Partnership for Sustainable Textiles

Circular Economy Glossary

Waste hierarchy

Waste hierarchy as set out in the German Circular Economy Act (Kreislaufwirtschaftsgesetz, KrWG)

Measures for preventing and managing waste are prioritised as follows (see Section 6 (1) KrWG):

1. Prevention

Prevention is any measure taken before a substance, material or product becomes waste. Prevention serves to reduce the volume of waste, the detrimental impacts of the waste on human health and on the environment, and the amount of harmful substances in materials and products. Methods include:

- the internal cycle of substances within plants
- low-waste product design, the reuse of products or the extension of their lifespans
- consumers specifically choosing to purchase low-waste and low-pollution products, and using reusable packaging (Section 3 (20) KrWG).

2. Preparation for reuse

Reuse refers to any operation by which products or components that are not waste are used again for the same purpose for which they were originally intended (Section 3 (21) KrWG). Preparation for reuse is any recovery process for verification, cleaning or repair by which products or their components that have become waste are prepared in such a way that they can be reused without any other pre-treatment for the same purpose for which they were originally intended (Section 3 (24) KrWG).

3. Recycling

The KrWG defines recycling as any recovery operation by which waste is processed into products, materials or substances, whether for the original purpose or other purposes. It includes the processing of organic materials, but excludes energy recovery and processing into materials that are intended for use as a fuel or for backfilling (Section 3 (25) KrWG).

- **Chemical recycling**
  Chemical or feedstock recycling refers to the conversion of plastic polymers into their monomers, basic chemical elements or base chemicals, i.e. depolymerisation using thermochemical or chemical processes. A standardised, legally binding definition has not been established to date. Chemical recycling techniques include pyrolysis, gasification and liquefaction. (German Environment Agency)

- **Closed-loop Recycling**
  Closed-loop loop recycling focuses on supply chain sustainability. Closed-loop systems are developed in such a way that all of the materials in the goods being manufactured can be recycled, usually for reuse in the same type of product. (General Kinematics)

- **Downcycling**
  Downcycling describes a way of using secondary materials that results in a lower economic value of that material. One example of this is using waste textiles as wiper rags, filling and insulation materials. (Circular Economy Practitioner Guide)

- **Fibre to fibre (F2F)**
  Fibre to fibre recycling describes the process of recovering fibres in order to put them back in the textile chain or use them for other applications. Fibres of varying quality can be produced, depending on the processing technology used, which in turn plays a role in determining the intended purpose for recycled fibres. The use of segregated/homogeneous materials is advantageous or even essential for certain processes in order to maximise the extraction of high-quality fibres and minimise processing work.

- **Mechanical recycling [textiles]**
  Mechanical recycling refers to using mechanical force to return textiles to their fibres. The resulting material can be used for non-woven fabrics or as filling or insulation material. Homogeneity with regard to fibre colour and mixture is less important here. Mechanical recycling generally results in shorter fibre lengths and a lower-value product (downcycling). (Schneider 2019)

- **Upcycling**
  Upcycling refers to the reuse of a textile or material in a process that maintains or improves quality. It aims to prevent the quality of the original material from being reduced during recycling. Pre-consumer and post-consumer waste can be upcycled (see below), as can a combination of the two. (Textiles Environment Design)

- **Mechanical recycling [plastics]**
  This term covers operations in which the polymer structure is not fundamentally changed and the plastic is retained as a material. Mechanical recycling is therefore less technically complex than chemical recycling. Much less processing is also involved, although this does depend on feedstock quality. The basic requirement for successful mechanical recycling is ensuring that the different types of plastic are separated from one another as far as possible in order to ensure that the secondary plastics recovered are of high quality. In practice, this is normally done using dry and wet mechanical processing operations or by extracting certain polymers using a preferential solvent effect. (German Environment Agency)

4. Other recovery methods, in particular energy recovery and backfilling

Annex 2 of the KrWG provides an overview of conventional recovery processes.

- **Material recovery**
  Material recovery covers all recovery processes except for energy recovery and processing into materials intended to be used as a fuel or another means of energy generation. Material recovery particularly includes preparation for reuse, recycling and backfilling (Section 3 (23a) KrWG).

