Updated Aurubis AG Environmental Statement 2016

Hamburg and Lünen Sites

Aurubis

Our Copper for your Life

Aurubis company profile

Our business, our business segments

Company profile

Aurubis is a leading international integrated copper group and the world's largest copper recycler, with production sites in Europe and the USA and an extensive service and sales system in Europe, Asia and North America. The Group has larger production centers in Germany, Belgium and Bulgaria. A total of 6,321 employees worked for the Group as of September 30, 2015 (previous year: 6,359). Of this number, 56 % were employed in German plants and 44 % worked in other countries.

Aurubis shares are part of the Prime Standard Segment of the Deutsche Börse and are listed in the MDAX and the Global Challenges Index (GCX).

Our business model

The Aurubis Group's business model closely links the production, recycling and processing of copper. This provides Aurubis with a great deal of efficiency and flexibility in managing raw material procurement, production and sales, as well as a strong market orientation.

Copper concentrates serve as the main input material and are primarily purchased from ores outside of Europe. The second raw material base is made up of intermediate products from other smelters, as well as copper scrap and other recycling materials that originate first and foremost in Europe. There are special processing options for residues from metal production, in addition to precious metal-bearing raw materials and electronic scrap.

Aurubis's product portfolio includes standard and specialty products made of copper and copper alloys, as well as other metals. The annual output of copper cathodes in the Group is over 1.1 million t, making Aurubis one of the largest producers of refined copper in the world. Copper cathodes produced at Aurubis are a registered trademark on the London Metal Exchange and can be sold there or to traders and the industry. Most of the cathodes are utilized as a starting product for copper products within the Group. The Aurubis Group therefore ensures a high level of delivery security for its customers.

The Aurubis Group's organizational structure is oriented towards its business model. In fiscal year 2014/15, Aurubis's activities were divided into two, previously three, operating Business Units (BUs): BU Primary Copper and BU Copper Products.

History

Aurubis was founded in 1866 as Norddeutsche Affinerie Aktiengesellschaft in Hamburg. Following various changes in the ownership structure, the company went on the stock exchange in 1998. Several subsidiaries and affiliated companies belong to the Group, as does the Belgian copper rod and semi-finished product fabricator Cumerio acquired in 2008. The company was renamed Aurubis in 2009. The product business became stronger and more international with the acquisition of the Luvata Rolled Products Division on September 1, 2011. With this acquisition, Aurubis has additional production sites in Buffalo (US), Pori (Finland) and Zutphen (Netherlands), as well as service centers in Zutphen, Mortara (Italy) and Shanghai (China) and sales offices in the US, Europe and several Asian countries.

This Environmental Statement applies to Aurubis AG, which comprises the Hamburg and Lünen sites.

Company guidelines and the Corporate Environmental Protection Policy

The former Luvata sites, which were integrated into the Group in 2011, were successfully integrated into Group environmental protection. After the good experience with the integration of the former Cumerio sites in 2008, it was important to analyze how the environmental protection situation could be further developed at the new sites as well. The following principles are laid out in our company guidelines:

- The continuous improvement of water pollution control, soil conservation and immission control are key aims of environmental protection.
- For reasons of accountability, environmental and climate protection should be developed in such a way as to preserve natural resources and avoid or minimize strain on the environment and our employees.
- Issues of environmental protection should be taken into account equally in the planning and development of new products and production processes.
- Processed raw materials and intermediate products should be brought into the economic cycle as completely as possible and unavoidable waste should be properly recycled or harmlessly disposed of. Raw material suppliers are advised on issues related to environmental protection if needed.
- Essential precautions to avoid accidents and operational disruptions are in place to prevent or minimize environmental hazards for our employees and neighbors, as well as effects on the environment.
- Our employees' sense of responsibility in environmental protection should be strengthened and an objective, open and respectful dialogue should take place with them, the relevant authorities and the public.
- Our customers are appropriately informed about the features of our products and necessary safety measures and are advised on questions related to product disposal.
- External companies working for us must be selected, informed and advised in such a way as to ensure that laws and our environmental protection standards are observed.

Compliance with legal regulations is the basis and minimum standard of our activities.

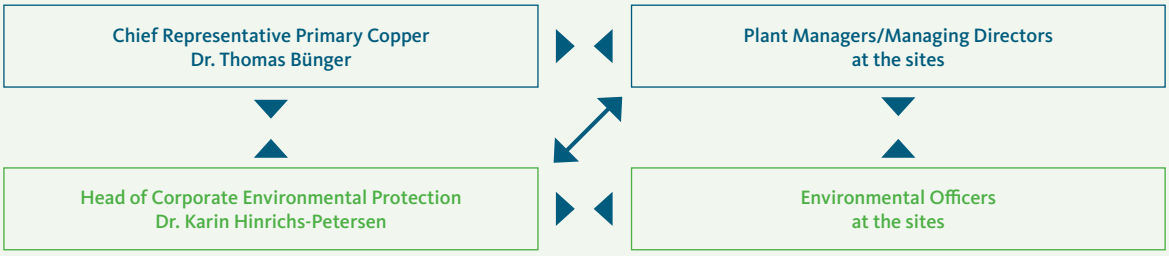
Aurubis assumes responsibility for environmental and climate protection, which is a key issue in the company's strategy. Metals are necessary for technical progress and a high standard of living. Rising demand worldwide is met with limited resources, however. Metal recycling is therefore an important source of raw materials – especially for a country like Germany that lacks natural resources. It makes an important contribution to supply security, sustainability and resource protection.

Aurubis obtains raw materials from more than 50 countries worldwide, with a focus on Europe for secondary raw materials. Environmentally friendly multi-metal production from primary raw materials and multi-metal recycling form the basis for a demand-oriented copper supply. A number of recycling raw materials, for example circuit boards, copper pipes and electronic scrap, are purchased and processed as part of Aurubis's multi-metal recycling. High volumes of recycling raw materials are processed into cathode copper and precious metals at the Hamburg site as well. Since copper concentrate processing is an exothermic procedure, recycling materials can be melted when processing primary raw materials in Hamburg, practically without any additional energy.

We assume responsibility for environmentally friendly production with the highest energy efficiency standard for climate protection and have established these targets in our company guidelines. Alignment with the market, orientation towards growth, a clear commitment to efficiency and continuous improvement processes, high quality awareness in all sectors and ecological and social responsibility: all of these factors secure the future of the Group.

Expanding recycling in the Group helps to close material cycles in an environmentally sound manner and therefore makes an important contribution to sustainable development. Beyond legal requirements, voluntary agreements like the chemical industry's "Responsible Care" initiative are important instruments for Aurubis to improve its environmental and health protection performance continuously.

Fig. 1.0: **Corporate Environmental Protection organizational chart**



Corporate Environmental Protection is responsible for the strategic orientation of environmental protection and directly reports to the Chief Representative for Primary Copper. Environmental Officers oversee the environmental protection duties at the individual sites under the technical supervision of the Corporate Environmental Protection management (see Fig. 1.0).

With the involvement of employees, Plant Managers/ Managing Directors and the Executive Board, uniform environmental protection standards were developed, established with corporate guidelines and implemented across the Group as part of the environmental management system (ISO 14001 or EMAS).

The key environmental protection factors, which are uniform within the Group, are reviewed and certified annually. Environmental discussions take place across the Group and employees are trained on environmentally relevant topics regularly. Emergency plans or alarm and danger prevention plans have been established at all sites for emergencies and accidents. They ensure that environmental impacts are effectively avoided and that employees and the community are protected. We carry out training sessions and emergency drills regularly, documenting and evaluating the procedures. Emergency plans are developed in coordination with the responsible authorities. The Corporate Environmental Protection Policy also include the tasks to implement the European chemical regulation, REACH.

Updated Aurubis AG Environmental Statement 2016

Hamburg Site

The largest Aurubis AG production site and the Group headquarters is located on the Elbe island Peute, only about four kilometers as the crow flies from Hamburg's city hall.

The plant was constructed in 1908 on an area of about 870,000 m² in Peute, an industrial inland harbor area in the Veddel district. Following reconstruction after World War II, the production facilities were continuously expanded and steadily modernized. Today, Aurubis AG's Hamburg site is one of the world's most state-of-the-art primary and secondary copper smelters and has an authorized production capacity of 450,000 t of copper cathodes each year. About 2,296 personnel are employed at the Hamburg site, including around 180 apprentices (as of September 30, 2015).

The individual production sectors at Aurubis AG in Hamburg are divided into three plant areas (see Fig. 1.1): Plant North (RWN) is mainly comprised of the administrative building, the workshops, the secondary copper smelter and precious metal production. Plant South (WS) includes the sludge decomposition plant, the cracking acid cleaning facility, the wastewater treatment facility, the concentrate delivery area, the chemical plants and the casting lines in particular. The primary smelter sector includes the main primary copper production facilities: the RWO, the sulfuric acid production plants and the tankhouse. This section also houses the rod plant.

Fig. 1.1: **The main Aurubis plant in Hamburg – a downtown copper smelter**

1 *Casting lines* 2 *Secondary smelter/precious metals* 3 *Rod line* 4 *Tankhouse* 5 *RWO*

Fig. 1.2: **Aurubis, an integrated copper producer**

Aurubis is an integrated copper producer that operates copper production and processing facilities at the Hamburg site (see Fig. 1.2).

The main raw materials for copper production are copper concentrates (processed copper ores) and recycling materials (including electrical and electronic scrap).

In the primary copper smelter, copper anodes (with a copper content of about 99 %) are produced from the primary raw material, copper concentrates, in multi-step pyrometallurgical processes. The metals in recycling materials can be drawn out in each step of the existing processes. The sulfur in the primary and secondary raw materials is oxidized into sulfur dioxide and converted in the downstream double absorption contact acid plant into sulfuric acid and oleum, two marketable products that are primarily used in the fertilizer and chemical industries.

Copper cathodes with a copper content of over 99.99 % are produced from the copper anodes in the copper tankhouse using electrochemical methods. The cathodes are used to manufacture copper intermediates (continuous cast rod, copper shapes, copper powder).

An iron silicate stone is produced from the iron that is chemically bonded to the concentrates by adding materials containing silicate, such as sand or other SiO_2-bearing substances. This iron silicate stone is processed further into quality-assured building materials and blasting abrasives.

Intermediates produced in pyrometallurgical and hydrometallurgical copper refining, such as flue dusts and slimes, are further treated in an electrothermal process, primarily in the secondary smelter's electric furnace. Both internal and external intermediates and recycling materials are deposited in a liquid copper or lead matrix in the process.

The refining of the matrix metals copper and lead in subsequent pyro- and hydrometallurgical processes (multi-metal production) serves to extract tramp metals such as zinc, nickel, antimony, selenium, tellurium and precious metals in metallic form or as metal compounds. Iron contained in the raw materials is also extracted in this process in the form of iron silicate by adding SiO_2-bearing materials. These materials include sand from renovation measures, glass from screens and other types of technical glass.

The process off-gases from the electric furnace are cleaned in filter facilities. SO_2-bearing process gases are additionally conducted through a multi-step wet gas cleaning facility before the SO_2 contained in the off-gas is converted into sulfuric acid in the double absorption contact acid plant previously mentioned.

Internal intermediates and purchased recycling materials rich in precious metals are processed to extract precious metals. In the process, primarily internal and external anode slimes from the copper tankhouse, as well as skimmings rich in precious metals and bullion containing sulfur, are used as input in the top blown rotary converter. The off-gases containing SO_2 and SeO_2 are cleaned in a flue gas scrubber and the SO_2 is processed into sulfuric acid in the contact acid plant. The selenium is discharged as moist selenium.

Primary materials with low amounts of sulfur and selenium, mainly precious metal-rich bullion, are placed in a refining furnace and then cast into silver anodes. The refining furnace's off-gas is conducted through an off-gas treatment facility. In the precious metal smelter, precious metals (silver, gold, platinum group metals) are separated using hydrometallurgical procedures and then extracted as commercial products.

Pure copper is produced from the various raw materials after the smelting process in the tankhouse. The copper can be traded on the international metal exchanges. However, Aurubis only sells a small proportion of the copper cathodes on the exchange. Most of the cathodes are processed into copper products such as continuous cast wire rod, shapes, strip, sheet, foil, wire and profiles at the different Group sites. For this purpose, the copper cathodes are melted in natural gas-fired furnaces and cast or rolled and drawn into the shapes requested by the customer.

In the central sewage treatment plant (ZABA), process wastewater from different areas at Aurubis is treated chemically and physically. Polluted slimes are separated, drained and disposed of. Harmful substances are removed from the purified clear phase, which is directly conducted into the Northern Elbe River pursuant to the provisions of the water law permit.

Precipitation from the plant premises, which are almost completely paved, is collected in internal sewer systems and purified chemically and physically in two treatment plants (south and east).

The purified wastewater is conducted into the Northern Elbe River pursuant to the water law permit or returned to the plant's process water supply as needed.

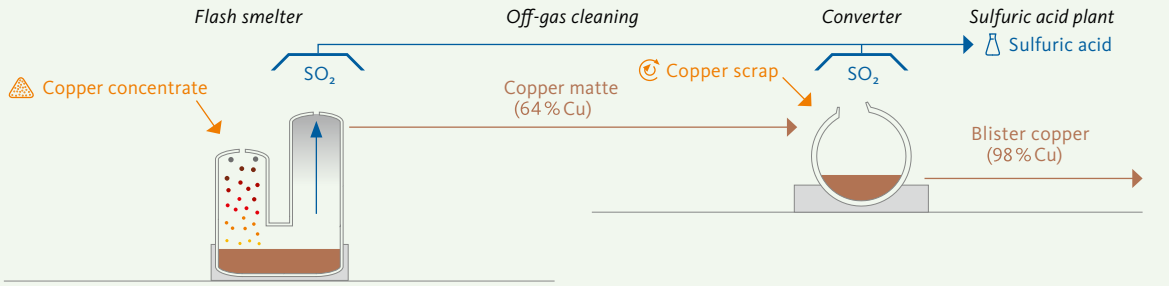
Non-ferrous metals such as copper are not used up but can be recycled as often as desired without a loss of quality, therefore fulfilling an important role in environmental and resource protection. Nearly all raw materials are transferred to marketable products at Aurubis Hamburg (see Fig. 1.3).

The environmental management system

Aurubis has had an environmental management system at the Hamburg site since 2002, which is certified in accordance with ISO 14001 and EMAS. The annual TÜV review is a good opportunity for Aurubis to have its effective environmental protection measures and the resulting successes inspected and verified by an external third party.

The energy management system at the Hamburg site was implemented in 2005. It was reviewed within the scope of environmental protection until 2013. Because of the increasing significance of certified management systems and the energy policy conditions, it was certified in accordance with DIN EN ISO 50001 for the first time in May 2013.

Fig. 1.3: **From copper concentrate to cathode**



Targets and tasks of the environmental management system

The environmental management system helps us to confidently control production processes. In particular, targets and measures are defined and their implementation is monitored. The environmental management system includes the documentation of operational processes, external environmental reviews, internal audits, routine recordings and site inspections. Inventory-taking forms the basis for decisions about the type, extent, suitability and execution of environmental protection measures.

Our environmental protection management system ensures that the applicable legal requirements are fulfilled with respect to environmental protection. Furthermore, it supports the continuous improvement of our environmental protection efforts with economically reasonable product and process design that takes the environment and occupational safety into account. Saving energy is also part of environmental protection for us, so we also had our energy management system certified in accordance with DIN EN ISO 50001. The energy flows are presented transparently and optimization potential is documented. The systems and organization of environmental management and health protection are described extensively and understandably in a handbook available to employees. This management handbook guarantees that all activities that concern environmental aspects and occupational safety issues are planned, managed, monitored and continuously improved with due regard to legal requirements.

The environmental management system EMAS also helps in the implementation of the Aurubis Group sustainability targets, which were newly defined in 2013, at the Hamburg site.

