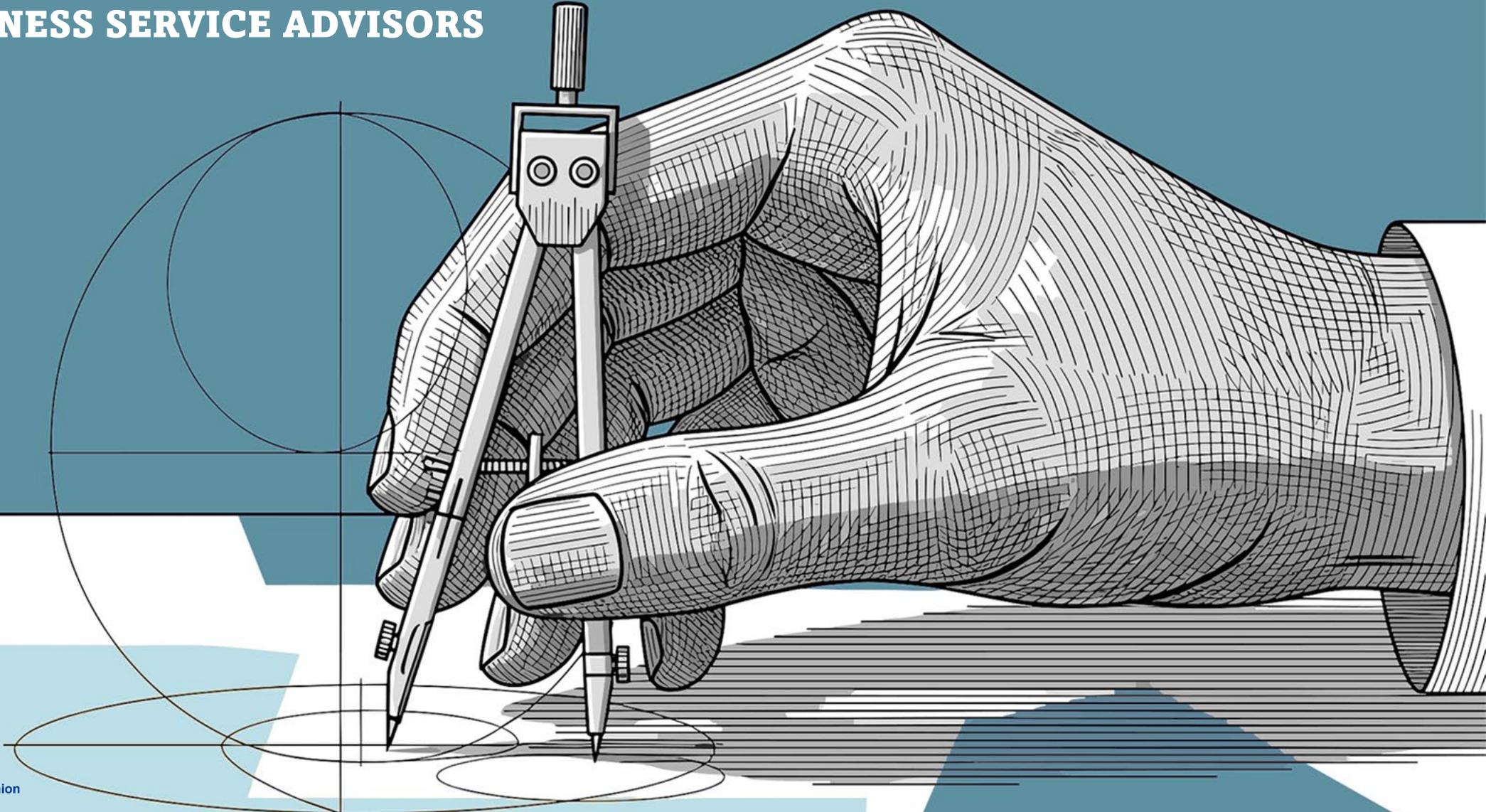


# CIRCULAR ECONOMY TOOLKIT

## FOR BUSINESS SERVICE ADVISORS



**Interreg**



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Northern Periphery and Arctic

**TARGET**   
**CIRCULAR**  
Supporting Sustainable SMEs to Success

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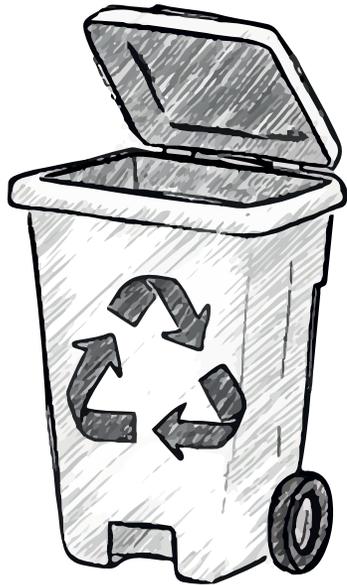
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## Your Waste Is My Business

The transition to a circular economy represents a fundamental shift in how businesses operate, offering a path toward sustainable development that prioritizes resource efficiency, waste minimization, and economic resilience, while also enhancing environmental and social sustainability.

