Turning the Tide on Plastics

Webcast, 20 May 2021

Speakers

Ina Vollmer
Professor
University of Utrecht

Yvonne van Veen
Director Market Strategy & Innovation
INEOS Styrolution

Jan Sültemeyer
Global Head of Innovation & Sustainability
Avient Switzerland GmbH

Dr Uwe G. Schulte
Governance & Sustainability Center Leader
The Conference Board

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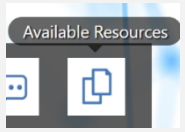
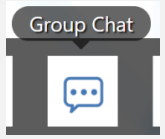


Group Chat



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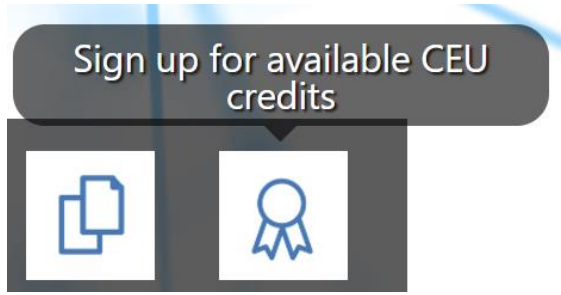
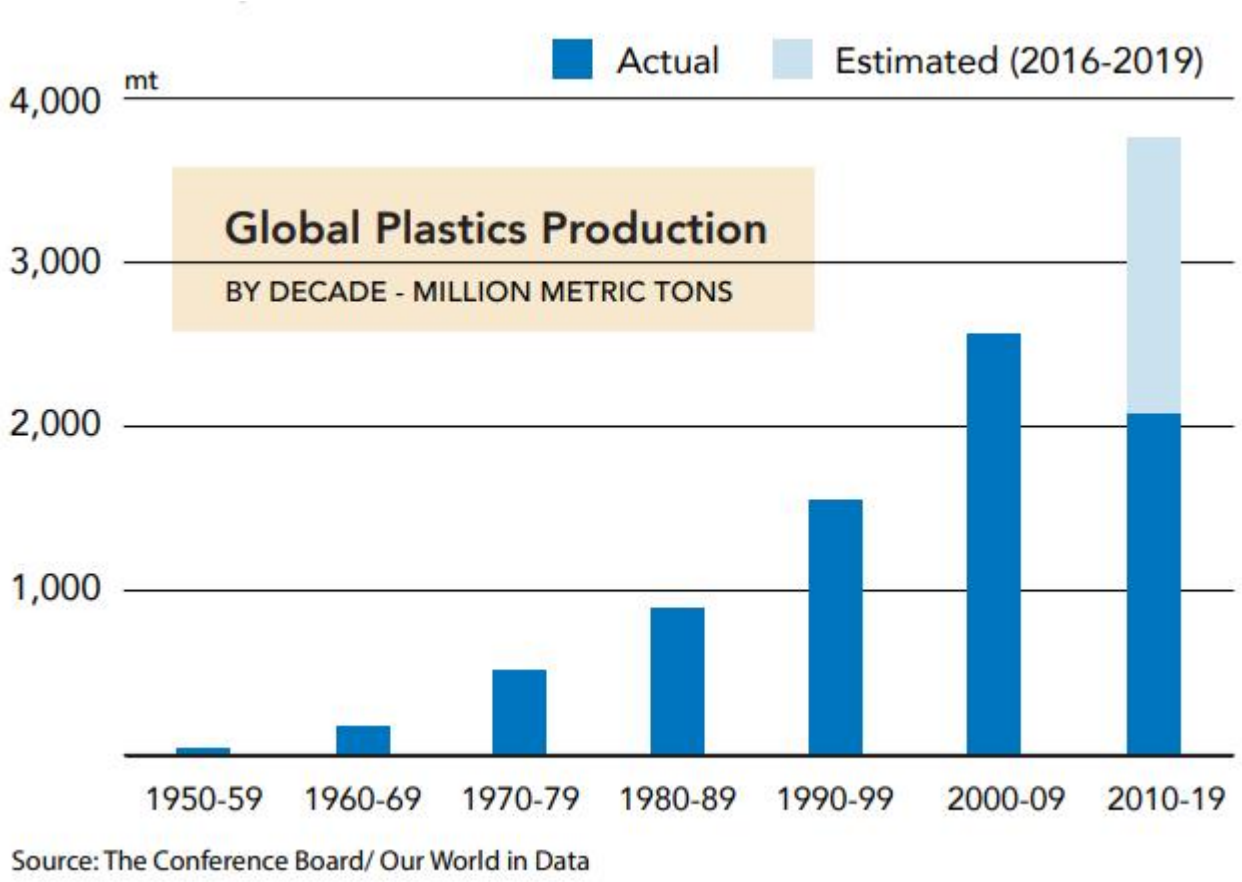


