Climate-KIC

Business Innovation through Circular Economy training

Timisoara | 21,22,25 Nov 2019

Climate-KIC is supported by the EIT, a body of the European Union

Outline of TRAINING

Content & training blocks

- How to **identify** worthwhile CE approaches

  Circular economy opportunities incl. climate impact

  Block #01 & #02 (Nov 21)

- How to **develop** worthwhile CE approaches **into realistic action plans**

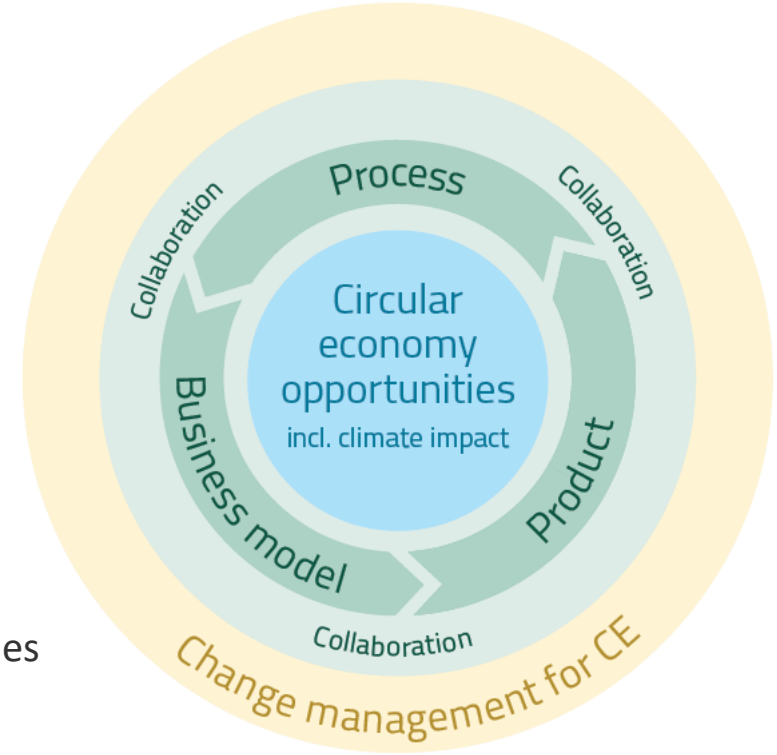
  Process, product and business model incl. collaboration & system relationships

  Block #03 & #04 (Nov 22)

- How to **make a success from** worthwhile CE approaches

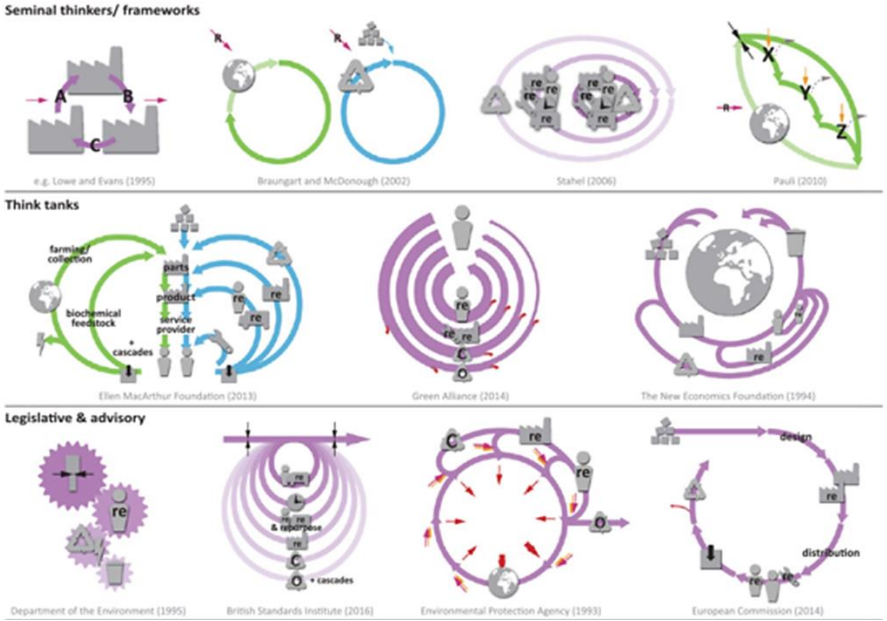
  Change management for CE

  Block #05 & #06 (Nov 25)



What is Circular Economy (CE)?

Circular Economy is…



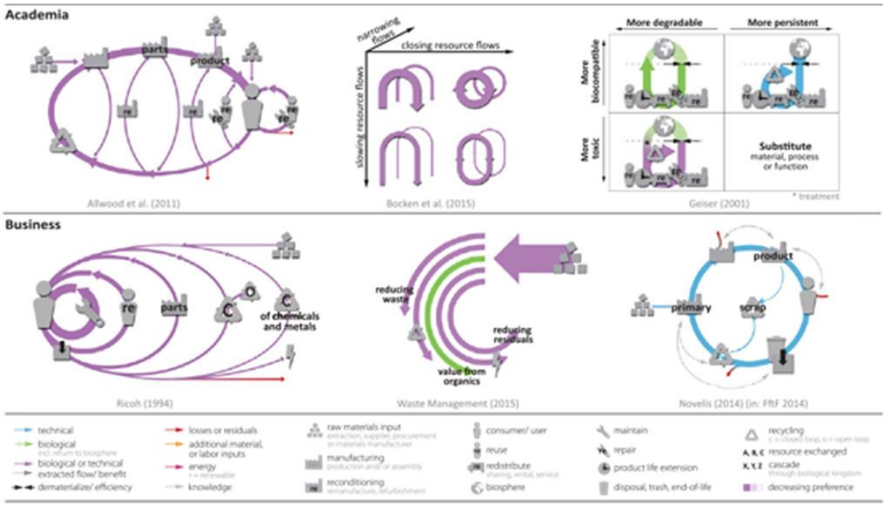


Figure 1 Overview of a selection of interpretations of waste and resource management frameworks. These illustrations purposefully lack some detail so as to draw attention to the underlying structure of these interpretations: that is, the major role that "circular" or resource life-extending strategies play as well as the preoccupation with organizing the relationship between strategies.

SOURCE: Blomsma and Brennan (2017)

CE is an umbrella concept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Why is Circular Economy needed?
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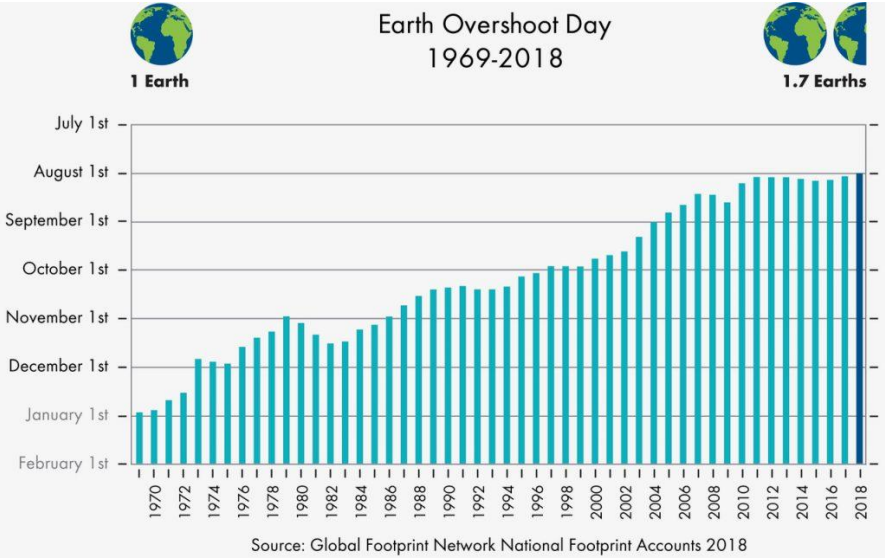
Facts & figures

