



DECIDE!

Kickstart your circular journey

CIRCULAR DESIGN • CIRCULAR BUSINESS MODELS • SUSTAINABLE PRODUCT DEVELOPMENT

Time for a transition.

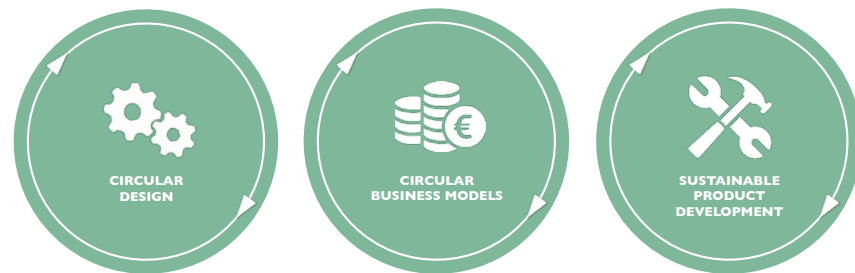
Currently the sustainability transition, circular economy, and carbon footprints are terms on everyone's lips. It is widely acknowledged that our existing linear economy, which revolves around extraction, production, and disposal, is not sustainable in the long run. Consequently, the transition to a circular economy is imperative, but how can we initiate this change within our own company?

In response to this challenge, we have developed a guide as part of the **DECIDE** project to facilitate this transition. Our aim is to inspire and guide companies towards a circular mindset, which ultimately would lead to more sustainable and circular products and services. At present, circularity is a crucial topic as customers, legislation, and new directives demand changes throughout the entire value chain. By implementing circular economy strategies, companies can not only contribute to a more sustainable future but also benefit from reduced costs, increased resource efficiency, improved reputation, and new business opportunities. By designing products that are durable, repairable, and recyclable, we can create a closed loop that both the environment and the economy can gain from.

This guide is tailored for manufacturing companies in the Jakobstad region, including their suppliers and customers, both new and old. It demonstrates how circular thinking can be practically implemented, providing concrete examples of companies that have successfully used circular design principles to meet future demands. The guide also provides useful information and models to spark interest in the transition towards circular thinking.

Our best advice? Start today. The guide consists of three themes:

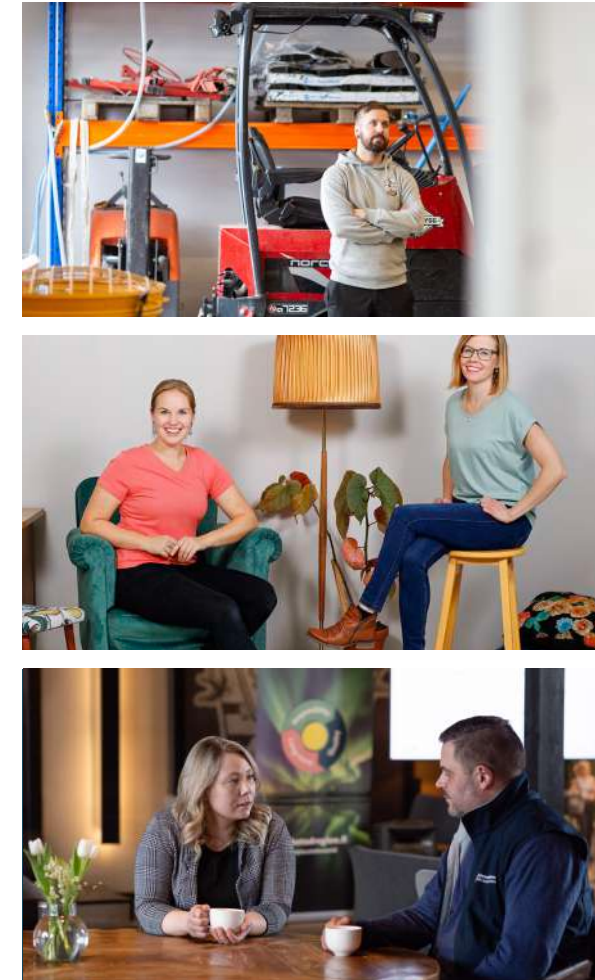
Circular Design • Circular Business Models • Sustainable Product Development



• All **dark blue links** in the guide are clickable – please read more on the organizations' own websites.

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Leverage from
the EU
2014–2020



EUROPEAN UNION
European Regional
Development Fund



Regional Council
of Ostrobothnia

• The project is funded by the REACT-EU instrument, as part of the measures implemented by the European Union due to the covid-19 pandemic.



Developing Circular Design

The **DECIDE** project strives to help the business community in the Jakobstad region to respond to the increased demand for the transition to a circular economy especially focusing on the product's design stage. This involves paying attention to the product's entire life-cycle and understanding circular production. We want to strengthen companies' abilities to develop their own products, services, and business models in line with circular principles, but also together with experts and business developers help to bring forward circular solutions based on design and product planning.



PROJECT PARTNERS

The Jakobstad Regions Development Company Concordia
Centria University of Applied Sciences
Novia University of Applied Sciences

FUNDED BY

Regional Council of Ostrobothnia
European Regional Development Fund

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PRODUCTION: Sonja Finholm, Alfred Media

A prosperous region.

There are currently over 6,800 companies in the Jakobstad region, and of them 32 percent are within the category of manufacturing. The companies in the region have a total turnover of 3.55 billion euros and together they export goods worth 2 billion euros.

The region is also a forerunner in circular economy. For a long time the regional development company Concordia has worked to help companies transition their operations. In 2019 Concordia, together with the other development companies in Ostrobothnia, launched **Ostrobothnia in Transition – Roadmap for Sustainable Development and Circular Economy** and now we are taking the next step. This toolkit is a result of the project **Developing Circular Design – DECIDE** – which started in the spring of 2022. The project has been carried out as a collaboration between the Jakobstad region's development company Concordia, Novia University of Applied Sciences and Centria University of Applied Sciences and is financed by the EU's regional development fund REACT and the Regional Council of Ostrobothnia.

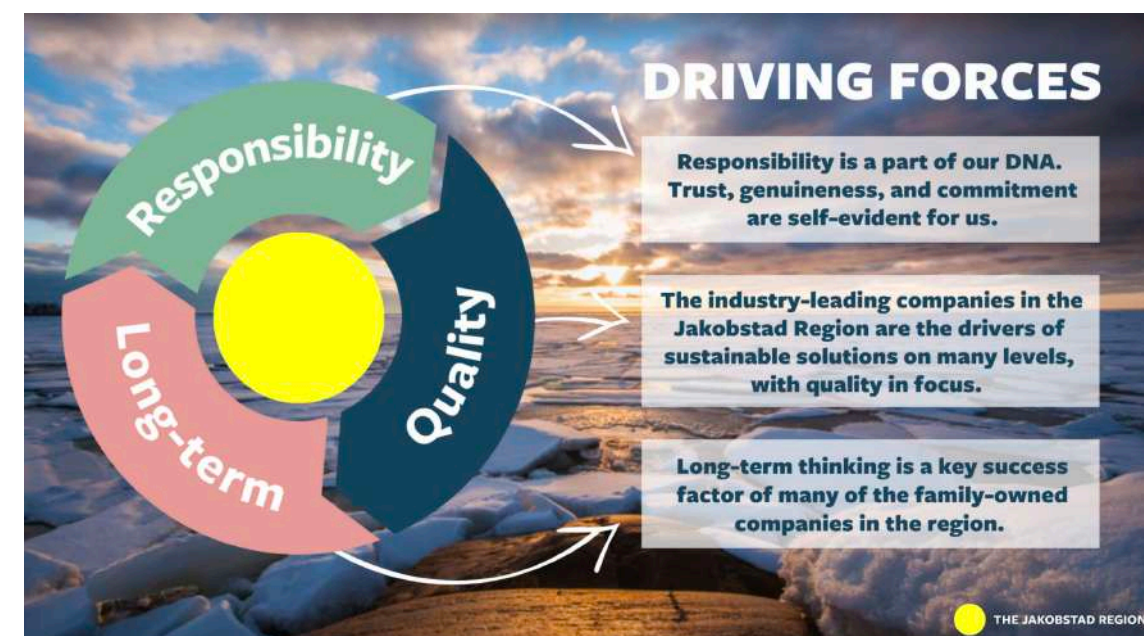
The focus of the DECIDE project is circular design, circular business models and sustainable product development. The goal is to

strengthen the region's ambition to be a forerunner and lead the way in the global transition towards a more circular society. At the same time, we want to contribute to strengthening the competitiveness of the manufacturing industry.

The long tradition of cooperation between industries and companies makes the region an ideal place to together take steps in the sustainability transition. Through collaboration, knowledge sharing and resource efficiency, we can together make significant progress towards a circular economy.

Sustainability is a natural part of the region's DNA and many of the region's companies are already industry leaders in the sustainability transition. We have made significant progress but are also aware that we still have a lot to do to live up to our vision of the sustainable Jakobstad region – a place where responsibility, quality and long-term-thinking are natural elements in everyday life. These three driving forces reflect and concretize all the sustainability work that is already being done in the region and are a good starting point when we take the next step.

Source: The Regional Development Company Concordia: Exportvärde och investeringar i Jakobstadsregionen 2019



Quick facts.



5

municipalities.



50000

inhabitants.



75%

speak Swedish, 19% Finnish, 6% other languages.



58%

live in the city and 42% in the countryside.



6813

companies.



22047

workplaces.



