



We create chemistry

We create chemistry for a sustainable future Our Pathway to Net Zero

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Our commitments to reaching the Paris Climate Agreement

An orange circular graphic, partially open on the right side, framing the year 2030.

2030

25%

CO₂ emissions
reduction
(compared with 2018)¹

An orange circular graphic, partially open on the right side, framing the year 2050.

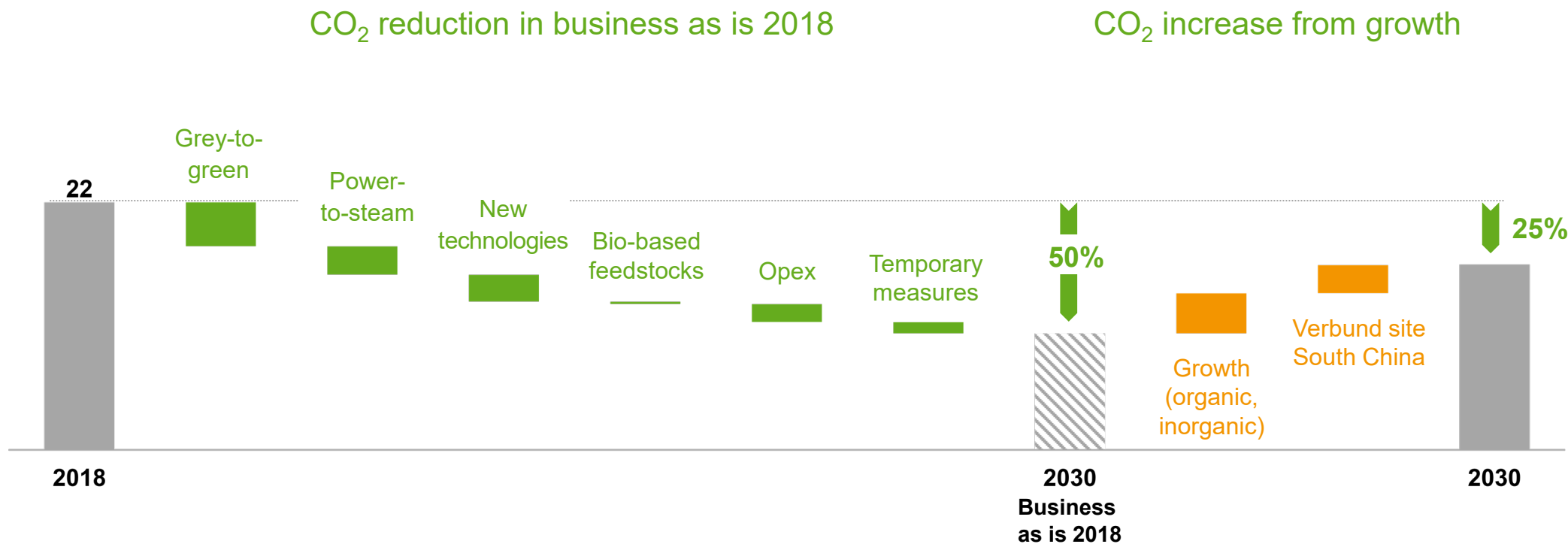
2050

net zero
CO₂ emissions¹

¹ Scope 1 and Scope 2; 2030 target compared with 1990: 60% CO₂ reduction

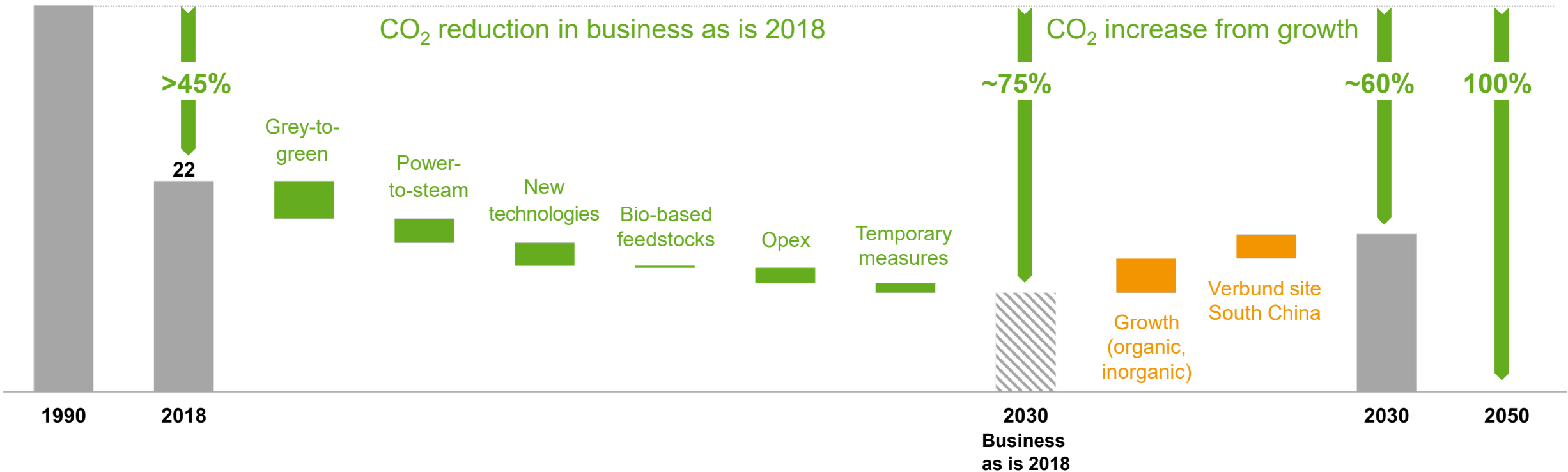
Our path to reduce BASF emissions from 2018 to 2030

