



**■ - BASF**

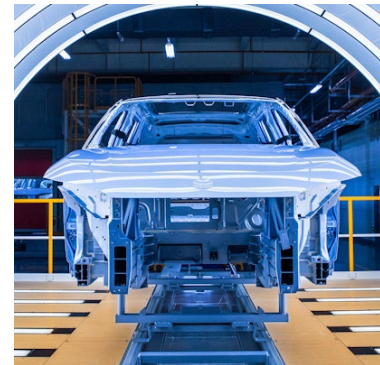
We create chemistry

Daniela Malkowsky

# Circular Economy at BASF

# BASF at a glance

- Sales 2022: €87,3 billion
- Employees (as of Dec. 31, 2022): 111,500
- 6 Verbund sites and 232 other production sites

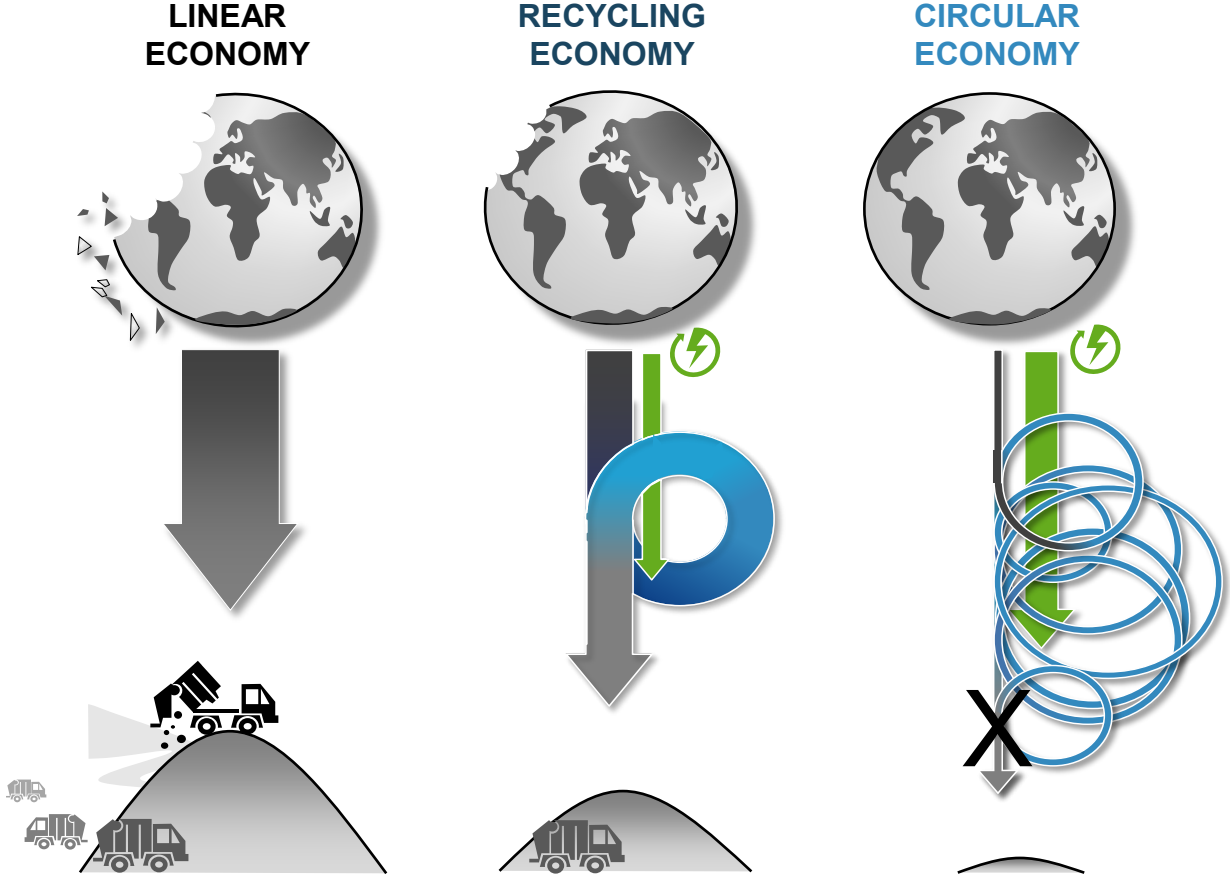


---

# Circular Economy

# A Circular Economy aims to decouple growth from resource consumption and is regenerative by design

- **Rethink design** and use of resources and **keep them in use as long as possible**
- **Recover and recycle** products and materials
- **Avoid waste and pollution** and **protect natural systems**



