

europ**ean**bioplastics

# EUBP TALK 2026



## Material Solutions: Bioplastics Beyond Packaging

### Focus 3: Consumer Goods



**Patrick Zimmermann, FKUR**

From toys to technical products: what bioplastics can already achieve today



**Jorn Behage, Arapaha**

Furniture and consumer goods based on PLA and blends



22 April 2026

10:00-11:00 am CEST



Online



ARAPAHA



# The future of biopolymers in the context of the PPWR

Market opportunities beyond flexible packaging



# Plastics care for Future

FKuR Background & Vision

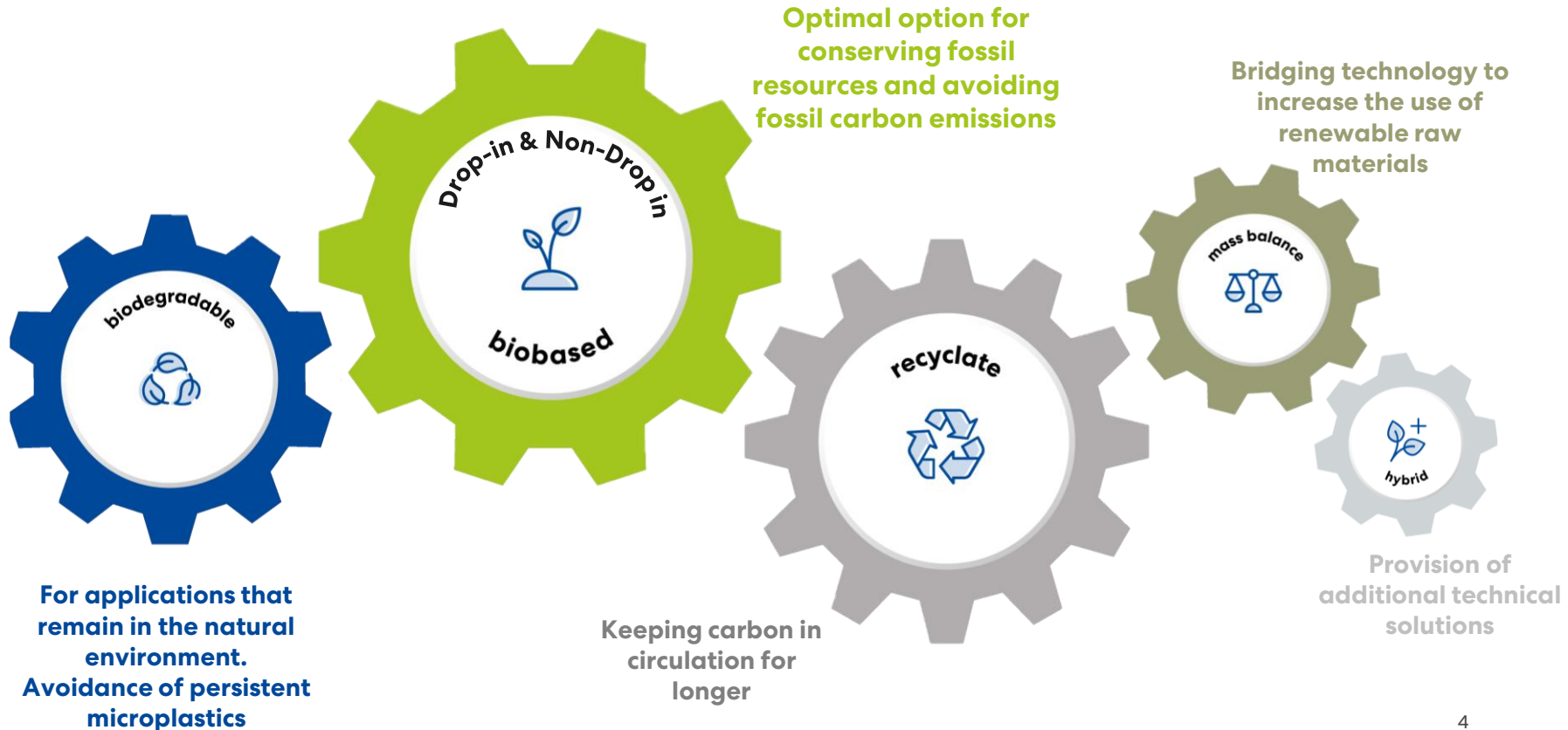
## Nature as guideline – Plastic as passion – Customers as partners

- **Who we are:** Medium-sized, private corporate group passionate about developing, producing, and distributing plastics and compounds designed for diverse, global end-of-life applications.
- **What we do:** Tailored plastic solutions, focusing on biodegradable, bio-based, and recycled materials, prioritizing domestic end-of-life solutions and addressing evolving societal needs.





