



Challenges of sustainable development of the chemical industry from producers' point of view

Dr. Thomas Narbeshuber,
*Vice President BASF South Central Europe &
Managing Director BASF Hungária Kft.*

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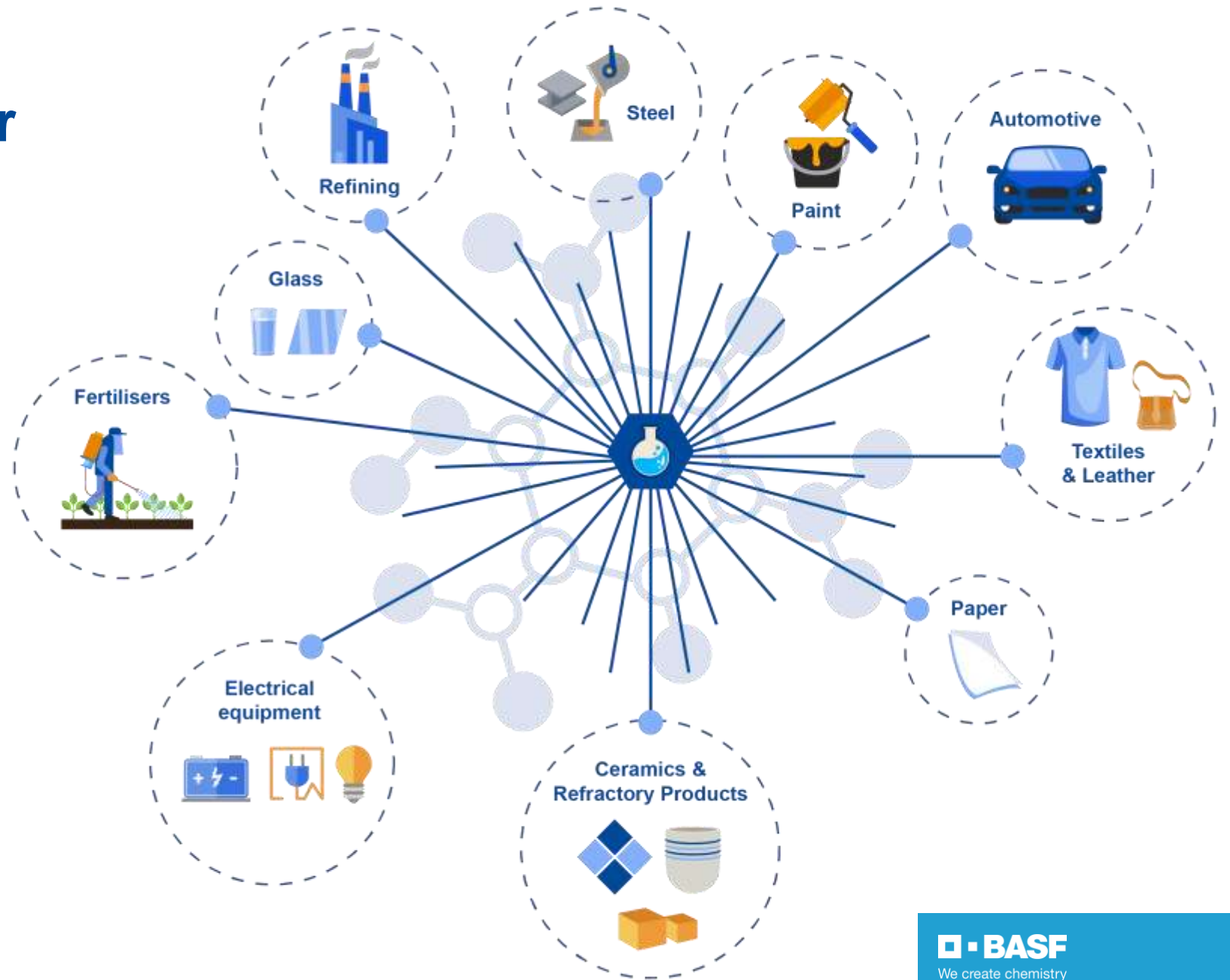
Snapshot of the current market environment



Chemical industry is key building block for EU industries

The EU chemicals industry represents around **7.5%** of EU manufacturing by turnover.

10 basic chemicals are the foundation for the production of more than **20.000 chemical products**.



