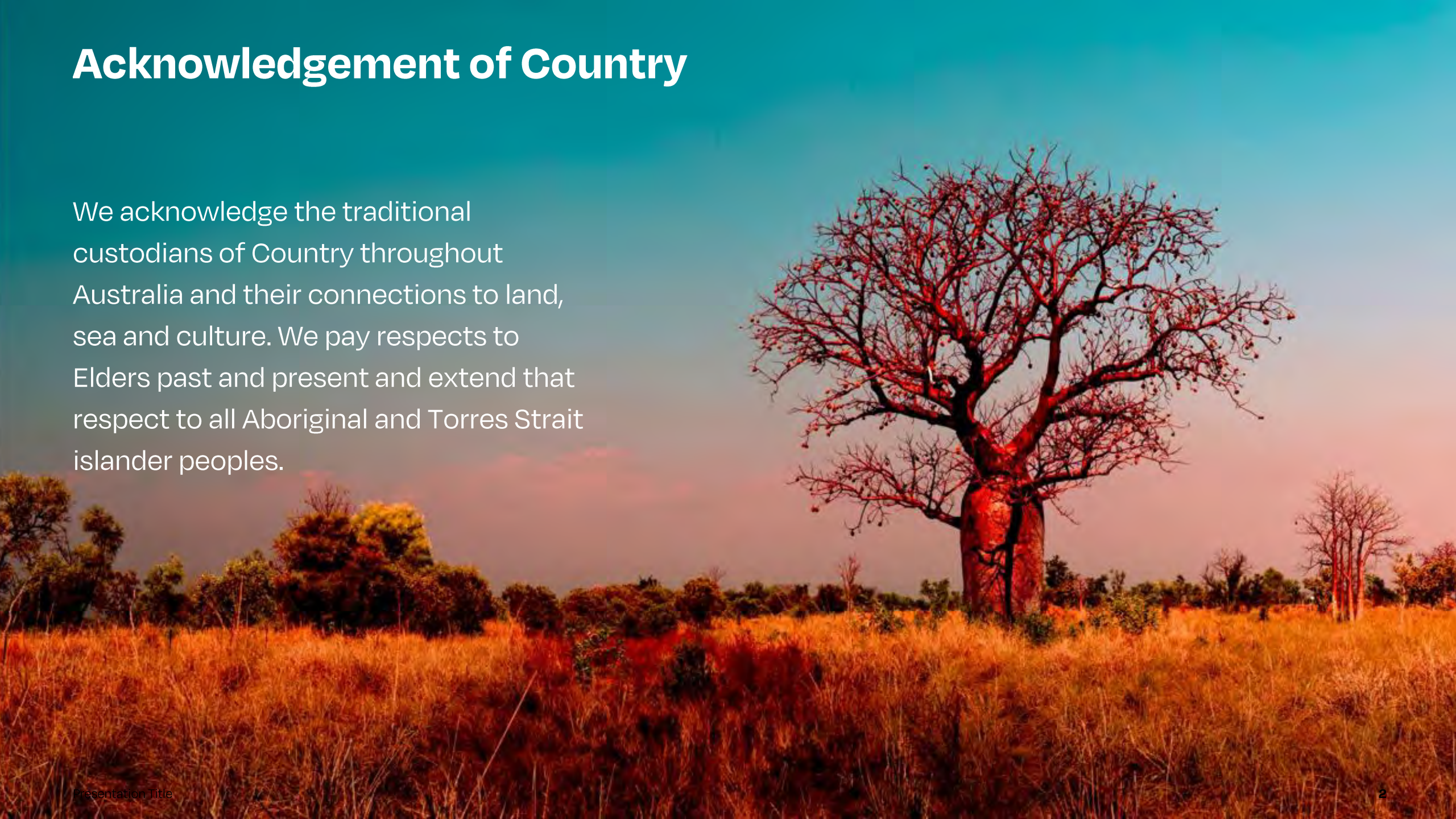
Seamless

Circular Clothing Design Implementation

Practical skills in circular clothing design

Acknowledgement of Country

We acknowledge the traditional custodians of Country throughout Australia and their connections to land, sea and culture. We pay respects to Elders past and present and extend that respect to all Aboriginal and Torres Strait islander peoples.



Today's facilitators

Courtney Holm

- CEO and Founder of A.BCH World and Circular Sourcing.
- Circular fashion designer and systems thinking.

Julie Boulton

- Leading sustainability expert in application of futures thinking, circular principles and systems design.
- Advises business and government on implementing sustainability frameworks.

What we'll cover

01 Circular design method overview

02 Design

03 Document

04 Deliver

05 Next steps

Learning objectives

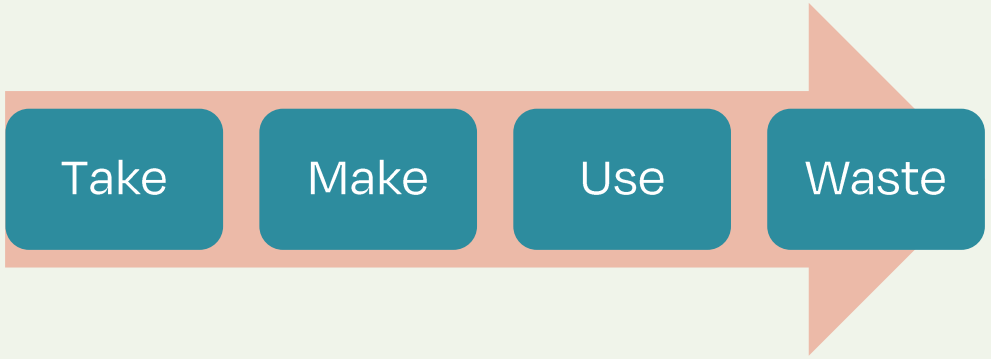
01 Apply the Refashioning circular clothing design methodology in a real world environment to redesign a garment that aligns with circular design principles.

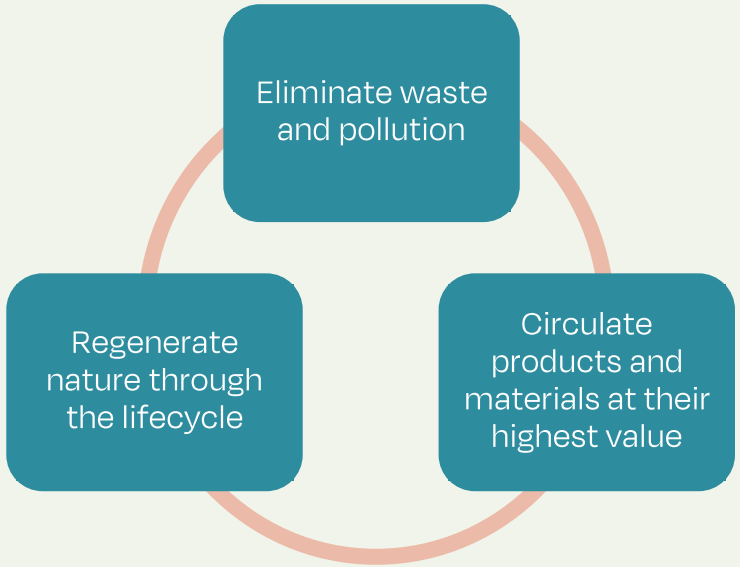
02 Collaborate with others to share learnings and set practical, actionable goals to support the implementation of circular clothing design principles within your organisation.

01.

Circular design method overview

Linear vs circular





- A **linear economy** is where products are made, used and discarded – the 'take, make, waste' economy.
- A **circular economy** eliminates waste throughout a product's lifecycle by ensuring that safe, recyclable or renewable inputs are used and that what we make is used for longer, and made to be reused.

Material flows

- The circular system can be understood within two material flow cycles: **biological** and **technical.**
- The **biological cycle** refers to a natural systems process for materials that are generated, consumed and returned to the earth safely.
- In the **technical cycle**, products and materials are kept in circulation for as long as possible so as to maintain the value embedded in the product.

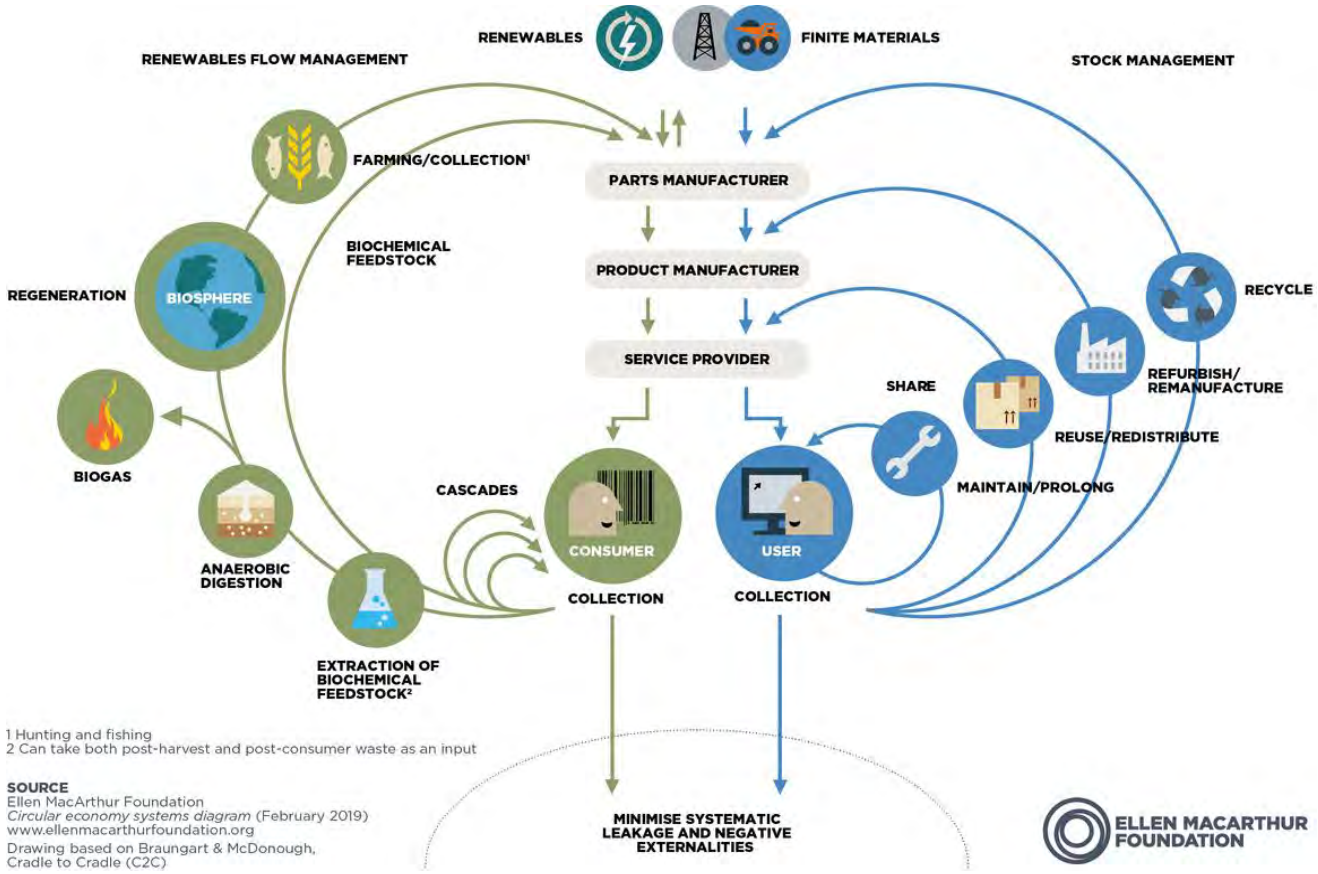


Image courtesy of the Ellen Macarthur Foundation

Circular design

- **Circular design** embeds circular economy principles into the design process. The objective is to produce products that can flow through a circular system.
- **Slowing the flow** is about designing products for a long life - they are kept in use at their highest value, for longer.
- **Closing the loop** is about designing for end of life – identifying how material value can be captured and reclaimed from the beginning.

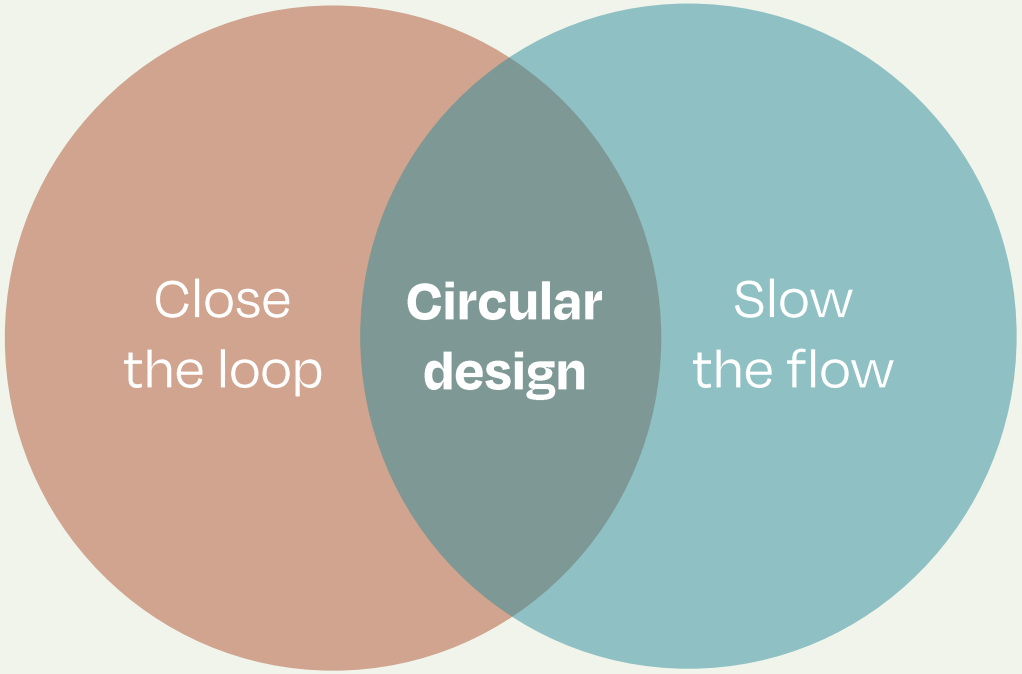


Image adapted from 'Refashioning: A Practical Guide'

Circular design for the full lifecycle

- Designing clothing for circularity requires knowledge of the full product lifecycle.
- It's crucial that designers consider the full lifecycle and if the product is not able to circulate past the use phase, to question whether the product needs to be created in the first place.
- Products that are not able to flow through this system are not circular.

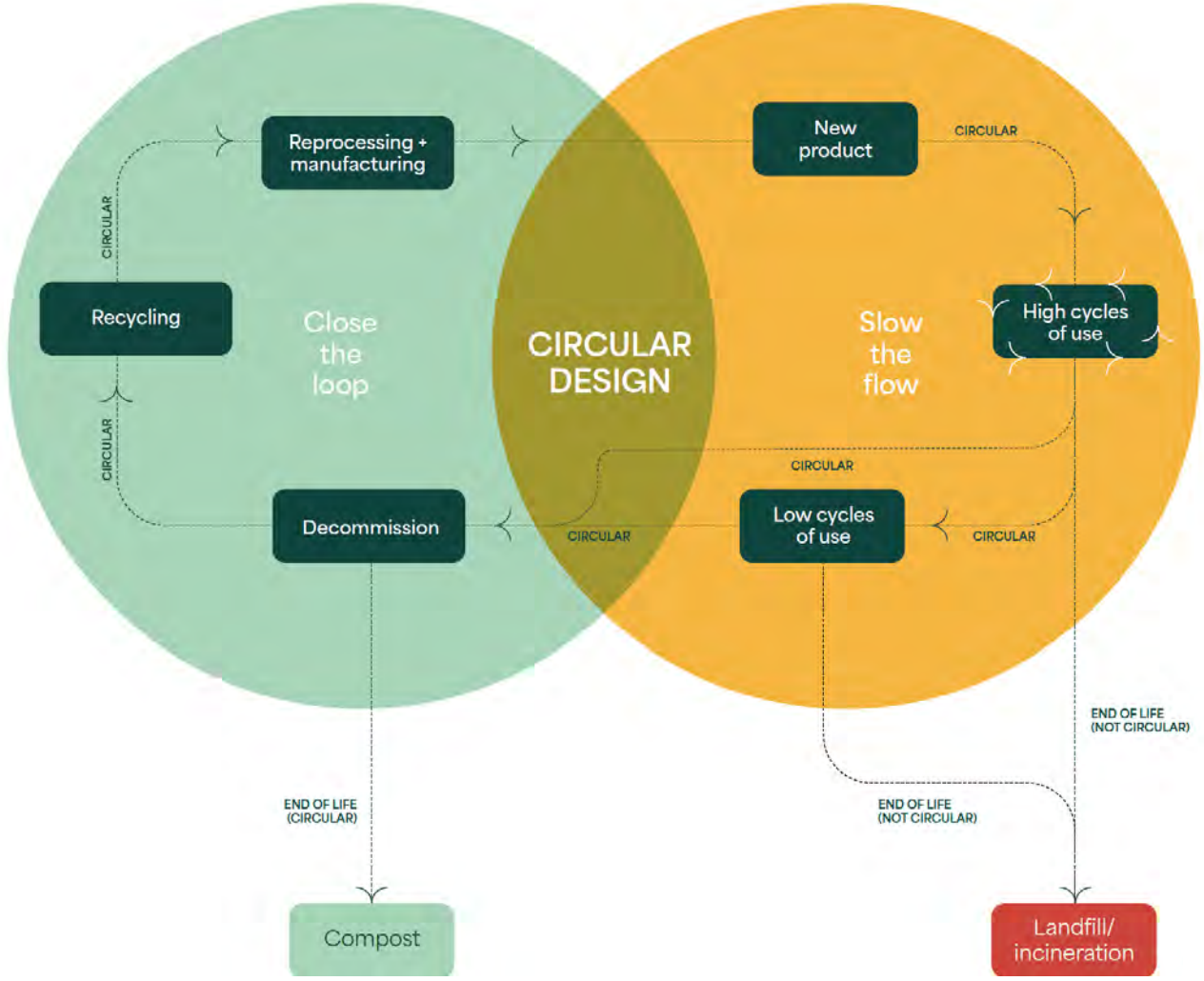


Image: Refashioning circular design systems approach, adapted from A.BCH World

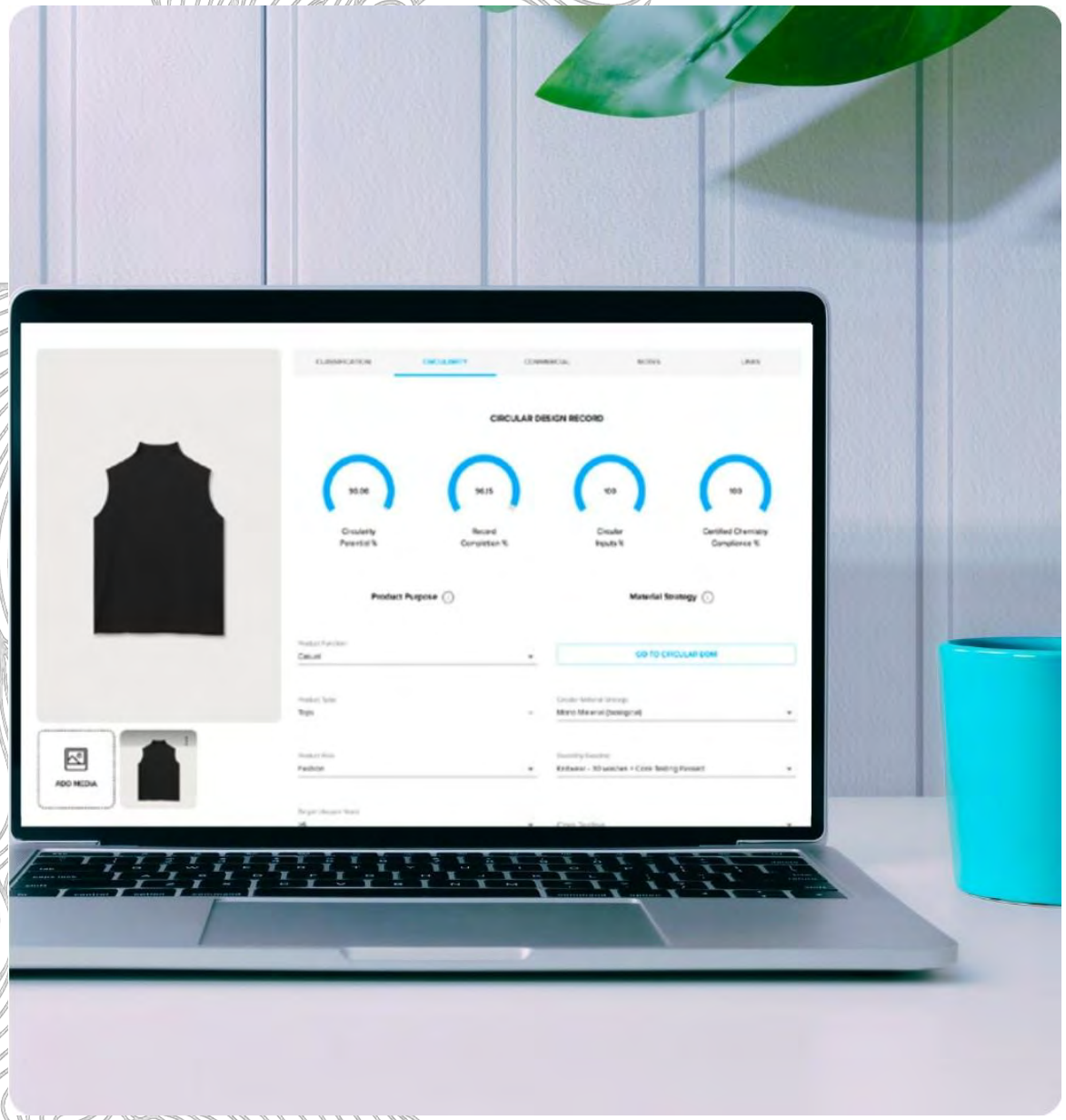
Group activity

Introductions

- Your role
- Your organisation
- Your interest in circular clothing design

Refashioning

- **Refashioning: Accelerating Circular Product Design at Scale** (Refashioning) is an innovative circular design guide for all clothing brands, no matter the scale.
- It was produced by a collaboration led by RMIT University's School of Fashion and Textiles and delivered in partnership with Country Road Group, A.BCH World and Julie Boulton Strategy and Sustainability.
- This training program leverages this guide, which was published in 2024.