Plastic: Current State of Affairs

Poll Question

What percentage of global plastic waste is currently being recycled?
[1 – 5%, 6 – 10%, 11- 20%, 21-30%, Not sure]

Since 1900, the production of plastics has increased nearly 60 percent every 10 years…

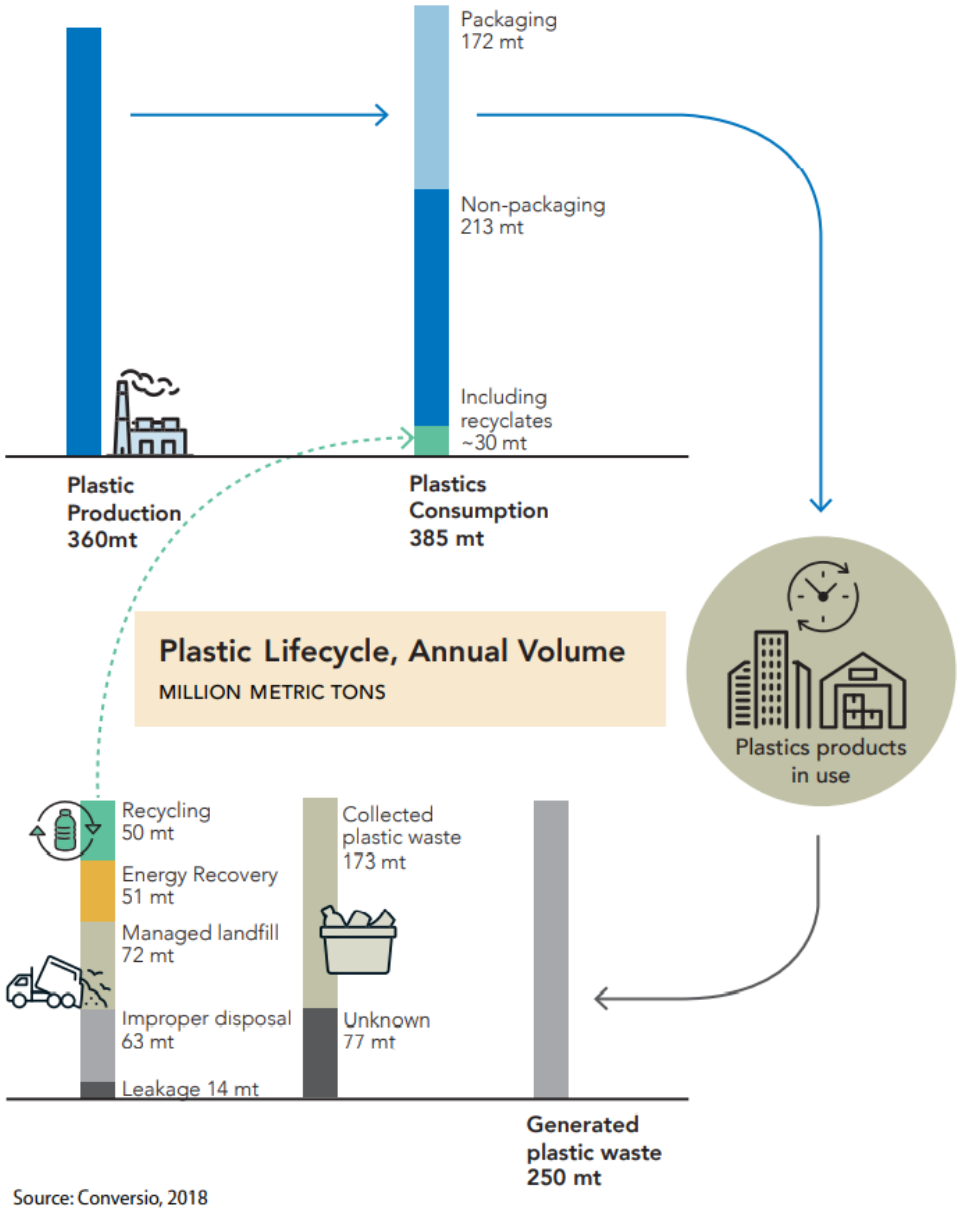


Source: The Conference Board/ Our World in Data

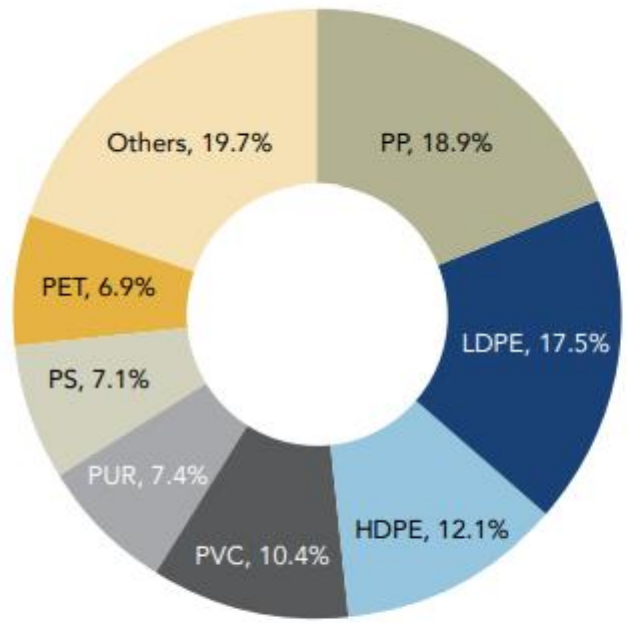
…leaving behind millions of metric tons of discarded plastic every year

- Plastic Production: 360 mt
- Plastic Waste: 250 mt
- Plastic Recycled: 50 mt

Annual, Million Metric Tons



We talk about ”plastics” as if it were a single material, but that is not the case



Source: Based on data from PlasticsEurope

01 PET	PET — Polyethylene terephthalate	• Bottles • Foods containers • Polyester clothing
02 PE-HD	HDPE — High density polyethylene	• Consumer products, e.g., plastic chairs and tables, toys, trash, and recycling bins • Fibers for industrial fabrics, nets, and ropes • Strong packaging materials, e.g., bottle caps, plastic milk bottles
03 PVC	PVC — Polyvinyl chloride	• Clothing • Electrical cables • Plumbing products
04 PE-LD	LDPE — Low density polyethylene	• Computer hardware covers and packaging • Plastic bags and wraps, and waterproof lining • Wash bottles and lids
05 PP	PP — Polypropylene	• Automotive parts • Carpeting, rugs, and upholstery • Medical devices
