



GREENROOM
VOICE



AGENCE
INNOVATION
RESPONSABLE

SHOWCASE / WORKSHOP

CIRCULAR ECONOMY

RAW MATERIALS - FIT FOR CIRCULAR ECONOMY

#reconomy

Anna RODEWALD & Benjamin MARIAS
November 2015



AGENDA

- Who are you ?
- Who are we ?
- Key definitions
- Raw materials : a deeper look into materials that are fit for circular economy - opportunities & limitations
- Examples of applications





OUR PURPOSE

We started our journey on circular economy with a first Workshop at OutDoor in Friedrichshafen 07/2015



RAW MATERIALS



OUR PURPOSE

For Performance Days 11/2015:

- ...we are focussing on the **Raw Material** part of Circular Economy
- ... we would like **to inspire** you to take over the mindset of Circular Design
- ... we will present **some examples** of Raw Materials which are fit for Circular Economy
- ... we would like to hear **your challenges and ideas** on integration of Circular Economy into your Business
- ... build **connection** between potential partners

WHO ARE YOU ?



WHO ARE YOU ?

Who is working on the implementation of circular economy principles ?

Why are you coming to this presentation ?

WHO ARE WE ?



WHO ARE WE ?



GREENROOM VOICE
building trust & transparency



AGENCE
INNOVATION
RESPONSABLE



WHO ARE WE ?

We don't do everything alone. We work with partners in EU.



VISION STATEMENT

MYCELIUM PARTNERS IS THE INDEPENDENT NETWORK OF ENTREPRENEURS WHO WORK AS INTERDISCIPLINARY EXPERTS FOR RESPONSIBLE AND INNOVATIVE BUSINESS SOLUTIONS WITHIN THE EUROPEAN SPORTS- AND TEXTILE-INDUSTRY.



