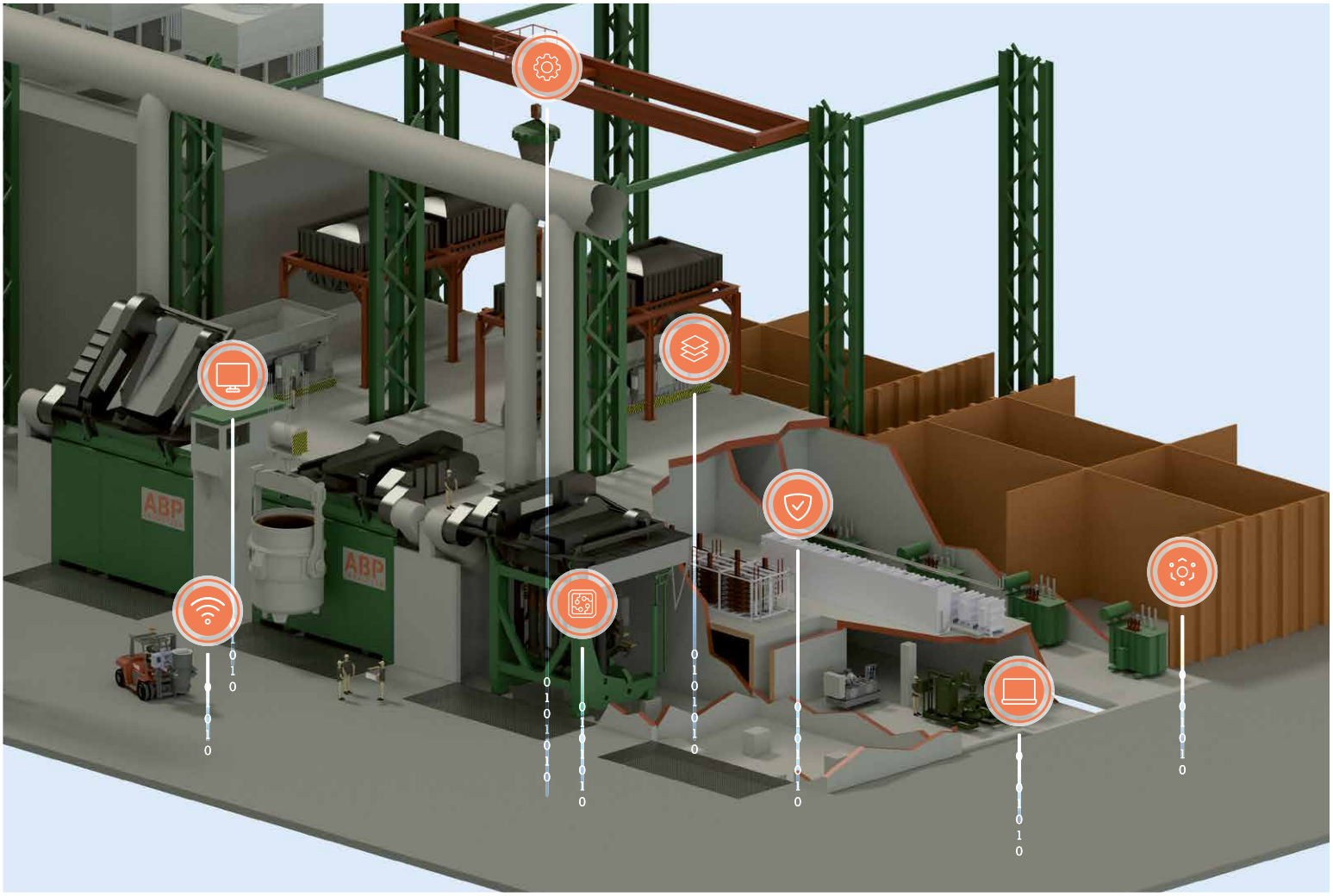
Issue December 2025

STEEL+ TECHNOLOGY

05/25

THE TECHNICAL MAGAZINE FOR IRON AND STEEL PROFESSIONALS AROUND THE WORLD



STEEL TECHNOLOGY

Net-zero CO_2 fluidized-bed reduction technology on the verge of breakthrough

STEEL PRODUCTION

How Artificial Intelligence is reshaping upstream steel production

STEEL ECONOMY

Global steel demand to bottom out in 2025, moderate growth projected for 2026

STEEL DISTRIBUTION

Investments in steel logistics infrastructure due to growing steel imports in the UK

SMS group

ELECTRIC STEELMAKING

PIONEERING MANLESS OPERATION

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Complex developments in the steel sector

This issue reflects the diversity of current developments in the global steel industry. First and foremost, it provides an analytical outlook on the global situation, which is published each October by the World Steel Association (worldsteel). This year, McKinsey also presented its report, 'Worldwide Materials Perspective 2025'. You can find a summary of both releases in our 'Economy' section, starting on **page 52**. Both reports highlight a duality: on the one hand, sustainability goals; on the other, profitable growth.

Steel companies are working to decarbonise steel production and develop new technologies through targeted R&D projects. In Australia, for example, Metal Logic intends to deploy its 'smelting as a service' model, which is based on a new, low-emission, modular smelting platform (**page 27**). In Europe, an R&D project has been developed to investigate a new hydrogen-based fine ore reduction method. A first industrial-scale demonstration plant is now set to be built in Austria (**page 38**).

Electrochemical hydrometallurgical ironmaking is also under development. In the US, Electra has decided to build a demonstration facility after a pilot plant proved the industrial feasibility of the method (**page 40**). Lastly, Outokumpu is proceeding with the R&D of methods for producing critical materials, such as chromium metal and enriched ferrochrome, without using carbon. The company is going to set up a new pilot plant in New Hampshire, USA. This will be a significant step forward in Outokumpu's strategy to scale up a new proprietary technology (**page 42**).

Other regions continue to prioritise growth and are expanding their conventional capacities further, with the aim of becoming independent of steel imports, for example. The commissioning of the Dung Quat 2 steel complex, for instance, will enable the Hoa Phat Group in Vietnam to increase its annual steelmaking capacity by around six million tonnes (**page 48**).

Arnt Hannewald,
Dipl.-Ing., Editor

However, this is not just about domestic demand; international commodity flows are also changing at a supraregional level. Steel and other metal imports are growing in the UK and Western Europe in general. Accordingly, Peel Ports Group has decided to expand its steel and metals multimodal hubs in England (**page 56**).

Times are changing for the steel sector. This topic was also discussed in detail at the HÜTTENTAG conference, the steel industry's annual technology event in Germany (**page 22**). The steel industry is at a turning point in its history. That's a good reason for you to be kept informed by our magazine.

18 Danieli Group's consolidated operating profit has increased during FY 2024/2025 compared to last year

40

COMPANIES

STEEL TECHNOLOGY

56 Investments in steel logistics infrastructure in England

Revolutionary, low-carbon, steel roof panel with thermal insulation and photovoltaic cells 67

DIGIMELTER®

Q-ONE® HYBRID POWER FEEDER

OCTOCASTER®

ENDLESS CASTING-ROLLING

DIRECT BUNDLING

BAR SPOOLING

MERCHANT ROLLING

WIREROD COOLING

Performances, operational reliability and quick startups are the result of 20 years of continuous research and development activities, carried out at the Danieli research center and onsite together with partnering customers.
Depending on plant configuration, MIDA QLP can make use of more than 30 Danieli patents covering technological layouts, production equipment and Danieli Automation solutions, such as power, instrumentation and intelligent digital controls.

— The most efficient, digitally controlled electric steelmaking with no impact on the power grid.

— 10 m/min casting speed, allowing up to 1.5-Mtpy productivity on one casting strand, 23.5 hours out of 24 of continuous endless-casting operation.

— No gas-reheating furnace, and no induction heating during casting.

— Danieli Automation robotics and artificial intelligence for zero-men on the floor.

— Least power-consuming process with the lowest carbon footprint.

— The most competitive plant in terms of CapEx and OpEx.

DANIELI

MIDA QLP®
ENDLESS CASTING-ROLLING MINIMILLS

UNIQUE PATENTED DANIELI TECHNOLOGIES

THE TRUE AND ONLY ONES IN OPERATION WORLDWIDE

With the order placed by CMC Steel for its fourth new, MIDA QLP hybrid-ready minimill, the Danieli scorecard hits 26 plants for long-product endless casting-rolling, out of 115 total minimills.

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PLANTS

ALLEIMA APPOINTS NEW GENERAL COUNSEL

Alleima has appointed Christian Swartling as Executive Vice President and General Counsel, effective January 19, 2026. He will be a member of the Alleima Group executive management.

Christian Swartling currently holds the position of Senior Vice President Group Legal at Stora Enso. Göran Björkman, President and CEO of Alleima, comments: "Christian has a strong foundation in industrial law and corporate governance. He brings deep expertise in navigating complex regulatory environments, managing international transactions, and supporting strategic initiatives across manufacturing and sustainability-driven sectors. His background from an international industrial company and his profound knowledge of working for companies that are listed on the stock exchange, makes him a great fit for the role."

Alleima

Christian Swartling is Alleima's new Executive Vice President and General Counsel (Picture: Alleima)

ENERGY DRIVE APPOINTS GLOBAL CHIEF OPERATING OFFICER

Energy Drive, a provider of zero-capex energy efficiency solutions for large motors in the mining and metals industries, has announced the appointment of Dr. Nicholas (Nick) Moelders as Chief Operating Officer.

As Chief Operating Officer at Energy Drive, Nicholas Moelders will be responsible for global operations and serve as executive lead in North America, supporting business growth. He will oversee the company's technological development, engineering implementation, manufacturing, site preparation, supplier partnerships and ongoing site optimization.

Nicholas Moelders brings over 30 years' experience in the energy sector, across power generation, oil and gas, and clean energy solutions. His career spans operational teams at large-scale manufacturers, both in the US and internationally. James Hynd, Group Chief Executive Officer, of Energy Drive: "We are thrilled to welcome Nick to Energy Drive as our new COO. Nick's deep expertise in energy technology and his proven ability to scale and lead high-performing teams will be instrumental as we accelerate our expansion in the US and globally."

Dr. Nicholas (Nick) Moelders joins Energy Drive as Chief Operating Officer (Picture: Energy Drive)

Energy Drive

CHANGES IN OUTOKUMPU'S LEADERSHIP TEAM

Johann Steiner will assume the position of President, business area Americas, of Outokumpu and be based in Calvert, Alabama. He continues to be a member of Outokumpu's leadership team, which he joined in 2013. Most recently, Johann Steiner held the role of Executive Vice President, Strategy, Sustainability & People. Johann Steiner succeeds Tamara Weinert, who will pursue new challenges.

Anouk de Graaf has been appointed as Executive Vice President – People, Sustainability and Corporate Relations and a member of Outokumpu Leadership Team as of February 1, 2026. She has an extensive international background in human resources, spanning across diverse industries and several regions, most recently as Vice President, Global People and Culture Business Partners at Borealis. She will be based in the Netherlands and report to CEO Kati ter Horst.

Outokumpu

FOR SALE

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Ø max. 150 x 5,5 mm

MAS/MAIR
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tube finishing shop
Ø max. 150 x 5 mm

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OUTOKUMPU APPOINTS VICE PRESIDENT, INVESTOR RELATIONS

Johan Lindh has been appointed as Vice President, Investor Relations, of Outokumpu. He will be based at the company headquarters in Helsinki, Finland, and report to Outokumpu's Chief Financial Officer, Marc-Simon Schaar.

Johan Lindh brings extensive experience in leading and developing investor relations functions, complemented by a strong background in Nordic equities, research operations, and engagement with international institutional investors. He joins Outokumpu from Ahlstrom, where he served most recently as Vice President of group investor relations.

Outokumpu's previous head of investor relations, Linda Häkkilä, left the company to join Konecranes as Vice President, Investor Relations.

Outokumpu

Johan Lindh, Outokumpu's new Vice President, Investor Relations
(Picture: Ahlstrom)

THE SYSTEMS GROUP NAMES NEW PRESIDENT

The Systems Group has announced that Kyle Morgan has been promoted as the new President of The Systems Group. He has been working in different aspects of The Systems Group for the last nine years.

Kyle Morgan has been promoted to President of The Systems Group
(Picture: The Systems Group)

Company CEO Lee Morgan comments: "Kyle Morgan will oversee the companies Systems Contracting, Systems Fab & Machine and Systems Plant Services." Systems, started by Charles Hays in 1970, as a family-owned construction company, is a diverse group of companies engaged in fabrication, plant maintenance, products, and construction for the steel and metals industries.

The Systems Group

PERSONNEL CHANGES ON THE EXECUTIVE BOARD OF THYSSENKRUPP STEEL

The Supervisory Board of thyssenkrupp Steel Europe AG took several personnel decisions that became effective on November 1, 2025. The Board appointed Marie Jaroni as CEO of the company and extended her contract for further five years. The contract of Philipp Conze, Chief Financial Officer at thyssenkrupp Steel since April 1, 2024, was also extended for another five years. Wilfried von Rath has been appointed as Labor Director and Chief Human Resources Officer in addition to his role as Chief Human Resources Officer of thyssenkrupp AG and will head the Human Resources department at Steel.

Marie Jaroni's contract now as CEO of thyssenkrupp Steel Europe has been extended for further five years
(Photo: thyssenkrupp Steel)

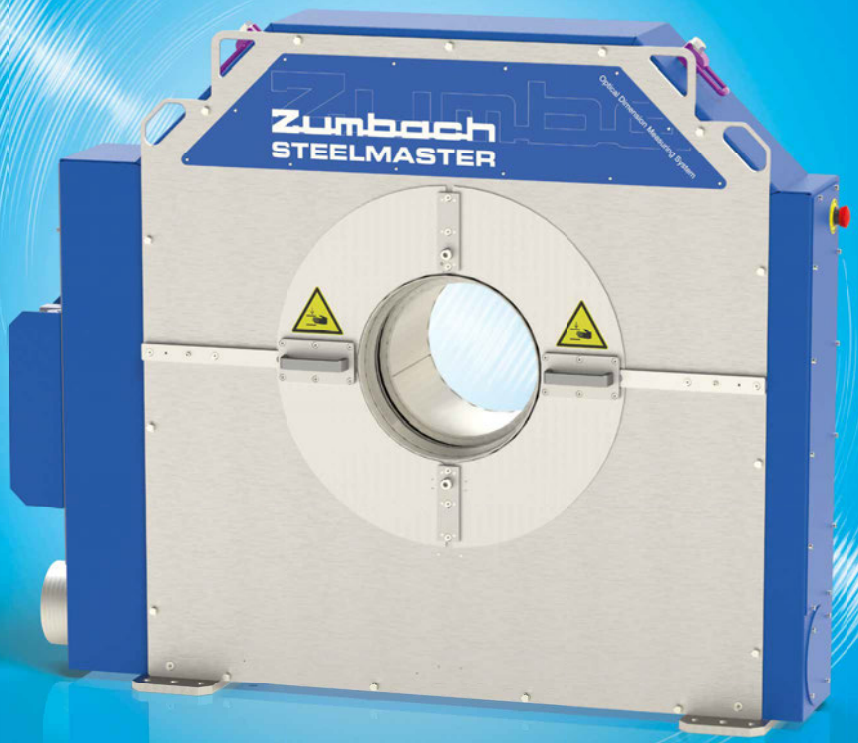
Certain Executive Board responsibilities will be temporarily reassigned. Marie Jaroni assumes interim responsibility for production operations, strategic corporate management, and additional functional areas. The position of Chief Production Officer will be filled in a structured process as soon as possible. Her current responsibilities will be taken over on an interim basis by the current Head of Sales, Georgios Giovanakis.

Dennis Grimm, the previous Spokesman of the Executive Board and COO of thyssenkrupp Steel Europe AG, is stepping down from his positions by mutual agreement. Ilse Henne, Chairwoman of the Supervisory Board: "Dennis Grimm assumed responsibility for the steel business at thyssenkrupp during a challenging phase and, in addition to numerous operational improvements, played a decisive role in shaping a new industrial concept and initiating the urgently needed restructuring. The Supervisory Board would like to express its gratitude to Dennis Grimm and wishes him all the best and continued success."

thyssenkrupp Steel

Zumbach

SWISS PRIME MEASURING SINCE 1957



min

4

Min. object diameter (mm)

max

135

Max. object diameter (mm)

1 – 3

Measurement axes

up to 6000

Scan rate (scans/s)

STEELMASTER SMR

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Benefits:

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PLIBRICO ANNOUNCES APPOINTMENT OF NEW PRESIDENT AND CEO

The Plibrico Company has appointed John Paul Surdo as its new President and Chief Executive Officer, following the retirement of longtime President and CEO Brad Taylor.

John Paul Surdo brings to Plibrico a distinguished career in large global manufacturing and distribution organizations, where he successfully led turnarounds, integrated acquisitions, and implemented go-to-market strategies that expanded market share and profitability. He holds a bachelor of science in business administration and an MBA in general management.

Plibrico Company, LLC is a single-source supplier of aluminosilicate and high-alumina monolithic refractories used in the processing of aluminium, steel, waste, power generation, and other demanding thermal environments.

Plibrico

John Paul Surdo succeeds Brad Taylor as President and CEO of Plibrico
(Photo: Plibrico Company)

THYSSENKRUPP DECARBON TECHNOLOGIES FILLS NEW POSITION OF CHIEF OPERATING OFFICER

Nadja Håkansson has been appointed as Chief Operating Officer and a member of the Executive Board of the thyssenkrupp Decarbon Technologies segment. She will assume this role in addition to her current position as Chief Executive Officer of thyssenkrupp Uhde.

Prior to joining thyssenkrupp, Nadja Håkansson held various management positions at Siemens and Siemens Energy. In these roles, she gained extensive international experience in supply chain management, operations, sales, and corporate management.

The Decarbon Technologies segment offers innovative cutting-edge technologies for the transformation to a climate-neutral industrial economy. It includes the thyssenkrupp businesses Rothe Erde, Uhde and Polysius as well as the majority stake in thyssenkrupp nucera.

thyssenkrupp Decarbon Technologies

Nadja Håkansson was appointed to the new position of Chief Operating Officer of thyssenkrupp Decarbon Technologies for an initial period of three years
(Picture: thyssenkrupp)

CHANGES TO STEGRA'S BOARD OF DIRECTORS

Shaun Kingsbury has been appointed new Chairman of the Board of Stegra replacing Harald Mix who has decided to step down as Chairman but will continue as an active member of the Board.

Following the announcement by Annica Bresky and Susanna Campbell to step down as Board Directors, Aidan de Brunner and Emmanuel Rodriguez were nominated as new Board Directors. Their appointments, as well as the appointments of Annemarie Manger and Lars Fromm, as new Directors were recently confirmed at an extraordinary general meeting. Stegra's Board now consists of the following individuals: Aidan de Brunner, Pierre Etienne Franc, Henrik Henriksson, Klas Johansson, Shaun Kingsbury (Chairman),Carl-Erik Lagercrantz, Matthew Lim, Harald Mix and Emmanuel Rodriguez.

"The combined and extensive experience of the new board members will be valuable as the work progresses with the establishment of the world's first large-scale green steel plant in Boden. I would also like to thank our co-founder Harald Mix for his leadership as Chairman over the past five years," said Shaun Kingsbury, Chairman of the Board of Stegra and Co-Chief Investment Officer of Just Climate.

Stegra

BELGIUM

Industeel to upgrade reheating furnace

SMS group has been awarded the order for a sustainable revamp of the walking beam furnace at its plate mill in Charleroi

This project represents a further step forward in Industeel Belgium's commitment to sustainability. By focusing on reducing fossil fuel emissions and the overall plant's carbon footprint, the revamp will improve the environmental performance of the furnace originally installed in 1969. The project scope includes the complete relining of the furnace box, installation of a high-performance heat recuperator, and the integration of SMS's innovative RAD-Flame HY2 burners, flat flame roof burners as well as X-Pact Prometheus, a fossil fuel combustion control system.

The X-Pact Prometheus combustion control system will ensure precise control of the heating process, resulting in reduced energy waste and better overall furnace performance. It will guarantee heating quality and process repeatability to reduce scrap and product repairs after rolling.

The modernization is scheduled for completion in the summer of 2026. The dismantling of the existing furnace and installation of the upgraded system will take place during a six-week summer outage, thus minimizing any disruption to production.

SMS group

FRANCE

GravitHy to connect with maritime terminal

GravitHy and HES FOS have signed a Memorandum of Understanding to explore a long-term partnership that will create critical infrastructure connecting GravitHy' s new industrial site in Fos-sur-Mer with HES FOS's established maritime terminal.

GravitHy is developing a large-scale industrial project in Fos-sur-Mer to produce low carbon hydrogen to produce direct reduced iron (DRI/HBI). Its operations will rely on the import of iron ore pellets and the export of hot briquetted iron, requiring reliable maritime access and storage capacity. The plant is scheduled to become operational by 2029, making the timely development of port connections and storage infrastructure essential.

Through the MoU, the parties will work together on the development and construction of the infrastructure necessary to link GravitHy' s site directly to HES FOS's terminal. This includes storage, handling and transfer facilities designed to ensure efficient supply chains for incoming raw materials and outgoing products. The MoU sets the framework for both parties to negotiate a final agreement by 2026. The collaboration aims to secure a long-term, commercially viable framework that justifies the required capital investment.

HES FOS is a subsidiary of HES International, headquartered in Rotterdam, a leading European seaport infrastructure operator for dry and liquid bulk products.

GravitHy / HES

GERMANY

Salzgitter and Oldendorff Carriers partner to decarbonize maritime iron ore transport

Salzgitter Flachstahl aims to reduce carbon emissions in the maritime transport of iron ore, marking a further step toward decarbonizing the supply chain.

