

# Aurubis Virtual Capital Market Day 2021

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# Agenda

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Introduction

Angela Seidler, VP

2

Mission, purpose, and strategy

Thomas Sturm, SVP

Rainer Verhoeven, CFO

3

Recycling markets

David Schultheis, ED

4

Battery recycling

Ken Nagayama, ED

5

Current projects contributing  
to updated strategy

Heiko Arnold, COO



# Aurubis AG

# Metals for Progress

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Introduction

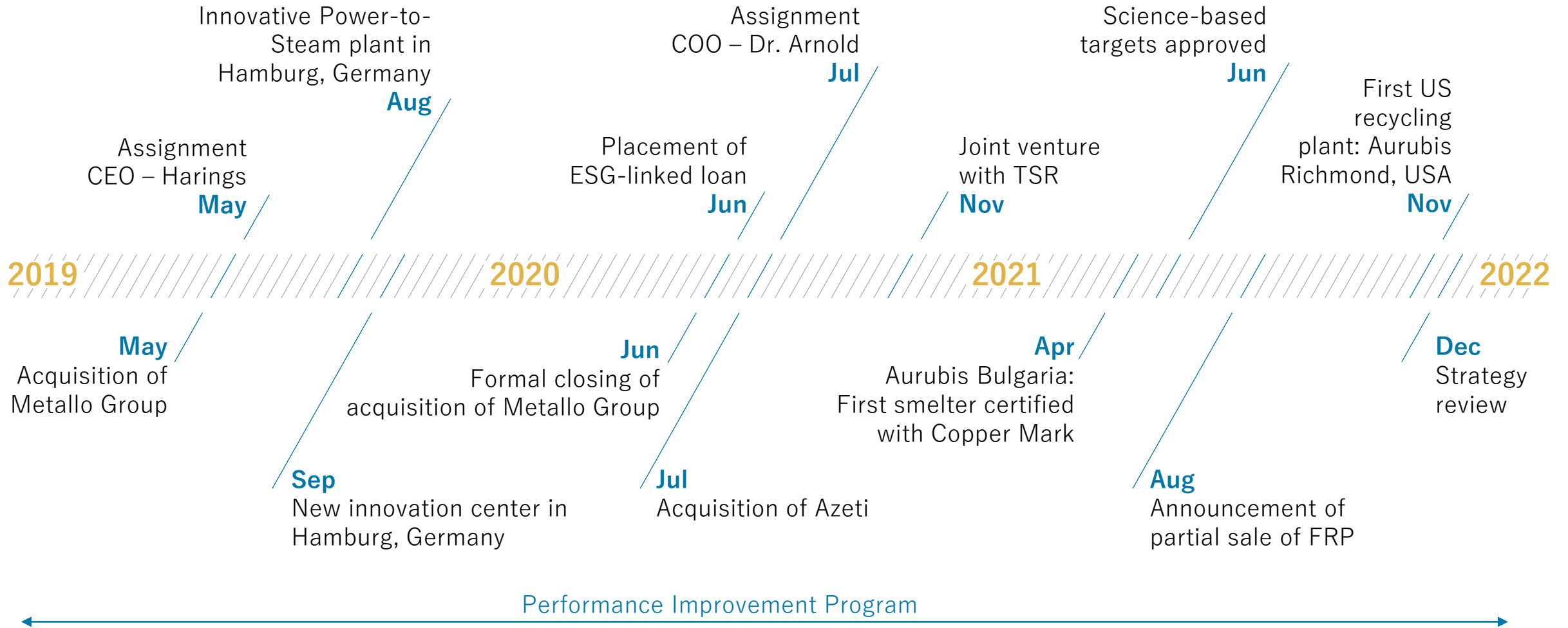
Roland Harings, CEO

Capital Market Day, December 6, 2021





# Much achieved & more ahead: Activities in support of strategy update





# We work for an innovative and sustainable world

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## MISSION

We responsibly transform raw materials into metals for an innovative and sustainable world.

## VALUES

**Performance** – means commitment!  
**Responsibility** – means decisions!  
**Integrity** – means maintaining trust!  
**Openness** – means curiosity!  
**Appreciation** – means real interest!

## STRATEGY



Metals for Progress:  
Driving Sustainable Growth

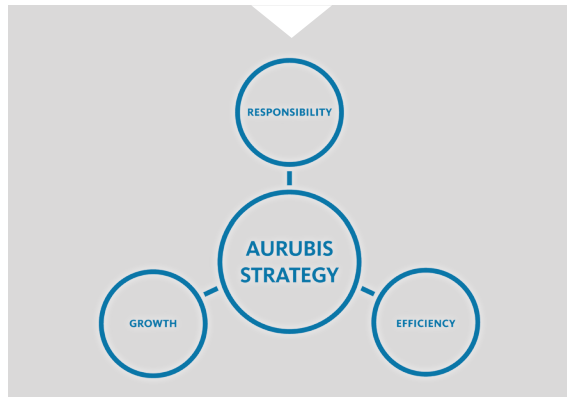
# Securing our frontrunner position by anticipating market developments



2017/18



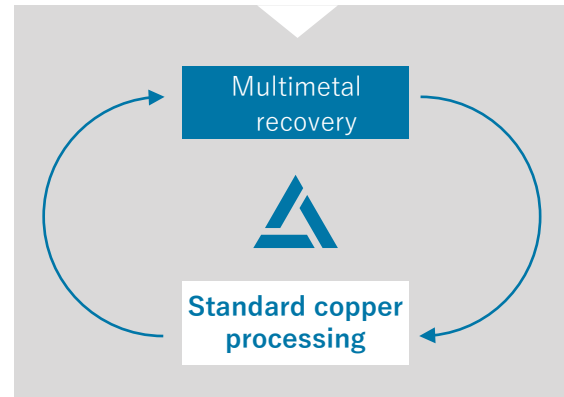
Strategic alignment towards increased demand for sustainable solutions



2019–21



Further diversification through implementation of multimetal strategy



Until 2030



Pursuing new growth areas to combine sustainability and growth



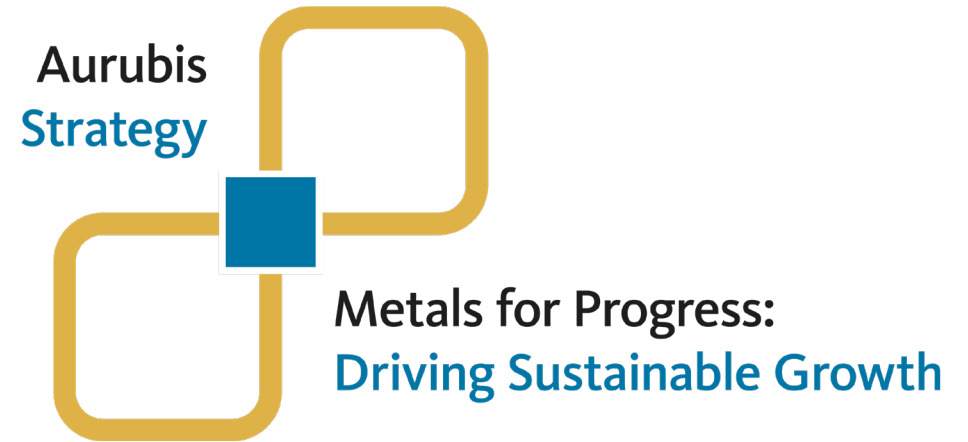


# Our strategy builds on the sound mission of Aurubis and covers all relevant aspects to drive sustainable growth



## Industry Leadership in Sustainability

- Enablers**
- Digitalization, automation, and “Plant of the Future”
  - Strategic resource management, talent and personnel development



» It is our mission to responsibly transform raw materials into metals for an innovative and sustainable world.

# Aurubis AG

# Metals for Progress

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Mission, purpose, and strategy

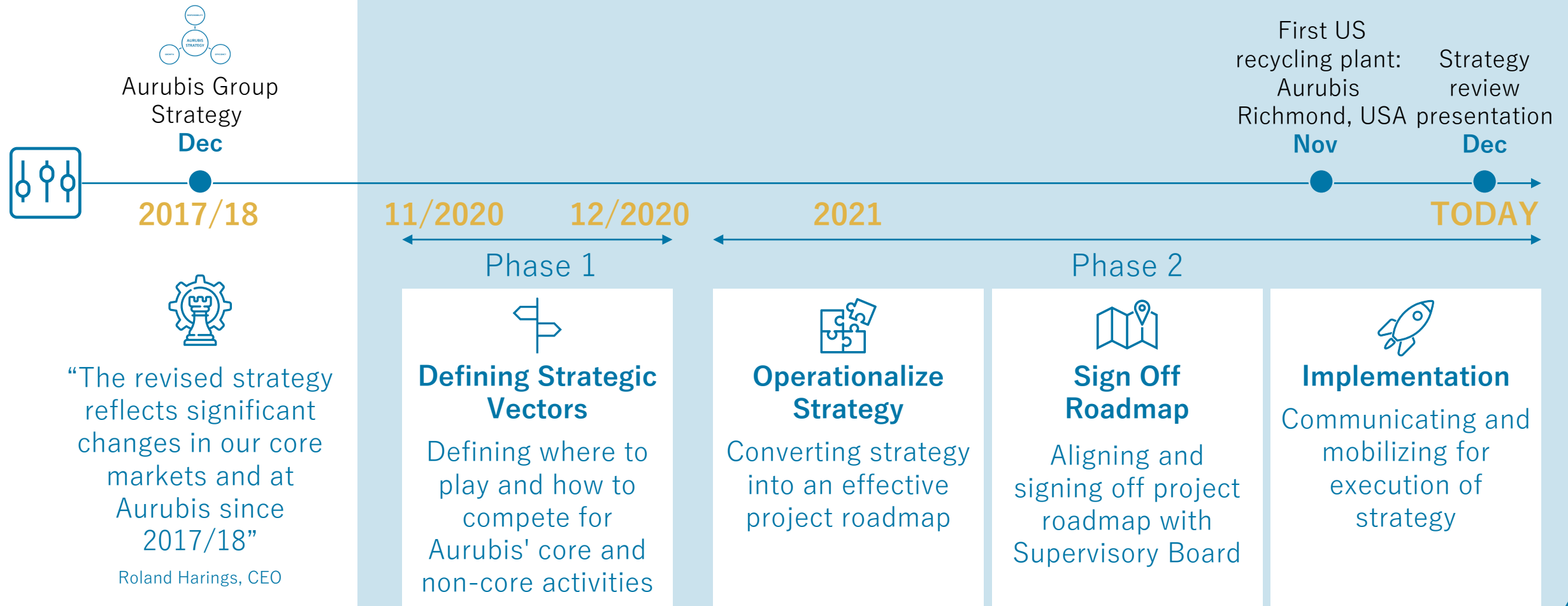
Dr. Thomas Sturm, SVP Corporate Development  
Rainer Verhoeven, CFO

Capital Market Day, December 6, 2021








# The strategy update led to a clear project roadmap



# We have operationalized our strategic agenda in five key areas

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

**Organization very successfully mobilized for strategy process**

- Five work packages managed by 11 process and content leads
- >100 colleagues from different roles and sites involved
- Bi-weekly SteerCo for extensive discussion and quick decision-making
- Routine risk assessment to identify and counter-act risks early on

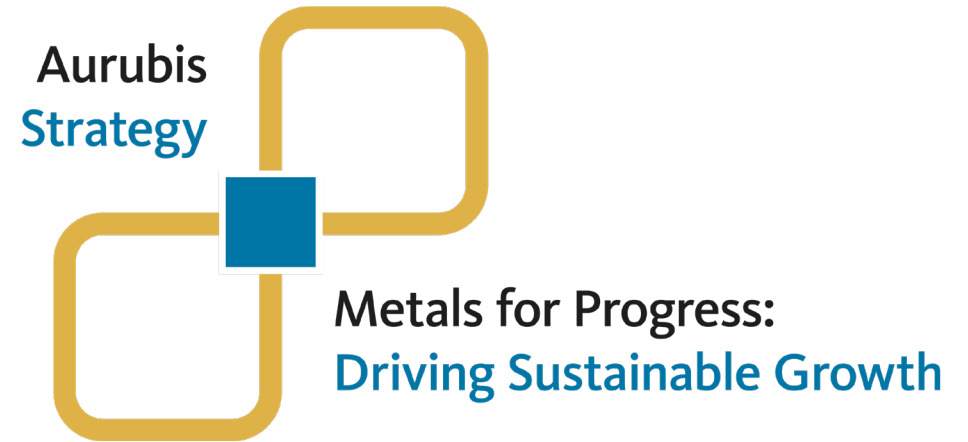


# Our strategy builds on the sound mission of Aurubis and covers all relevant aspects to drive sustainable growth



 **Industry Leadership in Sustainability**

- Enablers**
- Digitalization, automation, and “Plant of the Future”
  - Strategic resource management, talent and personnel development



**» It is our mission to responsibly transform raw materials into metals for an innovative and sustainable world.**

# Strategy pillar 1: Further optimization of our solid core business



## Secure Core Business

Core business is based on [high productivity](#), [cost efficiency](#), and [effective distribution channels](#) for our products.

Demand for our metals is rising and we aim to improve and expand [the processing capabilities within our Group-wide smelter network](#) to meet this demand.

Core elements of the continuous improvement and operating excellence include initiatives by the plants in supply chain management, maintenance planning, software, and data support.



## Strengthen Core Business

Implementing [targeted projects](#) at various sites to expand our processing capacities and increase [multimetal output](#).

Plans to [utilize synergies in the Group even more efficiently](#) for the benefit of the sites through the [targeted networking of](#) and an optimization of material flows.

A requirement for all projects and initiatives is that they must be [in line with our overall strategy](#).



**Our efficient and solid core business provides a strong foundation for further profitable, sustainable growth**

# Strategy pillar 2: Realize growth in existing and new business areas



## Pursue Growth Options

Based on our core business, we are pursuing new growth projects.

Increasing recycling rates, closed material loops, and e-mobility will continue to drive the supply of complex recycling materials in the future.

This is accompanied by a sharp rise in demand for low-emission supply chains.

### Drivers



**Recycling** – a key growth driver for us – both in terms of complex materials as well as new opportunities in areas such as battery recycling



**Focus on US and EU** – strong increase in supply expected for North America due to collection increase and fewer exports, growing supply in EU not fully tapped into



**Modular and repeatable approach** – ability to quickly react to market trends and demand with new plants and projects

» We use our long-standing process expertise and modern plant equipment to deal with more complex recycling materials.

# Strategy pillar 3: Sustainability defines our actions and operations



## Industry Leadership in Sustainability

We anchor sustainability even more firmly throughout the company, in all our workflows and processes, supported by ...

... our clearly defined responsibilities, resources, and projects



... our purpose to responsibly create metals from raw materials for an innovative and sustainable world



... our appropriate measures and binding targets within the areas environment, social affairs, and corporate governance



... our precisely defined roadmap for further sustainable, profitable growth



» **Most sustainable and most efficient: Our ambition is to be climate neutral well before 2050.**

# Based on the strategic roadmap: Short-term financial guidance

## Short term

2020/21ff.

- **~€ 350 million capex approved** for strengthening the core business, growth & sustainability
- ASPA, US recycling plant, and Industrial Heat 2 will lead to EBITDA of **~€ 100 million** starting 2025/26
- Most of the **EBITDA comes from the growth project**





# Based on the strategic roadmap: Medium-term financial guidance

## Medium term

2025/26

- **~€ 250 million in additional capex** planned for strengthening core business & sustainability
- Five strategic projects that are currently under development should lead to **~€ 70 million EBITDA by 2029/30**
- Additional strategic projects, e.g., the modular **recycling system (~€ 250 million capex each)** and **battery recycling (~€ 200 million capex)** aren't included yet but will be **actively pursued**



# Based on the strategic roadmap: Long-term financial guidance

## Long term

2030

- The **volume of our long-term growth and project pipeline** significantly exceeds the short-term and medium-term investment amount
- All capex projects will be subjected to a thorough sustainability review (particularly CO<sub>2</sub> contribution)
- **Battery recycling is a high-priority growth area** for Aurubis. We plan to invest ~€ 200 million until the middle of this decade. A **hydrometallurgical pilot plant** is currently **underway**. A corresponding **patent application** has been submitted.



