



Bærekraft i plast som materiale

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Research - Development – Testing – Advisory > 30 countries annually

Catalysis and Polymerisation



Catalyst synthesis and development

Compounding and pilot processing



Compounding Pilots

Polymer and product testing



Spectroscopic, rheologic and thermal analyses

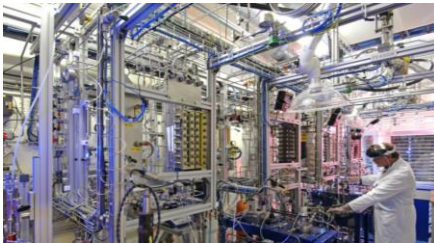


Microscopy and Failure analyses

Recycling



Mechanical recycling pilot centre



Polymerisation



Extrusion Pilots



Material testing



Autoclave testing



Chemical recycling



Process design and development



Moulding Pilots



Durability and Additives



Protective coating testing



Battery recycling

Expanded into new European Polymer Exploration Centre in 2022

Full service-portfolio in the plastics value chain from polymer to processing and end use innovations



We are racing for circularity!

Renewable

Reusable

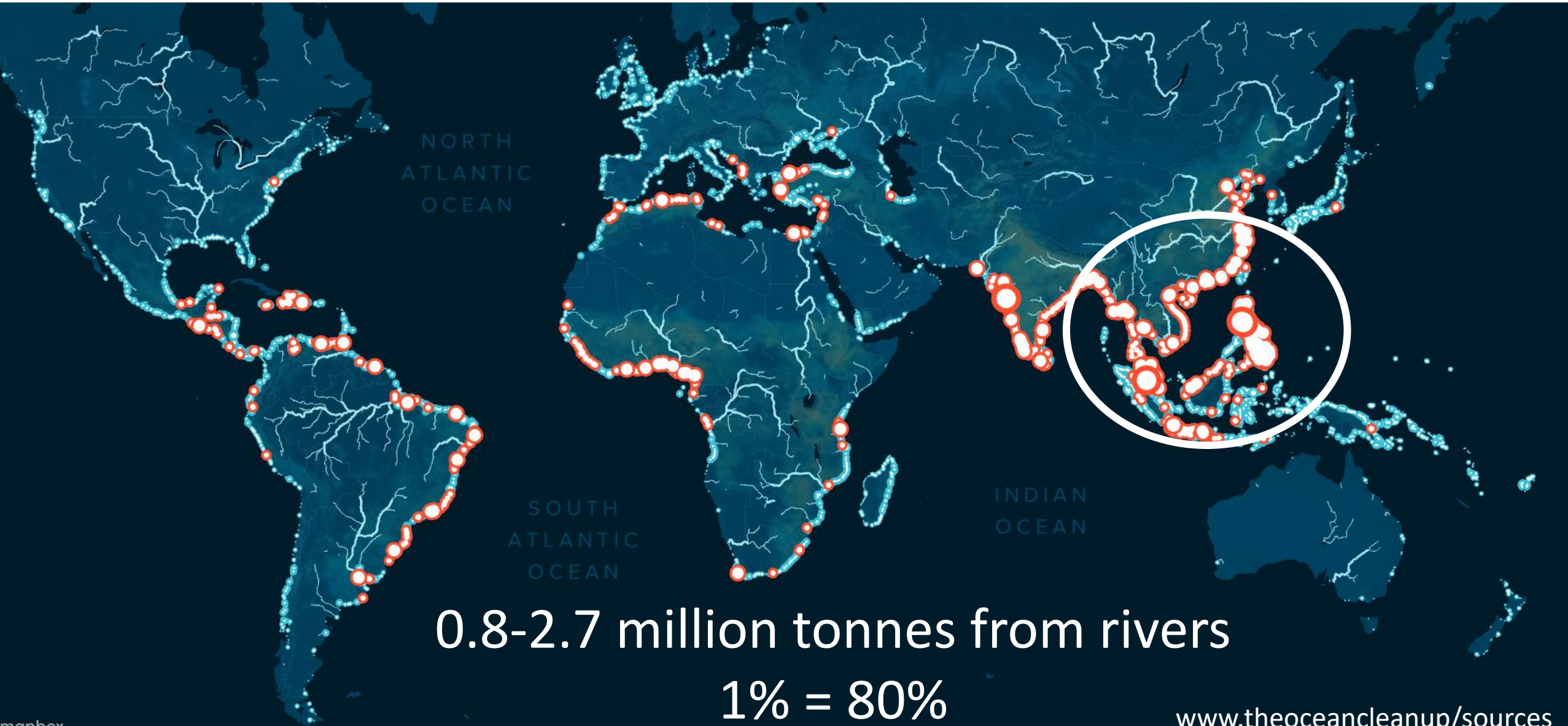
Recyclable

Recycled

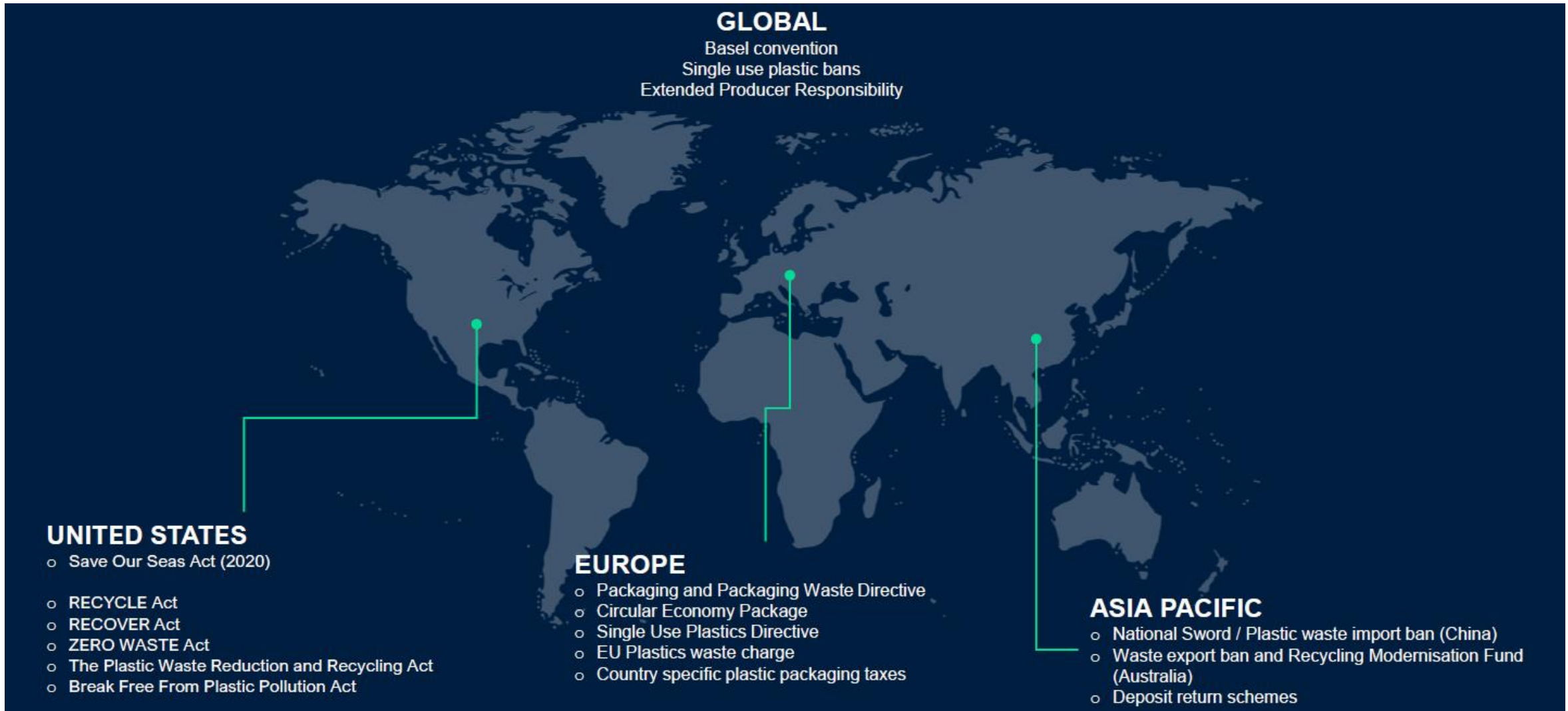
..in existing value chains



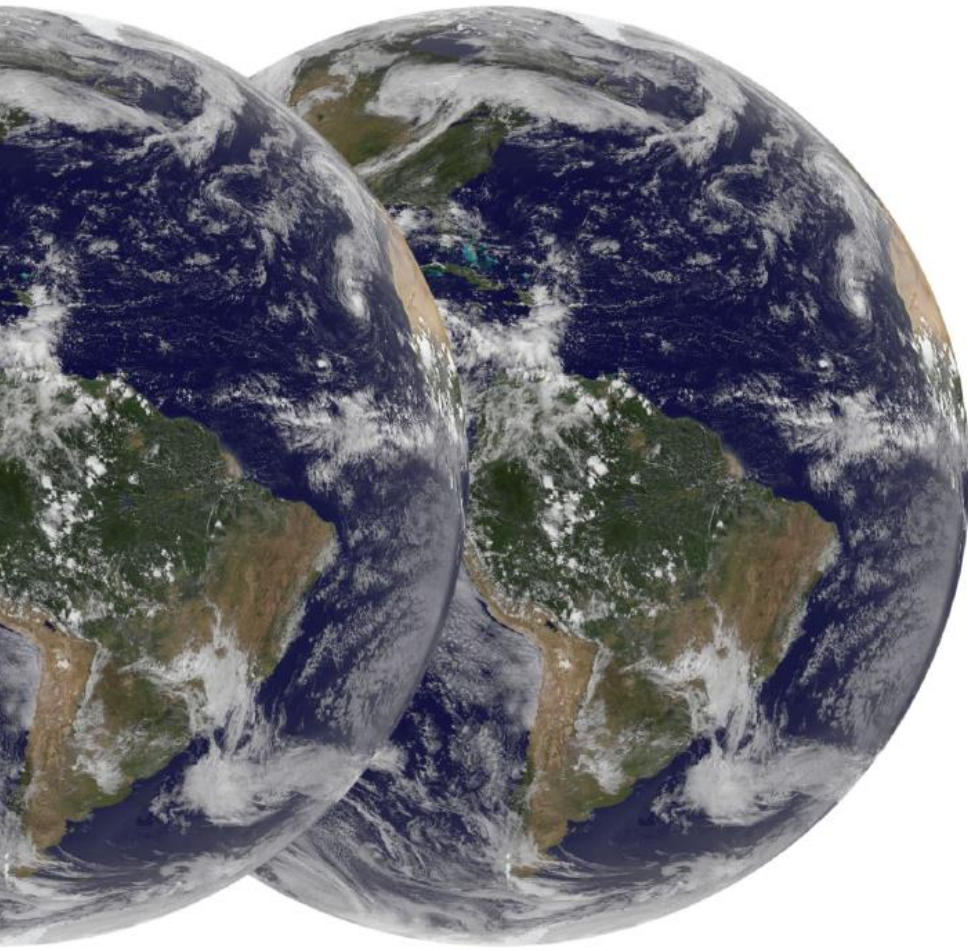
Without value – plastics are lost everywhere!



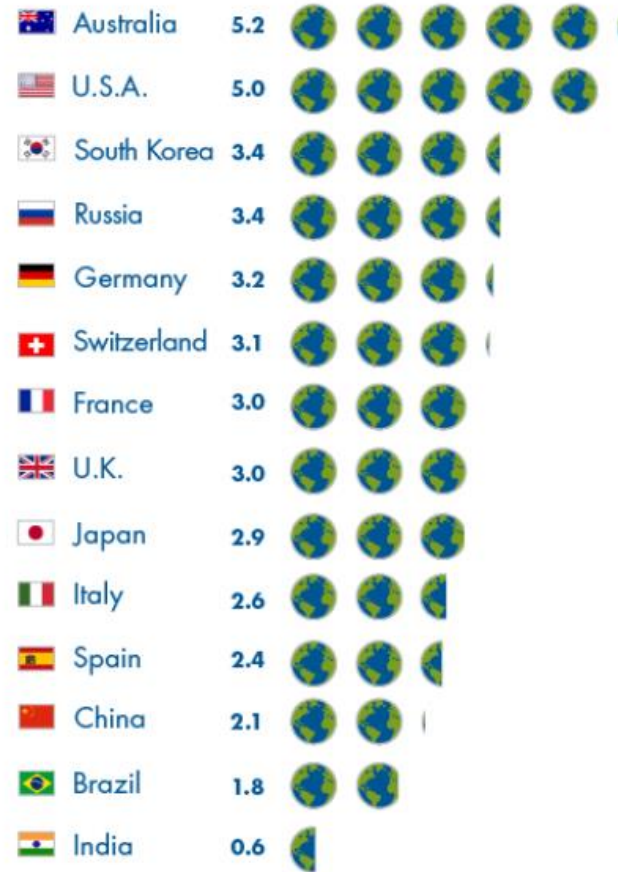
Without sustainable use – the use will be restricted!



We need to close the loop at less environmental impact!

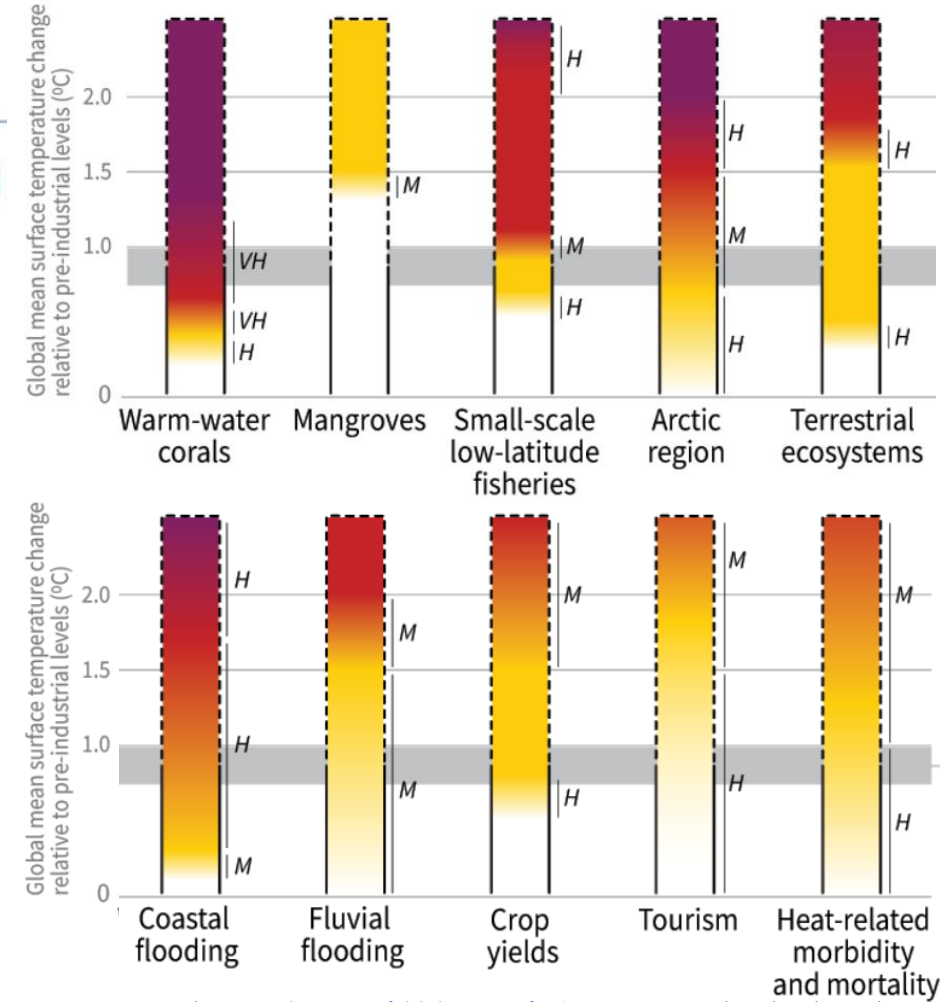


How many Earths do we need if the world's population lived like...



 **World** 1.7  

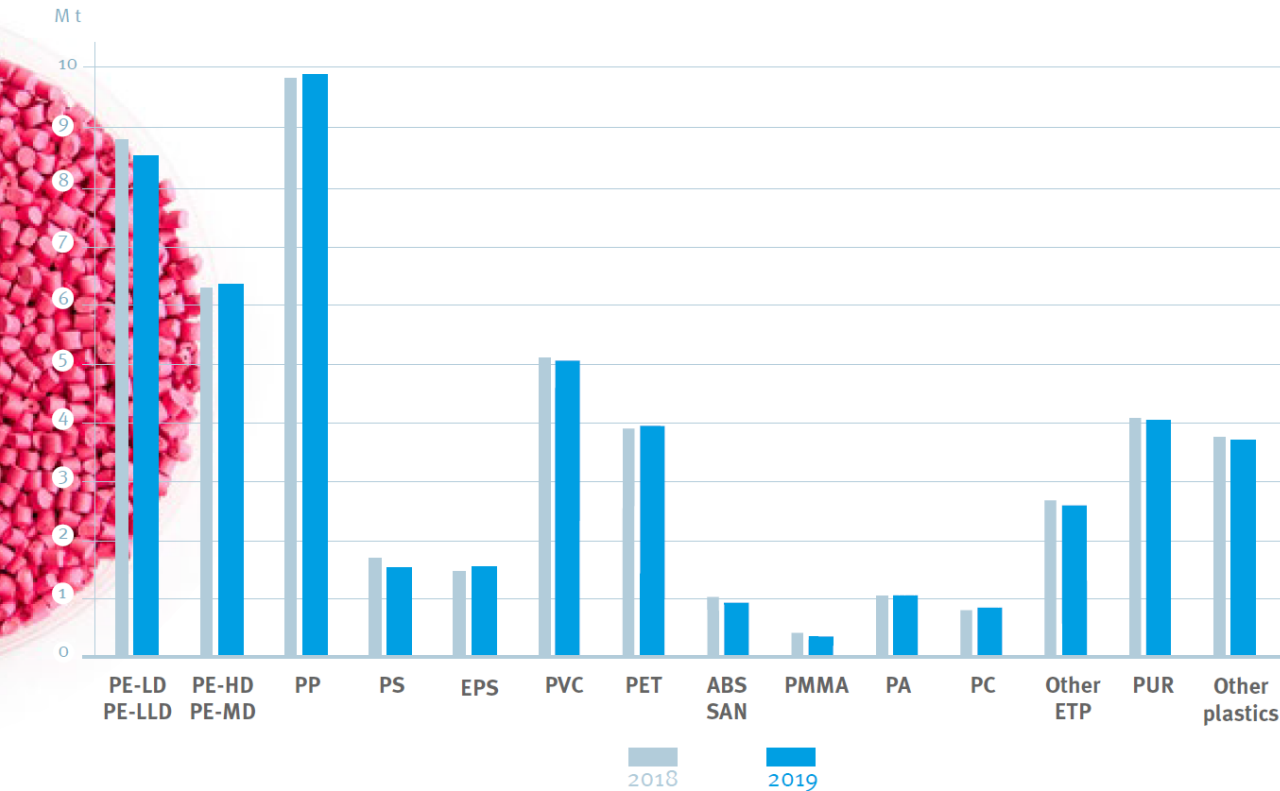
Source: Global Footprint Network National Footprint Accounts 2017