2500

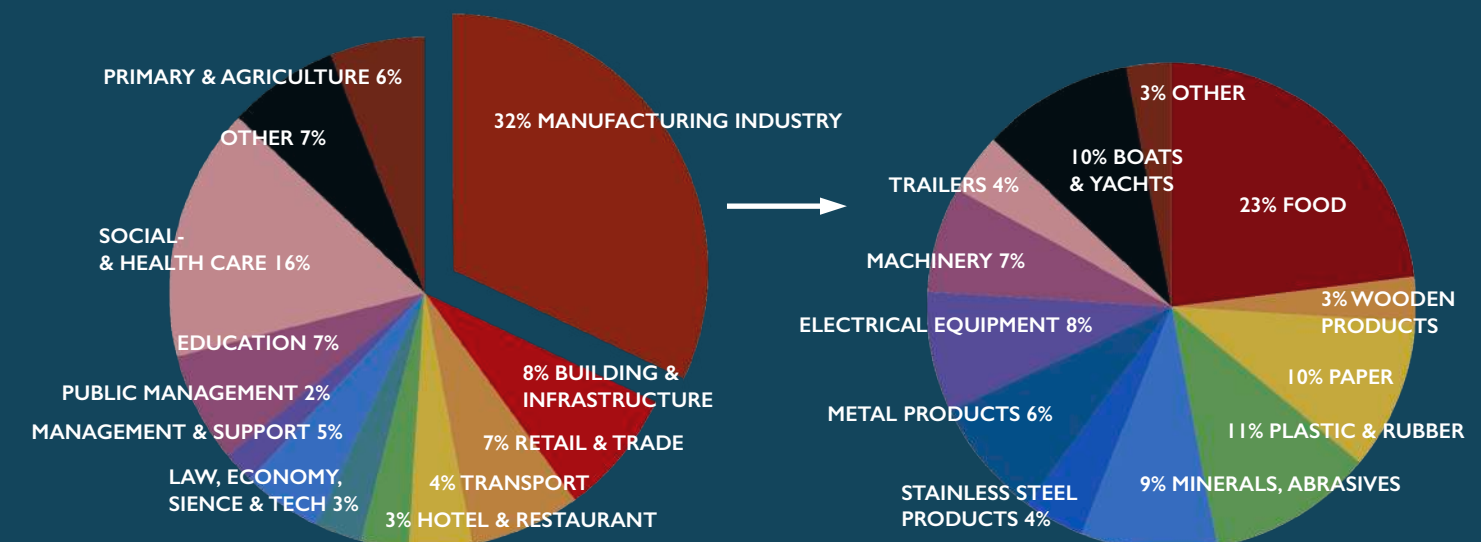
employees needed.



2 bn

yearly export value.

Diversified economy.



Are you familiar with these?

CIRCULAR ECONOMY	A regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling. (Geissdoerfer et al. 2017)
CIRCULAR DESIGN	Utilizing the ideas and tools of Circular Economy to better design, plan and innovate our world. From products to cities and purchasing behavior.
CIRCULAR PUBLIC PROCUREMENT	Action plan aimed at integrating circular economy into public procurement, which accounts for approximately 14 percent of the EU's GDP. It means utilizing criteria based on circular economy to be included in public procurement of products and services and may lead to new circular procurement directives on an EU and national level.
THE ECO DESIGN DIRECTIVE	A set framework for how products should be manufactured to significantly improve their circularity, energy performance and other environmental sustainability aspects. The directive sets, among other things, minimum requirements for products energy efficiency, material efficiency, durability and repairability. By establishing these requirements, the directive aims to promote development of more sustainable products and to provide consumers with more energy efficient and environmentally friendly choices.
EPR – EXTENDED PRODUCER RESPONSIBILITY	Action plan requiring expansion of EPR system to include all products, including textiles, construction, furniture, and packaging, which means that manufacturers will be responsible for the collection and recycling of their products at the end of their useful life. This can lead to new EPR legislation on an EU and national level.
EU TAXONOMY	A classification system that identifies economic activities as can be considered environmentally sustainable, with the aim of providing clarity and transparency for investors and companies by establishing a joint language and framework for sustainable finance. Manufacturing companies will have to adapt their business operations to the EU's taxonomy criteria to access sustainable financing and can also use the taxonomy to develop a more circular strategy.
CARBON FOOTPRINT	The total emissions of greenhouse gases from a certain focal point (product, production, or area of activity) expressed in carbon dioxide equivalents, CO2. Usually linked to the life-cycle analysis.
COMPOSITE	A material that combines two different types of constituents to create a new material with new properties.
LIFE CYCLE ASSESSMENT, LCA	A cradle-to-grave or cradle-to-cradle analysis method to assess the environmental impact in connection with all stages of a product, production, or company operations. Follows ISO 14040 guidelines and provides a carbon footprint for a particular focal point.

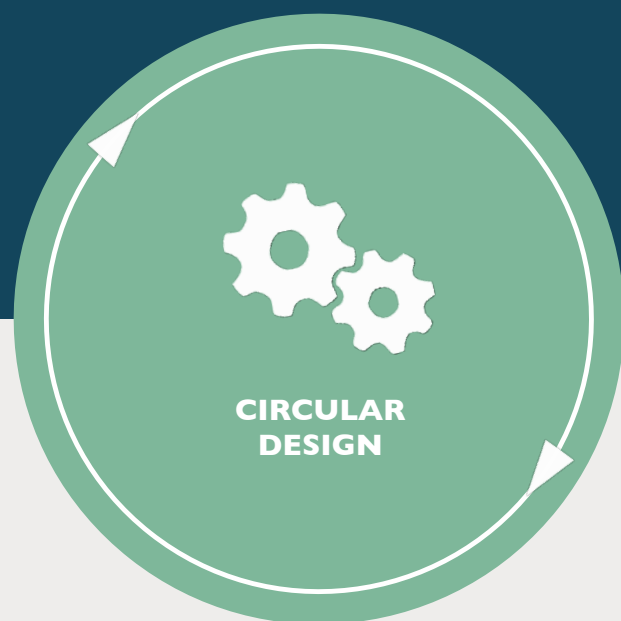
• More to read:
Programmet för främjande av cirkulär ekonomi
Circular Economy Action Plan

Circular Economy principles.

The 10'Rs of circular economy

REGENERATE	<ul style="list-style-type: none">To find new business opportunities that follow natural cycles and regenerate the well-being of nature.	
REFUSE	<ul style="list-style-type: none">To abandon harmful products and materials or find new opportunities to offer the same types of functions with a radically changed product.	SHORT LOOPS THE DESIGN PHASE
RETHINK	<ul style="list-style-type: none">To change the product from a life-cycle perspective by increasing usage, bring in more features and optimize circulation. Consider new business models like sharing and services.	
REDUCE	<ul style="list-style-type: none">To minimize the number of materials, chemicals, and energy used in the production of a product, and thereby the amount of waste generated.	
REUSE	<ul style="list-style-type: none">The reuse of functioning good quality products, by new users or in new kinds of purposes.	MEDIUM LOOPS THE CONSUMPTION AND USER PHASE
REPAIR	<ul style="list-style-type: none">To ensure the repairability of broken or defective products so that the product can regain its original function. Ensure products are repairable.	
REFURBISH	<ul style="list-style-type: none">To update a product so that its life-cycle can be extended, by spare parts and software updates.	
REMANUFACTURE	<ul style="list-style-type: none">To reuse quality parts from end-of-life products in the production of new products with the same or similar function.	LONG LOOPS THE END OF LIFE-CYCLE PHASE
REPURPOSE	<ul style="list-style-type: none">The reuse of disregarded products and parts in a new function or purpose.	
RECYCLE	<ul style="list-style-type: none">To process materials for retaining the materials quality or to improve it.	
RECOVER	<ul style="list-style-type: none">To take back materials and products for new use, recycling processes or incineration.	

Sources:
Potting, J., Hekkert, M. P., Worrell, E., & Hanemaaijer, A. (2017). Circular economy: measuring innovation in the product chain. Planbureau voor de Leefomgeving, (2544)
Morseletto, P. (2020). Restorative and regenerative: Exploring the concepts in the circular economy. Journal of Industrial Ecology, 24(4), 763-773



Circular design.

The design phase presents the most significant opportunity to make a positive impact on a product's ecological footprint. By incorporating circular principles into product and production process design, businesses can effectively and easily reduce their environmental impact during the idea and development phase. Unlike traditional manufacturing, which tends to focus solely on the end-user, circular design takes a holistic approach that considers all stakeholders involved in the product life-cycle. This includes everyone from raw material suppliers and manufacturers to end-users and disposal/recycling entities. By taking this approach, circular design creates new values and enhances resource efficiency.

In this section, we showcase examples and provide guidelines on how businesses can design products that are repairable, upgradable, and recyclable, while also having an extended lifespan.

It all begins with design.

Design is a powerful tool that can have a significant impact on the environment. Circular design is regarded as the engine of the circular transition, enabling manufacturing companies to reduce their environmental impact and optimize product sustainability. As much as 80% of a product's environmental footprint is determined during the design phase.

Many companies in the Jakobstad region have already adopted circular design strategies to move towards reduced waste and pollution levels. By taking a life-cycle approach by designing out waste and pollution from the outset, companies can create long-lasting products and incorporate mechanisms for reuse and recycling. Decisions made during the design process are critical in the transition to a circular economy, as they can turn theory

into action. The choices made during the design stage have a direct impact on the amount of waste and pollution generated in today's linear economy and the environmental destruction caused by resource extraction.

Design can transform not only products but also entire supply chains and business models. In a linear economy, materials follow a "take-make-use-lose" chain that has several drawbacks. This system has a negative climate impact, and the economic value is lost when a discarded product becomes waste. However, by designing products that can be easily disassembled and repaired, and by ensuring that the material components can be included in a new production chain, the material value can be kept in a closed loop – either the biosphere or the technosphere.

Key Principles of Circular Design



- Minimize the amount harmful and toxic substances.
- Minimize the number of different types of materials used in a single product. Simplification, without compromising functionality.
- Design based on a life-cycle perspective in view of repair, updates and material recovery.

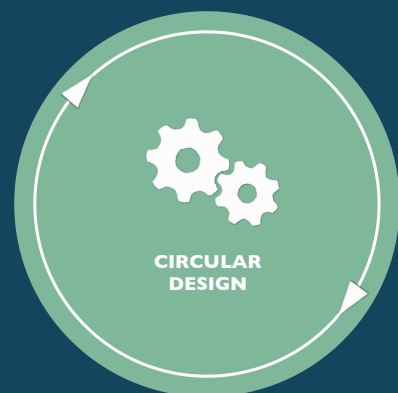


- Design for new kinds of material flows, systems and infrastructure that supports circulation services.
- Build sharing platforms to extend product lifetime.



- Shift away from the objective of "less harmful to nature" towards enriching natural systems and adding value.





Separate.

The two cycles for biological and technical materials.

