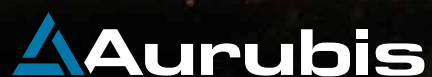



Metals for Progress:

# Driving *Sustainable* Growth

Magazine 2020/21

The Aurubis logo, featuring a stylized blue triangle icon to the left of the word "Aurubis" in a bold, white, sans-serif font.

**Aurubis**

A futuristic laboratory setting. In the foreground, a white robotic arm is positioned over a circular, reflective surface. In the background, a desk holds a microscope and other scientific equipment. The walls are metallic and feature a large, glowing circular light fixture. The overall atmosphere is high-tech and innovative.

The future is made from metals.  
With this knowledge, we set global  
standards. The Aurubis strategy  
“Metals for Progress: Driving  
Sustainable Growth” is our clearly  
defined roadmap for shaping the  
future – and responsibly transforming  
raw materials into metals for an  
innovative and sustainable world.



You can find additional exciting  
information online at:

 [annualreport2020-21.aurubis.com](https://annualreport2020-21.aurubis.com)

# Contents

## 02

Interview with the  
Executive Board

## 08

Our  
strategy

Aurubis  
Strategy



Metals for Progress:  
Driving Sustainable Growth



12 – STRENGTHEN



24 – GROW



32 – SUSTAIN

14 – From the idea  
to the improvement

18 – Innovative  
metal recycling in  
Beerse

21 – More capacities  
thanks to modernization

22 – Innovative  
exhaust system

26 – Growth  
through recycling

30 – Solutions  
for sustainable mobility

34 – A commitment to  
climate protection

36 – In-house energy  
production

38 – Metallurgical  
purification without  
emissions

40 – Our sustainability  
promise to customers

42 – Aurubis at a  
glance

# *Interview with the* Executive Board

They're the key players when it comes to setting the course of the Aurubis strategy toward responsible, profitable growth and to strengthening the core business: CEO Roland Harings, CFO Rainer Verhoeven, and COO Heiko Arnold. A discussion about megatrends, sustainability, change, growth – and joy.



Aurubis CEO Roland Harings in conversation with the magazine editorial team.



€353<sub>m</sub>OPERATING EBT  
(EARNINGS BEFORE TAXES)

15.6 %

OPERATING ROCE  
(RETURN ON CAPITAL EMPLOYED)

**Roland, after assuming office as CEO in 2019, you announced early on that the Aurubis strategy should be reviewed. After many intensive months, the updated company strategy is finally finished and will now be rolled out. What were and are the most important driving forces behind the development?**

**ROLAND HARINGS** I'm someone who starts by taking a close look at everything and then critically questioning things very directly. Anyone who knows me knows this. The Aurubis strategy was essentially a good fit for the exciting environment that I encountered: a financially solid company that processes primary and secondary raw materials, a company with

exceptional metallurgical expertise. Transforming raw materials into value, acting responsibly, being efficient – everything is as it should be. We're not exactly working in a market that chases fleeting trends. Our products form the lasting basis for a number of sectors, from the automotive to the cable industry.

When we look around, however, many things are changing quickly at the moment – whether in society, politics, or technology. Climate change, electric vehicles, new energy sources, sustainable business, and recycling – everything is interconnected due to global, digital networks. Aurubis makes a crucial contribution to nearly every one of these megatrends. In other words, they wouldn't even be possible in the first place without our metals.

How can we now improve in all of these areas and make the move from good to great? By placing an even stronger focus on recycling – reflecting the importance of a functioning circular economy in Europe, which is both a political objective and a necessity. Or, to reference the evolution of our strategy [Q Page 8ff.](#) and the strategic pillar "Growth," by choosing

“Aurubis is relevant and makes a crucial contribution to future trends.”

– Roland Harings,  
CEO



The fiscal year  
in 99 seconds:  
[aurubis.picturepark.com/  
v/yoiJlHEL/](https://aurubis.picturepark.com/v/yoiJlHEL/)

the right time to build the first recycling plant in the US – a market with enormous potential.

Strategy is one thing, but for employees, it's also about meaning and purpose. Why do I enjoy going to Aurubis every day? Because what I do is relevant for the world of tomorrow, for example.

### **What is the Executive Board's most important task while guiding the Group into the future?**

**ROLAND HARINGS** We, the Executive Board, have to identify precisely this potential, and leverage it for Aurubis profitably and at the right time. We of course receive support from many colleagues and external parties. It's all about teamwork. And as the Executive Board, we naturally obtain the support of the Supervisory Board for such strategic projects.

When developing our strategy, we presented and discussed work packages with the Supervisory Board time and time again because there are many individual project proposals behind the strategy. The fact that we've gotten the green light for everything so far illustrates their trust in our work. The extension of my appointment by five years is also a sign that the Supervisory Board approves of our path. After all, the strategy is first associated with the CEO.

“Processing both concentrates and recycling materials remains our core business.”

– Heiko Arnold,  
COO

### **Does the strategy's focus on recycling now mean that primary raw materials won't play such a big role at Aurubis anymore, Heiko?**

**HEIKO ARNOLD** On the contrary, processing raw materials – both concentrates and recycling materials – is and will remain our core business. It's important to strengthen both. We're investing intensively for this purpose.

It won't yet be possible to cover the huge demand for metals with recycling materials alone in the near future. Growth through construction or acquisition of more primary smelters isn't planned, however, because Europe doesn't need additional primary smelters.



Video about our strategy:  
[aurubis.picturepark.com/  
v/nAprUtnI/](https://aurubis.picturepark.com/v/nAprUtnI/)

At the same time, the amount of recycling raw materials is increasing massively in Europe. There aren't enough processing capacities for them yet, though. These complex raw materials are currently being exported to Asia to a large extent. As a result, we want to continue expanding the processing capabilities at our existing smelters to recover even more valuable materials – not just copper, but also more tin, nickel, zinc, and other metals.

We will continue to blaze the trail toward becoming a multimetal company. For me as COO, it's important that we also demonstrate excellent operational performance in the process. The key to profitability not only lies in our ability to process complex concentrates. Productivity, efficiency, and agility in production to optimally react to changes in available raw materials are much more crucial.

Due to the expansion of our smelter network, the sites are already working more efficiently and more digitally than before, for example in the processing of intermediates in the Group. It makes me proud to see how committed international collaboration is in a complex environment.

## **None of this works without investments. Aurubis wants to grow strategically. What does that mean from a financial perspective, Rainer?**

**RAINER VERHOEVEN** We just reported the best result in the company's history so far. The good market conditions at the moment are playing a key role in this development, of course, leading to increased refining charges in recycling, a high metal result with increased metal prices, and very good demand for our products. Aurubis is therefore in a robust financial position, despite the uncertain times, which is the ideal prerequisite for our investment projects.

With equity of € 2,648 million, a net cash flow of € 812 million, and hardly any debt, we're able to finance our growth plans relatively easily. This was made evident with the acquisition of our recycling sites in Belgium and Spain in 2020, which we linked to a successfully placed *Schuldscheindarlehen* loan with an ESG component, amounting to € 400 million. It was also clear from large-scale environmental protection investments like those in Hamburg [page 22](#) and the € 300 million investment in the new recycling plant in the US [page 26](#).

“Aurubis is in an extremely robust financial position, despite the uncertain times.”

– Rainer Verhoeven,  
CFO

On the other hand, as CFO, I of course have to make sure that we're as efficient and cost-conscious as possible. Cost reduction measures such as our Performance Improvement Program (PIP) were therefore necessary, and are proving to be effective: we will squarely achieve our goal of a € 100 million earnings improvement in 2022/23.