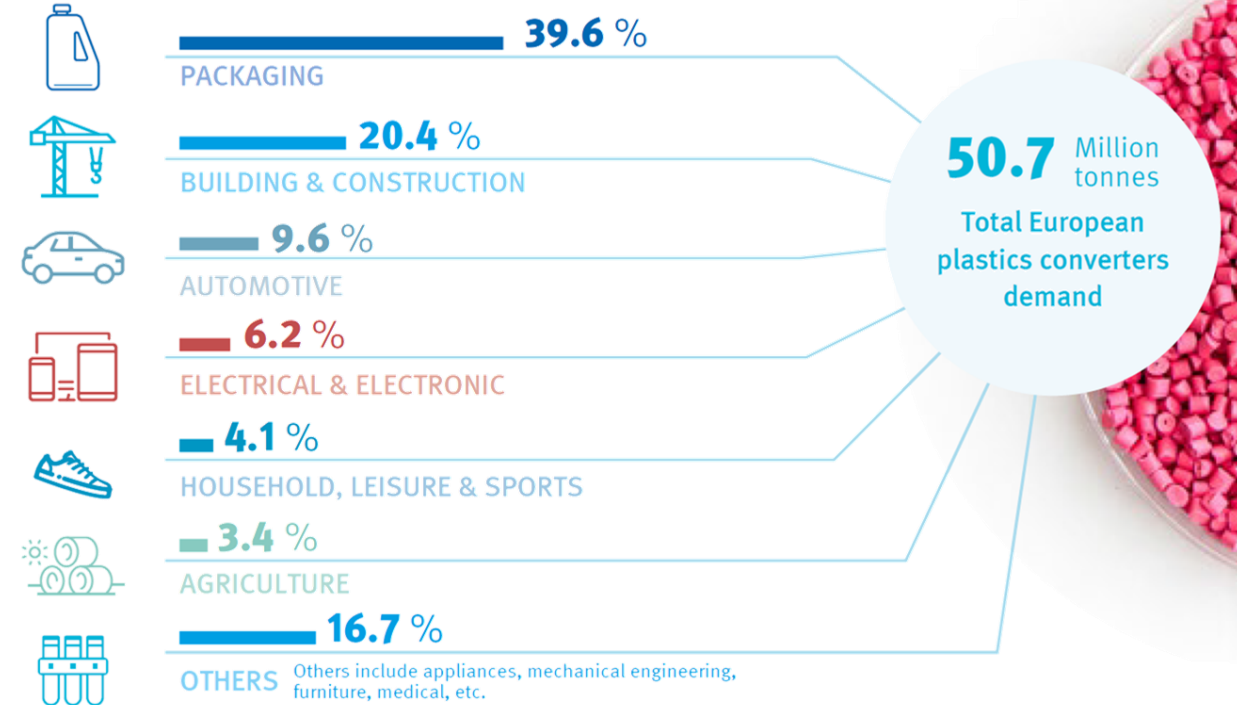
IPCC Special Report on the impacts of global warming of 1.5°C. Intergovernmental Panel on Climate Change.

Revised on January 2019 by the IPCC, Switzerland

Plastics – An intergrated part of modern society



EU-28 +NO/CH PLASTIC DEMANDS BY RESIN AND APPLICATION



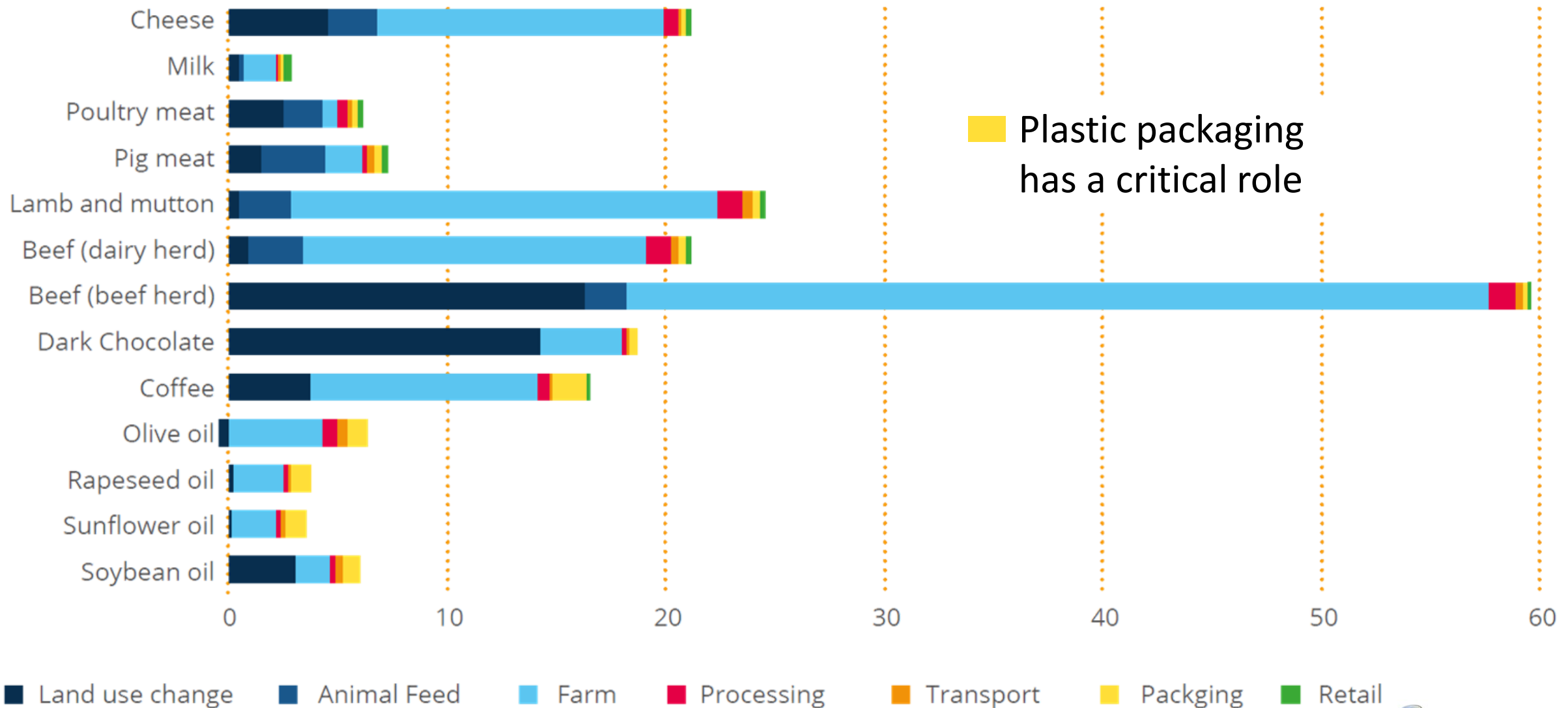
SUSTAINABLE?

Source: Plastics The Facts, Plastics Europe, 2021

Includes thermoplastics, polyurethanes, thermosets, elastomers, adhesives, coatings and sealants and PP-fibers.

Not included PET-, PA- and polyacryl-fibers.