In 2018, global **earth overshoot day** was on **August 1st**



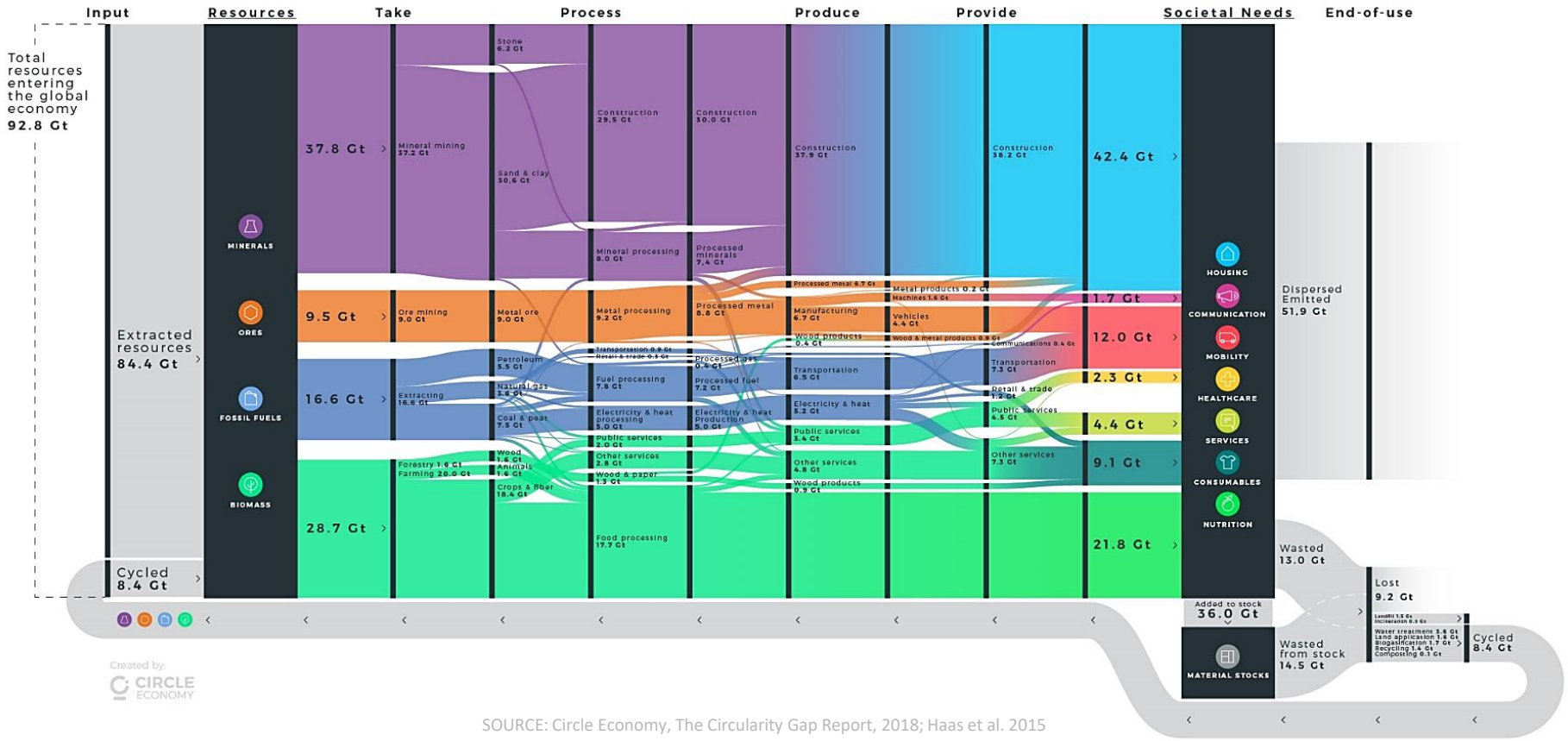
EARTH OVERSHOOT DAY

Source: Global Footprint Network National Footprint Accounts 2018

Global Footprint Network
Advancing the Science of Sustainability

SOURCE: https://www.overshootday.org/newsroom/country-overshoot-days/

Our economy is currently only 9% circular



SOURCE: Circle Economy, The Circularity Gap Report, 2018; Haas et al. 2015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Why is Circular Economy attractive for businesses?
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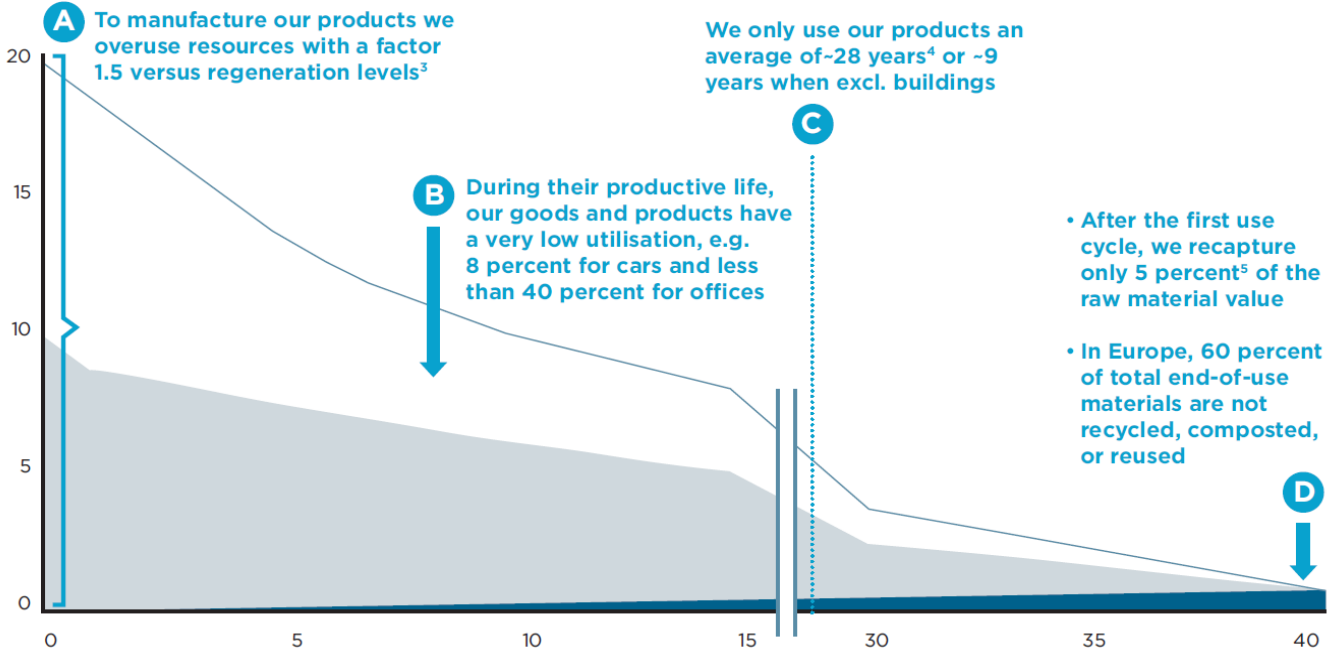
CE provides opportunities

Order of magnitude of CE improvement potential

Value loss of selected manufactured goods across the EU economy

Value of manufactured products, % of GDP, EU, 2012

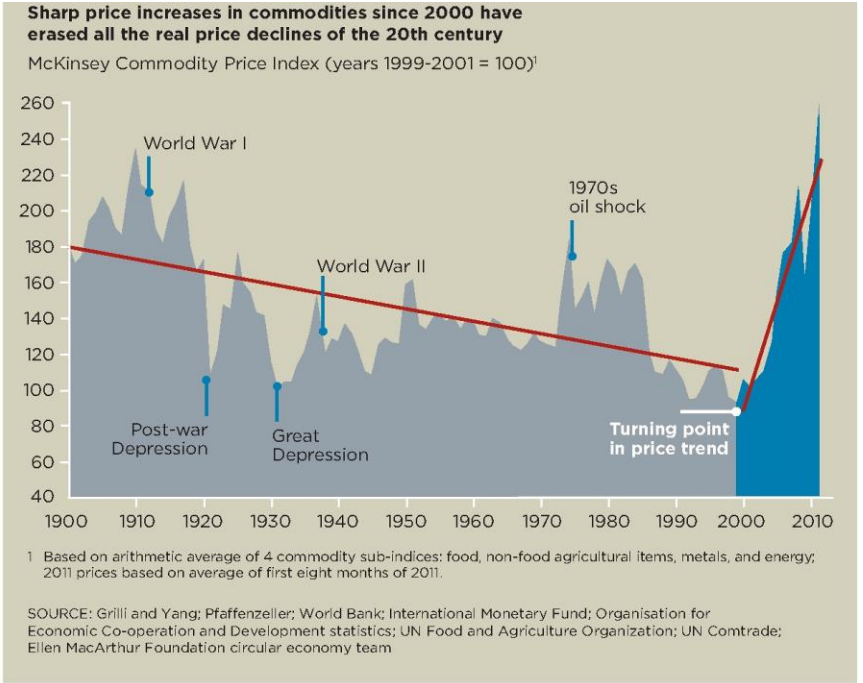


SOURCE: Growth Within: A CE Vision for a Competitive Europe. EMF 2015.

CE provides opportunities

Also potential for:

- Guarding against **price increases and fluctuations**
  Walter Stahel: "The goods of today are the resources of tomorrow at yesterday's resource prices".
- Guarding against **supply risks**
  Resource nationalism, disruption through more extreme weather
- Ensuring **continued 'license to operate'**
  Radical openness means increased customer/consumer scrutiny
- Keeping up or staying ahead of **regulatory trends**
  Increasingly stringent laws & regulations for emissions, Environmental Permitting Regulations, eco-design directive, etc.



CE provides opportunities

Also potential for:

- Opening of **new markets**

  *CE creates **new value creation systems** and thus new markets. **Adapting** to those markets or even **creating** them, the comany secures **future revenues**.*

- Intensification of **customer relations**

  *Business models of the CE **enhance customer contact** on a recurring basis. This increases customer **retention** and allows for the company to collect **valuable information** about users behaviour better than any market research could ever muster.*

- Added value through **strong partnerships**

  *In the CE, everybody seeks **cooperation** with other **value-providing market participants** qua system. This is the foundation for strong and powerful collaborations.*

- Stronger **brand image**

  *CE encourage the strengthening of **secondary markets**. Companies can seize the opportunity to **support and control** those and therewith foster the brand image.*

- Improved **competitiveness**

  ***All listed arguments**, in conjunction with a **resource value-preserving manner** of product manufacture helps to improve and secure the companies competitiveness.*

Strong corporate identity

The CE saves resources and secures our economic future and wealth. As pioneer in that development, companies give their clients as well as their employees a mission, they can and might want to stand for.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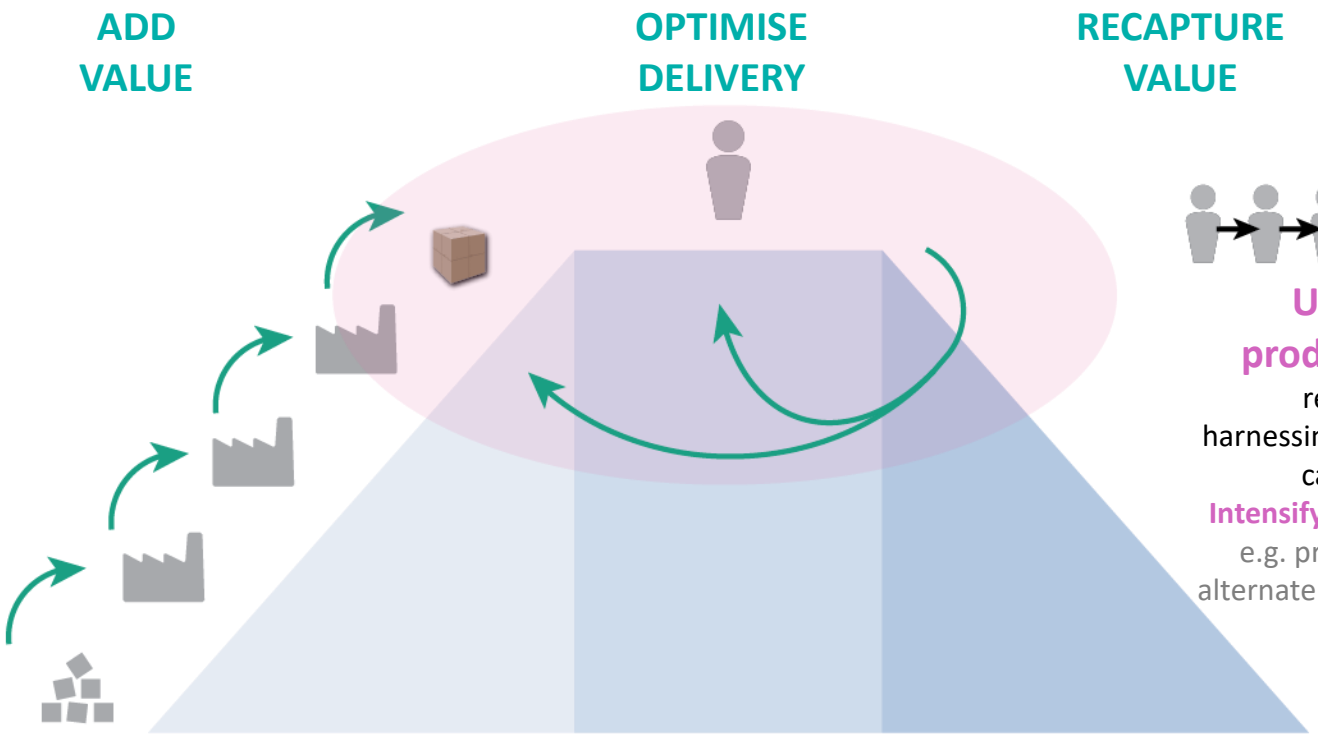
How to detect worthwhile circular economy approaches?