BASF greenhouse gas emissions (Scope 1 and Scope 2) 2018–2030



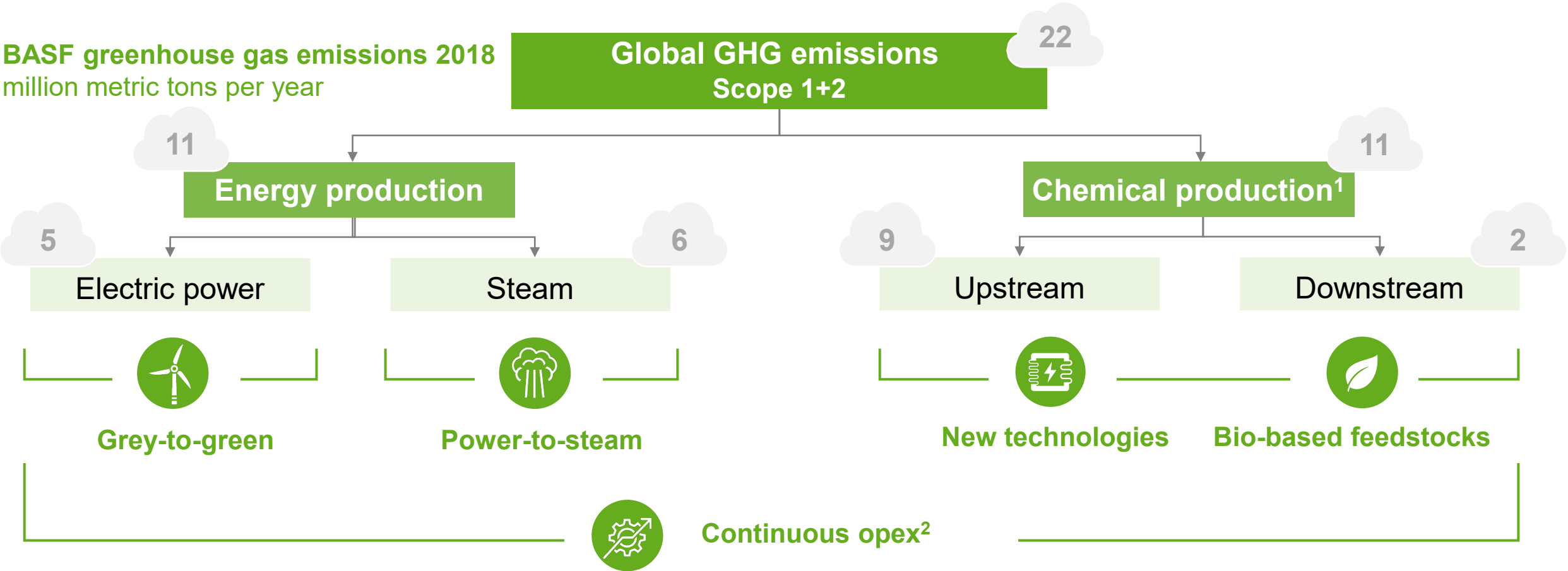
Our path to reduce BASF emissions from 1990 to 2050

BASF greenhouse gas emissions (Scope 1 and Scope 2) 1990–2050



No downstream decarbonization without upstream decarbonization

BASF greenhouse gas emissions 2018
million metric tons per year



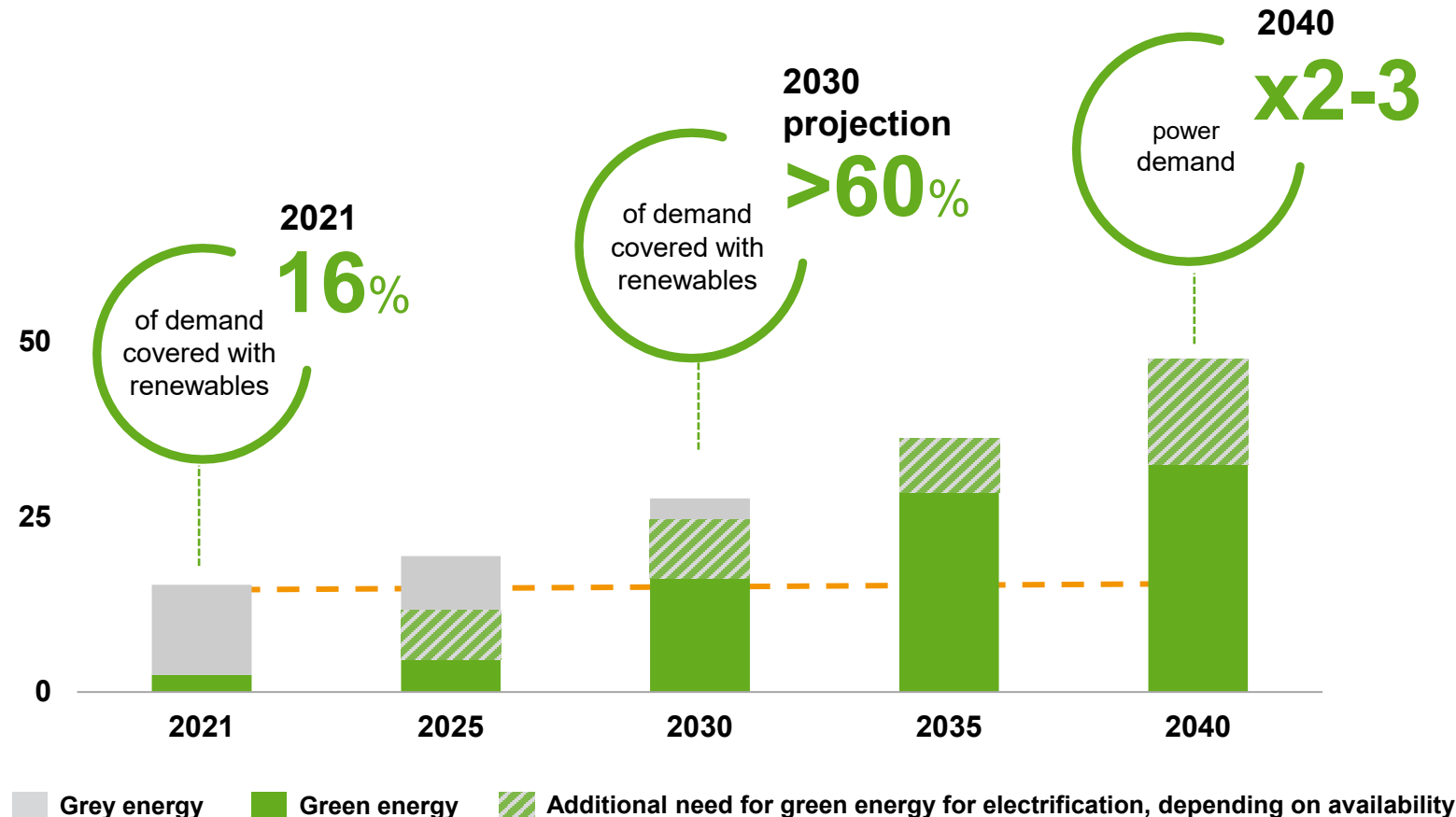
¹ Includes emissions from process energy ² Operational excellence measures Internal



Switching Our Power To Renewable Energy Will Be The Main Driver Of Emission Reduction Until 2025

