



Sustainable Plasticizers by BASF

Green Plasticizer Development Forum 2021
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Jiangnan University

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EU Green Deal – What does it mean?

- The European Green Deal comprises a set of policy initiatives by the European Commission with the aim of making Europe climate neutral in 2050 including increasing the EU's greenhouse gas emission reductions target for 2030 to at least 50%.
 - It includes a review of each existing legislation and introduces new legislations addressing **circular economy, building renovation, biodiversity, farming and innovation**.
 - Policy areas
 - Clean Energy
 - Sustainable Industry 
 - Building and Renovation
 - Farm to Fork
 - Eliminating pollution
 - Sustainable mobility
 - Biodiversity
- Circular economy
 - **Toxic free environment**
 -

To ensure a **toxic-free environment**, the EC presented a **Chemicals Strategy for Sustainability**.

- All parties including industry work together to combine better health and environmental protection.
- Better use of EU's agencies and scientific bodies to move towards "one substance – one assessment"
- Reflect scientific evidence on the risk of endocrine disruptors, hazardous chemicals, persistent chemicals and cocktail effects

CSS – Chemical Strategy for Sustainability



<https://ec.europa.eu/environment/pdf/chemicals/2020/10/Strategy.pdf>
(24 pages plus action plan with 56 defined measures)

■ Chemicals are everywhere in our daily life

Main aims

"This strategy is an opportunity to reconcile the societal value of chemicals with human health and planetary boundaries as well as to support the EU industry in producing safe and sustainable chemicals. It is also an opportunity to respond to the legitimate aspirations of EU citizens for a high level of protection from hazardous chemicals and to promote the EU industry as a global frontrunner in the production and use of safe and sustainable chemicals."

- CSS is focused on hazard-based policies enabling bans of substances due to their hazardous properties → Aiming for a **"Toxic free environment"**
- Intention is to motivate industry to innovate **"safe and sustainable by design"**

CSS Charts a Long-term Vision for EU's Chemicals Policy

■ Safe and sustainable products and production

1. Innovation of safe and sustainable EU chemicals
2. Stronger EU legal frameworks to address environment and health concerns
3. Simplification and consolidation of the legal framework
4. A comprehensive knowledge base on chemicals
5. Setting the example for a global sound management of chemicals

CSS – Key Issues

- Re-opening REACH legislation and considering mixture/cocktail effects and endocrine disruptors
- New hazard classes and criteria to be introduced in CLP (environmental characteristics, especially regarding ground water, endocrine disruptors)
- New criteria to define “**Substance of Very High Concern**” (SVHC)
- More chemicals will be subject to regulatory scrutiny
- Increased enforcement resources
- Withdrawal of existing REACH registrations will be implemented

Current Further Regulatory Developments in the EU

■ European Food Safety Authority (EFSA)

- ▶ New Mandate by EU Com – 2 parts
 - Part 1 to be finalized until May 31, 2022
 - Prioritization of Plasticizers in FCM
 - Exposure assessment
 - Update of hazard data
- ▶ Update of Food Contact Legislation

■ New Medical Device Regulation (MDR)

- ▶ Scientific Committee on Health, Environmental and Emerging Risks (SCHEER)
Mandatory guidelines for CMR substances and phthalates; active since May 26, 2021

Sustainability - A Key Success Factor



Our purpose:

We create
chemistry for a
sustainable future

- Be a leader in the area of sustainability and increase the role of sustainability in our business decisions.
- Decouple our CO₂ emissions from organic growth through a **Carbon Management** program.
- Invest in cutting-edge technologies to speed up the transition to a **Circular Economy**.

Plasticizer Portfolio of BASF in Europe (2021)

Offering a broad range of products covering different applications driven by *PERFORMANCE, CUSTOMER DEMAND* and *REGULATION*

