

Aurubis Virtual Capital Market Day 2021



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Sustainability
Angela Seidler, VP

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Energy
Roland Harings, CEO

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Energy & decarbonization projects
Heiko Arnold, COO



Metals for Progress

Sustainability

Angela Seidler, VP Investor Relations, Corporate Communication & Sustainability

Capital Market Day, December 6, 2021



Renowned ratings show strong track record in sustainability

Aurubis Sustainability Strategy 2018–2023, main sustainability ratings & initiatives



First Aurubis smelter awarded with The Copper Mark

- Aurubis Bulgaria is certified for meeting The Copper Mark's requirements for **responsible production practices**. Valid initially until **April 2024**.
- The auditing process of Aurubis plants Hamburg & Lünen started in June 2021
- The Copper Mark launched for copper producers in March 2020
- Basis: UN SDGs & Risk Readiness Assessment
- Regular review of the 32 sustainability criteria (evolving system)
- Focus on steady improvement of the sector



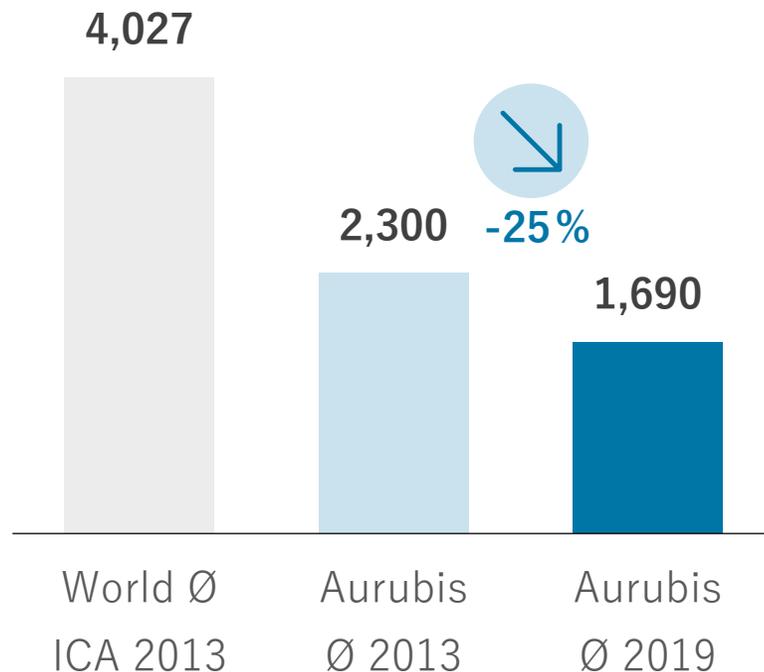
» The copper value chain demonstrates responsibility to mutually improve and develop.

Aurubis achieves significant reduction of carbon footprint



Industry Leadership
in Sustainability

Copper Carbon Footprint (in kg CO₂ eq./t Cu)



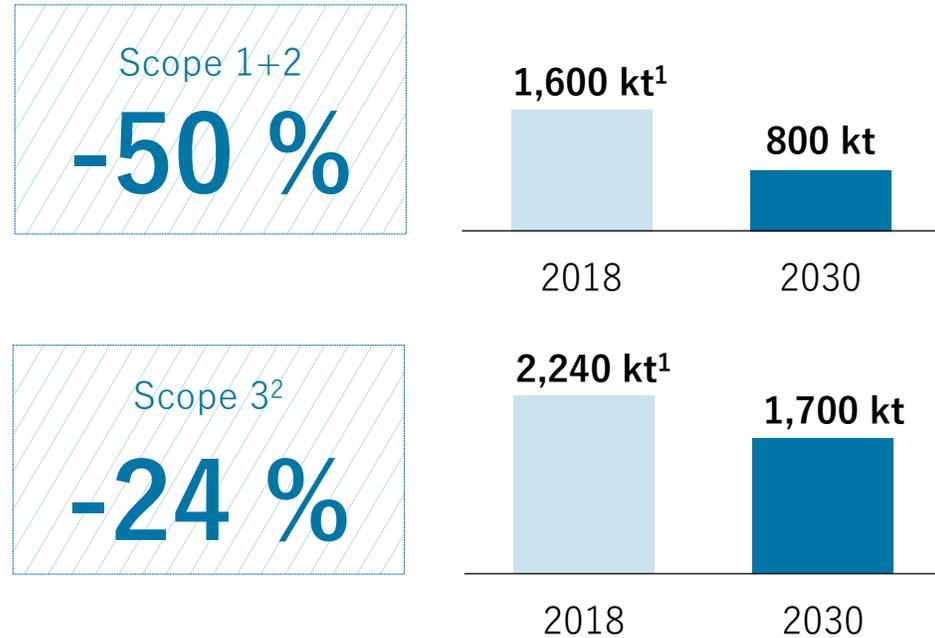
Update of Life Cycle Assessment leads to **reduction of 25 % of CO₂ emissions** related to copper cathodes on Group level.

Improvements driven by **lower direct emissions**, higher **energy efficiency**, higher **input of secondary materials**, increased use of **green electricity**.