Process and platform

- The team behind Quadrant Circular (QC), led by Seamless supporter Style Atlas, are providing all participants with free access to this circular clothing design solution for the duration of the training.
- There's no need to download any software—you simply access QC from your browser in a secure encrypted environment.
- QC makes it easy for you to collect, prompt and store your data and decisions throughout the redesign process.

Refashioning templates

- As an alternative to using QC, the Refashioning guide includes a set of templates that support the circular clothing design process.
- These have been shared with you in an editable format – there's no need to print them. Just download them, save them and type directly in the template.
- Click on the QR code or go to: seamlessaustralia.com/circular-design-training/implementation

Preparing for this workshop

- During this course you'll redesign an existing garment using circular design principles.
- Keep this garment with you as you'll need to refer to it.
- You'll also need to refer to the bill of materials you've created for this garment – if you don't have one, we can make a start on one today.

Circular design method

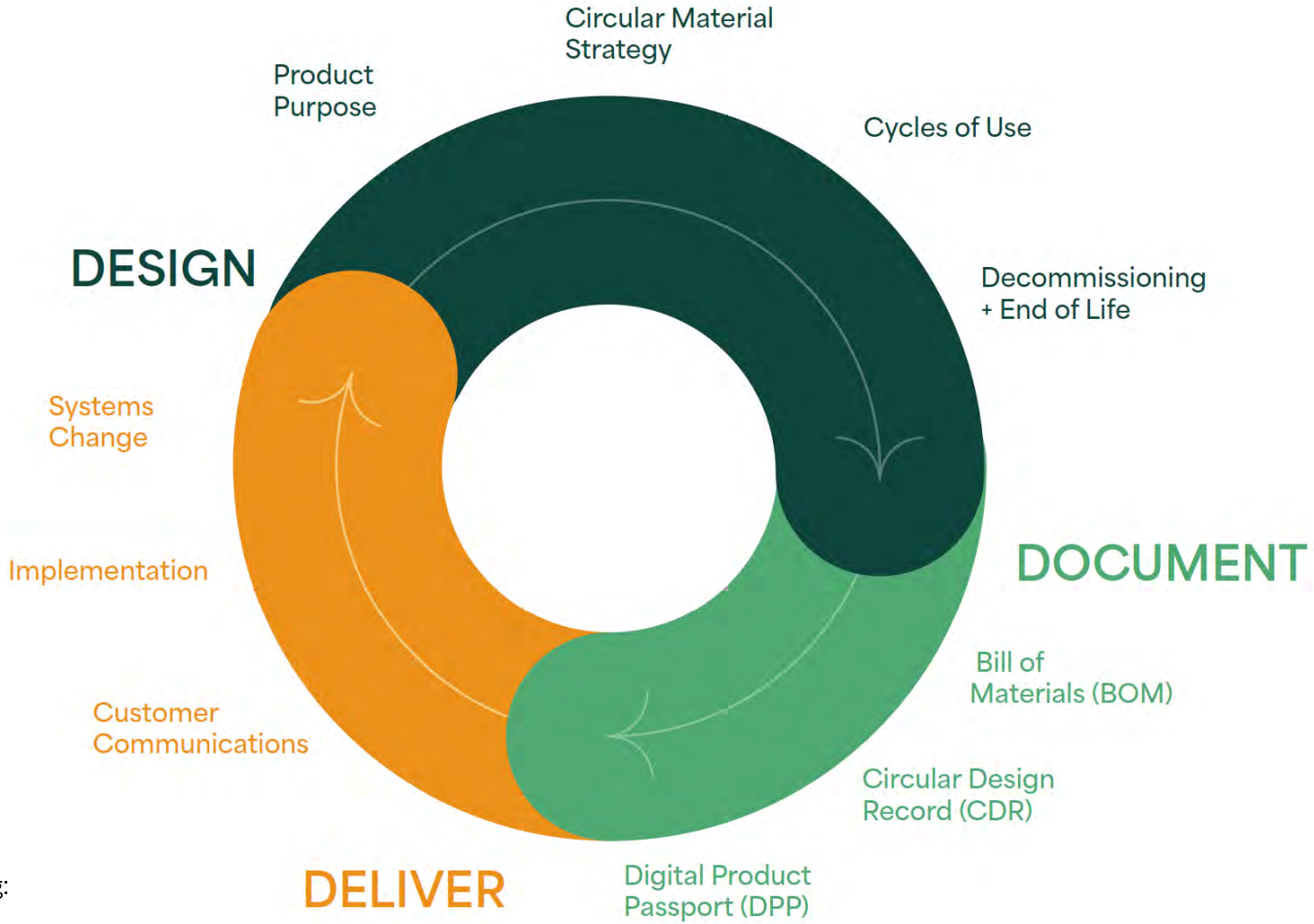


Image: Refashioning circular design method, 'Refashioning: Accelerating Circular Product Design at Scale', 2024

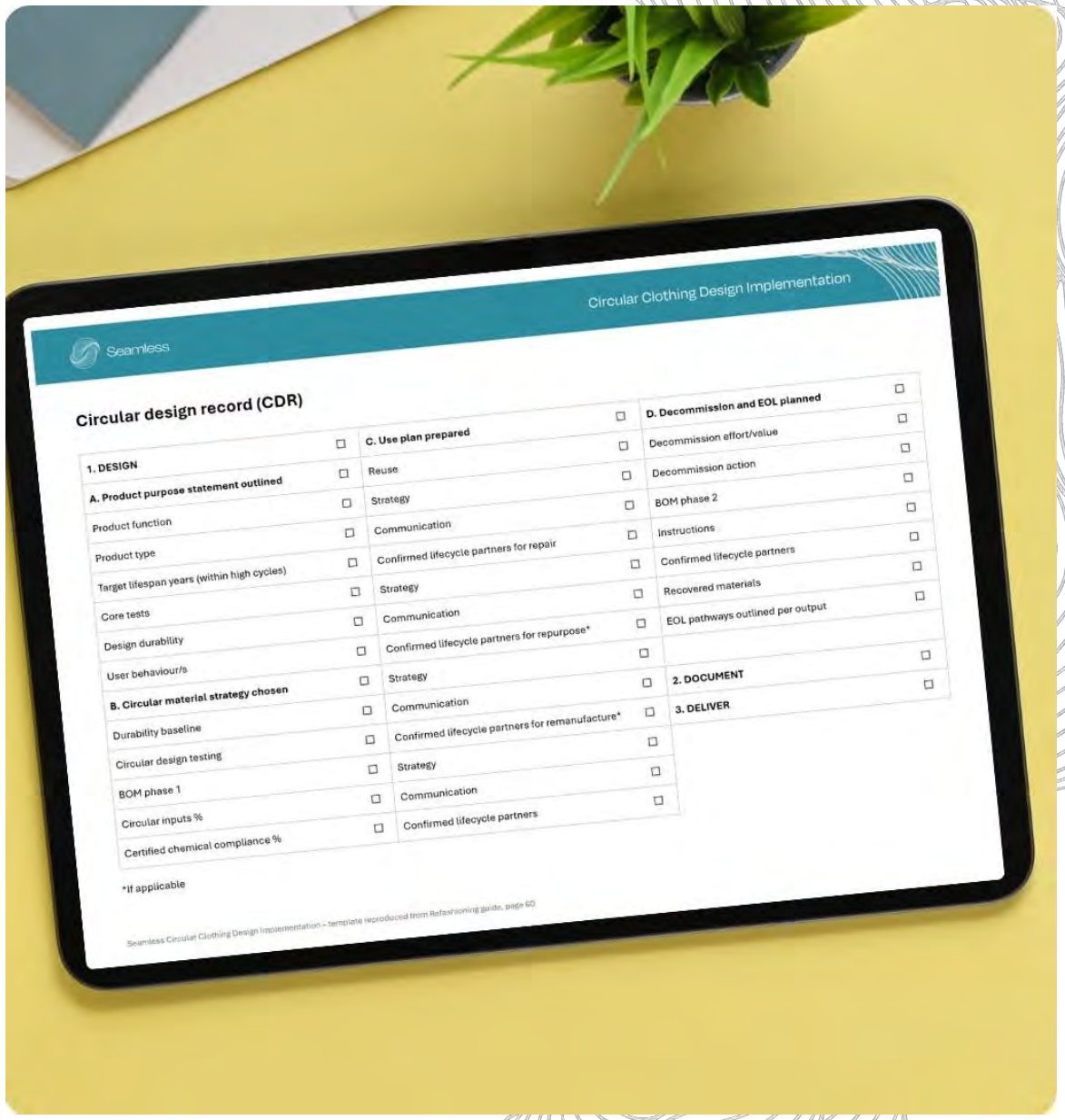
Introducing the CDR

The **circular design record** (CDR) captures each stage of the circular design method and the agreements made with lifecycle partners.

It includes the:

- Product purpose statement
- Circular material strategy
- Use plan
- Decommissioning and end of life plan

This can be completed in Quadrant Circular and the editable CDR template supplied is a checklist to guide you.



Group activity

In your group, discuss:

- The product you'll redesign
- Why you chose it
- What challenges you foresee, if any

02.

Design

Product purpose

1. **Product purpose**
   - Product purpose statement
   - Design for highest value
   - Introduction to lifecycle partners
2. Circular material strategy
3. Cycles of use
4. Decommissioning and end of life

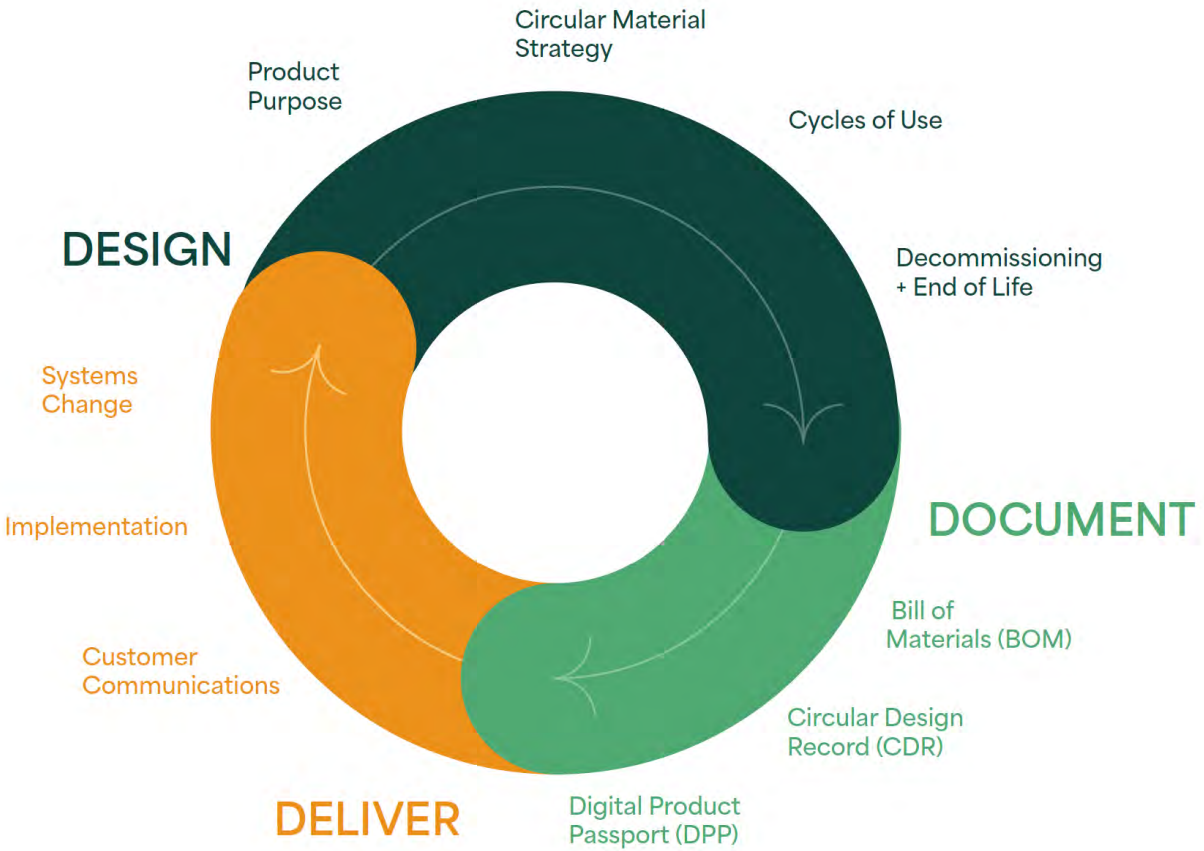
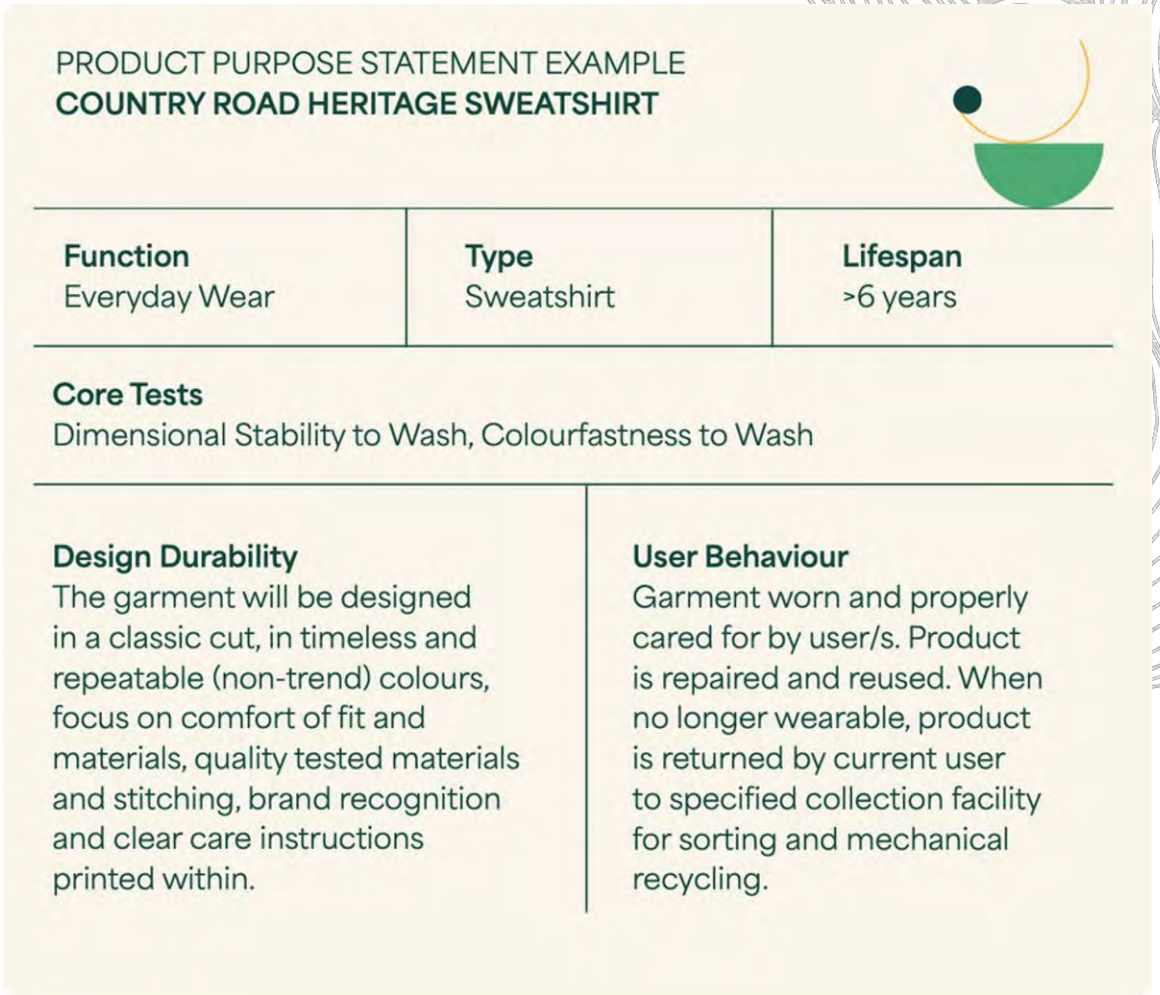


Image: Refashioning circular design method,
'Refashioning: Accelerating Circular Product Design at Scale', 2024

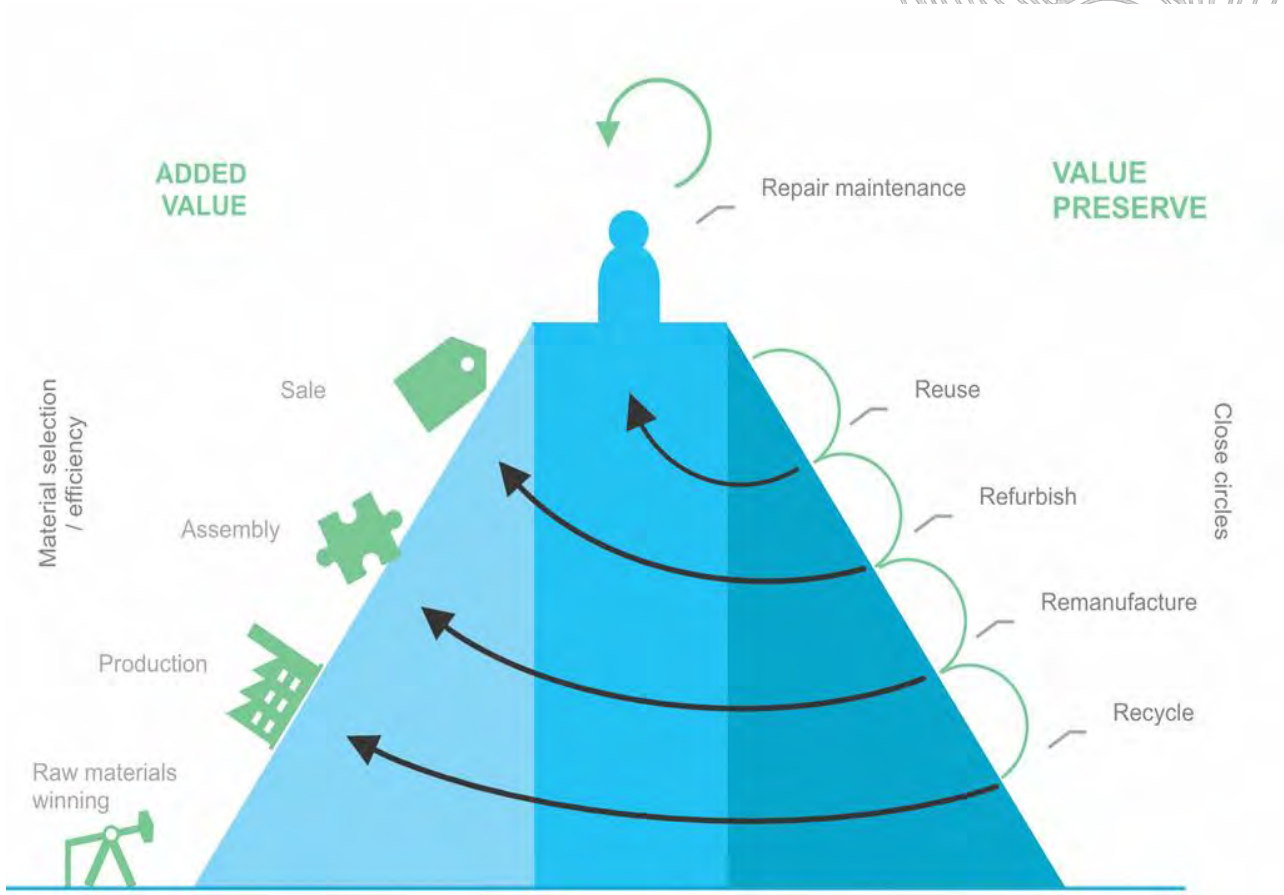
Product purpose statement

- The product purpose explains ‘why’
- It’s an opportunity to rethink part of the resource hierarchy and redesign a product for maximum quality, appeal over time and distribution of value to others
- Product purpose statement lists product:
  - Function
  - Type
  - Intended lifespan
  - Design durability
  - User behaviour



Design for highest value

- Design for highest value means:
  - Valuing raw materials, resources and skills required to make the product
  - Actively creating opportunities for users to value the product over a long time
  - Designing for high value material recovery and recycling
  - Communicating the product lifecycle plan to relevant stakeholders.
- Less than 1% of the global fibre market comes from recycled textiles, meaning most clothing ends up in landfill. **Why?**



The Value Hill

Introduction to lifecycle partners

- Lifecycle partners are stakeholders who provide a service that's integral to a garment's flow through a circular system.
- Working with lifecycle partners at the design stage helps to develop use cycle plans and decommissioning scenarios.
- Lifecycle partners can be internal or external to your organisation. They might be existing or new partners.
- At this stage, consider both raw materials and manufacturing lifecycle partners.