# Based on the strategic roadmap: Clear financial guidance

## Short term

2020/21ff.

- Capex ~€ 350 million approved
- EBITDA of ~€ 100 million starting 2025/26
- Most of the EBITDA comes from the growth project

## Medium term

2025/26

- Capex ~€ 250 million planned in addition
- EBITDA ~€ 70 million by 2029/30 in addition
- Additional strategic projects, e.g., the modular recycling system (~€ 250 million capex each) and battery recycling (~€ 200 million capex) not yet included

## Long term

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- Volume of our long-term growth and project pipeline significantly exceeds short- and medium-term investments
- All capex projects subjected to a sustainability review (particularly CO<sub>2</sub> contribution)
- Battery recycling high-priority growth area. Capex ~€ 200 million until the middle of this decade. A hydro-metallurgical pilot plant is underway. Patent application submitted.



# Aurubis AG

# Metals for Progress

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Recycling markets

David Schultheis, Executive Director Strategy

Capital Market Day, December 6, 2021





# Recycling markets are the focus of Aurubis' growth ambitions



Enablers:  » Digitalization, automation, and "Plant of the Future"  
» Strategic resource management, talent and personnel development

## Growing material availability

Strong growth in European and US recycling markets driven by global macro trends.

## Higher material complexity

Miniaturization and increasing collection rates will drive availability of low-grade recycling materials – a sweet spot for Aurubis!

## Low competition

Aurubis is a frontrunner in recycling of low-grade materials in Europe; limited low-grade recycling capacity in the US is a great opportunity.

## Stable supply base

Aurubis already has a diversified, reliable supply base in Europe & the US – closed-loop solutions convert customers into reliable suppliers.

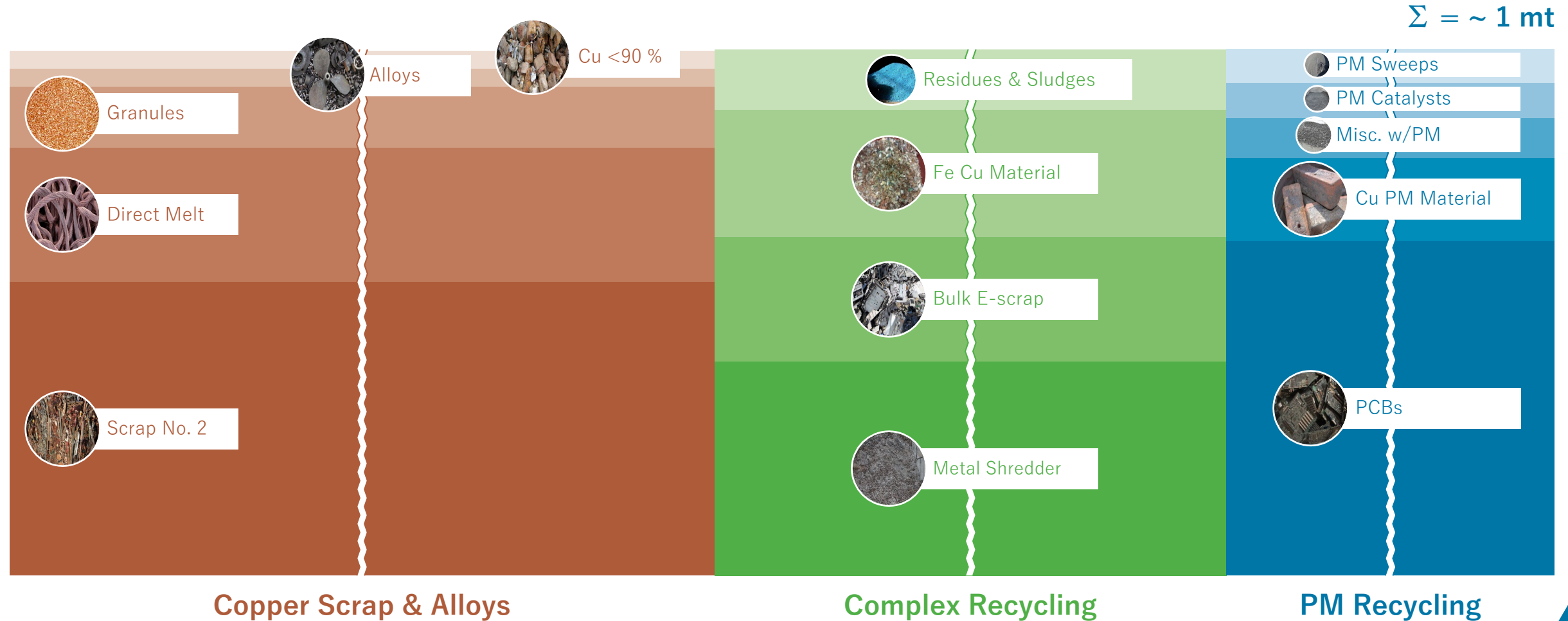
» **The perfect mix for Aurubis to pursue future growth.**

# Strong global macro trends drive growth in recycling markets

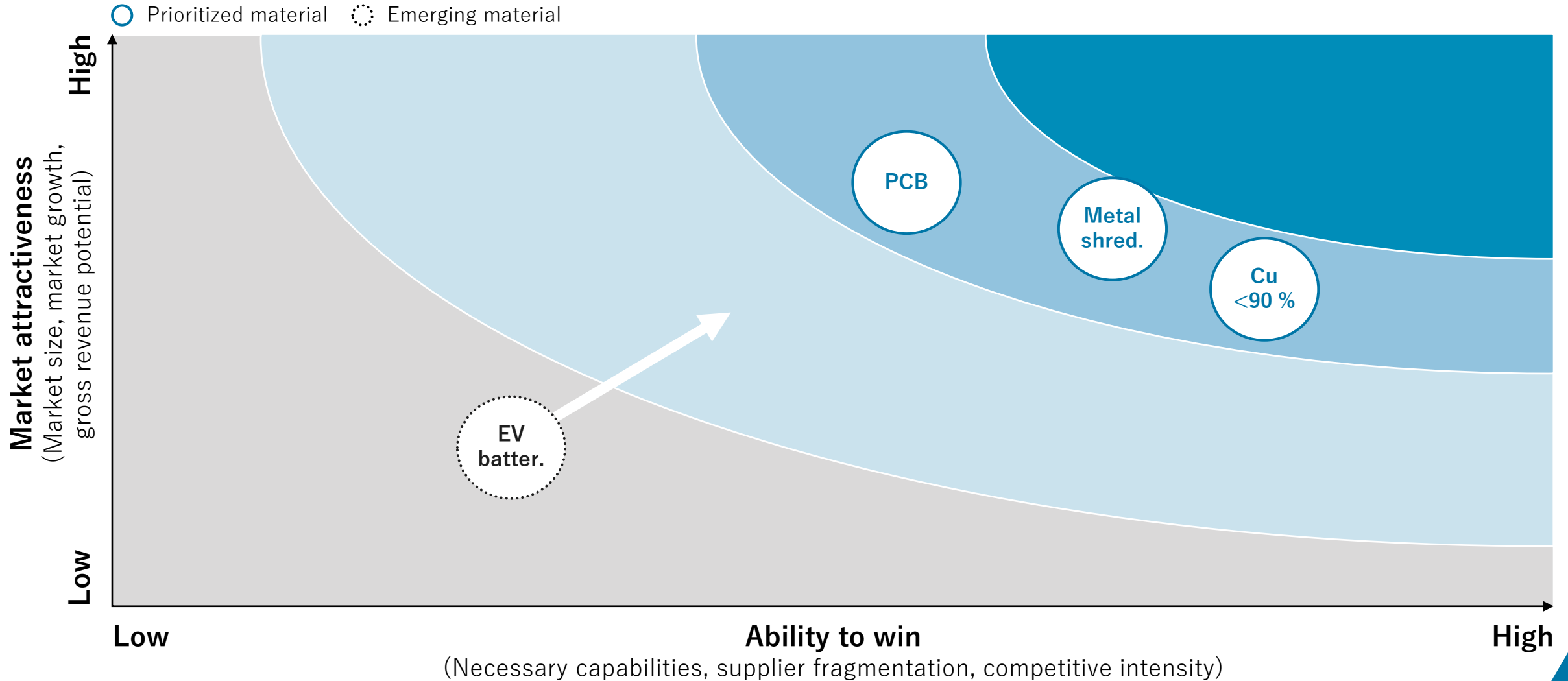


# Our metallurgical capabilities ensure necessary flexibility for feed mix

Illustrative



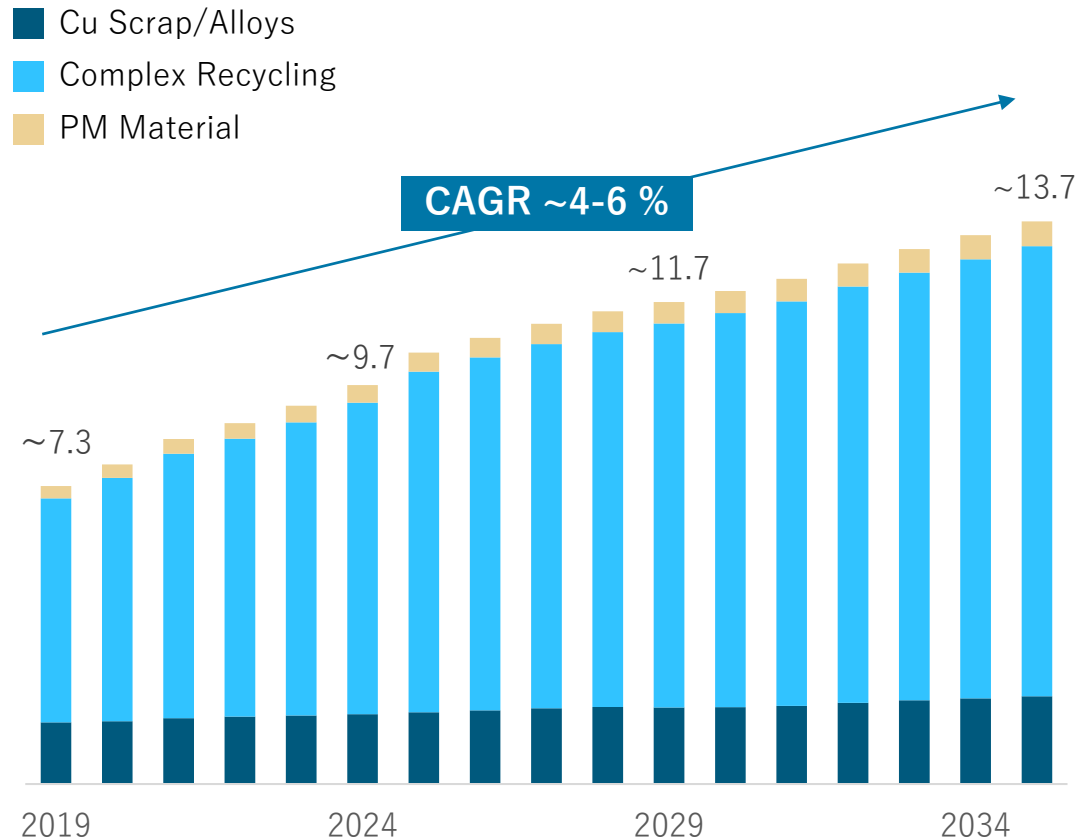
# Attractive opportunities and EV battery material as emerging business



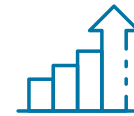
# European market: ~4 % CAGR 2019-35 driven by complex recycling



## EU market size for recycled materials 2019-35 (in mt)



## Growth Drivers



### Incremental Growth

**Steady growth of industrial activity** and consumption of consumer electronics provide solid growth base



### Collection Rates

**Increasing collection rates**, especially of bulk e-waste and PCB materials (currently only 40-45 % collected – below target of 65 %)



### Import/Export

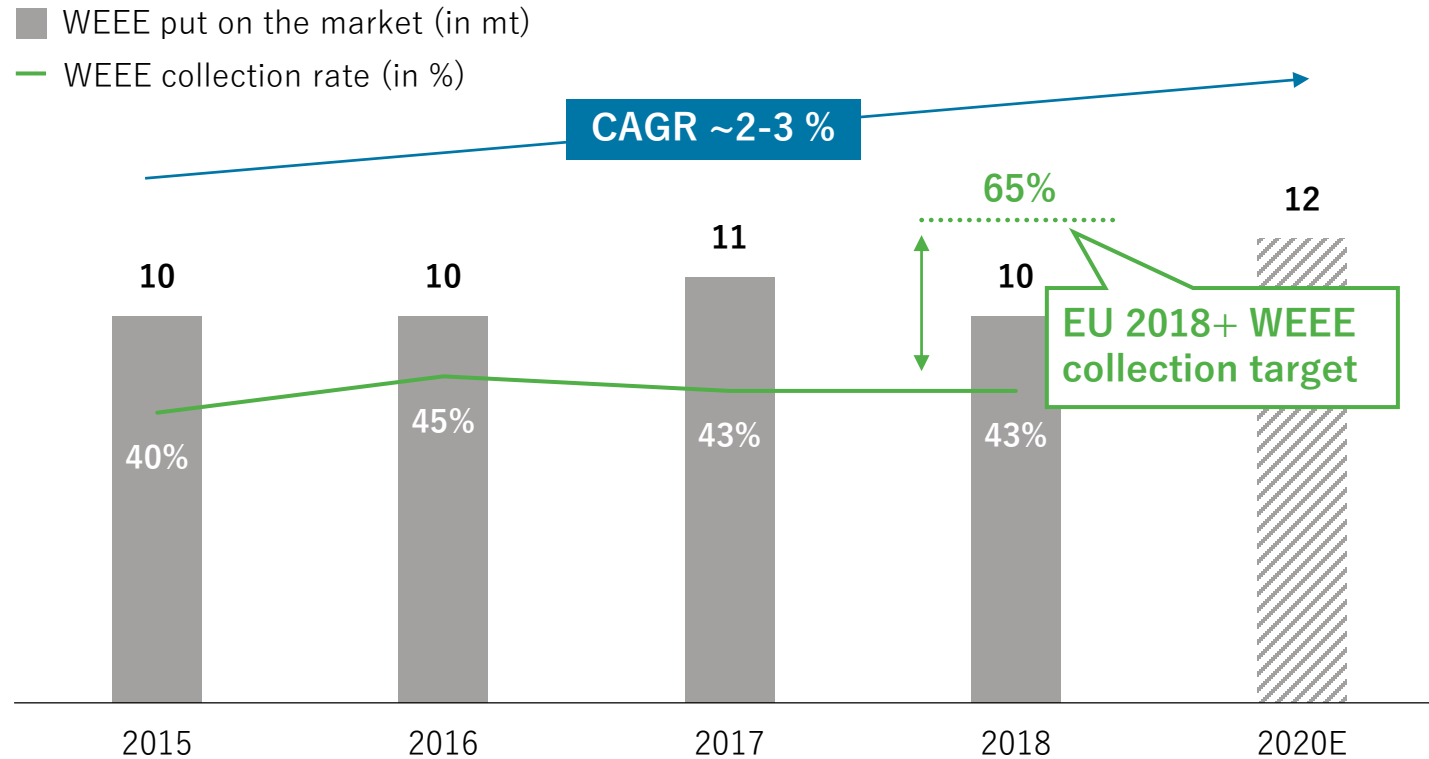
Net export of copper scrap **continuously decreasing with increasingly restrictive import policies** in current outlets