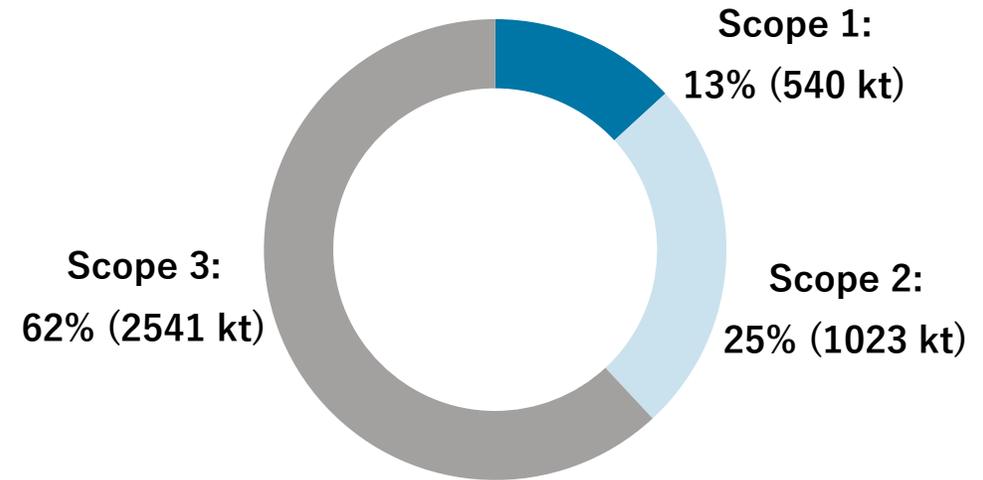
Projects with positive impact on environmental footprint: power-to-steam plant, Industrial Heat, innovative gas cleaning system in Pirdop.

Aurubis 2030 ambition for greenhouse gas reduction

Aurubis CO₂ reduction targets 2030



CO₂ emissions 2020



- Validated by the [Science Based Targets Initiative \(SBTi\)](#)
- Science-based targets are calculated based on [remaining carbon budget to reach 1.5°C target](#)
- Aurubis is signatory of the [Business Ambition for 1.5°C](#)



¹ Including the sites Beerse (Belgium) and Berango (Spain), acquired in 2020
² Assumed steady copper cathode production until target year (physical intensity target)

Five task items to operationalize the strategic agenda

	Cu/PM concentrates	Intermediate products/ P&MM	Materials containing Ni	Secondary materials	Sustainability
 Strategic Roadmap	<ul style="list-style-type: none"> – Roadmap of strategic projects for the next years – Transparency regarding critical risks 				
 Financial profile	<ul style="list-style-type: none"> – Rough long-term outlook of top KPIs (EBITDA, CAPEX, cash flow) 				
 Sustainability	<ul style="list-style-type: none"> – Targets for sustainability KPIs in 2030 – Aggregated perspective on the influence of sustainability KPIs 				
 Resources	<ul style="list-style-type: none"> – Transparency regarding the need for critical capacities for the next years 				
 Flowsheet	<ul style="list-style-type: none"> – Review and resolution of cross-work package Flowsheet Dependencies 				

Sustainability as integral part of our Group strategy

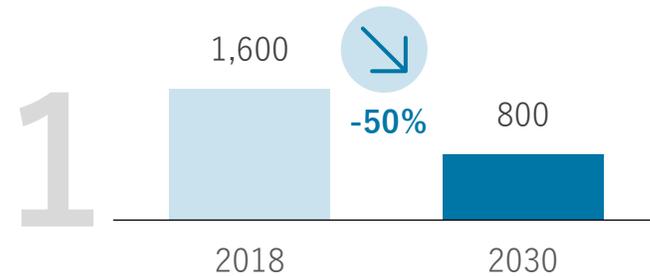
- Direct C-level accountability and strong support for cross-functional sustainability agenda
- Teams on Group level as well as at the sites

» We are anchoring sustainability even more firmly in the Group and in our strategy with binding KPIs for all projects and sites.

Six new, decisive KPIs underline Aurubis' ambitions in sustainability

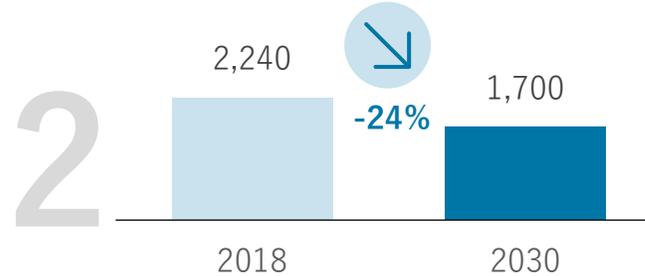
CO₂ Emissions Scope 1+2

Absolute scope 1+2 CO₂ emissions (in kt)



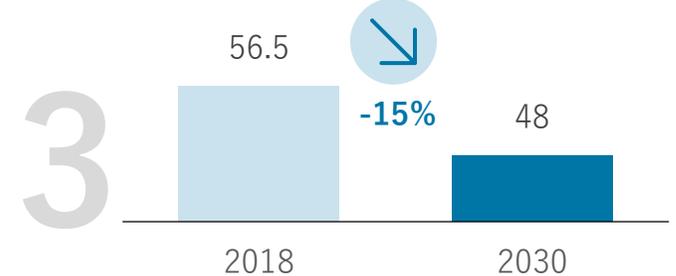
CO₂ Emissions Scope 3

Scope 3 CO₂ emissions (in kt)¹



Air Emissions (Dust)