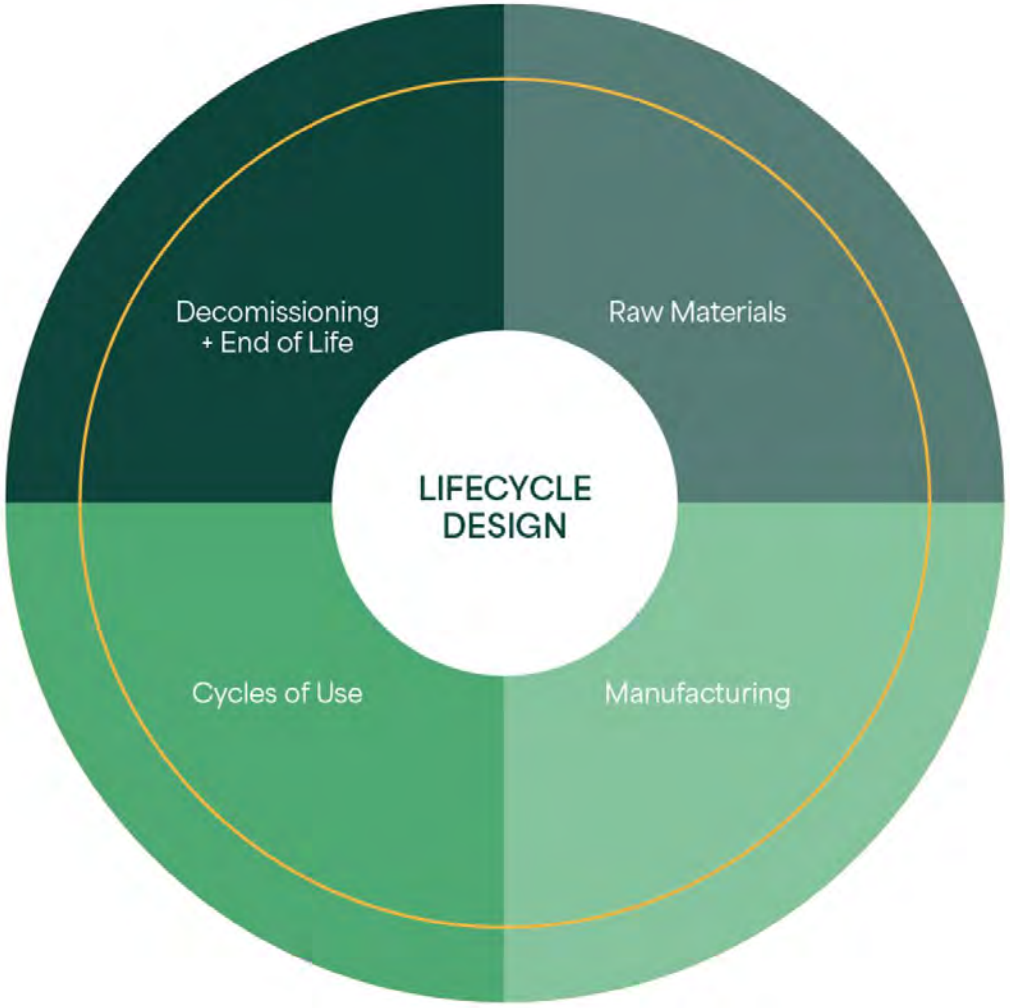
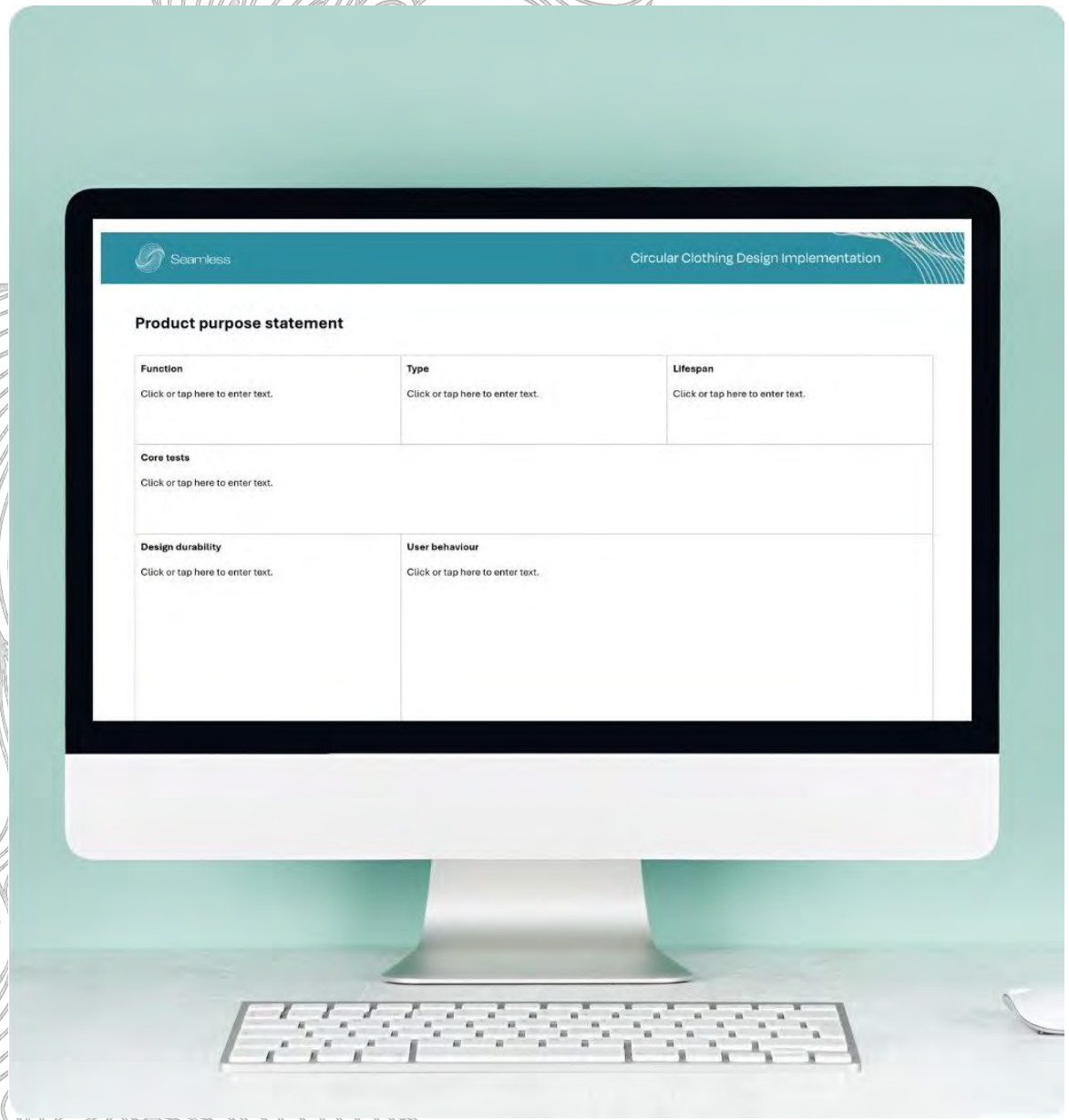


Image: Refashioning lifecycle design



Activity

Create your **product purpose statement** in either Quadrant Circular or the editable template.

This forms part of the circular design record (CDR).

Design

1. Product purpose

2. Circular material strategy

- Material categories
- Material strategies
- Bill of materials (BOM)
- Durability and circularity potential
- Production efficiencies
- Lifecyle partners

2. Cycles of use

3. Decommissioning and end of life

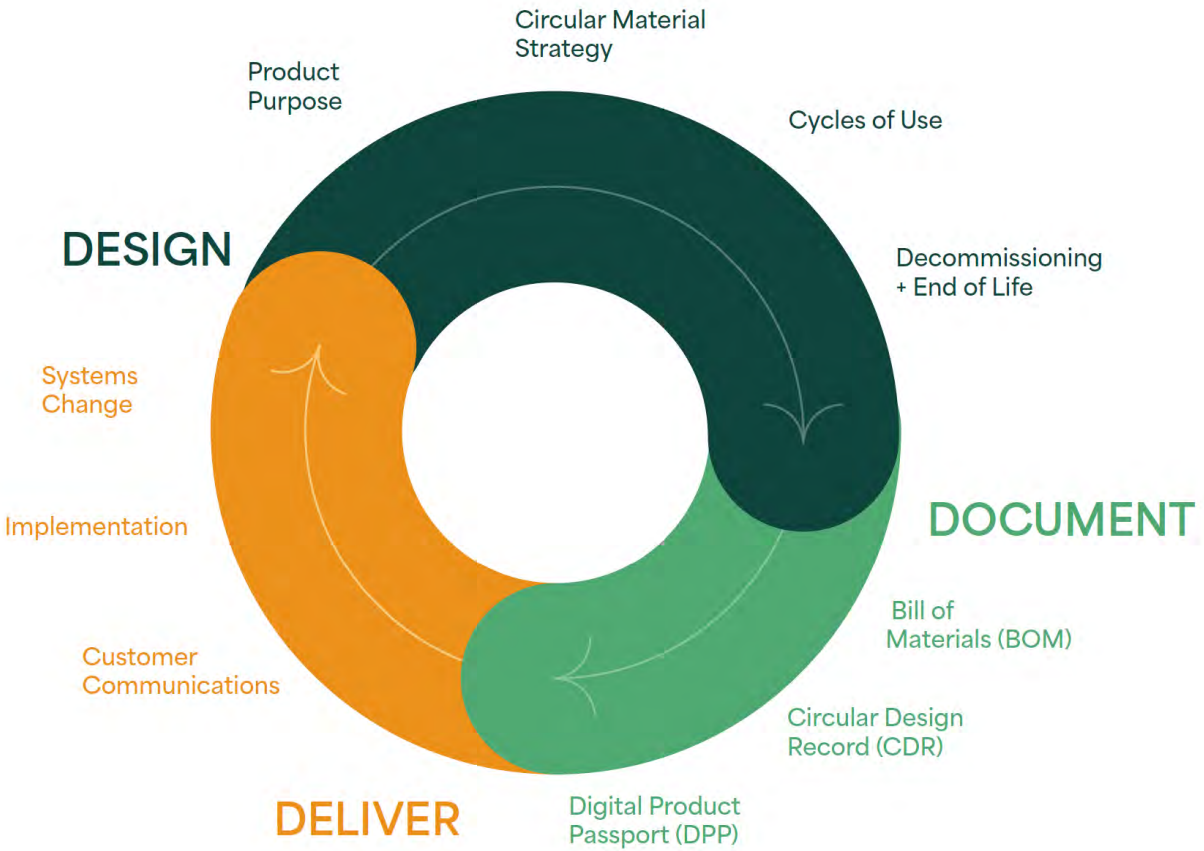


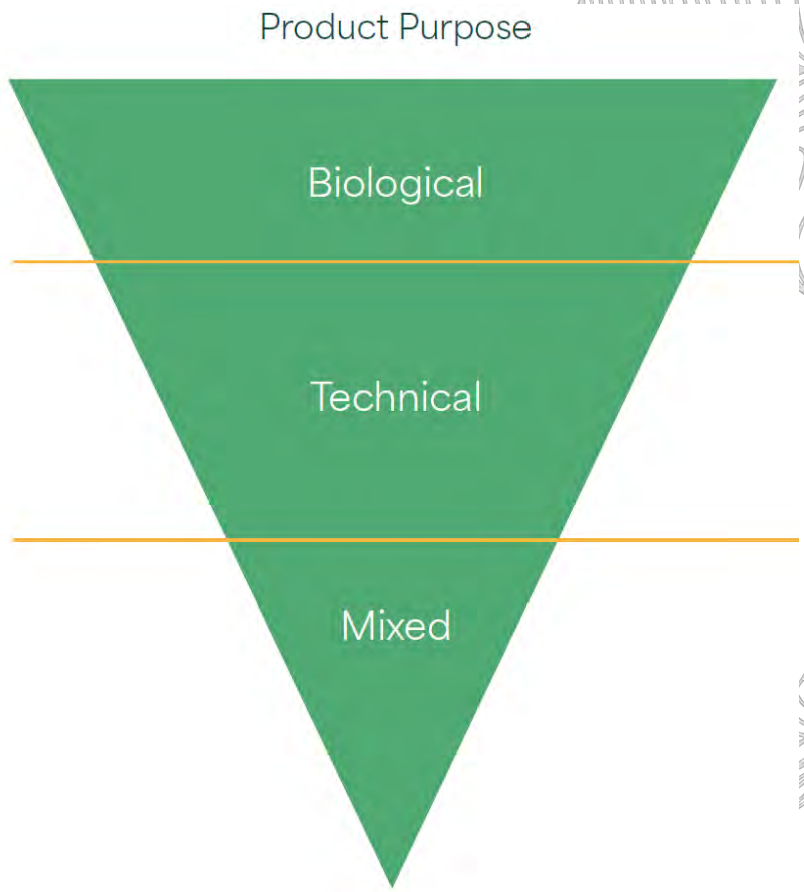
Image: Refashioning circular design method,
'Refashioning: Accelerating Circular Product Design at Scale', 2024

Material categories

There are three categories of materials for circular design:

1. **Biological**: derived from natural fibres. Not augmented with technical materials and can return safely to the earth.
2. **Technical**: derived from synthetic fibres, not augmented with biological materials.
3. **Mixed**: blend of biological and technical materials.

The material you choose should align to your product purpose.



Circular design material

The further you move down the triangle, the harder it is for a product to flow through a circular system.

Material strategies

- Seven material strategies to choose from.
- These strategies align with circular principles of eliminating waste and regenerating nature.
- Strategies are a hierarchical list based on:
  - Monomateriality or simple disassembly
  - Highest lifecycle materials value
  - Simplest, most scalable processes for end-of-life pathways
- Your product purpose should help to inform which strategy you choose.

Material strategies

Image: Refashioning guide

Material strategies

- **Monomaterial:** where materials and products consist of one (100%) of the same fibre or contents.

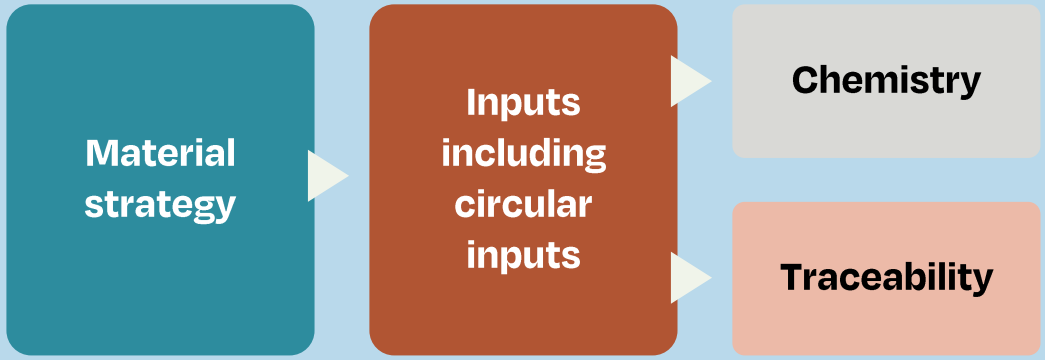
- **Simple disassembly:** products can be easily separated into material constituents at a particular phase in the lifecycle. "Simple" means low complexity and a minimal number of disassembly tasks is required - they must be outlined in the design phase. Simple disassembly allows for materials to enter reuse or end of life phases.

Material strategies

Image: Refashioning guide

Material strategies

Material strategy	Definition	Market example
Monomaterial (biological)	100% biological material of the same fibre. Requires no manual separation of materials at end of life.	A.BCH
Monomaterial (technical)	100% technical material of the same fibre. Requires no manual separation of materials at end of life.	Napaprijri
Simple disassembly (biological)	A mix of 100% biological materials that are specifically designed for simple separation for further processing.	Kowtow
Simple disassembly (technical)	Mix of 100% technical materials that are specifically designed for simple separation for further processing.	Norse Projects
Simple disassembly (mixed)	Mix of biological and technical materials that are specifically designed for simple separation of materials into multiple reclaimable material streams.	Unspun Uniqlo
Simple disassembly (polyester/cotton blends)	Mix of only polyester (PET) and cotton fibres (either as a blended fabric or mixed materials) specifically designed for simple separation of individual components, for example, removing buttons. Requires additional chemical separation of biological and technical materials from a specialist provider or mechanical recycling into renewed poly/cotton fabrics.	Cargo Crew
Not yet circular	Mix or blend of fibres and/or materials that are not easily separated, for example, wool/nylon blend fabric. Requires time consuming and manual separation of biological and technical materials that are generally considered too high effort or low value to perform. Reserve for the most complex of items with performance restrictions, such as fire fighter uniforms or extreme weather gear, with the goal to develop circular innovations for these products.	



What inputs in your current BOM should be replaced?
Who do you need to speak with to find out?

Bill of materials

- Once selected, record the material strategy in the **bill of materials**.
- The bill of materials (BOM) captures, measures and tracks every input including components and trims, of a garment.
- This is where you capture every raw material and whether it is:
  - Circular (renewable, recycled or reused)
  - Certified for traceability (chain of custody certifications such as OCS)
  - Certified for chemistry (Oekotex 100, Crade2Cradle Gold)
- The material strategy should always come first.

Bill of materials examples

Circular Material Strategy: *NOT YET CIRCULAR*

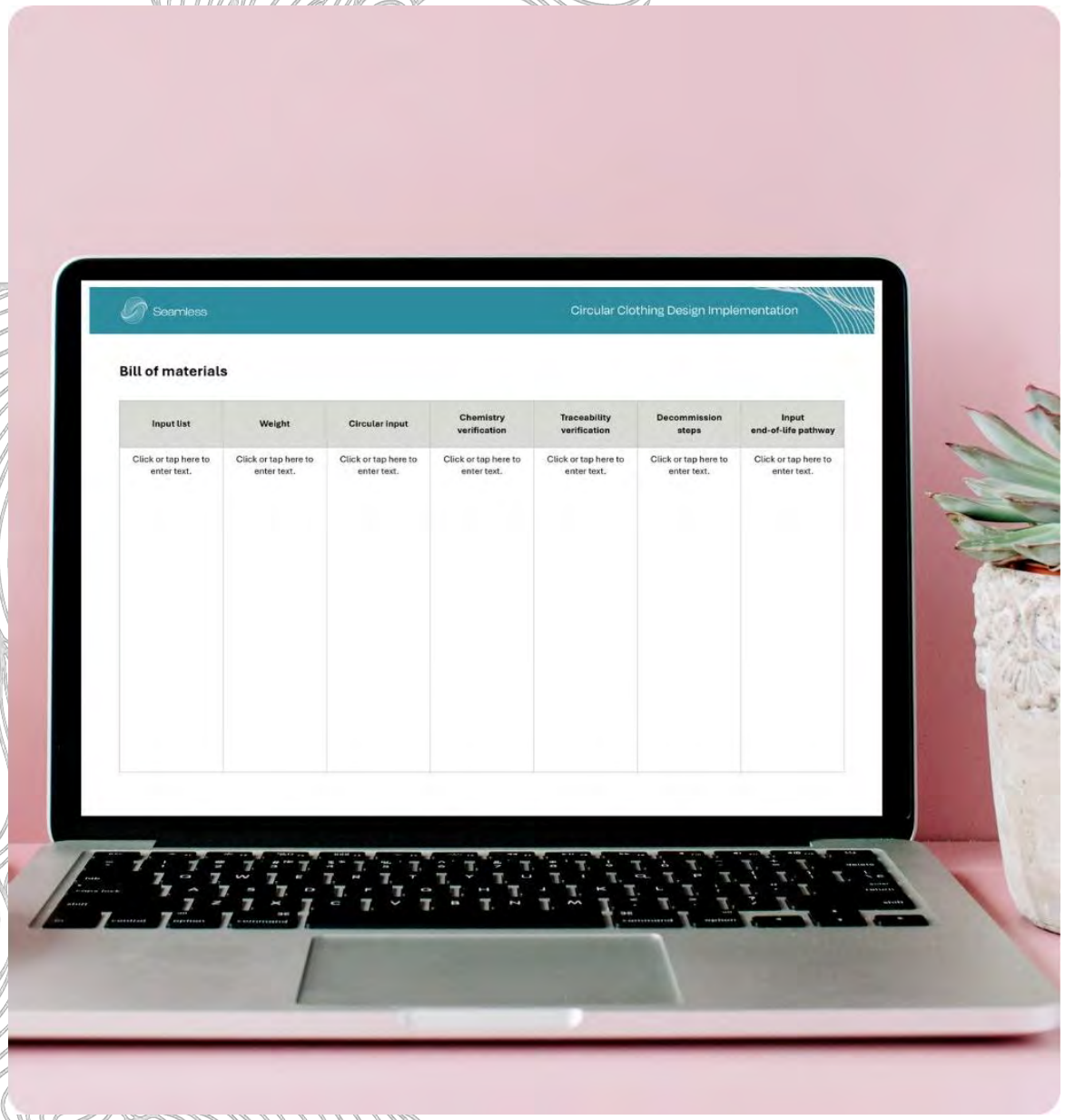
BILL OF MATERIALS

Input list	Input Weight	Circular Input	Chemistry Verification	Traceability Verification	De-commission Steps	Input End-of-Life Pathway
100% Cotton Jersey 150gsm - White	*210 grams*	*Renewable*	*None*	*None*		
100% Recycled PET Threads - 35 Tex - White	*18 grams*	*Recycled*	*None*	*RCS*		
100% Recycled Cotton Labels - Optic White / Soy Ink Screen Print - Black	*7 grams*	*Recycled*	*OEKO TEX 100*	*RCS*		
100% Polyester Woven Brand/ Size Label - White / Black Yarns	*10 grams*	*None*	*None*	*None*		

Circular Material Strategy: *BIOLOGICAL MONOMATERIAL*

BILL OF MATERIALS

Input list	Input Weight	Circular Input	Chemistry Verification	Traceability Verification	De-commission Steps	Input End-of-Life Pathway
100% Organic Cotton Jersey 150gsm - Optic White	*267 grams*	*Renewable*	*OEKO TEX 100*	*ORGANIC COTTON STANDARD*		
100% Organic Cotton Threads - 40 Tex - White	*37 grams*	*Renewable*	*Cradle to Cradle Material Health: Gold*	*GOTS*		
100% Recycled Cotton Labels - Optic White / Soy Ink Screen Print - Black	*7 grams*	*Recycled*	*OEKO TEX 100*	*RCS*		
100% Cotton Woven Brand/ Size Label - Undyed / Black Yarns	*12 grams*	*None*	*OEKO TEX 100*	*None*		



Activity

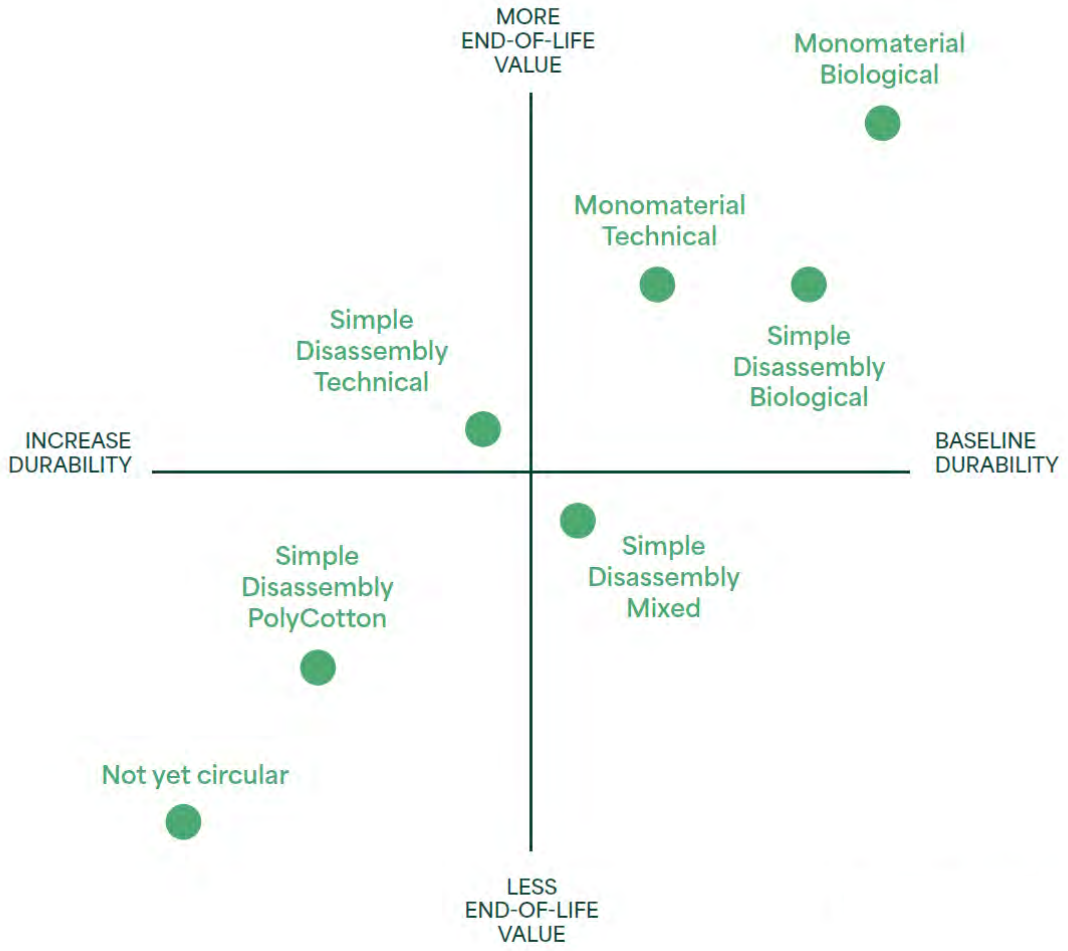
Consider your **bill of materials** in either Quadrant Circular or the editable template:

- Do you need to revisit any materials to fit your material strategy?
- Can any inputs be swapped for circular inputs?
- Do your inputs have any certifications?