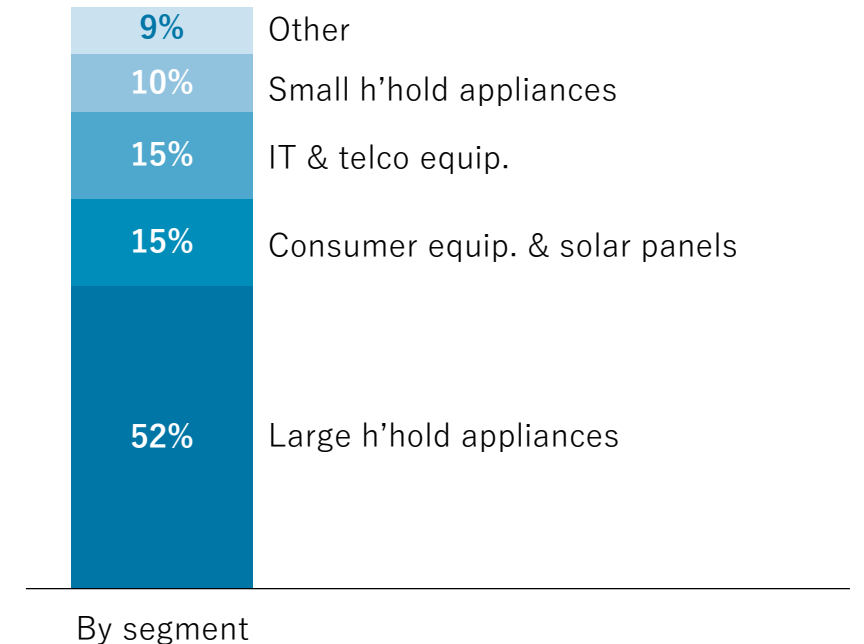
# Positive dynamics – expected rise in European WEEE collection rates



## WEEE supply expected to grow, driven by increase in collection rates



Split of collected WEEE in EU27+UK (in %)<sup>1</sup>



↑↓ Gap vs. target

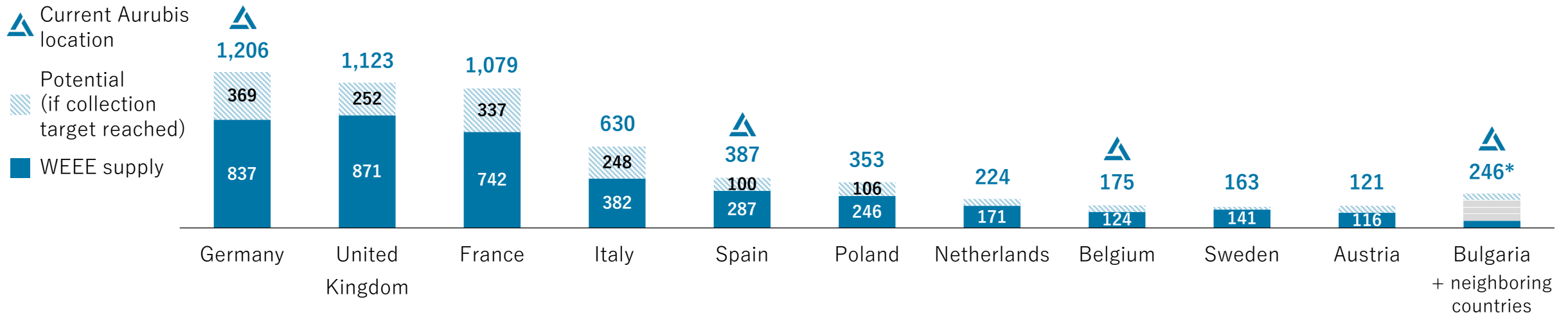
Note: <sup>1</sup>Based on 2017 split; (W)EEE = (Waste) Electrical and Electronic Equipment | Source: Secondary research

# Germany, UK & France: Highest potential for material availability



## Material availability in Europe by country (example: WEEE)

WEEE supply by country (in kt)<sup>1</sup>



Current collect. rate <sup>2</sup>	45%	50%	45%	39%	48%	45%	50%	46%	56%	62%	52%*
GDP growth rate '19-24 <sup>3</sup>	1.3% ↗	1.9% ↗	1.1% ↗	0.7% ↗	1.7% ↗	2.9% ↑	1.5% ↗	1.4% ↗	1.9% ↗	1.6% ↗	2.7% ↑

<sup>1</sup> Total collected waste electrical and electronic equipment (WEEE) for 2017; <sup>2</sup> Total collection rate for WEEE in 2017 as % of average weight of EEE put on the market 2015-2017; <sup>3</sup> GDP growth rate at current prices  
Note: \* Including neighboring countries Turkey, Greece, and Romania; collection rate calculated as weighted avg. of GR, RO, and BG | Source: Eurostat; Centre for Economics and Business Research; Project team analysis

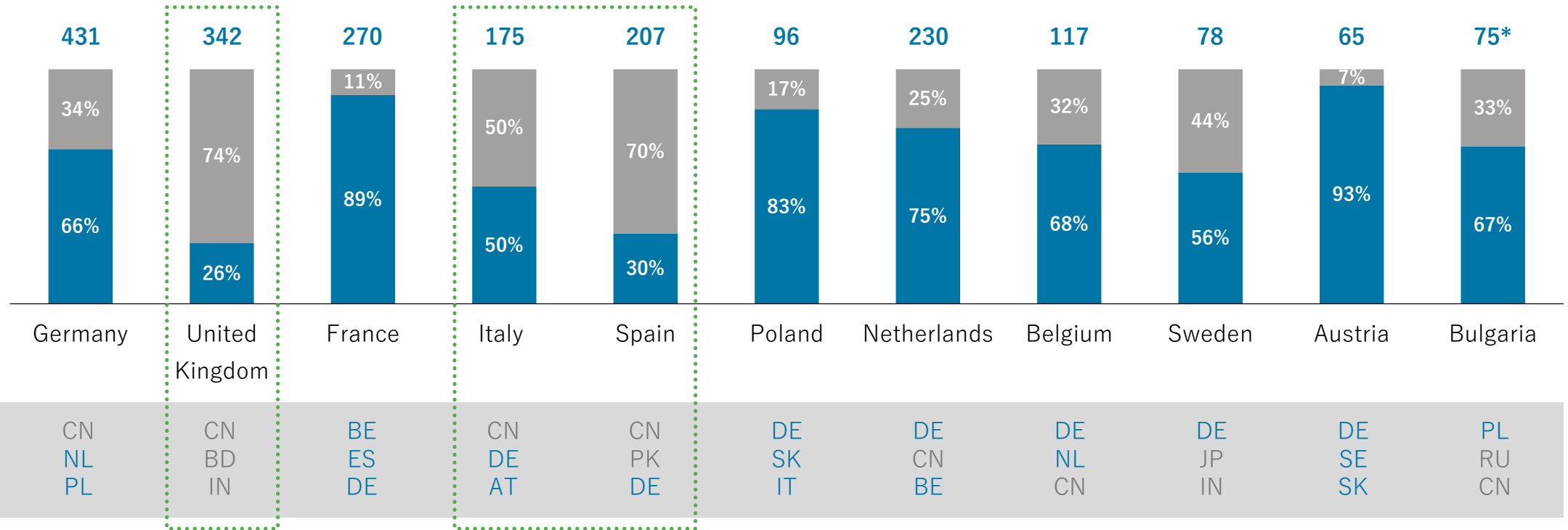
# UK, Spain & Italy: Copper waste & scrap exports show material supply



## UK among several countries with large exports to outside of Europe

Export of copper scrap by region in 2019 (in kt)

■ Non-Europe  
■ Europe

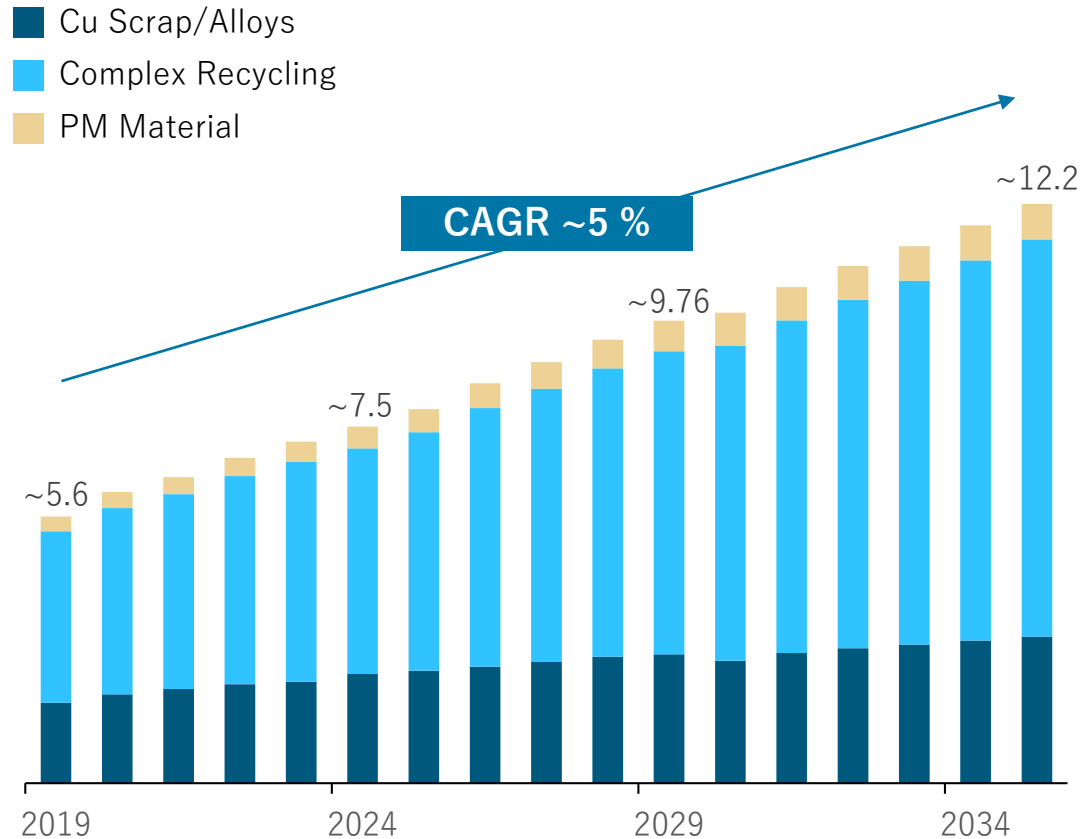


Note: \* Including neighboring countries Turkey, Greece, and Romania | Source: UN Comtrade 2020 (based on HS7404, copper waste and scrap); Project team analysis

# North America: ~5 % CAGR 2019-35 driven by complex recycling



## North American market size for recycled materials 2019-35 (in mt)



## Growth Drivers



### Incremental Growth

**Continuous growth of industrial activity** and consumption of electronics lead to solid growth base



### Collection Rates

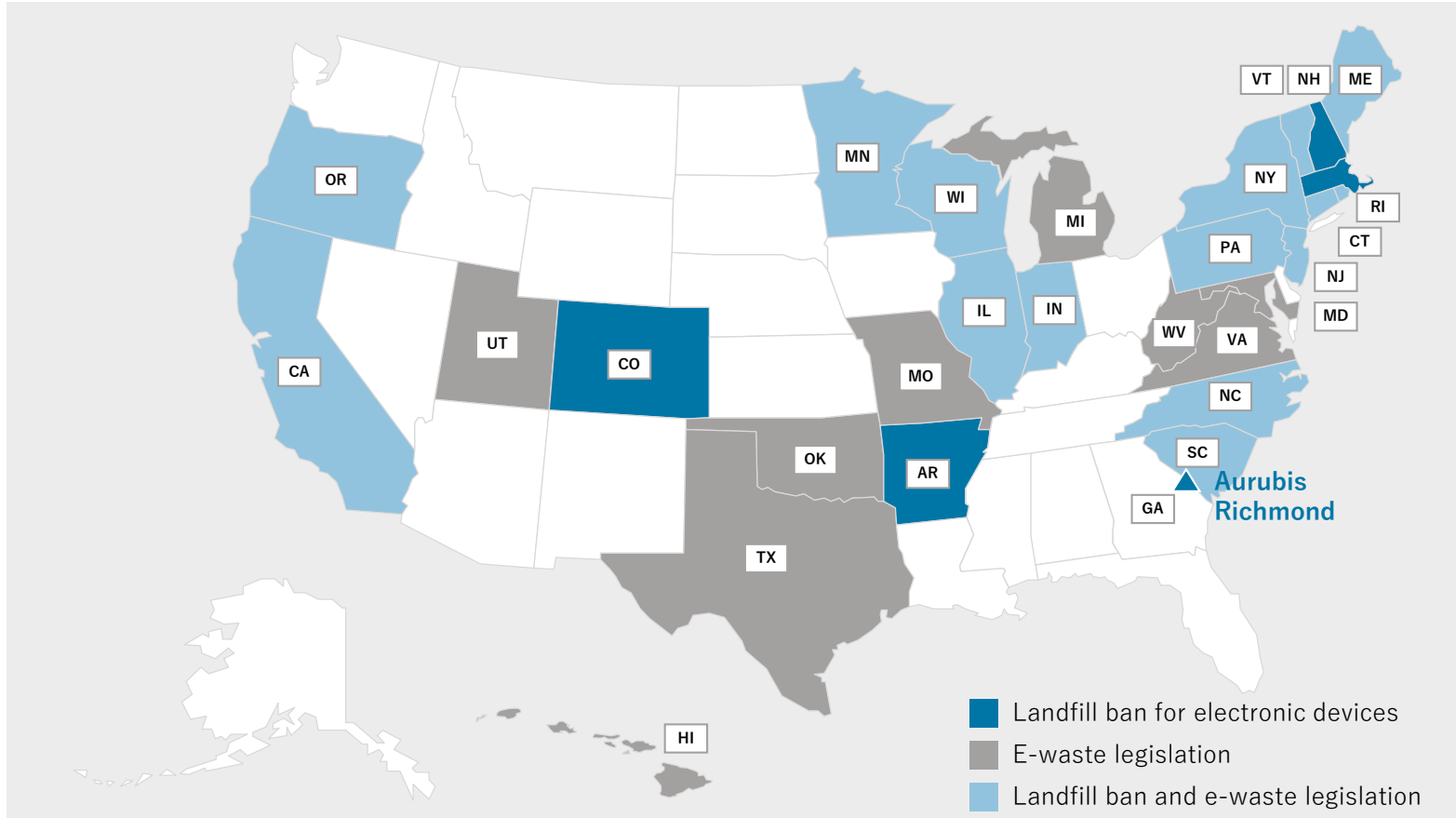
**Increasing collection rates**, especially of bulk e-waste and PCB materials (currently only ~30 %)



### Import/Export

Net export of copper scrap **continuously decreasing with increasingly restrictive import policies in current outlets** (China/Southeast Asia)

# Recycling & landfill regulation drive recycling market growth



## Landfill or disposal ban for electronic devices

- In 19 states + Washington, DC
- Selected electronics through general classification as hazardous waste (e.g., Delaware, Florida)

## E-waste legislation

- 25 states + Washington, DC
- In California since 2003:
  - E-waste Recycling Act
  - Electronic Waste Recycling Fee

» Currently different e-waste legislation in the US; unified regulatory framework expected within this decade

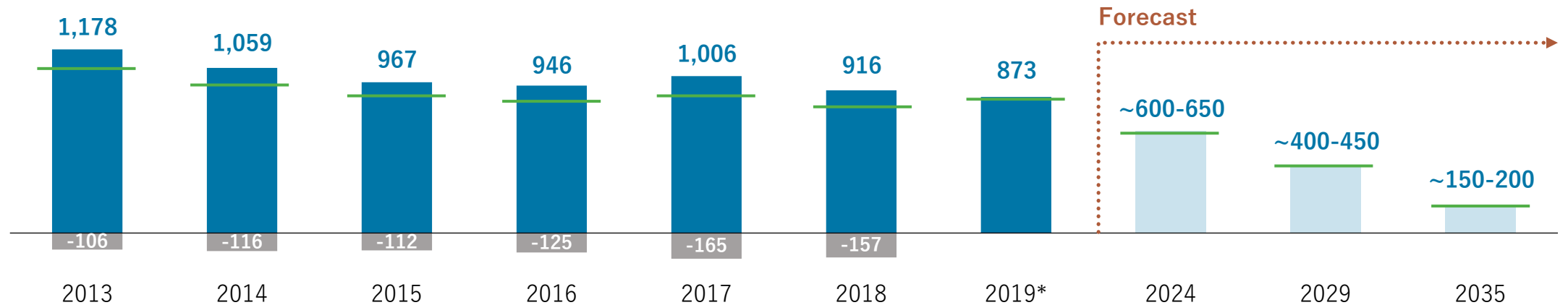
# Decline of US copper scrap exports since 2017 expected to continue



## Development of US imports & exports of copper scrap (2013-2035, in kt)

US exports/imports of copper scrap 2013-2035 (in kt)

