



# Sustainability report

2019



KME  
**Mansfeld**  
GmbH



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# Presentation

*Corporate Social Responsibility (CSR) is an integral part of our activity. Sustainability is both a value and a strategy for us. For this reason, although it is not one of the subjects for which the law provides for the obligation to do so, we have decided, since last year, to present our sustainability report. It is a choice of transparency and responsibility towards all stakeholders and the territory in which we operate. Our intention is to progressively extend this responsibility reporting to other KME group's plants as well.*

*The CSR activities of KME Mansfeld GmbH reflect our commitment to innovation of business practices and processes, creating products that satisfy the needs of our customers, with a strong and continuous attention to the principles of social and environmental responsibility. In doing so, we ensure that our company operates in an ethical, healthy and responsible manner. Acting with integrity is a prerequisite for being a company in which all stakeholders trust and with whom they want to interact in a correct and sustainable way.*

*We have a strong and a consolidated commitment to an ethical business conduct, using international best practices. Our willingness to pursue business ethics is fundamental to ensure to be able to continue successfully to conduct business activities. Sustainable innovation is a fundamental value for KME Mansfeld GmbH. The identification of new opportunities for the company organization and new products is a significant aspect of our activity.*

*The environmental management of KME Mansfeld GmbH aims not only to protect the environment and to reduce environmental impacts, but also to increasingly orient our activities towards the circular economy and sustainable development. At the same time, we strive to ensure high levels of safety at work and to develop a culture that encourages employee engagement through the continuous growth of their talents, the opportunities for professional growth, development leadership and commitment to our local communities.*

*I am proud to see, thanks to the work and commitment of our employees, that also in the 2019 we have made further progress in building a more sustainable future for our company, our stakeholders and the environment in which we operate.*

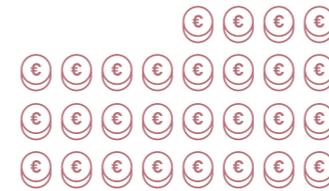
**Claudio Pinassi**  
Managing Director KME Mansfeld GmbH



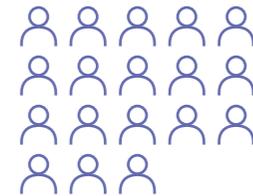
KME Mansfeld GmbH



Copper.  
Metal for the world.



**1,143,693,000** EUROS  
TURNOVER



**1,148**  
EMPLOYEES



AN INTEGRATED SYSTEM  
OF THE COPPER INDUSTRY IN EUROPE

**Strategic value for the circular economy  
and the European Green Deal**

# 1

## Our commitment to sustainable development

# 1.1

## Coping with the crisis caused by the pandemic

This is our first sustainability report, accounting for our activities in 2019. Everything we could have imagined, then, except that we would later find ourselves in an extremely difficult situation, caused by a pandemic that resulted in the loss of human lives and caused a serious economic and social crisis.

Our operations have obviously been affected by this situation as well. We have taken the necessary **preventive measures** to protect **health** and **safety** of our employees and their families, while working to ensure the highest possible level of **production**, sales and delivery services.

The pandemic has opened up scenarios of extreme uncertainty. An exceptional effort will be needed to overcome the economic and social crisis. However, this difficult period must be an opportunity to address the crucial challenges of our time.

The **United Nations 2030 Agenda** for Sustainable Development remains in this sense the most important reference project for finding solutions to global problems. Just as the **Green Deal**, announced by the European Commission at the end of 2019 and then reconfirmed as a pillar of the "Next Generation EU" plan, constitutes together with the digital transition the strategic priority for the future of Europe.

Focusing on sustainability means building the economy of the future: a green, low-carbon and circular economy. We need a sustainable transformation of the economy, orienting public policies and private investments in this direction, with the aim of a social, solid and lasting economic recovery. A recovery that must be based on two key words: **innovation** and **sustainability**.

In this context, the **copper industry** is already among those most committed to the efficient use of resources according to the principles of the circular economy. And

**KME** is one of the most virtuous experiences on the national and international scene. We've been on this path for some time. Today we want to speed things up even further, strengthening our commitment to contribute to sustainable development. That's why in this report we report on our activities with reference to the **sustainability goals** set out in the **UN's 2030 Agenda**.



CONTEXT

## The United Nations 2030 Agenda



In 2015, the United Nations approved the Global Agenda for Sustainable Development, which contains 17 goals (Sustainable Development Goals - SDGs) to be achieved by 2030. Considering the current model of development unsustainable, the UN indicates the need for all countries to commit themselves to orienting global development towards sustainability. In order to achieve these goals, a strong commitment is required not only from governments but also from all players in society and the economy, starting with businesses.



## A green deal for Europe

In late 2019, the new European Commission unveiled its plan for the **Green Deal**, which aims to make the green transition the opportunity for a new development model, enabling Europe to exercise leadership on the world stage. And the "**Next Generation EU**" plan for economic recovery in the wake of the pandemic points to the Green Deal as a strategic priority for the future of our continent

- The goal is to become the first carbon-neutral continent by **2050**, strengthening the **competitiveness** of European industry through a socially equitable **ecological transition** and an **industrial revolution** capable of ensuring sustainable production.
- The Green Deal aims to make Europe a **global leader in the circular economy**. As part of this, in March 2020 the European Commission unveiled its updated **Action Plan** for the circular economy, with the aim of accelerating the transition.



CONTEXT

## The new European industrial strategy

In March 2020, the **European Commission published** the new European Industrial Strategy. The goal is to sustain Europe's industrial leadership by directing it toward the goals set for 2050, around three priorities:

- Maintain the **competitiveness** of European industry on a global level;
- Make Europe a **carbon neutral** continent;
- Develop **digital infrastructure**.

The strategy defines the drivers of Europe's industrial transformation and proposes a set of actions to accelerate the green transition to an increasingly **green, circular and digital** economy.

# 1.2

## The copper industry in the ecological transition

The copper industry has a number of characteristics that make it a major player in the ecological transition.

### THE COPPER INDUSTRY IN THE WORLD

- Invests approximately \$20 billion to \$30 billion each year to make operations more sustainable
- Emits about 0.15% of total annual CO<sub>2</sub> emissions (about 35 billion tons)
- Represents about 0.1% of total annual global energy consumption (about 375 billion GJoule)
- Recycles 2 billion m<sup>3</sup> of water per year

### COPPER IS INFINITELY RECYCLABLE

- 2/3 of the 550 million tons of copper produced since 1900 is still in productive use
- Almost one third of copper demand is met through recycling

### COPPER IS ONE OF THE BEST CONDUCTOR OF HEAT AND ELECTRICITY

- Only silver is a better conductor, but as a precious metal it cannot be widely used in conductive applications.
- 70% of copper is used in electrical applications that benefit from energy efficiency.

### ENERGY EFFICIENCY

By meeting mandatory minimum energy performance standards in 6 product categories (motors, distribution transformers, air conditioners, refrigerators, lighting, information technology) by 2030, the following goals can be achieved:

- 10% reduction in overall electricity consumption
- Lower CO<sub>2</sub> emissions of 1.25 billion tonnes

### REDUCING GREENHOUSE GAS EMISSIONS

- Recycling copper requires up to 85% less energy than primary production, saving 40 million tons of CO<sub>2</sub> (equivalent to the emissions of 16 million cars).

### RENEWABLE ENERGY

- Renewable energy systems rely on copper to generate and transmit power with maximum efficiency and minimal environmental impact
- Renewable energy systems (solar, wind, hydro) require the use of more copper (on average 4 to 12 times more) than fossil fuel power generation.

### SUSTAINABLE MOBILITY

- While a conventional car uses an average of 8 to 33 kg of copper, a hybrid electric vehicle requires 40 to 65 kg of copper.

### SMART CITIES

- About 55% of the world's copper is used in buildings, 15% in infrastructure, 10% in industry, 10% in transportation and 10% in equipment manufacturing.
- Copper contributes to the evolution towards sustainable construction through architectural designs, materials used, renewable energy, energy efficient systems (heating, cooling, lighting, control, IT equipment, etc.).

## 1.3 Our Future

- Copper is one of the best materials for structural reinforcement, roofing, plumbing, heating systems and many other applications.
- Smart buildings use copper as a conductive material in building wiring and energy-efficient systems.
- These technologies save 15 to 22 percent of the total energy consumed in buildings; on a global scale this means nearly 1,000 Mtoe (million tonnes of oil equivalent) of energy saved cumulatively over 20 years (the equivalent of the energy consumed by one billion cars).

(data source: Copper Alliance)

As in the early 1900s, when the plant was one of the protagonists of electrification in industry, today, after more than 100 years of history, it will support the turn towards a sustainable economy characterized by renewable energies.

Our copper products are made with a minimum of CO<sub>2</sub> and helps to reduce harmful carbon emissions in other fields.

Our factory is a responsible actor and strives to protect the environment through reducing emissions and overall environmental impact.

The idea of copper recycling has had a firm place in our economic activities since the beginning of copper production. So we work embedded in the European metal industry to establish copper cycles and to save resources. For years, our activities have focused on the circular economy as a pillar of sustainability in development. All copper-containing waste is recycled. All other waste is recycled or returned to other use.

## 1.4 Report guidance

KME Mansfeld GmbH presents its sustainability report as a voluntary act of transparency and social responsibility.

The report has been prepared on the basis of the guidelines of the Global Reporting Initiative (GRI), an independent international organization recognized by the UN and the main reference for sustainability reporting activities worldwide.

The report uses 4 sets of indicators related to the GRI standards:

- **general**, regarding the legal and organizational profile of the company;
- **economic**, concerning the main economic results and the economic value distributed;
- **environmental**, in particular concerning energy, materials, water, waste, emissions;
- **social**, concerning personnel, training, safety, equal opportunities, human rights, relations with the territory.

### CIRCULARITY INDICATORS

In order to further illustrate the company's activities and strategies, in addition to the reporting carried out on the basis of GRI guidelines and standards, a special chapter of the report also uses **circularity indicators** to measure the company's performance in relation to the objectives connected with the **transition to a circular economy**.

### REPORTING

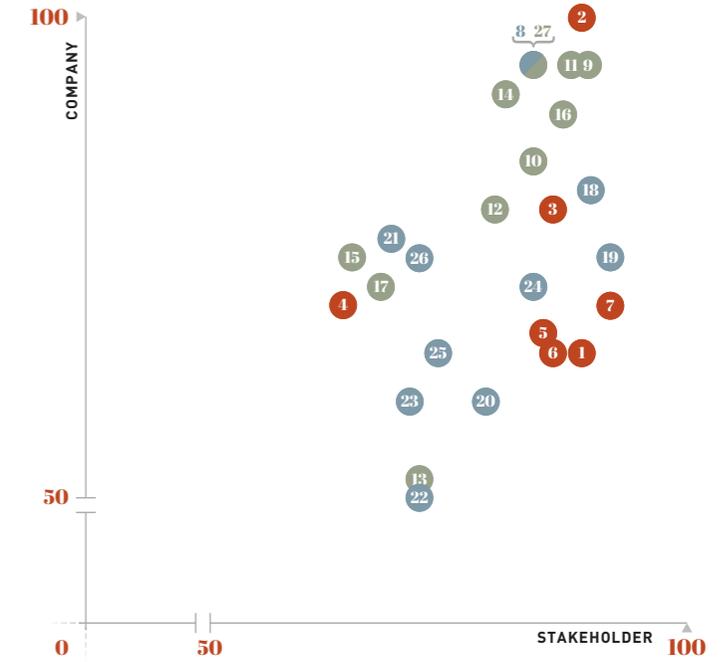
This sustainability report covers the year **2019**. Data for 2017 and 2018 are also reported to allow for an assessment of the performance of key indicators over the last three years.

**MATERIALITY MATRIX.**

The most relevant issues to be reported in the report were identified through discussion with **management** and key **stakeholders** (employees, shareholders, institutions, local community, trade associations, research bodies, etc.). The tool used to select the most interesting indicators is the "**materiality matrix**", which measures the degree of importance attributed to the various aspects subject to reporting\*.

\* Stakeholders and company management were asked to assign a priority level from a minimum of 0 (not relevant) to a maximum of 100 points to the various aspects being reported on. (very relevant). The evaluations make up the "materiality matrix".

- 1 CORPORATE WELFARE
- 2 HEALTH PROTECTION AND SAFETY
- 3 ENHANCEMENT OF HUMAN CAPITAL AND THE ROLE OF WORKERS
- 4 CONTRIBUTION TO THE DEVELOPMENT OF THE TERRITORY AND RELATIONS WITH THE LOCAL COMMUNITY
- 5 SUSTAINABLE SUPPLY CHAIN MANAGEMENT
- 6 EQUAL OPPORTUNITIES FOR MEN AND WOMEN
- 7 PROTECTION OF HUMAN RIGHTS
- 8 WASTE RECOVERY
- 9 EFFICIENT USE OF RAW MATERIALS / CIRCULAR ECONOMY
- 10 EFFICIENT WATER USE: SAVING WATER AND REDUCING LOSSES
- 11 PROTECTION OF THE TERRITORY AND OF SURFACE AND GROUNDWATER
- 12 CLIMATE CHANGE: MITIGATION AND ADAPTATION ACTIONS
- 13 SAFEGUARDING BIODIVERSITY
- 14 AIR QUALITY: CONTAINMENT OF POLLUTING EMISSIONS INTO THE ATMOSPHERE
- 15 CONTAINMENT OF ODOUR EMISSIONS
- 16 ENERGY EFFICIENCY AND RENEWABLE ENERGIES
- 17 TRANSPORT, ACCESS TO COMPANY SITES
- 18 INTEGRATED VALUE CREATION (ECONOMIC, SOCIAL AND ENVIRONMENTAL)
- 19 ETHICS, RESPECT FOR RULES AND COMPLIANCE
- 20 DEVELOPMENT OF SYNERGIES WITH PUBLIC ACTORS AND PRIVATE PARTNERS



- 21 LISTENING, INVOLVEMENT AND AWARENESS OF STAKEHOLDERS AND RELATIONS WITH THE TERRITORY
- 22 INDUSTRIAL GROWTH FOCUSED ON INFRASTRUCTURE
- 23 REMUNERATION POLICY AND EVALUATION OF THE PERFORMANCE OF TOP MANAGEMENT
- 24 CONSOLIDATION OF THE ELEMENTS OF SUSTAINABILITY IN CORPORATE GOVERNANCE
- 25 MANAGEMENT OF RISKS RELATED TO SUSTAINABILITY
- 26 VALORISATION OF ESG (SUSTAINABLE INVESTMENT APPROACH) ELEMENTS IN REPORTS WITH THE FINANCIAL COMMUNITY
- 27 TECHNOLOGY AND INNOVATION ON INDUSTRIAL PROCESSES, INFRASTRUCTURES AND SERVICES

# 2

## The company

Our company has over a century of experience in processing copper. Since 2019 we have been part of the KME Group. We manufacture in the city of Hettstedt in the state of Saxony-Anhalt, Germany. Each of our 1,148 employees is committed to the quality of our products and to innovation on a daily basis. We have customers in 60 countries all over the world. Over the past 20 years we have invested more than 400 million euros and continue to do so, looking to the future.

## 2.1 Our history

The plant in Hettstedt has a history of over 100 years. The location was chosen because of its proximity to copper smelting and production in the neighborhood. At the beginning of the 20th century, the mining complex "Mansfeldsche Kupferschiefer bauende Gewerkschaften" was the largest player in copper metallurgy in Europe and decided to found the Hettstedter Kupfer- und Messingwerke in 1907. As early as 1917, the plant with 2,200 employees was producing about 36,000 t of semi-finished products. The name of the company has changed several times over the years.



**1907**

Resolution to found the Hettstedter Kupfer-und Messingwerke

**1908**

Installation of the first production plant at the site, a rolling mill for wires

**1909**

Installation of the wide hot rolling mill for plates

**1912**

Start of a new rolling mill for copper sheets, a drawing plant for copper wire and a bar drawing plant

**1916**

Start of the rolling mill for strips

**1935**

Start of the production of aluminum extrusion products

**1946**

Conversion of Kupfer-und Messingwerk Hettstedt to Walzwerk für Buntmetalle der Sowj. A.G.

**1953**

Return to a German state owned company named VEB Walzwerk Hettstedt

**1970**

Integration into the enterprise VEB Mansfeld Kombinat Wilhelm Pieck

**1990**

German Reunion, Privatisation by German Treuhand as Walzwerk Hettstedt AG

**1993**

Fusion of Walzwerk Hettstedt AG and Mansfeld AG to Mansfelder Kupfer und Messing GmbH

**1995**

Acquisition by the Belgian group Lamitref Industries

**1998**

Extensive new investments at site including installation of the world first continuous casting plant for copper strips, rolling mills for wide strips and treatment furnaces to produce copper strips, installation of a continuous casting plant for wire rod and an anode hut for the production of copper cathodes

**2004**

Acquisition by the Kazhak company Kazhakhmys plc

**2013**

Acquisition by Copper 1909 Bidco GmbH

**2014**

Installation of a new biological wastewater treatment plant

**2015**

Installation of the copper wire casting plant

**2017**

Enlargement of the copper wire casting plant

**2019**

Acquisition by the company KME SE





## From 2019 part of the KME Group

In June 2019, MKM (Mansfelder Kupfer und Messing GmbH) officially assumed the name **KME Mansfeld GmbH**.

The name change completed the process of formally integrating MKM GmbH into the KME Group. The acquisition of KME SE's indirect 100% stake in MKM Mansfelder Kupfer und Messing GmbH had been completed at the end of February 2019.

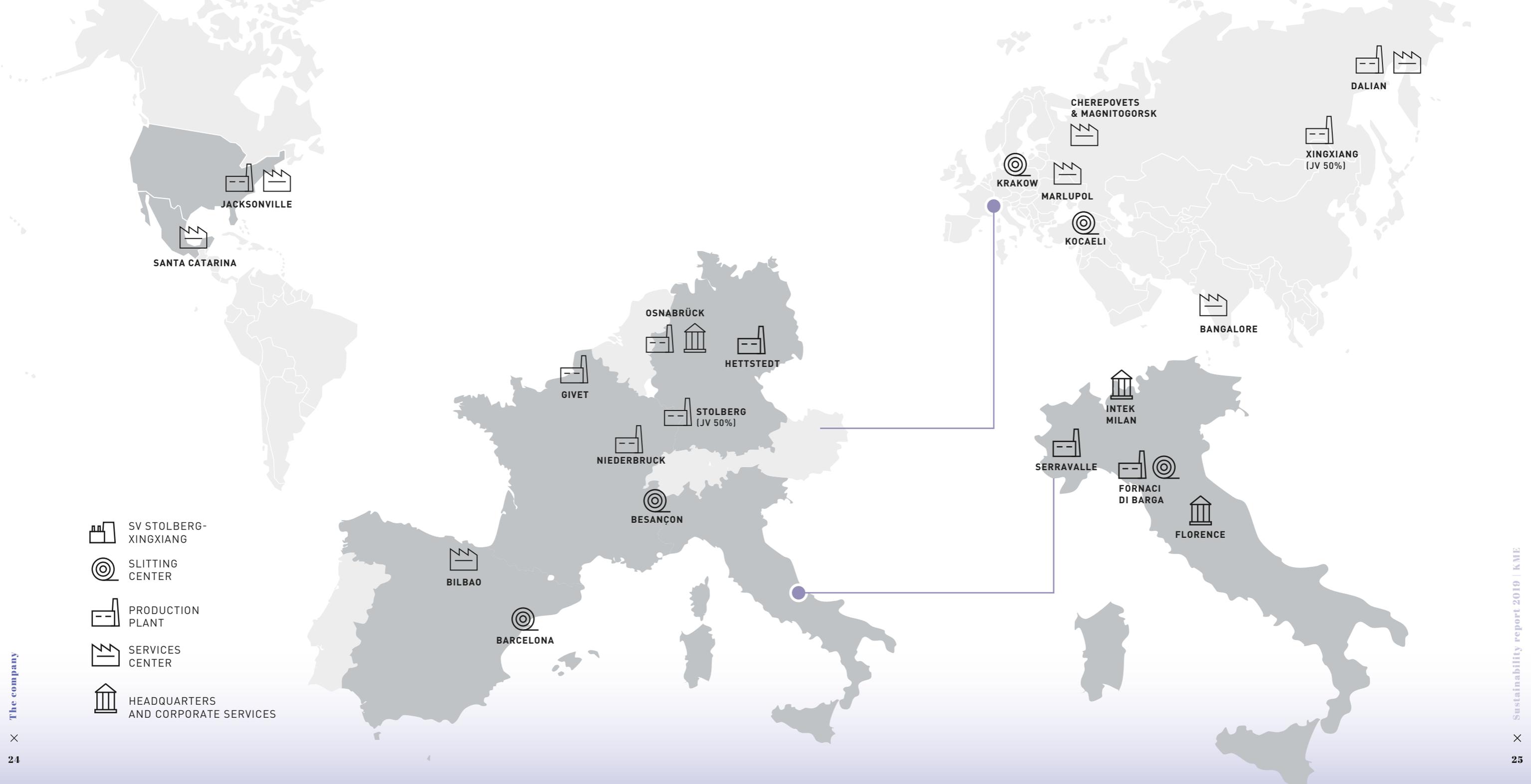
Under the new name KME Mansfeld GmbH, the Hettstedt plant is now one of the three pillars of the KME Group, alongside the sites in Fornaci di Barga and Osnabrück.