06 PS	PS — Polystyrene	• Building insulation • Food and liquid containers • Packaging materials
	PUR — Polyurethane	• Bedding and furniture • Building insulation • Coatings, adhesives, sealants, and elastomers

Definition of waste streams in most developed countries

Household waste

- Collection systems implement with support of Governments
- Most waste sorted according a general specification (PET, PE, PP, film and mixed plastics)
- Film and mixed plastics into incineration / landfill

End-of-life vehicle

- Collection systems organized by communities and/ or car manufactures
- Cars are dismantled, most metal is recycled. The plastic is separated from the iron and shredded.
- Most plastics go into incineration / landfill

Electronic waste

- WEEE: Waste Electrical and Electronic Equipment
- 50% of the plastics can be recycled the other 50% goes into incineration / landfill

Industrial waste

- Recycling of scrap generated in the production process
- No material quality degradation, easy to re-use in industrial processes

Construction waste

- Recycling of mixed plastic waste from construction
- Main focus currently on isolation material, concrete, wood recycling
- Most waste goes into incineration / landfill

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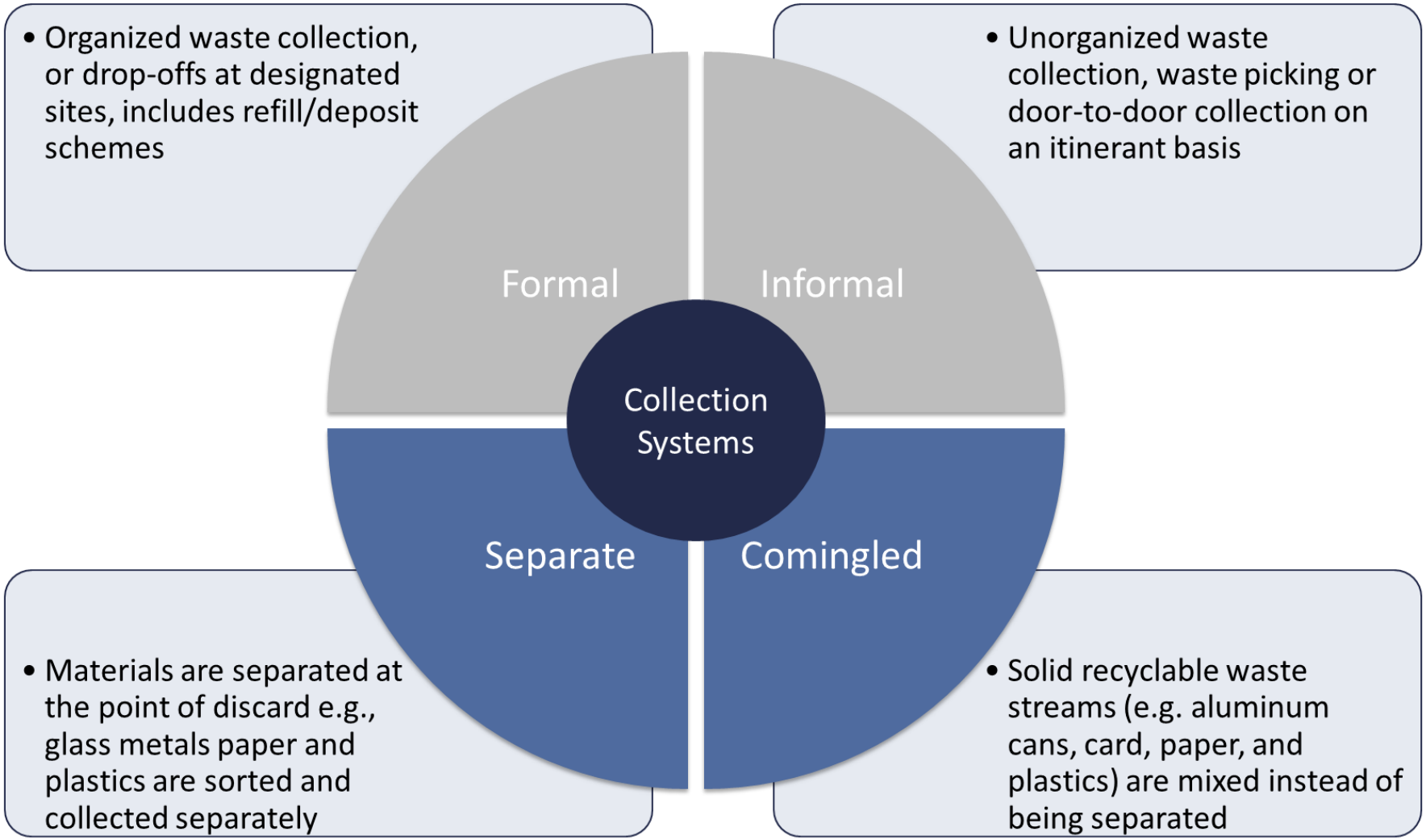
Waste collection systems



