



# Visions for 2050:

Sustainable, Circular, Connected and  
Strategic Fashion Textile Design

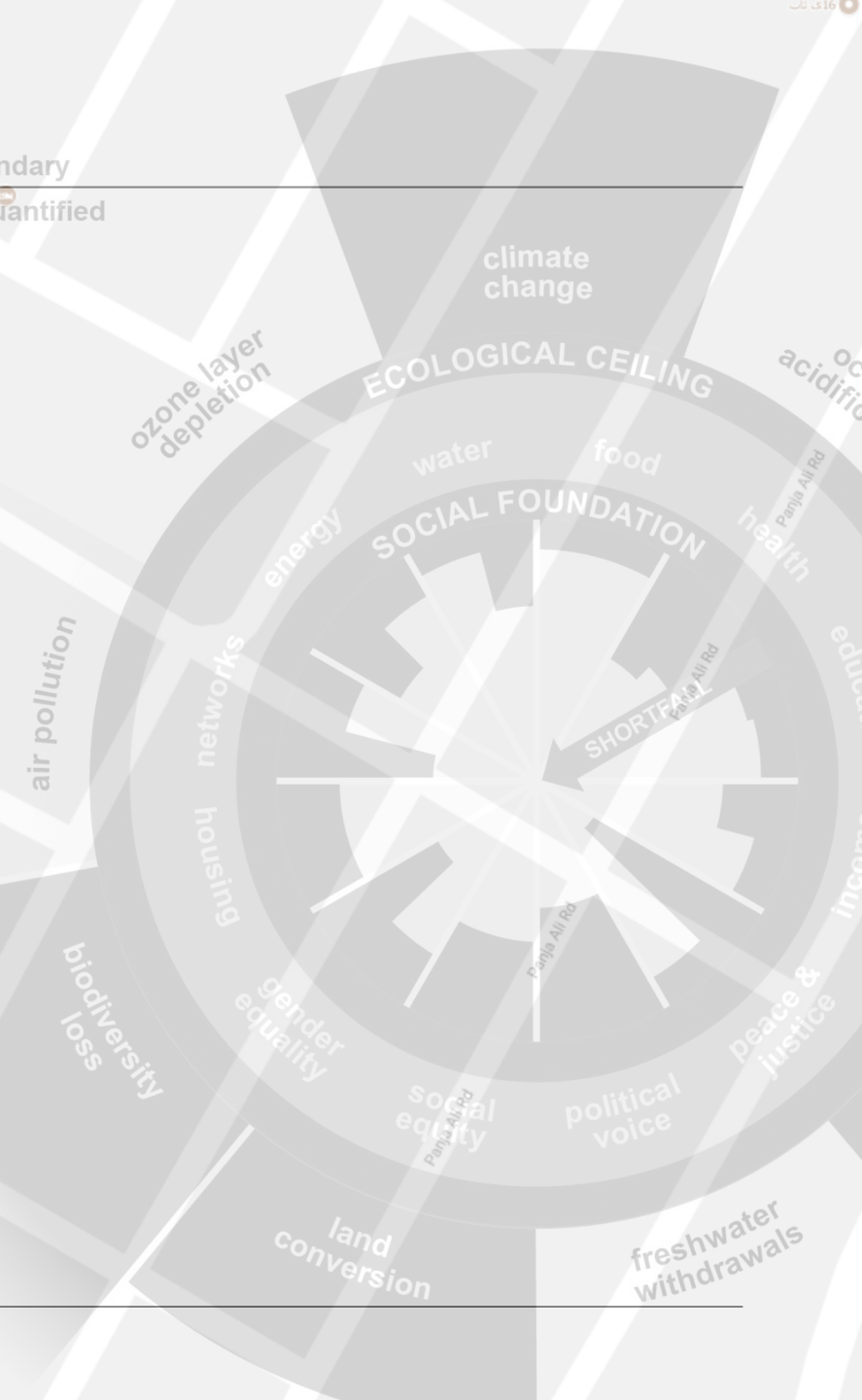
**ual** ■ centre for  
■ circular design

# Overview

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■ Beyond the boundary  
■ Boundary not quantified

- > **Introduction** Visions for 2050
- > **Key insights** from recent CCD research projects – what do we know now about sustainability, circularity and fashion textile materials?
- > **Meet the Street** – who lives here in 2050 and what are they wearing?
- > **World Circular Textiles Day 2050**



# Introduction: Centre for Circular Design

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## Keynote: Professor Rebecca Earley

Co-director of Centre for Circular Design, at Chelsea College of Arts, University of the Arts London.

Becky is a design researcher and award-winning research team leader. She makes, curates, facilitates and writes.

In October 2021 she co-founded World Circular Textiles Day 2050 with a team of like-minded collaborators.



*Each row from left:*

- **Prof Becky Earley**
- Dr Kate Goldsworthy
- Em Prof Kay Politowicz
- Phil Hadridge
- Dr Helen Paine
- David Cross
- Dr Rosie Hornbuckle
- Rosa Romeo
- Dr Laetitia Forst
- Kate Wakeling
- Cathryn Hall
- Laura Solomon
- Sanne Visser
- Dr Bridget Harvey
- Professor Lucy Norris
- Dr Clara Vuletich
- Emmeline Child
- Rachel Pearce
- Dr Marion Real
- Loula Mercedes

# Introduction: Visions for 2050

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This keynote looks ahead, through the eyes of consumers, at a range of garments and how they might be created, purchased, used, recirculated, recreated and regenerated, in 2050. Functioning at 'full circularity' the industry is in balance with scarce resources, food needs and emissions caps. Waste streams feed into new resources; biomaterials have finally arrived.

**This fashion future is circular, connected, local, regenerative, fun and fair.**





# Trash 2 Cash (2018)

A 3.5-year research project involved 17 partners from 10 different countries selected to represent the whole material life cycle. An experimental design-driven methodology was used to enable the collaboration along with new facilitation techniques and Life Cycle Thinking approaches designed and delivered by CCD researchers; the circular design concepts informed the materials development in an iterative co-design process to produce six sensational master case product prototypes.

**CCD researchers:** *Becky Earley, Kate Goldsworthy, Rosie Hornbuckle, Dawn Ellams*



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No xxxxxxxxx



# Trash 2 Cash (2018)

## Fashion Fascia

### THE CHALLENGE

Currently, cars are mostly manufactured with virgin materials, including composites (combinations of materials) that can't be recycled. Recycled materials are mostly unattractive and remain hidden. New regulations coming into force will require car manufacturers to use more and more recycled and recyclable materials; this will mean using them in the visible areas of the car where aesthetic standards are higher. The Trash-2-Cash automotive designers turned their attention to the car interior, where recycled materials could be an eye-catching feature. They focused on the central console and door inserts – the decorative areas by the gearshift and door handles. The designers wanted the new materials to add an individual touch and be luxurious, as well as being made from recycled materials and fully recyclable at the end of their useful life.

