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**GATEWAY TO A
CIRCULAR ECONOMY**

A GUIDELINE FOR THE TEXTILE INDUSTRY

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Intention of the guideline

- ✓ Create a basic understanding of the circular economy
- ✓ Identify potentials for implementation
- ✓ Effectively integrate circular actions



Circular Economy...

- is a global economic model that gradually **decouples economic growth** and development from the consumption of **limited resources**.
- distinguishes between **biological** (biodegradable) and **technical** (non-biologically degradable) **materials**, and keeps them separate.
- concentrates on the **effective design and use of materials** to optimise their flow and maintain or enable regeneration of the existing stock of technical and natural resources.
- offers **new opportunities for innovation** in areas such as product design, service and new business models. [1]

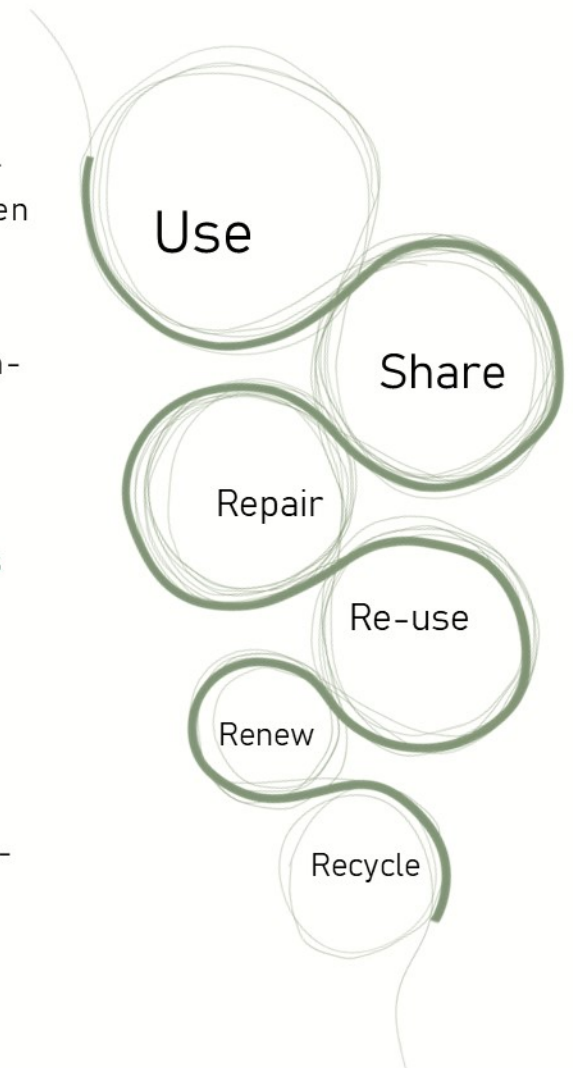
CIRCULAR ECONOMY IN THE TEXTILE INDUSTRY

In our current linear economic system, raw materials are procured, processed and transformed into a product, the product is consumed and finally disposed of. **The majority of waste in this system is not recyclable.** Consumed products end up in landfills or in natural ecosystems. Due to a lack of space in landfills, the products are often combusted. Released emissions pollute people and nature.[2]