- **Backfilling**
  Backfilling mostly takes place in landscaping and refers to all recovery operations whereby suitable, non-hazardous waste is used to recultivate previously excavated areas or for structural engineering purposes.

- **Recovery**
  Recovery refers to any process whose principal outcome is that waste is put to a useful purpose within the plant or in the wider economy. It does so by either replacing other materials that would otherwise be used to fulfil a particular function, or by waste being prepared to fulfil this function (Section 3 (23) KrWG).

5. Disposal

Within the meaning of the KrWG, disposal is any process that does not fall under the above recovery processes. An operation is also considered disposal if it reclaims substances or energy as a secondary consequence. Annex 1 of the KrWG provides an overview of conventional disposal processes

Players **(Policy Hub)**

Clothing manufacturers

Companies on a national, EU or global level (multinational companies) that manufacture clothing from textiles that are sold on to consumers.

Retailers

These include both large (multinational) fashion brands and smaller brands and boutiques that sell clothing to consumers.

Logistics

Companies that are responsible for collection points and return and take-back processes.

Recycling companies

Companies that sort and recycle used textiles.

Raw material manufacturers

Local or multinational companies that produce the raw materials for the textile value chain, using either natural or synthetic materials.

Suppliers

Fabric and yarn producers that manufacture the textile materials for clothing.

Design

Cradle to Cradle (C2C)

The Cradle to Cradle design principle provides a foundation for continuous innovation around the economic, environmental and social aspects of the way that products and services are designed and used. Specifically, the purpose of C2C is to improve how we make, use and reuse products, recognising the biological metabolism and the technical metabolism. The aim is to set a positive course for product and process design and development in a way that will allow natural and technical systems, products and processes to support the diverse population of life on Earth. (Cradle to Cradle Certified)

Design for disassembly

A design principle that focuses on how the product, components and materials can be deconstructed at the end of their lifecycle. (Circular Economy Practitioner Guide)

Design for durability

A design principle that maximises the usable lifespan of a product or service. It is the opposite of planned obsolescence, a marketing strategy whereby the product becoming outdated is part of the concept. (Circular Economy Practitioner Guide)

Design for environment

A design principle that largely minimises the negative environmental impacts of a product or service over its entire lifecycle. (Circular Economy Practitioner Guide)

Design for holistic impact

Design for holistic impact means that the entire lifecycle of a product is taken into account during its development, with attempts made to minimise waste at every stage. (Policy Hub)

Design for recyclability/Design for recycling (D4R)

A design principle (VDI 2243) that takes into account how the product will be collected, separated and sorted if necessary, and recycled at the end of its lifespan. The principles of design for disassembly are closely linked to D4R. (Circular Economy Practitioner Guide)

Design for repairability

A design principle that enables the product to be repaired easily, for example by using suitable fasteners, materials and processes. (Circular Economy Practitioner Guide)

Design for sustainabilty

A design principle that optimises the ecological and social benefits across the entire lifecycle of a product or service. (Circular Economy Practitioner Guide)

Circular Economy

The circular economy is a systemic approach to economic development from which companies, society and the environment all benefit. Unlike the linear model (take-make-dispose), the circular economy is designed to be regenerative from the outset and aims to gradually disconnect growth from the consumption of finite resources (Ellen MacArthur Foundation).

Horizontal circularity

Horizontal circularity means that a product is reused after the end of its lifecycle. This does not necessarily mean that it has to be transformed into a raw material. It could also mean that its parts get reassembled into a new product. (Ecochain)

Vertical circularity

Vertical circularity refers to a circular process within the value chain – for example, the reuse of waste generated during the manufacturing process. (Ecochain)

Life Cycle Assesment (LCA)

A life cycle assessment is a compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its lifecycle, i.e. it explores the environmental aspects and potential environmental impacts (e.g. use of resources and environmental impacts of emissions) from raw material extraction through to production, use, waste treatment, recycling and final disposal (i.e. 'cradle-to-grave') (see ISO 14044). A life cycle assessment consists of four phases:

1. Defining goal and scope
2. Inventory analysis
3. Impact assessment
4. Interpretation

Other important definitions associated with LCA (Circular Economy Practitioner Guide):

Cradle-to-Gate

An LCA that evaluates the environmental impacts of a product or process from raw material extraction through to manufacturing.