On course together: Salzgitter AG and Oldendorff Carriers are advancing the decarbonization of seaborne iron ore transport (Photo: Salzgitter AG)

Starting in January 2026, Oldendorff will transport iron ore for Salzgitter from various loading ports to Hamburg using bulk carriers operated with a focus on fuel-efficient practices. By optimizing cargo flows and routing, the collaboration is expected to reduce CO_2e emissions by at least 20%. This collaboration is projected to cut approximately 19,000 t of CO_2e, equivalent. The reductions represent Scope 1 emissions for Oldendorff and Scope 3 emissions for Salzgitter.

Oldendorff's fleet primarily consists of modern "eco"-type bulk carriers, which are designed to reduce fuel consumption compared to earlier vessel generations. Optimized hull forms, advanced engine technology and additional fuel-saving features contribute to a lower carbon intensity per tonne of cargo transported.

Salzgitter AG / Oldendorff Carriers

Stahl-Holding-Saar secures financing package for low-carbon transformation

SHS – Stahl-Holding-Saar Group, together with its subsidiaries Dillinger and Saarstahl, has successfully secured financing for its Power4Steel transformation project – one of Europe's largest decarbonization initiatives. The total financing package amounts to approximately EUR 1.7 billion, ensuring full funding for the entire duration of the investment project.

The financing was secured through a consortium of leading national and international banks and combines elements of corporate and investment financing. The investment component is supported by the export credit agencies OeKB (Austria) and SACE (Italy). Additional funding is provided through substantial equity contributions and direct financial support from the German Federal Government and the Saarland Regional Government under the EUR 2.6 billion programme for transforming the Saarland steel industry.

As part of the Power4Steel project, a new direct reduction plant and two electric arc furnaces are under construction at the Dillingen and Völklingen production sites. These will gradually replace the existing blast furnaces and converters. Hydrogen-based steelmaking will enable a significant reduction in CO_2 emissions, with levels expected to drop by around 55% by 2030. Fully climate-neutral production is envisaged by 2045. In the long term, SHS aims to become the largest producer of green steel within its peer group.

SHS – Stahl Holding Saar

GREECE

Sovel orders new spooler line for high-capacity rebar coils

Sovel, part of Sidenor, has ordered a new K-Spool line from Danieli to be installed at Sovel's micromill in Almyros. The new line will be integrated into the endless casting and rolling mill recently upgraded by Danieli.

The new equipment will replace the existing spooler line, which currently produces coils of up to 3.5 t, and will enable the production of compact, twist-free rebars-in-coil of up to 8 t, in diameters from 8 to 25 mm. The Danieli supply includes two spoolers, upstream equipment such as pinch rolls, loopers and laying devices, a new cropping shear, and a complete downstream coil handling system featuring Sund Birsta automatic strapping machines and discharging stations. This project will increase coil weight capacity, improve production efficiency and reduce handling and transformation costs for Sovel's rebar products. The new spooler line will be supported by patented Danieli Automation technology for precise coil loop control and formation. Integrated into the MIDA endless casting.

Danieli

SPAIN

ArcelorMittal Sestao to upgrade meltshop

As part of the "Sestao 1.6" new investment programs aiming for zero-carbon emissions, capacity increase and expanded product portfolio, ArcelorMittal Sestao has selected Danieli for the turnkey supply of a new fume-treatment plant and vacuum degasser for its Vizcaya plant, Basque Country.

The project team for the meltshop upgrade at ArcelorMittal Sestao (Photo: Danieli)

The installation of a new fume-treatment plant serving the existing No. 1 electric arc furnace will allow ArcelorMittal Sestao to fully exploit the potential of the two existing EAFs and increase productivity to up to 1.6 million t/year. The new fume treatment plant will filter EAF fumes with dust emission at the stack of less than 3 mg/Nm³. The dedusting system will include a refractory-free quenching tower, a Danieli-patented plug & play modular filter, and ID fans with variable-frequency drives.

A new vacuum degassing station featuring mechanical dry vacuum pumps will enable production of clean steel with precise chemical control, and low nitrogen and hydrogen content, making possible the expansion of the steel-grade portfolio at the flat-product facility of AM Sestao.

The compact and optimized layout enables the vacuum degasser to be installed in an extension to the existing meltshop bay, ensuring efficient ladle and process logistics from any melting unit and enhancing operational safety. An automatic foaming slag control system mounted on the vacuum cover to optimize pump-down time, and a Q-Degas system for real-time process control and quality assurance will be part of the vacuum degassing station. New Danieli Automation electrical and process control systems will be integrated within the meltshop's existing electrical and automation system. The new equipment is scheduled to be in operation starting from August 2026.

Danieli

SWEDEN

SSAB begins construction of new steel mill in Luleå

Ground has been broken for the construction of SSAB's new steel mill in Luleå. The new steel mill complex will be based on modern technology with two electric arc furnaces, advanced secondary metallurgy, energy efficient direct rolling mill and cold mill complex.

The Minister for Energy, Business and Industry and Deputy Prime Minister, Ebba Busch, and SSAB's CEO Johnny Sjöström broke ground for SSAB's new steel mill in Luleå (Photo: SSAB)

SSAB's new steel mill will replace today's blast furnace-based production and will have a capacity of 2.5 million t/year. In total, SSAB's investment in Luleå amounts to EUR 4.5 billion and also includes a cold rolling mill, advanced galvanization and continuous annealing. While the project is primarily financed by SSAB with its own funds, the Swedish Energy Agency has decided to grant SSAB SEK 314 million in funding through The Industrial Leap, focusing on finishing steps such as hot rolling, cold rolling and galvanizing – parts of the process that have not previously received public funding. SSAB had previously been granted SEK 1.45 billion through the Just Transition Fund and the Swedish Agency for Economic and Regional Growth to replace the blast furnace with an electric arc furnace up to the continuous casting stage. The start of operations of the new steel mill is planned for the end of 2029. In total, SSAB's investment in Luleå also includes advanced galvanization and continuous annealing.

SSAB

Plant electrification contract for Luleå mill of SSAB

SSAB has awarded ABB the contract to deliver the main electrical infrastructure for SSAB's new fossil-free mini-mill in Luleå

ABB deliverables between 2025 and 2028 will provide the foundation for fossil-free steelmaking at the site with the facilitation of a stable, efficient and future-ready electrical system. The scope includes full electrical design services as well as the supply of medium and low voltage equipment, distribution transformers, UPS systems, DC distribution, backup power systems, automation power control and monitoring system. ABB will also be responsible for installation and commissioning, acting as a single supplier for the entire project.

ABB

Stegra enters new financing round

The necessary additional scope includes the insourcing of railway investments and investments in port infrastructure.

These mission critical assets were initially intended to be funded by external parties, but are now being designed, built and owned by Stegra, which also enables greater control over the project plan. The round will also fund additional necessary groundwork and offset generally inflated costs for materials, construction and installation.

In addition to the initial commitments from equity investors, Stegra is in advanced discussions regarding outsourcing opportunities. The proceeds from the round are expected to represent up to approximately 15% of Stegra's total project funding, comprising a mix of new equity, debt, outsourcing and selected strategic partnerships. The round aims to fund additional scope related to insourcing of certain infrastructure, cover higher project costs, secure a prudent financial buffer and offset state grants that were not fulfilled despite approval from the EU Commission.

Stegra

TURKEY

Kardemir invests in 3-roll technology to enhance SBQ rolling

The investment is part of a modernization project aimed at increasing reliability and product quality in the rolling of special bar quality long products.

Special steel producer Kardemir Karabük Demir Çelik Sanayi ve Ticaret A.Ş. has placed an order with KOCKS for a reducing & sizing block RSB® 370++/4. The new unit will be integrated into the combined special bar quality mill after 2-high stand No. 18 and replace an existing sizing mill. The rolling mill, commissioned in 2018, has a designed capacity of 700,000 t/year. It includes a cooling bed, a bar-in-coil (BIC) line, and a wire rod outlet. Kardemir supplies its high-quality steel products to processing industries, including automotive, railway, machinery, and construction.

With the implementation of the new technology, the Turkish steel producer will be able to produce a broad range of SBQ dimensions, including straight bar products with diameters ranging from 20.0 to 105.0 mm, bar-in-coil products from 20.0 to 56.0 mm and hexagonal bars from 20.0 to 75.0 mm. In addition to the RSB®, the scope of supply includes the advanced 4D Eagle S measuring system, which provides precise real-time dimensional data and is connected to the size control system for continuous quality assurance during production.

Representatives of Kardemir and KOCKS after contract signing (Photo: KOCKS)

The order also includes the remote control for automatic stand and guide adjustment as well as the BAMICON Octopus, a workflow-oriented solution to support all processes in the roll shop. In addition to installation and commissioning, experts from KOCKS will also provide on-site training and advisory services for the equipment. The project is scheduled for completion in the first half of 2026.

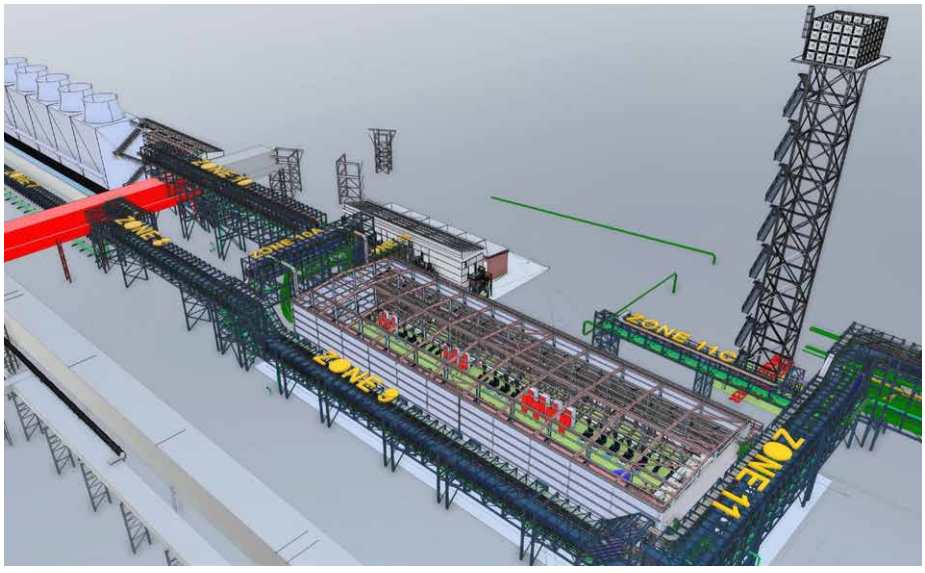
KOCKS

UNITED KINGDOM

Tata Steel orders water treatment plant

Tata Steel UK has recently signed a contract with PERT for the engineering and supply of a complete water treatment plant which will serve the new electric arc furnace of the Port Talbot project.

The new water treatment plant will serve the state-of-the-art single EAF melt shop to be supplied by Tenova. The EAF, designed for producing 450 t/h of liquid steel, equalling over 3,000,000 t/year, will require a total cooling-water flowrate of more than 25,000 m³/h. The water treatment plant will be designed according to a total water recycling concept and for maximum space optimization, matching the footprint available at the Port Talbot site. In addition to open and closed cooling circuits, the plant will feature a dedicated treatment for raw water and drains reuse. The plant will be entirely designed, manufactured and commissioned by PERT by January 2028.



A complete water treatment plant will serve the new electric arc furnace at Port Talbot (Photo: PERT)

PERT

Individual technologies that make the difference (Picture: Danieli)

ORDER BOOK WELL FILLED

Danieli satisfied with profitability

For Danieli Group, the 2024/2025 fiscal year shows a consolidated operating profit (EBIT) that has improved compared with last year's figure, despite having been penalized by the unsatisfactory results of ABS Steel Making and the problems experienced in the Plant Making segment. The net profit for the year was slightly down by 9% compared to the previous year, while an improvement is expected for the next fiscal year 2025/2026.

For Danieli Group, the 2024/2025 tax year ended on 30 June 2025 with a net profit of €220.1 million and a gross operating margin (EBITDA) of €437.8 million, up over last year and with profitability largely sufficient to ensure financial coverage for the investments that were made and for the huge expenditure in research and development incurred in the year. Good margin-to-sales ratio for the plant making segment, while steel making showed a loss with reduced and unsatisfactory margins, although it showed a good recovery in profitability in the first months of the new fiscal year 2025/2026.

Revenues of the **plant making** business segment are in line with the forecasts made at the beginning of the year and derive from fulfilled construction schedules contractually agreed with customers, with EBITDA of €384.1 million, better than the result for the 2023/2024 year, despite having recorded some significant losses during the period due to disputes with customers and significant extraordinary expenses related to the

completion and start-up of some complex and innovative plants.

In the period, the plant making segment continued to make rational use of its international structures, focusing on competitiveness in terms of innovation, technology, quality, efficiency and customer service. The types of orders currently in the plant making order book and production planning in the Group's manufacturing units allowed an orderly saturation of design offices and manufacturing shops both in Italy and the Far East, in some cases with higher transportation costs, without any significant delays in shipping or the supply chain.

On the other hand, revenues of the **steel making** business segment are lower than the budget at the beginning of the year) and show an unsatisfactory profitability (EBITDA is €53.7 million) due to the negative effect (mostly in the second half of 2024) of the costs of energy factors that in Italy are higher than in other European countries. Danieli expects that the measures taken by the Italian government, also supported by the EU, led to a gradual mitigation of this aspect during 2025, allowing for an improvement in profitability that will continue into the next fiscal year thanks to a normalization of energy costs more in line with prices per megawatt-hour in France and Germany. Steel making (ABS Group) products sold in the year reached about 1.1 million tons (10% less than last year), with the goal of increasing these volumes in the next fiscal year by bringing the furnaces serving the new bar, wirerod and ball rolling mills back to maximum capacity.

Finally, liquidity management was carried out during the year according to the usual principles of low-risk, easily realizable investments, with good average remuneration on both investments in euro and those in foreign currencies (essentially the USD). **Financial management** reports a positive result of €91 million. Cash management continued efficiently, maintaining a high level of solvency, and with a positive net financial position at the end of the period.

Currency management, on the other hand, was severely penalized by the sudden and significant depreciation of the US dollar (which occurred in June 2025), which generated a negative exchange rate effect of €86.7 million linked to the alignment of all foreign currency items in the balance sheet to the exchange rate on 30 June 2025. The negative exchange rate effect was only partially mitigated by existing hedges and therefore partially offset the good financial results achieved during the year, while remaining in any case linked to the future prospects of evolution for the Euro/US dollar exchange rate, which appears to have narrowed its fluctuation range.

Results of the fiscal year 2024/2025 compared to previous year and forecast

	2023/2024	2024/2025	2025/2026
(million €)	Group results	Group results	Group forecast
Revenues	4,350	4,200	4,200-4,300
EBITDA	391.2	437.8	430-450
Order backlog	5,751	5,384	6,000-6,200

For the year ended June 30, 2025, the number of Danieli Group **employees** was 10,009, of which 1,459 in the steel making segment and 8,550 in the plant making segment, a decrease of 356 over the figure of 10,365 employees for the year ended June 30, 2024.

Positive outlook

The performance of both the plant making (plant engineering and manufacturing) and steel making (production of special steels) segments and the continuing good level of orders in the order book allow to forecast positive results for the Group in 2025/2026 as well, with the goal of improving on what was done in 2024/2025. For the plant making segment, in particular, Danieli Group predict an operating result in line with or better than in 2024/2025, with good volumes and margins, equally distributed among the principal product lines (steelmaking shops, long and flat products) and evenly split among all the geographical areas with projects, and a better contribution to the Group's operating profit by the parent company Danieli & C Officine Meccaniche S.p.A.

Production volumes in the steel making segment are expected to grow slightly in 2025/2026, but with better margins and greater efficiency of manufacturing processes. However, the energy variable and weak demand linked to uncertainty in the EU and that generated by US tariff policy could still have a negative impact on both volumes and production margins. Considering the profile of investments already in place at the end of the fiscal year, Danieli expects a good financial result for the 2025/2026 fiscal year as well, where the exchange rate component may not have such a negative impact as it did in the 2024/2025 fiscal year.

Order book and forecasts

The Group's order book is well diversified by geographical area and product line, and for the year ended June 30, 2025, amounts to €5,384 million (of which €271 million in the special steelmaking sector) compared to €5,751 million for the year ended June 30, 2024 (of which €296 million for ABS steel making). Not included are several major orders acquired for which Danieli waits for them to come into force. Also not included is the intra-group order worth approximately €350 million from ABS S.p.A. for the new Digimelter furnace.

With these goals in mind, in the plant making segment, Danieli Group will continue to consolidate its international organization, while in the steel making segment the group will proceed with the construction of the new Digimelter at the ABS plant in Italy, which is an integral part of the new investment plan that also aims to renovate the other electric arc furnaces and double the installed production capacity, thereby improving competitiveness, quality and productivity by the end of 2025.

Danieli Group intends to continue pursuing its goals of efficiency such as increased productivity, lower fixed costs and innovation in order to be more competitive on the global market and ensure better service, especially for its customers in Southeast Asia, where most steel production is concentrated.

Danieli

TRANSNATIONAL CIRCULARITY PROJECT

2nd lease of life for Swedish railway tracks

ArcelorMittal Poland's Dąbrowa Górnicza plant has been supplying rails to the Swedish transport administration (Trafikverket) since 2022. Over time, this collaboration has strengthened the commercial relationship, and so it was no surprise that Trafikverket turned to ArcelorMittal for its innovative rail recycling project to transform used rails into new ones.

While the infinite recyclability of steel is well known, Trafikverket's engagement in circularity is shifting the traditional linear business model. Thanks to ArcelorMittal's dedication and expertise, Trafikverket is now demonstrating that even the most well-travelled rails can be brought back to life.

Tapas Rajderkar, Chief Marketing Officer, ArcelorMittal Europe – Long Products, said: "This project is a powerful example of how circularity and innovation can go hand in hand. By transforming used rails into new ones for the same network, we're redefining the future of sustainable infrastructure. I am truly grateful to Trafikverket for its confidence in our capability to support its innovative project."

Fredrik Svensson, business development purchasing and logistics manager at Trafikverket, said: "It is very important that we reduce our environmental footprint as much as possible, and one way is to close the loop with rails that have reached the end of their lives by bringing them back to their original performance. It is also important that we support our suppliers in moving towards more sustainable production methods, such as electric arc furnaces driven by renewable electricity sources. Our used rails will, in time, play a big role as high-value raw materials, helping us to secure our supply of new green rails."

A prime example of the circular economy in motion

The first 1,000 tonnes of dismantled rails arrived at Dąbrowa in July 2025, and another 1,500 tonnes are en route. "Dismantled rails are sent to Hallstahammar, where they are cut into smaller sections and loaded onto trains. They are then transported to Ystad, and from there they travel to Poland by ferry,"explains Witold Hickiewicz, logistics project manager at ArcelorMittal Poland.

The first 1,000 tonnes of dismantled rails arrived at Dąbrowa in July 2025
(Picture: ArcelorMittal)

This collaborative recycling effort is more than just logistics – it is a prime example of the circular economy in motion. The initiative, launched by Trafikverket, also includes several other partners besides ArcelorMittal Recycling Poland and ArcelorMittal Europe – Long Products, and redefines what it means to move forward together.

Maciej Graczyk, head of purchasing responsible for rail logistics at ArcelorMittal Poland, said: "We are more than happy to collaborate in this pilot with Trafikverket, thanks to which we not only deliver our rails to Sweden, but also gain a very valuable raw material."

This project is a proof to how industry and a railway administration can work together to meet sustainability goals. By turning used rails into a resource and removing national boundaries from the recycling chain, ArcelorMittal and its partners are redefining supply chain efficiency and environmental responsibility.

Marek Bednarek, ArcelorMittal Europe – Long Products area sales manager, said: "It's incredibly rewarding to support a customer who shares our vision for sustainability. By creating a circular system on rail production and reuse, we're not just delivering steel – we're delivering long-term value and trust."

As rail transport continues to grow as a sustainable alternative to road and air travel, the demand for long-lasting, environmentally responsible rail solutions will only increase. With recycling efforts like this, ArcelorMittal is not only meeting that demand – it is helping to shape the future of mobility.

ArcelorMittal Europe

> Our used rails will, in time, help us to secure our supply of new green rails.
>
> *Fredrik Svensson, business development, purchasing and logistics manager at Trafikverket*

FERALPI STAHL: Systematically Implementing Sustainability

Sustainability is an integral part of FERALPI STAHL's corporate strategy: growth with respect for people and the environment. This guiding principle, coined by Carlo N. Pasini, the founder of the Italian Feralpi Group, is more relevant today than ever.

Yet good intentions alone are not enough, as sustainability is a dynamic process. It requires transparent objectives, reliable systems for measurement and control, and clear organizational structures. Thanks to the Integrated Management System (IMS), sustainable innovation is implemented across all levels of the company.

FERALPI STAHL in Transition: Commitment to Innovation

At its Riesa site, FERALPI STAHL is recognized a pioneer in environmentally friendly steel production. For more than 30 years, the plant has been producing steel for the construction industry within a circular economy model: thanks to the use of an electric arc furnace, its CO_2 emissions have consistently remained significantly lower than those of primary-route steel plants.

Under the brand name FERGreen®, and with the commissioning of the second rolling mill that operates entirely Scope 1 emission-free, low-emission steels have been produced since 2025. Their environmental performance is transparently documented through Environmental Product Declarations (EPDs). The product range covers the entire construction sector: from billets and spooler coils to reinforcing steel in coils, wire, and mesh.

In this way, FERALPI STAHL is evolving from a pure steel producer into a driver of innovation in the field of green construction steel.

Innovation through Planning: The New Rolling Mill in Riesa

A key milestone in this transformation is the new spooler rolling mill, commissioned in spring 2025. Notably, it is the first to operate with zero Scope 1 emissions.

Its technological highlights include:

- Inductive furnace lines
- Soft quenching for targeted improvement of material properties
- Billet welding to minimize trimming losses
- Utilization of casting residual heat to increase energy efficiency

With this technology, for example, the GWP value (CO_2 footprint, A1–A3) for spooler coils has been reduced to 296 kg CO_2e/t, compared with the 2022 baseline. For conventional billet steel, the GWP now stands at 289 kg CO_2e/t, a reduction of more than 30 % from 2022 (459 kg CO_2e/t).