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KEY DEFINITIONS



DEFINITION

The circular economy principles*

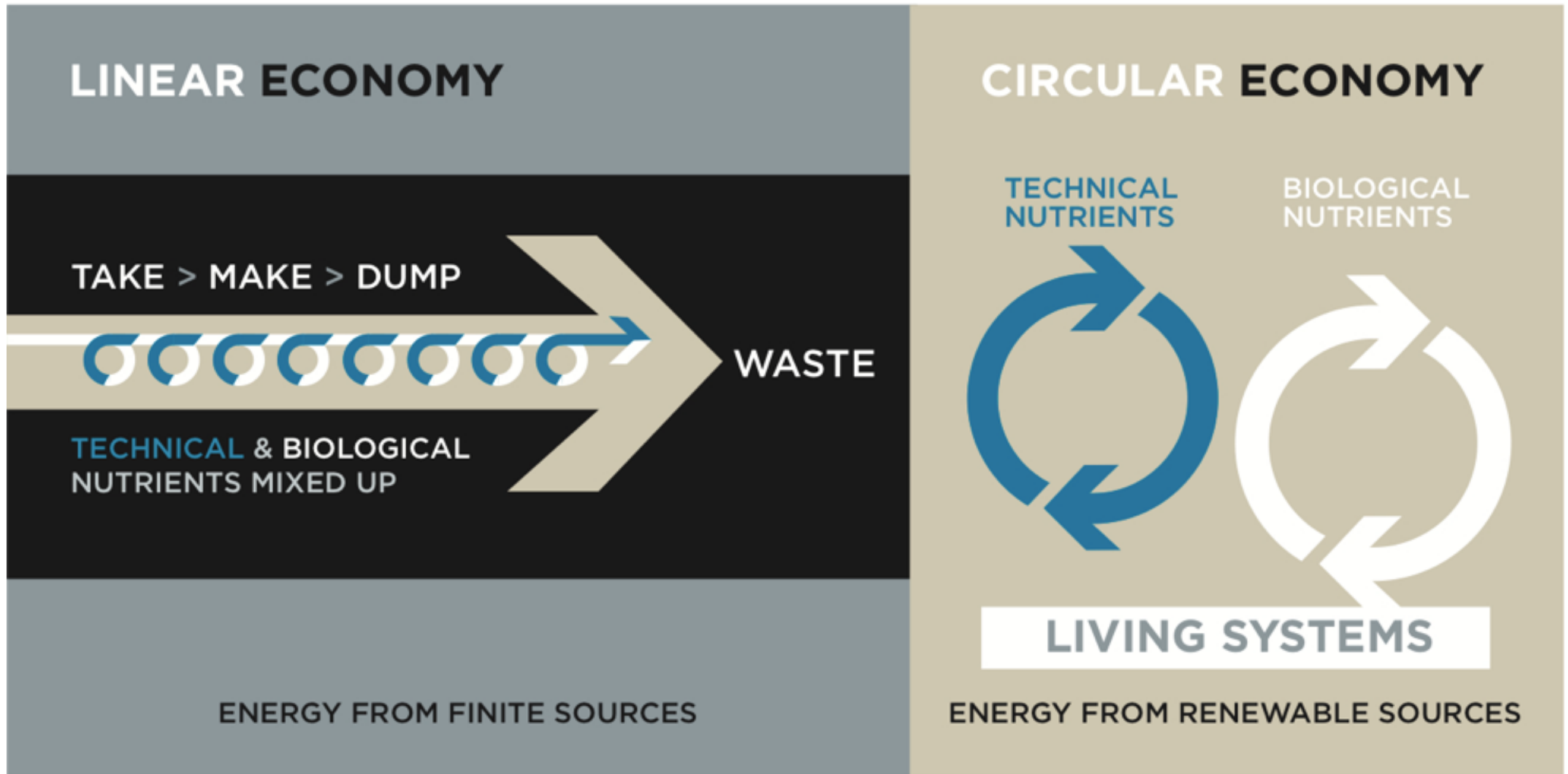
*Ellen MacArthur Foundation

A circular economy is one that is restorative by design, and which aims to keep products, components and materials at their highest utility and value, at all times.

- > Global economic model
- > Technical vs biological materials
- > Effective design and use of materials
- > New opportunities for innovation
- > Resilient system - Long term



DEFINITION



AFTER W McDONOUGH AND M BRAUNGART



DEFINITION

Recycle : Open-Loop

Strategy to extend material utilisation for more than one product lifecycle, where the recycled material properties degrade with every recycling loop to finally end up as waste. Open loop recycling can be considered as a **linear process**.



