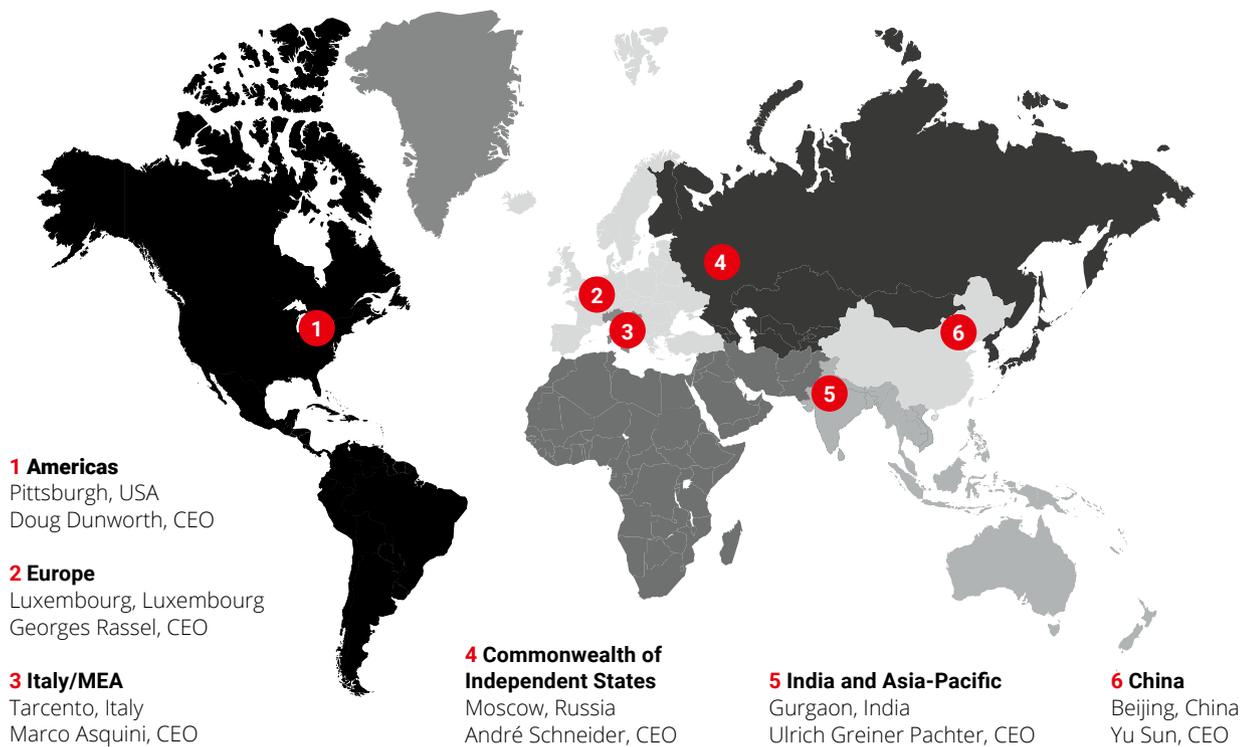


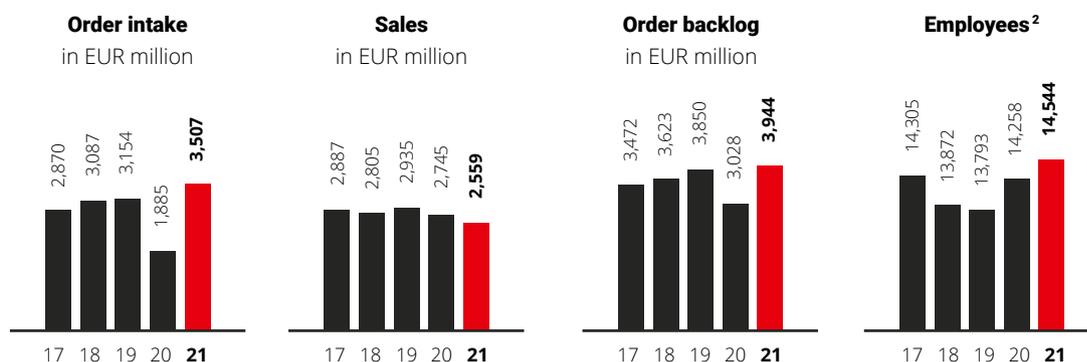
OUR DRIVE
YOUR PERFORMANCE

SMS group

Close to the Customer in six Regions



SMS group figures¹ 2017–2021



Figures in accordance with International Financial Reporting Standards (IFRS)

¹Including others/consolidated

²Average with apprentices/others

Annual Report

2021

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Leading Partner in the World of Metals

SMS group is renowned worldwide for its mechanical and plant engineering expertise, its future-oriented technologies, and its outstanding service for the metals industry. We use our 150 years of experience and our digital know-how to continuously provide the industry with innovative products and processes – even outside our core business. We are the partner for demanding projects, and we support our customers during the complete lifecycle of their plants, enabling profitable and resource-saving value creation chains. We have set ourselves the task of paving the way for a carbon-neutral and sustainable metals industry. As a global player with German roots, we take responsibility for our 14,000 employees and for wider society.

Executive Summary

Facts and Figures¹

Ukraine crisis

It is not yet possible to reliably assess the economic impact of the Ukraine crisis on the SMS group. Due to the Russian war of aggression in the Ukraine, we have stopped all new business in plant construction and mechanical engineering in Russia and Belarus. All work at current construction sites has been shut down. Maintenance and service business has been limited to security-relevant activities. There is also a risk of higher inflation owing to increased energy prices in Europe.

COVID-19

The dynamic development of the COVID-19 pandemic significantly influenced the global economy in 2021. In response to the uncertain economic situation, we introduced short-time working. Respective assistance from the government helped to reduce the pandemic's negative financial impact on our company.

Compliance with laws relating to COVID-19 within the everyday working environment remains of central importance to us. Internal crisis teams are organizing and coordinating measures at all locations and foreign construction sites worldwide. This has been a success. So far, we have avoided clusters of infection and prevented the closure of parts of the business or the quarantining of departments.

Steel market

Steel prices recovered in 2021 after two years of decline. They increased significantly in all regions. This was primarily attributable to the +4.5% rise in demand, while global crude steel production grew by only +2.7% against the previous year. The growth was primarily driven by the US (+23.1%), Europe (+13.5%), and India (+13.2%). Demand in China fell by -0.2%, but remained at a very high level.

Aluminum market

At around 67 million metric tons, global primary aluminum production was up slightly on the previous year's 65 million metric tons. Production stagnated in Europe and even declined slightly in North America (-2.4%). However, this was offset by upturns in the Gulf States region (+1.2%) and China (+4.2%), where over half of the total production volume was generated. The rest of Asia (excluding China) also contributed to an increase in volume (+8.7%).

Plant engineering

Despite the continuing coronavirus pandemic, demand for steel products grew considerably in 2021 as a result of catch-up effects from 2020. Accordingly, the year was characterized by increasing investment activity on the part of steel producers.

In addition to major projects and growth in the service business, order books were dominated by modernizations to improve the quality of end products and increase energy efficiency. Digital offerings also played a key role.

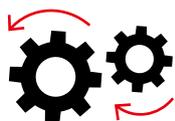
Trends in the metal industry

Growing worldwide awareness about climate change calls for resource-saving and environmentally friendly methods and processes in metal production. The metal industry is currently focused on the following issues in particular:

- Decarbonization of the steel industry
- Circular economy/recycling
- Digitalization

These issues are also central to our own development work. In the 2021 financial year, we spent €96 million (previous year: €89 million) on general developments and on design enhancements to our products. This equates to 3.7% of our sales (previous year: 3.2%).

¹As of: December 31, 2021



€3,507 M
Orders received



Orders

In the past financial year, our incoming orders recovered from their weak state in the previous year due to coronavirus, exceeding the previous year's figure by 86% to reach €3,507 million (previous year: €1,885 million). Thus, we recorded our highest level of incoming orders since 2008.

The number of incoming orders in the metallurgical plant business grew significantly to a volume of €2,285 million (previous year: €863 million). This is mainly attributable to the larger volume of contracts awarded in North and South America. The rise in incoming orders is firstly due to catch-up effects from investment projects postponed due to coronavirus in the previous year. Secondly, the high price of steel is enabling our customers to invest in plant efficiency and decarbonization. Aside from that, we generated follow-up orders from long-standing customers. The service business also benefited from this positive trend, increasing by €137 million to €795 million (previous year: €658 million).

Incoming orders in the industrial equity investments recovered considerably, amounting to €448 million (previous year: €384 million). This positive trend is mainly attributable to catch-up effects from the slump due to coronavirus in the previous year.

As incoming orders were significantly higher than sales in the past financial year, this meant a substantial rise in orders on hand, which totaled €3,944 million at the end of the year (previous year: €3,028 million).

Sales

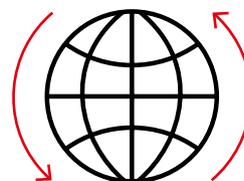
Sales of €2,559 million in 2021 represented a drop of €186 million compared to the previous year (€2,745 million). This equates to a decrease of 6.8%. The coronavirus pandemic delayed many schedules for order processing and acceptance. We were therefore unable to meet our forecast of virtually unchanged sales.

Due to the weak volume of incoming orders in the previous year, sales declined to €1,469 million in the metallurgical plant business (restated figure for the previous year: €1,757 million). However, our service business was less heavily affected by the impact of the pandemic. The volume of sales generated improved by €81 million to €716 million (restated figure for the previous year: €635 million).