This tool kit is designed to equip business support organizations with the tools and knowledge needed to assist their clients in navigating this transformative landscape.

The application of Circular Economy principles can improve various aspects of business operations and sustainability by transforming waste into valuable resources, optimizing resource use, and creating closed-loop systems (“your waste is my business”). This approach can lead to increased efficiency, reduced environmental impact, cost savings, and the development of innovative business models that enhance long-term resilience and competitiveness. Additionally, it can improve brand reputation, meet growing consumer demand for sustainable practices, and ensure compliance with evolving regulations. Overall, the Circular Economy fosters a more sustainable and profitable way of doing business.

Moving from theory to practice, the toolkit suggests several analytical tools and methodologies that help businesses assess their current position relative to circular economy principles. This includes the analysis of internal resources, such as material flows and underutilized assets, as well as external opportunities, like marketplaces for secondary resources and information databases on raw materials.

# 1. CE Terms

## Core Concepts

**Circular Economy:** An economic system aimed at eliminating waste and the continual use of resources through reuse, repair, refurbishment, and recycling.

**Linear Economy:** The traditional model of "take, make, dispose" — in contrast to circular economy.

**Closed-loop System:** A system where products and materials are reused and recycled continuously.

**Sharing Economy:** Utilization of a product or material in such a way that ownership does not change – a fee is paid for the use of the commodity, or a service fee is charged

**Services:** With the circular economy, services are becoming more common as a way to ensure that materials remain in circulation and product quality is sustainable.

## Key Terms

**Resource Efficiency:** Using resources in a sustainable way to minimize waste and environmental impact.

**Eco-design:** Designing products with their entire lifecycle in mind, including ease of repair, reuse, and recycling.

**Product-as-a-Service:** A model where products are leased or rented rather than sold, encouraging manufacturers to design for longevity.

**Extended Producer Responsibility:** A policy approach where producers are responsible for the end-of-life management of their products.

**Reverse Logistics:** The process of moving goods from their final destination back to the manufacturer for reuse, recycling, or disposal.

**Upcycling:** Transforming waste materials into new products of higher quality or value.

**Downcycling:** Recycling materials into products of lesser quality.

**Biological Cycle:** Part of the circular economy dealing with biodegradable materials that can safely re-enter the environment.

**Technical Cycle:** Focuses on non-biodegradable materials that can be reused or recycled.

**Cascade:** A principle of resource efficiency in which the order of use of raw materials is prioritized in order to achieve the highest added value.

## Sustainability-Related Terms

**Waste:** Business operations generate various surpluses, waste streams, and excessive work input.

**Cradle-to-Cradle:** A design philosophy where products are created with the intention of being reused or recycled indefinitely.

**Zero Waste:** A goal to eliminate waste through thoughtful design and resource management.

**Life Cycle Assessment (LCA):** A method to assess environmental impacts associated with all stages of a product's life.

## 2. Role of BSOs: Ask the right questions!

### 1. Awareness & Capacity Building

Educate businesses about circular economy principles and benefits.  
Organize workshops, webinars, and training sessions on circular practices.

### 2. Strategic Guidance

Help companies assess their current business models and identify opportunities for circularity.

Support the development of circular business strategies, such as shifting from product sales to service models.

### 3. Innovation Support

Encourage eco-design, modularity, and product life extension.

Facilitate access to R&D resources for circular product development.

### 4. Networking & Partnerships

Connect businesses with circular economy stakeholders (e.g., recyclers, refurbishers, logistics providers).

Promote industrial symbiosis — where one company's waste becomes another's resource.

### 5. Funding & Incentives

Guide companies to relevant funding opportunities, grants, or subsidies for circular initiatives.

Help with applications for EU or national circular economy programs.

### 6. Policy & Compliance Support

Advise on regulations like Extended Producer Responsibility (EPR), eco-design directives, and waste management laws.

Help businesses align with sustainability reporting standards.

### 7. Monitoring & Impact Measurement

Support companies in setting KPIs for circularity (e.g., material reuse rate, waste reduction).