Energy and Climate

Energy and Climate

Electrification of Steam Cracker

Steam crackers play a central role in the production of basic chemicals and require a significant amount of energy.

BASF, SABIC, and Linde: Building the world's first electrically heated steam cracker furnace demonstration plant

Location: BASF's Ludwigshafen Verbund

Technology has the potential to reduce CO₂ emissions by at least 90% compared to conventional steam crackers.

6 MW
input of
renewable
energy

Energy and Climate

Hollandse Kust Zuid Wind Farm

Location:
North Sea
~18-35 km off
the coast

The Hollandse Kust Zuid wind farm, which is currently under construction, has successfully generated its first electricity.

Current state: **36** turbines

1.5 GW
capacity

140
turbines



The current production of electrical energy from renewable sources cannot meet the expected future energy demand of BASF. For that reason, we invest in offshore windfarms.

Year 2023:
largest subsidy-free
offshore wind farm
in the world

Energy and Climate

low-carbon hydrogen: Methane pyrolysis

Hydrogen is one of the key elements to **reduce greenhouse gas emissions**, but **Green Hydrogen** belongs to the most expensive reduction options.

Therefore, the EU should consider all CO₂-reducing technologies instead of focusing purely on water electrolysis.

Low Carbon hydrogen with methane pyrolysis: This process splits natural gas or biomethane into carbon and hydrogen. If it uses renewable power, there are **no greenhouse gas emissions**, when combined with CCS.

This is the most economical and cleanest hydrogen production, and the current global demand for hydrogen in BASF is around one million tons per year.



Energy and Climate

Carbon Border Adjustment Mechanism

Carbon Border Adjustment Measures (CBAM):

- ✓ new suggested pricing tool
- ✓ imposes EU ETS-like costs on certain imports while reducing Carbon Leakage Protection under-ETS

CBAM and ETS are Siamese twins:

The introduction of CBAMS means a simultaneous shift from the installation of bases ETS system to a specific product-based CBAM system. For sectors with complex value chains (such as chemicals), this leads to a decrease in carbon leakage protection, as carbon leakage is simply shifted within the value chain to the next downstream product, which is not covered by CBAM.

For products under a CBAM and the affected value chains, this legislation will result in complex changes of cost structures and markets, especially when taking increasing CO₂ prices into account

Energy and Climate

Policy needs

Maintaining competitiveness in Europe

Sufficient and cost-effective access
to renewable electricity

R&D funding and business case

Buildings to contribute to climate goals



Plastics & Circular economy

Plastics & Circular economy

ChemCycling™

The important step has been made in the commercialization of our ChemCycling™ project.

Pyrolysis oil from end-of-life tires as an additional raw material source next to oil mixed plastic waste.



Chemcycling is BASF's chemical recycling project that turns plastic waste into raw materials (oil or gas). This replaces fossil feedstock in the Verbund and is used to produce new products, especially new plastics.

✓ BASF and New Energy uptake supply agreement signed up to **4,000 metric tons of pyrolysis oil per year derived from waste tires**

Plastics & Circular economy

Replacing raw fossil resources with pyrolysis oil

The collaboration of BASF and Mercedes-Benz represents the first-time pyrolysis oil from scrap tires has been combined with biomethane.

1. Pyrolysis oil generated from used tires

2. BASF combines it with biomethane from agricultural waste

3. Combined they make virgin-quality plastic

4. Bow door handles for S-Class and EQE enter series production this year



Plastics & Circular economy

Battery recycling prototype plant

BASF is building a battery recycling prototype plant in Schwarzheide, Germany.

The prototype recycling plant will optimize operations and technology from:

- ✓ End-of-life lithium-ion batteries
- ✓ Off-spec material from cell and battery material producers.

What will be delivered?

lithium

nickel

cobalt

manganese



The extracted metals will be used to produce CAM, enabling a circular economy for the battery value chain and reducing CAM's carbon footprint.

Plastics & Circular economy

Policy needs

All technologies are needed

Encourage alternative feedstocks

Holistic assessment of products
based on life cycle thinking

Allowing all solutions to contribute to a lower
environmental impact of the building



Environment and Chemicals

Environment and Chemicals

Chemicals Strategy for Sustainability

BASF supports the objective of the Chemicals Strategy for Sustainability (CSS) to protect human health and the environment.