There was also a slight year-on-year improvement in the industrial equity investments. At €392 million, sales were up €17 million (restated figure for the previous year: €375 million).



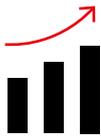
Regional distribution of SMS group sales in 2021



Western Europe 28.7%	Latin America 5.5%
North America 26.2%	Rest of Asia 4.7%
China 16.0%	MENA 4.2%
India 7.3%	Africa 0.6%
Eastern Europe 6.8%	



€87 M
EBT



€297 M
Cash flow



€151 M
Investment activity

Result

At €87 million in the 2021 financial year, earnings before taxes (EBT) were significantly higher than the previous year's figure (€-120 million). We more than compensated for the COVID-19-related decline in sales and associated higher deficits resulting from fluctuations in capacity utilization with substantially reduced order costs. This was reflected in a clearly improved gross margin. The reversal of restructuring provisions that were no longer required also had a positive effect. The significantly improved result was also supported by the early introduction of cost reduction measures such as extending the future collective agreement until 2026. We believe that our forecast of a significant improvement in EBT was borne out.

Liquidity

Cash and cash equivalents rose significantly by €154 million year-on-year to €896 million (previous year: €742 million). Cash flow from operating activities increased from €106 million in the previous year to €297 million. The significant increase in advance payments received (€+216 million) and the positive EBIT of €83 million reflect the recovery of our business activities in the 2021 financial year. This was offset by the increase in inventories (€-62 million) and the rise in trade receivables (€+19 million).

The advance payments received, which are customary in the industry, are secured by bank guarantees. The share of guarantee and borrowing facilities utilized is approximately 51% (previous year: 37%). The credit facility from KfW that was approved as a coronavirus precaution was not needed and was therefore returned on schedule in 2021.

Investments

The cash outflow from investment activity increased year-on-year to €151 million (previous year: €83 million). This increase is primarily due to the acquisition of the remaining shares in the operating business of the Paul Wurth Group and payment of the first half of the overall purchase price. The volume of investment in tangible and intangible assets grew primarily as a result of the construction of the new corporate headquarters in Mönchengladbach.



Avg. **14,544**
Employees

Employees

On average, SMS group had a workforce¹ of 14,544 in the 2021 financial year (previous year: 14,258). This reflects a moderate increase in the number of employees by +2.0% (+286 people) compared with the previous year. The main reason for this rise was the growing service business.

The average number of staff employed in Germany over the year totaled 5,864 (previous year: 6,212). The number of staff employed abroad in the past financial year was 8,680 (previous year: 8,046).

Burkhard Dahmen,
Chairman, SMS group GmbH

Torsten Heising,
Director, SMS group GmbH

¹Average for the year, including apprentices/trainees

INTERVIEW WITH THE MANAGEMENT BOARD



MICHAEL RZEPczyk
COO

HANS FERKEL
CTO

HEINRICH WEISS
Chairman of
the Shareholders'
Committee

KATJA WINDT
CDO

BURKHARD DAHMEN
CEO

EDWIN EICHLER
Chairman of
the Supervisory
Board of SMS
group GmbH

TORSTEN HEISING
CFO



“We have already demonstrated our implementation ability on various occasions since we introduced our new regional setup.”

Burkhard Dahmen,
CEO

Mr. Dahmen, how would you summarize the 2021 financial year?

BURKHARD DAHMEN It was another eventful year. In spring 2021, we introduced our new corporate structure which grants more business responsibility to the regions. This makes us the local partner for our customers, who are acknowledging this re-orientation. This applies to both sales and project management. We have already demonstrated our implementation ability on various occasions since we introduced our new regional setup.

In Germany, we have achieved a sustainable reduction in HR costs as a result of adjustments to the future-oriented collective labor agreement. With their readiness for compromise, the employees at our German locations helped make us more competitive. In addition to this, the peak of the COVID-19 pandemic demanded everything from our employees. Thank you very much to all of you.

How does this show in the figures?

TORSTEN HEISING In 2021, we had the highest order intake in more than ten years. New large-scale projects and the strong growth in the service area were the main drivers here. At the same time, our customers are again spending more money on plant modernization, after having cut down investments as a first reaction to the pandemic. Digitalization also continues to be a growth driver.

Accordingly, our liquidity position has markedly improved compared to the previous year. However, sales were lower as a result of slower order processing and longer customer acceptance processes as a direct impact of the COVID-19 pandemic.

Despite the worldwide restrictions to contain the pandemic, SMS group was able to complete some projects earlier than contractually agreed.

MICHAEL RZEPczyk Yes, this was possible thanks to our employees' strong will to battle all restrictions and obstacles for the sake of our customers' success. An example of this is the commissioning of a new hot plate leveler at Nanjing Iron and Steel Group Co., Ltd. (NISCO) in China. Due to the pandemic, our project management team in Germany could not travel, as planned, to China for the commissioning. Our local Chinese team took over at short notice. While performing the commissioning activities at the customer's site, they were supported by their German colleagues in real time via online tools. NISCO was able to produce the first plate a whole month earlier than agreed in the contract.

Nevertheless, 2021 was not all about the pandemic. The devastating flooding in Germany hit some of our customers really hard. We provided immediate support to help ease the impact on their production.

A large-scale project was completed in Indonesia for steel producer PT Krakatau Steel. One of the most advanced hot strip lines worldwide was put on stream at the customer's site on the island of Java.



“In Java, Indonesia, we commissioned one of the world’s most advanced hot strip mills.”

Michael Rzepczyk,
COO

From which regions did you receive most of your new plant orders?

MICHAEL RZEPczyk In the Americas, we were able to record a dynamic increase in orders. Our long-standing customer SDI ordered two additional galvanizing lines and two coil-coating lines, for their newly built works in Sinton, Texas, and their existing facilities in Terre Haute, Indiana, respectively. This reassures us of the importance of long-term partnerships and a strong local presence.

In the Italy, Middle East & Africa region (IMEA), we received an order for the supply of a high-capacity rail and section rolling mill to be installed in North Africa. This project makes a significant contribution to the enhancement of the infrastructure in that region.

Our supply scope for this project also includes a water treatment plant, a pressurized air station, cranes, and roll shop equipment. In other words, a full-line package. Here, we can demonstrate our turnkey expertise, using the full potential of our Center of Excellence (CoE) Implementation.

What new technologies has SMS group further developed and advanced in 2021?

HANS FERKEL The LIB (lithium-ion battery) recycling process from Primobius is turning out as a success story. Numerous representatives of companies interested in the technology have already come to Hilchenbach to see how the demonstration plant works. After the successful trial runs, the plant took up commercial operation in spring 2022. Primobius is also going to be an integral part of Mercedes-Benz’s recycling strategy. The company will supply its technology to the Mercedes-Benz location in Kuppenheim, Germany, where the car maker is building a battery recycling facility. This makes us pioneers in the circular economy for vehicle batteries in Europe. The potential partnership with Stelco may be the starting point for Primobius to gain a foothold in North America, one of the world’s fastest growing battery cell markets.

May we take a look at BOXBAY, a technology that is set to become a game-changer in port logistics? What is the current status here?

HANS FERKEL The High Bay Storage system in the port of Dubai has passed the practical test with flying colors in all categories. The technology has surpassed our expectations in terms of speed, efficiency of space use, energy consumption, and operational costs. With energy recovery systems and solar panels installed on the roof of the facility, we can reduce the carbon footprint of the system to a minimum. DP World, our joint-venture partner, and we agree that BOXBAY has great potential. We are currently in negotiation with interested parties and expect to be receiving the first orders before the end of this year.

SMS is giving itself a new software landscape. What are the reasons behind this project?

KATJA WINDT Our in-house digital transformation is one of the most encompassing change processes we plan to implement. As a provider of digital solutions, it is imperative that we are a trailblazer and role model and that we continue to further digitalize our own value creation and become more efficient as a result. Our business is characterized by elaborate products, services, and projects. The digital transformation is the key to being able to respond to and fulfil the increasingly complex requirements of our customers even better. For example, it enables us to recognize deviations from the defined project processes at a very early stage and we can react to changing circumstances more flexibly and faster – before additional costs arise. Being able to optimally interlink all areas and functions, getting the right insights from all the data in real time, and the continuous enhancement of our own processes are some of the most important benefits we get from our digital transformation. While we, as a company, benefit from this in our daily work, our customers benefit from the deeper insights that we gain from the data, and from smoother project management.



What are your growth targets for the service area?

KATJA WINDT Our performance promise is to develop integrated solutions tailored to our customers' specific use cases. Our modularized approach allows us to combine products and services from the three areas electrics/automation, digitalization, and technical service into performance-based business models. We focus on key performance indicators such as plant availability, product quality, productivity, and delivery reliability, but also on sustainability and occupational safety. Merging our integrated solutions with performance-based business models makes us a lifecycle partner for our customers, providing them the flexibility to focus on their core competences. We intend to raise the turnover generated with services to 50 percent of our total turnover by 2030.

“Our in-house digital transformation is one of the most encompassing change processes we plan to implement. As a provider of digital solutions, it is imperative that we are a trailblazer and role model and that we continue to further digitalize our own value creation and become more efficient as a result.”

Katja Windt,
CDO



“Our customers place extremely high demands on our products. They expect consistent quality, dependable yield, economically efficient production, and, to a growing extent, sustainability KPIs from our products.”

Hans Ferkel,
CTO

In addition to the expansion of the service area, a further strategic focus in the years ahead will certainly be the decarbonization of industrial processes.