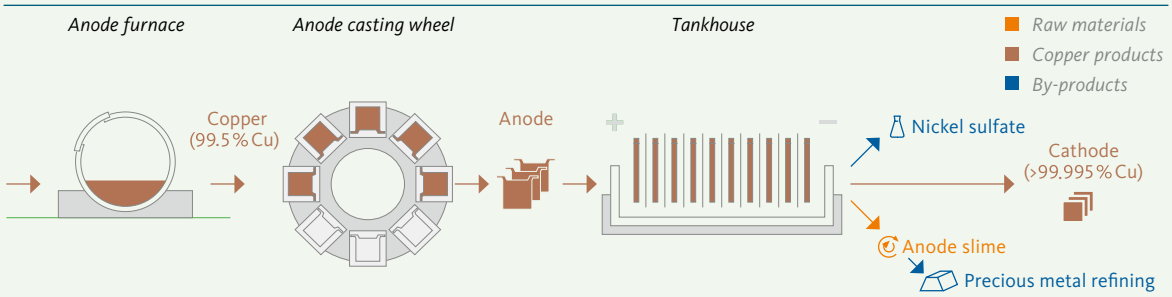
Environmental management organization

As the operator of facilities requiring a permit in accordance with § 52a Federal Immission Protection Law and § 53 Recycling Management and Waste Law, the Aurubis AG Executive Board or an appointed member of the Executive Board is responsible for observing environmental protection and radiation protection regulations. A member of the Hamburg Environmental Protection Department assumes the position of Environmental Management Officer and reports to the Executive Board. As part of the environmental management system, the Hamburg Environmental Protection Department tracks changes in legal requirements, reviews their effects on the different areas of our company and ensures that our facilities are operated in conformity with the law. Environmental Protection in Hamburg and Lünen, Occupational Health and Safety (OHS) and Energy Management at the Hamburg site are the departments responsible for updating the legal directory and informing the relevant employees.

The Hamburg Environmental Protection Department provides employees with training and information related to environmental protection.

The company management has appointed officers or specified individuals responsible for the following issues in order to fulfill corporate duties (see Fig. 1.4):

- Immission protection
- Water pollution control
- Waste management
- Radiation protection
- Hazardous materials
- Environmental management
- Officer for Specialized Companies pursuant to the German Water Management Act



» Occupational Safety Specialists
» Medical Department
» Energy Management
» Accidents

All environmental protection issues are coordinated, organized and monitored in the Hamburg Environmental Protection Department to support the different business sectors. The department also serves as a contact for company environmental protection.

Monitoring and internal auditing of environmental management

The effectiveness of the environmental and energy management systems is reviewed with internal audits pursuant to EMAS regulations and ISO 14001/ISO 50001. The approach for the internal audits is defined in specific process instructions. Internal and external audits take place annually in compliance with the EMAS and ISO 14001/ISO 50001 requirements.

Fig. 1.4: **Environmental protection organization at the Hamburg site**

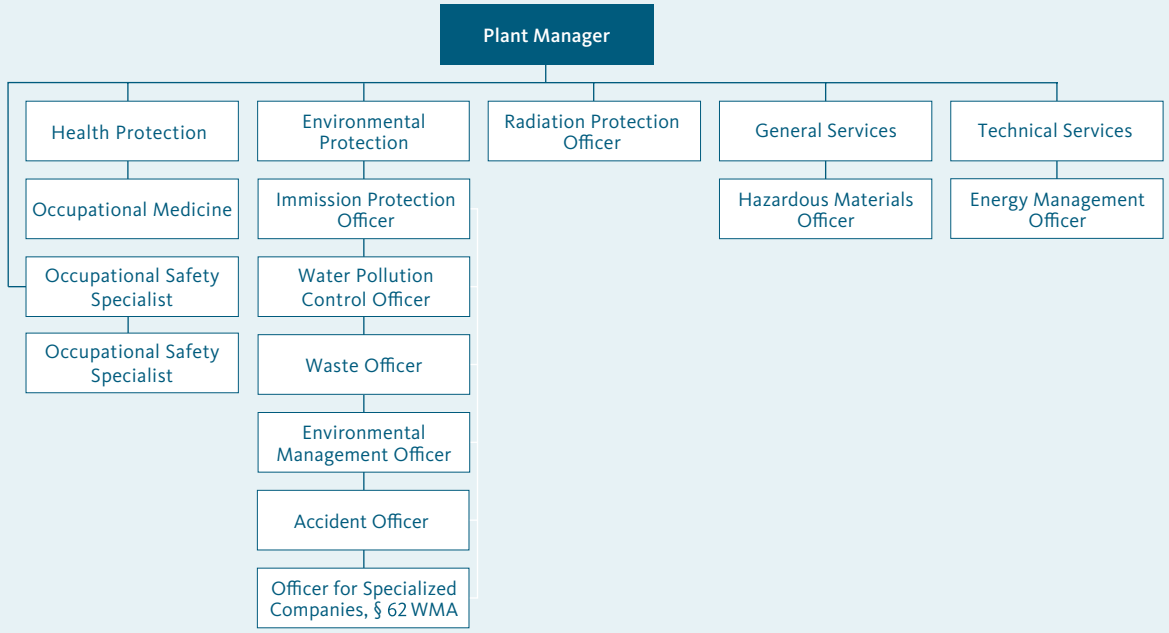


Fig. 1.5: **Quantity of hazardous materials transported at the Hamburg and Lünen sites**

Mode of transport in t p.a.	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY14/15
Road	57,311	69,145	87,960	97,280	86,894	93,066	140,971
Rail	83,170	102,016	198,323	197,155	192,243	200,400	181,144
Inland waterways	1,081,870	839,815	780,897	816,896	719,811	716,244	725,923
Sea	10,465	5,924	5,781	7,573	7,876	5,270	86,110
Air	0.2	0.1	0.1	<1	<1	<1	15
Total	**1,232,816**	**1,016,900**	**1,072,961**	**1,118,904**	**1,006,825**	**1,014,981**	**1,134,163**

The external audit involves verifying the description of operating processes and reviewing the environmental data provided. The results of the company environmental audits and internal audits are compiled in a report and presented to the Executive Board for assessment (Management Review). The Executive Board evaluates how suitable, appropriate and effective the management system is and whether our principles for environmental protection, health protection and occupational safety are being successfully implemented.

The Executive Board also evaluates the energy management system as part of a Management Review.

Emergency measures and crisis management

Because of the type and quantity of materials handled, the Hamburg production site is subject to the obligations of the German Accident Regulation. The existing safety report in accordance with § 9 Accident Regulation was updated for the entire Aurubis AG plant in Hamburg in 2010.

The inspections in the safety report are based in particular on the relevant technical facility data and the composition of the materials handled. According to this safety report, serious danger within the meaning of the Accident Regulation can be ruled out for the facilities. Furthermore, the measures provided to protect the general public and the surrounding area from other dangers, substantial disadvantages and significant disturbances pursuant to § 4b of the 12th German Federal Immission Protection Law prevent or limit large-scale damages.

The safety report is current and is regularly reviewed and updated according to legal requirements.

Emergency plans are in place for emergency situations and accidents. They describe how to react to prevent or limit environmental effects. We routinely carry out emergency drills, documenting and evaluating the processes. Moreover, we have developed an alarm and danger prevention plan in coordination with the responsible authorities, which describes emergency measures for our plant premises. The individual plant divisions also have alarm and danger prevention plans. These documents are issued by the Plant Fire Department or the plant divisions in cooperation with the Environmental Protection Department and are accessible to all parties involved in the emergency.

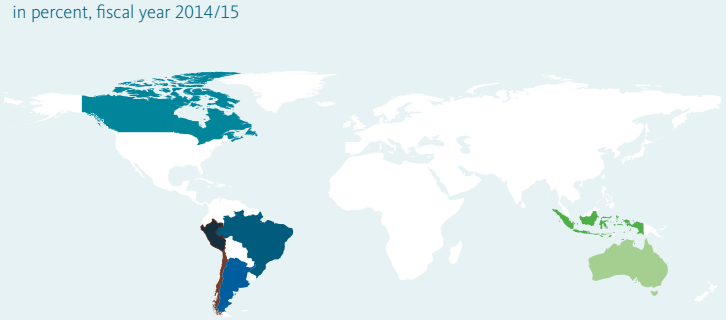
Our Plant Fire Department works around the clock in Hamburg. Employees are on call for each plant division and for all of the relevant departments. An engineer on duty who can also be reached at any time coordinates the required measures. The engineers rotate weekly.

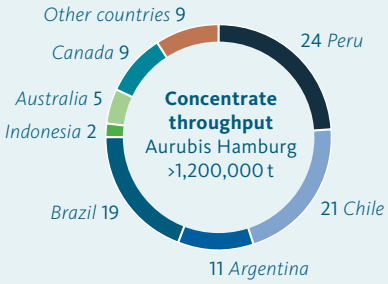
In an emergency, the individuals listed in the emergency plan are responsible for passing on information to the public.

In the fourth quarter of 2012, the informational brochure on incidents, “Safety for Our Neighbors”, was revised and updated in collaboration with 30 other companies in Hamburg to provide information to the public. The brochure, which was coordinated by the Hamburg Chamber of Commerce, was sent to all of the households concerned in February 2013. The brochure is also available as a download on the Chamber of Commerce website. As part of the Seveso III Directive, a new brochure is currently being drafted with Aurubis’s participation. Additional information will be made available in an online portal.

Fig. 1.6: **Origin of copper concentrates for the Hamburg site**

in percent, fiscal year 2014/15





Indirect environmental effects

Indirect environmental effects are effects that are not directly caused by our production processes on site. Therefore, Aurubis cannot directly influence them. These include the upstream and downstream value-added stages. We cannot directly influence transports of hazardous materials which we have commissioned, either.

Transporting hazardous materials

Two internal Hazardous Materials Officers were appointed, one for Hamburg and one for Lünen, and the relevant authorities have been informed.

Outgoing hazardous materials at the Aurubis AG sites in Hamburg and Lünen amounted to 1,134,163 t in fiscal year 2014/15. Of this amount of hazardous materials, over 90 % were classified as dangerous goods class 8, "Corrosive Substances" (see Fig. 1.5).

No accidents with hazardous material leakage occurred during the reporting period. Isolated irregularities were corrected immediately before transport in compliance with the relevant regulations on hazardous materials. Internal consultations, monitoring and training were carried out repeatedly in order to maintain this high safety standard.

Origin of the raw material copper concentrate

Our raw material for primary copper production, copper concentrate, is mainly extracted on site at mines, where ores with about 0.5 % to 4 % copper content are concentrated to an average copper content of 25-30 % to reduce transport volumes.

Our primary ore concentrate suppliers are the mining companies Vale, Teck, Glencore-Xstrata, Antofagasta, First Quantum and Codelco. These global mining companies have committed themselves to a sustainable corporate policy and to releasing environmental reports, which can be found on the companies' websites.

We seek out a dialogue with our partners to promote adherence to environmental and social standards and to avoid violations. A meaningful step in this regard is Business Partner Screening, a process to assess raw material suppliers more systematically. Aurubis has developed this screening system since 2013 in addition to the valid group-wide policy on processing conflict-free gold raw materials. The screening system has been used since 2015 to review the identity and integrity of Aurubis AG's business partners before entering into contracts. Business Partner Screening is based on a software and relies on multiple steps. The plan is to implement it across the Group. It is based on a questionnaire that analyzes possible financial, tax law, criminal law and sustainability risks, among other factors. If any risks are discovered, the Compliance and Sustainability Departments follow up on them. Contracts will not be entered into with new business partners before they are screened. For existing business partners, the screening will be repeated regularly – depending on the original risk. Our Business Partner Screening is continuously developed and adjusted to changes in requirements.

We obtain most of the copper concentrate from South America (75 %), 2 % from Asia, 9 % from Canada, 5 % from Australia and small quantities from other countries. The concentrate is transported almost exclusively by sea in bulk carriers via Brunsbüttel. Special ships suitable for inland waterways are used to deliver the concentrate

mixtures. They drop off their cargo in the Müggenburger Canal with a crane. In fiscal year 2014/15, over 1.2 million t of copper concentrates were delivered to our plant in this way.

Indirect CO_2 emissions

Copper production is an energy-intensive process for which a reliable electricity supply is very important in particular. Aurubis therefore has a long-term cost-based electricity supply contract with the coal power plant Moorburg (a so-called virtual "power plant slice"). This is one of the most state-of-the-art and efficient power plants of its kind. Electricity production in this power plant nevertheless leads to CO_2 emissions, which are indirect CO_2 emissions for Aurubis, and therefore indirect environmental effects. In 2015, these indirect CO_2 emissions totaled 385,938 t. Overall, 314,662 t of the indirect CO_2 emissions resulted from electricity consumption in the production processes, while 71,276 t resulted from the additional electricity consumption for oxygen production.

In order to reduce indirect CO_2 emissions further as well, the utilization of waste heat was expanded in the form of an interplant turbine to generate electricity in primary copper production. It was commissioned in Q4 2014. This project alone reduced indirect CO_2 emissions by 3,735 t in 2015.

A total of 15,006 MWh of electricity was produced from waste heat in 2015, or 2.22 % of total electricity consumption (2014: 1.35 %). There was an increase in the electricity produced from waste heat due to the start-up of the interplant turbine.

Furthermore, landfill gas was used in the production processes instead of natural gas (2015: 3,197 MWh). Aurubis thus uses 100 % of the landfill gas collected in the former Georgswerder landfill.

Steam is required for copper production processes. This steam is produced in large part from waste heat; in 2015, 76 % of the necessary steam was produced from waste heat and only 24 % of the necessary steam was produced from fossil fuels.

In Hamburg the completion of the Hamburg-Schwerin transmission line represented an important step in increasing supply security. This allowed us to reduce our protective measures considerably by the end of 2012. In the meantime, some temporary solutions for an emergency electricity supply have been replaced with permanent measures. The situation regarding the lack of local electricity production in Hamburg has eased. Both blocks of the coal power plant Moorburg went into operation in 2015.

Environmental protection data and facts

The production facilities operated in Hamburg are licensed pursuant to immission protection law. With respect to water pollution control, cleaned rainwater, wastewater and cooling water are fed in in compliance with existing water law permits. Data is collected at the Hamburg plant on the basis of data in the SAP system, the PI system, internal recordings and the results of comprehensive measuring programs. Calculation methods and data collection are documented so that data is always traceable and verifiable. Environmental aspects and data are reviewed, analyzed and evaluated as part of routine quality circles, manage-

ment discussions and audits. Environmental protection focuses and environmental targets can be established this way. The key indicators required by EMAS III are also redefined annually and checked for plausibility in this process.

During the internal audits, the company's 2015 environmental targets were reviewed to see if they had been fulfilled. This was confirmed for all of the relevant environmental targets with a direct influence on environmental effects. Several additional targets were updated and new targets were defined and documented.

The focus of the new Environmental Program is on further improving emission reduction and climate protection. Environmental quality circles and continued employee training were arranged to strengthen environmental awareness and implement the environmental protection targets.

The public contract Aurubis signed in 2011 with the city of Hamburg addresses the issue of air pollution control. The contract envisions a 9 t reduction in dust emissions per year based on the Emissions Declaration of 2008. The measures agreed on in the contract were incorporated in the new Environmental Program. The contract includes environmental protection measures with a capital expenditure volume of € 20 million. The agreement runs until 2016 and the reduction will be verified with the declaration of the Immission Protection Officer in 2017.

As documented in the measures, a new crusher was connected to the recently built Plant North warehouse in 2012. In addition, a sprinkler system was installed in the area between the crusher and the entrance to the bulk material warehouse, which will reduce fugitive emissions even further, especially in the case of dry weather.