The merger of MKM and KME brings significant benefits not only to the Hettstedt site, but also to the KME Group's role in the copper products market. With integrated plants in a strong production, research and development network, and a global presence in all markets, the group of companies can play a leading role in international competition. The three industrial sites will focus on specific product segments according to their technical strengths.

The KME Group can thus utilize further potential in the copper market, particularly with regard to scenarios related to the digital and ecological transition, which will have a positive influence on the demand for copper components.

## 2.2 KME Group

With production facilities in **Europe** (Germany, Italy, France, Spain), **China** and the **United States**, KME SE is one of the world's largest manufacturers of copper and copper alloy materials. KME SE is controlled by **Intek Group S.p.A**

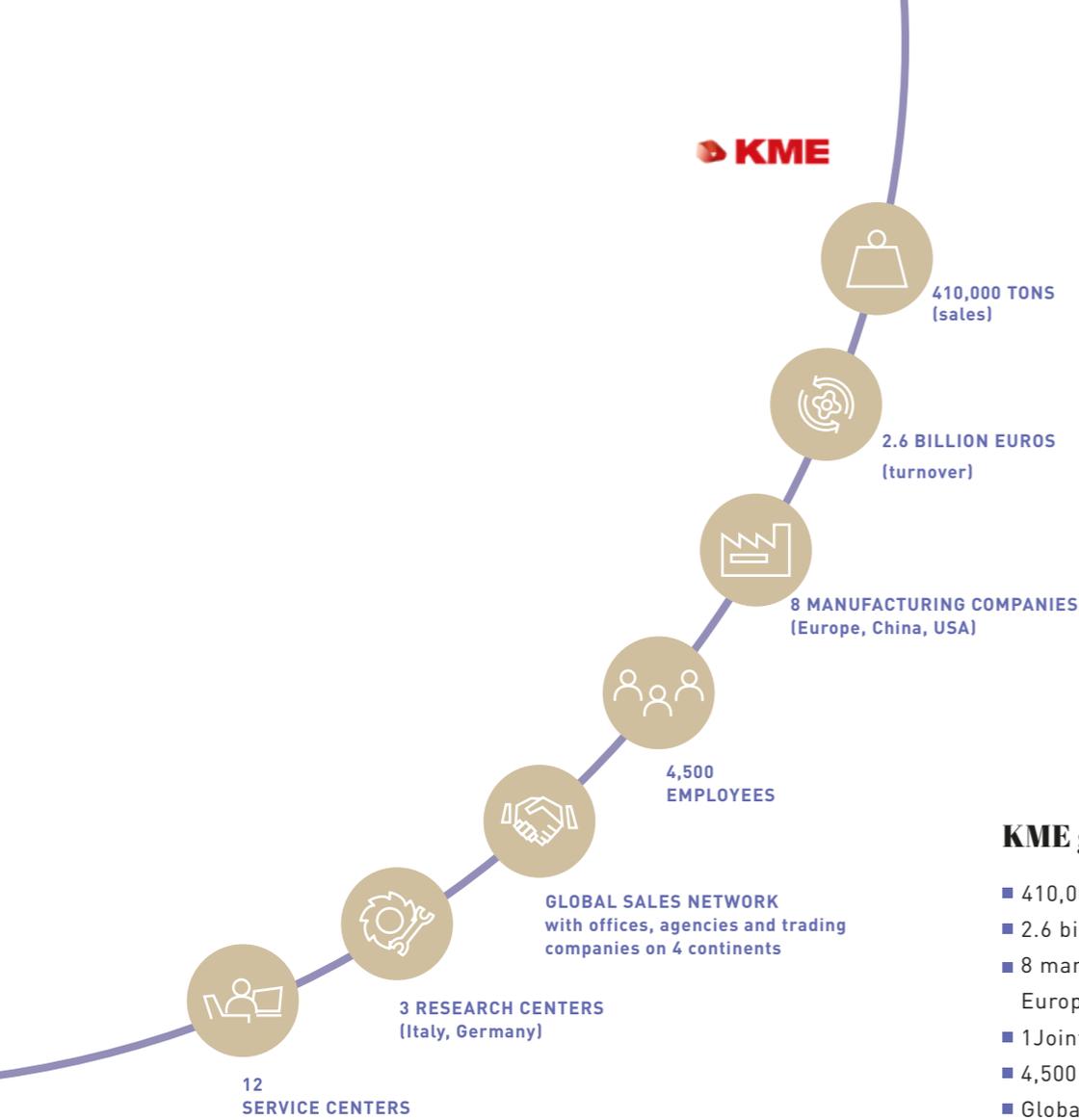


- SV STOLBERG-XINGXIANG
- SLITTING CENTER
- PRODUCTION PLANT
- SERVICES CENTER
- HEADQUARTERS AND CORPORATE SERVICES

JACKSONVILLE  
SANTA CATARINA

GIVET  
OSNABRÜCK  
HETTSTEDT  
STOLBERG (JV 50%)  
NIEDERBRUCK  
BESANÇON  
BILBAO  
BARCELONA

KRAKOW  
MARPOL  
KOCALI  
CHERPOVETS & MAGNITOGORSK  
BANGALORE  
XINGXIANG (JV 50%)  
DALIAN  
SERRAVALLE  
INTEK MILAN  
FORNACI DI BARGA  
FLORENCE



### KME group figures

- 410,000 tons (sales)\*
- 2.6 billion euros (turnover)
- 8 manufacturing companies in Europe, China, USA
- 1 Joint Venture in China
- 4,500 employees\*
- Global sales network with offices, agencies and trading companies on 4 continents
- 3 research centers in Italy and Germany
- 12 Service Centers, located in strategic areas

\*[excluding JV in China]

FIG 2.1 Group structure

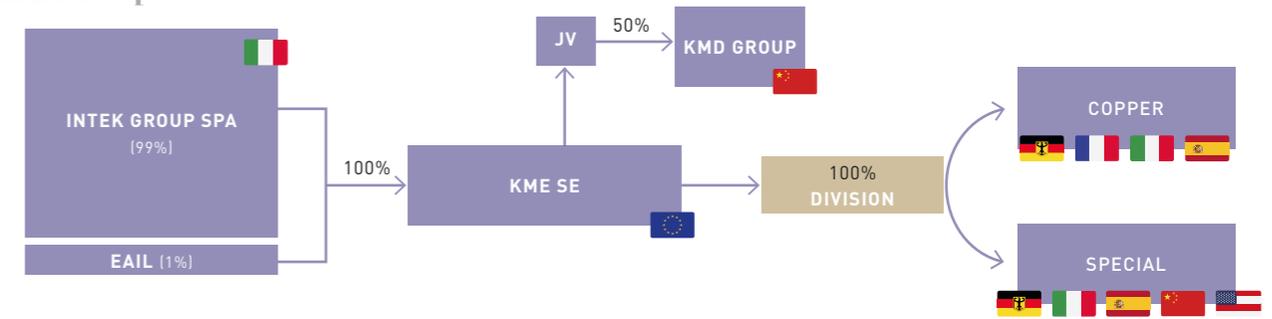
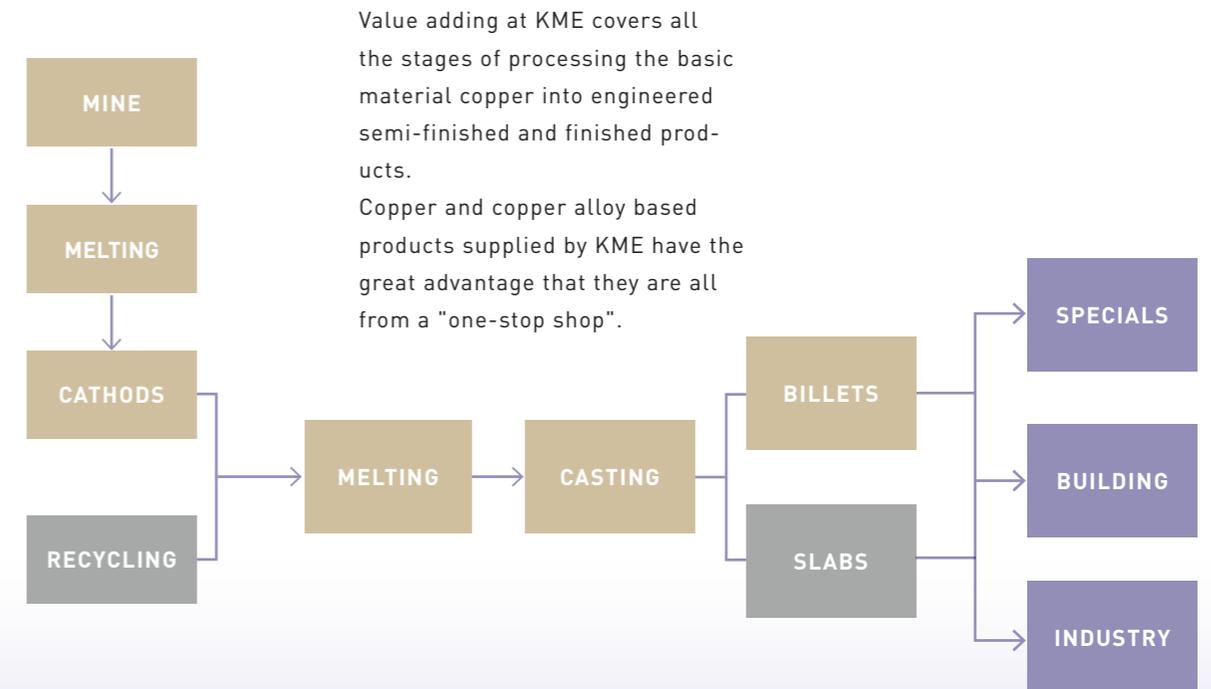


FIG 2.2 KME in the value chain



Value adding at KME covers all the stages of processing the basic material copper into engineered semi-finished and finished products. Copper and copper alloy based products supplied by KME have the great advantage that they are all from a "one-stop shop".



## KME's products

### ROLLED PRODUCTS

- Used in the electrical and electronics industry, construction, architecture, appliance manufacturing, automotive, renewable energy, power transmission, mechanical industry, coinage and telecommunications.
- End markets: electrical industry, construction, mechanical industry, automotive, renewable energy, architecture.

### TUBES

- Solutions for most civil and industrial plumbing and heating applications. Industrial tubing used for air conditioning, heat exchangers, boilers, medical applications and fitting manufacturing.
- End markets: construction, renewable energy, medical industry, electrical, healthcare.

### SPECIALS

- Tubular and plate moulds for continuous steel casting, cooling plates and casting wheels. Bars, profiles and tubes with welding and machining applications. Marine pipes, fittings, flanges, tubes and fittings.
- End markets: steel and metal industry, machine building, chemical industry, shipbuilding, offshore, domestic energy.

### COPPER BARS

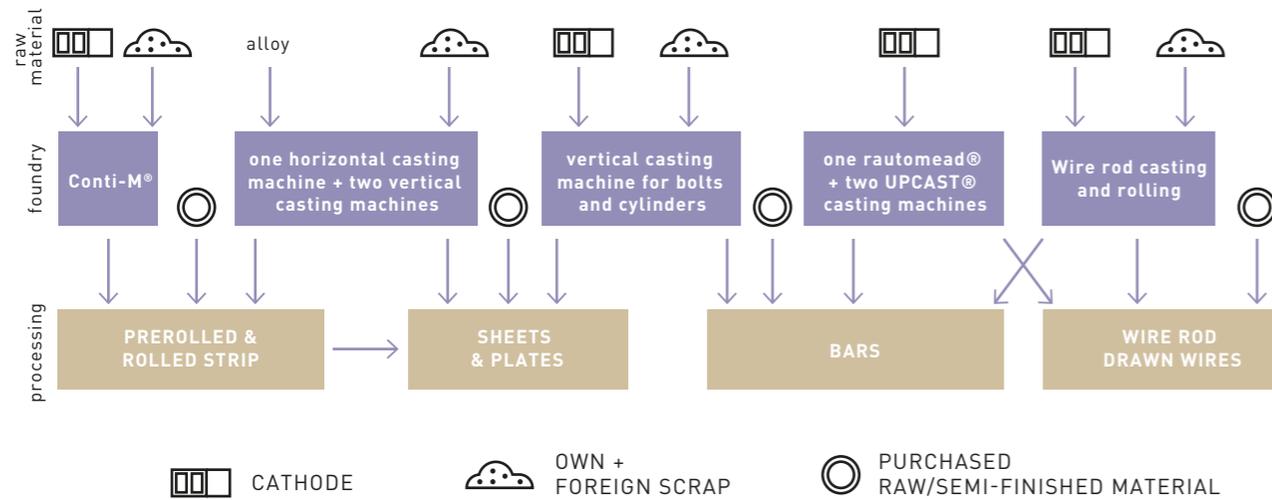
- Copper bars and copper profiles
- Used in the electrical industry, construction, architecture, renewable energy, power transmission, mechanical industry, telecommunications.
- End markets: electrical industry, construction, mechanical industry, renewable energy, architecture.



## KME leader in technological innovation

- **Intellectual property** of approximately 50 patents and 60 trademarks related to alloys and processes.
- **A team** of more than 70 research and development staff based in three research centers in Italy and Germany.
- **Current areas** of research and development include:
  - Materials processing and recycling (separation of tin and copper scrap).
  - Energy efficiency and process redesign.
  - Coating enhancements for extreme temperature conditions and high casting speeds.
  - Use of automation in manufacturing and digital development.





## 2.3 The factory

KME Mansfeld manufactures **primary and semi-finished products** made of **copper** and **copper alloys**. In addition to offering a wide range of products, the company also specializes in **customized solutions** for industry. With state-of-the-art technologies, it is a strong global partner in growth markets such as **e-mobility, renewable energy and digital infrastructure**.

KME Mansfeld GmbH is owner of the buildings and land on the north part of the plant in Hettstedt. The buildings and land in the south part of the plant in Hettstedt is owned by a third party and KME Mansfeld may use these within the framework of a heritable building right.

The plant in Hettstedt covers a total area of about 1.2 million m<sup>2</sup>, approx. 190,780 m<sup>2</sup> of buildings.

### Rolled

KME supplies pre-rolled strip, industrial strip, transformer strip, cable and HF cable strip and roofing strip. We manufacture all of our strip products using our Conti-M® technology which we developed inhouse, using continuous casting technology to achieve a 24/7 process.



#### MAIN PRODUCTS:

- Pre-rolled materials (Coils);
- Sheets made of rolled;
- Finished rolled products:
- Industrial strip - Transformer strip;
- Roofing (hook strip) - Cable tie;
- High frequency cable strip - Solar cells;
- Alloy strip;

#### CUSTOMERS / MARKETS / APPLICATIONS:

Sales in 59 countries with more than 600 customers of electrical, cable, solar technology or construction industry. Main markets are Europe, North America, East Asia, North Africa.

In the copper industry Conti-M®, with a twin belt caster as its core, is a unique production process. By combining melting, casting, homogenization, hot rolling and surface milling in one production line, we avoid additional cooling and re-heating phases. This leads to a highly efficient process in terms of energy usage, yield and throughput. Within KME Mansfeld GmbH, Conti-M® material is the source for all strip products.



## Wires

KME Mansfeld GmbH is one of only a few manufacturers of copper wires with an integrated production process. KME supplies the entire spectrum of wire rod, from thick, medium and fine wire to stranded wire and wire rope. Our fully integrated wire rod casting and rolling technology allows us to offer copper wire products and alloy wire products (plain and tinned) in a wide range of finishes.

### WIRE ROD CASTING PLANT (WIRE ROD CASTING AND ROLLING TECHNOLOGY)

- 130,000 t p.a.\* for the external market;
- plus 45,000 t p.a.\* for our drawn wire production;

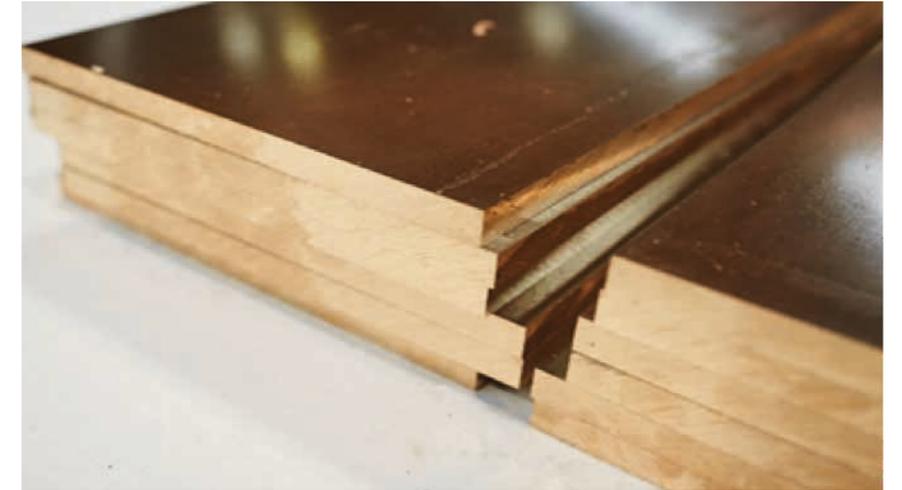
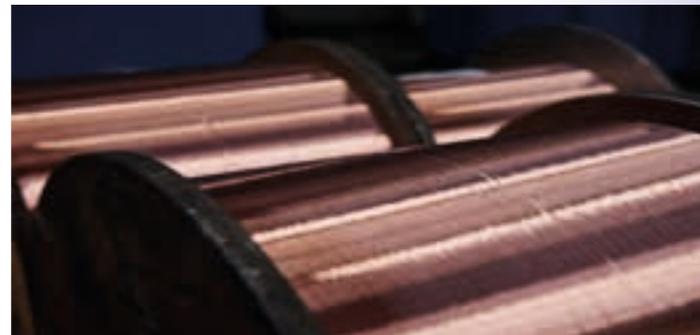
\* maximum system capacity

### DRAWN WIRE PRODUCTION WITH APPROX. 140 WIRE DRAWING AND STRANDING / STRANDING MACHINES

90% of all products are used as starting material for cables and wires.

- Power transmission.
- Automotive & mechanical engineering.
- Communication.
- Special cables.

Sales in 33 countries - main markets are Europe, Middle East, North Africa.



## Sheets and plates

KME offers sheets, plates and discs in a wide range of dimensions, to customer specific drawing on request. Our rolling mill is supplied by our own foundries. We serve a broad range of more than 50 alloys.

Production of copper, brass, bronze, special alloys.

### MAIN PRODUCTS:

- Sheets (thickness < 5 mm) 20%.
- Plates (thickness > 5 mm) 70%.
- Other products 10%.

### CUSTOMERS / MARKETS / APPLICATIONS:

- Sales in 41 countries.
- Main markets are Europe, North America, Middle- and East Asia.

### INDUSTRIAL APPLICATION:

- Chemical, Electronic, Energy technic, Drinking water production.
- Construction, architecture and decoration.

## Bars and profiles

KME is one of Europe's leading producers of copper bars and profiles. Our production range encompasses a wide range of sizes in various grades of copper. We also produce customised profiles based on technical drawings.

### MAIN PRODUCTS:

- Bars;
- Flat bars;
- Round bars;
- Hexagonal bars;
- Profiles.

### MARKETS / APPLICATIONS:

Switchgear construction (low and medium voltage), power distribution systems (busbars), transformers / electrical components, electrical machine construction, wind power, automotives, shipbuilding, off-shore-industry, system and apparatus engineering.

Main markets are Europe, North America, North Africa.



## Successful projects for KME Mansfeld products

Every job is different, especially when it comes to custom solutions and special products made on behalf of clients. Many of these cannot be found anywhere else in the world, for example when it comes to special buildings, artwork and monuments.

Here are some examples\*.

*\*(images taken from the company website)*



### New York - Ground Zero UNITED STATES OF AMERICA

125 tons in memory of the victims of the terrorist attack of September 11, 2001



### Off-shore

It takes up to 30 tons of copper to connect an offshore wind turbine to the power grid.



### Axel Towers - Copenhagen DENMARK

240 tons of brass sheet metal for a spectacular project

### Distillery of Dalmunach GREAT BRITAIN



### Yanbu SAUDI-ARABIA

The Yanbu 3 desalination plant use 450 tons copper-nickel plates for heat exchanger to transform sea-water into drinking water.



## 2.4 Governance and organizational model

As the legal form of a Limited Liability Company, KME Mansfeld GmbH is subject to the German Law on Limited Liability Companies (GmbHG). The regulations for large business corporations apply.