BURKHARD DAHMEN Yes, absolutely. The hashtag for this is #turningmetalsgreen. With the acquisition of the remaining shares of Paul Wurth in April 2021, we have further strengthened our plant engineering competence in metallurgy and hydrogen technology. We are expanding our Luxembourg site to become the research and development center for decarbonization within SMS group. The range of services includes all technologies for reducing CO₂ emissions in existing steel mills, and hydrogen-based, CO₂-free direct reduction of iron ore. In addition to this, the circular economy and recycling technologies for metals will be playing an increasingly important role. This is a further field where we see high growth potential for us.

HANS FERKEL In addition to this, we are active in the field of Power-To-X technologies for the production of synthetic fuels and downstream products. We develop sustainable processes for our customers that they need for the economic transformation. Our strategic partnership with Synhelion will pave the way for the realization of the world's first sun-to-liquid plant, which will produce synthetic fuels from solar energy.

Why does SMS want to reposition its product management?

HANS FERKEL Well-managed products are the basis of our business success. Our customers place extremely high demands on our products. They expect consistent quality, dependable yield, economically efficient production, and, to a growing extent, sustainability KPIs from our products. Moreover, we want to make the consideration of service aspects part of our product development processes. Thus, product management is a strategic task that requires a truly holistic approach.

KATJA WINDT One example of an interdisciplinary product successfully implemented within our global product management structure is our Coating Competence Center (CCC). We see high growth potential for this unit in which we concentrate our worldwide coating expertise. We take a strategic approach to both optimizing existing solutions and developing new processes.

We want to develop solutions not only for, but first and foremost together with our customers. Because we are close to our customers, we know the specifics and challenges of their operations and can develop bespoke solutions together with the customer as our partner. This opens up new prospects for coating technologies from which our customers will benefit in the form of reduced process costs and a higher-quality end product.

How has the conflict between Russia and Ukraine impacted SMS so far?

BURKHARD DAHMEN We still can't anticipate at this stage what the medium- and long-term consequences will be. We ceased all order acquisition activities in Russia with immediate effect and stopped our work at the construction sites. All services at customers' sites are limited to safety-critical maintenance processes.



“We see that our customers around the globe are again investing more in new plants and in services. For 2022, we anticipate an order intake at the level we experienced the previous year.”

Torsten Heising,
CFO

Without looking into the crystal ball: what is your outlook for the next few months? Will the market situation get back to normal again?

TORSTEN HEISING We see that our customers around the globe are again investing more in new plants and in services. For 2022, we anticipate an order intake at the level we experienced the previous year. Skyrocketing energy prices, the supply chain difficulties that we have been facing since the onset of the COVID-19 pandemic, and disturbances in the transport and logistics sector are causing uncertainty across the industrial sectors. I expect that the world economy will adjust to this situation in the medium term. The extreme fluctuations that have recently affected the markets will gradually even out. However, we will generally have to be prepared for and take into account our worldwide project activities possibly being subject to higher risks.

The new lockdown in Chinese megacities has shown us how easily COVID-19 can bring a major part of a country's economic activity to a sudden halt. It is still difficult to assess the dynamics of this situation. But we are well positioned to overcome these challenges.



Edwin Eichler,
Chairman of the Supervisory Board of SMS group GmbH



Dear business partners,

I'd like to begin with some words about the war in Ukraine. During the last few weeks and months, our concerns and thoughts have been with the people of Ukraine, with our local employees, and with the refugees seeking shelter from the risks of this conflict. Meanwhile, we have ceased all our business activities in Russia, with the exception of safety-relevant maintenance work, in compliance with the sanction rules imposed.

Assuring the safety and security of our employees and giving refugees a safe place to stay within our social infrastructure has priority over economic consequences. My special thanks go to our colleagues in Germany and abroad for their great helpfulness and generous support.

Given these events of war, it is not easy to change the subject to a look back on 2021 and an outlook for the current business year.

During the 2021 business year, SMS group was able to successfully complete most of its main, long-term restructuring projects.

The new organizational structure aligned to our clear focus on regions, the introduction of project-based profit and loss reporting, the successful implementation of our task force building measures, and the prolongation of the collective labor agreement, successfully negotiated in cooperation with the works councils, were essential factors for the good economic results achieved in the past business year.

Further, I would like to specially emphasize our achievements in implementing measures to ease the consequences of the COVID-19 pandemic. Whether cost adjustments, the entirely new experience of working from home, or our liquidity management – all this could only be mastered thanks to our corporate culture based on equal partnership.

Favorable market tailwind bringing along great order intake and prospects for large-scale projects in connection with the decarbonization of industry form a solid basis for the strategic development of our company. In particular, our technology advancement initiatives, the growth strategy for our service business, and our various strategic projects in the fields of digitalization and innovative electrics/automation solutions impressively illustrate the success of SMS group's realignment.

Our close connection with Paul Wurth provides us a unique position to implement large-scale projects that make a major contribution towards a greener steel industry.

Moreover, our innovative business initiatives have already yielded positive operative results. The stakes in BOXBAY and Primobius are milestones for SMS group along the entire industrial value chain.

The latest addition to this series of strategic moves was the acquisition of a 50 percent stake in KAEFER Industrie GmbH together with our partner Altor. This co-investment provides the possibility of an at-arm's-length expansion of our industrial service portfolio with new opportunities to implement operative innovations in projects with joint customers and in new markets.

The 2021 results reflect the vitality of SMS group and show that we are able to meet the strategic challenges imposed by the pandemic, including structural cost adjustments. In addition to the aforementioned prospects, the fact that we are globally positioned further guarantees that SMS group will continue its successful strategic development to become a true service and performance partner.

My thanks go to all our customers for their loyalty during challenging times, to our employees whose flexibility and untiring commitment alone made this success possible, and to our shareholders for granting SMS group the time and means to achieve what we have achieved.

The year 2022 will bear the marks of the war in Ukraine. Let's take on this challenge together and in solidarity with the people suffering from its consequences.

Edwin Eichler,
Chairman of the Supervisory Board of SMS group GmbH

Heinrich Weiss,
Chairman of the Shareholders' Committee



»» Dear partners and friends of our company,

The impact of the war on Ukraine by the Russian government, an extremely brutal and aggressive act that violates international law, has dramatically changed the political and economic situation in Europe in next to no time. Before, peace in Europe had been taken for granted. The many military conflicts outside Europe had affected us only marginally.

However, surging inflation and the unsound public spending policy that was spreading from the Mediterranean EU countries and France to Germany were the first signs of an imminent economic crisis. We came to realize that, during the past two decades, we have failed to prepare and make our country fit for the challenges of the modern world. In terms of costs and taxes, innovations, patent applications, digitalization, and the number of new businesses, we now rank among the last places within the EU. German tech companies no longer play a significant role internationally.

We are now feeling the consequences of the politicians' failure to act responsibly and farsightedly during a long period of prosperity. We have disregarded the signs of the times, failing to adopt necessary reforms. This has become strikingly obvious in our poor military defense capability.

It is now our politicians' urgent task to not only plan reform programs but to implement them quickly. However, a crisis also provides the opportunity to correct mistakes and failures faster, because awareness of deficiencies increases in times of crisis.

We at SMS have successfully overcome the last few years of crisis in our industry in close cooperation with the works councils. Moreover, my successors in the management have opened up new fields of technology, from which we expect significant medium-term growth for the entire group.

Solidarity among people grows in times of existential threat. In our group companies, too, we feel that our employees' team spirit and dedication are even stronger these days. It is to be hoped that this will lead to a boost in creativity and willingness to perform similar to the spirit that made the "Wirtschaftswunder" possible after WWII.

SMS group has given itself a fundamentally new organizational structure by transferring more global business responsibility to the regional management on the different continents. Decentralization, especially of sales and project responsibility, will lead to a more clear-cut organizational setup and, as a result, increase our share in international markets. Apart from technological leadership positions, business areas with a leading global market share can also provide the benefit of higher economies of scale and higher profit margins.

Of course, we all hope that we will soon return to a peaceful Europe and be able to pick up the threads of our company's century-long relationship with customers in Russia, a relationship that had never been interrupted before, not even in the wake of the horrors of WWII. I'd like to thank all our employees for their commitment and dedication during the past year and wish you all good health and happiness.

My sincere thanks for your confidence.

Heinrich Weiss,
Chairman of the Shareholders' Committee

P. 18

Mission Possible:

#turningmetalsgreen

P. 28

Sustainable Performance Wins

Integrated services of SMS group

P. 34

Center of Excellence Implementation

We operate “temporary enterprises”

Metals are indispensable in many key sectors of industry – above all, in renewable energy production, mobility, and communication technology. At the same time, there is the pressing need to tackle climate change.

The big challenges for the steel and metals producers are well known: high competitive pressure and the need for decarbonization. SMS supports its customers in succeeding in key performance indicators such as high plant availability, profitability improvement, and green technologies. SMS group has the necessary know-how to play a pivotal role in this transformation. Holistic project excellence, green metals strategies, and integrated lifecycle services will lead our customers – and us – into a sustainable, successful future. Our unique selling proposition is our holistic understanding of the industries that we serve – as experts in metallurgy, in mechanical, electrical and digital systems, and as a lifecycle partner.

We can drive change that ensures that our customers will be top-performers in the future, too. This is what we understand by

OUR DRIVE
YOUR PERFORMANCE



The metals industry is on the verge of a historic transformation in the face of climate change. With our advanced know-how, we play a vital role in this process and offer our customers the technology for climate-neutral production.