### THE INNOVATION

Trash-2-Cash scientists and designers explored a variety of material innovations using T2C recycled polymers and fibres, laser etching, an innovative recyclable epoxy resin and textile print design. In one example recycled PET pellets from old fleece dressing gowns have been injection moulded to produce a central console panel for a car interior. Customisable laser etching adds to the surface decoration, removing the need for additional treatments. In several other experiments a creative print design approach was used to finish different non-woven recycled polyester textiles and then encapsulate them in the new recyclable resin. This set of experimental samples extends this approach even further, reworking recycled polyester wadding with industry-ready finishes, to add value through design. These innovations have produced a number of distinctly different but beautiful decorative fascia pieces, showing new material directions for cars of the future.

By law, cars of the future will be increasingly required to use recycled and recyclable materials in their production. The Trash-2-Cash recycling technologies allow the proposal of new modes for manufacturing visually appealing, high-quality automotive interior plastics using recycled plastic pellets, recycled textiles and recyclable resin.



# Mistra Future Fashion (2011-2019)

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# Mistra Future Fashion, Phase 1 (2011 - 2015)

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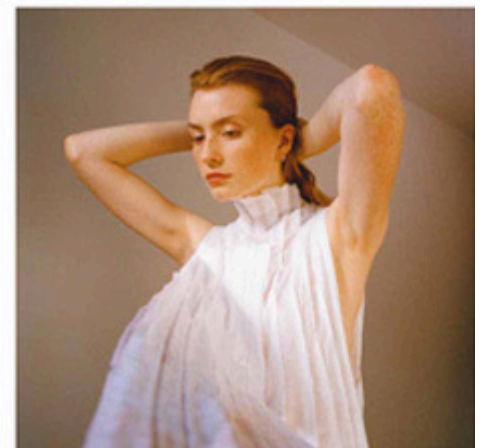
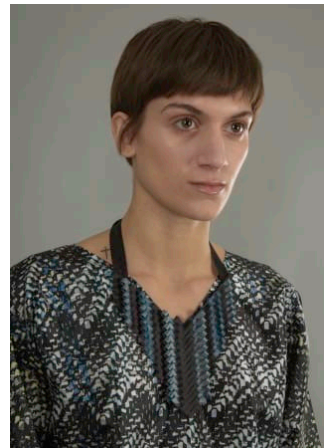
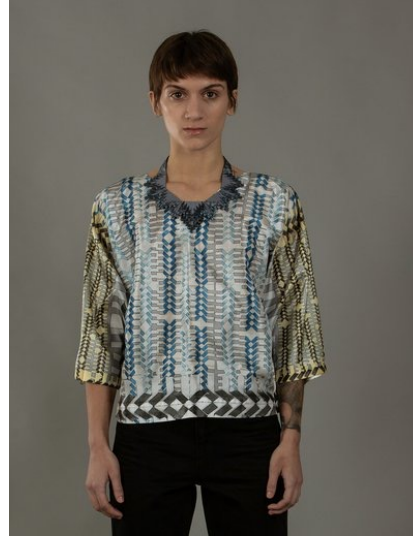


# Mistra Future Fashion, Phase 2 (2015 - 2019)

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For Phase 2 of the Mistra Future Fashion project researchers worked closely with material developers and service providers, to design appropriate materials for different speeds of use, production and recovery. They developed the concepts whilst also continuing to share their approaches with fashion designers in industry to enable commercial prototypes to be developed alongside the research garments.

**CCD researchers:** *Becky Earley, Kate Goldsworthy, Kay Politowicz, Helen Paine, Cathryn Hall, Laetitia Forst, Marion Real*