Provide tools or frameworks for tracking progress and reporting impact.

You can also use separate questionnaire document: [Microsoft Word - Questionnaire for companys byproducts and waste streams.docx](#)

### What role BSOs could have:

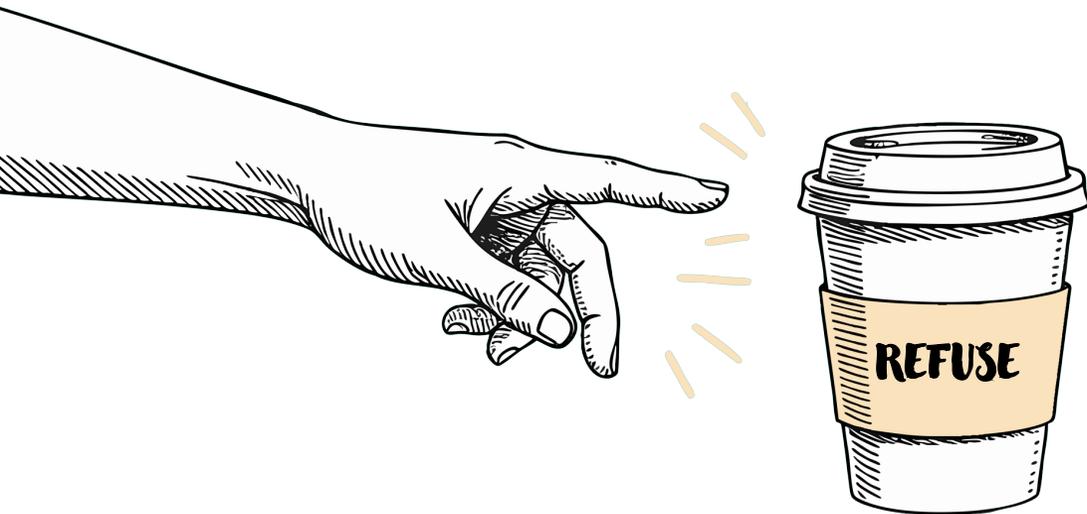
- Communication between companies - **BSOs and other organization role as matchmaker and communicator**
- Plastics and cardboards are not recycled, missing infrastructure due to small amounts (or knowledge, willingness to pay or to cooperate) – **matchmake companies across different industry segments to find the solutions for common challenge.**
- Lack of knowledge (uncertainty was expressed about where certain wastes could be recycled in the most optimal way and concerns about the usefulness of waste sorting (whether for recycling or for combustion energy) – **provide information on the latest regulations and laws and their impact on practice.**
- Life cycle assessment or carbon footprint calculation are not done, although is of interest or requirement to remain in the competition - **outlining of own processes**



### 3. Principles of Circular Economy: 11 R's

The circular economy adaption is guided by a set of strategies known as the 11 R's, which can be organized into three core phases: **circular design**, **circular use**, and **circular value**. Each phase represents a distinct stage in the lifecycle of products and together they form a comprehensive, systemic approach to sustainability.

**Circular Design** focuses on the earliest stages of product development, where decisions have the greatest impact on sustainability. **Circular Use** ensures that products are kept in use for as long as possible through maintenance and recovery strategies. **Circular Value** captures the remaining value in products and materials that can no longer be used in their current form.



#### CIRCULAR DESIGN

1. **REFUSE** - Refusing to use suppliers, materials, processes or practices that harm the environment
2. **RETHINK** - Making product use more intensive e.g. sharing the product
3. **REGENERATE** - Regenerative practices instead of extraction
4. **REDUCE** - Decreasing material and other resources use

#### CIRCULAR USE

5. **REUSE** - Reuse a product or resource to reduce waste instead of discarding
6. **REPAIR** - Maintaining or repairing products
7. **REFURBISH** - Reviving a product for use
8. **REMANUFACTURE** - Making products from used components
9. **REPURPOSE** - Reusing what would be discarded goods or resources for another purpose

#### CIRCULAR VALUE

10. **RECYCLE** - Salvaging material streams to be used again
11. **RECOVERY** - Recover value from waste

# Developing your business towards CE – BA Training

## Regenerate

- To what extent do you use and promote the integration of renewable energy sources within your operations, contributing to the regeneration of clean energy?
- How do you repurpose or regenerate waste materials within your business processes, turning waste into valuable resources and reducing overall environmental impact?
- Have you engaged in supply chain restoration initiatives, working with suppliers to regenerate ecosystems, protect natural habitats, or rehabilitate degraded areas?
- How does your business contribute to the regeneration of natural resources, such as through reforestation projects, water conservation initiatives, or soil health programs?
- How does your business manage water resources in a circular manner, emphasizing water regeneration practices and minimizing water consumption and pollution?