BASF global power demand and renewable supply projection

Terawatt hours



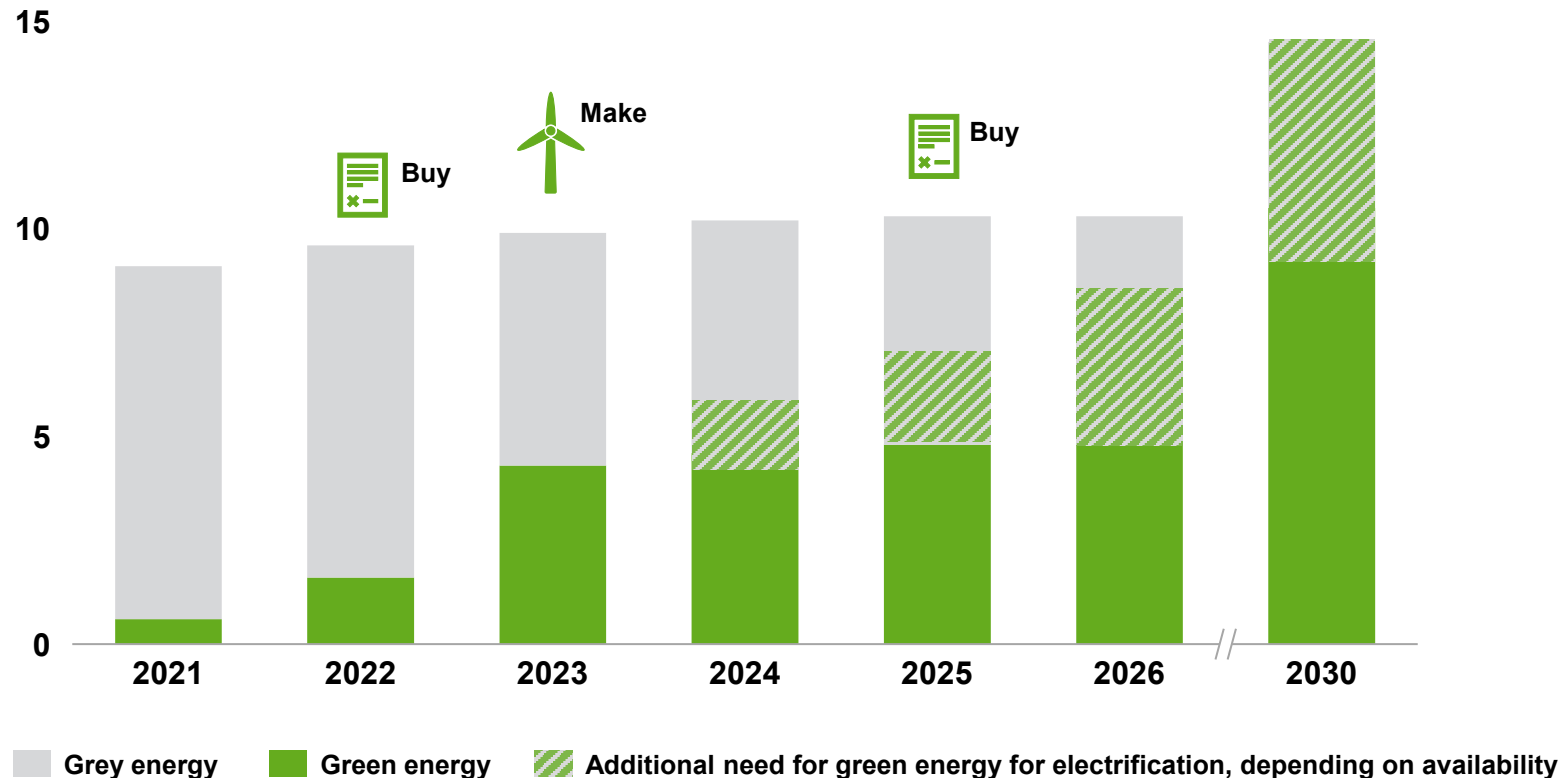
- BASF strives for **100% of power demand 2021 to be green by 2030**
- BASF **power consumption** expected to **increase strongly** due to electrification on our journey to net zero
- BASF pursues a **make-and-buy strategy** to secure access to renewable power
- Early investments in renewable power assets expected to offer **advantageous economics in the future**

We are delivering with a pipeline of projects to secure supply of renewable energy at competitive prices



BASF power demand and renewable supply projection in Europe

Terawatt hours

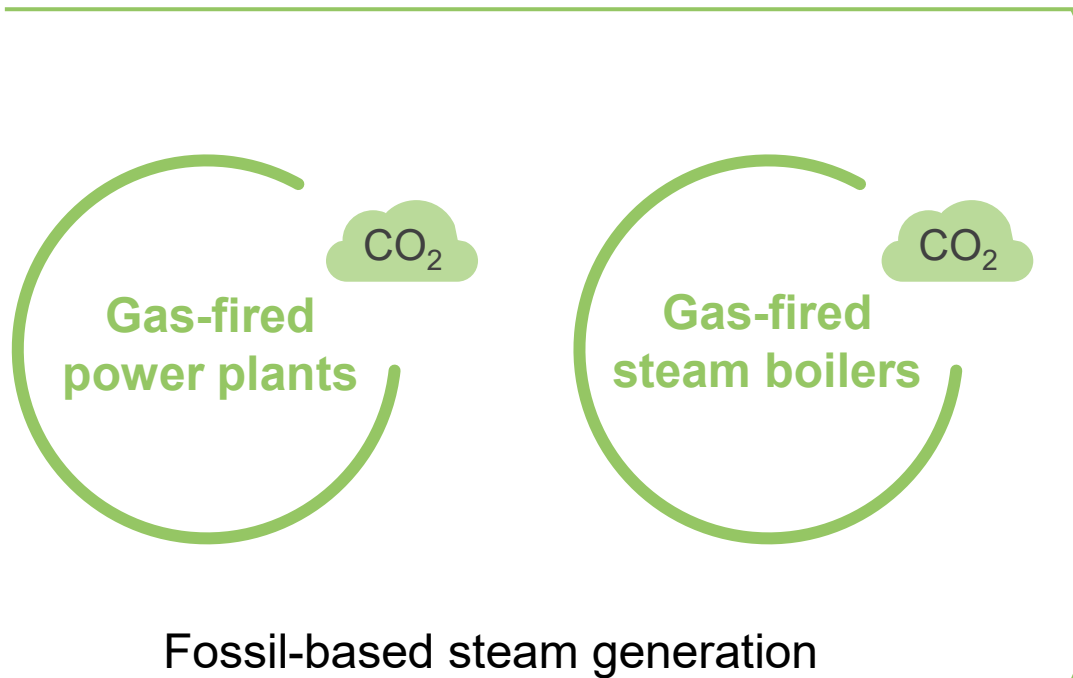


- Contracted projects in Europe:
 - Long-term PPAs signed with **ENGIE** and **Ørsted**
 - Investment in largest offshore wind farm; joint ownership with **Vattenfall**
- Pipeline** includes project idea for a wind farm together with RWE
- BASF Renewable Energy GmbH** to focus on supplying BASF Group companies in Europe with renewable energy

