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CIRCULAR PLASTICS NETWORK FOR TRAINING

Design for Circularity
Network Training Event 3
12-15 April, 2021

Product design for circularity

NTE 3 - Tuesday April 13th 2021

µ-Teaching ESR 3

PhD Manon Lisiecki

Detailed agenda and registration:
www.c-planet.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Sklodowska-Curie grant agreement No. 859885.

Outcomes of this µ-Teaching:

- A little bit of context
- Where design can benefit plastic circularity
- Own participation and insights about design for circularity
- Objectives and outcomes of the project
- Barriers and risks

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Host Institution

DTU Environment

Department of

Environmental Engineering

- Circularity & Environmental Impact
- Climate & Monitoring
- Water Technology & Processes

Home University - DTU Denmark Tekniset University

Host University - Ghent University

Supervisor – Prof. Thomas Astrup (DTU)

Co-Supervisor – Prof. dr. Kim Ragaert (UG)

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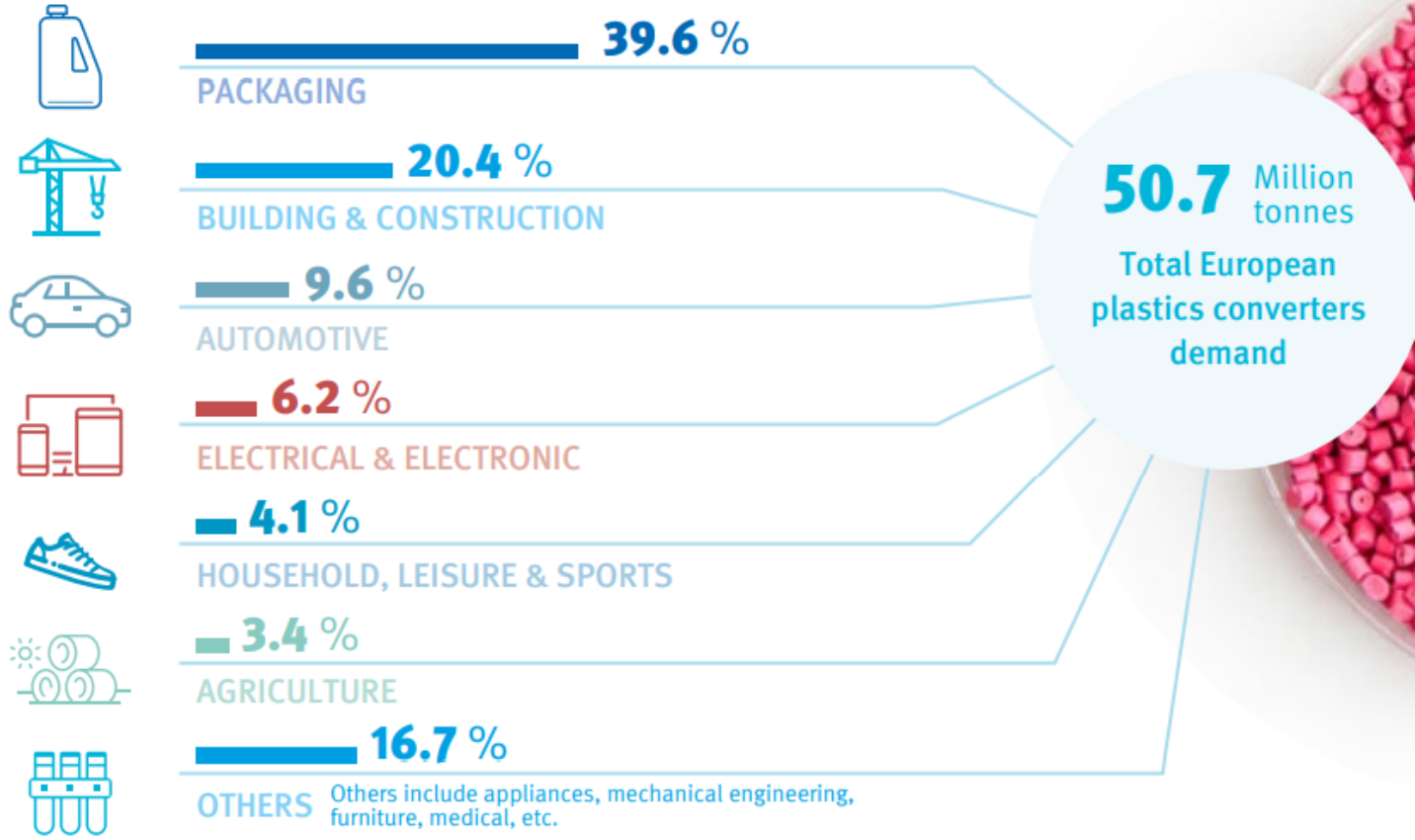
Introduction

- Large variety of plastic products
- Present everywhere in our daily life
- Design integrated in the CE definition