Monstrous hybrids

Circular design involves avoiding the creation of monstrous hybrids, which are products that combine materials from both technological and biological cycles, making them difficult to recycle, reuse or repurpose. Some examples of such products include laminates, smart-phones, and laptops. By neglecting the life-cycle perspective during the design stage, the entire material value is lost when these products are disposed of.

IT ALL STARTS WITH
DESIGN

Biosphere.

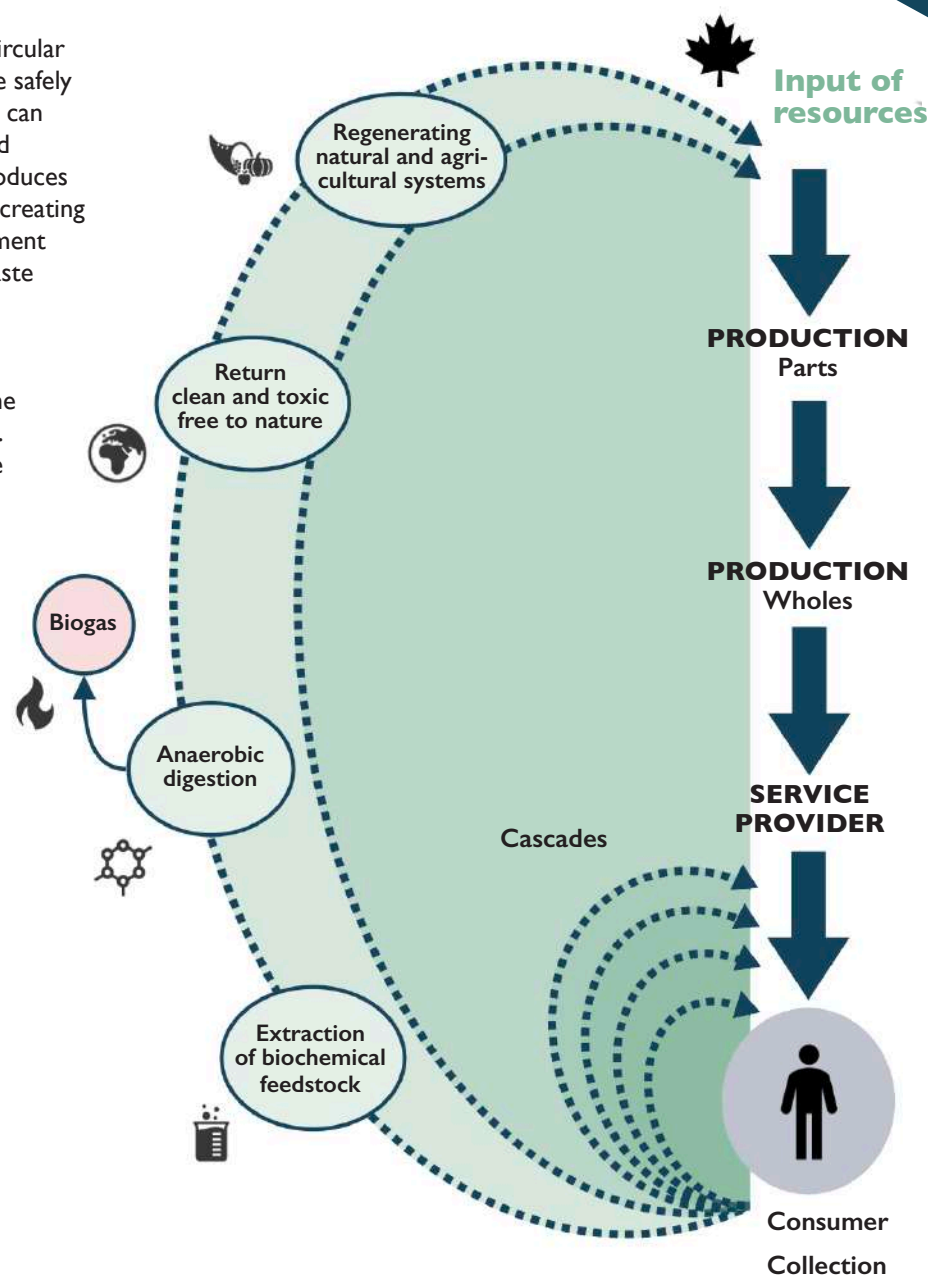
Objective: Regenerate our natural systems.

The biological cycle plays a crucial role in circular design, ensuring that biological materials are safely returned to the biosphere as nutrients that can regenerate ecosystems. This is accomplished through composting or digestion, which produces manure and biogas, among other things. By creating a cycle in which material becomes nourishment and then new material, we can minimize waste and maximize resource efficiency.

Some materials in the biological cycle, such as wood and textile fibers, can last over time and be circulated within the technical cycle. However, materials from the technical cycle cannot be circulated within the biological cycle as they are not naturally degradable.

The lifespan of biological materials can be extended through cascading, where materials are included in several products before being returned to the biosphere. An excellent example is textiles that can start as sheets, become rag rugs, padding, and finally insulation. Though, it is first best to ensure that the materials quality either is improved or remains the same before taking part in cascading processes that lower the quality of the material.

Source: Ellen MacArthur Foundation, Circular economy systems diagram (2019). Brungart & McDonough, Cradle to Cradle (C2C)



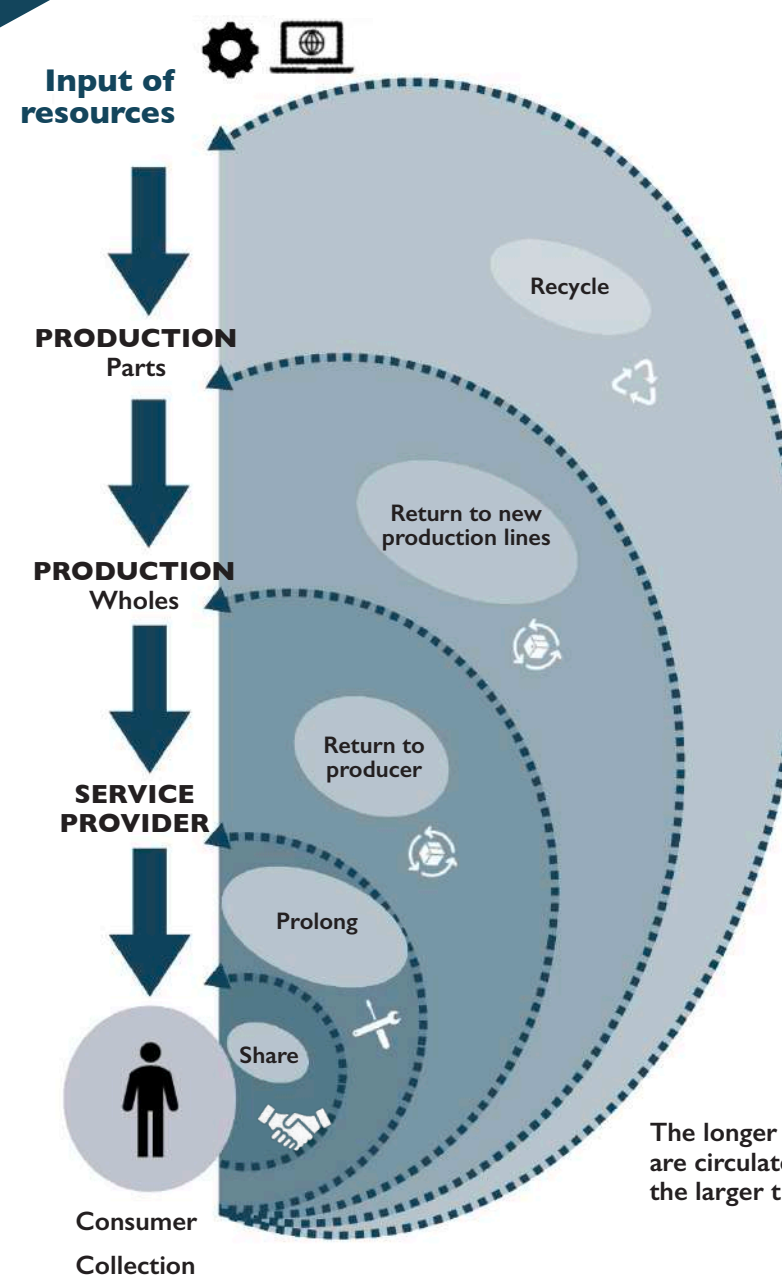
Technosphere.

Objective: Closed loops for circulation of technical materials with the highest possible retained value.

Circular design principles prioritize the engineering of materials such as metals and plastics to be reused in a closed loop with the highest possible value retention. This requires ensuring that products and materials can be shared, repaired, updated, disassembled, remanufactured, and recycled right from the design phase.

The technological cycle plays a critical role in achieving a sustainable, circular economy. By adopting circular design principles, waste and pollution can be minimized while prolonging the lifespan of technical materials in circulation.

As a result, circular design not only benefits the environment but also offers cost-effective solutions, maximizing the value of materials while minimizing waste.



The longer the materials are circulated within the loops the larger the effect will be.

Ekorosk plays a central role.

Waste management companies play a critical role in promoting new systems for material circulation due to their unique overview of different types of material flows. They possess a broad understanding of the infrastructure facilities handling residual flows and materials at the end of the value chain.

This knowledge allows waste management companies to act as a knowledge-hub between various industries and facilitate the exchange and reuse of residual flows. Furthermore, waste management companies have deep knowledge of the principles required to design products, so it's easier to take care and recycle its material at the end of the product's life.

However, it is crucial to note that waste management companies cannot solely find the right solutions to innovate value chains. Collaboration with various actors is necessary to identify solutions and the best ideas forward.