## Repair

- How is product design optimized for repairability?
- Is there any machinery or equipment in your business that is capable of being repaired instead of replaced?
- Do you have network of partners that are set up with third party repair centres that repair your products?
- How do you incentivize customers to repair instead of replace?
- How do you educate customers on the value of repair on the environment?

## Reuse

- What refurbishment processes do you have in place to ensure that products can be restored?
- Do you or are you interested in collaborating with an organization to facilitate the reuse of materials, components, or products?
- Do you offer incentives to encourage use of reused products over new ones?
- Are you willing to take part in joint projects to research reusability in your products or services?
- Do you need assistance in communicating sustainability?

## Reduce

- What measures are in place to conserve water, energy and materials?
- Have you or will explore more circular supply chains such as engaging in recycled sourcing or circular partnerships?
- Do you add circularity into your products i.e. Longevity, reuse, refurbishment?
- Are there any circularity projects you had in mind to work on?
- Do you need to move your business operations to digital in any way?

## Rethink

- Would you consider looking at materials or equipment that is more sustainable?
- Are you willing to establish partnerships with other businesses, NGO's, research institutions to collectively implement circular principles, sharing knowledge and resources?
- Do you encourage your employees to explore more sustainable opportunities in your business?

## Refuse

- Would you consider doing waste audits to find out which aspects of your business are producing too much waste?
- Will you or do you provide incentives for employees or customers who actively contribute to waste reduction?
- Do you have environmentally responsible supplier criteria for your business?
- Are you willing to, or do you have end of life product planning?

## Recover

- Are you willing to work on research projects to assist in material recovery?
- How are recovered materials utilized within your manufacturing processes, and what steps are taken to maximize their integration into new products?
- What innovations or emerging technologies are you exploring or implementing to improve the efficiency and effectiveness of material recovery from your products?

## Recycle

- How is your chain optimized to streamline the collection and transportation of materials from end-of-life products to recycling facilities?
- Do you integrate recycled content into the manufacturing of your products, and what initiatives are in place to increase the use of recycled materials over time?
- What efforts are being made to explore and adopt innovative recycling technologies that can improve the efficiency and sustainability of your recycling processes?

## Repurpose

- Do you have or are willing to gain partnerships with organizations that specialize in repurposing materials, creating a secondary market for your products beyond their original use?
- How do you ensure that the materials used in your products are compatible with various repurposing initiatives, considering factors like durability and adaptability?
- Are you willing to work on research projects that explore repurposing?
- To what extent do you incorporate repurposed materials into new products?

## Remanufacture

- Do you have partnerships with suppliers, third-party remanufacturers, or industry alliances to enhance the scalability and effectiveness of your remanufacturing efforts?
- How are your products designed to facilitate remanufacturing, with considerations for easy disassembly, replacement of worn components, and overall durability?
- How is your remanufacturing process to ensure efficiency, quality, and consistency in bringing used products back to a like-new condition?

## Refurbish

- Do you have a network of authorized refurbishment centres or partnerships with third-party refurbishers to facilitate the refurbishment of your products?
- How are your products designed to facilitate refurbishment, and what considerations are given to ensure that components can be easily upgraded or replaced during the refurbishment process?
- Have you explored or implemented a "Refurbishment as a Service" model, offering customers ongoing refurbishment and maintenance?

# Developing your business towards CE – BA Training

**Regenerate**

**Repair**

**Reuse**

**Reduce**

**Rethink**

**Refuse**

**Recover**

**Recycle**

**Repurpose**

**Remanufacture**

**Refurbish**

## 4. Internal Analysis of Resources

Internal analysis of resources tool has been designed to serve as a comprehensive resource for individuals and organizations looking to make informed decisions about which secondary resources to consider for further utilization, recycling, or repurposing.

Circular economy is more than just a framework; it is a strategic approach that redefines traditional linear economic models, where resources are extracted, used, and discarded, into regenerative systems where resources are continuously cycled back into the economy. In this context, materials, water, energy, and even intangible resources like knowledge, data, and time are valued and optimized to reduce waste and create new opportunities.

The purpose is to identify these wasted resources and find ways to reintegrate them into the value chain, thereby reducing waste and creating more sustainable economic and environmental systems.