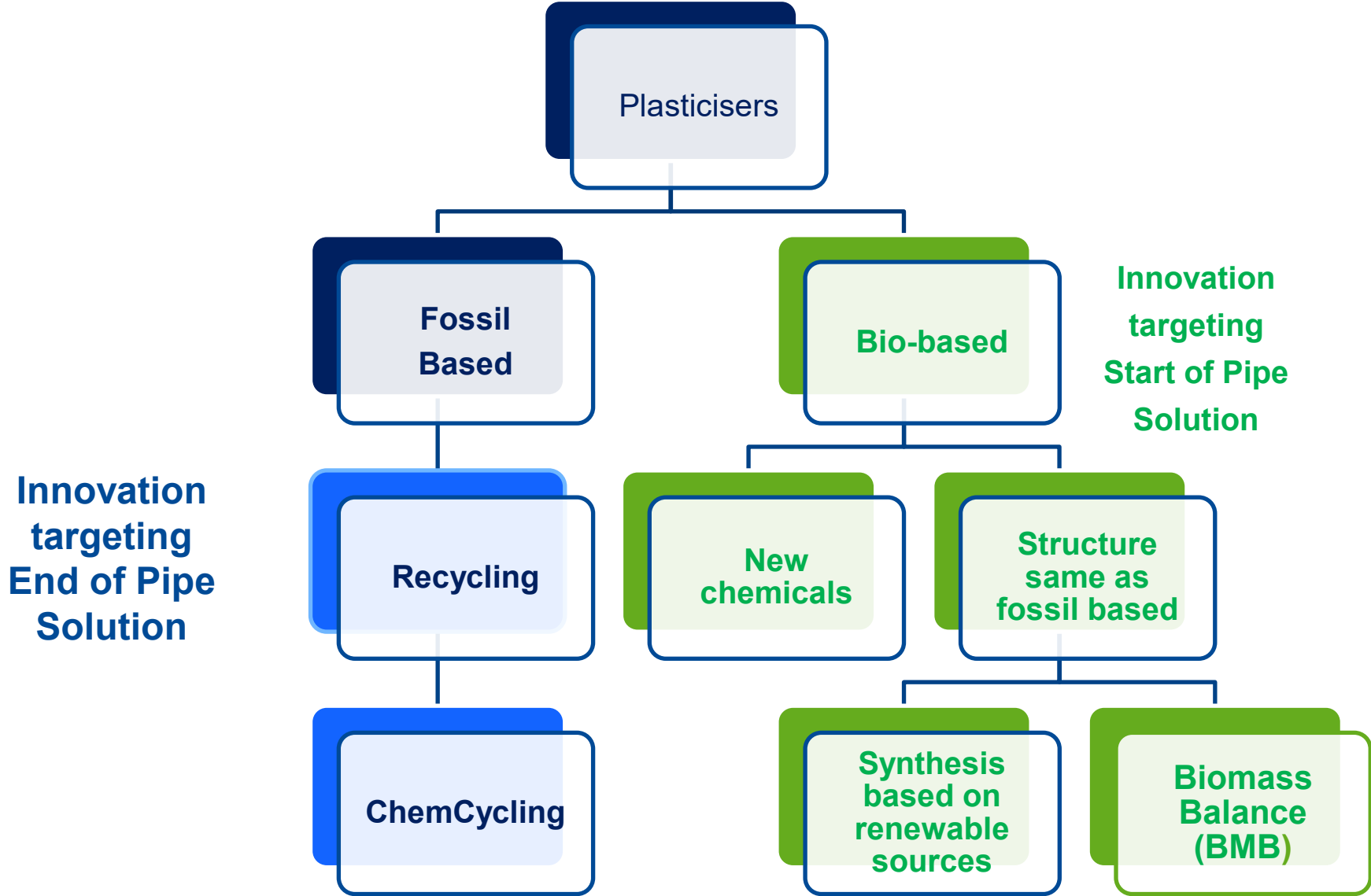
o-Phthalates	Cyclohexane dicarboxylate	Adipates	Polymeric Adipates
Palatino [®] N (DINP) Palatino [®] 10-P (DPHP)	Hexamoll [®] DINCH	Plastomoll [®] DOA Plastomoll [®] DNA	Palamoll [®] 632 638 646 652 654 656

Other types of plasticizers

- Terephthalates
- Trimellitates
- (Di)Benzoates
- Sebacates
- Phosphates
- ...
- ... **BIO / GREEN** ...