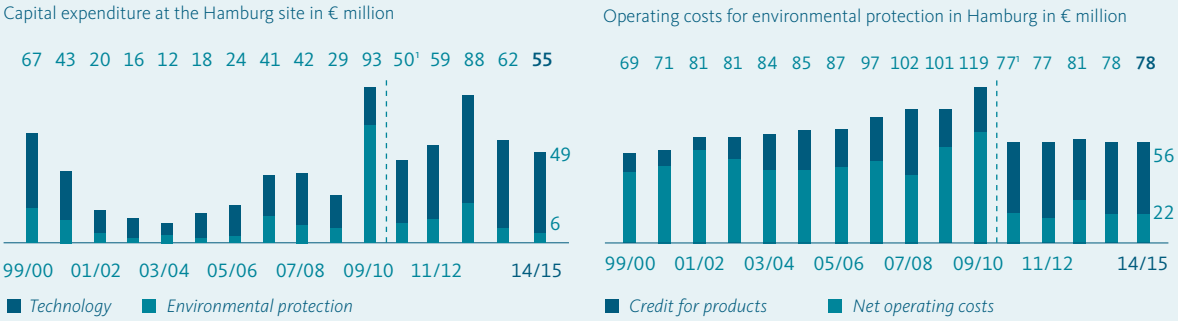
The main measures are as follows:

- In secondary copper production, the new crusher will be connected to the recently constructed Plant North warehouse.

- In primary copper production, a turbine was built to produce electricity from waste heat (CO_2 reduction of 5,000 t per year). It was commissioned in Q4 2014.

- A feasibility study on sealing off the ridge turrets in the primary smelter has been drafted. The subject of the study is the avoidance of fugitive emissions via the ridge turrets in primary copper production. In the course of the investigations, potential for improving the flow and the source extraction within the hall were also identified and will be implemented in additional projects. In 2015, the suction system in the ladle chambers was optimized and organizational improvements were made to the ladle transport process to reduce fugitive emissions.

Fig. 1.7: **High capital expenditure for environmental protection measures leads to higher operating costs**



[1] Because of a change in the accounting procedure, the information starting in 2010/11 deviates significantly from the previous years.

Investments in environmental protection

At Aurubis, copper and by-products are produced as sustainably as possible with the use of state-of-the-art plant technologies with very high environmental protection standards in order to conserve natural resources and maintain a clean environment for future generations. We therefore continuously invest in modern plant and environmental protection technology. Our most important tasks include constantly improving air quality, energy efficiency and water pollution control, as well as conserving natural resources for future generations.

An average of about one-third of the Aurubis Group's total capital expenditure has gone to environmental protection measures over the years. Since 1981, total capital expenditure has amounted to over € 1.3 billion, of which € 422 million was capital expenditure for the environment. By implementing these measures and operating state-of-the-art, innovative plant technologies, Aurubis AG is a leader in climate and environmental protection in the primary and secondary copper production sectors and in the production of wire, continuous cast material and flat rolled products (preliminary stages of processing). Today, only comparatively smaller improvements can be achieved with continued high capital expenditure on environmental protection because a leading international environmental standard has been reached and emission reduction is subject to technological limitations (see Fig. 1.7).

At the same time, the operation of facilities that provide environmental protection (e.g. filter facilities) incurs substantial costs. Environmental protection measures (e.g. operating filter facilities with fans) are very energy-intensive.

The projects to reduce fugitive emissions in particular are milestones for environmental protection. The success of these measures is illustrated by the fact that the suspended particulate recordings taken by the Hamburg environmental authority have been kept at a low level. Since 2012 the Veddel measuring station of the Hamburg Air Quality Measurement Network has been relevant for the official air quality recordings. It is located in the adjacent neighborhood, about 500 m west of the plant premises.

Aurubis has observed the EU target values for arsenic (6 ng/m³) and cadmium (5 ng/m³) that went into effect in 2013 for years already.

The investigations carried out by the Aurubis environmental monitoring team on the plant premises confirmed the values from the official recordings (see Fig. 1.8 and 1.9).

The best available plant technologies are in operation at Aurubis AG, offering a very high standard of environmental protection. Further emission reduction measures therefore require disproportionately high capital expenditure, but they are still planned and carried out to continuously improve environmental performance. Some of the implemented and planned projects are explained in more detail in the chapter "Commitment to the environment" starting on page 26.

Fig. 1.8: **Kaltehofe – an Elbe island near Aurubis**

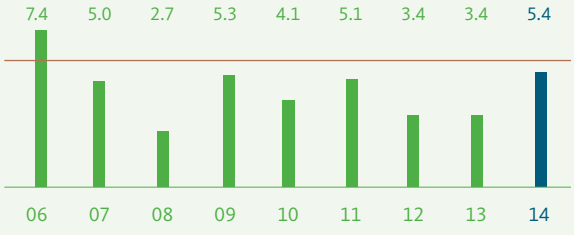
Prevailing wind direction

1 *Plant North* 2 *Plant South* 3 *Plant East*

Fig. 1.9: **Low immission values (suspended particulates) at the Veddel measuring station**

» Heavy metal immissions considerably below EU target value (valid from 2013)

Arsenic pollution at measuring site Kaltehofe in ng/m³



EU target value: 6 ng/m³

Cadmium pollution at measuring site Kaltehofe in ng/m³

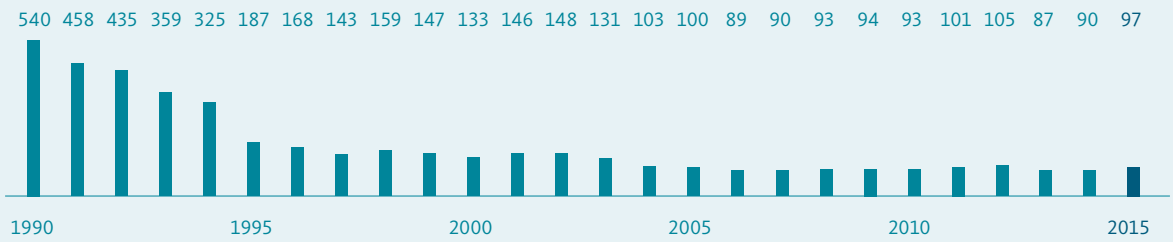
EU target value: 5 ng/m³

1 gram (g) = 1 billion nanograms (ng)

[1]*Data published by the Hamburg Authority for the Environment and Energy*

Fig. 1.10: **Dust emissions at the Hamburg site**

Dust in g/t of copper output



Air

One of the most important environmental protection milestones in the 1990s was the use of state-of-the-art filtering technologies for all directed emission sources, i.e. smokestacks.

All of the statements in this chapter are based on the current Emissions Report, which is issued annually by the Immission Protection Officer. The values outlined below are made up of a number of individual recordings. Directed emissions are recorded as classified values from continuous measurements made with a system provided by Durag data systems GmbH. Fugitive emissions from hall ventilation facilities, etc. are determined in recording campaigns carried out by both external recording institutes and the company's own environmental monitoring team and are projected to find the annual loads. Fugitive emissions due to transshipments in storage areas, etc. are calculated using the corresponding emission factors from the technical literature. The national calculation standards for data from continuous measurement institutes have changed since 2011. The so-called validation value is no longer considered, which leads to higher results. Consequently, dust emissions were actually further reduced, but the values can't be directly compared to the data from the previous years.

The projects to reduce fugitive emissions in particular are milestones for environmental protection. It is therefore crucial for Aurubis to develop innovative technologies for environmental protection and to enter new technical territory in the process.

The new 5,000 m² bulk material warehouse in Plant North (Plant North warehouse) went into operation in September 2011. The crusher/conveyor was integrated in 2012. The project, which had a capital expenditure volume of about € 7.5 million, reduced fugitive emissions from this area by more than 70 % (compared to 2008) as expected. Separated flue dusts can be processed within the smelter to recover the metals contained in them, so there is no additional waste.

Specific emissions to the air have been reduced significantly since 1990. This is illustrated in the following figures. Almost 80 % of the remaining metal emissions from the Hamburg production site come from fugitive sources, the majority of which stem from hall ventilation facilities.

Specific dust emissions have been reduced by 82 % since 1990. Specific dust emissions rose by 7 g/t in 2015 compared to the previous year, though the dust load decreased by a total of 2 t (see Fig. 1.10).

Copper is the main metallic substance in the dust at the Hamburg production site. Specific copper emissions have been reduced by 75 % since 1990. This low level was maintained, as the changes compared to the previous year were in the expected range (see Fig. 1.11).

Specific lead emissions have been reduced considerably (by 88 %) compared to 1990 and are therefore still at a low emission level. The fluctuations observed are due to the use of different concentrates (see Fig. 1.12).

Fig. 1.11: **Copper emissions at the Hamburg site**

Copper in g/t of copper output

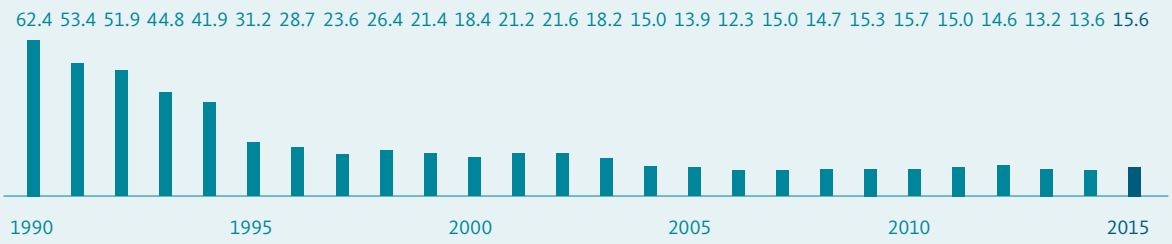


Fig. 1.12: **Lead emissions at the Hamburg site**

Lead in g/t of copper output

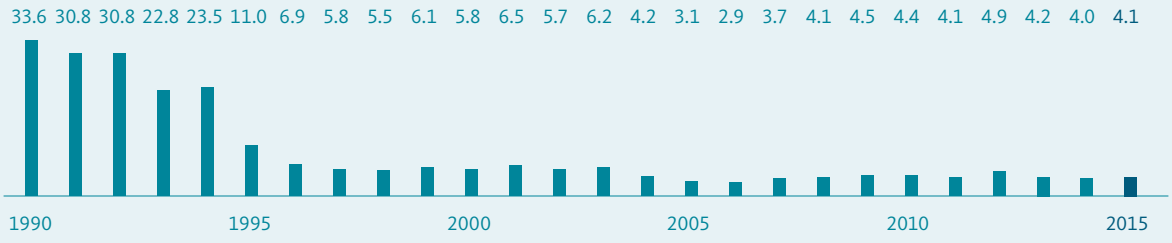


Fig. 1.13: **Arsenic emissions at the Hamburg site**

Arsenic in g/t of copper output

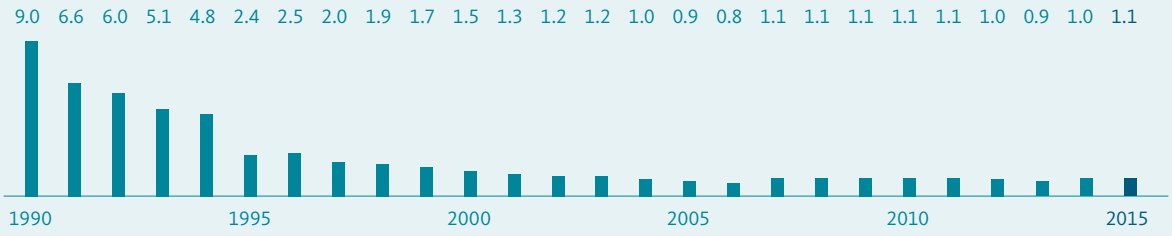


Fig. 1.14: **SO_2 emissions at the Hamburg site**

SO_2 in kg/t of copper output

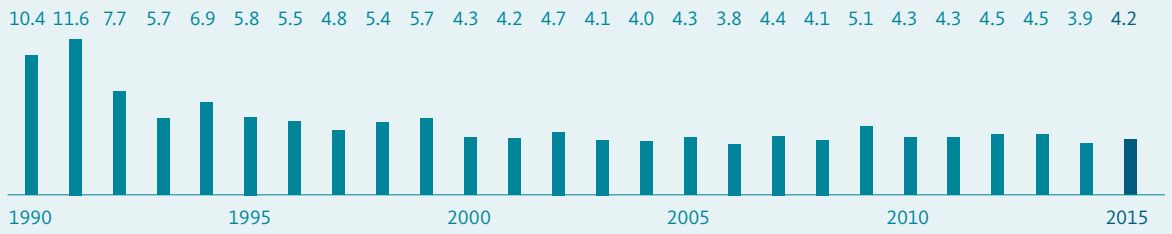
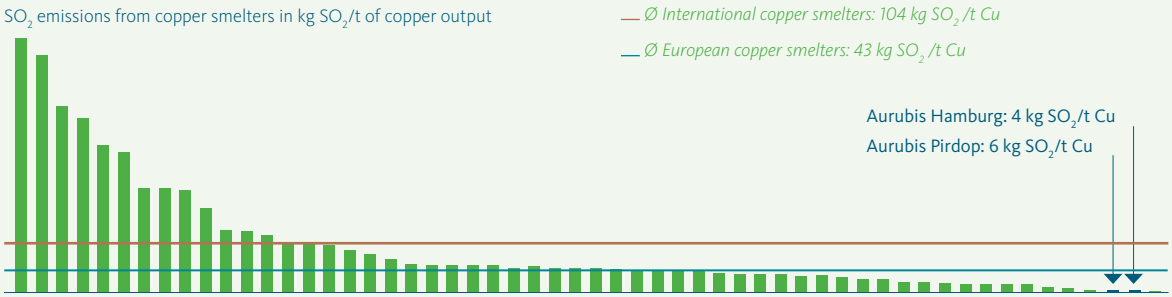


Fig. 1.15: **Highest environmental standards worldwide**



Sources: Wood Mackenzie, 2016/internal Aurubis data

Arsenic is a natural component of copper concentrates. Arsenic emissions have been reduced by about 89 % since 1990 in various steps of the copper refining process and have been at a low level in the last several years (see Fig. 1.13).

Apart from copper, sulfur is one of the main components of copper concentrates. The gaseous sulfur dioxide produced when ore is smelted is converted into sulfuric acid in the sulfuric acid plant using the modern double catalysis process. The sulfuric acid is mainly used in the chemical industry. Specific sulfur dioxide emissions have been reduced by 63 % since 1990 and tend to vary at a low level (see Fig. 1.14).

When compared internationally, the Aurubis Hamburg site continues to be a forerunner in reducing specific sulfur dioxide emissions (see Fig. 1.15).

With an input of 1,593,558 t of material and an annual output of 443,185 t of copper, specific emissions for 2015 are as follows:

Emissions		Specific emissions related to: input material	copper output
SO_2	kg/t	1.17	4.2
Dust	g/t	27.0	97
Copper	g/t	4.3	15.6
Lead	g/t	1.3	4.1
Arsenic	g/t	0.3	1.1

Overall, the emission limits mentioned in the Technical Instructions on Air Quality Control (TA Luft) (especially limit values mentioned in the relevant chapters) and established in the relevant permits for sources of collected and fugitive emissions were strongly adhered to. The relevant limit values of the TA Luft are featured in chapters 5.2.2, 5.2.4, 5.2.5, 5.2.7 and 5.4.3.3.1 in particular.

Noise

We regularly measure the noise level that emanates from our plant premises. The noise level at the plant boundaries is less than the existing reference values. Detailed noise recordings were carried out and a noise register was developed in 2010. These recordings are continuously carried out to evaluate how effective the implemented measures are.

Noise recordings were carried out in 2015 with the objective of reviewing the values established in the noise register. New plant sections, e.g. the new lead refinery, were inspected in particular.

