Biobased Materials
-
Rethinking the Status Quo

- **FKuR – plastics as passion**
- Status quo, expectations & nature as guideline
- Advantages and product solutions via bioplastics
- Latest developments
- Summary

FKuR - Plastics as passion

- Medium-sized, private group of companies with the aim of developing, producing and distributing innovative plastics
- Core business are the development and production of biodegradable and biobased plastics, as well as plastic specialties such as TPE
- Customized plastic solutions
- Distribution of biopolymers and specialties
- Co-operation with Fraunhofer UMSICHT, Oberhausen, in the area of strategic material development

FKuR - Plastics as passion

FKuR Portfolio and Distribution:

PLA-Blends
for extrusion and injection molding

Cellulose Compounds
for injection molding

Wood fibre Compounds
for extrusion and injection molding

Tailor-made
Green PE Compounds

Biobased TPE
for extrusion and injection molding

Authorized distribution partner in parts of Europe*, USA and Canada

Compounding Cooperation for Luminy PLA

Cooperation with FENC Corp. for their biobased PET

* Austria, Belgium, Denmark, Finland, Germany, Israel, Italy, Luxemburg, Netherlands, Norway, Sweden, Switzerland

FKuR - Plastics as passion

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…can I realize my ideas with biopolymers?

FKuR - Plastics as Passion

Why is FKuR dedicated to bioplastics?

Sustainability:

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.“

(World Commission of Environment and Development, 1987)

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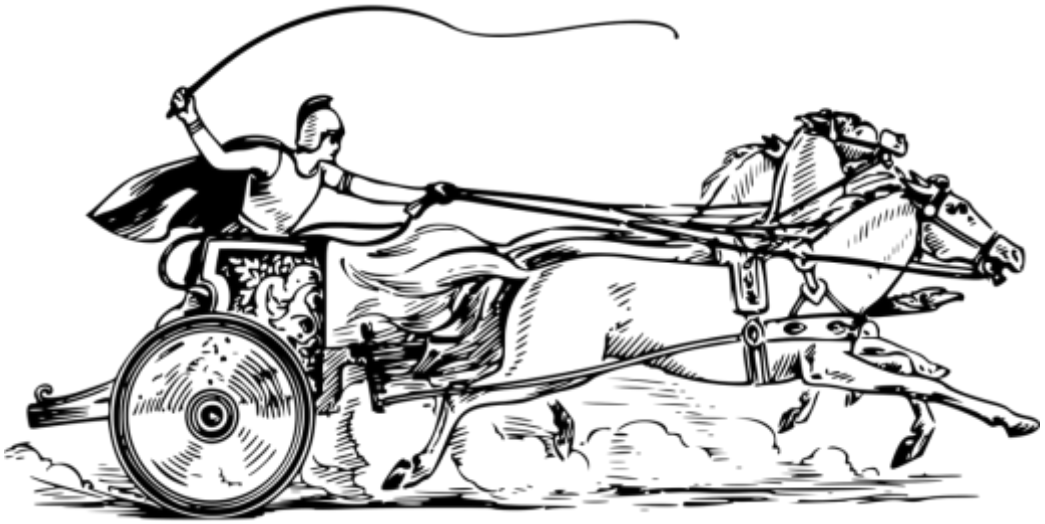
Status quo, expectations & nature as guide line

Status quo – years ago?

Wilhelm II: „I believe in the horse. The automobile is a temporary appearance!“

Status quo, expectations & nature as guideline

Status quo – what´s next?



Status quo, expectations & nature as guideline

Status quo? – Assumptions as to biobased and biodegradable materials nowadays:

Biobased:

- By nature, renewable resources have a negative impact on land use, eutrophication and acidification
- Bioplastics must always prove their benefits in terms of environmental, social and economic aspects

Fossil based:

- Environmental pollution from leakages and incidents (platforms or ships) is not included in life cycle assessments (LCAs)
- For fossil raw materials hardly any comparable proofs are demanded, even the depletion of fossil raw materials is accepted