This forms part of the circular design record (CDR).

Durability

- To keep products in use at their highest value, a minimum level of durability (**baseline durability**) is required.
- Efforts to increase durability should be made alongside efforts to increase value downstream, from repair and reuse, and remanufacture or repurpose, through to decommissioning and recycling.
- The **durability x value** matrix shows that when technical and mixed material strategies are chosen, a higher level of durability should be applied.



Durability x value matrix

Image: Refashioning guide, adapted from A.BCH World

Durability

According to the clothing longevity protocol, baseline durability is met when the specified product meets its:

- Target lifetime for longevity, calculated by reference to hours of wear, and
- Average number of washes with no/or little change* to the garment based on a set of core performance tests

*Note that reasonable wear and tear is expected.

Row	Longevity factors	Knitwear	Shirt	Jeans	Socks	T-shirt
A	Current lifetime estimate (years) [i]	3.7	3.6	3.1	1.8	3.3
B	Target lifetime (years) [ii]	5	5	4	2.5	4.5
C	Average wear days per year [iii]	30	16	75	50	25
D	Implied wear days per month [iv]	2.5	1.3	6.2	4.2	2.1
E	Total days of wear for the target lifetime [v]	150	80	300	125	112.5
F	Hours of wear for the target lifetime [vi]	1,800	960	3,600	1,500	1,350
G	Assumed days of wear per wash [vii]	5	2	10	2	2
H	Hours of wear per wash [viii]	60	24	120	24	24
I	Average number of washes for the target lifetime [ix]	30	40	30	62	56

i Based on WRAP data
ii Based on lifetime increase of one third
iii Working assumption (validated by industry interviews)
iv Row C / 12
v Row B x Row C
vi Row E x 12 (assumed avarage 12 hours wear per day)
vii Working assumption (validated by industry interviews)
viii Row G x 12
ix Row F / Row H

Clothing longevity protocol

Image: Refashioning guide, sourced from WRAP

Durability

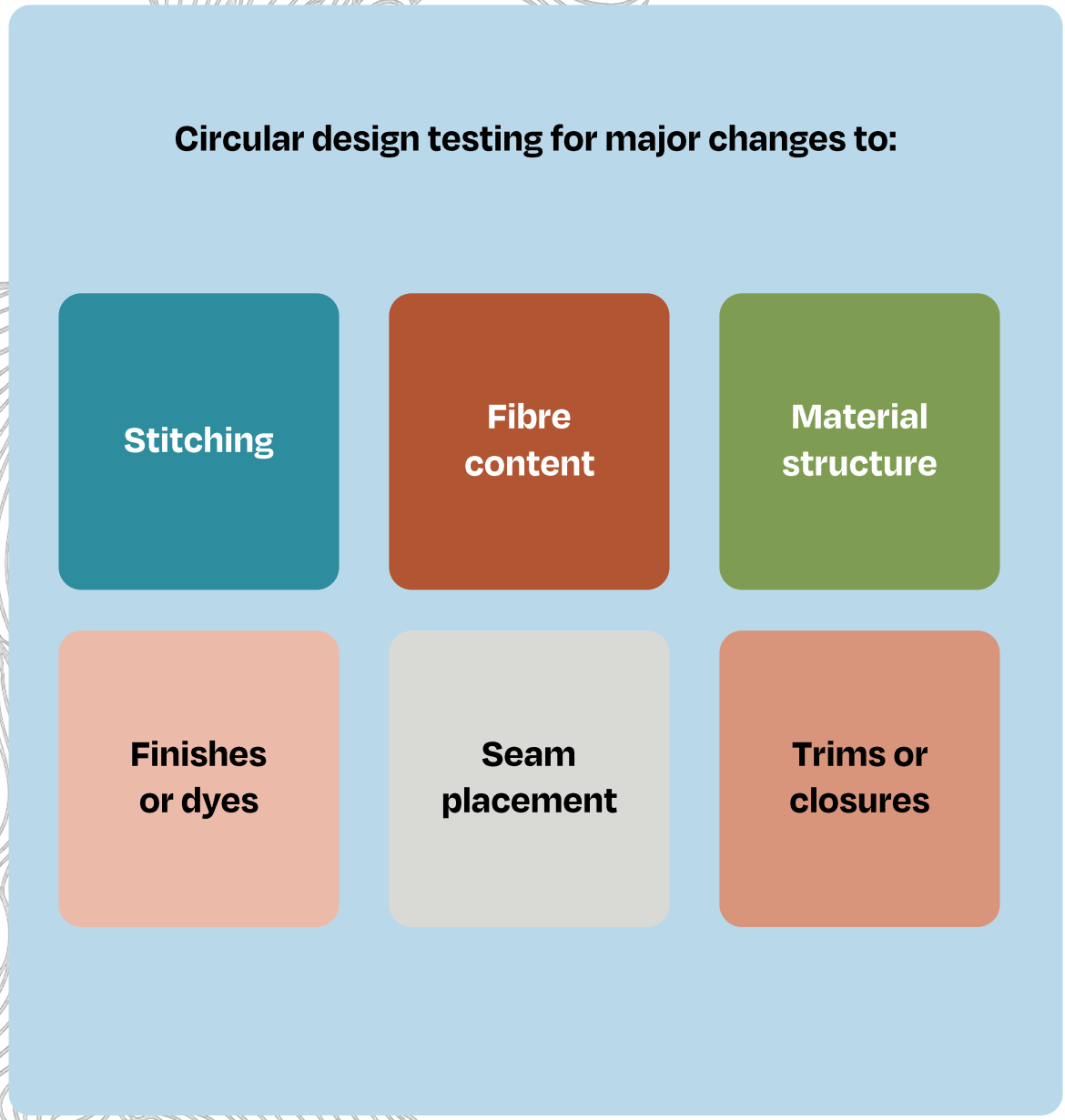
- Products should have a defined:
  - Function
  - Type
  - Intended lifespan
  - **Core testing**
  - Design durability
  - User behaviour

- Let's considering **core testing** in more detail. How will we know if our product is durable enough?

Core test	Knitwear	Shirt	Jeans	Socks	T-shirt
Number of washes to conduct before testing	**30**	**40**	**30**	**62**	**56**
Dimensional stability to washing/dry clean	+ or -5%	+ or -3%	+ or -3%	to fit sock boards or volumentric legs	+ or -5%
Pilling	4	n.a.	n.a.	4	4
Care label wash with visual assessment	expert judgement	expert judgement	expert judgement	expert judgement	expert judgement
Colour fastness to: •Washing* / dry clean • Water or perspiration* • Light • Rubbing *includes shade change and staining	 4 4 4 4	 4 4 4 4	 4 4 n.a. 4	 4 4 n.a. 4	 4 4 4 4
Spirality	3%	n.a.	n.a.	n.a.	3%
Seam slippage	n.a.	80N for 60mm opening	n.a.	n.a.	n.a.
Seam strength	n.a.	100N for 60mm opening	n.a.	n.a.	n.a.
Fusible lamination	n.a.	appearance after wash	n.a.	n.a.	n.a.

Core testing performance standards

Image: Refashioning guide, sourced from WRAP

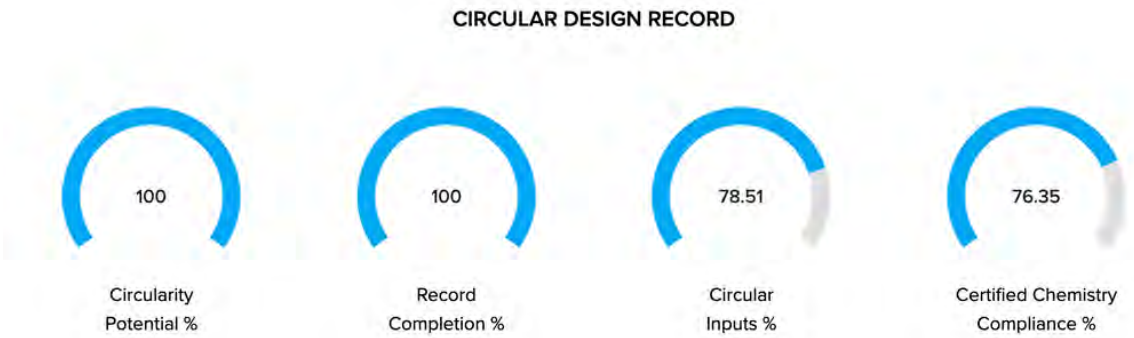


Durability

- Material choices need to be balanced with product quality and physical durability.
- Changes to materials, seams or finishes may require additional iteration.
- It is recommended that changes undergo circular design testing, especially in the early days of circular design transition.
- Over time and with practical experience, potential impacts can be accounted for more easily.

Circularity potential

- The **circular design record** (CDR) is where each stage of the circular design method and the agreements made with lifecycle partners will be captured.
- It sits alongside the BOM and assists in calculating the product's circularity potential.
- **Circularity potential** is the circularity rating of a garment determined by alignment to the CDR.
- It is a quantifiable rating that designers are encouraged to implement, measure and improve over time.



Production efficiencies

- Methods to reduce waste in production typically require change at a company level (although they can also be specific to a singular product type, for example, 3D knitwear).
- These organisation or facility level circular interventions are supplementary to circular product design.
- While circular product design is universal, each organisation will have an individual approach to production efficiencies.
- Organisations can employ facility-wide production efficiency mapping, analysis and system updates to reduce waste.

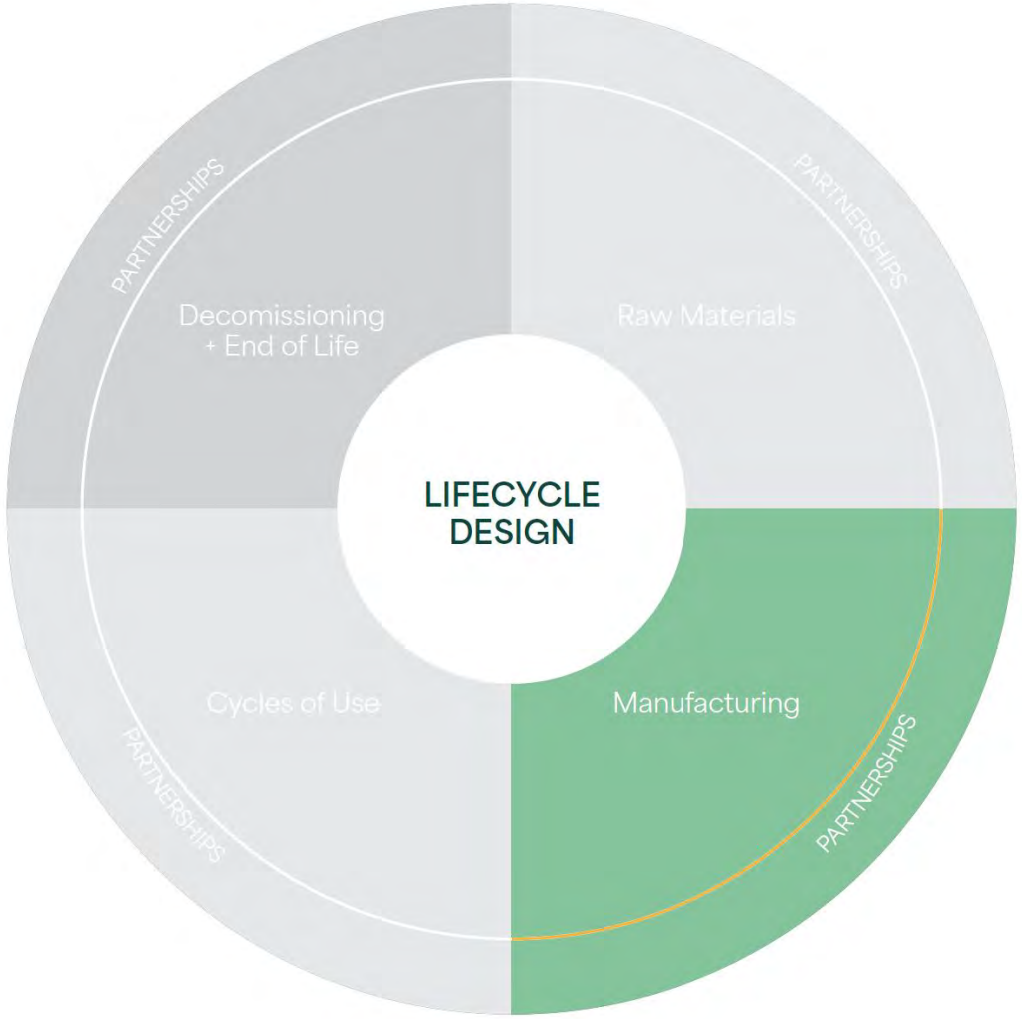
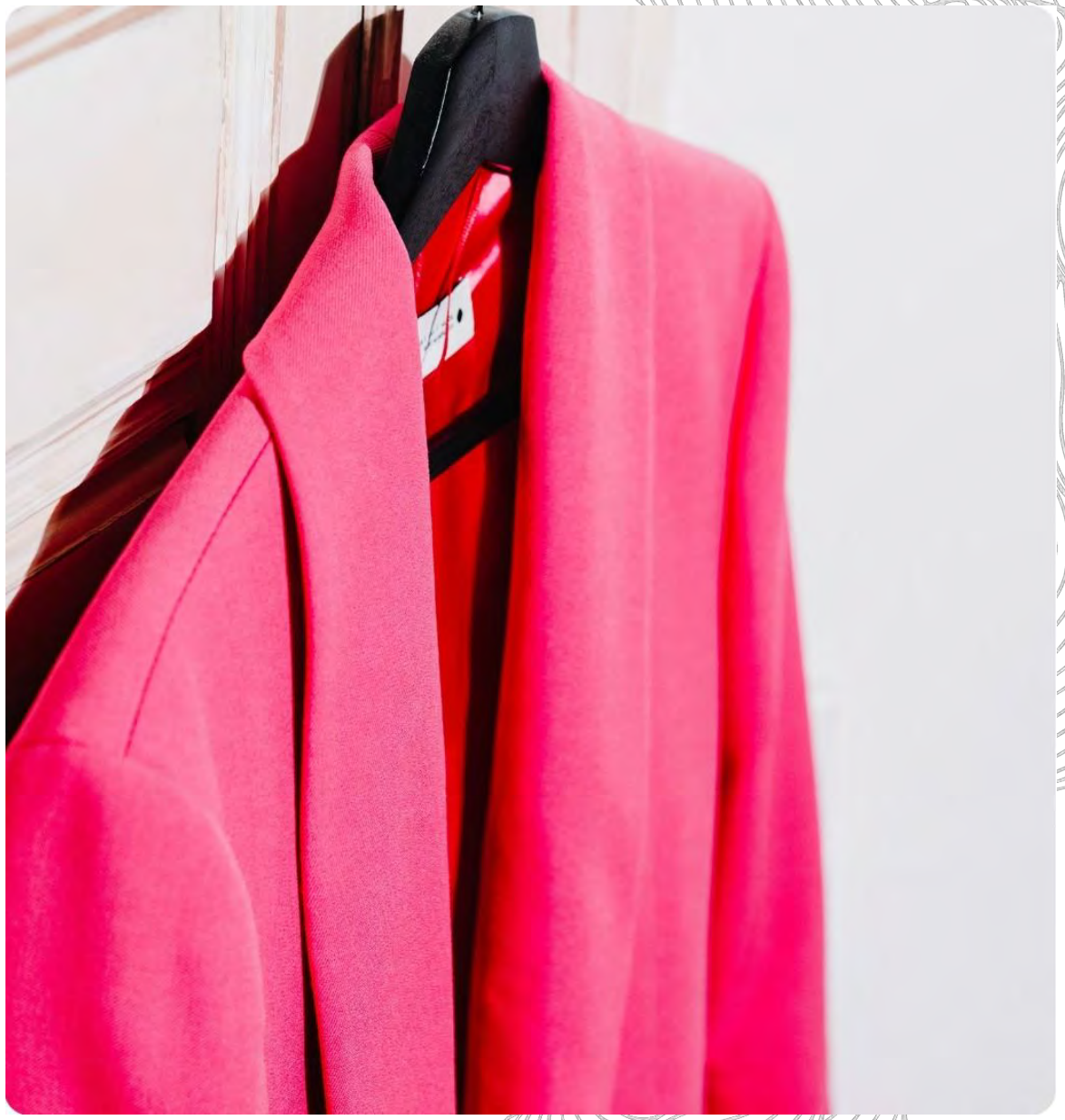


Image: Refashioning lifecycle design

Efficiency examples

Example of facility level production efficiencies:

- Zero or low waste pattern making
- Digital sampling
- Cross business or brand material sharing
- AI or predictive software to deliver more accurate product planning and allocation
- Accurate data collection on unsold stock
- Made to order or just in time manufacturing
- Material waste flow management
- Surplus use, reuse and remanufacturing strategies
- Lower impact processes, such as reduced water and energy use



Circular material strategy lifecycle partners

- Circular material strategy lifecycle partners may include:
  - Raw material suppliers (for example, farmers and technologists)
  - Yarn and textile producers
  - Wet processors (for example, dye houses)
  - Manufacturers
  - Accreditation, certification and testing organisations.
- Engaging with these partners ensures the circular material strategy is accurate and data is correctly documented.

