself and considered the whole value chain. Tools encouraged reflection on internal departments, external partners, and the broader ecosystem, including suppliers, recyclers, repair centers, and clusters. Incorporating future scenario thinking helped companies explore potential

developments and uncertainties, revealing opportunities and strategies they might not have previously imagined. This approach enabled SMEs to align with client strategies and position themselves as circular partners rather than just suppliers.

Company Contact Point:

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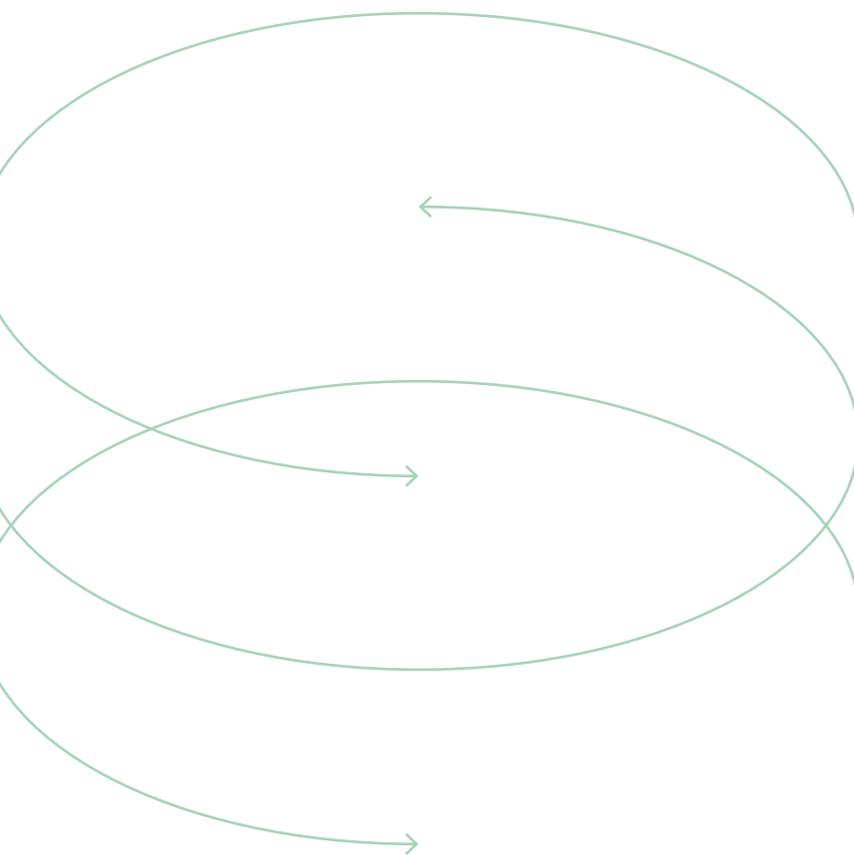
TECOS

Overview / Mission

TECOS – Slovenian Tool and Die Development Centre – is a non-profit technology centre founded in 1994 by the Government of Slovenia, the Municipality of Celje and the Chamber of Commerce to support the competitiveness of manufacturing SMEs. Its mission is to develop and transfer cutting-edge scientific and technological knowledge into industrial practice, co-creating new products, tools and production technologies and helping companies optimise their processes and move towards a green and digital economy.

As a Regional Circular Lab for Slovenia, TECOS focuses specifically on the transition to a circular economy in manufacturing and the EEE sector. From its location in Celje – the heart of the Slovenian tool hub – the lab combines prototyping, applied materials research and circular consulting to help companies turn circular ambitions into practical solutions.

Core Services for Companies

TECOS offers end-to-end support across the product and process life cycle. This includes industrial R&D and engineering (design, optimisation and development of parts, tools, materials and production systems), advanced FEM simulations, 3D scanning and metrology, prototyping and small-series production, as well as testing of new materials and technologies.

Within the Regional Circular Lab, TECOS provides high-precision prototyping and reverse engineering, support for implementing additive manufacturing technologies, development and testing of bio-based and environmentally improved materials, circularity assessments of products and services, and tailored circular-economy training and consultancy for SMEs.

Tools and Methodologies

Building on its engineering infrastructure, TECOS combines classic development tools (CAD/FEM, injection-moulding simulations, 3D scanning and additive manufacturing) with specialised circular-economy instruments. In CIRCOTRONIC project, TECOS has tested the use of Ecochain Mobius

Product Carbon Footprint calculations, Cyrkl Marketplace and Waste Scan for valorising waste streams, and the CIRCitNorden Circularity Assessment tools.

We can help you if,...

…you are a manufacturing or EEE company that wants to make products and processes more circular but needs a practical starting point.