# FKuR plastic solutions tailored to the needs of different regions and the waste management systems in place there



# What we supply: Versatile Polymer & Compound solutions

## BIODEGRADABLE

## NON BIODEGRADABLE

BIO  
BASED



Bioplastics, e.g. PLA, PHA, PBS

Eastlon



Bioplastics, e.g. biobased PE, PET, PA, PTT

FOSSIL  
BASED

Bioplastics, e.g. PBAT, PCL



Conventional Plastics, e.g. PE, PP, PET



# Sustainability & Circular economy

The continuation of linearity?



**Sustainability**  
**=**  
**CO<sub>2</sub> reduction &**  
**CO<sub>2</sub> neutrality**



But ...



**... sustainability goes far beyond CO<sub>2</sub> reduction, which additionally makes it more difficult to achieve broad societal acceptance.**

# Sustainability requires a fundamental transformation across all areas

The most effective driver for conserving resources lies in reducing consumption - not in isolated measures and certainly not exclusively in the PPWR.

The 8R principles represent a comprehensive, systemic approach to the responsible management of finite global resources.



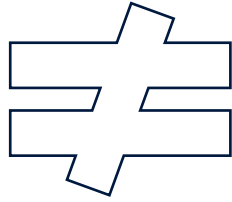
# How sustainable can the “developed world” be?



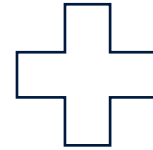
# Planetary boundaries – the circular economy alone will neither solve the problem of overconsumption nor contribute to the long-term safeguarding of resources for future generations!