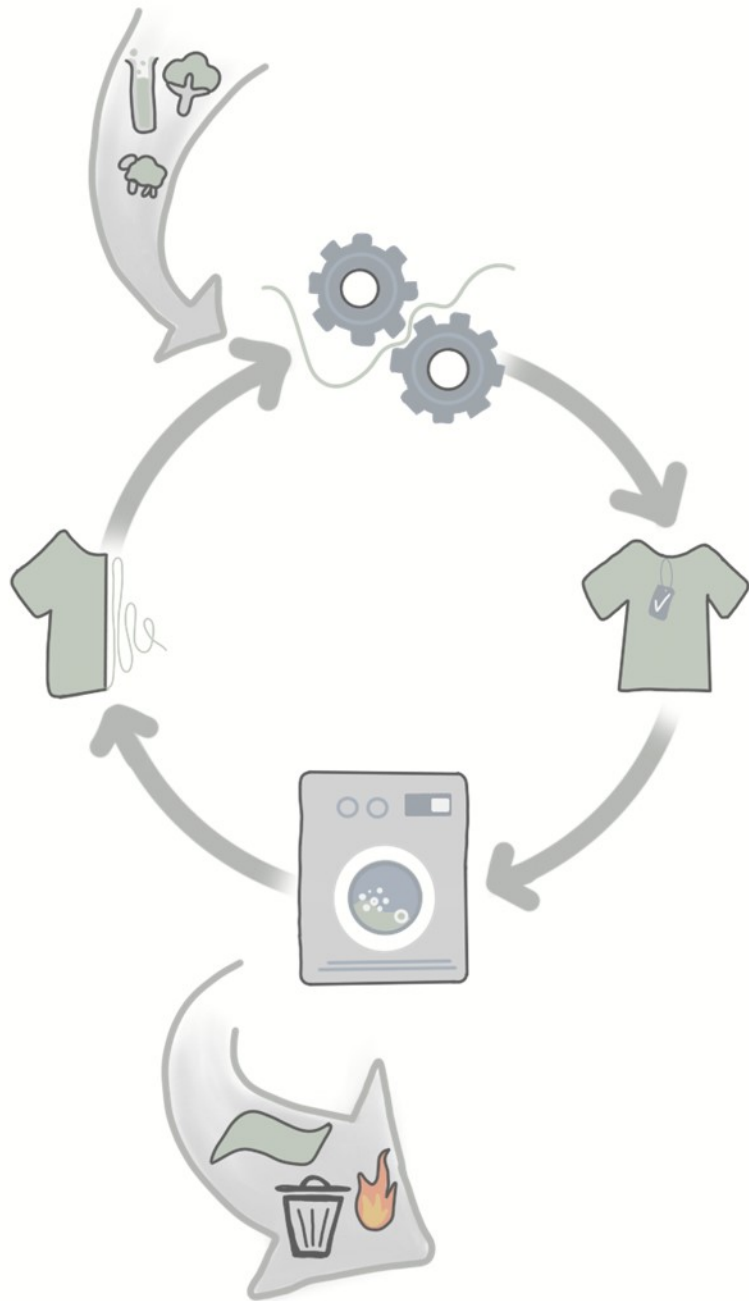
In the circular economy model, **no new raw materials are added** to the existing cycle, but the existing ones are reused. According to the '**Cradle to Cradle**' principle, raw materials at the end of a life cycle can be used for the beginning of a new one. It is also possible to rotate raw materials within a cycle, this principle is called '**inner product loop**'.

The fast changes in the textile industry lead not only to the **waste of textile resources** (fibres, yarns, fabrics) but also to the waste of production resources (labour, water, energy, etc.). Greenhouse gases, soil degradation, air and water pollution and loss of biodiversity are examples of the **negative environmental impact**. [3]

Circular economy brings many advantages over the linear economic model. Circular economy reduces waste and pollution, brings products and materials into cycling resource flows and enables natural regeneration, creating benefits for society, the environment and the economy. [3]



Pic.1: inner product loops



The development of recyclable textiles promises great potential for reducing the negative environmental impacts of textile production. [4]

The supply of primary raw materials and the loss of value through downcycling and combustion of raw materials should be kept to a minimum in the spirit of the circular economy.

Pic. 2: textile circular economy

Isn't recycling already taking place?

Used textiles are **already recycled mechanically in a big scale**. These are colour sorted and torn into fibres. The fibres are shortened and damaged during the process. This degrades their properties, functionality as well as quality, which makes it necessary to add native fibres. If a higher material purity of the used textiles is achieved, a basis for recycled material with a higher quality is created.

