

# The Mass Balance Approach: A groundbreaking way of deriving products from renewable raw materials

150 years

 **BASF**  
We create chemistry

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150 years

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# Our purpose: We create chemistry for a sustainable future

Nine billion people in 2050 **but** only one earth



## Chemistry as enabler



# Our contribution to sustainable solutions: Water-based or solvent-free adhesives



Labels



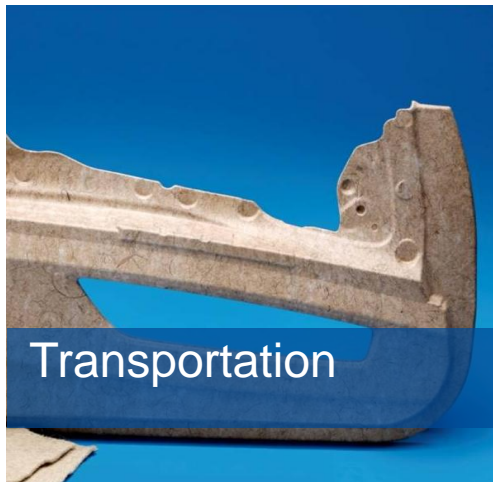
Tapes



Films



Packaging




Transportation



Furniture

# Motivation for using renewable feedstock

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- Increasing customers and end-consumer interest
  - Reduction of greenhouse gas emissions, and saving of fossil resources are key for a more sustainable future
  - Our precondition: Sustainable production of feedstock



150 years

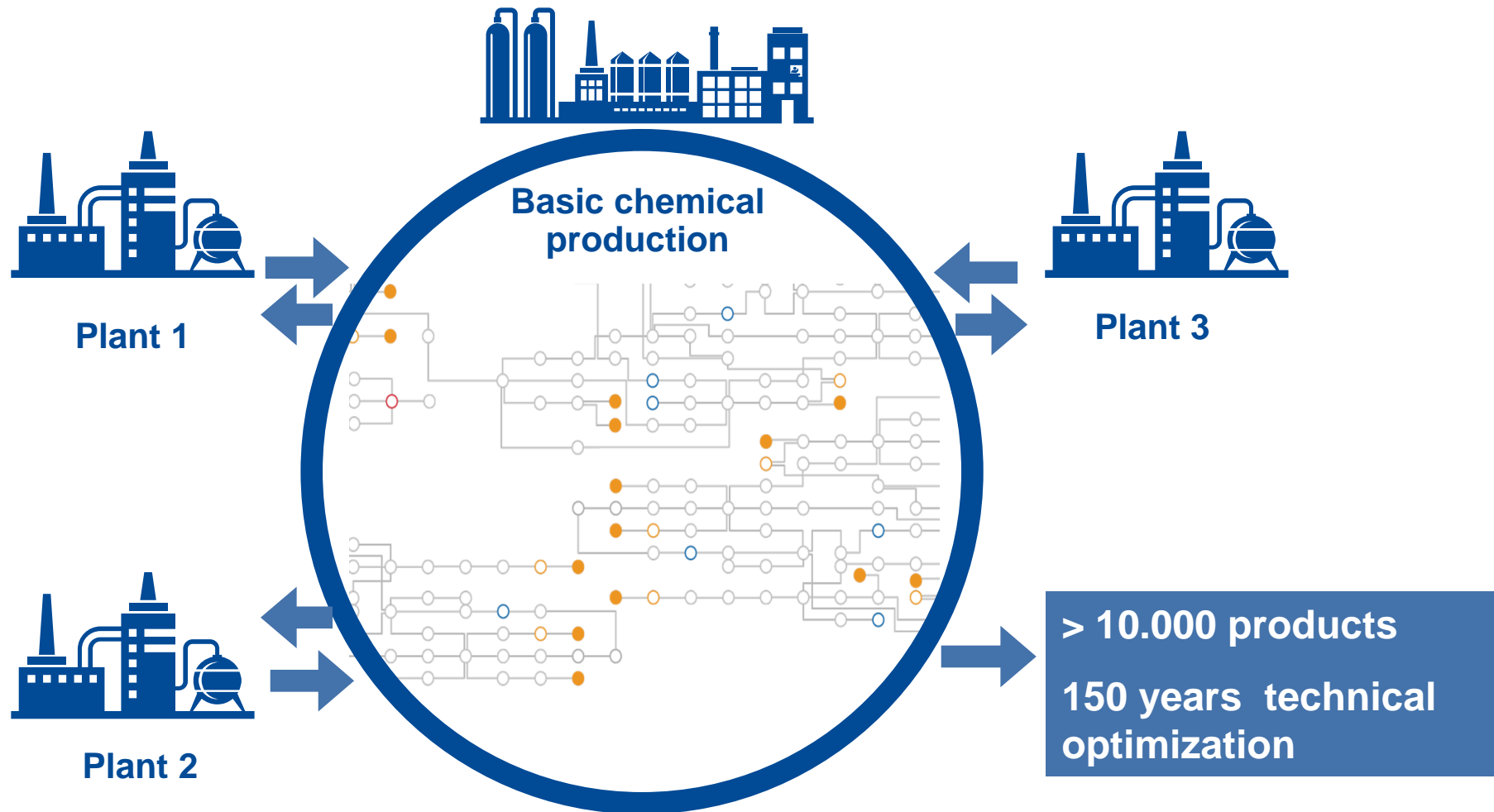
# Our core – the BASF “Verbund” Production site Ludwigshafen

