



# Design Tools

and how they relate to Designing out waste

A study within the research project  
**Wasted Textiles**

led by SIFO, Oslo Metropolitan <https://uni.oslomet.no/klesforskning/wasted-textiles/>

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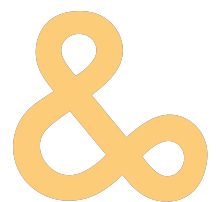
# Introduction

This is a task in WP3 in the NFR funded project Wasted Textiles; “A desktop analysis of ‘green’ design tools, to examine the extent to which they recommend using synthetic fibres.”

**The aim of this study is to map what kind of design guides and tools are available to support a circular design process, and whether they specifically address challenges related to synthetic materials.**

The study looks at a representative selection of tools from industry, academia and organisations. All are open-source, except Higg Index Product Module.

There may be many more good resources out there that are not covered in this study.





# Research question WP3

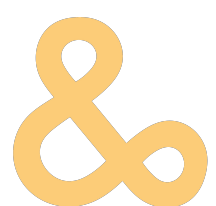
**How can consumption of synthetic textiles be minimised, replaced or utilised to reduce synthetic wasted textiles?**

**Each design tool is examined to see whether it addresses;**

1. Regenerative, Biodegradable and Biodiversity specifically
2. Growth in volumes of production and/or consumption (pieces)
3. Reduction in manufacturing waste/Zero waste design
4. Durability (social, emotional, technical, longer use)
5. Design for repair, reuse, resale, recycling etc
6. To stop or minimize the use of synthetic materials specifically
7. Plastic waste problems like solid waste, recycling, microplastics, toxicity
8. A stated preference of synthetic over natural fibres

The tools are not evaluated on how they perform for design purposes in general.

Introductions to the tools are mainly copied directly from the tools or their websites, with the aim to give some core information only.





# Some of the terms used

## **Design Tool**

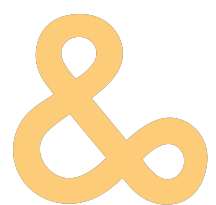
Tools, guidelines, principles in written form or interactive made to guide designers, product developers and sourcing people in their design and development decisions.

## **Plastic**

in this context are synthetic fibres and trims in textiles

## **Zero Waste Design**

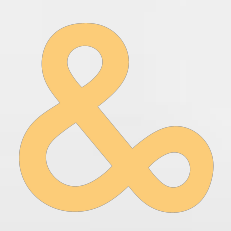
A design strategy to minimize manufacturing waste through pattern making design or other means







# Summary







# Some general findings

## **RQ: How can consumption of synthetic textiles be minimised, replaced or utilised to reduce synthetic wasted textiles?**

- All tools, except Higg Index Product Module, are open-source
- Except for Giotto, none of the Design Tools have a general principle of reducing or minimizing the use of synthetics.
- None have a clear stated preference for synthetics over naturals
- Some mention biobased alternatives to fossil synthetics, reducing fossil fuels, yet the waste problems remains the same (eg Polyester, Polyamide, Elasthan)
- Many tools have a “preferred materials” system where recycled is typically a favorite, with biodegradable and regenerative up and coming
- All tools address reducing waste on a general basis, most related to manufacturing waste.
- The “elephant” of growth and volumes in numbers of products is mentioned only by academia.
- A couple address Microfibres in general, not Microplastics specific.
- Most tools advice choosing materials related to function and expected lifetime.
- Durability is key for all, both emotional and technical. Except Higg that is limited to technical durability only.
- Prolonging life via repair and resale is key for all. For Higg only in the PM.

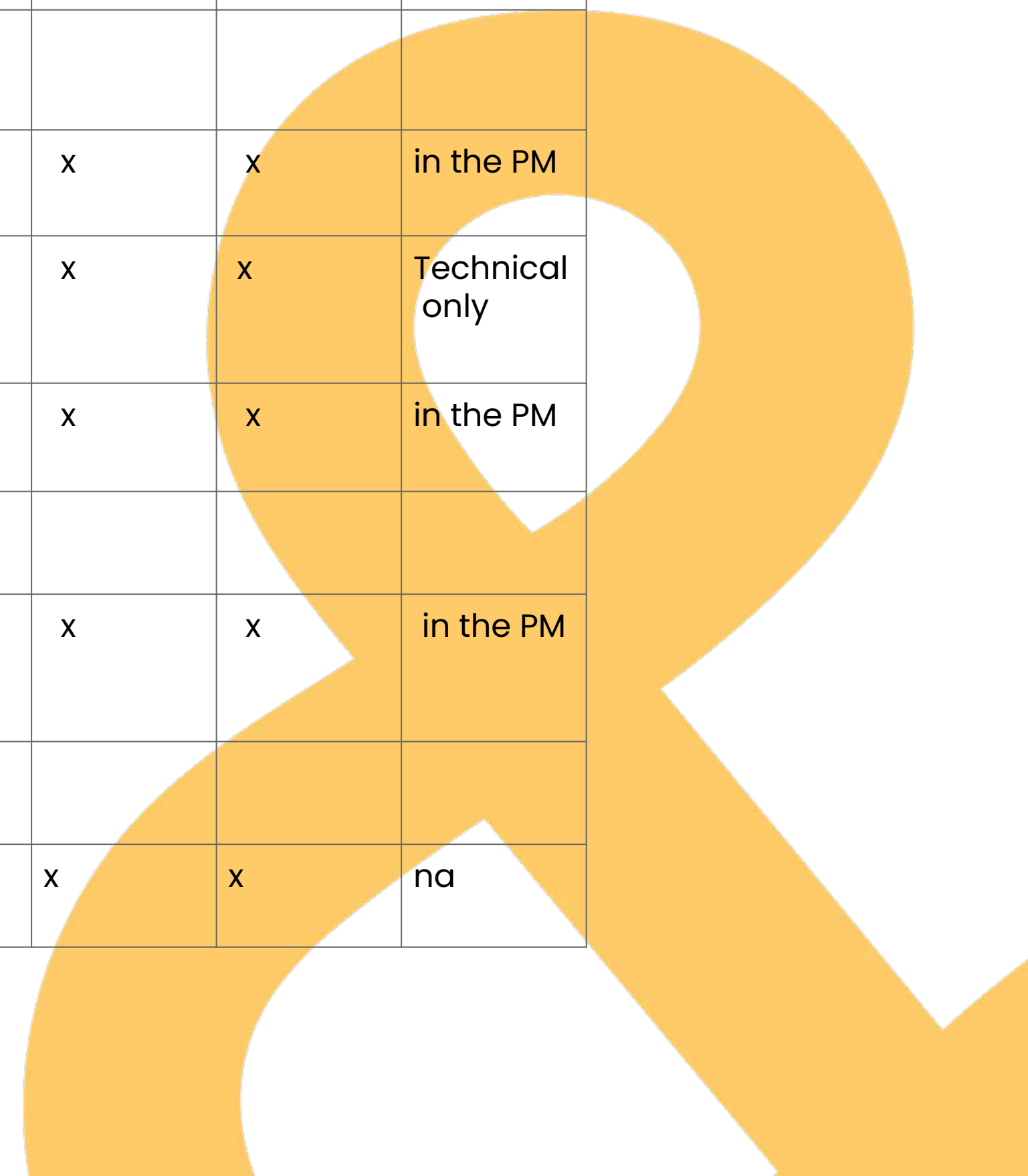
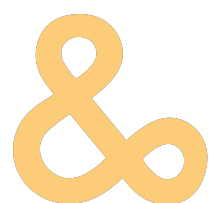




# Summing up the RQs

**X=YES, the topic is addressed as important.** Strategies and extent is individual.

	<b>Does the tool include/address</b>	<b>TED 10</b>	<b>Giotto</b>	<b>H&amp;M</b>	<b>Bestseller</b>	<b>Nike</b>	<b>ASOS</b>	<b>EMF</b>	<b>C2C</b>	<b>GFA</b>	<b>Higg</b>
1	Regenerative, Biodegradable, Biodiversity			x			(x)	x	x	x	
2	Growth in volumes of production or consumption (numbers of products)	x	x					X			
3	Zero waste design (mainly related to manufacturing waste)	x		x	x	x	x	x	x	x	in the PM
4	Durability (Social, Emotional, Technical, Longer use)	x	x	x	x	x	x	x	x	x	Technical only
5	Design for repair, reuse, resale, recycling etc ?	x	x	x		x	x	x	x	x	in the PM
6	To reduce or minimize use of synthetic materials		x								
7	Plastic waste problems? (solid waste, toxicity, recycling, microfibers, EOL)	x	x	x	x	x	x	x	x	x	in the PM
8	A clearly stated preference of plastics over naturals?										
9	Material strategy	x	x	x	x	x	x	x	x	x	na







## Some personal reflections

The Design Tools chosen in this study represent work done by brands and organisations in recent years, and so I see them as reflecting the state-of-the art in knowledge at the time they have been developed.