Water

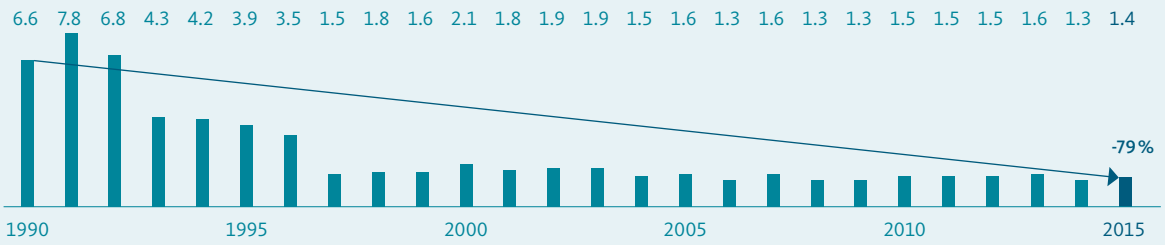
The wastewater from Aurubis AG's entire Hamburg plant is composed of precipitation, indirect and direct cooling water, condensate, process wastewater and desludging water. All of the plant's precipitation is collected and cleaned together with other wastewater (e.g. from the anode casting machine in the primary smelter) and discharged into the Elbe River. Precipitation is also used as cooling water in some cases.

Accumulated process water is cleaned in a separate state-of-the-art wastewater treatment facility. The Hamburg plant has water law permits and observes their requirements. The sanitary water (especially wastewater from kitchens, cafeterias, showers and social rooms) is discharged into the city sewer system to be treated by the city's wastewater treatment plant.

The proportion of heavy metals discharged by Aurubis in the Elbe's total load is less than 0.1 %. Aurubis has reduced the heavy metal load that is discharged with the wastewater into the Elbe by 79 % since 1990. Today's average emission value of 1.4 g/t of copper products is evidence of Aurubis's top position in environmental protection.

Fig. 1.16: **Metal emissions in water at the Hamburg site**

Metal emissions in g/t of copper output



The minimum requirements for discharges into bodies of water are regulated in the German Wastewater Ordinance (AbwV) – Annex 39. Furthermore, the requirements and limit values in the water law permit apply, some of which considerably exceed the requirements of the AbwV. They are monitored by both internal recordings and unannounced recordings by the relevant authorities. The recorded values clearly fall below the regulated limit values. The diagram shows the total metal emissions of all discharge points (see Fig. 1.16).

The specific wastewater quantities related to input material and copper output are given in the following table.

Specific metal emissions in water at the Hamburg site

Year	Specific metal emissions in water related to: input material in g/t	copper output in g/t
2007	0.58	1.6
2008	0.46	1.3
2009	0.41	1.3
2010	0.49	1.5
2011	0.47	1.5
2012	0.42	1.5
2013	0.53	1.6
2014	0.43	1.6
2015	**0.39**	**1.4**

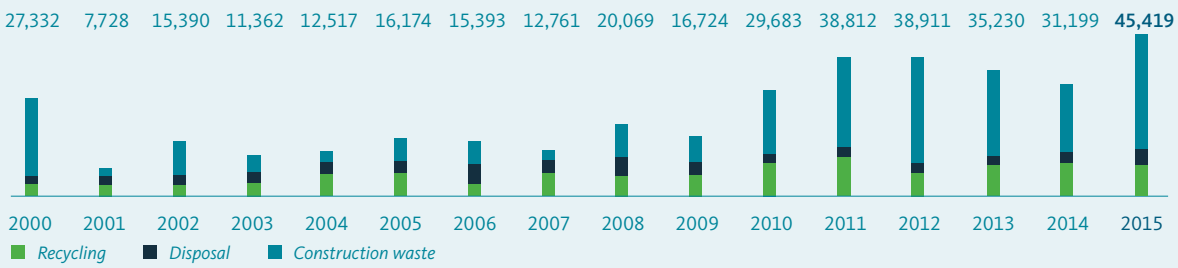
Aurubis operates an extensive monitoring network for cooling water discharge. In the process, the discharge temperature, temperature increase and cooling water quantity are measured and recorded at all discharge points. Moreover, the oxygen concentration in discharges that are relevant in terms of quantity were measured continuously. The quality of the discharged water is increased as a result of enriching the cooling water with oxygen at the significant discharge points by operating turbulence points.

An evaluation system that statistically assesses and documents the parameters determined for the cooling water has been in operation since 2011. Monitoring heat emissions through the cooling water is another measure for improving water pollution control that is being continuously expanded.

The new water law permit for implementing the thermal load plan for Aurubis Hamburg, which was negotiated with the Hamburg Authority for the Environment and Energy, was issued in 2015. To put this plan into effect, new limit values for discharge temperatures, heat levels and oxygen concentrations were implemented in the control rooms and verifiably adhered to.

Potable water usage from the Hamburg Water Works rose significantly at the Hamburg site in 2015 compared to the previous year (+29 %). The reason for this was construction work that required a temporary substitution of the fully desalinated water supply. In total, the treatment of Elbe River water to convert it into fully desalinated water saves the consumption of about 400,000 m^3 of potable water per year.

Fig. 1.17: **Disposal methods for waste produced at Aurubis AG, Hamburg**



Facilities handling substances hazardous to water

Aurubis is considered a specialized company pursuant to the German Water Management Act (WHG). A specialist company under the WHG is distinguished by factors including specific devices and equipment; specific, trained personnel and their targeted employment; work in accordance with generally recognized technical rules at the minimum; a company organization that can react quickly and flexibly; and sufficient documentation of the work that is performed.

The mandatory specialized audit of the relevant facilities under the German Act on Plants Handling Materials Hazardous to Water (VAwS) was carried out by TÜV Nord pursuant to the established audit cycles. The specialized company inspections in accordance with the Water Management Act were also performed by TÜV Nord.

If they aren't double-walled and designed with leakage monitoring, these facilities under the VAwS have leakproof, stable collection devices that, at a minimum, correspond to the possible volume of materials that could leak in the case of malfunctions.

New installations and renovations in the facilities were also carried out pursuant to the applicable state ordinances and accepted by TÜV specialists.

Waste

A total of 107,805 t of waste were accepted and recycled at the Hamburg site in 2015, of which 3,850 t were classified as hazardous waste. A total of 2,733 t of this came from other countries and was registered.

Overall, 11 % of the waste accepted was used as a slag former (e.g. spent abrasives, sand and excavation residues) and 89 % was used for metal recovery (dust, slimes, slags and precious metal-bearing sweeps). At about 96,000 t, the use of metal-bearing secondary raw materials stayed at a constant level.

In calendar year 2015, a total of 45,419 t of waste were generated and directed to waste management at the Hamburg site (see Fig. 1.17). Of this amount, 10,493 t (23 %) were classified as hazardous waste. The proportion of construction waste in the total waste volume was 70 % in 2015 (2014: 61 %). In total, 13,403 t of waste were related to production, of which 4,630 t were directed to waste disposal and 8,773 t to external recycling. This corresponds to a recycling rate of 65 %.

Most of the waste that is disposed of is slimes from off-gas cleaning.

With an output of 443,185 t of copper for the year, the specific waste level is 102 kg per ton of product (2014: 62 kg/t, 2013: 80 kg/t). The increase in the specific waste volume is mainly due to the higher level of construction activities.

35,940 t of olivine pyroxene rock from the secondary smelter and 13,848 t of slag material from the primary smelter were not marketed as substitute construction material but were recycled as construction material for landfills.

Fig. 1.18a: **Specific energy consumption at Aurubis Hamburg**

in MWh/t of copper output

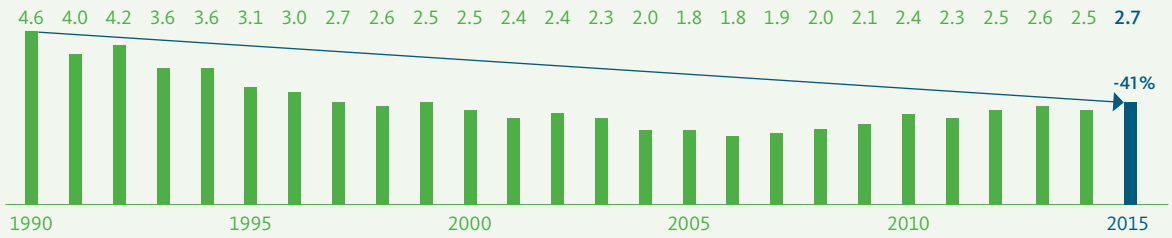
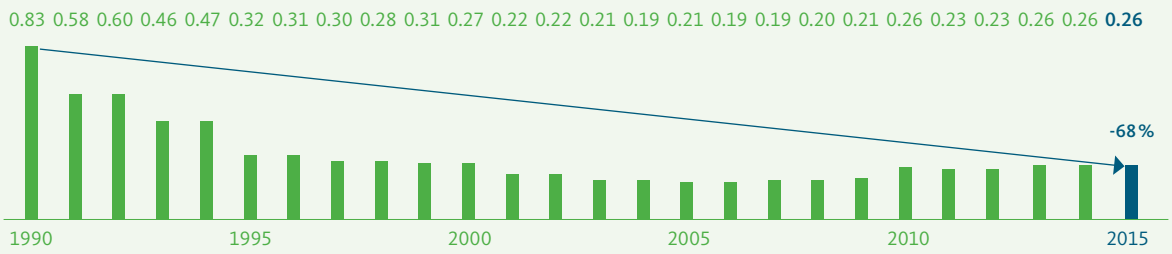


Fig. 1.18b: **Specific fuel-related CO_2 emissions at Aurubis Hamburg**

in t CO_2/t of copper output



» Reducing energy consumption ensures that we stay competitive and makes an important contribution to climate protection.

Energy and climate protection

We act responsibly towards future generations by economically and efficiently using raw materials and energy. Our main energy sources are electricity and natural gas. In 2015 Aurubis AG consumed a total of 1,196 GWh of energy at the Hamburg site. With an annual copper output of 443,185 t, this amounts to specific energy consumption of 2.7 MWh per ton of copper output (2014: 2.5 MWh/t, 2013: 2.6 MWh/t).

Specific energy consumption has stagnated at a high level at the Hamburg site in the past several years. An important reason for this is the higher level of multi-metal recycling in the meantime and the commissioning of new facilities, e.g. the anode slime processing plant, which lead to higher total energy consumption at the Hamburg site without a significant increase in the copper volume. Furthermore, a trend towards using lower-energy, i.e. less sulfurous, copper concentrates can be observed. This leads to higher gas consumption for producing heating steam.

Taking a longer-term view, specific energy consumption as a yardstick for energy-efficient production has been significantly reduced at the Hamburg production site in the last few decades, falling by 41 % compared to 1990. Fuel-related specific CO_2 emissions have been reduced by about 68 % since 1990 due to the economical and efficient handling of energy. With an output of 443,185 t of copper in the calendar year, specific CO_2 emissions from fuels amounted to 0.26 t of CO_2 per ton of product (see Fig. 1.18a and 1.18b). This corresponds to 117,230 t of CO_2 (see the chapter "CO_2 emissions trading").

The calculation is based on CO_2 emission factors from the following sources:

- For natural gas: GasCalc calculation program, version 2.3.2, distributed by e.on Ruhrgas AG
- For all other fuels: German Emission Trading Office data, last reviewed on May 2, 2016

Aurubis uses process waste heat to heat buildings, to facilitate the production processes and to generate electricity. For example, 75 % of the heat for the buildings at the Hamburg site comes from waste heat. One example of an effective energy-saving measure is the installation of several steam turbines at Aurubis Hamburg. The existing pressure drops in the steam pressure levels are consistently used to produce electricity.

Copper production from ore concentrates begins in the primary smelter's flash smelter. Its exhaust gases have a temperature of 1,400 °C and contain about 35 % sulfur dioxide, which is processed into liquid sulfuric acid in a so-called contact acid plant. The flash smelter's hot exhaust gases are initially cooled in a waste heat boiler, producing 60 bar steam. This is first depressurized to 20 bar in the Interplant turbine, which was commissioned in 2014 (see the chapter "Commitment to the environment"). We produce about 8 GWh of electricity annually in the process. The 20 bar steam serves as process steam for various procedures in the plant. The remaining volume is depressurized to 3 bar in the first stage of another steam turbine. This steam is then used as heating steam in the plant and administrative buildings. Any leftover steam (mainly in the summer months) can be depressurized in the second stage of the steam turbine (condensation stage).

The two turbines at the Hamburg site produce a total of about 15 GWh of electricity annually, which is equivalent to the average consumption of nearly 5,000 households. The environment is spared 9,000 t of CO_2 due to the avoidance of electricity production in power plants (calculated with the 2012 national electricity mix).

The heat content of the hot waste air from the contact acid plant's air coolers is also utilized year-round and produces 3 bar steam in a so-called waste heat boiler, which flows into the plant network. The waste heat boiler produces around 30,000 t of steam per year and thus reduces CO_2 by 2,000 t p.a.

The new anode slime processing building

CO_2 emissions trading

The third trading period of the EU emissions trading for greenhouse gases started in 2013. Energy-intensive companies in the production industry, such as Aurubis, will now be included in this trading period. These companies were excluded from emissions trading until 2012. Only the thermal power plant was included in CO_2 emissions trading until 2012 since its furnace thermal capacity is over 20 MW. Because of the modified conditions for participation in CO_2 emissions trading, the CO_2 emissions of the entire site, not just those of the thermal power plant, have been reported since 2013.

The allocation application for the third certificate trading period 2013 to 2020 was submitted on time to the German Emission Trading Office in January 2012.

Furthermore, a monitoring plan was developed and submitted to the German Emission Trading Office. It was approved in February 2013 and was last updated in late 2015. CO_2 emissions have been documented pursuant to the approved monitoring plan since 2013.

Thermal power plant

The thermal power plant at the Hamburg site converts excess steam, which accumulates occasionally, into electricity using turbines and produces additional 20 bar heating steam as needed using auxiliary boilers. The thermal power plant has been included in the CO_2 emissions trading system since 2005, as the installed furnace thermal capacity is over 20 MW. A total of 80 % of the Hamburg plant's heating comes from waste heat from the smelting process in the RWO's flash smelter. Only the additional volumes due to weather conditions are generated from natural gas. There are strong fluctuations during cold winters.

In 2015, a total of 171,410 t of direct CO_2 emissions were registered in the ETS (Emissions Trading System). In addition to the fuel-related volumes (see the chapter "Energy and climate protection"), this figures includes 54,180 t of CO_2 that arose from the input materials during the process. Moreover, in accordance with the official CO_2 reporting regulations pursuant to ETS, 3,808 t of CO_2 from diesel consumption for vehicles wasn't included. The CO_2 emissions from the thermal power station amounted to 16,300 t of CO_2 in 2015 compared to 17,727 t in 2014.

The increase compared to the previous years is due to the much higher level of steam consumption resulting from the construction of additional production facilities.

Because of the multi-year trading period (2013–2020), it is possible for higher emissions in one of the years to be balanced by lower emissions in the other years.

Commitment to the environment

At Aurubis, copper and by-products are produced sustainably using state-of-the-art, energy-efficient plant technologies with very high environmental standards in order to conserve natural resources and to maintain a clean environment for future generations. Raw materials and recycling products (such as copper scrap and computer scrap) are almost completely converted into marketable products.

Various projects illustrating Aurubis's commitment to the environment are explained in more detail below.

Climate protection agreement with the Hamburg Senate

In August 2007, the Hamburg Senate approved the Hamburg Climate Protection Concept 2007-2012 and presented it to the public. A major part of the concept was based on the participation of Hamburg industry.

Aurubis AG was one of the first companies to participate in this climate protection concept and implemented a number of projects between 2007 and 2012 that cut CO_2 by 32,000 t each year.