…you want to prototype new solutions (including recycled or bio-based materials) and understand their technical and environmental performance.

…you generate production or post-industrial waste and would like to explore new value streams or recycling partnerships.

…you need support with applying LCA or circularity tools and interpreting results in concrete design, investment or procurement decisions.

Partner Insight: 3 Lessons we learned from Piloting

Good data and active follow-up unlock value. Pilots with waste-marketplace tools showed that accurate waste data, dedicated staff to manage listings and regular updates are essential to actually close deals and turn waste into revenue rather than just "nice profiles" on a platform.

Circularity works best when embedded early and facilitated. Circular assessment tools are most powerful when they are integrated at the concept and design stage and moderated by someone who can translate results into concrete engineering and business actions, rather than used as standalone checklists.

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TUW

Overview / Mission

The Institute for Engineering Design at the Technical University is in research and education with specific focus on integration of sustainability and circularity aspects into product development since 1993.

Core Services for Companies

- Providing workshops on the topics: Legislation, LCA/PCF, Ecodesign, Environmental communication/Labelling, DPP
- Provide training and teaching materials for students and companies
- Developing and testing new methodologies and tools to support companies in circularity assessment, circular design and the development of circular business models
- Applying tools and methods in order to develop circular products and business models

Tools and Methodologies

- Circularity Assessment – Tool to select the most relevant CE strategy and to select design measures for product improvement
- ECODESIGN+ (https://ecodesignplus.com) – Tool to calculate and improve the product Carbon Footprint (PCF)
- Circular Economy Strategist (https://tools.katche.eu/strategist/) – Tool to select and define a circular business model
- Circular Economy Designer (https://tools.katche.eu/designer/)
- ECODESIGN PILOT (http://pilot.ecodesign.at): Tool to select relevant Ecodesign strategies and to derive improvement measures

We can help you if,...

...you are a company interested in general information or awareness training on circular economy and its strategies, opportunities, best practices, etc.

...you want to improve your product from environmental or circular perspective but don't know where to start

...you are interested in practical tools and structured approaches

...you like to do research in funded projects

Partner Insight: 3 Lessons we learned from Piloting

- Understanding the product and its environmental impact along its life cycle is key to take the right decisions
- Product information like the detailed material content or the existence and amount of critical raw materials is often not known.
- Take back of products is key for circularity but often challenging

Company Contact Point:

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Rainer Pamminger: <u>rainer.pamminger@tuwien.ac.at</u>

ASRD

Overview / Mission

The Agency for the Support of Regional Development Košice (ARR) is a non-profit organisation established by the Košice Self-Governing Region. Our mission is to foster sustainable development, innovation, and collaboration across the region. Through projects like CIRCOTRONIC, we have gained valuable experience in supporting small and medium-sized enterprises (SMEs) in their transition toward circular economy practices. We aim to share these insights and tools with businesses to help strengthen the region's resilience and sustainability.

Core Services for Companies

While our primary focus is regional development, we can offer targeted support to companies through:

- Awareness-raising and capacity-building activities
- Workshops and consultations on circular economy principles
- Access to practical tools for assessing and improving sustainability
- Sharing of best practices and lessons learned from pilot projects

Tools and Methodologies

As part of the CIRCOTRONIC project, we piloted several tools that can help companies explore circular solutions:

- Quickscan Circular Business Models – for identifying strengths and gaps in circularity
- CircitNorden Circular Assessment Tool – for evaluating product design and life cycle sustainability
- CircularSupplyChain Workshop Tool – for improving circularity in supply chains
- Circularity Assessment Tool – for a comprehensive overview of circular potential

We can help you if…

…you are an SME looking to explore circular economy opportunities

…you want to improve your sustainability practices but don't know where to start

…you are interested in practical tools and structured approaches

…you want to learn from other companies' experiences in piloting circular tools

…you are part of the Košice region and want to contribute to its sustainable development

Partner Insight: 3 Lessons We Learned from Piloting

1. Tools uncover hidden potential – Companies discovered actionable opportunities, such as reusable packaging and extended product lifespans.
2. Clarity and simplicity matter – Tools are more effective when they include examples and clear guidance.
3. Local flexibility is essential – Even within centralized structures, engaging local suppliers and adapting tools to the regional context proved valuable.

Company Contact Point
Are you a company based in the Košice region interested in circular economy tools or consultations? Visit www.arr.sk or contact us at arr@arr.sk We'll be happy to guide you through the available tools and help you identify opportunities for sustainable growth.

Conclusion

Conclusion

The CIRCOTRONIC project set out to support SMEs and Mid-Caps in the Electrical and Electronic Equipment (EEE) sector in advancing circularity through practical tools, structured piloting, and partner-driven guidance. Across all work carried out in the project—from tool testing and methodological development to partner engagement and company collaboration—a consistent set of insights emerged. These learnings reflect both the opportunities and the challenges of circular transformation and form a valuable foundation for companies seeking to advance their own circularity ambitions.