We do so, by:

01

— constantly reviewing our portfolio towards stronger sustainability contributions (Sustainable Solution Steering)

02

— making safety a priority in our own production

03

— taking a proactive approach to product stewardship and applying the highest regulatory standards globally



Environment and Chemicals

CSS's five building blocks

Innovate

- ✓ Safe and Sustainable-by-design
- ✓ Non-toxic material cycles
- ✓ Innovating industrial production
- ✓ Strengthening EU's open strategic autonomy

Strengthen

- ✓ Protection against harmful chemicals
- ✓ Endocrine disruptors
- ✓ Chemical mixtures
- ✓ Chemical pollution in the environment
- ✓ PFAS

Simplify

- ✓ Coordinate and simplify actions across institutions and EU chemical legislation
- ✓ Methodologies and Data
- ✓ Zero-tolerance for non-compliance

Build knowledge base

- ✓ Information requirements
- ✓ Inclusion of science into policy

Model

- ✓ Lead internationally, where improvement is most needed
- ✓ Cooperation with third countries



Environment and Chemicals

CSS - Impact on many levels



Environment and Chemicals

Epoxy hardener for rotor blades of windmills

Modern turbines require larger rotor blades and are frequently built offshore. But with ever larger rotor blades the use of wind power presents a challenge for both technology and materials.

*CSS impact
on industry
example #1*

What is the challenge?

- ✓ IPDA, epoxy resins, and reactive diluents are skin sensitizers
- ✓ the substances are handled by professionals

What are the consequences?

- ✓ Efficiency and durability will be compromised as Europe's renewable energy share grows
- ✓ Impact on BASF and windmill blade producers

Environment and Chemicals

UV filters for sunscreen and skin care market products

UV filters reduce the amount of UV light that penetrates the skin and protect from the negative effects of exposure to UV radiation.

What is the challenge?

- ✓ Poor water solubility and biodegradability - rating as persistent substances
- ✓ Suspected substances with potential endocrine disrupting properties (EDCs)

What are the consequences?

- ✓ With a ban of most of the organic performing UV protection effective sunscreens could not be marketed
- ✓ This would reduce customers' skin protection and increase skin cancer risk

*CSS impact
on industry
example #2*

Environment and Chemicals

Our messages



We support the objectives of the Green Deal and CSS's targets

- ✓ Protect human health and the environment



REACH is the **most comprehensive regulatory framework** worldwide

- ✓ Focus on closing existing gaps and better enforce existing legislation



Hazardous substances **can be handled safely and provide a sustainability benefit**

- ✓ Maintain the current risk-based approach to chemicals management



New hazard classes should be introduced at **UN GHS level first**

- ✓ Do not further depart from harmonization of global chemicals management



Occupational exposures **can be well controlled** through e.g., training and technical measures

- ✓ Maintain the current discrimination between industrial, professional and consumer use

An **EU Chemical Industry Transition Pathway** and a robust **innovation agenda** to

- ✓ integrate the entire transformation effort and
- ✓ build upon market expertise in safe and sustainable chemistry