■ Export  
■ Import  
— Net export



### Top 5

China	China	China	China	China	China	Malaysia
Canada	Canada	Canada	Canada	Canada	Malaysia	Canada
Hong Kong	Germany	Germany	Germany	Hong Kong	Canada	China
Germany	Hong Kong	South Korea	South Korea	South Korea	South Korea	South Korea
Belgium	South Korea	Belgium	India	Germany	Japan	India

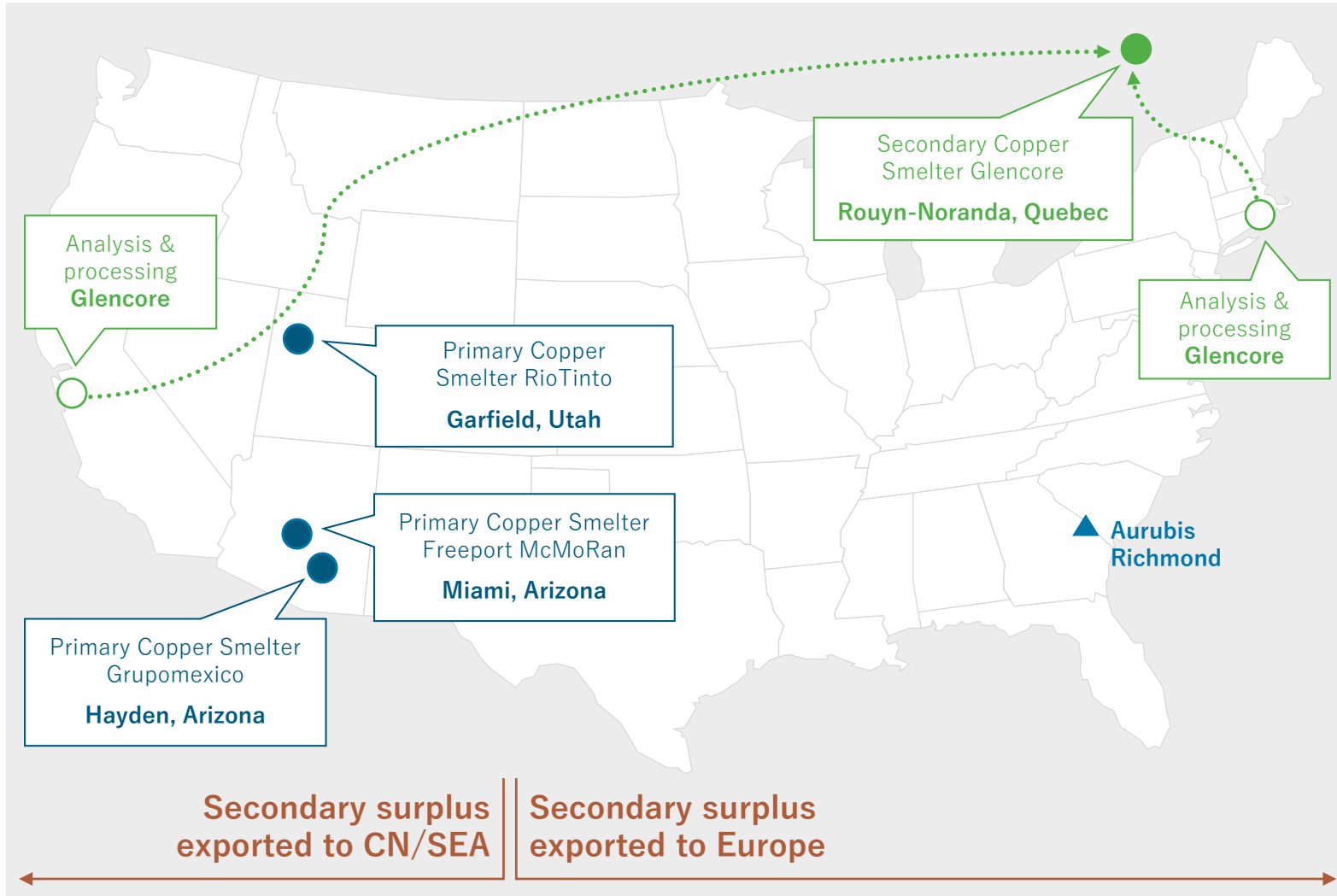
### Decrease in exports to Asia:

- CN/SEA become more restrictive
- Increased reliance on domestically generated scrap

Note: \*) Import data not available for 2019 | Source: UN Comtrade 2020 (based on HS7404, copper waste and scrap); Project team analysis



# Low degree of competition creates window of opportunity



- **Currently no direct competitor** in the secondary smelter segment in the US
- **Nearest competitor located in Canada** processes 100+ kt of Cu recycling material per year, with analysis and processing locations in the US

# Aurubis AG

# Metals for Progress

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Battery recycling

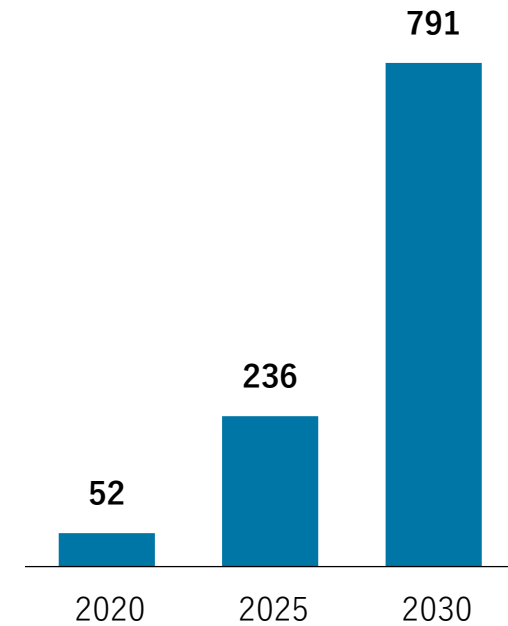
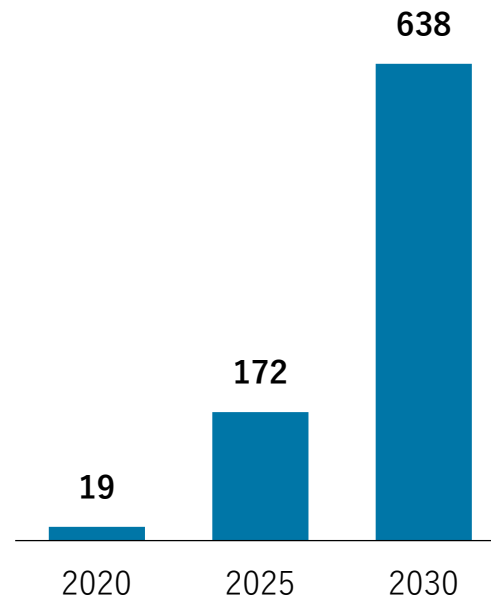
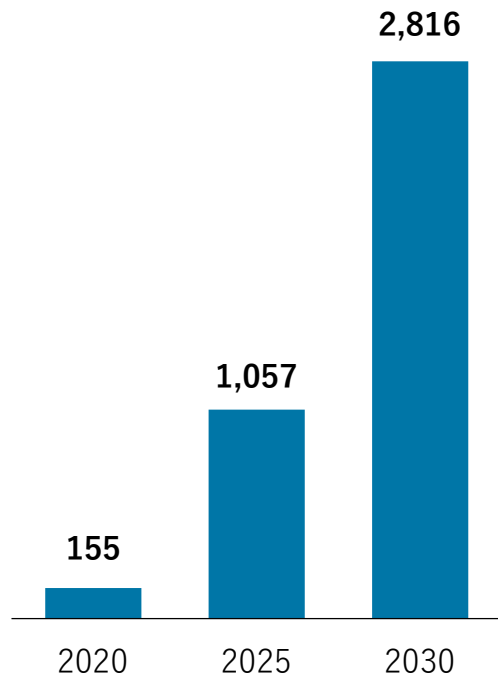
Ken Nagayama, Head of Business Development Battery Materials

Capital Market Day, December 6, 2021



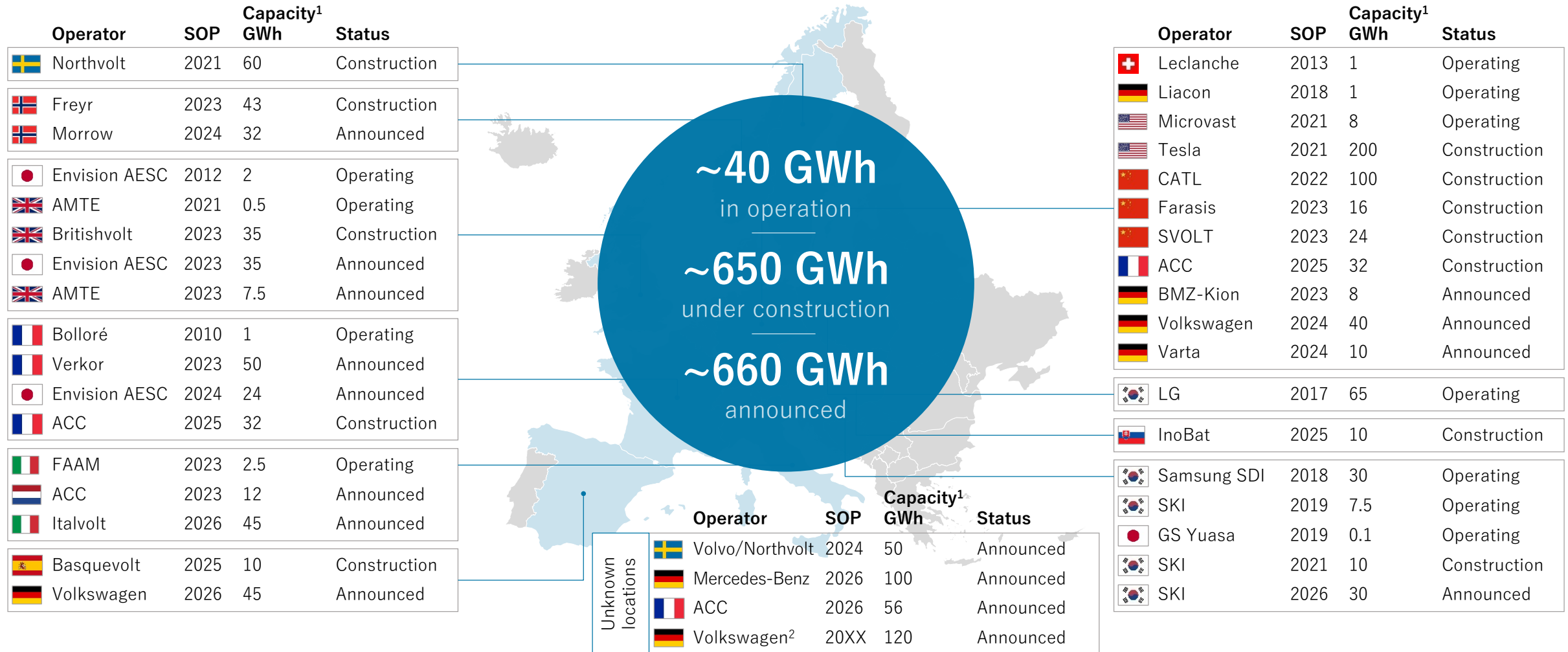
# Electric mobility: Substantial demand for lithium-ion battery quantities

Lithium-ion battery demand from electric vehicles (GWh)



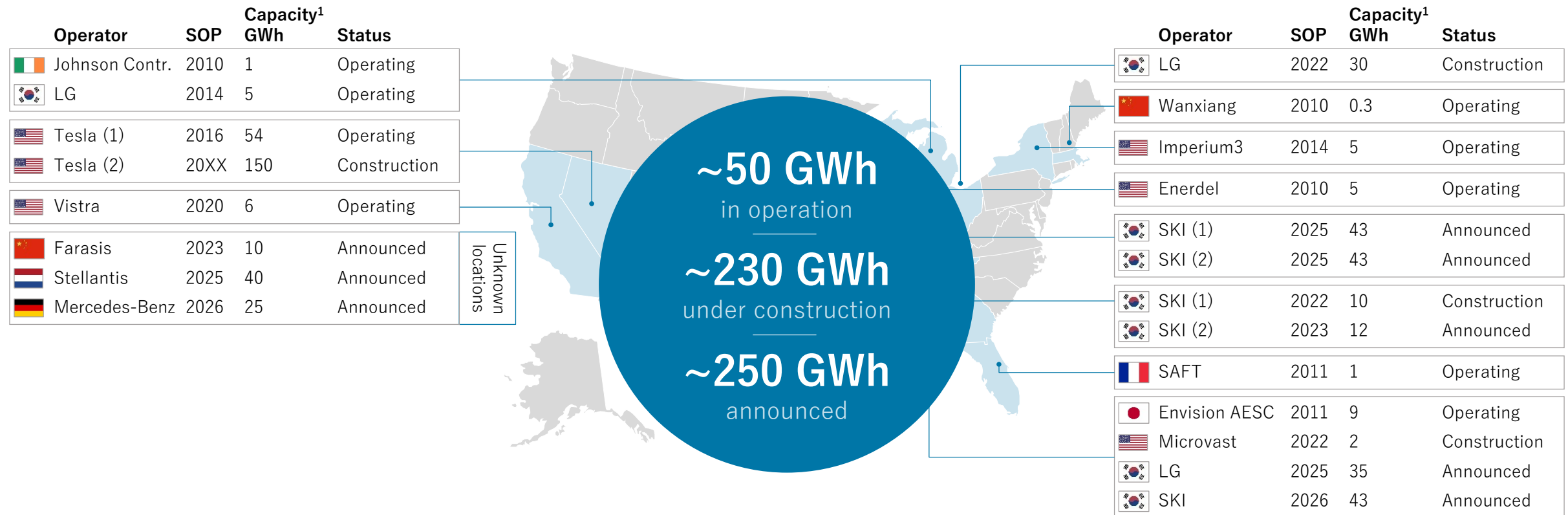
Source: IEA, Aurubis estimates

# Broad plans for European production define a future recycling stream



Source: Roskill 10/2021; Note: <sup>1</sup> Including future capacity expansions; <sup>2</sup> Unknown Volkswagen factories comprise three factories with a capacity of 40 GWh each

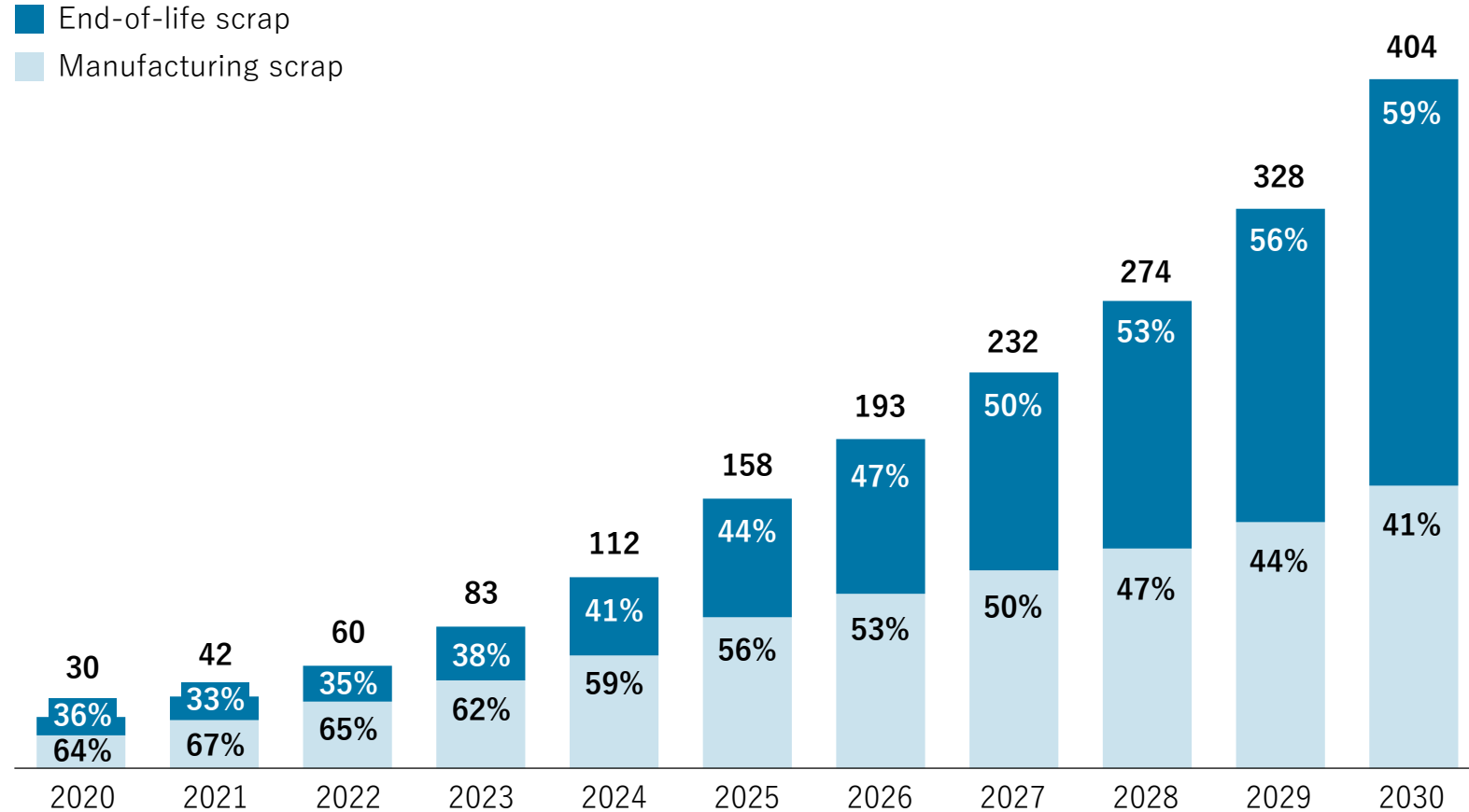
# US lithium-ion battery production also needs local recycling solutions