Mission Possible: #turningmetalsgreen



Decarbonization



Hydrogen



Circular economy



Recycling

TALS


30%

of CO₂ emissions can be cut by injecting hydrogen or hot synthesis gases into the blast furnace.

Humanity faces a central challenge that it can only overcome by working together: saving our climate. The steel, aluminum, and copper industries have a special responsibility, as they are responsible for around 10 percent of global CO₂ emissions.

What needs to be done to curb climate change has been clearly described scientifically. It is already being implemented at national and supranational levels in concrete policy frameworks such as CO₂ pricing, emissions trading, and clearly defined savings targets. For metal producers, decarbonization is a transition of historic proportions that requires profound changes in production processes.

The metals industry is in a relatively favorable position because the relevant technologies are already available for implementation today. The sector is significantly ahead of many industries facing similar challenges. The newly developed technologies also have a significant leverage effect. Here's just one example: using one metric ton of climate-neutral hydrogen in steel production saves around 26 metric tons of CO₂ compared with the classic blast furnace route. As long as "green" hydrogen is only available in limited quantities, its use in the metals industry, therefore makes a lot of sense.

We are aware that we play a vital role in transforming the steel, aluminum, and copper industries. Our experience, deep understanding of processes, and technological know-how make us an essential partner for our customers because they need solutions that can do more than comply with guidelines and regulations. We are committed to enabling them to take a leading role in the transformation.

Without doubt, we are looking at a marathon rather than a sprint. It will take years before the new technologies we have brought to commercial viability lead to a noticeable reduction in CO₂ emissions. But we have made a start, and we can already report initial successes in decarbonization and circular economy on an industrial scale.

The big opportunity: steel industry decarbonization

So why not start smaller? Because the biggest challenge goes hand in hand with the greatest potential. The time is now for SMS group to make the most of its unique core competencies, technologies, and partnerships because we are the only supplier worldwide that can provide all climate-neutral processes from a single source. From green hydrogen to direct reduction and electric steelmaking to the conversion of downstream processes – with solutions that our customers can use in the short, medium, and long term.



The climate-neutral steel mill becomes a reality.

Almost

100%

of CO₂ emissions can be eliminated by combining hydrogen, direct reduction, and electric arc furnaces.

To put this in perspective, let's first look at the scale: today, integrated steel mills produce around 1.3 billion metric tons of crude steel annually, accounting for 90 percent of the steel industry's CO₂ emissions. More than 30 million metric tons of crude steel capacity will have to be converted to climate-neutral processes every year to achieve the current climate targets alone. How do you tackle such a mammoth task?

More than 80 percent of greenhouse gas emissions are caused in the primary stage during hot metal production. Due to the long investment cycles in metallurgical plants, a large part of the required CO₂ savings must come from the ongoing operation of existing blast furnaces. Therefore, it is encouraging to know that there is also considerable optimization potential for the classic blast furnace route. Simply by injecting hydrogen or hot synthesis gases into the blast furnace, the CO₂ footprint in pig iron production

can be reduced by a considerable 30 percent. As the use of coke is reduced simultaneously, this technology even lowers operating costs. The dry reforming plant commissioned in 2021 by SMS group subsidiary Paul Wurth at ROGESA Roheisengesellschaft Saar mbH, a subsidiary of Dillinger and Saarstahl, in Dillingen (Germany), uses precisely this technology and has made an excellent start in its pilot phase.

When revamping existing integrated metallurgical plants, it is necessary to carefully reassess the entire infrastructure as well as the energy balances and flows. This process is hardly possible without the expertise of a large-scale plant engineering company. As a holistic solution provider, SMS group offers a variety of ways to cost-effectively improve the CO₂ balance of blast furnaces.



In 2021, Algerian Qatar Steel's Midrex® plant also went into production.

60%

Compared to the classic blast furnace route, the CO₂ savings potential of natural-gas-fired Midrex® plants is around 60%.



The hydrogen century

There is no doubt that steel manufacturers are under pressure to implement green steel solutions. The reasons for that go beyond policy frameworks and CO₂ emission costs. Their important customers demand sustainably manufactured products because they sense that consumer demand for them is growing. For those who want to drive a green car, going electric is often no longer enough – the steel also needs to be produced in an environmentally friendly fashion. This type of thinking supports more forward-thinking business models, in which higher costs can also be factored in. In other words, the market is already moving toward the next investment stage in decarbonization. And that is a crucial factor because saving CO₂ on the way to climate neutrality is a complex technological undertaking that requires far-reaching infrastructure adaptations.

The future of steel production is the efficient use of raw materials such as steel scrap and iron ores and energy sources such as power from renewable sources and the green hydrogen generated from it. In the future, steelmakers will produce the largest share of climate-neutral steel in a hydrogen-based reduction process followed by an electric smelter.

Hydrogen is already an integral part of several projects we have implemented for customers worldwide. Until sustainably produced hydrogen is available in sufficient quantities and at competitive prices, there are some exciting examples of interim solutions that we have already implemented.

2021

**Success confirmed:
Tosyali Algeria has ordered
another Midrex® plant**

A genuine success story is the record-breaking Midrex® DRI plant that Paul Wurth supplied to Tosyali Algeria in 2018. Using a natural-gas-based direct reduction process, it produced a whopping 2.28 million metric tons of iron in 2021. Compared to a conventional blast furnace, the Midrex® plant's carbon footprint is around 60 percent lower. In addition, it can be gradually converted to hydrogen so that with minor changes to the plant and its operating parameters, it can achieve complete decarbonization in the future. The customer confirmed the project's success: Tosyali Algeria has ordered an almost identical plant for another site in 2021 to expand its international market presence with additional production capacity. That will make Tosyali a technology leader in the decarbonization of the industry, who also makes a significant contribution to the industrial development of Algeria as a whole.

Not waiting. Doing.

Green hydrogen will play a pivotal role in producing green metals. Therefore, the question of its availability is an urgent one right now. Will there be sufficient capacity on an industrial scale? What impact will its price have on the profitability of steel? SMS group has decided to play an active role in shaping the supply situation for hydrogen; after all, hydrogen will also play a vital role in decarbonizing the manufacturing processes of aluminum, copper, and other non-ferrous metals.



Direct reduction plants are fitted to gradually convert operation to hydrogen.

“We are transforming our Luxembourg site into a research and development hub for decarbonization within SMS group.”

Prof. Dr. Hans Ferkel,
CTO

H₂

Hydrogen will play a pivotal role in decarbonizing the metals industry.



A partnership for green hydrogen

Here's a constellation that rarely happens: an industry whose demand for hydrogen is rising steadily meets a hydrogen specialist looking for industry partners. That is why SMS group became a strategic investor and technology partner in Sunfire GmbH in 2019.

The German company has developed an efficient process for high-temperature electrolysis. The difference from traditional electrolysis is that instead of liquid water, water vapor is used because it is easier to split into hydrogen and oxygen. As the steam can be generated from the waste heat from industrial plants, this process is ideal for all steel mills. Compared with conventional electrolysis, the process can save 20 to 30 percent energy and do so with significantly higher efficiency.

The strategic partnership establishes an excellent basis for integrating hydrogen production into the steel industry. It is a perfect example of the type of forward-looking approach that opens up integrated, state-of-the-art solutions for our customers, as our metallurgical expertise lays the foundation for sustainable progress in the complex world of non-ferrous metal recycling.



— High-temperature electrolysis plant

30%

High-temperature electrolysis can achieve energy savings of up to 30% compared to conventional electrolysis.



✓
90,000 t

The new Aurubis plant will be able to recycle 90,000 t of e-waste in the future.

The Aurubis plant will recover copper, nickel, tin, zinc, precious metals, and platinum group metals.

That's because many of these metals will play an increasingly important role in critical technologies of the future. However, the available deposits are limited, the extraction of the metals is costly, and mining is also often fraught with adverse environmental impacts.

Advanced technical products are often highly complex combinations consisting of many different materials. A smartphone, for example, combines many hundreds of metals, plastics, and other materials such as glass into a functional mix in a tiny space. With our know-how, we develop sophisticated plant concepts to recover valuable, high-purity raw materials for new high-tech products – always with the aim of pushing recycling rates to their thermodynamic and technological limits.

In keeping with our high standards, we always look for the best partners to cooperate with. Aurubis AG is one of the leading suppliers of non-ferrous metals and one of the largest copper recyclers worldwide. Together, we are currently planning the construction of the first multi-metal recycling plant for electrical scrap in the USA. Construction at the Augusta site in Georgia is scheduled to start in the summer of 2022, and beginning in 2024, the plant will recycle around 90,000 metric tons of a wide variety of materials annually. Making e-waste usable again with the required degree of purity requires advanced processes, such as the top-blow rotary converter (TBRC), a highly →

The future is circular

New research shows that the use of renewable energies and efficiency improvements will only achieve part of the required reduction in greenhouse gas emissions. Recycling is also a vital factor in the equation.

And that's where metals shine, because their properties are a perfect fit for a sustainable circular economy. They are extremely durable and can, at least in theory, be recycled an infinite number of times without compromising their quality or properties. Even better: for the metals industry, the use of scrap is nothing new. On the contrary, in steelmaking, scrap is an integral part of the manufacturing process, especially in the highly efficient secondary route with electric arc furnaces, where production capacity is limited solely by the quantities and qualities of scrap available. This is an area where we have developed leading metallurgical, process engineering, and digital expertise, which we are now extending to recycling non-ferrous metals.

efficient system for recovering copper, nickel, tin, zinc, precious metals, and platinum group metals. The scope for the Aurubis plant also includes components for sampling and waste gas purification, which are also essential for a sustainable recycling economy.