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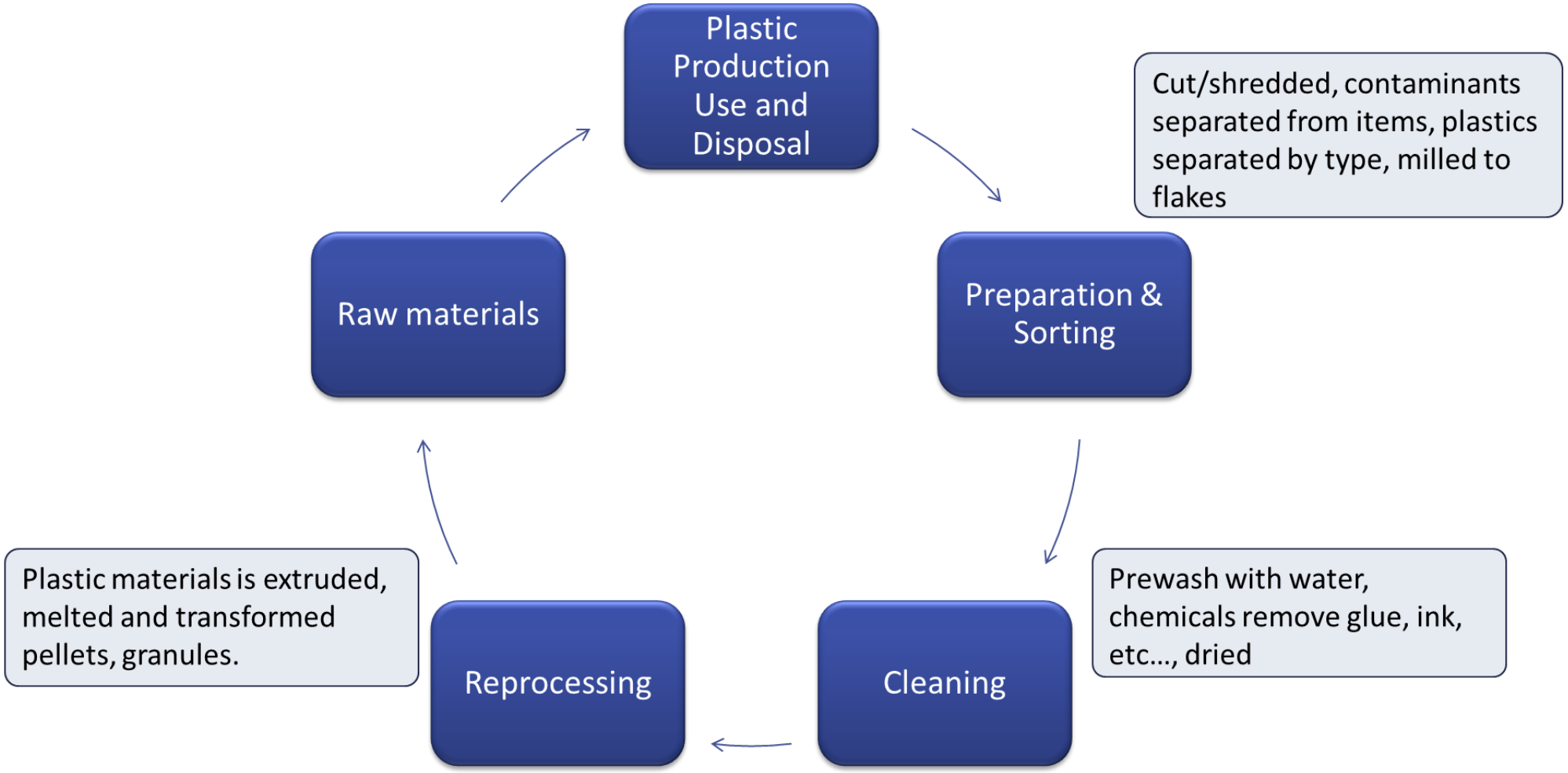
Simplified Overview of the Mechanical Recycling Process