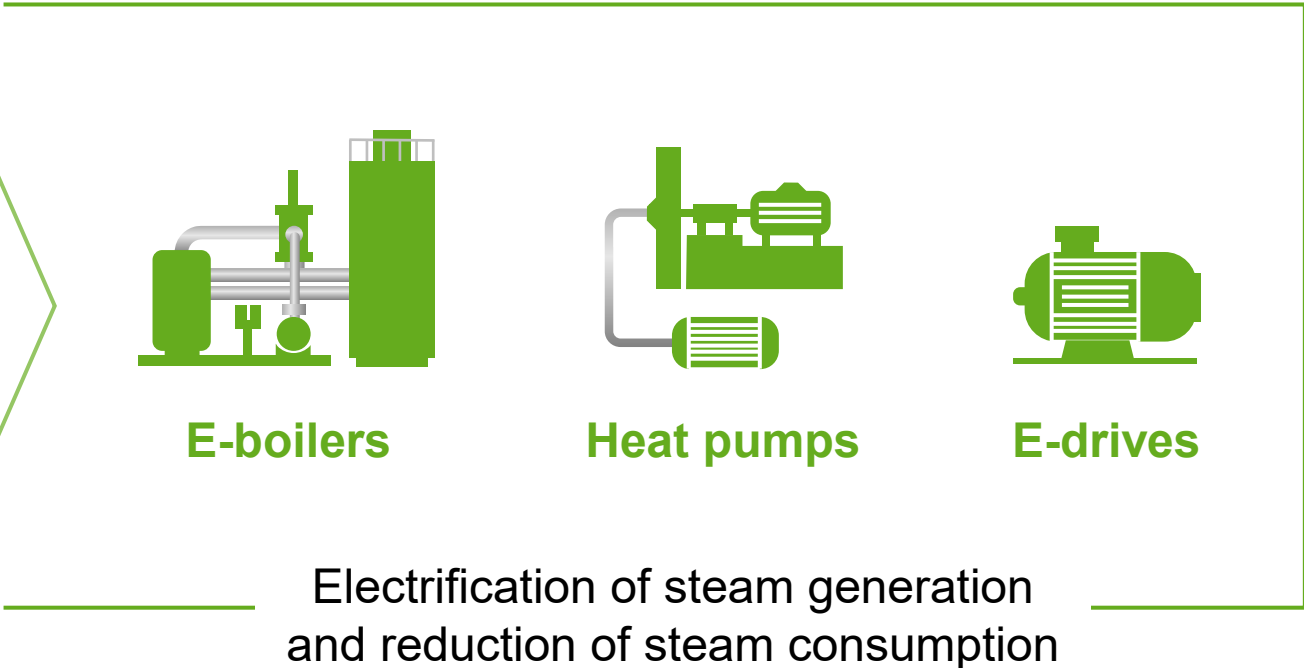
High potential from changing to power-to-steam allows decoupling from electricity supply



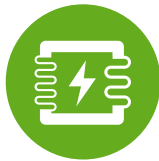
Current situation



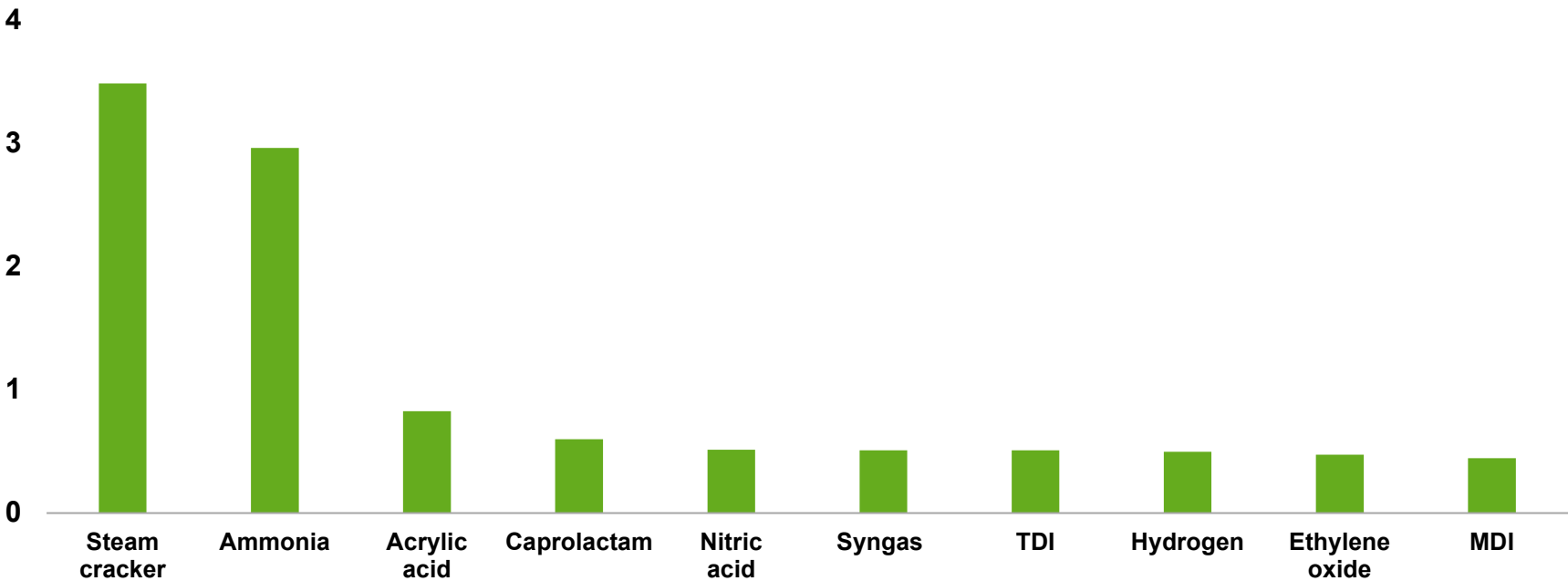
Future situation



Ten base chemical production technologies cause the majority of BASF's CO₂ emissions