The company is situated in Hettstedt, Lichtlöcherberg 40, and is entered in the commercial register of Stendal local court under HRB 207208. On 23 May 2019, the shareholders' meeting resolved the change of Article 1 (name) of the articles of association and changed the name into KME Mansfeld GmbH, Hettstedt/Germany (formerly: MKM Mansfelder Kupfer und Messing GmbH, Hettstedt/Germany).

The members of the management represent the company in and out of court and convenes the shareholders' meeting. Members of the management in 2019 were:

- Mr Roland Harings, Herrliberg/Switzerland (chairman), managing director, CEO (until 28 February 2019),
- Mr Ulrich Becker, Duisburg/Germany, managing director, CEO (as from 1 March 2019 until 17 September 2020),
- Mr Pierpaolo Di Fabio, Florence/Italy, managing director, CFO (as from 14 May 2019 until 26 November 2019),
- Mr Marco Miniati, Florence/Italy, managing director, CPO (as from 14 May 2019 until 26 November 2019),
- Mr Claudio Pinassi, Rosignano Marittimo (LI)/Italy, managing director, COO (as from 26 November 2019),
- Mr Kakha Avaliani, London/Great Britain, managing director, CCO (as from 26 November 2019).

The supervisory board supervises the management and acts as its controlling body. It is responsible for overseeing the functioning and compliance with the model and reporting any critical issues to the shareholder's meeting. The chairman of the supervisory body is a person external to the company. In 2019, the supervisory board consisted of the following persons:

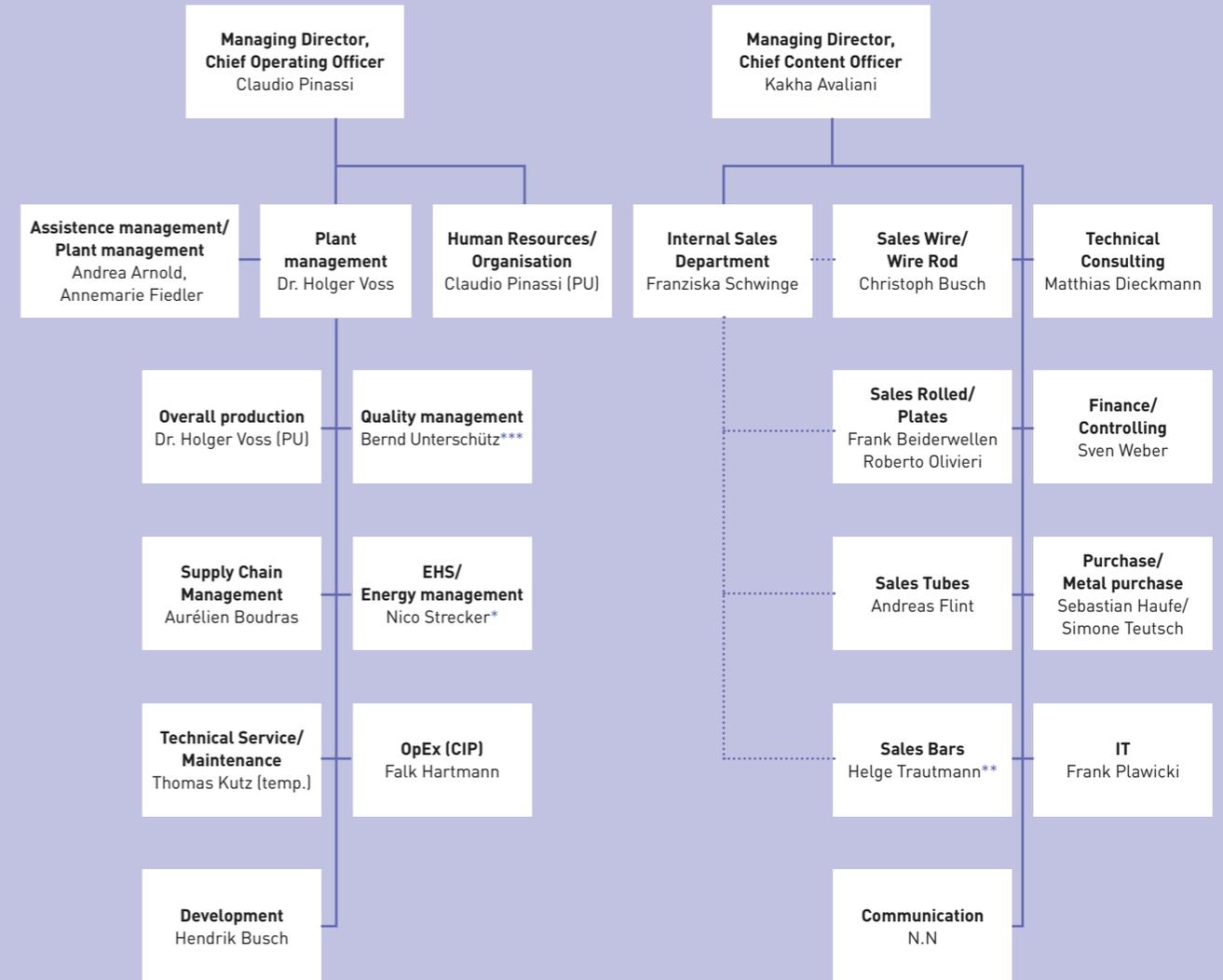
### EMPLOYEE REPRESENTATIVES

- Mr Ian Howard (chairman) (until 28 February 2019)  
Profession: independent consultant
- Mr Burkhard Brauch (until 28 February 2019)  
Profession: Financial investor
- Dr h.c. Hans-Joachim Otto (until 28 February 2019)  
Profession: Notary
- Mr Jürgen Brethauer (until 28 February 2019)  
Profession: Electrical engineer

With effect from 1 March 2019, the following persons were appointed as members of the supervisory board.

- Mr Roelf-Evert Reins (Chairman)  
Profession: Lawyer
- Mr Vincenzo Manes  
Profession: Chairman of executive board of Intek Group S.p.A.
- Ms Diva Moriani  
Profession: Deputy chairwoman of executive board of Intek Group S.p.A.
- Mr Marcello Gallo (as from 1 March 2019 until 3 June 2019),  
Profession: Managing director

## Organizational model and main corporate functions Status Dec, 1<sup>st</sup>, 2020



With effect from 3 June 2019, the following person was appointed as member of the supervisory board.

- Ms Alessandra Pizzutti Profession: Lawyer KME Group

### EMPLOYER REPRESENTATIVES

- Mr Thomas Lipsch (deputy chairman) (until 25 June 2019) Profession: Maintenance mechanics
- Mr Gerald Kost (until 25 June 2019) Profession: Process mechanics
- Mr Ronny Wehling (deputy chairman) (as from 25 June 2019) Profession: Paramedic
- Mr Christian Klopfer (as from 25 June 2019) Profession: Industry mechanics

As the sole shareholder of KME Mansfeld, KME SE sends its representatives to the shareholders meeting. In 2019 participated for the shareholder

- Mr Ulrich Becker (Chairman, managing director, CEO KME SE)
- Mr Marco Miniati (managing director, CPO KME SE)
- Mr Paolo Di Fabio (managing director, CFO KME SE)

The auditing firm for KME Mansfeld is Deloitte.

\* Energy Management Officier  
 \*\* Representative of the customer  
 \*\*\* Quality Management Officer

## 2.5 Code of conduct

KME Mansfeld GmbH operates according to principles of social responsibility. It is aware of the consequences of its business decisions and actions in economic, technological, social, and environmental terms, based on its code of conduct.

KME voluntarily contributes to the long-term well-being and development of a global society at every possible point in the places where it operates. It is oriented towards ethical values and universal principles, in particular integrity, honesty and respect for human dignity. The code of conduct applies in all KME units, as well as at every possible point for its suppliers and other parts of the value chain.

KME actively works to ensure that the following **core values** for **social responsibility** are put into practice in business management and are respected.

### Adherence to laws

- KME complies with the applicable laws and other legal requirements of the countries in which it operates. To this end, KME has systems in place to control, for example, the identity of its customers and business partners to prevent money laundering. KME's philosophy is to establish business relationships only with fully compliant partners.

### Organizational integrity and governance

- KME orients its activities towards ethical values and universal principles, in particular integrity, honesty, respect for human dignity, openness and non-discrimination based on religion, ideology, gender and ethnicity.
- KME rejects corruption, as set forth in the relevant United Nations Convention. It uses appropriate means to promote transparency, integrity, responsible leadership and corporate accountability.
- KME pursues fair business practices and fair competition. It promotes cooperation with the supervisory authorities.

### Consumer interests

- KME complies with consumer protection laws and appropriate sales, marketing and information practices.

### Communication

- KME communicates openly and is oriented towards dialogue on the requirements of the code of conduct and its implementation among employees, customers, suppliers and other stakeholders.

### Human rights

- KME is committed to promoting human rights. It respects human rights as set forth in the United Nations Charter.

### Privacy

- KME protects privacy.

### Health and safety

- KME is committed to ensure health and safety, in particular, ensuring a safe and health-promoting work environment, avoiding accidents and injuries.

### Harassment

- Protection of employees against physical, sexual, psychological or verbal harassment or abuse.

### Freedom of conscience

- Protecting and guaranteeing the right to freedom of conscience and freedom of expression.

### Working conditions

KME adheres to the following core work standards:

#### ■ Child labor

Prohibition of child labor, i.e., the employment of persons under the age of 15, provided that local legal requirements do not provide for a higher age limit and provided that no exceptions are allowed.

#### ■ Forced labor

Prohibition of forced labor of any kind.

#### ■ Salary remuneration

Work rules relating to compensation, particularly with respect to the level of compensation as required by applicable laws and requirements.

#### ■ Employee rights

Respect the employee's rights to freedom of association, freedom of assembly and collective bargaining, to the extent legally permitted and possible in the respective country.

#### ■ Prohibition of discrimination

Treatment of all employees in a non-discriminatory manner.

### ■ Working hours

KME adheres to labor standards regarding maximum allowable work time.

### Environmental protection

- KME meets the requirements and standards for environmental protection and acts in an environmentally conscious manner. To take greater responsibility for natural resources, it adheres to Rio's Declaration principles.

### Civic engagement

- KME contributes to the social and economic development of the countries and regions in which it operates and promotes voluntary activities by its employees.



### No supply from war zones

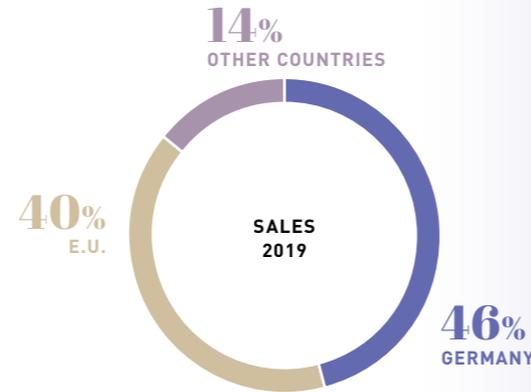
KME purchases materials only from approved and registered suppliers, and constantly inspects their work. **Does not purchase materials from mines located in regions of armed conflict.**

### Legality

KME fights **corruption** in all its forms by embracing the principle enshrined in the UN Convention: "No potential additional income of any amount can justify illegal business practices".

With regard to foreign countries where gifts may be offered as a form of courtesy, KME requires its employees to ensure that no dependence can develop on either the donor or the recipient, and that all applicable national and international regulations are complied with. The company also requires them to inform the project supervisor about gifts of any kind.

**FIG 2.7 Sales 2019**



## 2.6 Certifications

The management system of KME Mansfeld GmbH is certified according to the following standards:

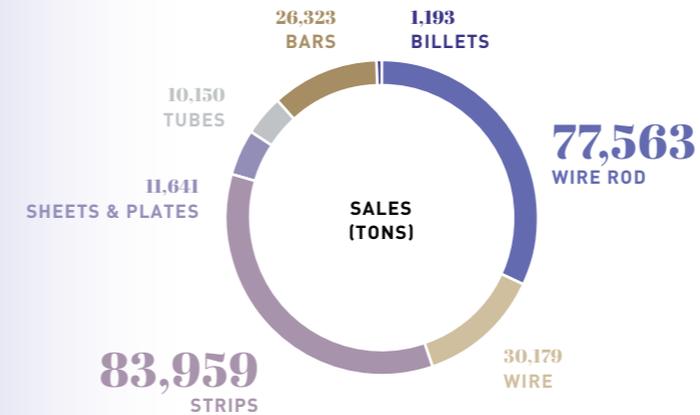
- DIN EN ISO 9001:2015 (Quality management)
- IATF 16949:2016 (Additional certification for automotive)
- DIN EN ISO 50001:2018 (Energy management)

In 2021 and 2022 we plan to achieve the certification to DIN EN ISO 14001:2015 (Environmental management) as well as DIN ISO 45001:2018 (Occupational health and safety management).

### Quality certification

The IATF 16949: 2016 certification system guarantees the quality of our products. Our customers' requirements are met through a consistently high level of quality, from the inquiry stage to the finished product, right through to delivery at the customer's premises. And, of course, we monitor the quality of our products during production and once completed. We use the latest testing equipment in manufacturing, chemical laboratory, mechanical materials testing, metallography and metal physics.

**FIG 2.8 Sales (tons)**



## 2.7 Sales

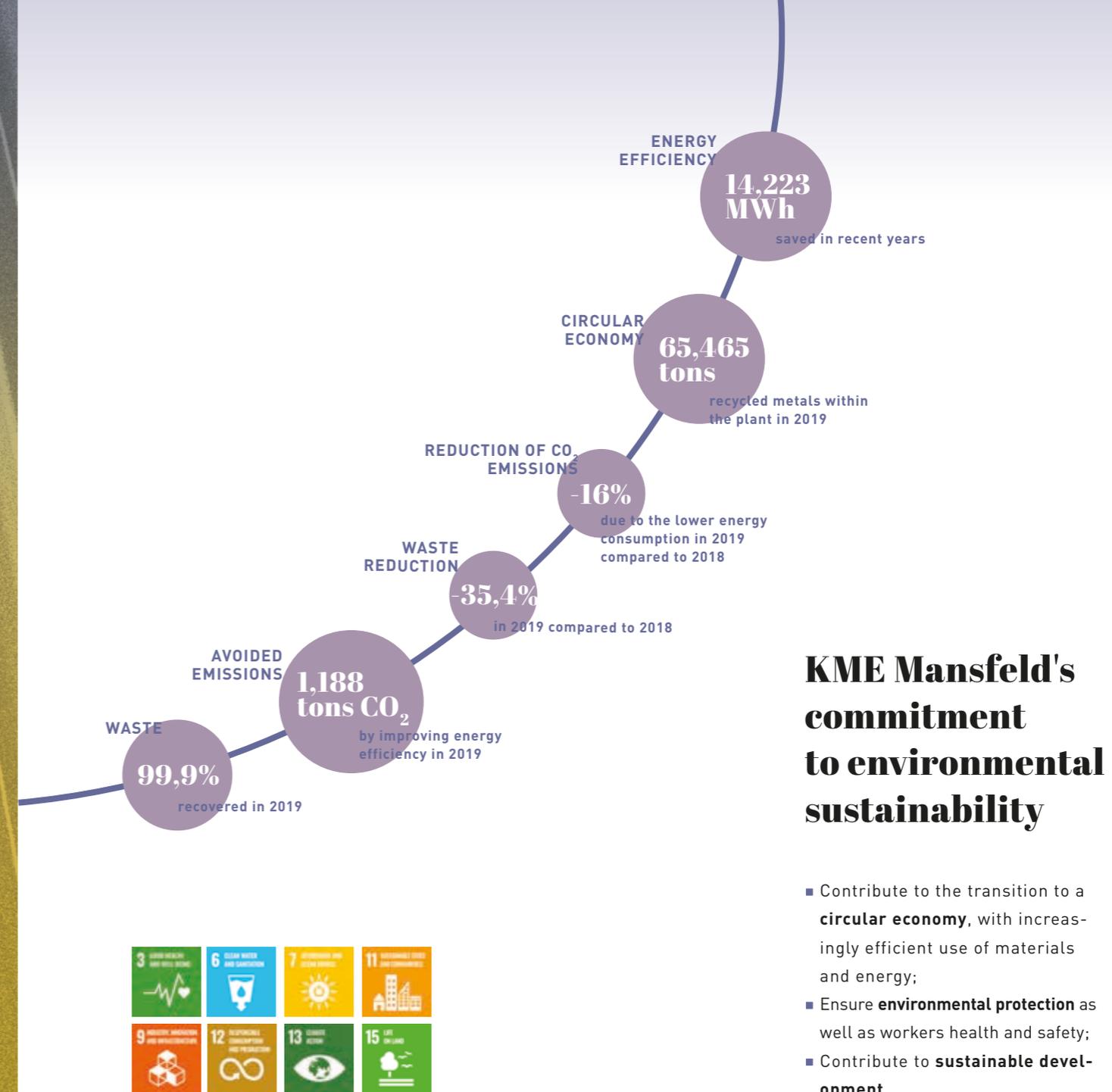
In 2019 sales amounted to 241,008 tons, of which:

- 45.64% in Germany
- 40.44% in other EU countries
- 13.92% in the rest of world

sales	2017	2018	2019
wire rod	95,334	101,644	77,563
wire	37,990	36,809	30,179
strips	85,727	89,474	83,959
sheets & plates	10,488	11,405	11,641
tubes	14,156	12,578	10,150
bars	25,914	27,542	26,323
billets	479	2,517	1,193
<b>Total</b>	<b>270,088</b>	<b>281,969</b>	<b>241,008</b>

# 3

## Environmental sustainability



### KME Mansfeld's commitment to environmental sustainability

- Contribute to the transition to a **circular economy**, with increasingly efficient use of materials and energy;
- Ensure **environmental protection** as well as workers health and safety;
- Contribute to **sustainable development**.

## 3.1 Environmental management system

As stated in the KME Group's Code of Conduct, protecting the environment is a priority for our business. The focus on environmental protection is also necessary because the main activities of KME Mansfeld GmbH have a major environmental aspect.

There are 5 assets in operation that require approval under German law. In addition, these assets are subject to the European Industrial Emissions Directive and are controlled by German authorities. The results of the inspections are made public. For years, these reports have confirmed that the

company is operating in compliance with the European law.

Because of the obligation to continuously improve the management system, we have decided to strive for an external certification according to DIN EN ISO 14001:2015. Starting in 2019, employees were trained in the basics of the environmental management system and a management team was installed to organize the transition to an integrated energy and environmental management system. The first procedural instructions were drawn up and the management manual revised. The aim is to achieve certification in 2021.

The installation of a certified management system includes the obligation of the top management to specify the energy and environmental policy and to have the necessary resources ready to activate procedures and processes that aim to bring about a continuous improvement in energy and environmental performance.

To this end, the energy and environmental performance is assessed, deficits identified and measures generated. Internal and external audits are carried out. Results will be reported to the management.



## Our commitment to high environmental standards

It is absolutely natural for us to maintain high environmental standards. The efficient use of resources makes ecological as well as economic sense. We aim to use resources as efficiently as possible and reduce the emissions and the waste we produce. We reduce our use of raw materials by recycling our own copper scraps and that of our business partners. We are working to minimize our use of fresh water by recycling wastewater from different production areas and reusing it. We are reducing our use of natural gas by using waste heat from our foundries and production systems, with the goal of protecting natural resources.

### ENVIRONMENTALLY FRIENDLY OPERATING SUPPLIES

We strive to purchase environmentally friendly operating supplies so as to reduce the amount of hazardous waste we generate. We fully inform our customers about our products, enabling them to use them in an environmentally friendly manner.

### REGULAR AUDIT OF KME MANSFELD AND ITS SUPPLIERS

We work closely with local authorities during the implementation of new regulations and legal permits. We regularly assess and evaluate our environmental behavior as part of our annual environmental report. We also expect our suppliers and contractors to exhibit similarly positive environmental behavior and monitor this through appropriate certifications. In accordance with the new European chemical regulations - REACH - we ensure that only registered substances (metals) are contained in our products.



CONTEXT

## European environmental standards for copper industry

Companies producing copper and semi-finished copper products operate in compliance with European Union environmental regulations. Environmental permits are regulated by the **Industrial Emissions Directive 2010/75/EU**, which requires the use of the best available technology and sets emission limits.

### AS PART OF THE REGULATIONS AFFECTING THE COPPER INDUSTRY, IT SHOULD ALSO BE NOTED THAT:

- Copper producers are partly affected by the **Emission Trading Scheme (ETS)** for the reduction of CO<sub>2</sub> emissions. Operators of large energy plants and energy-intensive industrial plants in Europe take part in the ETS. The ETS is an instrument of EU climate policy with the aim of reducing greenhouse gas emissions at the lowest possible economic cost by issuing a limited number of emission rights and then trading them on a market;
- All facilities are directly or indirectly affected by chemicals legislation, such as **REACH 1907/2006**.

### OTHER REGULATIONS RELEVANT TO COPPER PRODUCTS INCLUDE:

- **EU Water Directive;**
- **Regulation (EG) Nr. 1272/2008** for Classification, Labelling and Packaging is of more interest for all manufacturers and also for manufacturers of industry in the EU. The CLP regulation contains uniform requirements for the classification, labeling and packaging of chemical substances and mixtures.