[What is a circular economy? | Ellen MacArthur Foundation](#)

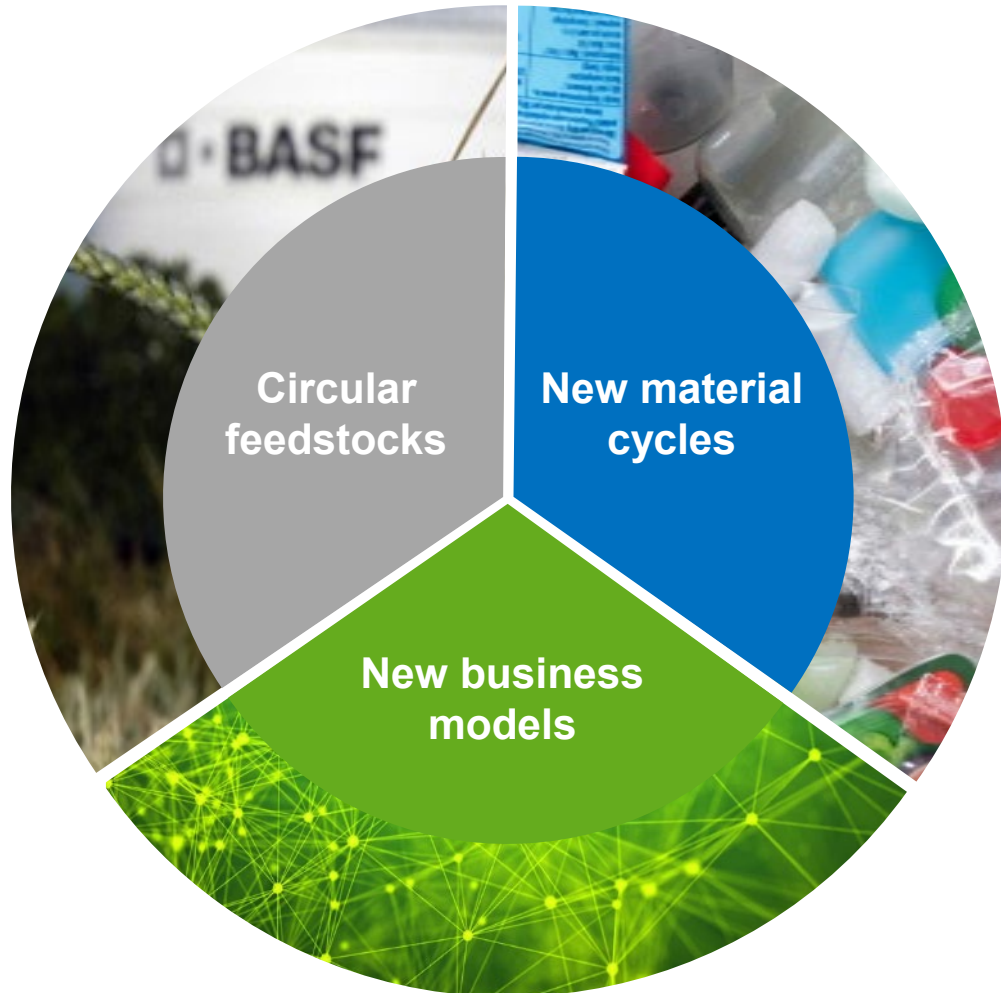


---

# Circular Economy Program

---

# We have three areas of focus: circular feedstocks, new material cycles and new business models



## Circular feedstocks

We will increase the volume of renewable and recycled feedstocks from sustainable sources, also via the certified mass balance approach.

## New material cycles

We design materials for circularity, develop solutions which improve or enable recycling and establish product-specific recycling loops.

## New business models

We enter new markets, create smart digital solutions and offer new services which allow a decoupling of growth from resource consumption.