Food production: 1/3 of total GHG gas emissions

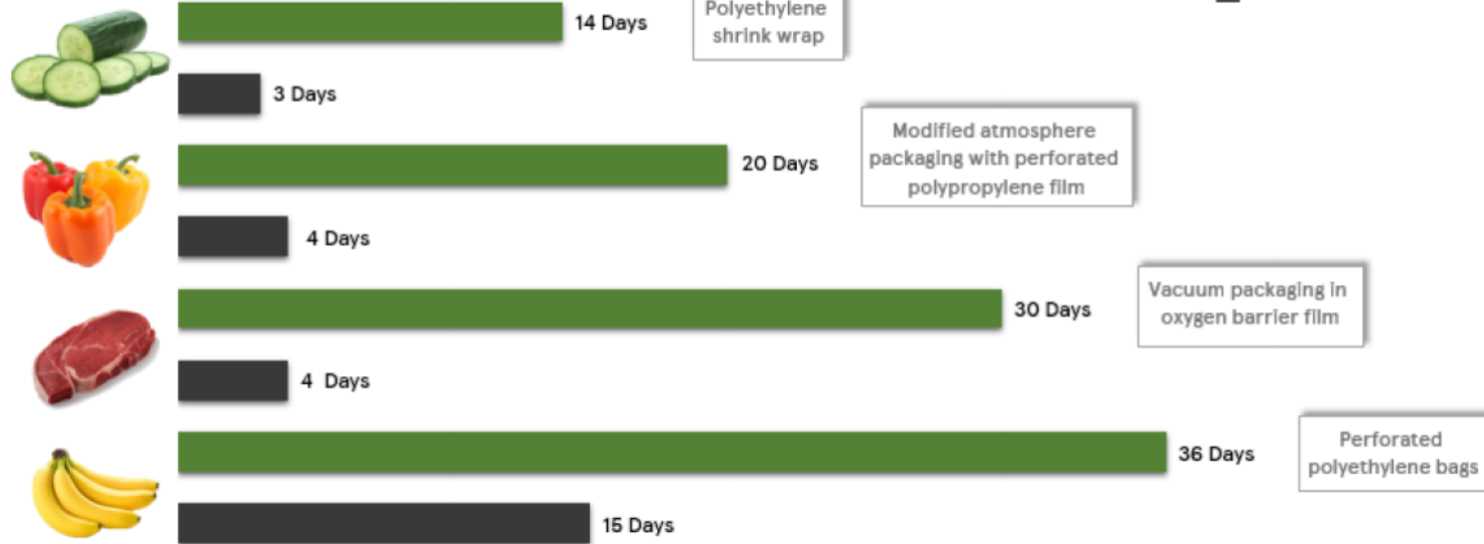


LCA's are required to make sound decisions!

Extended life

Modern plastic packaging can lengthen the life of food in your fridge

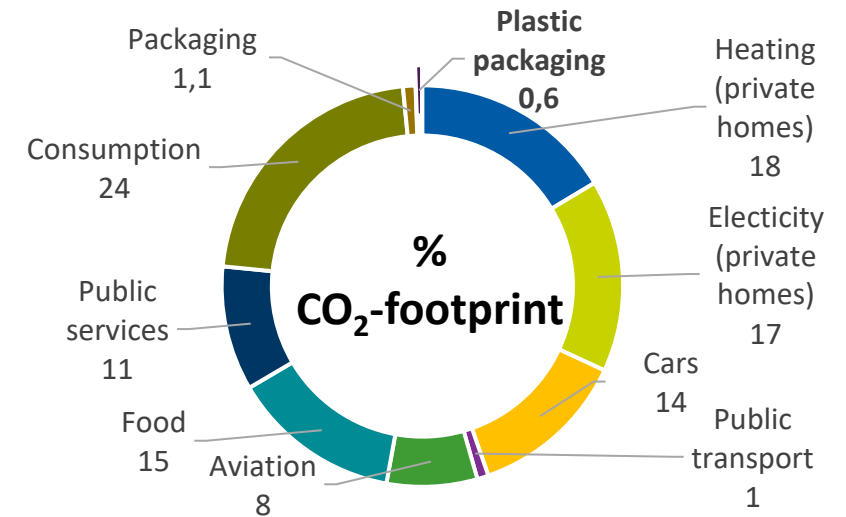
TESCO
Every little helps



Bagged Salad

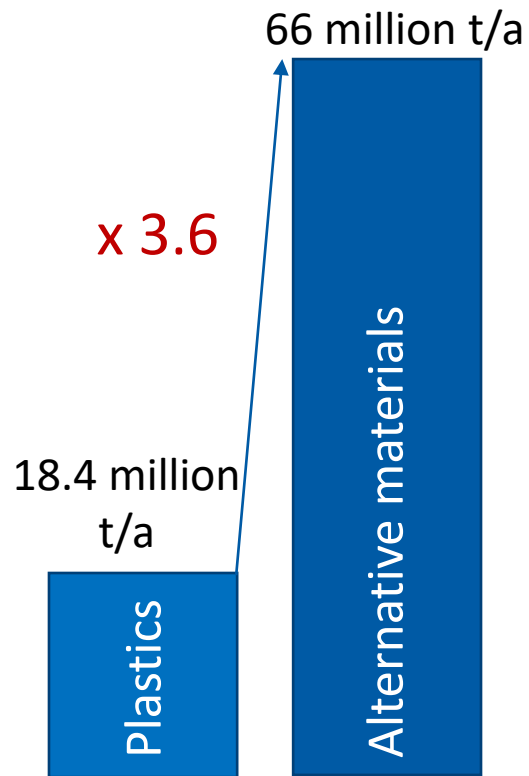


The average European

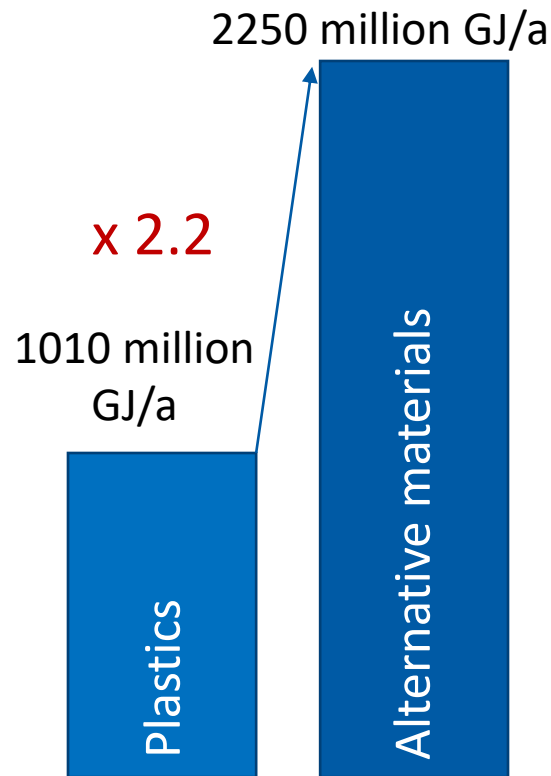


What if we replace plastics with available alternatives?