DEEPENING

## “REACH” regulation

- REACH (“Registration, Evaluation, Authorisation and restriction of Chemicals”) is a European Union regulation to protect people and the environment from potential risks from **chemicals**, while strengthening the innovative and competitive capacity of the chemical industry in the European Union.
- **Manufacturers and importers of chemicals** must process the data and assess the potential risk. This information is communicated to ECHA. This is where the possibilities for **safe use of the material** are defined and the measures necessary for the user to manage the risks are communicated.
- **KME** supplies copper and copper alloy products in the form of hot-rolled and cold-rolled sheets and strips, as well as pressed and drawn tubes, sections and bars, perforated parts and special products such as casting dies. All materials or preparations contained in the products have been **registered or pre-registered by KME** or another party upstream in the **supply chain**.
- KME is a **downstream user of** substances that are contained in copper or copper alloy products. These substances are subject to the registration procedure as phase-in substances, the use of which in the production of copper and copper alloy products is considered for registration.
- As far as **semi-finished products** in copper and copper alloys are concerned, according to REACH regulations, these **products are not subject to the obligation** to draw up a safety data sheet. Nevertheless, KME provides its customers with product information documents by means of a **voluntary sheet**.

## 3.2 Energy



**Reducing energy consumption** is a very important objective for the copper industry. First of all from an environmental point of view, to contribute to the reduction of greenhouse gas emissions. But it is also important from an economic point of view to reduce production costs.

KME Mansfeld has therefore taken measures to increase energy efficiency and has an energy management system based on the international DIN EN ISO 50001 standard. The certification was issued by Lloyd's Register Deutschland GmbH, Cologne, Germany.



### KME Mansfeld energy efficiency to protect the climate

Copper is potentially climate friendly. According to calculations published by the Eco Institute in Freiburg, its **global warming potential** per kilogram of primary metal is 2 kg of CO<sub>2</sub> equivalent. In comparison, one kilogram of gold has a global warming potential of 18,000 kg of CO<sub>2</sub> equivalent. The cumulative energy consumption of gold per kg of primary metal is also 8,700 times that of copper. However, the energy expenditure in copper production is still high.

Because the energy used to obtain copper from recycled materials is up to 90% less than that required to obtain copper from ore, KME Mansfeld uses recycled copper in addition to copper from ore. And the company pays close attention to **energy conservation**, taking a wide range of measures to significantly increase its energy efficiency. KME Mansfeld has introduced an **energy management system** based on the international DIN EN ISO 50001 standard, which it applies consistently and successfully. We have already significantly improved the energy efficiency of our production by increasing the **percentage of recycled material** and integrating **heat recovery** into continuous manufacturing processes. In order to achieve lasting savings across the company, our energy management team regularly identifies other areas of potential and develops proposals on how to capitalize on them. Other important elements of the system include ongoing training and information for our employees.

FIG 3.1 Energy consumption (kWh eq.)

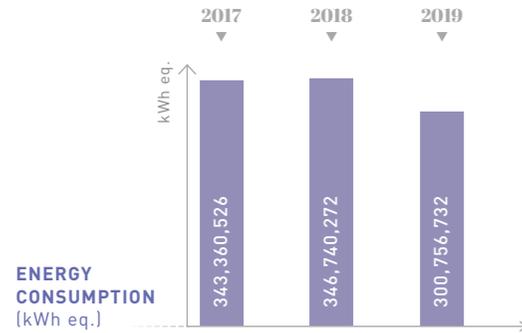


FIG 3.2 Energy consumption

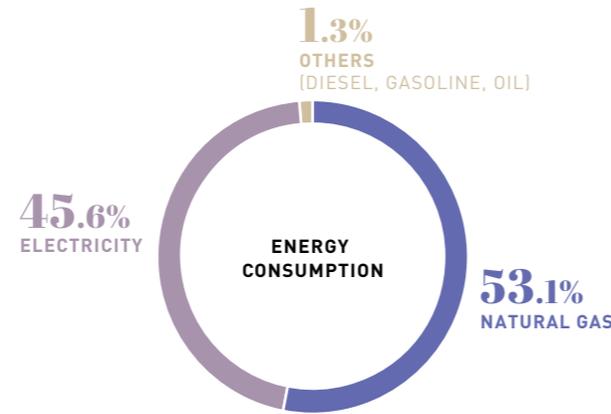


FIG 3.4 Specific energy consumption (kWh/ton)



### 3.2.1 Consumption

KME Mansfeld uses **natural gas** and electricity. It also uses limited quantities of diesel, gasoline and extra-light fuel oil.

In 2019, electricity consumption amounted to 137,333,502 kWh, while those of natural gas amounted to 159,628,047 kWh eq. Other consumption (diesel, gasoline, oil) amounted to 3,795,182 kWh eq

Overall, KME Mansfeld consumed **300,756,732 kWh eq.** in 2019. Compared to 2018 there was a reduction of 13.3%.

FIG 3.3 Energy consumption (kWh eq.)

ENERGY CONSUMPTION (kWh eq.)	YEAR 2019
NATURAL GAS	159,628,047
ELECTRICITY	137,333,502
GASOLINE	3,507,834
PETROL	237,768
EXTRA LIGHT FUEL OIL	49,580
<b>TOTAL</b>	<b>300,756,732</b>

### 3.2.2 Energy Intensity

However, the absolute value of consumption does not help to fully understand efficiency levels, because they obviously depend on the production volume.

The most significant figure for measuring efficiency is **energy intensity**, i.e. specific consumption per unit of product.

In 2019, **1,248 kWh eq** was consumed per ton of product. Compared to 2018 there was an increase of 1.5%, while in comparison to 2017 there was a decrease of 1.8%.

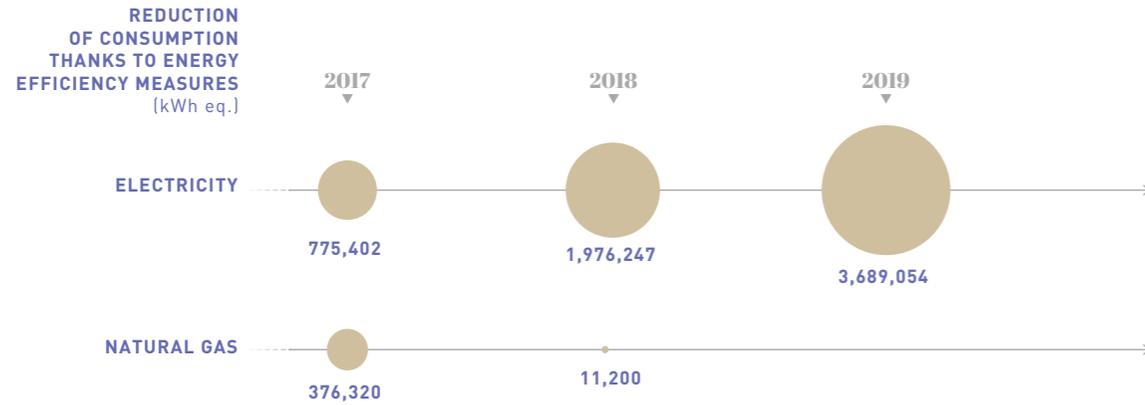


#### Methodological note

We operate a foundry for each production area (strip, sheets and plates, wire, bars and profiles) which converts copper cathodes and copper scrap into primary material for the subsequent production processes. Depending on the level and depth of production, these primary materials are refined in the subsequent processes to produce saleable semi-finished copper products. As part of the operating data acquisition and evaluations in the controlling and energy management area, the entire tonnages that are processed in our production facilities are recorded. These are simply added up for internal purposes.

Since, as described above, primary materials can run multiple times through different production facilities and production areas, depending on the production level and depth, the tonnage quantities are sometimes counted multiple times and their amount is 456,857 tons. The methodology used in this report, however, also for reasons of consistency with the other plants of the KME group, calculates the specific energy consumption as the ratio between energy consumption and the production output of the plant (241,008 tons)

FIG 3.5 Energy efficiency results



### 3.2.3 Energy efficiency measures

Some data highlight the results already achieved through energy efficiency measures and savings in the use of natural gas and electricity:

- In 2019, through measures related to electricity consumption, the savings were 3,689,054 kWh.
- Over the three-year period (2017-2019), interventions in natural gas and electricity use have avoided the consumption of 6,828,223 kWh eq.
- The energy savings achieved increases to 14,221,973 kWh when considering a 5-year period (2015-2019).

## 3.3 Materials



**Efficiency in the use of material resources** and the **use of recycled materials** are very important elements for the environmental sustainability of the industry. Those who produce copper and copper alloys, from this point of view, can leverage the fact that copper is a so-called "permanent" material, potentially infinitely recyclable.

KME Mansfeld uses copper scrap, mainly through scrap procurement. KME Mansfeld owns the permit to recycle **copper scrap**.

**253,976 tons** of materials were used in 2019.

The materials used are 95.7% **metals** (new metal, scrap and semi-finished).

FIG 3.6 Materials

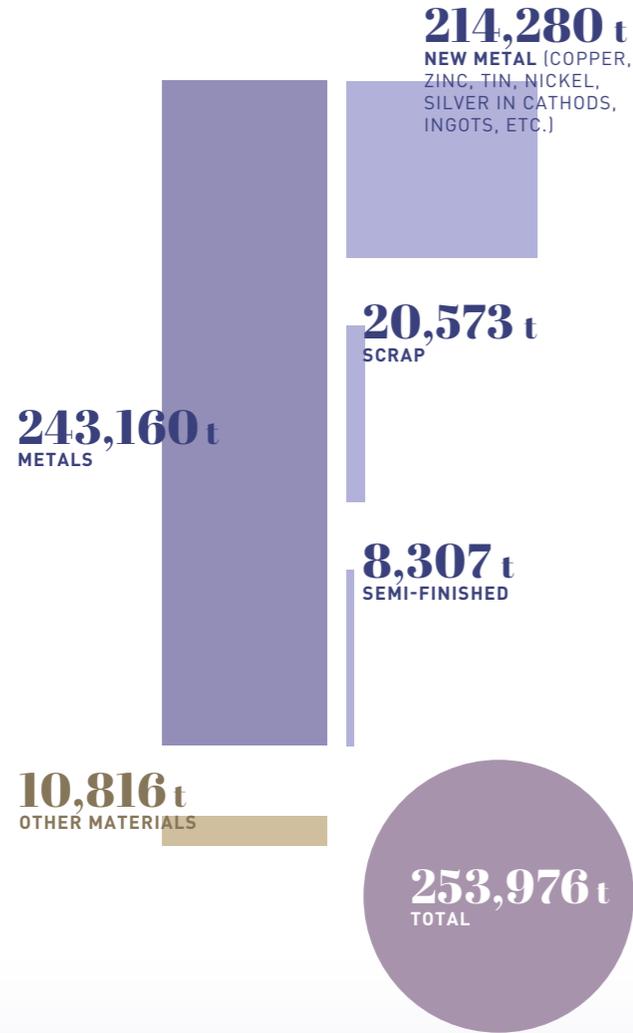
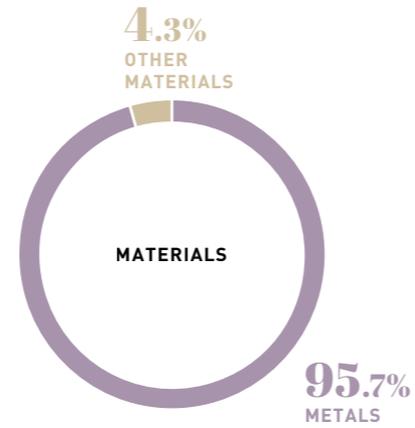


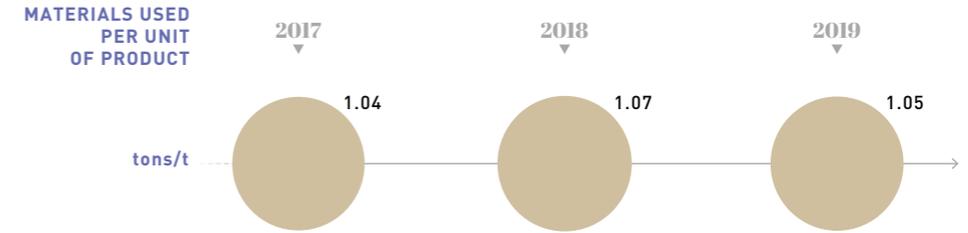
FIG 3.7 Materials



### 3.3.1 Materials used per unit of product

In 2019, for every ton of product sold, 1.05 tons of materials were used.

FIG 3.8 Materials used per unit of product



### 3.3.2 Renewable raw materials

6,090 tons of materials used in 2019 can be classified as **renewable raw materials**. These are wood packaging, pallets and paper packaging. Of the total materials used, they make up only 2.4%, but net of metals the percentage of renewable raw materials rises to **56.3%**.

FIG 3.9 Renewable raw materials

RENEWABLE RAW MATERIALS	YEAR 2017	YEAR 2018	YEAR 2019
TONS	2,952	12,245	6,090
PERCENTAGE OF TOTAL MATERIALS	1%	4%	2.4%
PERCENTAGE OF OTHER MATERIALS (NET OF METALS)	30.7%	66%	56.3%

FIG 3.10 Recycled materials (%)

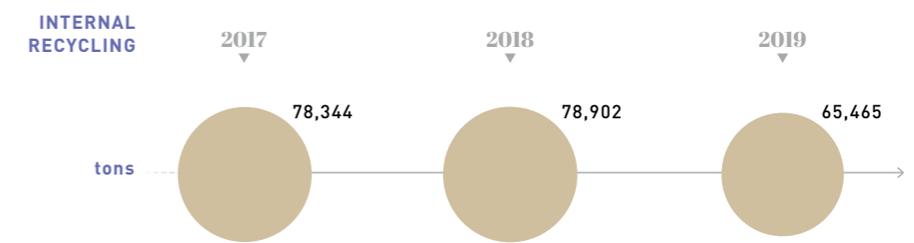


### 3.3.3 Recycled materials

In 2019, the plant used 20,573 tons of **scrap** from external recycling processes. Including the use of **re-cycled pallets** (605 tons), the total amount of materials from recycling is **21,178 tons**, corresponding to **8.34%** of materials used.

It should also be considered that a portion of the semi-finished products used, which cannot be quantified exactly, is also made up of recycled materials.

FIG 3.11 Internal recycling



### 3.3.4 Internal recycling

From the point of view of the principles of circular economy, the most significant figure is that of internal recycling at the plant. In fact, a relevant part of metals is reused through **internal recovery processes** at the plant. In 2019, **65,465 tons** were thus recovered and reintroduced into the production cycle.

Calculating also the quantity of metals re-introduced in the production cycle through internal recycling, in 2019, the tons of metals processed are 308,625 tons (metals from outside plus metals recycled inside the plant). In this sense, the percentage of total metals recycled (from external recycling and internal reuse) is 27,9% of metals processed.

## 3.4 Waste



### 3.4.1 Waste production

The amount of waste produced by the plant amounted to 4,773 tons in 2019. Compared to 2018, there is 35.4% reduction .

FIG 3.12 Waste production

WASTE (t)	2017	2018	2019
NON HAZARDOUS	3,379	5,600	3,080
HAZARDOUS	3,422	1,783	1,693
TOTAL	6,801	7,383	4,773

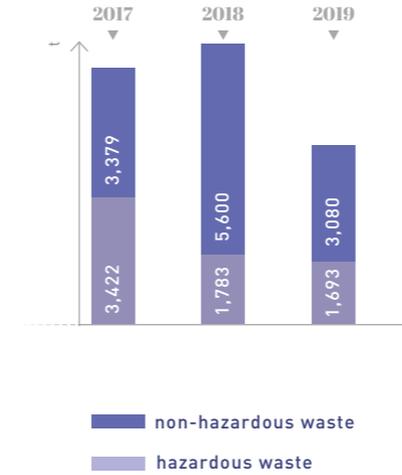


FIG 3.13 Waste (t)

### 3.4.2 Waste per unit of product

An important indicator is the amount of waste generated per unit of product. This indicator shows a significant **reduction over the three-year period**. In 2019 it is **19.8 kg** per ton per unit of product, while it was 26.2 kg/t in 2018. Compared to the previous year, the reduction is 24.4%.

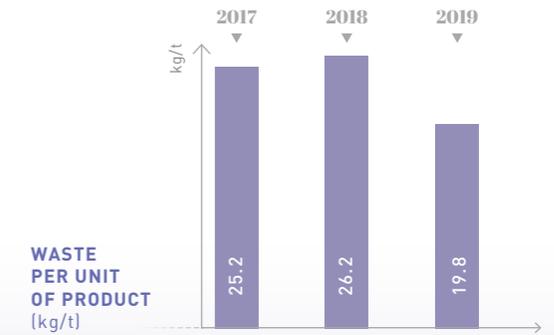


FIG 3.14 Waste per unit of product (kg/ton)

### 3.4.3 Waste Management

99.9% of the waste produced by the company is sent for recovery. Only 0.1% (7 tons) is disposed in landfills.

The company works to recycle as much waste as possible, especially production waste and packaging materials (wood and paper). Separate collection is organized in such a way as to allow maximum recycling of waste.

FIG 3.15 Waste management

HAZARDOUS WASTE	2017	2018	2019
RECOVERY (t)	3,156	1,776	1,686
DISPOSAL (t)	266	7	7

NON-HAZARDOUS WASTE	2017	2018	2019
RECOVERY (t)	2,163	5,600	3,080
DISPOSAL (t)	1,215	-	-

### 3.5 Greenhouse gas emissions



Reducing CO<sub>2</sub> and other greenhouse gas emissions, which are needed to combat global warming, is the most important global environmental challenge. Since 2013, copper-producing industries have been involved in the *Emission Trading Scheme* (ETS), the main tool adopted by the European Union to achieve CO<sub>2</sub> reduction targets in major industrial sectors.



#### Towards the "zero emissions" objective

The 2015 **Paris Agreement** on Climate Change, the United Nations Sustainable Development Goals, and the Intergovernmental Panel on Climate Change Special Report (October 2018) call for swift and decisive action to reduce greenhouse gas emissions and create a low-carbon, climate-resilient economy. The **European Union** has set ambitious targets for greenhouse gas emission reductions, renewable energy, and energy efficiency, with the goal of achieving a **net-zero greenhouse gas economy by 2050**.



DEEPENING

## How greenhouse gas emissions are calculated

The calculation of GHG emissions is based on the GHG reporting system, which classifies GHG emissions into:

- direct emissions\*;
- Indirect emissions\*\* from the production processes of purchased and consumed energy;
- other indirect emissions (e.g. from transport).

As information on the latter is not available, the calculation of emissions reported in this report concerns direct emissions and indirect emissions connected with the production of electricity purchased from the grid.

Direct emissions from the use of charcoal are also reported separately because they are biogenic emissions, i.e. of biological or organic origin.

The calculation of specific emissions [CO<sub>2</sub> eq. per unit of product] is made with reference to total emissions (direct and indirect)\*\*\* net of biogenic emissions.

*\*In the case of KME Mansfeld, these are emissions from natural gas, diesel, gasoline, oil, and purge gas. For the calculation of direct emissions, reference is made to the values reported by the company net of offsets from EU ETS CO<sub>2</sub> certificates.*

*\*\*The calculation of indirect emissions from electricity consumption is made with reference to the greenhouse gas emission factors of the national energy mix.*

*\*\*\* Source of the emission factors and GWP (Global Warming Potential): 1) Carbon Dioxide Emissions for the German Atmospheric Emission Reporting 1990 - 2018; 2) Carbon Dioxide Emissions factors for fossil fuels of German Federal Environment Agency*

## 3.5.1 Total emissions

Adding together direct emissions (from production at the factory) and indirect emissions (related to the production of purchased and consumed electricity), KME Mansfeld's **total emissions** in 2019 were **75,487 t CO<sub>2</sub> eq.**, a **reduction of 16 %** compared to 2018.

KME Mansfeld also uses **charcoal**, which produces **CO<sub>2</sub>** emissions that are classified as **biogenic emissions**, as they are of biological origin. In 2019, these emissions totalled **1,119 t**, a decrease from previous years (1,206 t in 2017 and 1,123 t in 2018).

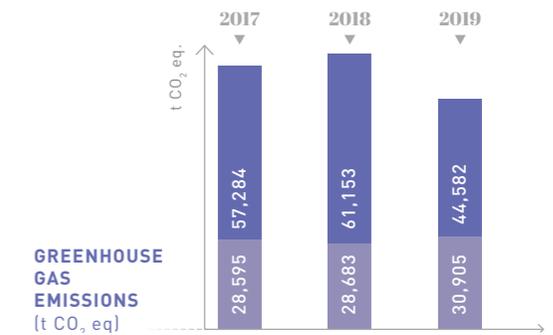


FIG 3.16 Greenhouse gas emissions (t CO<sub>2</sub> eq.)