Proven data and science-based open dialogue will be crucial

Environment and Chemicals

Policy needs

Retain the risk principle

Distinguish between
consumer vs professional use

Enforcement

Holistic assessment



Sustainable Agriculture

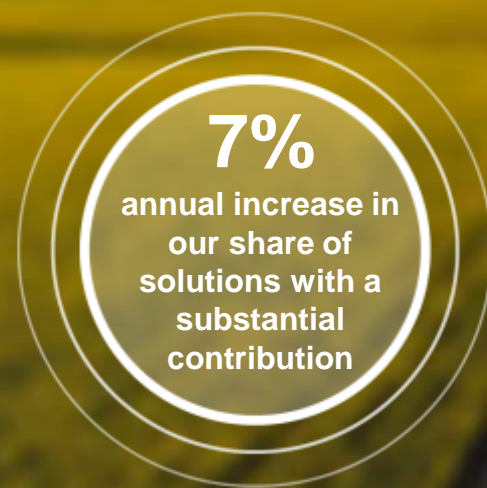
Sustainable Agriculture

BASF Agricultural Solutions' commitments

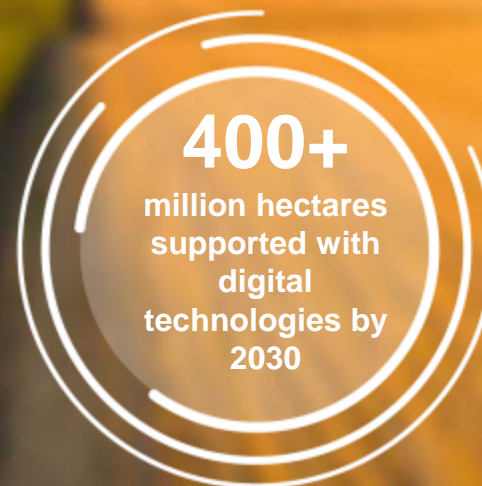
Climate Smart Farming



Sustainable Solutions



Digital Farming



Smart Stewardship

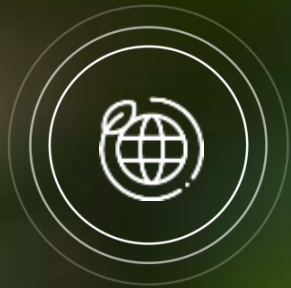


We need a regulatory framework that accelerates the sustainable transformation of agriculture

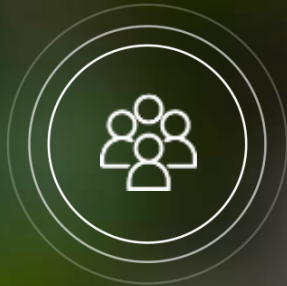
Sustainable Agriculture

AgBalance®

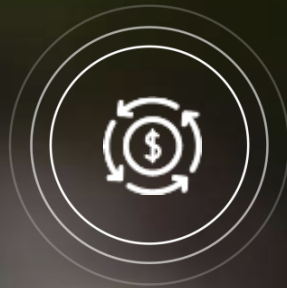
BASF has developed a Life Cycle Assessment (LCA) tool called **AgBalance®** that allows farmers to review the contribution of their current farming operation across all three sustainability pillars.



Environment



Society



Economy

Sustainability is integral to modern farming. It is at the center of a farmer's daily work and drives improvement efforts on the farm.



Sustainable Agriculture

Smart spraying technology

Bosch's camera sensor technology combines with BASF's digital platform xarvio® to maximize efficiency with reduced product input



xarvio® – an ecosystem of products to support the “Better Yield”



Identify weeds, pests and diseases and know what to do best



Field-zone-specific improvement and automation of crop production



Selling outcomes: The healthy field

Sustainable Agriculture

Digital and Precision Agriculture



The EU Commission has recognized that precision and digital farming technologies can contribute to the reduction of the overall use and risk of pesticides in Europe

To support digital and precision agriculture we propose the following:

- Digital and precision solutions mandated as enablers of IPM (Integrated Pest Management)
- Ensure there is one harmonized electronic IPM register and coherence with tools such as Digital label compliance and the reduction of the use and risk of PPP
- Requirements for MS to list in their National Action Plans measures aimed at increasing the uptake of DPA tools
- Indicative targets in National Action Plans to increase the uptake of DPA tools at the national level

Sustainable Agriculture

Policy needs

Engage with the agri-food industry

Food security

Encourage the innovation's contribution

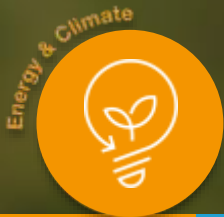
Adopt concrete measures to support
the use of bio-based products

Sustainability should apply equally to
all processes and production

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06.09.2022

Policy needs - Overall conclusion



Energy and climate	Plastics and Circular Economy	Environment and Chemicals	Sustainable Agriculture
Maintaining competitiveness in Europe	All technologies are needed	Retain the risk principle	Engage with the agri-food industry
Sufficient and cost-effective access to renewable electricity	Encourage alternative feedstocks	Distinguish between consumer vs professional use	Encourage the innovation's contribution
R&D funding and business case	Holistic assessment of products based on life cycle thinking	Enforcement	Adopt concrete measures to support the use of bio-based products
Buildings to contribute to climate goals	Allowing all solutions to contribute to a lower environmental impact of the building	Holistic assessment	Sustainability should apply equally to all processes and production
			Food security

The path to Net Zero is long but worthwhile, and the chemistry role is crucial.

The transformation of the industries will make it possible, and we're contributing to this goal with all our resources.



That is why our slogan is

**We create chemistry
for a sustainable future**


We create chemistry



We create chemistry