However, technology alone is not enough: without structured planning, clear processes, and an integrated system, such performance improvements would hardly be achievable.

How the Integrated Management System Serves as a Foundation

FERALPI STAHL's Integrated Management System (IMS) links the disciplines of environment, energy, quality, and occupational safety. It complies with international standards such as ISO 14001, ISO 50001, and ISO 9001. Moreover, the Riesa plant is one of only two German steelworks with EMAS certification – proof that its commitment goes well beyond legal requirements and is verified and recognized through external audits.

The key advantage of the IMS lies in its structure: it organizes improvement initiatives, records performance indicators, and enables external certifications. It is therefore not an end in itself, but a tool through which innovation can be systematically managed and sustainably implemented.

Making Sustainability Visible: EPDs and FERGreen

Credibility depends on transparent documentation of environmental performance. With six Environmental Product Declarations (EPDs), all FERGreen products are comprehensively assessed for their environmental impact: from raw material extraction to the finished product.

Examples:

- Billet steel: GWP (A1–A3) = 289 kg CO_2e/t
- Spooler coil: GWP (A1–A3) = 296 kg CO_2e/t
- Wire rod: GWP (A1–A3) = 368 kg CO_2e/t

In addition, the minimum recycled content exceeds 98 %, underlining the company's consistent focus on circular economy principles. These transparent figures are based on data provided by the IMS, making sustainability measurable and comparable.

Structures for the Future

Sustainability is not a one-time initiative but an ongoing commitment. It requires both technological progress and organizational reliability. FERALPI STAHL demonstrates that when technology and systems are integrated, a solid path toward a green future emerges.

The combination of a modern rolling mill, integrated management systems, and transparent product documentation not only distinguishes the company from its competitors – it also builds trust among customers, partners, and the public.

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The HÜTTENTAG conference this year was the seventh of its kind (Picture: Lucas Möllers)

CONFERENCE REPORT

HÜTTENTAG 2025: Times are changing for the steel sector

On 13 November 2025, it was time again: around 200 participants from the steel sector came together at the HÜTTENTAG – steel's annual technology event in the heart of Europe – in the Congress Center of Messe Essen, Germany, to discuss the current challenges facing the steel industry. The motto of the HÜTTENTAG set the tone: the steel industry at a turning point in history.

The HÜTTENTAG conference this year was the seventh of its kind. With around 200 participants, the event was not quite as well attended as in previous years, which was probably due to companies' limited travel budgets. Under the motto 'The steel industry at a turning point', all participants enjoyed expressive keynote speakers, informative specialist presentations and a communicative social event, the HÜTTENABEND.

Difficult economic landscape pushes companies to their limits

HÜTTENTAG 2025 focused on how companies can adapt to an increasingly challenging economic scenario and how digitalisation, artificial intelligence and other innovations can help to reverse the trend. The ongoing recession in the German economy, new challenges on international markets and persistently high energy prices are pushing companies in the commodity industries to their limits. Years of declining demand from steel-processing sectors have also led to price pressure and overcapacity in the steel industry.

Keynotes on the transformation of the steel sector offered new impetus

The morning focused on keynote speeches, beginning with a keynote address by Thomas Schauf, Head of Strategy and Governmental Affairs at the German Steel Association. His topic, 'Steel. Location. Germany – secure it now!' addressed the continuing challenges facing the location, which are making it increasingly difficult to maintain the German steel industry – and indeed the entire industrial value chain – and thus to make the country a strong and resilient location. According to Thomas Schauf, this is a historic transformation that requires reliable framework conditions. He formulated three key demands for economic policy. First, foreign trade policy safeguards are urgently needed to counter market influence from global overcapacity, unfair trade and effective carbon leakage protection. Secondly, high energy prices have become a locational disadvan-

Thomas Schauf, German Steel Association: Steel. Location. Germany – secure it now (Picture: Lichtschacht Studio)

Till Schreiter, Chairman of the VDMA Metallurgy stated that VUCA has become a general reality
(Picture: Lichtschacht Studio)

CTO Stefan Erdmann says that Outokumpu is initiating a paradigm shift in many areas of the value chain
(Picture: Lichtschacht Studio)

tage. Energy-intensive industries expect a commitment to support grid fees, electricity price compensation and an acceleration of the development of hydrogen supply. And thirdly, a healthy steel industry is a prerequisite for a strong economy. This, in turn, is a prerequisite for a strong defence. Steel is not obsolete, but rather a topic of the future – the basis for energy, mobility and infrastructure – all of which will be built on a sustainable and resilient foundation in the future.

In the second keynote speech of the day, Stefan Erdmann, Chief Technology Officer at Outokumpu, spoke about global competition and decarbonisation. From the perspective of an international company, he highlighted the role of low-carbon raw materials that are secure in supply as a key opportunity for diversification and for promoting innovation and value creation in the metals industry. Outokumpu is initiating a paradigm shift in many areas of the value chain. On the one hand, there is the development of a new proprietary platform for low-carbon metal production. Furthermore, value chains must be redefined and re-evaluated. For example, bio-carbon is a relatively expensive raw material. However, if the production of bio-carbon is taken into account, revenues are also generated from the utilisation of climate-neutral heat and electricity generation. This makes the overall balance commercially viable. There should also be no dogma when it comes to the supply of hydrogen.

The third keynote speech was given by Till Schreiter, Chairman of the VDMA Metallurgy Association (German Engineering Federation) and CEO of ABP Induction Systems GmbH. He explained the situation in metallurgical plant engineering in light of current geopolitical and global economic upheavals and outlined the economic situation in the industry with regard to economic policy risks from the USA and China. He said: "Geopolitically, VUCA has become a general reality." [VUCA: volatility, uncertainty, complexity and ambiguity]. The economic order no longer follows democratic rules, and this at a time of technological change and an ever-increasing shift towards artificial intelligence. Till Schreiter said: "Protecting economic areas

Moderator Nadine Pungs led the keynote speakers in a fascinating panel discussion that involved the audience (Picture: Arnt Hannewald)

Thomas Kufen, Lord Mayor of the City of Essen and Patron of the HÜTTENTAG conference
(Picture: Lichtschacht Studio)

Dr Kirsten Bender, Head of the Technology and Business Location Department at the Ministry of Economic Affairs, Industry, Climate Protection and Energy of the German Federal State of North Rhine-Westphalia (Picture: Lichtschacht Studio)

Dilan Özdemir-Kaluk from Exsolut says that communication is key to employee motivation during transformation (Picture: Lichtschacht Studio)

is not the solution. The aim must be to strengthen the competitiveness of companies and reduce distortions of competition, but without subsidies."

Moderator Nadine Pungs led the keynote speakers in a fascinating panel discussion that involved the audience, with all speakers participating. It was unanimously agreed that location factors are crucial to the success of the transformation. It was also agreed that a shift in the steel value chain would certainly be irreversible.

Parallel lecture sessions in the afternoon

In three parallel lecture sessions in the afternoon, a total of 18 specialist presentations were on the programme, divided into the following thematic areas:

- Innovative metallurgical technologies
- Green energies for green steel
- Digitalisation and artificial intelligence
- Smart solutions for steel production
- Green transformation and circular economy

The specialist presentations brought together the combined expertise of around 45 authors and co-authors. This demonstrated the innovative potential that the steel industry is developing in order to tackle the current challenges.

Professional and personal exchange at the trade exhibition and evening event

Once again there was a varied industry exhibition at this year's HÜTTENTAG. This expo was the place for individual questions and discussions about concrete solutions in operational practice.

The evening programme was opened with welcoming speeches by the guests of honour. Patron Thomas Kufen, Lord Mayor of the City of Essen, spoke plainly about the state of the economy. Local companies are bound by framework conditions that are defined in Brussels or Berlin. Ultimately, it is politicians who decide on support or obstacles. Dr Kirsten Bender, Head of the Technology and Business Location Department at the Ministry of Economic Affairs, Industry, Climate Protection and Energy of the German Federal State of North Rhine-Westphalia, explained the importance of the state government's work as policy measures for transformation in industry.

Transformation requires communication for employee motivation

In a spotlight presentation, Dilan Özdemir-Kaluk, Manager of Digital Transformation Projects at the family-owned company Exsolut, illustrated that communication is crucial for winning over employees in companies for the transformation. "Only through excellent communication can you get all employees on board, motivate them and give them guidance. Because transformation can only succeed if we work together," she said. Communication can become a real driver of motivation and change. The keynote speech contained the important message that transformation is not just about technology and limits. People need clear goals. If you want to reach people, you have to touch them – clearly, honestly and inspiringly. That's how change becomes real movement. "What doesn't get under your skin won't get into your head," said Dilan Özdemir-Kaluk.

At the end of the day, the HÜTTENABEND provided a great opportunity for networking in a relaxed atmosphere, with a delicious buffet and good music.

HÜTTENTAG 2026 will take place at the same venue on 12 November 2026. The get-together of the steel industry is organised by DVS Media GmbH in cooperation with Messe Essen.

STEEL + TECHNOLOGY editors


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RESEARCH AND DEVELOPMENT

Modular low emission smelting platform

Low-emission steel platform Metal Logic has secured a strategic location in Western Australia's iron ore–rich Pilbara region to deploy its 'smelting as a service' model

Metal Logic will utilize its Australian-invented, modular and scalable array smelting technology at industrial scale with an initial array deployment of 1 million t per year then ramping up mass production from Melbourne. Chief Executive Joel Nicholls confirmed that Metal Logic has secured land from a private entity within 20 kilometres of the key rail lines that transport more than half of the Pilbara's iron ore to the coast for export. "Metal Logic intends to deploy its modular, scalable array smelter at this location, delivering our 'clean steel' solution to the market," Joel Nicholls stated. "Our platform allows treatment of lower-grade iron ore, enabling operations to continue below previous cut-off grades and unlocking previously stranded or care-and-maintenance deposits," he explained.

The company is already evaluating stranded and care-and-maintenance iron ore resources to determine their suitability for the process. Metal Logic's approach aims to reset the steel value chain by supporting two types of customers:

Resource owners with stranded assets. The technology makes lower-grade ores economically feasible, extends mine life, and reduces environmental impact by processing deposits that would otherwise remain untapped.

Locating smelters near these resources also minimizes shipping inefficiencies and keeps value creation local, potentially adding up to $400 USD in value per tonne of ore retained in Australia – creating jobs and new industries.

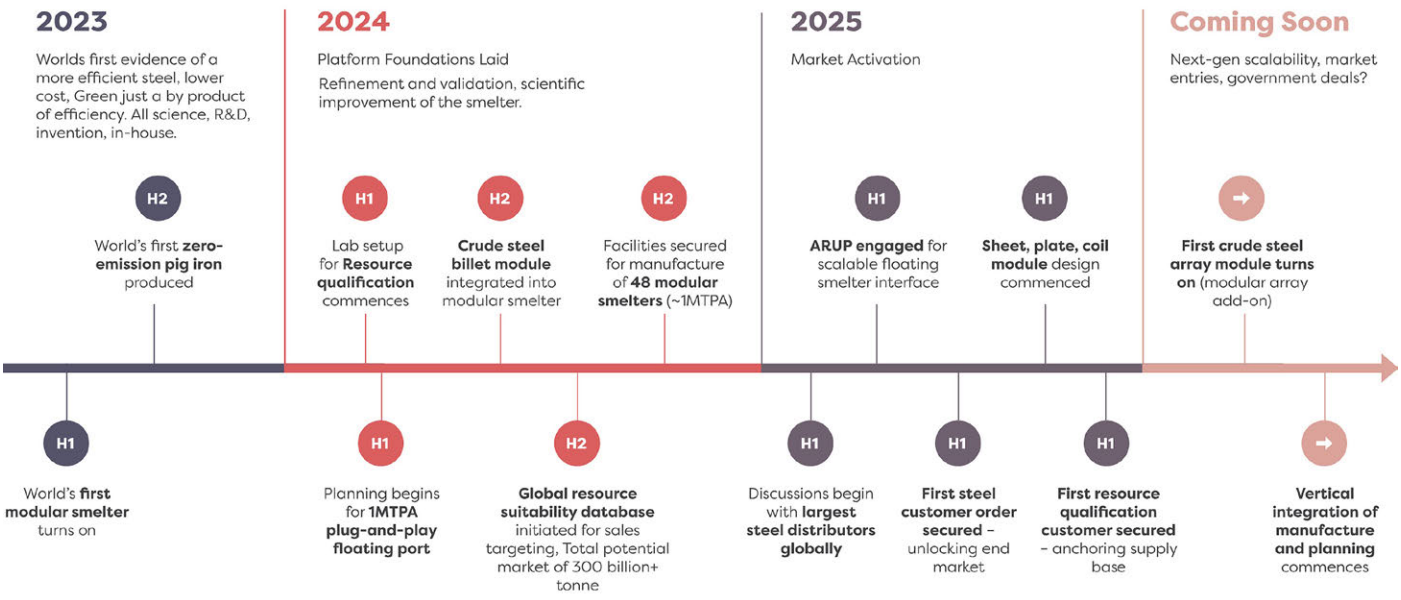
Steel buyers seeking traceability. Metal Logic offers steel with traceability and verifiable CO_2 footprints. Advanced electrochemical, photonic, and molecular-scale separation methods allow efficiency beyond traditional methods, reducing the need for bulk shipping of ore and waste.

Conclusion

Australia has long exported raw ore and repurchased high-value manufactured goods. Metal Logic's platform aims to "industrialize" resource-rich regions, extend mine life, reduce environmental footprints, and supply downstream industries with lower-cost, traceable steel. For miners, it unlocks marginal resources; for manufacturers and nations, it delivers affordable, cleaner steel at scale. For communities, it means jobs and resilience – not the loss seen with past industry closures.

Metal Logic operates research, development, laboratory, smelter development, and production facilities in Victoria, with offices in Perth and Melbourne. With its newly secured site near Port Hedland in the Pilbara, the company is advancing the commercialization of the new technology.

Metal Logic



Timeline of the low emission smelting platform (Picture: Metal Logic)

THE AMERICAS – USA

Cleveland-Cliffs collaborates with POSCO

With the recent completion of the new U.S. and Korea trade agreement, cooperation between the two nations' industrial sectors will be further reinforced by this partnership.

The partnership will allow POSCO to support and grow its U.S. customer base while ensuring that its products meet U.S. trade and origin requirements. The collaboration represents a model of how allies can deepen industrial cooperation under fair and transparent trade principles, and aligns with U.S. policy goals to strengthen domestic industry and attract foreign investment. A formal announcement on a definitive agreement is expected in the fourth quarter of 2025 or first quarter in 2026 with closing expected in 2026.

Cleveland-Cliffs

THE AMERICAS – USA

North American Stainless orders reducing & sizing block

The investment is part of a major modernization project aimed at increasing production flexibility, enhancing product quality, and improving efficiency.

KOCKS will supply an RSB® 370++/6 in the latest 5.0 design. It will be integrated into the existing rolling mill at NAS in Ghent, Kentucky, as a finishing block after 19 H/V stands. With this set-up, NAS will be able to roll straight and coiled SBQ bars, in round and hexagonal dimensions – all in one block. The RSB® will also roll the feeders for the existing wire rod line. With a total mill capacity of approximately 200,000 t/year, NAS will cover a wide and demanding product range. Finished products include round bars (stainless and high-performance alloys) from 12.7 to 103.6 mm in diameter, special rebar with 3 ribs from 12.7 mm to 44.5 mm, and hexagon bars from 12.7 to 76.2 mm.

The scope of supply will also include KOCKS Blue Box® water cooling lines and a microstructure simulator for thermomechanical rolling. Precise closed-loop quality control will be ensured by the 4D Eagle S system, combined with a size control system and remote control for automatic stand and guide adjustments. In the roll shop, the BAMICON Octopus software and hardware supports all set-up processes. KOCKS will also supply the shears as well as electrics and automation. With quick stand changes and the one-pass family rolling philosophy, the equipment will make a significant contribution to higher productivity and operational excellence at NAS, also offering a high degree of flexibility to meet customer and market requirements. Commissioning is planned for the third quarter of 2026.

Patrick Connell, KOCKS, (left) and Cristobal Fuentes, North American Stainless, signing the contract for the new reducing & sizing block (Photo: KOCKS)

KOCKS

THE AMERICAS – USA

Sterling Steel grants final acceptance for DC drives upgrade

The project involved the upgrading of 16 DC drives for the company's rolling mill stands.

The scope of supply included engineering, equipment delivery, and commissioning of the new DC drive systems. The upgrade was prompted by the obsolescence of Sterling Steel's previous DC drives platform, which had become a risk factor due to the lack of spare parts and diminishing technical support. The project was completed on schedule and was officially concluded with the receipt of the final acceptance certificate (FAC).

Key benefits of this upgrade include reliable technical support, future access to spare parts, and the integration of two additional drives to support future coil size expansion. The new solution not only resolves obsolescence issues but also integrates seamlessly with the existing Siemens PCS7 automation platform, enhancing maintainability and system support. Sterling Steel will also benefit from improved system efficiency and reliability, helping to reduce operational expenditure (OPEX).

Primetals Technologies

Sterling Steel's rolling mill now operates with 16 upgraded DC drives
(Photo: Primetals Technologies)

THE AMERICAS – USA

U. S. Steel announces investment projects

The plans include the construction of a slag recycler in Pennsylvania and a hot strip mill improvement in Indiana.

In Pennsylvania, U. S. Steel is submitting an "air construction permit" for a new slag recycler at its Edgar Thomson Plant for approval from the Allegheny County Health Department. After permit approval, engineering planning will be finalized, and construction is expected to begin next year.

The Board also approved a major investment to improve the Gary Works hot strip mill to optimize production costs and expand premium product offerings, including heavy gauge line pipe and automotive steel. These two projects represent only a fraction of the activity underway as part of Nippon Steel's investments in U. S. Steel.

U. S. Steel / Nippon Steel

ASIA – CHINA

Henan Fengbao places billet caster order

Henan Fengbao Special Steel has awarded Danieli a contract for a new continuous casting machine for high-alloy round billets.

Danieli will supply a three-strand caster designed to produce ultra-large, high-alloy round billets of up to 1,000 mm in diameter. The steels, including grades such as P91/P92, to be processed by the caster have to comply with high mechanical standards for specialized applications, such as pressure pipeline components in the power, petroleum, chemical and metallurgical industries. Danieli's scope of supply includes the complete core-area design, key equipment supply, and entire L1 and L2 systems from Danieli Automation.

Danieli

ASIA – CHINA

Henan Jiyuan to upgrade billet caster for SBQ production

Henan Jiyuan Iron and Steel has awarded SMS Concast the order to modernize its billet caster No. 2, increasing the production capacity to more than 1 million t/year. The commissioning of the caster modernization is scheduled to be completed in June 2026.

The modernization of the caster, which was originally supplied by a local manufacturer, aims to improve product quality and productivity while increasing the flexibility in processing different steel grades and achieving an increase in annual billet production capacity. With eight strands and a ten-meter nominal radius, the machine is equipped to cast three section sizes: 150 mm, 160 mm and 180 mm square. More than 90% of the product mix will include high-carbon grades such as bearing and spring steels and a full range of steel grades for the automotive industry. In order to minimize downtime and ensure rapid implementation, particular importance was attached to the project planning and delivery schedule.

Tang Tiejun, Project Manager Jiyuan; Chen Qiwen, General Manager, SMS Concast Shanghai; Pierpaolo Rivetti, Vice President, SMS Concast AG; Li Yutian, Chairman, Jiyuan; Wang Fangjun, General Manager, Jiyuan; and Zhao Hongjun, Vice General Manager, Jiyuan (from left to right) (Photo: SMS group)

The upgrade, to be undertaken entirely by SMS, covers a comprehensive redesign of CCM#2, featuring highlights such as dynamic mechanical soft reduction (DMSR) to improve the inner quality of the billets by precisely controlling the central porosity and segregation. In addition, the Conflow® stopper technology and a compact oscillation system with Condrive® will be installed. A number of existing systems will also be carefully integrated into the new caster design.

SMS group

ASIA - CHINA

LY Steel starts up new 20-high silicon steel mill

LY Steel in Loudi, Henan Province, has successfully rolled its first coil of high-quality silicon steel for new energy applications.

The new production line establishes a strong foundation for LY Steel in producing and developing high magnetic induction GO and high-grade NGO silicon steel.

Primetals Technologies supplied engineering, mechanical equipment, and commissioning services for the project. The advanced HZ mill supports stable, large-scale production of ultra-thin, high-grade silicon steel.

This innovative split-housing mill developed by Primetals Technologies offers several advantages over conventional ZR mills. Its large gap opening allows for easier strip threading and smooth recovery after strip breakages. Flexible roll diameter configurations cover a wide range of production requirements, while the shape control system ensures stable rolling and improved productivity. Additionally, the work rolls can be used throughout nearly the entire range without being limited by intermediate roll diameters, further enhancing operational flexibility.

Primetals Technologies

LY Steel Electromagnetic Materials has successfully produced the first coil on its new split-type 20-high HZ mill (Photo: Primetals Technologies)

ASIA – CHINA

Shougang Jingtang invests in new furnace for galvanizing line

Shougang Jingtang has signed a contract with Fives for the supply of an annealing furnace for its No. 9 continuous galvanizing line, designed for a production capacity of 450,000 t/year of automotive grade steels.

Signing ceremony for the new annealing furnace at Shougang Jingtang (Photo: Fives)

The new Stein Digiflex® vertical annealing furnace will be equipped with the latest generation of the AdvanTek® combustion system and a FlashCooling® rapid cooling system. These technologies provide a high degree of energy efficiency, fuel flexibility and low emissions, as well as operational flexibility in terms of cooling rate control, temperature cycle control and uniformity of cooling.

The new annealing furnace will be designed to give Shougang Jingtang full flexibility in controlling the furnace atmosphere management, which is critical to achieving the required metallurgical targets and galvanized surface quality. In total, Shougang Jingtang has been operating six Stein Digiflex® annealing furnaces at the Caofeidian facility since 2005.