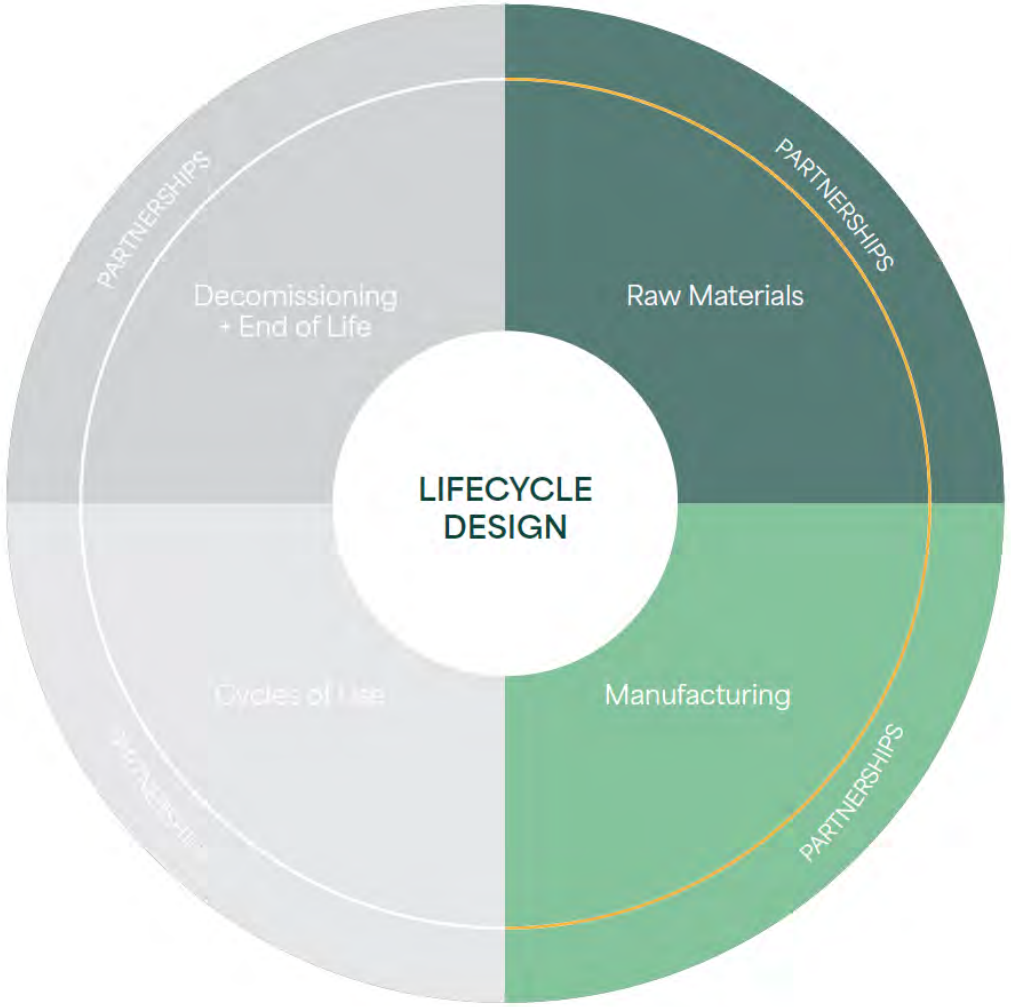


Image: Refashioning lifecycle design

Design

1. Product purpose
2. Circular material strategy
3. **Cycles of use**
   - Use strategies
   - High and low cycles of use
   - Examples
   - Lifecycle partners
4. Decommissioning and end of life

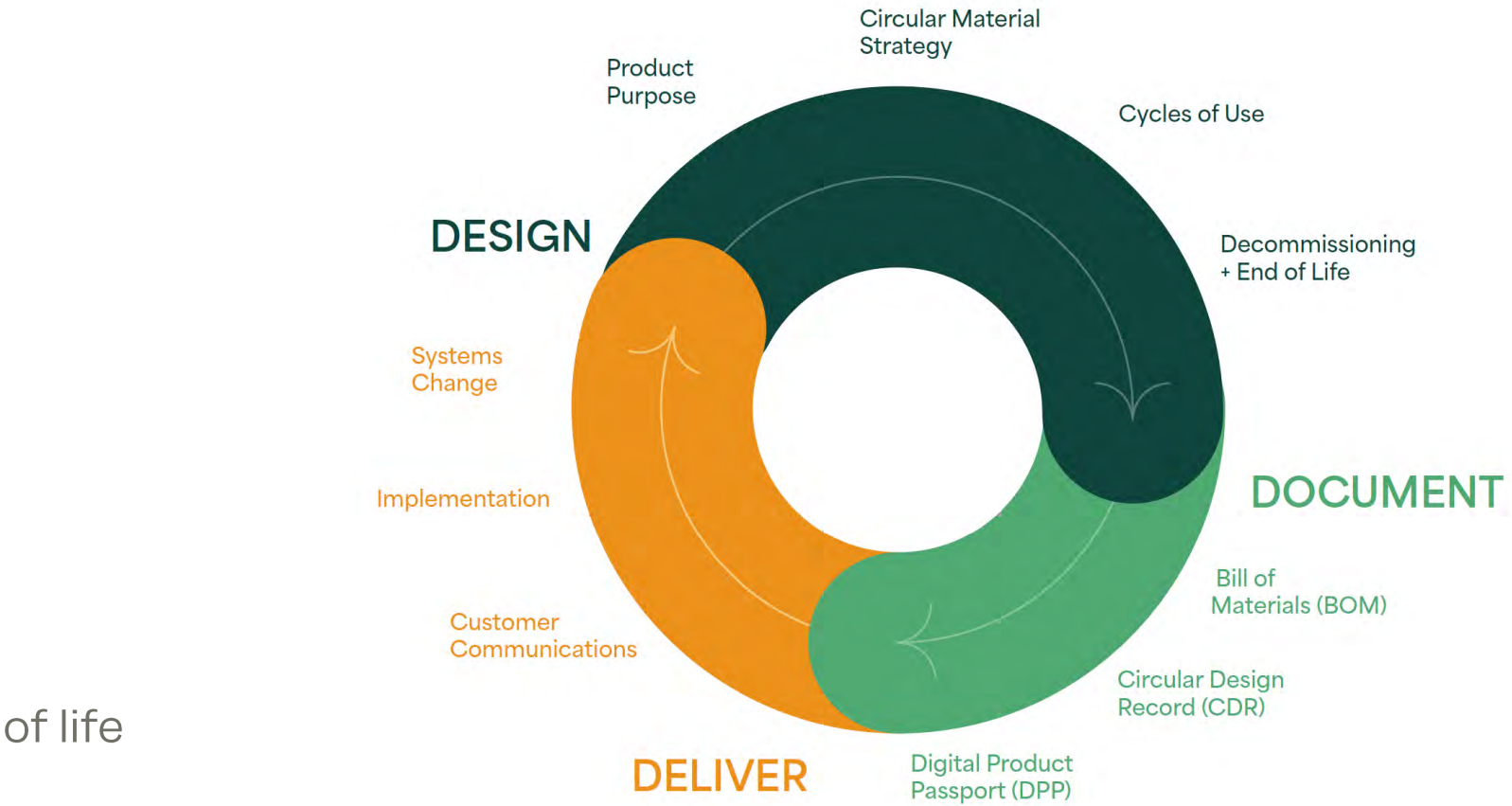


Image: Refashioning circular design method,
'Refashioning: Accelerating Circular Product Design at Scale', 2024

Use strategies

While the use phase often sits outside the remit of the designer, a **use plan**:

- Describes how a product will flow through (and stay within) the chosen cycles of use
- Defines expectations for how the garment should be used, reused, repaired and if appropriate, remanufactured or repurposed.

The use plan will outline strategies, lifecycle partners and communications required, and must align to the product purpose and circular materials strategy.

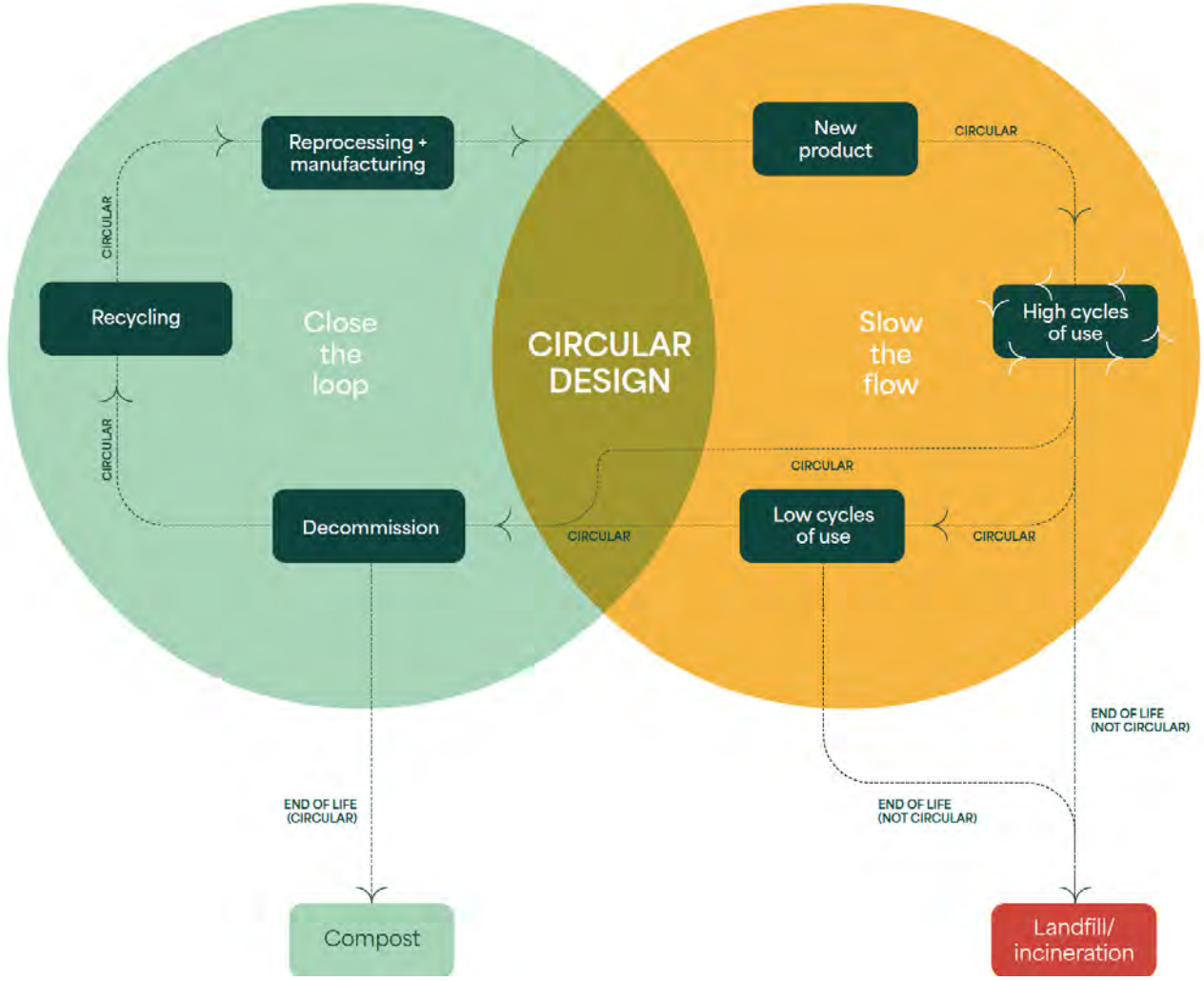
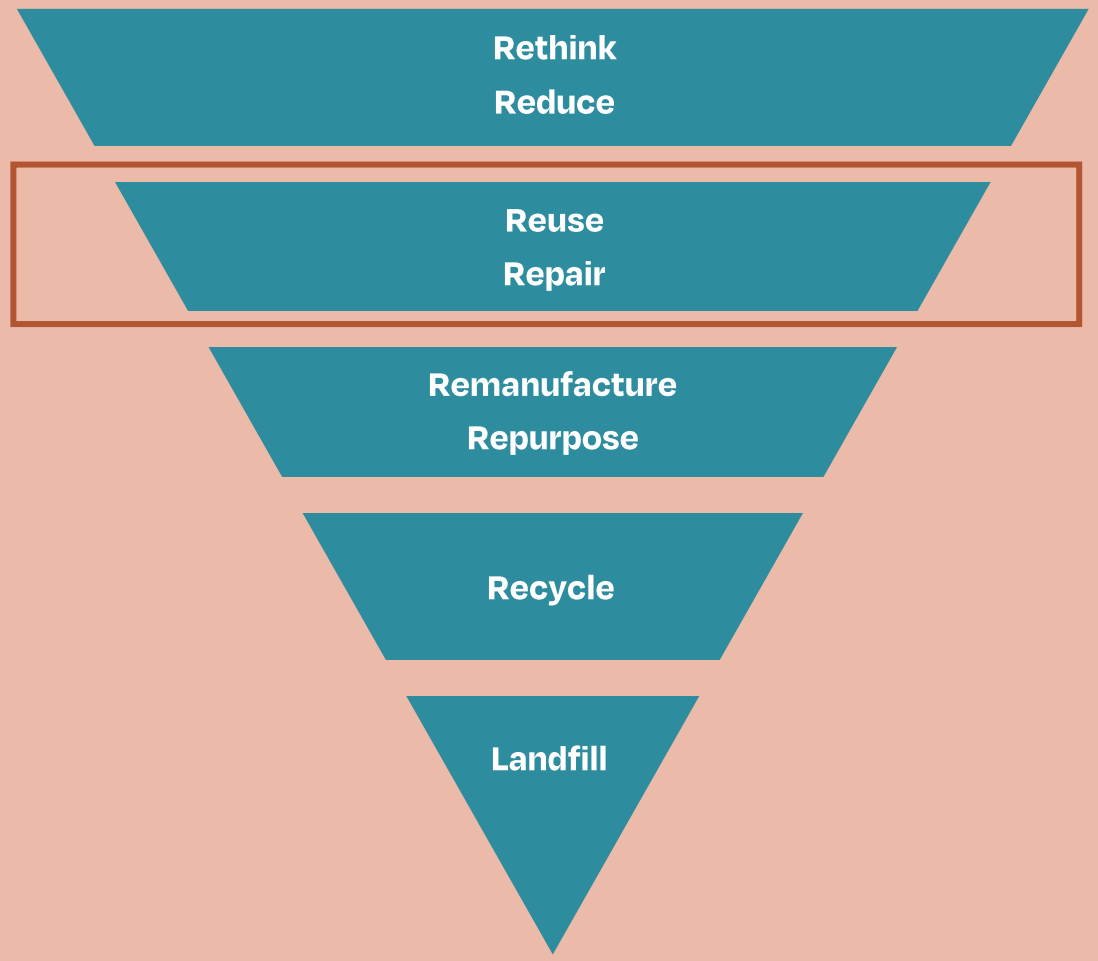


Image: Refashioning circular design systems approach, adapted from A.BCH World



High cycles of use in the resource hierarchy

High cycles of use

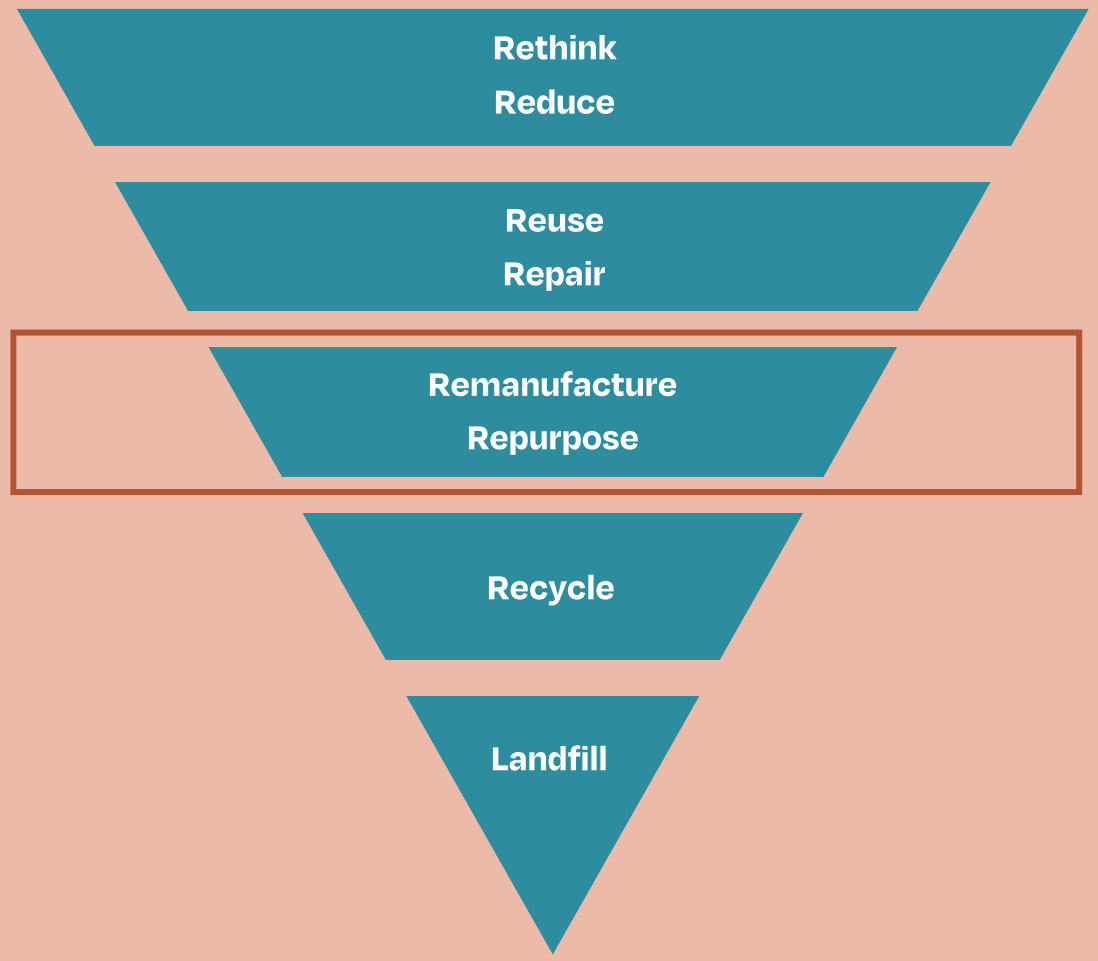
High cycles of use maintain a product in its original form, making maximum use of embodied value. They are considered the highest value and lowest effort to implement and include:

- **Reuse**: used by multiple users through resale, rental, swapping or sharing
- **Repair**: damage or wear-and-tear mended for cycling back into reuse for original or subsequent users.

Almost all clothing should be designed with a view to enact high cycles of use.

Discussion

1. Provide examples of high cycles of use.
2. How would you describe high cycles of use to a colleague?
3. Explain why high cycles of use are important.



Low cycles of use in the resource hierarchy

Low cycles of use

Low cycles of use alter the original form and value of the product and may include:

- **Remanufacture**: high effort and high value actions, also referred to as upcycling
- **Repurpose**: low effort and low value actions, also referred to as downcycling

Products designed with high circularity potential may deliberately avoid a low cycles of use plan.

Plans for 'not yet circular' products should contain both high and low cycles of use.

Discussion

1. Provide examples of low cycles of use.
2. How would you describe low cycles of use to a colleague?
3. Discuss circumstances when you might skip low cycles of use.

Documenting cycles of use

- This example shows how to plan and document the cycles of use.
- Keep in mind that not all products will be suitable for low cycles of use due to the destructive action required to the original form, which could result in disruptions to a product's material strategy.
- If your product is falling into the 'not yet circular' material strategy, it's recommended you create a plan with high and low cycles of use.

EXAMPLE ON HOW TO DOCUMENT CHOSEN CYCLES OF USE, STRATEGIES AND LIFECYCLE PARTNER/S

HIGH CYCLES OF USE	STRATEGIES	PARTNER/S
Reuse	e.g., White label in-house resale and rental program	e.g., RNTR
Repair	e.g., In-house + preferred repair provider network provided for customers	e.g., In-house: Sustainability + Marketing Departments
LOW CYCLES OF USE	**STRATEGIES**	**PARTNER/S**
Remanufacture	e.g., Products are cut, re-worked and combined with other materials to make new products	e.g., Loop Upcycling
Repurpose	e.g., Products are torn into wiper rags	e.g., Sam's Rags

Cycles of use lifecycle partners

Cycles of use lifecycle partners may include:

- Consumers
- Rental businesses
- Repairers
- Second life sellers (resale platforms, charities)
- Remanufacturers
- Collection and sorting operators

Revisit the product purpose statement to define actions you want consumers to take in the use phase.

Also consider how you will communicate with consumers.