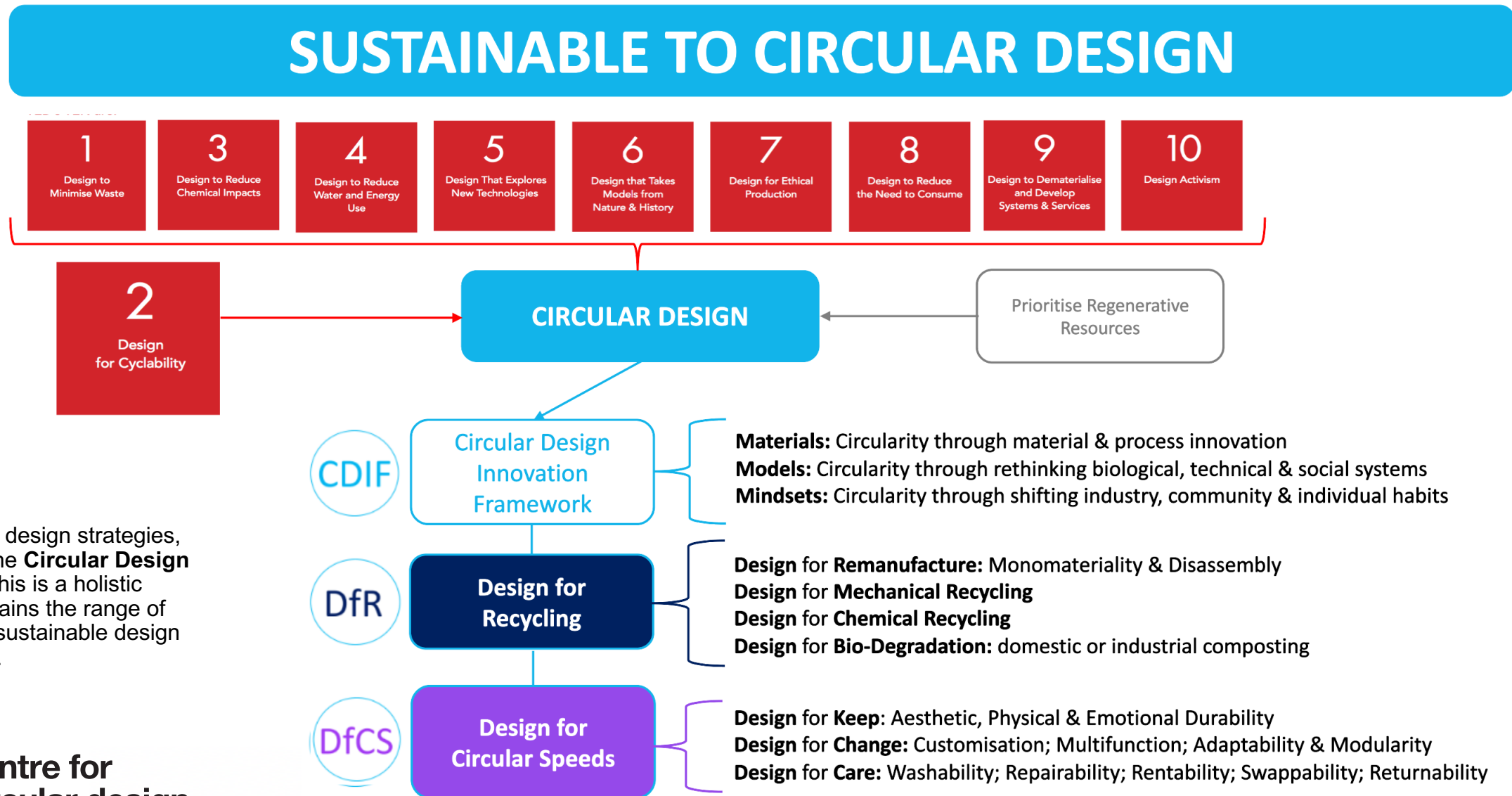
mistra  
future  
fashion

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circular design

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# Methodology: Strategic Textile Design Thinking



The **TEN**: sustainable design strategies, evolved in 2020 into the **Circular Design** strategy framework. This is a holistic approach which maintains the range of values established in sustainable design research and practice.

# HEREWEAR (2020-2024)

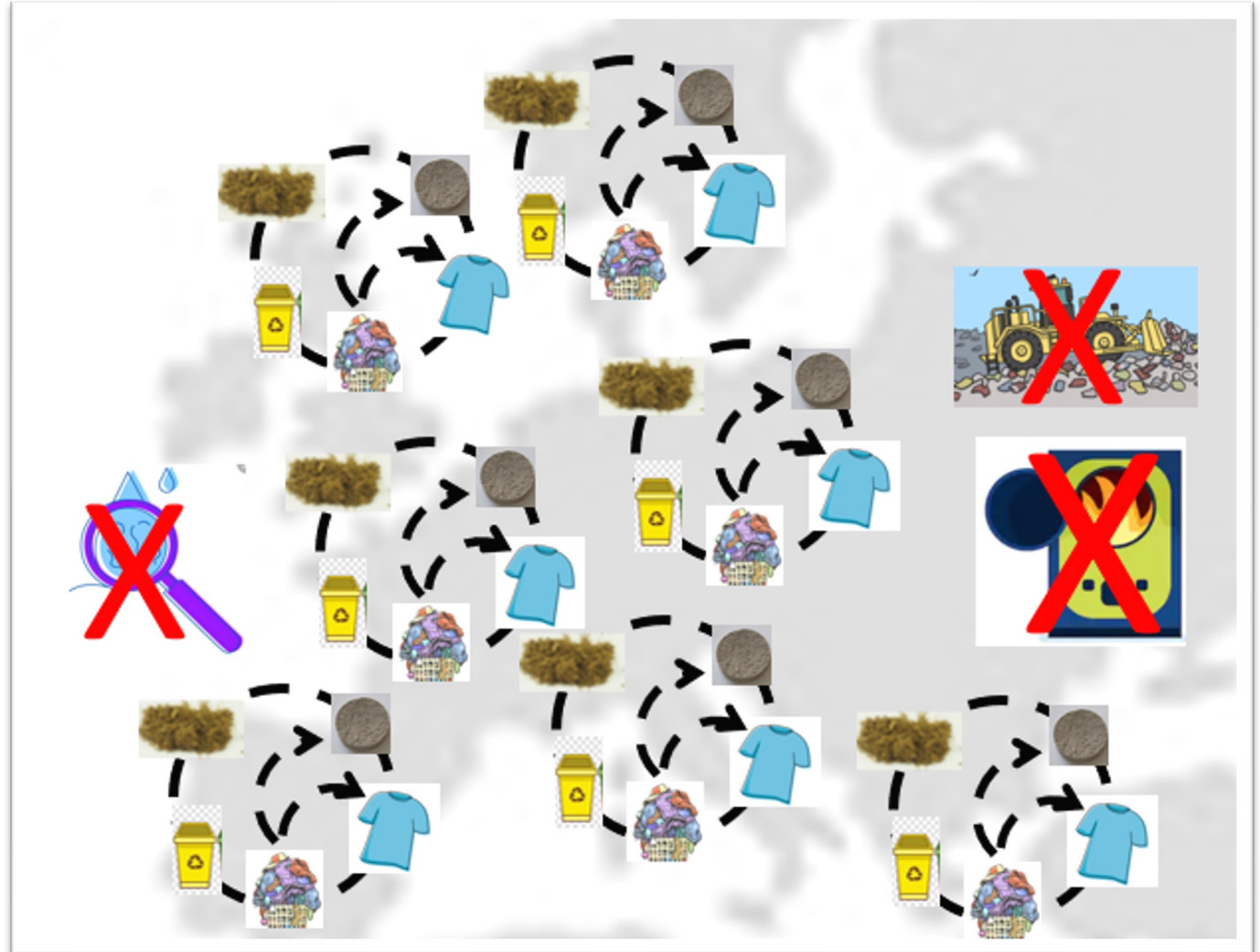
Herewear is CCD's latest EU H2020 funded research project, focusing on bio fibres made from agricultural waste and seaweed, to be used in streetwear and uniforms across a series of localised digital manufacturing hubs. Kick off meetings happened in October 2020 during which all the consortium members met for the first time online. The project is hosted by Centexbel in Belgium, and partners include Circular.Fashion (Berlin), Mai Bine (Romania), Research Institutes of Sweden (RISE) and Eurecat (Spain).

## **CCD researchers:**

*Rebecca Earley, Kate Goldsworthy, Laetitia Forst, Rosie Hornbuckle*



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000632.