We could improve our processes, however. In this regard, digitalization and automation are key enablers, as is sensible resource planning. We've created good conditions in this area as well, thanks to new structures and projects. And we still have a lot planned.

**Roland, sustainability is also an integral part of the strategy. Aurubis wants to continue expanding its leading role in this area, but it's undisputedly an energy-intensive company. Is this a balancing act?**

**ROLAND HARINGS** Not at all! Sustainability has always been a fixed component of Aurubis' strategy. The social and political shift described means that the objective of acting sustainably is becoming more visible and important. And that's a very good thing. Business success and sustainable activity are not a contradiction in terms at Aurubis.

We're already the most sustainable smelter network in the world, and this is confirmed by external sources as well – through confirmation of our compliance with high environmental standards and our respect for human rights, for instance, but also through our outstanding ESG ratings. Then there are our own initiatives to reduce CO<sub>2</sub> emissions and projects to use renewable energies at our sites. We want our production to be carbon-neutral well before 2050.

We're now going to tackle all of these projects together with our employees around the world. I'm looking forward to it!

48%

EQUITY RATIO

€ 812 m

NET CASH FLOW



Executive Board résumés:  
[www.aurubis.com/en/about-us/  
management/executive-board](http://www.aurubis.com/en/about-us/management/executive-board)





“Digitalization and automation are key enablers, as is sensible resource planning.”

– Rainer Verhoeven,  
CFO



“We want to continue expanding the processing capabilities at our existing smelters to recover even more valuable materials.”

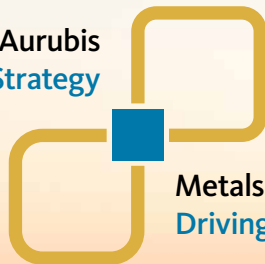
– Heiko Arnold,  
COO

Metals for Progress:

# Driving *Sustain* Growth

 **Aurubis**  
Metals for Progress

Aurubis  
Strategy



Metals for Progress:  
Driving Sustainable Growth

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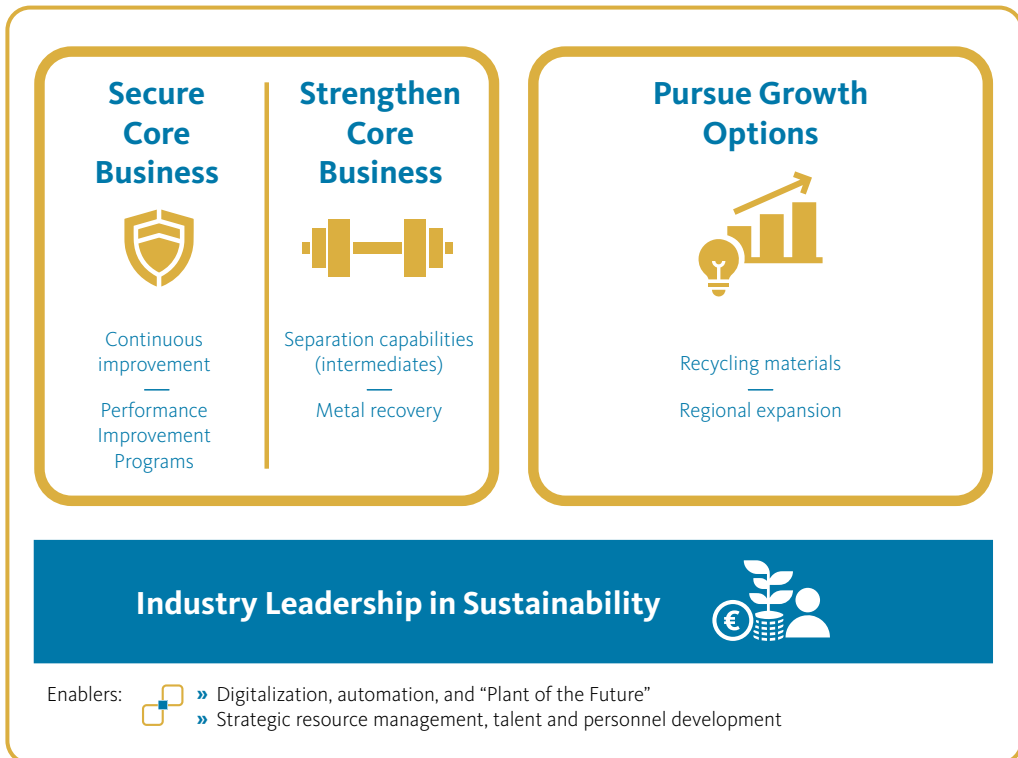
Metals are the foundation for progress. With the Aurubis strategy, we are providing a clear answer to how we will continue solidifying and expanding our position as the most efficient and sustainable multimetal producer in the world: as a high-performance smelter network with a strong core business and new drivers of growth in recycling.



# Our strategy



Our strategy provides a clear answer to how we will keep developing our business to shape the future and grow through sustainable profitability.



Aurubis has an eye on the dynamics of the market at all times. We're constantly on the lookout for opportunities, anticipating trends and acting accordingly. As a result, we've now honed our strategy and devised a roadmap for the next decade. Our core business in the areas of concentrate processing and recycling provide an excellent starting point for this.

We're taking action from a position of strength: Aurubis has unique metallurgical expertise and financial power. We have a diverse, efficient team setup, and we've already achieved a great deal when it comes to digitalization and automation. With the updated Aurubis strategy, we're now taking the next steps and establishing the basis for tomorrow's success today.

### **The pillars of our strategy**

Our core business is processing metal-bearing raw materials – concentrates as well as recycling materials. It is characterized by high productivity, cost efficiency, and effective sales outlets for our products. And because the world will need more and more of these metals that we produce in the future, the core business remains an essential component of our strategy. In light of global competition, we will secure and strengthen our core business.

“We will continue solidifying and expanding our position as the most sustainable and efficient smelter network in the world.”

– Roland Harings,  
CEO

For this purpose, we're continuing to expand the processing options within our Group-wide smelter network. We're executing projects in a targeted way at different sites to expand our capacities and boost multimetal recovery. The requirement for all projects and initiatives is that they have to contribute to our overall strategy.

We're pursuing new growth projects based on our core business. Recycling is a central driver of growth for us. Rising recycling rates, closed material cycles, and electric vehicles will reinforce the supply of complex recycling materials in the future. The surging demand for low-emission supply chains is a related aspect. That's why our strategic projects address precisely this development in order to tap this potential for Aurubis.



Our complete strategy is featured in the Management Report on page 84.



# Securing, strengthening, and expanding the core business

Aurubis has a healthy, high-performing core business. By connecting our sites in a targeted manner and optimizing material

flows, we want to make even better use of synergies in the Group. This will allow us to create the conditions for further growth.

---

## Growth options

We are building up scalable recycling capacities in Europe and abroad to process complex recycling materials in state-of-the-art

facilities. Further down the road, we want to expand our offerings to include battery materials and battery recycling.

---

## Sustainability

Sustainable conduct and business activity are integral components of Aurubis' strategy. We have established targeted measures and KPIs to reduce emissions in order to make our production carbon-neutral well before 2050.

Our production technologies and facilities already make a crucial contribution to responsible resource use, supporting the energy transition in addition to our products.



# A discussion with Thomas Sturm

Transparent and consistent, the Aurubis strategy offers concrete answers to how we want to sustainably achieve our growth targets.