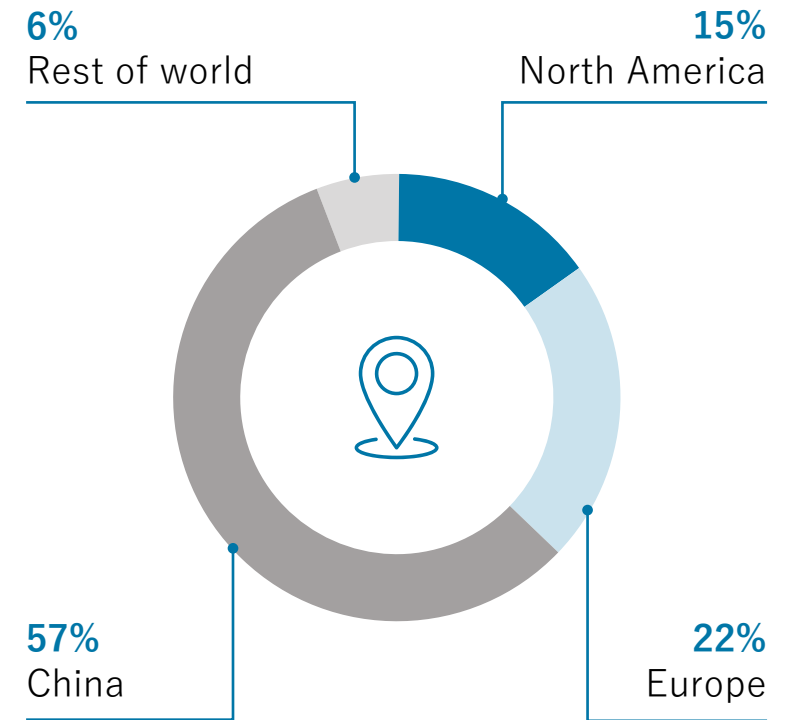
Source: Roskill 10/2021; Notes: <sup>1</sup> Including future capacity expansions

# Lithium-ion battery scrap recycling is a market challenge already today

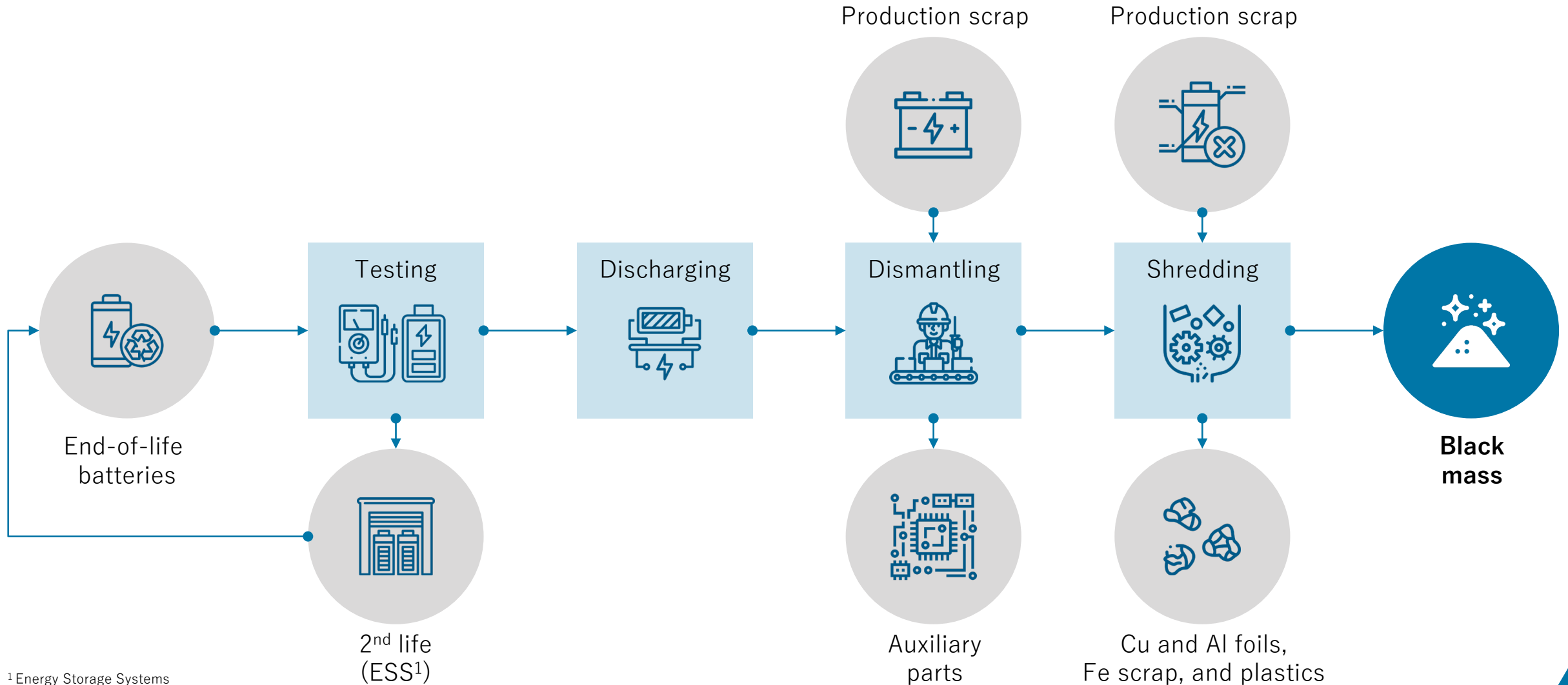
## LIB scrap projection (GWh equivalent)



## Regional split 2030



# Battery scrap recycling requires specialized solutions and know-how



<sup>1</sup>Energy Storage Systems



# Black mass contains a broad range of scarce and valuable metals



## Lithium-ion battery

### Example of composition

10% Others

1% Steel

2% Lithium

2% Electronics

2% Cobalt

3% Manganese

5% Plastics

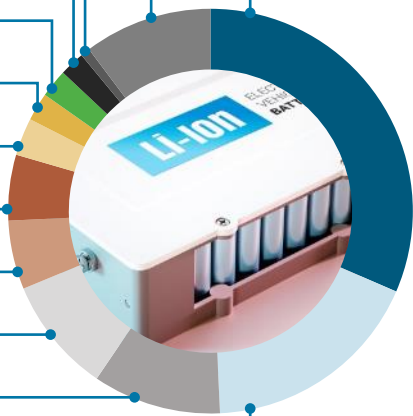
6% Copper

9% Electrolyte

10% Nickel

Aluminum 32%

Graphite 18%



## Black mass

### Typical range of elements

Elements	wt %
Nickel	10-30
Cobalt	0-20
Manganese	0-30
Lithium	4-10
Copper	5-10
Aluminum	5-10
Fluorine	1-3
Carbon	5-60

### Share of metal value

53% Lithium

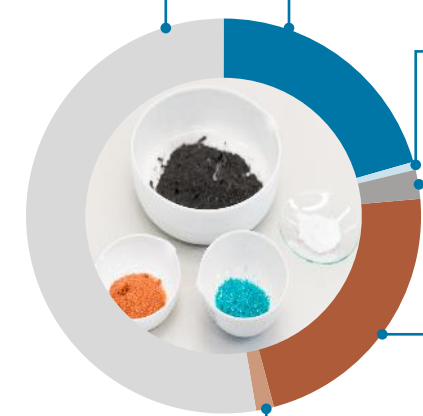
Nickel 21%

Aluminum 1%

Copper 2%

Cobalt 22%

Manganese 1%

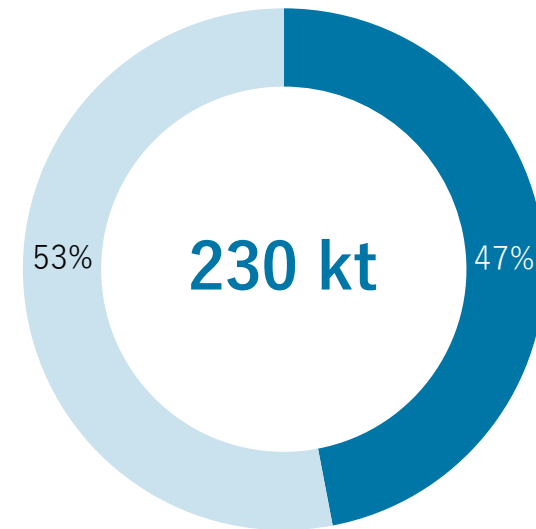
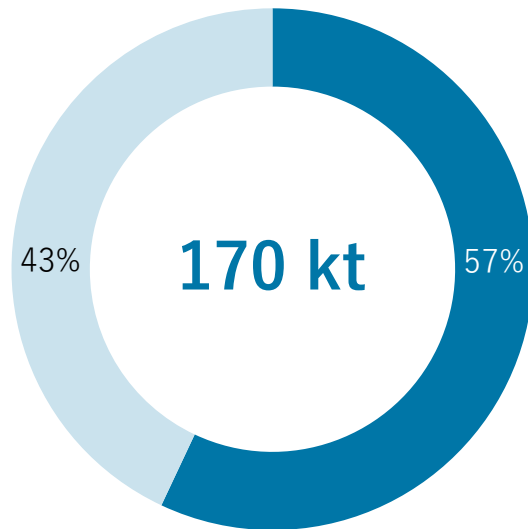


# Black mass markets will require industrial-scale recycling solutions

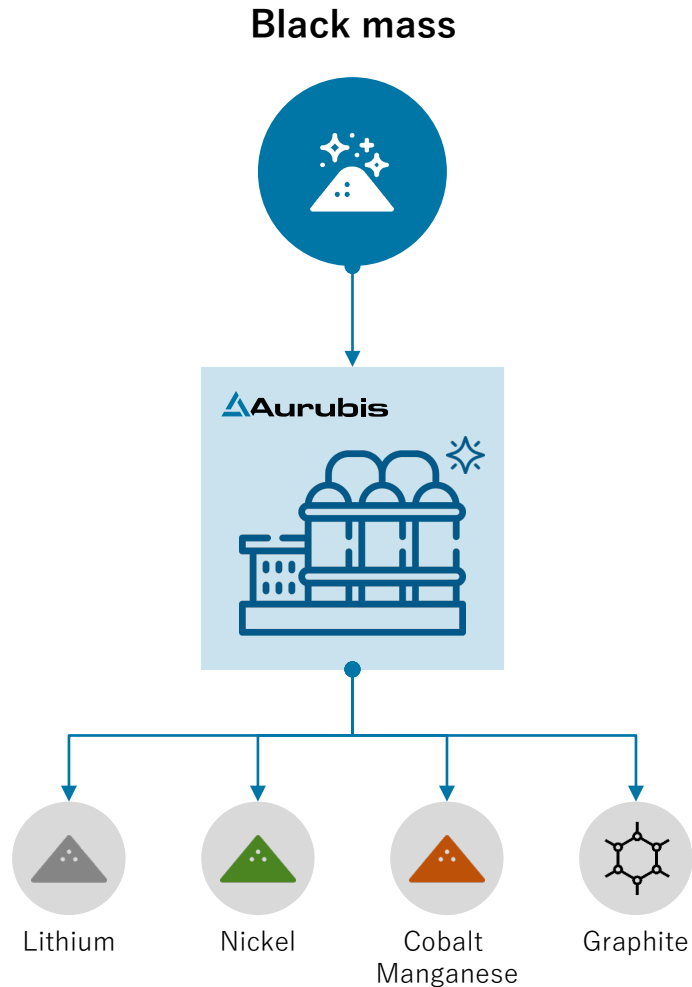
## Black mass generation from LIB scrap 2030



■ End-of-life scrap  
■ Manufacturing scrap



# Aurubis has developed a novel black mass recycling technology



Sustainably closing  
the loop



Integration into  
smelter network



Metal recoveries  
beyond regulatory  
requirements



Battery-grade  
products

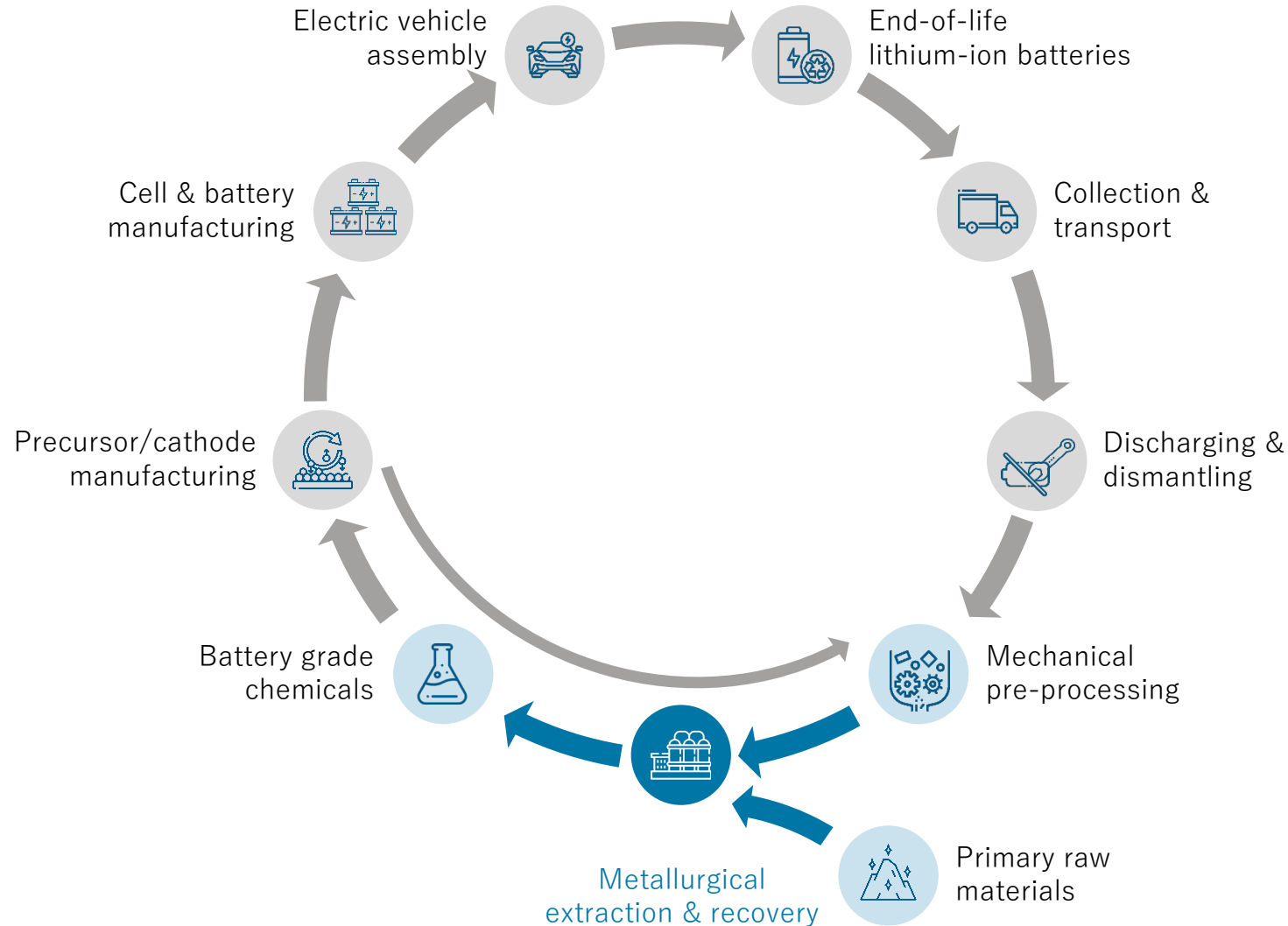


Cost  
efficiency



Patent  
application

# Aurubis contributes to sustainably closing the loop for batteries



## We are the experts

Complex raw materials are our daily business.