Air emissions (in g per t of Multimetal Cu equivalent)²



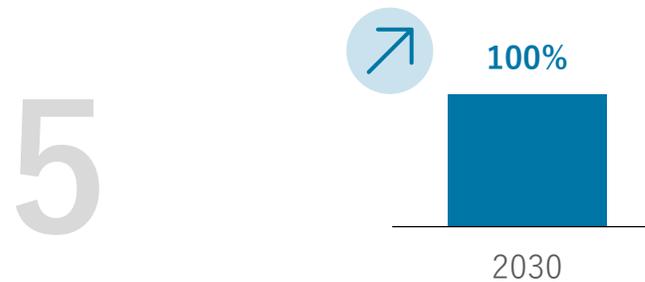
Metal Emissions to Water

Metal emissions to water (in g per t of Multimetal Cu equivalent)²



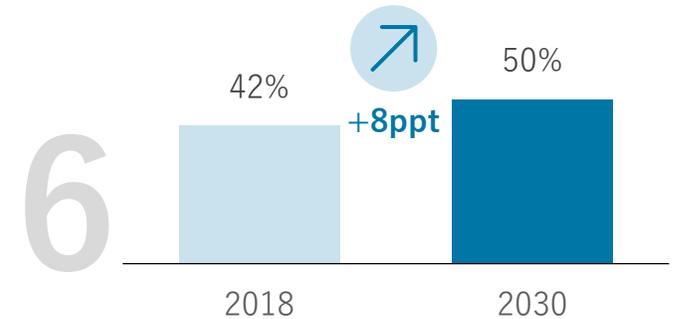
Supply Chain Integrity

Share of compliant suppliers (in %)³



Recycling Content (Cu)

Recycling share of Cu cathodes (in %)



¹ Assumed steady copper cathode production until target year (physical intensity target)

² Multimetal Cu equivalent: Total metal produced at Aurubis smelters (Cu, Zn, Ni, Pb, Sn, Au, Pd, Pt, Ag, Rh, Se, Te) x weight factors (t/a)

³ Aurubis plans to introduce a revised and uniform business partner screening system for the financial year 2021/22, in which we will bundle the requirements of the various regulations, standards and initiatives

We further drive sustainability and build on our strong track record

We aim to be carbon-neutral well before 2050

Aurubis drives innovation to create a more sustainable world and set new global standards. We see ourselves as part of the solution.



As a frontrunner in our industry, we insist on the highest standards in energy efficiency and environmental protection – always and everywhere.



Already today we operate one of the most sustainable smelter networks, which is reflected in various renowned ratings.



We are letting ourselves be measured with six new KPIs that underline our commitment to further implementing sustainability in project evaluations and our operations.



Metals for Progress

Energy

Roland Harings, CEO

Capital Market Day, December 6, 2021



Aurubis holds a leading position in energy efficiency

The CO₂ footprint of our copper production is less than half the global average



Global average:
4,027 kg CO₂*



 **Aurubis**

1,690 kg CO₂
per t of copper

Industrial Heat 2 provides potential for a further 300 kg of CO₂ saved per t of copper produced

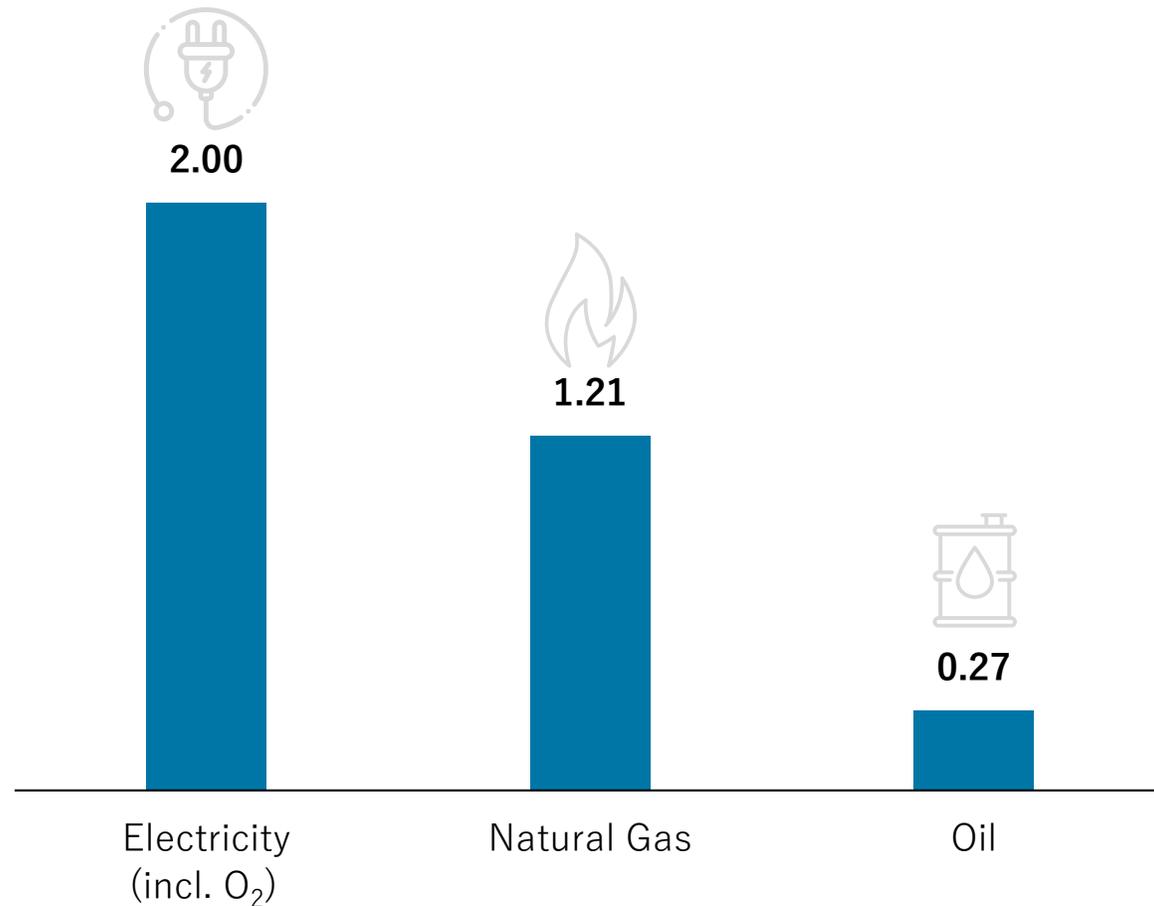
* Source: International Copper Association, Aurubis, 2019 (* 2013, to be updated).