Raw Material Basis for Plasticisers



Biomass Balance Approach

- Requires **no reformulation** – identical product performance
- Saves fossil resources and **reduces greenhouse gas emissions**
- Drives the use of sustainable **renewable feedstock**

- **Start of pipe approach**
 - ▶ Available for most of our products



Biomass Balance Approach – Replacement of Fossil Resources in Production Processes

Feedstock

Fossil



Renewable

Use of renewable feed-stock in very first steps of chemical production (e.g., steam cracker)

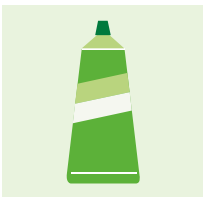
BASF Verbund



Utilization of existing Production Verbund for all production steps

Products

Conventional product



Biomass Balance product

Allocation of renewable feedstock to selected products

Need for Certification and Standardization

Feedstock

Fossil



Renewable

BASF Production Verbund



Products



Conventional



Allocated

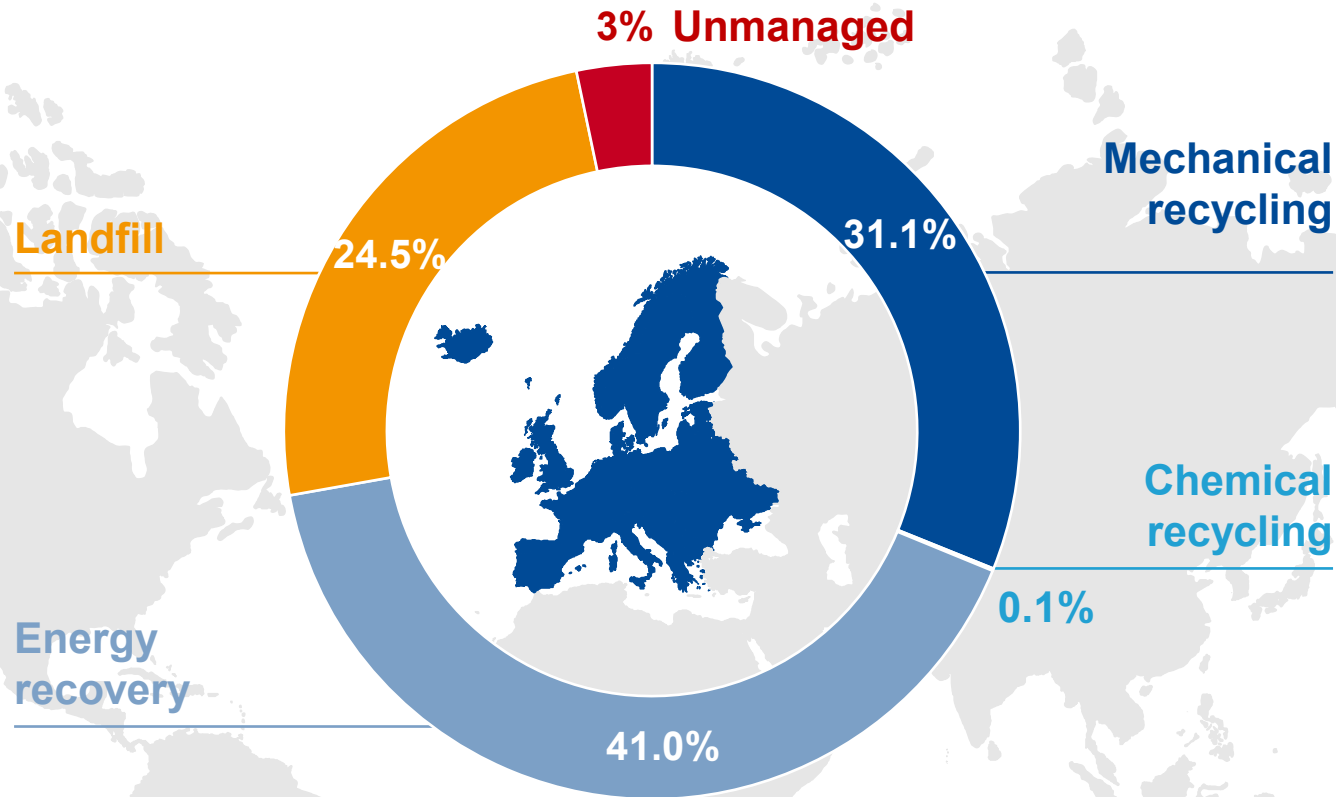
The new REDcert² standard ensures the correct allocation of renewable resources in BASF's value chain.