---

# Circular Feedstocks

# By using alternative raw materials, we can manufacture products in a more sustainable way

## Recycled feedstock

**Dedicated mechanical recycling or depolymerization**



e.g. mechanically recycled feedstock from waste expanded polystyrene (EPS)

**Chemical recycling (e.g. ChemCycling®)**



Pyrolysis oil derived from plastic waste or end-of-life tires

## Renewable feedstock

**Biomass balance**



Biomethane or bio-naphtha derived from biomass (waste)

**Dedicated bio-based production**



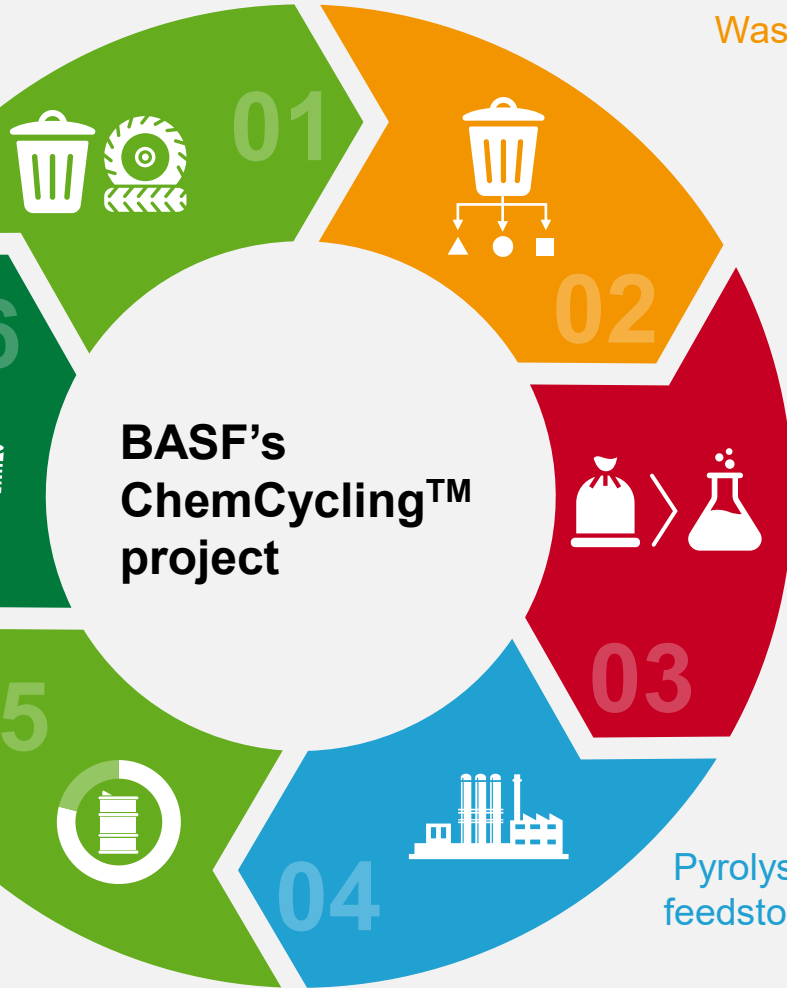
Sustainably sourced bio-based resources, e.g., RSPO certified palm oil

**Mass balance approach**



# With ChemCycling™ overall recycling rates of plastic waste will be increased

Consumers use and dispose plastic products (e.g. packaging, tires)



Waste companies collect and sort the waste and supply BASF's technology partners with it



Our customers use these chemicals to make their own products

Our partners convert the plastic waste into pyrolysis oil through a thermochemical process



BASF can allocate the recycled feedstock to all chemicals produced in this Verbund via a certified mass balance approach