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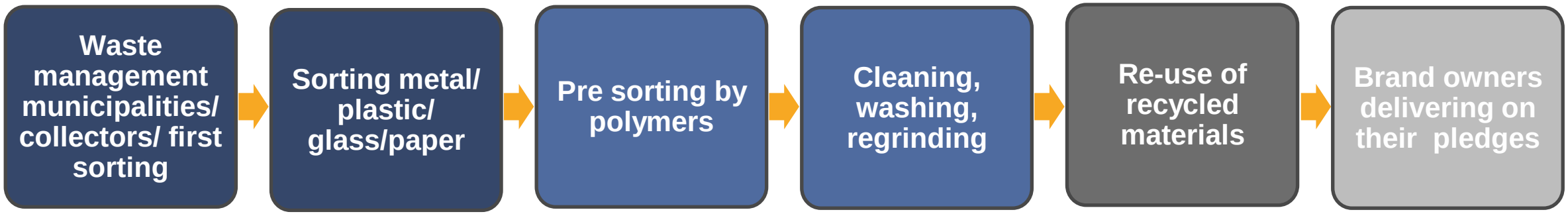
Many steps needed to re-use recycled materials



Waste collection companies contracted by the municipalities / governments for waste collection and first sorting of materials

Recycling companies, specialized per waste stream, using different sorting technologies

Food approved materials versus non-food approved

Hazardous

Technical material properties

Chemical Industry

Brand owners in FMCG, Household, Electronics, Automotive, Furniture, etc.

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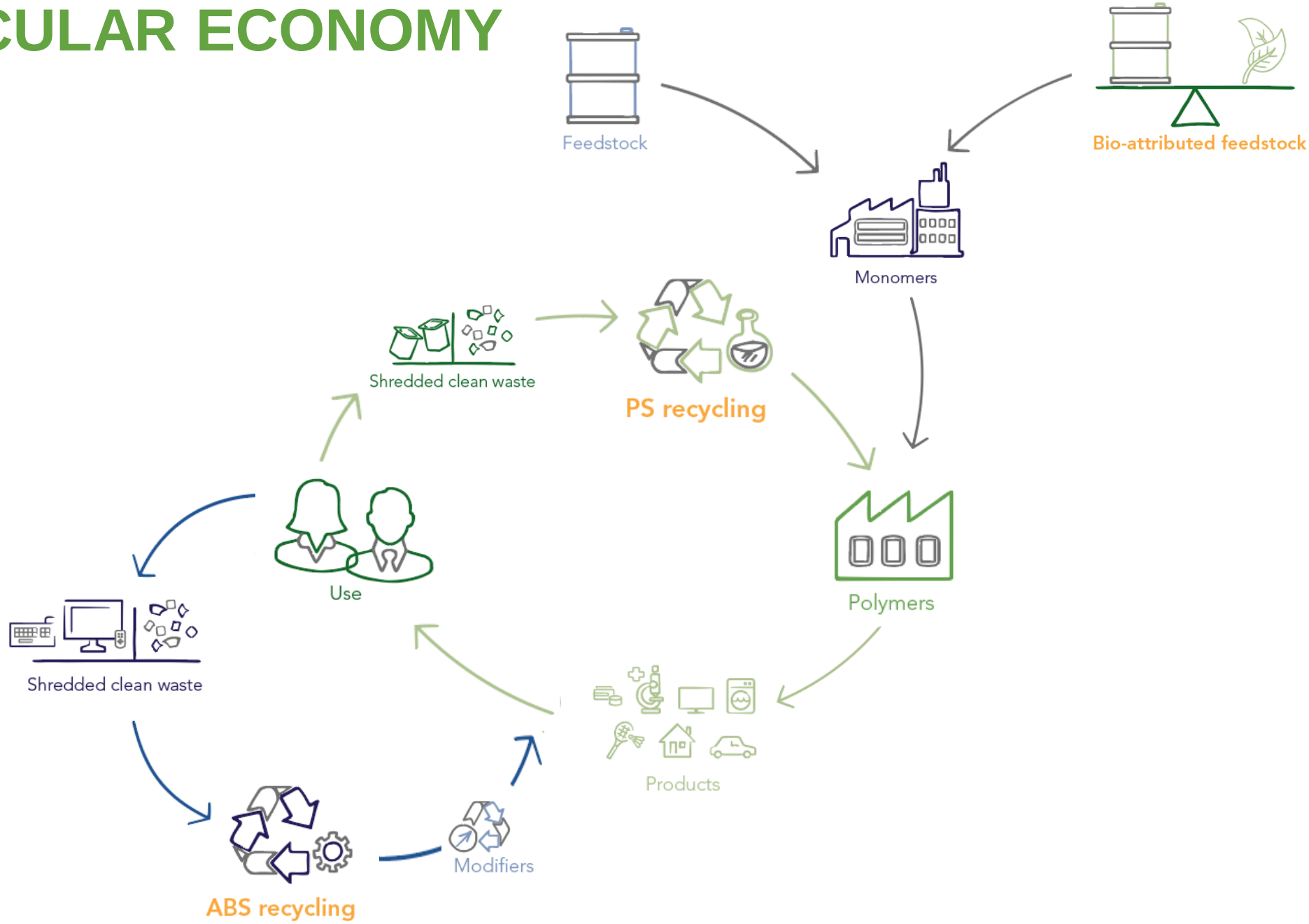
Example of different feedstock's in our supply chain