Status quo, expectations & nature as guideline

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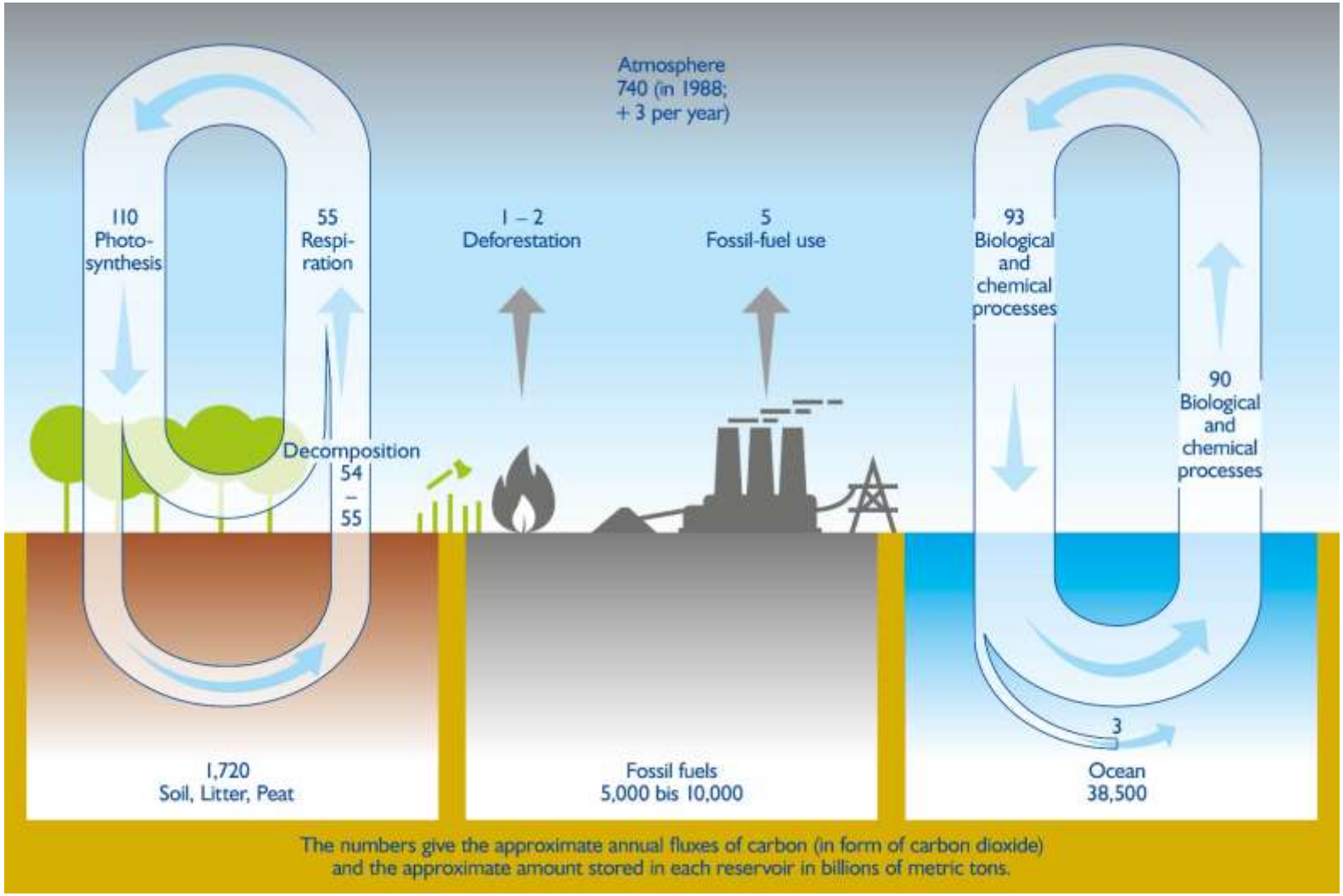
Status quo? Our expectations to exhaustible resources for years now?

Unlimited Availability

Always Cheap

Status quo, expectations & nature as guideline

Status quo since decades?



Source: Data from Bolin (University of Stockholm)

Status quo, expectations & nature as guideline

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Plastics… are omnipresent:

Status quo, expectations & nature as guideline

A vision for Europe's new plastics economy - Plastic Strategy agenda for 2030:

"A smart, innovative and **sustainable plastics** industry, where **design** and **production** fully respects the needs of **reuse, repair, and recycling**, brings growth and jobs to Europe and **helps cut EU's greenhouse gas emissions** and **dependence on imported fossil fuels"**.