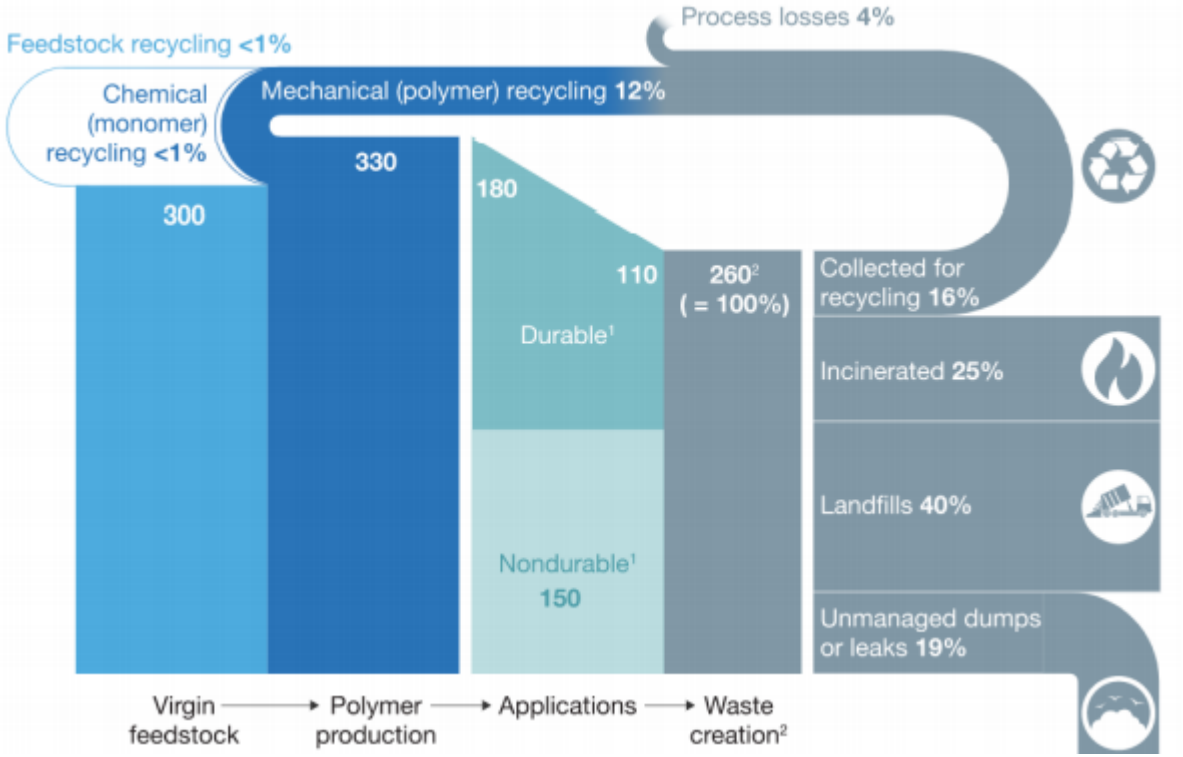


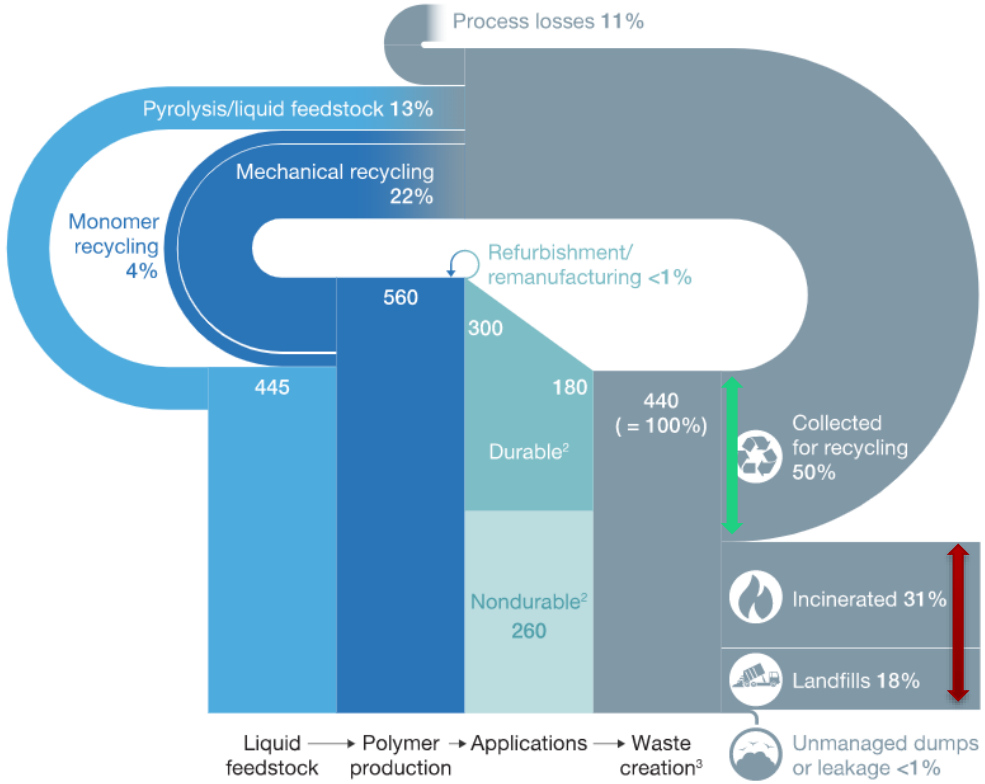
Source: Plastics - the Facts 2020 (plasticseurope.org)

What is product design for circularity ?