## What was the starting point for developing the new strategy?

We as a company have to be aware of changes at all times – particularly when it comes to the markets, raw material streams, and flows of goods, but also with regard to regulatory aspects. On top of that, there were internal changes such as the integration of the former Metallo sites and changes in the Group's management. As a result, we asked ourselves: what is the right path for Aurubis in the future in a constantly shifting environment? We reviewed, revised, and developed our existing strategy. Furthermore, we looked at the facts in detail, taking topics like recycling and sustainability, which have gained huge significance recently, more strongly into consideration.

## How pleased are you with the result?

The strategy we had before was fitting. Our objectives are still fundamentally the same, too, they were just brought into stronger focus and substantiated with concrete projects. We can now give very precise answers about how we'll achieve our goals. The strategy is transparent and consistent, with clear analyses, hypotheses, and results. The extensive project landscape that arose in the process notably heightened our vision of the Group's future. Each plant

in the Group now knows its path and its role. We've developed clear, measurable sustainability targets and will review every new project on the basis of these KPIs from now on as well.

## What stood out during the development process?

The strategy will ensure our long-term, sustainable growth. This is in the interests of all stakeholders and shareholders. Every current and future employee will understand that working at Aurubis means being relevant to the company's progress and having clear future prospects. Openness and transparency were therefore important to us in the development process. We included a broad range of experts and managers – across divisions, sites, and cultures – and thus gained valuable ideas and insights that were incorporated in the strategy.

“The strategy is transparent and consistent, with clear analyses, hypotheses, and results.”

– Thomas Sturm,  
SVP Corporate Development

## Implementation and sustainability

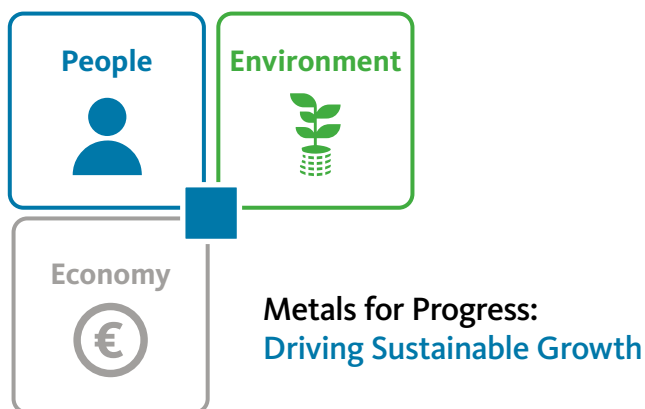
The updated Aurubis strategy is a precisely defined roadmap for our sustainable and profitable growth. It takes both external and internal factors into account. Priorities include digitalization in production and collaboration with business partners, in addition to strategic personnel management – recruiting and developing employees for the future. We have established clear responsibilities, resources, and projects that provide a strong footing for our objective of responsibly transforming raw materials into metals for an innovative and sustainable world.

One driving force of our future success is the higher level of awareness for sustainability in society and industry. We are aligning our business model even more strongly with the sustainability targets. We aspire to be carbon-neutral well before 2050. Based on binding targets and appropriate measures in the areas of the environment, social issues, and corporate governance, we are enshrining sustainability even more strongly in the entire company – in all processes and in all new projects.

## Segmentation

In addition to refining our strategy, we also adjusted our segment reporting to achieve greater transparency. The most important change since October 1, 2021 has been the classification of our recycling activities in a separate segment, Multimetal Recycling. This includes the Lünen, Olen, Beerse, and Berango sites as well as the ERN and Cablo holdings. Our Custom Smelting & Products segment includes the smelters in Pirdop and Hamburg and our wire rod and flat products.

CEO Roland Harings sums up how the strategy will provide us with the roadmap for future success: “It will help us continue solidifying and expanding our position as the most sustainable and efficient smelter network in the world.”



# Three questions for Christian Obst,

## Equity Analyst at Baader Bank AG



**Your job is to monitor companies and their development and to offer stock investment recommendations. What role does a company's strategy play in this?**

A company needs an objective and a description of the path to achieving it. Employees, suppliers, customers, owners, and lenders should have an idea about why the company is developing as it is. This transparency is necessary to build and maintain trust and involvement in the company. Based on my knowledge of the company, I try to explain why the management, in a given political and economic environment, makes certain decisions that impact the results. While I'm at it, I make a distinction between the factors that can be influenced by the management and those that can't.

**What makes a good strategy, in your opinion?**

First and foremost, a good strategy is based on transparent overall conditions. In addition to the knowledge about its own capabilities, structures, and processes, the management should develop its strategy and a timeline in which its concrete goals should be achieved. Intermediate goals are required to keep things on track but don't necessarily have to be communicated in

detail. A clear process should facilitate regular reviews of whether the overall conditions and the resulting measures are still pointing in the intended direction. Evaluating a strategy requires observation over longer periods. Quarterly reports can serve as orientation, for example in recognizing impending problems.

**In your view, what developments need to be considered right now, especially for Aurubis?**

The metal industry's supply flows from the mines and recycling. The underlying conditions for these two parameters are incredibly different. Mines and smelters also have to make sure that they operate their production with minimal environmental strain. The recycling of raw materials is playing a stronger and stronger role worldwide. Even in industrialized countries, the recycling rate is well below what's actually possible. It just isn't worth it in many places yet. But circumstances are changing: I would view recycling as a true megatrend. This is certainly a huge chance for Aurubis. It gets really exciting when companies expand into new regions or even new continents. Setting up and operating a profitable site under unfamiliar conditions is a challenge for the management that can't be underestimated.

# Strengthen

We're securing and strengthening our core business, improving it even more. Producing metals from concentrates and recycling materials remains a strong foundation for us. In the future, we want to use synergies in the Group by connecting our sites in a targeted way and optimizing material flows. This will allow us to create the conditions for further growth.

Page

14

From the idea  
to the improvement

Page

18

Innovative metal  
recycling in Beerse

Page

21

More capacities  
thanks to modernization

Page

22

Innovative  
exhaust system







PIP and CI:

# From the idea to the *improvement*

Aurubis is always on the lookout for process improvements, whether in production or along the supply chain. In doing so, digital solutions play a pivotal role.



There's a lot going on at Aurubis: through the Performance Improvement Program (PIP), the company is permanently reducing its costs and boosting its performance. We will achieve the full impact of € 100 million on earnings by fiscal year 2022/23. At the moment, we're gradually implementing more than 350 improvement ideas within the context of PIP, including a project to increase throughput in the Hamburg primary smelter Rohhütte Werk Ost (RWO).

PIP focuses on sales, administrative, and overhead costs, (non-metals) procurement at Group level, and production and maintenance in Hamburg. At the same time, the new corporate function Continuous Improvement (CI) zeroes in on cross-site improvement of production processes with the help of the Aurubis Operating System (AOS) and digital tools. For this purpose, the Digital Factory program was started as an overarching initiative to improve production processes with data-driven tools under the collaboration of azeti, IT, and CI, among others. azeti is a software company from Berlin that has been part of the Aurubis Group since 2020.



- > Above: Ayca Cangel, Director Transformation & Business Improvement
- > Below: Verena von Weiss, Vice President Continuous Improvement

# > 350

IDEAS FOR IMPROVEMENTS ARE  
CURRENTLY BEING IMPLEMENTED  
IN CONCRETE PROJECTS





PRODUCTION  
MANAGER PRIMARY  
SMELTER HAMBURG:  
**Alois Unger** “In the  
Digital Factory, all of  
the necessary data is  
collected to monitor  
and visualize the  
process.”

In Hamburg, CI is currently working with colleagues in engineering, IT, and azeti on using the azeti platform on the anode casting wheel and the flash smelting furnace, for instance. The IoT (internet of things) platform is already being tested on the anode casting wheel to monitor the production process in order to detect and remedy disruptions early on. This is referred to as predictive maintenance. At the flash smelting furnace, the software is being used in a project to optimize combustion.