Our cooperation with Aurubis will extend beyond this project. We have entered into a long-term cooperation agreement to jointly develop and build additional modular multi-metal recycling plants in Europe and North America.

Battery recycling

In 2022, we cannot discuss the circular economy without talking about electromobility and the recycling of lithium-ion batteries. The reuse of metals and raw materials is a major challenge that will help determine the sustainability of e-mobility as a whole – in economic, ecological, and social terms. A surprising fact: while almost 99 percent of lead batteries are recycled today, the rate for lithium ion batteries is distinctly lower. There is a lot of catching up to do here to achieve a similarly high recycling rate.



Circular economy: turning waste materials into new products

Scrap metal

- Scrap copper and other non-ferrous metals
- Waste electrical and electronic equipment (WEEE)
- Cell phones
- Ionic brass, insulated wire, electric motors
- Aerospace parts
- Catalytic converters
- Slag, debris, fly ash, ash



Recycling products

- Copper cathodes for wire, rods, slabs, and tubes
- Copper, copper foils, lithium, cobalt, and nickel for batteries
- Lead and tin for solder, sheet metal, and batteries
- Palladium, platinum, gold, silver for connectors or jewelry
- Metal solutions for batteries and the chemical industry
- Metal ingots
- Recovery of metals, conditioning of hazardous slags into high-quality products



Primobius battery recycling combines mechanical and hydrometallurgical processes.

3 

Primobius has already signed three letters of intent for battery recycling plants.

We address that situation through Primobius, our joint venture with Neometals Ltd in Australia. Primobius develops and markets an environmentally friendly recycling technology for end-of-life lithium-ion batteries. It is based on a combination of mechanical and hydrometallurgical processes to recover valuable materials such as lithium, nickel, and cobalt.

Established as recently as 2020, the joint venture has made enormous progress in recent months. The most prominent manifestation is the pilot plant at the SMS group site in Hilchenbach, which was opened in March 2022.

The reactions from the industry have been very encouraging – e.g., Primobius has reached an agreement with the Mercedes-Benz subsidiary Licular GmbH, wherein Primobius is to become the technology partner for the company's first battery recycling plant in Kuppenheim, Baden-Württemberg. The planned plant will be CO₂-neutral and is going to have an annual capacity of 2,500 metric tons.

Onward and upward

Looking back at 2021, there is cause for optimism. Our industry is well-positioned to significantly contribute to creating a more sustainable future by turning metals green. The power of innovation, partnership-focused thinking, and sound expertise are deeply rooted in our company culture and empower us to play a decisive role in shaping our industry's transformation. Our customers, policymakers, and society expect nothing less from us.



Sustainable Performance Wins

We drive innovation. SMS group possesses unique knowledge in the field of metallurgical plant construction, built up over the course of 150 years. We also secure the future success of the company with integrated services resulting from the close cooperation of the following departments:

- Electrics/Automation**
- SMS digital**
- Technical Service**

Integrated services of SMS group



These services pave the way technologically for a future-proof, sustainable business. They increase the performance, sustainability, and safety of our customers' plants over their entire lifecycle. Reference solutions used throughout the world provide the solid basis for differentiation from the competition through innovation and new business models. Our understanding of the industry's complex value chain is our unique selling point. We want to use this to our advantage.

Must-haves: availability, profitability, decarbonization

The industry is facing three major challenges. Firstly, plants must be constantly available and production processes must remain stable. Any unplanned downtime endangers profitability. In addition, customers expect reliable quality as well as punctual and complete delivery. This is where every aspect of plant operation comes into play, including hardware, software and automation, maintenance, logistics, and personnel. An important factor is to predict failure at an early stage and initiate appropriate countermeasures to prevent process-related deviations or even plant downtimes. Secondly, global overcapacity in the metal industry places a strain on overall profitability. Prices are coming under pressure, but at the same time, there is demand for ever smaller batch sizes with even higher and certified product quality. Here, too, preventive and data-based measures must be taken in the case of quality deviations. The earlier these are detected, the sooner corrections can be made in downstream processes. Thirdly, there is a need to reduce carbon emissions while increasing production efficiency and adapting to changes in the energy sector. Reducing carbon emissions is not just something demanded by society. It also has a direct impact on costs because many countries have started taxing carbon emissions. The downstream industries also have to take action, which is why they often demand energy and carbon certificates from producers.

The plant and its complementary components as a basis

SMS group covers all areas and process steps of the metal industry. The basis is always formed by the production plant together with its mechanical equipment, its automation solution – including the sensors, measuring systems, and actuators – and the drive technology and robotics.

Our X-Pact® (Process automation control technology) system package ensures that all plant components perfectly complement each other, while also guaranteeing efficient, dynamic, and resource-saving operation of entire plant facilities. Thanks to proven and powerful automation solutions and digital applications that allow all plant components to interact intelligently, operators increasingly need to intervene less frequently in the production process.

Digital comes as standard

No system leaves our factory unless it is "digital-ready." Machine and automation data is enhanced with contextual meta-information and data access information and shared in a kind of "dictionary" in standardized form. Harmonized data models are the standard for all SMS group systems and enable groundbreaking cooperation between our Electrics/Automation, SMS digital, and Technical Service divisions.

We use such harmonized models, for instance, when creating and deploying digital twins. By combining harmonized real-time data from production and processes with data and models from the design and construction phase, we get a virtual image of the real system. We can use this to track and optimize the system processes, predict events, and work out appropriate measures, including operator guidance. One good example of a digital twin used in practice is our X-Pact® Plug & Work integration test, which allows us to test and optimize the complete automation of our systems in advance, train the customer's operating staff, and ensure swift start-up of the system in combination with excellent performance data.

The way to achieve the best performance

Digitalization shows us the way to achieve the industry must-haves – availability, profitability, and decarbonization. We have identified a number of performance-determining criteria as part of our vision of achieving largely autonomous plant operation: system availability, process stability, product quality, output quantities, and operating and maintenance costs, combined with minimized risks as well as sustainability and safety. These criteria can be backed up by quantifiable performance indicators in the specific customer project. This allows us to precisely measure the performance of our integrated solutions and identify any potential for improvement, thus making a crucial step towards a sustainable and networked metals industry.

Only SMS group can do this

It is our manufacturing knowledge that makes the difference. Lasting performance improvements cannot be achieved with process knowledge alone or by solely using software or artificial intelligence (AI) expertise. And status-based maintenance at the very least – or, better still, predictive maintenance – is needed in order to increase the availability of production facilities. This is where the special position of SMS group comes into play. As a complete supplier of systems for the metal industry, we are in a position to understand the entire value chain and its data, recognize patterns and acquire the critical information from it. By perfectly combining our technological knowledge, our software and AI expertise, and our comprehensive service concepts, we develop integrated solutions with lasting benefits for our customers. This is our unique selling point on the market.

The learning mill

The most challenging process situation in a continuous pickling line/tandem cold mill is product changes as they take place while line operation is going on. Optimization potential is gained as a result of production planning and navigation-based process management. The difficulty lies in the rapid changes in the operating points, due to almost sudden changes in strip properties and strip dimensions in the individual mill stands. These changes must be precisely set in order to ensure plant stability, quality, and productivity.



Large amounts of data are collected and used in the development of artificial intelligence on the way to the “learning tandem mill.” This can then take over the superior control of the system by means of what are referred to as technology classes. A future expert system within our X-Pact® Superior Control can then also automatically work out the optimal strategy for all product changes. This look into the past can now be done as often as required based on mass data. As soon as the artificial intelligence provides a sufficient hit rate in the forecast, it generates added value in the form of improved length combined with strip flatness and thickness as well as increased stability of product changes. This is how a technologically self-optimizing system takes shape, continuously improving its product quality over the entire lifecycle.

Turning data into action

We can use our knowledge to correctly interpret the generated data in order to determine forecasts and, above all else, recommended courses of action. Such actionable items can either be fed back directly into the automation system in a closed control and optimization cycle, or they are passed on to the operator as a recommended course of action. They also help to identify specific maintenance and repair measures and efficiently plan and carry them out.

Even faster: industrial 5G

A fast broadband network acts as a booster on the way to autonomous plant operation: industrial 5G. The new technology provides high data rates, reliability, and accuracy, as well as real-time connectivity. At the same time, it is energy-efficient, permits the use of many devices even on a small area, and can be used to improve the safety of both humans and machines. As a result, even complex industrial processes can be fully modeled and optimized. In order to give customers the best possible support on their way to digitalized production, SMS digital offers numerous solutions for predictive plant status analysis, product quality, production planning, and energy management – and is now taking another decisive step on the way to a networked plant with its testing of a 5G infrastructure in Hilchenbach.

Value-creation partner throughout the entire lifecycle

Our integrated, digital service solutions relieve the plant operator of certain risks or problems, while also providing specific performance promises. Depending on the desired solution and agreed value proposition, we offer different contract models, from software as a service (SaaS) and maintenance as a service to component and equipment as a service.

We are a value-creation partner throughout the entire lifecycle of a plant. All services can be combined to meet specific customer needs and supplemented by performance-dependent business models. Plants with high service demands, in particular, are interesting for such business models. Individual payment models –

“Many customers increasingly want to concentrate on their core processes and leave the maintenance to their partners. We are well placed to uniquely combine technical and process-related skills for the benefit of our customers.”