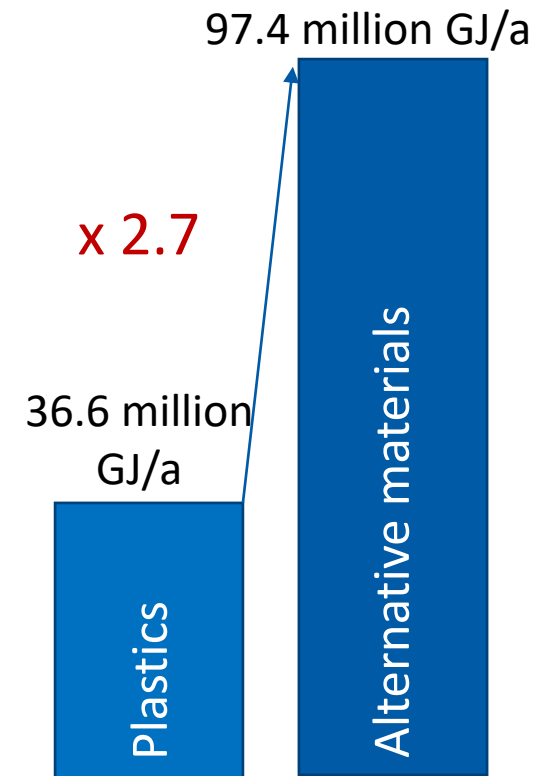
Total masses
for same functional units



Energy consumption
in total life-cycle

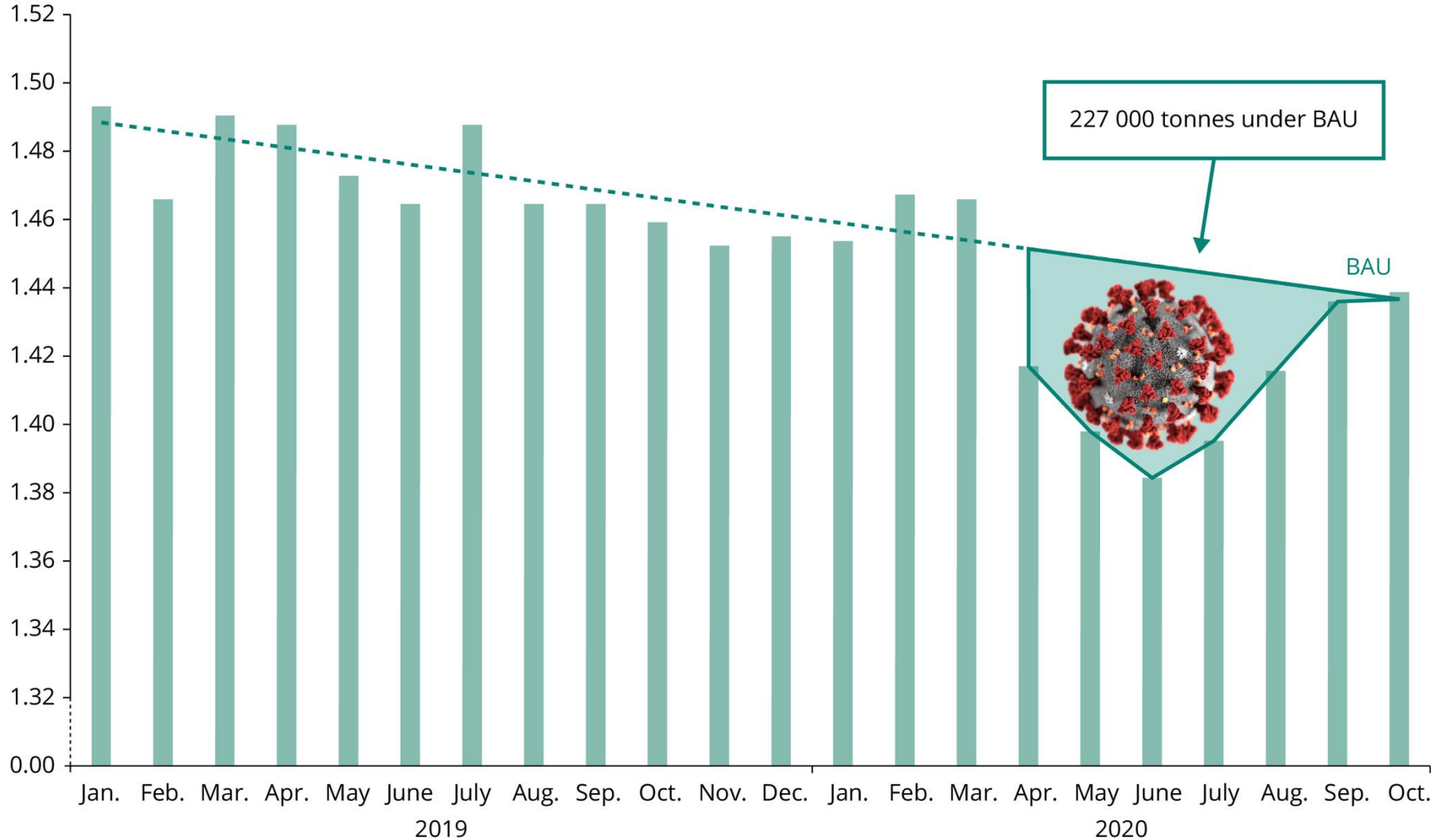


GHG emissions
in total life-cycle



To consume less – the biggest sustainability challenge?

Million tonnes



Plastic Packaging: 770 000 tonnes of CO₂eqv were saved

Equivalent to the direct CO₂ emissions of 480 000 EU citizens in 2019 (from burning fossil fuels for home heating and transport)

EU defines sustainable plastic manufacturing

Manufacture of plastics in primary form shall comply with at least one of the following three criteria:

1. Manufactured by mechanical recycling
2. Manufactured by chemical recycling*
3. Wholly or partially derived from renewable feedstock *

*The carbon footprint shall be lower than the carbon footprint of the plastics in primary form manufactured with fossil fuel feedstock

(The carbon footprint shall be calculated in accordance with ISO 14067:2018 and validated by a third party)



The graphic features a blue background. On the left, the text "EU TAXONOMY" is written in white, surrounded by twelve yellow stars arranged in a circle. To the right of the stars is a large yellow Euro symbol (€). Further to the right is a large yellow arrow pointing to the right.

Environmental objectives:

1. Climate change mitigation
2. Climate change adaptation
3. Sustainable use and protection of water and marine resources
4. Transition to a circular economy
5. Pollution prevention and control
6. Protection and restoration of biodiversity and ecosystems

EU will increase the uptake of recycled materials

- European Commission will propose mandatory requirements for recycled plastic content in e.g. packaging, construction and vehicles
- Supported by industry - if recycled content include both mechanical and chemical recycling with a credible mass balance approach

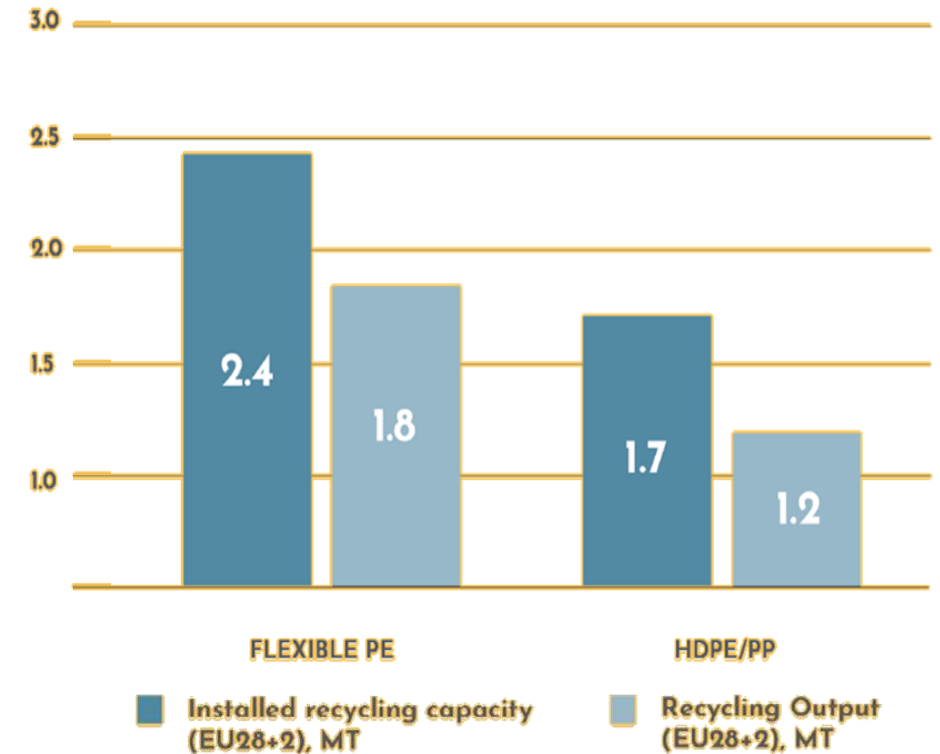
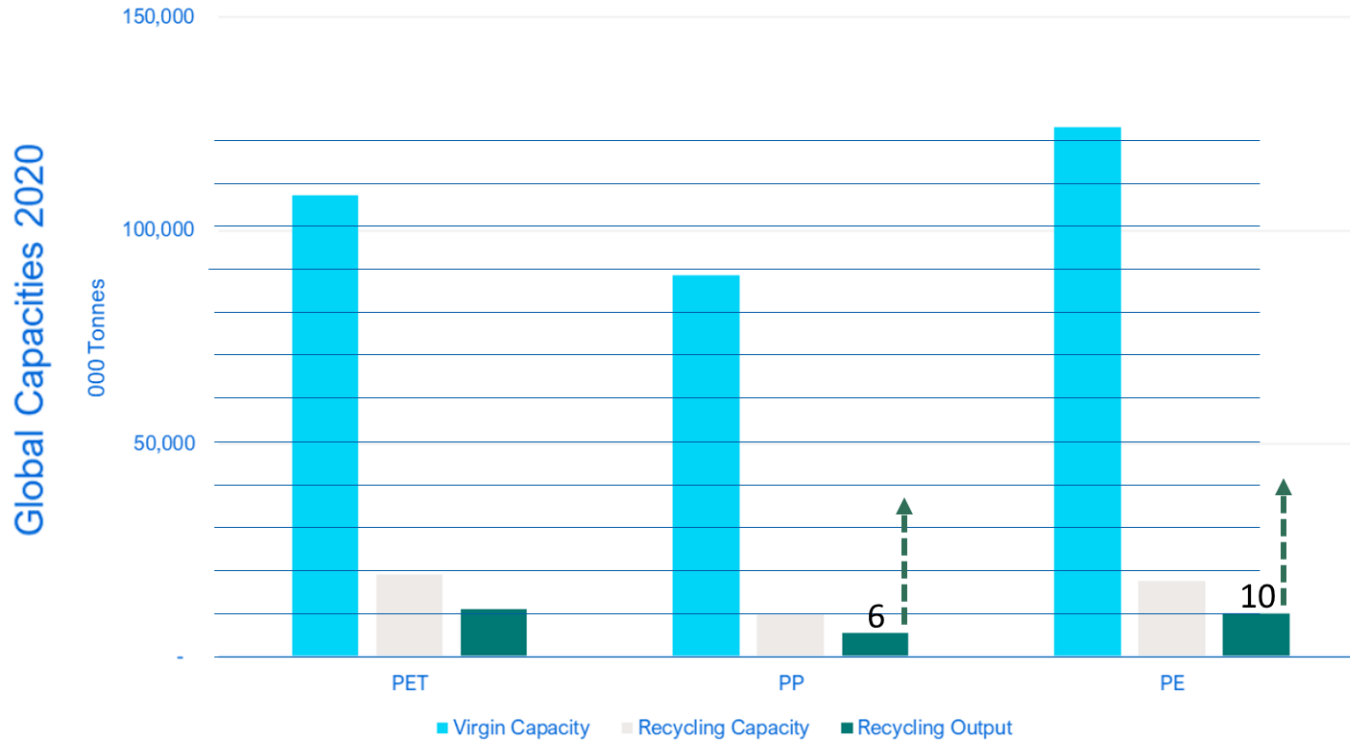


TEPPFA supports the Circular Plastics Alliance Declaration to increase the uptake of recycled material into new products including plastic pipes. Various technologies are available and widely used on the market, especially for sewage and stormwater pipes but also cable conduits. The recycled material is either being mixed with virgin material or coextruded in the middle layer of the plastic pipe.