Source: EU Parliament, 2015, Circular economy: the importance of recycle products and materials

Current situation





Anticipate and imagine tomorrow

Source: [Recycling and the future of the plastics industry | McKinsey]

Could plastic be circular with design thinking/guidelines ?

Could design be used to increase the quantity and the quality of the recycled plastic ?

DESIGN

General design guidelines available

- Use mono-material
- Different density
- Minimise colour
- Easily separable items
- Avoid full sleeves
- Chose wisely adhesives

DESIGN

Deploying products in a **very competitive** environment**, without compromising functionnalities**

Link these guidelines with **plastic products** & **circularity scoring**

Not only for packaging but for all plastic products

According to you, for which plastic products you would be interested to have design guidelines for circularity ?

Go to **www.menti.com**
Use the code **3277 0208**

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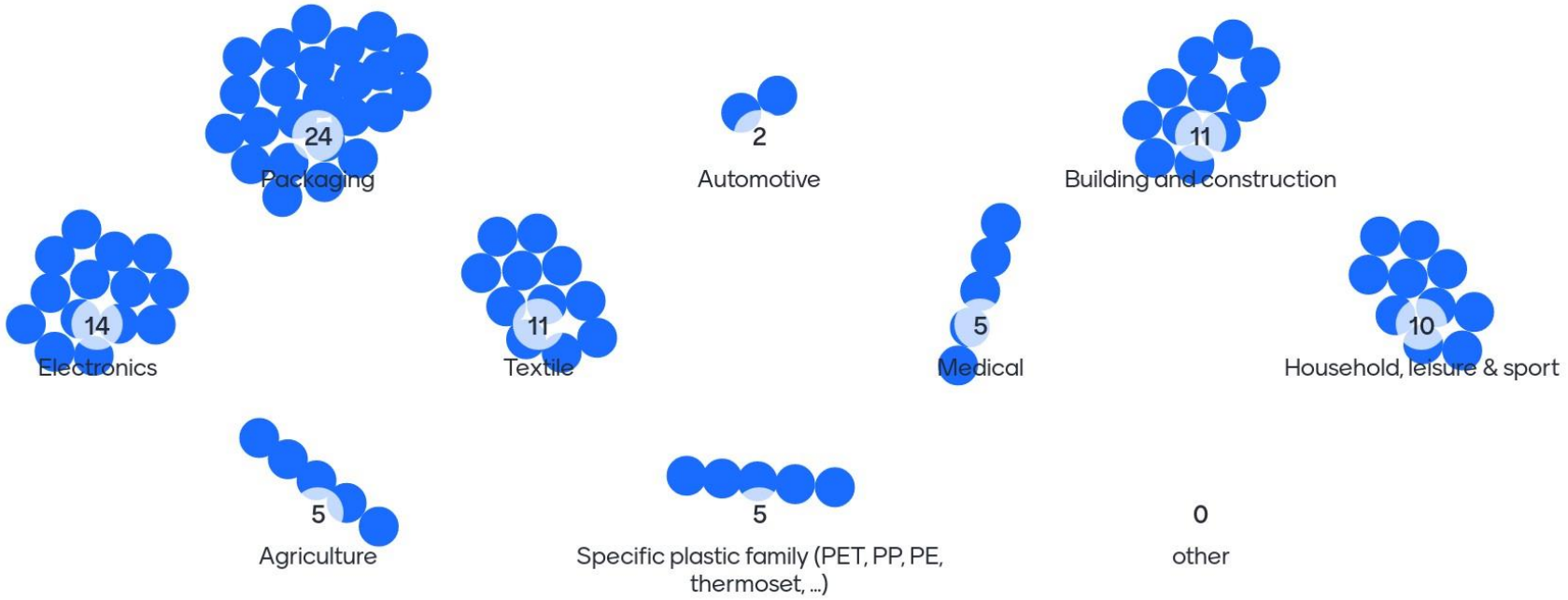
For which plastic products you would be interested to have design guidelines for circularity ?