The first tool is identifying how to review your entire operation and identify any waste from it using Lean thinking\*

\*This tool has partly made use of the "Deadly wastes" canvas produced by InnoValor: <https://businessmakeover.eu/fi/tools/deadly-wastes-canvas>



# Identify potential waste using Lean thinking

Waste	Where in the process/operation was this found?	Cause	Solution	What is the timetable?	Do the solutions require resources	How are changes measured?
<b>Errors:</b> Errors that need to be corrected require more time, resources and money						
<b>Overproduction:</b> Errors that need to be corrected require more time, resources and money						
<b>Waiting:</b> Wasted time whenever work in the process has to stop for some reason or other waiting						
<b>Communication:</b> Misunderstanding and miscommunication caused by inaccurate or missing information						
<b>Transportation:</b> Unnecessary movements of products and materials or utilities						
<b>Inventory:</b> Excess products and materials not being processed						
<b>Motions:</b> Unnecessary movements by people (e.g. walking) or machines						
<b>Excess processing:</b> More work or higher quality than is required						
<b>Skills:</b> Not or under-utilizing peoples' talents, skills and knowledge						
<b>Facilities and equipment:</b> Unnecessary facilities and equipment, underutilization of premises and equipment						

## 5. Material flow analysis (MFA)

The untapped potential held within secondary resources, often generated as byproducts or waste materials, can contribute to resource conservation, improved local resource accessibility, cost savings in raw material acquisition, and enhanced environmental sustainability. The latent value within secondary resources, when identified and exploited, can lead to a significant enhancement in operational efficiency and competitiveness of each company and collectively extended to have a positive impact on a regional and broader scale.

Waste is generated at various stages of the industrial process, including raw material procurement, production planning, manufacturing, post-production, maintenance, storage and waste management.

The main steps in material flow analysis:

**Analyse** the flow of materials throughout the various stages, from raw material acquisition to final waste output, to identify where and in what quantities waste is generated. Account for material losses due to factors such as quality issues and overproduction, maintenance of equipment, expiration, etc. Use to list the inputs and to document the outputs from the same processes.

**Categorize** the by-products and waste (e.g., organic, metal, plastic, chemical). Consider the quality, contamination level, and condition of the waste materials.

**Calculate the revenues** of by-products and costs associated to by-product and waste handling.

To further extend analysis explore the potential of secondary materials, identify which waste streams can be recovered, reused, or recycled, and brainstorm potential methods for repurposing by-products and waste.

## Some Questions to Assist Analysis:

- What methods and processes are used to sort by-products and waste streams during production and after?
- What costs are associated with the further processing of by-products and waste materials, such as waste disposal or treatment expenses? Can you specify the types of costs involved?
- Do you generate revenue from selling by-products and waste materials? If so, what percentage of your total revenue does this represent?
- If you are not currently selling or further processing by-products and waste materials, have you considered doing so? If yes, what are your considerations?
- What strategies and practices are employed in production to minimize by-products and waste streams?
- Have you explored or used platforms like [materiality.fi](https://materiality.fi) for buying and selling by-products and waste materials? If so, did you find any relevant matches or opportunities? Would you consider using such platforms for selling your by-products?
- Do you have a method in place for monitoring by-products and waste streams?
- What challenges do you face in managing by-products and waste streams? Are there any known 'bottlenecks' that prevent you from managing these streams as effectively as possible
- First explore possibility to improve operations to enable reduction or elimination of waste
- Determine if waste can be directly reused within the company's operations (e.g., reusing metal shavings in production).
- Explore opportunities to develop new products or applications using the secondary raw materials, which could open up new markets or revenue streams.
- Explore digital marketplaces to find potential buyers or industries interested in the type of waste your company generates.
- Refer to implemented case studies for inspiration and insights.
- Estimate potential costs and revenues related to handling and reuse of secondary materials.







## 6. Analysis of Intangible Resources

Applying Circular Economy principles to intangible resources such as knowledge, time, and data can significantly maximize their value and enhance operational efficiency. By reusing and sharing these assets, businesses can streamline processes, improve decision-making and uncover new business opportunities, ultimately leading to a competitive edge and sustainable growth.

Review your entire operations to identify intangible waste, such as underutilized knowledge, time, and data, and estimate the associated costs of these losses. Evaluate the potential of intangible resources by identifying ways to enhance their efficiency in current operations and exploring opportunities to generate new revenue through innovative, circular economy-inspired solutions.



## Use Resources Wisely

**Time as a wasted resource.** The inefficient use of time in processes, idle periods in manufacturing, and underutilized human resources can all contribute to wasted potential in a business. Application of circular economy principles:

**Process optimization:** Lean manufacturing and just-in-time (JIT) principles can reduce wasted time by optimizing workflows, minimizing downtime, and improving efficiency.