The projects of the Digital Factory program always serve the purpose of supporting colleagues in the plants with their work and enhancing plant availability. This is also true for a project that will require more of CI's energy in the coming weeks and months: harmonizing maintenance processes across the Group.



Video of the  
anode casting wheel:  
[aurubis.picturepark.com/  
v/pZu1tU3a/](https://aurubis.picturepark.com/v/pZu1tU3a/)



## Higher concentrate throughput in the Digital Factory

For maximum concentrate throughput in our flash smelting furnace, the combustion of the copper concentrate has to be consistent. The temperature is monitored at over 180 temperature recording points on the reaction shaft for this purpose. In the case of consistent combustion, the temperature is the same everywhere. If the temperatures are different, the center lance has to be used to check whether the concentrate is being directed into the furnace on one side. In this case, the furnace has to be stopped for 15 to 20 minutes and the nearly 5 m long, 400 kg heavy center lance is removed. The azeti software was introduced to the process at the Hamburg site to optimize combustion and avoid unplanned center lance inspections. It conveys the relevant process, temperature, pressure, and volume data to the control room employee that they can use at any time to manage things in a targeted way. In the second stage, they should then also be shown additional parameters to be able to optimally operate the flash smelting furnace. Production, engineering, azeti, IT, and the Analytics Center of Excellence work together on the Digital Factory project team for this project. The azeti platform gathers all of the data necessary to monitor and visualize the process. The Data Science Team from the Analytics Center of Excellence is responsible for analyses and model calculations.



## Lean network control with a digital business partner portal

On the basis of more than 20 workshops with suppliers, customers, and internal stakeholders, Aurubis developed ideas for a digital business partner portal and defined its requirements. This includes fixing contractual volumes or calling up contract data from the previous Copper Online platform. We're currently subjecting the first product entities to a practical test in a trial phase with customers and suppliers. Projects like this are making the management of our production network leaner, more digital, and even stronger.



## Higher throughput in the RWO

One objective of PIP is to increase concentrate throughput in the Hamburg plant's primary smelter Rohhütte Werk Ost (RWO). To that end, a team set about figuring out how the regular partial repairs and relinings of the converters could be carried out in a shorter period of time – with the goal of enabling the smelter to run in three-converter operation for longer. The result: technical upgrades, standardized processes, and modified work hours have reduced repair times by six days. Six days in which we can produce more.



## Good collaboration with our customers – in the Aurubis Digital Innovation Lab (InnoLab)

Aurubis doesn't just rely on digital solutions in production. We want to work together more digitally with our customers, too, providing them with added value. We established the InnoLab in September 2020 with this purpose. There, we develop digital services and solutions that enhance our products' appeal and strengthen customer loyalty.



ASPA:

# *Innovative metal recycling* in Beerse

Continuous innovation and the drive to become more and more efficient are part of Aurubis' formula for success. At the site in Beerse, Belgium, the state-of-the-art ASPA (Advanced Sludge Processing by Aurubis) recycling facility is set to be constructed using the synergies of the Metallo acquisition.

The concept of the circular economy didn't just crop up with the announcement of Green Deals in Europe and the US. The development of a functioning circular economy is key to resource-efficient business, to achieving national and international climate targets, and to maintaining prosperity and progress. Our recycling activities also make an important contribution and make us the most sustainable integrated smelter network worldwide.



Growth – but sustainable. This is our stated objective, which is why we're continuously expanding our recycling business. With ASPA, we are building a state-of-the-art recycling facility in Beerse (Belgium) starting in 2022, which will process anode sludge – a valuable intermediate product of the copper tankhouse – from the recycling sites in Beerse and Lünen in an internally developed hydrometallurgical process. The new method will recover metals from anode sludge more efficiently and in even less time than before – including precious metals such as gold and silver, but also tin. Around 250,000 t of multimetal scrap is already processed in Beerse every year, from the most complex industrial residues to higher-grade scrap.



#### PROJECT MANAGER:

**Yves De Visscher** "For us, ASPA is the circular economy at its best."

## The new hydrometallurgical process

With this newly developed process, we can recover more valuable metals from intermediate products – even faster than before.

€27m  
INVESTMENT



AU AG SN

“With ASPA, our production in Beerse will be faster and more efficient, and there will ultimately be an even higher yield of valuable metals than today.”

– Heiko Arnold, COO

“For us, ASPA is the circular economy at its best,” says Dirk Vandenberghe, Managing Director in Beerse. After all, the facility will recycle and reprocess an even greater volume of metal scrap – a vital step in light of the constant rise in metal scrap around the world.

### Next-level metal recycling

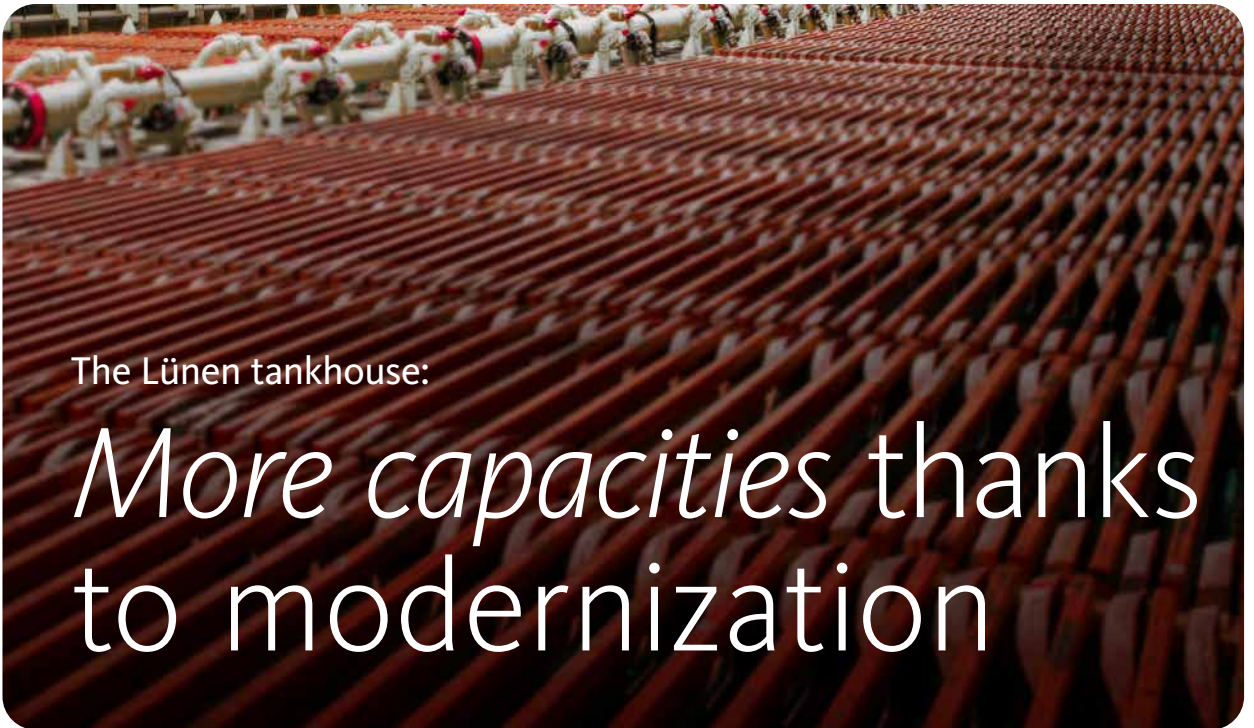
However, it's not just the quantity of metal scrap that's increasing; its composition is becoming more complex as well. The number of metals – for example in discarded smartphones or laptops – has risen sharply, and the product design of the devices is increasingly multi-layered. This makes the recycling process more elaborate, and requires investments in research. While developing ASPA, Aurubis and Metallo worked together closely with researchers at the university KU Leuven for three years to optimize the process and “raise metal recycling to the next level,” as Heiko Arnold, COO of Aurubis AG, explains. “That's a complex process. But reprocessing as many components as possible and tapping the potential of ‘urban mining’ – meaning the use of the city as a raw material warehouse – for scrap metal is crucial for closing

the waste cycle and fulfilling the increased demand for metals in a resource-efficient manner.”