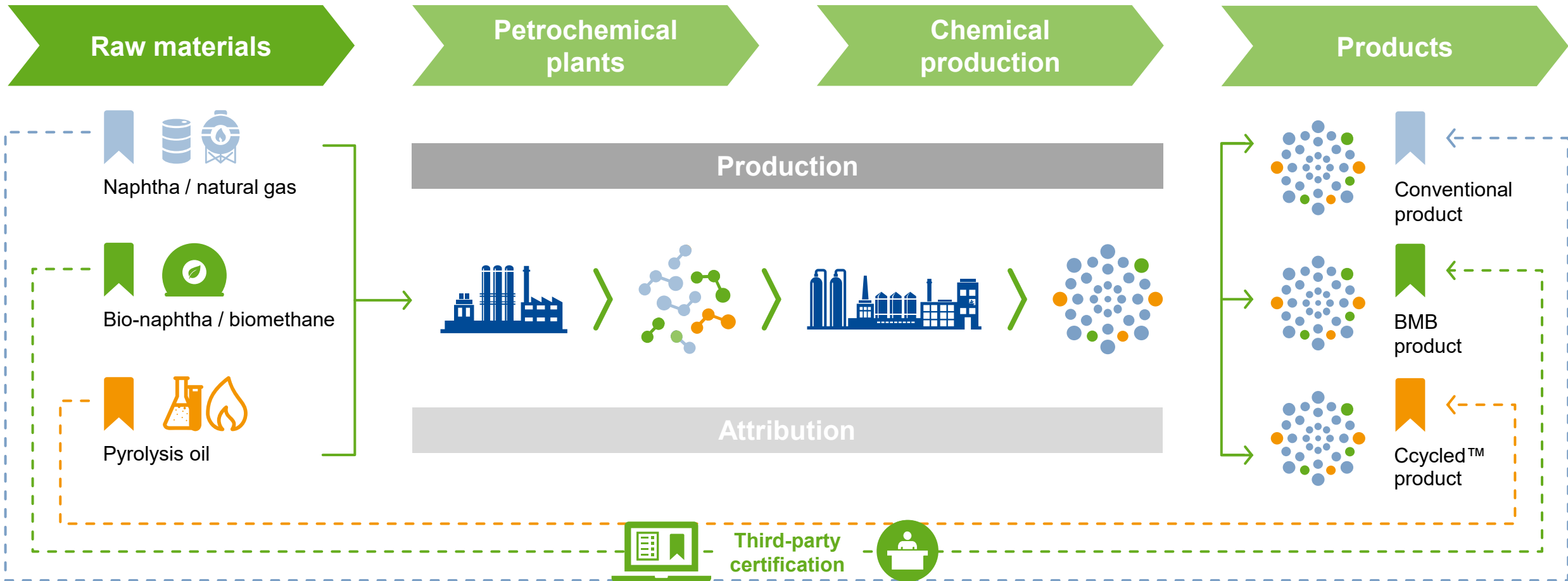
Pyrolysis oil is purified to be used as feedstock at the beginning of BASF's Verbund production

# ChemCycling™ enables manufacturing of trousers from end-of-life tires

- BASF and VAUDE take a step towards sustainable textiles
- Ultramid® Ccycled™ polyamide from chemically recycled tires forms the basis for outdoor pants
- Available in stores



# The alternative feedstock is attributed through the mass balance approach (credit method, according to ISO 22095)



---

# New Material Cycles



# Battery recycling

- In 2030, 1.5 million metric tons of end-of-life batteries are expected globally
- BASF will utilize end-of-life batteries and extract battery-grade lithium
- Recycling will help meet growing demand for critical metals
- Using recycled metals will significantly reduce CO<sub>2</sub> emissions in the production of electric vehicles