# HEREWEAR (2020-2024)

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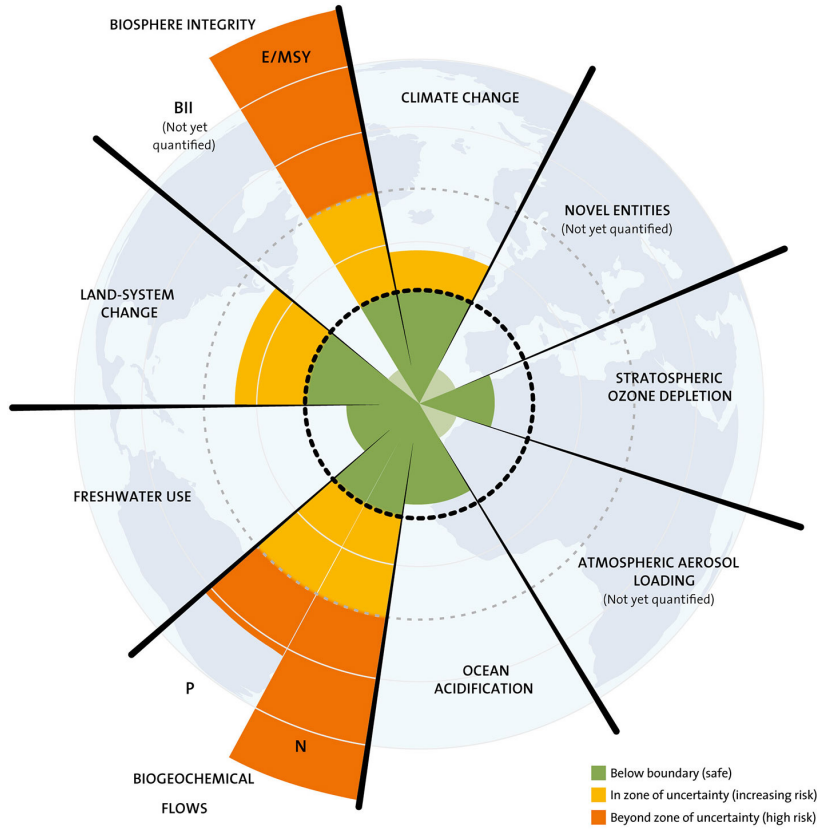


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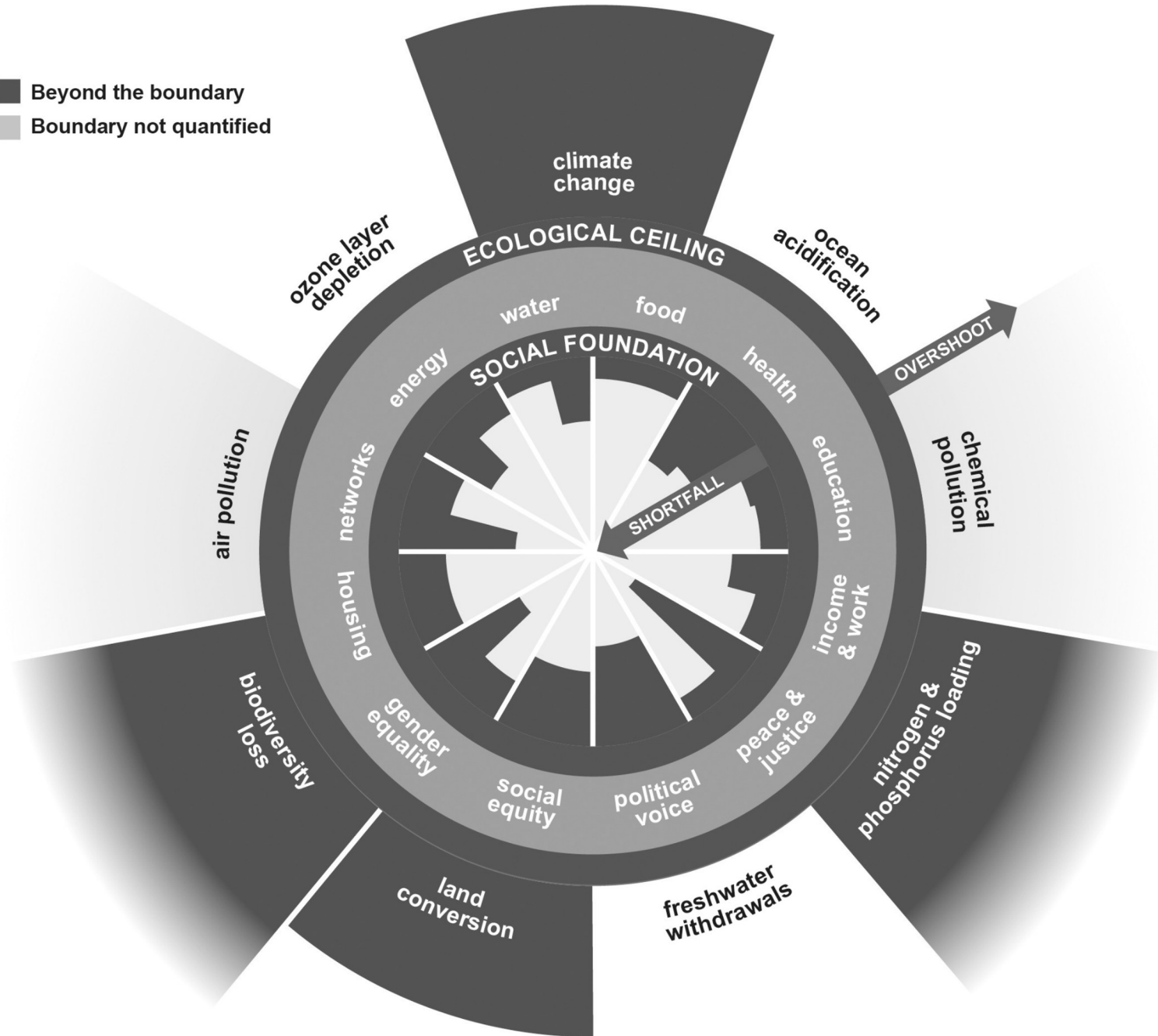
**D1.1 – Bio-Based Samples Collection (2020-21).** Dr Laetitia Forst has been collecting bio-based materials and time coding them 'now', 'near' and 'far'. We are using the samples to create a set of guidelines for how to best use them in localised, circular clothing contexts.

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# Doughnut fashion?