Mentimeter



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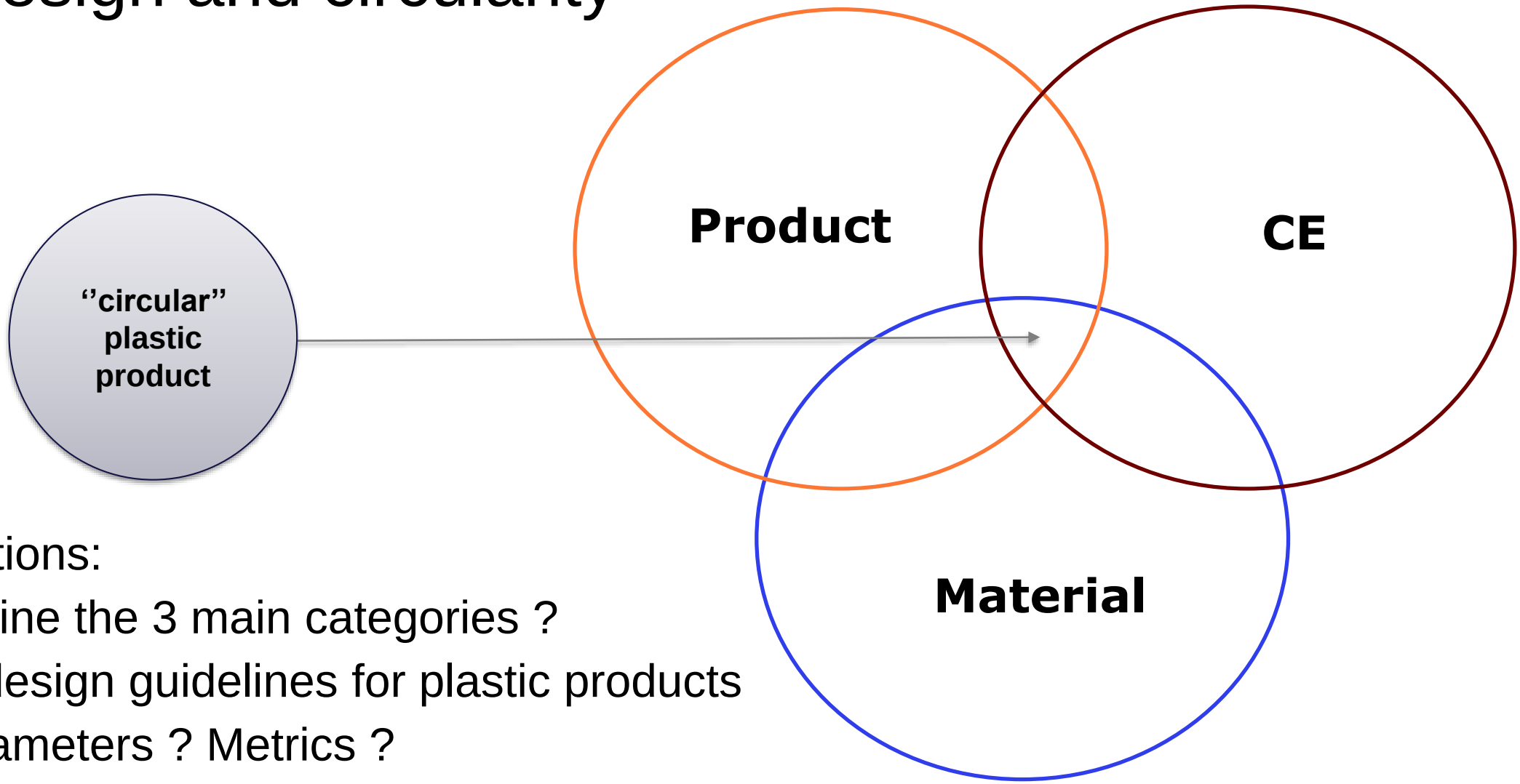
Link design and circularity



Pending questions:

- How to define the 3 main categories ?
- What are design guidelines for plastic products
- Which parameters ? Metrics ?
- Is it possible to score the circularity ?

According to you, which parameters should be taken into account in the circularity evaluation ?

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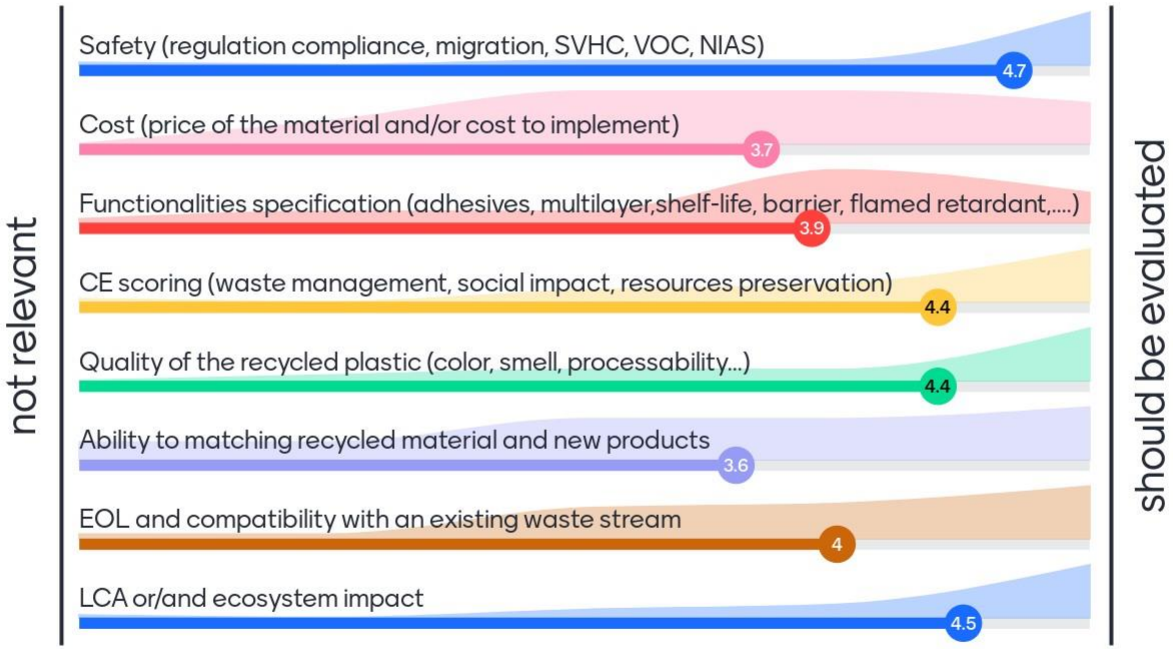
Which parameters should be taken into account in the circularity evaluation ?