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Around 160 completely interlinked  
production plants



# BASF's chemical Verbund



# Our offer: A Mass Balance Approach to use renewable feedstock in our production

## Feedstock

Fossil



Renewable

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

## BASF Production Verbund



Utilization of existing Production Verbund for all production steps

## Products

Conventional



Allocated

Allocation of renewable feedstock to selected products



# Challenge: Physical dilution of the bio-based content of end products

## Feedstock

Fossil



Renewable

## BASF Production Verbund

Therefore,  
**a credible external certification system is needed**



## Products

Conventional



Allocated



# Our solution: Certification and standardization

## Feedstock

## BASF Production Verbund

## Products

Fossil



Renewable

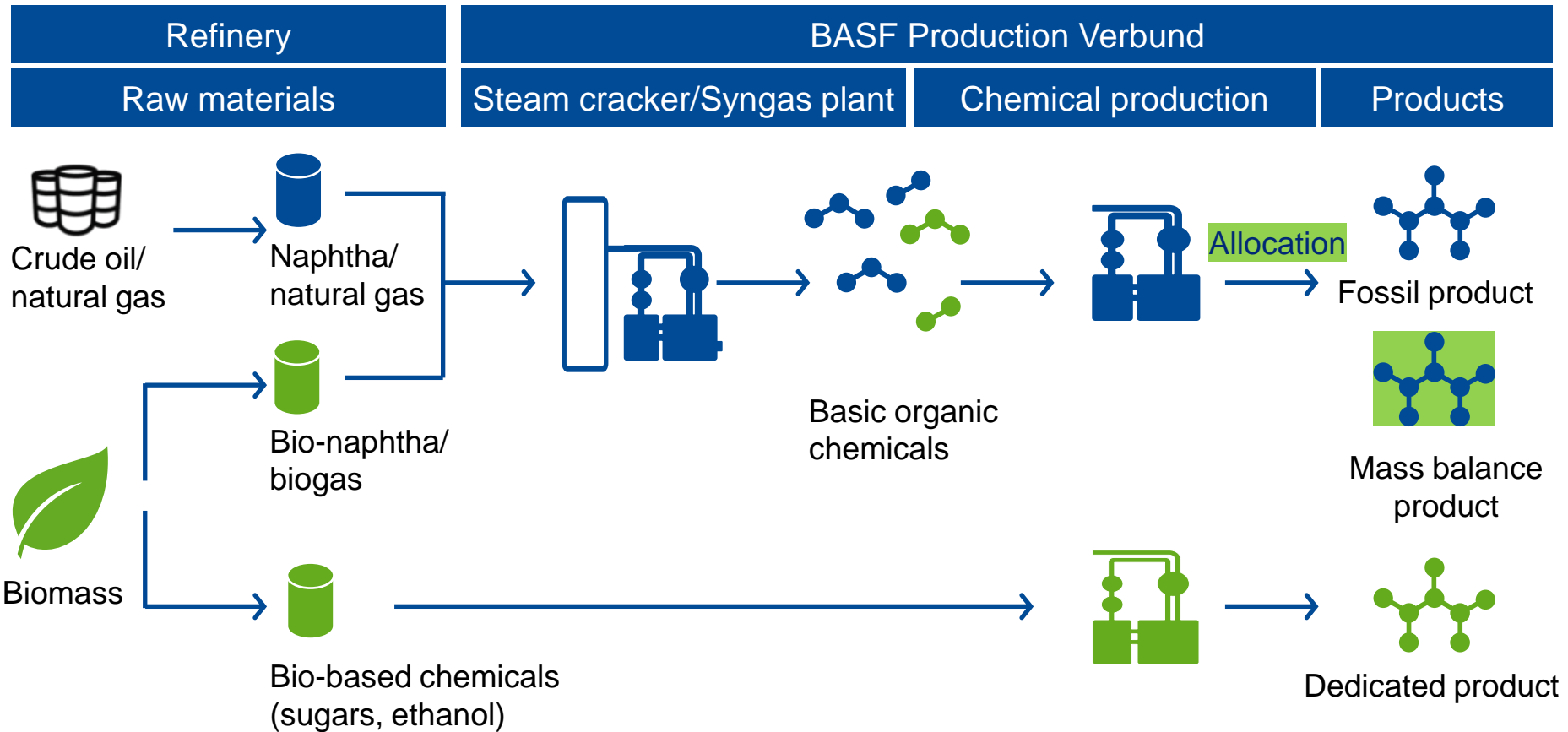


Conventional



Allocated

# Mass balance approach versus dedicated production



# Filling the gap between traditional and dedicated production

## Traditional production

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- Fossil feedstock
- Known performance
- >10,000 products available in production scale
- Verbund production

## Mass balance approach

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- Biomass-derived, 3rd party certified
- Same performance
- >10,000 products available in production scale
- Drop-in BASF Verbund production

## Dedicated production

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- Bio-based (<sup>14</sup>C method)
- Often different product properties
- Not available for all products
- Investment in new plants