EUROPEAN PLASTICS PRODUCERS CALL FOR
A MANDATORY EU RECYCLED CONTENT TARGET FOR
PLASTICS PACKAGING OF 30% BY 2030

PRESS RELEASES

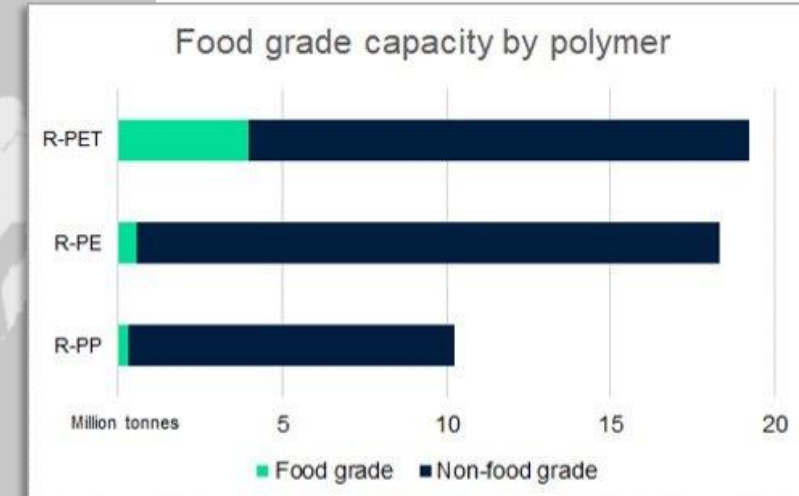
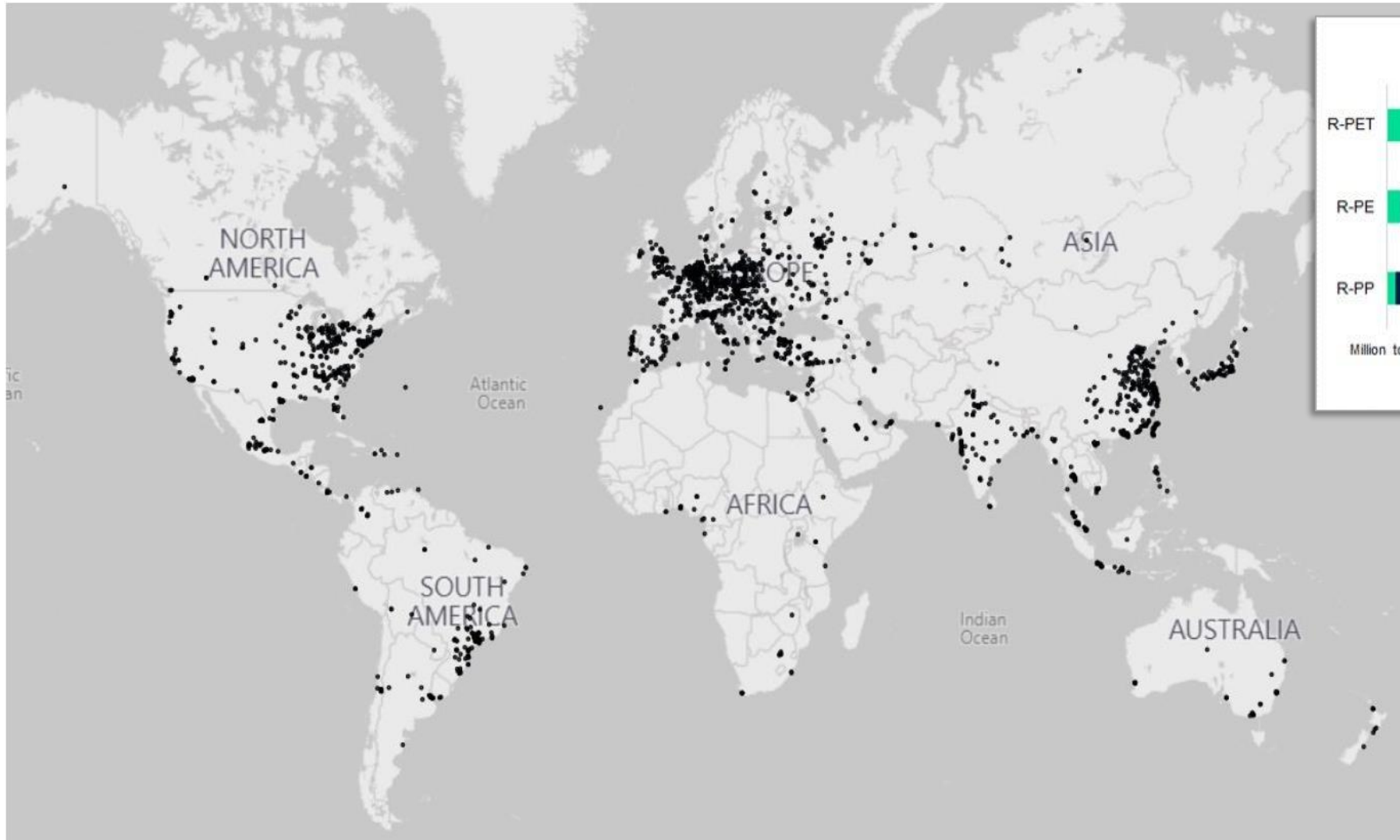
The challenge – the industry needs quality recyclates



- Average estimate recycle share of global capacity in 2020 is < 10%
- Un-used capacity due to poor quality of output

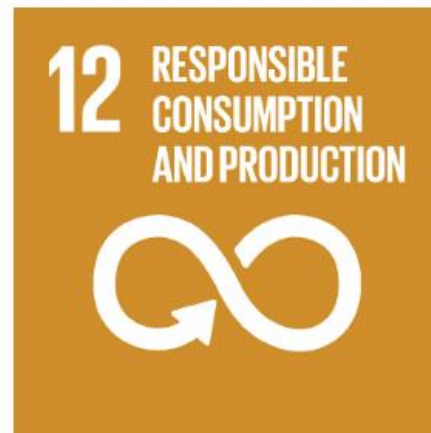
- Europe needs better recycling technologies to reach 10 MT within 2025

FDA and EFSA food grade recyclates are required



- 46 million tonnes
Recycled PET, PE, PP capacity per year
- > 2600
PET, PE, PP mechanical recyclers with more than 10 kT annual capacity
- < 10% Food grade capacity
of which PET: 82%, rPE: 12%, ,rPP: 6%

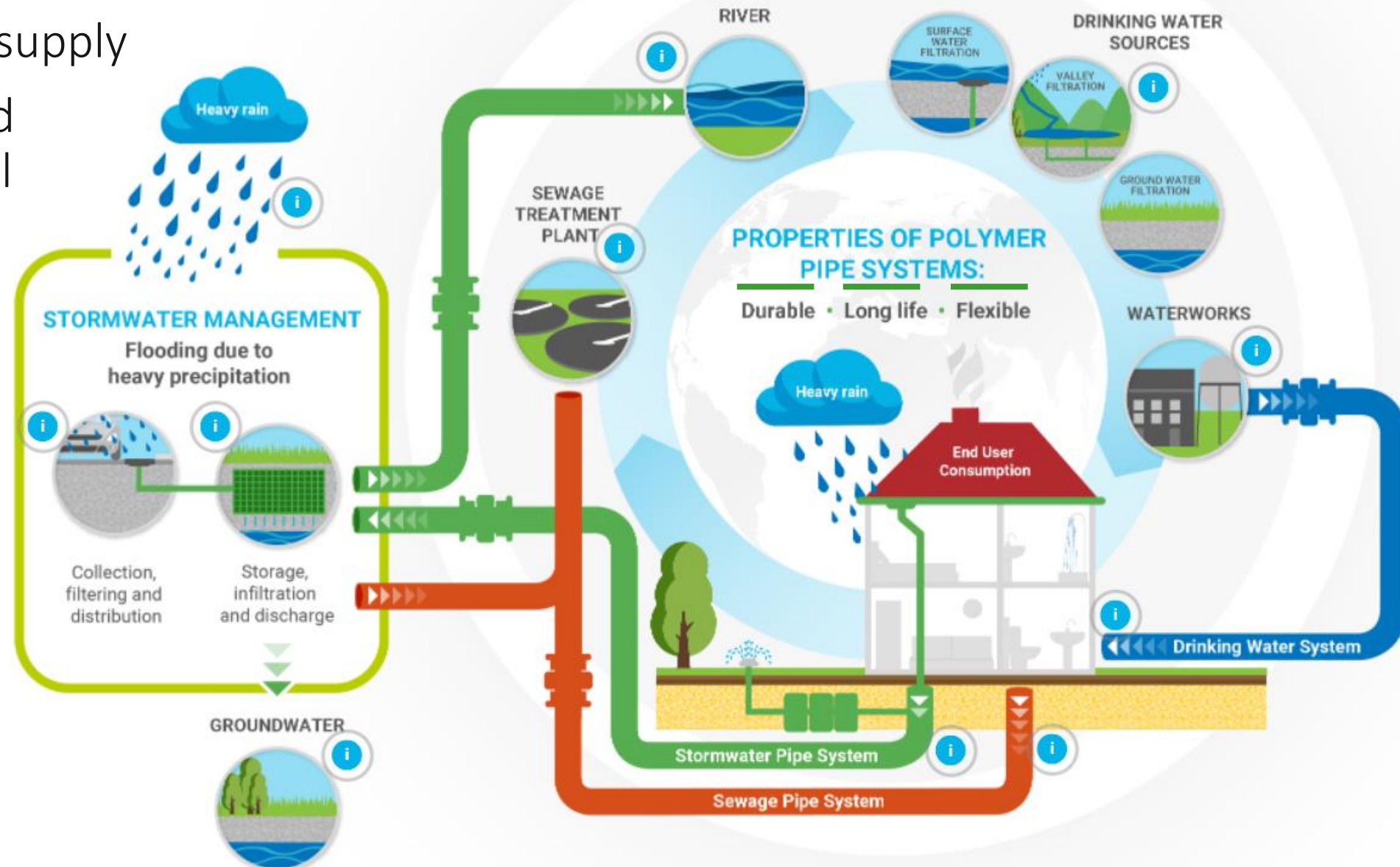
Plastic pipes play a major role in achieving the SDGs by 2030