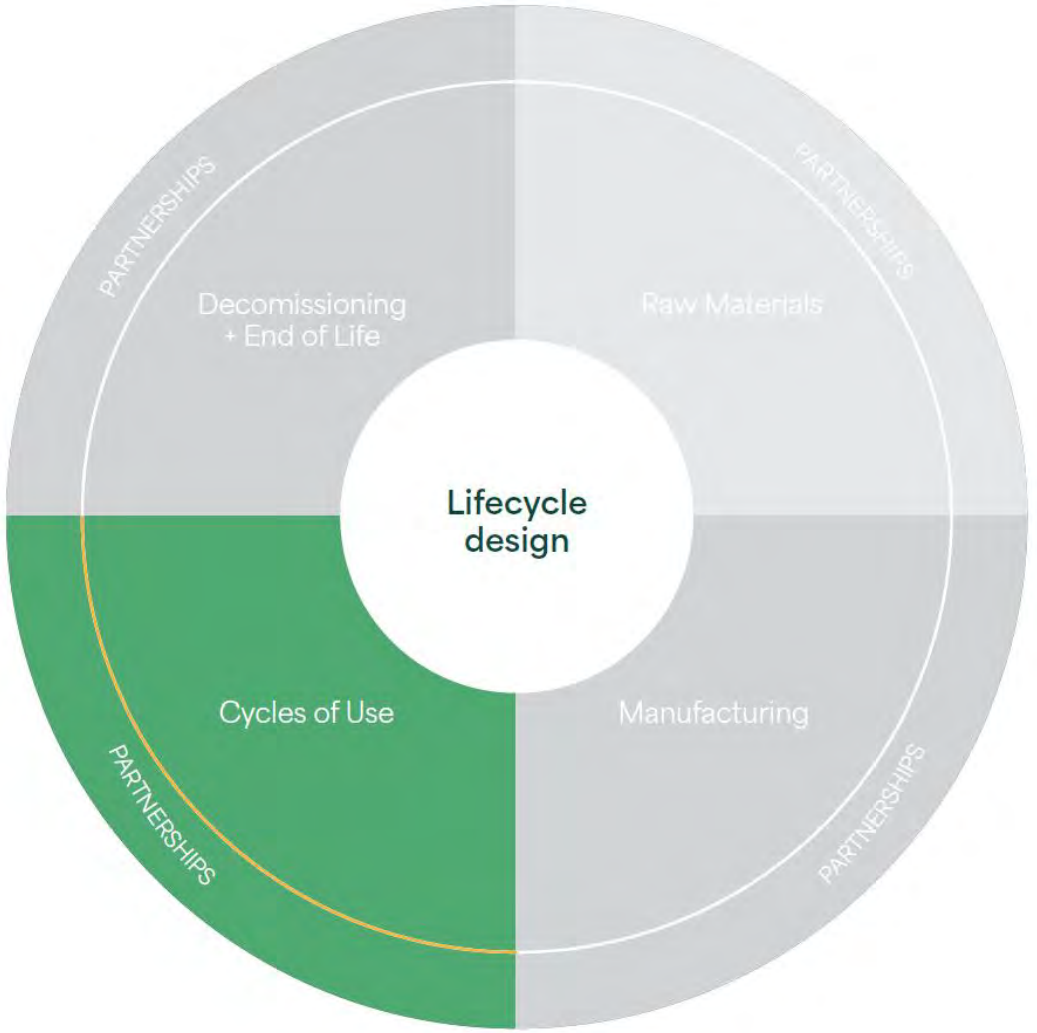
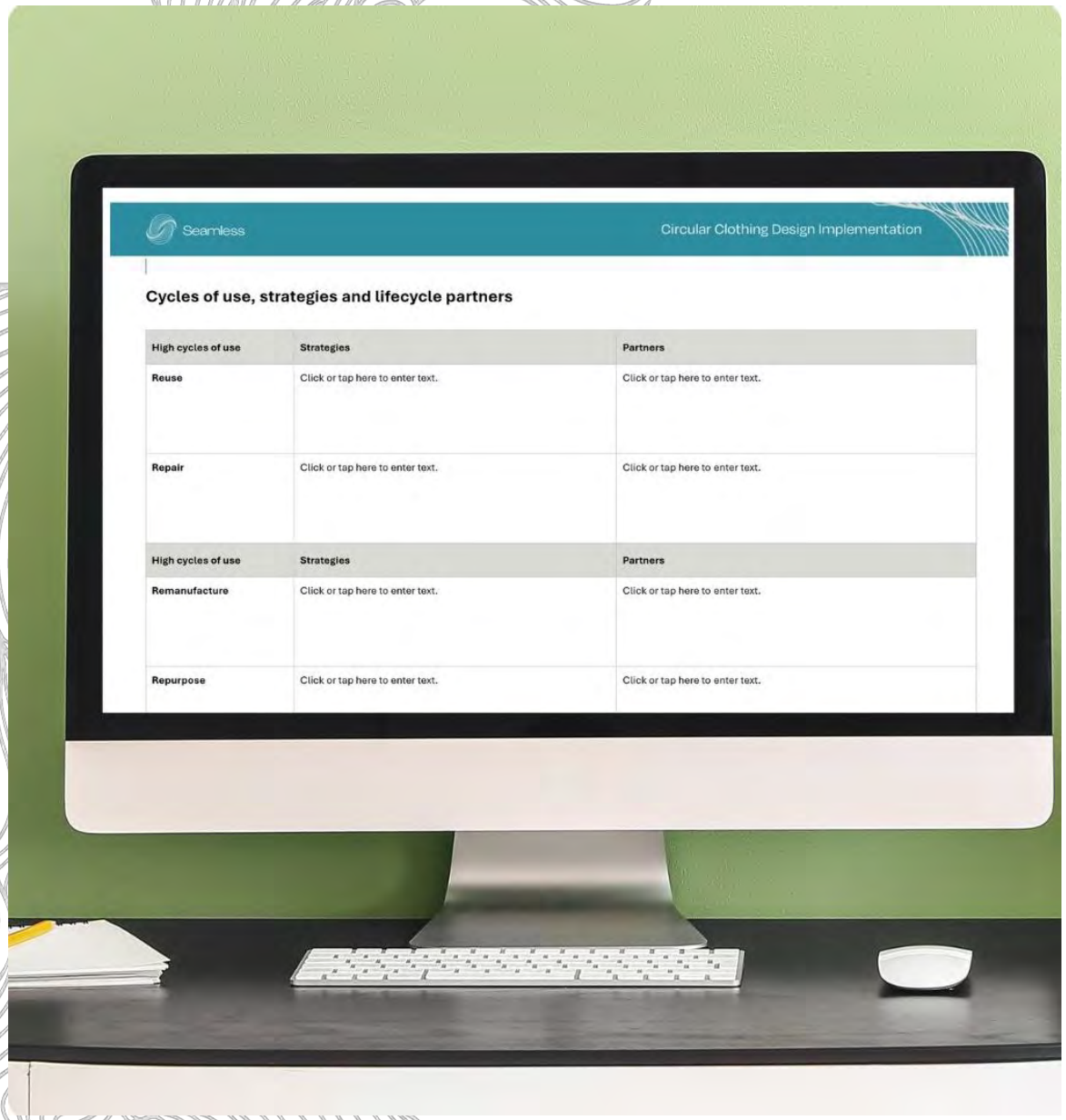


Image: Refashioning lifecycle design



Activity

Create a **use plan** for your garment in Quadrant Circular or the editable template called 'Cycles of use, strategies and lifecycle partners'.

If you can't identify all of your lifecycle partners now, consider what research you might need to undertake.

This forms part of the circular design record (CDR).

Design

1. Product purpose
2. Circular material strategy
3. Cycles of use

4. Decommissioning and end of life

- Decommissioning feasibility
- End-of-life (EOL) pathways
- Inputs and outputs
- Completing the bill of materials (BOM)
- Linking material strategies to EOL
- Planning for recirculation
- Lifecycle partners

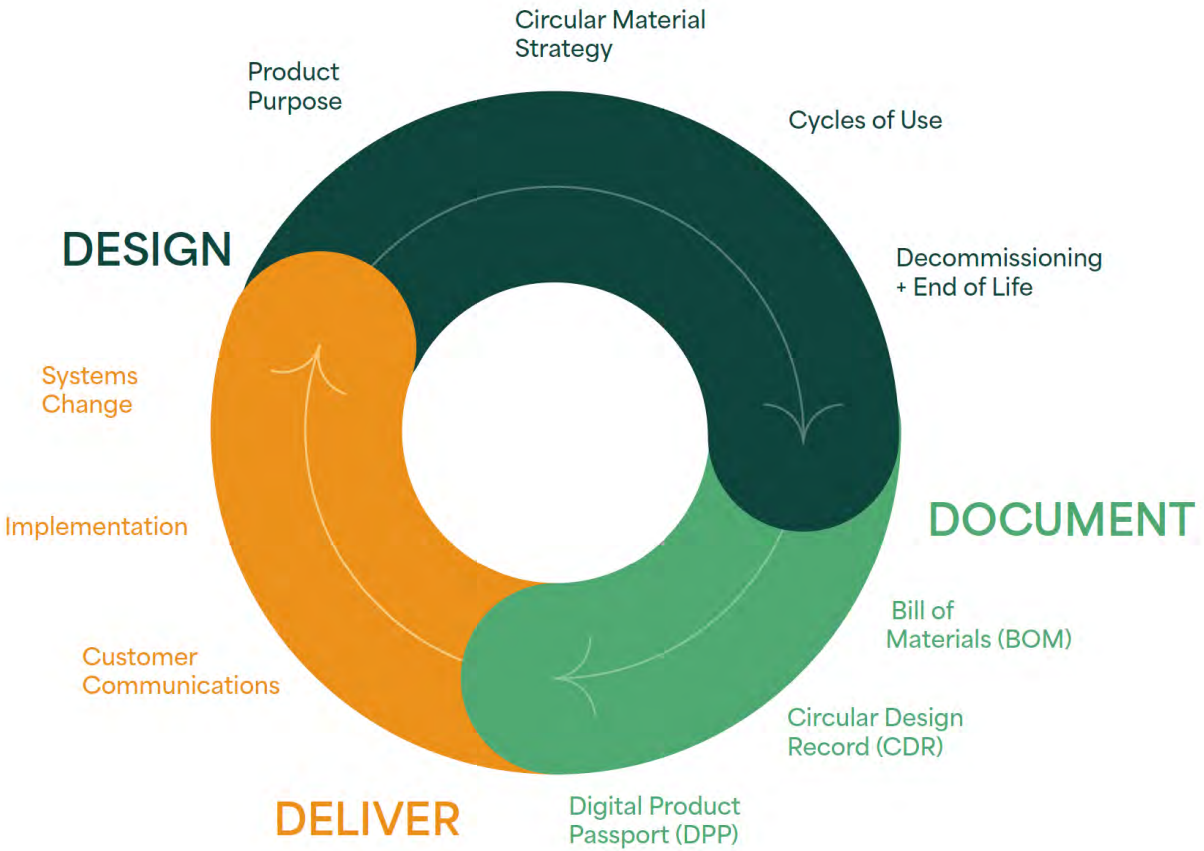
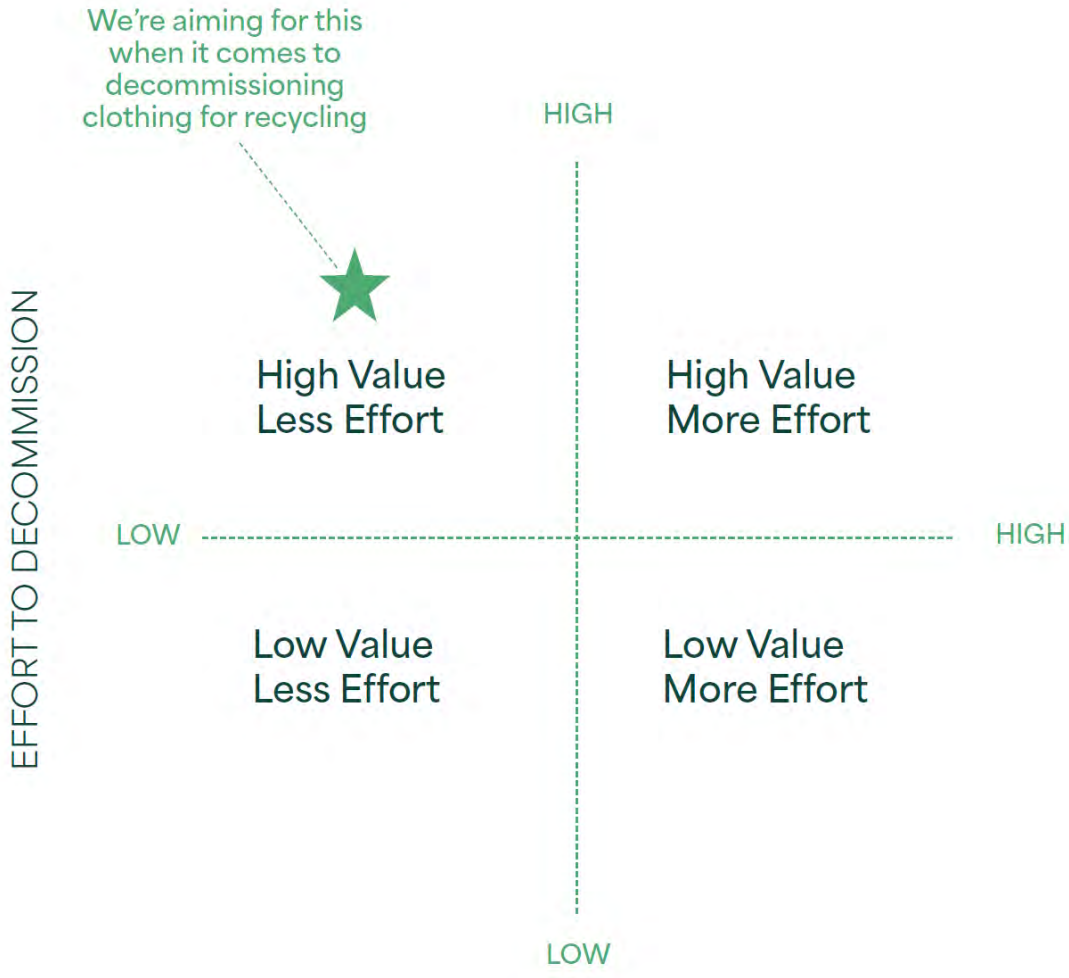


Image: Refashioning circular design method,
'Refashioning: Accelerating Circular Product Design at Scale', 2024

Decommissioning feasibility

- Decommissioning is when a garment is no longer fit for cycles of use and is disassembled for end-of-life processing.
- Feasibility in decommissioning garments at scale requires that the value of the recovered materials be high enough to warrant separation efforts.
- The **disassembly effort factor** considers the complexity and number of steps involved in disassembly. Ideally, this process should be as simple as possible.



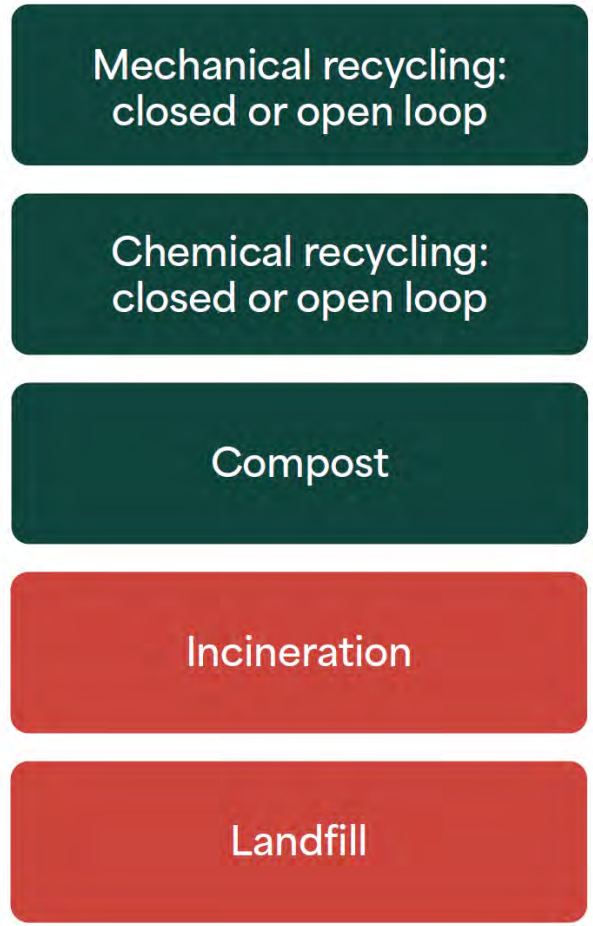
Material value x decommissioning effort matrix

Image: Refashioning guide, adapted from A.BCH World

End of life pathways

Circular EOL pathways include:

- **Composting:** biologically safe and suitable products or disassembled materials enter the biosphere via aerobic or anaerobic digestion.
- **Recycling (open loop):** products or disassembled materials are broken down to fibre and reprocessed into materials for a different end market.
- **Recycling (closed loop):** products are broken down to fibre and reprocessed into yarns and materials of similar quality and function.



End of life pathways for textiles and clothing

Image: Refashioning guide

Inputs and outputs

Inputs are the resources that are put in or added to a system, process or product and **outputs** are the resulting resources (including waste and finished materials) expended from a system, process or product.

Mechanical recycling	Chemical recycling	Compost	Incineration	Landfill
Input: Industrial mono-materials **Output:** High quality same fibre (shorter staple length than virgin fibre) **Input:** Mono pre/post consumer materials **Output:** Mid quality same fibre (shorter staple length than virgin fibre) **Input:** Mixed materials **Output:** Low quality mixed fibre (shorter staple length than virgin fibre)	**Input**: Cotton, viscose, polyester, nylon mono materials **Output**: High quality MMCF (man made cellulose fibre) and MMF (man made fibre)	**Input**: Biological materials **Output**: Neutralised compost	**Input**: Any materials **Output**: Negative environmental impacts (greenhouse gas emissions, waste, soil, water and air toxicity) or neutralised output (waste to energy)	**Input**: Any materials **Output**: Negative environmental impacts (greenhouse gas emissions, waste, soil, water and air toxicity)

Revisiting the bill of materials

We can complete the bill of materials with the decommission steps and end of life pathways:

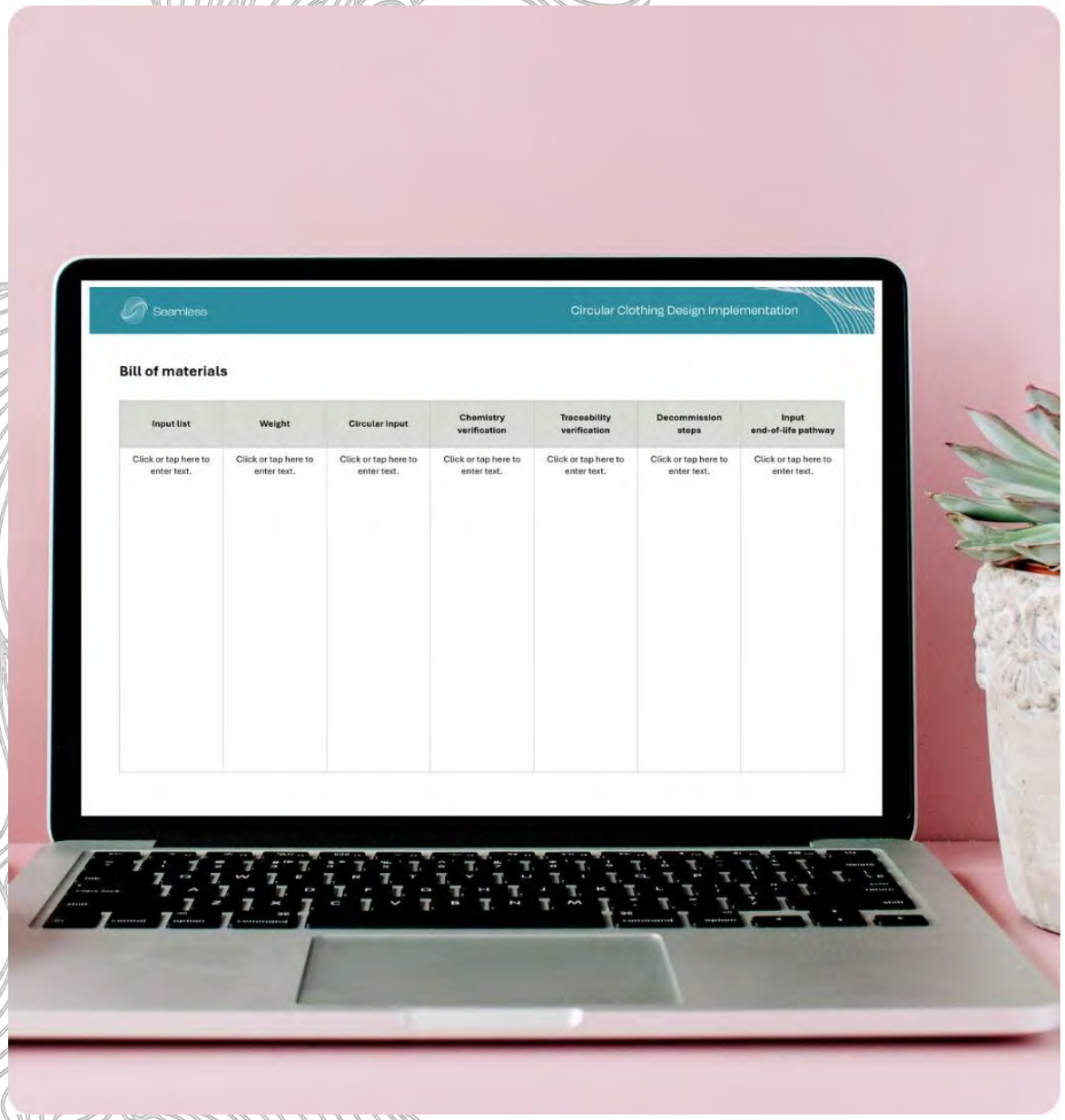
- **Decommission steps** should include instructions for how inputs should be deconstructed and whether any inputs are combined
- The **end-of-life pathway** for inputs should be documented.

It's important to engage with relevant lifecycle partners for this step.

Circular Material Strategy: *BIOLOGICAL MONOMATERIAL*

BILL OF MATERIALS

Input list	Input Weight	Circular Input	Chemistry Verification	Traceability Verification	De-commission Steps	Input End-of-Life Pathway
100% Organic Cotton Jersey 150gsm - Optic White	*267 grams*	*Renewable*	*OEKO TEX 100*	*ORGANIC COTTON STANDARD*	*Shred or cut into pieces smaller than 15cm*	*Mechanical Recycling (Fibre to Fibre)*
100% Organic Cotton Threads - 40 Tex - White	*37 grams*	*Renewable*	*Cradle to Cradle Material Health: Gold*	*GOTS*	*Remain with cotton fabric*	*Mechanical Recycling (Fibre to Fibre)*
100% Recycled Cotton Labels - Optic White / Soy Ink Screen Print - Black	*7 grams*	*Recycled*	*OEKO TEX 100*	*RCS*	*Clipped off from fabric*	*Mechanical Recycling (Open Loop)*
100% Cotton Woven Brand/ Size Label - Undyed / Black Yarns	*12 grams*	*None*	*OEKO TEX 100*	*None*	*Clipped off from fabric*	*Mechanical Recycling (Open Loop)*



Activity

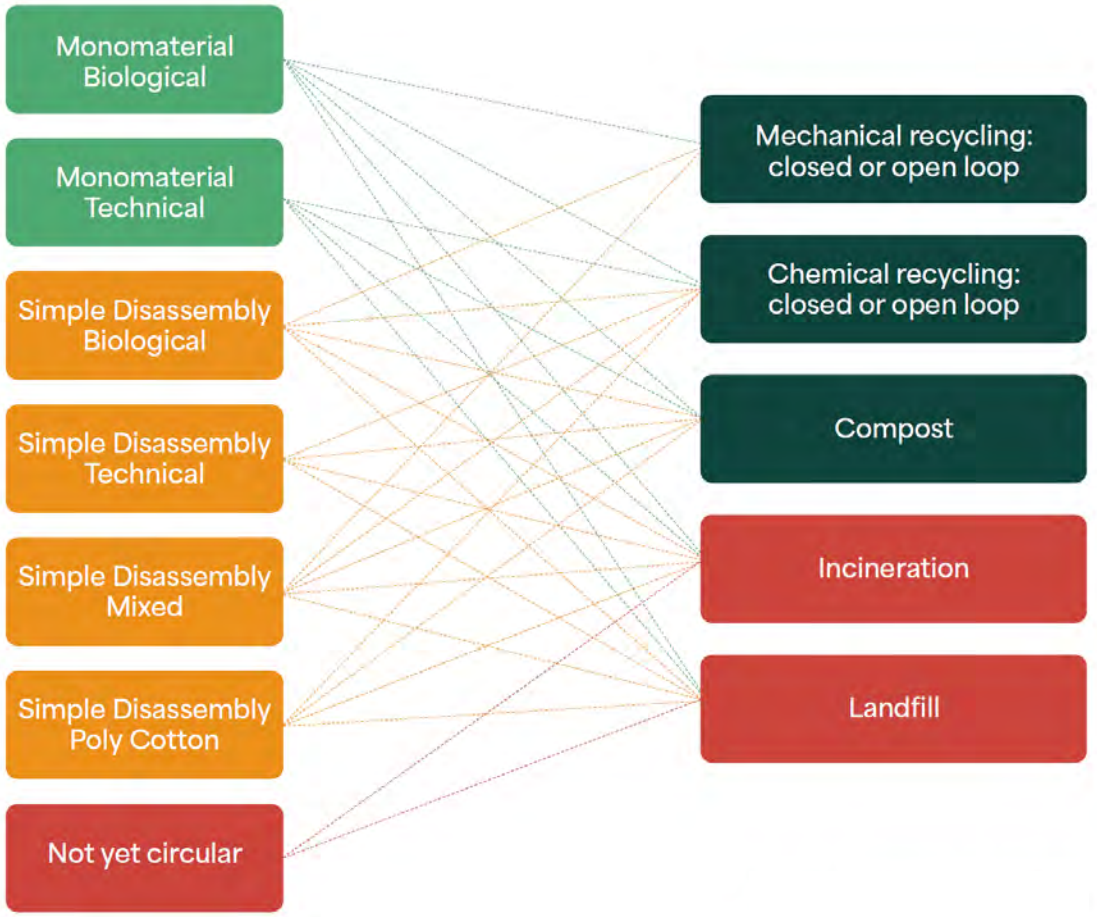
Revisit your bill of materials in either Quadrant Circular or the template and:

1. Complete the **decommissioning steps**
2. Complete the **end-of-life pathway**

This forms part of the circular design record (CDR).