# Mechanical Recycling: Neopor® F 5 Mcycled™

X- Neopor® with 10% Recycled Content



## Mcycled™ benefit:



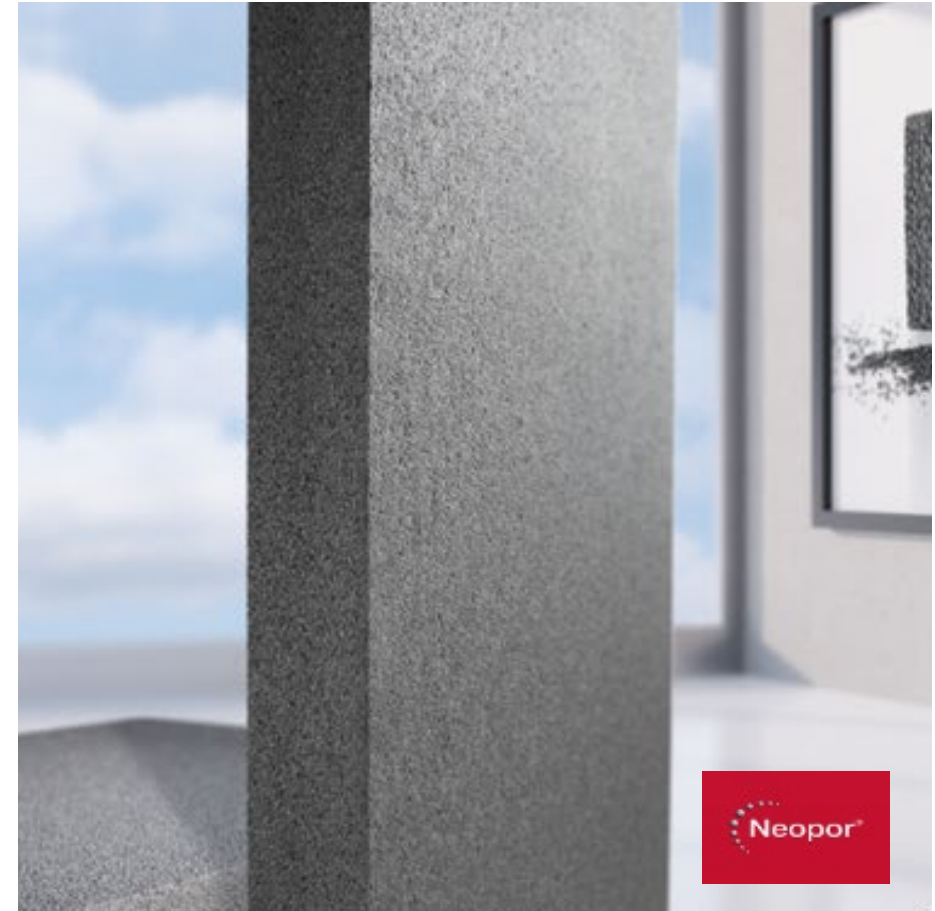
First certified recycled material from **mechanically** recycled expanded polystyrene (EPS) waste\*



Similar mechanical properties and optimized insulation performance as standard **Neopor®**



Saving of fossil resources  
Direct contribution to circularity of plastics



 \*Attribution of recycled feedstock to the certified Mcycled™ product by a third-party audited