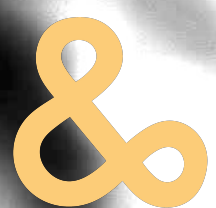
It is clear that Circular Economy has influenced most of them, and that they want to inspire their users. The tools also have a spirit of collaboration, both in creating them, and in their use.

Except for Giotto, none of the Design Tools have a written principle of reducing or minimizing the use of synthetics, neither a clear stated preference for synthetics over naturals. It might be possible to find signs of synthetic preference, depending on how you interpret wordings, based on what you have heard earlier, and how you think the brand or organisation behind it behave. It has not been the aim of this study to read between lines.

Some of the brands and organisations have in previous publications and reports, tended to favour synthetics, preferably recycled, in order to reduce environmental impact. It seems obvious to me that they have moved on and learned that there are no such easy answers.

It is likely, and to hope for, that the more problematic sides of synthetics, like microplastics and chemicals, will appear in coming editions, as the industry develops and learns about new aspects. It is a journey to be continued even if it moves slow.

It is encouraging to see the more holistic approach to Circular Design and complete life cycles, as well as alternative business models.







# Design Tools & Guides





# Design tools

The chosen tools represent different categories, and are among the most recently launched.

## 1. **Circular Design Strategies**

TEDs Ten

H&M

Bestseller

NIKE

ASOS

Ellen McArthur Foundation EMF

Cradle to Cradle Product Innovation Institute - C2CPII

Global Fashion Agenda - GFA

## 2. **LCA based**

Giotto

Higg MSI & PM





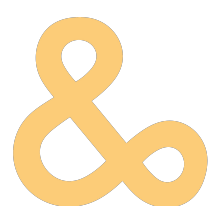
# Tool development collaborations

Academia has been involved in co-developing most of the Circular Design tools, and brands examples are frequently used to inspire each other. This indicates a collaborative approach and a wish to align with design education and research.

Tool	Developed in collaboration with	Inspired by
<b>Teds Ten</b> by UAL; Centre for circular design, London	UAL; Centre for circular design, London	VF Corporation, MISTRA Future Fashion
<b>Giotto</b> by LENS, Politecnico Milano	LENS, Politecnico Milano	LCA
<b>H&amp;M</b>	circular.fashion	other brands
<b>Bestseller</b>	Design school Kolding	GFA, EMF
<b>Nike</b>	Central Saint Martins, University of the Arts	GFA
<b>ASOS</b>	Centre for Sustainable Fashion, London	EMF
<b>Ellen McArthur Foundation EMF</b>	IDEO	C2C
<b>Cradle to Cradle Product Innovation Institute C2CPII</b>		C2C
<b>Global Fashion Agenda GFA</b>		member brands
<b>Higg MSI and PM by Sustainable Apparel Coalition</b>	Members	LCA



Unknown





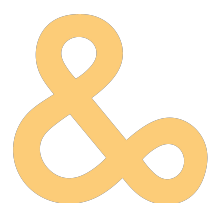
# Tool categorisation

The tools serve different purposes and represent different concepts\*

Archetype	Inspiring and aspiring strategies	Inspiring circular guiding	LCA assessment based	Participatory
<b>Tools</b>	<b>Teds Ten</b>	<b>H&amp;M, Bestseller, Nike, ASOS, EMF, GFA, C2CPII</b>	<b>Higg MSI and PM, Giotto</b>	<b>None</b>
<b>Description</b>	Tools are an inspirational compendium of sustainable design strategies for designers to integrate as they see fit into their design practice	Tools are an inspirational guide for the designers to integrate strategies as they move through the circular design approach	To identify and reduce negative environmental and social impacts of products and production processes.	Tools prescribe various approaches for co-design methods where designers build empathy and engage consumers in the design process.
<b>Characteristics</b>	<ul style="list-style-type: none"> <li>• Do not have a specific duration or system for use.</li> <li>• Can be easily applied and used within any part of the design process depending on Strategies selected</li> <li>• Minimal to no instruction on their use needed as they are intended to be general</li> <li>• Guidance comes in the form of examples and further readings, leaving further learning for the designer to seek out.</li> <li>• Information is presented in an easy to use format such as visual two-dimensional models and/or physical cards</li> </ul>	<ul style="list-style-type: none"> <li>• have some system for use.</li> <li>• Can be easily applied and used within any part of the design process depending on Strategies selected</li> <li>• Minimal to no instruction on their use needed as they are intended to be general</li> <li>• Guidance comes in the form of examples and further readings, leaving further learning for the designer to seek out.</li> <li>• Information is presented in an easy to use format such as visual two-dimensional models and/or physical cards</li> </ul>	<ul style="list-style-type: none"> <li>• Agenda driven and are context-specific</li> <li>• used at specific points within the design process</li> <li>• Categorized by life cycle phases</li> <li>• Require specific instruction on use</li> <li>• Utilize a scoring mechanism to assess impacts</li> <li>• Require working with suppliers and factories to collect, monitor and improve upon environmental impacts</li> <li>• Provide excellent additional support to tools categorized under Participatory and Universal</li> </ul>	<ul style="list-style-type: none"> <li>• The designer is central to this process, seeking change on a deeper level that is long term.</li> <li>• Intended to be used at the beginning and then as needed throughout the design process, depending on how involved the consumer is in the co-design process.</li> <li>• Instructions and context of use are more specific than Universal</li> <li>• Design process is extended/more time consuming</li> <li>• Information is presented in an easy to use format such as visual two-dimensional models and/or physical cards</li> </ul>
<b>Sustainability dimensions</b>	Environmental, social and aesthetic	Environmental, social and aesthetic	Largely Environmental with minimal attention to the social dimension	Environmental and social

*\*Inspired by: Tools for Sustainable Fashion Design: An Analysis of Their Fitness for Purpose Anika Kozlowski 1\*, Michal Bardecki 2 and Cory Searcy 3 1 School of Fashion, Ryerson University, Toronto, ON M5B 2K3, Canada 2 Department of Geography and Environmental Studies, Ryerson University, Toronto, ON M5B 2K3, Canada 3 Yeates School of Graduate Studies, Ryerson University, Toronto, ON M5B 2K3, Canada \**

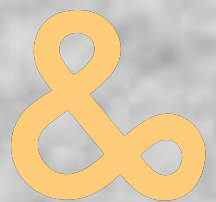
Correspondence: a2kozlow@ryerson.ca Received: 6 May 2019; Accepted: 21 June 2019; Published: 28 June 2019  
[https://www.mdpi.com/2071-1050/11/13/3581?fbclid=IwAR04k32CwPSwIYEHbsZi\\_eKcdYOMcB1E6mwbJpChLdFK8vT1x\\_xemERlks](https://www.mdpi.com/2071-1050/11/13/3581?fbclid=IwAR04k32CwPSwIYEHbsZi_eKcdYOMcB1E6mwbJpChLdFK8vT1x_xemERlks)







# A closer look







# Circular Design Guides

Open-source guides and tools in an interactive or downloadable format, containing inspirational material, visuals and case studies.

## Organisations

**Ellen McArthur Foundation – EMF**

**Cradle to Cradle Product Innovation Institute – C2CPII**

**Global Fashion Agenda – GFA**

**TEDs Ten**

## Brands

**H&M**

**Bestseller**

**NIKE**

**ASOS**

It is worth noting that most are developed in collaboration with academic or key consultancy resources.







Unknown

# Circular Design Guides intro

Circular design guides have emerged in the last 5 years, especially within the industry itself, made by brands. These kind of inspirational guides first emerged from industry organisations like Ellen McArthur Foundation, European Outdoor Group, or academia like TEDs TEN .

They are basically a set of topics to consider or choose to implement, clustered around the complete life cycle of a product.

The user can go step-by-step and receive guidance from the beginning of a concept development through to manufacturing details, how to design for care and repair, possible recycling options and what other business models could or should be implemented in supporting the product.

Cases from industry underpin and showcase different approaches and challenges. They also show that a complete circular design including all aspects is a complex task.





# Ellen MacArthur Foundation

## Circular Design Guide by IDEO

2018

The Circular Design Guide provides a collection of digital tools, workshops and resources for Circular Economy in general. It covers the design of businesses, organisations, systems and products. There is a lot of focus on material health and toxicity as inspired by Cradle to Cradle Design. Plastic has been a main topic at EMF for many years, as well as fashion and textiles. The website offers huge amounts of resources, case studies, YouTube videos from industry and pilot cases.