## We are multimetal

Already today, we process a range of 20 different metals.

## We are committed

Our financials are sound, and we have the capacity to make the investments.

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For Aurubis, **battery recycling** is a **growth area with priority**, and we are targeting a **sizeable market share**. A **pilot plant** is currently **under construction**. A **patent application has been filed** for the hydrometallurgical process. We envisage a **commercial-scale facility** within the **next 5 years**.



# Aurubis AG

# Metals for Progress

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Current projects contributing to updated strategy

Dr. Heiko Arnold, COO

Capital Market Day, December 6, 2021



# Recycling markets are the focus of Aurubis' growth ambitions



Enablers:

- » Digitalization, automation, and "Plant of the Future"
- » Strategic resource management, talent and personnel development



# Modular recycling plants: Flexible structures and integrated processes



Our modular system allows us to expand recycling capacities in line with market demand – efficiently, at low risk, and flexibly.

Additional capacities are seamlessly integrated into the existing smelter network precisely where they are needed.

## Preparation Module

Shredding of base material and analysis of samples to determine its metal content and value.

**Five modules** that can be used **individually or in combination** according to needs ...

## Slag Module

Granulating the slag produced and selling it in this form.

## Smelter Module

Melting base with Top-Blown Rotary Converter (TBRC), separating metal-containing ingredients from the slag.

## Off-Gas Module

Filtering waste gases generated in the process. Usage of waste heat to generate steam and electricity.

## Lead-Tin Module

Extracting lead and tin from the input material through pyrometallurgical processes.

» We strengthen our recycling activities based on integrating the right combinations of existing technological knowhow and proven procedures.

# Pursue growth options

Aurubis Richmond



# Pursue growth options

## Aurubis recycling plant in Richmond, USA



### Pursue Growth Options

Investment  
~ € 300 million

EBITDA p.a.  
~ € 80 million  
(by 2025/26)

Aurubis creates **frontrunner position** in highly attractive US recycling market with very limited competition and significant annual growth rates of 4-6 % (CAGR) through 2035.

Aurubis Richmond marks **milestone** to deliver on updated growth strategy, unlock new growth areas, and further strengthen earnings profile.

Start of production  
following ramp-up  
phase  
**early CY 2024**

~ **90,000 t**  
input material  
~ **35,000 t**  
blister copper output

Strong project indicators: **ROCE >20 %** after full ramp-up in FY 2025/26 and **amortization period <10 years**.

Attractive location in **Richmond, Georgia**, competitive advantage by capitalizing on existing know-how and proven technologies.

Expansion of multimetal portfolio with **new materials**.

Easily adjustable approach allows for **quick adaptation** to changing market demands.



**Project fully in line with Aurubis' sustainability targets and ambition to strengthen and expand our position as the most efficient integrated smelter network worldwide.**



# Secure & strengthen core business

## Lünen tankhouse

Tankhouse



# Secure & strengthen core business

## Lünen tankhouse

Investment  
~ **€ 60 million**

Production increase  
(at full production)  
~ **+ 10 % p.a.**



**Secure**  
Core Business



**Strengthen**  
Core Business

Aurubis is **strengthening its core business** and investing € 60 million for the general tankhouse overhaul.

The renovation includes the **demolition and reconstruction** of the tankhouse basins and other **extensive improvements** to the production facility.

The renovation process is scheduled **until 2024** and runs during ongoing production. The facility can **be operated at 80 %** of its original capacity during this period.

After the modernization, the **new capacity** will reach up to **210,000 t p.a.**

Old capacity  
~ **195,000 t p.a.**

New capacity  
~ **210,000 t p.a.**

» Project underscores Aurubis' commitment to its German business activities, while increasing capacities for the sustainable recovery of raw materials needed for the energy transition worldwide.



# Secure & strengthen core business

## Advanced Sludge Processing by Aurubis (ASPA)

ASPA





# Secure & strengthen core business

## Advanced Sludge Processing by Aurubis (ASPA)

Investment  
~ **€ 27 million**

EBITDA p.a.  
~ **€ 7 million**  
(at full production)

Start of production  
following ramp-up  
phase  
**FY 2024/25**

~ **2,500 t p.a.**  
input material in form  
of anode sludges



**Secure**  
Core Business



**Strengthen**  
Core Business

Aurubis is **strengthening its core business** and taking the next step towards becoming the **most efficient and sustainable integrated** smelter network worldwide.

Construction of a state-of-the-art recycling facility at the **Beerse site (BE)**.

**ASPA**, a newly developed hydrometallurgical process, will extract **more** valuable metals such as Au, Ag, and Sn from anode sludge **faster**.

Prime example of the **synergies** created by Metallo acquisition and how the whole company benefits in developing new **innovative solutions together**.



**Project capitalizes on synergies from the Metallo acquisition and contributes significantly to a well-functioning circular economy.**



# Agenda

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Sustainability  
Angela Seidler, VP

7

Energy  
Roland Harings, CEO

8

Energy & decarbonization projects  
Heiko Arnold, COO



# Metals for Progress

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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



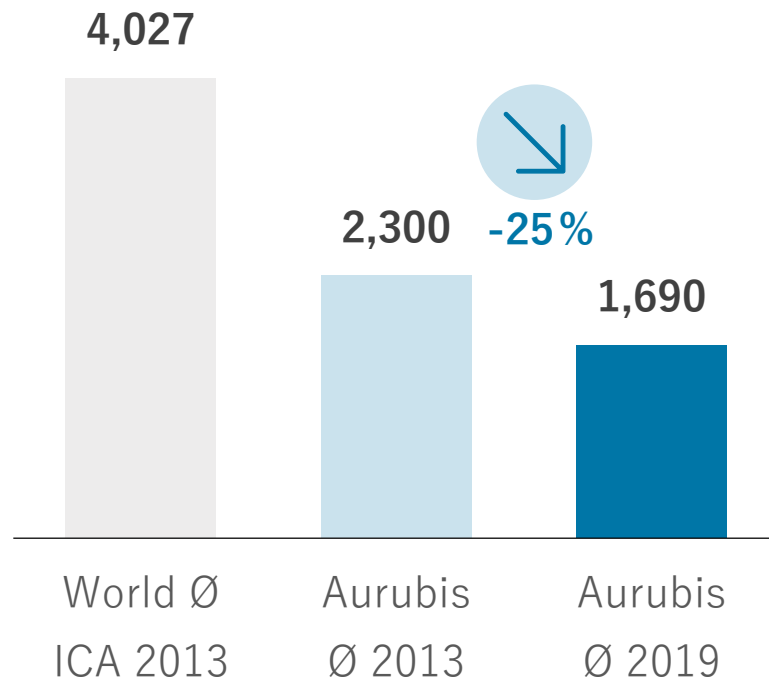
» The copper value chain demonstrates responsibility to mutually improve and develop.

# Aurubis achieves significant reduction of carbon footprint



Industry Leadership  
in Sustainability

Copper Carbon Footprint (in kg CO<sub>2</sub> eq./t Cu)



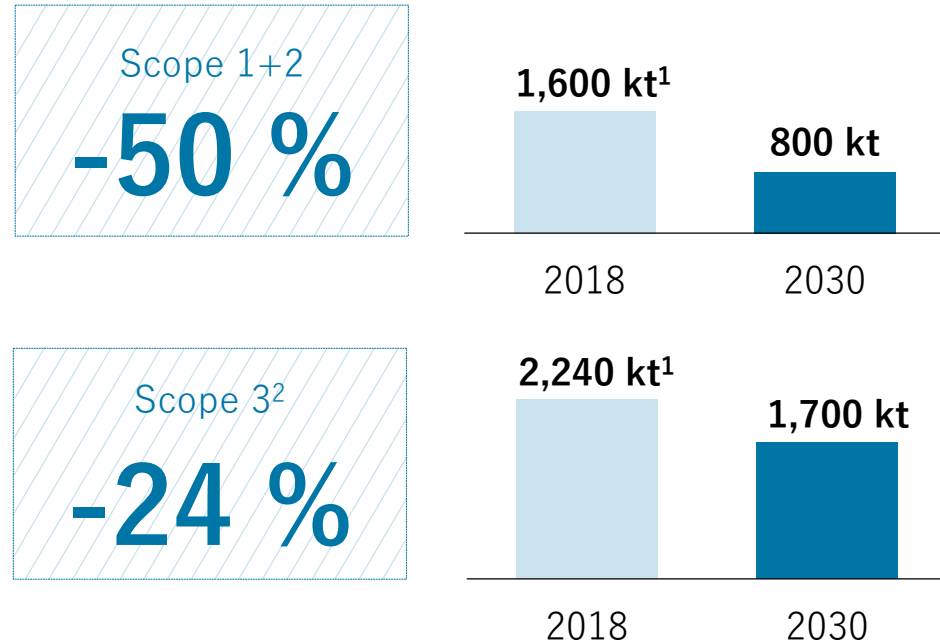
Update of Life Cycle Assessment leads to **reduction of 25 % of CO<sub>2</sub> emissions** related to copper cathodes on Group level.

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

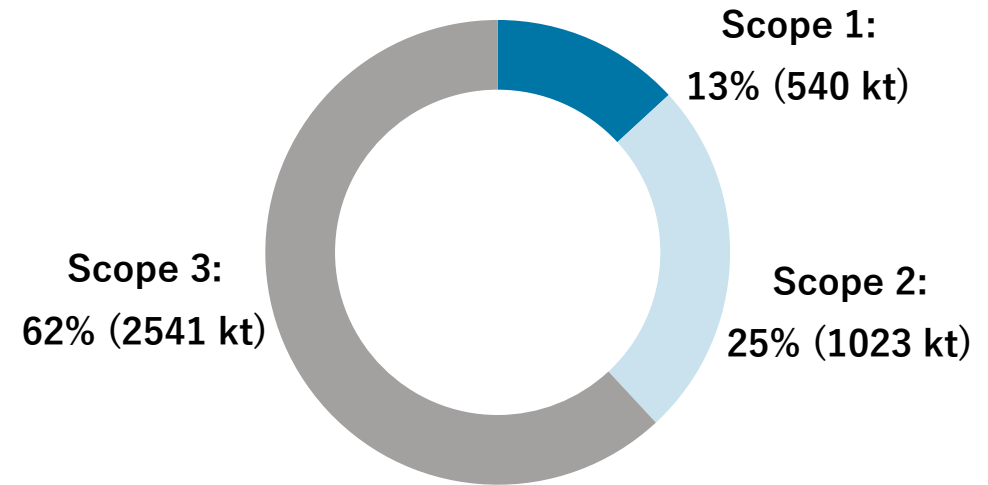
**Projects with positive impact on environmental footprint:** power-to-steam plant, Industrial Heat, innovative gas cleaning system in Pirdop.

# Aurubis 2030 ambition for greenhouse gas reduction

Aurubis CO<sub>2</sub> reduction targets 2030



CO<sub>2</sub> 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](#)



<sup>1</sup> Including the sites Beerse (Belgium) and Berango (Spain), acquired in 2020  
<sup>2</sup> 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
 <b>Strategic Roadmap</b>	<ul style="list-style-type: none"> <li>– Roadmap of strategic projects for the next years</li> <li>– Transparency regarding critical risks</li> </ul>				
 <b>Financial profile</b>	<ul style="list-style-type: none"> <li>– Rough long-term outlook of top KPIs (EBITDA, CAPEX, cash flow)</li> </ul>				
 <b>Sustainability</b>	<ul style="list-style-type: none"> <li>– Targets for <b>sustainability KPIs in 2030</b></li> <li>– Aggregated perspective on the <b>influence of sustainability KPIs</b></li> </ul>				
 <b>Resources</b>	<ul style="list-style-type: none"> <li>– Transparency regarding the need for <b>critical capacities</b> for the next years</li> </ul>				
 <b>Flowsheet</b>	<ul style="list-style-type: none"> <li>– Review and resolution of cross-work package <b>Flowsheet Dependencies</b></li> </ul>				

## Sustainability as integral part of our Group strategy

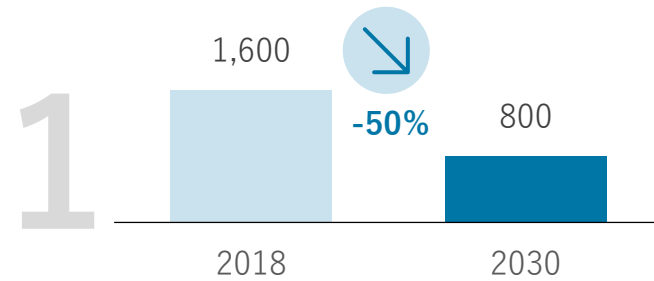
- Direct C-level accountability and strong support for cross-functional sustainability agenda
- Teams on Group level as well as at the sites

» 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

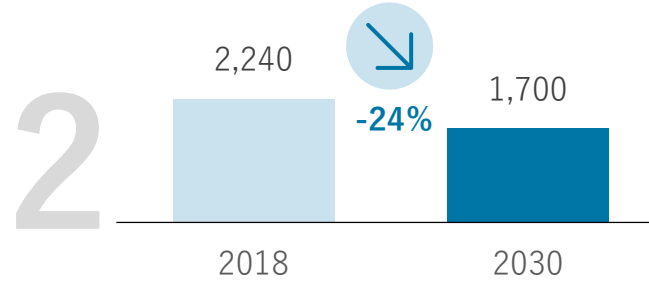
## CO<sub>2</sub> Emissions Scope 1+2

Absolute scope 1+2 CO<sub>2</sub> emissions (in kt)



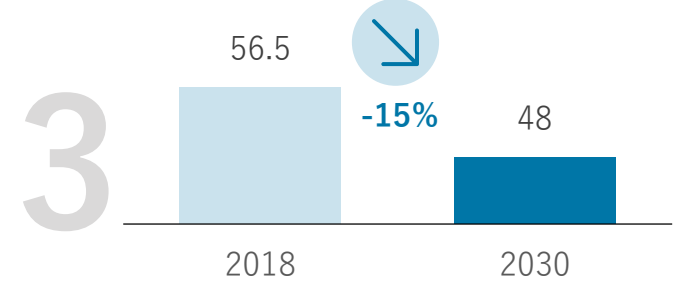
## CO<sub>2</sub> Emissions Scope 3

Scope 3 CO<sub>2</sub> emissions (in kt)<sup>1</sup>



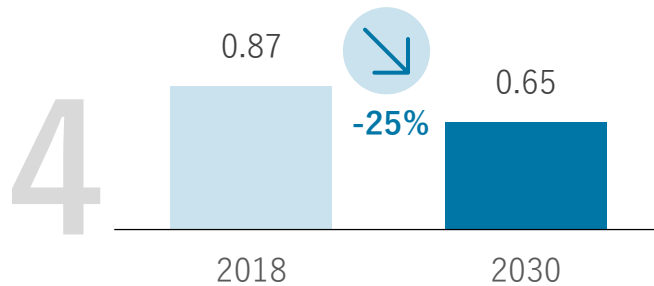
## Air Emissions (Dust)