The Value Hill



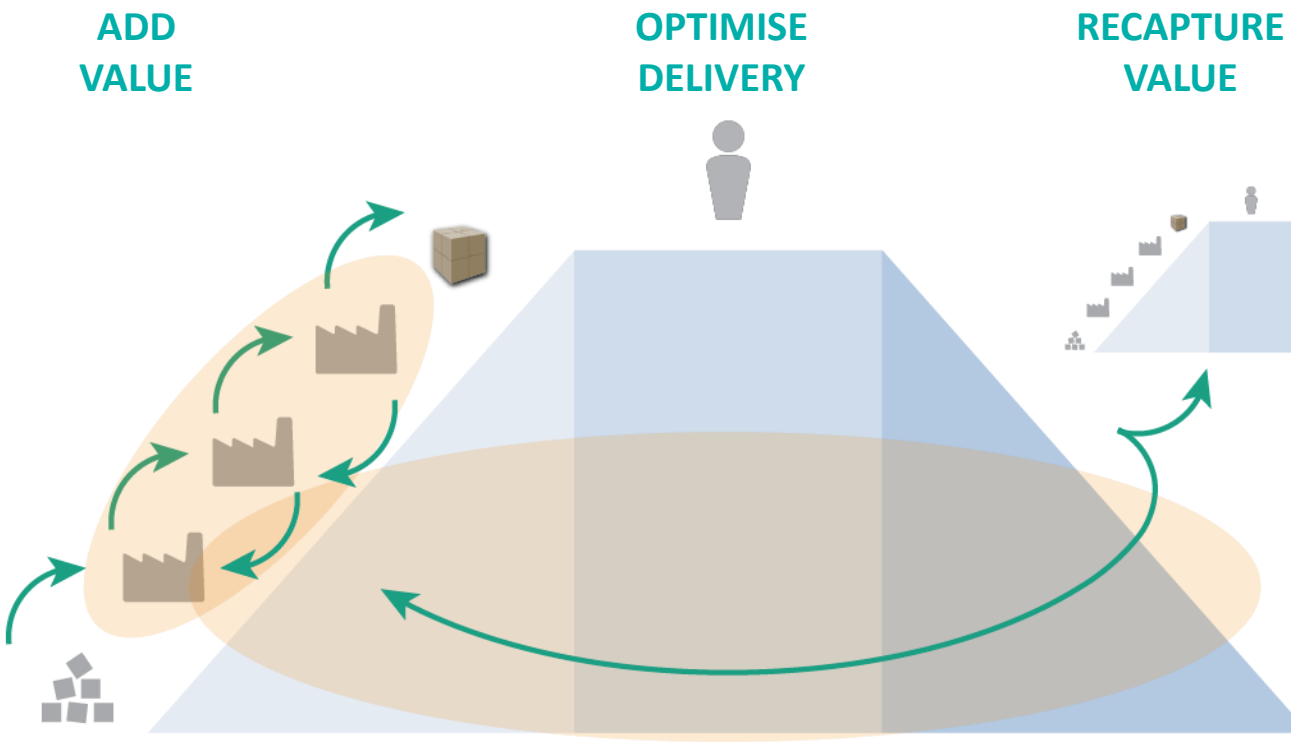
Underused product capacity

remedied by:
harnessing un- or underused capacity, use:

Intensifying loop strategies

e.g. product cascading, alternate use, sharing, co-use

The Value Hill



Underused particle capacity

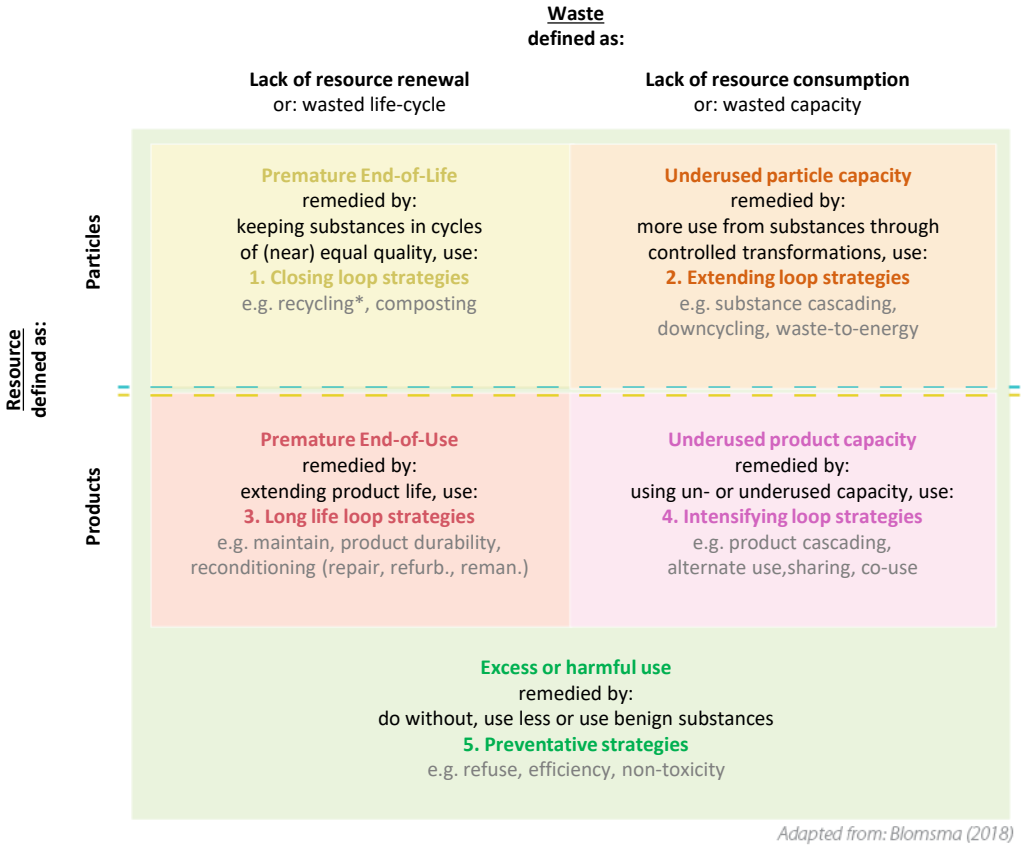
remedied by:

more use from substances through controlled transformations, use:

Extending loop strategies

e.g. substance cascading, downcycling, waste-to-energy

The ‘Big Five’ Structural Wastes



Adapted from: Blomsma (2018)