DEFINITION

Recycle : Close-Loop

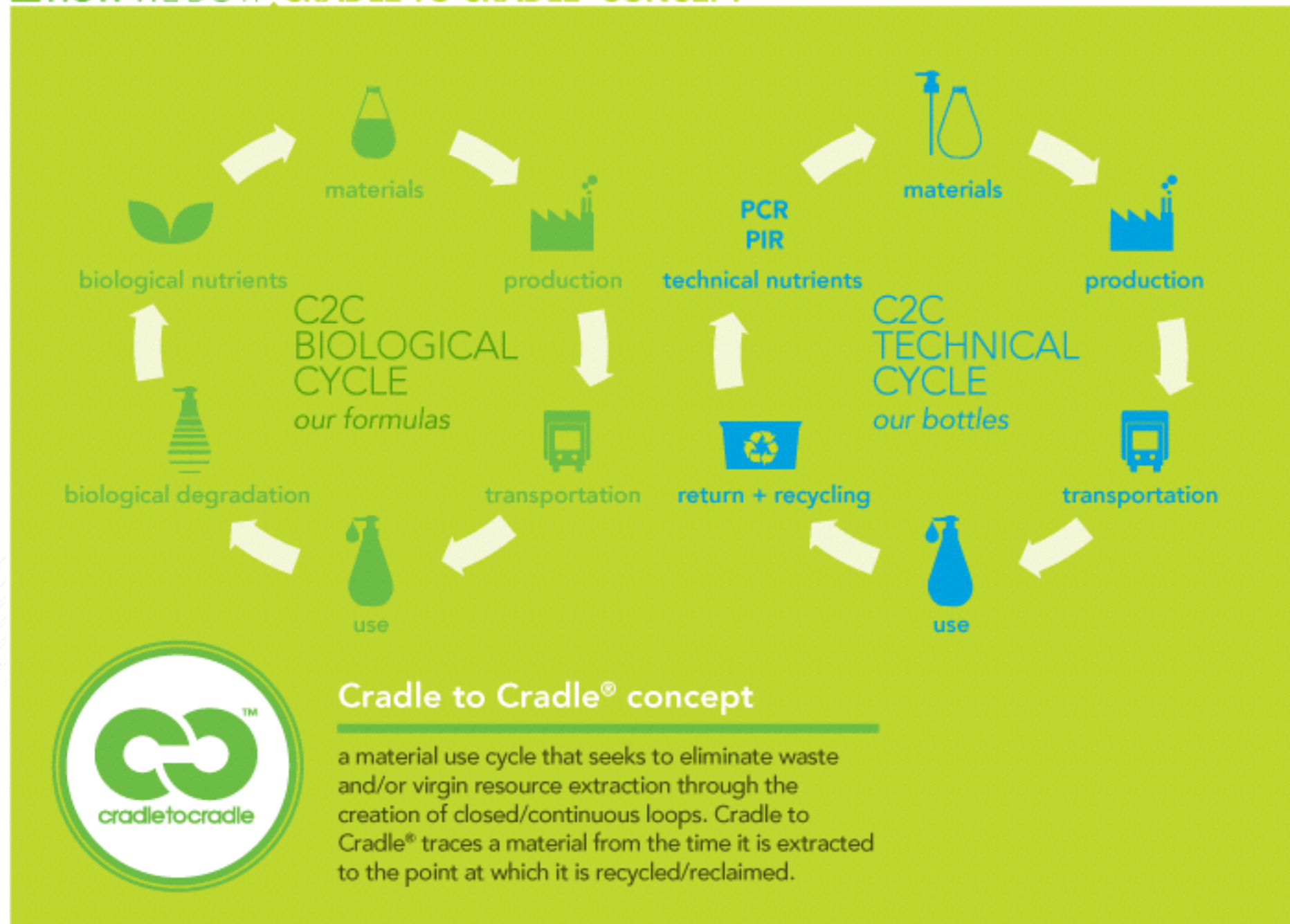
Strategy where the recycled materials keep their original material properties, providing the same material performance through many recycling loops, ideally endlessly.

- > Material resource efficiency and resource security concerns
- > Simpler messaging to consumers
- > Part of a **circular economy process**