Fives

ASIA – INDIA

Rath opens new refractory production site

Refractory manufacturer Rath has officially opened its new production site in Visakhapatnam, India. The new plant is part of the joint venture Rath Avanee Private Limited.

Production in Visakhapatnam began gradually in March 2025, with around 5,000 t of fireclay produced in a bogie hearth furnace and successfully placed on the Indian market. A further tunnel kiln was commissioned at the end of July 2025. With the commissioning of the additional furnace, total annual capacity will reach approximately 20,000 t of refractory products.

The new production site was officially opened in mid-September, after only 18 months of construction. The joint venture Rath Avanee expands production capacity and further strengthens the global presence of the international refractory manufacturer. The company now operates eight production sites across three continents – Europe, the United States and Asia.

Ribbon cutting by Andreas Pfneiszl, speaker of the Executive Board, Rath Group; Dr. Raju, Rath Avanee; and the joint venture's first customers Mr Siddarth Reddy, Sagar Cements, and Mr Neeraj Sarda, Executive Director, Sarda Metals & Alloys (Photo: Rath)

Rath

ASIA – JAPAN

Maruichi Stainless Tube orders extrusion line for stainless steel tubes

Maruichi Stainless Tube has commissioned SMS group to supply a complete production line for the manufacture of extruded stainless steel tubes as part of the new greenfield project in Shimonoseki, Japan.

The heating systems to be supplied by SMS are fully electrified and comprise a horizontal preheating system for the billets, an intermediate heating system for precise and flexible heating prior to perforation punching, and a final heating system for precise and flexible heating prior to extrusion. The core forming units comprise an expansion press and a next-generation horizontal tube extrusion press for extruding pre-holed billets with a run-out system including water quench tank. By increasing the extrusion force of the horizontal extrusion press from 20 to 50 MN, Maruichi is expanding the range of possible dimensions for stainless steel pipe production. The production line will be fitted with the SMS production control system MIDIS (Management Information Diagnostic Indication System), which enables the precise monitoring and control of all processes.

Construction of the new factory building is scheduled to be completed by the end of 2026, followed by the erection of the equipment. Start-up of production is planned during the 2027 fiscal year, once JIS certification (Japanese Industrial Standards) has been obtained.

SMS group

ASIA – JAPAN

Topy Industries to integrate water detection at EAF

Topy Industries is implementing Phase II of the innovative acoustic water detection system at its Toyohashi Plant Works.

Since pioneering the adoption of Tenova's off-gas system for process control in 2005 – the first of its kind in Japan -– Toyohashi Plant Works has consistently leveraged Tenova's innovations to enhance operational efficiency and environmental performance. More recently, the success of Tenova's acoustic water detection Phase I installation on the 200 t AC EAF shell represents the first rollout of this technology in the Japanese market. Phase II represents the integration of the Tenova detection system on the EAF shaft panels, further strengthening Toyohashi Plant Works' commitment to sustainability and technological excellence.

The patented acoustic system consists of software and models designed to process data that is used to detect the presence of water and give an alarm in case water is found. By harnessing sound and vibration data from the furnace, the acoustic water detection system provides real-time insights into critical operational conditions. What was once considered a nuisance or noise can now be used as a diagnostic asset for EAF steelmakers.

Tenova

ASIA – JAPAN

Yamato Steel upgrades heavy section mill

Yamato Steel, manufacturers of beams and structural steel, has contracted SMS group to modernize its section mill in Himeji, replacing two existing mill stands with new compact cartridge mill stands.

The modernization project involves revamping the existing universal roughing and edger mill stands with SMS's compact cartridge stand (CCS®) technology, which offers high stand rigidity for enhanced product quality. Its compact design makes these stands suited for revamping brownfield plants such as Yamato Steel's heavy section mill. The scope of supply includes the CCS® 1000 and CCS® 500 E mill stands, which are engineered to produce a wide range of products, including H- and I-beams, and U-type sheet piles. This equipment will support Yamato Steel in the production of heavy sections and sheet piles.

Compact cartridge stands in SULB's heavy section mill in Bahrain, supplied as part of the greenfield minimill project in collaboration with Yamato Kogyo (Photo: SMS group)

The new mill stands will feature universal and two-high rolling modes as well as hydraulic roll adjustment and quick-automatic change facilities. Additionally, the upgrade will incorporate new work roller tables with flange cooling and high-pressure descaling units. Also included in SMS's scope of supply is the CCS® tandem rolling mill control system, which enables real-time process control and ensures dynamic automatic gap control as well as automatic roll gap setting after program changes.

The modernization of the mill stands is anticipated to be completed by the summer of 2028.

SMS group

ASIA – OMAN

Jindal Steel orders second hydrogen-ready DRI plant

Jindal Steel has ordered a second hydrogen-ready direct reduction plant for the production of hot briquetted iron (HBI) from Danieli. The plant will be installed in Duqm, in the Al Wusta region of the Sultanate of Oman.

This new DRI plant will feature Zero-Reformer Energiron® direct reduction technology, jointly developed by Tenova and Danieli, and will produce 2.5 million t/year of direct reduced iron, achieving an average metallization rate of 94%.

The design anticipates the possible implementation of the Hytemp® pneumatic transport system to feed hot DRI at more than 600 °C directly to the EAF, ensuring an extremely energy-efficient total process. Hybrid by design, Energiron® is able to operate with natural gas and up to 80% hydrogen, or any mix of the two, without requiring modifications to the plant. The hot DRI will be briquetted to HBI suitable to be stored or exported.

Duqm is also the location of the first Energiron® DRI plant now under construction and scheduled to start operation in 2026. This project will leverage Oman's natural gas and renewable-energy potential, converted into hydrogen. Carbon capture facilities will allow for the reuse of the captured carbon and will be integrated seamlessly into Jindal Steel Duqm's larger, green steel complex.

Danieli

ASIA – KAZAKHSTAN

Eurasian Resources Group to set up DRI/HBI production

Global metals and mining company Eurasian Resources Group (ERG) has signed a strategic contract with a consortium of Primetals Technologies and Midrex Technologies. The agreement covers detailed engineering, supply of key process equipment, and a range of services for the construction of a hot briquetted iron (HBI) plant in Rudny, Kazakhstan.

This agreement follows the completion of pre-engineering and basic engineering packages. Producing HBI with a metallization degree of at least 93.5% and an iron content of approx. 90% will enable Kazakhstan to enter the global HBI market with a new, competitive product. The Midrex Flex® direct reduction plant includes a 7.15-m-diameter Midrex shaft furnace and a proprietary Midrex reformer. It will process oxidized iron ore pellets produced by SSGPO JSC, a part of ERG, with the capability to deliver hot product directly to a future steelmaking shop. Commissioning of the plant, designed for a production capacity of 2 million t/year of HBI, is scheduled for 2029.

Primetals Technologies / Midrex Technologies

ASIA – UNITED ARAB EMIRATES

EMSTEEL to launch pilot for electric process-gas heating

In collaboration with Kanthal and EMSTEEL, Danieli has launched a pilot project for the electrification of process-gas heating at the DRI plant in Abu Dhabi.

The 1.3 MW electric process-gas heater will integrate with the existing Energiron DRI process, a joint development by Tenova and Danieli, marking the first installation of direct electric heating for process gas at industrial scale.

The pilot unit is based on Prothal® DH technology, a compact and modular electric heating solution developed by Danieli and Kanthal for high-efficiency operation. The system is designed to run in parallel with the fired heater currently in use.

Installation and commissioning are planned for 2026. The initiative is supported by the Khalifa University, which will provide modelling of the DRI core process, electrical grid impact, and renewable power variability. This step contributes to the progressive decarbonization of direct reduction plants and supports Danieli's roadmap for fossil-free steelmaking.

Danieli

AUSTRALIA

Alter Steel to build new, green steel mill in Queensland

Alter Steel selected Danieli to supply technology and equipment for its new steelmaking facility in Pinkenba, Queensland. The plant will produce 500,000 t per year of high-quality reinforcing bar, wire rod, hot-rolled mesh, spooled coil and bar, all from a single site.

The project will leverage Danieli MIDA QLP (Quality Long Product) technology and will incorporate the Digimelter and Q-One power feeder for sustainable electric steelmaking. Fully compatible with renewable energy sources, the Digimelter will achieve CO_2 emissions of just 0.37 t per t of steel, an 80% reduction compared to traditional blast furnaces.

Furthermore, the MIDA QLP endless casting-rolling process eliminates billet reheating, cutting energy use by up to 75% compared to conventional mills. The finished products are delivered in under two hours, in precision-aligned, tangle-free bundles for optimized downstream processing.

The facility is scheduled to be completed by late 2027 and will be the first greenfield steel mill built in Australia in over 40 years. The project will support local demand for construction-grade products with 100% Australian scrap-sourced materials.

Danieli

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The groundbreaking ceremony for the new hydrogen-based ironmaking plant was attended by politicians and industry leaders (Photo: Primetals

RESEARCH AND DEVELOPMENT

Net-zero CO_2 emissions ironmaking on the verge of breakthrough

Hy4Smelt is the name of the world's first industrial-scale demonstration plant capable of combining two innovative technologies: a hydrogen-based direct reduction process for ultra-fine iron ores and an electric smelting process. The industrial-scale demonstration plant is scheduled to commence first production by the end of the 2027 calendar year, with the research project ending in 2030.

Primetals Technologies, a global plant engineering company, voestalpine, the international steel and technology group, and Rio Tinto, one of the world's leading mining companies, are taking a completely new and promising approach to researching steel production with net zero CO_2 emissions. The Hy4Smelt project will implement a new process for potential net-zero CO_2 emissions ironmaking. The project partners Rio Tinto, voestalpine and Primetals Technologies, aim to accelerate the development of the combination of hydrogen-based direct reduction and smelter technologies, providing a potential alternative to blast furnaces for hot metal and commercial hot briquetted iron (HBI) production. The industrial-scale demonstration plant now under construction is scheduled to start up at the end of 2027, with a capacity of 3 tonnes per hour.

"At voestalpine, we are researching new processes in collaboration with partners from industry and science, as well as

s Technologies)

Technical facts of the Hy4Smelt demonstration plant

The demonstration plant is an industrial-scale installation of HYFOR technology, Smelter and all required auxiliary facilities

- Designed for a maximum capacity of 3 t hot metal and 1 t slag per hour
- Continuous operation from preheating iron ores to hot metal and slag
- Flexible ore basis: capable to utilize multiple iron ore qualities (low- to high-grades, hematite to magnetite) up to 3 t per hour
- Fossil-free metallics: direct reduction uses H_2, which is generated using renewable energy, and fully electrified heating
- Carbon addition based on biochar and other carbon carriers
- The Smelter plant can be operated independently, which means that a different mix of materials can be used (DRI, HCI, HBI, scrap, and by-products).

> There's still a lot to learn, but we're optimistic about the potential of fluidized bed and electric smelting technologies to support the steel industry's transition.
>
> *Rafael Azevedo, General Manager, Iron Ore Sales and Marketing Atlantic, Rio Tinto*

investing in groundbreaking steel production projects. Seeing construction underway of the globally unique Hy4Smelt demonstration plant once again confirms our technological and innovation leadership in green steel production," says Herbert Eibensteiner, CEO of voestalpine AG.

Research projects have matured

The HYFOR (HYdrogen-based Fine-Ore Reduction) process eliminates the need for agglomeration of the iron ore fines. It features lower reduction gas temperatures, in-situ recycling of captured dust particles, and high metallization of the DRI and HBI. Primetals Technologies began developing the technology a decade ago, and since 2021, a pilot plant owned and operated by Primetals Technologies at the voestalpine premises in Donawitz, Austria, has run more than 50 successful campaigns with basically all major iron ore sources. The smelter is a furnace powered by renewable energy that melts and completes the reduction of DRI to produce hot metal or pig iron and a value-added slag suitable as cement clinker substitute.

By using certified **fossil-free hydrogen** from the existing electrolysis plant at voestalpine's site, these plants will produce hot metal similar to that from a blast furnace, but with the potential for net-zero CO_2 emissions.

Rio Tinto will supply 70% of the **iron ore** for the Hy4Smelt industrial-scale demonstration plant, as well as provide technical support to the proje ct. Rio Tinto will also support the development and future commercialization of HYFOR and the smelter technology.

HYFOR and the smelter technology are expected to be commercially available from 2028 and will have the capacity to meet the needs of the steel sector.

With total costs of around EUR 170 million, Hy4Smelt is the largest climate action research project in Austria in terms of investment. For the HYFOR and smelter project in Linz, Primetals Technologies has formed a strategic partnership with integrated trading and investment company Mitsubishi Corporation, as a co-investor. Funding for the investment and operation of this prototype plant has been provided by the Austrian federal government. In addition, the European Union supports the venture through the European Union Research Fund for Coal and Steel within the Clean Steel Partnership (CSP) and the European Union Clean Hydrogen Partnership. The scientific partner is K1-MET, one of the leading international metallurgical competence centres for the development of metallurgical and environmental technology processes.

Primetals Technologies / Rio Tinto / Mitsubishi Corporation

ELECTROCHEMICAL HYDROMETALLURGICAL IRONMAKING METHOD

Electra to build demonstration facility

After proving the industrial feasibility of the electrochemical hydrometallurgical ironmaking technology in a pilot project over many months, Electra unveiled the site of its new demonstration facility in Jefferson County, Colorado, USA, in October 2025. This demonstration plant will prove the technology at scale.

Inspection of a plate of iron from Electra's low-temperature iron electrowinning cell at its Pilot plant (Picture: Business Wire)

Electra, a clean iron company, is bending the trajectory of climate change by electrifying iron refining. A new demonstration facility, expected to begin operations in mid-2026, will deploy Electra's technology to convert iron ore into 99% pure iron using its proprietary low-temperature process powered by chemistry and clean energy. To be erected in Jefferson County, Colorado (USA), the 130,000 square foot (12,000 m²) facility will produce up to 500 metric tons of Electra's low-carbon, high-purity iron annually.

The facility is supported by a new US$50 million grant from Breakthrough Energy Catalyst, a program within Breakthrough Energy that funds and helps scale early commercial clean energy projects, and an $8 million dollar tax credit from the Colorado Industrial Tax Credit Offering (CITCO) along with $186 million in Series B funding announced earlier this year.

"Steel production is one of the largest sources of emissions, driven primarily by the energy-intensive step of refining iron. Electra is reimagining the fundamentals of ironmaking, enabling a scalable, cost-effective pathway to low-carbon steel," said Mario Fernandez, Head of Catalyst at Breakthrough Energy. "Working in close collaboration with BE Catalyst, Electra applied the 12 Keys to Scaling Up to systematically de-risk their technology, assemble a world-class team, and lay the foundation for commercialization."

Purchase agreements with global steel leaders

Clean iron produced at Electra's demonstration facility is already contracted for delivery to several strategic partners to qualify the material for use in steel applications. Signed purchase orders include Nucor, the largest steelmaker in the Unit-

> Electra is reimagining the fundamentals of ironmaking, enabling a scalable, cost-effective pathway to low-carbon steel.
>
> *Mario Fernandez, Head of Catalyst at Breakthrough Energy*

ed States and early investor of Electra, Toyota Tsusho, the global steel trading company, and INTERFER Edelstahl Group, the European steel and metals distributor.

Nucor will use Electra's clean iron in their Electric Arc Furnace (EAF) steelmaking, a lower-emission alternative to traditional blast furnace methods, at their sheet mills.

"We're excited to see Electra's demonstration facility become a reality, marking an important milestone in our partnership and in the journey to decarbonize the steel supply chain. This facility lays the groundwork for a new era of low-carbon materials, and we're proud to support Electra as they scale their innovative solutions," said Al Behr, Nucor's executive vice president of raw materials.

Once qualified, Toyota Tsusho America plans to sell Electra's clean iron to steelmakers and distribute green steel to automakers, creating a closed-loop system that supports widespread adoption of low-carbon materials. INTERFER Edelstahl Group will use Electra's clean iron, following qualification, in specialty steel applications to help customers meet their decarbonization goals.

Pioneering EAC agreement with Meta

As part of the unveiling, Electra announced its first Environmental Attribute Credit (EAC) purchases from Meta. Under the agreement, Meta will purchase verified EACs linked to the reduced emissions from Electra's clean iron. The contract with Electra is part of Meta's goal to reach net zero emissions in 2030 by addressing emissions sources throughout its supply chain, including the steel used to build and operate its infrastructure. Meta will also have the option to purchase EACs for CO_2 reduction from future Electra commercial facilities.

"Meta is thrilled to collaborate with Electra to advance low-carbon iron and steel – critical data center building solutions – made here in the U.S. Through this partnership and our commitment, we aim to demonstrate a pathway for these innovative materials to scale," said John DeAngelis, Head of Clean Technology Innovation at Meta.

Scaling Electra's clean iron

With new funding from Breakthrough Catalyst and purchase agreements from industry leaders for the demonstration facility, Electra is on track to reach commercial scale clean-iron production by the end of the decade. "We started Electra to fundamentally reinvent the way the world makes iron and tackle one of the biggest sources of industrial emissions, but we've always known we could not do it alone," said Sandeep Nijhawan, CEO of Electra. "With binding commitments and support from strategic partners, we are proving that pure iron can be made resourcefully and scaled quickly to meet global demand."

Pilot plant has already proofed industrial feasibility of the method

In spring 2024, Electra commissioned its pilot plant in Boulder, Colorado. The Pilot has been designed to produce clean iron in approximately 1-meter square plates, and Electra has increased capacity in a phased approach to validate modularity. By repeatedly connecting the iron plates already demonstrated at the Pilot scale, the plant capacity has increased to commercial scale.

The Pilot demonstrates Electra's first-of-a-kind technology to produce metallic iron from already mined, high-impurity, commercially stranded ores to accelerate decarbonization, sustainability, and circularity across the ore-to-steel value chain. Electra's electrochemical hydrometallurgical method operates at temperatures that are only around 60°C (140 degrees Fahrenheit), enabling seamless integration of intermittent renewable energy resources, making emissions-free iron possible at temperatures colder than coffee.

The process intakes a wide range of ores and the principal iron ore impurities like alumina and silica are selectively refined as co-products. With greater than 99 percent purity, Electra's clean iron, combined with recycled scrap steel, offers the highest value-in-use for electric arc furnace (EAF) steelmakers, while reducing the capital intensity, cost, and waste across the value chain.

Electra CEO and co-founder Sandeep Nijhawan said, "Clean iron produced from a wide variety of ore types is the key constraint to decarbonizing the steel industry sustainably. With support from our partners across the value chain, the Pilot brings us closer to our goal of producing millions of tonnes of clean iron by the end of the decade."

Electra

RESEARCH AND DEVELOPMENT

Creating low-CO_2 chromium and ferrochrome for the stainless steel industry

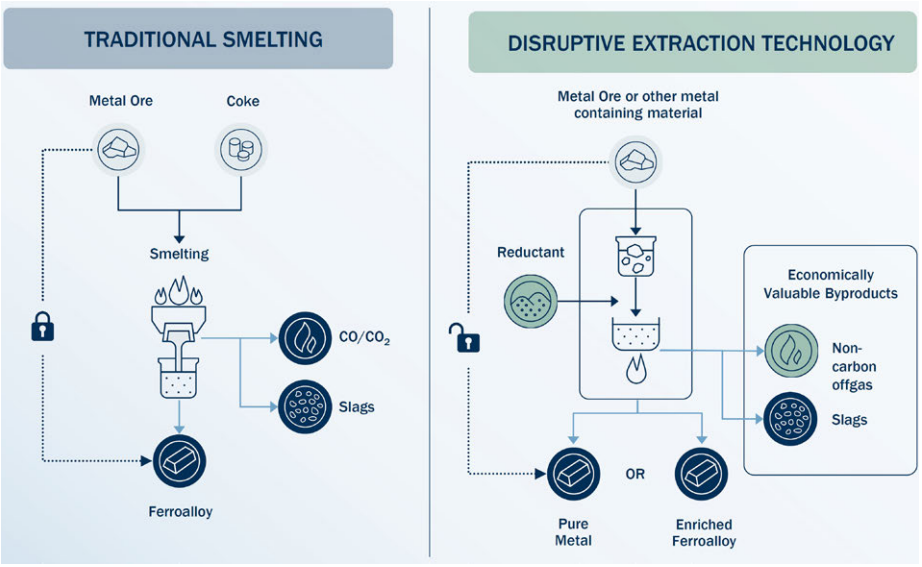
Outokumpu builds a pilot plant to develop CO_2-free production technology for chromium and enriched ferrochrome. With a lower carbon footprint than today's alloying elements, these sustainable materials could be used in stainless-steel manufacturing melt shops if industrial-scale production becomes feasible.

Outokumpu is proceeding with research and development of methods to carbon-free produce critical materials, such as chromium metal and enriched ferrochrome. The company invests approximately USD 45 million to set up a new pilot plant in New Hampshire, U.S., planned to be operational in the first half-year of 2027. The pilot plant with its unique engineering will represent a significant step forward in Outokumpu's strategy to scale up a new proprietary technology.

"We are proud to go ahead, in line with our EVOLVE strategy, to produce low-CO_2 metals and move up the chromium value ladder. Backed by years of research, we are leveraging proprietary technology targeting premium-priced, high-purity metals essential for demanding sectors. With limited Western supply and growing demand, we see a significant market opportunity for sustainable, high-performance materials", says Stefan Erdmann, Chief Technology Officer (CTO) of Outokumpu.

Over the past four years, scientists have developed and tested a proprietary technology and have already successfully scaled up production of key materials from lab-scale (1 gram) to pre-pilot-scale (1 kilogram). In 2024, Outokumpu set up a materials research laboratory near Boston, Massachusetts, USA. Next, the aim of the pilot phase will be to demonstrate the scalability and industrial feasibility of the process by scaling up from 1 kg to 1 ton of daily production. The two materials that will be produced in the pilot plant are enriched ferrochrome, containing 65% chrome and chromium metal, with more than 90% chrome content. Such an implementation of technology would advance Outokumpu's Ferrochrome business towards specialty metals business.