**“A circular economy is one that is restorative and regenerative by design”** Ellen MacArthur

**The circular economy is based on three principles, driven by design:**

- Eliminate waste and pollution
- Circulate products and materials (at their highest value)
- Regenerate nature

<https://www.circulardesignguide.com/>

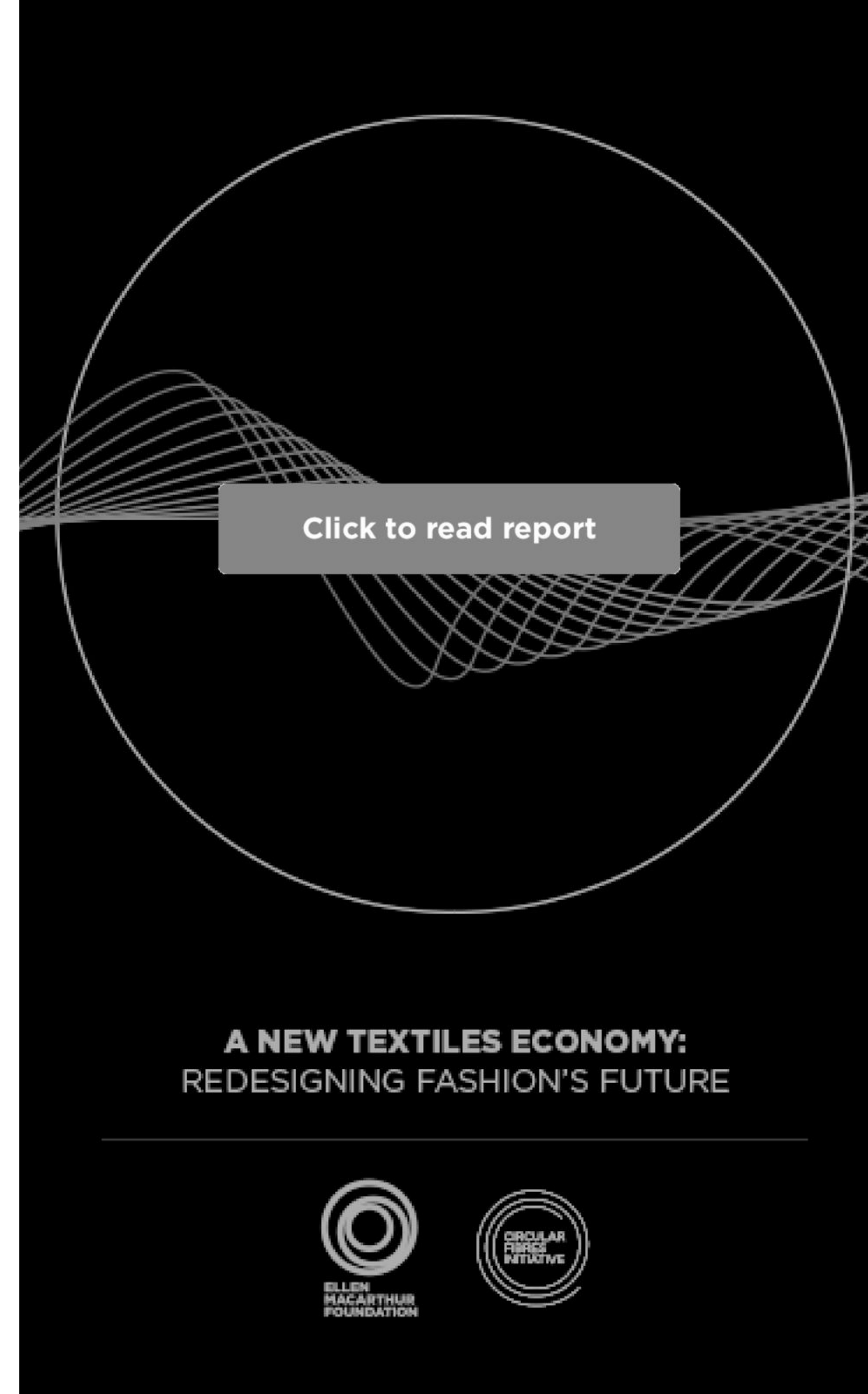
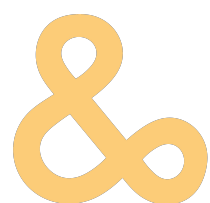
**RUN A WORKSHOP** with these workshop packages and resources. It's free and easy to get started.

**EXPLORE METHODS** that help you understand, define, make, and release circular innovations.

**READ A STORY** about pioneers in circular design and how they applied the concept to their own innovations.

**Vision of a circular economy for fashion:**

<https://emf.thirdlight.com/link/nbwff6ugh01m-y15u3p/@/preview/1?o>



Click to read report

**A NEW TEXTILES ECONOMY:  
REDESIGNING FASHION'S FUTURE**



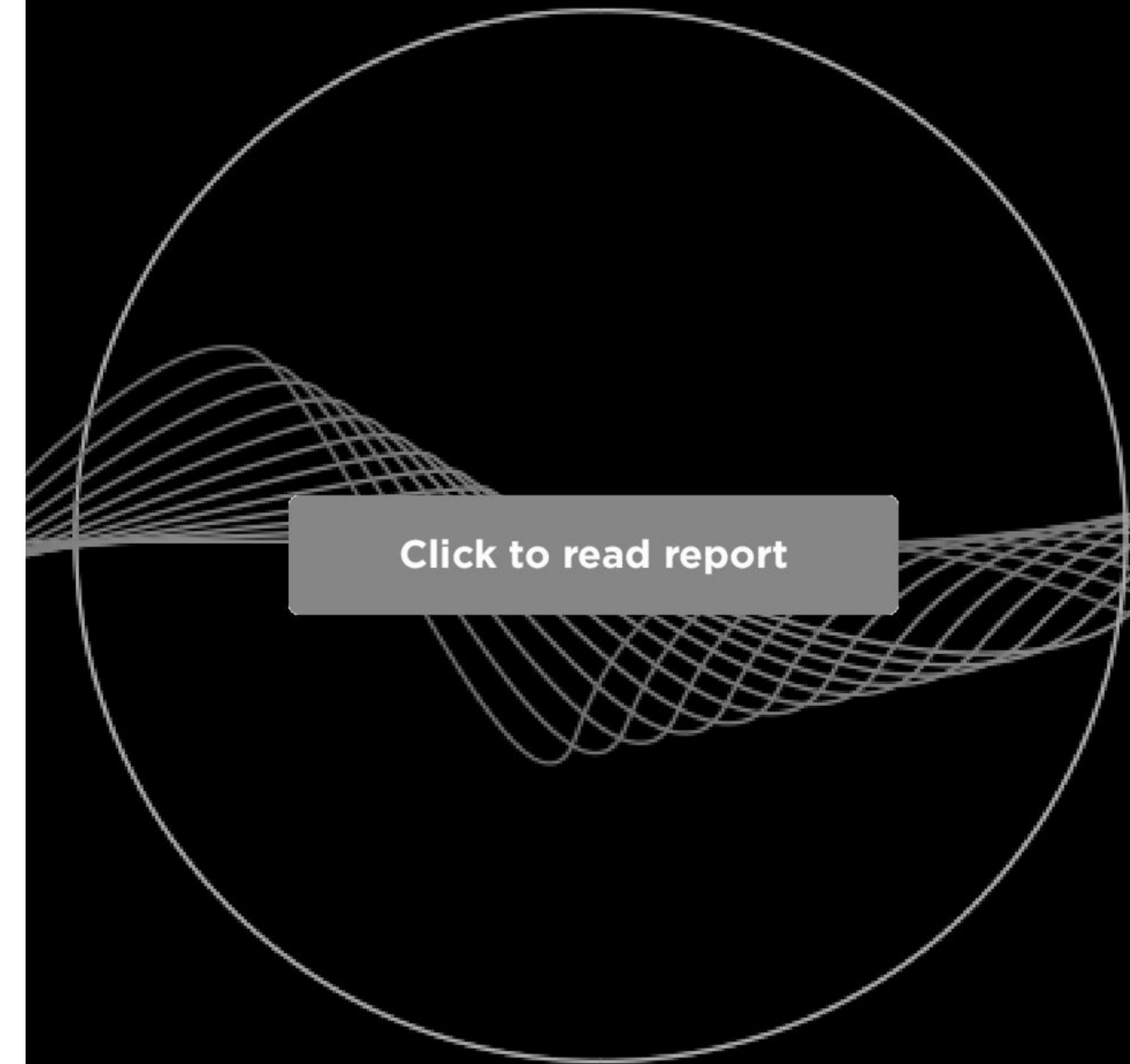


# Ellen MacArthur Foundation

## Circular Design Guide by IDEO

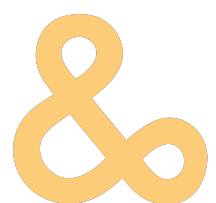
2018

	Does the tool include/address	Yes/No	Comments
1	Regenerative, Biodegradable, Biodiversity	Yes	
2	Growth in volumes of production and/or consumption	Yes	Replacing products with service, digitals and interactive is pointing towards this
3	Reduce manufacturing waste/ Zero waste design	Yes	
4	Durability (social, emotional, technical, longer use,)	Yes	All aspects
5	Design for repair, reuse, resale etc ?	Yes	
6	To stop or minimize use of synthetic materials	No	
7	Plastic waste problems? (solid waste, toxicity, recycling, microfibers, EOL)	Yes	
8	A stated preference of plastics over naturals?	No	
9	Material strategy	Yes	materials that come from, and safely flow, into their respective nutrient cycles; technical and biological



[Click to read report](#)

**A NEW TEXTILES ECONOMY:  
REDESIGNING FASHION'S FUTURE**





# Cradle to Cradle Product Innovation Institute Circular Design Guide

**Cradle to Cradle Design is a concept defined by McDonough and Braungart in the late 80s.**

It has a broad perspective on how to design business, products, services and systems that are regenerative and compatible with human and planetary health.