Linking circular material strategy to EOL

- It's important to consider which circular materials strategies and end-of-life pathways are compatible.
- For example, a garment that has employed a monomaterial biological material strategy should have every end-of-life pathway available to it.
- In comparison, a garment that is not yet circular will only be able to move to incineration or landfill when it reaches end-of-life.



Circular material strategies and end-of-life

Image: Refashioning guide, adapted from A.BCH World

Planning for recirculation

- To increase circular inputs we must influence the quality of feedstock being generated and re-circulated.
- High quality outputs only come from high quality inputs.
- It's critical to take collective action on:
  - Re-circulation standards for recycled materials
  - Improving the quality, consistency and volume of post-consumer recycled materials
  - Securing demand for recycled feedstock to other end markets.

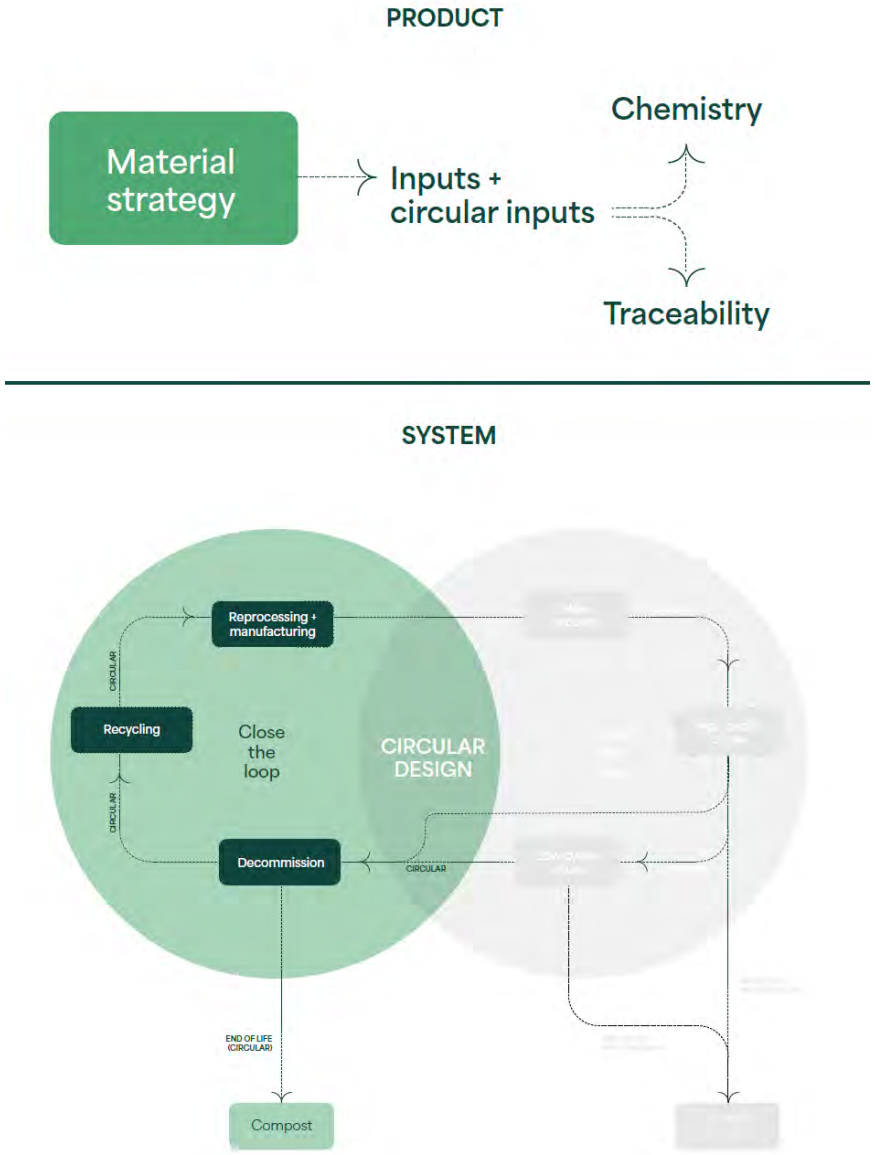
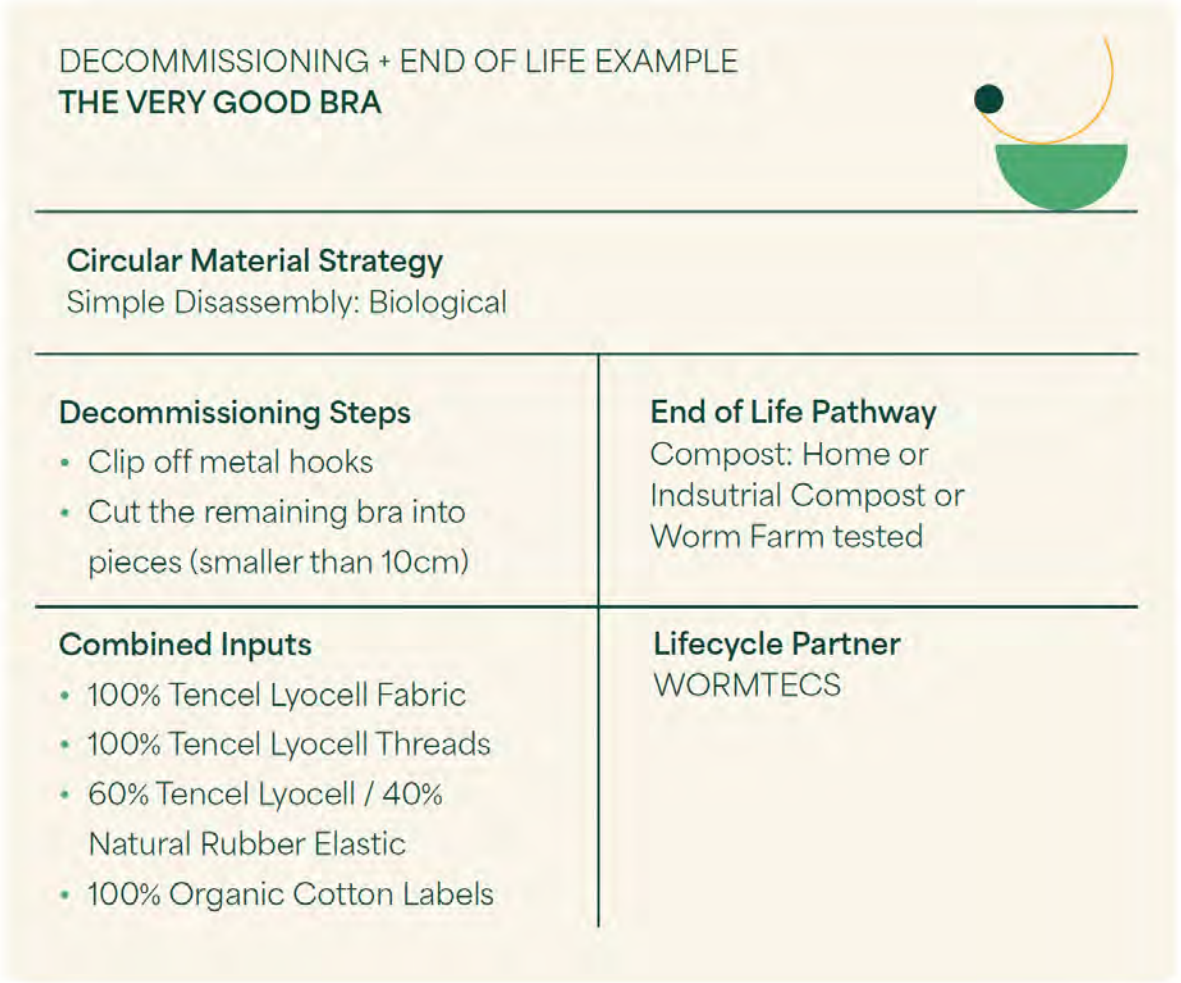


Image: Refashioning circular design systems approach, adapted from A.BCH World

Decommissioning and end of life example

- **Recycle for progress, not perfection**.
- Recycling and composting aren't perfect solutions for clothing end-of-life, but we do need to begin.
- When materials are safe, renewable and high quality, even incremental blends of recycled fibres into new textiles will help reduce reliance on virgin materials and help build the circular system sustainably.



Decommissioning lifecycle partners

Decommissioning and end-of-life partners may include:

- Sorters
- Decommissioning agents
- Recyclers (mechanical and chemical)
- Composters.

When engaging with your partners, you'll need to understand:

- Steps required for each stage
- Responsibilities for each stage
- Options for end-of-life processes (locations)
- Options for closed and open loop recycling

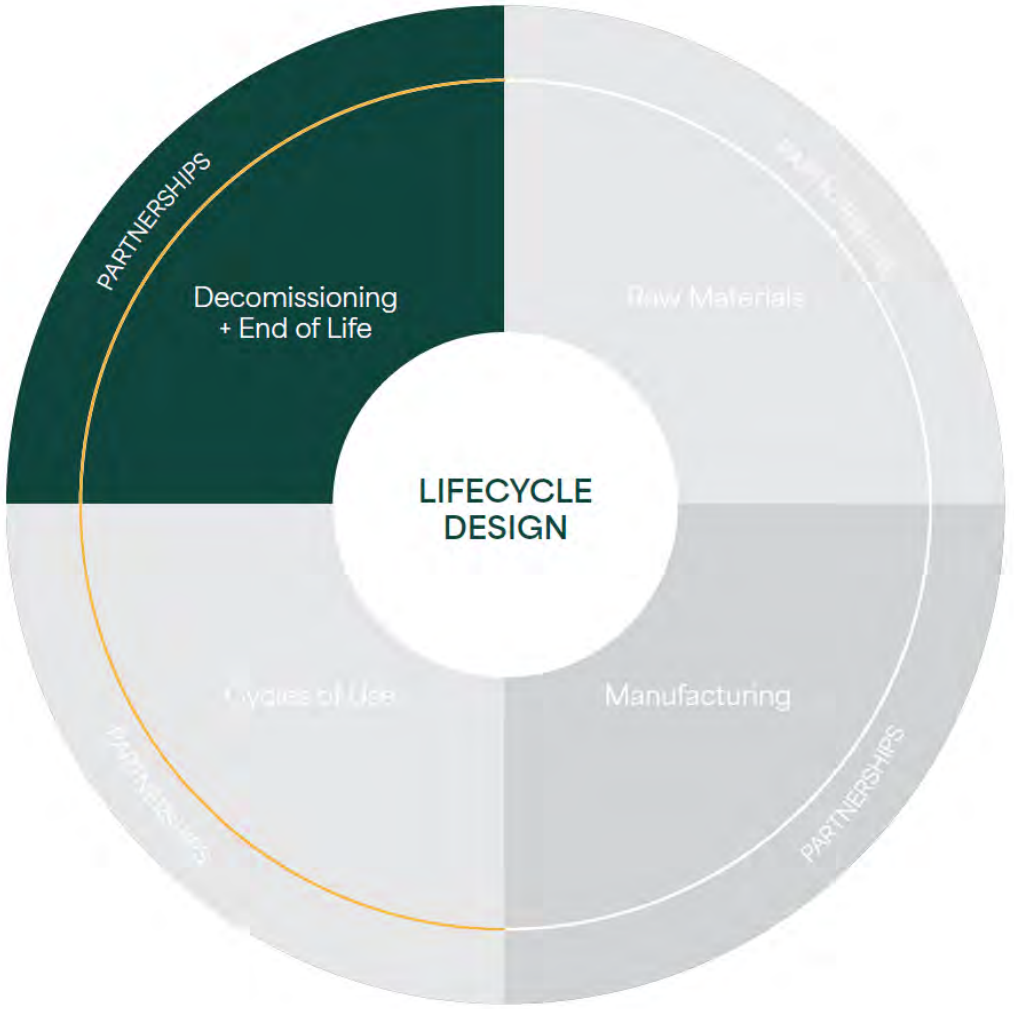


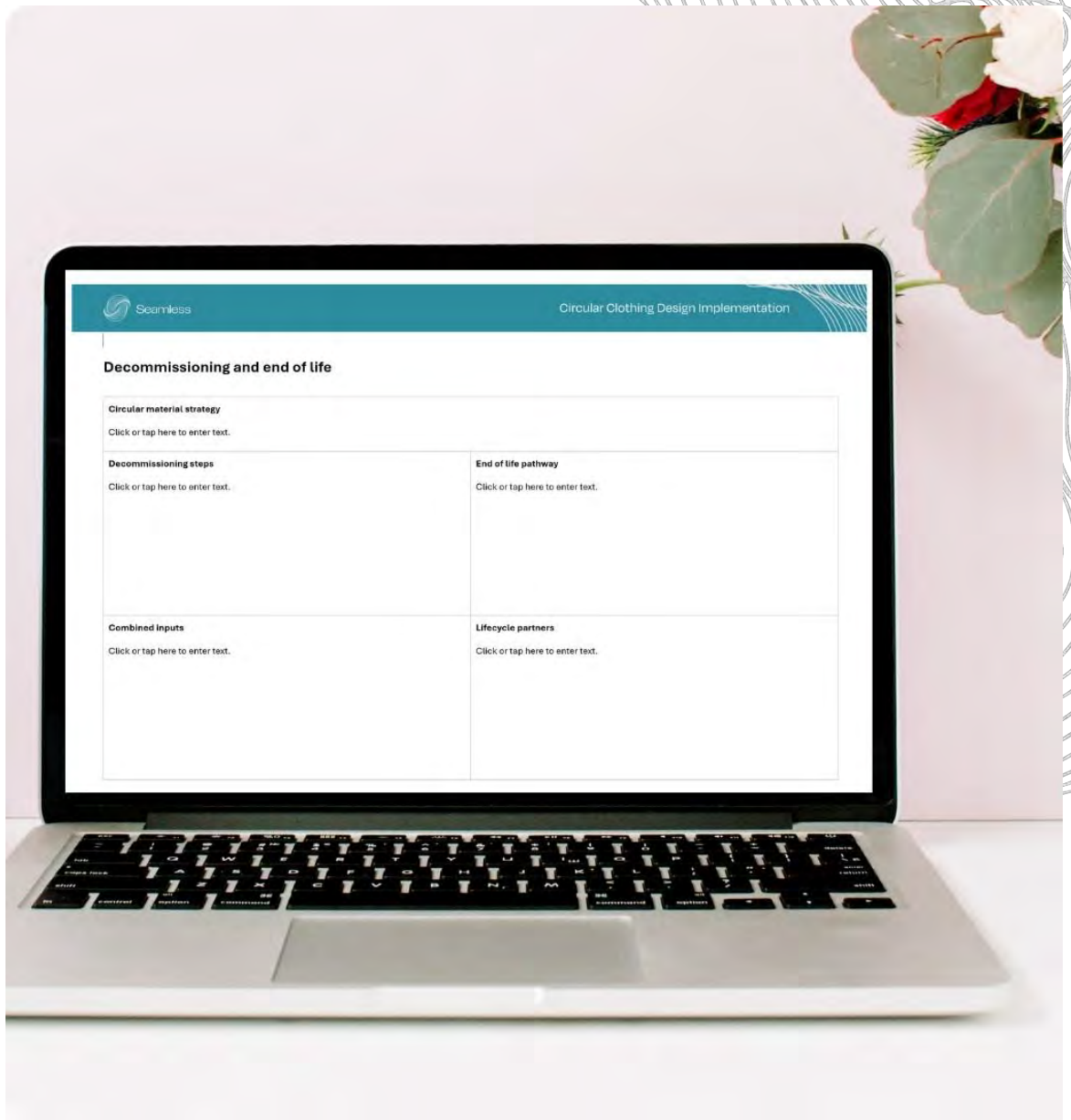
Image: Refashioning lifecycle design

Activity

Complete the **decommissioning and end-of-life plan** for your garment in Quadrant Circular or by filling in the relevant template.

If you can't identify all of your lifecycle partners now, consider what research you might need to undertake.

This forms part of the circular design record (CDR).

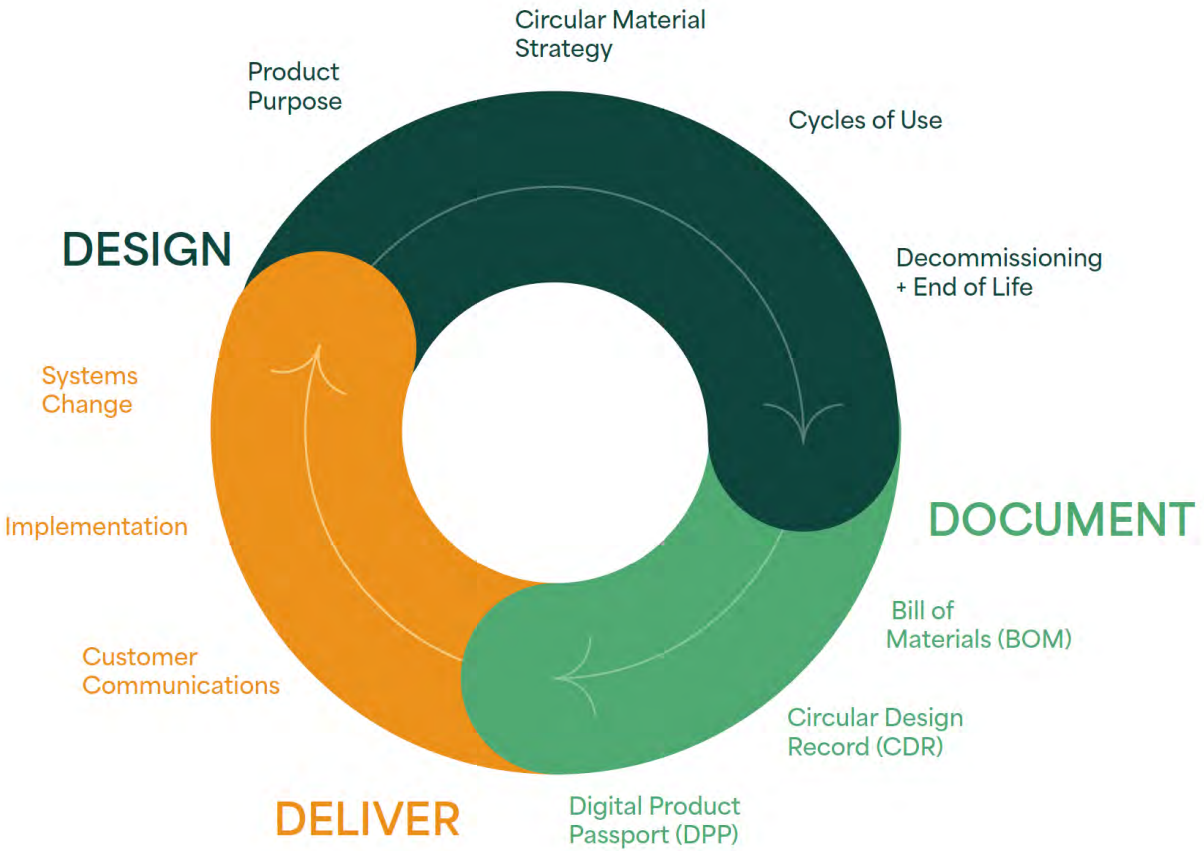


03.