Pia Granqvist, publicist at the regional waste management company **Ekorosk**, emphasizes the importance in the producer's responsibility to ensure that material in their products can be taken care of by the end of their value chain:

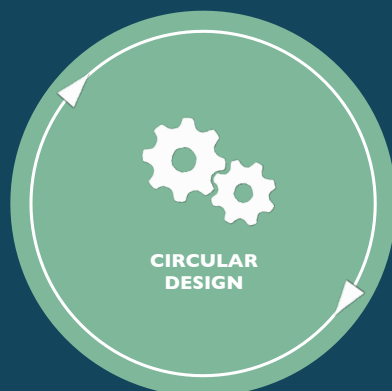
"When waste material and used products come to us at Ekorosk, the composition of the materials is decisive for our ability to use it again as raw material. For example, fiberglass,



consisting of glass fiber and plastic matrix, is currently in practice deposited in the landfill. This is because recycling still is relatively costly and involves long transports, which in the end can lead to more emissions. Here, producers can be encouraged to think further and consider the possibilities in utilizing raw material encapsulated in discarded products. In other words, already in the design and product development stage – consider how the product's combined materials can be used as raw materials when its life-cycle has come to an end."



PHOTO: AZRA ARNAUTOVIĆ



According to **PATRIK LINDGREN**, project manager of the ClusDe development project, industry cluster collaborations offer substantial benefits for circular design at the system level, as well as a platform for tangible initiatives and solutions. When professionals from an industry come together, they create an arena that expands knowledge pools, identifies, and develops solutions with common values, and fosters innovation by sharing resources and expertise. This collaboration can also lead to the development of new tech-

nologies and processes that support circular economy. Clusters can also facilitate the creation of shared infrastructure, such as waste treatment facilities or renewable energy sources, contributing to local resilience. Cluster development is an excellent way to initiate industrial symbiosis, allowing companies to reduce their dependence on virgin materials by valuing their residual flows as a valuable resource for other actors, and fostering favorable collaborations with other local actors.



The house that grows with the family.

Bohouse launched their new concept, **Bohouse Plus** in the spring of 2023. This innovative solution is focused on the future of housing, by incorporating circular economy principles. The design is based on modularity and disassembly, giving homeowners the flexibility to expand or reduce their living space based on their changing needs. This creates a sustainable and cost-effective housing solution.

Bohouse Plus is based on pre-assembled modules that can be easily assembled into the basic structure. Designing for modularity enables easy additions or removal of elements, allowing homeowners to adapt their living space to their changing needs over time. This results in a more personalized home that can be tailored to individual needs. As families grow or change, the home can be expanded or reduced accordingly, increasing its resale value, and creating interesting investment opportunities for future buyers.

To ensure the long life of the modular building and easy recycling, Bohouse carefully considered material selection and mounting solutions. The choice of material is essential for easy assembly and disassembly, as well as ensuring the elements have a lasting lifetime.

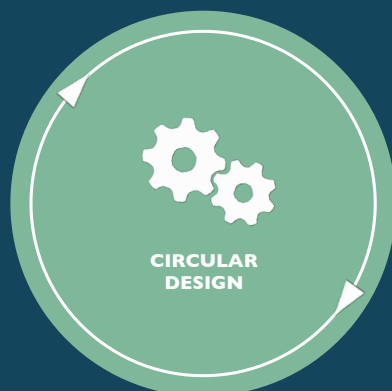
Bohouse explores circular business models to retain ownership of the material in the modular elements, allowing them to be updated and reused. The vision is for the modular elements to circulate for at least a hundred years.

Useful tips

- **Standardization:** Use standardized components to make it easier to identify, separate, and reuse components.
- **Simplification:** Reduce the complexity of the design by minimizing the number of components needed.
- **Mark components:** Label components and materials to make it easier to identify during the disassembly process, as well as for recycling purposes. Consider using a product passport to provide this information.
- **Design for repairability:** Extend the product's lifespan by using easily replaceable components, providing repair manuals and guides, and utilizing modular constructions that enable easy component replacement.



PHOTO: BOHOUSE



The concept of **DESIGN FOR DISASSEMBLY** entails creating products that facilitate their disassembly at the end of their life-cycle. By doing so, it becomes simpler and less resource-intensive to repair, recycle, or reuse them, thereby enhancing the chances of salvaging and reutilizing valuable components and materials.

DESIGN FOR MODULARITY entails creating products with interchangeable and standardized parts and components that can be effortlessly replaced or upgraded. This approach streamlines the process of repairing and upgrading products, which, in turn, prolongs their lifespan and reduces the demand for new products. Furthermore, designing for modularity makes it simpler to reuse components from various products, thereby supporting the goal of maintaining materials within a closed technological cycle and preserving their value for as long as possible.

Holistic approach to construction.

Kronqvist Bolagen is a company dedicated to extending the lifespan of the built environment. One-third of their business today involves upgrading and renovating existing buildings, and they aim to expand this further. With two stable legs – an engineering firm and a construction contracting business – the company is well-positioned to approach projects from a holistic perspective, overlooking the process from start to finish.

"We believe that everyone has a part to play in achieving sustainable change, and it's from that foundation we have set out from," says CEO **Cay Kronqvist**.

The engineering firm's expertise in analysis, planning, and optimized indoor environments, combined with the construction team's professional know-how, allows Kronqvist to experiment with new solutions and remain at the forefront of several markets.

"Often, it's a choice between demolishing or upgrading, where the environmental benefits of preserving and upgrading are enor-

mous," says **Marcus Jansson**, CEO of Kronqvist engineering firm.

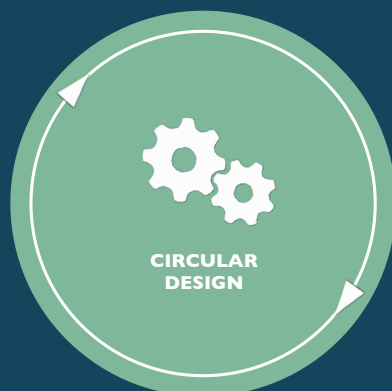
This approach keeps materials high up in the value chain, rather than ending up in landfills, while also reducing material inputs. Retaining existing structures not only benefits the environment but also preserves cultural heritage and spreads knowledge about optimizing indoor climates and adapting buildings to new needs.

Previously, harmful chemicals were used in clean-up processes, but Kronqvist now prioritizes cleaner, non-toxic, and more sustainable high-quality alternatives. By prioritizing analysis, planning, and construction work from a holistic perspective, Kronqvist Bolagen demonstrates circular thinking. They are committed to continuously learning, developing, and remaining at the forefront of the industry.

Their vision is to become a carbon neutral company with a focus on holistic energy solutions and circular planning and construction principles.



PHOTO: AZRA ARNAUTOVIĆ



DESIGN FOR AN EXTENDED LIFE-CYCLE doesn't just apply to the built environment, but to all products we encounter in our daily lives. By upgrading, renovating, sharing, and updating products, we can keep their material value within the value chain. Keeping highly functional products in circulation requires attention and knowledge on the part of the user but has significant positive environmental effects.

REPAIR CAFÉ is a solution to extend the life-cycle of your products. In the last Thursday of every month the artisan study program at the vocational school Optima in Jakobstad organizes a Repair Café open to the public, where you can bring broken or worn possessions, and gain knowledge on how to repair and refurbish them yourself. Slowing down and extending use is the most powerful action you can take as a user.



Systems approach

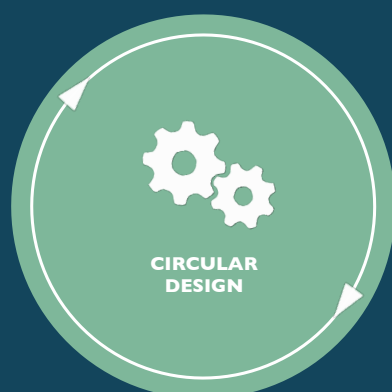
By 2035, Finland has set an ambitious goal to become a carbon neutral circular society. To achieve this goal, it is crucial to adopt a systems approach when designing for circularity, both at the internal, local, and national levels.

A systems approach entails understanding how different elements are interconnected and identifying the forces that affect the system's overall performance. This approach can help to identify opportunities for collaboration and potential synergies between industries, including different industrial clusters. Moreover, taking a systems approach can help to identify and deal in strategic and systematic way with potential barriers, that contributes to waste generation and challenges in recycling infrastructure. For example, insufficient infrastructure or lack of consumer awareness can hinder the transition towards a circular economy. Therefore, a holistic and long-term circular solution is required.

By considering a systems approach at the design stage, the possibility of achieving this is enhanced significantly. At the local level, understanding the unique characteristics and challenges of the environment is crucial for identifying and developing the right type of investments. Therefore, considering a systems approach is particularly critical at the local level. By doing so, Finland can transition to a carbon neutral circular society effectively and efficiently, contributing to a more sustainable future.



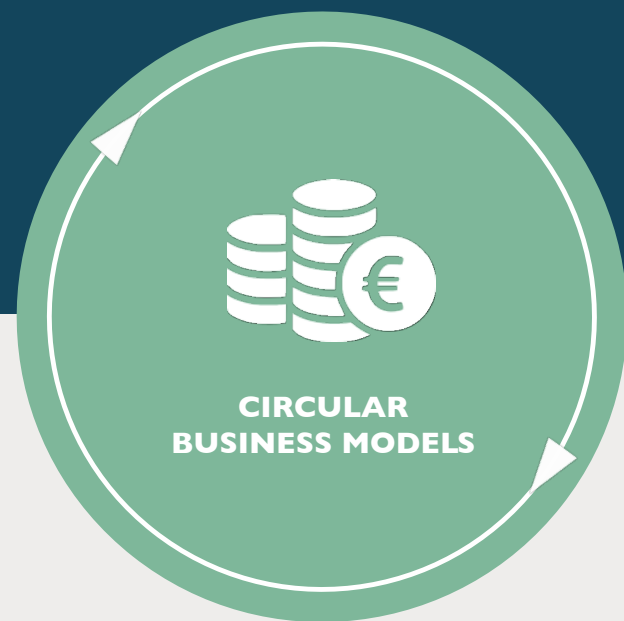
PHOTO: AZRA ARNAUTOVIĆ



"Circular design is an essential tool for achieving development and resilience in Europe's regulated and demanding market. It supports necessary innovation and presents new opportunities, positioning businesses at the forefront of the sustainable transition. Failure to invest and make necessary changes in time poses a risk of missing out on significant advantages."

IDA BRITTA PETRELIUS

Systems designer, sustainability scientist and project manager at Novia



Circular Business Models.

The business models of the future are based on us consuming less, not more. The prerequisites for sustainable business models vary between industries. Therefore, it is important to consider the needs for different solutions and models depending on which materials companies use and whether they offer products or services.