Aurubis is also participating in the follow-up agreement. The objective of the 15 companies that have signed the agreement is a reduction of at least 150,000 t of CO_2 per year. To achieve this goal, Aurubis has pledged to carry out a key project to use additional waste heat in primary copper production. Aurubis will achieve a reduction of 12,000 t of CO_2 per year by implementing all of its planned projects.

Membrane filter press in anode slime processing

Aurubis is developing innovative technologies in the Hamburg plant which have a multiplier effect. One example is the development of a new membrane filter press to dry slimes in an energy-efficient way.

An innovative pilot project in anode slime preparation, which was funded with € 328,000 from the German Federal Environment Ministry, will reduce energy demand in this area by 35 %. The actual operating success was verified in 2015. The new process has lowered CO_2 emissions by 370 t per year at the same time.

A membrane filter press that can be heated and evacuated was developed and commissioned in 2013 to dry slimes in an energy-efficient way. The process technology follows the principle of a normal filter press with a packet made of membrane plates. However, the slimes are actually dried using integrated heating plates through which 120 °C process steam flows. The steam-saturated air that forms (exhaust vapor) is suctioned off and condensed using a vacuum, so subsequent gas cleaning is no longer necessary.

Innovations like these contribute to improving our environmentally friendly multi-metal recycling, which is fundamental for future-oriented, resource-efficient recycling management.

The facility was commissioned on August 16, 2013.

Peregrine falcon in front of its nesting hole

Partnership for Air Quality and Low-emission Mobility

In September 2012, Aurubis and 11 other companies of different sizes and from different industries signed the "Partnership for Air Quality and Low-emission Mobility" initiated by the city of Hamburg. The objective of the partnership is to reduce pollution resulting from individual transport. A reduction in nitrogen dioxide emissions, which are caused by road traffic in particular, are a special focus.

To develop ideas to fulfill the targets of the air quality partnership at Aurubis, open workshops were carried out for all employees in May 2013 together with Innovation Management. They focused on the topics "employee mobility" and "efficient vehicle fleets". The feasibility of additional measures, e.g. improving the plant's public transport connection, creating locked bike compartments at the nearby Veddel train station and the viability of an e-bike leasing program for employees, are currently being reviewed.

As part of an action week, the employees were offered a free bike safety check. The purpose of the check in fall 2015 was to ensure that employees were safe on their bikes during the darker winter months and to motivate more people to commute by bike. Many employees participated in the safety check.

Promoting biodiversity

Overall, 88 % of the plant premises is developed or paved (766,000 m² of a total 871,000 m²). Trees and bushes have been planted in the green areas. The plant also has its own tree registry. In the meantime, a peregrine falcon can often be observed in front of a nesting case that was built onto Chimney 4 in 2011.

As part of the project UnternehemensNatur (Company Nature), additional ways to promote biodiversity will be determined with NABU Germany in 2016. The creation of green roofs and insect boxes and the planting of native bushes and trees are under discussion.

Interplant turbine

The proportion of electricity from renewable sources was doubled from about 1.4 % to 2.2 % of total energy consumption in 2015 owing to the installation of the new steam turbine. The Interplant turbine utilizes the difference between the 60 bar steam produced in the flash smelter's waste heat boiler and the 20 bar heating steam still used in the plant network.

The turbine was commissioned in the fourth quarter of 2014 (see the chapter "Indirect CO_2 emissions").

New lead refinery

The new lead refinery was commissioned on May 4, 2015 while the existing facilities were in operation.

The capacity of the new lead refinery remains at a level of 25,000 t per year. The set-up of the new lead refinery was optimized with respect to the material flow and storage, which considerably reduces environmental effects due to the transport and storage of the materials. This includes storing the material in roofed areas and creating a flood-proof storage location for the necessary chemicals.

Additional measures are planned to improve environmental and climate protection at the Hamburg site. These measures are described in the Environmental Program found in this Environmental Statement.

Polluted areas

There are soil impurities typical for industrial areas at the Hamburg plant owing to many years of industrial use. The heavy metal pollution values are so low that no clean-up is required from the authorities' view. The plant premises are mostly paved so that soil impurities cannot mobilize. Furthermore, the groundwater is protected from soil impurities by a water-resistant layer of clay. A sheet pile wall has also been erected in the primary smelter that effectively prevents backwater from flowing beyond the plant premises.

The baseline report for the soil pursuant to the Industrial Emissions Directive was submitted to the Hamburg Authority for Urban Development and Environmental Protection. The plan is for the report to be passed during the next permit process. The objective of the report is to evaluate the condition of the soil and the groundwater at the site with respect to hazardous substances. If the site returns to its original state, the baseline report serves as evidence and a standard of comparison and is obligatory for Aurubis in the case of significant facility modifications.

Special occurrences

There were no incidents within the meaning of the German Hazardous Incident Ordinance during the reporting period. There was an operational disruption in the primary smelter in January 2015. Due to incomplete suctioning, fugitive emissions were released. No harmful effects for the general public or the surrounding areas were ascertained.

Accident prevention

The alarm and danger prevention plan was updated in May 2015 and sent to the relevant authorities.

In 2015 the Plant Fire Department instructed 300 employees about preventive fire protection, including the use of fire extinguishers.

Three evacuation drills were carried out with the employees in the office buildings. A drill involving a hypothetical leakage of hazardous substances was held with the Logistics Department. A firefighting drill was carried out with the Municipal Fire Department near the power plant.

The Plant Fire Department completed a total of 26 drills in the plant as part of their vocational training. The focuses of this training included plant entrances and thoroughfares, parking and movement areas for the Fire Department, accessibility of hydrants and standpipes, as well as plant-specific safety installations.

The Flood Task Force once again organized the routine flood protection drill and carried it out with participants at the Hamburg plant on September 12, 2015.

Aurubis AG Hamburg's Plant Fire Department has been a member of the TUIS, the Transport Accident Information and Assistance System, since 2015. The TUIS, a network of the German chemical industry, supports emergency response personnel across Germany in the case of transport accidents involving chemicals, but also production and warehouse accidents.

Environmental Program

The targets set in the context of the Environmental Statement 2015 were reviewed to determine the extent to which they had been achieved and implemented. Talks with employees, training, audits and quality circles served as a basis for discussing and evaluating the environmental protection measures, as well as developing a new environmental protection program for 2016. The results are presented in the following Environmental Program:

Strengthening environmental awareness

Objective	Planned measure	Degree of implementation/date
Monthly information regarding environmental protection as part of regular communication	Routine discussions and review with the plant management and the division and/or production managers	Every two months or as needed
Training employees in all of the plant areas relevant for environmental protection	Annual training sessions for employees in the primary smelter, secondary smelter, lead plant, precious metal recovery, casting lines, rod plant, ELWO, acid plants and logistics	Implemented in 2015; to be repeated annually
Carrying out six training sessions in environmental protection for production and plant managers, especially within the scope of environmental quality circles	Carrying out a training session for production and plant managers on the legal situation and correct implementation of regulations, as well as clarifying the consequences of non-compliance	Training sessions were successfully carried out again; they will continue in 2016 as part of general continuing education
Plant tours by employees in the Environmental Protection Department	Monitoring operations with regard to environmental effects and compliance of Environmental Protection Department with regulations	Information is provided to the plant and division management in short reports, including implementation controlling
Strengthening environmental awareness	All employees should be reached by distributing the Environmental Report and providing the environmental handbook with the relevant instructions on the intranet	Completion of the Environmental Report including Environmental Statement ready for printing by August 2016

Reducing dust emissions by 9 t each year

Public contract with the city of Hamburg for the timeframe 2011-2016

Objective	Planned measure	Degree of implementation/date
Increasing energy efficiency	Constructing and operating a turbine to produce electricity from waste heat in the primary copper production sector (CO_2 reduction of 5,000 t p.a.)	Target was carried over from 2009 Construction started in December 2011 and the turbine was commissioned in Q4 2014. CO_2 reduction of 3,735 t in 2015
Reducing fugitive emissions in the secondary smelter	Improving off-gas capture and cleaning in the secondary smelter	Implemented by 2012; auxiliary hood filter on the Big Bag feed is currently in trial operation
Reducing fugitive emissions from open spaces and roadways	Program to optimize cleaning of roadways, halls and storage areas	Implemented by October 2013; optimization continues
Reducing hall emissions in the primary smelter	Feasibility study on closing the primary smelter's ridge turret and installing a suction system for the area. Assessment was issued in 2013. Agreement with the Hamburg Authority for Urban Development and the Environment in 2014, ongoing.	Improvement in the direct suctioning of the ladle chambers implemented in 2015 Optimization of approach to ladle linings scheduled for 2016 Ridge turret recordings to verify the improvements scheduled for 2016 Additional steps are being reviewed for implementation in cooperation with the Hamburg Authority for Urban Development and the Environment
New lead refinery	Replacement of lead refinery with new building	Start-up on May 4, 2015

Air pollution control and permits

Objective	Planned measure	Degree of implementation/date
Participation in the Hamburg Senate's climate protection concept Voluntary pledge among Hamburg industrial companies	Implementing projects to cut 12,000 t of CO_2	Implemented so far: Interplant turbine and conversion of the cracking plant from high-pressure to medium-pressure oxygen (level of implementation in 2015: 7,300 t of CO_2); additional projects in the planning stage, in particular waste heat usage, acid cooling, MSO
Reducing emissions in the primary smelter	Preparing a concept for a new steam dryer	The project was activated again in 2015
Reducing dust emissions with an innovative membrane filter	Tests in the rod plant in 2015	Positive initial test results with regard to cleaning performance, differential pressures and adsorption

Energy optimization

Objective	Planned measure	Degree of implementation/date
Increasing energy efficiency	Feasibility study on the construction of a CHP gas turbine	Feasibility study developed in 2012; implementation delayed in favor of other projects
Reducing energy demand in precious metal recovery	Pilot project funded by the German Federal Environment Ministry: use of a membrane filter press that can be heated and evacuated when drying metallurgical slimes Reducing energy demand by up to 35 %; reducing ca. 460 t of CO_2 p.a.	2013 The membrane filter press was installed; the final work was carried out in the first half of 2014 Review of the set targets Reduction of 370 t of CO_2 in 2015, lower volume due to standstills
Reducing heat discharge in the Elbe River	Reviewing a concept for extracting heat from the acid coolers of KAWO line 1 (ca. 18 MW) or lines 1 to 3 (ca. 60 MW) for district heating	Concept prepared in 2015, discussions with the city of Hamburg about how to arrange the heat extraction for district heating

Water pollution control

Objective	Planned measure	Degree of implementation/date
Reducing the authorized heat input via the cooling water	Measurements of heat-relevant parameters, including a data analysis unit (classification unit) to record and assess the heat-relevant data (discharge quantity, temperature increase, discharge temperature, volume measurement, heat input and oxygen content or oxygen saturation for the discharge point Norderelbe and two points in the Müggenberger Canal) as an hourly average or 6-hour moving average	Measurement program has been implemented since March 2011; continuation in 2014. Requirements of the thermal load plan have been implemented since 2013. Water law permit was issued in 2015. Application for water law permit to install measuring buoys in the Elbe in 2016

Safety aspects/plant safety

Objective	Planned measure	Degree of implementation/date
Support in the case of transport and warehouse accidents with chemicals in public spaces	Participation of the Plant Fire Department in the TUIS system	Initial deployments have taken place since 2015
	Drills for the alarm and danger prevention plan	Took place in September 2015

Continuous improvement of environmental management system

Objective	Planned measure	Degree of implementation/date
Continuous improvement of environmental management system	Recording the environmental targets for the individual plant sections and separate schedule tracking	Department-specific target documentation since April 2011; ongoing
Introduction of an integrated management system (IMS) for Aurubis AG, Hamburg and Lünen	Executive Board draft for implementation – IMS handbook for the areas of environment, energy, quality and occupational safety	Certification in 2017

Business Partner Screening

Objective	Planned measure	Degree of implementation/date
Reinforcing a sustainable approach to raw materials	Developing and implementing a Business Partner Screening process Screening all suppliers and customers under aspects of sustainability, compliance and tax law, possibly including an in-depth review regarding sustainability and therefore environmental aspects	Concept developed in 2013 Introduced in 2015

Participation in Partnership for Air Quality and Low-emission Mobility

Objective	Planned measure	Degree of implementation/date
Promoting low-emission mobility	Developing a concept for e-bike/personalized bike leasing	Continued in 2016
	Reviewing the feasibility of a better public transport connection (additional Hamburg bus routes or shuttle service to Veddel train station)	Review continues
	Construction of a bike compartment at the Veddel train station	Bike safety checks for employees in September 2015
	Air Quality Action Day	
	Reviewing whether the integration of a StadtRad (City Bike) station is possible at Aurubis	StadtRad is not interested
Sustainable, efficient and climate-friendly mobility	Mobil.Pro.Fit program: development of mobility management (focusing on business trips, vehicle fleets and improving employee mobility in particular)	Participation in the second round of Mobil.Pro.Fit in 2016
Promoting biodiversity	Participating in the UnternehmensNatur (Company Nature) program	Evaluation in cooperation with NABU in 2016

Key figures for Aurubis AG, Hamburg site, in calendar year 2015

Input

Raw materials

Copper concentrates	1,218,492 t
Copper scrap/refining material	46,218 t
Other Cu-bearing raw materials	126,759 t
PM-bearing raw materials incl. scrap	22,885 t
Lead scrap and waste	23,490 t
Waste for recycling	385 t
Total TC/RC-earning raw materials	**1,438,229 t**

Auxiliaries

Sand and additives incl. cyclone sand	138,473 t
Iron as an additive	16,856 t
Total input materials	**1,593,557 t**
Input material per t copper	**3.6 t/t Cu**

Energy

Electricity consumption	539,442 MWh
Additional electricity consumed to produce oxygen	118,794 MWh
Natural gas	468,933 MWh
Coke	56,077 MWh
Other energy sources	19,053 MWh
Total energy consumption	**1,202,300 MWh**
Energy consumption per t copper	**2.7 MWh/t Cu**

Water withdrawal/uptake

River water	67,406,000 m^3
Potable water	343,000 m^3
Precipitation	428,000 m^3
Total water uptake	**68,177,000 m^3**
Water discharge per t copper	**154 m^3/t Cu**

Area used at the Hamburg site

Total plant area	871,000 m^2
Buildings and paved area	766,000 m^2 (equivalent to 88 %)

Output

Products

Copper	443,185 t
Sulfuric acid products as H_2SO_4	1,005,178 t
Iron silicate stone (incl. granules)	777,165 t
Silver and gold, selenium	1,430 t
Metal compounds (Ni, As)	2,635 t
Lead	13,876 t
Total products	**2,243,469 t**

Waste

Recycling	8,773 t
Disposal	4,630 t
Construction waste	32,016 t
Total waste	**45,419 t**
of which hazardous waste	10,493 t
Waste per t copper output	**102 kg/t Cu**
Waste per t input material	**29 kg/t**
Conversion into products	**99.2 %**

Emissions

Dust	42 t
Dust per t copper	96 g/t Cu
SO_2	1,868 t
NO_x per t copper	478 g/t Cu
Direct CO_2 emissions	171,410 t
of which CO_2 from fuels	117,230 t
CO_2 from fuels per t copper	0.26 t/t Cu
Indirect CO_2 emissions	
from electricity consumption	385,796 t
from additional electricity consumed to produce oxygen	71,276 t
Metal discharge in water	606 kg
Metal discharge in water per t copper	1.4 g/t Cu

Water discharge

Direct discharge	66,048,533 m^3
Indirect discharge	54,147 m^3
Total water discharge	**66,102,680 m^3**
Water discharge per t copper	**149 m^3/t Cu**

Updated Aurubis AG Environmental Statement 2016

Lünen site

Aurubis AG's recycling center is located in the south of the city of Lünen about one kilometer from the town hall.