FIG 3.17 Greenhouse gas emissions

GREENHOUSE GAS EMISSIONS CO <sub>2</sub> EQ. (t)	2017	2018	2019
DIRECT EMISSIONS	28,595	28,683	30,905
INDIRECT EMISSIONS	57,284	61,153	44,582
TOTAL	85,879	89,836	75,487

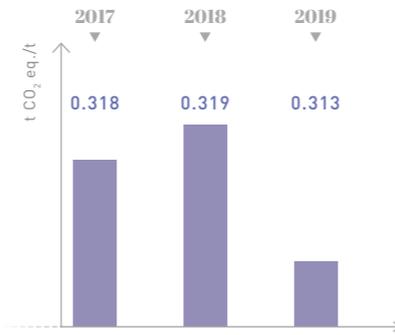


FIG 3.18 Specific emissions (t CO<sub>2</sub> eq./t products)

### 3.5.2 Specific emissions

**Emissions\* per unit of product** decreased compared to previous years. In fact, **0.313 t of CO<sub>2</sub> eq.** per unit of product was generated in 2019, while it was 0.318 t of CO<sub>2</sub> eq. in 2017 and 0.319 t of CO<sub>2</sub> eq. in 2018. The reduction compared to the previous year is 1.9%.

*\*direct and indirect emissions, net of biogenic emissions*

### 3.5.3 Avoided emissions

The measures taken to improve energy efficiency have significantly reduced greenhouse gas emissions. In 2019, **1,188 tons of CO<sub>2</sub> eq.** that would otherwise have been generated by the production of the necessary electricity were avoided.

Also through these interventions over the entire three-year period 2017-2019, **2,252 tons of CO<sub>2</sub> eq.** were avoided.

REDUCING EMISSIONS THROUGH ENERGY EFFICIENCY MEASURES	2017	2018	2019
<b>ELECTRICITY</b> t CO <sub>2</sub> eq.	<b>281</b>	<b>761</b>	<b>1,188</b>
<b>NATURAL GAS</b> t CO <sub>2</sub> eq.	<b>21</b>	<b>1</b>	<b>-</b>
<b>TOTAL t CO<sub>2</sub> eq.</b>	<b>302</b>	<b>762</b>	<b>1,188</b>

FIG 3.19 Reducing emissions through energy efficiency measures

## 3.6 Other emissions



### Air quality

Air quality is an important element for the environment and for human health. For this reason, increasingly stringent regulations have been introduced in recent decades to reduce emissions that cause air pollution.

The main sources of this pollution are the industrial, transport and heating sectors. The first two sectors have been subject to regulations in all industrialized countries since the 1970s. In particular, industrial plants were the first to be subject to limits on emissions and to the obligation to adopt technologies to reduce the production of pollutants or to abate them before they are released into the atmosphere.

### 3.6.1 Emissions

The emissions generated by the activities of the plant concern in particular **nitrogen oxides (NO<sub>x</sub>)**, **volatile organic compounds (VOC)** and **particulate matter (PM)**. In 2019, **NO<sub>x</sub>** emissions were 14,942 kg (-11.6% compared to 2018).

**VOC** emissions were 3,309 kg (up 66% from 2018) and **PM** emissions were 4,710 kg (down 20.4%).

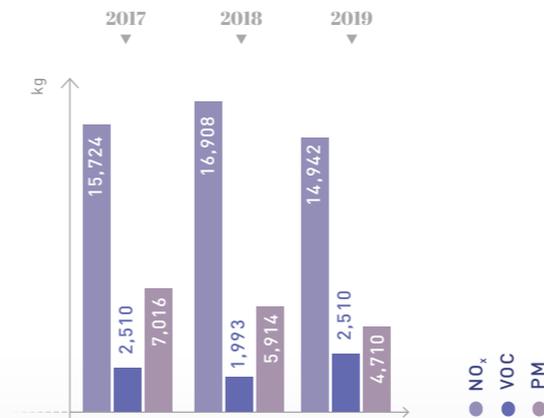


FIG 3.20 Emissions (kg)

### 3.6.2 Specific emissions

Data on specific **emissions**, i.e. the amount of emissions per unit of product, show an increase in specific emissions of NO<sub>x</sub> and VOC, while there is a reduction in PM.



FIG 3.21 Specific emissions (kg/Tonne)

## 3.7 Water

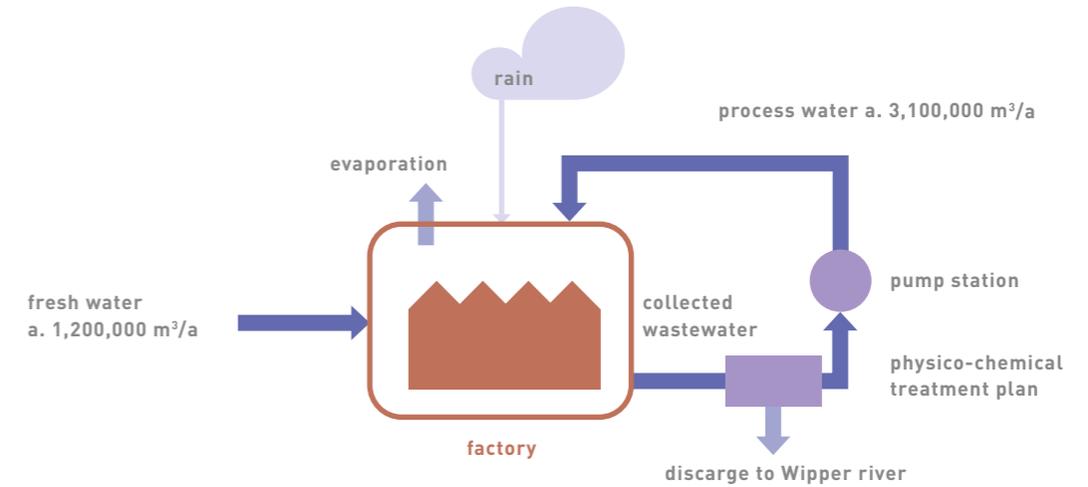


In 2019, KME Mansfeld **consumed 469,237 m<sup>3</sup> of water**. 1,123,499 m<sup>3</sup> water was withdrawn for internal processes (cleaning, steam generation, rinse water, emulsion, sanitary uses, to feed cooling towers, for direct cooling) from the ecosystem and 654,262 m<sup>3</sup> physico-chemical cleaned process water lead back to the ecosystem.

FIG 3.22 Water consumed (m<sup>3</sup>)

	2017	2018	2019
<b>WATER WITHDRAWAL</b>	<b>1,388,292</b>	<b>1,175,972</b>	<b>1,123,499</b>
- thereof rainwater	378,000	216,000	285,000
- thereof groundwater	1,000	1,000	1,000
- thereof fresh water	1,009,292	958,972	837,499
<b>WATER DISCHARGE INTO WIPPER RIVER</b>	<b>816,052</b>	<b>702,812</b>	<b>654,262</b>
<b>WATER CONSUMPTION</b>	<b>572,240</b>	<b>473,160</b>	<b>469,237</b>

FIG 3.23 Wastewater management KME Mansfeld



### 3.7.1 Recycling

The water-system of our plant is a big water circuit with one outlet (discharge of cleaned wastewater to the Wipper river). All water-input (fresh water, water from third parties, rainwater, groundwater) is collected and transported as a mixture via water pipes. After usage it is processed in the central water treatment plant (so called ZBA). Here we clean the water from copper, nickel and other metals, oil and dirt. Afterwards the cleaned water is divided into 2 streams: one stream is

recurrent discharged to the Wipper river, the other one flows continuously to the pumping station and back to the factory (process water piping). Fresh water is added via separate piping from outside.

This virtuous system of recycling, involving about 3,100,000 m<sup>3</sup>/year, therefore avoids the withdrawal of significant volumes of water.

### 3.7.2 Specific consumption

For every ton of products in 2019, 1.95 m<sup>3</sup> water was consumed.

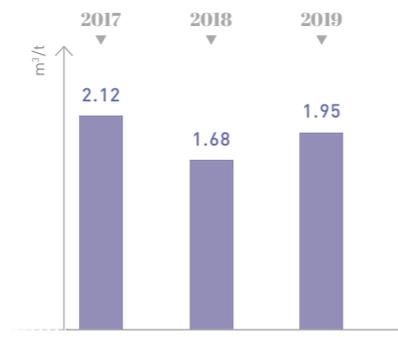


FIG 3.24 Specific consumption (m<sup>3</sup>/t)

### 3.8 Purification and water discharges



The water used in the plant is discharged into the Wipper river after **purification** through chemical and physical treatment. Wastewater is managed using the best available techniques.

The values of pollutants in the wastewater are well **within the limits** specified in the permit. With regard to **copper**, compared to

an authorized limit of 0.5 mg/l, the plant releases water with concentrations not exceeding 0.28 mg/l. The same is true for **nickel**: the limit is 0.5 mg/l, while discharged water reaches a maximum concentration of 0.13 mg/l.

FIG 3.25 Discharges water (m<sup>3</sup>)

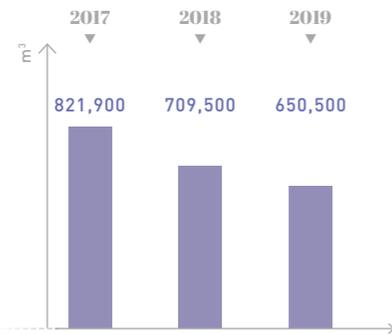


FIG 3.26 Copper and nickel in discharges water

DISCHARGES WATER	LIMITS TO BE RESPECTED	2017	2018	2019
COPPER (mg/l)	< 0.5	MAX 0.14	MAX 0.32	MAX 0.28
NICKEL (mg/l)	< 0.5	MAX 0.1	MAX 0.17	MAX 0.13

## 3.9 Biodiversity

There are no protected areas or areas of high biodiversity within or adjacent to the operational site.

The only species classified as "vulnerable", among those listed in the IUCN red list and in the national lists that find their habitat in the area of operation of the plant, is the *oedipod caerulescens*.

The impact of the copper fed into the Wipper river is being examined.

# 4

## Social sustainability

### 4.1

## Social responsibility

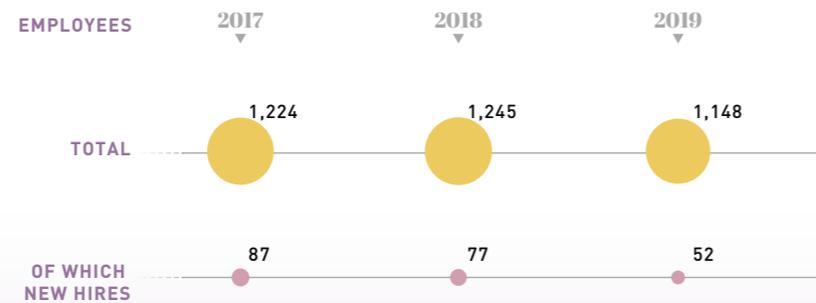
- The company, also thanks to its long history, has a strong relationship with the local community of the area in which it operates and with its stakeholders. Its presence has generated economic and employment benefits over time, and it is an integral part of the social and cultural fabric. KME Mansfeld is aware of its social and environmental responsibility towards the local area, its employees and the local community.
- KME Mansfeld is one of the largest employers in Saxony-Anhalt with over a thousand employees. The company works to ensure respect for workers' rights, their health and safety, and professional development. As stated in the KME Group's code of conduct, the company considers the protection of workers' health and safety a top priority. KME Mansfeld is one of the recognized training facilities in Saxony-Anhalt, with activities aimed at both its own apprentices and people from partner companies.
- KME Mansfeld maintains an open and collaborative relationship with local communities and the state of Saxony-Anhalt. It develops initiatives for the local area, from training to social support for people in need, and encourages employees to engage in volunteer work.

## 4.2 Employees



As of December 31, 2019, KME Mansfeld had **1,148 employees**. During the year, 52 new employees were hired.

FIG 4.1 Employees



### 4.2.1 Employee structure and duties

- 854 workers;
- 241 employees;
- 46 executives (management level 2);
- 7 executives (management level 1).

FIG 4.2 Employee structure

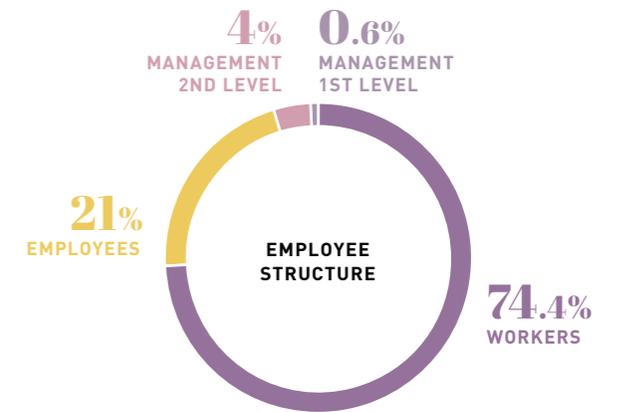
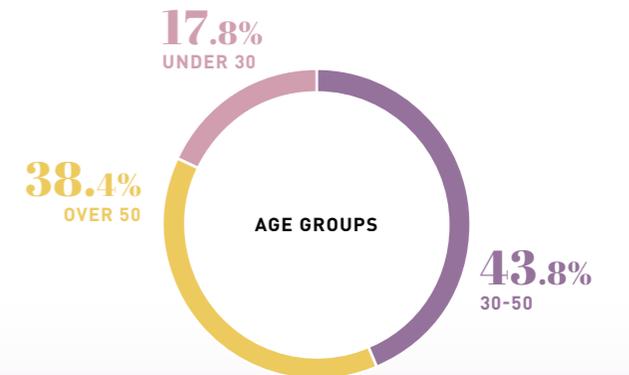


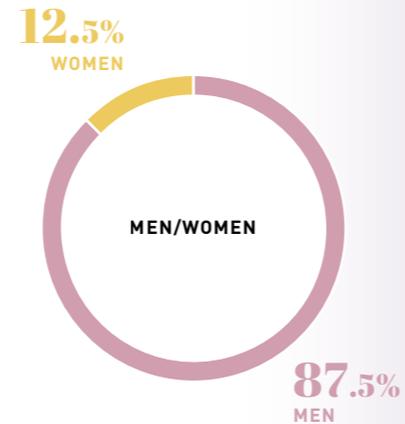
FIG 4.3 Age groups



### 4.2.2 Age groups

- 204 employees (17.8%) are under the age of 30;
- 503 employees (43.8%) are between the ages of 30 and 50;
- 441 employees (38.4%) are over 50.

FIG 4.4 Men/women



## 4.3 Equal opportunities



As of December 31, 2019, 1,005 men (87.5%) and 143 women (12.5%) worked at the company.

- The 7 top-level executives are all men;
- Of 46 second-level managers, there are 5 women (10.9%);
- Among the 241 employees there are 99 women (41.1%);
- Among the 854 workers, there are 39 women (4.6%).

No incidents of discrimination were detected or reported during the period examined.

According to the metal industry collective tariff agreement, there is no difference in payment between men and women. Within the pay group, the basic salary is the same for all employees, regardless of gender.

During the year 39 employees (27 men and 12 women) took parental leave, as provided for by law and the collective labor agreement.

## 4.4 Occupational health and safety



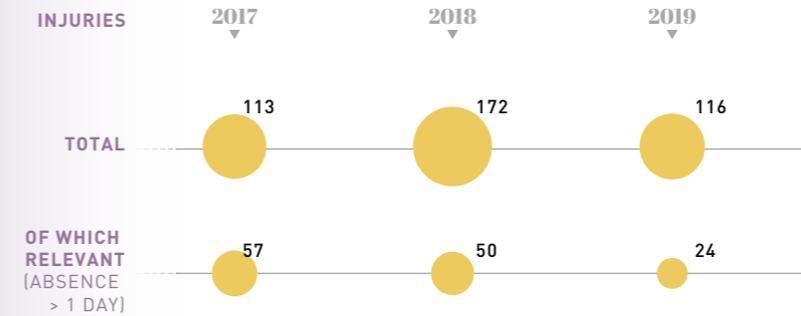
Worker health and safety are key priorities. The main goal is to prevent accidents, work-related illnesses, and inappropriate physical and mental exertion.

■ **Workplace health and safety** is an essential aspect of business management:

- The company monitors whether goals are being met and is committed to ensuring that each staff member is able to act with health and safety awareness.
- An occupational health and safety committee operates in the company with management, the works council, production managers, employee representatives, the company doctor and occupational safety officers.

- The company's occupational health and safety objectives are measurable and are evaluated through regular audits, inspections and management reviews.
- A company medical service conducts weekly on-site consultations. Pre-employment examinations are provided for new employees, including verification of health fitness for work and regular occupational health examinations for employees.
- The company promotes safety training courses for staff.
- KME Mansfeld GmbH is subject to the regulations of the **German Occupational Health and Safety Act**.
- A number of **health and safety agreements**, local or more general, have been signed with labor organizations:
  - 03/2009 General provisions on noise protection;
  - 03/2010 Prevention and occupational health care;
  - 02/2013 Non-smoking protection in the workplace;
  - 07/2015 Occupational health and safety (framework agreement);
  - 01/2019 Bonus for occupational safety.
- Compliance with safety regulations is also required for **partner companies** and third parties. KME Mansfeld takes this into account when choosing to collaborate with other companies.

FIG 4.5 Injuries



### 4.4.1 Accidents

There were 116 injuries during 2019, a 32.6% decrease from the previous year. There were 24 major injuries that resulted in absences of more than one day, half the number in 2018.

Other indicators also show an improvement in occupational health and safety conditions. In 2019, the plant recorded:

- an **Injury Rate** (Injury Rate, according to *Occupational Safety and Health Administration (OSHA)* parameters; each 200,000 working hours) of 0.00 for women and 3.11 for men;

FIG 4.6 Injury rate

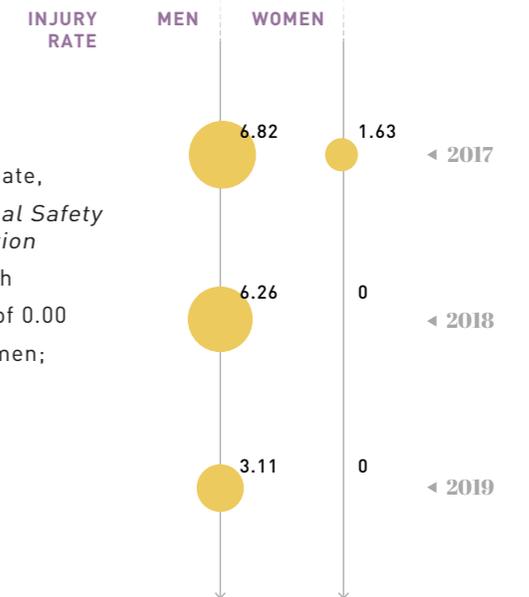
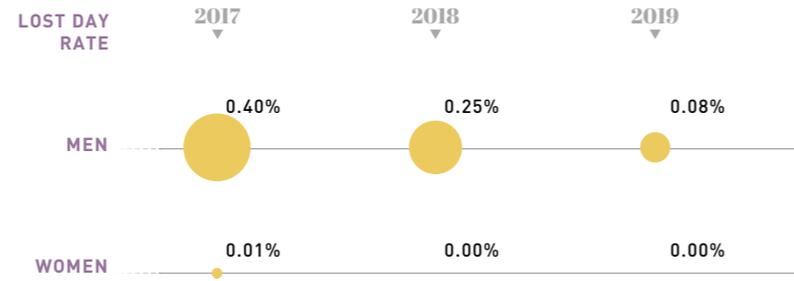
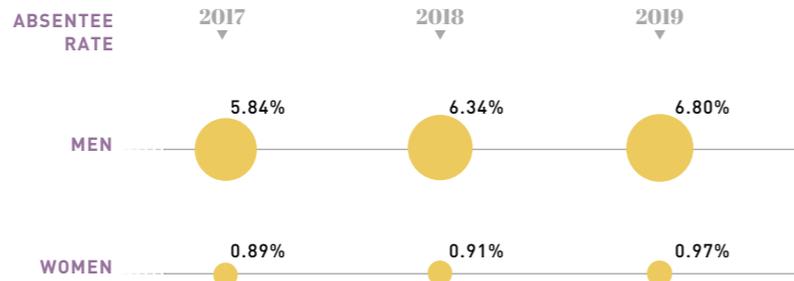


FIG 4.7 Lost day rate



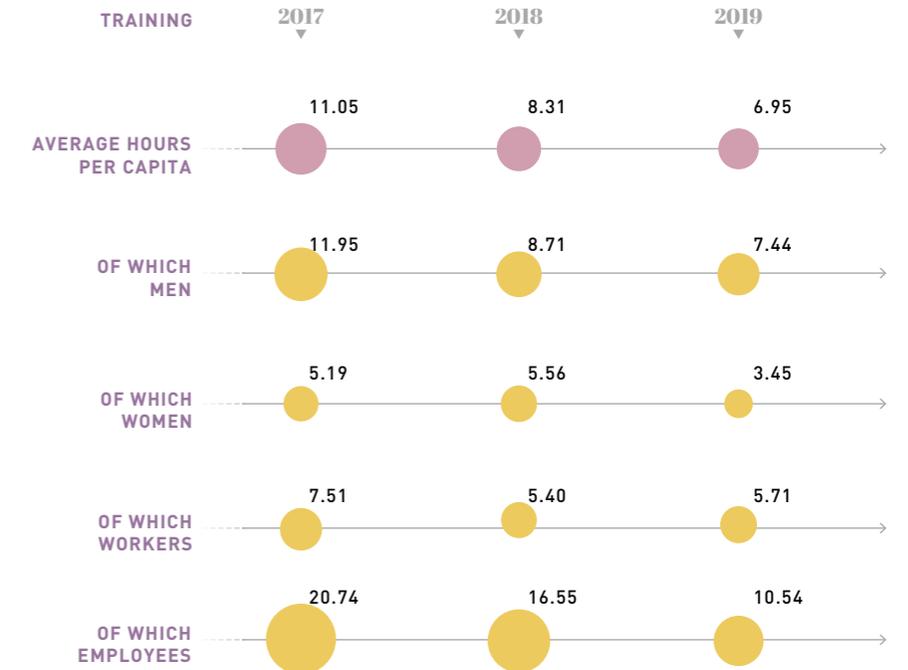
■ a **Lost Day Rate** (Lost Day Rate: ratio of days not worked due to injury to hours worked in the year) of 0.00% for women and 0.08% for men;

FIG 4.8 Absentee rate



■ an **Absentee Rate** (Absentee Rate: the number of days of absence due to illness, strike, injury over the number of days worked in the same period), equal to 0.97% for women and 6.80% for men.