Plastic Waste - a Global Challenge

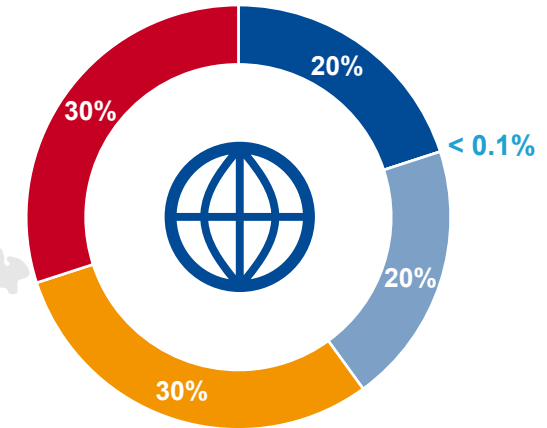


Today's Recycling Landscape for Plastic Waste

30 million metric tons of plastic waste generated in EU28+2 in 2018



Globally: 250 million metric tons

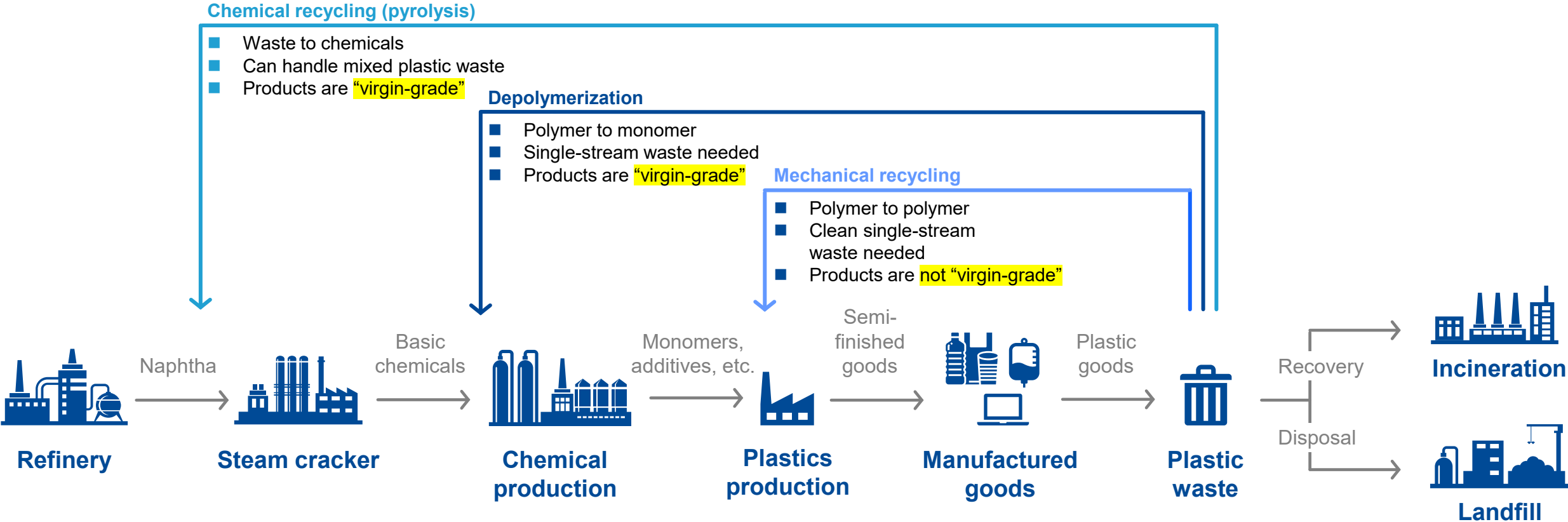


Only one third of all plastic waste is kept in the materials cycle in EU28+2.

Source: Conversio, "Circular Economy of Plastics 2018 EU28+2", September 2019 // Conversio, "Global Plastics Flow 2018", February 2020