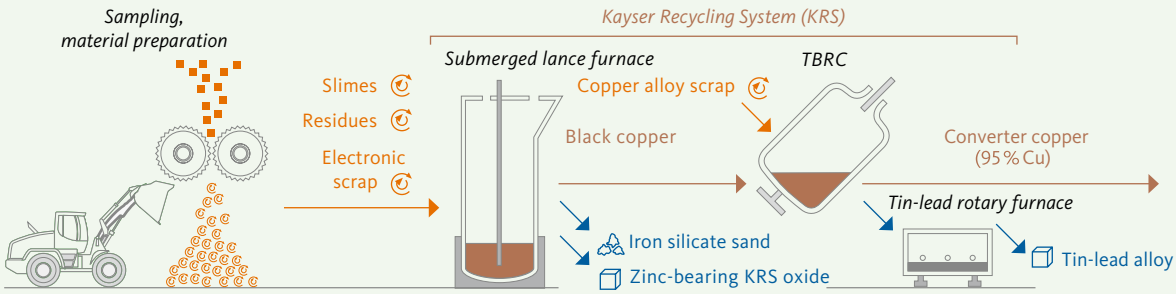
The plant was built and commissioned on undeveloped land between the Cologne-Minden railway and the Datteln-Hamm Canal in 1916 as a branch plant of Hüttenwerke Kayser in Berlin. After the loss of the Berlin plants and reconstruction after the end of World War II, the production facilities were continuously expanded and modernized. After the then Norddeutsche Affinerie AG acquired the majority of Hüttenwerke Kayser shares in 2000, the plant was initially integrated into the company structure and expanded to become the Group's recycling center. Today Aurubis AG's Lünen site is the largest secondary copper smelter in the world with a production capacity of 210,000 t of copper cathodes annually.

Primarily recycling raw materials are used in the smelting units in Lünen, including traditional recycling raw materials such as copper scrap and other scrap, slimes and residues, as well as increasingly complex materials, in particular electrical and electronic scrap. The feed materials, which are largely delivered by truck, are first sampled, in some cases crushed and separated in a material preparation plant, and then treated in a multi-step metallurgical process. The copper anodes produced in this way are then refined electrolytically into cathodes, which are the final product at the Lünen site. Additional anode quantities from other Aurubis sites are also processed in the copper tankhouse (see Fig. 2.1).

The core facility for metallurgical processes has been the Kayser Recycling System (KRS) since 2002, which gained a TBRC (top blown rotary converter) in 2011 as part of the KRS-Plus project. The converter copper produced in the TBRC is refined together with copper scrap in the anode furnace and cast into anodes in a casting plant. The anodes are dissolved electrochemically and precipitated as cathodes. Zinc-bearing KRS oxide, iron silicate sand (slag granules), a lead-tin alloy, nickel and copper sulfate, as well as anode slimes, are produced as by-products of "multi-metal recycling". The anode slime is processed in the Hamburg site's precious metal recovery procedure.

There are about 590 employees at the Lünen site, around 40 of whom are apprentices.

Fig. 2.1: **Multi-metal recycling at the Lünen site**



The environmental management system

An environmental management system exists at the Lünen site as well. It has been certified in accordance with ISO 14001 and EMAS and incorporated in a TQM (total quality management) system in connection with quality management pursuant to ISO 9001 since 1997. The TQM system fulfills the requirements of the waste disposal regulation (EfbV) and the law on circulation, withdrawal and environmentally sound disposal of electrical and electronic devices (ElektroG) for the material preparation plant. Since 2013 the TQM has also included a certified energy management system pursuant to DIN EN ISO 50001.

Targets, tasks and organization of the environmental management system

The targets and tasks of the environmental management system correspond to those at the Hamburg site, while the organization takes site-specific features into account.

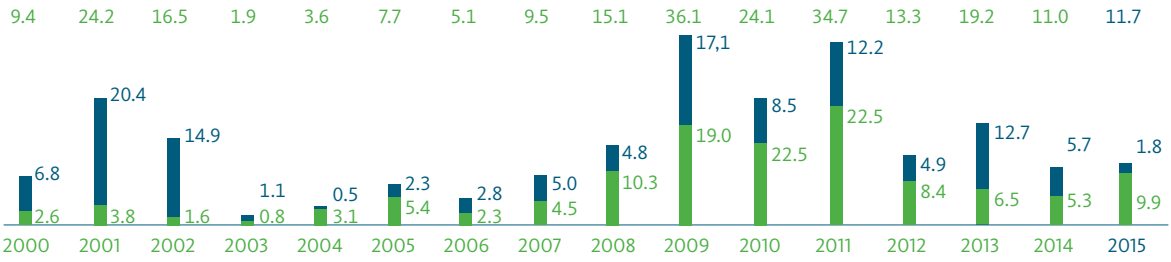
In this respect, the management handbook and its process and work instructions, etc. are related not only to the environmentally relevant issues including accident prevention and health protection, but also quality assurance and energy management measures.

The TQM team consists of the Quality and Energy Management Officer, the Environmental Management Officer and other delegated individuals and employees. The officer functions for

- Immission protection und accident prevention
- Waste management
- Radiation protection
- Specialist companies in accordance with the Water Management Act (WMA)
- Hazardous materials

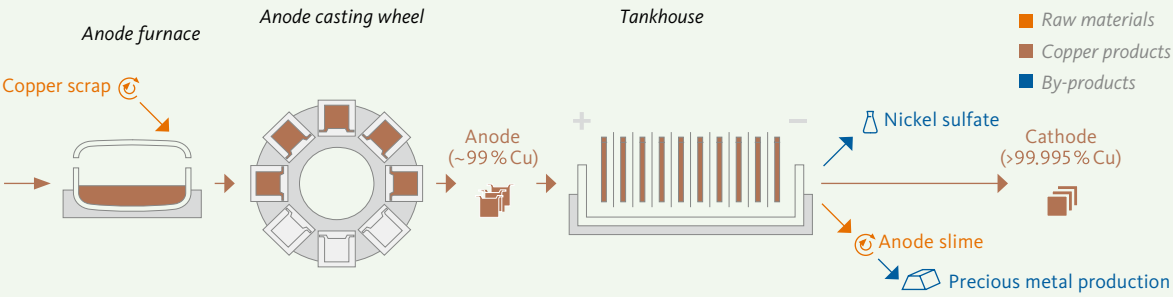
Fig. 2.2: **Capital expenditure of Aurubis AG at the Lünen site**

in € million/fiscal year



» A total of € 230 million has been invested in technology and environmental protection since 2000, of which € 119 million went to environmental protection alone.

Technology
Environmental protection



are carried out by the employees mentioned above. The same applies to the Occupational Safety Specialist, while the health protection measures that extend beyond this are the responsibility of Aurubis AG's company Medical Department.

The officer function for REACH and CLP (Classification, Labeling and Packaging) is carried out centrally for all of Aurubis AG from Hamburg.

Capital expenditure on environmental protection

Capital expenditure on environmental protection also has a high level of significance in Lünen. The Kayser Recycling System (KRS) initially set new precedents with a capital expenditure volume of around € 40 million. Additional capital expenditure followed, especially for reducing fugitive emissions in metallurgical facilities and in the storage and handling of feed materials.

The emission reduction concept agreed on with the authorities for the period 2005 to 2009 was initially estimated at about € 10 million but was then supplemented with further capital expenditure of € 25 million with additional measures. Significant projects included the e-scrap warehouse and warehouse 4 for dust-forming KRS input materials, extensive paving of storage areas and the additional KRS filter 5. Furthermore, environmental protection accounted for € 17.5 million of the investment costs of the KRS-Plus project, which has been implemented in the meantime.

Overall, around € 121 million has been invested in environmental protection from 2000 to 2015 (see Fig. 2.2).

Modernizing the electrolyte cycles

In the course of 2014, a comprehensive concept for modernizing the electrolyte cycles was drafted with the purpose of enabling much more efficient recovery of tramp metals, especially nickel, which will be drawn from the process in a more targeted way.

Furthermore, during this adjustment, a number of modernization measures were carried out in the tankhouse and leaching operations, and environmental protection was improved again.

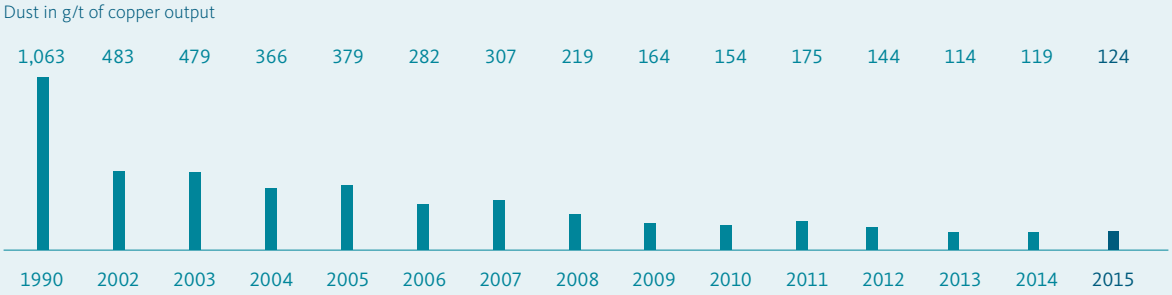
Improved nickel recovery in the anode furnace

In connection with the tankhouse modernization, a concept to recover anodes with high levels of nickel was submitted and approved on June 8, 2015.

This concept enables targeted nickel recovery in individual campaigns, which improves the yield overall and reduces the nickel contents of the other campaigns. This also reduces the nickel emissions of the campaigns.

The permit also includes the installation of a post-combustion system for the anode furnace's off-gases. A post-combustion test operation carried out in 2014 delivered very good results, so an additional improvement in emission values can be expected in this area as well.

Fig. 2.3: **Dust emissions at the Lünen site**



Environmental effects
Air

Emissions

The emissions from directed sources (chimneys) are monitored by continuous measuring devices in connection with emission data transfer. Aside from dust, sulfur dioxide, nitrogen oxides, hydrogen chloride, hydrogen fluoride and mercury in the KRS are measured continuously depending on relevance. Other off-gas and dust components are measured manually.

The TA Luft establishes emission limits for air pollutants. However, the permit requirements of many facilities are even lower than the TA Luft guidelines. The relevant limit values of the TA Luft are featured in chapters 5.2.2, 5.2.4, 5.2.5, 5.2.7 and 5.4.3.3.1 in particular.

Consequently, the measurements comply with the limit values overall or fall significantly below them in some cases. The same applies to additional substances listed in the permits, e.g. NOx, HCl, HF, etc.

Emissions of dust and especially dust components (copper, lead, arsenic, etc.) have been considerably reduced at the Lünen site in the past several years due to reduction measures. The figures to the right incorporate the fugitive emissions including storage and handling.

The dust emissions in 2015 were again at about the same low level of the previous year.

The newly added filter in the primary smelter (source 2041) stabilized the source's dust emissions at a low level (287 kg instead of 250 kg in the previous year; however, 3,317 kg prior to the installation of the new filter).

Overall, the developments in the metal freights are very encouraging. For example, the dust components have decreased consistently and significantly as the dust freight has stayed nearly the same.

In contrast, emissions of CO and, in particular, NO_x have increased. This is primarily the result of a rising input of natural gas and especially petroleum coke.

Arsenic emissions have been at a low level since 2009 and have been further reduced by about 85 % since then (see Fig. 2.6).

With an annual output of 186,022 t of copper cathodes and a material input of 388,433 t, the following specific quantities result for 2015:

Emissions		Specific emissions related to input	Specific emissions related to product
SO_2	kg/t	2.4	4.9
Dust	g/t	59	122
Copper	g/t	4.0	8.3
Lead	g/t	2.2	4.9
Arsenic	g/t	0.1	0.2

Fig. 2.4: **Copper emissions at the Lünen site**

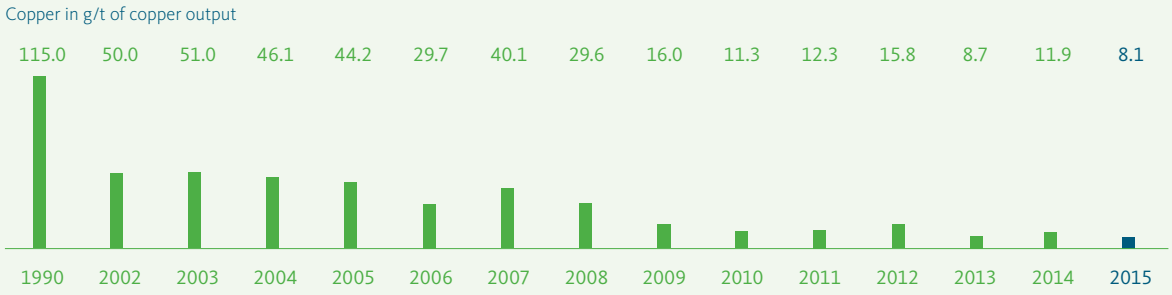


Fig. 2.5: **Lead emissions at the Lünen site**

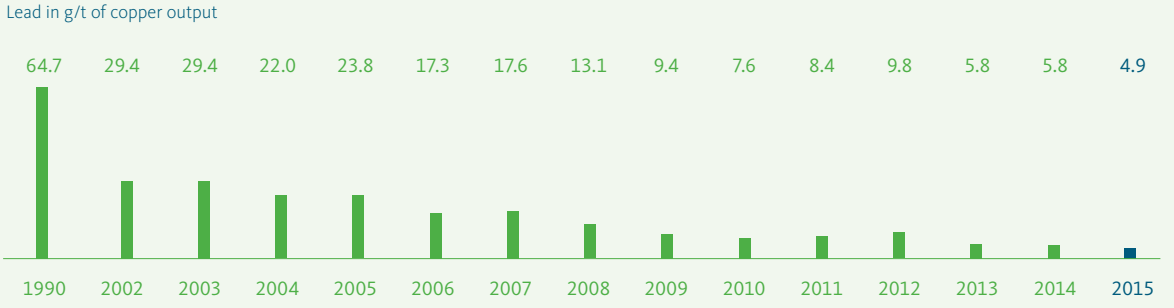
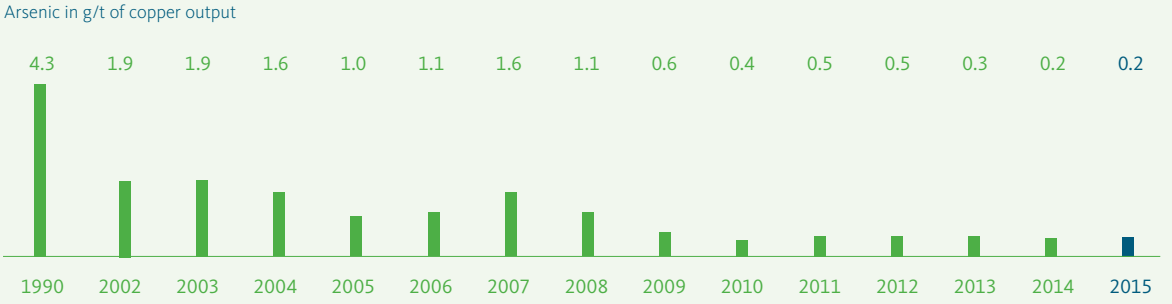


Fig. 2.6: **Arsenic emissions at the Lünen site**



» Arsenic emissions have been satisfyingly low since 2009 and have been further reduced by about 85 % since then.

Note on the selection of the years presented here: Fugitive emissions in particular have been determined or calculated since 2004 in accordance with the methods used at the Hamburg site. The values for 1990, 2002 and 2003 were estimated in a comparable manner, but there are no reliable values for the missing years.

Immissions

To measure the immissions of dust precipitation including metallic components, LANUV (NRW State Agency for Nature, the Environment and Consumer Protection) operates a network of currently 12 so-called "Bergerhoff" measurement points in the area surrounding the Lünen plant. The network was established after the TA Luft (Technical Instructions on Air Quality Control) went into effect in 2002 and has been expanded little by little (LÜNE 001 etc., see Fig. 2.7).