### Prime example of the integration of Metallo

For ASPA, colleagues from Aurubis and the former Metallo site Beerse worked together closely on a joint project for the first time as well. The initial idea was developed by the employees in Belgium. But only with the collaboration of Aurubis and the integration of the new ASPA process in combined, cross-company flowsheets was the full potential leveraged and the implementation of the facility initiated. ASPA therefore isn't just a prime example of synergies from the acquisition of Metallo, but also of how two successful companies become one.

After the detailed planning is completed, construction of the facility will kick off in the second quarter of 2022. Commissioning is scheduled for early 2024.



The Lünen tankhouse:

# *More capacities thanks to modernization*

To produce high-purity copper, anodes with 98.5% copper content are used to produce cathodes with 99.99% copper content in the tankhouse. The tankhouse in Lünen was constructed in the mid-1960s. As a result, many parts of the facility already had 30 to 50 years of operation behind them.

## **Renovation during ongoing production**

Aurubis is currently modernizing the facility for about € 60 million so that it can be used even more efficiently in the future – for instance to

process heavier anodes. This will boost capacity by roughly 10 %.

All sections of the tankhouse are being overhauled one by one until 2024 by successively tearing down and rebuilding the cells – during ongoing production. This means that 80 % of the facility's capacity is in use at all times.

## **Potential for production expansion**

Roughly 210,000 t of copper cathodes will be able to be produced in Lünen annually following the modernization. Each second, that's the amount of pure copper required for about 300 smartphones. Because the plant in Lünen uses recycling raw materials, nickel is recovered first and foremost in addition to copper. We also draw gold, silver, and other precious metals out of the anode slimes within our smelter network.

80 924

EMPLOYEES ARE PART OF THE  
TANKHOUSE TEAM IN LÜNEN

CELLS IN FIVE SECTIONS ARE PART  
OF THE TANKHOUSE IN LÜNEN



RDE:

# Innovative *exhaust system*

With the RDE project (Reducing Diffuse Emissions), Aurubis is continuing its path of environmental protection with a sense of purpose and investing an additional € 85 million in better air quality at the Hamburg site.

## **Largest environmental protection investment since the 1980s**

Since 2000, Aurubis has invested over € 300 million in environmental protection at the headquarters in Hamburg alone and has continuously reduced particulate emissions. Thanks to the new exhaust system for the

project Reducing Diffuse Emissions (RDE), the site will fulfill the high environmental protection requirements in the future as well. With an investment volume of € 85 million, the installation is the largest environmental protection measure in the parent plant since the 1980s – which means it secures the site's viability in the long term as well. The innovative exhaust



system with ultra-fine filters and state-of-the-art installation technology has been in operation since October 2021 and will lead to a significant additional reduction in diffuse dust emissions. As a result, we are setting global standards for environmentally compatible primary copper production.

## Innovative and powerful

After a year and a half of planning, we constructed an impressive pipeline and exhaust system in 18 months during ongoing operation. Diffuse emissions from the primary smelter that previously couldn't be captured from a technical standpoint are now suctioned off, cleaned, and completely returned to the production cycle. The specially developed, needs-based control of the ridge turrets enables a level of digitalization in environmental protection that is unique in the industry, as well as efficient implementation with high volumes of exhaust air. Intermediate products from primary copper production will also be processed nearly emission-free in a new, closed building extension starting in 2022, and this hall will likewise be connected to the exhaust system.

“With RDE, we’re setting new standards in environmentally friendly primary copper production and are expressing a clear commitment to sustainability as a result.”

– Jens Jacobsen,  
Hamburg Plant Manager



More information  
in a short film:  
[aurubis.picturepark.com/  
v/CAIHjT7I/](https://aurubis.picturepark.com/v/CAIHjT7I/)



> Jens Jacobsen, Hamburg Plant Manager

# Grow

Recycling is a driver of growth for us. Our copper cathodes already contain about 45 % recycling material. We want to achieve a recycling rate of 50 % by 2030. North America and Europe in particular provide us with significant growth opportunities that we will leverage with our scalable Aurubis Modular Recycling System. This will kick off with our new recycling plant in Augusta, located in the US state of Georgia. Another high-priority growth area for us is battery recycling.

Page

26

Growth through  
recycling

Page

30

Solutions for  
sustainable mobility



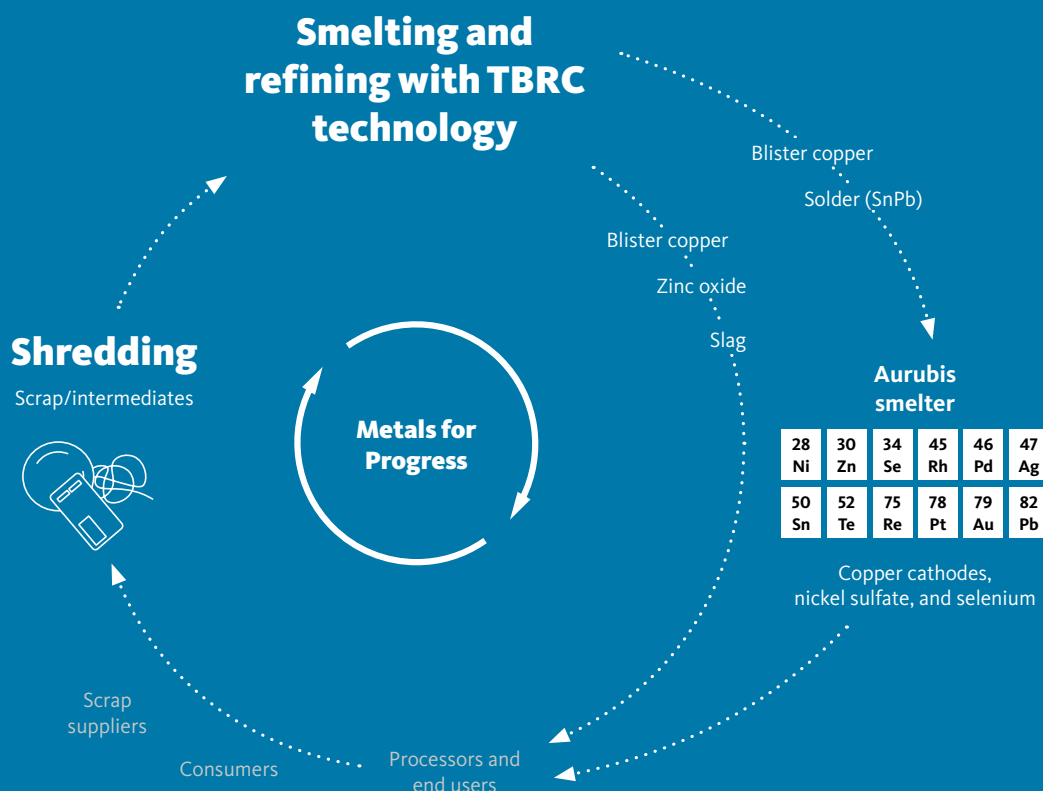




## Aurubis Modular Recycling System:

# Growth through *recycling*

With a modular system to develop new recycling plants, Aurubis can set up new sites quickly and flexibly in the future. This will begin with a new secondary smelter in the US.