Polymer pipe systems: Indispensable in the water cycle

- Drinking water supply
- Clean water and sanitation for all
- Climate change adaptation

.....at lower environmental footprint than alternative materials



Environmental product declarations – output of LCAs

- Enable users to assess the environmental impacts of pipe systems
- Allow comparisons with alternative products at the system level
- Ensure transparency about the impact of plastic pipe systems on environment
- Based on ISO standard for Type III environmental declarations (ISO 14025) and the European norms EN 15804 and EN 15942
- Validated by independent party



Abiotic Resource depletion
(non-renewable materials which can lead to exhaustion of natura resources.)



Acidification Potential
(emissions resulting in acid rain)



Eutrophication Potential
(excessive algae growth and reduction in oxygen levels)



Global Warming Potential
(climatic disturbance, desertification, rising sea levels and spread of disease)

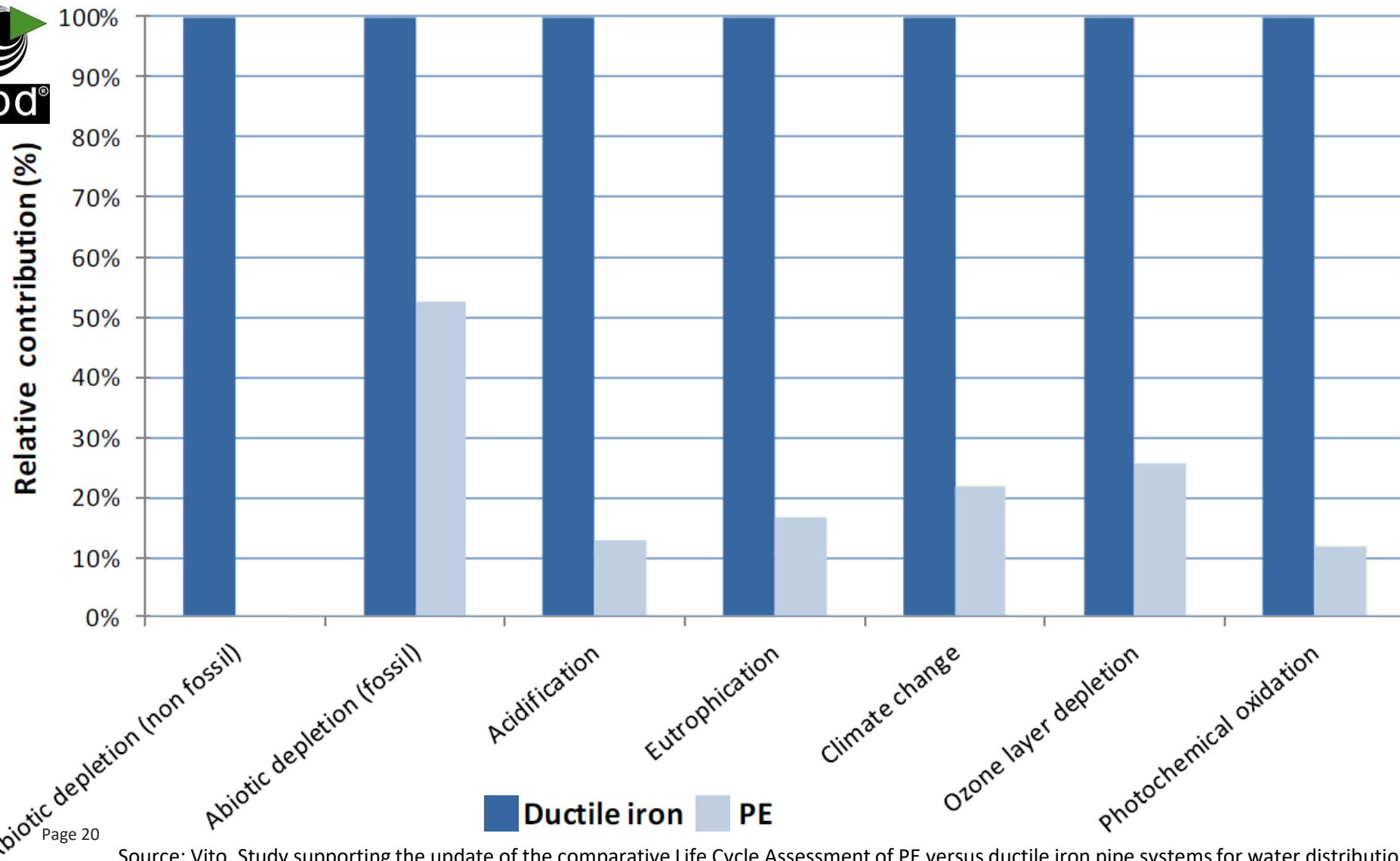


Ozone Depletion Potential
(UV, cancer, damage to immune system, reduction in crop yields)



Photochemical Ozone Creation Potential
(health, crops, ecosystem)

Plastics: Impact of 0.5% to 53% vs. alternative system



Functional unit:

“The below ground transportation of drinking water, 100 m, by a typical European public water distribution system over their complete service life cycle of 100 years, calculated per year”.