Air emissions (in g per t of Multimetal Cu equivalent)<sup>2</sup>



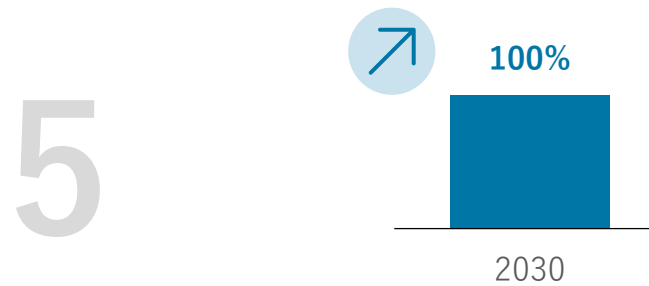
## Metal Emissions to Water

Metal emissions to water (in g per t of Multimetal Cu equivalent)<sup>2</sup>



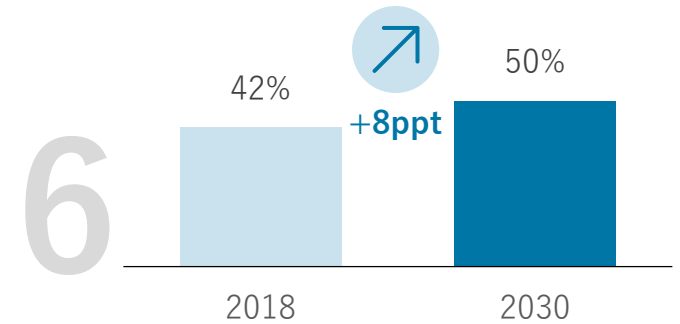
## Supply Chain Integrity

Share of compliant suppliers (in %)<sup>3</sup>



## Recycling Content (Cu)

Recycling share of Cu cathodes (in %)



<sup>1</sup> Assumed steady copper cathode production until target year (physical intensity target)

<sup>2</sup> 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)

<sup>3</sup> 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

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Energy

Roland Harings, CEO

Capital Market Day, December 6, 2021



# Aurubis holds a leading position in energy efficiency

The CO<sub>2</sub> footprint of our copper production is less than half the global average



Global average:  
**4,027 kg CO<sub>2</sub>\***



**Aurubis**

**1,690 kg CO<sub>2</sub>**  
per t of copper

Industrial Heat 2 provides potential for a further 300 kg of CO<sub>2</sub> saved per t of copper produced

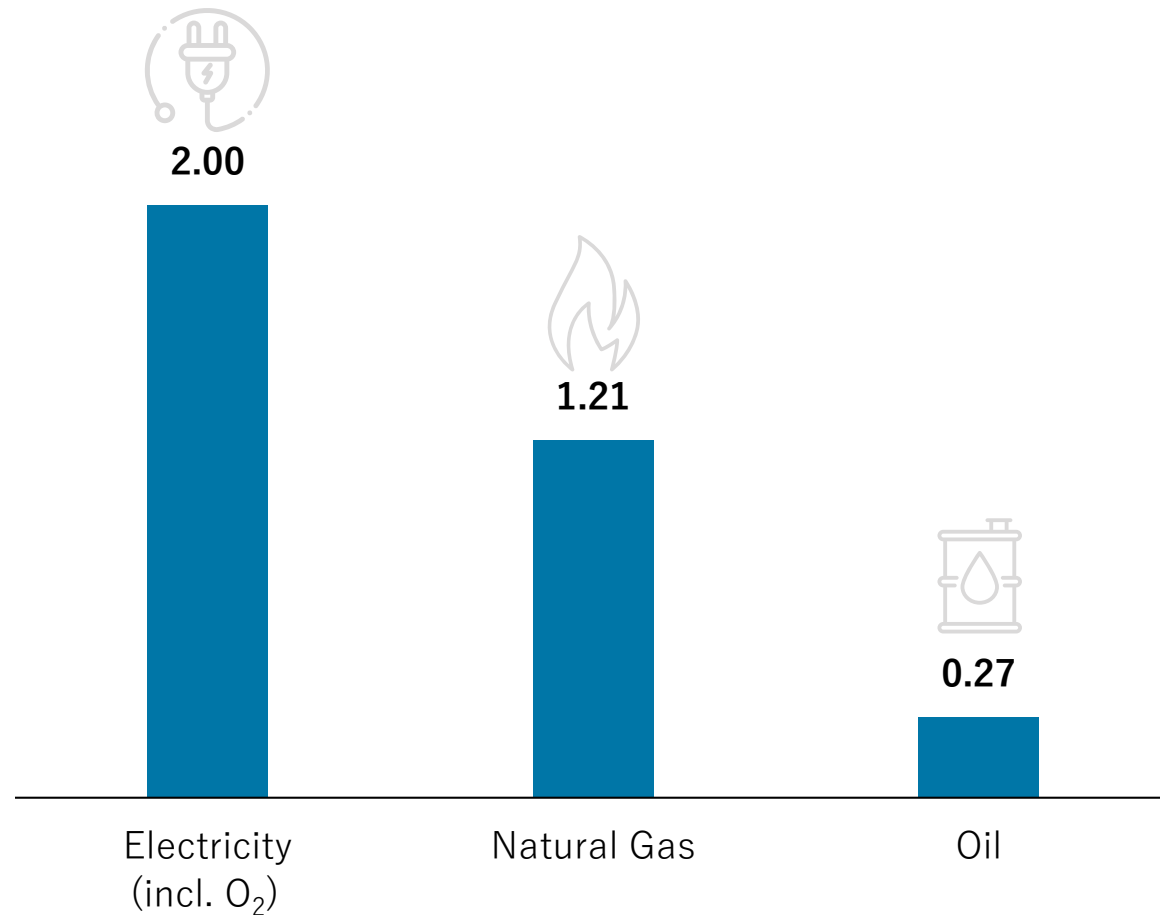
\* Source: International Copper Association, Aurubis, 2019 (\* 2013, to be updated).

**» Once the Industrial Heat 2 project is implemented, Aurubis' CO<sub>2</sub> footprint will improve further.**

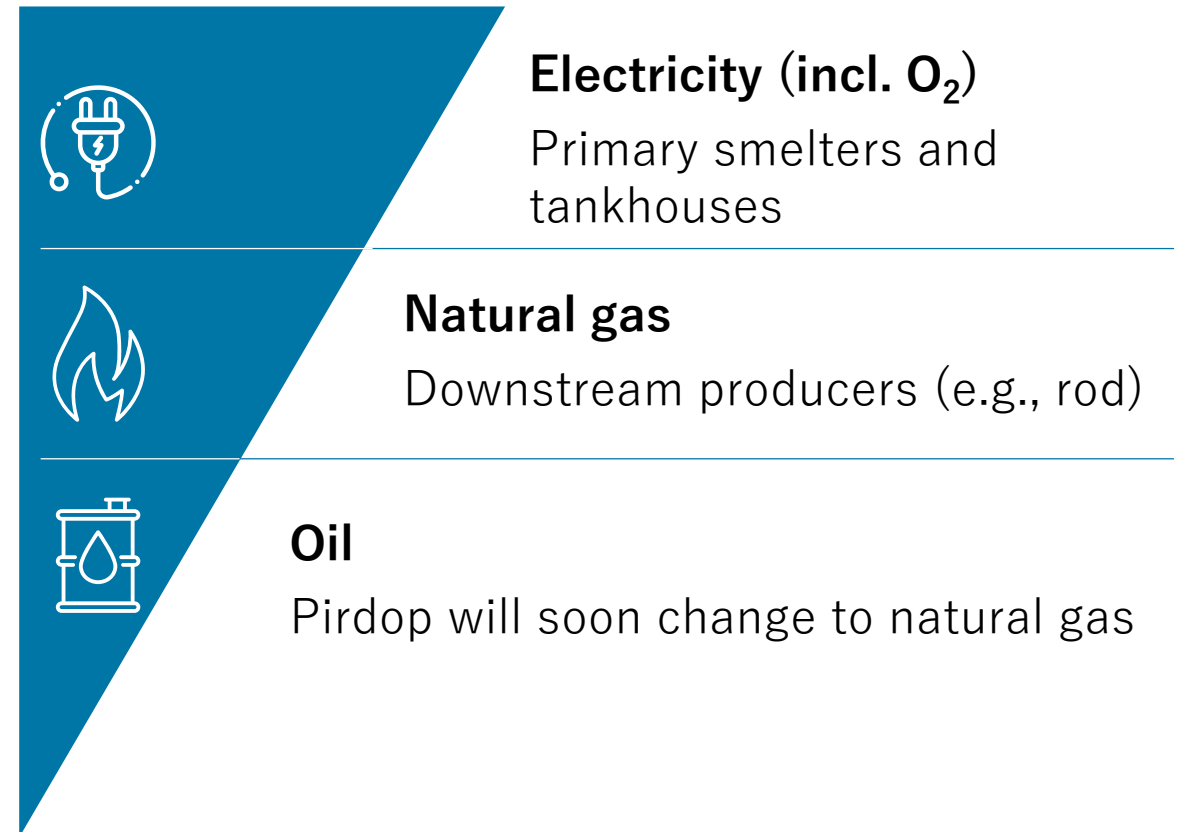


# High level of savings achieved, lower effects expected in coming years

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



Main consumers

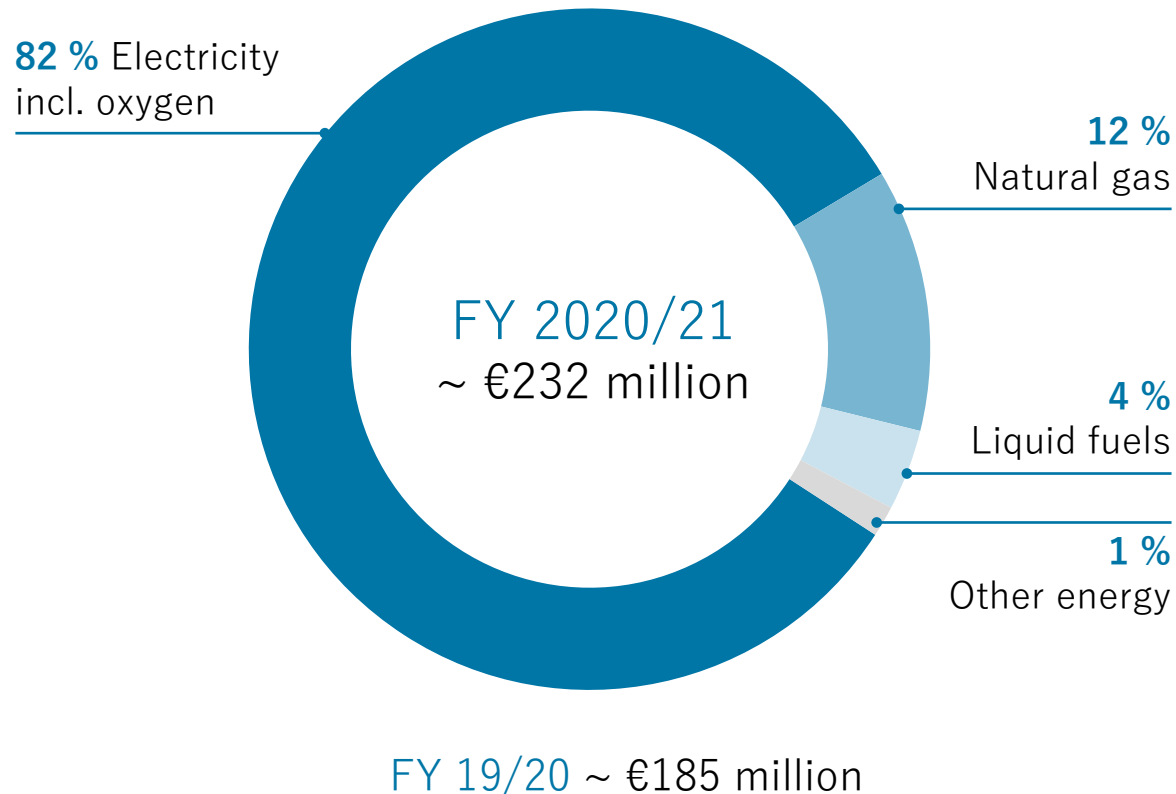


# High degree of electrification keeps use of fossil fuels to a minimum



## Electricity consumption and CO<sub>2</sub> scopes

Breakdown of energy costs in the Aurubis Group



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

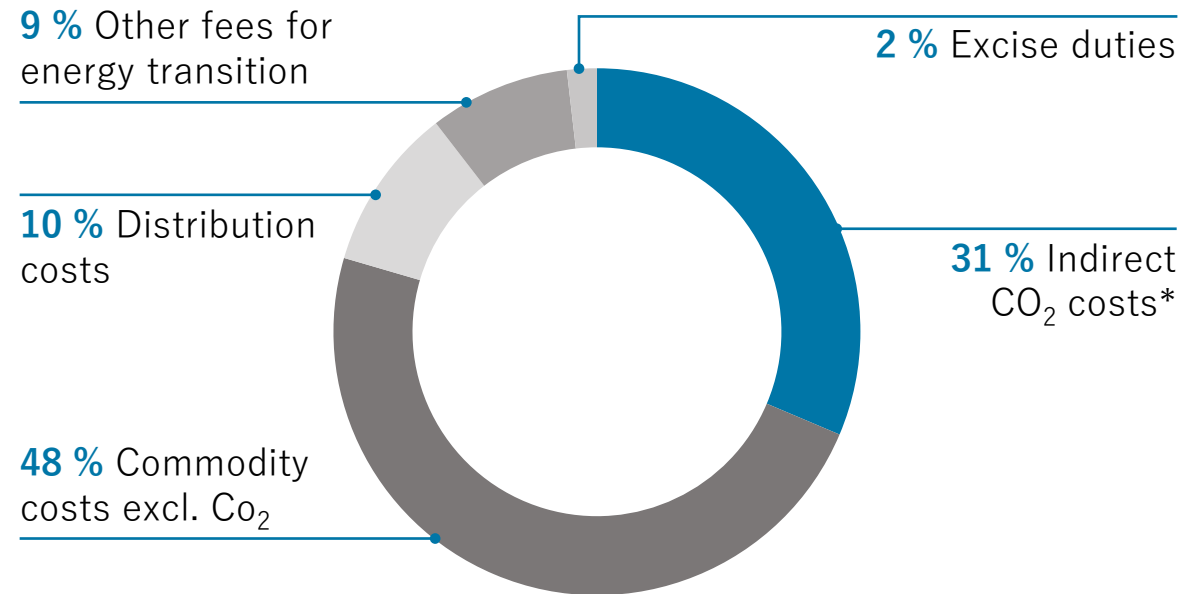
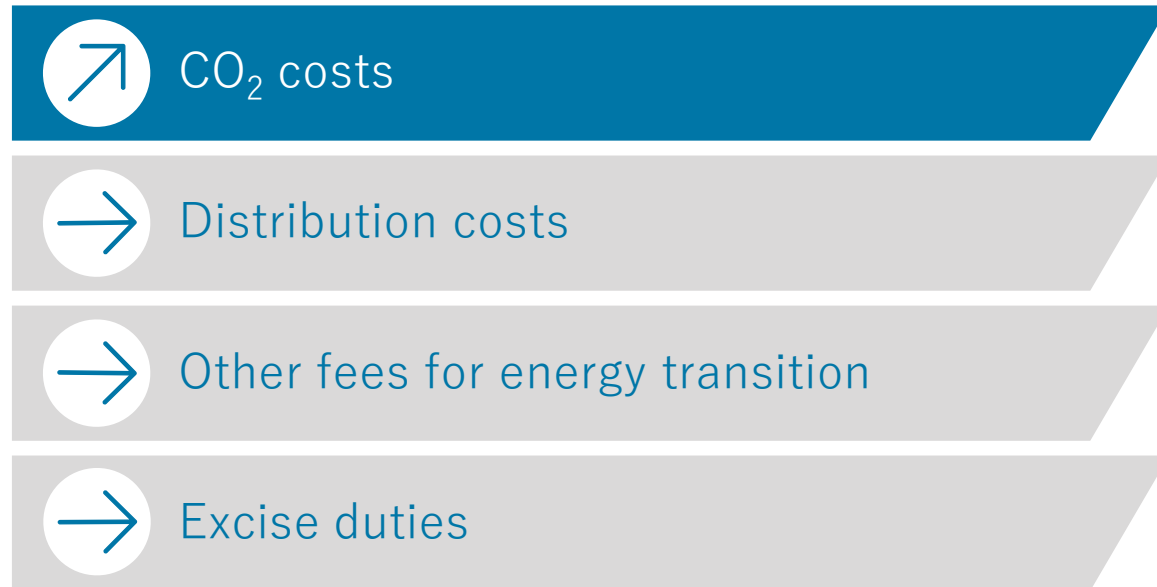
CO<sub>2</sub> emissions of 1.56 million t (2020)

- 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

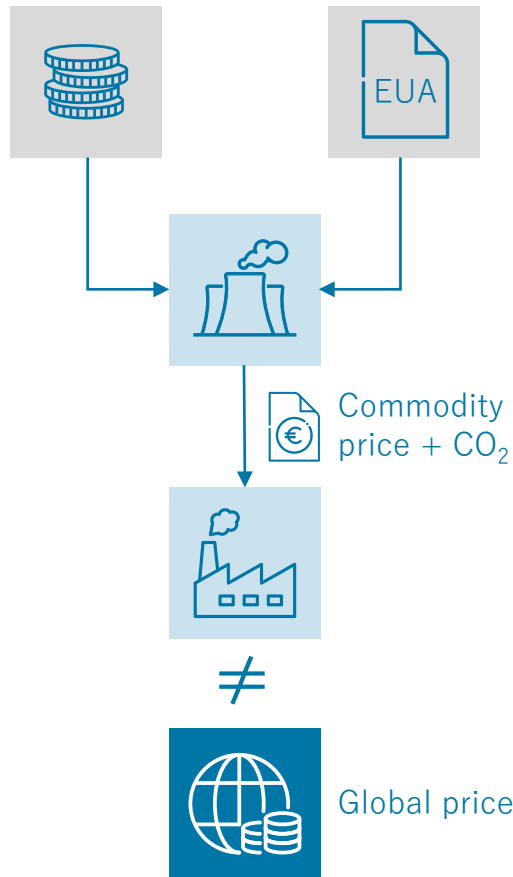


\* approx. 50 % are compensated

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



# Compensation of indirect costs in Europe at a glance



**Direct carbon costs:** Electricity producers have to buy CO<sub>2</sub> certificates (EUAs) for every ton of carbon they emit by producing electricity.