Mentimeter



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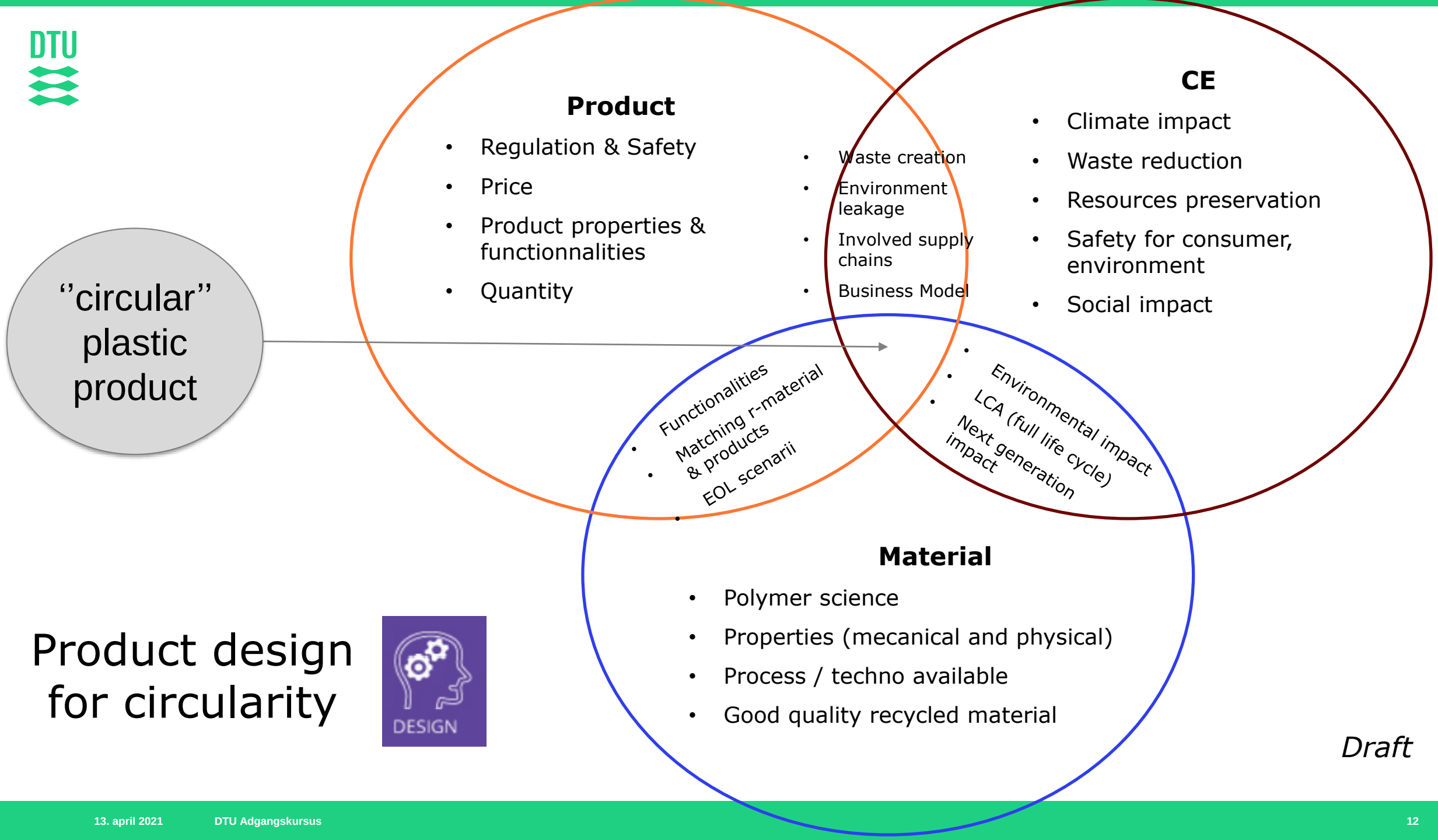
Product design for circularity



Draft

Expected outcomes

OVERVIEW	DEFINE	TEST	IMPLEMENT
Litterature review	**Framework methodology for circularity evaluation**	**Lab work**	**Tool** to rate the circularity of a plastic product
Mapping of the value chains for different plastic products	**Identification of parameters/factors** to evaluate design recommandation	**Apply methodology** on specific plastic products or waste streams	Check scalability of the recommendation for industries
Identification of gaps/barrier/lack of actions	**Prioritize** the design initiatives and propose recommandations for circularity	**Calculate and rate** the circularity	