**Shared resources:** Time-sharing models, such as co-working spaces, car-sharing, and tool libraries, allow resources to be used more effectively across multiple users, reducing idle time and increasing overall productivity.

**Service platforms:** Time can be better utilized through digital platforms that match underutilized labour (like rent economy workers) with demand, ensuring that skills and time are not wasted.

**Knowledge as a wasted resource.** Untapped expertise, skills, or intellectual capital that is not shared or utilized effectively represents a missed opportunity for innovation and growth.

**Knowledge sharing platforms:** Creating open-source platforms, industry collaborations, and knowledge hubs where organizations and individuals can share expertise, best practices, and innovations. This ensures that valuable knowledge is not siloed but is accessible for others to build upon.

**Training and upskilling:** Continuous learning and upskilling programs ensure that workers' skills remain relevant, preventing the waste of human capital. This is especially important in rapidly changing industries where knowledge can quickly become outdated.

**Mentorship and community engagement:** Establishing mentorship programs and engaging communities in knowledge transfer can prevent the loss of valuable experience, particularly in specialized fields or traditional crafts.

**Data as a wasted resource.** Unused or underutilized data that could provide valuable insights or drive decision-making if properly analysed.

**Data sharing and open data initiatives:** Promoting the sharing of data across industries and organizations can unlock value by allowing different stakeholders to leverage data for various purposes, such as improving sustainability, optimizing supply chains, or enhancing customer experiences.

**Data analytics and AI:** Employing advanced data analytics and artificial intelligence to extract insights from large datasets, ensuring that data is fully utilized to inform decisions, optimize operations, and predict trends.

**Data monetization:** Organizations can explore ways to monetize their data by offering it as a service to other businesses, thus turning what was previously a wasted resource into a revenue stream.

**Feedback loops:** Implementing systems where data generated from products, services, or processes is continuously fed back into the system to improve and optimize performance, efficiency, and sustainability.



## 7. Circular Business Model Canvas

The circular economy business model canvas is based on the traditional BMC, but the focus is on considering what circular economy value we want to create with our business and what positive and negative impacts it will have.

The help questions help you figure out what to answer in each box.

### Partners

- What businesses, organisations, suppliers or people do you think you need to create value and be successful?
- What activities and expertise do they provide?
- How do you benefit your partners?
- What key activities can you both work on together?
- What resources can they provide your business? What resources can you provide them?

### Activities

- What are the key activities creating CE value?
- What expertise/core competencies do you have to execute activities?
- What activities are the primary drivers for customer relationships?
- What key activities or processes in producing or delivering your products or services?
- What activities do you perform to acquire the necessary resources for your business operations?
- What activities do you undertake to develop supply chain and logistics?

### CE value

- What problem does your business solve/resolve? What is the value offering for customers?
- What differentiates you from other offerings?
- What features or attributes of your product or service are most valued by your customer?
- How do you plan on continuously enhancing or evolving your offering based upon the changing customer needs?

### Resources

- What natural resources are necessary?
- Do you engage with the 11r's in circularity?
- How do you source these resources?
- Are there any collaborations or partnerships in place that enhance sustainable sourcing or management of these resources?
- Have you explored green tech or practices that promote responsible resource use?

## 7. Circular Business Model Canvas

### Customers

- Who are our most important customers?
- Who is the end user?
- How do we maintain and develop customer relationships?
- Are new services needed, such as maintenance, return, or reuse?
- Can customers participate in managing the product lifecycle (e.g., by returning the product)?
- How does customer behaviour affect the functioning of the circular economy model?

### Customer relationships

- For whom are we creating value?
- Who is at the heart of our customer base?
- What are the scenarios linked to our value proposition?
- What is the customer journey?
- Do you have any customer retention activities?
- What is the size and growth potential of your target market?
- How do you gather or monitor feedback from customers and adapt your offering based upon their input?

### Recovery

- What materials or components can be recovered or recycled from the product?
- Does the product contain parts that can be easily removed and reused?
- Can materials be collected and processed efficiently at the end of the product's life cycle?
- How much does the recycling process reduce environmental impact?
- Can the recycling process reduce the use of virgin raw materials?
- How does recycling support the company's sustainability goals?

### By-products and waste streams

- What waste streams are generated?
- What by-products are generated?
- Do they generate income or are they an expense item?

### Distribution

- How can we make our value proposition better known?
- What type of customer relations process is in place?
- How is the product delivered or offered?
- What are the primary channels or methods through which your products or services reach your customers?
- Are there any intermediaries or distribution partners involved in getting your offering to end users?
- How do you handle inventory for your products or services?
- Are there any specific geographical areas or markets where you primarily distribute your products or services?