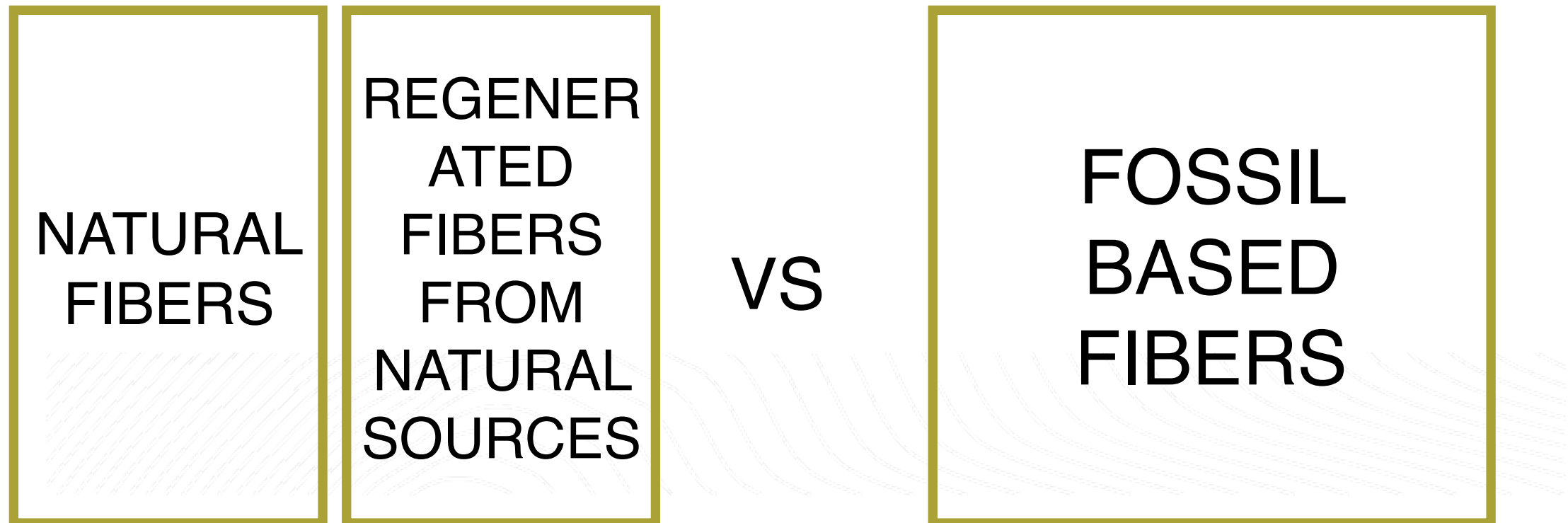
DEFINITION

GREENSKEEPING
HOW WE DO IT, CRADLE TO CRADLE® CONCEPT





DEFINITION



**RAW MATERIALS : A DEEPER LOOK INTO
MATERIALS THAT ARE FIT FOR CIRCULAR
ECONOMY - OPPORTUNITIES AND LIMITATIONS**



RAW MATERIALS

NATURAL
FIBERS

OPPORTUNITIES	LIMITATIONS
Renewable	Chemicals involve in the cleaning and dying process
Insulation Performance	Traceability of the whole supply chain
Durability	Cost
Recyclability : mechanically & well manage (Italy, France, Spain, UK, etc.)	CO2 footprint higher than down



CALAMAI



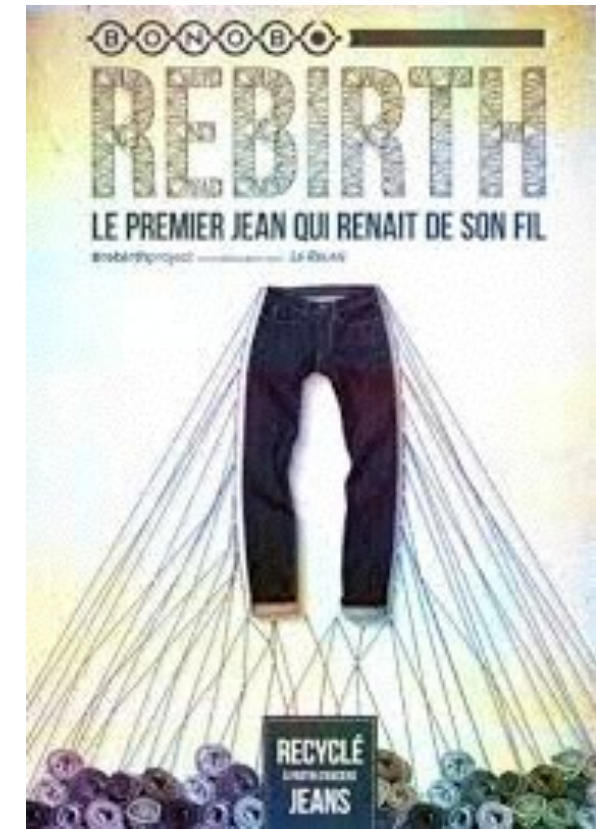
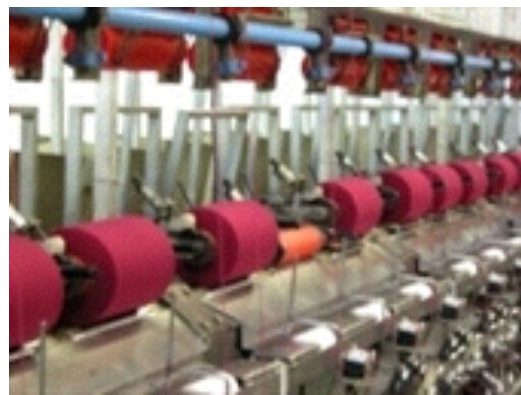
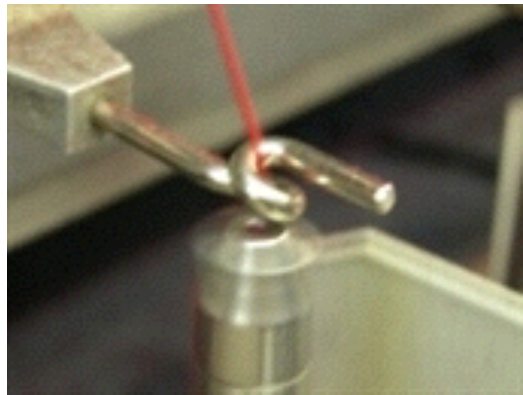