From a business perspective, circular economy can bring significant savings and new business opportunities. Smart solutions and digitalization are central parts. A circular business model also needs to be economically viable. In a linear model companies can only charge once, while in a circular model companies may have several revenue streams at different steps.

Traditional vs circular.

Circular economy means new business opportunities for the region's manufacturing industry. But what principles is the circular economy based on, what business models support circular solutions in practice, what business opportunities are there and how can you as a company identify your circular potential? A traditional business model follows a linear pattern and contributes to the "take-make-use-lose" society. This means that you extract raw materials, manufacture a product, sell it on to the consumer who uses it and then dispose of it.

This model creates waste and contributes to the consumption of the Earth's limited resources. A circular business model is designed to be regenerative, resource efficient and sustainable. It is based on the principles of circular economy, keeping materials and products in use for as long as possible to reduce waste and other negative environmental impacts. A circular business model assumes that products are designed based on the 10 R's of circular economy. It supports the use of renewable resources and strives for innovative solutions to reduce the generation of waste.

Here are some central principles:

Design for reuse

- Products should be designed to be easy to

repair, upgrade and reuse, and be produced from renewable and recyclable materials.

Extend product value

- Products remain in their original intended use for as long as possible through service, repair, remanufacturing, upgrading or repeat marketing.

Optimizing the use

- Engage in sharing economy in the form of renting, sharing, or providing products as a service. This will reduce unnecessary consumption and raw material extraction but maximize profits for higher utilization rate of goods and resources.

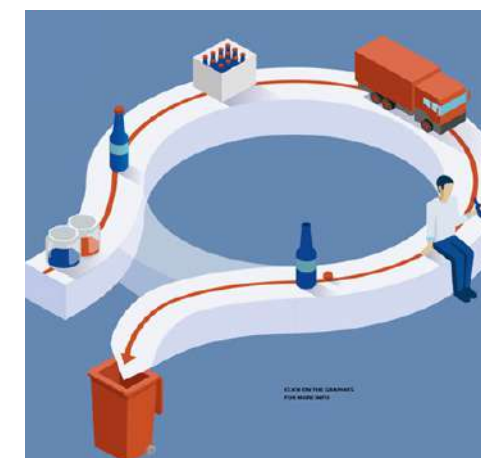
Utilize the value in residual flows and side streams

- Material and energy-efficient solutions as well as recovery and reuse of products and raw materials that have reached the end of their life-cycle. Waste becomes raw materials for the production process of new products.

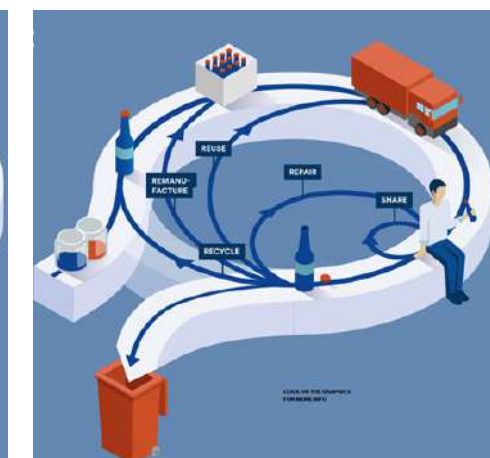
Service-oriented solutions

- Offer the value of the product in the form of a service or competence. The customer pays for the function of the product or the desired result.

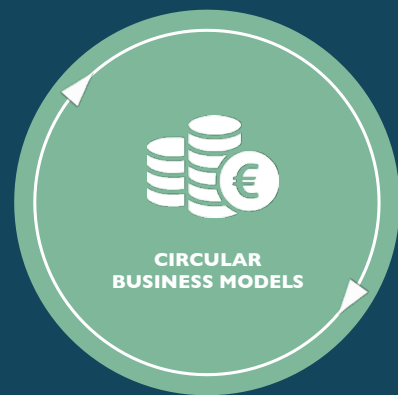
Traditional business model.



Circular business model.



Source: Eurostat: Circular economy explained visually



"Sustainability and the circular economy may sound like difficult topics for companies to tackle, but even with small, simple changes in daily operation can have a big impact and contribute to a company's competitive advantage. Pioneering companies play an important role in the transition to circular economy, by finding better and new ways to do business."

MIRA VALKJÄRVI

*Circular economy researcher, business coach
and project manager at Centria University of Applied Sciences*

CONSIDER:

- Is there reliable, transparent, and easily accessible information about the product's life-cycle available to customers?
- Can the product be maintained, reused, repaired, and disassembled?
- How should the product be handled when it is used up?
- Which materials and chemicals are used, and what kind of environmental impact do these have?

Why a circular business?

There are many advantages in circular business models, but there are also challenges that companies must overcome to succeed in the transition to a more sustainable and resource-efficient business model.

ADVANTAGES

• Business opportunities

Circular business models can offer new markets and business opportunities to companies, for example by offering services such as repair and recycling. By focusing on reducing waste and using resources more efficiently, companies can reduce their costs and increase their profit margins.

• Competitiveness and customer loyalty

Companies that adopt circular business models can increase their competitiveness by reducing costs, increasing brand value, and strengthening customer relationships by selling services and maintenance services instead of products. Companies that succeed in creating loyal customer relationships by offering high quality, good service and a sustainable profile can increase their sales and revenues.

• Resource efficiency and sustainability

Circular business models support a more efficient use of resources. In addition, savings can be made by reusing, repairing, and recycling materials and thereby reducing emissions.

CHALLENGES

• Legislation

More and more countries are introducing new legislation that promotes circular economy and sustainability. This means that it can be challenging especially for smaller businesses to stay up to date and on the cutting edge and to know what to focus on. Companies that change to circular business models, on the other hand, are better equipped to meet these regulations and minimize the risks.

• Industry-specific challenges

Some industries may have larger and specific challenges that make the transition to a circular business model more difficult.

• Consumer behavior

For circular business models to be successful, consumers also need to embrace them by demanding more sustainable products and services and higher price tags.

How to identify circular business opportunities.

A profitable circular business model requires a focus on design, efficiency, customer loyalty, long-term strategy, and regulations. By adopting a holistic view of the company's operations and focusing on sustainability and circular economy, companies can in the long run increase their competitiveness and profitability. It can also be very helpful to learn from good examples to then be able to identify new business opportunities from their business operations.

Here's how to get started:

Map

- Map existing processes and products – how do they work today and how do they affect the environment? This may include an analysis of production, material flows and waste management.

Develop a vision

- Develop a vision for a circular business model that meets the business needs, based on the results of the mapping. The vision should include short-term and long-term goals and guidelines for achieving the set goals.

Identify opportunities

- Identify opportunities to increase circularity by looking at the entire life-cycle of the products. This can be to reduce material use, increase recycling and promote repair and reuse.

Evaluate

- Evaluate different business models to see which are best suited for the business. Business models that focus on services and sharing of resources, such as leasing, buyback, and reuse, may be suitable to increase circularity and maintain the value of the product.

Implement and follow up

- Implement the chosen business model and follow up the result. This may mean introducing new processes, training staff, and cooperating with new actors in the value chain.

• Read more:

www.circulardesignguide.com

CASE VONMÖÖPELI

Old furniture gets a new life.

Malin Timmerbacka and Theresa Särs-Jebali have been running the joint company **Vonmööpel** since autumn 2022. The idea for the company was born out of their common interest in old furniture, restoration, and recycling. Malin and Theresa's areas of expertise complement each other well. Malin works with content production in the company **Krearte**, while Theresa has extensive experience in the technical and practical aspects of restoration via her company **Hemfix**.

The common driving force lies in the fact that both were tired of the trend of "fast furniture" and the lack of colorful personal furniture. A large quantity of furniture on the market resembles the homes found in interior design magazines, usually in different shades of gray. They saw a potential in working with old furniture, which is the need of renovation to get a new life and to be able to become a personal and unique interior detail for the customer.

At Vonmööpel, you can also get help in finding unique furniture that is exactly what you are looking for. Vonmööpel's business is mainly about refurbishing used furniture to be as good as new in condition and then selling them on their webshop. Everything is based on reusing and updating the quality of the furniture. The materials used are always chosen with an environmental perspective in mind. The company also produces its own products with the same values – products designed

from pure materials in a manner that restoration is possible. Environmentally friendly alternatives are also being tested for transport, such as services that connects people who need transport assistance with people who travel by car and have extra space in their vehicle in the Ostrobothnia region.

Malin and Theresa say that the interest in refurbished furniture is increasing, above all among an increasingly younger clientele, and probably thanks to the increasing awareness of sustainability. They still hope for a change in attitude among consumers when it comes to buying used furniture. A used piece of furniture is usually expected to be cheaper than a new one, but the fact is that these often have a significantly longer life-cycle than modern furniture and can therefore be seen as an investment. Thanks to solid materials and constructions, the furniture can be restored several times over. This also provides new business models, such as leasing furniture to make it available to a wider clientele and at a more affordable price. This can also enable consumers to be more creative in their interior design and style in the home, without investing in new furniture each time. Another solution that could be attractive and save both time and money, especially for people who live in varying locations for short periods of time either for work or studies, is the possibility of leasing a ready-made interior solution.



PHOTO: KAROLINA ISAKSSON



PHOTO: MALIN TIMMERBACKA

WHAT DO WE LEARN FROM THIS?

1. Utilize the products that already are in circulation and build a circular business model around these.
2. Think long-term and prioritize high quality materials which have potential for circulation.

"There is a lot of old furniture that deserves to be renovated, even if they are not designer furniture."

THERESA SÄRS-JEBALI
Vonmööpel

CASE BYGGSTAFF

Flexible modules in the construction industry.

The construction company **ByggStaff** in Nykarleby, has invested in new and larger facilities for their business. This has also led entrepreneurs **Tobias Wik** and **Nikolai Juselius** to realize an idea that has been dormant in their minds for a long time – modules that are adapted to the customer's needs. The modules are easy to move and can thus meet the needs of several different customers at different stages.