FIG 4.9 Training



## 4.5 Training

In 2019, hours dedicated to training averaged 6.95 per employee. Training activities are specifically aimed at growing professional skills and safety in the workplace.





KME Mansfeld is one of the recognized apprentice training institutions in Saxony-Anhalt. We are currently training 82 young people, 61 of whom are our apprentices, the other 21 are training specialists from partner companies.

## 4.6 Suppliers

The company's procurement model is based on transparent processes and precise criteria, in accordance with the KME Group's compliance regulations, to ensure ethical and legal standards.



## Sustainability of business processes

KME is committed to pursuing a sustainable strategy in the organization of its business processes, in particular with regard to

- Transparent customer orientation during product and process design
- Observance of a corporate code of conduct
- A healthy and safe working environment for employees and contractors
- Continuous risk assessment
- Adherence to current regulations
- Implementation of best available techniques and procedures for continuous process improvement
- Developing preventive strategies to reduce environmental impacts
- Efficient use of materials and energy in the manufacture and supply of products
- Manufacture of products with safety, energy efficiency and recyclability requirements

The corporate guidelines define binding standards for all companies operating within the KME Group. In the choice of suppliers, criteria are adopted that qualify the potential partner on an organizational, environmental and social level. For the supply of all products or services, preference is given to environmental management system certifications (ISO 14001 or EMAS), safety management system certifications (BS OHSAS 18001), quality system certifications (ISO 9001). When it comes to sourcing raw materials, KME does not use any cathodes/metal from regions with armed conflicts. Due to the complex supply chain and the many processes involved in metal transformation, KME

## 4.7 Relations with the local community

- aware that it is not possible in every case to fully trace the materials acquired, especially with regard to recycled materials

- when selecting new suppliers considers participation in EICC-GesiConflict-Free (an initiative of the Electronic Industry Citizenship Coalition and Global e-Sustainability) an essential requirement. The quality management system ensures continuous monitoring of supplier requirements.



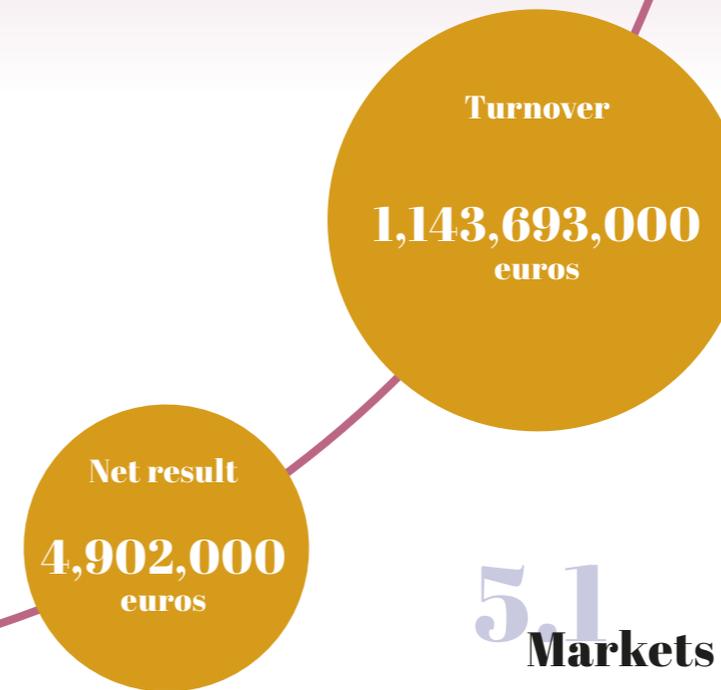
For centuries, the region „Mansfelder Land“ was shaped by a proud history of copper mining and fabrication. Our employees rely on the economic success of KME Mansfeld GmbH, as the cities of Hettstedt and Mansfeld prosper with us. In the aftermath of the re-union of East- and West Germany, most of the old industry was closed down and many inhabitants of our region lost their jobs. During this phase, KME Mansfeld GmbH proved to be a reliable employer and today

ranges in the top 5 biggest companies of the state of Saxony-Anhalt. The long lasting mining and industrial activities leaved its scars in the landscape. The environmental impact of our plant has been reduced significantly over the years. This effort will be continued and we will prioritize future investments together with our neighbours and the authorities.

- financial support of local organisations and youth facilities
- participation in public events (company runs, Girls & Boys Days, vocational training fairs...)
- Cooperation with the local universities (scholarships, supervision of bachelor and master theses, practical training)
- Fundraising for local social projects
- Stem cell typing campaign
- Commissioning of a new biological treatment plant to improve the water quality of the local Wipper river
- Construction of a noise barrier to reduce noise emissions towards the direct residents

# 5 Economic sustainability

FIG 5.1 Turnover and sales



## 5.1 Markets and strategies

Demand for copper and copper alloy products is closely linked to the general trend of economic activity in the various reference markets. In addition to the uncertainties regarding the global economy, which is already influenced by geopolitical tensions and the spread of protectionist policies, at this stage the economic crisis caused by the COVID-19 pandemic is also being felt.



### MARKET TRENDS

In 2019, prior to the impacts of the pandemic on the European and global economies, trends in demand for semi-finished copper and copper alloy products for the industrial sector had confirmed signs of stability, albeit to varying degrees across segments. However, there were signs of a negative trend in all applications indirectly related to the automotive sector, due to uncertainties over the fine-tuning of technological standards and prolonged destocking activity throughout the sector's value chain, including the electronics sector which is more stable in traditional segments and has interesting long-term growth prospects in developments in electro mobility and digitalization.

## 5.1.1 KME Group strategies

The difficult macroeconomic scenario of recent years has led the copper business units of KME Group to strengthen operational efficiency and organizational flexibility and to rationalize the business portfolio, with the aim of concentrating resources on a series of companies and markets with high added value and greater growth potential.

This led to a clear strategic focus and the launch of an investment package in Germany for the expansion of alloy strip products with higher added value and aimed at applications in e-mobility and digitization, amid strong demand for connector elements. The project was finalized in the last quarter of 2019. Production successfully started in January 2020.

As part of a strategic plan to reduce complexity and focus its product portfolio on long-term sustainable growth and margin development, the KME Group has decided to implement the "Forerunner" integration program during 2019, aimed at specializing copper production sites according to the strengths of individual production facilities and promoting the best utilization of its production units.

## Strategic transactions completed by KME in 2019

### ■ ACQUISITION OF MKM (Mansfelder Kupfer und Messing GmbH)

On February 28, KME SE executed the agreement to purchase Copper 1909 Group, which MKM is part of, thus becoming its owner. MKM employs around 1,100 workers with a turnover of around €1.1 billion. The acquisition of MKM strengthens KME's role in the copper laminates sector, making it one of the world's leading companies.

### ■ DIVESTMENT OF THE BRASS BARS AND TUBES BUSINESS

On 31 March, the agreement to sell the brass tubes and bars business was executed. This further strengthens KME's product portfolio in the "core business" divisions of "Special Products" and "Copper Products", reducing the complexity of KME's industrial and commercial structure. The overall perimeter of the operation involves approximately 1,100 workers.

### ■ REPURCHASE OF THE ENTIRE SHAREHOLDING IN TRÉFIMÉTAUX SAS

On July 9, an agreement was finalized between KME SE and ECT- European Copper Tubes Ltd for the purchase of a 49% stake in Tréfimétaux SAS (TMX) by KME SE, which thus returned to holding 100% of that company. Tréfimétaux SAS is a French company that produces copper tubes and bars at its Givet and Niederbruck plants, respectively, and controls Serravalle Copper Tubes Srl, an Italian company operating in the copper tubes business with its own plant located in Serravalle Scrivia. The consolidated annual sales of the above perimeter as of December 31, 2018 were approximately 220 million euros with the employment of approximately 560 workers.

### ■ JOINT VENTURE KMD

Regarding the strategy of focusing on markets with higher growth potential, the Chinese joint venture KMD, which is set to establish a new production plant in Xing Xiang, China, achieved the process launch in the first half of the year.

## 5.1.2 Opportunities

Copper is the most traded and most used industrial metal of the world and a further increasing demand for copper is forecasted. As regards the copper market, KME Group sees a large potential following the progressing digitalisation and worldwide networking, the electro mobility and the expansion of the renewable energies.

With the implementation of the new mobile phone standard 5G, significant infrastructural expansions are required, which will positively affect the copper component need.

Hybrid and electro vehicles own a copper content, which is two to four times higher than conventional vehicles and also the necessary investments in the loading and network infrastructure require more copper. According to Fraunhofer Institut, the electro mobility will determine more than 20% of the share of copper by the year 2050.

The offshore- and onshore as well as the photovoltaic plants have a copper content that is up to nine times higher compared to conventional production. Consequently, we can derive an increase of demand for the upcoming years.

The global wind energy industries revenue for equipment like generators, wiring etc. is projected to grow significantly until 2023. It should be noted, that the generation of electricity through solar or wind power uses about three times the amount of copper than the conventional production of electricity.

One of the most significant global trends is reflected in KME's most important market, amongst others the electrification of drive trains in e-mobility. Motorisation and automation continue to progress, and the development of new efficiency standards are leading to an increase in demand of copper. Furthermore, the Smart Home/Electro Technology area gains further importance.

## 5.1.3 Outlook

It remains to be seen how the "Brexit" will affect the markets. Furthermore, the impacts of escalating global trade conflicts are not foreseeable. The substitution of copper with other materials such as aluminum is increasing with rising raw material prices. But the growth in e-mobility opens up new opportunities for the use of copper products. This means that the challenge will be to meet the strict requirements of the automotive industry.

Despite the lasting growth of copper demand, based on the expansion of infrastructures in countries such as China and India as well as the worldwide trend towards clean energies, it is assumed that the slow-down of the global economic growth will negatively affect the growth of copper use.

Furthermore there are risks arising from the trade policy development on the global market as well as risks that may arise from the "Corona crisis".

## 5.1.4 Objectives

The integration into KME Group aims to strengthen the performance of the company by means of the use of synergies. The future strategy will be directed to differentiate each of the relevant facilities by means of their specific production strengths.

The merger of former MKM and KME does not only offer material advantages for the Hettstedt site, but also for the market of semi-finished copper products and thus in particular for our customers. With focused facilities within a strong production affiliation, bundled research and development competence as well as a worldwide presence in all markets, a strong corporate group has established, which play a leading role in the international competition.

In addition to the production of wire, wire rod and extruded products (bars and profiles), the rolled products segment for industrial applications from pure copper qualities will be concentrated in Hettstedt/Germany. The market position will be additionally improved by further automation and improvement in productivity and higher competitiveness of standard products. Improvement projects in the area of process optimisation and product development for customers with support of research and development are an important key to success.

Based on the demographic change, the creation of an attractive working environment in order to acquire highly qualified employees is a material prerequisite to achieve our objectives.

## 5.2 Economic results



In 2019, KME Mansfeld's turnover amounted to € 1,143,693,000, a decrease of 11.9% compared to the previous year.



Turnover net of the cost of raw materials is 165,251,000 euros. There was a decrease of 7.5% compared to 2018, while compared to 2017 there was an increase of 13.1%.

The net result is 4,902,000 euros, up from previous years.

Shareholders' equity is 125,891,000 euros.

FIG 5.2 Turnover (euro/000)



FIG 5.3 Net results (euro/000)



## 5.3 Distributed economic value



The indicator that best highlights the ability of a company to produce value is represented by the added value, which allows to measure both the economic performance of management and the ability to create the conditions for the wealth produced to be distributed to the stakeholders. It therefore represents the ability of a company to produce wealth and then distribute it, and is therefore the point of union between the annual report and the sustainability report. The reclassification of the economic balance sheet makes it possible to highlight the economic value distributed among the main stakeholders (staff, shareholders, public authorities, lenders) or retained by the company.



The share of economic value distributed to human capital is the predominant one. In 2019, it amounted to 63,874,000 euros, and corresponds to 72.3% of the total distributed value. Of this, 53,568,000 euros were distributed to employees as direct remuneration and 10,306,000 euros as indirect remuneration.

The remuneration to financial capital, in terms of interest to loan capital, was 5,854,000 euros (6.6% of the distributed value).

The value distributed to public administration was 3,592,000 (4.1% of the value distributed).

No dividends were allocated to shareholders.

The value retained by the company for depreciation was 15,047,000 euros (excl. 1,174,000 euros extraordinary depreciation) (17% of the value distributed).

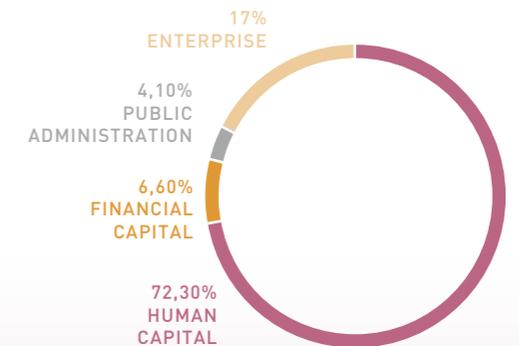


FIG 5.4 Distributed economic value

## 5.4 Investments



The economic value of investments in 2019 is 10,032,225 euros.



The implemented investments were both replacement investments, investments to increase the production depth as well as productivity.

Significant investments to increase efficiency were made in the area of sheet and plate production (wide reversing mill), in the area of strip with an automatic packing line as well as in the area of wire (16x multi-wire system).

Furthermore, capital investments were made in the renewal of the technical infrastructure (compressors, central pneumatic station, electronic energy data recording etc.) as well as in the modernisation of the testing equipment of the laboratory.

Economic value of investments in 2019 aimed in particular at environmental protection and ecological innovation:

- 70,000 euros ..... Noise protection wall in front of the Conti-M® filter system
- 208,500 euros ..... Electronic energy data recording system
- 56,600 euros ..... Cooler hood including a dust extraction system for an ASARCO shaft melting furnace
- 65,400 euros ..... Modernization of air conditioning systems
- 11,500 euros ..... Roll-off container for waste
- 11,700 euros ..... Installation of high-speed doors
- 7,600 euros ..... Collecting trays for containers and barrels
- 21,000 euros ..... Clean gas measurement
- 30,900 euros ..... Renewal of exhaust air filter cartridges
- 89,000 euros ..... High pressure descaling system on wide reversing mill

# 5.5 Research and development



## Our commitment to innovation

The name of the street on which our headquarter is located - Lichtlöcherberg - reveals something about our origins. The narrow, often oval shafts that supplied miners with fresh air underground are called Lichtlöcher - holes of light. They may not have actually provided light, but they did provide oxygen. And fresh air was also needed for underground lighting, which was not electric in the beginning.

Fresh air is also an appropriate term for what we usually call research and development. In other words: replacing the old with the new, bringing freshness into something so we can dig deeper. Copper and its alloys are prehistoric metals. You'd be forgiven for thinking there's nothing left to discover about them. But there is. Working with our employees and partners, we are committed to creating pioneering solutions for the future, particularly in the areas of electro mobility and energy.

For research activities, there is coordination at the KME Group level to avoid overlapping projects between all research departments (Fornaci di Barga, Hettstedt and Osnabrück) and to optimize the use of expertise.

Activities are application and process oriented, and are conducted in close collaboration with all production units, as well as with universities and other research centers.



## Research and development activities in the KME Group

- Research and development activities are of fundamental importance to KME in order to guarantee innovation, efficiency and quality. Research is aimed in particular at developing innovative materials, but also at innovating production processes and applications of copper and copper alloy products. With 49 registered patents and 64 trademarks, research and development activities have top priority for KME.
- KME's laboratories are equipped and certified in accordance with ISO 9001:2015 and IATF 16949:2016. It is here that qualified teams of scientists and engineers address the issues concerning the added value of copper, from the raw material to the realization of alloys up to semi-finished copper products and finished products. In the test benches it is possible to carry out the realization of alloys and casting techniques with in-depth scientific expertise. Experimental and test castings provide fast and effective results. It is possible to carry out all the necessary tests and analyses: material analysis, corrosion research, material tests (to determine mechanical and physical properties), chemical analysis.
- KME manages cooperation projects with companies, universities and research centers around the world and actively supports national and international research projects. It also participates in product and process standardization and is committed to support training.

### A TEAM OF 83 RESEARCHERS AND DEVELOPERS IS WORKING ON:

- Material treatment and recycling (tin and copper scrap separation)
- Metallurgy and casting technology (improvement of conductivity and corrosion resistance)
- Manufacturing technology (energy efficiency and process redesign)
- Numerical simulation (design simulation and geometric design based on customer's manufacturing process)
- Materials science (basic research and development on replacement trends and application of materials such as 3D metal design)
- Surface technology (coating improvements for extreme temperature conditions and high casting speed)
- Material testing (100% traceability and continuous quality improvement)
- Applications engineering (research of new application fields for copper and brass alloys)
- Industry 4.0 and digital development
- 3D printing for copper parts

### 5.5.1 Projects

Research and development are essential elements at KME Mansfeld GmbH for maintaining the competitive capacity of the company and achieving competitive advantages based on the corporate strategy. All research and development activities are carried out with the objective to further develop the products to the benefit of our customers and to optimise our production processes under taking into account sustainability, environmental protection, conservation of resources and energy efficiency.

The development projects of KME Mansfeld GmbH that are assigned to the production areas primarily relate to application-orientated research and engineering technology development and notably concentrate on aspects of increasing the performance, on the process optimisation as well as also on focuses concerning the technology development.

### 5.5.2 Main projects

- Optimisation of the continuous rotary extrusion technology (CRE);
- Process optimisations of Conti-M®;
- Development of a low-turbulence casting system based on the immersion pipe technology for Contirod®;
- Optimisation of the Contirod® roll shapes to reduce roll configurations and to minimize scale formation on the cast-rolled wire surface;
- Production of micro alloyed materials with the focus on processing;
- Process concept for the chemical sharpening of special bars;
- Use of diffusion-inhibiting layers to minimize scale formation at the traditional extrusion;
- Additive manufacturing of high-performance cooling elements for automotive applications;
- Optimisations in production of special bars with complex geometry;
- Implementation of high-pressure descaling system on the casting line Contirod®.

### 5.5.3 Projects to improve energy efficiency

The hall lighting of KME Mansfeld GmbH has been converted to LED. The conversion was carried out by an external service provider without interruption of production, in close coordination with the workforce. In addition to the significant reduction in energy consumption by over 5 gigawatt hours per year, another major advantage was convincing: compliance with the Technical Rules for workplaces with regard to lighting.

The compressed air consumption was reduced by leakage detection with a special measuring instrument and sealing the leakages associated therewith. 341 leakages were fixed with savings of approx. 680,000 m³/h. Furthermore, measurements for the substitution of compressed air, have been identified. For example, in the alloy foundry, the compressed air on the portal milling machine was replaced by a more energy-efficient blower. The functions on the milling machine in terms of cooling the machine and blowing off the chips could thus be ensured in an equivalent manner.