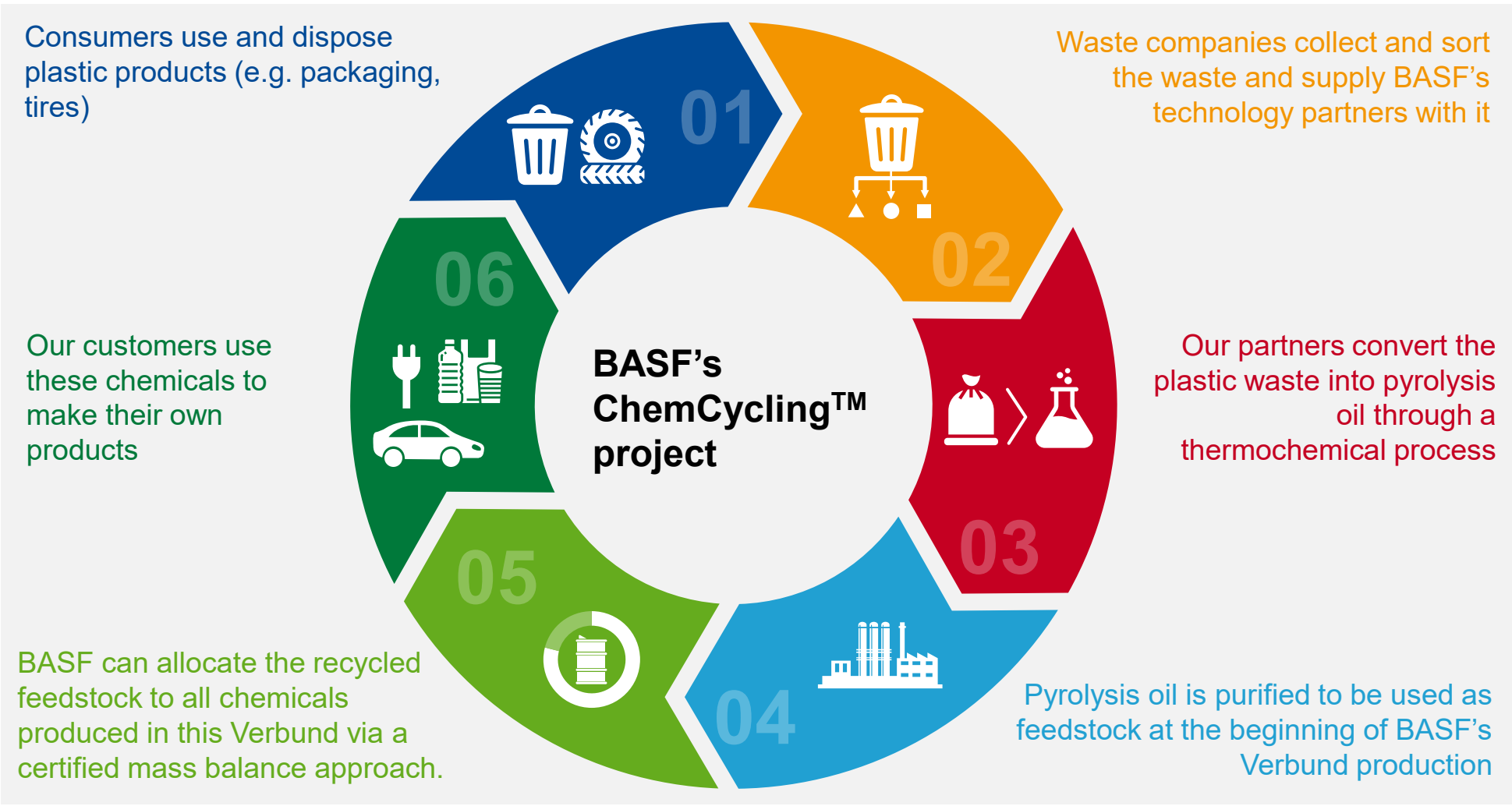
The Role of Chemical Recycling in a Circular Economy

Different loops are necessary for a successful transition towards circularity



ChemCycling™ Project

Breaking new ground in plastics waste recycling



ChemCycling™ is a Complementary Approach to Existing Recycling Methods

- We contribute to the recycling of **plastic waste for which no high value recycling processes are established yet**
- Examples of plastic waste which is difficult to recycle mechanically, or which is currently incinerated:
 - Plastics with adhering food residues
 - Multi-layer food packaging
 - Tires

ChemCycling™ - a solution to increase overall recycling rates of plastic waste



Our Solution: Certification and Standardization

Feedstock

Fossil



Recycled

BASF Production Verbund



Products



Conventional



Allocated

Ecoloop ensures the correct allocation of recycled resources in BASF's value chain. A switch to REDcert2 in analogue to BMB is currently under evaluation

Summary

- We are well prepared for the tasks ahead
- We support our customers to meet their demand for sustainable products
 - ▶ The BASF Plasticiser portfolio meets Green Deal and CSS requirements
- Major advantages of the smart innovations by ChemCycling™ or BMB products are:
 - ▶ Well known plasticizers can also be offered to customers as cycled™ or BMB variants
 - Chemically these variants are the same as the virgin products
 - Registrations in different chemical inventories still apply
 - Approvals for specific applications are still valid
 - ▶ Customers don't have to adapt their production processes





We create chemistry