$M_{\text{globe}}$



$M_{\text{Consume 1}}$

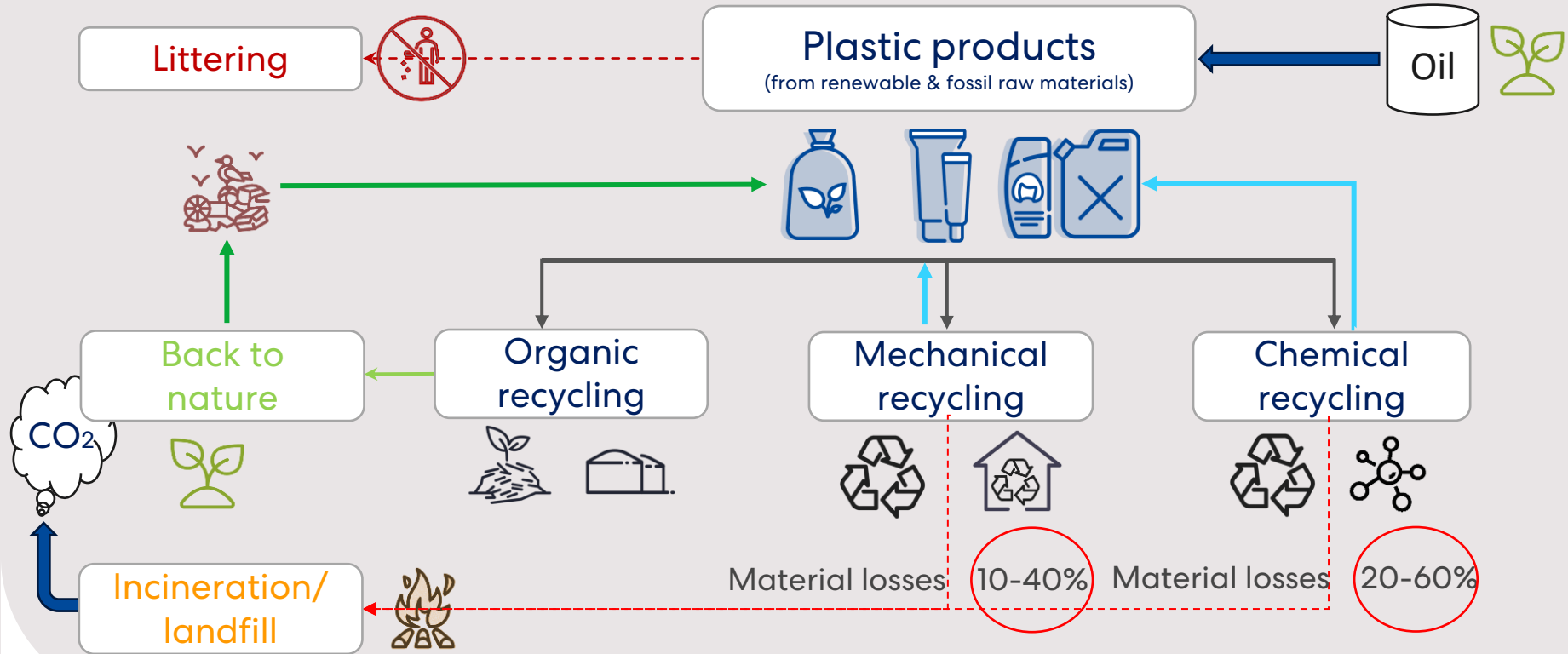


$M_{\text{Consume 2}}$

- Infinite growth is not possible on a finite planet with finite resources (already stated in 1972 by the Club of Rome).
- Today, humanity globally consumes ecological resources at a level equivalent to living on approximately **1.75 Earths** on average.
- If all people worldwide consumed as much as in Germany, the resources of about **3 Earths** would be required.



# Efficiency improvements are the only solution for a better form of circular economy, but waste will always be generated!



**Increased collection + higher quality in sorting and processing  
= greater circularity**



# Key take-aways from the PPWR and the resulting derivations for our industry to date

- Recycling as a key mission to do something useful with our waste before it will be finally incinerated or landfilled
- Main view on existing polymer solutions and too little opportunities for new & innovative materials
- Too little promotion of biobased/renewable sources – change is beginning (bio-economy)
- Limited understanding of organic recycling as an important resource
- **The biggest threat for innovative materials is the term “recycling at scale”**

# Biopolymer solutions beyond flexibles

We are more than just bags!



## Children dining equipment

Bio-based Terralene® PP compound

Replacing PP

Robust & durable

break-resistant

recyclable

Partly biobased (approx. 35%)

Dishwasher and microwave tested and approved





## Biobuddy – biobased toy blocks

Tailor-made compound from bio-based  
Terralene®

Robust & durable

break-resistant

recyclable

Biobased

Replacing somehow ABS, PP

# Kindergarden Toys from Green PE

Sustainable Profile

Increasing of portfolio

Transparent communication

Differentiation from competition

Packaging design

First mover

Recyclable

biobased



## Binabo – construction game

Tailor-made compound from bio-based  
Terralene®

Robust & durable

break-resistant and yet flexible

Recyclable

biobased





## Reusable Cup from green sons

Made from bio-based, biodegradable Bio-Flex® grade

Lightweight, high-quality cup with a pleasant feel

For hot and cold drinks

Dishwasher & food safe



## Biodegradable plastics for applications in natural environments

- Biodegradability is a material property
- Compostability is a process, which is e. g. defined by the standard EN 13432
- Industrial and home-composting
- Soil degradation follows different mechanisms and boundary conditions
- Unstable or inconsistent degradation conditions



## Biobased Drop-In Solutions are already integrated

Biobased Drop-In solutions like biobased PE (PP, PET) are already an integrated part of a circular economy:

- Same performance as their fossil counterparts
- Recyclable in existing PE/PP/PET recycling streams
- The only logical option to keep carbon in the loop, not yet mandatory, while recycling is





# Summary

- Sustainability in a conservative sense primarily means **waste prevention** and living within planetary boundaries.
- Consumption patterns need to be **reconsidered** by those who already consume the most.
- The **consistent** closure of the carbon cycle is only possible through bio-based plastics and organic resources (biomass utilization, bioeconomy).
- The recyclability of products **must** be **significantly** increased. Both the quantity and quality of recyclates must inevitably be improved in the future.
- Biodegradable plastics should be **used** where biodegradability provides a significant advantage.



**Take off those rose-tinted glasses!**

**Glad to  
answer your  
questions**





# Product design with bioplastic materials

## A designer perspective

Jörn Behage  
April 22<sup>nd</sup> 2026

# ARAPAHA

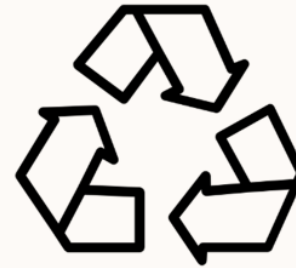
Discover a lifestyle  
in balance with our planet