CIRCULAR ECONOMY



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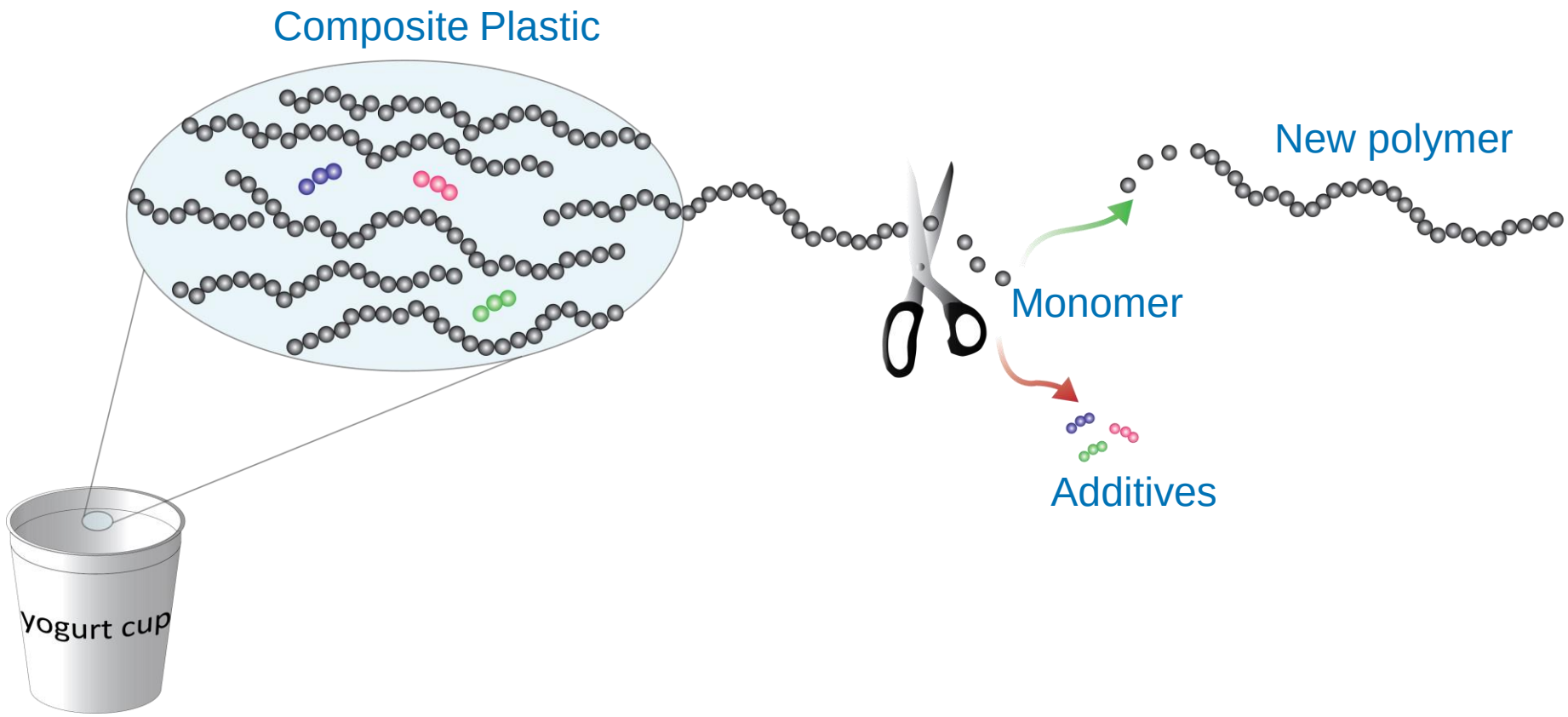
Plastic Waste Management Challenges