With this technology, enriched ferrochrome is produced with lower carbon footprint and can be utilized in melt shops and sold externally at higher prices compared to the current offering. The process also enables new production pathways for high-purity metals, such as chromium metal, which is applicable for high-value markets, such as aerospace, defence and energy sectors.



Outokumpu announced the proprietary technology during the Capital Markets Day in June 2025 (Picture: Outokumpu)

Following the successful completion of the pilot phase, Outokumpu plans to construct the first industrial-scale plant, with an anticipated annual production capacity of approximately 10,000 tons. The target timeline for the industrial plant to be operational is 2029–2030, and Outokumpu expects to unlock the full commercial potential of the innovative proprietary technology from 2030 onwards.

Outokumpu

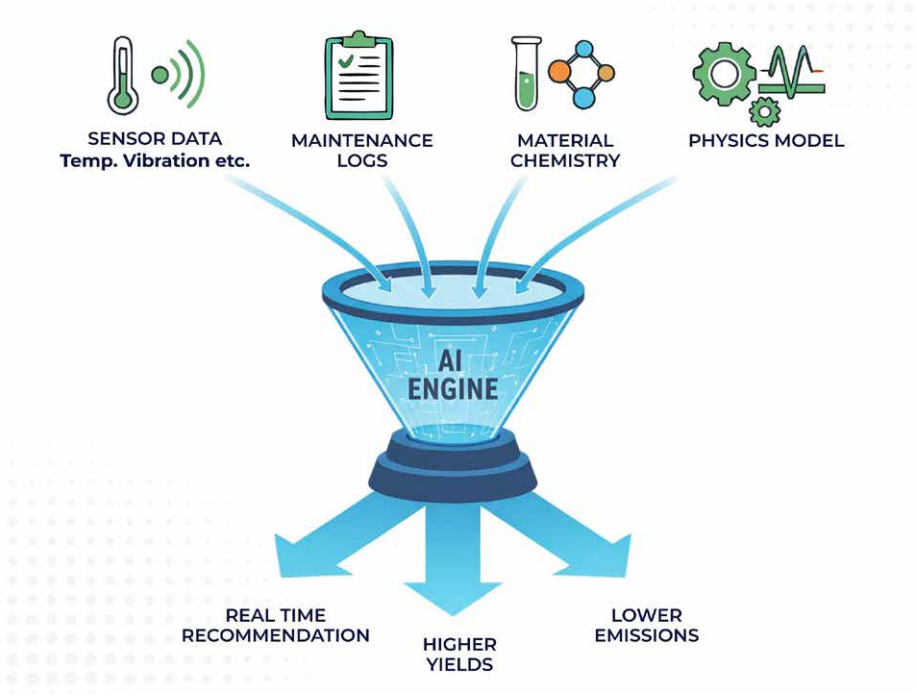
> With limited Western supply and growing demand, we see a significant market opportunity for sustainable, high-performance materials.
>
> *Stefan Erdmann, Chief Technology Officer (CTO) of Outokumpu*

FROM ORE TO OUTPUT

Artificial Intelligence is reshaping upstream steel production

Predictive analytics and process optimization powered by AI can reduce energy consumption, downtime, and scrap rates from ironmaking to hot rolling.

In order to achieve a decarbonized future, steelmakers have introduced a number of new pathways aligned with greener production methods; the use of green hydrogen, carbon capture and storage, and even bio-fuel alternatives to name but a few. These will all be significant players in the drive to go green, particularly as the technology advances, infrastructure matures, and costs become less prohibitive. However, to capitalise fully from the benefits these pathways offer, steelmakers need to offset cost, energy usage, and downtime – and the contributing factors that lead to them, such as equipment wear, fluctuating demand, or process inefficiencies. By using predictive analytics and AI-driven process optimization, a panoramic view of the factory is established, one that takes into account the technologies being harnessed while drawing on historical data and real-time insights to build a cleaner and more efficient future. All aspects of production thus work synchronously, from raw material input to finished product, ensuring that resources are maximized and waste is minimized. AI is transforming the steel sector – working alongside established and nascent technologies to ensure sustainability targets are reached without compromise, while simultaneously strengthening competitiveness in an evolving global market.



How data powers Metal AI (Picture: Tvarit)

The steel value chain, encompassing ironmaking, steelmaking, and casting and hot rolling, holds many challenges. From blast furnace inefficiencies to variable feedstock quality, to unplanned outages, steelmakers are tasked with preventing a long list of issues, while ensuring production is kept to a tight timeline. To make matters worse, due to complex geopolitical conditions, energy pricing is at an all-time high, particularly for European producers. With around 20–30 GJ required per tonne of crude steel in the BF-BOF route (and 5–8 GJ for EAF) [1], unforeseen downtime presents much more than a logistical challenge – but a huge financial barrier to business survival, costing producers millions in lost production. Defects in production during the casting and hot rolling stage, often contributing to 2–5% yield loss, are another constant issue for steelmakers – with inclusions, cracks, and temperature deviations going unnoticed by the human eye, and being difficult to predict – ultimately making profit margins tighter, and causing unscheduled delays.

Thankfully, these challenges are not without a solution. At its core, predictive analytics in steelmaking refers to the ability to forecast process deviations before they occur, allowing manufacturers to take preventative or corrective measures in real time. Instead of reacting to equipment failures, energy spikes, or quality issues after the fact, predictive models continuously analyze data streams to anticipate problems in advance. This foresight enables operators to stabilize production conditions, for example reducing the standard deviation in hot metal silicon content by

Vikas Goel, Patrick Stanula, and Vishal Marje, Tvarit GmbH, Frankfurt, Germany – Contact: vikas.goel@tvarit.com

20% in blast furnace, and minimize variability across the upstream value chain.

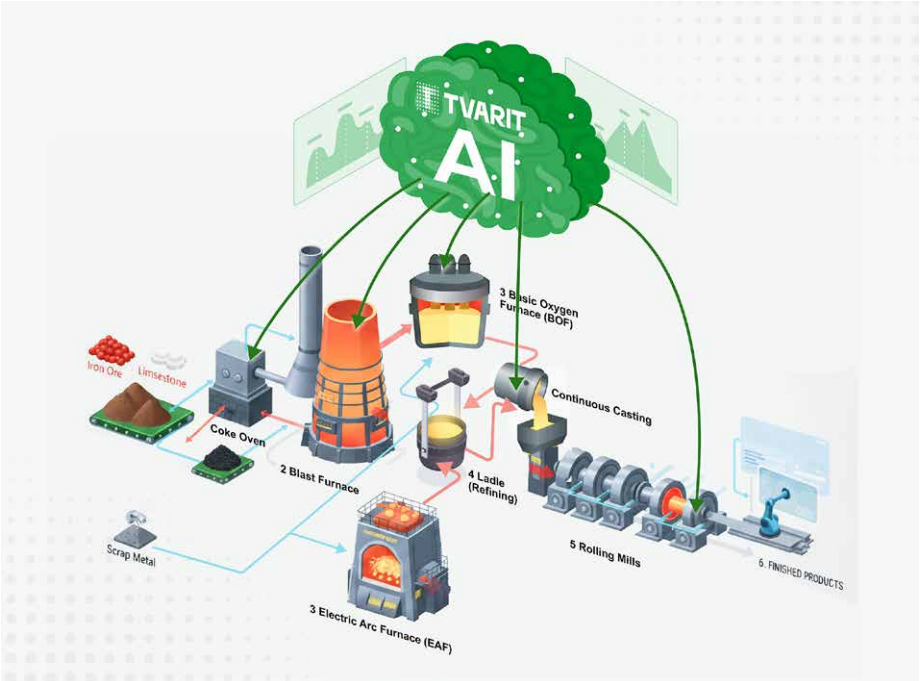
A key application of AI in this context is process optimization. By learning from historical data and live inputs, AI systems can deliver actionable, real-time recommendations to operators – whether that means adjusting furnace temperatures, modifying alloying additions, or recalibrating rolling schedules. This ensures that production not only remains stable but also operates closer to its theoretical optimum, minimizing waste and energy consumption while improving throughput.

Traditional statistical models have long been used in steelmaking for quality control and process modelling. However, these methods struggle when faced with the highly complex, multi-dimensional datasets typical of modern steel plants, where thousands of sensors generate >10,000 datapoints per minute. AI, and particularly machine learning, excels in this environment. It can detect subtle correlations and nonlinear patterns that humans or conventional tools often overlook, producing far more accurate predictions of equipment behaviour, material performance, and defect formation.

Two main types of AI applications have emerged in steel production. The first is machine learning applied to sensor and process data, which interprets vast amounts of information generated by PLCs, DCS systems, and shopfloor sensors. The second, more advanced approach is Hybrid AI, which combines these data-driven models with physics-based simulations. Companies such as Tvarit have pioneered this field, alongside large steel producers who are also advancing hybrid digital twin approaches, embedding engineering design data, material properties, and maintenance records into their models. This allows for deeper insights that go beyond what sensors alone can measure, such as predicting the impact of tool wear or input material variability. The result is a system capable of near real-time adjustments to raw material usage, energy input, and equipment settings. For steelmakers, this translates into higher yields, reduced scrap rates, lower energy bills, and greater operational resilience – all of which are essential in today's competitive and decarbonization-driven market. For instance, predictive models for coke strength after reaction (CSR) provide daily CSR predictions and coal blend suggestions to stabilise blast furnace performance, while burn-through temperature (BTP) prediction in sintering has shown a 3–5% productivity improvement by forecasting BTP ahead of time and reducing reliance on operator proficiency. Similarly, silicon prediction during blast furnace operations reduces fuel rate, promotes stable furnace operation, and improves hot metal quality.

AI offers three key benefits to steelmakers that directly impact both profitability and sustainability: energy reduction, lowered downtime, and decreased scrap use. Energy is often the single largest cost component in steelmaking, accounting for 20–40% of total production costs, depending on the route (blast furnace vs. electric arc furnace) [2]. AI is increasingly being deployed to tackle this challenge – and for good reason. By optimising EAF power-on-time, electrode consumption, and furnace scheduling, and by providing predictive control of blast furnace fuel injection rates and coke ratios, AI can generate significant efficiencies. Through using AI, a leading European steelmaker recently reported a 15% reduction in energy use in EAF operations [3], translating into millions of euros in annual savings while also helping meet EU Green Deal and CBAM (Carbon Border Adjustment Mechanism) compliance targets. Tvarit's Hybrid AI platform further strengthens these gains, enabling producers to simulate the physical properties of processes and materials beyond what is measurable by shop-floor sensors, ensuring that energy inputs are aligned with the unique specifications of each production setup.

The issue of unplanned downtime has historically been one of the most costly and unpredictable variables in upstream steel. A single hour of stoppage in a blast furnace or hot rolling mill can cost thousands, forcing manufacturers to adapt reactively under conditions that are neither efficient nor sustainable. Predictive maintenance, powered by AI, changes this paradigm, for example, detecting early blast furnace stave cooling failures before catastrophic downtime. By forecasting equipment wear, lubrication needs, and potential failures in advance, AI enables interventions before breakdowns occur. According to Deloitte, AI-enabled predictive maintenance can reduce downtime rates by 20–30% [4], while McKinsey estimates that predictive maintenance can reduce maintenance costs by 10–40% overall [5]. Tvarit's approach, which blends sensor-driven data with maintenance logs, tool specifications, and engineering designs, provides a more holistic view of machine health, enabling plant managers to act not only on immediate red flags but also on subtle long-term degradation patterns that traditional monitoring would miss. This approach is already being applied in machine learning-based blast furnace

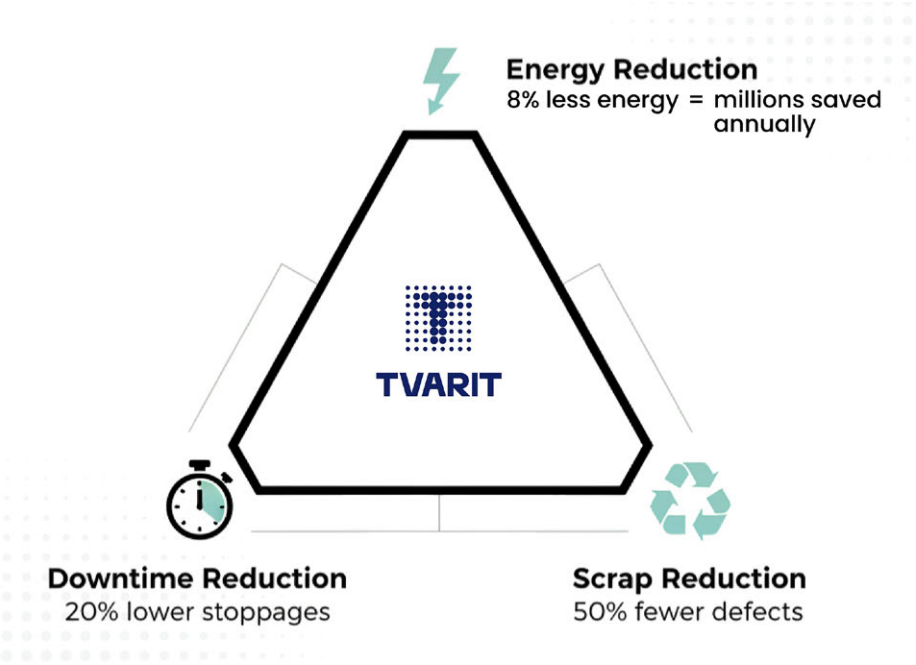


Hybrid AI in action (Picture: Tvarit)

channelling prediction, which allows steelmakers to detect incidents earlier, reduce downtime, and improve overall furnace efficiency.

Finally, scrap reduction is emerging as a critical lever for competitiveness, especially in a world where raw material shortages and decarbonization targets are converging. Scrap accounts for 5–15% of material losses in typical steel operations, with defects arising from inconsistencies in input materials, process instability, or tool wear. Each percentage point of scrap reduction translates into significant cost savings and lower CO_2 intensity per ton of steel produced.

AI plays a central role in preventing process instabilities that otherwise transmute into defects. Tvarit's Hybrid AI models are particularly effective in this area: by incorporating variables like scrap chemistry, tool performance, and raw material batch variability, they enable steelmakers to proactively adjust parameters. Results in industrial deployments have shown a significant reduction in defects and substantial yield improvements, outcomes that directly increase profitability and lower emissions. In practical terms, this means that Tvarit's solutions can offset quality fluctuations by diagnosing variations in raw material blends, stabilising operations, and ensuring consistent hot metal quality across production cycles. In short, while AI-driven solutions may be technically complex, their outcomes are simple and tangible: less energy consumed, lower emissions generated, fewer disruptions endured, and higher-quality steel produced. For European steelmakers navigating high energy costs, stricter emissions regulations, and competitive global markets, these improvements are not just operational enhancements – they are critical to long-term survival and growth.



AI impact: reduced downtime, less consumption of energy and scrap (Picture: Tvarit)

While we are still in the earlier stages of AI adoption within the steel sector, the more frequently and rapidly these technologies are integrated, the more effective they become. As the workforce adapts with improved digital training, enhanced data quality, and better understanding of cybersecurity and data governance. AI is rapidly becoming critical for steel's survival and sustainability. It will serve as a catalyst for green manufacturing, using the challenges of steel's past and present to create a cleaner, more productive future.

Tvarit

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STEELMAKING

Straight limestone to substitute soft lime in the electric arc furnace

Once again, Partners for Environmental Progress (PEP) has recognized Outokumpu's state-of-the art mill in Calvert, Alabama (USA) for its continuous efforts to minimize impacts to the environment. The mill's melt shop team has received the environmental stewardship award for CO_2 reduction innovation.

During PEP's annual meeting on September 25, 2025, the organization presented the Calvert team with an award for its innovative 'Soft Lime Replacement Project'. The stainless steel industry relies heavily on lime in the melting process, which contributes significantly to CO_2 emissions. Outokumpu's melt shop team trialed straight limestone in the electric arc furnace, bypassing the processing step that produces soft lime. This innovation reduced CO_2 emissions, improved efficiency, and generated operational savings. Since implementation, the project has:

- eliminated over 4,000 tons of CO_2 emissions,
- improved refractory life by 5%,
- reduced gunning material by 10%.

Herman Moggee, Head of Melt Shop Operations (Calvert), Outokumpu business area Americas, noted, "What began with scepticism quickly turned into excitement and dedication, as our team saw the real-world success of a method not commonly used in the stainless steel industry." He explained, "The metallurgical properties are not affected, as the end product is the same as what was historically added. Typically, lime (CaO) is added to protect the refractory lining and some metallurgical functions like desulphurization. The current limestone process adds $CaCO_3$ which converts to CaO in our EAF providing the same function as lime in the past."

Since the implementation of the Soft Lime Replacement Project at Outokumpu's mill in Calvert, Alabama, the trial has now become standard practice at Outokumpu. They are very pleased with the outcome and have not had any concerns along the way. "In fact, we are continuing to optimize our process around this addition. We are also exploring the use of dolostone ($MgCO_3.CaCO_3$)," says Herman Moggee.

The technology for this Soft Lime Project is most likely only viable in stainless steel producing EAF's as excess energy is used to calcine the product. "We have rolled out this concept to our sister mills. We currently see this innovative approach to minimizing environmental impact as a competitive advantage in our industry," said Wayne Dention, Director of Environmental, Health & Safety (Calvert), Outokumpu Business Area Americas. He added, "This project demonstrates Outokumpu's commitment to continual improvement in environmental standards – locally in Calvert and globally."

Outokumpu is a globally recognized leader in sustainability. Its leadership emphasizes that sustainability is not just a policy, but an actionable commitment embedded in every stage of production. This is the third consecutive year that Outokumpu's mill in Calvert has received PEP's Environmental Stewardship Award for its environmental performance across its operations.

Outokumpu

> We currently see this innovative approach to minimizing environmental impact as a competitive advantage in our industry
>
> *Wayne Dention, Director of Environmental, Health & Safety at Outokumpu Calvert*

Outokumpu Calvert mill receives the environmental stewardship award for CO_2 reduction innovation (Picture: Outokumpu)

STANDARDIZED PRODUCTION WITH MINIMAL MANUAL INPUT

Advanced automation systems pave the way for one-button steelmaking

Rizhao Steel successfully completed the modernizsation of the steelmaking facility at the integrated iron and steel works in Rizhao, China. The project includes Level 2 automation systems for LD converters (BOF), ladle furnaces, and RH plants, enabling centralized, highly automated steel production – "one-button steelmaking". The new automation system was provided and commissioned by Primetals Technologies.

Thanks to the upgrade, 95 percent of the steelmaking process is now automated, and Rizhao Steel has become a leader in smart steelmaking, applying advanced digital technologies to automate and optimize the steel production process. The solution integrates powerful metallurgical models, dynamic process control, and precise calculations of input materials. Operators can now manage the entire meltshop with minimal manual intervention, improving consistency, efficiency, and product quality.

The automation systems meet all performance guarantees for chemical analysis and temperature hit rates. Operators benefit from real-time insights as the plant moves closer to full digitalization.

"The Primetals Technologies team did an outstanding job commissioning the 300-ton automation upgrade. The project was completed ahead of schedule, meeting all targets. The Primetals Technologies Level 1 and Level 2 teams' technical expertise and teamwork helped manage the complexity of process routes, equipment conditions, and raw materials smoothly. This project sets a strong example for our digital transformation and will be a benchmark for large-tonnage converter "one-button steelmaking" and automation upgrades in the steel industry," said Zhou Yong Zhi, ESP Plant Production Chief at Rizhao Steel.

95 per cent of the steelmaking process at Rizhao Steel is now automated, making it a leader in smart steelmaking (Picture: Primetals Technologies)

Automation systems drive meltshop optimization

Primetals Technologies implemented Level 2 automation systems – BOF Optimizer, LF Optimizer, and RH Optimizer – across three LD converters (BOF), four twin ladle furnaces, and two twin RH plants. The converters were also equipped with LOMAS off-gas analysis systems, which enable dynamic end-of-blow control and ensure higher carbon hitting rates. In addition, the BOF Optimizer uses input from sublance in-blow measurements, combined with off-gas data, to determine the optimal treatment and ensure precise control of the blowing endpoint.

A key objective of the project was to reduce the amount of manual operator input required during heats. The automation package uses intelligent models that guide operators through each process step and systems calculate all key process parameters.

For the LD converter (BOF), the system generates a complete setpoint table for the main blowing process, including oxygen volume, material addition with distribution pattern, and lance and stirring patterns.

At the LF, the system provides real-time, dynamic suggestions for slag modification, alloy additions, calcium treatment, and arcing and energy input based on caster pacing and equipment status.

The solution also delivers automated vacuum and lift-gas patterns for the RH plant, as well as recommendations for the amount and timing of oxygen and alloy wires or pieces. These features result in a standardized, efficient, and reproducible process across all shifts, ensuring consistent quality and efficient decision-making with real-time operator guidance and minimal manual adjustments.

About Rizhao Steel. Founded in 2003, Rizhao Steel, a subsidiary of the Rizhao Steel Holding Group, is located in southern Shandong Province. Rizhao Steel has an annual crude steel output of 12 million tons and employs 12,000 people. Its product portfolio includes hot-rolled coils, wire, bars, and small I-beams, which are primarily sold to customers in China. Thanks to the implementation of the energy-efficient Arvedi Endless Strip Production (ESP) technology supplied by Primetals Technologies, Rizhao Steel holds a leading position in the Chinese steel industry.

Primetals Technologies

EXTENSIVE EXPANSION OF THE VIETNAMESE STEEL INDUSTRY

Hoa Phat Dung Quat 2 steelmaking plant commissioned in record time

With the new Dung Quat 2 complex, the Hoa Phat Group will increase its annual steelmaking capacity by around six million tonnes. Two 300-tonne basic oxygen furnaces (BOF), plus secondary metallurgy, are now operational. The steelmaking plant will produce high-alloy steels, including ultra-low carbon grades (IF), for use in the automotive and manufacturing industries.