» Once the Industrial Heat 2 project is implemented, Aurubis' CO₂ footprint will improve further.

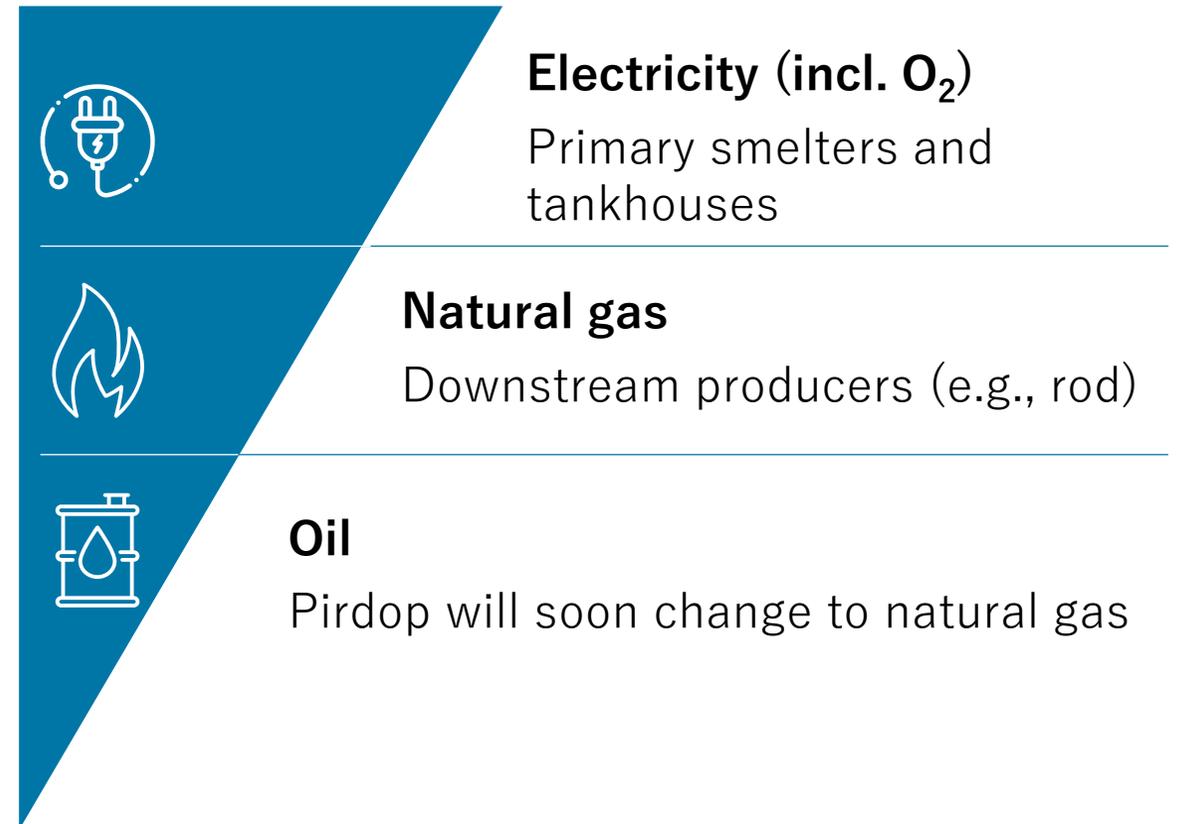


High level of savings achieved, lower effects expected in coming years

Main energy sources in CY 2020
(in TWh (Bn. kWh))