## **Efficient, flexible, low-risk: More growth with modular recycling capacities**

Global market trends such as digitalization, the increase in renewable energies, and more sustainable business are driving the circular economy and therefore the reprocessing of valuable materials containing metals. We are taking advantage of this at Aurubis with a sense of purpose in order to significantly expand our recycling capacities in the years to come, penetrating new markets in a targeted way at the same time. The starting point is the idea of a “construction kit” system in which the individual stages of the recycling production process can be built in a variable fashion. This will enable us to efficiently and flexibly create new capacities with technologies available on the market, at little risk, and to integrate them into the broader smelter network.

After implementing another key phase of our multimetal strategy with the acquisition of Metallo, the next step is to strengthen our recycling activities through plants that we can develop in a modular approach – and thus flexibly – in line with our needs. In these plants, too, we will rely on technologies that are well-known in the market to recover valuable metals from scrap coming from the automotive or telecommunications sectors – such as sheathed cable and printed circuit boards (PCBs). This targeted expansion of our capacities will secure our position in a market with strong growth potential early on. After all, PCBs are found in nearly every electronic component and accumulate in large volumes because of the often very short life cycle of modern technical devices such as smartphones and laptops.

In our future recycling plants, five modules (or the five stages of the recycling process) will be able to be used individually or combined, in accordance with the “construction kit” principle.

## ***Flexible setup, integrated processes, and long-term value creation***

We will position the new recycling sites according to the recycling raw material markets. This will help us optimize transport costs while protecting the environment. The module selection at each new site will be oriented to the current processing capacities in the Aurubis Group. The planned models differ in particular with regard to the extent that recycling raw materials are processed before they are fed into the existing smelter network for refining. We want to seamlessly integrate the new sites into our network so that we can process as many intermediate products as possible internally along the entire process chain.

Thanks to the modular setup of the new recycling facilities, we're in a position to react flexibly to the market and demand, returning more and more valuable materials containing metals to the resource cycle.

“With this investment, we're sending a clear signal for sustainable growth, and we'll become a forerunner for multimetal recycling in the US as well.”

– Roland Harings,  
CEO



## Sustainable growth through expansion into the US recycling market

We will build the first secondary smelter specializing in multimetal recycling in the US. The start of construction is planned for mid-2022.

A total of 6 million t of recycling material containing metal accumulates in the US each year. According to expert estimates, the market there will grow an average of 4 to 6% annually. A rise in awareness for sustainability issues and increasing regulations for resource-efficient business activity are leading to an ever-mounting accumulation of valuable materials in the US as well, materials that are currently transported to Asia for processing. We're taking advantage of this huge opportunity to enter an attractive,

# ~300

INVESTMENT VOLUME (€ MILLION)

# 100+

LOCAL JOBS

fast-growing market as a forerunner, recycling valuable materials containing copper, nickel, lead, and precious metals locally in the US. This will ultimately broaden our international integrated smelter network in the future.



> This visualization reflects how Aurubis' new US recycling plant will look.

We're very familiar with the features specific to the US since we've been operating a plant in Buffalo since 2011. Following extensive analyses and after carefully reviewing different options, we decided on Augusta (Richmond County) in the state of Georgia as the site for the plant, where we met strong support from local political decision-makers.

The first multimetal recycling plant in the US will be built on a section of a 600,000 m<sup>2</sup> property in accordance with the highest environmental standards, with enough space for future capacity expansions.

### ***Seamless integration into our smelter network***

We plan to fully ramp up production in 2024. About 100 new experts will then process PCBs, shredded metal, and other recycling materials containing metals into around 35,000 t of blister copper each year with our market-specific technologies. We will process this intermediate product into different valuable metals at our European smelter sites to a large extent, and extract metals such as tin, lead, and zinc, which we will also return to the resource cycle. Industry needs the recycled high-purity metals to manufacture electric vehicles, wind turbines, and solar plants, for example.

The investment of about € 300 million in our first US recycling plant will pay off in multiple ways. It will contribute to ambitious climate protection goals and to conserving natural resources across borders in the EU and the US. We expect an annual contribution to EBITDA of approximately € 80 million beginning in fiscal year 2025/26.

“With the decision for a US recycling plant, we’re in the right place at the right time.”

– Hans Rosenstock,  
Project Manager  
Corporate Development



› Pat Wilson, Commissioner of the Georgia Department of Economic Development, and Aurubis CEO Roland Harings signed an MoU regarding economic support measures on November 10, 2021.

## Battery recycling:

# Solutions for *sustainable mobility*

As the number of electric vehicles increases, the demand for batteries is growing rapidly. Aurubis is now looking into ways to recycle them in a pilot plant.



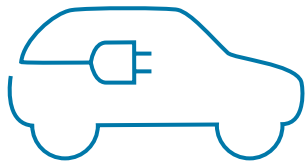
### **Nickel, cobalt, manganese, and lithium**

In the future, Aurubis will have a sustainable solution for processing black mass (top) and will recover not only nickel (bottom center), but also cobalt (bottom left), manganese, and lithium (bottom right). These metals can be returned to battery production.

### **On the move with batteries**

In the fight against climate change, sustainable solutions are in demand. For instance, there's currently an ongoing push to expand electric vehicles. According to current forecasts, every second car sold in the EU will be electric by the end of the decade. This will cause the need for lithium-ion batteries to rise rapidly as well – just like demand for the raw materials to produce them. Estimates indicate that more than

10 million t of key battery metals such as lithium, nickel, cobalt, and manganese will be needed for electric vehicles alone in 2030 – nearly ten times as much as in 2020. At the same time, the volume of lithium-ion battery scrap will increase fivefold in this period, to nearly 1.5 million t. What's clear is that the necessity of recycling batteries is growing. Policymakers are also calling for the proportion of recycled raw materials in batteries to increase. The EU has enshrined this requirement in its battery directive, for example.



EVERY SECOND NEW CAR WILL  
BE ELECTRIC BY THE END OF THE  
DECADE.

With the electrification of road traffic, demand for lithium-ion batteries is on the rise. Demand for the raw materials to produce them is increasing rapidly as well.

Accordingly, the powdery content of used lithium-ion batteries – referred to as black mass – is becoming a valuable raw material. Depending on the content of different battery metals, the value of one ton can be over US\$ 10,000. At the same time, black mass is a very complex raw material.