## A radically lower impact on our planet

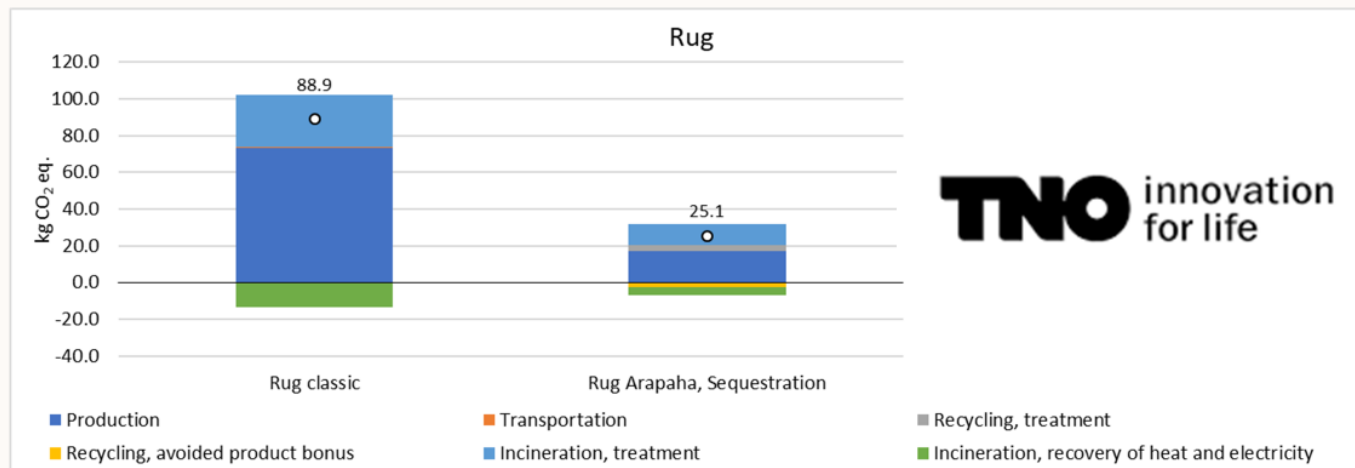


-70%  
GWP of Arapaha rug vs  
classic rug



-73%  
GWP of molecular  
recycling vs virgin  
production

Source: TNO



ARAPAHA



# Key design requirements

- Fundamental knowledge about molecular structure of Materials (such as PLA and PHA)
- Knowledge about additives and dye technologies
- Knowledge about suitable production technologies
- Application of digital twins in packaging
- Limits of aesthetics using biomaterials
- End-of-life concept fully integrated in the design process