COTTON (ORGANIC)

OPPORTUNITIES	LIMITATIONS
Renewable	Water consumption
Comfort & touch	Land use
Easily available	
Fully recyclable : mechanical, easily accessible (Italy, Spain, France, Turkey, etc.)	Lower quality after mechanical recycling



FILATURES DU PARC / HILATURAS FERRE





LINEN - HEMP

OPPORTUNITIES	LIMITATIONS
Low water consumption in agriculture	Small number of manufacturers who can deliver good quality
No need for fertilizers	Wrinkling if used 100%
High mechanical properties	No « official » recycling process
Good skin comfort, fibre absorbs moisture, “cooling” effect	
Multipurpose use: from apparel to technical equipment	
Compostable (if appropriate dyes)	



FREITAG F-ABRIC



F-abric is made from a **blend of flax and hemp fibers**, along with modal fibers made by spinning cellulose obtained from beech trees. F-ABRIC will **biodegrade** completely within around a couple of months in the compost.



DOWN

OPPORTUNITIES	LIMITATIONS
Renewable	Materials traceability
Lightweight	Animal welfare
High insulation performance	Price
Fully recyclable : mechanical process, close-loop, accessible	Market availability over the years



NAU + FRENCH SUPPLIER





RAW MATERIALS

REGENERATED
FIBERS
FROM
NATURAL
SOURCES



REGENERATED CELLULOSE

OPPORTUNITIES	LIMITATIONS
All kinds of wood and other cellulosic raw materials can be used	Price
No need for fertilizers	Traceability of the wood
Variety of technical functionality possible	Recyclability not fully commercialized yet
Good skin comfort, fibre absorbs moisture, “cooling” effect	

REGENERATED CELLULOSE



re:newcell

New ground breaking **recycling process** of cotton and other cellulosic textiles such as viscose **into new textile fibres.**