Introduction to the Circularity Compass

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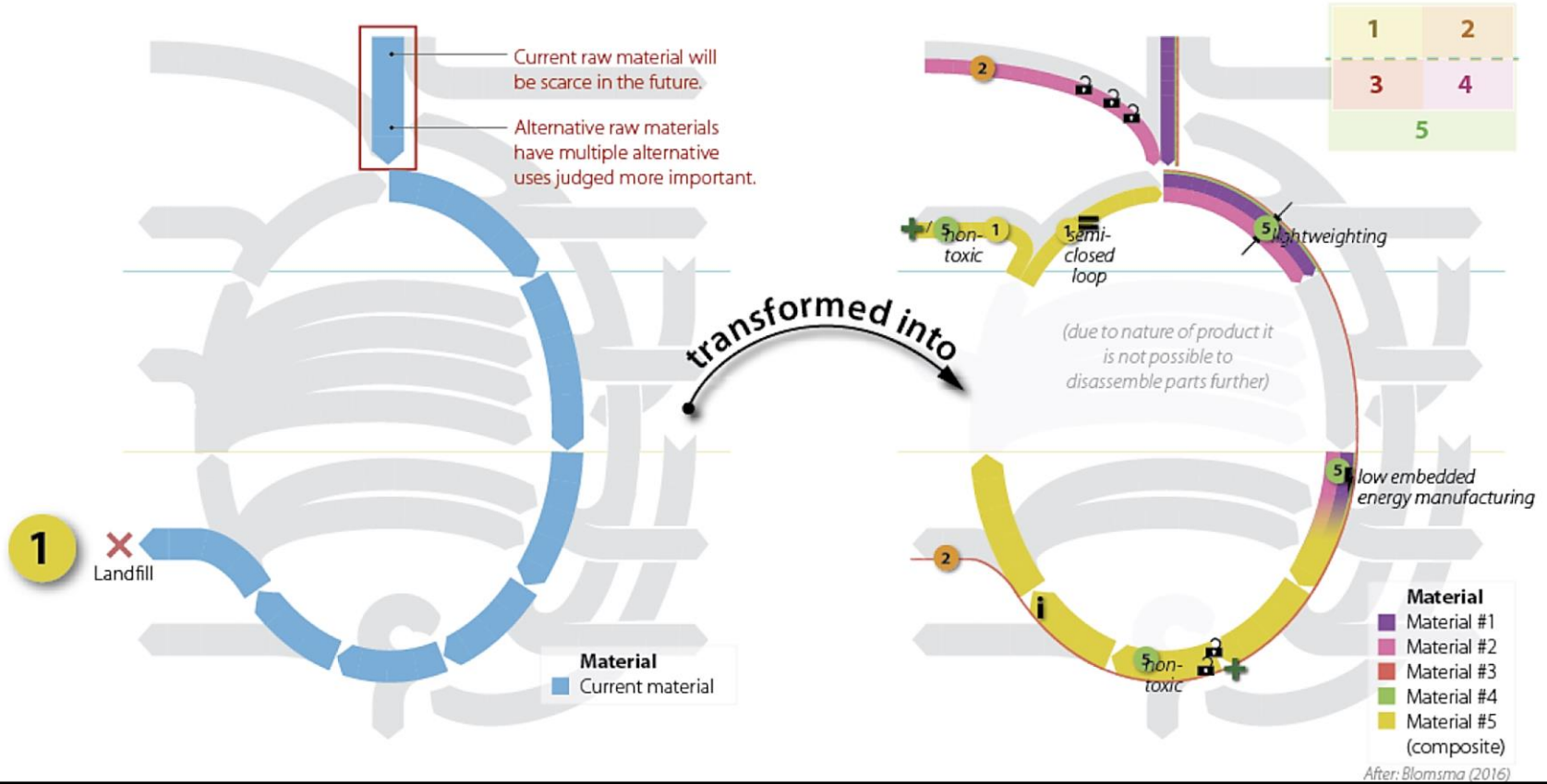
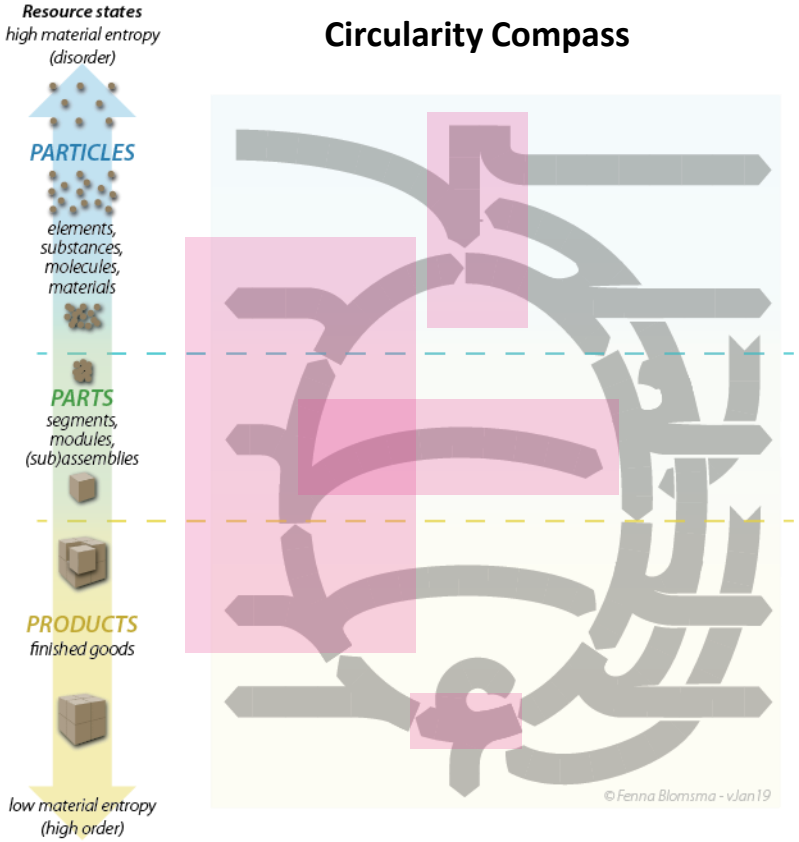
How can we use the Compass?



Circularity Compass



Current issues (examples):

Downcycling (i.e. using high value materials for low value applications)

- Waste of high value materials

Dependency on non-renewables

- Generating high-impact

Wrong reuse of parts

E.g. cannibalization or parts harvesting

- For resale and use in other vehicles
- Selective reuse only

Idle time

- Cars are parked 92-98% of the time

IMAGES: ...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System example including
various company cases
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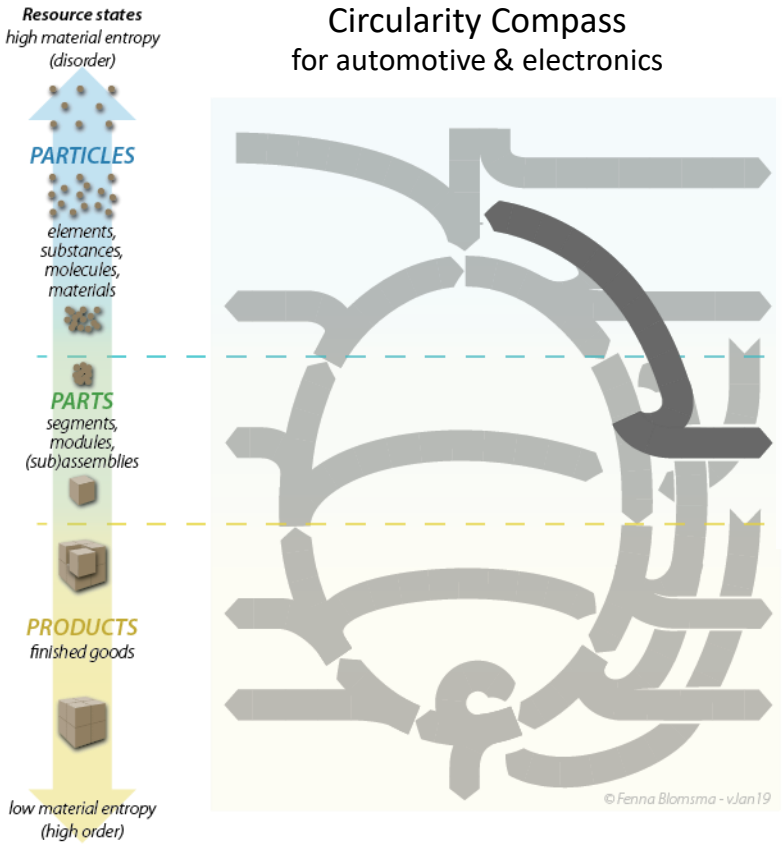


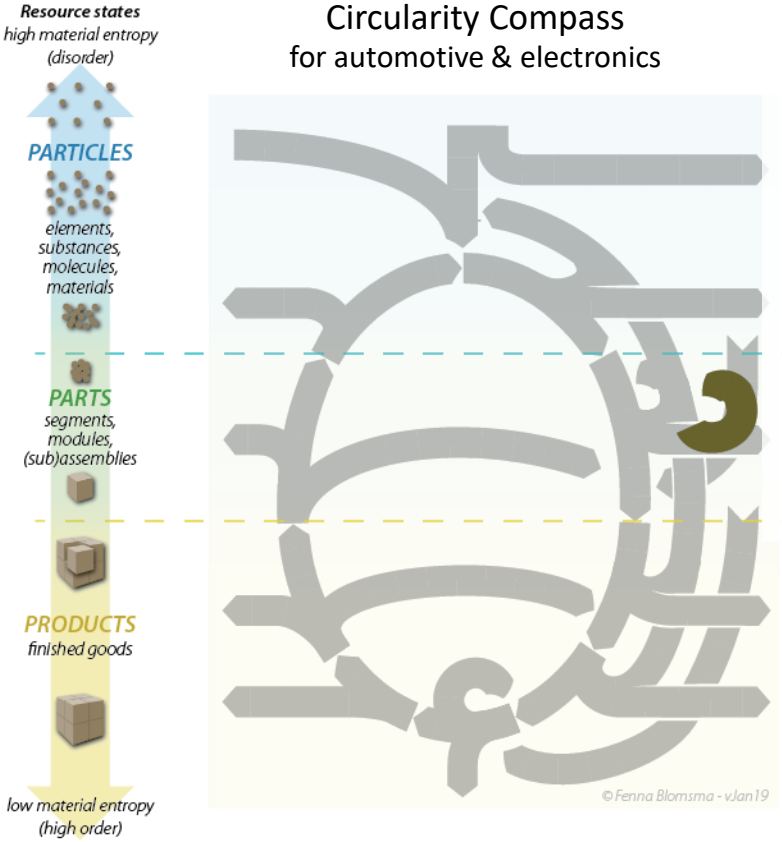
Off-cuts -> new raw material / parts

Abbey Steel

- **Buying off-cuts** from car manufacturers
- Recycling **without re-melting** (less energy)
- **Regular shape cuts** sold as (noncritical) small parts to other companies (e.g. electrical connectors and shelving)
- **Financially sustainable** business, could **grow**

IMAGE: abbey-steel.co.uk

Circularity Compass
for automotive & electronics



Circular supply of cutting machine fluids

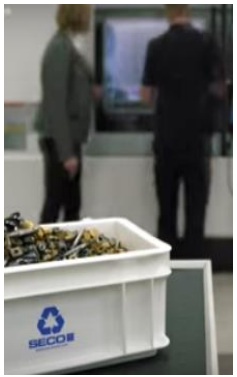
Renault & cutting machine Supplier

- **Materials as a Service**, machines and fluid ownership and service were transferred
- **Renault:** less support activities, reduced its TOC by 33%
- **Supplier**: forced to innovate fluid formula and process -> durable fluid x12, improved its margin by 125%

Circular supply of cutting tools

Seco Tools

- **Free-of-charge return** of used tools (containing rare metals, e.g. tungsten)
- Critical material in **pure streams of high quality**, when recycling