Status quo, expectations & nature as guideline

Current status for plastics

- Image loss due to the littering problem in our oceans
- EU efforts to completely ban single-use products
- Substitution of plastic by paper, to the detriment of product safety and life cycle assessment

Quelle: Pixabay.com

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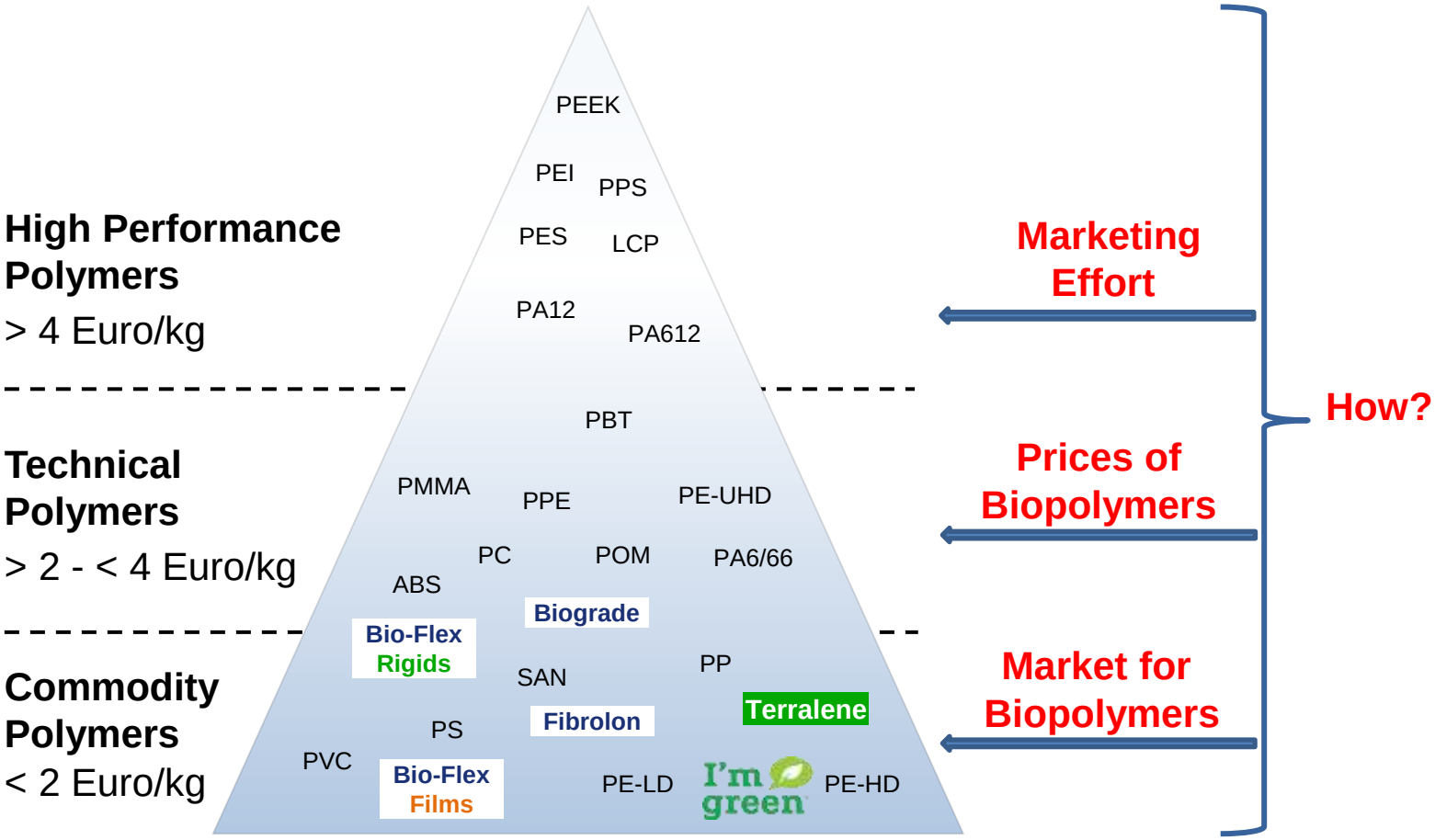
Competitive advantages with bioplastics



Without an appropriate marketing strategy and analysis of valuable market segments, a biobased product will be not successful.