Main consumers

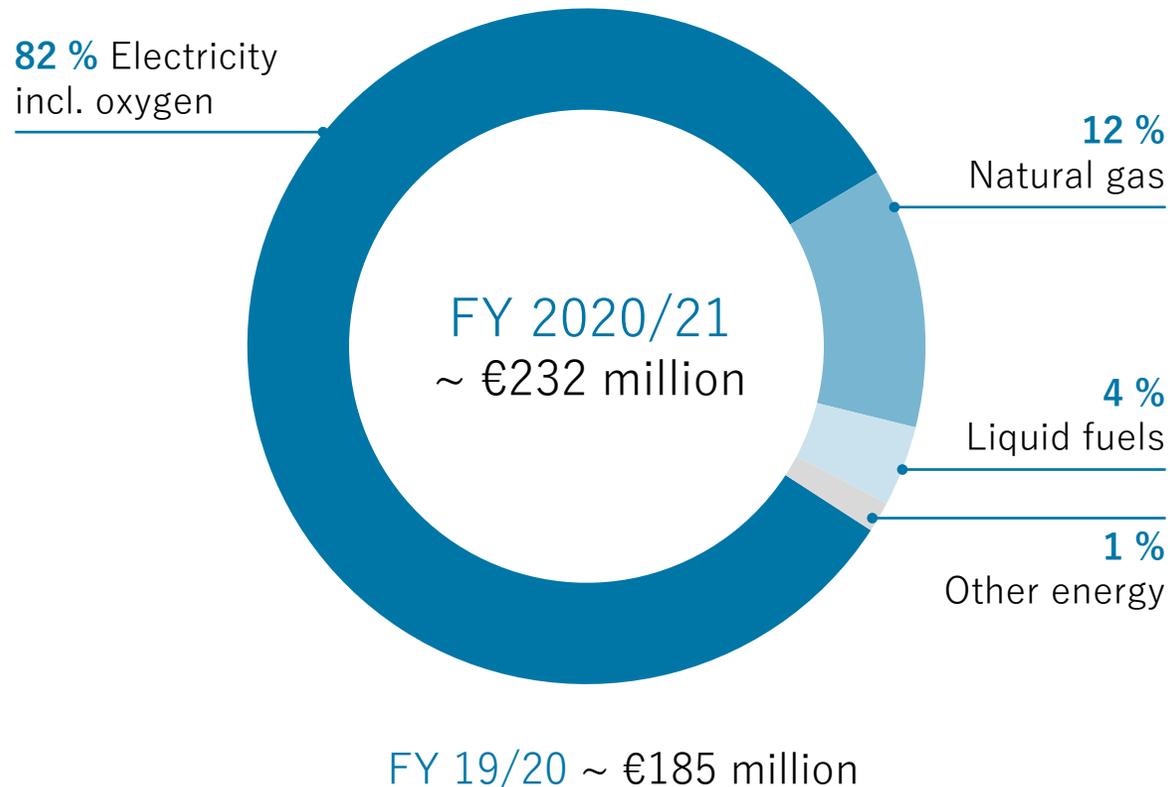


High degree of electrification keeps use of fossil fuels to a minimum



Electricity consumption and CO₂ scopes

Breakdown of energy costs in the Aurubis Group



Electricity incl. oxygen consumption in the Aurubis Group: approx. 2.00 TWh (2020)

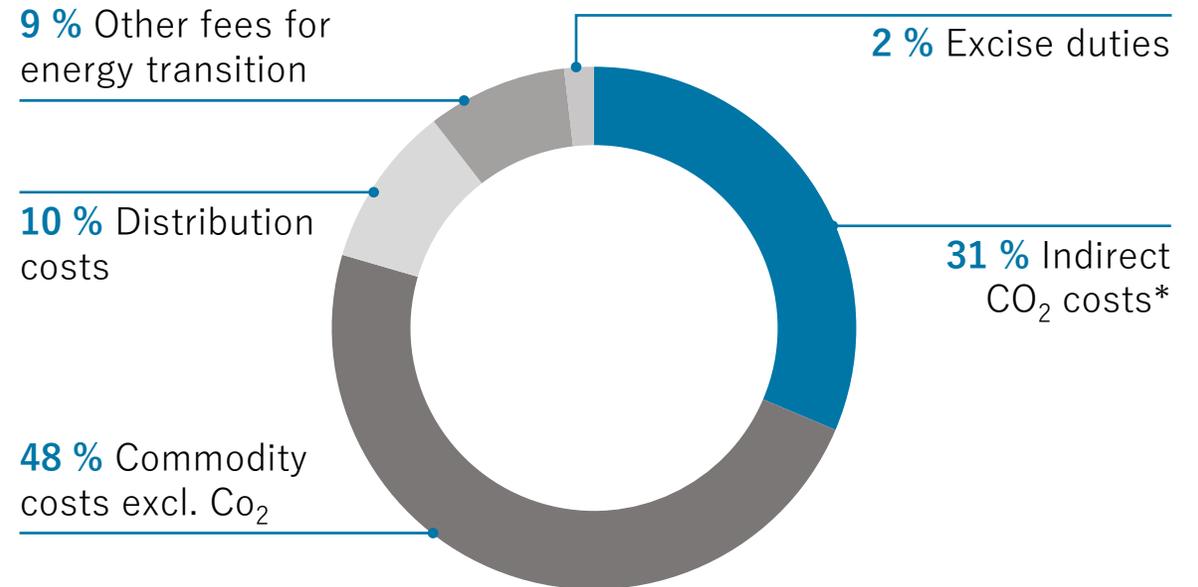
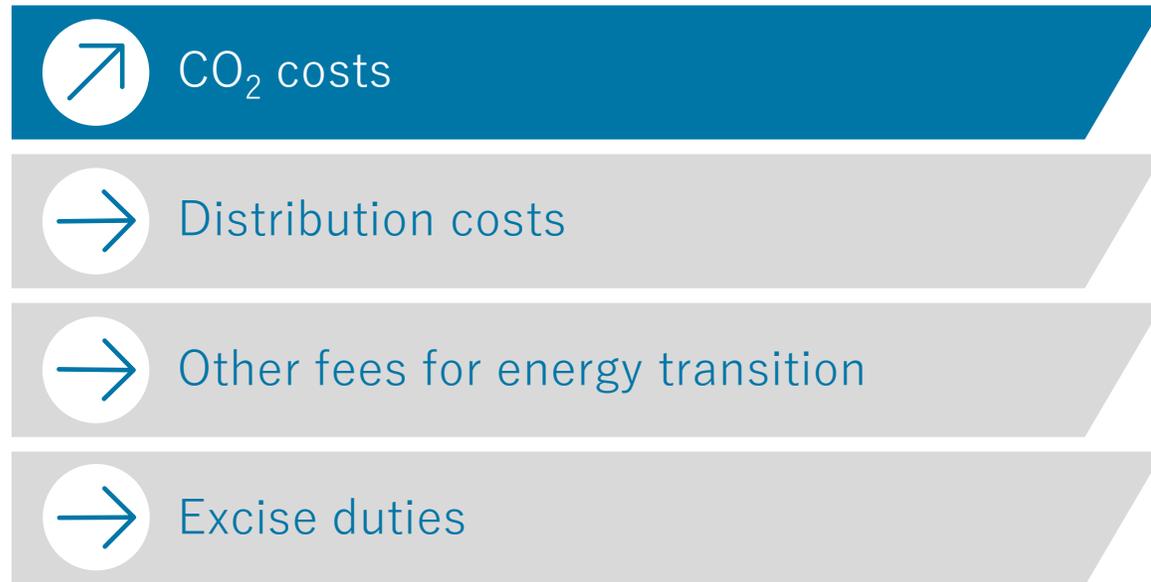
CO₂ emissions of 1.56 million t (2020)