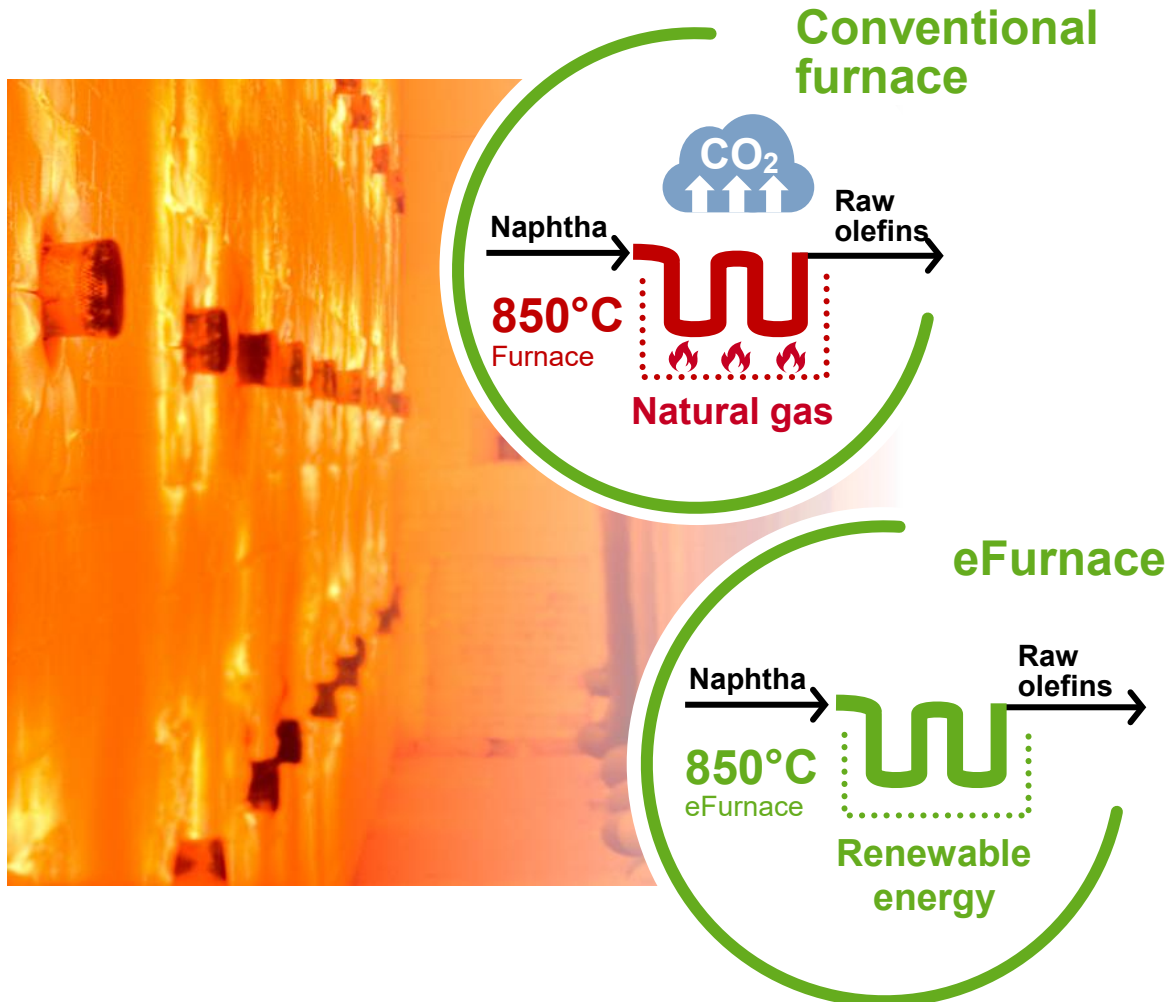
Greenhouse gas emission profile of BASF technologies
Energy and chemistry emissions, million metric tons per year¹



BASF has identified its CO₂-intensive processes and is addressing them

¹ Based on nameplate capacities, excluding at-equity consolidated companies
Internal

BASF, SABIC and Linde join forces to realize the world's first electrically heated steam cracker furnace

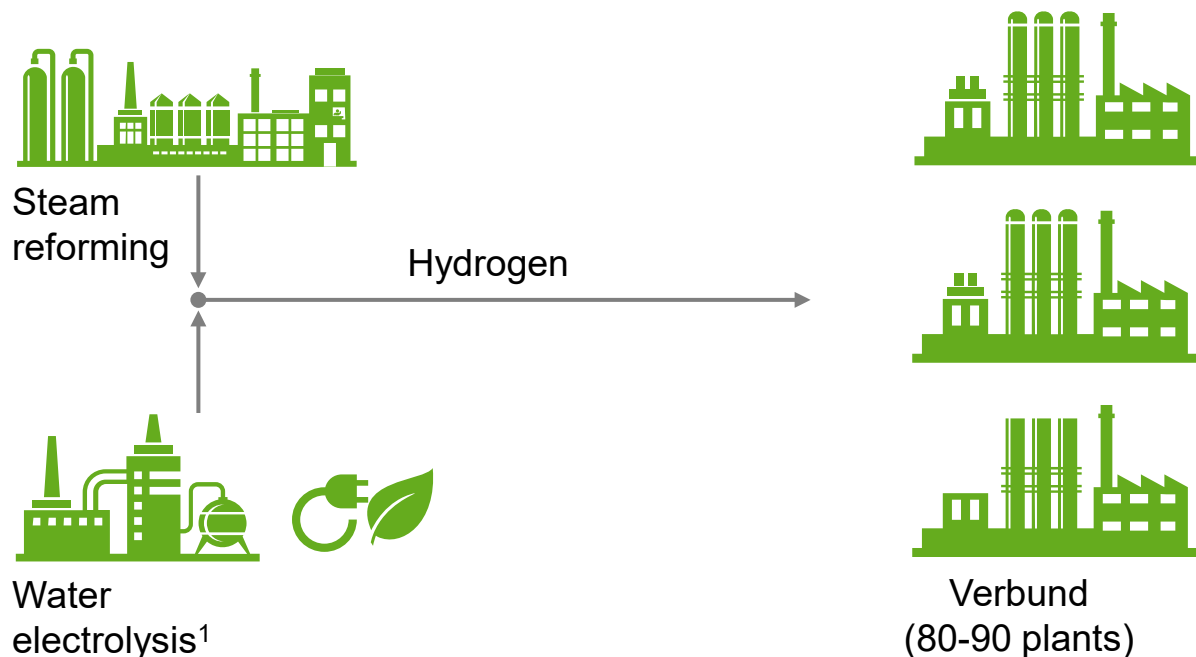


- Goal is to drive concepts and faster implementation through combined strengths
 - ▶ BASF and SABIC: extensive know-how and intellectual property in developing chemical processes; long-standing experience and knowledge in operating steam crackers
 - ▶ Linde: expertise and intellectual property in developing and building steam cracking furnace technologies and driving future industry commercialization
- Construction of a demonstration plant depending on funding granted – application to E.U. Innovation Fund and German funding program “Decarbonization in Industry”
- If funding is granted, startup could happen as fast as 2023

Water electrolysis plant will integrate internally produced green hydrogen into our Verbund