In order to increase its steelmaking capacity, Hoa Phat Dung Quat Steel (a member of the Hoa Phat Group) has constructed the Dung Quat 2 complex in Quang Ngai Province, Vietnam. The aim is to increase production by around six million tonnes of steel per year by 2028, focusing on the manufacture of high-quality hot-rolled coil (HRC) for use in the automotive industry, as well as low-carbon steel. The company awarded SMS group an order for plant equipment, mainly:

- two 300-ton BOF converters with primary dry gas cleaning plants (GCP),
- secondary metallurgy facilities, including a 300-ton twin ladle furnace (LF) and
- two 300-ton duplex Ruhrstahl Heraeus (RH) units.

The plant equipment incorporates several technological advancements, including the innovative swivelling sublance in the BOF, which offers greater flexibility and precision than traditional fixed designs, thereby boosting operational efficiency. The twin ladle furnace arrangement ensures high plant availability, while the RH degassing process improves steel quality and allows high-performance steels to be alloyed under vacuum conditions, enhancing the way specialized steel grades are produced. Furthermore, the advanced dry-type gas cleaning system (ESP) with gas recovery significantly reduces emissions. The plant currently maintains dust emission levels that are even lower than the target of 20 mg/Nm³.

The complete order was divided into two delivery groups. Groups 1 and 2 were both installed and commissioned ahead of schedule. Mai Van Ha, CEO of Hoa Phat Dung Quat Steel, applauds the collective efforts,

Celebrations at Hoa Phat's steelmaking facility with SMS group employees marking the successful commissioning of the 300-ton basic oxygen furnace (Picture: SMS group)

"SMS group is a trusted long-term partner of Hoa Phat. Together, we managed to complete this major project in record time. The installation and commissioning of the first BOF converter section were completed in December 2024 after only twelve months, including live tests. Group 2 was already commissioned eight months later, in August 2025. This demonstrates the efficiency and expertise of both parties. Overall, the commissioning of this equipment marks a significant milestone in the Vietnamese steel industry and significantly boosts our production capacity to position us as a leader in steel technology. The integration of cutting-edge solutions underscores our commitment to efficiency, innovation, and sustainable growth in the steel industry."

> The commissioning of this equipment marks a significant milestone in the Vietnamese steel industry.
>
> *Mai Van Ha, CEO of Hoa Phat Dung Quat Steel*

Digitalization contributes to CO_2 emission reduction in production

The new steel melt shop integrates cutting-edge software and automation systems such as the SMS Data Factory and Ladle Management System, which enhance precision and control without manual interventions. SMS's smart solutions are employed to transform process data into valuable insights. The Data Factory centralizes plant data, while the Auto Tapping and Slopping Detection system automates BOF operation and event identification. This data supports existing and future digital applications, aiding in the transition to a fully integrated digital management platform, crucial for advancing CO_2 emission control and sustainability targets.

The level 2 Process Guidance (PG) system optimizes processes, significantly reducing the carbon footprint through real-time data analysis and decision-making, thus improving production quality and performance. In addition, comprehensive electrical and automation solutions enhance material handling and scrap yard operations.

The BOF steel converter commissioned at Hoa Phat's facility in Vietnam
(Picture: SMS group)

"We are proud of the successful commissioning of Hoa Phat's new facilities at Dung Quat 2. This project enhances production capabilities and sets new efficiency standards," said Bernhard Steenken, CSO, APAC & MEA, SMS group. Earlier in May 2025, Hoa Phat and SMS signed another contract to supply the technology and production lines for a rail and section mill with an annual capacity of 700,000 tons.

SMS group

Hoa Phat Dung Quat Iron and Steel Complex

Hoa Phat Group, a listed company, is the leading steel manufacturer in Vietnam and ranks among Top 10 enterprises creating the most value in Vietnam 2025. The integrated iron and steel works were erected in the Dung Quat Economic Zone close to Da Nang. With a total area of 700 hectares, Hoa Phat Dung Quat Iron and Steel Complex has a total design capacity of 11.6 million tons of steel per year, with a total investment of over US$7 billion.

In particular, Dung Quat 1 has been in synchronous operation since 2021, with a capacity of 6 million tons per year, including 3 million tons of HRC and 3 million tons of construction steel and high quality rolled steel. Dung Quat 1 comprises, among others, four blast furnaces and two converter steelmaking plants with a total of four 120-ton BOFs.

Dung Quat 2 is still under commissioning and has been designed for a capacity of 5.6 million tonnes of high-quality HRC per year. Blast Furnace No. 5 was commissioned in 2024 and Blast Furnace No. 6 was blown in on 18 August 2025. Once completed, Dung Quat 2 is expected to propel Hoa Phat Group into the top 30 largest steel enterprises in the world.

Hoa Phat Group

FIRST OF ITS KIND IN JAPAN

Compact roller straightener implemented in an existing heavy section mill

The new roller straightener offers improved product quality and shorter downtimes thanks to innovations such as the Load Share Control system and automated roller changes. Features including optimized energy efficiency are helping Yamato Steel to achieve its sustainability goals by enabling more environmentally friendly production.

Yamato Steel Co. Ltd., a leading manufacturer of beams and sections, and SMS group have successfully commissioned Japan's first Compact Roller Straightener (CRS®). The equipment was installed in Yamato Steel's heavy section mill in Himeji, Japan, originally supplied by SMS group in 2024.

The heavy section mill was upgraded with the CRS® 2000-9H straightening machine. This modernization reflects Yamato Steel's commitment to meeting market demand with superior-quality products and reliable production processes.

The CRS® 2000-9H straightening machine, the first of its kind in Japan, features nine rollers and a 2000-millimeter pitch. It is designed to straighten heavy sections and sheet piles by applying controlled bending forces, thereby enhancing operational efficiency and product quality. This process corrects distortions and ensures consistent results.

The CRS® design enables precise and accurate adjustments with the straightening rollers supported in bearings on both sides. This allows the straightening forces to be applied symmetrically, thus ensuring uniform product quality, less residual stress in the finished products, and a longer service life of the straightening discs. Each of the nine straightening rollers is individually driven, and the top rollers can be precisely adjusted by hydraulic means, even under load, improving adaptability and straightness.

The CRS® 2000-9H straightening machine successfully commissioned at Yamato Steel's heavy section mill in Himeji, Japan (Photo: SMS group)

High efficiency, short downtimes

With less installed power and effective overload protection, the Load Share Control (LSC) system developed by SMS boasts optimized drive power with guaranteed high energy efficiency levels. This feature also provides better product property control, particularly when it comes to minimizing residual stresses in the finished product.

Yamato Steel's CRS® 2000-9H incorporates several features, including a fully automatic system that changes all nine straightening rollers at the same time and an automated "chamber size adjustment" system for the straightening discs. These innovations optimize workflows and minimize downtimes for adjustments during operation, delivering economic benefits by reducing the time and labour required for roll changes.

SMS group's scope of delivery included the engineering, equipment supplied mainly from SMS workshops, a new L1-automation system, as well as technical assistance for the erection and commissioning and the provision of spare and change parts.

In this way, SMS is underlining its commitment to delivering integrated solutions tailored to the specific needs of its clients. The successful commissioning of the CRS® straightener further solidifies the long-standing partnership between Yamato Steel and SMS. Over the years, SMS has supported the Yamato Kogyo Group, shareholder in Yamato Steel, in several major projects around the world, including revamps at Nucor Yamato Steel in the USA, the supply and commissioning of the heavy section mill at SULB Company B.S.C. in Bahrain, as well as the construction of a new minimill for Siam Yamato in Thailand.

SMS group

STRIP PROCESSING

Giant push-pull pickling line at Tangsteel

The Chinese steel company HBIS Tangsteel has started operating its new strip processing line. The Primetals Technologies plant enables the manufacture of a wide range of products, which would typically require two conventional pickling lines. It delivers excellent surface quality and reduced rejects, as well as expanded processing options for coils.

Primetals Technologies has received the provisional acceptance certificate (PAC) for one of the world's largest push-pull pickling lines (PPPL) at HBIS Tangsteel's steel plant in Laoting, Hebei province, China.

The new line processes strip thicknesses from 1.8 to 15 millimetres at speeds up to 200 metres per minute, enabling a wide product mix usually possible only with two conventional continuous pickling lines. Primetals Technologies supplied the complete mechanical, electrical, and automation scope, as well as engineering and advisory services.

Optimized winding quality. Targeted process optimization and the use of state-of-the-art control technology have resulted in outstanding winding quality for steel coils up to and above 12 millimetres thick. This ensures more consistent strip tension control, reduced offsets between layers, and improved edge guidance. The result is higher surface quality, fewer rejects, and more options for further coil processing – a decisive advance for demanding applications in the automotive, construction, and mechanical engineering industries.

Maximized throughput. The PPPL is supported by an innovative solution for automated analysis and control of the pickling process. Operators now have a comprehensive overview and can manage the process with high precision.

The Level 2 automation solution features a sophisticated pickling software model that considers multiple parameters to ensure optimal temperature, pickling levels, flows, and turbulence. This leads to increased throughput, optimized energy use, and reduced pickling fluid consumption.

The line is also equipped with an in-line 4-high single-stand skin-pass mill for enhanced strip flatness control and a turret-head-type side trimmer for thicknesses from 2 to 8 millimetres, ensuring top strip-edge quality.

HBIS Tangsteel is one of the largest state-owned iron and steel enterprises in China. Its main products include hot-rolled and cold-rolled sheet, galvanized sheet, medium and heavy plate, bar, wire, and section products. These products are used in automobiles, appliances, machinery manufacturing, infrastructure, and bridge construction, and are shipped to more than 100 countries worldwide.

Primetals Technologies

The push-pull pickling line from Primetals Technologies is now operational at HBIS Tangsteel (Picture: Primetals Technologies)

TRENDS IN THE GLOBAL ECONOMY

Worldwide materials perspective 2025

McKinsey's report "Global Materials Perspective" reveals resilience as sector sustains US$1.3 trillion in profits amid geopolitical shifts. Despite a 6% revenue decline, the industry records one of its highest-earning years in the past two decades, amid rising geopolitical pressures and shifting demand patterns.

In October, McKinsey & Company released its "Global Materials Perspective 2025" report, providing a system-wide view of how metals and mining are navigating profitability resilience, shifting demand, and a more fragmented global market against the backdrop of slowing energy transition momentum in some regions.

The report highlights that overall, materials revenue slightly contracted in 2024 to about US$6.7 trillion, following a period of price volatility. Metals and mining revenue declined by 6% to approximately US$3 trillion, reflecting a cyclical reset driven by price adjustments across major commodities like thermal coal, steel, and battery materials.

Nevertheless, profitability remained resilient at US$1.3 trillion, with metals and mining accounting for US$700 billion – cementing the year as one of the most profitable in the past two decades. This resilience was achieved despite mounting cost pressures from declining ore grades, labour shortages, and environmental requirements, underscoring the importance of productivity gains to sustaining and improving margins.

At the same time, the analysis revealed a shift in profit pools away from coal and steel toward gold, copper, and aluminium – extending a multi-year trend, while capital markets remained robust with total shareholder returns growing 3.5 times since 2015 and market capitalization doubling over the same period.

The report also finds that global supply-demand gaps are beginning to narrow, as lower prices constrain supply while demand growth moderates in line with the energy transition. Meanwhile, geopolitical focus has intensified, with new tariffs, incentives, and export barriers. Consequently, governments and companies alike are seeking to reduce dependencies: with importing nations pursuing stockpiles and strategic projects to strengthen resilience, while producers push for more local downstream processing – especially in Africa.

Macroeconomic trends

At the same time, macroeconomic trends increased market fragmentation: in 2000, the top ten metals and mining companies accounted for 60% of the market, but by 2015 that share fell to 30% and has stabilized since. Over the 2000-24 period, players in China and North America increased their market shares while Europe's share decreased to 11%, and the steel industry saw its share decline from around 20% in 2000 to 10% in 2024.

> For industry players, this shifting landscape creates clear opportunities.
>
> *Michel van Hoey, Senior Partner at McKinsey*

In terms of productivity, the analysis shows a modest rebound after years of decline, growing by around 1% annually since 2018. Latin America has led improvements in factor costs and capital productivity, while North America and Oceania outperformed in labour productivity. Yet sustaining gains will be harder as ore grades decline, mining conditions become more complex, and environmental and labour requirements increase.

"Productivity has become a defining theme for the sector, and recent gains are encouraging," said Karel Eloot, Senior Partner at McKinsey. "But productivity in mining is no longer about a single lever – it's about deploying a full toolbox. Companies that integrate automation, generative AI, electrification, and operational efficiency measures can help offset declining grades, rising costs, and set new benchmarks for long-term competitiveness."

Against this backdrop, new demand drivers are emerging. Analysis suggests there could be an accelerated demand from the expansion of AI technologies, and this will likely have a material impact on demand profiles. For example, AI data centres could represent up to 3% of global copper demand by 2030.

"The metals and mining sector has remained profitable despite revenue headwinds but the sources of pressures are changing," said Michel Foucart, Associate Partner at McKinsey. "Geopolitics, defence, and AI-driven demand are reshaping supply chains, while productivity gains are increasingly reliant on digital innovation. Together, these dynamics will require companies to innovate and adapt faster than ever before."

"For industry players, this shifting landscape creates clear opportunities," said Michel van Hoey, Senior Partner at

McKinsey. "Mining companies can engage in partnerships with downstream customers and can leverage incentives to bring new projects faster to market. Metals companies can align with policy priorities through the development of domestic assets and building inventory buffers. Together, these actions can enhance resilience and competitiveness in a market increasingly shaped by evolving geopolitical and sustainability demands."

Outlook

The analysis highlights robust demand outlook through 2035, with more than half of demand growth from 2024 to 2035 expected to come from energy transition materials such as copper, lithium and rare earth elements.

Geographically, Asian countries could remain the largest drivers of demand globally, accounting for more than 45% of demand growth by 2035 across most commodities.

The defence sector is an additional area of key growth, potentially accounting for 2% of aluminium, 4% of steel, and 8% of copper demand from NATO Europe countries by 2030.

Global supply-demand gaps are beginning to narrow, as lower prices constrain supply while demand growth eases in line with the energy transition.

Importing nations are pursuing greater self-sufficiency through strategic initiatives, though many European projects remain challenged by cost competitiveness, particularly compared with North America's faster supply ramp-up.

Meeting demand through 2035 will require US$4.7 trillion in capital expenditure, 270 GW of additional power capacity and 350,000 new jobs globally.

McKinsey's latest survey highlights a slowdown in demand for green materials. Nearly half of steel and copper buyers now say they are unwilling to pay premiums up from 35-40% last year while aluminium has remained relatively stable. This shift comes as momentum for low-carbon steel projects in Europe has slowed, with 30-40% of announced capacity on hold or cancelled.

Metals and mining emissions are projected to decrease by a modest 6% by 2035.

The Global Materials Perspective 2025 provides fact-based insights for executives, governments, and investors. It highlights how profitability, geopolitics, productivity, and new demand drivers are redefining competitiveness in metals and mining. The 54-page report is available to download from McKinsey's website.

McKinsey

STEEL ECONOMIC FORECAST

Global steel demand to bottom out in 2025, moderate growth projected for next year

Global steel demand in 2025 is projected to be flat compared to 2024, reaching about 1,750 million tonnes. A modest rebound of 1.3% is forecast for 2026, pushing global demand to 1,772 million tonnes.

At its General Assembly in Washington, DC, United States, from 12 to 14 October 2025, the World Steel Association (worldsteel) released its latest Short Range Outlook (SRO) for global steel demand in 2025 and 2026. Commenting on the outlook, Alfonso Hidalgo de Calcerrada, Chief Economist, Spanish Steel Producers Association (UNESID) and Chair of the worldsteel Economics Committee, said, "despite a considerable escalation of the global trade war and inherent uncertainties, we are cautiously optimistic that global steel demand will bottom out in 2025 and demonstrate moderate growth in 2026. This positive outlook is underpinned by the demonstrated resilience of the global economy, continued strength in public infrastructure investments in most major economies of the world, and the expected ease in financing conditions.

The projected growth in 2026 is driven by a mix of powerful regional trends. We expect to see a slowdown in the decline of steel demand from China, coupled with strong growth in developing economies like India, Vietnam, Egypt, and Saudi Arabia. Critically, we also anticipate the long-awaited return of steel demand growth in Europe.

However, the path forward isn't without its challenges. First, the global manufacturing sector continues to face a squeeze from elevated production costs and sustained affordability pressures on consumers. Second, escalating trade tensions are having a direct, negative impact on steel demand in economies heavily reliant on the export of steel-intensive goods, such as machinery and automotive components. Finally, geopolitical uncertainties act as a major deterrent, chilling both consumer and investor confidence, and dampening steel demand across key markets."

Alfonso Hidalgo de Calcerrada, Chief Economist at UNESID and Chair of the worldsteel Economics Committee at the worldsteel general assembly in Washington, DC (USA) on 13 Oct 2025 (Picture: worldsteel)

China. Worldsteel anticipates that China's steel demand will continue its decline in 2025, falling by approximately 2.0%. This forecast represents a moderation of the downward trend observed since 2021, driven primarily by the ongoing downturn in the housing market. Looking ahead to 2026, the decline is projected to further decelerate to 1.0% as the housing market bottoms out. We believe that the risks to our current China steel demand outlook weigh on the downside. A tougher global trade environment poses a significant downside risk, potentially slowing steel demand from the manufacturing sector. Additionally, lingering financial pressures on local governments could constrain infrastructure investments, further dampening demand.

Developing world. Steel demand in the developing world excluding China is forecast for robust growth, with a 3.4% increase in 2025 and a 4.7% increase in 2026. This expansion is primarily driven by strong performance in India, and some ASEAN and MENA countries.

Projections suggest steel demand in **India** will continue to charge ahead with around 9% growth in its steel demand over 2025 and 2026, driven by continued growth in all steel using sectors. In 2026, steel demand in India is projected to be almost 75 million t higher than in 2020.

For nearly a decade, starting in the mid-2010s, steel demand in **Africa** remained largely flat, hovering around the 35–40 million t mark. However, a significant shift has been underway since 2023, with clear indicators of a strong resurgence in construction and steel consumption across the continent. The analysis estimates that over the past three years, Africa's steel

Top 10 steel using countries 2024 (SRO October 2025, finished steel products)

	million tonnes			y-o-y growth rates		
China	856.6	839.5	831.1	-5.4%	-2.0%	-1.0%
India	147.9	161.1	175.7	11.4%	8.9%	9.1%
United States	89.1	90.7	92.3	-1.6%	1.8%	1.8%
Japan	49.7	48.1	47.7	-3.9%	-3.1%	-0.8%
South Korea	47.8	44.8	45.1	-8.9%	-6.3%	0.6%
Russia	43.7	40.2	39.0	-2.1%	-8.0%	-3.0%
Türkiye	38.3	39.7	40.3	0.6%	3.7%	1.5%
Mexico	27.8	24.9	25.9	-4.3%	-10.5%	4.0%
Germany	26.6	27.0	28.2	-6.2%	1.5%	4.6%
Brazil	26.1	27.4	27.7	8.9%	5.0%	1.0%
f - forecast						

demand has grown by an average of 5.5% per annum, fuelled particularly by robust activity in the Northern and Eastern regions. This renewed momentum, which brought Africa's steel demand to about 41 million t in 2025, is underpinned by improving macroeconomic fundamentals and governance. For instance, most of Africa's major economies have recently achieved greater stability, seeing a noticeable reduction in volatility across inflation and exchange rates. Furthermore, several African nations are actively pursuing ambitious economic diversification agendas, supported by key reforms. These developments might be paving the way for a potentially sustained period of steel demand growth in the continent.

Worldsteel anticipates a relatively strong 5.5% growth in **Central and South America**'s steel demand this year. This projected expansion is primarily driven by a double-digit rebound in Argentina – recovering from a massive 30% or more decline in 2024 – and solid 5.0% growth in Brazil, where government-supported social housing initiatives continue to bolster construction steel consumption. This forecast of 5.5% growth is expected to push the region's total steel demand to approximately 50 million t. However, it is important to note that this level is 2 million t lower than the consumption recorded back in 2013. This clearly reflects the persistent deindustrialisation trend that has marked the region's economic trajectory since the early 2000s.

Developed countries. The developed world is forecast to experience a 0.5% decrease in steel demand in 2025, marking the fourth consecutive year of decline since 2021. However, a recovery is anticipated in 2026, with projected growth of 1.5% as steel demand in the EU and US is expected to bottom out in 2025 and post modest growth thereafter. Conversely, steel demand in Japan and Korea is projected to remain subdued throughout 2026.

Worldsteel expects the **EU + UK** region's demand to grow 1.3% in 2025 and 3.2% in 2026. The long-awaited return of steel demand growth in the EU reflects the impact of increased infrastructure and defence spending in the continent in combination with improving macroeconomic conditions such as lower inflation, easing credit conditions, and improvements in real household income.

Steel demand in the **USA** is expected to rebound by 1.8% in 2025 thanks to front-loading of production ahead of increased tariffs and continued growth in infrastructure spending. In 2026, worldsteel expects steel demand to grow by 1.8%, aided by pent-up demand in residential construction and private investment, easing financing conditions, and reduced uncertainty. Additional upside could come from the launch of the "One Big Beautiful Bill" stimulus, which may boost multiple sectors.

worldsteel

Climate change and the production of iron and steel – 2025

Worldsteel has published an updated policy paper on climate change and the production of iron and steel. The 12-page brochure focuses on mitigating the emissions from the production of iron and steel. It outlines the challenges ahead, as well as steps needed to remove barriers and accelerate decarbonisation. The paper calls for action from the industry and its value chain, governments, and academia. These actions are highlighted throughout the paper.

Contents: Steel steers transformation – Keeping track of our emissions – Taking action to reduce our emissions: three main levers – Critical enablers: resources, infrastructure, and people – Market demand – Decarbonisation will not follow the same path everywhere.