#### INSTALLED LUMINAIRES

HQL	LED-high-bay
HQI	LED-System of a strip of luminaires
Fluorescent lamps	LED-Tube T8
	Daylight- and motion-dependent control technology

4,600 ■----- **TOTAL NUMBER OF LUMINAIRES INSTALLED** -----■ 3,000

7.6 GWh ■----- **ANNUAL ENERGY CONSUMPTION** -----■ 2.4 GWh



**Before**



**After**

# 5.6 Supplies

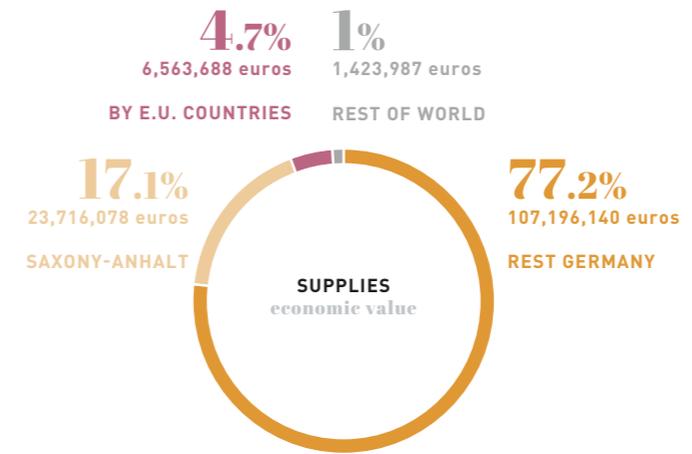


**1,124,761,780** euros ..... Total economic value (excl. taxes) of supplies of goods and services in 2019

**138,899,895** euros ..... Economic value of supplies of goods and services net of metal and tax

**1,805** ..... Total number of suppliers

FIG 5.5 Economic value of supplies (excl. metal and taxes) by area of origin



# 6

## Towards the circular economy



**« I want Next Generation EU to kickstart a European renovation wave and make our Union a leader in the circular economy. But this is not just an environmental or economic project: it needs to be a new cultural project for Europe. »**

URSULA VON DER LEYEN

The European Union's Action Plan for the Circular Economy aims to change production and consumption systems, for both environmental and economic purposes. The main objective is to increasingly improve efficiency in the use of resources - through changes in the design of goods, production processes, technologies, the life cycle of products, waste management - to build environmentally sustainable development, while promoting economic competitiveness and employment.

In this context, KME Mansfeld aims to help accelerate the transition to a circular economy through the efficient use of materials and energy.

# 6.1

## The transition to the circular economy

At the end of 2019, the new European Commission unveiled its plan for the Green Deal, which aims to make the climate challenge and ecological transition an opportunity for a new development model and to enable Europe to exercise leadership on the world stage.

The goal is to become the first carbon-neutral continent by 2050, strengthening the competitiveness of European industry through a socially equitable ecological transition and an industrial revolution capable of ensuring sustainable production. The green transition will be supported by an investment plan that aims to mobilize at least 1,000 billion euros, between public and private resources, over the next decade. The Green Deal aims to make Europe a world leader in the circular economy and clean technologies.

In this context, in March 2020 the European Commission presented the update of the Action Plan for the Circular Economy, with the aim of accelerating the transition to a new model of development. This is a challenge that is as ambitious as it is far-sighted, of great importance from both an economic and an environmental point of view. A challenge that is even more important today, in light of the coronavirus pandemic and the serious consequences for the European and global economy. Focusing on the circular economy is a way to promote a recovery based not only on a strong revival of public and private investment but also on a new economic paradigm and a different model of development.

The Green Deal and the transition to the circular economy constitute, together with the digital transition, the strategic axes of the Recovery Plan "Next Generation EU" presented in the wake of the COVID-19 pandemic.



### The need for circular economy

Why is it increasingly urgent to move from a linear to a circular economy model? It only takes a few facts to understand.

- Each year, the world economy consumes about 100 billion tons of materials (minerals, fossil fuels, metals, biomass) and only 8.6% of these are currently reused or recycled.
- The consumption of natural resources, which has already tripled since 1970, could reach 180 billion tons by 2050 if current trends continue.
- Material consumption is growing at twice the rate of population.
- From 1970 to 2017, the world's population doubled: from 3.7 billion people to 7.5 billion.
- During the same period, global consumption of materials increased 4-fold, from 26.6 to 109 billion tons.
- To date, only 8.6% of the world economy is circular.

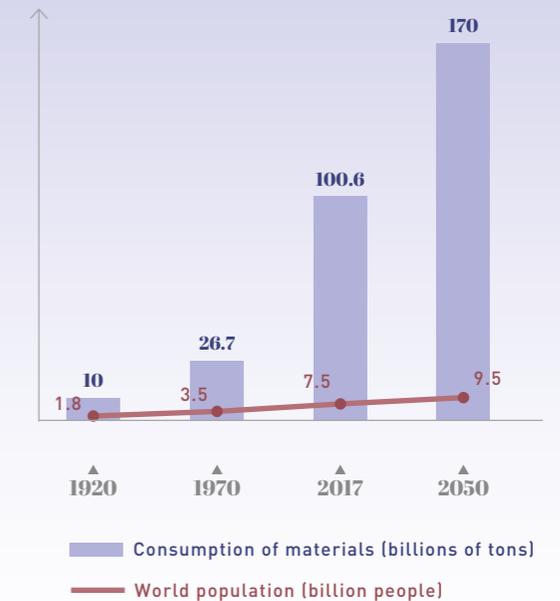


FIG 6.1 World materials and population

The transition to a circular economy is therefore necessary to ensure the sustainability of development.

- This is also a necessary strategy for climate protection. Greenhouse gas emissions are not decreasing fast enough to meet the targets. Switching to renewable energy can only reduce them by 55%. The remaining 45% of emissions come from how products are produced and used.
- The current linear growth model assumes that natural resources are unlimited and available at low cost, but this is not the case. Resources are limited, demand for them continues to grow, and ecosystem balances are increasingly compromised. Hence the need for an economy based on a more efficient use of natural resources and a reduction of waste. An economy in which products maintain their value of use for as long as possible and in which, at the end of the life cycle of a product, resources are not lost as waste but are reintroduced into the production cycle to create new value.
- The transition to a circular economy has for Europe and Germany a strategic importance not only from the environmental point of view but also for economic competitiveness, because it reduces the risks related to the supply of raw materials. It is not an easy challenge, but it brings with it many benefits: lower consumption of raw materials, lower supply costs for the manufacturing system, reduction of greenhouse gas emissions, new technologies, growth of employment, competitiveness of companies and territorial economic systems.

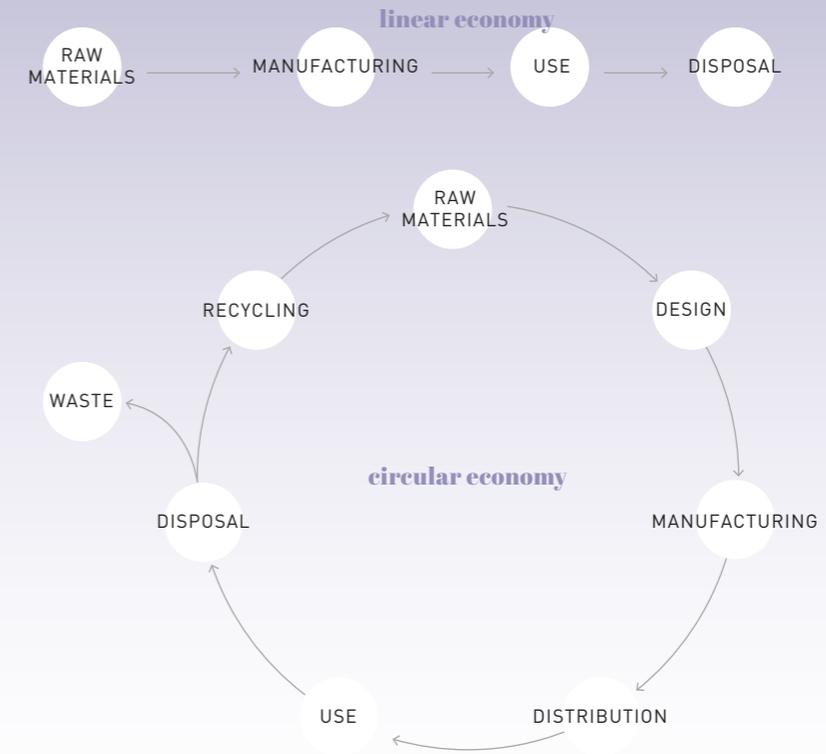


FIG 6.2 Linear vs circular economy



CONTEXT

## The new Action Plan for the Circular Economy

In March 2020, the European Commission completed the European industrial strategy framework with the publication of a new Circular Economy Action Plan, which contains measures to accelerate the transition path.

The Commission will propose specific measures so that:

- The design and trade of sustainable products becomes the norm;
- Products are designed to last longer, are easier to reuse, repair and recycle, and incorporate as much recycled material as possible rather than virgin raw material.

Actions will focus on sectors that use the most resources and where the potential for circularity is highest. Priority objective is also to reduce waste generation and transform it through recycling into quality resources for reuse.

## 6.2 Copper in the circular economy

The copper industry is one of the crucial sectors for the establishment of a circular economy model. Germany is among the leading countries in recycling. For KME Mansfeld, the challenge of the circular economy is an opportunity. An appointment to which it can be ready, with its experience and cutting-edge technologies.

Why is copper among the materials that play an important role in the transition to the circular economy?

- Copper can potentially be recycled indefinitely without losing its properties. Once the useful life of the product is over, it can be reused for new products and new functions. The high recyclability of scrap makes copper's contribution to waste generation minimal.
- Another important quality that makes copper a protagonist of the circular economy is its durability: the life cycle of a copper product is in fact very long. The most technologically advanced countries recover products containing copper at the end of their useful life, thus reducing dependence on imports. We are therefore talking about a real permanent resource, essential for the development of a circular economy.
- Currently, the world's population uses an average of 50 kg of copper per capita. Almost 1/3 of the world's copper demand each year is met through recycling. It is even estimated that 80% of that extracted since ancient times is still in use today in various forms.

### EUROPE IS A RECYCLING LEADER

- The need for copper is increasingly being met through material recovery. About 50% of Europe's copper requirements come from recycling. This percentage is expected to rise further over the next few years.
- The benefits for Europe are many: lower consumption of natural resources, lower energy consumption (up to 85 million TWh of electricity, equal to the consumption of 24 million households each year) and reduction of CO<sub>2</sub> emissions (up to 30 million tons less in one year).

## Copper recycling in Europe

- According to the International Copper Study Group, around 50% of the copper used in Europe comes from recycling. This helps to meet the growing demand for this metal (+250% since the 1960s) and, at the same time, to reduce the environmental impact of its production and ensure availability for future generations.
- A computer contains about 1.5 kg of copper, a house about 100 kg, a wind turbine 5 tons. Considering that copper can be fully recycled and reused multiple times without any loss of performance, it can be ensured that copper products and waste are properly treated when they reach the end of their useful life.
- Recycling saves energy and reduces CO<sub>2</sub> emissions. It requires up to 85% less energy than primary production. Worldwide, it saves 100 million MWh of electricity and 40 million tons of CO<sub>2</sub> per year.
- More than 2 million tons of copper are reused in Europe, from end-of-life products and directly recycled production scrap. The increase in recycling is due to technologies from European companies that enable greater efficiency in refining secondary scrap and processing for direct smelting of high-purity copper scrap.

### THE PRODUCTION CHAIN

Copper, naturally present in the form of ore, must undergo processes of concentration, smelting, refining and transformation. The production chain can be summarized as follows:

- Copper concentration process;
- Production of pure copper cathodes;
- Transformation into finished products (e.g. tubes and sheets) or into semi-finished products that require further downstream processing (e.g. cables, bars, strips);
- Consumer use;
- Reuse and recycling at the end of product life.

Unlike many other materials, copper can be continuously recycled without losing its qualities. Recycling produces so-called "secondary" copper, which comes from the collection of products that have reached the end of their life cycle (wires and cables, household appliances, computer and electronic components and materials, etc.) as well as from the direct melting of scrap, cuttings and waste generated during industrial production.

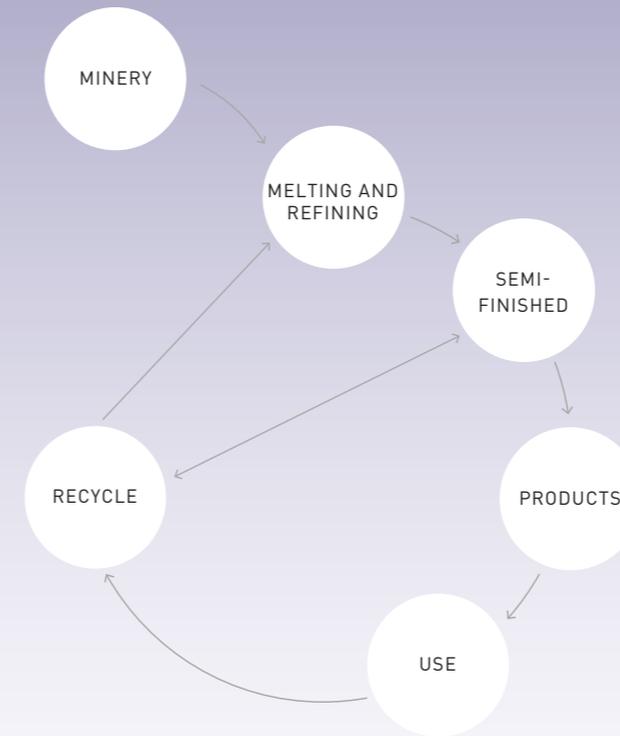


FIG 6.3 Copper life flows

### MINE

Primary copper production begins with mining the ore. There are two basic ways to extract copper: surface mining and underground mining.

### SMELTING AND REFINING

Smelting is a process of heating and melting the ore. Refining refers to any process that increases the grade or purity of the metal. After completing the refining processes, the copper cathode is generally 99.9% pure.

### SEMI-FINISHED PRODUCTS

Copper, along with clean scrap, is converted into wire/wire rod, tubes, bars, sheets and strips for use along the value chain.

### PRODUCT MANUFACTURING

Copper wire/wire rod, tubes, bars, sheets and strips are processed into finished products that can be used directly by consumers and businesses.

### USE

Copper has multiple uses and applications.

### COPPER RECYCLING

An increasing share of the copper used comes from recycling sources. Based on the global model of copper stocks and flows, it is estimated that two-thirds of the 550 million tonnes of copper produced since 1900 are still in productive use. (source: Fraunhofer Institute)

## Technological innovations for the ecological transition

Copper is at the heart of many technological innovation processes that move in the direction of sustainability, supporting the energy transition and circular economy. These include, for example, its use in energy-efficient equipment, renewable energy generation and electro mobility.

- Energy-efficient equipment, including distribution transformers, electric motors and air conditioners, are among the largest users of copper. Demand in this sector is expected to grow at a rate of 4.1% per year, with annual demand potentially reaching 9.7 million tons by 2035.
- Renewable energy accounts for a growing share of global energy production, and the rapid growth of wind and photovoltaic installations will be a major driver of copper demand.
- Electric vehicles, which could make up one-third of global sales by 2035, contain more copper (additional cables, electric motors and batteries) than conventional vehicles. The development of charging infrastructure will also contribute to the demand for copper in the mobility sector.

## 6.3 Circularity indicators of KME Mansfeld



Accelerating the transition from linear economic models to a circular economy requires that every company be fully aware of its own positioning. Companies need to be able to measure their circularity performance at each stage of their production process and along the entire value chain, from design to procurement, from production to sales, from logistics to maintenance, to end-of-life management of products.

To this end, increasingly sophisticated tools for the detection and analysis of the main indicators of circularity are starting to spread, with the aim of providing companies not only with analytical tools, but also with information and solutions to improve the efficiency in the use of resources and the circularity of the production cycle.

How to measure "circularity"? To date, there are still no standardized and shared criteria and parameters. There are some examples of methods developed in recent years at the international level, but a standardized monitoring methodology is still being defined by the European Union, with reference to the "Action Plan for the Circular Economy".

Using the methodology developed by Greening Marketing Italy, a number of circularity indicators relating to KME Mansfeld's activities are reported in the sustainability report. In this way, the company, which is already strongly committed to the circular economy, intends to set out on a path of even more careful evaluation of its efficiency in the use of resources and to monitor progress year after year.

## 6.3.1 Circularity rate



A first important indicator is the circularity rate, i.e. the percentage of recycled materials compared to the total materials used.

**8.34%** OF THE MATERIALS USED COME FROM EXTERNAL RECYCLING

Recycled materials (copper scrap and wooden pallets) are 8.34% of total materials used in 2019.

In the last 3 years, the percentage of recycled materials has gone from 7.22% to 8.34%.

**8.46%** OF METALS USED ARE RECYCLED METALS

Calculating the percentage of metals coming from external recycling (net of a share of semi-finished products that it is not possible to quantify precisely) in relation to the metals used, the rate of circularity rises to 8.46%.

THANKS TO INTERNAL RECYCLING  
**the rate of circularity**  
 OF PROCESSED METALS INCREASES TO **27.9%**.

But the circularity rate does not end with these numbers. Adding to the use of recycled materials outside the plant is the fact that within the plant's production process a high amount of materials (65,465 tons in 2019) is recycled and returned to the production cycle. This further increases the efficiency rate in the use of materials and reduces the consumption of raw materials. Overall, compared to the total metals processed within the plant, the share of metals from external recycling and internal reuse is 27,9%.



FIG 6.4 Recycled materials

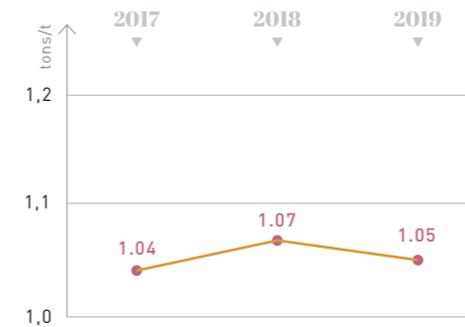


FIG 6.5 Materials used per unit of products



FIG 6.6 Turnover per ton of material used

## 6.3.2 Resource productivity

In order to measure the efficiency in the use of resources, an important indicator is the ratio between the amount of materials used and the production output from the plant. In 2019 it is equal to 1.05 tons/ton.

### PRODUCTIVITY IN RELATION TO TURNOVER

If we measure resource productivity relative to turnover, the indicator shows a significant improvement over the last 3 years. In 2019, 4,503 euros was generated per tonne of materials used, compared to 3,885 euros in 2017 and 4,295 euros in 2018.

### 6.3.3 Waste reduction

A circular economic model requires a progressive reduction of waste and an increase in material recovery, both within the production cycle and downstream of production. Data for the three-year period 2017-2019 show a strong improvement of the company in this direction, both in absolute and relative terms.

In fact, the amount of waste produced by KME Mansfeld fell from 6,801 tons in 2017 to 7,383 tons in 2018 to 4,773 tons in 2019, a reduction of 35.4% compared to the previous year .

Equally significant is the figure for the amount of waste per unit of product. In 2019, 19.8 kg of waste was generated per unit of product (ton), a reduction of 21.4% compared to 2017 and 24.4% compared to 2018.

Another very important indicator is the percentage of waste sent for recovery instead of disposal in landfills. In 2019 it reaches 99.9%, with a strong increase compared to 2017, when it was 78.2%.

### less waste and more recycling



FIG 6.7 Waste per unit of product

### 6.3.4 Efficient use of water resources

Even water, in a circular economy scenario, should be used as efficiently as possible, reducing consumption and increasing reuse within production cycles.

The data show a progressive improvement. In fact, we go from 1,388,292 m<sup>3</sup> of water withdrawn in 2017 to 1,123,499 m<sup>3</sup> in 2019, a reduction of 19%. And it is significant that about 25% of the water used is rainwater.

The plant also uses a water recycling system that processes approximately 3,100,000 m<sup>3</sup>/year, thus significantly reducing the volume of water withdrawal required. Again, this is a principle of circular economy applied to an element, water, whose importance, also due to climate change, has grown and will grow in the future.

Finally, it should be noted that the discharged water, after being purified in a physico-chemical treatment plant, is released into the Wipper river, thus closing the cycle.



FIG 6.8 Water withdrawn

### 6.3.5 Energy efficiency

In a circular economy model, energy, like matter, must be used as efficiently as possible. All the more so in energy-intensive facilities such as metalworking plants. As mentioned in another chapter, KME Mansfeld has already taken steps to improve energy efficiency for this reason.

In absolute values, there is a 13.3% reduction in energy consumption in 2019 compared to 2018.

In terms of specific consumption in 2019, 1,248 kWh eq. was consumed per ton of products leaving the factory, an increase of 1.5% compared to the previous year, while in comparison to 2017 there was a reduction of 1.8%.

The most significant data are those of energy savings obtained through interventions made in the use of electricity and natural gas. Thanks to these interventions, a reduction in consumption of 3,689,054 kWh was achieved in 2019.

The energy savings is 14,221,973 kWh when considering the years 2015 through 2019.



FIG 6.9 Energy consumption



FIG 6.10 Specific energy consumption

### 6.3.6 Reducing greenhouse gas emissions

The increase in efficiency in the use of natural resources and the transition towards a circular economy model are closely related to the need to reduce greenhouse gas emissions in order to combat global warming. This is therefore also among the main objectives that a company must pursue on the path towards circularity.