Jochen Burg,
Executive Vice President Technical Service,
SMS group

such as payment per month, per part/ton, one-off payments, or (partial) financing of investments by SMS group or third-party companies – make it possible to draw up win-win contracts and distribute risk in a balanced manner.

Advantage SMS group

Our integrated service solutions are paving the way technologically for SMS group's future-proof and sustainable business activities – predictable for our customers and for us. We are improving our profitability with continuous and less-cyclical incoming orders and attractive margins. By bundling our services, we can offer new value propositions supporting the operative business of our customers and helping them to focus on their core processes. In this way, we enable continuous plant operation and optimize defined KPIs to be identified jointly with the customer. →



SMS group supports
the efficient production
process.

Data for environmental protection

The decarbonization of steel production also makes it necessary to take a look at the entire value chain – from the iron ore to the end product. The latest predictive analytics for plant performance and technical service makes it possible to cut carbon dioxide emissions, prevent waste material, increase plant availability, and reduce overall energy consumption. These technologies are no longer just being piloted – they are ready for large-scale applications.

The use of energy and charge materials is often not sufficiently regulated, even though these resources account for a significant part of the total costs. The Viridis Energy & Sustainability Platform is a single-source-of-truth system for energy, resource, and sustainability management, combining perspectives from all operational levels. Using AI tools, Viridis plays a direct role in effectively increasing the operational efficiency of energy and resources, optimizing planning, and thus promoting a process of continuous improvement. In this way, energy consumption can be reduced by 5 to 15 percent.

At the same time, more intense dialogue and closer networking with our customers helps us to draw inferences in relation to the development and construction of our systems and thus also strengthen our core business.

To a certain extent, data forms the link between status transparency and smart maintenance and is the basis for SMS group's new business models as well as for future plant development. This is because we gain additional knowledge beyond the usual project business, which we can ultimately feed back into the planning and design of our new plants.

Always a helping hand

In order to identify and evaluate the problem areas together with the customer, we can model the current status in an audit or consulting project. By doing so, we highlight the areas in which there is potential for optimization. Possible focal areas include plant equipment and technology, production processes, essential planning and control processes, software and maintenance or technology. In consulting projects, experts from SMS group provide support with specific, usually production-related problems and inquiries. Four principles form the basis of our consulting philosophy: best in class, local service, quantification of measures and results, and support with implementation.

We make the difference

Wide-ranging and globally realizable solutions call for internal diversity. We combine expertise from all divisions of SMS group as well as all regions. Our diversity is the cornerstone of our innovative strength, because development is only possible where different people come together. We are all working toward the same goal – to increase the performance of our customers' plants on the way to autonomous plant operation. Thanks to our 50 service locations in 17 countries employing some 5,000 people, SMS group is always close to the customer.

Connected software

X-Pact®
automation
solutions



Genius CM®
Condition Monitoring
System



DataXpert®
System



IMMS®
Maintenance
Management System

One example of our approach involves the monitoring of the segments in a continuous caster: during production, our X-Pact® automation solutions continuously supply data and compare it against the target values: current casting speeds, materials, temperatures, pressures, and much more besides. This data then passes through the SMS DataFactory and onto our Genius CM® Condition Monitoring System. Among other things, it is used here for electric motor running analyses, for noise analyses, for monitoring cylinders and drives, and for detecting clogged nozzles.

The DataXpert® system consolidates the real-time data from the processes and the information from the condition

monitoring system and can use this as a basis to diagnose and forecast the condition of nozzles, drives, lubrication and cooling lines, and other essential components of a continuous caster. “Actionable items” can thus be determined, transferred to the operator guidance, and fed back into the automation of the continuous caster. Based on the current status of the plant and machinery, our IMMS® Maintenance Management System can schedule any necessary maintenance work in line with production planning. This prevents any unnecessary downtime. The digital plant documentation system eDoc can be used to determine where spare parts are needed and worn parts need to be replaced. The corresponding orders are also placed directly by the system.

“It is important that we not only develop solutions for our customers, but also in conjunction with them.”

Prof. Dr.-Ing. Katja Windt,
Chief Digital Officer, SMS group



CENTER OF EXCELLENCE IMPLEMENTATION

The six-stand finishing mill at PTKS features highest precision, productivity and availability.



We operate
“temporary enterprises”

On the island of Java, Indonesian steel producer PT Krakatau Steel (PTKS) has put on stream one of the most advanced hot strip mills worldwide. The new hot strip mill 2 was built on a turnkey basis by a consortium of SMS group and PT Krakatau Engineering. The entire project was managed and implemented safely and reliably by SMS as the consortium leader and contact partner. Our recipe for success: focused project excellence.

At our customer PTKS, the consortium was responsible for the infrastructure, all site buildings, all ancillary equipment and supply systems, the entire engineering, and the manufacture, installation and commissioning of all process-related facilities.

Custom-tailored concepts

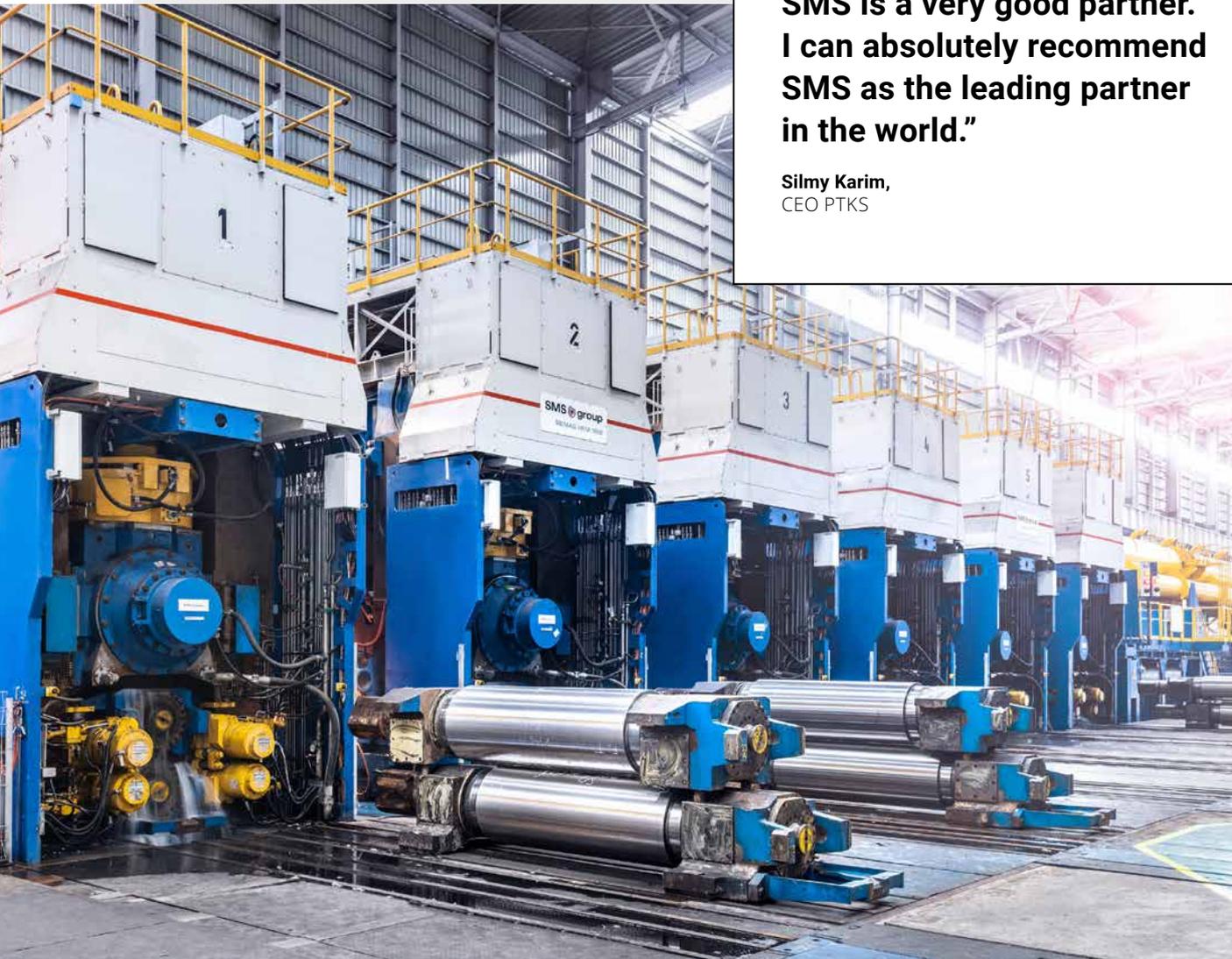
With its turnkey hot rolling mill 2, Krakatau Steel is able to manufacture a wide range of products. In particular, this includes thin and high-strength strip as well as sophisticated tube and automotive grades. SMS group's intelligent plant concept already takes into account efficient future expansion. Two additional walking beam furnaces, an exit-side edger at the roughing stand, a seventh mill stand in the finishing line and two more coilers permit the mill's

capacity to be increased from a current output of 1.5 million tons to 4 million tons per year. The product range can be flexibly expanded, too.

Customers like PTKS are impressed by our high level of project excellence: Even under most exacting conditions, we lead our projects to a successful conclusion, always in due time, at outstanding quality and within the contracted budget. Satisfied customers are the result.

“Our experience in this project was really great. In my view, SMS is a very good partner. I can absolutely recommend SMS as the leading partner in the world.”