# Sustainability of renewable raw materials used for Mass Balance Approach



## Renewable raw materials for the BASF Verbund:

- Biogas from organic waste (e.g., kitchen waste)
- Bio-naphtha from vegetable and organic waste oils

## International sustainability criteria are applied to feedstock

- Reduction of greenhouse gas emissions
- Sustainable use of land
- Protection of natural biospheres
- Social sustainability

**New feedstock explored and developed in line with international sustainability standards (e.g., ISCC, RSPO, and others according to RED)**

# Claims and certificates



“ Fossil resource saving product. X % of the fossil feedstock required for the manufacturing of this product was replaced in the production site by renewable raw materials. ”

*Certified by TÜV SÜD*

“ The replacement of fossil through renewable feedstock reduces the greenhouse gas emissions by x t CO<sub>2</sub> equivalents per t product. ”

*Additional self-assessment of BASF for declaration according to ISO 14021*

# Existing products now derived from biomass

- Acrylic dispersions
- UV-curable acrylic resins
- Styrene-Butadiene dispersions (XSB)
- Polyurethane dispersions (PUD)
- Polyvinylpyrrolidone (PVP) powders
- Polyvinylether (PVE) resins
- Urea Formaldehyd resins





# Turning sustainability demand into market opportunities

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## Our offer :

- Readily available drop-in solution
- Fossil resource saving
- Reduced greenhouse gas emissions
- Certified sustainable feedstock



## Further information online:

[www.basf.com/massbalance](http://www.basf.com/massbalance)

<http://www.tuev-sued.de/ER-ID>

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