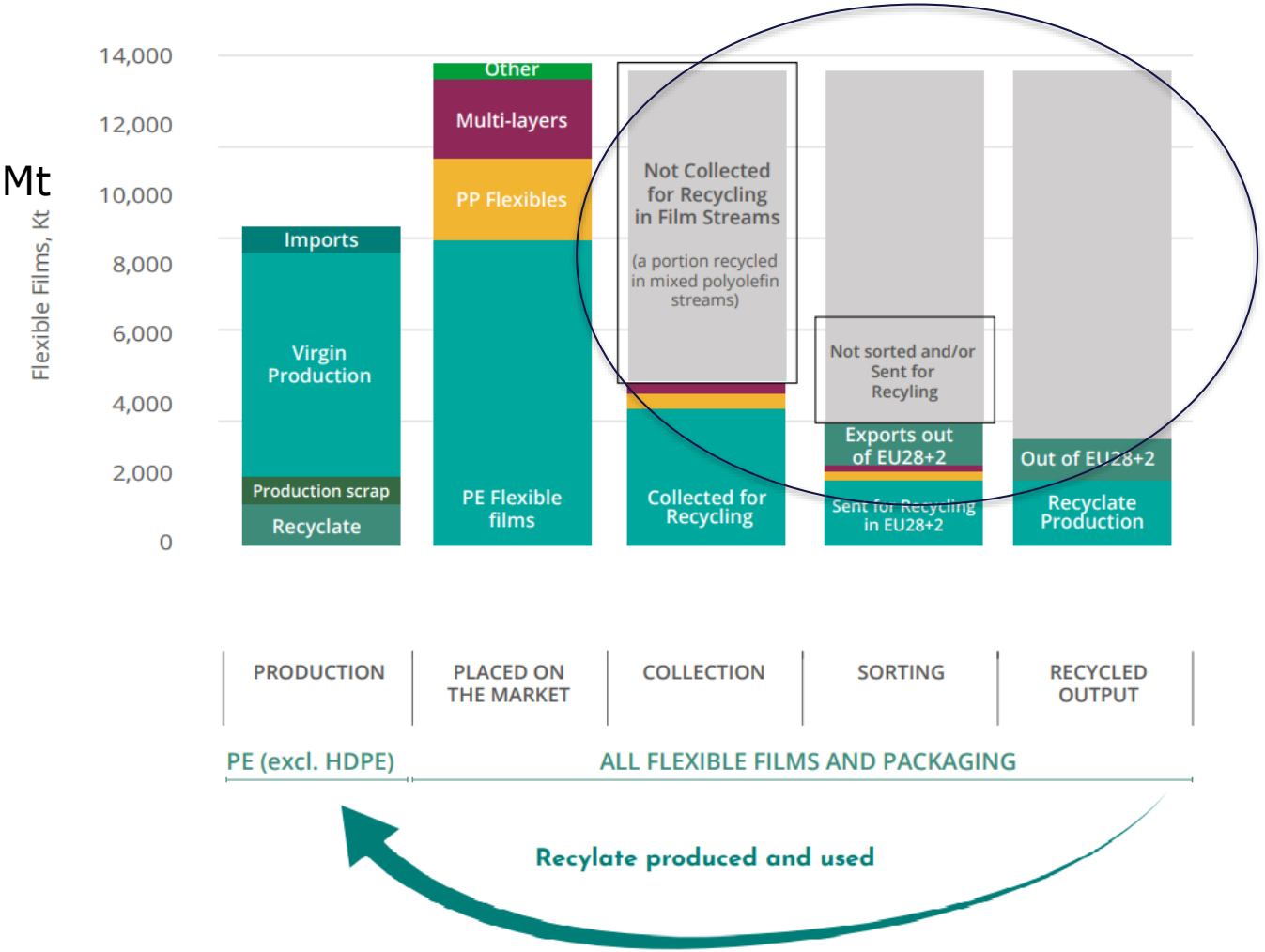
OVERVIEW

Litterature review - Mapping the different value chains for plastic products and highlight gaps for circularity

- Total plastic production in Europe in 2020 = 57,9 Mt
- 29,1 Mt of collected waste
- 7,5Mt sent to recycling facilities
- Generated recycled material 5Mt:

Packaging	0,96
Building & construction	1,84
Agriculture	0,52
Household, leisure and sport	0,04
Automotive	0,12
Electronics	0,08
Others (include appliances, mechanical engineering, furniture, medical)	0,44
Export out of Europe	1

[Source: Plastics - the Facts 2020 (plasticseurope.org)]



Source: Plastic Europe Recyclers, FLEXIBLE FILMS MARKET IN EUROPE: STATE OF PLAY: production, collection and recycling data

Barriers & risk

OVERVIEW | DEFINE | TEST | IMPLEMENT

Litterature review

Mapping of the value chains for different plastic products

Identification of gaps/barrier/lack of actions

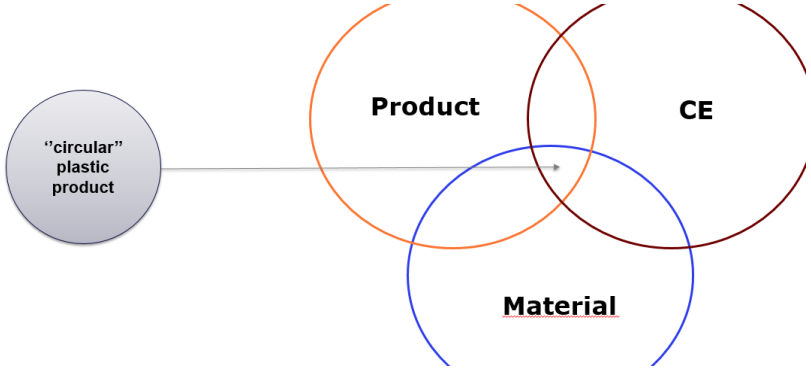
- Lack of data
- Confidentiality issues
- Loss of traceability
- Today barriers might be solutions of tomorrow

- Broad subject

DEFINE

Framework Methodology - Define parameters to evaluate design circularity

=> Identify parameters to rate the circularity



Product design for circularity :

- Design for raw material
- Design for second raw material
- Design for additives
- Design for EOL (repair, reused, recycling,…)
- Design for safety

According to you, which specific design guidelines must be part to the product design ?