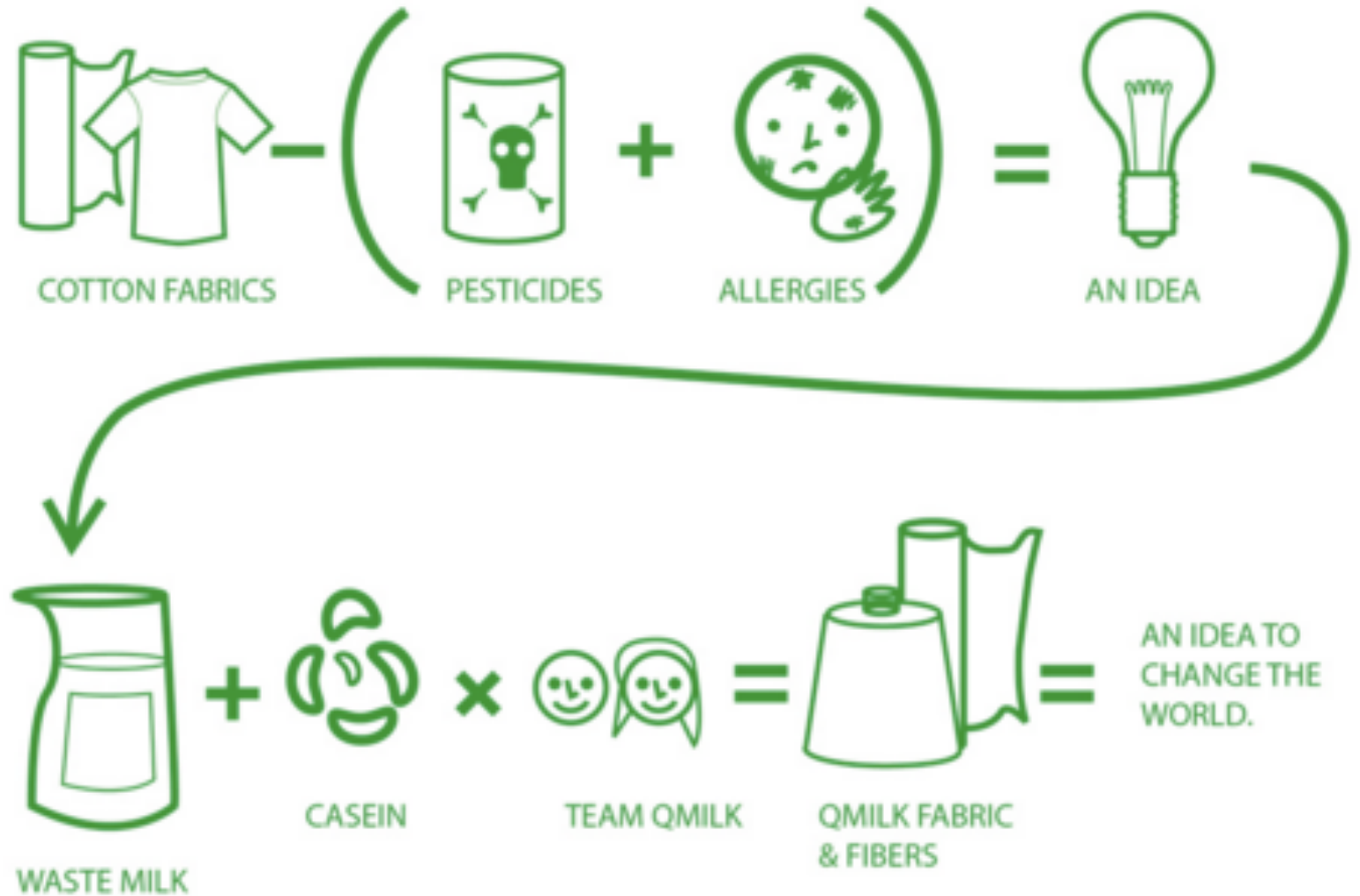


REGENERATED PROTEIN

OPPORTUNITIES	LIMITATIONS
Use of plant based (i.e. soy bean) and animal based (i.e. milk) protein	Price
Biodegradable	In development, not much experience in bulk production yet



REGENERATED PROTEIN





RAW MATERIALS

FOSSIL
BASED
FIBERS



FOSSIL BASED FIBERS

OPPORTUNITIES	LIMITATIONS
Global existing recycling streams	Keep the fibers in a close loop system
Broad availability on fabrics, fillings and accessories	Often need to add virgin materials after recycling process to keep the performance
Commercialized process for chemical and mechanical recycling	Polyester and polyamide are often mixed with other fibers = not recyclable as such or more difficult



POLYESTER - CHEMICAL RECYCLING TEIJING - ECO CIRCLE



ECO CIRCLE™ is an environmentally friendly system.



POLYESTER - MECHANICAL RECYCLING

SINTERMA - NEW LIFE





POLYAMIDE - CHEMICAL RECYCLING

AQUAFIL - ECONYL





POLYAMIDE - CHEMICAL RECYCLING NILIT® ECO CARE (PA 6.6)





RECYCLED RUBBER

Timberland 
— TIRES —



SOEX
FOOTWEAR
RECYCLING
PILOT





RAW MATERIALS

REGENERATED
FIBERS
FROM
NATURAL
SOURCES



REGENERATED FIBERS FROM NATURAL SOURCES

OPPORTUNITIES	LIMITATIONS
Renewable resources	Potential competition with the food industry
Great substitution of fossil based materials	Not all fully commercialized yet
Less toxic by-products	Often mixed with fossil based fibers (PES, PA)
Potentially biodegradable	Further research needs to be done for appropriate biodegradability