Ductile iron: DN100

Pipe: 1802 kg

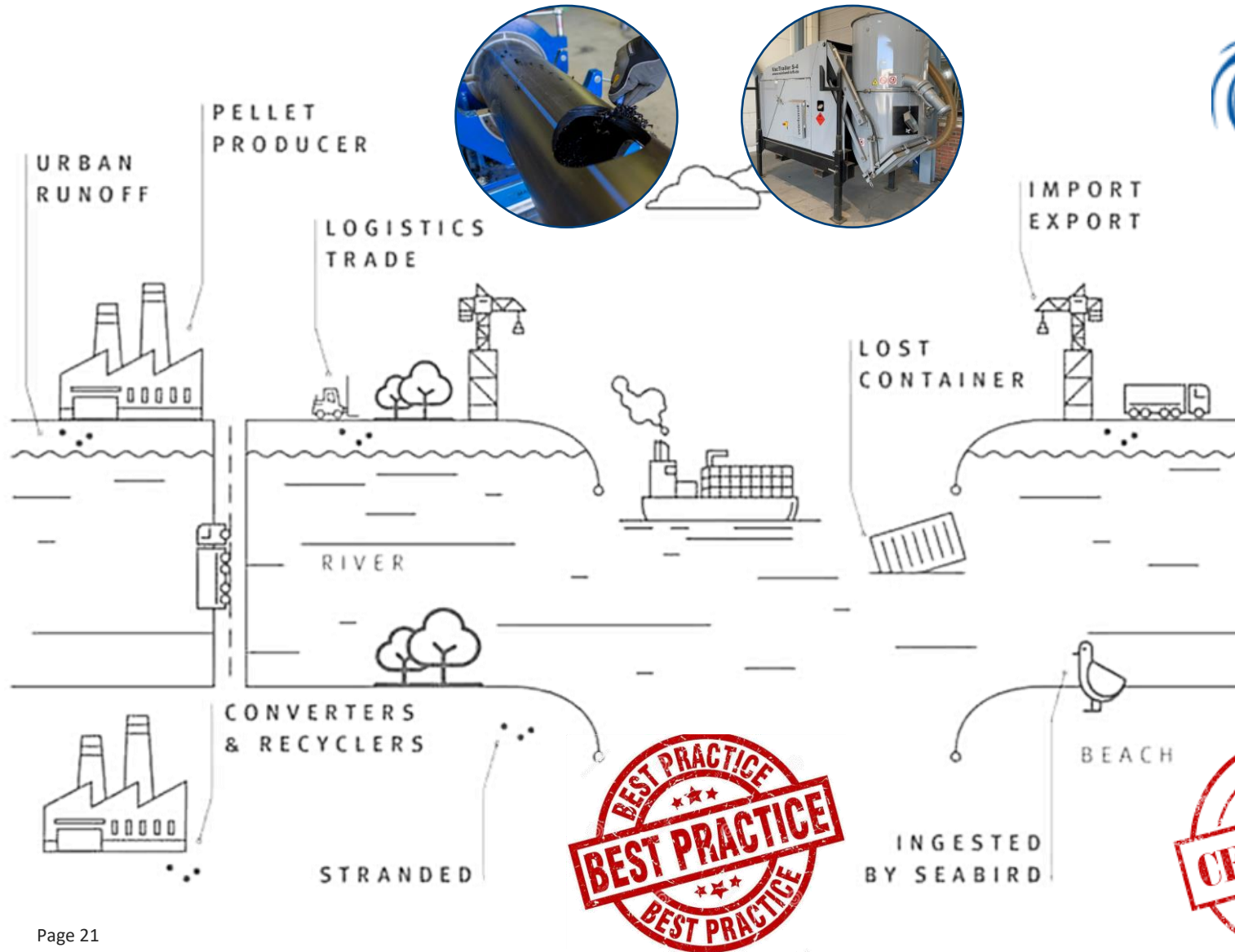
Fitting: 129 kg

PE: DN/OD 110mm

Pipe: 217 kg

Fitting: 15.84 kg

Plastic pellets: a raw material not to be wasted



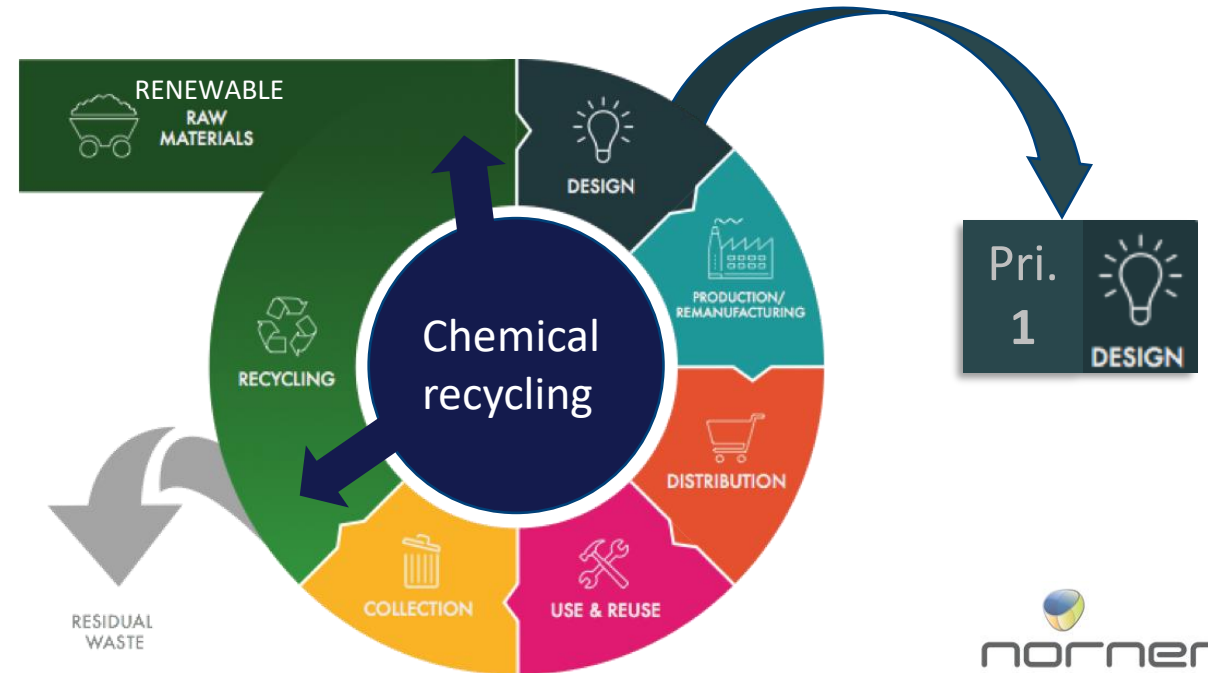
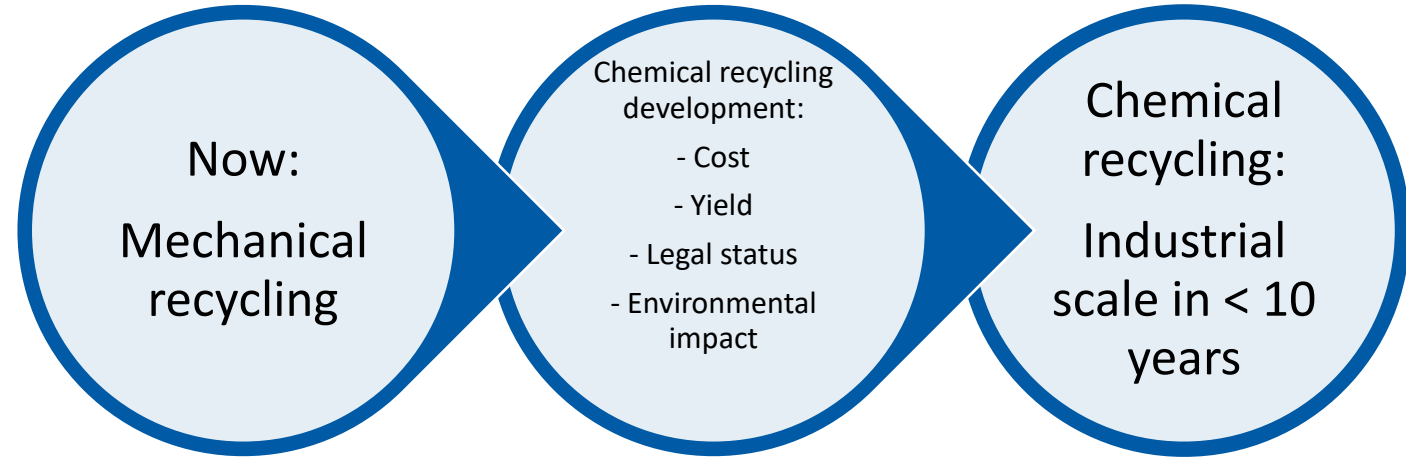
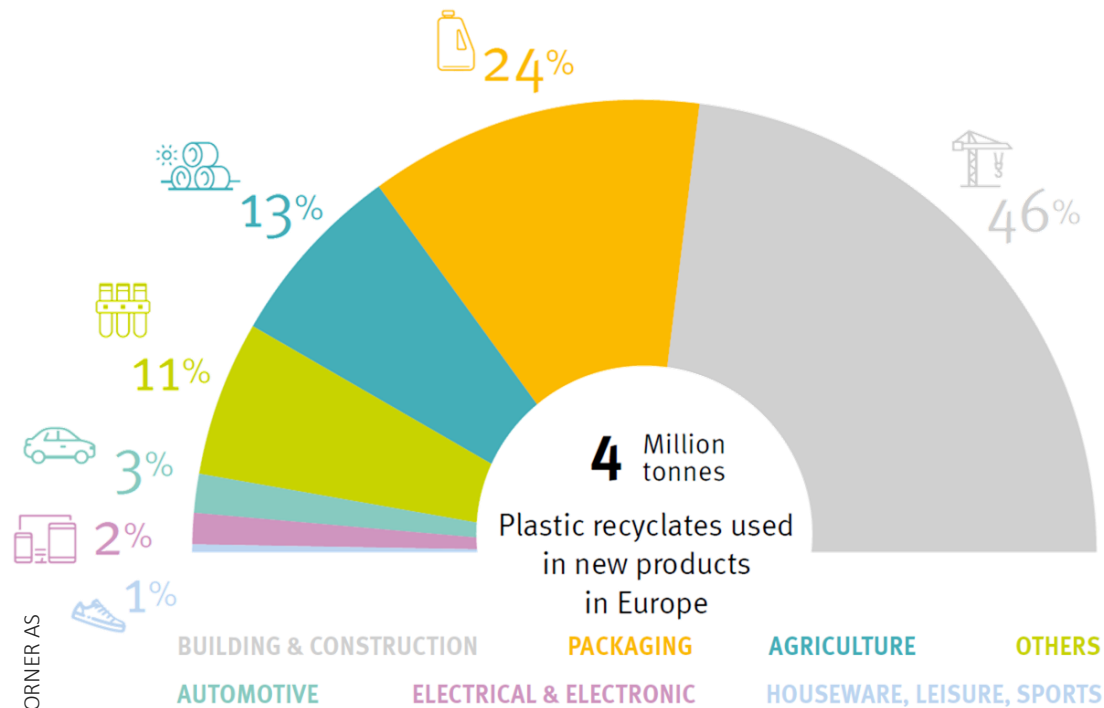
Operation Clean Sweep®



We need to transform the way plastic products are designed, produced, used and recycled + document!

Europe:

- 29.1 million tonnes collected
- 4 million tonnes used
- Mechanical recycling is not fulfilling the requirements needed to enable targeted use





It's a great future in circular plastics

www.norner.no

CHANGE OR BE CHANGED!

**LICENCE TO
OPERATE**