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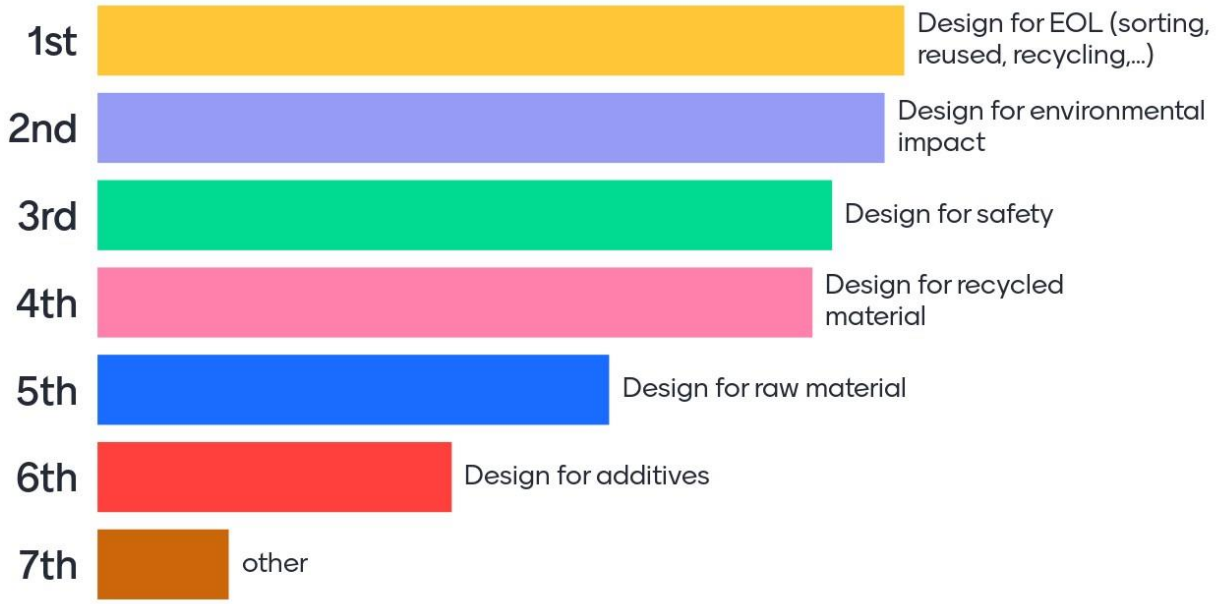
Which specific design guidelines must be part to the product design for circularity ?

Mentimeter



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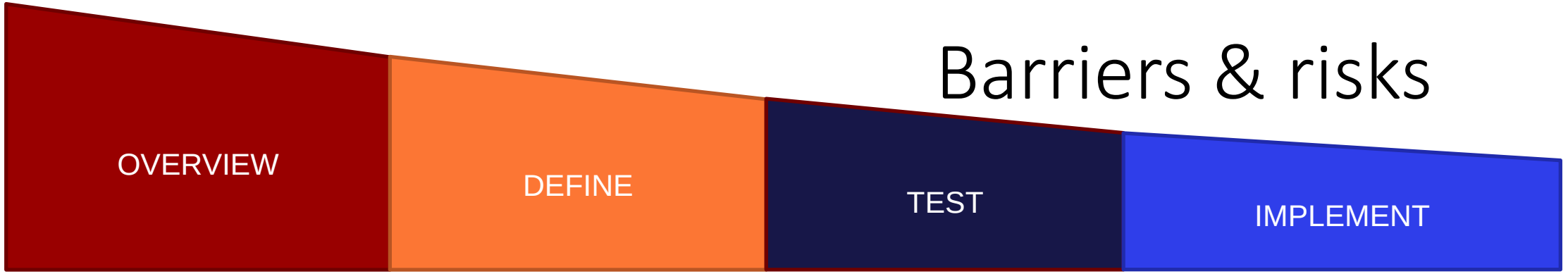
Barriers & risks



Define terms :

- **Raw materials**
- **Waste** as valuable material
- **Quality recycled plastic**
- **EOL** scenarii
- **Design** for Circularity

Framework methodology for circularity evaluation

Identification of parameters/factors to evaluate design recommandation

Prioritize the design initiatives and propose recommandations for circularity

- Choice of the parameters
- Metrics for the circularity evalaluation
- Different End of Life scenarii in CE

- A lot of voluntary commitments
- Fast moving environment

Barriers & risks

OVERVIEW | DEFINE | TEST | IMPLEMENT

- Link labwork and parameter choices
- Plastic product of interest
- Methodology compatibility

- Ghent University secondment
- Possibility to propose new guidelines
- Circularity scoring methodology