POLYESTER - PLANT-BASED TORAY

TORAY
Innovation by Chemistry





POLYAMIDE - PLANT-BASED TORAY

'TORAY'
Innovation by Chemistry

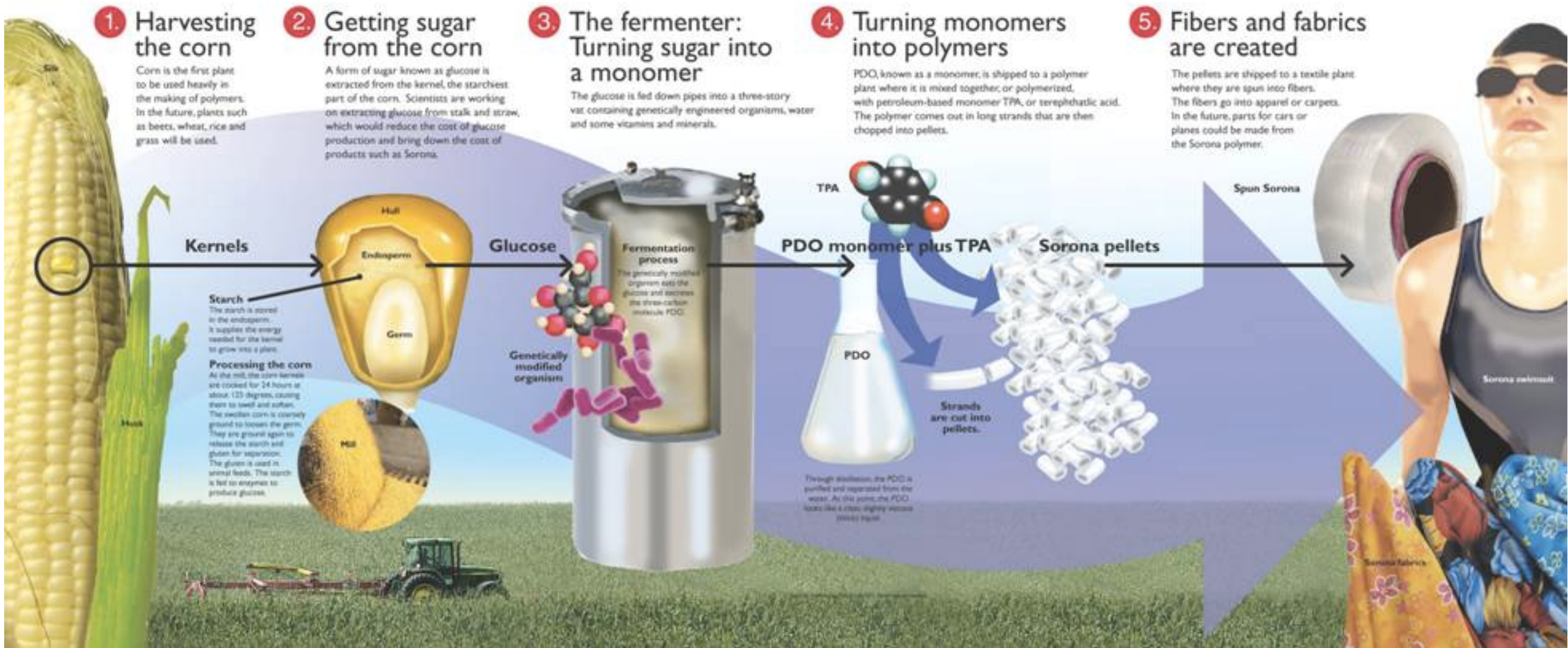




SORONA - PLANT-BASED

From corn to polymers and fibers

DuPont™ Sorona® is made from naturally occurring starch in the kernels of corn. In the next five years, researchers plan to find ways to use starch from the entire plant.





TAKE AWAY

As a designer :

- **Eliminate** materials that would disrupt or contaminate the recycling stream (e.g., in-product electronics, high % of elastane, „polyblend“, glued in parts)
- Design products that can be **easily disassembled** into recyclable or reusable material streams
- Design products with a **single fiber type** to aid in closed-/open-loop material recycling
- Design policy for **extended / multiple re-use**
- Design product that **can be repaired**
- Design recyclable products that are **easily identifiable** as such by customers.



WHAT'S NEXT ?

1. **19.-21. January 2016:**

Join us at the Ethical Fashion Show in Berlin

2. **24.-27. January 2016:**

Join us for #RECONOMY our Circular Economy Showcase & Workshops in Munich

3. **13.-16. July 2016:**

Join us for OutDoor Show in Fridrichshafen



QUESTIONS ?

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