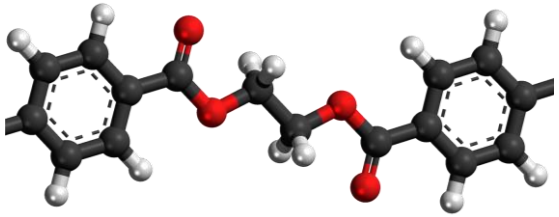
Chemical Recycling

Chemical Recycling



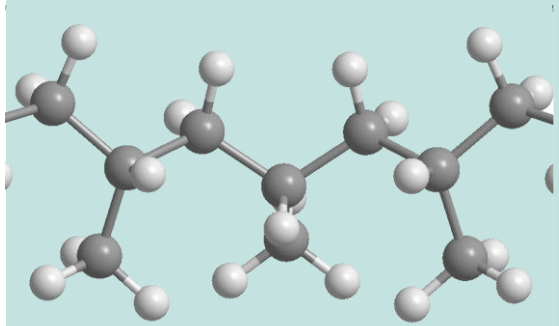
Source: I. Vollmer, M. J. F. Jenks, M. C. P. Roelands, R. J. White, T. Harmelen, P. Wild, G. P. Laan, F. Meirer, J. T. F. Keurentjes, B. M. Weckhuysen, *Angew. Chemie Int. Ed.* **2020**, *59*, 15402–15423.

Breaking chemical bonds requires energy



Polyethylene terephthalate (PET)