Designing out waste by designing everything for endless loops, either in the biological cycle or the technical cycle and eliminate all toxic ingredients. It uses nature as metaphor, as in nature nothing goes to waste. Main focus is upon material health and how to design out toxicity. Learn about Safe and Circular material choice strategies. It is a broad and inspirational design philosophy and guide.

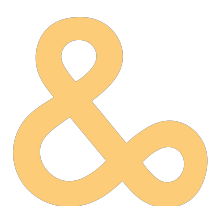
*"This advanced series of methods has been created for designers, entrepreneurs, and innovators to take their material choices integration to the next level. Together they show how to rethink the design process to integrate safe and circular principles from the very start."*

**Ellen Mc Arthur was inspired by C2C as the basis for her development of the Circular Economy principles.**

Brands guided and certified by Cradle to Cradle Design are many, especially within jeans and cotton; C&A, Wolford, Napapijri, Calida, G-Star RAW, Climatex, Ocean Safe, Jack & Jones, Lee

C2C also holds a certification scheme. **Fashion Positive** is a library containing all its Cradle to Cradle Certified™ materials in one place, making it easier for designers to navigate what fibres to use. Furthermore, Fashion Positive collects tools and resources that give you greater insight into fashion in the circular economy, as well as how to make tangible progress toward certified materials

<https://www.c2ccertified.org/>



G-Star RAW



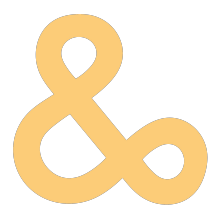
# Cradle to Cradle Product Innovation Institute

## Circular Design Guide

	Does the tool include/address	Yes/No	Comments
1	Regenerative, Biodegradable, Biodiversity	Yes	All
2	Growth in volumes of production and consumption	No	
3	Reducing manufacturing waste/Zero waste design	Yes	Design out waste in general
4	Durability (social, emotional, technical, longer use,)	Yes	All, Related to function
5	Design for repair, reuse, resale etc ?	Yes	
6	To stop or minimize use of synthetic materials	No	
7	Plastic waste problems? (solid waste, toxicity, recycling, microfibers, EOL)	Yes	
8	A stated preference of plastics over naturals?	No	
9	Material strategy	Yes	Compatible with human health and nature Renewable energy No PVC



G-Star RAW





# Global Fashion Agenda

## Circular Design Toolbox

2018

The guide is a 20 page download that guides you through the design process, including business models and systems thinking as well as how to organise the work internally. It has inspirational cases and links to other organisations in this field. It covers a broad range of topics related to product development and what questions to ask.

The development has been showcased by brands; AlgiKnit, Design for Longevity/ECAP, Fashion Positive, Filippa K, G-Star Raw, Houdini, Nudie Jeans, Proef and Puma.

*"Global Fashion Agenda is a leadership forum on sustainability in fashion. Anchored around the world's leading business event on sustainability in fashion, Copenhagen Fashion Summit.*

*A non-profit initiative, Global Fashion Agenda collaborates with a group of Strategic Partners, including Kering, H&M, Target, BESTSELLER, Li & Fung and Sustainable Apparel Coalition on setting a common agenda for focused industry efforts on sustainability in fashion.*

*This toolbox is designed to support fashion brands and retailers who would like to explore circular design within their company. It highlights the role design plays in creating a circular fashion system and is aimed to redefine the life cycle of garments by looping them continuously back into the fashion system.*

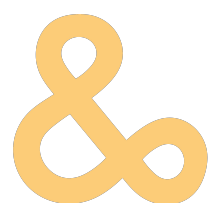
*This is a guide both to designing circular business and products with several cases from the industry"*

### **It builds upon 5 main approaches to Circular product design**

Design for:

1. Durability
2. Repairability
3. Disassembly
4. Fibre recycling
5. Biodegradability

<https://globalfashionagenda.org/product/circular-design-toolbox/>



# CIRCULAR DESIGN TOOLBOX

GFA | 2020 CIRCULAR FASHION  
SYSTEM COMMITMENT



# Global Fashion Agenda

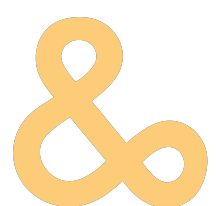
## Circular Design Toolbox

2020

	Does the tool include/address	Yes/No	Comments
1	Regenerative, Biodegradable, Biodiversity	Yes	Design for biodegradability and C2C certification
2	Growth in volumes of production and consumption	No	
3	Reducing manufacturing waste/Zero waste design	Yes	
4	Durability (social, emotional, technical, longer use,)	Yes	Technical and emotional
5	Design for repair, reuse, resale etc ?	Yes	
6	To stop or minimize use of synthetic materials	No	
7	Plastic waste problems? (solid waste, toxicity, recycling, microfibers, EOL)	Yes	Recycling, toxicity, EOL, less use of chemicals, Microfibers
8	A stated preference of plastics over naturals?	No	
9	Material strategy	Yes	Select materials fit for your purpose Develop a list of preferred materials that aligns with your strategy and brand Use material assessment tools to guide your sourcing decisions

# CIRCULAR DESIGN TOOLBOX

GA | 2020 CIRCULAR FASHION SYSTEM COMMITMENT





# TED Tens

## Design Strategy cards

2010

Since 1996, **TED** <http://www.tedresearch.net> at **UAL: Centre for circular design, London**, has been developing and refining a set of sustainable design strategies for textile and fashion designers. These strategies have emerged out of a need for a toolbox for designers to help them navigate the complexity of sustainability issues and to offer real ways for designing 'better'.

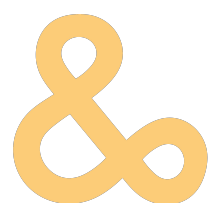
In 2010 Rebecca Earley and Kay Politowicz at UAL created **TED's TEN**. In 2011, they brought out the first set of cards whilst working for **VF Corporation** in the USA; in 2014 the animations were created for the **Mistra Future Fashion** programme, as well as Swedish and Chinese translations of the cards.

The TEN are sustainable strategies which aim to help designers reduce the environmental impact of textile design, production, use and disposal. Intending to educate and inspire users to make more informed and innovative decisions, Becky uses design-led methods in workshops to support the decision-making process.

The TEN are not a check-list, but rather they are a framework for creative thinking and action. As ideas emerge, The TEN can be used to develop reflection and redesign skills, or simply to communicate concepts and intentions more clearly.

- 1 – design to minimise waste
- 2 – design for cyclability
- 3 – design to reduce chemical impacts
- 4 – design to reduce energy and water use
- 5 – design that explores clean/better technologies
- 6 – design that looks at models from nature & history
- 7 – design for ethical production
- 8 – design to reduce the need to consume
- 9 – design to dematerialise and develop systems & services
- 10 – design activism

<https://www.circulardesign.org.uk/tools/>





# TED tens

	Does the tool include/address	Yes/No	Comments
1	Regenerative, Biodegradable, Biodiversity	No	
2	Growth in volumes of production and consumption	Yes	
3	Reducing manufacturing waste/ Zero waste design	Yes	
4	Durability (social, emotional, technical, longer use,)	Yes	
5	Design for repair, reuse, resale etc ?	Yes	
6	To stop or minimize use of synthetic materials	No	
7	Plastic waste problems? (solid waste, toxicity, recycling, microfibers, EOL)	Yes	
8	A stated preference of plastics over naturals?	No	
9	Material strategy	Yes	Biobased, monomaterials, organic, recyclable

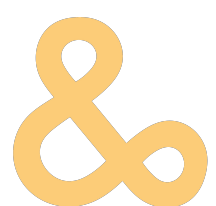
# 1

## Design to Minimise Waste

How to reduce the many kinds of waste created within the textiles industry, both pre and post consumer?