The constructions can be seen as a complement to existing buildings, for example if you need more space in the form of a guest house or temporary accommodation during a construction process. There are many advantages to building complete modules or buildings indoors. Indoor production is a cost-effective method, which saves work time, travel time and transport distances. Materials are protected from weather conditions during the construction process, and, in addition, the workers can be guaranteed a uniform working environment. Having extra space that allows projects like this is also a way to maximize unused square footage, which is also a cost.

All this enables having affordable prices for the end customers. Modules that are designed to be moved after they are completed also enables relocation possibilities when they no longer fulfill their original purpose. The modules are usually placed on plinths and



therefore require less preliminary work and less work while being relocated. For a circular business model to be beneficial and profitable for a company choosing to adopt a modular thinking, clear contracts between producers and consumers are needed. In addition, systems that provide the solutions required for the construction industry to operate according to the principles of circular economy, are also needed.

Such solutions reveal possibilities for new business opportunities in services, both between producer and consumer and vice versa, in the form of short- and long-term rentals.



PHOTO: AZRA ARNAUTOVIĆ



WHAT DO WE LEARN FROM THIS?

1. Be responsive and adapt your products to the changing market.
2. Review what opportunities your premises offer, perhaps there is room to develop new projects that can result in resource efficiency?

"We see potential in these solutions, for example at campsites or other places where flexibility is needed."

NIKOLAI JUSELIUS
ByggStaff

CASE MMI COMPANY

3D printed molds.

Brothers Håkan and Daniel Sundelin at MMI Company came to the conclusion that they must be doing something wrong, when they produced their molds for composite manufacturing.

But first a little background: to be able to manufacture boats or other details from glass fiber or carbon fiber, you need a mold to cast it in. The starting point is a full-scale three-dimensional model of what you want to manufacture – a mold. The mold is used to make a mockup for the lamination. The material can be plywood, polystyrene or similar. Industrially, molds are manufactured from polystyrene which is milled and coated. The finish of the mold is important because the surface of the mold will be an exact replica of the mold and any flaws will be visible in the finished part. This is a time-consuming but costly process that also requires some hands-on work.

Customers also request to have their molds stored to be able to make more components at a later stage. The molds are large and often consist of wooden components, which means they cannot be stored outdoors. This in turn leads to a lack of space and unnecessary storage costs for molds that may not even be used multiple times.

The Sundelin brothers saw a video with a 3D printer that caught their attention. This,

combined with a conversation held with a researcher from Centria University of Applied Sciences, made them delve deeper into what 3D printing could bring to their business and to mold manufacturing. Large-scale 3D printing means that, with the help of an extruder, you apply for example, molten plastic in many layers to achieve the desired shape. The extruder can be mounted on a robotic arm which is then programmed to follow a digital 3D model. This means freedom of form in production and the possibility to easily produce organic forms.

At MMI Company, we are convinced that this technology will facilitate the manufacture of molds because it gives the designer an opportunity to quickly make changes to the model, which means that the process from the drawing board to mold will be faster and require less manual work. If you use plastic, it also enables you to re-granulate the material in the mold and use it again and again. Such innovations enable completely new business models. Earlier one had to lock in costs of a non-reusable part, the opportunity is now given to charge for work done in a different way that can reduce material costs for the final product. This also means that you don't have to store the molds in the same way as before.



PHOTO: MMI COMPANY



WHAT DO WE LEARN FROM THIS?

1. Be curious and dare to question your own production methods.
2. Seek support, for example, from regional universities or other actors who can provide funding or skills development for new projects. They may possess the very knowledge you didn't even know you lacked.

“This method allows us to grind down the mold and 3D-print the same material in a completely new purpose over and over again.”

HÅKAN SUNDELIN
MMI Company





Meetings and material exchanges

During Sustainability Week in September 2022 the DeCiDe and CIT projects arranged an inspirational breakfast with change activist **Isabelle McAllister**. During the morning the idea of a "spillpool trip" (in Swedish), was born, where companies can share different types of side streams they possess.

As the first step, we organized a bus trip in the beginning of December to visit different companies with different types of waste. Participants of this trip consisted of an exciting mix of representatives of the region's manufacturing companies, creators and developers. The participants could dig, feel, vision, and think about what could be done with the leftover resources.

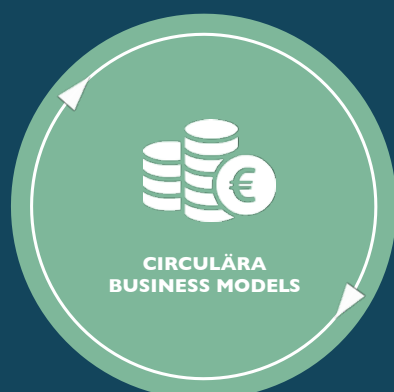
The participating companies were **Fluid-Bag, Brisa, After Eight, Elsa Möbel** and **Essma**. The common conclusion afterwards was clear – this we should do more often.

"It was inspiring to see how the creativity and the ideas flowed, says **Malin Fleen**, who together with **Tomas Knuts** worked as tour guides and facilitators during the day.

The spillpool-trip has also opened possibilities for new collaborations among companies that did not participate in this trip. There is thus an interest in regional material collaborations and exchanges of side streams.

• Read more about the CIT project and the circular economy roadmap: *Ostrobothnia in Transition*

PHOTO: AZRA ARNAUTOVIĆ



WHAT DO WE LEARN FROM THIS?

1. It can be uncomfortable to deal with questions concerning how the business operates. But there is always something worthwhile that you can take to heart.
2. Discuss waste and side streams with other companies in your region. Perhaps they have waste that you can utilize? This can lead to completely new circular business opportunities.
3. Visit each other, even without a fixed agenda. One visit over a cup of coffee can lead to new ideas and collaboration opportunities.

"In today's linear society, many products are designed in such a way that they are difficult to repair, which leads to difficult-to-handle waste and thus many lost business opportunities. In a circular way of thinking, one strives to extend a product's life-cycle through reuse, repair or sharing services, but also by making use of residual materials and waste in new production processes."

MALIN FLEEN

Designer, cabinet maker and project manager at Concordia



Sustainable Product Development.

Companies within the manufacturing fields and especially product development will have to figure out new requirements for their products. These include how to increase their performance and efficiency within production, how the products can be maintained and repaired, how the different parts can be recycled at the end of their life-cycle and how the life-cycle can be extended with updates, components and softwares.

Choices regarding materials play a central role in the transition towards circular economy. The digital product passport, designed by the EU, is a significant leap towards the manufacturing of sustainable products. The aim of the passport is to digitalize all the information of any given product, that can be easily accessed through a data provider (e.g., barcode, QR code). The goal of the product passport is to offer consumers information about their products, especially regarding repair, recycling, and material origins. The passport could also include other useful data, such as carbon footprint calculations.

CASE REDUCE YOUR CARBON FOOTPRINT

Get a sense of the emissions.

Our example company **Jeppo Potatis** chose the GHG protocol as the starting point for understanding their emissions. Jepuan Peruna Oy wanted to create a clear process on how to collect data for the carbon footprint calculations, that could be monitored monthly. Quite often companies in the manufacturing field may have to forward information about their carbon emissions to their customers or other partners within their supply chain. Monthly monitoring of the required data gives

a company a better idea of their own emissions sources and what measures they can take to reduce their carbon footprint.

According to GHG protocol, emissions are divided into three categories based on the emissions source. Generally, carbon footprint calculations do not consider other factors related to environmental impact, but gives a relatively broad picture of a company's production, products, procured goods, transportation and levels of greenhouse gas emissions.



"Potatoes as a raw material are an excellent and climate-friendly choice on the dining table. Our partners require us to report our carbon footprint, but we don't have the resources to find out the differences between the various calculation methods. We ourselves also want to monthly monitor our emissions data."

MINNA ALLONEN
Quality manager, Jeppo Potatis



How to calculate

your carbon footprint according to the GHG protocol.

There is an increasing demand from customers, investors, and other stakeholders for detailed information about organizations emissions. Emissions calculations, specifically carbon footprint calculations, begin with mapping out the different activities of the company. There is a variety of methods, calculations software's and emissions factors to consider. It is essential for a company to define which method or guidelines they will follow in the calculations, to be able to set accurate goals and measurement practices. In this guide we present one of the commonly used methods, the **GHG protocol** (Greenhouse gas protocol), which divides emissions into 3 scopes.

Where should we start?

After mapping out activities create an overview of the activities we wish to monitor and then match them with their appropriate scope, outlined on the following page.