### **We can do complex**

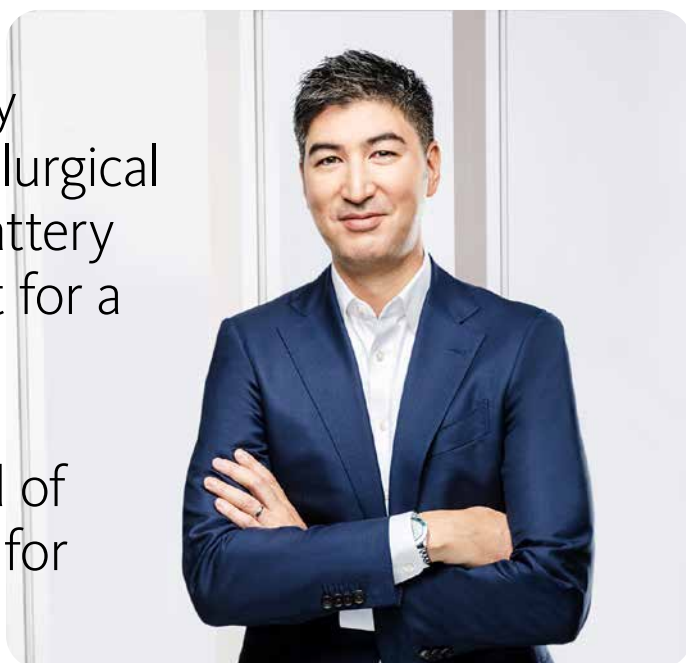
Thanks to our metallurgical expertise, we can process complex materials and return valuable metals to the production cycle – pursuant to our mission “Responsibly transforming raw materials into value – to provide metals for an innovative

world.” We aspire to continue boosting resource efficiency and to make a positive contribution to the circular economy. Aurubis has spent the past two years successfully developing a new hydrometallurgical method for processing black mass and registered it for a patent. This allows us to recover nickel, cobalt, manganese, and lithium and return them to battery production. Graphite is also drawn out as an intermediate product.

At the moment, we’re preparing the trial phase. At the Hamburg site, we plan to investigate aspects such as the recovery of the metals, the influence of impurities, and cost efficiency in a pilot plant. We want to process different raw material qualities and produce products and intermediates in multiple campaigns. As soon as we can ensure that the process is running robustly, we will start designing the first industrial plant for processing black mass: a sustainable solution for recycling complex battery waste.

“Aurubis has successfully developed a new metallurgical process for recycling battery metals and registered it for a patent.”

– Ken Nagayama, Head of  
Business Development for  
Battery Materials



# *Sustain*

Sustainable conduct and business activity are integral components of our strategy. We want our production to be carbon-neutral well before 2050 – with measurable targets and concrete measures to reduce emissions. Through our responsible approach to resources, we're already making a notable contribution to the energy transition with our production techniques – just as we do with our products.

Page

## 34

A commitment to climate protection

Page

## 36

In-house energy production

Page

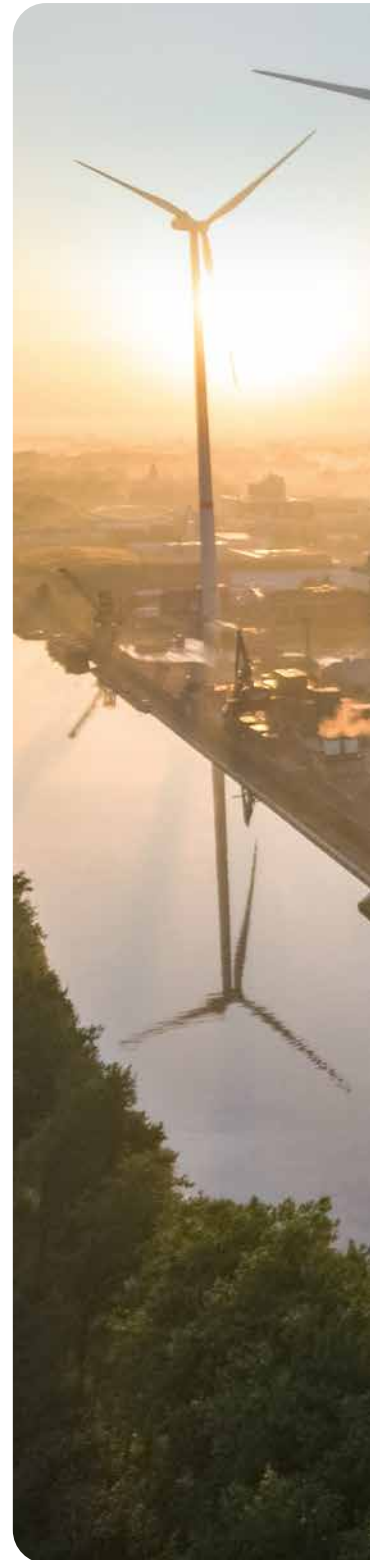
## 38

Metallurgical purification without emissions

Page

## 40

Our sustainability promise to customers







## Science Based Targets initiative:

# *A commitment to climate protection*

By cutting Scope 1 and Scope 2 emissions in half by 2030, we want to make an important contribution to limiting climate change. Our emission targets have now been validated by the Science Based Targets initiative.

### **New requirements for emission reduction**

We want to reduce our absolute Scope 1 and Scope 2 emissions by 50 % compared to the reference year 2018. This applies to CO<sub>2</sub> emissions from burning fuels in our own facilities (Scope 1) and from bought-in energy (Scope 2). We also want to reduce the emissions that arise in the upstream and downstream stages of the value chain (Scope 3) at the same time – by 24 % per ton of copper cathode output. Aurubis plans

to make a vital contribution to limiting climate change, which is why our ambitious target is for our production to be carbon-neutral well before 2050. Cutting CO<sub>2</sub> emissions in half by 2030 is an important milestone on this path.

### **Objective parameters based on science**

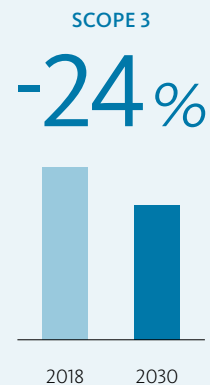
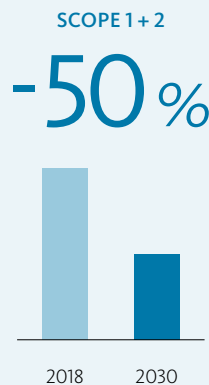
In June 2021, the Science Based Targets initiative (SBTi) validated these targets. This confirms our contribution to limiting global warming to

## **CO<sub>2</sub> reduction targets until 2030**

Our science-based reduction targets are an important milestone on the way to making our production carbon-neutral well before 2050.



**BUSINESS AMBITION FOR 1.5°C**  



1.5°C pursuant to the Paris Agreement with our targets. The SBTi is an international initiative of the CDP, the World Wide Fund for Nature (WWF), the UN Global Compact, and the World Resources Institute (WRI) with the goal of keeping global warming below 1.5°C through a 4.2% annual reduction in CO<sub>2</sub> emissions.

By joining the UN Global Compact initiative Business Ambition for 1.5°C in 2019, we committed to devising science-based CO<sub>2</sub> reduction targets in accordance with the SBTi method, which is based on the Greenhouse Gas Protocol (GHG Protocol). The initiative is a global coalition of UN organizations, companies, and industry leaders in cooperation with the Race To Zero campaign. It calls on companies to set ambitious, science-based targets to reduce emissions.

“We support the European climate targets and will make a key contribution as a company.”

– Roland Harings,  
CEO

### **A variety of measures to achieve the targets**

We are currently developing a detailed roadmap to help us achieve our climate goals. Regarding Scope 1 and Scope 2 emissions, we rely on technical measures such as decarbonizing plant facilities by using green hydrogen instead of fossil fuels, electrifying our production, utilizing waste heat, and expanding the purchase of green electricity. Approaches for reducing Scope 3 emissions include cooperation in the supply chain and increased recycling activities, for example.

### **WE'VE HAD OUR SCIENCE-BASED TARGET APPROVED**



## Solar plant in Bulgaria:

# In-house *energy production*

In Bulgaria, we're taking the next step on the path to decarbonization by building the country's largest in-house solar plant.

### **Photovoltaic project on a new scale**

In June 2021, Aurubis Bulgaria started building a 10 MW solar plant on the premises of the site in Pirdop. As an industrial consumer of this size, Aurubis Bulgaria is setting new benchmarks for in-house production of green energy in Bulgaria with this project.