Assess the potential forward impact of design choices/decisions, on production, use and eventual disposal of textile products. Create a design narrative in response to a life-cycle analysis of the product.

Examples: slow design; design for long-life and short-life applications; zero waste cutting; design with enhanced aesthetic value.





# H&M

## Circulator

2021

Design strategies and choices based upon time or frequency of use and its correlating durability. Much inspired by Cradle to Cradle Design. Material choices are prioritizing recycled materials, regenerative and biobased, related to function and expected lifetime. No fiber has a higher status than others.

*“With the launch of “Circulator”, H&M Group underlines its ambition to have all its products designed for circularity by 2025. The Circulator shall raise awareness and reduce the complexity and subjectivity of circular design decisions. It has been developed with guidance of internal and external experts, such as **circular.fashion**. By making the tool available to others in the coming years, H&M Group wants to equally share and gather knowledge and learnings with others.*

*The Circulator consists of two parts: a downloadable guide and a digital scoring tool. The feedback and practical learnings from this first launch phase of the tool will contribute to the development of the scoring tool, which will be launched in the coming years and piloted with industry partners.*

**The concept:** By defining how the product will be used, for how long and how often, it will be put into one of three Product Purpose Categories: **light, mid** or **extensive**.

**Materials:** Each family of materials (Synthetics, Cotton, Metal etc) is broken down into four categories A-D, where group A are our preferred materials like Regenerative and Recycled, while materials in group D include conventional, virgin materials.

**Natural versus synthetic:** There’s a common myth that natural fibres are better for the environment than synthetics. But it’s not that simple and every fibre has an impact. For example, conventional cotton needs a lot of water, wool uses a lot of land, traditional synthetics are made from fossil fuels and all of them shed microfibres that persist in the environment (not just synthetics as widely believed). To make more circular products we need to use a mix of fibres that meet different product needs according to product purpose.

**Design principles:** Physical durability • Non-physical durability • Increased use • Repairability • Avoiding waste • Recycling

**Design for non-physical durability:** We recommend you combine it with design for physical durability to mitigate for wear and tear that can occur on clothing kept for a long time. Bear in mind that non-physical durability can be subjective. We still have a lot to learn about this strategy, but we can’t overlook it simply because we don’t have all the answers. Non-physical durability plays an important role in extending the longevity of our products and we expect this strategy to evolve as we understand more about the area”

<https://hmgroup.com/news/hm-group-launches-circular-design-tool-circulator/>



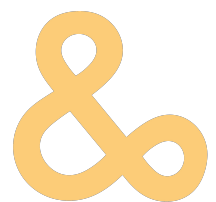


# H&M

## Circulator

2021

	Does the tool include/address	Yes/No	Comments
1	Regenerative, Biodegradable, Biodiversity	Yes	In preferred materials Group A
2	Growth in volumes of production and/or consumption	No	
3	Reducing manufacturing waste/Zero waste design	Yes	Principle< Design for avoiding waste
4	Durability (social, emotional, technical, longer use,)	Yes	All of them
5	Design for repair, reuse, resale etc ?	Yes	
6	To stop or minimize use of synthetic materials	No	Avoid virgin synthetics from fossil fuels
7	Plastic waste problems? (solid waste, toxicity, recycling, microfibers, EOL)	Yes	Microfibres in general, as a potential from all materials
8	A stated preference of plastics over naturals?	No	
9	Material strategy	Yes	Choose material related to function. Preferred materials in 4 groups A-D. Group A = best = Recycled, Regenerative farming, or from agricultural waste by 2030





# Bestseller

## Circular Design Guide

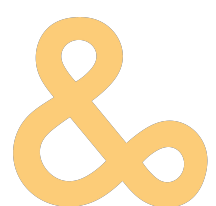
2022

The tool is a guide for designers and product developers across brands on how to create a circular garment. It is based upon a design approach with 3 levels of complexity in requirements; Good-Better-Best. You choose level depending on your starting point and goal, acknowledging that fully circular design does not happen overnight. It is illustrated with design examples in the different categories. Material advice follows the same principles, from virgin to recycled or regenerative, a Bestseller preference list.

*"In BESTSELLER, Designing for Circularity is defined as "a systemic shift that brings forward new ways of using and designing clothing. From the outset, the design should ensure that the product can be part of a circular system. This means that products should be made from the approved Fashion FWD materials, be designed for optimal use of resources, last as long as possible and be recyclable."*

*Our Circular Design Guideline, developed in collaboration with **Designskolen Kolding**, is built around 3 different levels of complexity (good, better, best). Based on ambition and starting point, a designer can tap into the level of complexity that is best fit for a given situation. Each step is made up of certain criteria. While new criteria are added others become more complex when moving from Good to Better and lastly to Best. The 3-step model explains what criteria belong to what level of complexity."*

<https://about.bestseller.com/news/remarkable-bestseller-brand-wins-access-to-trailblazing-material>



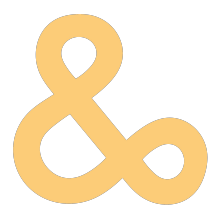


# Bestseller

## Circular Design Guide

2022

	Does the tool include/address	Yes/No	Comments
1	Regenerative, Biodegradable, Biodiversity	No	
2	Growth in volumes of production and/or consumption	No	
3	Reducing manufacturing waste/ Zero waste design	Yes	Design to minimize and avoid waste
4	Durability (social, emotional, technical, longer use,)	Yes	Design for longer use and Design for durability
5	Design for repair, reuse, resale etc ?	No	
6	To stop or minimize use of synthetic materials	No	
7	Plastic waste problems? (solid waste, toxicity, recycling, microfibers, EOL)	Yes	Recycling, EOL
8	A stated preference of plastics over naturals?	No	
9	Material strategy	Yes	safe, renewable and/or recycled fibres





# Nike

## Circularity workbook

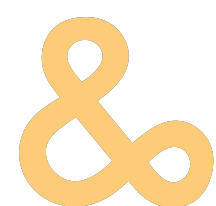
2019

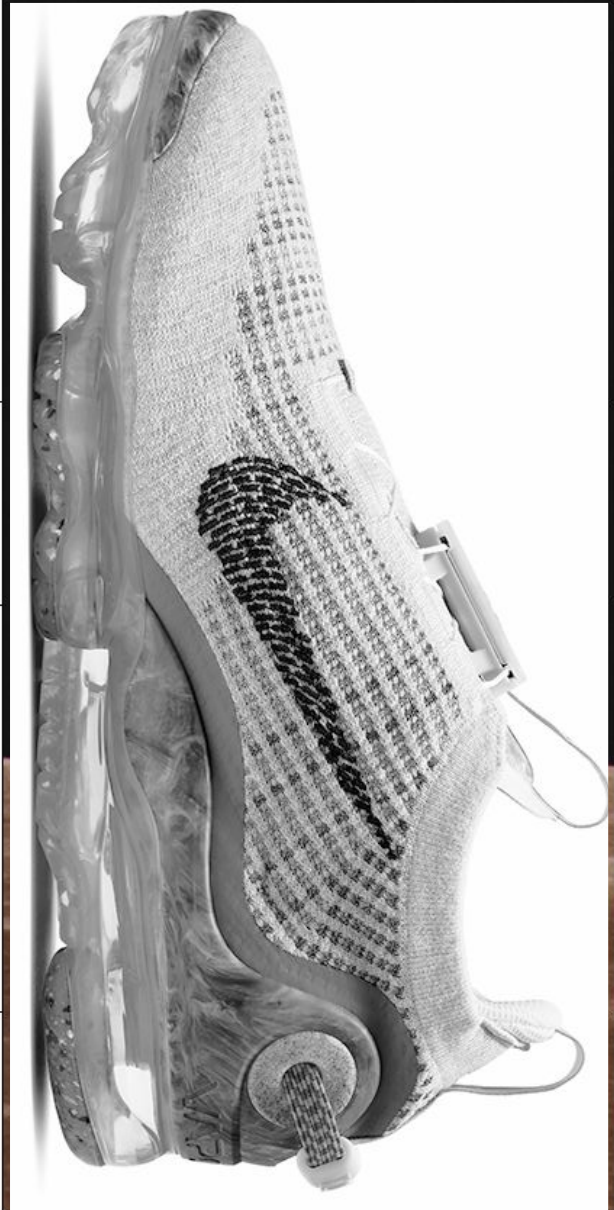
**Circularity: Guiding the Future of Design** was created in collaboration with the students and staff of **Central Saint Martins, University of the Arts London** and with inspiration from the **Global Fashion Agenda**; and follows the notion that the future of design is an opportunity. The aim is to create products that promote circularity, that last longer and are designed with the end in mind.