- Beyond the boundary
- Boundary not quantified



# Fashion textile material development through the lenses of...

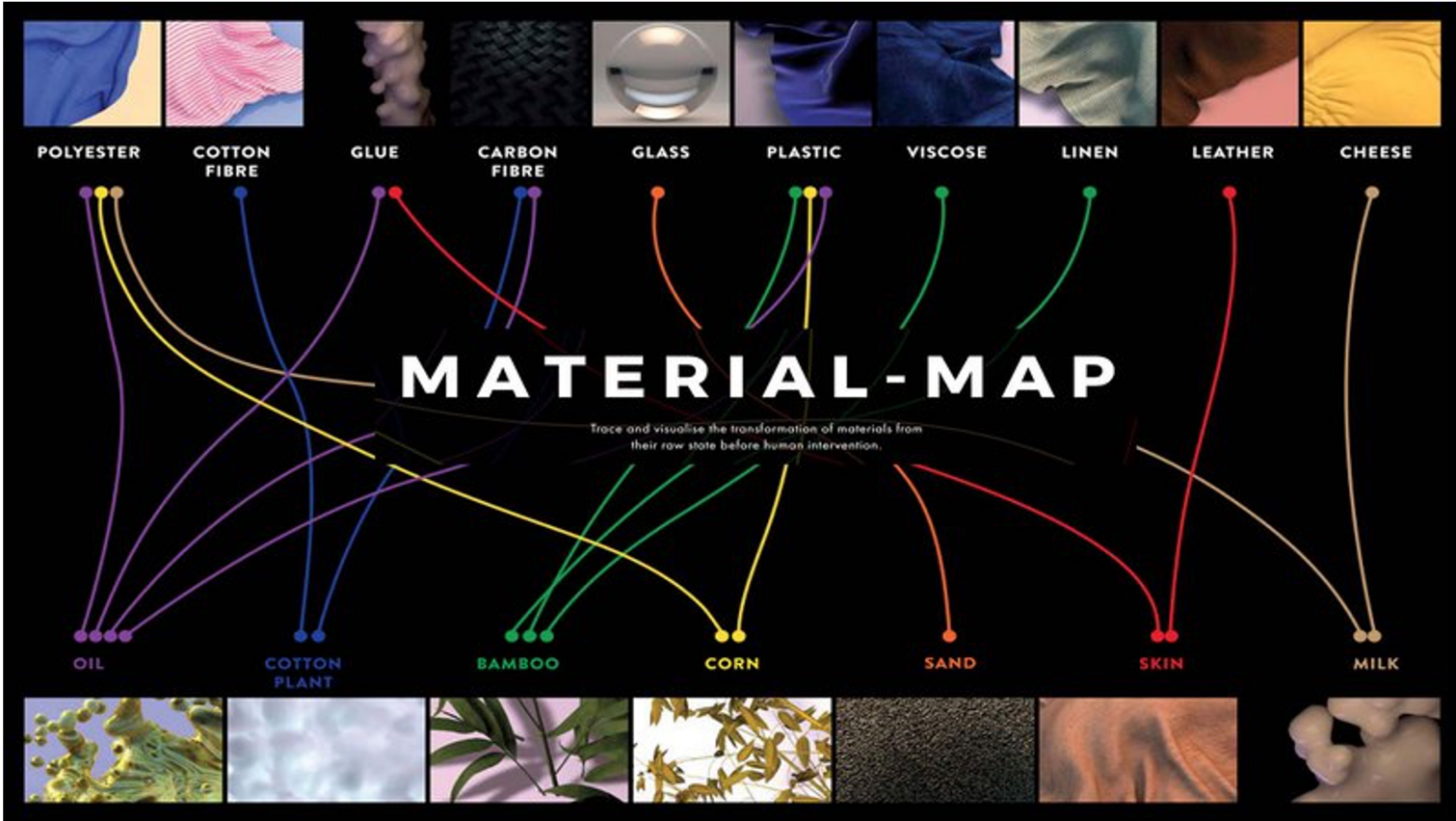
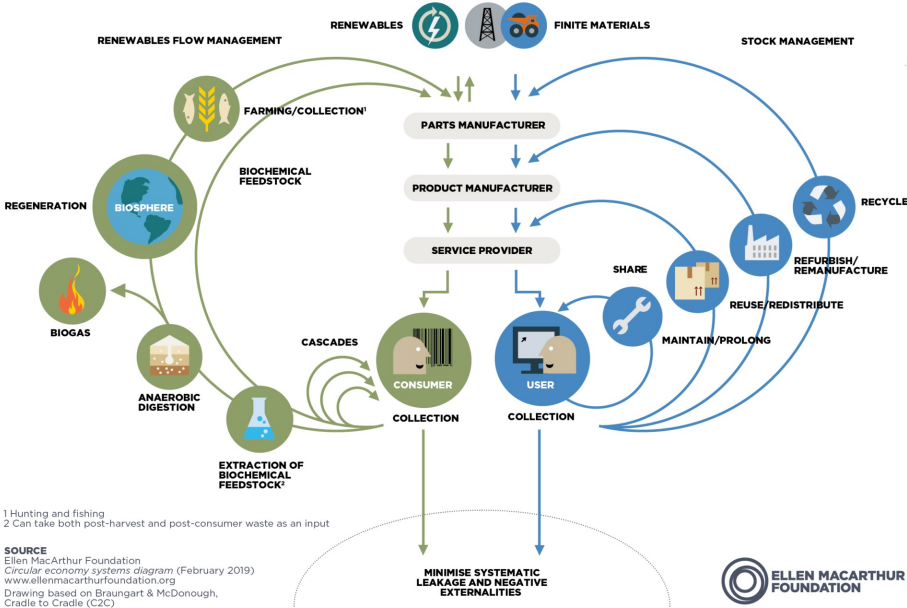
- > Energy
- > Water
- > Food
- > Health
- > Education
- > Income and work
- > Peace and justice
- > Political voice
- > Social equity
- > Gender equality
- > Housing
- > Networks