Document

Document

1. Bill of materials
2. Circular design record
3. Digital product passport



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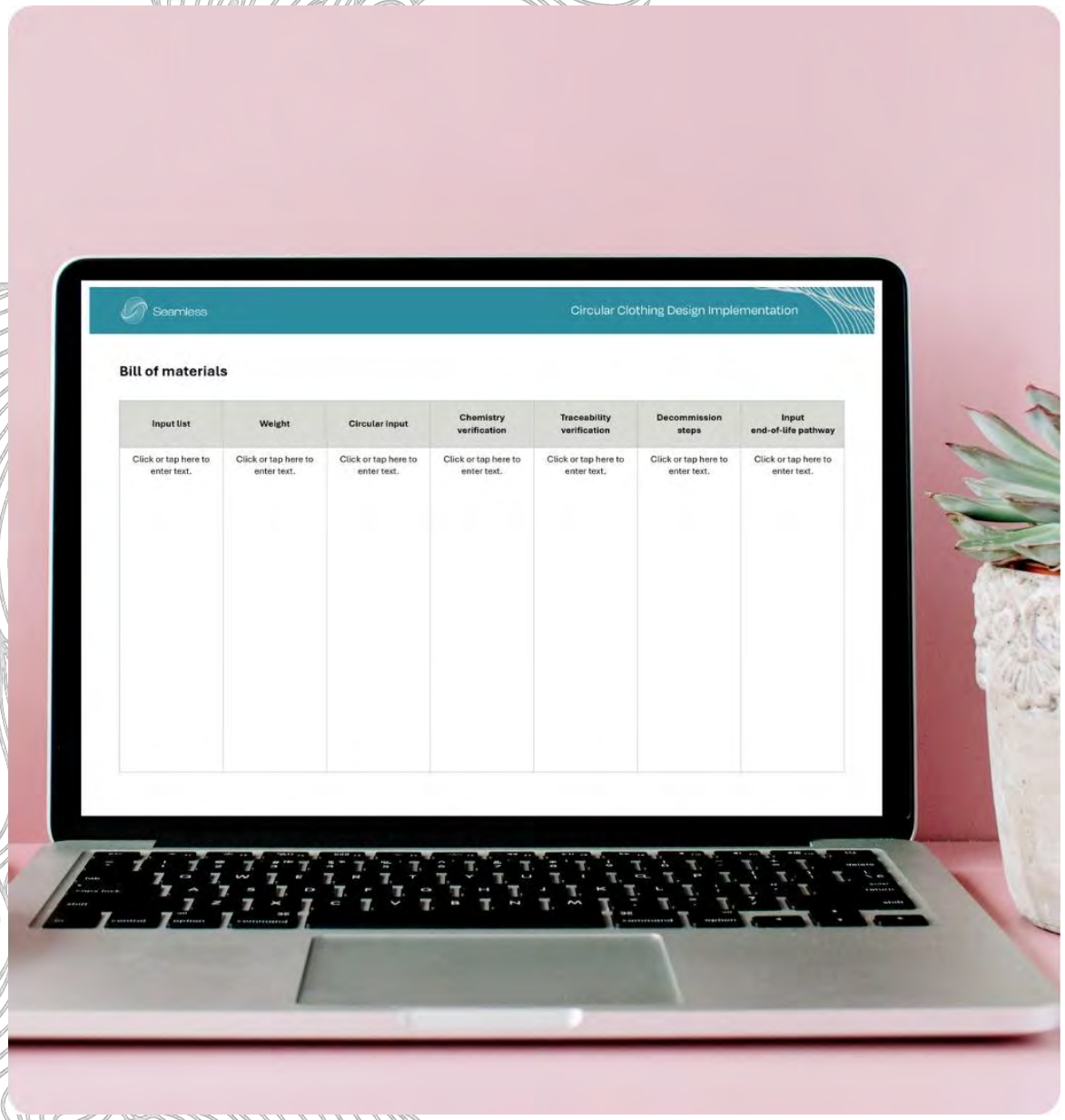


Bill of materials

- Your **bill of materials** for your garment should be completed at the design stage.
- This can be completed in either Quadrant Circular or the editable template supplied
- As the bill of materials measures and tracks circular inputs it will be useful for identifying your garment's circularity potential and measuring its environmental footprint.

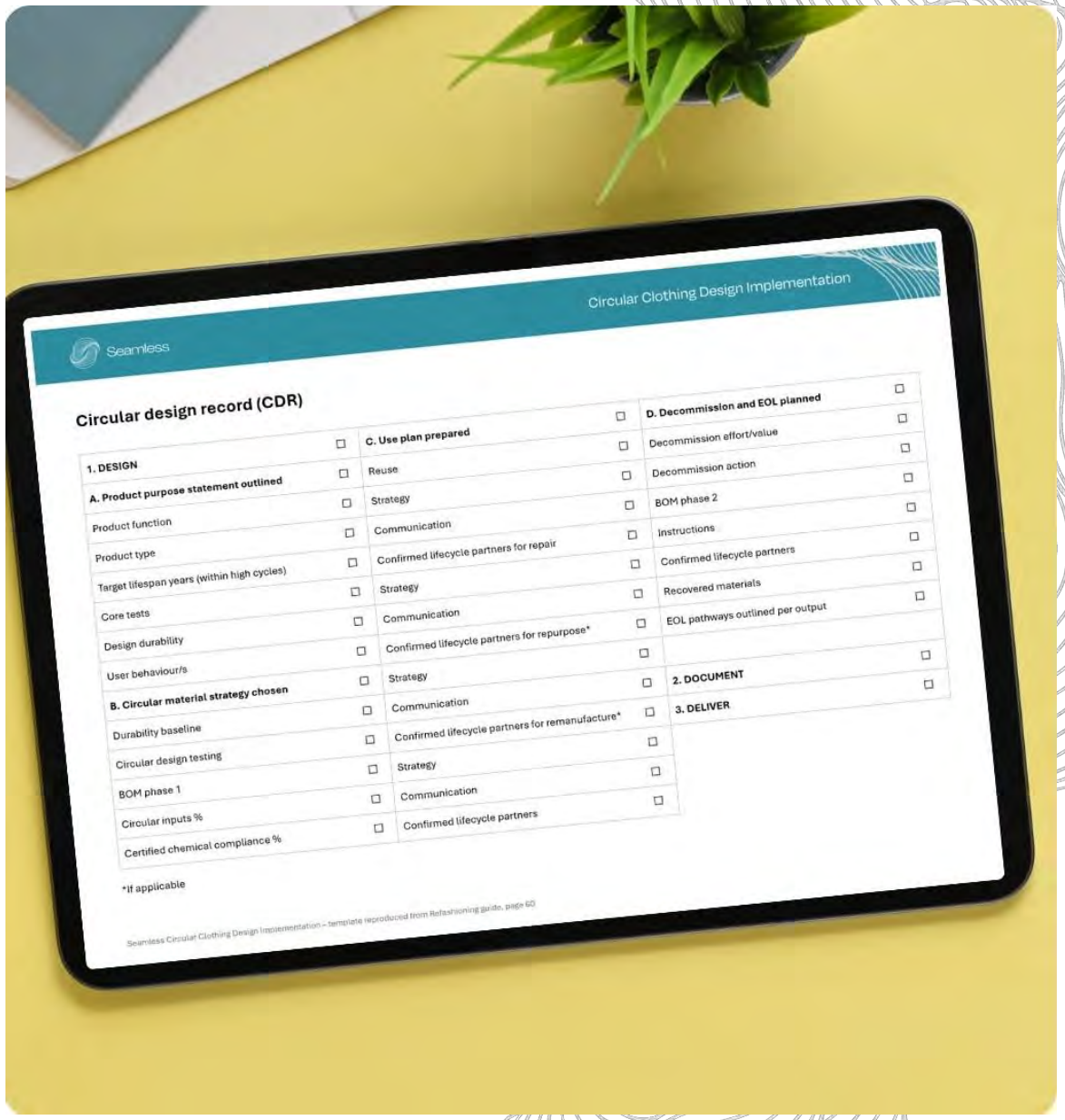
Circular design record

The **circular design record** (CDR) captures each stage of the circular design method and the agreements made with lifecycle partners.

It includes the:

- Product purpose statement
- Circular material strategy
- Use plan
- Decommissioning and end of life plan

This can be completed in Quadrant Circular and the editable CDR template supplied is a checklist to guide you.



Digital product passport

- Digital product passports (DPPs) enable producers and consumers to track and trace resource use and impacts across the value chain.
- There is currently no standard in Australia for the information included in DPPs.
- Some overseas jurisdictions such as the EU and New York are in the process of enacting legislation which will apply to DPPs and the type of information they collect.

04.

Deliver

Deliver

1. Customer communications
2. Implementation
3. Systems change

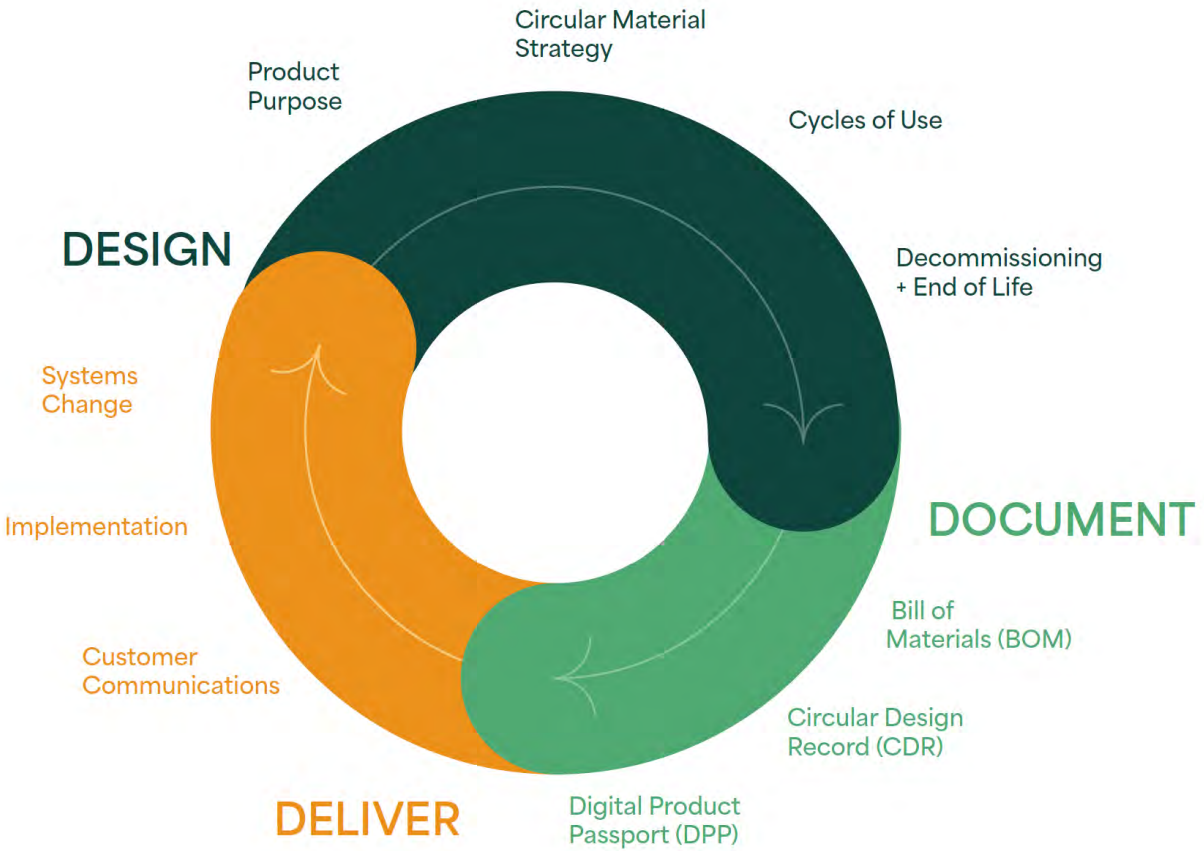


Image: Refashioning circular design method,
'Refashioning: Accelerating Circular Product Design at Scale', 2024

Customer communications

- The **customer** plays a critical role in ensuring the garment reaches its circularity potential.
- They can:
  - Buy circular designed products
  - Adopt circular behaviours
- Designers can work with Marketing and Product teams to drive change across these areas.

Communication examples

- In-store or online instructions at point of sale
- QR codes on care labels or tags
- Scannable thread embedded into clothing, that is, smart yarns
- Near field communication (NFC)
- Follow-up messaging (email, SMS, chat, forums, socials, website) covering use, care, alterations, restyling, repairs and options for when the garment is no longer needed

Implementation

Key actions for implementation:

- Engaging lifecycle partners
- Creating the circular design record
- Ongoing measurement and improvement

Lifecycle partners may be internal or external partners who focus on:

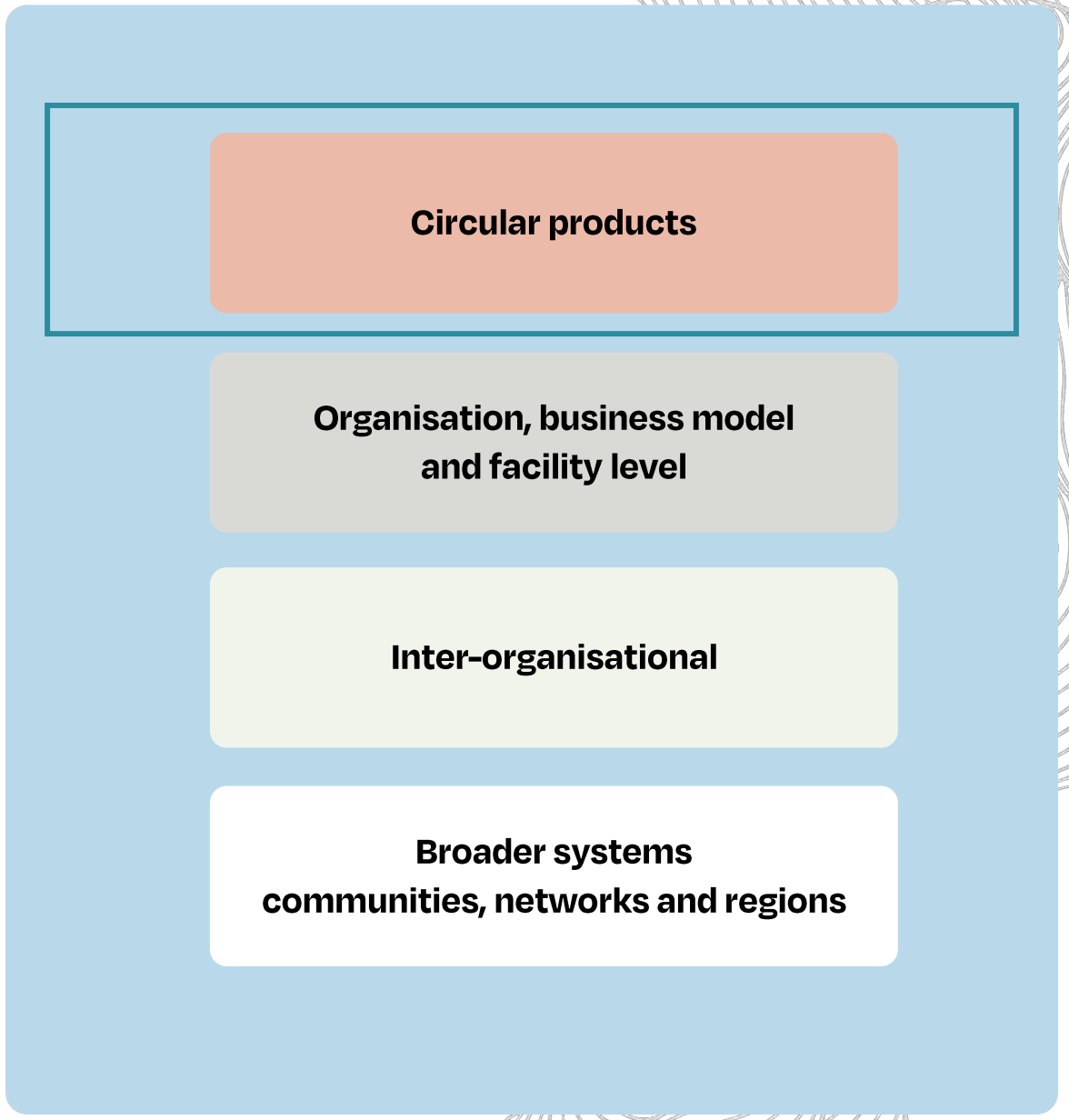
- Marketing and communications
- Retail
- Clothing collection
- Logistics such as rental, resale and repair
- Decommissioning
- Recycling

Circular system levels

We encourage you to take the first steps towards transforming the clothing sector by changing how you design products.

Businesses can contribute by:

- Designing products that leverage circular principles
- Investing in circular design and circular business models and empowering teams to transform
- Engaging and educating consumers on circularity benefits and opportunities



Practical steps

Ongoing actions your organisation can take are:

- Work with others on collaborative solutions for example, sourcing or sharing materials
- Engage in multi-stakeholder forums
- Invest in circular raw materials and zero waste manufacturing
- Push for regulatory change and industry standards
- Support regulated participation in Seamless
- Establish or fund circular businesses models, such as rental, repair, alterations, restyling and sharing to meet circularity ambitions
- Educate customers on their role in circularity

05.

Next steps

Your next steps

1. Continue to work through the templates and redesign and produce your garment
2. Check in with Julie or Courtney in a consultation session if required
3. Prepare for the final online presentation where you'll share your redesigned garment and learnings

Seamless circular design training

When	Course	Participants
June 2025	Seamless Circular Clothing Design Foundations	Organisation wide
July 2025	Seamless Circular Clothing Design Implementation	Design and production teams
September 2025	Seamless Circular Clothing Design Implementation: online presentation	Design and production teams and key decision makers

Seamless circular design training

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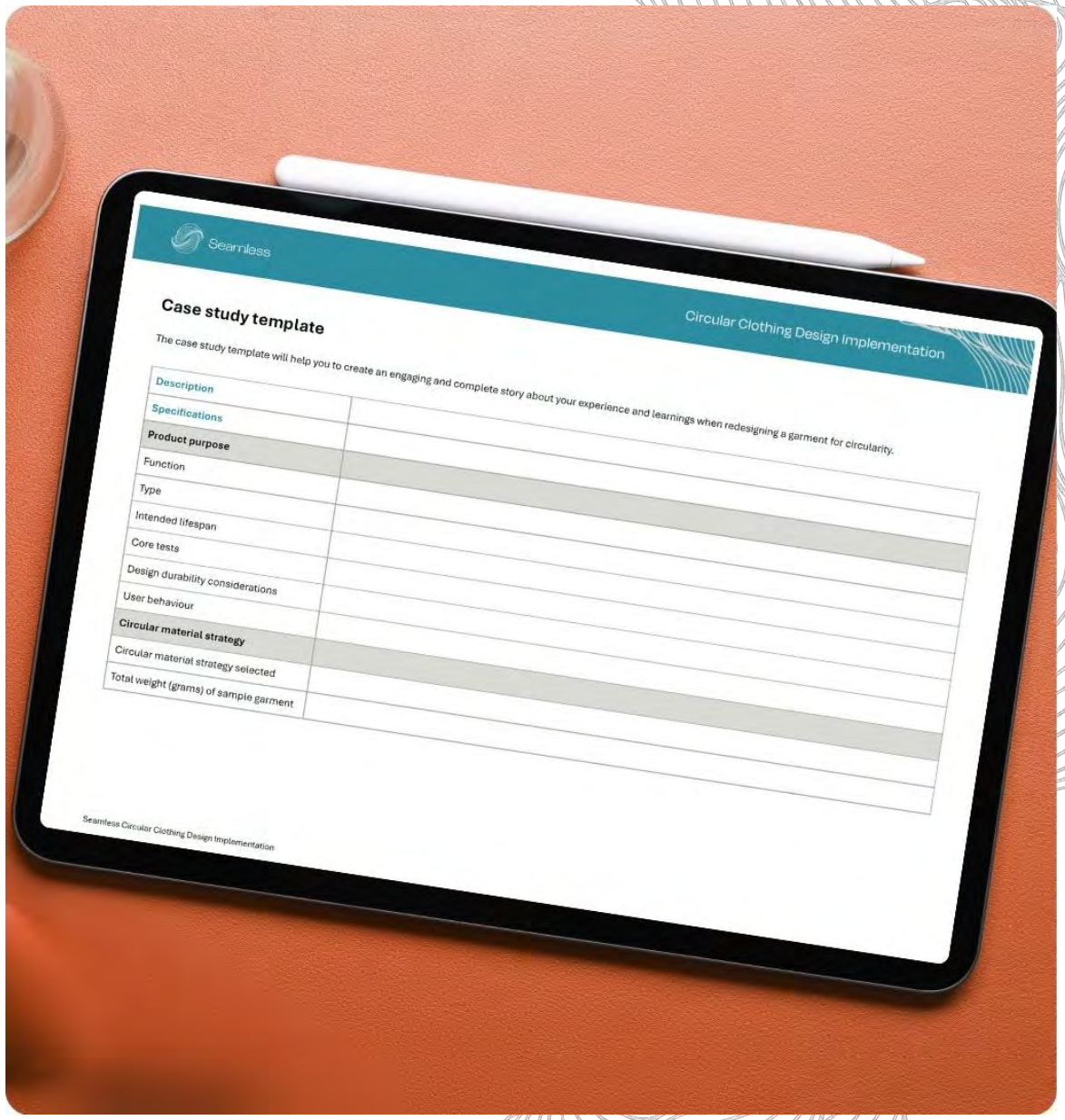
September 2025	Seamless Circular Clothing Design Implementation: online presentation	Design and production teams and key decision makers

Create a case study

- The **case study template** will help you to create an engaging and complete story to inform your online presentation.
- Your case study can also be a useful internal change management tool which documents learnings and insights.
- It can also help you share successes with your team and organisation – consider sharing it in a team meeting, on the Intranet or in the staff newsletter.
- The case study template has been shared with the training resources.



Online presentation

Five minute presentation followed by five minute Q&A session.

Treat this session as a **pitch** to your leadership team which aims to inform and persuade them to take a specific course of action.

We suggest you cover:

1. The challenges you set out to solve
2. Your planning process
3. The outcome: your redesigned garment
4. Your key learnings and insights
5. What's next

Helpful hints

- Treat this as a pitch to your leadership team. Keep it short, sharp, direct and engaging.
- Share a clear problem statement which explains the challenges and circularity principles you set out to address.
- Explain how the proposed garment redesign addresses those challenges.
- Consider the role of broader business or system changes including changes to business models or financial strategies.

Resources

Click on the QR code or go to:
seamlessaustralia.com/circular-design-training/implementation

1. Refashioning circular design guide
2. Product purpose statement template
3. Bill of materials template
4. Cycles of use template
5. Decommissioning and end of life template
6. Circular Design record template
7. Case study template
8. Implementation workshop presentation

Key takeaways

Seamless

Contact

Seamless
E: info@seamless.org.au

Courtney Holm
E: courtney@abch.world

Julie Boulton
E: julieboulton75@gmail.com