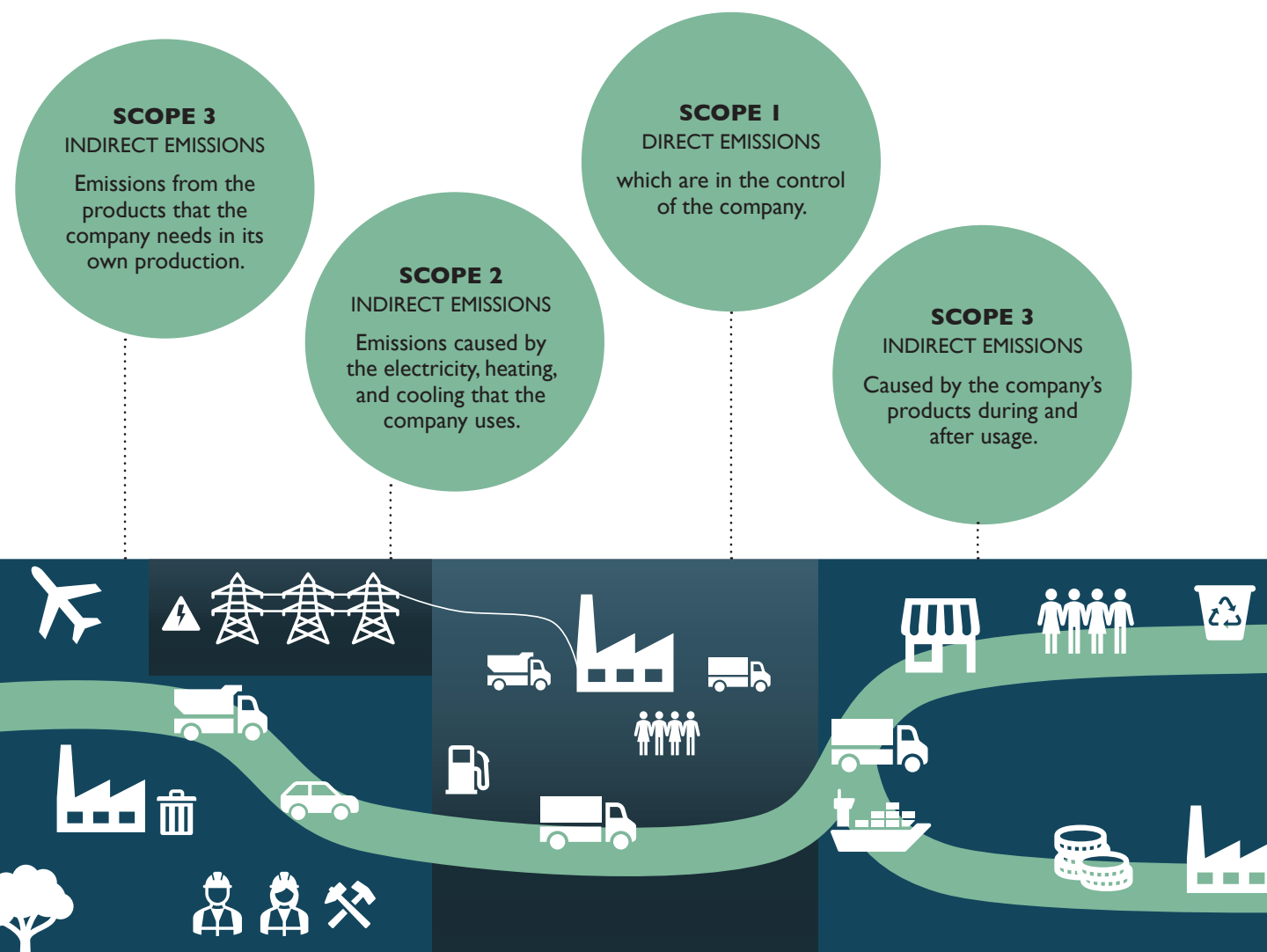
Scope 3 is the largest and most challenging scope to map out, but its best to define clearly which activities influence your company the most and target them.

On the data collection form, created alongside this guide, you will find both emissions factors to be considered and calculations formulas. Note that the emissions factors need to be updated annually from reliable sources.

- **Read more about the different models:**

Energiankulutuksesta aiheutuvien kasvihuonekaasupäästöjen raportointi

Greenhouse gas emissions scope's



SCOPE I



- Emissions of greenhouse gases that are generated directly as a result of the company's operations.
- Combustion of fuels in own fixed devices, such as heaters and incinerators.
- Use of fuels in own mobile vehicles, for example forklifts and other vehicles.
- Emissions created during production, for example the calcination phase in the production of concrete.
- Fugitive emissions, for example refrigerant leaks.

SCOPE 2



- Greenhouse gas emissions that are created due to the electricity produced, heating, and cooling that the company uses.
- The electricity that is produced elsewhere and bought for the company's use.

SCOPE 3



Greenhouse gas emissions that include all indirect emissions that are a result of the company's operations, with exceptions for emissions already reported in scope 2. This includes upstream emissions, i.e., emissions which are generated in the production of products that the company needs in its own production:

- Purchased products and services
- Investments
- Fuel production and energy transfers
- Transport and distribution
- Waste
- Commuting
- Business trips
- Leased property
- Investments
- Licensing activities

In addition, downstream emissions caused by the products that the company produces when the products are resold and when they are taken out of use:

- Transport and distribution
- Processing of sold products
- Use of sold products and services
- Liquidation of sold products
- Rented out property

Questions for data collection:

- Do we own equipment that uses fuel?
- Do we own vehicles that use fuel?
- Does our production process create carbon dioxide?
- Do we use equipment that may leak or cause emissions during its use?

Questions for data collection:

- What kind of electricity contract do we have and how is the electricity produced?
- Do we buy heating or cooling produced by other means than electricity?
- Do we buy other commodities, like steam or compressed air?

Questions for data collection:

- What does the supply chains look like (from cradle to grave principle)?
- What scope 3 emission does our company have?
- Can we ask for more information from parties within our supply chain?

Source: *The Greenhouse Gas Protocol*

CASE REUSE OF COMPOSITE MATERIALS

High material awareness.

The Jakobstad region has a longstanding history and expertise within boat manufacturing. Specifically experience in material knowledge of carbon fibers and composite materials. The focus within the industry and among researchers has been to replace fossil raw materials with renewable or recycled materials.

This guide provides a look into the current situation of carbon fiber and composite

recycling on a global level. The following pages illustrate first the structure of composite materials and then the current recycling methods available.

Composite is a compound material, where two or more of the materials have differing properties separately but together form structural material with new, generally improved properties.