### Services

- What services do we offer to extend the product's life cycle (e.g., maintenance, repair, upgrades)?
- Can we offer a service instead of a product (e.g., leasing, rental, right of use)?
- How does the service support the principles of the circular economy (e.g., reducing waste, extending service life)?
- How does the service create added value for the customer compared to traditional ownership?
- Is the service an easier, more affordable, or more responsible option for the customer?
- How can the service increase customer loyalty or long-term relationships?
- How is the service delivered to the customer (digitally, physically, on site)?
- Are partners needed to implement the service (e.g., logistics, service network)?
- How are the quality and availability of the service ensured?

## 7. Circular Business Model Canvas

### Costs

- What are the critical expenses looking at both fixed and variable costs?
- What resources looking at both technical and natural are the most costly?

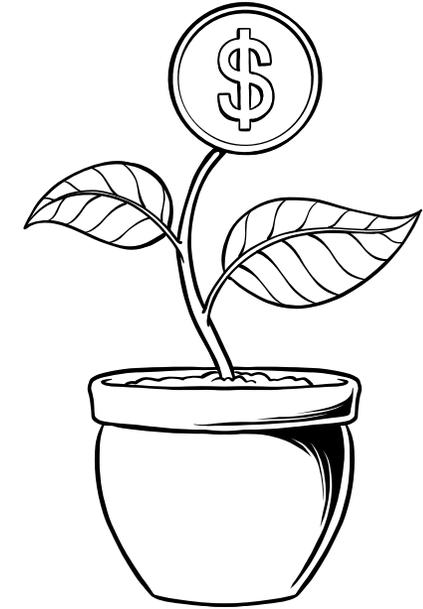


### Negative Impacts

- How does your value proposition contribute or mitigate environmental concerns?
- Have you conducted a life cycle assessment of your product or service?
- Are there specific environmentally friendly features or materials integrated into your product or service?
- Are there any revenue streams or opportunities you might not have thought of using the 11'rs?
- Are there any efforts in place to continually improve the environmental impacts of your value proposition?

### Revenue

- How do you make money?
- How much money will you make?
- What are the price setting criteria?