Seamless integration into BASF Verbund Schematic

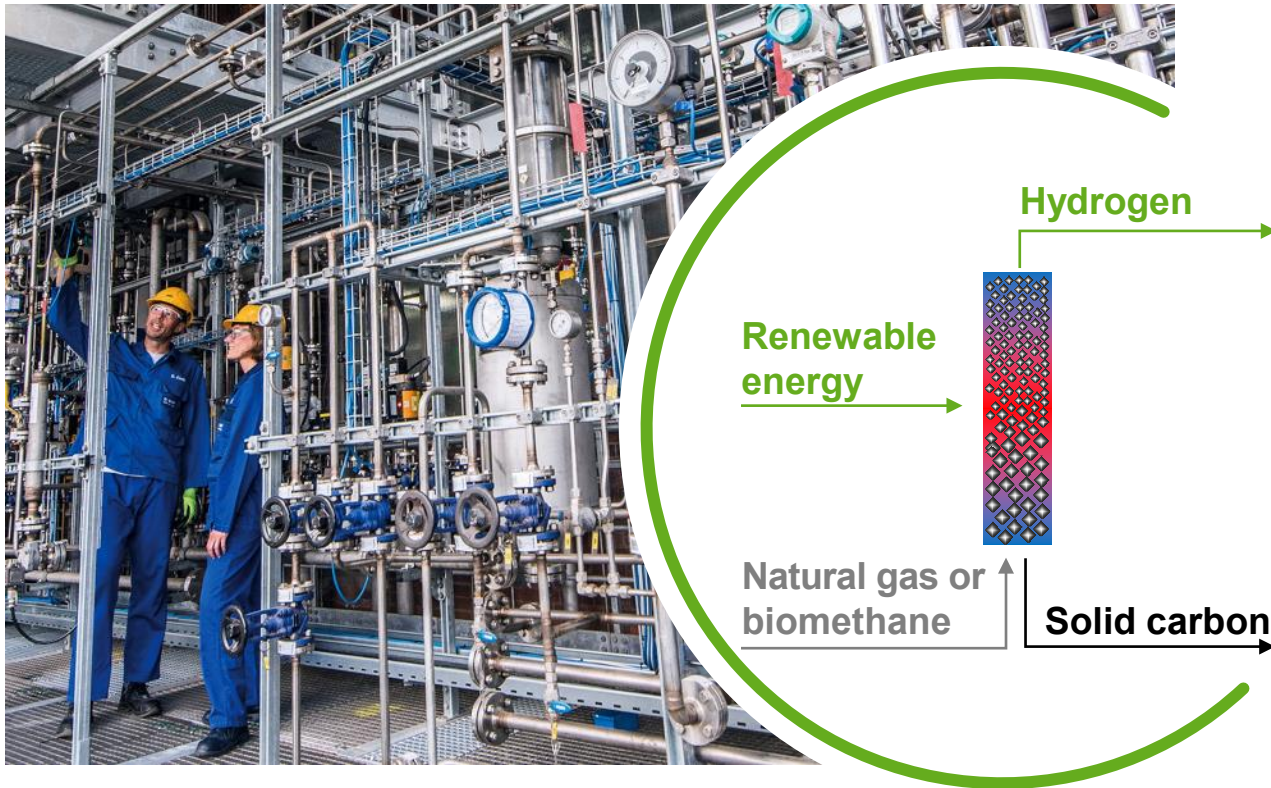


- Application for funding through **IPCEI** Hydrogen Technologies and Systems (Important Project of Common European Interest) has been shortlisted
- **Start-up** of water electrolysis **targeted for 2024**, investment of more than €90 million, capacity of 8,000 metric tons
- Hydrogen to be used in **BASF Verbund** and for **local community hydrogen mobility market**

Water electrolysis is a commercially available technology but consumes large amounts of electricity

¹ PEM technology

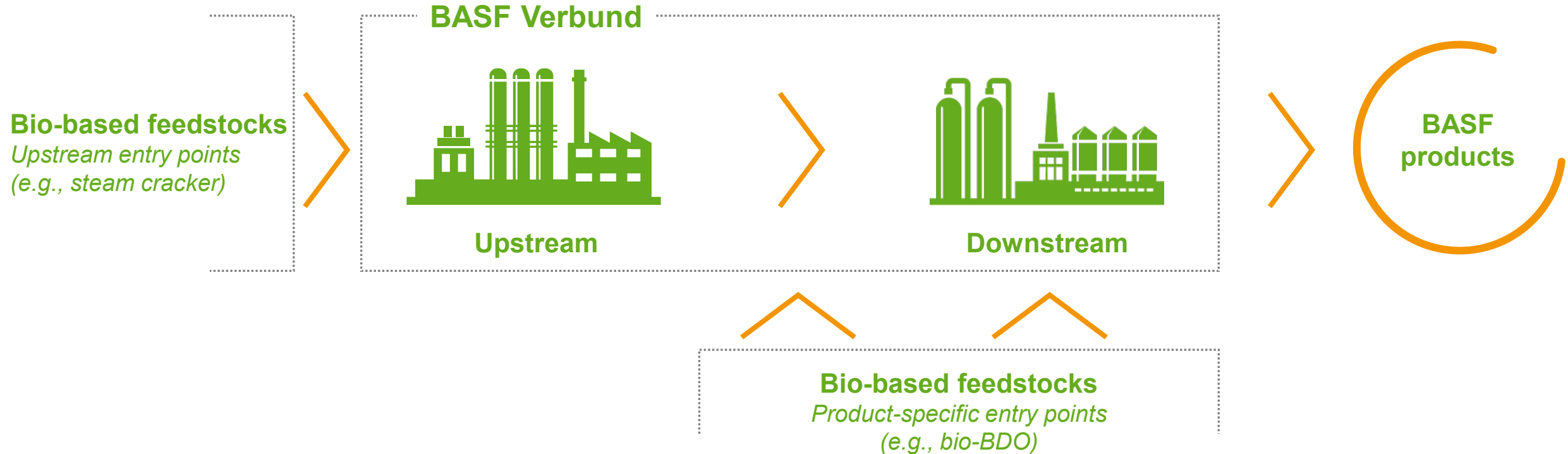
Methane pyrolysis combines low emissions with low energy demand



- **Methane pyrolysis** requires around **80% less electricity** than water electrolysis
- **Funding** for pilot reactor **was granted** by German Federal Ministry of Education and Research
- **Pilot reactor** at the Ludwigshafen site
- Start-up of **first commercial plant projected for 2030**

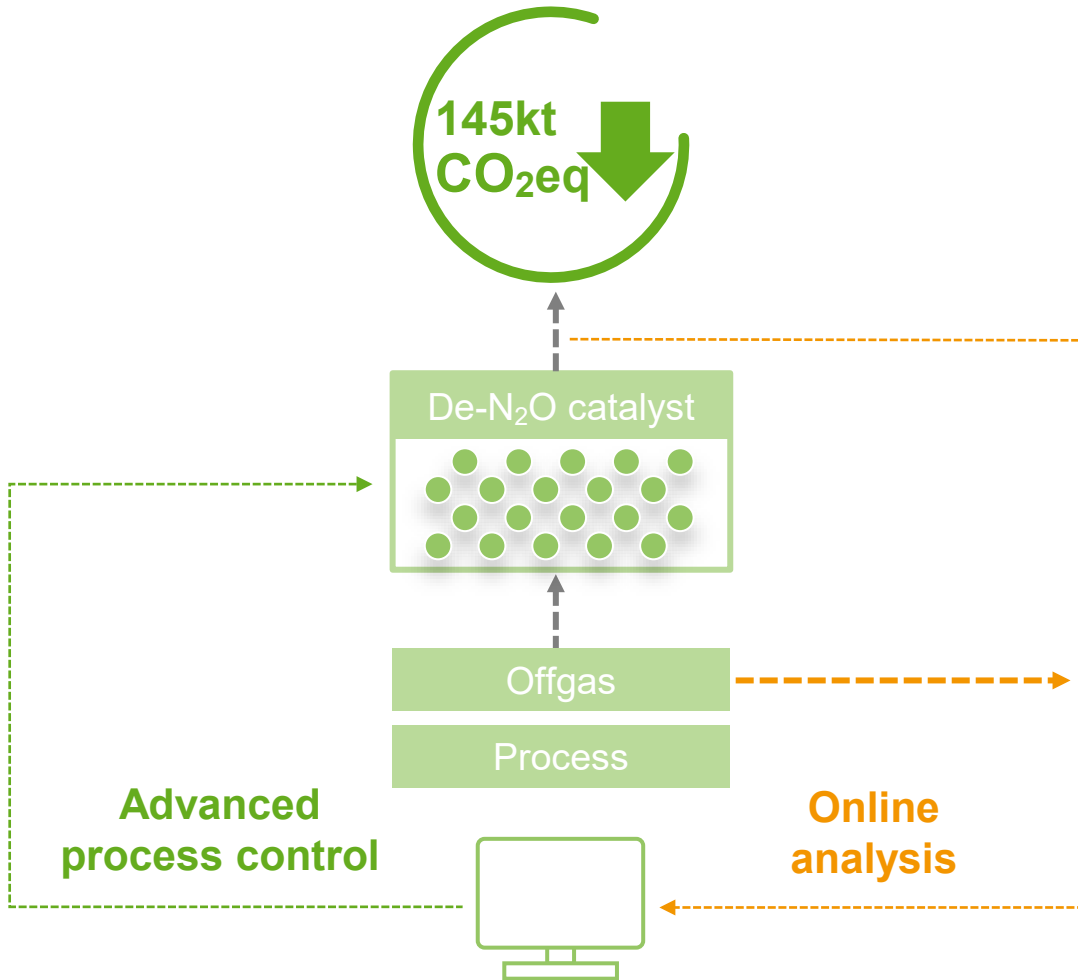
We have achieved a milestone in scaling up our groundbreaking methane pyrolysis process for hydrogen production