FOTO: AZRA ARNAUTOVIĆ

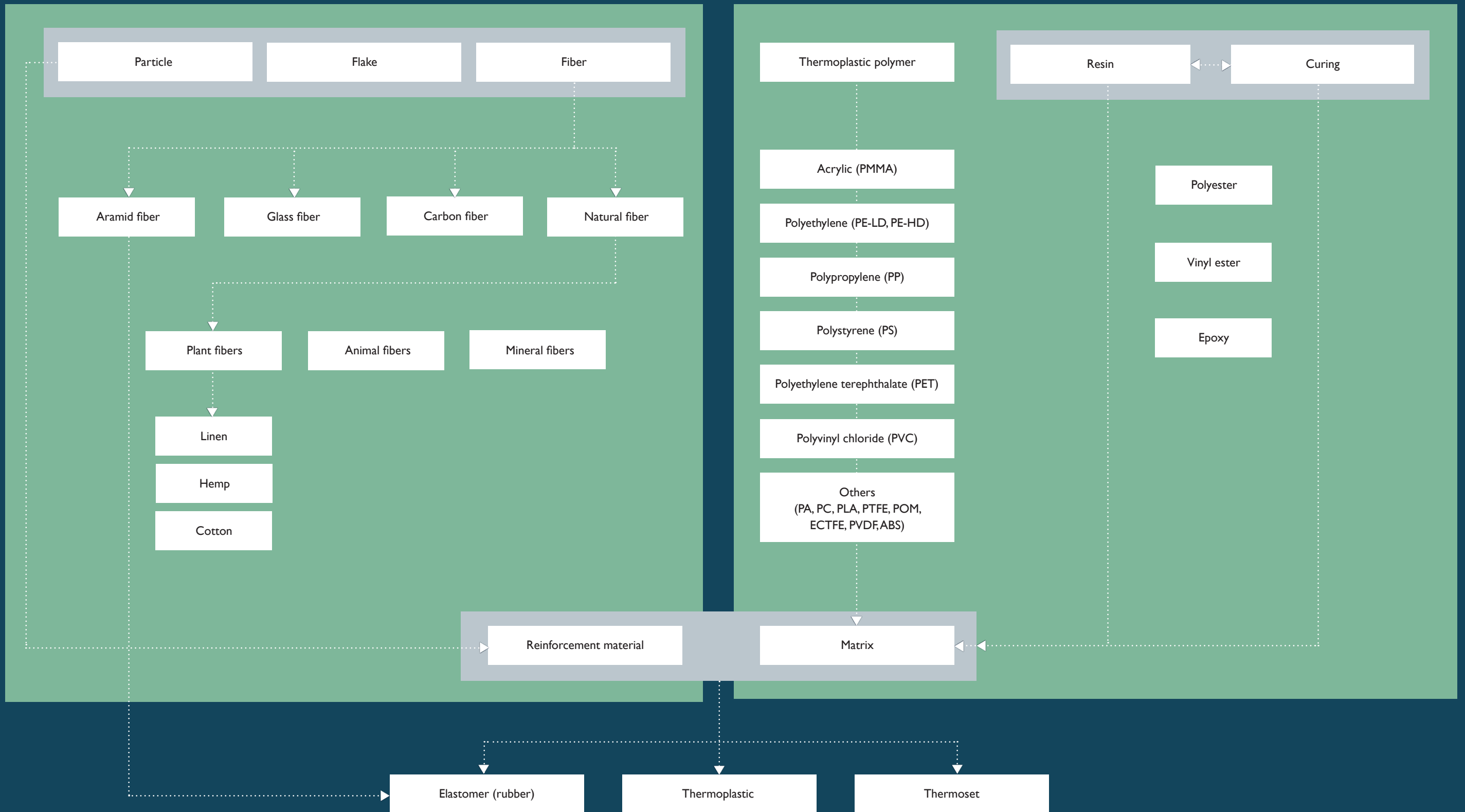


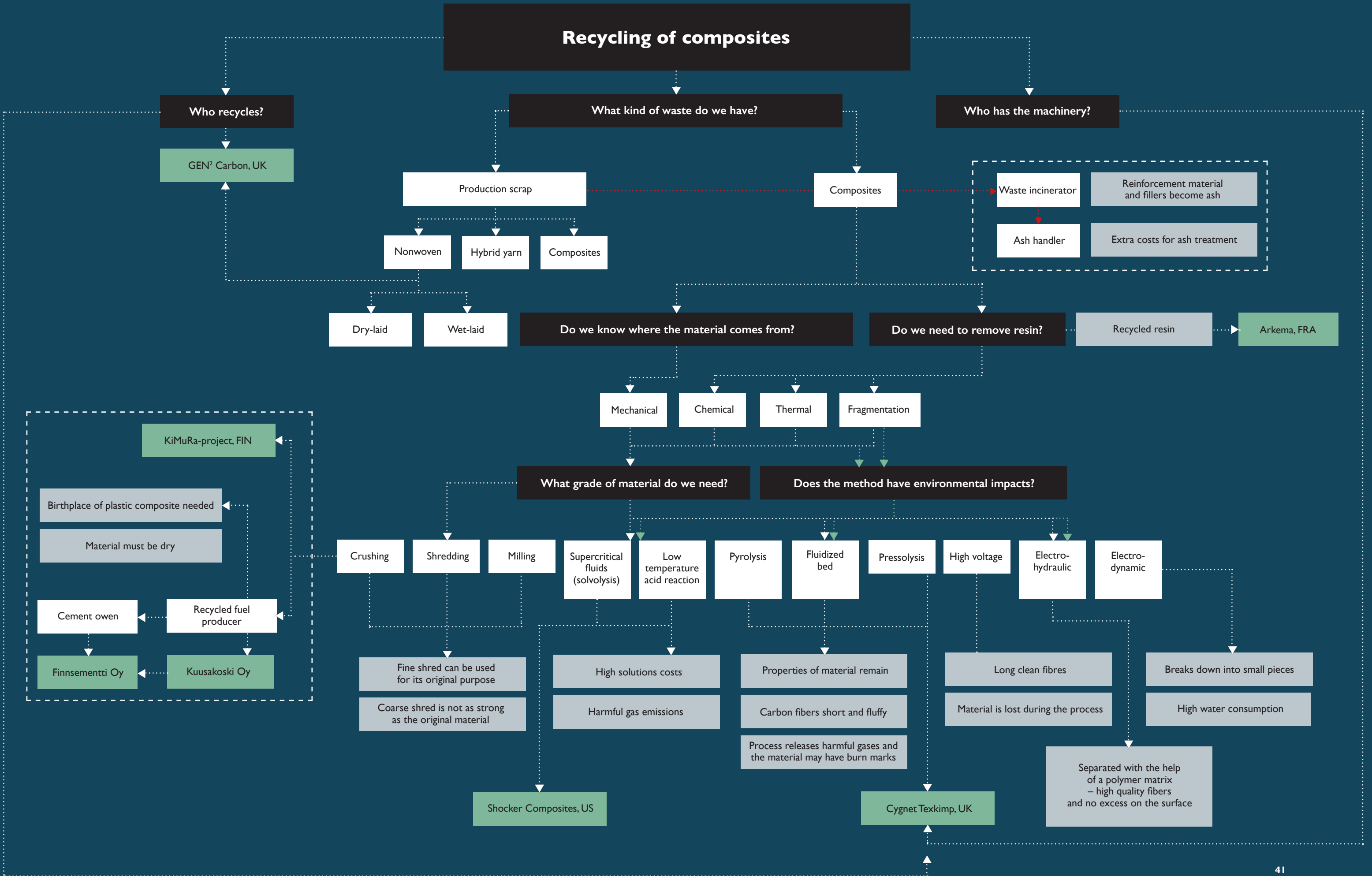
"Sustainability and circular economy are important to us. For some time, we have been interested in finding out the status on recycling of carbon fiber and composite materials in our country and in the world. How far have we come, in which sectors and what does this mean for us? However, we at Baltic Yachts did not have the resources for this evaluation, so the help from the project came at just the right time."

PAMELA HONGA
Quality and Sustainability Manager, Baltic Yachts



The structure of composites





CASE RECYCLING OF WORK CLOTHES

Where does old workwear end up?

The new waste regulation regarding textiles requires companies and municipalities to efficiently recover and recycle textile waste.

Municipalities must organize collection points for textile waste created by consumers, as well as handling and recycling of the waste. Companies are responsible for the textile waste they create. In the Jakobstad region, clean and dry household textiles are accepted by Ekorosk. There are no requirements for weekly collection of textiles, thus it is collected when possible.

Our goal:

To extend the life-cycle of clothing

In many industries, there are special requirements for work clothing in terms of functionality and safety – Protective Clothing Standards. Recent years have also seen a rise in attention to comfort of use, as users of work clothes wear them more than any other garment. We can reduce the need for using new virgin materials by extending the life-cycle of existing work clothes. Finnish workwear producers have been keen in developing services that offer a type of rental service which will cover the maintenance, repair, and recycling of the clothing after use.

Producers have also started to pay atten-

tion to the materials they use, in some cases certified or recycled materials are required to be used. Based on textile projects in Finland we can find that the most recycled material is mixed materials, particularly the blend of cotton and polyester. There is a large variety of materials but also suitable recycling methods. For example, cotton can be recycled either in a mechanical or chemical process, while polyester can be also recycled in a thermal process.

In Finland, there are currently two companies that transform textiles into fibers: Rester and Dafecor. The goal is that more and more recycled fiber will be used instead of new textile fiber.

The case company involved in the project purchases their own work clothes, which are tailored to their needs. They use a local laundry service, to clean the clothing and have an inhouse team that maintains the clothing otherwise, e.g., a seamstress that repairs damaged clothing. The maintenance team also assess the quality of the clothing and whether they can still be safely used. Despite the intense usage and washing of the clothing, several pieces have lasted up to five years or longer. For reference, jackets and pants used are changed daily after each shift.

Sources: VTT: Tekstilimateriaalien soveltuvuus kierrätykseen and Suomen Tekstiili & Muoti



PHOTO: SNELLMANS KÖTTFÖRÄDLING



EU's WASTE HIERARCHY

1. Prevent the creation of waste.
2. Reuse materials and side streams.
3. Recycle materials that have no other use.
4. Recover materials for reuse or energy production.
5. Disposal when no other option is available.

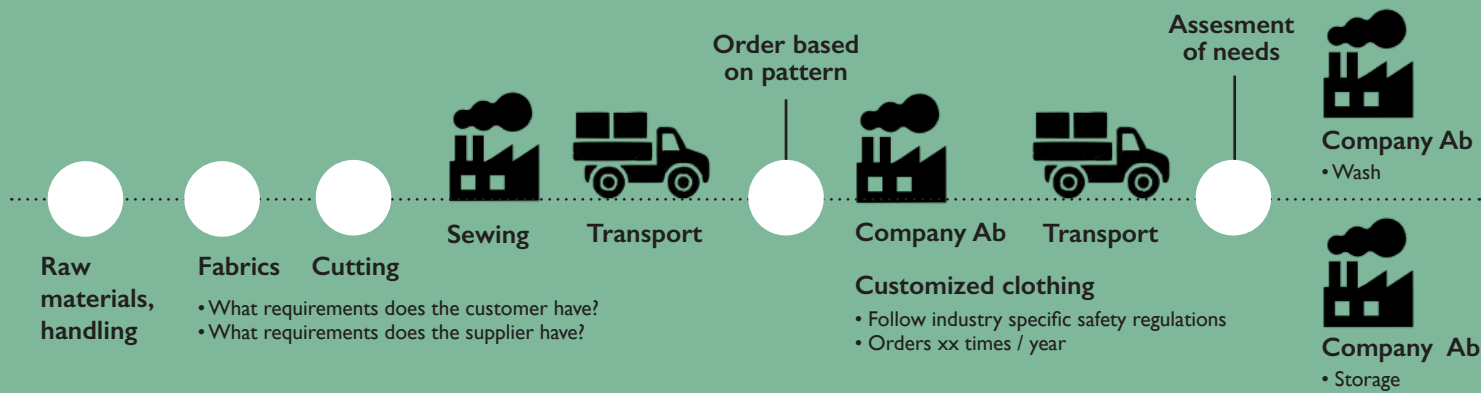
"We are particularly interested in the life-cycle of work clothes after we have found them to be unusable. What happens to them, and which option is the most sustainable? Is there anything that should be considered in the purchase and use processes to make the whole life-cycle more sustainable? It would be good to have a model for this, which we also can use for other textiles and footwear, as well as for life-cycle assessments."

EEVA HEIKKILÄ

Head of sustainability, Snellmans Köttförädling



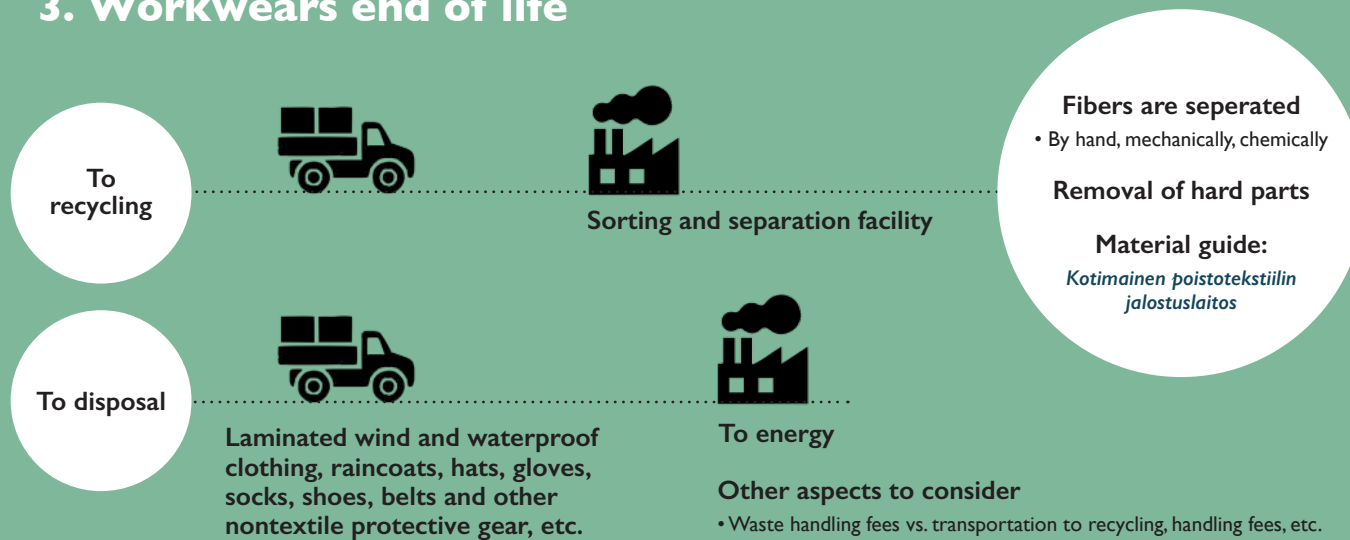
1. Procurement of workwear



2. The life-cycle of workwear



3. Workwears end of life



COMPANIES – WORK-WEAR AS A SERVICE

- Touchpoint
- Lindstrom Group
- Clewor
- Image Wear

COMPANIES THAT RECYCLE WASTE TEXTILES

- Rester – Helping the world recover
- Fiber by fiber
- Dafecor

PHOTO: PIXABAY



PROJECT PARTNERS

The Jakobstad Regions Development Company Concordia
Centria University of Applied Sciences
Novia University of Applied Sciences

FUNDED BY

Regional Council of Ostrobothnia
European Regional Development Fund