- 0.54 million t of direct emissions (Scope 1)
- 1.02 million t of indirect emissions related to purchased energy; market-based (Scope 2)

Energy cost components – on Group level

In addition to the commodity prices for electricity, the total electricity costs consist of the following additional surcharge components:

Comparison FY 2019/20 vs. FY 2020/21

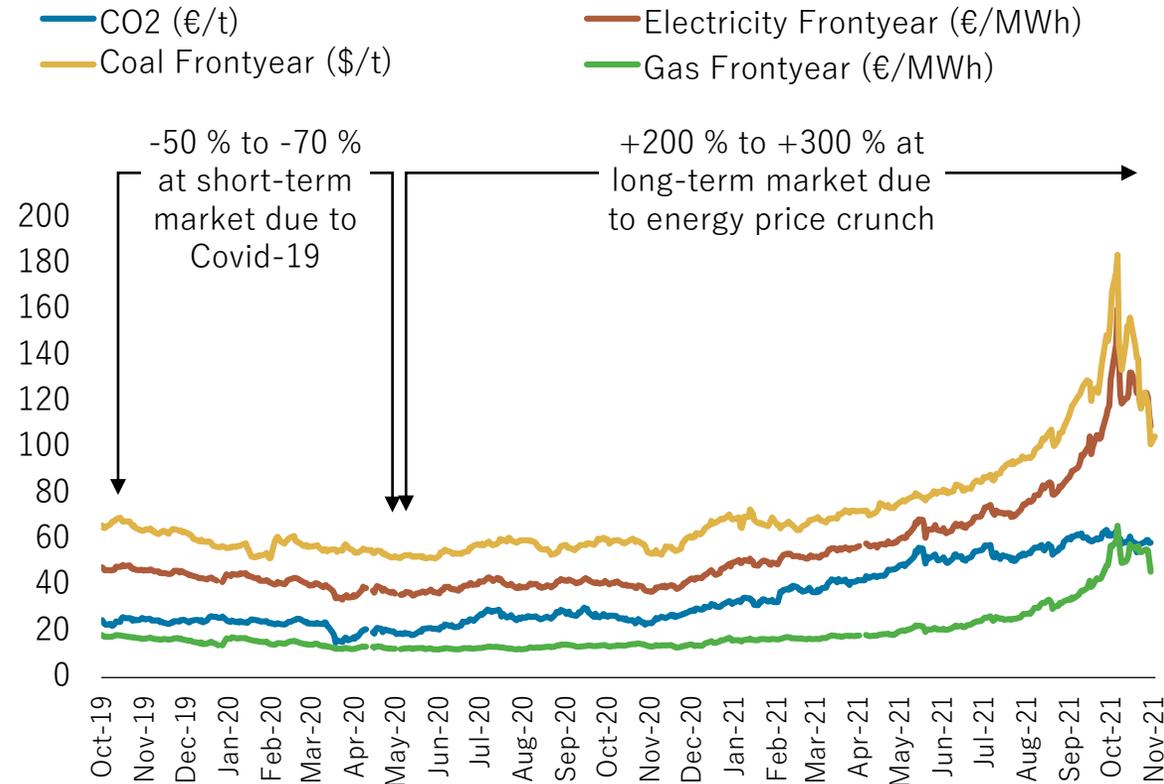


* approx. 50 % are compensated

» Aside from the pure commodity costs, a variety of additional surcharges strain Group-wide energy costs.