# BASF Mechanical Recycling solutions

## Enhancing more cycles with higher quality



Resin identification

**trinamiX**

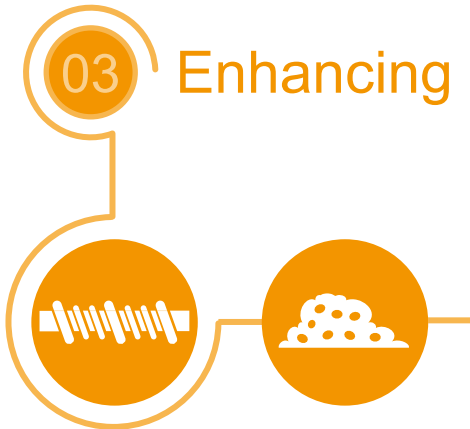
Mobile NIR Spectroscopy  
Solution



Grinding      Washing      Drying

**Chemetall solutions**

Gardoclean<sup>®</sup> / Gardobond<sup>®</sup>  
Gardopure<sup>®</sup>



Compounding      Pelletizing

**IrgaCycle<sup>®</sup>**

Part of VALERAS<sup>®</sup> portfolio  
Additive solutions for recycling



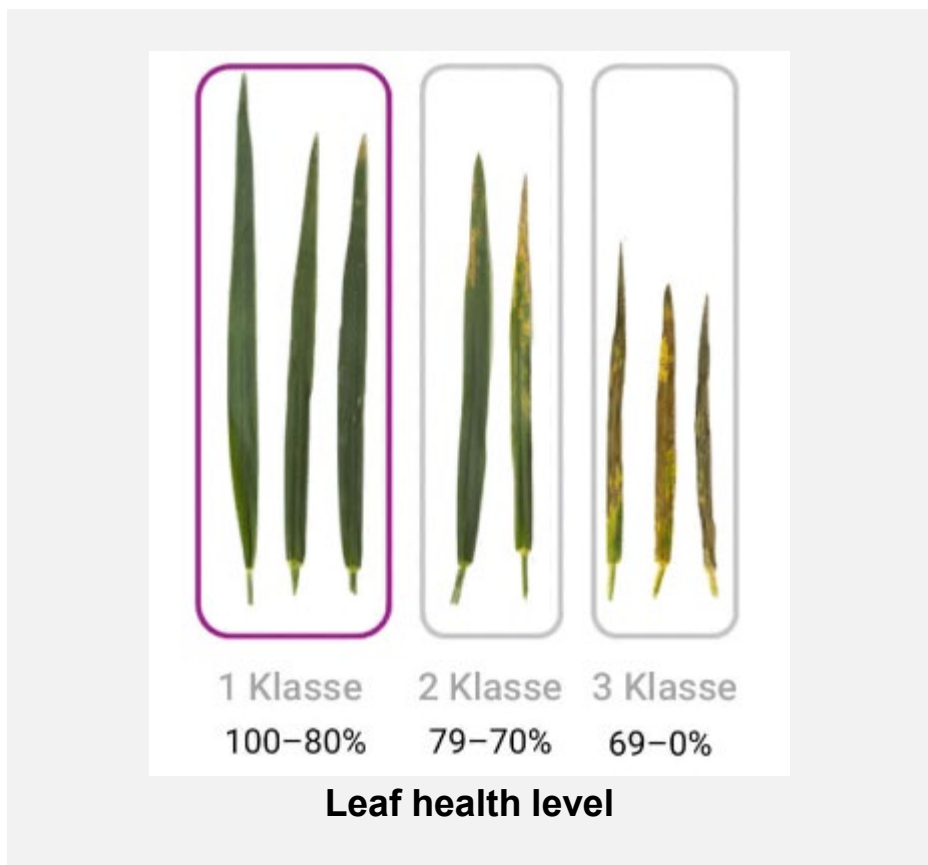
[MechanicalRecycling.com](https://www.mechanicalrecycling.com)

---

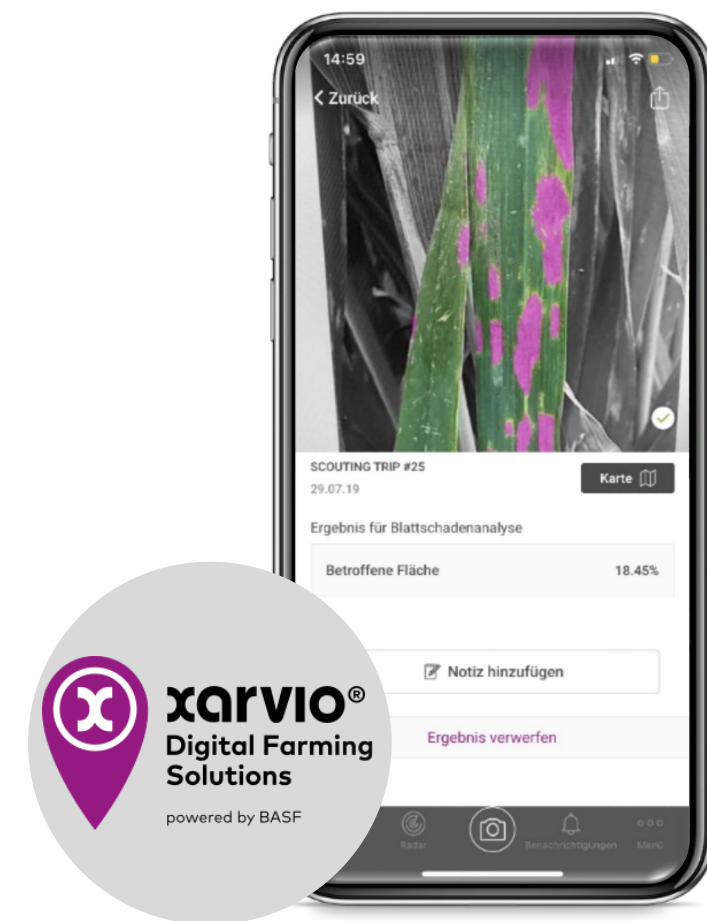
# New Business Models



# Performance based Business Model: selling Healthy Fields xarvio<sup>®</sup> – the Future of Farming



- Product-Service Combination
- During the season, leaf health can be monitored using the SCOUTING app
- If the guaranteed leaf health level is not reached, BASF **pays the customer a fixed compensation** based on the chosen package



The xarvio<sup>®</sup> business model aligns objectives of customers and BASF, incentivizing both BASF to be as resource efficient as possible

---

# Circular Transformation

# A successful circularity transformation requires a diversified approach and concerted actions





We create chemistry