After its completion, scheduled for late 2021, it will be the largest company solar plant for in-house electricity generation in the country. The Aurubis-1 project comprises the installation of 20,000 solar panels on a remediated and recultivated landfill – with a total area of 104,000 m<sup>2</sup>. CEZ ESCO, a company of the CEZ Group, is building the Aurubis-1 solar plant.

# 20,000

SOLAR PANELS

### **Reducing emissions with in-house electricity**

With this project, Aurubis is taking the next step toward sustainable multimetal production: the project already contributes to our strategic objective of making our production carbon-neutral by 2050. Once commissioned, Aurubis-1 will reduce the annual external electricity consumption by approximately 11,000 MWh. This is equivalent to 2.5% of the site's electricity needs. Aurubis Bulgaria will thus save 15,000 t of CO<sub>2</sub> each year with the project compared to the use of coal-generated power – that's 225,000 t of CO<sub>2</sub> over its planned operating life. In the medium term, this contribution from Aurubis Bulgaria will help the Aurubis Group fulfill its ambitious goals. The plant wants to produce 20% of its energy from its own renewable sources by mid-2030.

These strong objectives will help further reduce our already very small footprint within the international sector and expand our leading position in environmental protection.



- › The project comprises the installation of over 20,000 solar panels on a remediated and recultivated landfill. The total area covers 104,000 m<sup>2</sup>.



More information  
in a short film:  
[aurubis.picturepark.com/  
v/2Xe1eavh/](https://aurubis.picturepark.com/v/2Xe1eavh/)



- › Petko Ivavnov, Project Manager at Aurubis Bulgaria: “We want to lead by example when it comes to sustainability, and the solar plant is another flagship project for this.”



- › Kiril Petkov, Minister of Economy in Bulgaria, and Roland Harings, Aurubis CEO, came to Pirdop, Bulgaria, to kick off construction of the largest internal company solar plant on June 24, 2021.





## Hydrogen:

# *Metallurgical purification* without emissions

In a pilot project at the Hamburg plant, Aurubis successfully tested the use of hydrogen in the anode furnace. This facilitates a reduction process without CO<sub>2</sub> emissions.



### Successful pilot project

Aurubis was the first company in the copper industry to test the use of hydrogen on an industrial scale. In a pilot trial extending over several weeks at the Hamburg plant, we used a gaseous mixture of hydrogen and nitrogen in place of natural gas to pole copper melt in the anode furnace during production. Poling refers to a metallurgical purification process or a reduction process in melted metal. When feeding in the gas mixture, excess oxygen bound to the copper is drawn out of the copper melt.

**R&D PROJECT MANAGER:**  
**Torben Edens** “Hydrogen could replace fossil fuels in the production process in the medium term, making production more climate-friendly overall.”

In the current process using natural gas as a reducing agent, carbon dioxide (CO<sub>2</sub>) is formed as a by-product. These CO<sub>2</sub> emissions can be avoided when a gas mixture is used in reduction – in this case, water vapor is the only by-product of poling. A regulating station plays a crucial role in this pilot process, keeping the pressure in the anode furnace constant through the feed nozzles.

## The foundation for a future with hydrogen

This project enabled us to test the reaction of the facilities to the hydrogen fed into them, and we were able to get this production step up and running smoothly. As a result, Aurubis has laid the foundation for additional Group activities with hydrogen thanks to the technical experience gathered in the pilot.



> The test series was carried out in the anode casting wheel in Hamburg.



> First Mayor of Hamburg Peter Tschentscher (right) was also impressed by the successful pilot test (shown here with Roland Harings).

“With the successful launch of the hydrogen pilots, Aurubis visualizes a carbon-neutral future with the help of innovation.”

– Roland Harings,  
CEO

## Tomorrow Metals by Aurubis:

# *Our sustainability promise to customers*

The label Tomorrow Metals by Aurubis® represents our strong commitment to sustainability. It is based on four pillars: environmental protection, carbon footprint, recycling, and responsibility.



More in the video:  
[aurubis.picturepark.com/  
v/5movoz1B/](https://aurubis.picturepark.com/v/5movoz1B/)

### **A strong label for a strong promise**

Tomorrow Metals by Aurubis emphasizes the strong Group-wide focus on sustainability. The label stands for Aurubis' pledge to deliver more value while lowering its carbon footprint and imposing the highest standards on energy efficiency and environmental protection.

Michael Hellemann, Head of Commercial at Aurubis, underlines the company's commitment to sustainability: "Our promise encompasses our many efforts to increasingly act and do business sustainably, efforts we have already made in the past and will continue to push forward in the future as well. Those who buy from Aurubis today and in the future can be assured that Aurubis is at the forefront when it comes to sustainability."

### **Four pillars provide a reliable footing**

Tomorrow Metals by Aurubis consists of more than just a pledge for sustainable and responsible conduct. The label is supported by four pillars that comprise reliable KPIs.

"Those who buy from Aurubis today and in the future can be assured that Aurubis is at the forefront when it comes to sustainability."

– Michael Hellemann,  
SVP Commercial



## Tomorrow Metals is based on four pillars

### ENVIRONMENTAL PROTECTION

Aurubis has invested more than € 730 million in environmental protection measures since 2000, reducing dust emissions to air by 96 % and metal emissions to water by 88 % in copper production across the Group, among other achievements.

### CARBON FOOTPRINT

Aurubis is determined to keep shrinking its carbon footprint, thus contributing to the 1.5°C goal of the Paris Agreement. Compared to 2018, the Group wants to cut its Scope 1 and 2 emissions by 50 % and Scope 3 emissions by 24 % per ton of copper cathode output until 2030.

### RECYCLING

Currently, Aurubis' copper cathodes contain about 45 % recycling material. To further promote the circular economy of metals, the Group will continue expanding its recycling capacities. This will kick off with our new recycling plant that we'll be building in the US.

### RESPONSIBILITY

We maintain a relationship of trust with our employees, suppliers, customers, and neighbors. When selecting business partners, Aurubis ensures that, among other aspects, sustainability and compliance criteria are reviewed and continuously evaluated.

# Aurubis *at a glance*

2020/21 in numbers



€353 m

OPERATING EARNINGS  
BEFORE TAXES (EBT)



15.6 %

OPERATING ROCE  
(RETURN ON CAPITAL EMPLOYED)



€1.60

DIVIDEND



€812 m

NET CASH FLOW



7,135

EMPLOYEES

## Publisher

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Germany





1 million t

RECYCLING  
MATERIAL INPUT



2.3 million t

CONCENTRATE  
THROUGHPUT



€ 256 m

CAPEX



45 %

RECYCLING MATERIAL  
IN EACH COPPER CATHODE



5.0

LTIFR (LOST TIME INJURY FREQUENCY RATE)



€ 232 m

ENERGY COSTS

### Paper

Printed on FSC-certified paper. By using FSC paper, we are actively supporting the preservation of our forests, promoting plant and wildlife protection, and taking a stand against human exploitation of forest resources.

### Additional environmental measures

CO<sub>2</sub>-neutral production with a Gold Standard certificate.

[www.klima-druck.de/klimainitiative/?lang=en](http://www.klima-druck.de/klimainitiative/?lang=en)



[www.blauer-engel.de/uz195](http://www.blauer-engel.de/uz195)

- resource-conserving and environmentally friendly manufacturing process
- low emission printing
- primarily made from waste paper

BD3

The paper and the printer are certified in accordance with the latest Blue Angel standards (DE-UZ 195).

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**Metals for Progress**

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