Circularity Compass
for automotive & electronics

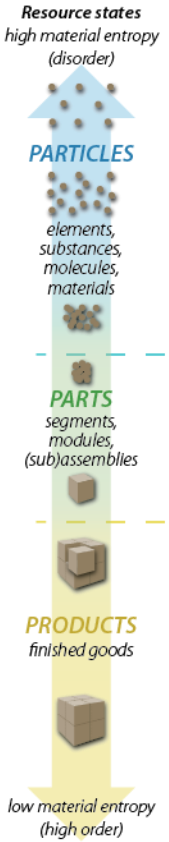


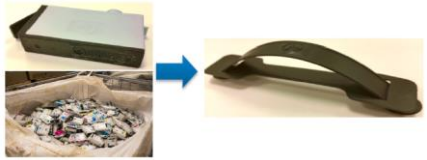
IMAGE: teslapittsburgh.com,

IMAGE: openmotors.co

IMAGE: ellenmacarthurfoundation.org

IMAGE: bosch-mobility-solutions.com

Remanufactured parts
Sinctronics & HP



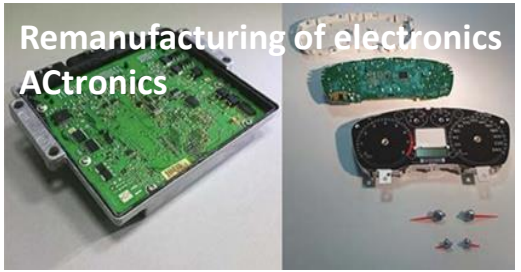
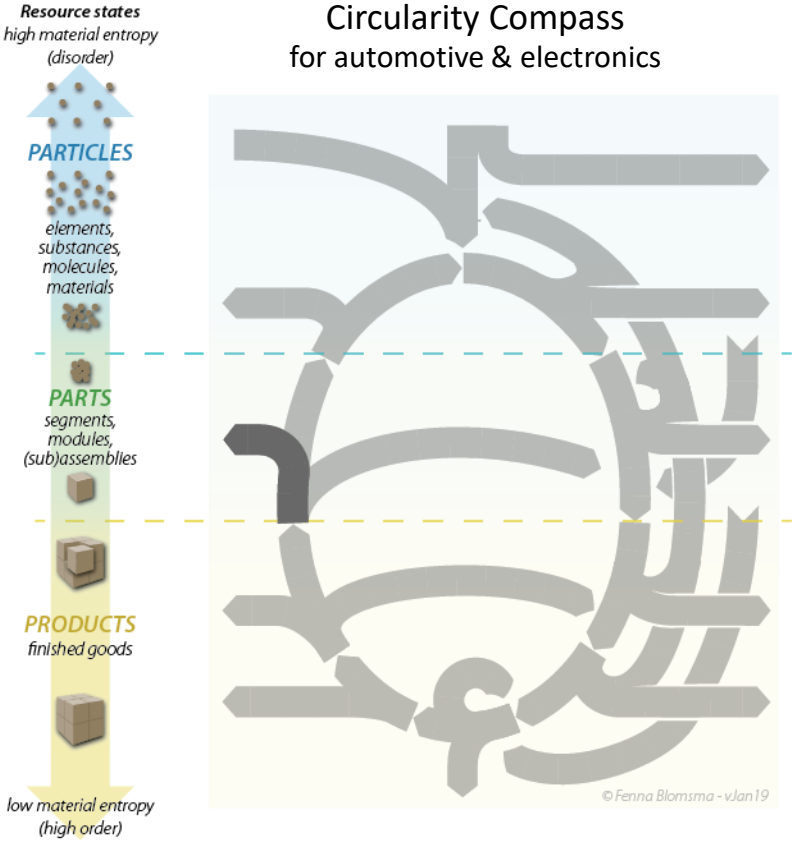


IMAGE: autotechnician.co.uk



Cascading of parts

Nissan and Sumitomo

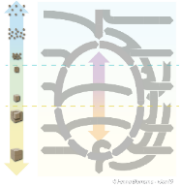
- World's first large-scale **power storage**
- A **second life for electric car batteries** (70-80% used): grid support, power supply applications, power operated applications
- Estimated **market potential**: USD 8 - 17 billion by 2030

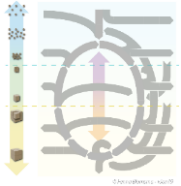
Map the system and identify structural waste

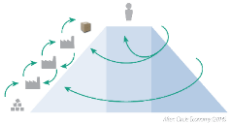
Using the tools

An overview of the exercise

- Four steps:
  1. Map resource flows
  2. ‘Waste hunt‘
  3. Identify suitable circular strategies
  4. Organise circular strategies








Build & Sell
30 mins
Visioning
Exercise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Understanding the dynamics of circular systems
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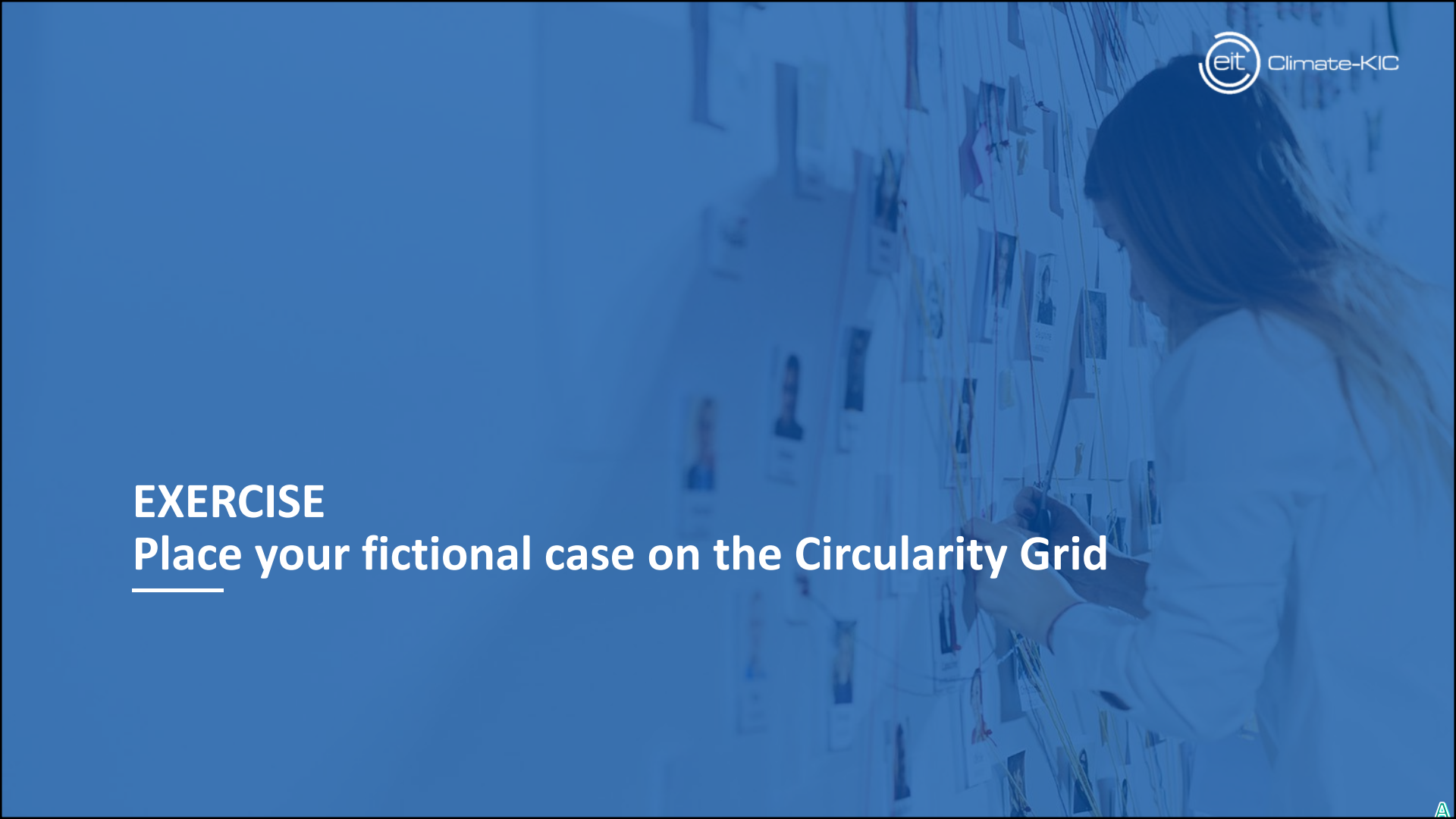
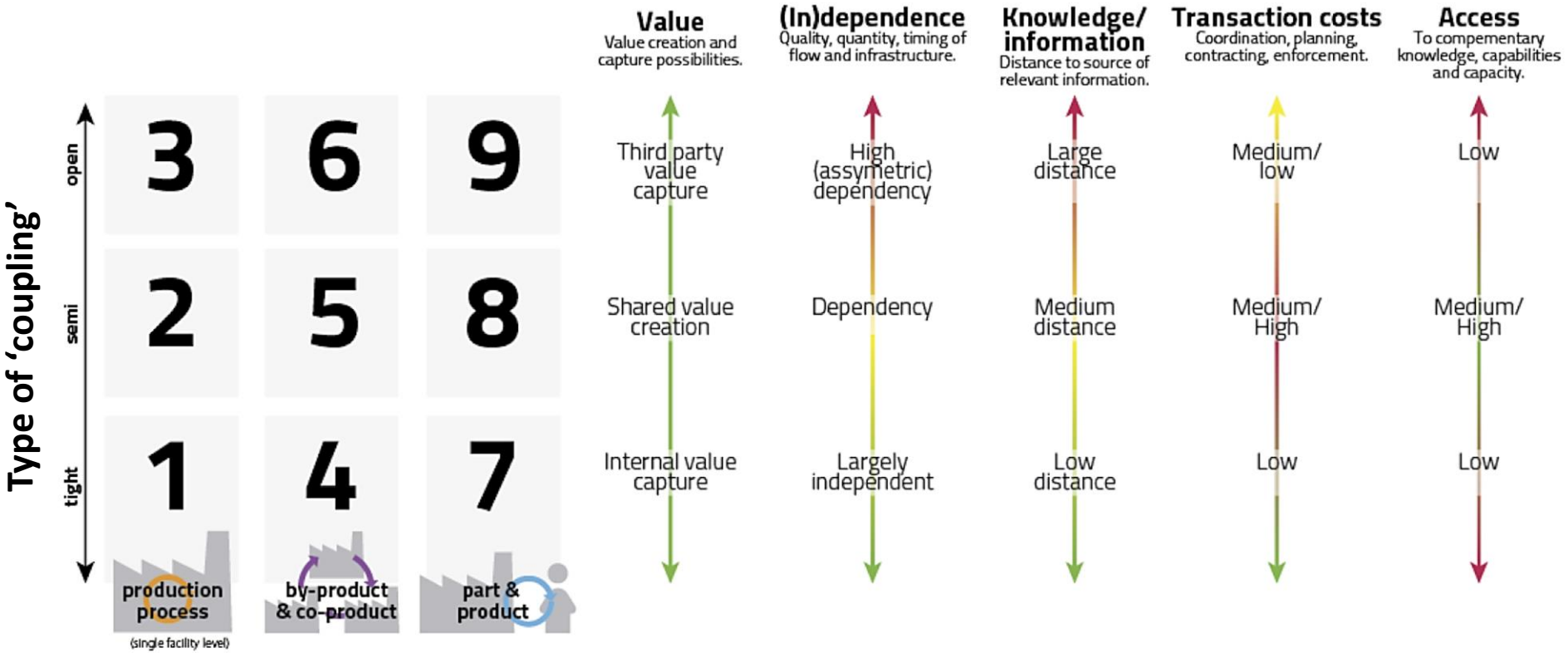
Circularity Grid

Type of 'coupling'	production process	by- & co-product	part & product
open	Waste from one process -> support process.	'Open loop' cascading.	Highly networked exchanges.
semi	Waste from one process -> different process.	Cascading through direct exchange between org's.	Circulation facilitated by partnerships.
tight	Waste from one process -> the same process.	Cascading within single organisation.	Manuf. directly engages with end-users for circulation.