The workbook is an open-source guide with a long list of comprehensive questions, combining technical product aspects with consumer behaviour and market value. It includes case studies from many brands.

### “Some main questions:

- *WHAT IS THE PURPOSE OF THE PRODUCT? HOW COULD YOUR DESIGN ALLOW IT SERVE OTHER PURPOSES (E.G. WORKING OUT TO A NIGHT OUT) OR BE USED IN A WIDER RANGE OF ENVIRONMENTS?*
- *BASED ON THE ENVIRONMENTAL IMPACT, HOW COULD MATERIAL CHOICES BE RECONSIDERED TO LESSEN THE PRODUCT'S IMPACT?*
- *HOW COULD YOU ELIMINATE OR MINIMIZE THE USE OF MATERIALS AND FINISHES THAT USE TOXIC OR HAZARDOUS CHEMICALS?*
- *HOW CAN YOUR MATERIAL CHOICE INCREASE THE LIFE CYCLE OR DURABILITY OF THE PRODUCT?*
- *HOW COULD YOUR MATERIAL CHOICE ALLOW A PRODUCT TO BE REFURBISHED?*
- *HOW COULD YOUR MATERIAL CHOICE INCREASE THE LIFE CYCLE OR DURABILITY OF THE PRODUCT?*
- *HOW COULD YOU ADJUST YOUR DESIGN SO THE PRODUCT INCREASES IN VALUE WITH USE?*
- *WHAT PART(S) OF THE PRODUCT WILL GENERATE OR USE THE MOST HAZARDOUS SUBSTANCES? (KEEP IN MIND IT MAY NOT BE THE MOST OBVIOUS.)*
- *HOW COULD PLANT-BASED MATERIALS OR FINISHES ACHIEVE THE SAME PERFORMANCE OR AESTHETIC AIMS AS SYNTHETIC OPTIONS?*
- *HOW COULD YOUR DESIGN INCORPORATE NATURAL FIBERS (COTTON, FLAX, SILK, WOOL, ETC), BIOMATERIALS, OR LAB-GROWN MATERIALS (MUSHROOM LEATHER, SPIDER SILK, ETC.) THAT HAVE A LOWER CARBON, WATER, AND CHEMISTRY IMPACT THAN THE BENCHMARK COMPARISON MATERIAL?*
- *CAN COMPONENTS SAFELY DECOMPOSE WITHOUT ADDITIVES OR OXO-DEGRADABILITY? IF NOT, ARE THE ADDITIVES NEEDED CAUSING UNNECESSARY HARM?”*



NIKE CIRCULARITY WORKBOOK	INTRODUCTION		4
NEW MODELS ESTABLISHING NEW SERVICE AND BUSINESS MODELS TO EXTEND PRODUCT LIFE CYCLE.	MATERIAL CHOICES SELECTING LOW IMPACT MATERIALS THAT USE PRE- & POST-CONSUMER RECYCLED FEEDSTOCK.	CYCLABILITY DESIGNING WITH THE END IN MIND; THINKING THROUGH HOW A PRODUCT WILL BE CYCLED AT END OF USE.	
CIRCULAR PACKAGING PURPOSEFUL PACKAGING, MADE OF MATERIALS THAT CAN BE REPURPOSED, RECYCLED, OR BIODEGRADE.		WASTE AVOIDANCE MINIMIZING OR ELIMINATING WASTE IN THE PRODUCT CREATION PROCESS.	
DURABILITY PRODUCTS MADE STRONGER BY METHOD OF MAKE AND MATERIAL CHOICES.		DISASSEMBLY PRODUCTS THAT CAN EASILY BE TAKEN APART; RECOGNIZING THE VALUE OF EACH COMPONENT.	
VERSATILITY PRODUCTS THAT EASILY ADAPT TO GROWTH, STYLE, TREND, GENDER ACTIVITY, AND PURPOSE.		REFURBISHMENT PROLONGING THE USE OF A PRODUCT THROUGH REPAIR OF COMPONENT PARTS OR MATERIALS.	GREEN CHEMISTRY CHEMICAL PRODUCTS & PROCESSES THAT REDUCE OR ELIMINATE THE USE OF HAZARDOUS SUBSTANCES.






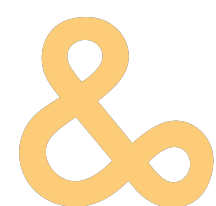
# Nike

## Circularity workbook

2019

	Does the tool include/address	Yes/No	Comments
1	Regenerative, Biodegradable, Biodiversity	No	
2	Growth in volumes of production and/or consumption	Yes/No	limited to: One product should serve more purposes
3	reducing manufacturing waste/Zero waste design	Yes	Avoid waste in manufacturing
4	Durability (social, emotional, technical, longer use, repair, redesign, etc)	Yes	Technical and emotional, refurbishment
5	Business models for repair, reuse, resale etc ?	Yes	Design for refurbishing, repair and disassembly
6	To stop or minimize use of synthetic materials	Yes	Use plant based materials instead of fossil
7	Plastic waste problems? (solid waste, toxicity, recycling, microfibers, EOL)	Yes	Avoid waste in manufacturing Eliminate hazardous materials Use recycled materials Safe decomposing of materials
8	A stated preference of plastics over naturals?	No	Looking for new plant based materials
9	Material strategy	Yes	Select low impact materials that use pre- and post consumer recycled feedstock. (LCA approach)

NIKE CIRCULARITY WORKBOOK		INTRODUCTION	4
<b>NEW MODELS</b> ESTABLISHING NEW SERVICE AND BUSINESS MODELS TO EXTEND PRODUCT LIFE CYCLE.	<b>MATERIAL CHOICES</b> SELECTING LOW IMPACT MATERIALS THAT USE PRE- & POST-CONSUMER RECYCLED FEEDSTOCK.	<b>CYCLABILITY</b> DESIGNING WITH THE END IN MIND; THINKING THROUGH HOW A PRODUCT WILL BE CYCLED AT END OF USE.	
<b>CIRCULAR PACKAGING</b> PURPOSEFUL PACKAGING, MADE OF MATERIALS THAT CAN BE REPURPOSED, RECYCLED, OR BIODEGRADE.		<b>WASTE AVOIDANCE</b> MINIMIZING OR ELIMINATING WASTE IN THE PRODUCT CREATION PROCESS.	
<b>DURABILITY</b> PRODUCTS MADE STRONGER BY METHOD OF MAKE AND MATERIAL CHOICES.		<b>DISASSEMBLY</b> PRODUCTS THAT CAN EASILY BE TAKEN APART; RECOGNIZING THE VALUE OF EACH COMPONENT.	
<b>VERSATILITY</b> PRODUCTS THAT EASILY ADAPT TO GROWTH, STYLE, TREND, GENDER ACTIVITY, AND PURPOSE.		<b>REFURBISHMENT</b> PROLONGING THE USE OF A PRODUCT THROUGH REPAIR OF COMPONENT PARTS OR MATERIALS.	<b>GREEN CHEMISTRY</b> CHEMICAL PRODUCTS & PROCESSES THAT REDUCE OR ELIMINATE THE USE OF HAZARDOUS SUBSTANCES.





# Asos

## Circular Design Guidebook 2021

The ASOS Circular Design Guidebook is a 112-page long interactive resource to drive innovation in circular design and production. It is co-authored by the **Centre for Sustainable Fashion**, a research centre based at London College of Fashion, University of the Arts, London.

The guidebook is closely aligned with **Ellen McArthur Foundations** principles for circular textiles.