Competitive advantages with bioplastics

Opportunities by using Green PE for different market players

- New product line
- Diversification
- First Mover status
- No changes in machine equipment

- EU Strategy 2030
- New product line
- Diversification
- Brand image

- Awareness for more sustainable products
- Willing to pay the extra costs

- More heterogenous product portfolio
- Sustainable image

Sources: Pixabay

Closing natural cyles with …

Biobased plastics

- Plastics require a separate recycling stream for each type of material
- Once a recycling stream has been established for a fossil plastic, biobased alternatives (e.g., Bio-PE, Bio-PET) can be recycled together with fossil counterparts in these streams
- Targeted recycling in form of material utilization is established and saves valuable resources
- Biobased and compostable plastics are potentially recyclable (e. g. PLA)
- Thermal utilization is an alternative (energy production)

Bioplastics in the context of the EU plastics strategy

Biobased – e. g. packaging

Strenghts	• Meets the criteria of EU Strategy 2030 • Alternative biobased feedstock • Post-consumer recycling • Many options for communication	**Low customer perception** due to: • No visual or haptical differences (e.g. compared to conventional PE packaging)	Weaknesses
Opportunities	• Marketing of biobased products in terms of recyclability • Willingness to pay the higher price	General concerns from: • NGOs • Consumers • Politics	Risks

Product: design water bottle

Natural Bottle

- Biobased, reusable design water bottle
- Bottle: Green PE (Bio-PE)
- Cap: Bamboo (outside) and wood (inside)
- Potential for reduction of CO^2 emissions through a more favorable ecological footprint
- Fully recyclable

Picture: natural-bottle.co

Product: cosmetic packaging

Speick Organic 3.0

- Holistic sustainable packaging concept (mono-material)
- ‘Perfect Product Fit’ (packaging and content complement each other optimally)
- Differenciation from competition
- Green PE (Bio-PE) replaces all materials
- No differences in production

Picture: speick.de

Product: food packaging

La Granda, packing of meat

- Holistic sustainable packaging concept
- ‘Perfect Product Fit’ (packaging and content complement each other optimally)
- Pouch: combination of Gre PE (Bio-PE) and paper
- Content of renewable resources in the packaging > 80%
- Printing and lamination possible with innovative solvent-free technology

Picture: lagranda.it

Closing natural cyles with…

Biodegradable plastics

- Compostability is a clear advantage when plastic articles are mixed with biowaste
- Mechanical recycling is then impossible for either plastics or biowaste
- Mixed waste is suitable for organi recycling
- The result is valuable compost that serves as a fertilizer for crops in the circulation
- Products and materials must comply with the standard EN 13432 (industrial compostability)

Bioplastics in the context of the EU plastics strategy

Compostable – e. g. fruit and vegetable bags

Strenghts	• Meet the criteria of Packaging and Biowaste Ordinance **Biobased & compostable materials**	Heterogeneous acceptance and **low knowledge** about bio waste bags in • Municipalities, • Disposal companies • Politics and public	Weaknesses
Opportunities	• **Cascade use**: reuse bags as trash bags • **Added value**, e.g. more organic waste is collected • **Natural cycles** are closed	• Risk of **'misthrowing'** due to insufficient labeling • Risk of **littering**	Risks

Product: Mulch film

Mulch film made from Bio-Flex®

- Certified compostable and biodegradable according to EN 13432 and ASTM D 6400
- Excellent ratio between degradation & performance
- Cost-effective: no collection and disposal costs for film
- Excellent resistance to moisture
- Replacement of herbicides by high weed suppression

Picture: FKuR Kunststoff GmBH

Product: organic waste bags

Organic waste bags made from Bio-Flex®

- Certified compostable and biodegradable according to EN 13432 and ASTM D 6400
- Certified home compostable “OK Compost HOME” by TÜV Austria
- Clean, dry and low-odor collection of organic household waste
- Increase in the quantity and quality of separated bio waste

Picture: FKuR Kunststoff GmBH

Product: tree protection

Tree protection made from Bio-Flex®

- Characteristics comparable to fossil polymers used so far
- Product remains stable during the period of use
- Fragmented plastic particles biodegrade over time
- No contamination of the soil by durable plastics

Bild: CSX

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Latest Developments: biobased compounds