~100 °C

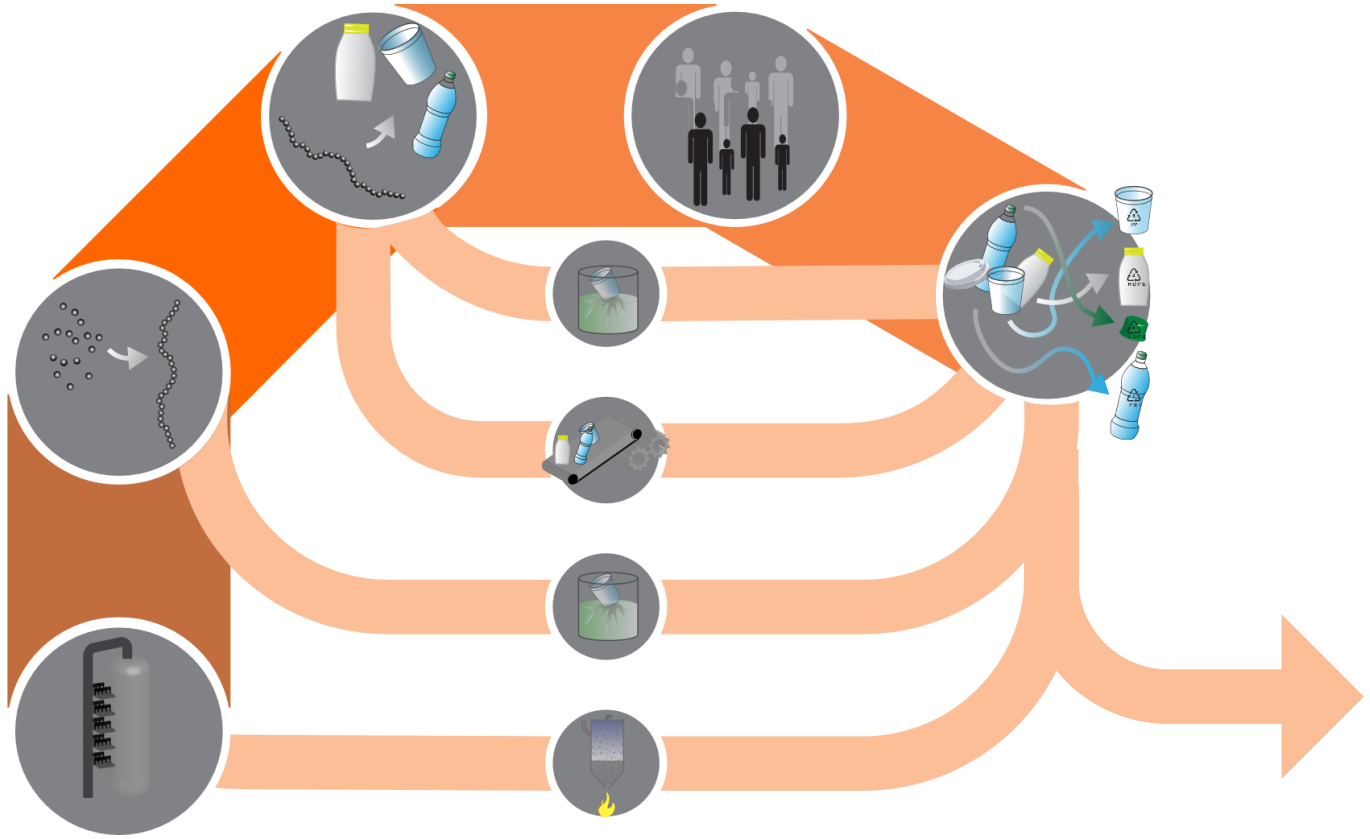


Polypropylene (PP)

>400 °C

Polyethylene (PE)

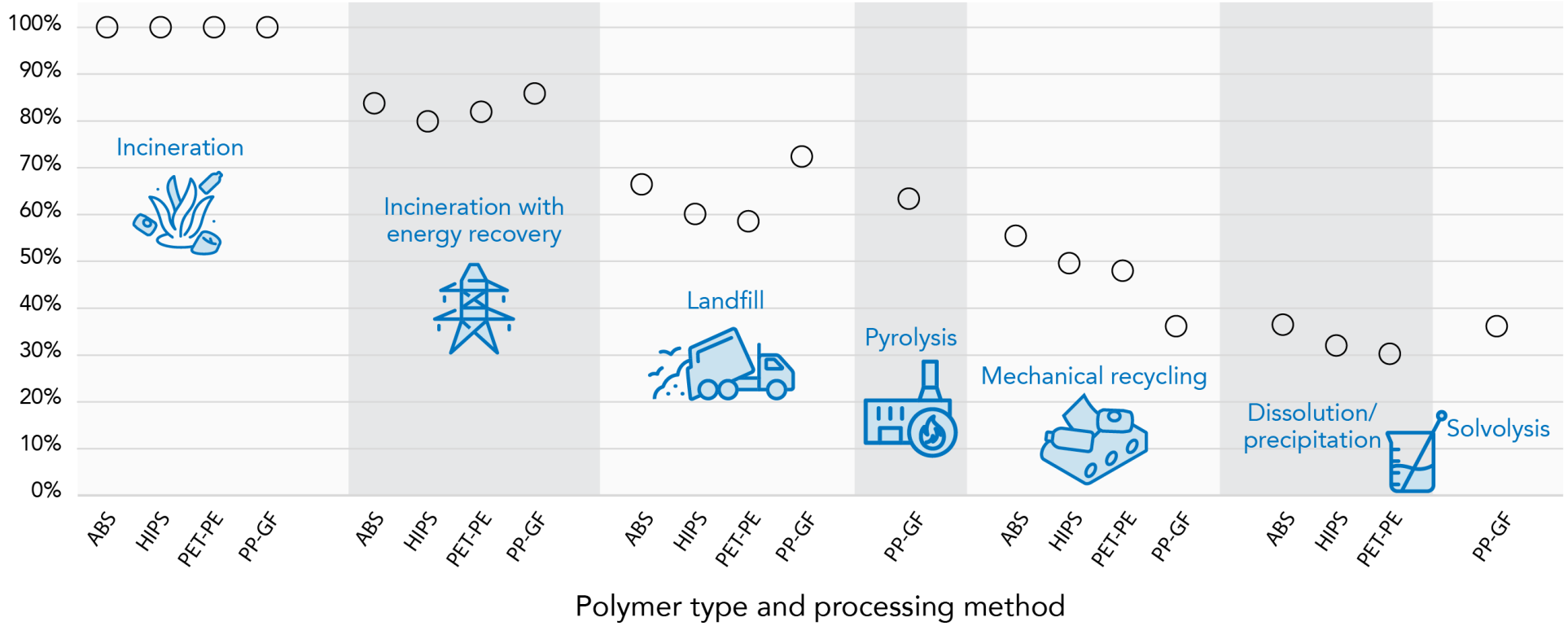
Make plastics circular



Other high value chemicals

Sourcde: I. Vollmer, M. J. F. Jenks, M. C. P. Roelands, R. J. White, T. Harmelen, P. Wild, G. P. Laan, F. Meirer, J. T. F. Keurentjes, B. M. Weckhuysen, Angew. Chemie Int. Ed. 2020, 59, 15402–15423.

High purity product = less CO_2



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