**SUSTAINABLE DEVELOPMENT GOALS**  
17 GOALS TO TRANSFORM OUR WORLD



# Beyond the butterfly... to material maps



Animal Vegetable Mineral website by Dr Kate Goldsworthy



# Feedstocks, bio-based materials, blending and EOL

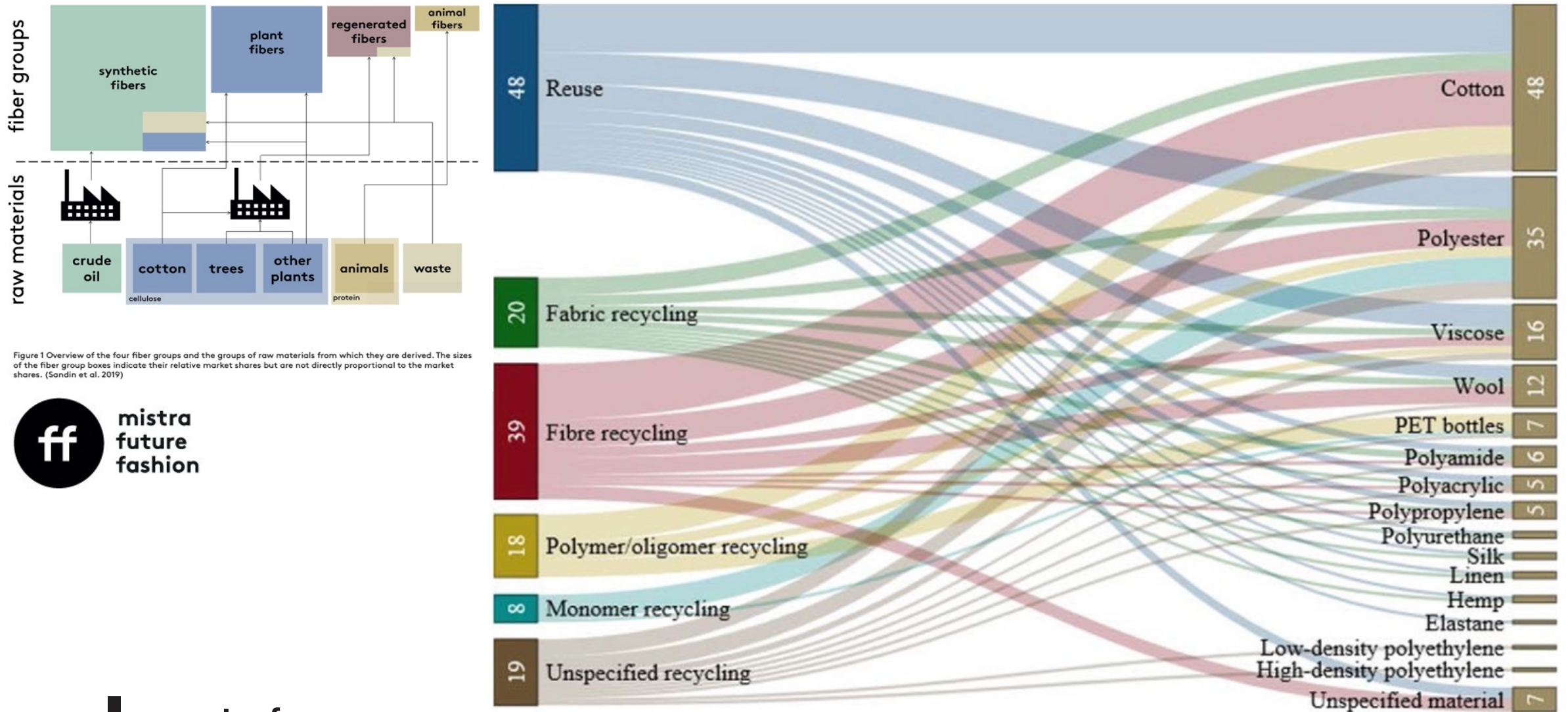
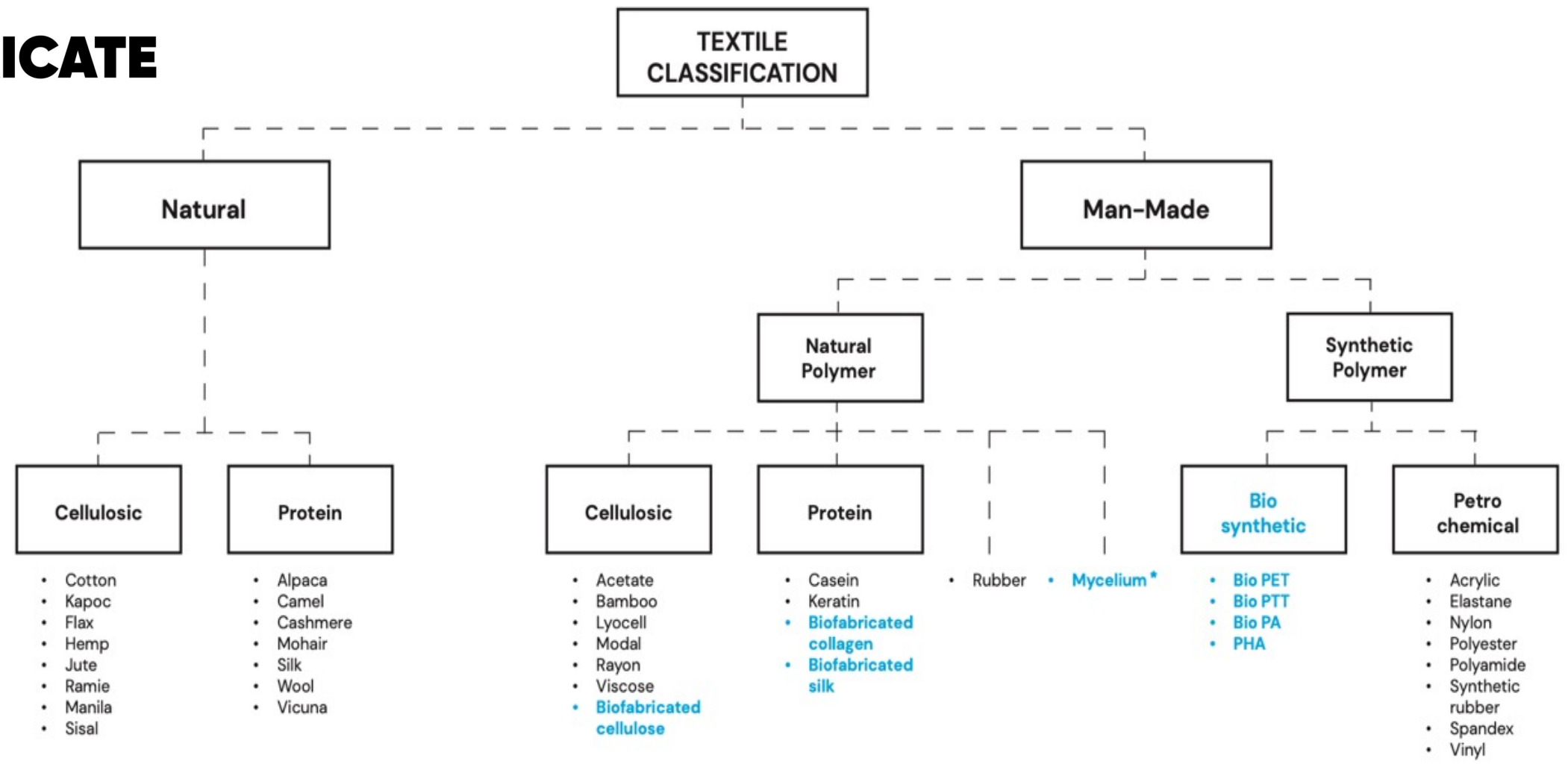