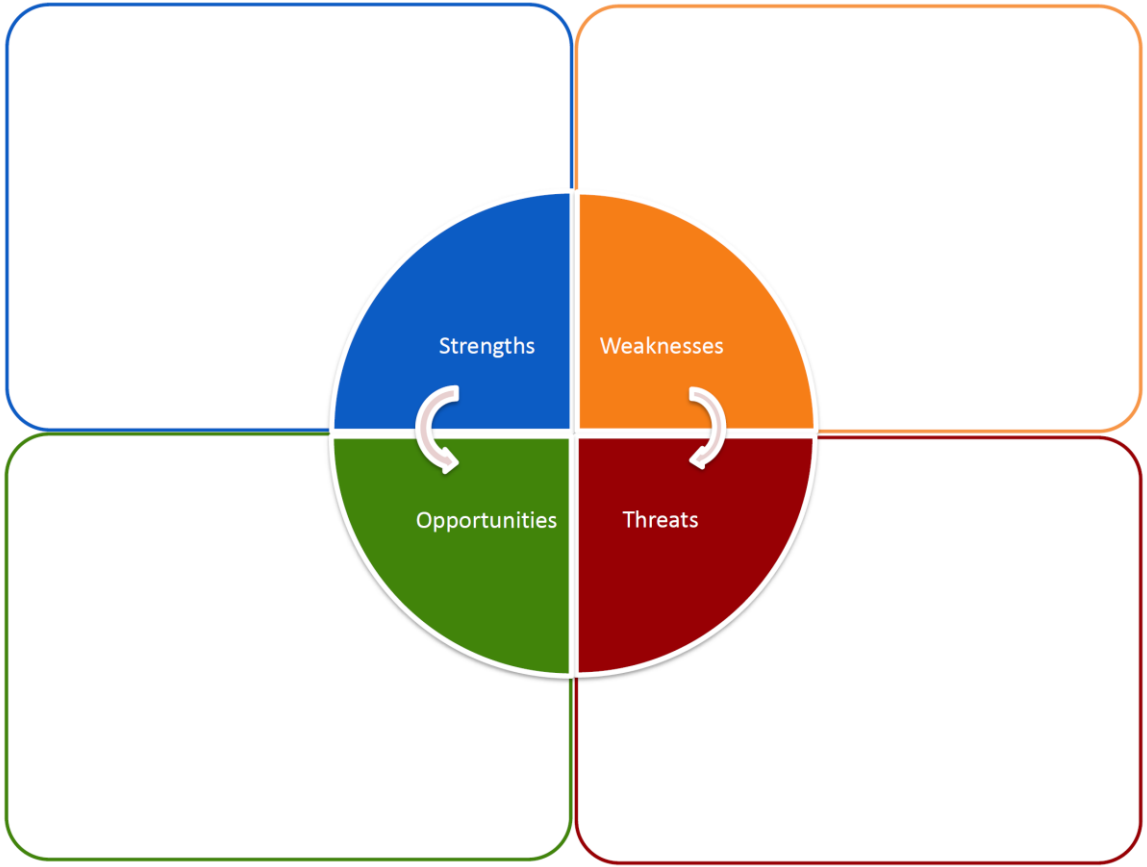


EXERCISE
Place your fictional case on the Circularity Grid

Keeping in mind...



2. Do a SWOT Analysis




Climate-KIC
Eco-design:
processes & product,
business model and
paradigm redesign
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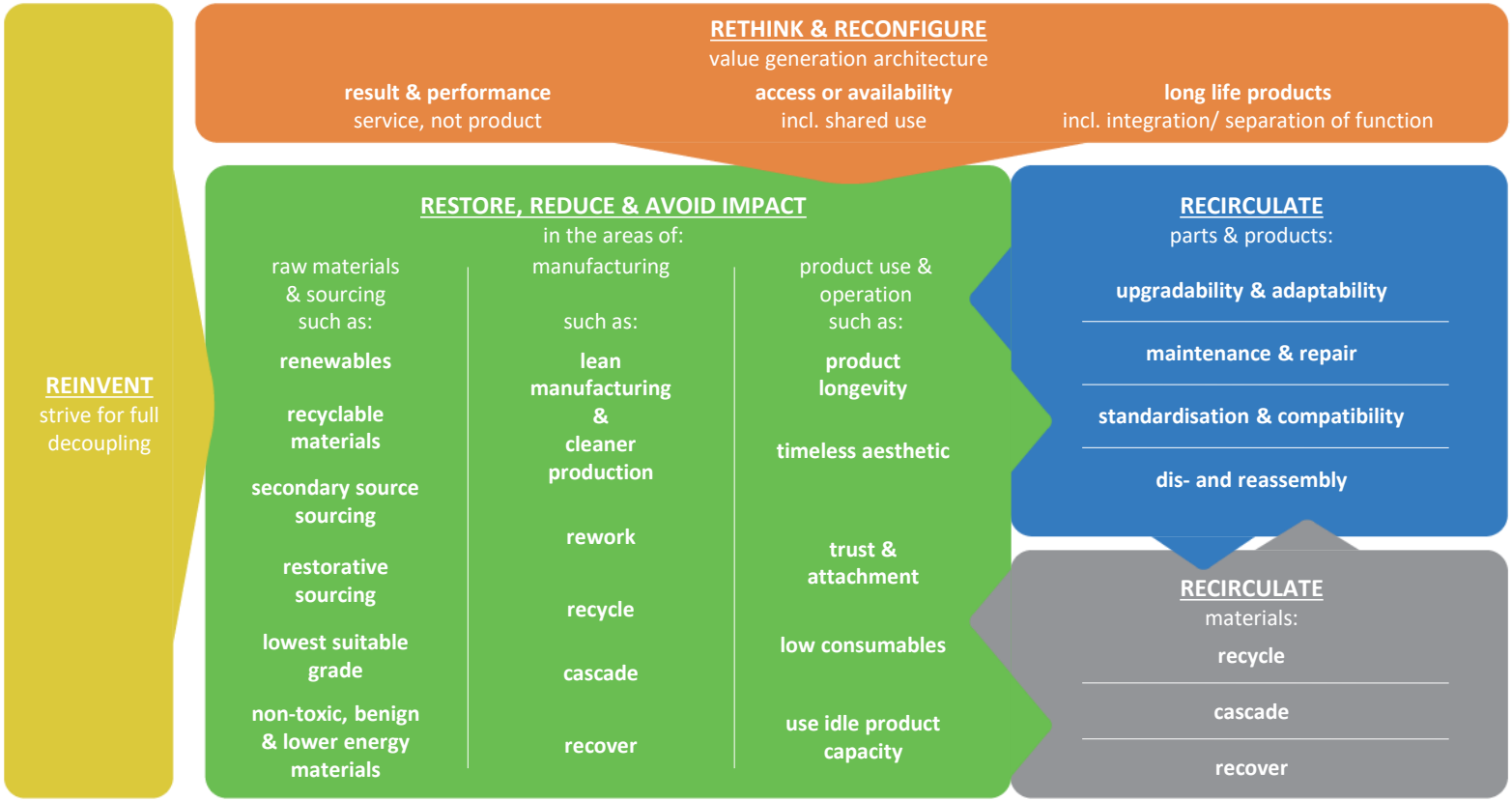
Circular Strategy Scanner

- Eco-design version -



SOURCE:
Blomsma et al.
(in review)