Silmy Karim,
CEO PTKS

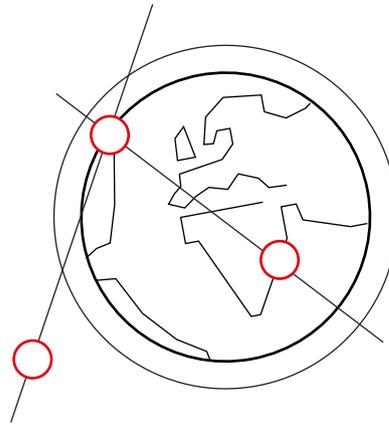




On the road to X-Pact® Lights-Out

For the first time in a state-of-the-art hot strip mill, a central control station concept was implemented, meaning that all plant areas can be operated and controlled from just one control station. SMS group supplied all X-Pact® electrical and automation systems which are the central interface for all level 1 and level 2

automation systems and process models. High-tech sensors are integrated throughout the plant and transmit their data to the technological control systems in real time to ensure optimal rolling settings.



Wide-ranging expertise for unique projects

As a project and technology partner, we use our entire specialist and project expertise: all large-scale and medium-sized projects are comprehensively managed in our Center of Excellence Implementation. For each project, we put together an international project team that is responsible for integrated project time scheduling and resource planning and the smooth management of all project phases – from the initial idea to the commissioning stage. Our strength lies in the fact that we see projects as teamwork between all disciplines: by routinely involving experts in fields such as engineering, supply chain, and project controlling, we make sure that every customer project is executed to highest standards. The project team also relies directly on the expertise of staff from the Center of Excellence Implementation from which it receives support with key aspects such as risk management and document management.

As “CEOs” of their projects, our project managers always have a complete overview of all subprojects, inter-dependencies, and interfaces. There is a high level of responsibility because it is not just about delivering a project in time with the customer in

~200

participants from around the world are being coordinated by an international project team in the planning phase.

mind, but also about managing internal and external risks and ensuring adherence to the budget. Only the consistent and company-wide use of the latest tools and digital solutions make this possible: in terms of project management, we systematically break down the structure of the entire project until the last screw – which brings us additional advantages when it comes to procurement and rendering services after commissioning.

By pooling our expertise from general engineering, project management, construction and commissioning in the Center of Excellence Implementation, we efficiently execute even highly complex projects. And we manage many of them simultaneously.

“A customer project is like a temporary enterprise – we provide the CEO and the team and ensure the success of the project with our expertise.”

Hubertus Jakobi,
Head of Center of Excellence Implementation



The facility at PTKS produces hot strips between 600 and 1,650 millimeters wide and 1.4 to 16 millimeters thick.

High-quality production

Not just megaprojects, but also large-scale and medium-sized projects benefit from the holistic approach of the project teams as well as the new tools and internal processes. This permits greater transparency, a higher degree of flexibility, and thus faster and more efficient implementation, regardless of whether it involves a single plant unit or a turnkey large-scale plant. The agile, integrated project management approach also makes it possible to react swiftly to changes, which is an important advantage, not least because over the past two years alone, the global environment has seen such a dynamic change that could hardly be imagined before – with noticeable impact on the project business. The coronavirus pandemic, for instance, and also the increasing pressure on international supply chains require creative solutions. Thanks to the flexibility of our project teams, we were able to successfully continue and complete our customers' projects – whether by performing remote commissioning, virtual training, or adapting procurement.

“Data volumes within projects are constantly increasing. We make sure that the flow of information and data in project remains under control. To this end, we use specially developed tools and methods.”

Paul Tockert,
Head of Center of Excellence Implementation

This successful adaptation to global challenges has strengthened us. With the Center of Excellence Implementation, we are well positioned to deliver top performance for our customers all over the world and successfully lead our company into the future.

<h2>Center of Excellence Implementation</h2>			
<p>DEPARTMENT FOR PROJECT DELIVERY EXCELLENCE WITH 730 STAFF MEMBERS WORLDWIDE</p>	<p>730</p>	<p>IN SIX REGIONS WORLDWIDE</p>	<p>6</p>
	<p>GLOBAL EXPERT COMMUNITY WITH MORE THAN 100 INTERNATIONAL PROJECT MANAGERS</p>		<p>100</p>
<p>PROJECT MANAGEMENT EXCELLENCE - USING STATE-OF-THE-ART TECHNOLOGIES FOR OPTIMAL HANDLING OF PROJECTS:</p> <p>SAP planning tools</p> <p>Integrated project scheduling</p> <p>Preventive risk and claims management</p> <p>Intelligent document management system</p> <p>5D building information modeling</p> <p>Joint structures and interfaces (e.g., plant breakdown structure)</p>		<p>AREAS OF EXPERTISE:</p> <ul style="list-style-type: none"> — Integrated plants: Sales and order handling EPC projects, feasibility studies — Project management: Global competence center for over 100 project managers — Commercial contract management: Commercial and contractual management of projects — Project governance and controls: Time scheduling, document management, project governance and steering — General engineering: Interdisciplinary plant engineering, bundled engineering expertise for various product and plant types (foundations, pipework, building construction, etc.) — Construction and erection: Central site services, site management, erection planning and execution, field services — Implementation management office: Processes and project reporting 	

Projects around the World

In 2021, we were able to secure numerous new orders and implement crucial projects with ideal results. A selection thereof is presented in brief in the following.

COMMISSIONING PROJECT — USA

» Stronger after modernization

For our customer Nucor-Yamato Steel Company (NYS), we successfully modernized heavy beam mill No. 2 at the Blytheville location in Arkansas, USA. The line is used to produce wide-flange beams and I-beams. The upgrade enables NYS to further expand its leading market position in the construction steel sector, since the compact tandem reversing mill allows for more diverse and heavier products and provides higher capacity at lower costs.



COMMISSIONING PROJECT — MEXICO

» Non-stop hot-dip galvanizing

Designed for an annual capacity of 400,000 metric tons, the new continuous hot-dip galvanizing line we supplied to Nucor-JFE Steel Mexico now produces high-quality steel strip for the automotive industry. SMS was responsible for the engineering, technology, electrical systems, and automation of the line installed in Silao, Mexico. The scope of supply also included a recoiling line and an inspection line.



ORDER — BRAZIL

» Higher capacity

Brazilian-based ArcelorMittal Vega has selected us to expand their flat rolling complex we installed in 2003 with a new universal annealing and hot-dip galvanizing line as well as a recoiling and inspection line. This project will increase production capacity by 640,000 metric tons per year. In addition, our customer will be able to produce ultra-high-strength steel strip for the automotive industry in the future. Commissioning is scheduled for 2023.



The order includes modifications to the existing pickling line/tandem cold mill at the São Francisco do Sul production site.



ORDER — GERMANY

» **Electrical strip for e-mobility**

thyssenkrupp Steel Europe is concentrating its electromobility activities at the Bochum location in Germany. To this site, we will supply an annealing and insulation line for the production of non-grain-oriented electrical steel. The annealing process recrystallizes the microstructure of the cold-rolled strip to be coated with an insulating layer. From 2024 on, our customer will be able to produce over 200,000 metric tons of electrical steel per year for use in efficient electric motors and generators.



ORDER — ITALY

» **Water management system for sustainable steel production**

Italian section producer Duferco Steel has contracted us to equip the new medium section mill in San Zeno, in the province of Brescia, with a state-of-the-art water treatment plant. The saving and treatment of water are essential factors to achieve production process sustainability. This means we will supply a new water management system to the northern Italian works in addition to the medium section mill.



The line's outstanding features are its resource-saving processes and the high degree of automation and digitalization.

ORDER — ITALY

» **One of the world's largest continuous casters for copper alloys**

To Hailiang Metal Europe we are supplying a four-strand fully continuous caster for brass billets. The horizontal machine will be installed at the Serravalle site in Italy and replace an older line. With an annual capacity of up to 150,000 metric tons, the caster will be one of the largest continuous machines for copper alloys around the globe. Commissioning is scheduled for the second half of 2022.



COMMISSIONING PROJECT — BELGIUM

» **Further stainless steel line**

Improved competitiveness through enhanced cost efficiency, shorter delivery times, a broader range of products, and automated and resource-saving processes: Aperam Stainless Belgium successfully commissioned the new annealing and pickling line supplied by SMS. This will be the second stainless steel line we have installed at Aperam's Genk site.

ORDER — GREECE

» **Earthquake-proof logistics**

Greek aluminum producer ElvalHalcor is continuously expanding production capacity at its Oinofyta plant near Athens, always with an eye on optimized transport processes. Our intralogistics specialist company AMOVA is to connect the tandem hot strip mill with the cold-rolling mill and to build a state-of-the-art high-bay warehouse where the coils can be stored and cooled in a gentle manner. In the planning phase, earthquake safety was an important issue to be considered. Commissioning of the plant is scheduled for mid-2022.



ORDER — TURKEY

» **Aimed at higher rolling capacity**

Turkish steel producer Habaş has awarded us an order covering the extension of the hot strip mill at its Aliğa site near Izmir. With this upgrade to the rolling mill, supplied and commissioned by us in 2014, Habaş is aiming for a significant capacity increase of up to 4.5 million metric tons per year as from 2023.



COMMISSIONING PROJECT — SOUTH KOREA

» Upgrade for larger beams

Following our modernization of the section mill in Incheon, South Korea, Hyundai Steel is now able to produce larger beams with webs of up to 1,100 millimeters and sheet piles up to a system height of 800 millimeters. Our customer also benefits from higher rolling speeds, shorter change times, and reduced maintenance effort while improving tolerances.