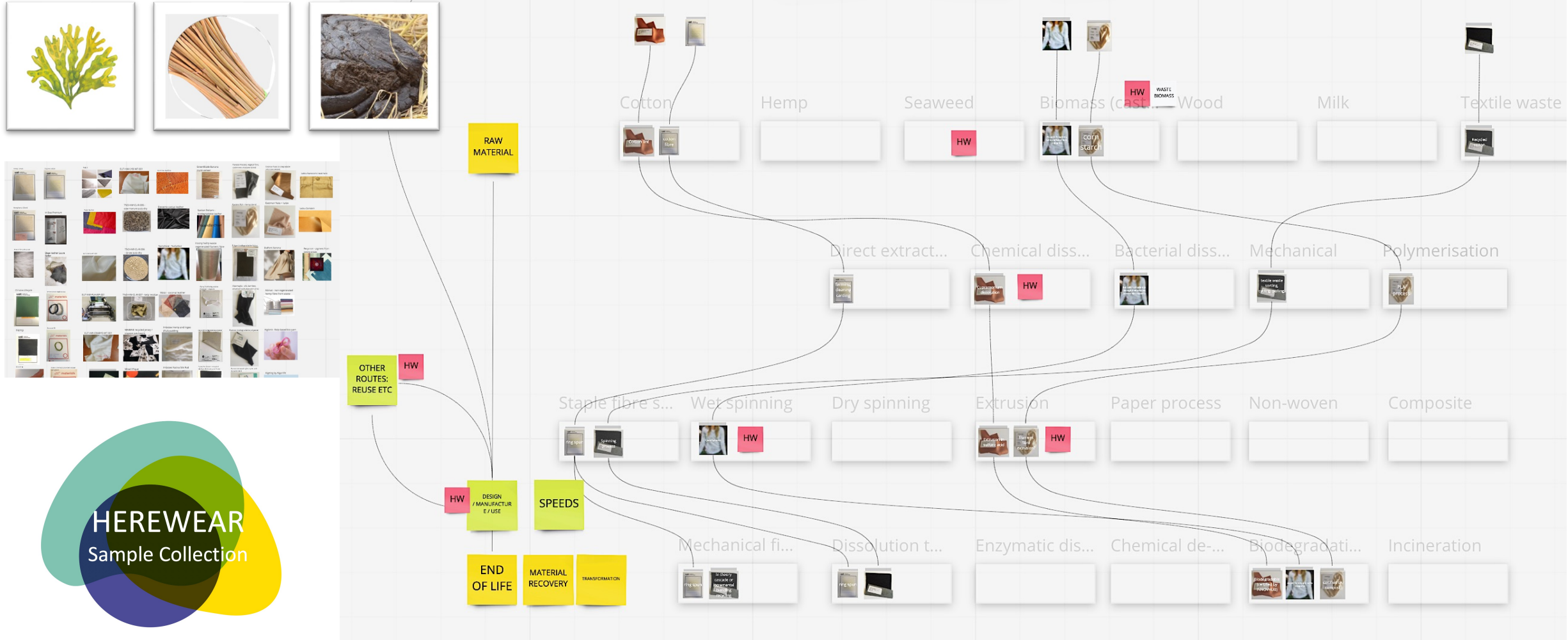
Figure 1 Overview of the four fiber groups and the groups of raw materials from which they are derived. The sizes of the fiber group boxes indicate their relative market shares but are not directly proportional to the market shares. (Sandin et al. 2019)



# Feedstocks, bio-based materials, blending and EOL



# Feedstocks, bio-based materials, blending and EOL



# Meet the Street: prior thinking

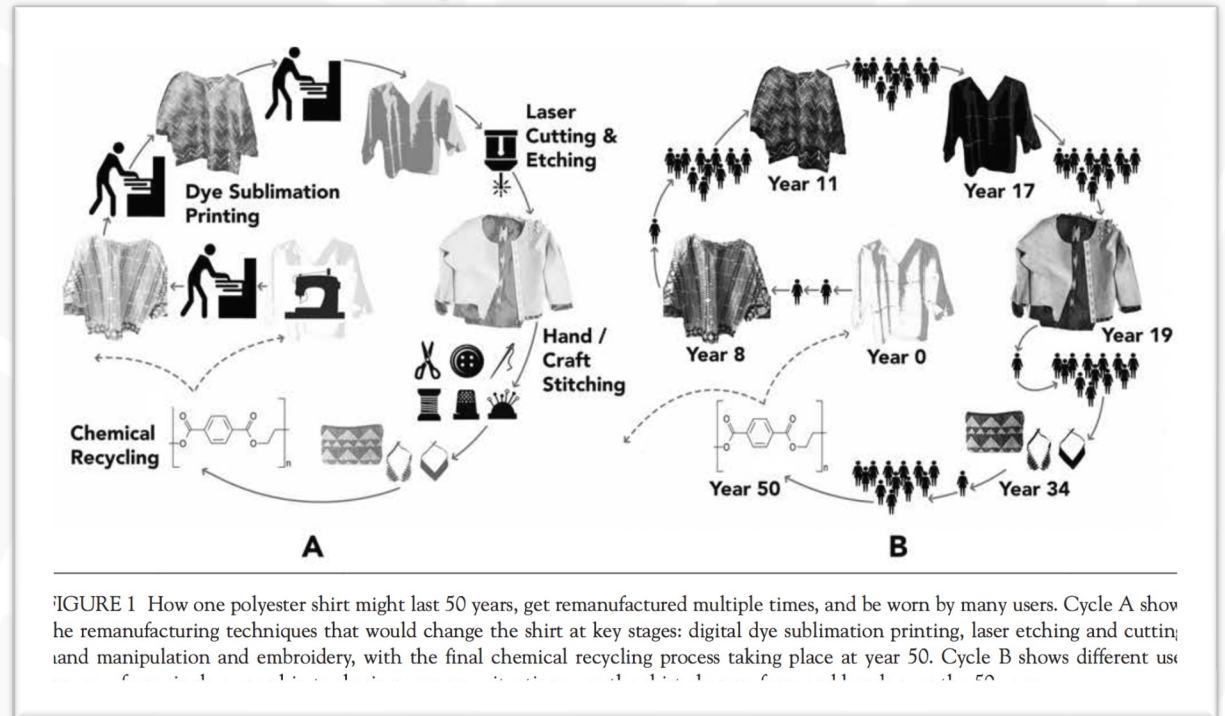
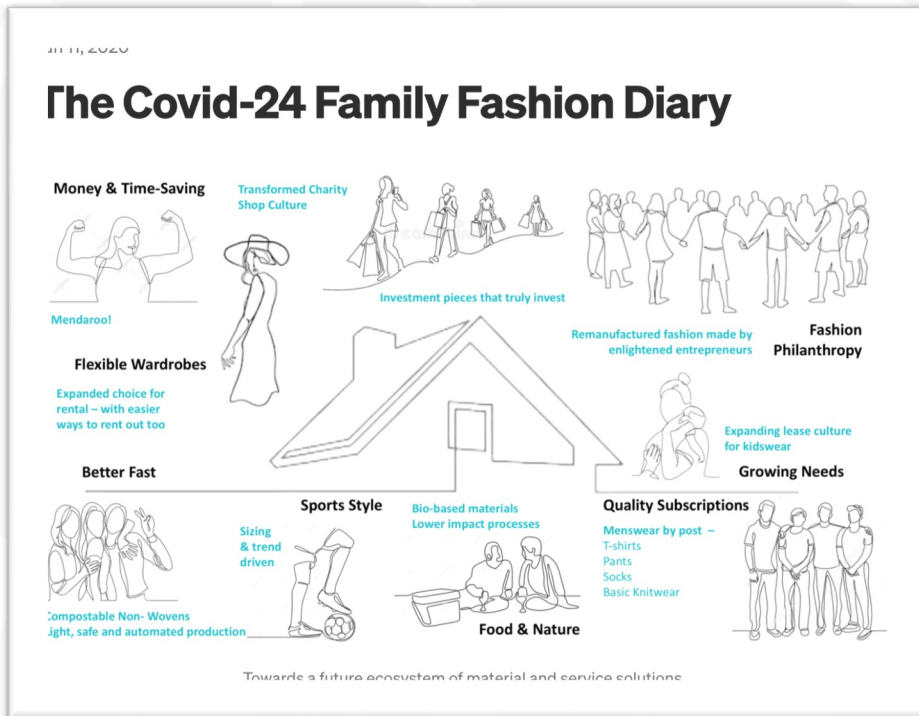