# Practical tips for designers

What problem do you solve when you apply bioplastics in packaging



Develop a digital twin for different types of packaging

Adapt your packaging concept to the waste treatment possibilities in your region

# Practical tips for designers

What problem do you solve when you apply bioplastics in products







# DYEING OF PLA

with supercritical CO<sub>2</sub>  
*Arapaha patent*

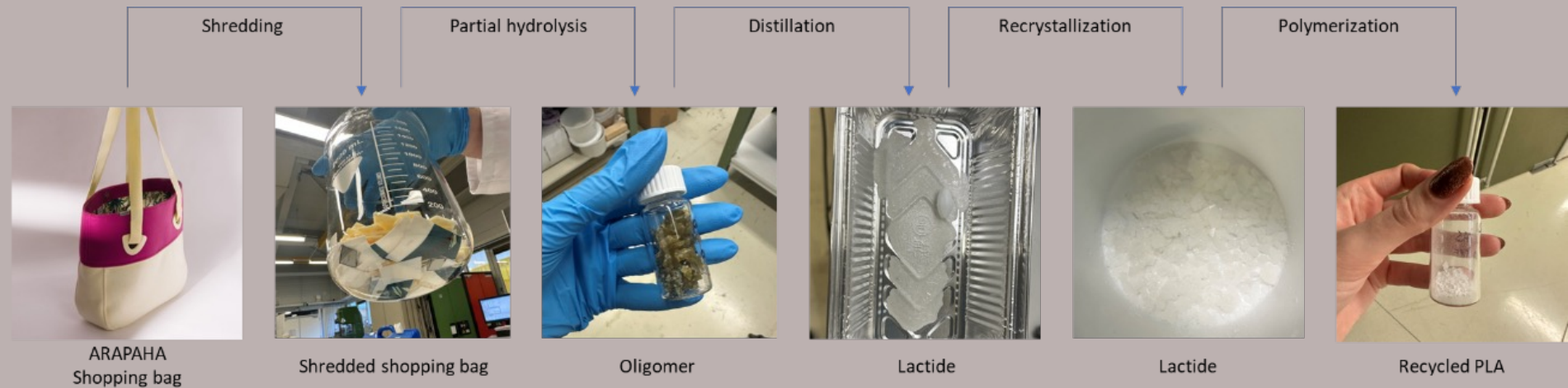
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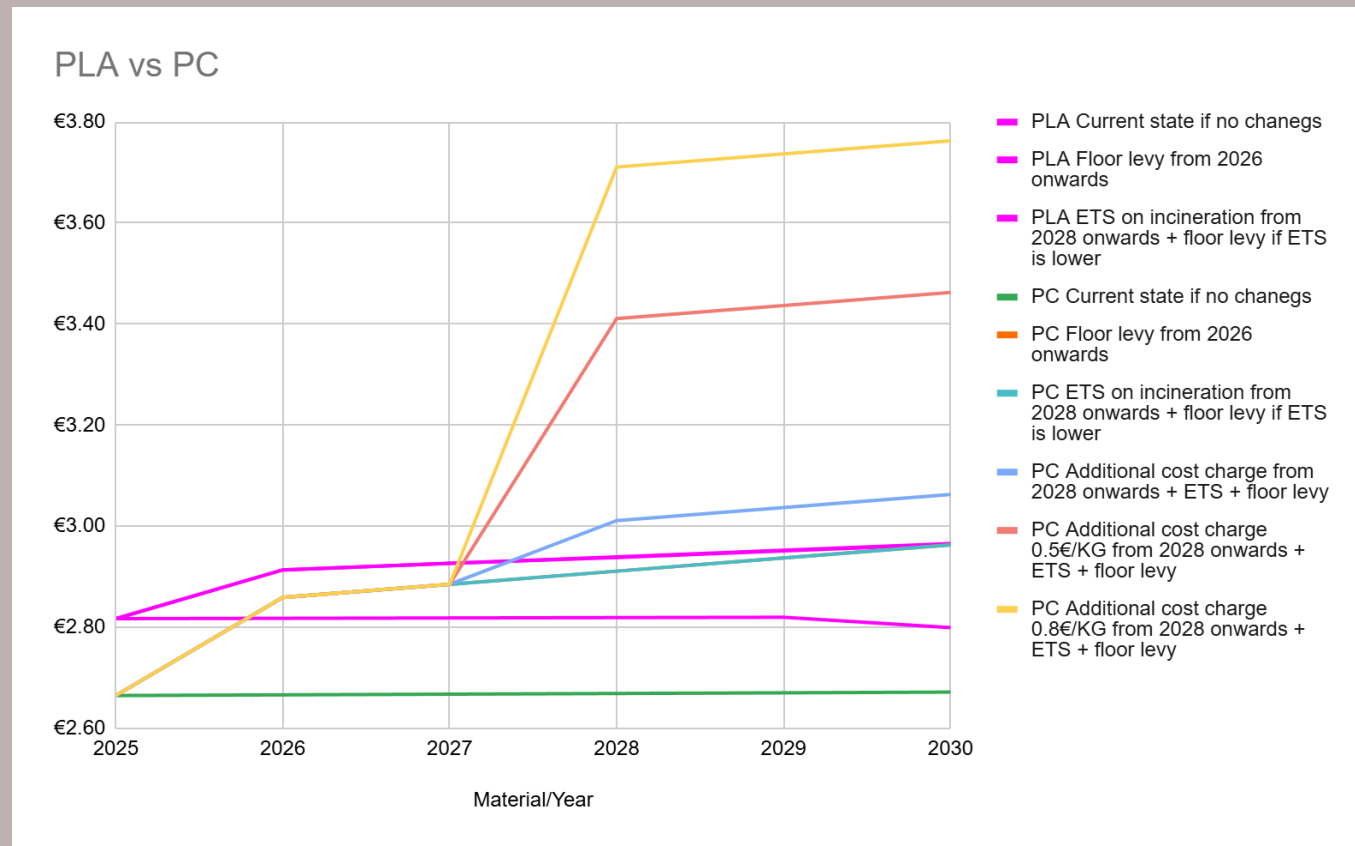
# Case studies



# Molecular recycling of multiple form factors



# Comparing the forecasted price development of PLA against PC



# Main challenges

- Material performance – with and without additives
- Production technologies (embedded energy of a product)
- Product end of life concept - recycling or composting
- Costs compared to current materials now and in the future
- Consumer behaviour
- European and national policies on fossil-based materials versus biopolymers



# Thank you for your attention



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