Entry points for bio-based feedstocks in BASF value chains



In the BASF Verbund, bio-based feedstocks can be used as a drop-in solution, in part using new, dedicated processes

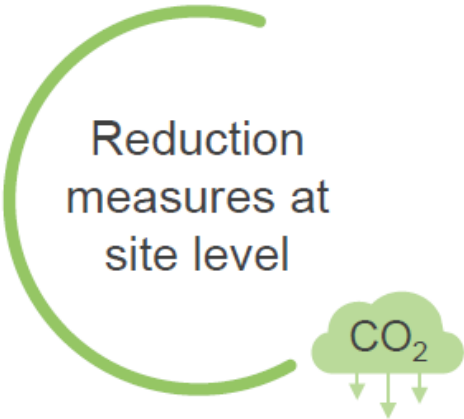
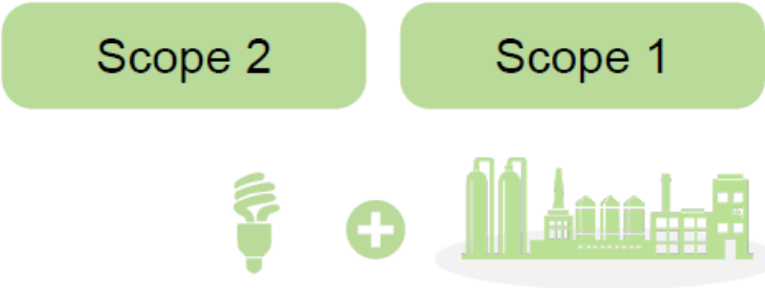
Our upstream integration allows large improvements with single measures



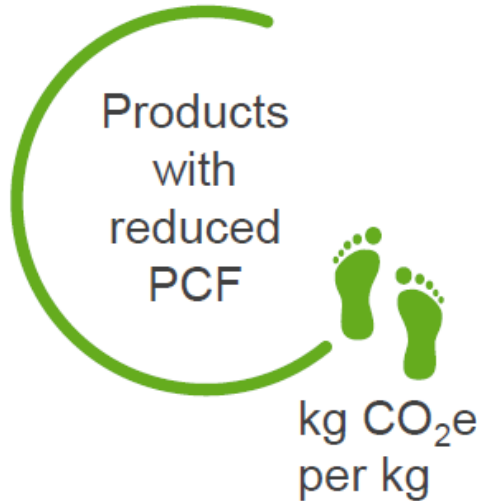
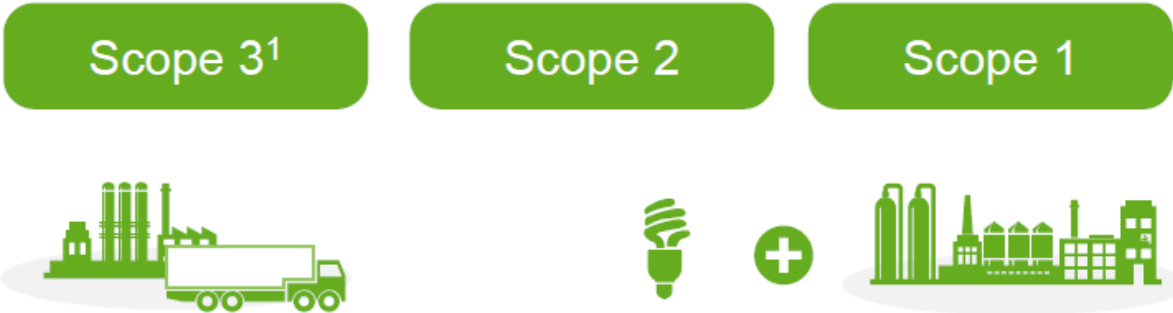
- **Avoiding 145,000 tons of CO₂ equivalents** per year through optimized process control
- **Nitrous oxide (N₂O) decomposition** in nitric acid cluster was **further improved from 99% to 99.9%**, residual N₂O was reduced by a factor of 10 to 0.1%
- Key to success were state-of-the-art process modelling capabilities; improvement could be achieved **without major plant modifications or investments**
- One of more than 1,500 operational excellence measures we are currently pursuing to reduce CO₂ emissions and improve energy efficiency

Our two perspectives on emission reductions

BASF Group targets



Product carbon footprint (PCF)



¹ Scope 3 emissions from raw materials production by suppliers

Consumers will drive demand for net-zero and low-PCF products



Transformation enabled by BASF

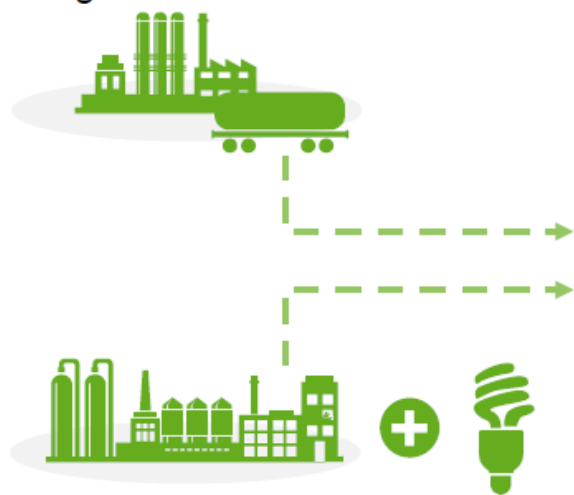
- **Chemical raw materials** are key contributors to **PCFs** of consumer products – in the case of shampoo, more than 90%
- BASF is able to offer its customers **net-zero and low-PCF chemicals** by applying a **toolbox of emission reduction measures** – from raw material choice to green energy
- **End consumers are expected to drive demand** for net-zero and low-PCF products