Gate-to-Gate

An LCA process that evaluates the environmental impacts of a product or process at the company manufacturing it.

End-of-Life

Lifecycle phase in which a product no longer has value to its original owner and is then disposed of.

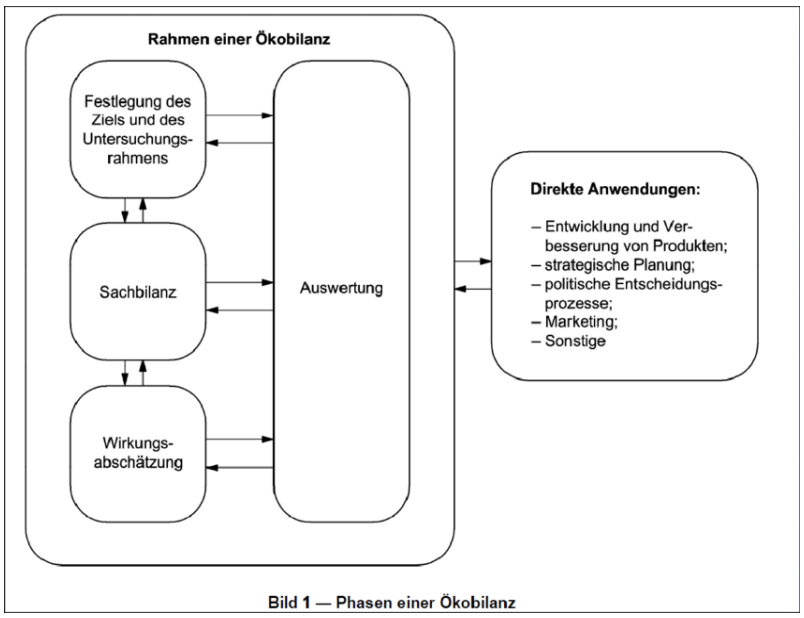

Bild 1 — Phasen einer Ökobilanz

(ISO 14044)

Materials

Biodegradable materials

Materials that can be fully broken down through biological processes (e.g. using microorganisms or enzymes). (Textil+Mode)

Blends

Blends are fabrics and yarns made from two or more different fibres spun together. Materials that can be spun in this way include cotton, wool and polyester-viscose. Polyester-cotton-viscose blends are the most common. Different effects and properties can be created depending on the fibres used and the amounts of these fibres in each blend. (Textile School)

Non-textile components

Non-textile components are any components of textile products that are not made from textile fibres, such as buttons and zips. In the case of jeans, this may include a leather patch with the manufacturer's logo on the waistband. This would be considered a non-textile component of animal origin. (Jeans Manufaktur)

Post-consumer Waste

Post-consumer waste generated by households or by commercial, industrial, and institutional facilities in their role as end-users of the product that can no longer be used for its intended purpose. This includes returns of materials from the distribution chain. (Textile Exchange) When talking about post-consumer waste, it is also important to consider product responsibility, which is also defined in the KrWG: parties who develop, produce, process, treat or distribute products shall bear product responsibility with regard to the achievement of the objectives of the circular economy. Products should be designed in such a way that waste generation within their production and use is reduced, and that environmentally compatible recovery and disposal of the waste generated in their use is safeguarded. When selling these products, it must be ensured that their fitness for purpose is maintained and that they do not become waste (Section 23 (1) KrWG).

Post-industrial Waste

Post-industrial waste refers to waste (e.g. plastic) that is generated during the industrial processing of new products. Surplus material that remains in the same condition as it was prior to processing is collected, grouped together with the same materials, processed if necessary and used in the next production run. (Circular Economy Practitioner Guide)

Pre-consumer Waste

Pre-consumer waste refers to materials that become waste during the production or supply of goods prior to delivery to the consumer. Pre-consumer materials can be broken down and transformed into similar or different materials. They can also be sold as-is to third parties that will then use these materials for consumer products. In the textile industry for example, this includes surplus textiles from retailers that could not be sold. (Circular Economy Practitioner Guide)

Recyclate

Recyclates are secondary raw materials that have been generated by means of the recovery of waste or are generated in the disposal of waste and are suitable for the production of products (Section 3 (7b) KrWG). Masterbatches or blends processed from multiple materials, i.e. that are created through a form of processing, are not considered recyclate. (kunststoffe.de)

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