Circular Transformation Benefits from Structure, Not Complexity

The piloting activities showed that companies benefit most when circularity is approached through a structured and clearly sequenced process. Tools that provided a step-by-step pathway—such as circularity assessments, mapping exercises, or business-model canvases—gave companies orientation and lowered the perceived complexity of circularity. Even companies with limited prior experience were able to identify relevant opportunities when methods were broken down into manageable phases.

A recurring finding was that starting small is often more effective than attempting comprehensive change from the outset. Focusing on one representative product, a single waste stream, or a limited set of circular concepts helped companies build momentum and confidence before expanding their efforts.

Data Availability Determines the Depth of Insight

Many tools require a certain level of product, material, or process data. While simple strategic or ideation tools can be applied with minimal preparation, quantitative tools—such as those related to Product Carbon Footprints (PCF), Life Cycle Assessment (LCA), or supply-chain mapping—depend on accurate and structured data.

The piloting experience showed that incomplete Bills of Materials, missing material specifications, or limited insight into upstream suppliers can restrict the depth and reliability of tool results. Companies that invested time

upfront in data preparation benefitted from clearer insights, more targeted recommendations, and stronger decision support.

Facilitation and Cross-Functional Collaboration Strengthen Outcomes

Across nearly all tools, one consistent lesson emerged: tools alone do not create impact—people do.

Workshops, guided discussions, and expert facilitation were central to translating tool results into meaningful next steps.

Companies that involved different internal roles—design, engineering, sustainability, operations, purchasing, management—achieved more comprehensive and realistic outcomes. Circularity touches multiple dimensions of a company's operations, and piloting confirmed that collaborative approaches lead to richer insights and stronger internal alignment.

Circularity Works Best When Embedded Early

Regardless of tool type or thematic area (Design, Materials & Recovery, or Business Models & Value Chains), the most substantial benefits emerged when circularity was considered early in product development or strategic planning. Once design decisions, supplier contracts, or production processes are fixed, the room for change becomes more limited. Early exploration enables:

- longer product lifetimes
- more modular and repairable solutions
- lower environmental impacts
- more resilient supply chains
- clearer business-model choices

Tools that supported early-stage idea development—such as the Circular Business Model Canvas, Value Mapping Tool, or design-oriented assessments—were particularly effective in setting a direction for subsequent implementation.

The Business Case Drives Engagement

The project confirmed that companies engage in circular initiatives when they see a clear and relevant business benefit. This includes:

- cost savings (energy, materials, waste management)
- reduced regulatory risks
- improved resilience against supply-chain disruptions
- customer requirements and market expectations
- opportunities for new business models

While environmental motivation can support engagement, lasting commitment emerges when circularity aligns with financial and operational priorities.

Tools Differ in Complexity and Maturity—Selecting the Right Tool Matters

The 15 tools piloted during the project serve different purposes and require different levels of effort, data, and expertise. They range from:

- introductory tools for awareness and orientation,
- strategic and ideation tools for business-model thinking,
- assessment tools for design and materials decisions,
- advanced tools for quantitative analysis and supply-chain transparency.

Piloting confirmed that companies benefit from careful selection based on:

- their maturity level,
- available data,
- internal capacity,
- and specific challenges or goals.

Using the right tools in the right sequence significantly increased the relevance and quality of outcomes.

Ecosystem Support Enables Long-Term Progress

One of the central strengths of the CIRCOTRONIC project is the diversity of its partners and the ongoing services they provide. Regional development agencies, innovation centres, research institutions, universities, circular labs, design organisations, and public bodies all offer different forms of expertise. Their continued engagement beyond the project gives companies access to:

- methodological support
- technical and regulatory guidance
- supply-chain insights
- prototyping and testing capabilities

- funding advice
- networking opportunities

This ecosystem ensures that circular transformation does not end with the project but can continue as companies move from exploration to implementation.

Final Considerations

The CIRCOTRONIC project demonstrates that circular transformation is both achievable and beneficial for SMEs and Mid-Caps in the EEE sector. The tools tested throughout this project, combined with partner expertise and company commitment, form a strong foundation for moving from linear practices toward more resilient, future-proof, and resource-efficient business models.

The overarching conclusion is clear:

Circularity becomes successful when it is practical, guided, data-informed, and aligned with a company's strategic priorities.

With the right tools, collaborative processes, and long-term support, companies can not only meet emerging regulatory requirements but also unlock new economic opportunities and strengthen their competitive position in a rapidly evolving market.

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