*“The co-authored guidebook is the latest element of a multi-year collaboration between ASOS and CSF which started in 2018. The resource builds on ASOS’s first proof-of-concept for circular design, the ASOS Design Circular Collection, in September 2020.*

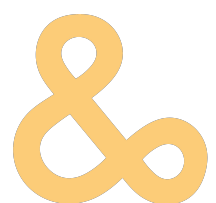
*The guidebook includes detailed information on the nine ASOS circular design strategies – methods for designing products to build towards a circular economy for fashion, and make the shift from linear to circular. It also contains a zero-waste cutting guide, a guide to choosing suitable materials for circular design products, and details on textiles recycling techniques and technologies. Throughout the guide, we’ve included examples of best practice in circular design from across the fashion industry.*

*Under our approach to circular design, a circular product must be made from safe and recycled or renewable materials, plus it must be designed to meet either the ‘Used More’ or ‘Made to be Made Again’ points, through appropriate circular design strategies.*

### **Main principles for products:**

1. Made from safe and recycled or renewable materials
2. Used more
3. Made to be made again”

London College of Fashion <https://www.sustainable-fashion.com/online-resources>



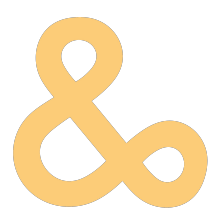


# Asos

## Circular Design Guidebook

### 2021

	Does the tool include/address	Yes/No	Comments
1	Regenerative, Biodegradable, Biodiversity	Yes	Regenerative fibers as emerging materials
2	Growth in volumes of production and/or consumption	No	
3	reducing manufacturing waste/ Zero waste design	Yes	Both minimize waste in general and zero waste design
4	Durability (social, emotional, technical, longer use, repair, redesign, etc)	Yes	All aspects.
5	Design for repair, reuse, resale etc ?	Yes	
6	To stop or minimize use of synthetic materials	No	
7	Plastic waste problems? (solid waste, toxicity, recycling, microfibers, EOL)	Yes	Focus on Recycling and recycled materials (all fibres) Minimizing manufacturing waste Use mono materials
8	A preference of plastics over naturals?	No	
9	Material strategy	yes	focusing on supporting materials that promote new recycling technologies, are made from waste, and are using alternative recycled materials.







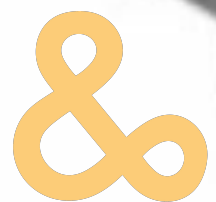
# LCA (Life Cycle Assessment) based tools

## **Higg Index**

Material Sustainability Index - MSI  
Product Module - PM

**Giotto Project** - Handbook

**MISTRA** - Supply chain guidelines







## LCA – brief intro

LCA, Life Cycle Assessment, is a science based method to calculate environmental impact from products and systems.

The ISO 14000 series defines LCA as;  
*LCA studies the environmental aspects and potential impacts throughout a product's life cycle (i.e. cradle-to-grave) from raw materials acquisition through production, use and disposal. The general categories of environmental impacts needing consideration include resource use, human health, and ecological consequences.*

Basic knowledge of methodology is needed in order to understand how to interpret an LCA.

Depending on what you want to measure, LCAs have different goals, functional units, system boundaries and chosen impact categories, which makes comparisons very challenging.

Data and their qualities vary a lot, from global average to site specific. (primary vs secondary) For textiles, data are often European or US based, while the majority of supply chain impact are in Asia.

LCAs are expensive and time consuming to do, and must be done by experts with access to the database and software.





# Giotto Project; 2019

## Handbook for sustainable fashion system design

This handbook is researched and made at **LENS, a design research lab at the Design department Politecnico di Milano**. A Life Cycle Thinking and Analysis (LCA) based guide/report with focus on Energy use, toxicity and natural fibres. It has a technical academic research style with flowcharts and tables, less visual.

*"The aim is to set the basis for an articulated skills' development on both a strategic and technical know-how that could make effective the emerging of a new generation of eco- efficient garments (low environmental impact along with high economic and competitive values).*

### Some examples from the handbook:

- Consider the use of rapidly renewable materials, like plant-based or animal-based fibres
- Avoid materials from exhausting resources, such as polyester, nylon and acrylic made from fossil fuels
- Use materials derived from other production processes
- Use components made of parts, coming from disposed products, e.g. hinges, zippers and buttons coming from disposed accessories (purses, bags, suitcases)
- Use recycled materials or recycled materials combined with new materials
- Consider using biodegradable materials

The best fabrics originated from renewable materials are Lyocell, hemp, jute, bamboo, linen, organic cotton and silk. Not renewable fibres are the synthetics one like the nylon, polyester, acrylic and lycra. Because of their compositions, the synthetics fibres have a very low tax of biodegradability. Fabrics that are alone, completely biodegradable are Lyocell and linen.

### Life Cycle Design guidelines for clothes

The focus of this design strategy is to design durable as well as intensely usable clothes. It aims towards an overall reduction in the environmental impact during the stages of pre-production, production, distribution and disposal. The main reasons that lead to clothes disposal are:

- Degradation of performance and structural fatigue due to normal usage
- Degradation due to environmental or chemical causes
- Damage caused by accidents or improper usage
- Technological obsolescence
- Aesthetic or cultural obsolescence.

*Facilitate upgrading, extension and adaptation, enable reuse, remanufacturing and intensify use"*

<https://www.lenslab.polimi.it/>

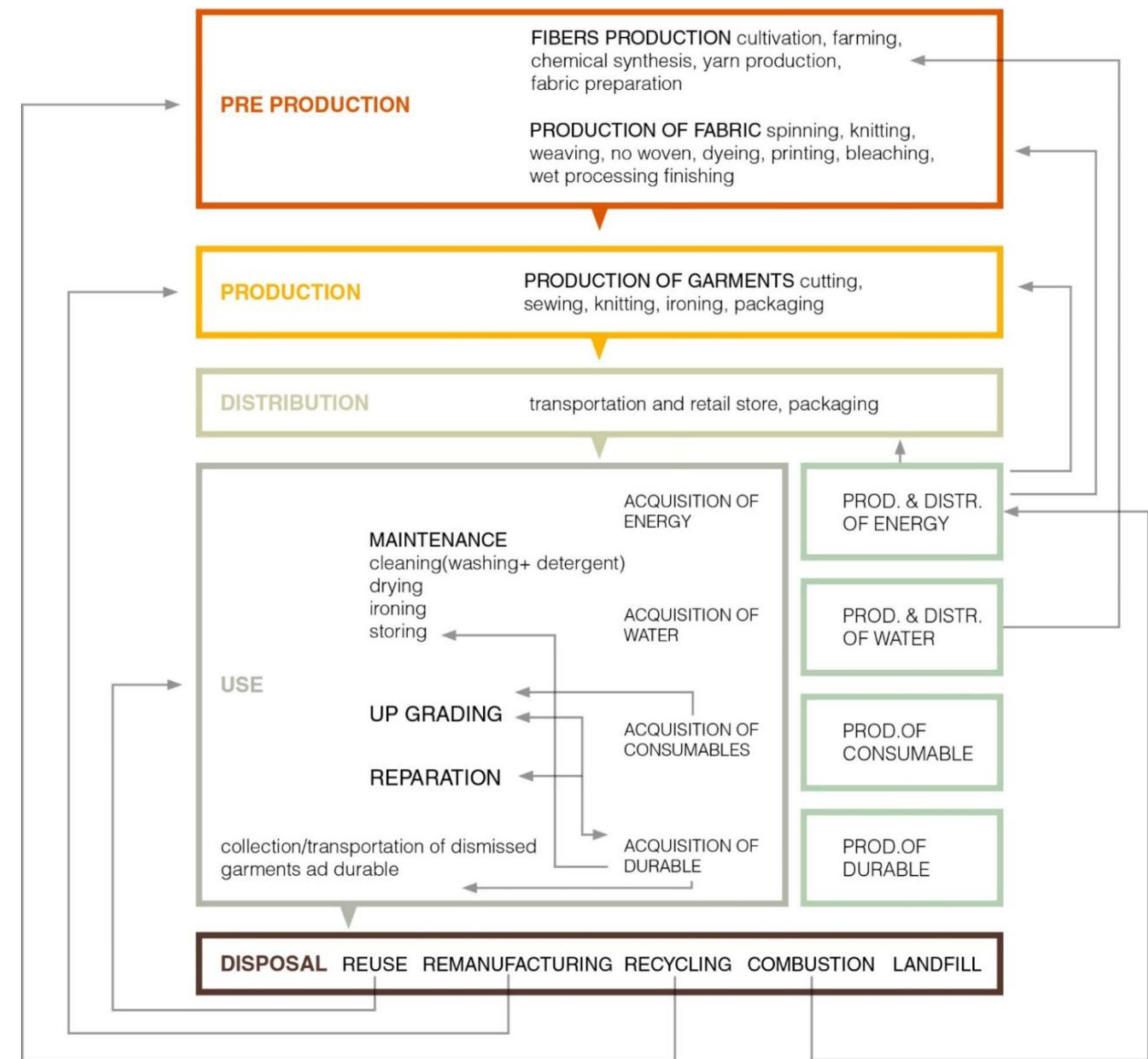
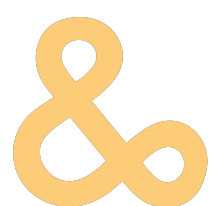


Fig. 1 - The system boundaries: the clothing care life cycle (elaborated from Giannone D., 2019<sup>5</sup>)