The data show an improvement over the period examined. In absolute terms, total GHG emissions (direct plus indirect) decreased 16 % in 2019 compared to 2018. Specific emissions, as measured in relation to output, were also down 1.9% from the previous year.



FIG 6.11 Emissions

### 6.3.7 Eco-innovation

The promotion of a circular economy requires investments in process and product eco-innovation, new business models, technological innovations, industrial symbiosis projects and research and development activities.

As part of the research and development activities of the KME Group and KME Mansfeld, as mentioned in section 5.5, particular attention is paid to two topics closely related to the circular economy: efficiency in the use of materials and energy efficiency.

reduction of CO<sub>2</sub> emissions

# 7

## Appendix



# 7.1

## Copper: history, facts, curiosities

It was the first metal to be used by man since prehistoric times. The axe of Ötzi, the man who lived 5,000 years ago in the Alps, was made of copper. The Statue of Liberty, inaugurated in 1886, the symbol of New York, is made of copper. It is copper that makes the superconductors at CERN in Geneva, the world center of physics, work.

Copper is everywhere around us: inside TVs, lamps, cell phones, cars, pots, pipes, vases, electrical circuits, household appliances, sanitary equipment, architectural furnishings. And it can give life to alloys, such as bronze (with tin) and brass (with zinc).

How much do we know, however, about this valuable material? Perhaps very little. For this reason we want to close this report with some information and curiosities related to the history of copper and its uses.

## Some historical notes

- Copper was already known to some of the most ancient civilizations. It is estimated that its use began at least 10,000 years ago.
- A native copper pendant dated to around 9500 BC was found in Šhanidar Cave in the Zagros Mountains (Iraq).
- More copper objects dating back to 7000 BC have been found in Turkey.
- Signs of activity in the refining of copper from its mineral oxides (malachite and azurite) date back to 5000 BC, a thousand years before those related to the use of gold.
- Copper and bronze artifacts of Sumerian origin have been found in city sites dating back to 3000 BC, and pieces produced with copper and tin alloy by the ancient Egyptians date to the same era.
- A pyramid houses an approximately 5,000-year-old copper alloy drain pipe system. The first copper water pipe dating back to 2750 BC can be seen at the Berlin State Museum. The use of copper in ancient China dates back to 2000 BC, whose bronze production reaches excellence around 1200 BC.
- In Europe, the use of copper is confirmed by the discovery of the Similaun Man (also known as Ötzi), the mummified body of

a man dating back to 3200 BC found in the Alps, whose axe has a tip made of 99.7% pure copper. The high arsenic content found in his hair suggests that man's activities included producing copper.

- Towards the end of the 3<sup>rd</sup> millennium BC, at Saint-Véran (France) a technique was known for detaching a piece of ore, beating it and heating it at a copper mine at an altitude of 2,500 meters. The recovered historical artifacts, dating from an advanced phase of the Bronze Age (early 2<sup>nd</sup> millennium BC), include ceramic nozzles and dry stone structures that can be interpreted as a pre-historic metallurgical furnace.

## Features

- The use of bronze, an alloy of copper and tin, was so widespread in history that it gave its name to a stage in the evolution of human civilization: the Bronze Age. The transitional period between the previous Neolithic and the Bronze Age is called Chalcolithic or Copper Age and is characterized by the coexistence of stone tools and copper tools.

Copper is the chemical element of atomic number 29 and its symbol is Cu. It is called "red gold" because of its coloring.

It is a metal of very high electrical and thermal conductivity, surpassed only by silver.

It is very resistant to corrosion due to a patina that forms spontaneously on the surface, first brown in color and then green or greenish-blue. It is easily machined, as it is extremely ductile and malleable. It

can be easily recycled and its scrap has a high salvage value.

It combines with other metals giving rise to numerous metal alloys (there are at least 400): the most common are bronze and brass, respectively, with tin and zinc; among others, cupronickel and aluminum bronzes.

In addition, copper is bacteriostatic, that is, it fights the proliferation of bacteria on its surface.

## Did you know?

- The Latin word for copper is cuprum: this is the origin of the name in most modern European languages (copper in English, cuivre in French, koppar in Swedish, cupru in Romanian, Kupfer in German, cobre in Spanish...).
- The ancient Egyptians used the ankh symbol to indicate copper in hieroglyphics. It also represented eternal life.
- Copper has been associated to the goddess Venus in mythology and alchemy because of its shiny appearance, its use in the production of mirrors and because of its main mining area, the island of Cyprus. The symbol used by alchemists to represent copper is identical to that used by astrologers to represent the planet Venus.
- The oldest evidence of copper being used in plants is the pipe that carried water to the temple near the pyramid at Abusir, Egypt, and dates back to 2750 BC. It is currently preserved in excellent condition at the State Museum in Berlin, confirming the material's resistance to the test of time.
- The main mines are located along the Andes Mountains and the Rocky Mountains: the main mining countries are Chile, Peru, China, United States, Congo, Australia; other important mines are located in Indonesia, Papua New Guinea, Zambia, Canada, ex-USSR countries, Poland and Finland.
- The Statue of Liberty in New York is clad in over 80 tons of copper. Copper was an almost obvious choice: it is a material that can withstand New York's extremely aggressive and corrosive marine and industrial atmosphere.
- In automobiles, copper serves in the wires and windings that generate motion and transmit impulses. A Tesla Model S contains 50kg of copper in the rotor of its electric motor, as well as other copper in the batteries.
- Copper is an excellent conductor of heat (about 30 times more than stainless steel and 1.5 times better than aluminum). This is why it is required in applications where fast and efficient heat transfer is needed, such as in heat exchangers, air conditioning, radiators, heat sinks in computers, radiant heating, solar collectors, etc.
- In the kitchen, copper pots and pans are valued for their ability to spread heat evenly, without creating hot spots or thermal inertia.
- The excellent conductivity of copper is also exploited in surgery. Copper coatings on medical scalpels conduct electricity to heat the blade, making it self-cauterizing. This is important for controlling bleeding during operations and removing damaged tissue.
- Copper protects millions of buildings around the world through a network of lightning rods: the electricity is then discharged through an earth ground, also made of copper.
- Copper is a naturally occurring material in the earth's crust and in the fresh waters and oceans. Life on earth evolved in its presence, which is why organisms incorporate it and use it for their vital functions. Humans have about 1 mg per kg of body weight.
- One of the most spectacular and futuristic applications of copper is in the superconductors of the Large Hadron Collider at CERN in Geneva, the largest particle accelerator in the world (525 million km of copper wire!).
- Most printed circuit boards for electronic applications are made by laminating a thin sheet of copper to a flexible film and etching away the copper to leave thin lines that will carry the current. A new technology involves an ink to deposit only the copper lines on the circuit board, thus eliminating waste and lowering manufacturing costs.

- The workability and availability of brass makes it suitable for the production of musical instruments: although it is strong, it is bendable and workable at the same time: it can be hammered, cut, rolled, polished and spliced. It has considerable resistance to corrosion, although it is generally polished and lacquered to maintain its characteristic bright yellow color.
- Copper can be shaped even in complex forms and it transfers heat in a very efficient way: for this reason it is used to build stills and boilers, for the production of beverages and food. For this reason it is used in the production of beer and in distillation in general.
- Copper and its alloys are necessary materials for efficient energy generation, storage, transport and consumption. This is also true in renewable energy production. For example, a 1 MW wind turbine contains 3 to 4 tons of copper.

- The colors of the fireworks depend on the ingredients, and the blue comes from copper salts, introduced as an extremely fine powder. When the gunpowder explodes, the metal particles oxidize, creating the heat needed to excite the powders, which emit light.
- The Pantheon in Rome (dating back to the 2<sup>nd</sup> century A.D.), had gilded bronze coverings for the dome and the gallery, which were removed after 1,500 years to make the columns of Bernini's canopy in St. Peter's and the cannons of Castel Sant'Angelo: an example of historical recycling!
- Copper and its alloys are ideal for making coins, thanks to their resistance to abrasion, impact and corrosion. In addition, they are perfectly recyclable and assume - depending on the percentage content of other metals - different colors and extremely precise electrical and magnetic properties.

- The Euro was minted in copper alloys: CuAl5ZnSn1 for the 10, 20 and 50 cent coins, CuNi25 and CuZn20Ni5 for the white and yellow parts of the 1 and 2 Euro coins respectively.
- For many industrial applications, the performance of copper can be improved by the addition of one or more different metals. The best-known copper alloys are brass (copper-zinc), bronze (copper-tin) and copper-nickel. It is estimated that there are more than 400 copper alloys on the world market today.
- The furthest copper artifact in space is the (gold-plated) disk aboard Voyager 1, now in interstellar space more than 21 billion km from Earth.
- Bronze was even used by the ancient Romans as a material for valves in the water distribution network.

- Numerous scientific studies have shown that in the presence of copper piping there are fewer colonies of bacteria such as Legionella, responsible for serious and sometimes fatal pneumonia.
- According to the U.S. Geological Survey, since 1950 reports have regularly indicated that an average of 40 years of copper reserves and 200 years of available resources were available. Reserves are defined as deposits that have already been discovered, determined, and evaluated as economically viable; resources are defined as reserves, discovered and potentially viable deposits, and other deposits not discovered but predicted by preliminary geologic analyses.

*(source: European Copper Institute)*

## 7.2 Methodological note

The sustainability report was prepared in accordance with the Global Reporting Initiative GRI-G4 guidelines. GRI promotes the use of sustainability reporting as a tool to enable businesses and organizations to contribute to the sustainability of the global economy. The report was prepared with the consultancy of Greening Marketing Italia (GMI).

### REPORTING PERIOD

The reporting period for this sustainability report is January 1 through December 31, 2019. The report contains not only 2019 data but also data from the previous two years (2017 and 2018) in order to provide a more complete picture of the ongoing trends in the company's performance.

### PRINCIPLES OF DEFINING REPORT CONTENT

- **Materiality:** The information contained in the report and its level of detail take into account all significant impacts (economic, environmental and social) and all aspects that could substantially influence stakeholders' assessments and decisions.
- **Stakeholder inclusiveness:** the report addresses all stakeholders, internal and external, who are involved or may be affected by the activities of the facility and the companies.
- **Sustainability context:** the report describes the company's performance with respect to the objectives of sustainable development, taking into account both significant global impacts (such as climate change) and the specific characteristics of the territorial context in which the significant impacts of the industrial activity occur.
- **Completeness:** the report describes the environmental, economic and social performance of the company using a system of indicators that describes all the main impacts of the activities carried out, and highlighting their evolution in the reference period.

### PRINCIPLES OF RELATIONSHIP QUALITY ASSURANCE

- **Balance:** The report describes both the positive and negative aspects of the company's environmental, social and economic performance, providing qualitative information and quantitative data that allow the reader to make an independent and balanced judgment.
- **Comparability:** the indicators developed in the report follow the methodologies indicated in the GRI guidelines, thus making it possible to compare the company's performance with that of other industries, as well as to assess its evolution over the reporting period.
- **Accuracy:** each indicator developed in the report is developed according to a consistent pattern, reporting numerical data in tables, accompanying them with explanatory graphical representations and illustrating with a synthetic text the main evidence found. Tables and graphs indicate the units of measurement used.
- **Clarity:** The report is drafted using language that is as simple as possible, avoiding overly detailed technical information. The structuring of the index and the table of correspondence with the GRI index help stakeholders identify issues of specific interest to them in the report. Graphics facilitate understanding of the data.

- **Verifiability:** Information is provided in such a way that it can be verified over the years and possibly become the subject of external scrutiny.

### PRODUCTION DATA

The figure relating to the company's production is to be understood as the quantity of products leaving the plant (output) during the year, while the figure relating to materials used refers to the quantity of materials entering (input) in the same period. The production figure may therefore include some quantities not actually produced during the year but already in stock.

# 7.3 GRI correspondence table

\* Where this is an indicator deemed not relevant or not available, no reference paragraph is given

## Profile

GRI INDICATOR	DESCRIPTION	PARAGRAPH *
<b>Organization Profile</b>		
102 - 1	Name of organization	2.2
102 - 2	Activities, brands, products and services	2.3
102 - 3	Location of management offices	2.2
102 - 4	Location of existing activities	2.2
102 - 5	Ownership and legal status	2.1-2.2
102 - 7	Order of magnitude of the organization	2.2-2.3
102 - 8	Information about employees and other workers	4.2
102 - 9	Supply chain	4.6-5.6
102 - 10	Significant changes in relations between the entity and its supply chain	-
102 - 11	Precautionary principle	2.4-2.5
102 - 12	External initiatives	4.7
102 - 13	Membership in associations	-
<b>Strategy</b>		
102 - 14	Declaration of top decision makers	Letter to stakeholder
102 - 15	Main effects, risks and opportunities	5.1
102 - 16	Values, principles, standards and rules of conduct	2.5
102 - 17	Ethics Advisory Mechanisms	-
102 - 18	Governance structure	2.4
102 - 19	Delegating process	2.4

GRI INDICATOR	DESCRIPTION	PARAGRAPH
102 - 20	Executive level for economic, environmental and social topics	2.4
102 - 21	Consultation with stakeholders on economic, environmental and social topics	-
102 - 22	Composition of governance at the highest levels	2.4
102 - 23	Chairing the highest level of governance	2.4
102 - 24	Apex nomination and selection	2.4
102 - 25	Conflict of interest mechanisms	2.5
102 - 26	Role of senior governance figures in setting values and intentions	2.4
102 - 27	Cognition of senior governance figures on individual topics	2.4
102 - 28	Assessing the performance of senior governance	-
102 - 29	Identification and management of economic, environmental and social impacts	-
102 - 30	Effectiveness of risk management processes	2.4
102 - 31	Monitoring of economic, environmental and social topics	2.4
102 - 32	Role of senior governance on the sustainability report	2.4
102 - 33	Communication of critical issues	2.4
102 - 34	Nature and number of critical aspects	5.1
102 - 35	Remuneration policies	4.2
102 - 36	Compensation Determination Process	As per national collective agreement
102 - 37	Level of stakeholder involvement in the remuneration process	-

GRI INDICATOR	DESCRIPTION	PARAGRAPH
102 - 38	Annual total compensation ratio	-
102 - 39	Percentage increase in compensation ratio	-
102 - 40	List of stakeholders involved	1.4
102 - 41	Collective bargaining agreements	4.2
102 - 42	Identification and selection of stakeholders	1.4
102 - 43	Approach to stakeholder engagement	Presentation
102 - 44	Key themes	1.4
<b>Reporting</b>		
102 - 45	Entities included in the financial statements	5.2
102 - 46	Defining report content and topic boundaries	7.2
102 - 47	List of topics materials	-
102 - 48	Information review	-
102 - 49	Changes in reporting	-
102 - 50	Reference period	2019
102 - 51	Date of most recent report	-
102 - 52	Reporting cycle	Annual
<b>Management approach</b>		
103 - 1	Explanation of the topic and its boundaries	-
103 - 2	Reporting requirements	-

## Economic performance

GRI INDICATOR	DESCRIPTION	PARAGRAPH
201 - 1	Direct economic value generated and distributed	5.3
201 - 2	Financial implications and other risks and opportunities due to climate change	6.2-6.3
201 - 3	Significant financing received from the public administration	-
<b>Market presence</b>		
202 - 1	Ratio of local minimum wage to average entry level wage	-
202 - 2	Proportions of senior management hired from within the local community	-
<b>Indirect economic impacts</b>		
203 - 1	Investments in infrastructure and services	4.7
203 - 2	Significant indirect economic impacts	5.6-5.7
<b>Procurement practices</b>		
204 - 1	Proportion of spending with local suppliers	5.6
<b>Anti-corruption</b>		
205 - 1	Operations planned for corruption risks	2.5
205 - 2	Communication and training on anti-corruption procedures	2.5
205 - 3	Evidence of corruption and responses	-
<b>Conduct detrimental to competition</b>		
206 - 1	Legal action for anti-competitive behavior, anti-trust and monopolistic practices	-

## Environmental performance

GRI INDICATOR	DESCRIPTION	PARAGRAFO
<b>Materials</b>		
301 - 1	Materials used, by weight or volume	3.3
301 - 2	Recycled materials used	3.3
301 - 3	Reused products and their packaging materials	3.3
<b>Energy</b>		
302 - 1	Energy Consumption	3.2
302 - 2	Energy consumption outside the organization	-
302 - 3	Energy intensity	3.2
302 - 4	Reduced energy consumption	3.2
302 - 5	Reductions in energy requirements for products and services	3.2
<b>Water</b>		
303 - 1	Water withdrawal	3.7
303 - 2	Water sources significantly affected by the withdrawal	3.7
303 - 3	Recycled and reused water	3.7
<b>Biodiversity</b>		
304 - 1	Operational sites owned, leased, managed in, or adjacent to protected areas	3.9
304 - 2	Significant impacts of activities, products and services	3.9
304 - 3	Protected or restored habitats	3.9
304 - 4	Species on the IUCN red list	3.9

GRI INDICATOR	DESCRIPTION	PARAGRAPH
<b>Emissions</b>		
305 - 1	Direct greenhouse gas emissions (scope 1)	3.5
305 - 2	Indirect greenhouse gas emissions (scope 2)	3.5
305 - 3	Other indirect greenhouse gas emissions (scope 3)	-
305 - 4	Greenhouse gas emission intensity	3.5
305 - 5	Reduction of greenhouse gas emissions	3.5
305 - 6	Emissions of ozone-depleting substances	-
305 - 7	Nitrogen oxides, sulfur oxides, and other significant air emissions	3.6
<b>Waste and discharge</b>		
306 - 1	Final water discharge	3.8
306 - 2	Waste and disposal methodology	3.4
306 - 3	Spills	-
306 - 4	Transport of hazardous waste	-
306 - 5	Water bodies affected by discharges and/or outflows	3.8
<b>Environmental Compliance</b>		
307 - 1	Non-compliance with environmental laws and regulations	no
<b>Supplier environmental assessment</b>		
308 - 1	Reporting obligations	4.6
308 - 2	Negative environmental impacts in the supply chain	-

## Social performance

GRI INDICATOR	DESCRIPTION	PARAGRAFO
<b>Workers</b>		
401 - 1	Hiring new employees and employee turnover	4.2
401 - 2	Benefits reserved exclusively for full-time employees	-
401 - 3	Parental leave	4.3
<b>Corporate Labor Relation</b>		
402 - 1	Minimum notice periods for operational changes	as per contract national collective of work
<b>Health and Safety</b>		
403 - 1	Employee representation on joint management/employee health care committees	4.4
403 - 2	Injury types and percentage of injuries, work-related illnesses, absences, and work-related deaths	4.4
403 - 3	Workers with a high degree of injury or high risk of occupational disease	4.4
403 - 4	Health and safety issues covered by formal agreements with labor organizations	as per contract national workforce
<b>Training</b>		
404 - 1	Average annual hours dedicated to training	4.5
404 - 2	Skills implementation and transition assistance programs	-
404 - 3	Percentage of performance and review	-
<b>Equal opportunities</b>		
405 - 1	Diversity of management bodies	4.3
405 - 2	Salary ratio man/woman	4.3

GRI INDICATOR	DESCRIPTION	PARAGRAPH
<b>Non-discrimination</b>		
406 - 1	Incidents of discrimination and actions taken	4.3
<b>Freedom of association and collective bargaining</b>		
407 - 1	Transactions and suppliers where there are association risks	-
<b>Child labor</b>		
408 - 1	Operations and suppliers subject to child labour risk	2.5
<b>Forced labor</b>		
409 - 1	Operations and suppliers at risk for forced labor	2.5
<b>Security practices</b>		
410 - 1	Security personnel trained in human rights	2.5
<b>Rights of indigenous peoples</b>		
411 - 1	Incidents involving violations of indigenous peoples' rights	2.6
<b>Human rights assessment</b>		
412 - 1	Operations subject to human rights controls	2.5
412 - 2	Human rights policy training	2.5
412 - 3	Investment agreements for the protection of human rights	2.5
<b>Local communities</b>		
413 - 1	Activities involving local communities	4.7

GRI INDICATOR	DESCRIPTION	PARAGRAFO
413 - 2	Operations with significant impacts on communities	4.7
<b>Social evaluation of suppliers</b>		
414 - 1	New suppliers screened using social criteria	4.6
414 - 2	Negative social impacts in the supply chain	4.6
<b>Public policies</b>		
415 - 1	Public Contributions	-
<b>Consumer health and safety</b>		
416 - 1	Assessment of safety and health impacts	2.6-3.1
416 - 2	Incidents of service and product non-compliance	no
<b>Marketing and labeling</b>		
417 - 1	Product disclosure and labeling requirements	2.6
417 - 2	Incidents related to non-compliance	-
417 - 3	Incidents related to failure to communicate	-
<b>Consumer Privacy</b>		
418 - 1	Reasoned complaints about invasion of privacy	-
<b>Socio-economic compliance</b>		
419 - 1	Failure to comply with laws of socio-economic area	-



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GRAPHICS AND LAYOUT  
**BIANCO TANGERINE**



X  
2019

Sustainability  
report