Risk management: Hedging of energy prices

Development of energy prices (in €/unit)



Unprecedented volatility of energy prices in the past two years:

Lowest energy prices due to Covid-19



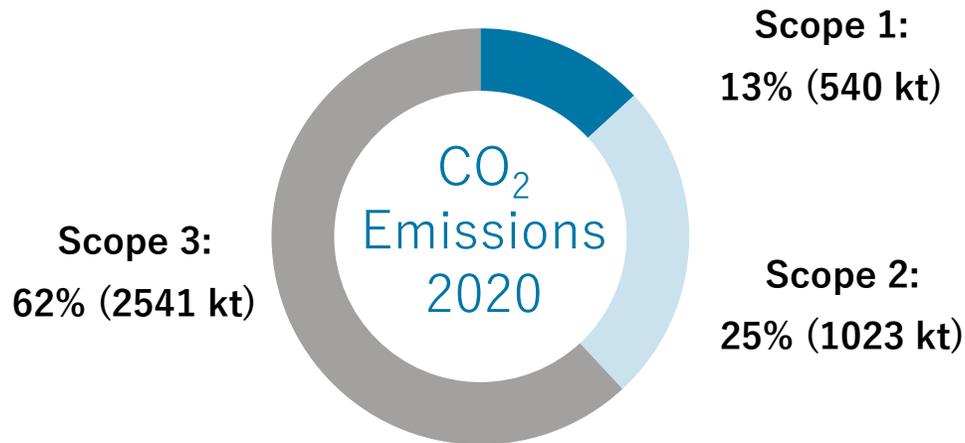
Highest energy prices due to the global energy supply shock

Appropriate mix of risks and opportunities through mix of hedging measures:

- Long-term power contracts with hedging components
- Long-term gas, coal, and power hedges
- State aids, e.g., indirect CO₂ cost compensation or refund of power plant income in Bulgaria

» With current hedging measures, approx. 2/3 of energy commodity cost increases for FY 2021/22 are fixed.

Opportunities for green electricity supply



Sites in [Germany](#), [Bulgaria](#), and [Belgium](#) are responsible for almost all of Aurubis' CO₂ emissions in Scope 2:

- Focus on [PPA solutions](#)
- Implementation of green PPA would [reduce emissions](#) of Aurubis by [25 %](#)



Contract options

Short-term PPA contracts (1-2 years):

- To support continued operation of plants that are no longer subsidized
- Price based on market price level, futures market, and the additional Guarantees of Origin

Long-term PPA contracts (10-20 years):

- Mainly concluded for financing new projects (e.g., offshore wind parks); enable long-term certainty
- Price based on forecast models for market

PPA: Power Purchase Agreement



Ongoing dialogue with electricity suppliers on opportunities to reduce Scope 2 emissions and path towards climate neutrality.

Further strengthening our industry leadership in energy efficiency

Aurubis drives different initiatives to support the transition to green energy for the Group

Aurubis actively contributes to decarbonization. We already operate with a high degree of electrification, keeping fossil fuels to a minimum.



Our targeted, ongoing investments will further electrify our production processes, thus reducing Scope 1 emissions.



Early and proactive additional purchases and savings of CO₂ certificates ensure coverage of Scope 1 emissions until 2030.



We constantly review options to further improve energy efficiency in order to remain globally competitive.



Aurubis AG

Metals for Progress

Energy & decarbonization projects

Dr. Heiko Arnold, COO

Capital Market Day, December 6, 2021



Sustainability

New innovative system for Reducing Diffuse Emissions (RDE)

RDE



» Aurubis' RDE is the largest environmental protection installation in Hamburg since the 1980s.

Sustainability

RDE sets new standards primary copper production

Investment
~ **€ 85 million**

Absorption of
**diffuse
emissions**



Industry Leadership in Sustainability

Major investment in Hamburg of about € 85 million in suctioning devices and filter facilities.

RDE is an innovative filtering system, which can be controlled according to current needs and is hence very energy-efficient.

Expected reduction of diffuse emissions.

Aurubis sets new standards in the copper industry, and with RDE, Aurubis Hamburg will become the most sustainable primary copper smelter.