# Giotto Project; 2019

## Handbook for sustainable fashion system design

	Does the tool include/address	Yes/No	Comments
1	Regenerative, Biodegradable, Biodiversity	Yes	renewable, biodegradable
2	Growth in volumes of production or consumption	No	
3	Reducing manufacturing waste/ Zero waste design	yes	minimizing material content and waste
4	Durability (social, emotional, technical, longer use,)	Yes	
5	Design for repair, reuse, resale etc ?	Yes	
6	To stop or minimize use of synthetic materials	Yes	Avoid materials from exhausting resources, such as polyester, nylon and acrylic that are made from fossil fuels
7	Plastic waste problems? (solid waste, toxicity, recycling, microfibers, EOL)	Yes	toxicity, non biodegradable
8	A stated preference of plastics over naturals?	No	Opposite
9	Material strategy	Yes	<ul style="list-style-type: none"> <li>• use rapidly renewable materials,</li> <li>• Avoid fossil fuel based</li> <li>• use leftovers from other processes</li> <li>• Use recycled materials</li> <li>• use biodegradable materials</li> </ul>

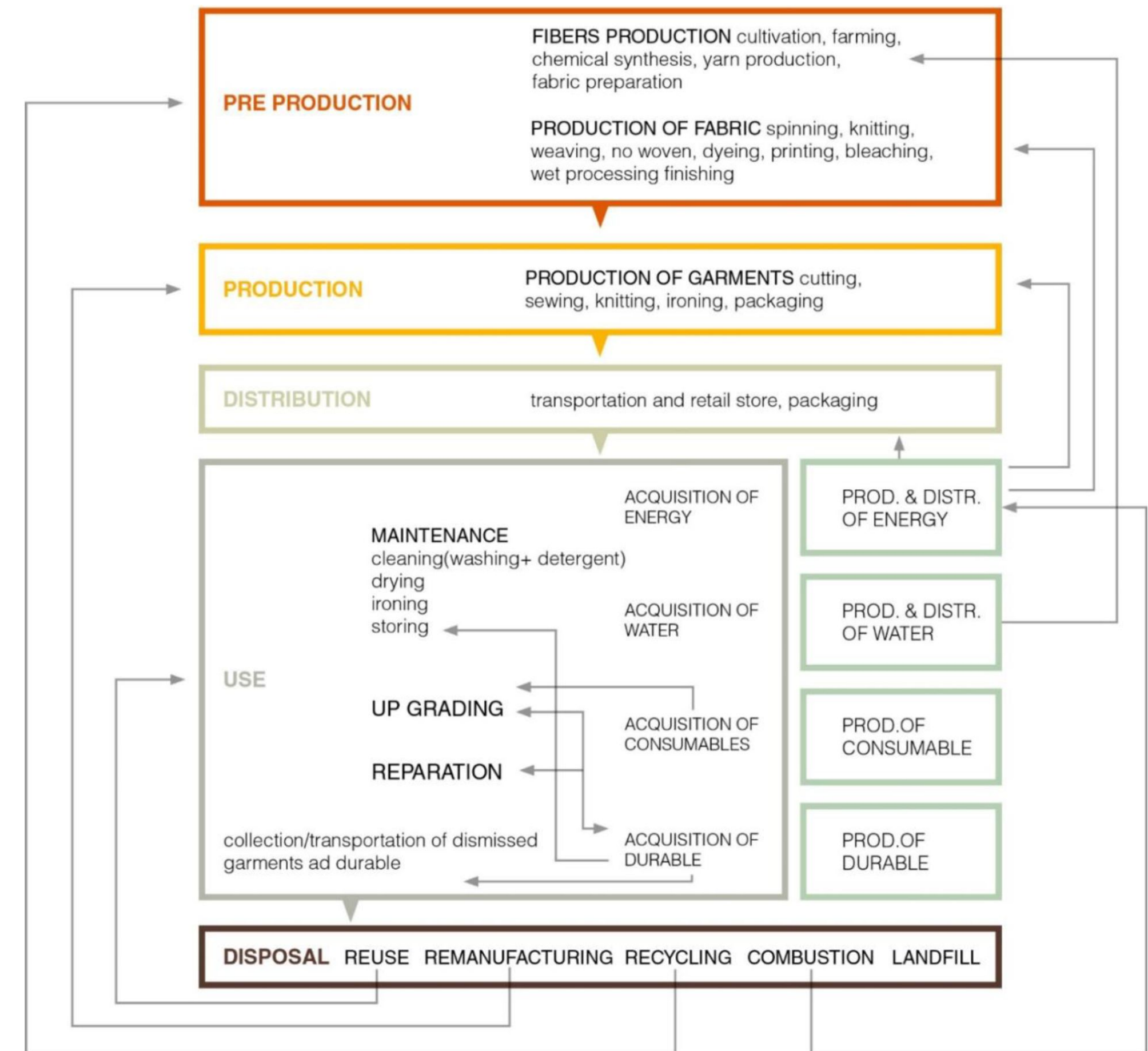
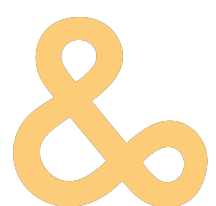


Fig. 1 - The system boundaries: the clothing care life cycle (elaborated from Giannone D., 2019<sup>5</sup>)





# Sustainable Apparel Coalition

## Higg MSI and PM

developed since 2012

**The Higg Materials Sustainability Index, MSI** is a LCA based tool to design/model, materials, fabrics and trims, to see how different manufacturing aspects like raw material source, yarn formation, dyes and finishes, impact the results.

The inputs are peer-reviewed LCAs provided by the industry itself, hence it is a collection of diverse LCAs on many materials, both general and company specific. The user can build its own materials, choose yarn specifications, knits or wovens, dyes and finishes.

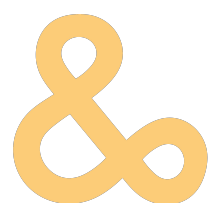
The results are only as good as the data available from the LCAs provided, and limited to 5 impact categories: 1.Global warming 2.Nutrient pollution in water (eutrophication) 3. Water scarcity 4. Abiotic resource depletion/use of fossil fuels 5.Chemistry.

**Hence, the MSI is a limited tool for learning about how different raw material and process choices affect the final fabric or trim, within those 5 impact categories only. This makes the Higg MSI less useful, and partly misleading as an open-source, since the results cannot be used to design and assess a complete product and its life cycle. Unless you are SAC member using the Higg PM (next page)**

*"The Higg Materials Sustainability Index, MSI, is a cradle-to-gate scoring tool that measures the environmental performance of thousands of materials used in creating apparel, footwear and home textile products. It is designed to compare the environmental impact of different materials so design and development teams can make more sustainable choices during materials selection. The original version of the MSI was developed by Nike and later adopted by the SAC.*

*The Higg Materials Sustainability Index (MSI) provides access to a large amount of relevant information about the impacts of material production used in the apparel, footwear, and home textile industries. You can leverage the information in different ways to get a clear understanding of what is causing different types of material impacts, and different production processes that can be used to reduce those impacts.*

*The Higg MSI uses peer-reviewed life-cycle assessment, LCA, data to quantify the environmental impacts of material production from the extraction or production of raw materials through manufacturing, finishing, and preparation for assembly."*



<https://apparelcoalition.org/the-higg-index/>





# Sustainable Apparel Coalition

## Higg MSI and PM

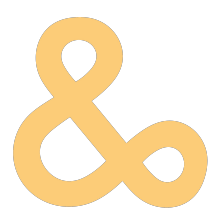
developed since 2012

**The Higg Product Module, PM**, is the tool to model and **design product** options, based on the material design choices from the MSI, and based on the same impact categories, as well as qualitative aspects.

The PM let the user choose and model different choices through the whole life cycle, like material weights, yield, transport means, packaging, laundry habits, technical durability tests, distribution, recycling possibilities, certificates/labels etc.

**The Higg PM is unfortunately accessible for SAC members only.**

<https://apparelcoalition.org/the-higg-index/>





# Sustainable Apparel Coalition

## Higg MSI and PM

developed since 2012

	Does the tool include/address	Yes/No	Comments
1	Regenerative, Biodegradable, Biodiversity	No	
2	Growth in volumes of production and consumption	No	
3	Reduce manufacturing waste/ Zero waste design	Yes	Yield is accounted for
4	Durability (social, emotional, technical, longer use,)	Yes	Technical only
5	Design for repair, reuse, resale etc ?	Yes	In the Higg PM
6	To stop or minimize use of synthetic materials	No	
7	Plastic waste problems? (solid waste, toxicity, recycling, microfibers, EOL)	Yes	Recycling, EOL, eliminating waste
8	A stated preference of plastics over naturals?	No	LCA methodology leads to better scores for synthetics in the 5 categories. This is often interpreted as favouring synthetics, if you choose to compare different material types.
9	Material strategy	nA	This is an assessment tool only