COMMISSIONING PROJECT — RUSSIA

» First plant of its kind

The world's first recycling plant for the recovery of precious metals from electrical and electronic waste was ordered in 2017 and handed over to the operating company Aurus in the year under review. Aurus is domiciled in Mzensk, Russia, and belongs to Ecopolis Corporation.

COMMISSIONING PROJECT — CHINA

» High-strength hot strip now possible

Benxi Iron & Steel has issued the final acceptance to SMS for the modernization of its hot strip mill No. 1. Substantial improvements to the mill made the rolling process even more stable. In addition, the upgrade now allows high-strength grades to be produced and increases availability at the Chinese location.

COMMISSIONING PROJECT — INDIA

» Long welded rails for western India

With the production of the first long rail for Western Railway, a regional company of India Railways, the new flash butt welding line in Ahmedabad started operation. As EPC contractor, SMS India supplied, installed, and commissioned the entire process equipment and all transformers needed to manufacture the up to 260-meter-long welded rails (LWR). The plant is part of the high-speed train project from Ahmedabad to Mumbai. Flash butt welding is a very precise process and is the preferred solution for seamlessly welded tracks of high quality to ensure safe and comfortable high-speed traffic.

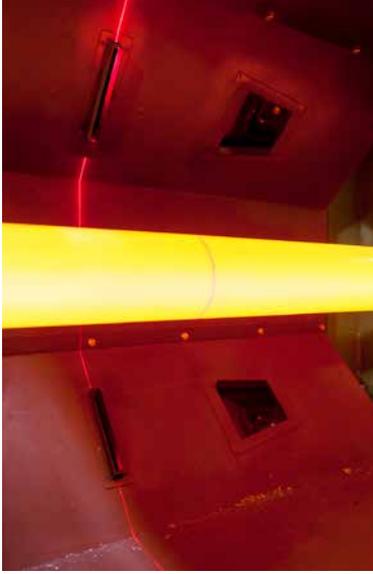


COMMISSIONING PROJECT — INDIA

» Innovative furnace

In Toranagallu, India, JSW Steel successfully started up the first zero-power furnace supplied by SMS. After installation of the facility, annual production increased by approximately 1.5 million metric tons. The zero-power furnace uses a charge mix with about 90 percent liquid pig iron content. The optimized process is mainly based on a higher oxygen blowing rate by sidewall injectors.

Laser-based light-section measurement with the TBK PROgauge system.



ORDER — JAPAN

» Unprecedented precision

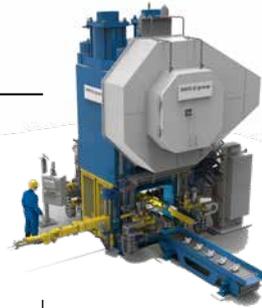
Osaka Steel has invested in the PROgauge light-section system from our subsidiary TBK Automatisierung und Messtechnik, based in Austria. The use of PROgauge will enable the Japanese section producer to perform surface analyses based on 3D representation and hence to optimize its production in an area not measurable previously.

ORDER — CHINA

» Smart maintenance included

In order to enable the construction of light-weight electric vehicles, Hirschvogel Automotive Components will produce aluminum chassis components in Pinghu, China, in the future. For this purpose, SMS is supplying a fully automated closed-die forging press with a force of 3,150 metric tons, which is scheduled to start operation in the second quarter of 2022. The order includes future support in plant maintenance via remote access with the aid of special data glasses (SMS Smart Glasses).

The fully automated eccentric press from SMS combines impressive performance and outstanding availability.



COMMISSIONING PROJECT — TAIWAN

» Vacuum pump offers many advantages

Our customer China Steel Corporation operates a steelworks in Kaohsiung, Taiwan's second largest city. As part of its modernization project we supplied and commissioned a powerful vacuum pump to further improve plant availability and steel quality. Production is running smoothly now and without interruptions even at higher condensate cooling water temperatures.

ORDER — CHINA

» Modernization of wide hot-strip mill

Panzhuhua Steel & Vanadium Co. Ltd., China, has awarded SMS group the order for an extensive modernization of its 1,450-millimeter hot strip mill in Panzhihua, Sichuan Province. This revamping of the facility, which has been in operation since 1996, entails the renewal of all quality-relevant equipment and will enable Panzhihua to expand its portfolio by thin-gauge and high-strength hot strips, while improving mill availability and, as a result, production capacity. Annual production capacity will be raised from currently 2.4 million tons to at least 3 million tons. The revamp will further enhance the flexibility of the wide hot-strip mill with regard to the product mix, which includes carbon steel as well as silicon steels and titanium strips. The first hot strip is scheduled to be rolled in October 2022.

COMMISSIONING PROJECT — CHINA

» High-end products to ensure safe road holding

At its Ningbo site in China, our customer Ningbo Xusheng Auto Technology commissioned a fully automatic closed-die forging line. Excellent mechanical properties and a uniform microstructure of the aluminum forgings are indispensable requirements to ensure the safety of mass-produced automobile chassis parts.



➤➤ Consolidated statement of financial position

EUR THOUSAND	Dec. 31, 2021	Dec. 31, 2020 restated retrospectively ¹	Dec. 31, 2020
ASSETS			
Intangible assets	323,511	334,452	334,452
Property, plant, and equipment	491,620	497,586	646,471
Investment property	523,900	505,467	0
Shares in unconsolidated affiliated companies	5,460	4,011	4,011
Shares in investments accounted for using the equity method	69,585	68,567	68,567
Other equity investments	45,114	38,980	38,980
Investment securities	145,652	155,048	155,048
Deferred tax assets	85,709	58,236	63,228
Other non-current assets	11,323	12,052	12,052
Non-current assets	1,701,874	1,674,400	1,322,809
Inventories not including short-term contract assets	237,873	180,020	180,020
Short-term contract assets	652,373	626,082	626,082
Inventories	890,246	806,102	806,102
Trade receivables not including short-term contract assets	520,385	453,464	453,464
Short-term contract assets	265,139	302,722	302,722
Trade receivables	785,524	756,186	756,186
Receivables from income taxes	21,915	18,216	18,216
Other current assets	142,417	217,042	217,042
Securities	276,014	277,464	277,464
Cash and cash equivalents	896,244	741,570	741,570
Current assets	3,012,360	2,816,580	2,816,580
Total assets	4,714,234	4,490,980	4,139,389

¹ In the financial year, a change was made to the accounting policies with regard to investment property. In accordance with IAS 8.19, the change was applied retrospectively and recognized directly in equity as of January 1, 2020.

EUR THOUSAND	Dec. 31, 2021	Dec. 31, 2020 restated retrospectively ¹	Dec. 31, 2020
LIABILITIES			
Issued capital	52,000	52,000	52,000
Capital reserves	499,264	499,264	499,264
Retained earnings	-85,818	-56,373	-213,504
Income and expense recognized directly in equity	14,374	-13,698	-13,698
Equity attributable to shareholders of SMS GmbH	479,820	481,193	324,062
Non-controlling interests	174,753	203,776	95,454
Equity	654,573	684,969	419,516
Non-current financial liabilities	111,103	65,771	65,771
Provisions for pensions and similar obligations	768,671	787,063	787,063
Deferred tax liabilities	202,533	179,196	93,058
Other non-current provisions	96,585	92,176	92,176
Other non-current liabilities	10,578	3,520	3,520
Non-current liabilities and provisions	1,189,470	1,127,726	1,041,588
Current financial liabilities	83,271	90,676	90,676
Trade payables	371,817	366,531	366,531
Liabilities from income taxes	21,814	18,602	18,602
Short-term contract liabilities	1,098,913	865,207	865,207
Other current provisions	1,118,102	1,187,227	1,187,227
Other current liabilities	176,274	150,042	150,042
Current liabilities and provisions	2,870,191	2,678,285	2,678,285
Total liabilities	4,714,234	4,490,980	4,139,389

¹ In the financial year, a change was made to the accounting policies with regard to investment property. In accordance with IAS 8.19, the change was applied retrospectively and recognized directly in equity as of January 1, 2020.

➔ Consolidated income statement

EUR THOUSAND	2021	2020 restated retrospectively ¹	2020
Revenue	2,558,568	2,744,922	2,744,922
Cost of sales	-2,000,702	-2,325,700	-2,325,700
Gross profit	557,866	419,222	419,222
Selling costs	-280,517	-261,422	-261,422
General administrative costs	-134,481	-124,866	-124,866
Other income	98,952	108,283	65,616
Other expenses	-148,317	-271,183	-272,865
Operating result	93,503	-129,966	-174,315
Result from investments accounted for using the equity method	-869	2,277	2,277
Other net investment result	-9,563	423	423
Net investment result	-10,432	2,700	2,700
Earnings before interest and taxes (EBIT)	83,071	-127,266	-171,615
Financial income	26,949	28,235	28,235
Financial expenses	-23,497	-21,415	-21,415
Net financial result	3,452	6,820	6,820
Earnings before taxes (EBT)	86,523	-120,446	-164,795
Income taxes	-25,124	-18,722	-7,365
Net loss/net profit for the year	61,399	-139,168	-172,160
Thereof attributable to:			
Shares attributable to shareholders of SMS GmbH	54,574	-152,379	-172,109
Non-controlling interests	6,825	13,212	-51

¹ In the financial year, a change was made to the accounting policies with regard to investment property. In accordance with IAS 8.19, the change was applied retrospectively and recognized directly in equity as of January 1, 2020.

➤➤ Supervisory Board SMS group GmbH

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Sandweiler/Luxembourg,
Chairman of the Board of Directors
of Paul Wurth Real Estate S.A.

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