Start
of filtration systems
October 2021

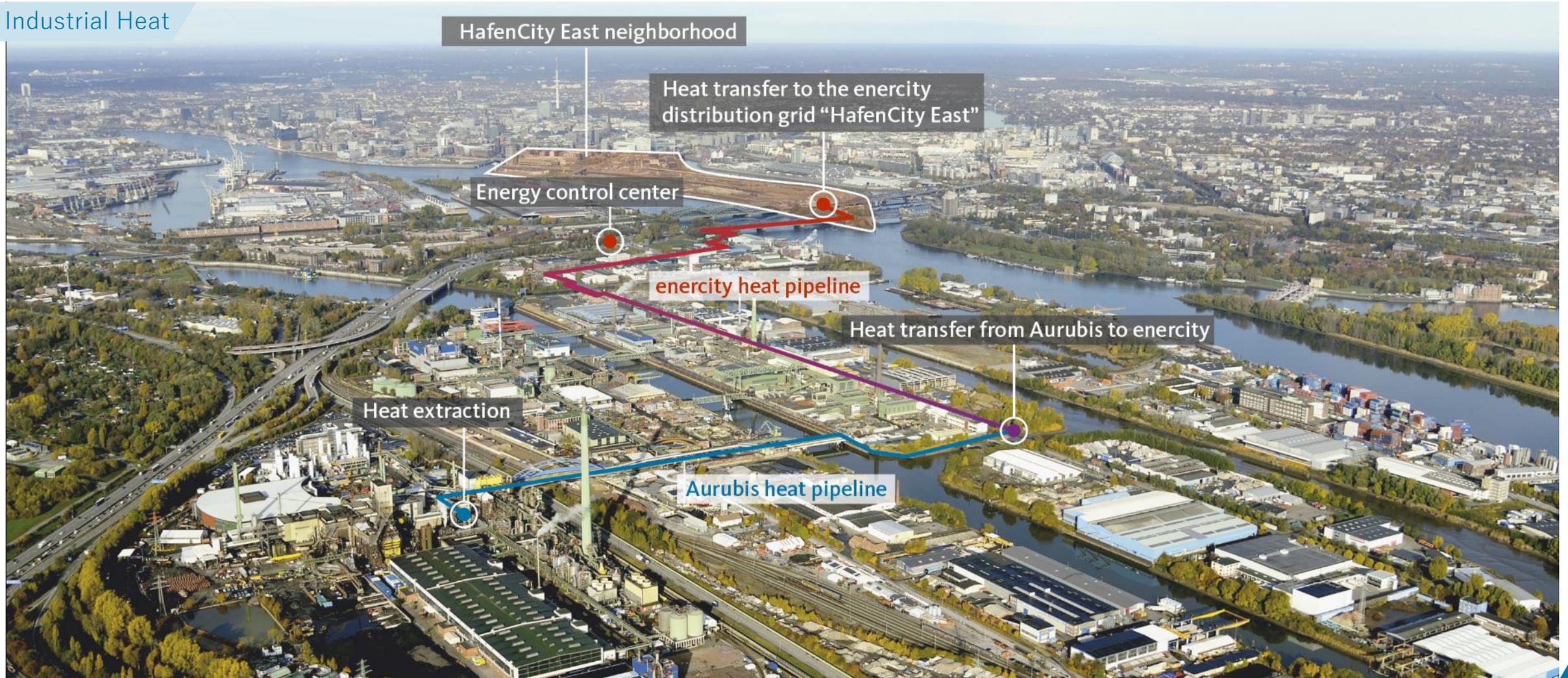
~ **6,300 t**
filter elements
540,000 Nm³/h
air suction capacity

» Aurubis is actively investing to exceed the steadily increasing requirements for environmental protection today to secure the site in the future.

Sustainability

Energy and decarbonization projects

Industrial Heat



Sustainability

Germany's largest industrial heating project

Investment
~ **€ 97 million**

EBITDA p.a.
(at full production)
~ **€ 3 million**



Industry Leadership in Sustainability

The industrial heating project to supply heat to the [HafenCity East](#) district with a savings potential of up to [20,000 t of CO₂ p.a.](#) was successfully implemented with [enercity](#) in 2018.

Aurubis' remaining industrial heating potential in the Hamburg contact acid plant amounts to about [100,000 t of CO₂ p.a.](#)

This follow-up project makes a significant contribution to achieving the city of Hamburg's [climate goals](#) and supports Aurubis' [sustainability ambition](#) through a further reduction of the carbon footprint.

With the city utility company [Wärme Hamburg GmbH](#), we have gained a reliable, long-term partner.

Cost efficiency is achieved through expected [funding](#) provided by the Federal Ministry for Economic Affairs and Energy and revenues from heat sales to [Wärme Hamburg GmbH](#).

Start of
production
following
ramp-up phase
2nd HY 2024

Additional CO₂
savings p.a.
once in full produc-
tion in 2nd HY 2024
~ **100,000 t**

» Hamburg heat grid's CO₂ emissions to be reduced by 55 % by 2030 and carbon-neutral by 2050; Aurubis Industrial Heat provides substantial contribution.

Sustainability

Energy and decarbonization projects

Hydrogen



Sustainability

Aurubis exploits efficiency increases by using hydrogen

Investment
~ **€ 1 million**

Usage of
hydrogen p.a.
(at full production)
~ **34,150 Nm³**

Production of
2,127 t
anodes in Hamburg

CO₂ savings
in Hamburg p.a.
~ **6,200 t**
Est. CO₂ savings
across Group
~ **15,000 t**



Industry Leadership in Sustainability

Use of hydrogen as a reducing agent in the anode furnace in Hamburg.

First test on an industrial scale in summer 2021 with very promising results:
~ 2,127 t of anodes produced with hydrogen.

CO₂ reduction potential (estimated):

- 6,200 t p.a. for anode furnace in Hamburg,
- 15,000 t p.a. for all anode furnaces across the Group,
- 40,000-50,000 t p.a. if all reduction processes at Aurubis were operated entirely with hydrogen.

1st place in the Responsible Care national competition of the VCI (German Chemistry Association).



Recently awarded pilot project demonstrates how even energy-intensive industries can forge a path into an environmentally compatible future.

Sustainability

Energy and decarbonization projects

PV Pirdop



Sustainability

Aurubis on its way to carbon-neutral production

Investment
in 10 MW PV
~ **€ 6 million**

Optimizing electricity
consumption p.a.
~ **11,000 MWh**



Industry Leadership in Sustainability

Start of construction for **largest in-house PV plant (10 MW)** in **Pirdop, Bulgaria**.

The PV plant will reduce the **smelter's external electricity consumption by 11,000 MWh** annually, and for the period of 15 years, the total renewable energy production will amount to nearly 170,000 MWh.

Compared to coal-fired power generation, this will save up to **15,000 t of CO₂ emissions p.a.** – or over 225,000 t over the operating period.

Start of production
following trial phase
2021

CO₂ savings p.a.
~ **15,000 t**
compared to
coal-fired power
generation

» **Green energy goal for Bulgarian site:
covering 20 % of energy needs with own renewable sources by 2030.**

Thank you for your participation.

For further questions, contact:
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 **Aurubis**



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