¹ CO₂e emissions (cradle-to-gate), calculated using a McKinsey methodology for analysis

We have built an industry-leading system enabling us to provide product carbon footprints calculated with a certified digital solution

Scope 3

Emissions caused by suppliers and generation of raw materials



Scope 1 + 2

Emissions caused by own operations¹



- TÜV-certified²
- Meets ISO standards³
- Calculates product carbon footprints cradle-to-gate

CO₂



Product carbon footprints of sales products



Customer benefits

- Transparency on CO₂ emissions
- Identification of main reduction levers
- Certified software
- Transparent documentation

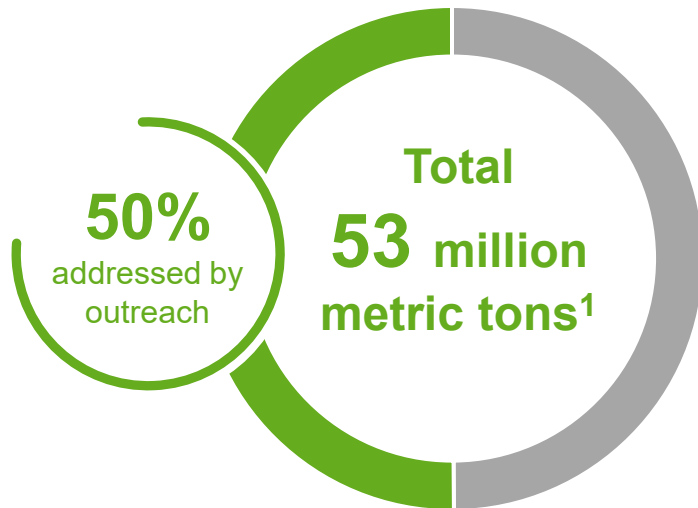
¹ Energy generation and chemical processes

² ISO 14067:2018

³ ISO 14040:2006, 14044:2006, 14067:2018, GHG Protocol Product Standard

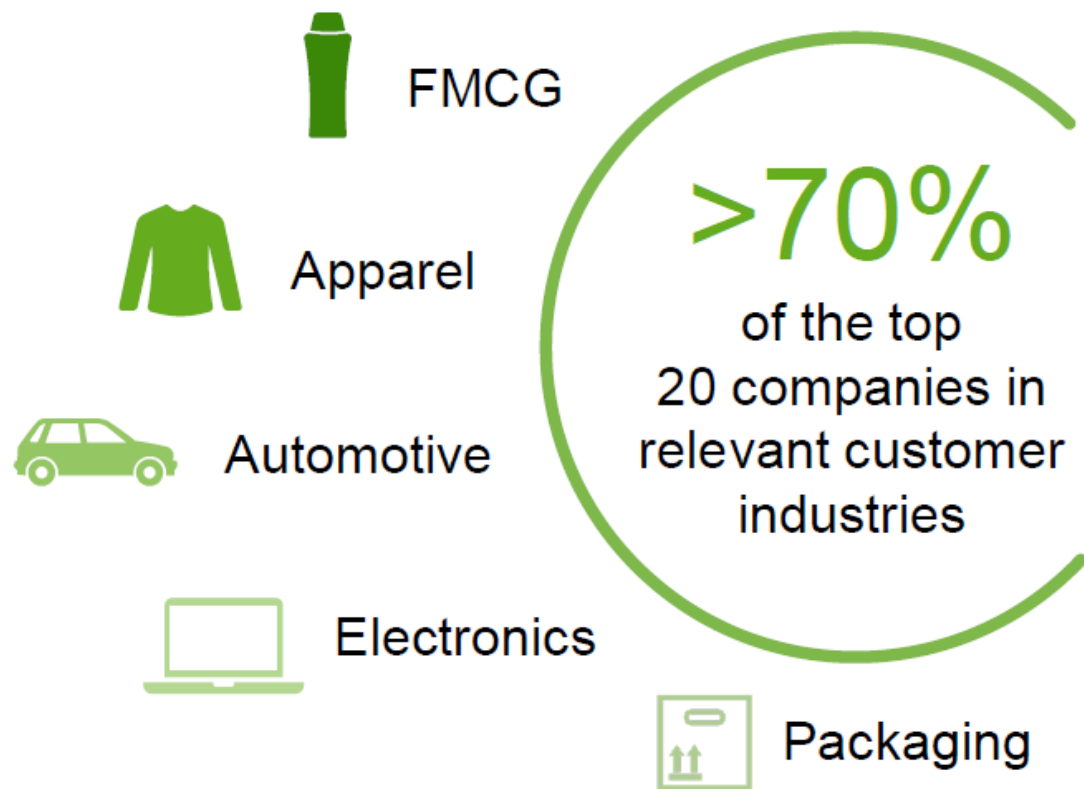
We Create Transparency On The CO₂ Emissions Of Our Raw Materials As An Important Step In Reducing BASF's Scope 3 Emissions

BASF's CO₂e emissions from raw material purchase 2021



- BASF is supporting various initiatives to **develop and establish workable standards** for the chemical industry
- **Supplier CO₂ Management Program rolled-out** in 2021 to collect specific PCFs and align on reduction targets
- More than **700 key suppliers** have been approached by the end of 2021, accounting for **50% of Scope 3 emissions¹**
- Collaboration through **knowledge sharing on PCF calculation methodology** ongoing to ensure engagement and quality of data
- First suppliers have **committed to reducing** their emissions
- **BASF will make PCFs a buying criterion** to ensure PCF reduction of its sales products

More and more market leaders in important BASF customer industries are committing to reducing their Scope 3 emissions



had committed to CO₂ emission reduction targets¹ by 2021;

almost half have defined **Scope 3 emission targets**

First movers in decarbonization set to profit from strong market pull for low-PCF products

¹ Source: CapIQ, Science-Based Targets Initiative, CDP Worldwide, McKinsey ESG Solutions / Sustainability Insights.
Customer industries: apparel, automotive, electronics, FMCG and packaging

BASF And Henkel Join Forces To Substitute Fossil Feedstock In Henkel's Laundry & Home Care And Beauty Care Products



- Henkel will **substitute fossil with renewable carbon feedstock from BASF** for most of Henkel's Laundry & Home Care and Beauty Care businesses in Europe over the next four years
- Following a successful pilot with Henkel's cleaning and detergent brand Love Nature in 2021, we are now **going big** with Henkel's core brands like Persil, Pril, Fa and Schauma
- Ultimately, **around 110,000 tons per year** of ingredients will be substituted with renewable carbon sources with BASF's certified **biomass balance approach**
- The program will ramp up quickly and **avoid around 200,000 tons of CO₂ emissions** in total



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