FIGURE 1 How one polyester shirt might last 50 years, get remanufactured multiple times, and be worn by many users. Cycle A shows the remanufacturing techniques that would change the shirt at key stages: digital dye sublimation printing, laser etching and cutting, and manipulation and embroidery, with the final chemical recycling process taking place at year 50. Cycle B shows different users wearing the shirt over time, with remanufacturing occurring at various points throughout its 50-year lifespan.

- Focus on people's needs, habits and behaviours
- Bring materials together with systems, around an end-of-life route
- Consider human stories as motivational factors

- Consider short-, medium- and long-life products
- Products to move between being owned by individuals or borrowed by groups of people
- All goods are recovered in some way: through a biodegradation, mechanical or molecular recovery

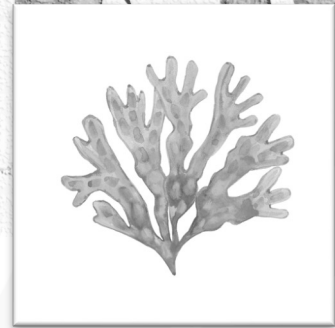
# Future Family



Reusing what we already have



Feeding into stable, durable & highly customizable contexts



Local, regenerative, bio-based, circular – made to meet needs of a community

# Young Entrepreneurs & Professionals



Cardiff Repair Café



An ecology of dress speeds



Virtual fashion

Service sportswear

# Ageing Generation X'ers

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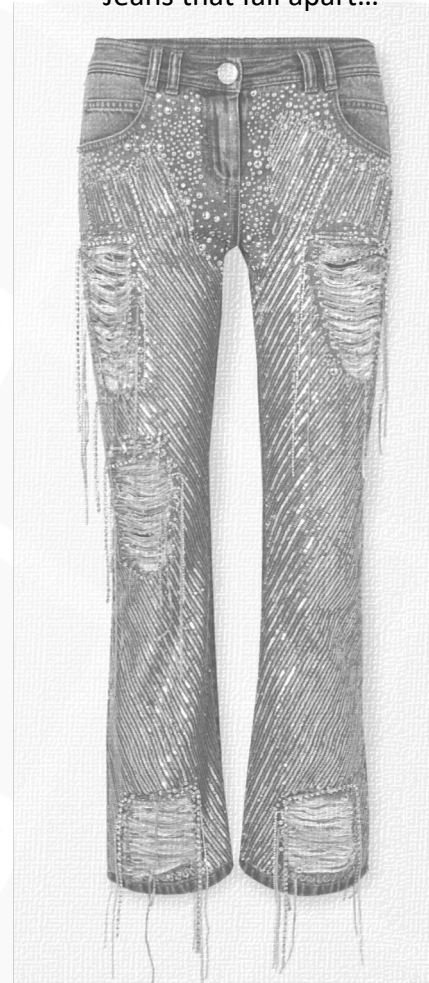


Wardrobes that come with the flat...



Local luxury luggage...

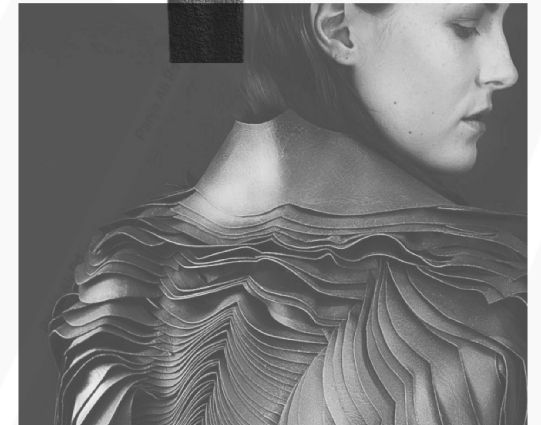
Jeans that fall apart...



Shape, pattern and colour changing clothes



Biker jackets that self-repair & regulate body heat



## Full circularity: 2050

100% circular by 2050: a time when there is dignity, equity and equality. A time when our shared textiles resources, in the form of products and raw materials, are kept in continual circulation. Virgin resources are no longer needed.

We are here to explore the realities of a fully circular future and what we need to do to get there. But this future is yet to take shape. Through dedication, innovation, infrastructure and collectivism, a circular system can operate and thrive.

# Call to action 2021

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## RAW MATERIALS

RENEWABLE, REUSABLE AND NON-TOXIC, USED EFFICIENTLY AND KEPT IN CONTINUAL CIRCULATION

## PRODUCTS & SERVICES

DESIGNING TO KEEP MATERIALS AND PEOPLE FUNCTIONING AT THEIR HIGHEST VALUE

## PEOPLE

PEOPLE ACROSS THE SUPPLY CHAIN THRIVE, IN AN EQUITABLE, SOCIALLY JUST AND RESILIENT SOCIETY



# Thanks for listening!

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Rockström, J., W. *et al.* 2009. Planetary Boundaries: exploring the safe operating space for humanity. *Ecology and Society* 14(2): 32. [online] URL: <http://www.ecologyandsociety.org/vol14/iss2/art32/>

## Project Websites

Centre for Circular Design, [www.circulardesign.org.uk](http://www.circulardesign.org.uk)

Herewear Project, <https://herewear.eu/>

World Circular Textiles Day 2050, <https://worldcirculartextilesday.com/>