Climate-KIC

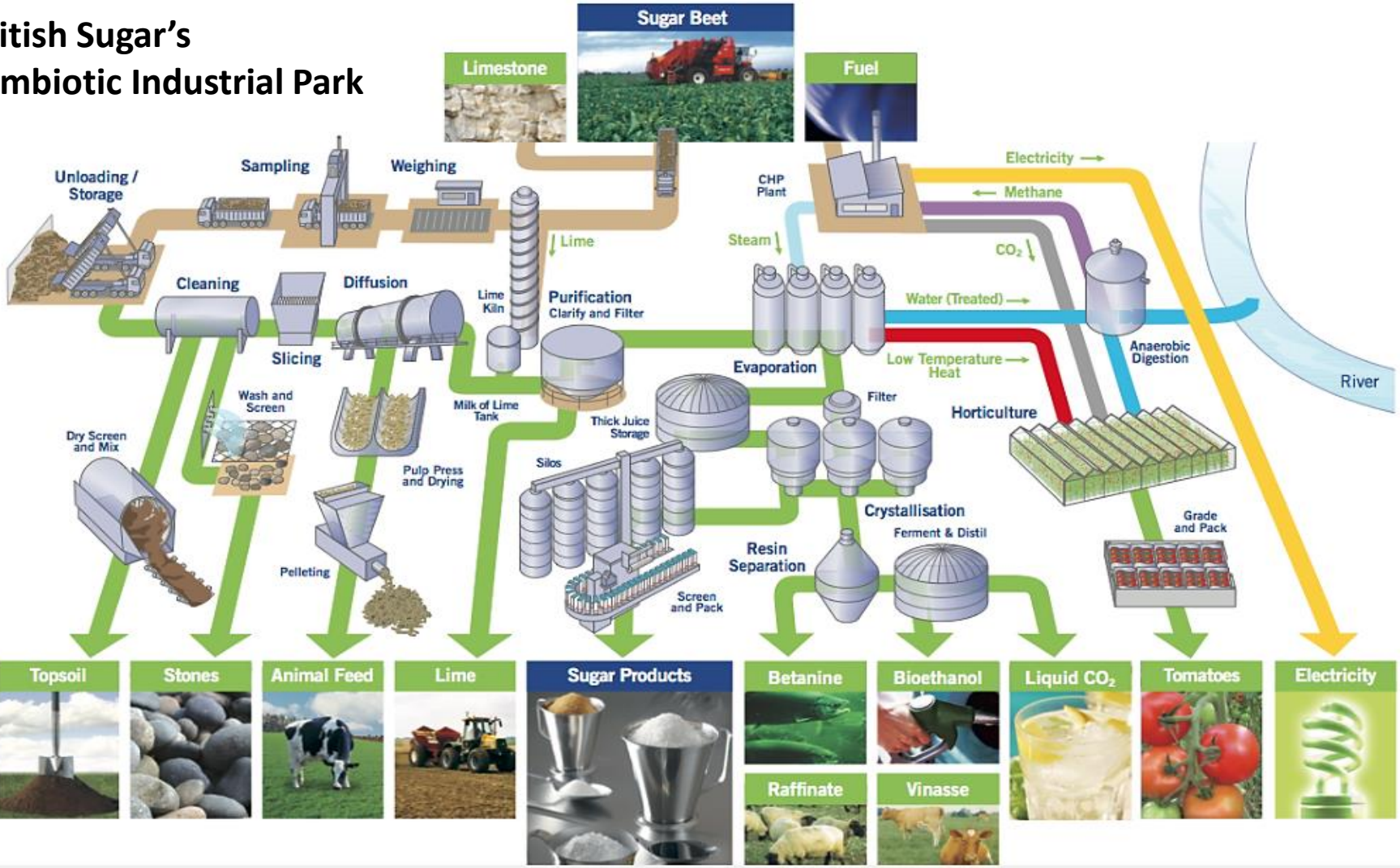
The story of British Sugar

How good Ecodesign hits many birds with one stone

- Recirculation of **removed soil and stone** from cleaning process into construction sector
- Recirculation of **lime** used to purify sugar into agriculture industry (used to correct soil acidification
- Recirculation of **food-grade CO2 emission** into industrial refrigeration processes
- Recirculation of **other CO2 emission and waste heat** into a salad and tomato greenhouse in the neighborhood of the plant (extra build for that)

https://www.britishsugar.co.uk/Topsoil.aspx

British Sugar's Symbiotic Industrial Park



The story of Loop/TerraCycle

New zero-waste platform –
experiments in New York City and Paris will start soon

Loop is a **circular shopping platform** that transforms **packaging** from everyday essentials **from single-use disposable to durable, feature-packed designs**.

Loop hygienically **cleans and sanitizes** the returned packaging, so they are ready for reuse, instead of ending up as waste after a single use.

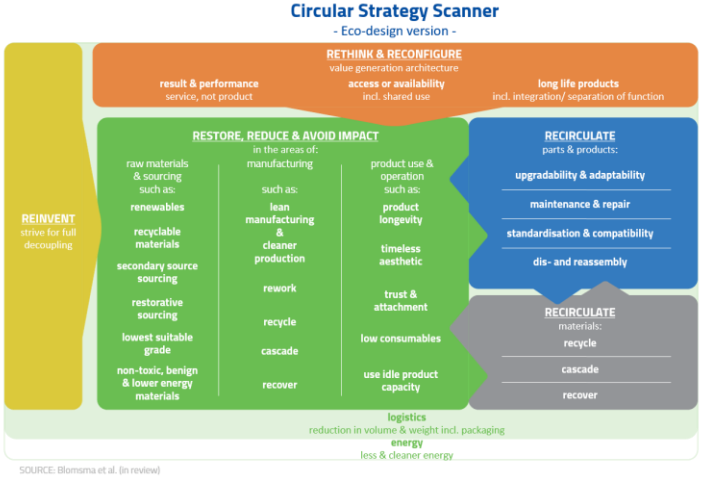
The concept will be **tested with a few brands** and in two major cities. Partners are companies like Unilever.

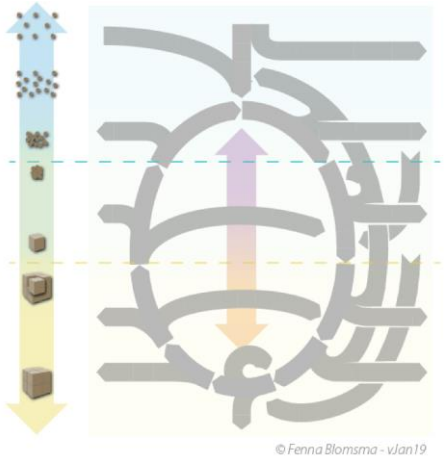
If it is successful, it **could be a paradigm shift** for the packaging sector.

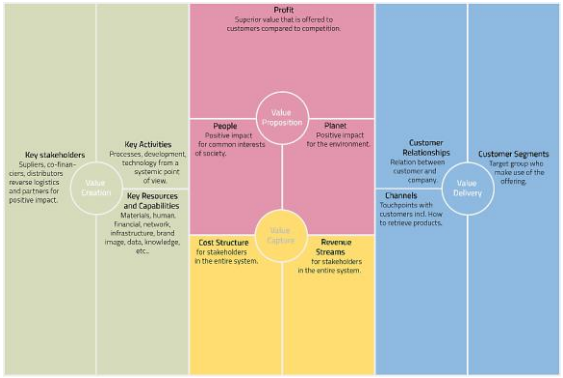
https://loopstore.com


(Re)design your
product, process and
business model

(Re)design your product, process and business model







Discuss & Fill

40 mins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How to make
CE approaches
successful
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PESTLE

- **P**olitical Factors
- **E**conomic Factors
- **S**ocial Factors
- **T**echnological Factors
- **L**egal Factors
- **E**nvironmental Factors

Structured tool to analyze the internal and external factors that impact the macro environment of a system.

Each of these factors imply certain changes, risks and opportunities.

Some of these factors are out of control …or seem to be.

P&L in PESTLE - the EU CE package

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EU Circular Economy Package

- In **January 2018**, as part of a **shift towards a circular economy**, the European Commission adopted a **new set of regulations**

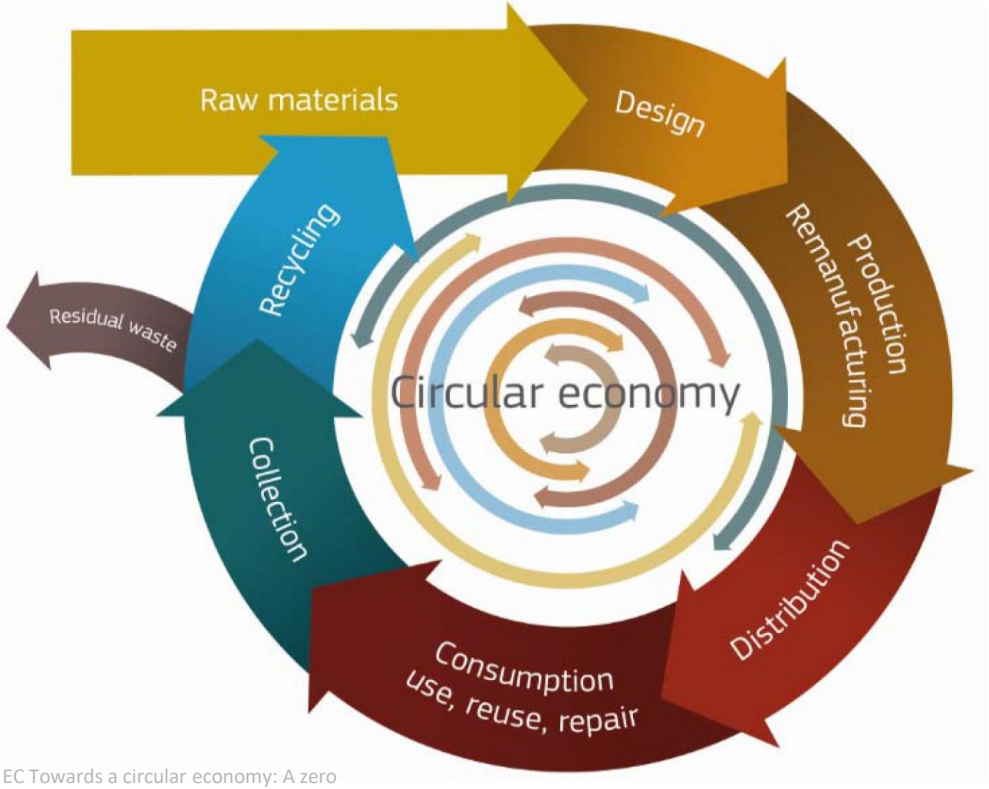
- These include:
  - new ***waste management targets*** regarding reuse, recycling and landfilling
  - strengthening provisions on ***waste prevention*** and ***extended producer responsibility***
  - streamlining ***definitions, reporting obligations and calculation methods*** for targets

- Additionally, the new EU Strategy for Plastics in the Circular Economy states that **by 2030, all *plastics packaging* should be recyclable**

EU CE Package: Overview

- CE Package contributes to the overarching legislation, the 2008 **Waste Framework Directive,** which defines main waste management concepts:
  - **'Polluter pays principle' –** ensuring that the costs of preventing, controlling and cleaning up pollution are reflected in the cost of goods
  - **'Waste hierarchy' –** a priority order set among waste prevention and management options
  - **'End-of-waste status' –** when waste ceases to be waste after recovery

EU CE Action Plan



EC Towards a circular economy: A zero waste programme for Europe. 2014

Among others:

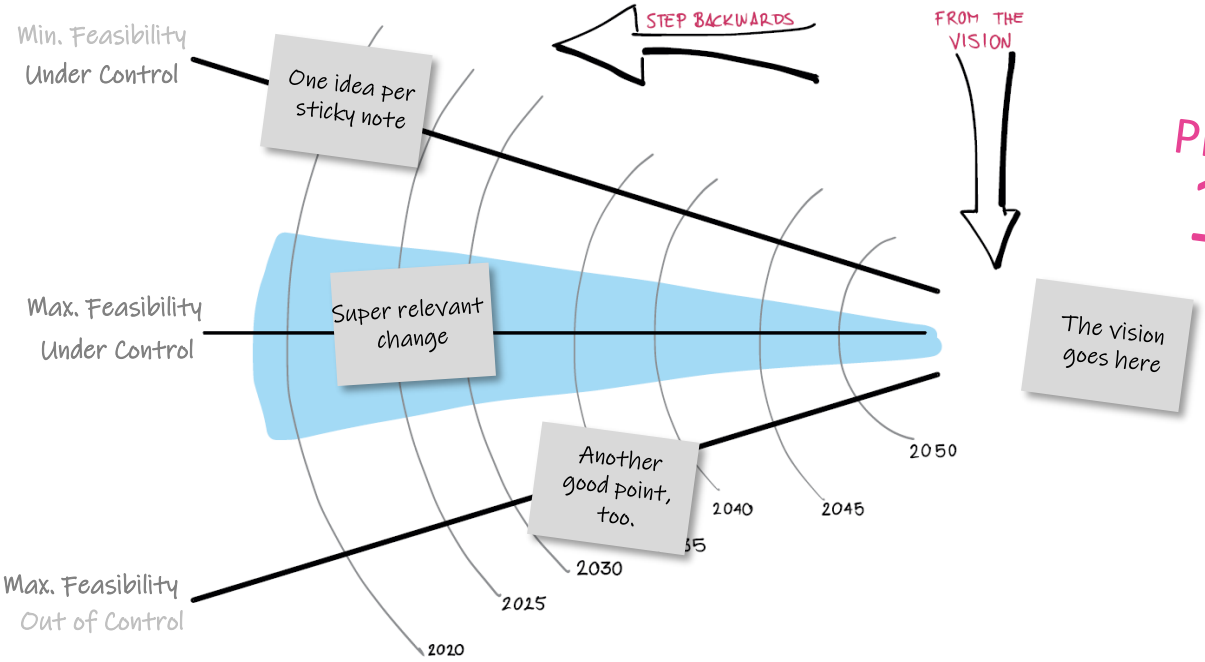
- Covers all phases of the **product life cycle**!
- Involves all **legislative and political means**
- Introduces and strengthens **enablers**, such as innovation or investment
- **Tackles** market barriers in specific sectors or material streams
- Supports **SMEs** and **business opportunities**
- Addresses the **sustainable consumption**
- Improves **Green Public Procurement**
- Supports the creation of (local) **jobs**

EXERCISE
Radar for CHANGES: travel from the future

Backcasting I: travel from the future

Note1:
A collection of potential innovations and changes may lead to the same vision

Note2:
Besides PESTLE, you could use 5M or other tools for your inspiration



Fill sticky notes
15 mins

Place sticky notes
10 mins

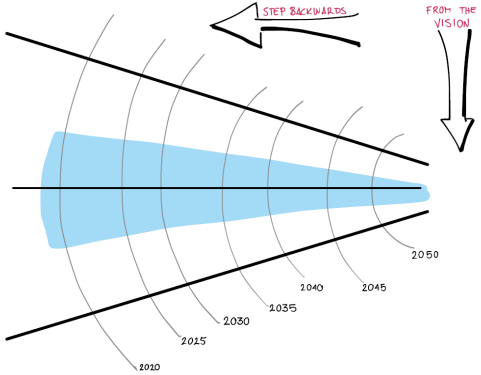
EXERCISE
Radar for ACTIONS: travel from the present

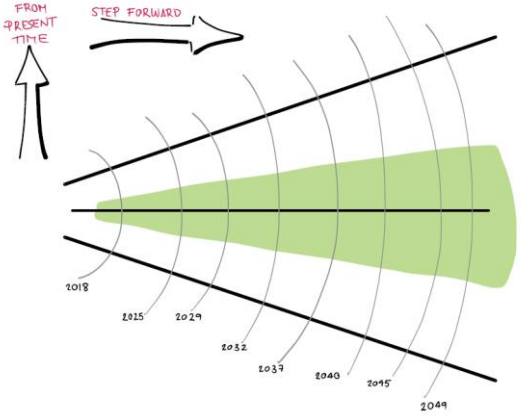
Backcasting II: travel from the present

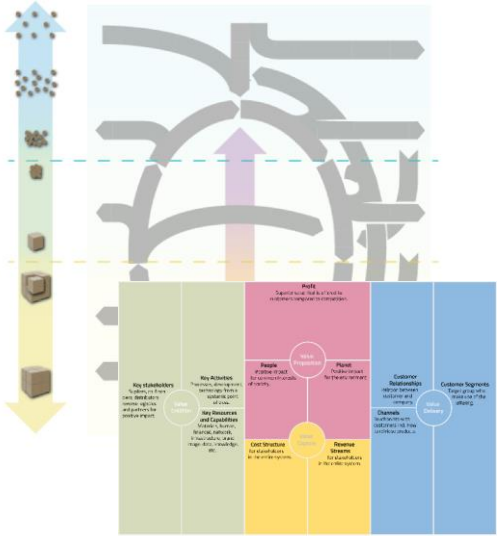
‘Radar for Changes’
Travel from the future
Block #05

‘Radar for Actions’
‘Travel from the present’

Adapt
Circularity Compass and/or
Sustainable Business Model








Climate-KIC
What`s next? …The Lean Startup Cycle
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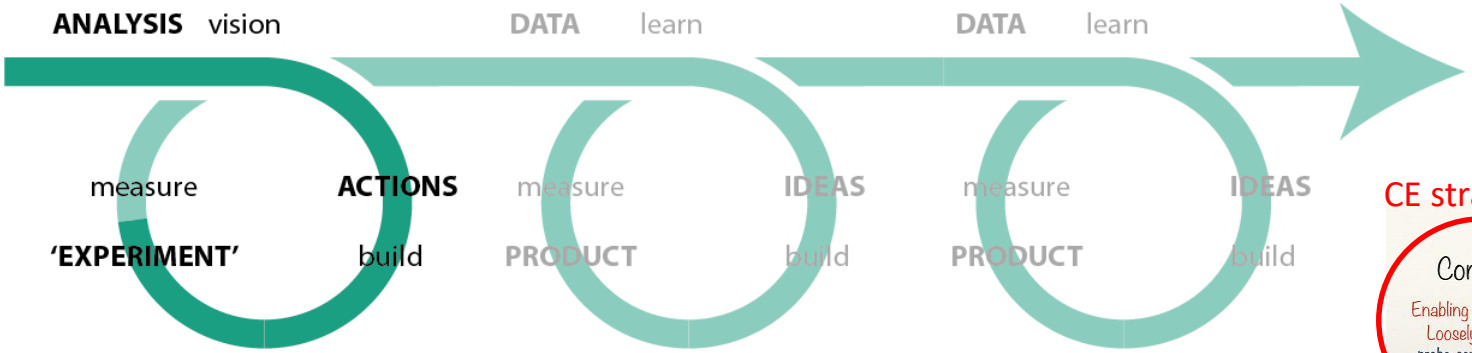
The Lean Startup Cycle (LSC)

Experimentation (under extreme uncertainty):

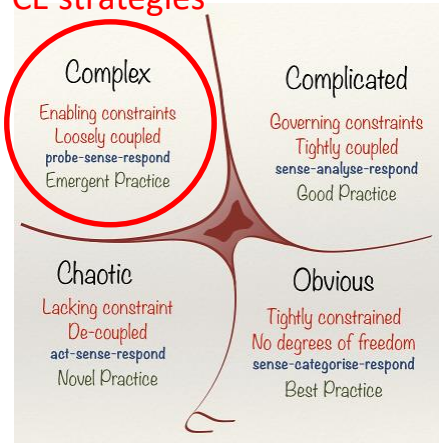
It´s all about learning and doing and learning and doing and learning...

-> Validated **experimenting (probe)**, **learning (sense)** and **decision-making (respond)**!



- Verify **assumptions** (e.g. right vision, right features)
- Design by applying **small cycles** (BUILD - MEASURE - LEARN), as opposite to creating the 'envisioned perfect solution' that does not actually fit the reality when launched
  - find out **WHAT to design, BEFORE starting** to design it
- **Cost-effective approach** (cheap cycles)

CE strategies



EXERCISE
Conceptualize your experiment

Climate-KIC is supported by the
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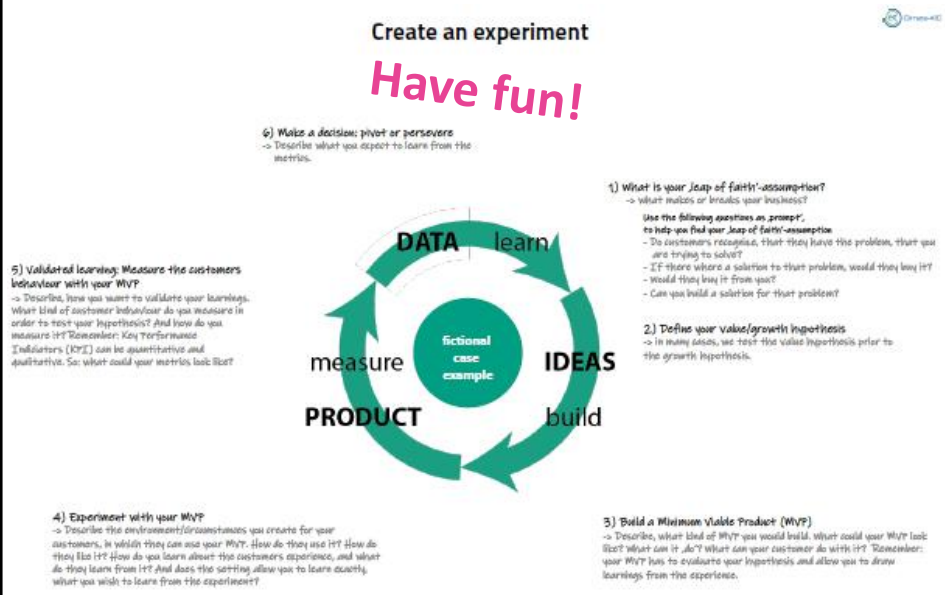
The Lean Startup Cycle (LSC)



Discuss & Conceptualize

25 mins

An experiment for your fictional case:

- **Conceptualize** your experiment:
  - What would put your **value** & **growth hypotheses** (one or more) **to test**?
  - What could your **Minimal Viable Product** look like?
  - What **metrics** would tell you reliably, if your hypothesis is true and/or what you have to change to fit your product to reality and your business goals?

Closing of the training

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References for further support (1)

- **GENERAL** (including good practices from automotive and electronics industries)**:**
  - **Ellen MacArthur Foundation**: https://www.ellenmacarthurfoundation.org
  - **Circular Economy Practitioner Guide**: https://www.ceguide.org
  - **Circular Economy Club**: https://www.circulareconomyclub.com

- **ROMANIA:**
  - **Environmental Fund Administration** (includes: wreck programs for home appliances and cars, photovoltaic panels program w. energy sale, EV recharge stations, taxes and contributions e.g. for packaging, validated waste collectors and recyclers, validated WEEE replacement operators, waste management educational program): https://www.afm.ro

Note: The Environmental Fund Administration is main institution that provides financial support for the implementation of environmental protection projects and programs set up in accordance with the European principles of "polluter pays" and "producer responsibility".


Now… CE journey starts!