The policy paper is available to read and download online at worldsteel.org

IMPORTS OF STEEL AND OTHER METALS ARE GROWING IN THE UK

Investments in steel logistics infrastructure in England

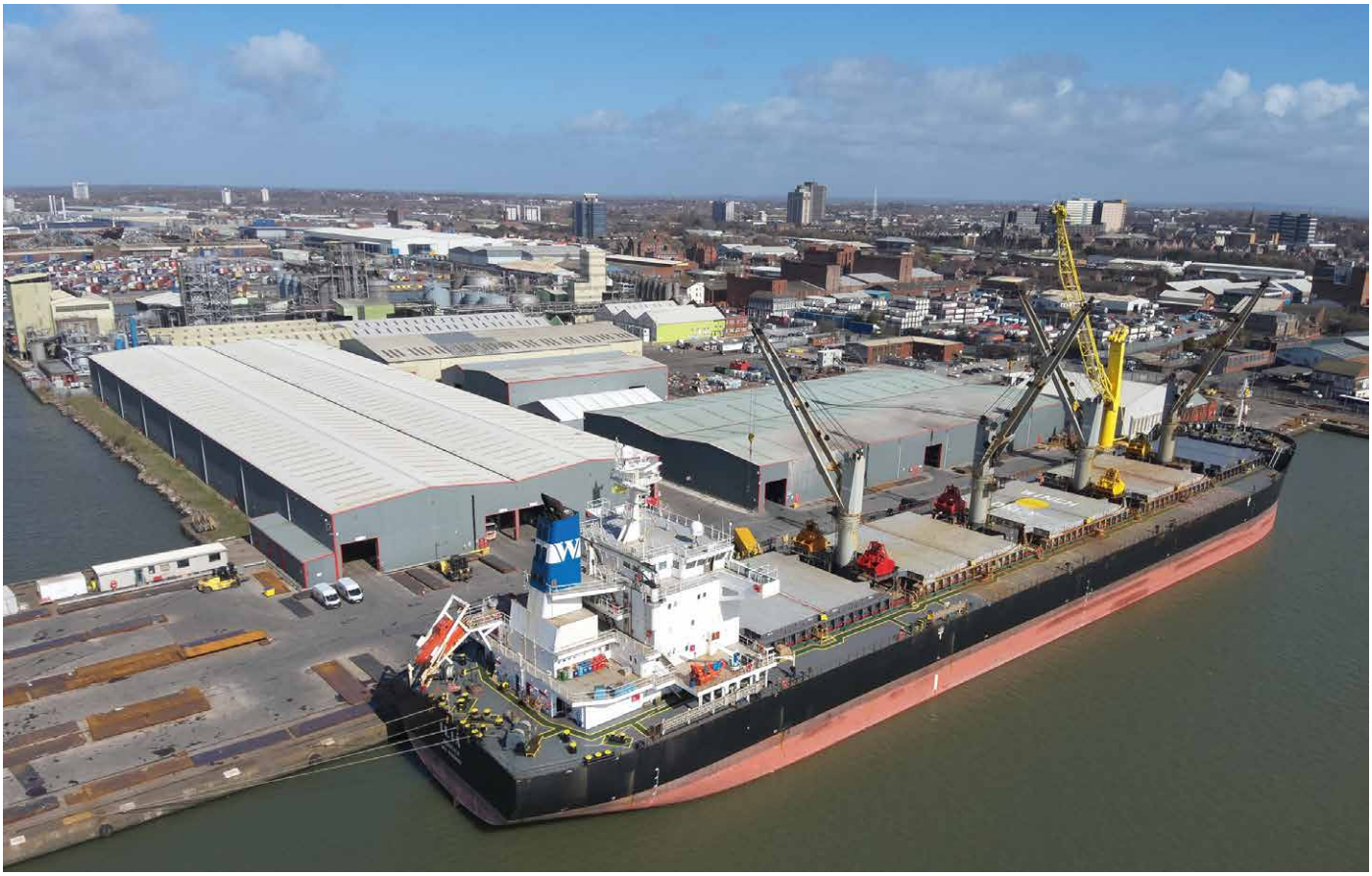
Peel Ports Group has decided to expand their national steel and metals multimodal hubs in England. Plans include new automated terminals in Liverpool and London Medway, with the development of a new automated rail facility in the Midlands. The steel and metals storage at the Port of Liverpool will be expanded.

Peel Ports Group is to invest £100m (approx. €113 million) into the steels and metals sector in a move to enhance capacity and boost the efficiency of logistics. The UK's second largest port operator is progressing with £32m (approx. €32 million) to add a further 140,000 sq ft (13,000 m²) of storage at its Port of Liverpool steel and metals terminals.

Overall across the Ports of Liverpool and London Medway, warehousing will be increased by 50 percent from the current 1 million sq ft (93,000 m²) to create an additional 500,000 sq ft (46,500 m²) of capacity.

Further plans include creating a second automated terminal in Liverpool dedicated to steel coils, as well as a new automated terminal for the Port of London Medway in Sheerness. These will be developed to include rail connectivity by a new inland rail terminal in the Midlands.

This fresh investment by the port group follows a record year for steel imports at the Liverpool facility and will help further grow the volumes of steel it transports across the UK. David Huck, Chief Operating Officer at Peel Ports Group, said: "This is a game-changing investment for us. Demand for steel and metals handling across our port group, and the UK in general, has risen sharply over the past five years and this will allow us to expand our support to the construction and manufacturing supply chain right across the country. This investment ensures we have the scale, speed, and specialist expertise to support our customers today and long into



Steel and metals storage facilities at the port operator's Port of Liverpool (Picture: Peel Ports Group)

the future, helping to also address some of the storage and transportation issues the steel sector currently faces."

"With expanded capacity and a growing, dedicated steel handling team, we can now move more product, more efficiently than ever before. Our location in Liverpool is in the heart of Britain and gives us a clear advantage – perfectly placed to serve stockholders and fabricators nationwide, supported by excellent road and rail links."

Warehousing will remain a key focus for the business, with further expansion already in the pipeline as the port group continues to futureproof service for the UK's critical industries. The addition of a new rail terminal in the Midlands will allow them to efficiently connect the two strategically located deep-water ports of Liverpool and London Medway, boosting the efficiency of logistics for customers and partners. The business is already working with customers to bring steel cargoes closer to major centres of demand across its seven statutory harbour authority ports and 24 terminals.

This is the second time in under two years it has extended its Port of Liverpool steel and metals terminal and will involve the creation of two newly dedicated warehouses at its Seaforth Dock to handle these products. The port group has added a new team of specialist Stevedores at the Port of Liverpool and is actively recruiting for extra positions and training internal staff to enhance handling capability to meet the rise in demand. The port now boasts more than 610,000 sq ft (56,700 m²) of storage for the commodity, and this expansion means it will be able to store an additional 35,000 tonnes of steel and metals.

> Demand for steel and metals handling across our group, and the UK in general, has risen sharply over the past five years.
>
> *David Huck, Chief Operating Officer at Peel Ports Group*

The automated steel terminal at the port operator's Port of Liverpool
(Picture: Peel Ports Group)

Import volumes at the Port of Liverpool have increased by more than 35% compared to last year

This fresh investment by the port group follows a record year for steel imports at the city facility. The port group has the capability to store and handle many different types of metal products, including rebar, plates, coil and aluminium, and handles significant volumes.

In April, the company reported a record-breaking year for steel imports at the Port of Liverpool, with volumes increasing by more than 35% year-on-year. 702,000 tonnes of bulk steel were processed at the port in 2024, coming from across the world including from South Korea, Vietnam, Taiwan, Turkey, and Europe. The port operator also recently underlined its commitment to supporting UK steel and metals supply chains by becoming the first and only UK port operator to join the Aluminium Federation (ALFED).

Peel Ports Group is the UK's second largest port operator, owning and operating six of the UK's most important ports (Liverpool, Heysham, Manchester Ship Canal, Medway (Sheerness / Chatham), Clydeport and Great Yarmouth). It also operates a container terminal in Dublin and owns BG Freight Line, which provides short sea container services between the UK, Ireland and mainland Europe and Peel Ports Logistics, one of the UK's leading shipping and freight forwarders.

Peel Ports handles approximately 70 million tonnes of cargo every year. 14% of the total UK major ports traffic flows through ports operated by the Group. Headquartered in Liverpool, it employs around 2,000 staff.

Peel Ports Group

ACCELERATING THE SUSTAINABILITY JOURNEY

15,000 tonnes of steel delivered by electric trucks on the Belgium-Netherlands route

ArcelorMittal has committed to supporting partners in building a more sustainable future. Collaborations like the one with KS Service Center demonstrate how shared ambition and innovation can drive meaningful progress across the steel supply chain.

From left to right: Gregory Rombaut (Sales and Marketing Manager KS Service Center), Erik den Hoedt (Account manager ArcelorMittal Belgium) and Corne Rottier (Managing Director KS Service Center) together at Blechexpo 2025
(Picture: ArcelorMittal)

> With ten deliveries per week, we are taking clear and concrete steps toward a more sustainable steel industry.
>
> *Corne Rottier, Managing Director at KS Service Center*

The KS Service Center was the first steel service centre in The Netherlands to buy Magnelis® steel from ArcelorMittal which was produced using the XCarb® recycled and renewably produced route. Moreover, two years ago, KS Service Center also took a bold step toward transforming its logistics operations. Today, that vision has become reality: 15,000 tonnes of ArcelorMittal steel have been delivered using electric trucks. With 750 deliveries now completed by electric trucks, it sets a new benchmark for environmentally responsible transport in the steel industry.

Thanks to the use of electric trucks on the Belgium-Netherlands route from KS Service Center to ArcelorMittal Gent, ArcelorMittal has achieved a certification of total CO_2e savings of 89.89 tonnes from November 2023 to end 2024.

And this is just the beginning. With continued investment in sustainable logistics and expanding partnerships, more milestones are expected in 2025 – further reinforcing the commitment to decarbonising our steel supply chain and driving meaningful change across the industry.

Strong partnerships, real impact

"It's always a beautiful moment to see our electric trucks arrive. It reminds me that, as KS Service Center, we are truly contributing to a more sustainable supply chain. With ten deliveries per week, we are taking clear and concrete steps toward a more sustainable steel industry. Every trip we make with an electric truck means less emissions and less environmental impact, ensuring that not only our product, but also its delivery, is future proof. In this way, we actively contribute to a more sustainable logistics chain in the Benelux," says Corne Rottier, Managing Director KS Service Center.

KS Service Center continues to inspire both customers and partners to invest in a more sustainable economy – proving that innovation and responsibility can go hand in hand.

About KS Service Center. KS Service Center originated from the parent company KS Profiel, founded in 1975. In order to obtain purchasing advantage for the profiles for its clients, the company acquired its own slitter in 2005. This immediately enhanced the delivery times. Overcapacity of the slitter is quickly used for other steel processing companies.

ArcelorMittal

MODERNISATION

Perfectly synchronised saws and storages

Brütsch/Rüegger Metals AG, a Swiss metal distributor rich in tradition, has upgraded its operations by replacing a semi-automatic honeycomb storage system with fully automatic long goods storage systems from Kasto. To enhance the process chain, the company has also integrated two modified bandsaws. Considering growing demands, this combination has become a vital factor for success.

The combination of two automatic storage systems, high-performance output stations, and flexible sawing centres ensure short delivery times (Picture: Kasto Maschinenbau)

Brütsch/Rüegger Metals AG is a full-range metals distributor based in the canton of Zurich, Switzerland. Since its establishment in 1877, the company has experienced steady growth. It boasts a portfolio of over 8,000 products and maintains a warehouse stock of 5,500 tonnes. With a team of 30 employees, the company is now one of the leading suppliers of tubes, bars, and sections in the alpine country.

However, with growth came new challenges: The semi-automatic honeycomb storage system from the 1980s was increasingly reaching its limits. Issues such as inefficient use of space, high search times, and safety risks associated with manual operations have hindered operational processes.

The manual setup process using a rail crane became a significant bottleneck, making it impossible to meet efficiency requirements. "The continual expansion of our product range, along with the takeover of Walter Looser AG – the leading provider of semi-finished and finished bronze products in Switzerland – prompted us to look for a high-performance solution," explains Patrick Epp, Managing Director of Brütsch/Rüegger Metals AG. "Our warehouse stock continued to increase, and we eventually reached our maximum storage capacity." Expanding the warehouses was not feasible due to existing infrastructure constraints, leaving only one option: consolidation. This led to the initiation of 'Project Core'. The objective was to increase storage capacity, modernise the warehouse with state-of-the-art technology, and enhance process efficiency.

The idea: a complete solution from a single source

The metal specialist had complex requirements for the new system. It needed to have twice the storage capacity, fit within the 26-meter-wide Hall 5, and accommodate both 6-meter and 12-meter long goods. Additionally, the system had to be reliable and easy to operate. The project included a request for the capability to implement seven different storage and retrieval stations, allowing for simultaneous storage and processing of materials with multiple saws. The capacity requirements presented a particular challenge, as the design had to consider not only the limited floor space but also the height restrictions due to a photovoltaic system installed on the roof of the hall, which generates green electricity.

"We conducted extensive market research," reports Patrick Epp. "Since 2018, we have been using the KASTOwin A 3.3 bandsaw, and we are very satisfied with its performance." This high-performance bandsaw is designed for efficient series cutting, providing fast and reliable operation. It includes automatic functions, minimises non-productive times, and features comprehensive monitoring systems, all of which contribute to high efficiency and safety while reducing tool wear, whether for single cuts or large series. "This efficiency was one of the primary reasons we chose to meet with Kasto in person at the LogiMAT fair in Stuttgart in 2022 to discuss our planned warehouse."

There it became evident: Kasto, a specialist in sawing and storage solutions, offers exactly what Brütsch/Rüegger Metals AG was looking for with its two systems, UNITOP and UNITOWER. The managing director emphasises, "A significant advantage of Kasto over its competitors is that we receive both storage systems from a single source. All other suppliers could only deliver one or the other." This expertise in system solutions comes as no coincidence.

Tailor-made system for complex requirements

The new installation at Brütsch/Rüegger features two storage systems from Kasto: the UNITOP overhead storage system, which has a storage length of six meters, and the UNITOWER tower storage system, with a storage length of twelve meters. Additionally, the installation includes two sawing centres from the KASTOwin series (models F 3.3 and A 3.6).

> The key competitive factors are the compact storage and efficient processing of our products.
>
> *Patrick Epp, Managing Director of Brütsch/Rüegger Metals AG*

Patrick Epp is the managing director of Brütsch/Rüegger Metals AG
(Picture: Kasto Maschinenbau)

This configuration allows the company to efficiently store and process long goods within a single hall, optimising the use of space. The overhead storage system is equipped with an operating gantry crane that moves above the cassettes containing the metals, enabling quick storage and retrieval. Special feature: to achieve the required capacity given the limited height of the hall, both systems were installed four meters into the floor.

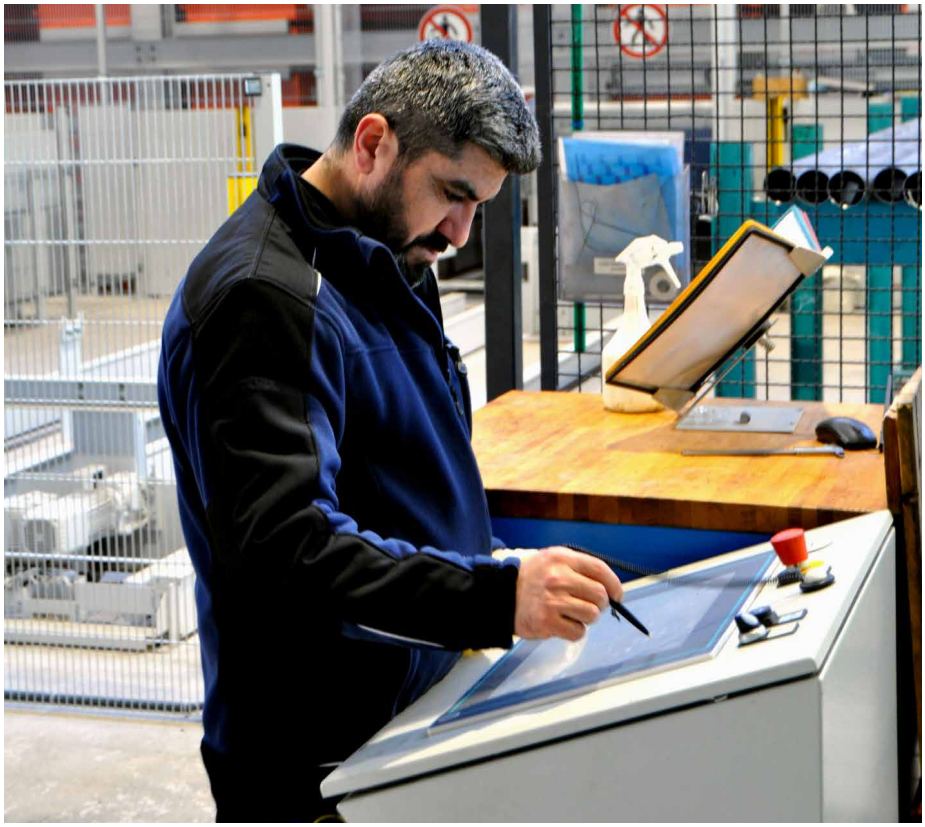
The UNITOP overhead storage system optimally utilises available space and provides a clear overview of inventory through its computer-controlled features. This system efficiently transfers long materials to three double output stations in short cycles, seamlessly integrating into the material flow. By incorporating automatic bar separation and connecting to KASTO–win saws, Brütsch/Rüegger Metals AG has developed a flexible production system that operates largely without human intervention. The metal specialist stores specialised products, such as twelve-meter-long cylinder tubes for the hydraulics industry, in the UNITOWER. This tower storage system enhances material flow and saves significant space thanks to its compact design. It can handle loads of up to five tonnes per cassette, which can be provided quickly and easily.

Outdated storage system was converted into a comprehensive solution

The conversion process was executed in phases: In the first stage, technicians

removed the right half of the old honeycomb storage system and the operating gantry crane (OGC), creating space for the new structure. During this time, good were temporarily stored in other halls. The left half of the storage system remained operational, with employees managing it manually. Next, a four-meter-deep channel was created, into which two new storage systems were installed: UNITOP and UNITOWER. Following this, the KASTOflow align front storage station was integrated into the overhead storage system. This installation enabled Brütsch/Rüegger Metals AG to efficiently transfer long goods from both the temporary storage systems and the remaining old storage half to the new UNITOP.

In the final phase, specialised personnel completely dismantled the remaining half of the old system and installed three double retrieval stations in the newly available space. These stations automatically supply four sawing centres with materials. "It was a challenge to coordinate the conversion while managing day-to-day business," recalls Patrick Epp, Managing Director. "However, both the storage solutions and the saws have significantly improved our efficiency," he says, praising them.



Since the new structure was built, organising and accessing stored materials has become significantly easier (Picture: Kasto Maschinenbau)

More than just speed: advantages in action

The changes are evident at all levels. "The organisation and access to the material are much simpler since the conversion." says Patrick Epp happily. "This improvement is not only seen in the speed of the current honeycomb storage system but also when comparing it to the overhead storage system from another manufacturer that we use". Thanks to the shorter storage and, particularly, retrieval times, the metal specialist operates much more efficiently. Additionally, the new storage system has increased workplace safety, since goods are now transferred automatically via retrieval stations to the saws. This represents a significant improvement over the previous manual solution. The reduction in error rates during the setup process directly impacts customer satisfaction. Faster access to materials leads to shorter delivery times, giving us a decisive advantage over competitors in the just-in-time production landscape of modern industrial companies. Furthermore, the Kasto subsidiary in Switzerland ensures quick assistance in the event of malfunctions, thereby minimising downtime.

"Our expectations regarding performance and quality were fully met," concludes Managing Director Epp with satisfaction. The company successfully completed 'Project Core' with the commissioning of the final saw, a KASTOwin A 3.6, at the end of the year. He summarises his assessment: "The key competitive factors are the compact storage and efficient processing of our products. Kasto provides complete systems and solutions from a single source that we can depend on."

Kasto Maschinenbau GmbH & Co. KG

THE AMERICAS

Klöckner to sell U.S. distribution sites

Klöckner & Co is selling seven distribution sites of its U.S. subsidiary, Kloeckner Metals, to Russel Metals and one to Service Steel Warehouse. With these divestments, Klöckner aims to intensify its focus on the higher value-added and service center business.

For Klöckner & Co, both divestments represent significant steps in the successful execution of its corporate strategy "Klöckner & Co: Leveraging Strengths – Step Up 2030", through which the company committed itself to intensify its focus on the higher value-added business, such as processing and fabrication solutions, within its customer value chain. By enabling the company to reallocate capital from the distribution business to the higher value-added and service center business, Klöckner & Co will further reduce its exposure to volatile commodity markets.

The distribution sites to be sold to Russel Metals are located in Austin and Houston (Texas), Charlotte (North Carolina), Dubuque (Iowa), Jacksonville and Pompano Beach (Florida), and Suwanee near Atlanta (Georgia). The site to be sold to Service Steel Warehouse is located in Amarillo (Texas). As part of the agreement with Russel Metals, the parties have entered into a transitional service agreement. Excluding the eight distribution sites, the share of sales generated by higher-value-added and service center business, which are characterized by more stable demand and higher profitability, was 86% (+5 pp) in the first half of 2025, compared with 81% including these sites. The transactions thus further improve Klöckner & Co's earnings profile.

Klöckner

THE AMERICAS

Ryerson and Olympic Steel announce merger agreement

Ryerson Holding Corporation, processor and distributor of industrial metals, and metals service center Olympic Steel have entered into a definitive agreement to merge.

Under the terms of the merger agreement, Olympic Steel shareholders will receive 1.7105 Ryerson shares of common stock for every Olympic Steel share of common stock owned, resulting in an approximately 37% ownership of the combined company. The deal is expected to close in the first quarter of 2026, subject to the satisfaction or waiver of customary closing conditions and the receipt of regulatory and shareholder approvals.