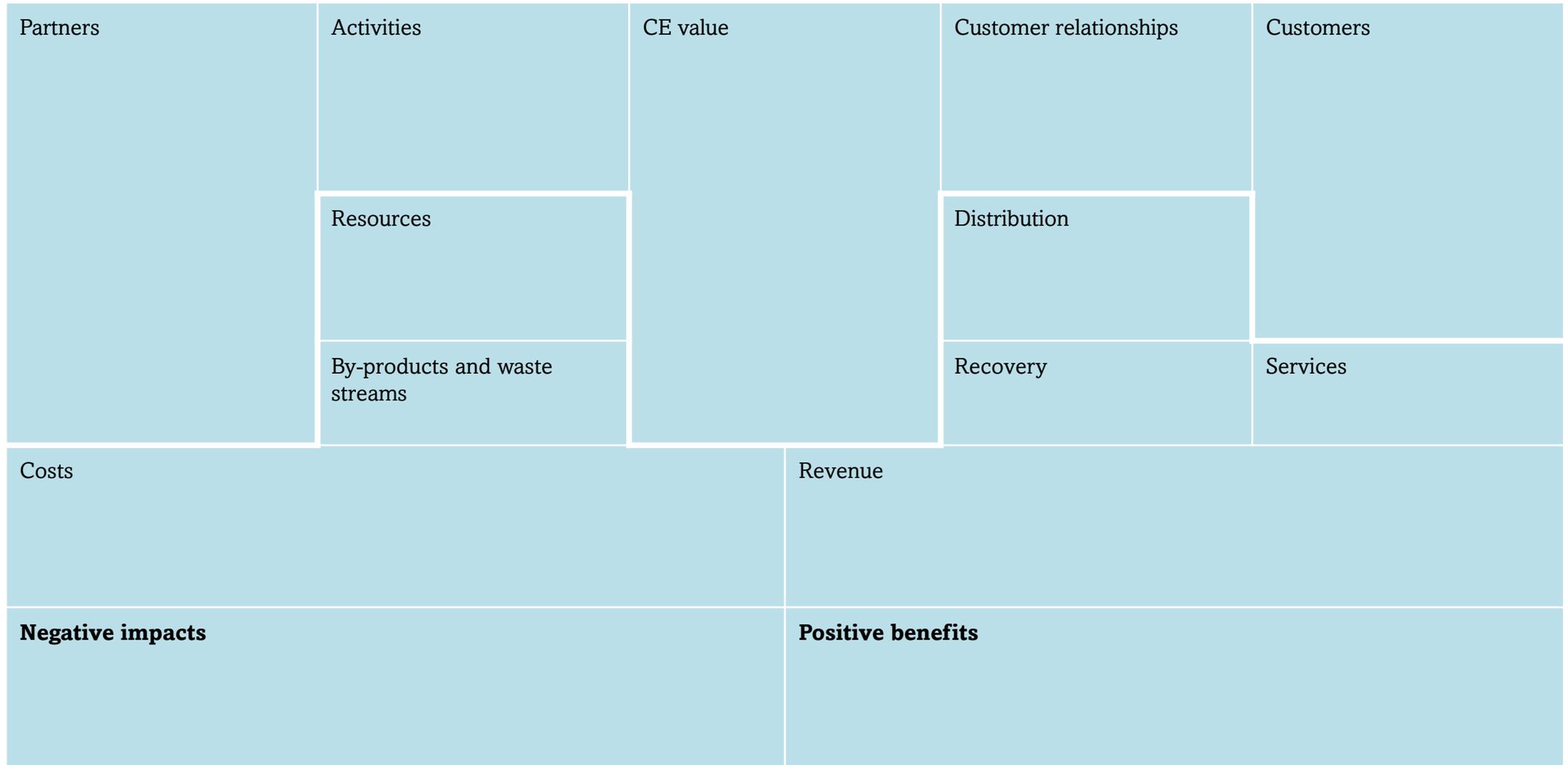


### Positive benefits

- What specifically are the environmental advantages that your product or service offer (e.g. energy efficiency, waste reduction, waste valorisation, carbon footprint reduction)?
- How are you communicating your environmental benefits to your customers?
- Are there ongoing innovations or R&D efforts to improve the environmental benefits of your value proposition?
- What features or design elements are integrated into your product to enhance environmental benefits?

# Circular Business Model Canvas

Osterwalder & Pigneur (2016)



## 8. Circular Economy Advisory Checklist

### 1. Initial Engagement

- Understand the client's business model and industry.
- Assess current sustainability and resource use practices.
- Identify key stakeholders and decision-makers.

### 2. Awareness & Education

- Explain circular economy principles and benefits.
- Share relevant case studies and success stories.
- Provide sector-specific circular economy examples.

### 3. Opportunity Identification

- Map material and energy flows (input/output).
- Identify waste streams and inefficiencies.
- Highlight potential for reuse, recycling, or redesign.

### 4. Strategic Planning

- Support development of circular business models (e.g., Product-as-a-Service, leasing).
- Help set circularity goals and KPIs.
- Align circular strategies with core business objectives.

### 5. Partnerships & Ecosystem Building

- Connect clients with recyclers, refurbishers, and logistics partners.
- Facilitate collaboration with local circular economy networks.
- Promote industrial symbiosis opportunities.

### 6. Funding & Incentives

- Identify relevant grants, subsidies, or EU programs.
- Assist with funding applications and documentation.
- Advise on financial planning for circular investments.

### 7. Compliance & Policy Guidance

- Inform about relevant regulations (e.g., EPR, eco-design).
- Support sustainability reporting and certifications.
- Monitor policy changes and advise accordingly.

### 8. Implementation Support

- Provide tools and templates for circular practices.
- Recommend technologies for tracking and optimization.
- Offer training or connect with experts for implementation.

### 9. Monitoring & Evaluation

- Help set up systems for tracking circular performance.
- Review progress against goals and KPIs.
- Adjust strategies based on feedback and results.

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## Northern Periphery and Arctic

### **Target Circular – Supporting Sustainable SMEs to Success**

The Target Circular project is a collaboration between institutions in Ireland, Finland, Norway, Iceland and Sweden, and builds on recent research how businesses can use a more scientific approach to decision-making.

Project's research partners develop and test with SMEs methodology for fast decision-making using tools as “strategy mapping” and “business model canvas” and applies the tools also for supporting SMEs towards circular economy and sustainable business practises.

The project is co-financed by EU funding programme Interreg Northern Periphery and Arctic.

### **Project Partners**

Coordinator - Munster Technological University: Hincks Centre of Entrepreneurship Excellence, Circular Economy Cluster Southwest, Ireland

Centria University of Applied Science, Finland

Norinnova As, Norway

Kokkolanseudun Kehitys Ltd (KOSEK), Finland

Ludgate Operations, Ireland

Federation of Regional Authorities North West Iceland, Iceland

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