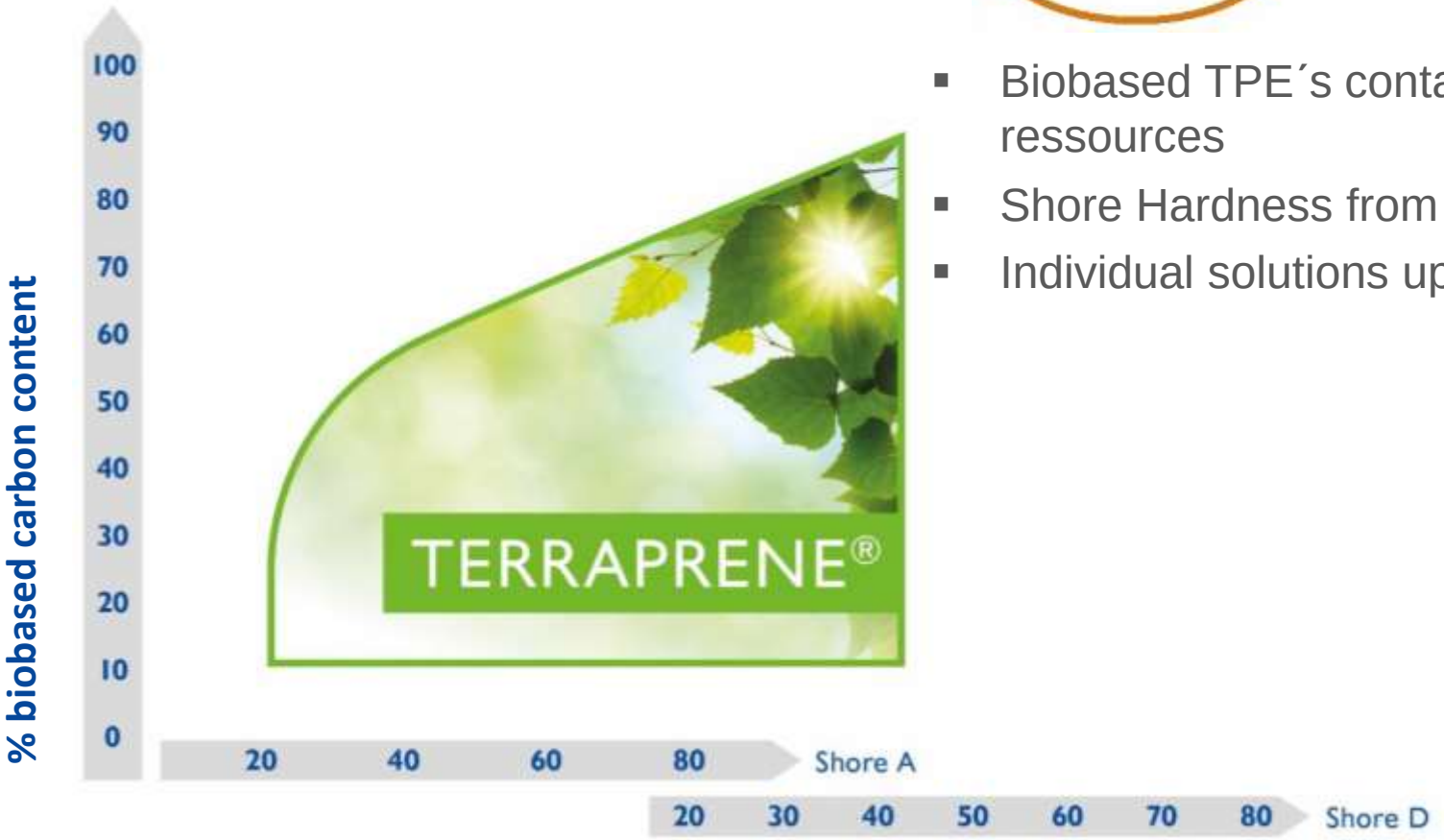
Terralene® PP

I'm green™

- Compounds from biobased PE and oil-based PP
- Ready-to-use on standard PP-equipment
- Early developments started with a bio-based content < 35 %
- **Latest developments with increased biobased content:**

  > 50% - 80%
- Mechanical properties comparable to PP (homo, copo, random)

Latest Developments: biobased compounds



- Biobased TPE´s containing renewable ressources
- Shore Hardness from A20 to D 40
- Individual solutions upon request

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Summary

- Plastics from renewable raw materials play an important role in view of EU Plastics Strategy 2030
- Biodegradable AND biobased solutions will determine future developments depending on the **application** and **disposal route**
- **Biobased plastics** (such as Bio-PE, Bio-PET) can already be fully **integrated into the circular economy**
- Whenever plastics **remain in nature** - for whatever reason - they should **be biodegradable**

plastics - made by nature!®

Nature as Guide Line
Plastics as Passion
Customers as Partners

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