While the deposition values of TA Luft 2002 for lead (100 µg/(m² · d)), arsenic (4 µg/(m² · d)), cadmium (2 µg/(m² · d)) and nickel (15 µg/(m² · d)) are currently still exceeded at some measurement points, the following reductions are evident on average for the measurement points that were continuously operated in the period from 2006 to 2014 (1 to 3, 5 to 7 and 9 to 11):

Immission	Development
Lead	-36 %
Arsenic	-63 %
Cadmium	-43 %
Nickel	-21 %

Note: The deposition values result from a variety of different factors and thus are not binding limit values for the operation of individual facilities.

LANUV does not have any validated figures for 2015 yet.

The data pool for a comparable assessment is not sufficient yet for measurement points 12, etc. established by LANUV after 2006 at areas that were subject to more pollution.

Moreover, there has been a LANUV measurement station for suspended particulates (PM10), including components, on Viktoriastrasse (ca. 100 m northeast of LÜNE 12) since 2008. The position corresponds to that of the plant's calculated immission maximum.

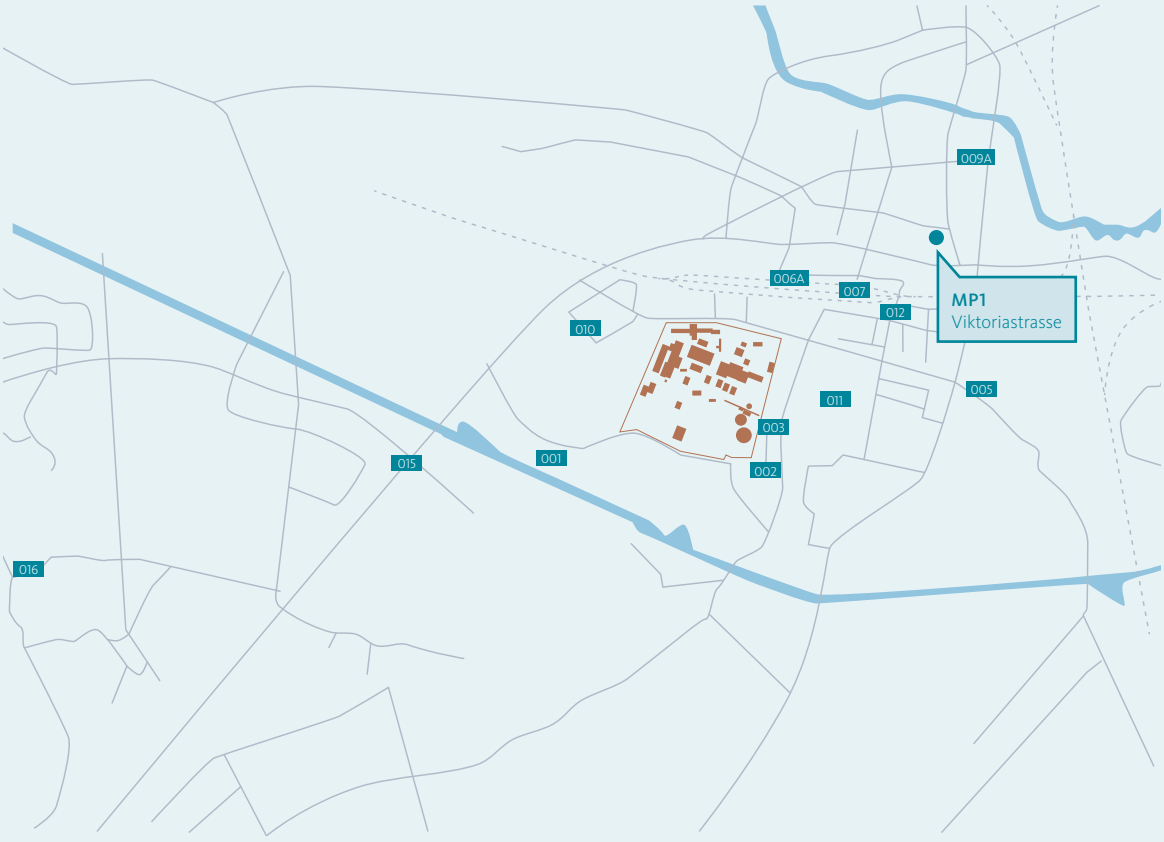
The latest parameters determined for suspended particulates and content calculated by LANUV indicate that the levels of PM10 and lead are significantly and consistently below the limits, while the levels of arsenic, cadmium and nickel are also considerably below the EU limit values.

For PM10, LANUV shows 10 days on which the limit was exceeded at the Viktoriastrasse measurement station, which is a distinct decrease compared to 2013 (22 days).

While the level of suspended particulates (PM10) is almost 50 % below the limit, the level of lead is more than 90 % lower than the limit.

The continued improvement for arsenic is especially positive: it was initially 35 % below the limit in 2008 and is now about 60 % below. Cadmium is 90 % below the limit in the meantime, while nickel is over 80 % below.

Fig. 2.7: **Locations of immission measurement points near the Aurubis plant in Lünen**

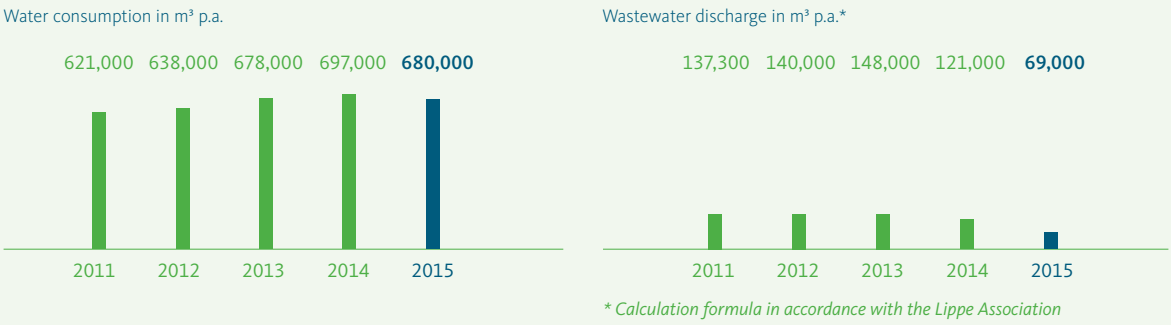


"Bergerhoff" measurement points in Lünen

001 *Buchenberg*
002 *Kleine Bergstrasse*
003 *Bergstrasse 48*
005 *Bebelstrasse/Süggelbach*
006A *Rail line/mosque*
007 *Lünen South freight yard*
009A *B 236/Lippebrücke*
010 *Im Wiesengrund*
011 *Builders' association/building yard*
012 *Rail line/Kantstrasse*
015 *Im Engelbrauck/north side*
016 *Im Siepen*

Aurubis plant building

Fig. 2.8a: **Water consumption and wastewater discharge at the Lünen site**



** Calculation formula in accordance with the Lippe Association*

Noise

Noise protection measures take high priority in the conception of new facilities in particular. The additional noise pollution in the area in terms of TA Lärm should be marginal, i.e. the levels should be at least 10 dB(A) lower than the TA Lärm immission reference values. This requirement was fulfilled in the last few years in all projects, and noise reduction measures were carried out at existing facilities as well.

The measurements carried out in 2012 showed that the reference values relevant for the respective uses were observed at all assessment points predetermined by the authorities. In the areas classified as mixed use areas, this is 60 dB(A) maximum during the day and 45 dB(A) maximum at night.

New sound measurements taken during the authorities' acceptance of the KRS-Plus project in 2013 showed that the TBRC's sound peaks were well below the maximum limits permitted.

Water

Water is used in the Lünen plant for various cooling purposes, including anode cooling and slag granulation, as feed water for the steam boiler, for operating several sweepers, as well as sprinkling driveways, plant/storage surfaces and input materials. Particularly the increases in water consumption for the latter measures to reduce dust emissions lead to a continuous increase in water usage (see Fig. 2.8a).

In contrast, water discharge decreased starting in 2014 since the rainwater retention, treatment and usage facility was commissioned in May 2014. In the future, a large volume of the plant's internal cooling and process water demand will be covered by the collected rainwater, so discharge volumes and water consumption will decline.

Fig. 2.8b: **Layout of the two rainwater retention basins, central pump station, treatment plant and service water storage tank 1**

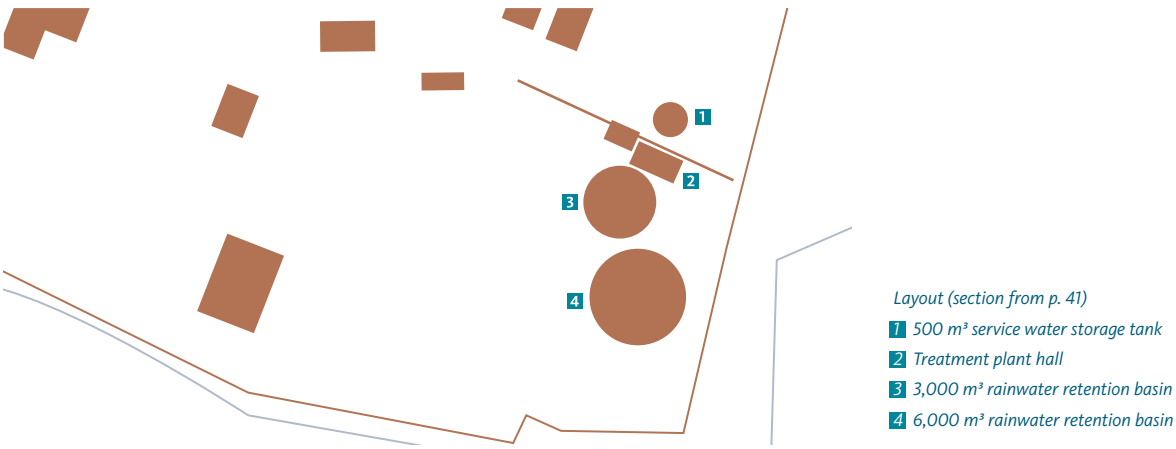


Fig. 2.9: **Waste generated at the Lünen site**

in t p.a.	2008	2009	2010	2011	2012	2013	2014	2015
Packaging and other waste	1,084	1,189	1,318	1,533	1,276	1,338	909	794
Construction waste	242	19,701	44,487	41,531	23,740	23,706	9,914	8,925
Spent potlining	1,089	1,279	1,503	990	264	343	272	201
Retail products and waste products from the material preparation facility	7,890	7,190	4,737	5,410	5,713	6,683	4,849	3,712
Total	**10,305**	**29,359**	**52,045**	**49,464**	**30,993**	**32,070**	**15,944**	**13,632**
of which hazardous waste	655	801	1,420	830	359	1,513	2,996	276

In the course of this project the plant wastewater, sanitary water and precipitation were separated and the site's sewer system was modernized further (see Fig. 2.8b).

Waste

The waste from the Lünen plant mainly results from packaging from delivered materials, from construction measures and from spent potlining from the KRS, anode furnaces, etc. The externally marketed contingents of the material preparation plant, e.g. aluminum and separated plastics for continued recycling, are also inevitably among the waste from the site, as they do not lose their waste properties due to preparation.

The waste accumulated in all categories decreased further in 2015 and the total hazardous waste reached an all-time low. This was related to the much lower level of construction activity in the plant, among other factors (see Fig. 2.9).

Like last year, there was no process-related hazardous waste for disposal.

Soil conservation

Restoration measures

Since the plant opened in 1916, facilities producing non-ferrous metals have been operated continuously at the site. In conjunction with war damages, this led to a strain on the soil in the past.

On the basis of comprehensive tests, a restoration plan was developed, which was coordinated with the responsible authorities and has been partly implemented.

The restoration concept includes encapsulating the contaminated area with the help of a sealing wall, as well as a drainage facility that requires the discharged water to be purified. Part of the sealing wall and some extraction wells have already been completed in the run-up to construction measures.

The treatment of the restored water was optimized again with additional tests. Because of the sulfate content, the water cannot be discharged via the city sewer system, so direct discharge into a body of water nearby is required.

In late 2014, a restoration agreement was signed with the Unna District describing the further agenda and the steps planned to restore the soil and groundwater at the Lünen site.

According to this, Aurubis agrees to apply for all of the necessary measures by summer 2016. A groundwater flow model was developed for the site as a basis for optimizing the measures and creating a monitoring concept.

Preventive measures

Preventive and protective measures have been developed for several decades in order to eliminate future strains on the soil. They are primarily related to the facilities dealing with materials hazardous to water, e.g. the tankhouse and oil storage. Furthermore, the storage spaces for input materials are being designed so that even traces of deposits and components of input materials hazardous to water cannot end up in the soil.

Indirect environmental impacts

Delivery traffic is one of the main indirect environmental impacts. We strive to relocate this as much as possible from roads to railways and waterways.

With the extension and two-track expansion of the plant railway completed on the northern plant premises in 2011, the anodes delivered to the plant and the cathodes delivered from the plant by train increased distinctly.

Nevertheless, the delivery of most input materials and auxiliary materials with trucks cannot be avoided. The main reason is that the type of delivery is the supplier's choice. About 70 % of deliveries arrive through the "Buchenberg" entrance, which is completely located in an industrial area of the Lünen city harbor and is separated from residential areas with an effective noise protection wall.

Energy/climate protection

Energy is required first and foremost for the metallurgical processes (primarily heating oil and natural gas), as well as for the tankhouse (electricity). Steam for leaching and electrolysis is mainly produced in the waste heat boilers of the KRS submerged lance furnace and anode furnaces. There are also two auxiliary boilers fueled with light oil or natural gas.

After a longer start-up and test phase, a two-stage condensation turbine was commissioned on November 24, 2015. The steam from the process waste heat is initially depressurized from 18.6 bar to 5.15 bar in the first turbine stage. Steam is removed for thermal use and the remaining volume is then depressurized to 0.85 bar in the second turbine stage. On July 17, 2015, the German Federal Office of Economics and Export Control licensed the turbine as a highly efficient new facility pursuant to Section 5(2) of the German Act on Combined Heat and Power Generation.

Both the primary energy demand and the specific energy demand [in kWh of primary energy input per ton of secondary raw material input] rose again significantly compared to the previous year, by 4.2 % and 11.4 %, respectively. Some of the reasons for this are the following trends, which are derived from the energy figures:

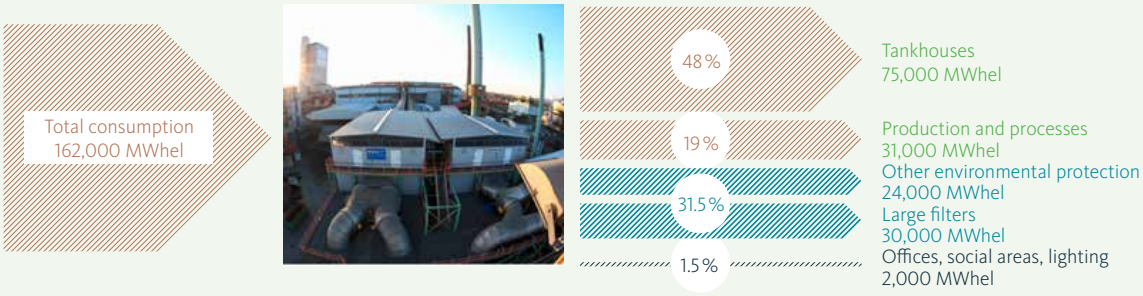
- A high throughput of the metallurgically energy-intensive metal zinc, with an increased yield of the product KRS oxide
- An improvement in the output of valuable metals due to extensive trial phases in the KRS submerged lance furnace
- An up to 60 % higher output volume of tramp metal products
- A considerable increase in the input of energy-intensive, complex raw materials such as shredder materials and residues
- A consistent decline in usable energy content in electrical and electronic scrap

Fig. 2.10: **Energy consumption[1] at the Lünen site**

in GWh p.a.	2008	2009	2010	2011	2012	2013	2014	2015
Heating oil	329	288	295	302	291	266	266	242
Coal, coke, etc.	13	16	10	10	6	13	9	27
Natural gas	47	52	49	77	81	77	105	135
Electricity	139	137	144	151	154	156	162[2]	161[3]
Total	**528**	**493**	**498**	**540**	**532**	**512**	**542**	**565**

[1] Calculated using DEHSt (German Emissions Trading Authority) standards
[2] Includes 14.8 GWh of internal electricity produced by the steam turbine
[3] Includes 17.4 GWh of internal electricity produced by the steam turbine

Fig. 2.11: **Environmental protection facilities – including those at the Lünen site – are very energy-intensive**



About 30 % of electricity at Aurubis is used for environmental protection measures.