The use of material such as rPET from PET bottles does not serve to promote a circular economy in the textile industry, as raw materials from outside the industry are integrated into textile cycles. Only the prioritisation of **fibre-to-fibre recycling** creates a closed loop within the textile industry. [5]

In contrast to mechanical recycling, **chemical recycling** enables the production of recycled fibres with (near) virgin quality. There are several innovative approaches to fibre-to-fibre recycling for both synthetic and natural fibres. In all processes, **the use of chemicals, energy consumption and the CO2 footprint have to be taken into account**.

Overall, textile recycling is **not yet taking place on a sufficient scale**. For a functioning circular economy, adjustments and innovations are needed both for the recycling processes and for the textile material supply.

Circular economy is a **complex and holistic concept**. This guideline helps to adapt different perspectives and transform them into practical solutions. Our focus is on the design of **future circular products**.

The development of circular products starts with

– CIRCULAR DESIGN

CIRCULAR DESIGN



Definition:

Circular design includes the processes and product development to realise a circular economy. The closing of loops is at the centre of this.

Benefits:

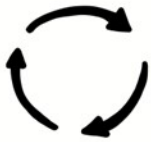
- Extension of the use phase
- Reduction of costs in relation to the period of use
- Reduction of environmental impact
- Saving natural resources
- Integration of future-proof processes

In the guideline, we will primarily focus on the following three design strategies:



DURABILITY

- Maximizing the period of use
- Durability can be achieved through the material texture or emotional durability of the product



RECYCLABILITY

- Consideration of the recyclability of a product and the Product components
- Includes collection and separation of individual raw materials



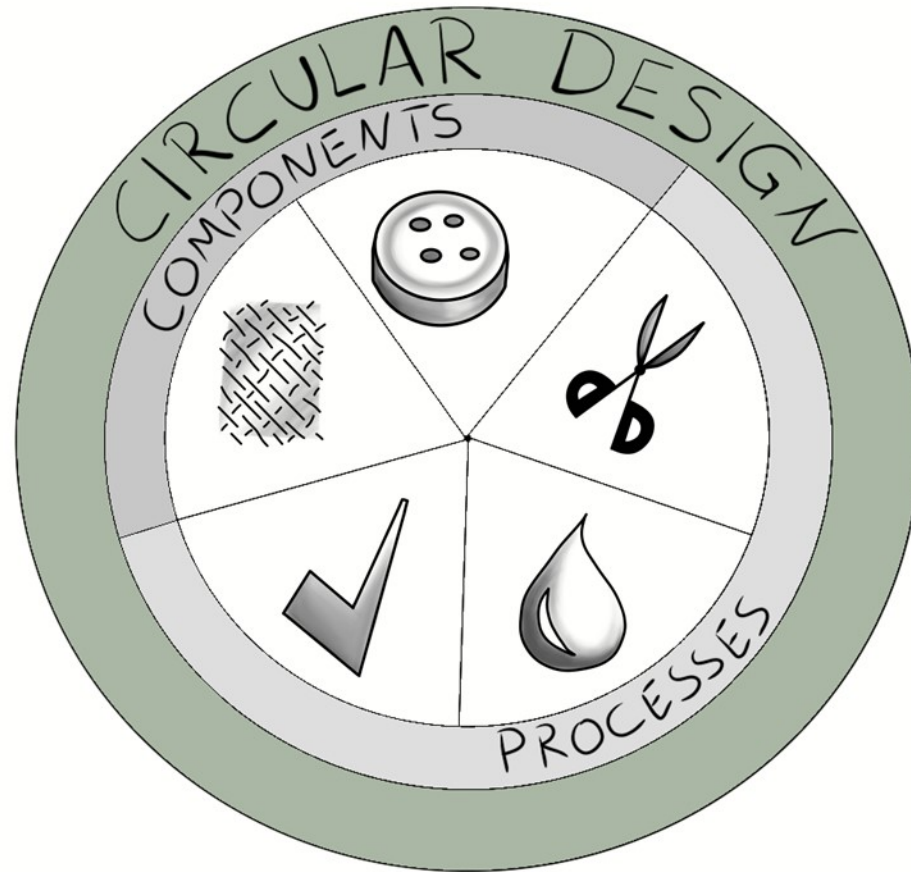
REDUCED ENVIRONMENTAL IMPACT

- Striving for the lowest environmental impact over the entire life cycle of a product

Why exactly these three strategies?