**Indirect carbon costs:** Electricity producers pass on additional costs to their consumers, e.g., industry.

**EU companies:** Faced with **additional electricity costs**, unlike competitors in other parts of the world.

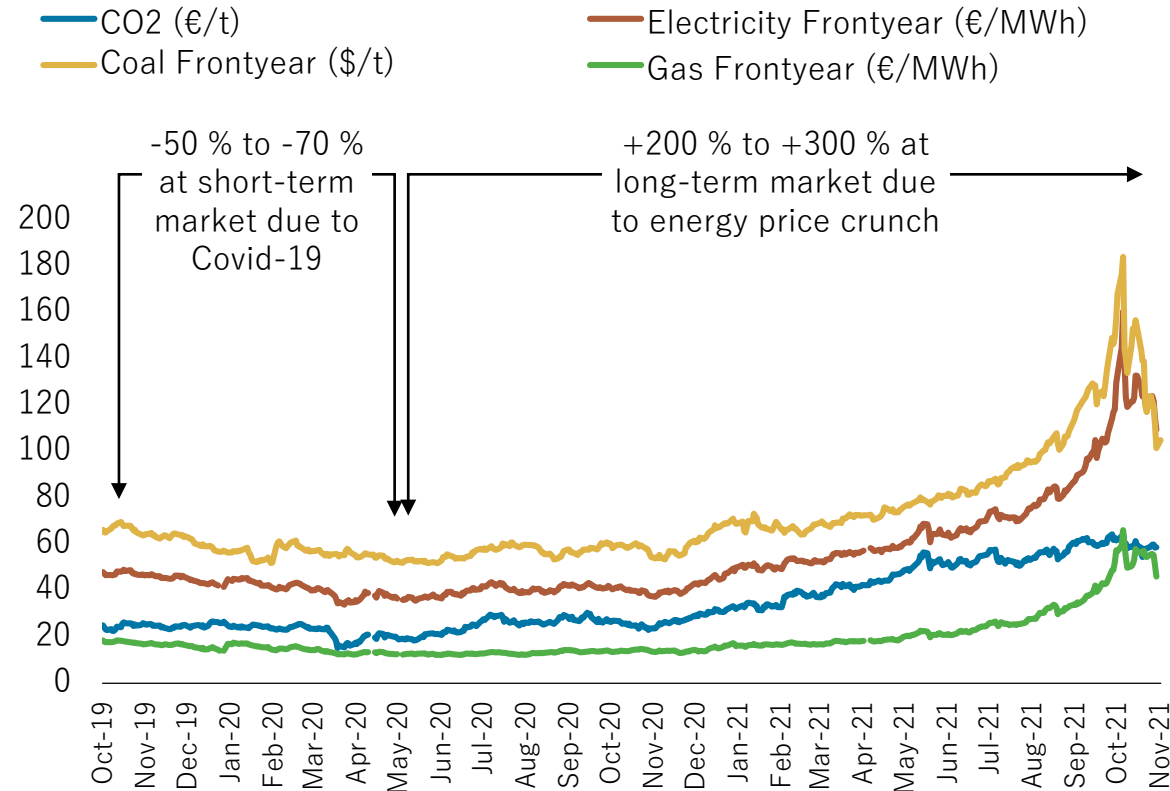
**Carbon leakage protection:** For electricity-intensive companies, the EU arranges for compensation of these costs.

**EU compensation:** Most EU member states provide a compensation of at least 50 % of the indirect CO<sub>2</sub> costs in power prices. New regulation to further reduce the financial burden of indirect CO<sub>2</sub> in power prices.

➤ **The copper sector remains eligible for compensation of indirect CO<sub>2</sub> costs for 2021–2030.**

# 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



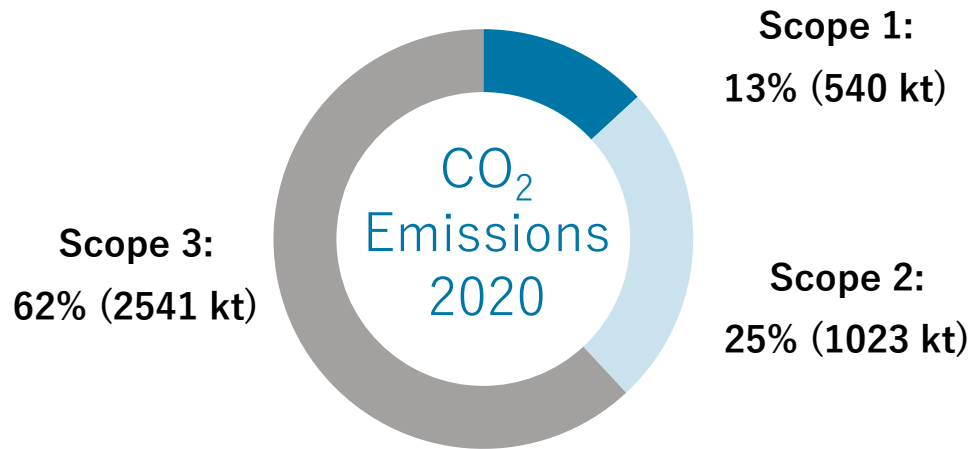
Highest energy prices due to the global energy supply shock

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 CO<sub>2</sub> 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' CO<sub>2</sub> 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 CO<sub>2</sub> 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

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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 Nm<sup>3</sup>/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 CO<sub>2</sub> p.a.](#) was successfully implemented with [energcity](#) in 2018.

Aurubis' remaining industrial heating potential in the Hamburg contact acid plant amounts to about [100,000 t of CO<sub>2</sub> 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 CO<sub>2</sub>  
savings p.a.  
once in full produc-  
tion in 2nd HY 2024  
~ **100,000 t**

» Hamburg heat grid's CO<sub>2</sub> 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 Nm<sup>3</sup>**

Production of  
**2,127 t**  
anodes in Hamburg

CO<sub>2</sub> savings  
in Hamburg p.a.  
~ **6,200 t**  
Est. CO<sub>2</sub> 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.

CO<sub>2</sub> 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

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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 CO<sub>2</sub> emissions p.a.** – or over 225,000 t over the operating period.

Start of production  
following trial phase  
**2021**

CO<sub>2</sub> 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.**

# Agenda

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New segmentation and financial guidance  
for FY 2021/22

Rainer Verhoeven, CFO

10

Closing remarks

Roland Harings, CEO



# Aurubis AG

# Metals for Progress

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New segmentation and financial guidance for FY 2021/22

Rainer Verhoeven, CFO

Capital Market Day, December 6, 2021



# New segmentation: Greater transparency after strategy review

Several factors speak in favor of revising the Aurubis segmentation for reporting

## Transparency

The **new segments** allow for more transparent insights into profitability and future developments.

## Strategy Review

The **strategy review** was a good time to set up the segmentation with a focus on recycling and custom smelting.

## FRP Partial Sale



After the **partial sale of FRP**, the segment content would not be very meaningful.

» New segments from October 1, 2021

# New segmentation

- Scrap/blister
- Slags/residues
- E-scrap
- Other recycling materials
- Concentrates
- Scrap/blister








## Multimetal Recycling

-  Cu cathodes
-  Other base metals
- Aurubis Modular Recycling System

**Recycling smelters:** Beerse (BE), Berango (ES), Lünen (DE), Olen (BE), Richmond (US)

**Earnings drivers:**  
RCs for recycling materials, cathode premium, free metal

## Custom Smelting & Products

-  Cu cathodes
-  Sulfuric acid
-  Precious metals
-  Base metals
-  Rod
-  Shapes
-  Strip, others

**Primary smelters:** Hamburg (DE), Pirdop (BG)

**Additional plants:** Avellino (IT), Buffalo (US), Emmerich (DE), Olen (BE), Pori (FI), Röthenbach (DE), Stolberg (DE)

**Earnings drivers:**  
TC/RCs for concentrate smelting, RCs for scrap and blister, free metal, sulfuric acid, cathode premium, surcharges for products

Further processing, for example for ...

- Renewable energy solutions
- E-mobility
- Digitalization

Aurubis' international, integrated smelter network

# New segmentation and transition based on the example of FY 2020/21

Old structure	Operating EBT (in € million)			Operating ROCE (in %)	
	FY 20/21	FY 19/20	Diff.	FY 20/21	FY 19/20
Metal Refining & Processing	399	285	114	18.9	12.6
Flat Rolled Products	13	1	12	6.6	3.0
Other/Cons.	-59	-66	7	-	-
<b>EBT</b>	<b>353</b>	<b>221</b>	<b>132</b>	<b>15.6</b>	<b>8.6</b>
New structure	FY 20/21	FY 19/20	Diff.	FY 20/21*	FY 19/20*
Multimetal Recycling	262	117	145	34.4	18.3
Custom Smelting & Products	151	170	-19	9.8	10.2
Other	-59	-66	7	-	-
<b>EBT</b>	<b>353</b>	<b>221</b>	<b>132</b>	<b>15.6</b>	<b>8.6</b>

\* preliminary, auditing in 2021/22

## Multimetal Recycling

Mainly comprises production facilities for processing **secondary raw materials** (e.g., copper and electrical scrap).

**Focus:** Optimization of **input mix** and **stable equipment availability**.

## Custom Smelting & Products

Includes production facilities for processing **primary raw materials** (copper concentrates), production and marketing of **standard and special products** (e.g., Cu cathodes, wire rod, shapes, strip products, sulfuric acid, and iron silicate).

**Focus:** **Equipment availability, input mix**, optimized sales of standard **products in large quantities**, differentiated processing of **customer requests in smaller lots**.



# FY 2021/22 forecast – new segmentation

## Our forecast range

Operating **EBT**  
between € **320** million  
and € **380** million

Operating **ROCE**  
between **12 %** and **16 %**

	Operating EBT in € million	Operating ROCE in %
Group	320-380	12-16
Multimetal Recycling	140-200	16-20
Custom Smelting & Products	210-270	10-14



# Aurubis AG

# Metals for Progress

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Closing remarks

Roland Harings, CEO  
Capital Market Day, December 6, 2021



# Taking Aurubis to the next level: Clear plan for sustainable growth



1

Our strategy and underlying growth initiatives address **global mega-trends** such as electrification, economic progress, and sustainability.

2

Aurubis is a **leader** in multimetals and a **frontrunner** in the largely untapped **recycling market**. We will further expand our lead and increase our competitive advantage.

3

We will continue to capitalize on **our core business** while pursuing new, highly **attractive growth areas**, and we have the **financial strength** to successfully pursue our strategic path.

4

Sustainability has always been part of our actions and will further permeate our operations. We hold ourselves accountable and make **ourselves measurable with clearly defined KPIs**.

5

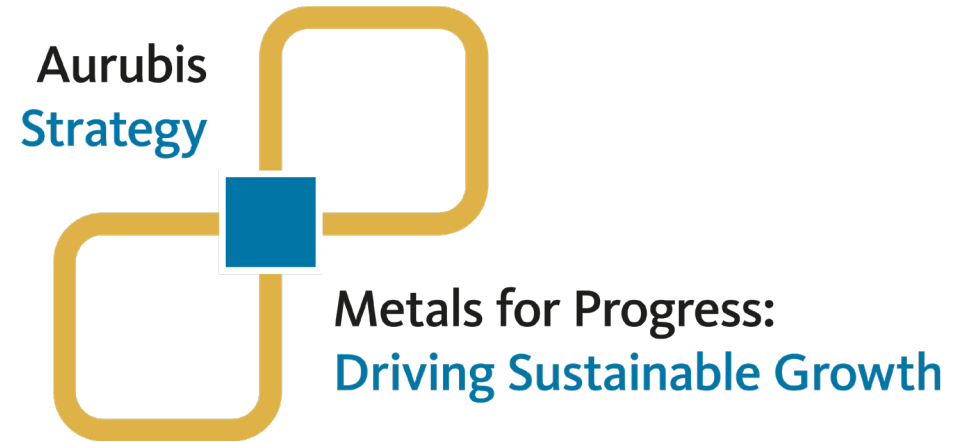
We will be part of the solution and strive to be **carbon-neutral well before 2050**.

# Our strategy builds on the sound mission of Aurubis and covers all relevant aspects to drive sustainable growth



 **Industry Leadership in Sustainability**

- Enablers**
- Digitalization, automation, and “Plant of the Future”
  - Strategic resource management, talent and personnel development



» **It is our mission to responsibly transform raw materials into metals for an innovative and sustainable world.**

# Based on the strategic roadmap: Clear financial guidance

## Short term

2020/21ff.

- Capex ~€ 350 million approved
- EBITDA of ~€ 100 million starting 2025/26
- Most of the EBITDA comes from the growth project

## Medium term

2025/26

- Capex ~€ 250 million planned in addition
- EBITDA ~€ 70 million by 2029/30 in addition
- Additional strategic projects, e.g., the modular recycling system (~€ 250 million capex each) and battery recycling (~€ 200 million capex) not yet included

## Long term

2030

- Volume of our long-term growth and project pipeline significantly exceeds short- and medium-term investments
- All capex projects subjected to a sustainability review (particularly CO<sub>2</sub> contribution)
- Battery recycling high-priority growth area. Capex ~€ 200 million until the middle of this decade. A hydro-metallurgical pilot plant is underway. Patent application submitted.



# Thank you for your participation.

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For further questions, contact:  
[IR@aurubis.com](mailto:IR@aurubis.com)

 **Aurubis**



# Disclaimer statement

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Aurubis disclaimer regarding forward-looking statements:

This document contains forward-looking statements that involve risks and uncertainties, including statements about Aurubis' plans, objectives, expectations, and intentions. Readers are cautioned that forward-looking statements include known and unknown risks and are subject to significant business, economic, and competitive uncertainties and contingencies, many of which are beyond the control of Aurubis. Should one or more of these risks, uncertainties, or contingencies materialize, or should any underlying assumptions prove incorrect, actual results could vary materially from those anticipated, expected, estimated, or projected.

Sustainalytics:

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