Lab work

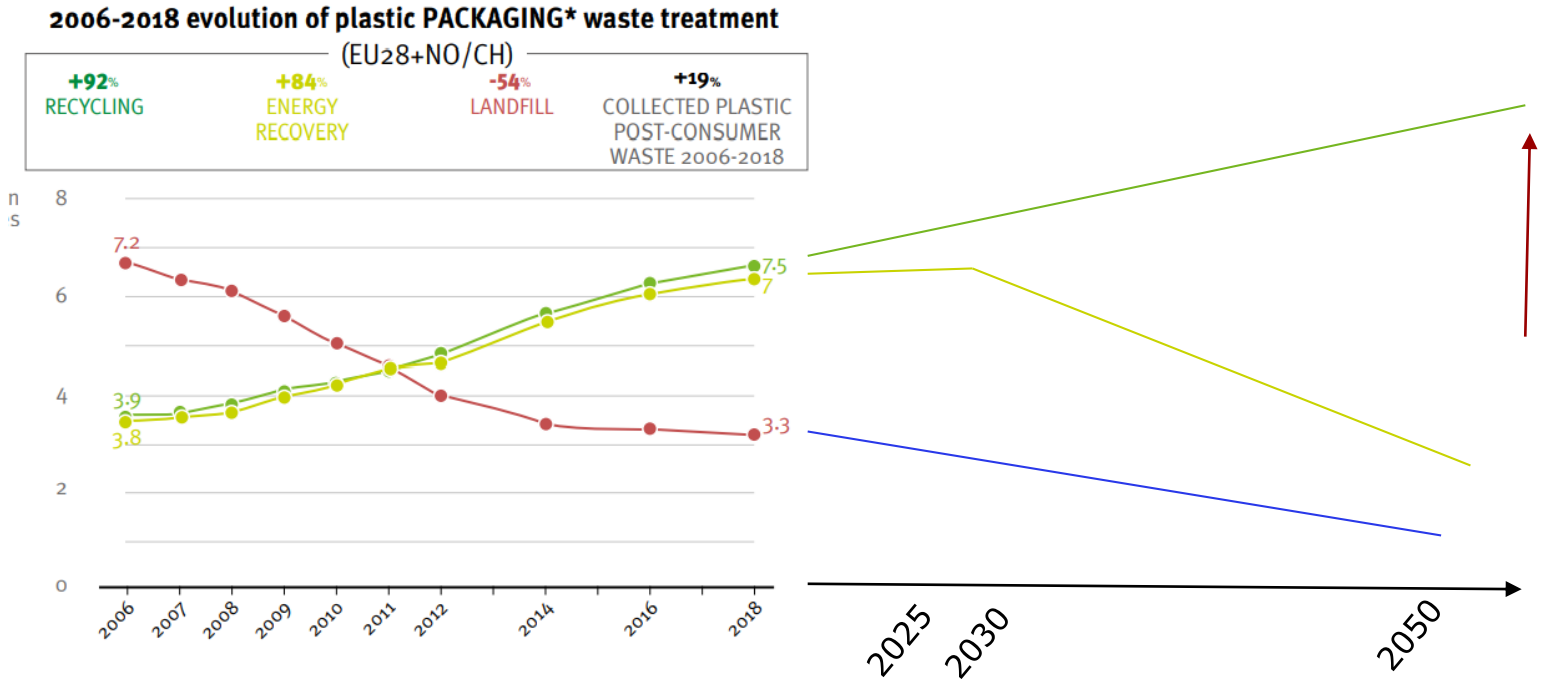
Apply methodology on specific plastic products or waste streams

Calculate and rate the circularity

Analysis – Labwork

IMPLEMENT

Creation of a tool to evaluate circularity



Source: Plastics - the Facts 2020 (plasticseurope.org)

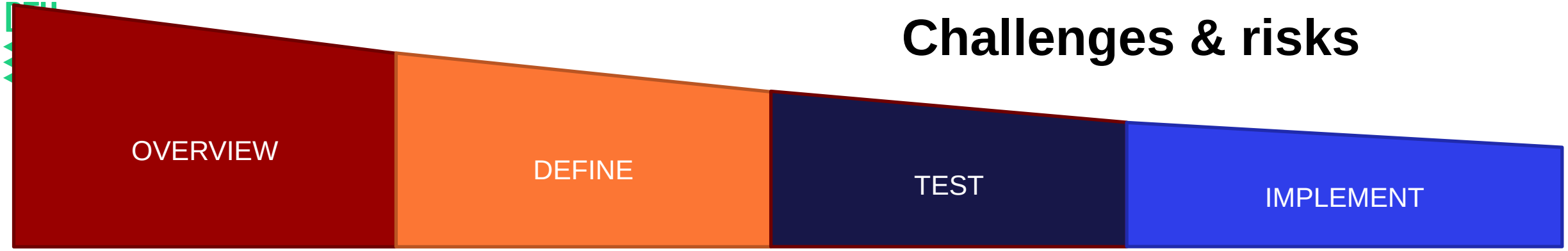
Call for actions

- Which action is a lever or not ?
- CE and EOL scenarii

- Support industries
- Anticipate tomorrow to ensure good decisions for CE

Tool basis for decision-making to the respective circularity concepts

Challenges & risks



- Design guidelines is a subject of interest
- A lot studies published about circularity

- Ambitious outcome
- Long term objective

Create a tool to rate the circularity of the plastic product

Check scalability of the recommendation for industries/market

Thank you for your attention

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H2020 MSCA ITN C-PlaNeT (c-planet.eu)

C-PlaNeT is funded by the European Union in the framework of the H2020 MSCA ITN