With the help of these design strategies, with little effort an impact can already be achieved. The new EU strategy for sustainable and circular textiles (communicated on 30.03.2022) also focuses on circular design. Topics such as durability, recyclability and environmental impact, among others, are already being discussed by the European Commission and will shape the future of the textile industry. The visions that have been stated are to be achieved already in 2030. [7]

Circular design goes beyond the mere looks of a product. In the following five areas, the circularity of a product can be positively influenced by design decisions. The weighting of the individual areas is quite unique and can vary according to preference and applicability to the product.



Pic. 3: Circular Design



PRODUCT DEVELOPMENT

How to develop circular products?

One way to influence circular design is through **product development**. Even with small product adjustments, far-reaching changes can be created.

Improved product stability

Design-related shortcomings can be prevented in the development process. A close exchange between production and development supports this.



Enhanced repairability

Possibilities can be created to exchange or replace the components in order to maintain the value of the product.

Emotional durability

Products with different use options, that are timeless, rare and have a history, encourage longer use.



The product is kept longer in a life cycle and this enables inner product loops.

PRODUCT DEVELOPMENT



Components from similar fibres

Recyclability is improved when textile components have the same fibre composition.



Easily detachable elements

Avoiding elements that are permanently connected (e.g. by adhesive bonding or laminating) enhances the separability and thus the recycling process



Increasing recyclable products and economic circularity

Avoid waste and residual materials

Textile waste can be minimised by making the best possible use of materials in cutting or optimising pattern design. This is supported by new technologies, digitalisation and zero-waste design software.

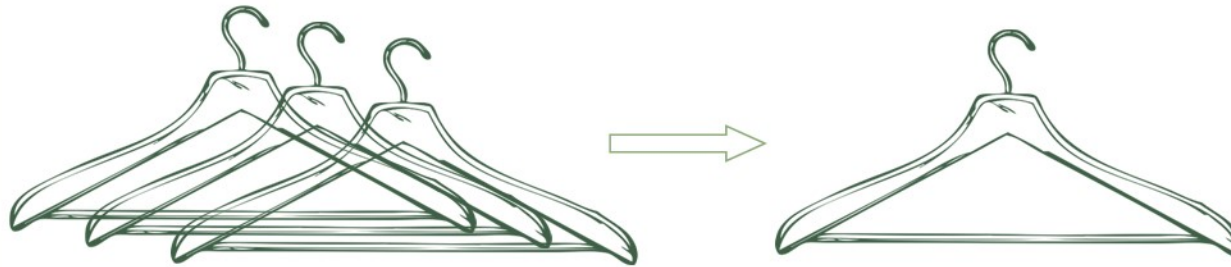


Prevent overproduction

A demand-oriented use of resources leads to the reduction of overproduction and restants. This is supported by stable supply chains and innovative technologies that improve communication channels.



Efficient use of resources and preventing overproduction



The **purpose** of the circular economy is to **reduce the amount of textiles that end up in the production cycle**. Some of the selected practical examples involve either modest effort with immediate achievability, medium effort with mid-term achievability, or ambitious effort with long-term achievability. The implementation of actions to promote circularity should be considered individually according to the product, the possibility of realisation and the timeframe for execution.

Sum-Up

- Durable products
- Products with advanced use and adaptability
- Design for recyclability
- Innovative technologies and digitalization

IMPRESSUM



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