Fig. 2.12: **Specific energy demand in relation to recycling raw material input**

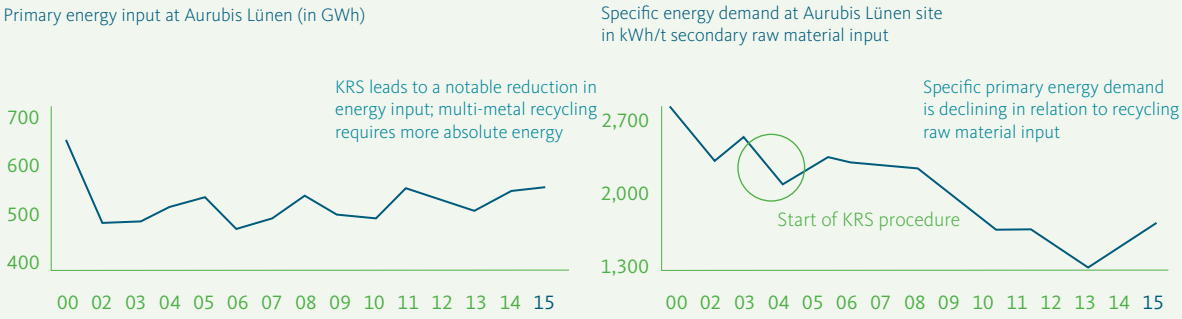


Fig. 2.13: **CO_2 emissions at the Lünen site**

in t p.a.	2008	2009	2010	2011	2012	2013	2014	2015
Total CO_2	140,622	150,027	152,696	166,304	172,870	168,297	172,461	174,549
Biogenic CO_2	517	454	653	457	0	568	569	0
CO_2 subject to DEV 2020[1]	140,105	149,573	152,018	165,847	172,870	164,995	169,134	171,858

[1] 2020 Data Collection Regulation for the third emissions trading allocation period

Fig. 2.14: **Specific energy consumption at the Lünen site**

Fig. 2.15: **Specific CO_2 emissions at the Lünen site**

Furthermore, about 46,000 t of electrolyte from the Olen plant has been treated in the Lünen tankhouse and leaching plant since 2014. This leads to a higher demand for heat (with lower potential for internal electricity generation via the turbine at the same time) and electricity. The electricity demand for environmental protection measures remains unchanged at roughly 30 % of total electricity demand.

As previously explained, the specific energy demand is also rising significantly in relation to the copper output (copper cathodes). This effect is reinforced because the anode quantity delivered across the Group sank from 30,000 t to below 7,000 t in the period from 2011 to 2015.

The left-hand curve of Fig. 2.12 shows that the site's absolute energy demand has been relatively constant for 10 years. The specific energy KPI in relation to the input of recycling raw materials very concretely illustrates the multi-metal recycling strategy selected for the Lünen site. With the same or, in the last three years, a declining cathode copper output, metal is produced from a high and continuously increasing input of recycling materials. The average copper content in the raw materials is decreasing, while the proportion of tramp metals such as zinc, tin, nickel, gold and silver is rising distinctly. The shift in the trend shows that the increasingly complex composition of raw materials is becoming more energy-intensive when it comes to processing.

The CO_2 emissions were determined in accordance with DEHSt (German Emissions Trading Authority) standards. The increase in the absolute figures is mainly a result of a higher quantity of complex input materials with low copper contents. This trend, which has been observed for some time now, led to an increase of more than 10,000 t in 2011 due to the implementation of the KRS project. The total CO_2 emissions include biogenic emissions and emissions from mobile production equipment, i.e. the diesel consumption of plant vehicles that are not considered in emissions trading.

According to the reporting methods of the DEHSt, the raw materials contribute more to the site's CO_2 emissions than the main energy source SE oil (40 % compared to 37 %).

Communication with the general public/ special occurrences

There were no incidents or malfunctions with significant environmental effects within the meaning of the Hazardous Incidents Ordinance at the Lünen plant during the reporting period.

As in past years, LANUV analyzed leafy greens from Lünen gardens in 2014 as well. The assessment took place on the basis of Commission Regulation (EC) No 1881/2006 on setting maximum levels for certain contaminants in foodstuffs. This regulation is based on the assumption of regular consumption of the tested foodstuffs which, due to the actual vegetation period of the leafy greens in question, doesn't apply to the specific plants from the gardens.

The results were published in winter 2015 and an informational event with the local gardeners affected took place on December 3, 2015. One insight from the analyses is that a significant proportion of the pollution is transferred not through the air but through the soil.

The consumption recommendation has been defined more precisely since 2014 due to lower contaminant loads. Instead of a general recommendation not to consume the leafy vegetables, specific, harmless amounts have been established.

Another very positive aspect that should be mentioned is that the authorities clearly distance themselves from a direct connection between the emissions from Aurubis and the increased heavy metal values in leafy vegetables in the meantime.

Audits and inspections by the authorities

The following environmental inspections were carried out by the relevant authorities in 2015:

- Monitoring of the measures from the 2014 Incident Inspection, BR Arnsberg, October 22, 2015
- IED Inspection, Acceptance of Furnace 4 Sampling and Review of Waste Registry, BR Arnsberg, December 10, 2015

All inspections were completed successfully. The reports from the IED inspections are publicly available online.

Environmental program

The targets set in the context of the Environmental Statement 2015 were reviewed to determine the extent to which they had been achieved and implemented. Talks with employees, training, audits and quality circles served as a basis for discussing and evaluating the environmental protection measures as well as developing a new environmental protection program for 2016. The results are presented in the following Environmental Program:

Air pollution control

Target	Planned measure	Degree of implementation/date
Completely closing the storage area on the west side of the plant	Connection and storage hall 2A to close the gap between halls 2 and 3	The project was delayed to 2017/18 due to new prioritization
Closing the KRS roof ventilation	Analysis of the emission effects after closing the smelting operations hall (chimney effect) and possibly closing the KRS roof ventilation	A filter facility for roof ventilation is scheduled and budgeted for FY 2016/17

Water pollution control

Target	Planned measure	Degree of implementation/date
Optimizing wastewater flows	Separate treatment of sanitation water	Details are currently being coordinated for environmental remediation with the responsible authorities. The concept is still being adjusted as part of this coordination process.

Energy optimization

Target	Planned measure	Degree of implementation/date
Increasing energy efficiency	Developing an assessment basis taking the following aspects into account: » Form of energy » Raw material structures » Raw material availability » Price volatility	The EnPIs have been evaluated as meaningful on the whole. There is no assessment standard for the overall process with regard to energy efficiency.
Optimizing the anode smelter cycles and leaching plant	Heat utilization and water quality have to be optimized to enhance performance	Concepts are being developed. Projects are taken into account in the capital expenditure budget.

Plant safety

Target	Planned measure	Degree of implementation/date
Improved organization	Revising the Safety Report	The Safety Report was completely revised following the incident inspection and the authorities' comments were addressed.

Environmental management system

Target	Planned measure	Degree of implementation/date
Improved organization	Computerized integrated management system First step: data and document management	Document management has been developed for Aurubis AG and is currently being implemented at the Lünen site. The data is already being entered into the system in a pilot phase and employees are being trained comprehensively (about 80-100 users at the site).

Key figures for Aurubis AG, Lünen site, in calendar year 2015

Input

Raw materials

Recycling raw materials	348,403 t
Blister, etc.	33,217 t
Copper anodes from other Aurubis sites	6,813 t
Total raw materials	**388,433 t**
Input material/t Cu cathodes	**2.09 t/t Cu**

Auxiliaries

Oxygen	43 mill. m³
Rhine sand	11,823 t
Limestone	2,949 t

Energy

External power sources	143,789 MWh
Internal power sources	17,379 MWh
Natural gas, oil, coal	404,317 MWh
Total energy consumption	**565,485 MWh**
Specific energy consumption/t Cu cathodes	**3.04 MWh**

Water withdrawal/uptake

Potable water	680,000 m³
Precipitation	21,000 m³
Total water uptake	**701,000 m³**
Water consumption/t Cu cathodes	**3.80 m³**

Area used at the Lünen site

Total plant area (incl. south plant entrance)	316,000 m²
Buildings and paved area	247,000 m² (equivalent to 78 %)

Output

Products

Copper cathodes	186,022 t
KRS oxide	21,846 t
Iron silicate sand	157,904 t
Other (tin composite, nickel sulfate, etc.)	13,271 t
Total products	**379,043 t**

Waste

Recycling	4,707 t
Disposal	2 t
Construction waste	8,923 t
Total waste	**13,632 t**
Waste per t copper output	73.28 kg/t Cu
Waste per t input material	35.09 kg/t

Emissions

CO_2	0.92 t/t Cu cathodes
Dust	124 g/t Cu cathodes
SO_2	4.90 kg/t Cu cathodes
NO_x	1.86 kg/t Cu cathodes

Water discharge

Wastewater (indirect discharge)	69,000 m³
Water discharge/t Cu cathodes	0.37 m³

Registrierungsurkunde

EMAS

GEPRÜFTES UMWELTMANAGEMENT

Aurubis AG

Hovestraße 50
20539 Hamburg

Kupferstraße 23
44532 Lünen

Register-Nr.: DE-131-00035

Ersteintragung am
01. November 2005

Diese Urkunde ist gültig bis
16. Juli 2017.

Diese Organisation wendet zur kontinuierlichen Verbesserung der Umweltleistung ein Umweltmanagementsystem nach der EG-Verordnung Nr. 1221/2009 und EN ISO 14001:2004 Abschnitt 4 an, veröffentlicht regelmäßig eine Umwelterklärung, lässt das Umweltmanagementsystem und die Umwelterklärung von einem zugelassenen, unabhängigen Umweltgutachter begutachten, ist eingetragen im EMAS-Register und ist deshalb berechtigt, das EMAS-Zeichen zu verwenden.

Hamburg, 2. Oktober 2014
HANDELSKAMMER HAMBURG

HK Handelskammer Hamburg

Fritz Horst Melsheimer
Präses

Prof. Dr. Hans-Jörg Schmidt-Trenz
Hauptgeschäftsführer

TÜV NORD

GÜLTIGKEITSERKLÄRUNG

gemäß den Vorgaben der

Verordnung (EG) Nr. 1221/2009 i.d.F. vom 25.11.2009

über die freiwillige Teilnahme von Organisationen an einem Gemeinschaftssystem für Umweltmanagement und Umweltbetriebsprüfung (EMAS)

EMAS

Die Unterzeichnenden, Wolfgang Wielpütz und Ralph Meß,
zugelassen für den Bereich "NACE-Code 24.44"
bestätigen, begutachtet zu haben, dass die Standorte, wie in den
aktualisierten Umwelterklärungen der Organisation

Aurubis AG
Hovestrasse 50
20539 Hamburg
Deutschland

mit der Registrierungsnummer DE-131-00035 angegeben, alle Anforderungen der Verordnung (EG) Nr. 1221/2009 des Europäischen Parlaments und des Rates vom 25. November 2009 über die freiwillige Teilnahme von Organisationen an einem Gemeinschaftssystem für Umweltmanagement und Umweltbetriebsprüfung (EMAS) erfüllen.

- **die Begutachtung und Validierung in voller Übereinstimmung mit den Anforderungen der Verordnung (EG) Nr. 1221/2009 durchgeführt wurden,**
- **das Ergebnis der Begutachtung und Validierung bestätigt, dass keine Belege für die Nichteinhaltung der geltenden Umweltvorschriften vorliegen,**
- **die Daten und Angaben der aktualisierten Umwelterklärungen der Standorte Hamburg und Lünen ein verlässliches, glaubhaftes und wahrheitsgetreues Bild sämtlicher Tätigkeiten der Standorte Hamburg und Lünen innerhalb des in der Umwelterklärung angegebenen Bereichs geben.**

Diese Erklärung kann nicht mit einer EMAS-Registrierung gleichgesetzt werden. Die EMAS-Registrierung kann nur durch eine zuständige Stelle gemäß der Verordnung (EG) Nr. 1221/2009 erfolgen. Diese Erklärung darf nicht als eigenständige Grundlage für die Unterrichtung der Öffentlichkeit verwendet werden.

Essen, 2016-07-04

Wolfgang Wielpütz
Umweltgutachter
DE-V-0046

Ralph Meß
Umweltgutachter
DE-V-0300

TÜV NORD CERT UMWELTGUTACHTER GmbH Am TÜV 1 30519 Hannover www.tuev-nord.de
DAU-Zulassungs-Nr.: DE-V-0263

TÜV NORD

Die TÜV NORD CERT GmbH, Fachbereich Managementsysteme
bestätigt, dass das Unternehmen

AURUBIS AG

Bereich Materialvorbereitungsanlage (MV-ZS)
Kupferstraße 23
44532 Lünen

berechtigt ist, die Bezeichnung

Entsorgungsfachbetrieb

gemäß §§ 56,57 KrWG und § 11 Abs. 4 ElektroG

und das Überwachungszeichen der TÜV NORD CERT GmbH bis zum

30. September 2016

für die Tätigkeit

Behandeln von Abfällen

entsprechend der Anlage zu diesem Zertifikat (die Anlage umfasst 2 Seiten) zu führen. Die Ergebnisse der Überprüfung vom 27.05.2015 sind in dem Prüfbericht, Berichtsnummer 35151564 dargestellt.

Nächstes Audit:
Mai 2016

Zertifikat- Registriernummer:
44 714 070790

Essen, den 10.08.2015

TÜV NORD CERT GmbH
Langemarckstraße 20
45141 Essen

- Die Leitung -

- Die Sachverständige -
(Dr. Gertrud Steinbrink)

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Publisher
Aurubis AG
Hovestrasse 50
20539 Hamburg
Phone +49 40 7883-0
Fax +49 40 7883-2255
www.aurubis.com

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Editorial deadline
This report describes calendar year 2015. Current events were included up to the editorial deadline of June 2016.

This Environmental Statement comprises Aurubis AG, which includes the Hamburg and Lünen sites.

Your contacts

Dr. Karin Hinrichs-Petersen
Head of Corporate Environmental Protection
Phone +49 40 7883-3609
k.hinrichs-petersen@aurubis.com

Arne Schilling
Head of Environmental Protection Hamburg
Phone +49 40 7883-3788
a.schilling@aurubis.com

Dr. Hendrik Roth
Head of Environmental Protection Lünen
Phone +49 2306 108-606
h.roth@aurubis.com

Michaela Hessling
Head of Corporate Communication
Phone +49 40 7883-3053
m.hessling@aurubis.com

Kirsten Kück
Head of Sustainability
Phone +49 40 7883-3270
k.kueck@aurubis.com

aurubis.com

EN_16/08

Our Copper for your Life

Aurubis AG
Hovestrasse 50
D-20539 Hamburg
Phone +49 40 7883-0
Fax +49 40 7883-2255
info@aurubis.com