As part of the transaction, Michael D. Siegal, Executive Chairman of Olympic Steel's Board of Directors, will be appointed chairman of the Board of Directors of the combined company, and Olympic Steel will also appoint three other mutually satisfactory directors to the combined 11-member board. Eddie Lehner, President and Chief Executive Officer of Ryerson, will serve as CEO of the combined company, with Richard T. Marabito, CEO of Olympic Steel, serving as President and Chief Operating Officer.

Eddie Lehner said, "This merger represents an immensely attractive and unique opportunity for Ryerson and Olympic Steel as it combines our two organizations, which couldn't be more complementary and synergistic around the products, services, footprint, and customer experience that will enhance our market presence while adding significant value to our stakeholders."

"We are very excited about the combination of Ryerson and Olympic Steel and the trajectory of the business going forward," added Steve Larson, Chairman of Ryerson's Board. "

Ryerson / Olympic Steel

THE AMERICAS

Posco enters strategic Alaska LNG partnership

Glenfarne Alaska LNG and Posco International Corporation have announced an agreement to advance a strategic partnership for the development of the Alaska LNG Project, the only federally authorized LNG export project on the U.S. Pacific Coast. The partnership will include steel supply, LNG offtake, and an investment with respect to the Alaska LNG project.

Glenfarne Group CEO and founder, Brendan Duval, and Posco International CEO, Kye In Lee, signed a commercial agreement to advance the Alaska LNG project (Picture: Posco)

Alaska LNG is a joint venture between Glenfarne, majority owner and lead developer of Alaska LNG, and the state-owned Alaska Gasline Development Corporation. The agreement defines the process for Glenfarne and Posco to move forward on definitive agreements, which will close pending board approvals by both sides. It will include initial terms for Posco to supply a significant portion of the steel required for Alaska LNG's 807-mile, 42-inch (1 metre) diameter pressurized natural gas pipeline. The Alaska LNG pipeline will connect Southcentral Alaska, home to Alaska's population center and the Alaska LNG export terminal, with Alaska's natural gas resources on the North Slope. Glenfarne is targeting a year-end final investment decision for the Alaska LNG pipeline. The agreement will include initial terms for a 20-year heads of agreement for 1 million t/year of LNG offtake on a free-on-board basis.

The Alaska LNG project consists of a pipeline capable of transporting enough natural gas to meet both Alaska's domestic needs and supply the Alaska LNG export terminal in Nikiski, Alaska. Further accelerating the project's execution, the pipeline will be built in two independent, financially viable phases. Phase I will deliver natural gas approximately 765 miles (1,200 km) from the North Slope to the Anchorage region. Phase Two includes the Alaska LNG facility, approximately 42 miles (70 km) of pipeline under Cook Inlet, and pipeline compression equipment.

Posco /Glenfarne

THE AMERICAS

Russel Metals announces rationalization initiatives in Western Canada

Russel Metals has announced a series of initiatives related to its Western Canadian operations that will rationalize excess capacity and redundant locations, reduce invested capital and gain operational efficiencies.

Russel Metals is one of the largest metals distribution companies in North America with a growing focus on value-added processing. The specific initiatives announced include binding agreements in place to sell the real estate associated with Russel Metals' branches in Delta, British Columbia, and Saskatoon, Saskatchewan. The permanent closure of the Delta location will result in a repatriation of excess working capital, once the inventories are integrated into Russel Metals' other locations in the region. Certain processing equipment, racking and cranes at three of the Western Canadian locations, including the Delta location, will be removed, refurbished and relocated to operations in North America or sold.

Russel Metals

THE AMERICAS

Steel Dynamics launches lower-embodied-carbon steel products

Steel Dynamics has announced lower-embodied-carbon steel product offerings to support customers in achieving their greenhouse gas emissions reduction and sustainability initiatives.

BIOEDGE™ and EDGE™ are lower-embodied-carbon steel products produced exclusively with electric arc furnace technology. Additionally, the steel is matched with Green-e Energy certified renewable energy certificates or emission-free nuclear energy certificates, significantly reducing Scope 2 emissions. BIOEDGE further reduces embodied carbon in the EAF steelmaking process, utilizing renewable biocarbon as a replacement for anthracite, significantly reducing Scope 1 emissions.

The EDGE family of steel products will be available across the company's steel operations. The renewable biocarbon used to produce BIOEDGE will be sourced exclusively from SDI Biocarbon Solutions, which is 75%-owned by Steel Dynamics and 25%-owned by Aymium.

Steel Dynamics, Inc.

ASIA

Benteler opens new module plant in Beijing

In Beijing, Benteler officially opened a new module plant, which is part of a joint venture with the Chinese automotive supplier BHAP (Beijing Hainachuan Automotive Parts).

The new module plant is located in an important hub for the automotive industry, with a large consumer base and a well-developed supply chain. The plant covers an area of more than 23,000 m² and is designed for an annual capacity of 350,000 units. Production of chassis suspension modules for Beijing Benz has already started. At full capacity, the site will employ up to 250 people.

"China is one of the most dynamic and promising automotive markets worldwide. With our new plant in Beijing, we are further expanding our presence in the region, while reinforcing our partnership-driven approach: we are forming strong joint ventures with local business partners to shape the mobility of the future together," emphasized Ralf Göttel, CEO of the Benteler Group, in his opening speech.

Benteler

During the opening ceremony of the new module plant (Picture: Benteler)

ASIA

Benteler and Chenzhi expand partnership

Benteler has signed a second Memorandum of Understanding (MoU) with its long-standing partner, the Chenzhi Group.

Benteler and Chenzhi already successfully operate a joint venture in the city of Chongqing. The new MoU aims to expand the partnership with plans to establish an additional joint venture focused on the development, assembly and sale of intelligent chassis systems and structural components for so-called "new energy" vehicles. With 16 locations and targeted investments, Benteler reinforces its role as an innovation leader in one of the world's most important and fastest-growing automotive markets.

Signing of an MoU to establish a further joint venture (Picture: Benteler)

Benteler

ASIA

SSAB cracks down on counterfeit goods

SSAB has taken decisive action against two Indian companies selling counterfeit steel. The unauthorized products, labelled with the Hardox® trademark, exhibited severe quality issues, posing risks to buyers who believed they were purchasing genuine Hardox® wear plate.

Following a recent investigation and lawsuit in India, two companies based in the Mumbai area admitted to serious violations of SSAB's intellectual property rights. The companies not only paid exemplary damages but also faced a permanent injunction in the lawsuit and were directed to cease all use of the infringing marks. Additionally, they issued unconditional public apologies to SSAB.

Genuine Hardox® wear plate, a premium, high-quality product known for its exceptional hardness and toughness, is only produced by Swedish steel manufacturer SSAB, and it is only available from SSAB and from SSAB-certified suppliers. Each month, SSAB successfully removes hundreds of website links, online marketplace advertisements and social media pages based in India and China, offering counterfeit products or falsely claiming to stock genuine Hardox® wear plate for export to Middle East and other parts of the world, often at very low prices.

SSAB

EUROPE

Innovation award for structural health monitoring system

During the 4th Geoengineering and Underground Construction Congress in Łódz, Poland, ArcelorMittal received the prestigious TYTAN 2025 Award for its SmartSheetPile structural health monitoring system for sheet piles. The award recognizes excellence and innovation in engineering disciplines across Europe.

SmartSheetPile is designed to enhance the safety, resilience and sustainability of steel sheet pile-based infrastructure, such as ports, dykes and bridges. By integrating embedded sensors, real-time data transmission, digital twin modelling and advanced artificial intelligence analytics, SmartSheetPile enables continuous monitoring of critical parameters, including impacts, corrosion, structural integrity, deformation and strain. Its predictive maintenance capabilities and early warnings help to prevent catastrophic failures, reduce downtime and optimize asset performance.

SmartSheetPile offers five key benefits: securing assets through early detection of potential issues; minimizing costly downtime through predictive maintenance; optimizing maintenance schedules based on actual conditions rather than periodic inspections; revealing hidden structural capacities; and enabling digital transformation of infrastructure management.

ArcelorMittal Europe

Bauta opens new steel cutting and storage facilities in Norway

Bauta Metal officially opened its new cutting and storage facilities in Vestnes, Møre og Romsdal, on Norway's west coast. With a deepwater quay and direct access to the region's main highways, the location offers significant logistics advantages for customers.

The 3,200 m² production hall is equipped with large crane capacities and advanced machinery for shot blasting and priming. It features a plasma cutter with two cutting robots and a 3.6 x 34-m cutting table capable of handling plates up to 300 mm thick, as well as Norway's only 5-axis fiber laser, designed for plates up to 2,000 x 6,000 mm. The facility also includes industrial saws for cutting pipes and profiles. In combination with a 2,000 m² storage hall for aluminium and stainless steel, and 20,000 m² of outdoor storage, the facility offers substantial capacity.

Bauta Group is a family-owned industrial consortium consisting of 19 companies. Its core activities are in steel construction for the maritime and offshore industries, while other companies within the group specialize in electrical installations, construction, property development, aquaculture, welding wire distribution, and training services.

Bauta

PSI and metalsXP sign partnership agreement

PSI Software SE has entered into a partnership with SAP consulting company Metals Experience GmbH (metalsXP). This partnership will provide mutual customers with access to seamless SAP transformation processes and industry-specific consulting services, as well as integrated software solutions with only a single point of contact for complex digitalization projects.

The collaboration combines PSI's robust, industry-proven production management systems with metalsXP's deep metallurgical expertise and specialized tools for ERP. Together, this will enable metals producers to seamlessly integrate production execution systems with ERP, driving greater transparency, efficiency, and operational excellence.

"With this partnership, we look forward to a joint collaboration that will target key transformation challenges in the metals sector. By leveraging PSI's advanced production software and the tailored SAP consulting solutions and tools from metalsXP, customers can expect faster implementations, streamlined processes, and enhanced decision-making across the value chain", explains Ruben Perez Sobrino, Partner Manager, PSI Software SE.

"We're excited to partner with PSI. Together, we offer a compelling proposition for metals producers seeking smarter, more connected systems that are deeply aligned with business strategy", says Stefan Rauch, Managing Partner at metalsXP.

PSI / metalsXP

Pontus HeatTreatment becomes part of Härtha Group

By acquiring Pontus HeatTreatment, the Härtha Group is expanding its presence and expertise in the strategic core segment of heat treatment and coating solutions for aerospace, the semiconductor industry, and other technically demanding applications.

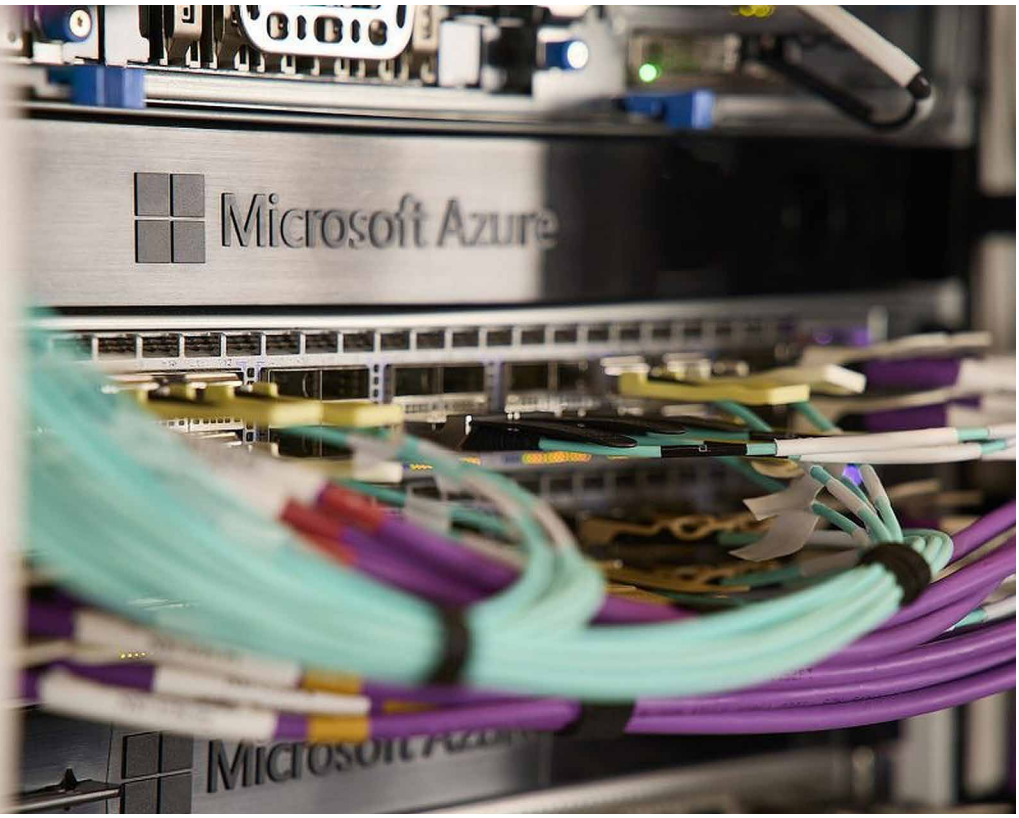
Pontus, headquartered in Enschede, The Netherlands, is a highly specialized service provider in the heat treatment and brazing of metallic components, with a particular focus on technically advanced solutions for the aerospace, defence and semiconductor industries. The company holds internationally recognized certifications such as NADCAP and EN9100, which guarantee the highest quality standards in safety-critical industries. Härtha currently operates 13 production sites in Germany, Italy, and the Netherlands, employing around 500 people.

Härtha Group / Pontus

GREEN VALUE TO BE SOLD SEPARATELY

Stegra signs agreements with Microsoft, driving demand for green steel

Stegra has entered into two new agreements with Microsoft. One is for the supply of steel with near-zero emissions to be used in Microsoft's datacenters. The other is for the purchase of environmental attribute certificates tied to production from Stegra's manufacturing facility in Boden, Sweden. This agreement is the first-of-its-kind in the steel industry designed to help drive global demand for green steel.



Microsoft is entering into a supply agreement for near-zero emission steel, as well as an agreement for environmental attribute certificates (Picture: Microsoft)

After investing in Stegra in 2023 through its Climate Innovation Fund, Microsoft is now also entering into a supply agreement for near-zero emission steel, as well as an agreement for environmental attribute certificates (EACs). These agreements align with Microsoft's focus on building markets for low-carbon construction materials, which in turn supports the company's ambition to become carbon negative by 2030.

Most Microsoft's carbon emissions are what is considered "scope 3" or indirect emissions. The rise in those scope 3 emissions in part comes from the construction of more datacenters and the associated embodied carbon in building materials and technology hardware. The challenges that Microsoft faces are in part unique to their position as a leading cloud supplier that is expanding its datacenter footprint. But even more, Microsoft reflects the challenges that the world must overcome to develop and use greener concrete, steel, fuel, and chips.

The supply agreement will see Stegra deliver steel with up to 95% lower emissions than conventional steelmaking, from its flagship plant currently under construction in Boden, to be used by Microsoft's datacenter equipment suppliers. Microsoft is not a direct buyer of materials such as steel. It will work with its suppliers to receive the coils from Stegra and process the green steel into components designated for use by Microsoft's datacenter equipment suppliers.

De-coupling the green value from the physical steel product

In addition to the agreement that covers physical steel, Stegra and Microsoft have also signed an agreement for environmental attribute certificates. This is a model that Microsoft has worked with in other industries, like aviation fuels and cement but this is the first time it is being implemented in the steel industry.

What Stegra is doing in this innovative environmental attribute certificate agreement is de-coupling the green value from a physical steel product. The physical steel is sold as conventional non-prime steel without a green premium, and to ensure there is no double counting of emission avoidance, the buyer of the physical steel will be obliged to commit to not make any green claims.

The green value is sold separately through the EACs. With these EACs, Microsoft can claim using the corresponding amount of steel with almost no emissions in its operations. The possibility to sell the green value separately via EACs will help drive further demand for sustainably produced products beyond where it today makes sense to deliver the physical product.

Stegra

The sandwich panel is made up of two steel sheets with a layer of thermal insulation between them and solar cells fitted on top (Picture: ArcelorMittal)

PRODUCT INNOVATION FOR THE CONSTRUCTION SECTOR

Revolutionary, low-carbon, all-in-one insulated steel roof

An innovative roofing product combines steel panel, thermal insulation, and PV cells. ArcelorMittal has inaugurated its Helioroof® production line in Contrisson, France, introducing this innovative roofing product that also has a significantly lower carbon footprint compared with conventional products.

Ready-to-install and all-in-one, Helioroof® modules are custom-made, up to 12 metres in length, with an energy output of up to 2.1 kWp (kilowatt peak) per module – a world record in both size and power. Helioroof® reflects ArcelorMittal Building Solutions' commitment to sustainable construction. Material-efficient, Helioroof® weighs half as much as a traditional roof with added solar panels and has a carbon footprint that is 25% lower than traditional insulated steel roofs.

The sandwich panel consists of two steel sheets with a layer of thermal insulation between them, and the top steel sheet is fitted with solar cells. All of these components are assembled at the Contrisson site. Undoubtedly: ArcelorMittal Building Solutions uses ArcelorMittal steel, including XCarb® recycled and renewably produced steel.

Driven by European expertise, manufactured in France

ArcelorMittal brought together top expertise to develop and industrialise this innovative roofing product. ArcelorMittal Building Solutions' R&D teams collaborated with CRM Group, a leading Belgian research centre specialising in metallic materials and industrial innovation.

Helioroof® and its production process are protected by 15 patents filed by ArcelorMittal. The culmination of 5 years' work, Helioroof is an innovative solution designed and produced in Europe, to meet the sustainability and performance demands of the European market. Speaking at the inauguration event in Contrisson, Jean-Christophe Kennel, CEO ArcelorMittal Building Solutions, said: "We have cre-

ated a unique product that is already being used by customers here in France and across Europe. These customers were the first to recognise the advantages of using Helioroof® – with a carbon footprint that is more than a third lower than standard products, faster installation times, while also being cost competitive on a project basis. I would like to sincerely thank everyone involved in bringing this fantastic product to market".

The first projects involving customers deploying the solution account for a total of 1,500 square metres of Helioroof®, including:

- an urban brewery in Liège, Belgium,
- two industrial halls for metal construction companies in the Haut-Rhin and Meuse regions (France),
- a family house built by a low-energy building expert in the Marne region (France).

ArcelorMittal has inaugurated its Helioroof® production facility in Contrisson, France
(Picture: ArcelorMittal)

Production of Helioroof® has started

The industrial equipment was custom designed for the Contrisson plant: a highly automated production line where quality is monitored at every stage, with extremely high standards. ArcelorMittal Building Solutions teams have developed and applied specific expertise from the solar industry for Helioroof®, including working in a 'grey room' environment to ensure the integrity of the solar cells.

Commercial production of Helioroof® has begun recently and the Contrisson plant may expand further depending on market demand.

The top steel sheet of the sandwich panel is fitted with photovoltaic cells
(Picture: ArcelorMittal)

About Helioroof®. Helioroof® is part of the Helexio® Line project, which is supported by the Innovation Fund. The Fund is one of the world's largest funding programmes for the deployment of innovative net-zero technologies, helping Europe reach its climate neutrality goals. The Helexio® Line project was awarded a grant under one of the first Innovation Fund calls in 2020, receiving funding sourced by revenues from the EU Emissions Trading System.

Helioroof® won the 2024 Smarter E AWARD in the Photovoltaics category at the Intersolar 2024 trade fair. It is also, alongside other ArcelorMittal products, a candidate for the 2025 "Grande Exposition du Fabriqué en France," to be held at the Élysée Palace in November.

The Contrisson site is operated by ArcelorMittal Building Solutions, the ArcelorMittal entity dedicated to steel products for the building market: roofs, façades, walls, floors, and balconies. Innovative and custom-made solutions that inspire architects and contractors to design ingenious and aesthetic constructions for high-performance, sustainable, and attractive buildings.

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TUBE & PIPE

Pipelines for the hydrogen era

Greek pipe producer Corinth Pipeworks S.A. (CPW) and leading European heavy-plate maker Dillinger are pursuing, in a pioneering role, the construction of high-pressure gas pipelines for hydrogen of up to 100 percent purity. An outstanding example of this is their successful cooperation in Poland and Italy on the first European pipelines certified for pure hydrogen.

Corinth Pipeworks is a global Tier 1 supplier of steel pipes, meeting the highest standards of the oil and gas industry. Over 90 percent of its products are used in gas-transmission pipelines for natural gas, hydrogen and carbon capture and storage systems.

Corinth Pipeworks has long served Polish gas-grid operator GAZ-System Poland SA. In 2021, alongside establishing its hydrogen testing lab, the company received an order for an 80-kilometer high-pressure pipeline, initially for natural gas but designed for future hydrogen use as part of the European Hydrogen Backbone.

Corinth Pipeworks' standardised test and certification procedure, as provided by its in-house hydrogen laboratory, convinced GAZ-System to adopt the requirements of the ASME Code into its own specifications for the planned high-pressure gas pipeline. This pipeline, running from Gustorżyn to Wronów in Poland, is a section of a larger high-pressure gas pipeline project.

Made by longitudinally submerged arc welding (LSAW), the pipes for this project have a diameter of 1,016 millimetres, with a wall thickness of 22.2 millimetres. Externally, it features a triple-layer polyethylene coating for protection against corrosion and, internally, an epoxy-resin coating.

The pipeline's operating pressure of 80 bar conforms to the typical pressure for transmission pipelines used in Europe. As Efthymios Dourdounis emphasises: "We tested the pipe at a much higher pressure than the operating pressure, and it consistently withstood pressures of even 200 bar". Athanassios Tazedakis adds: "In order to meet and exceed the applicable specification requirements, we must be very cautious and conservative when selecting our partners". The choice of plate supplier fell to the German steel company Dillinger,

Tack welding of a pipe (Picture: Corinth Pipeworks)

which supplied 11,000 tonnes of heavy plate in grade L485ME for this section. "This is the highest steel grade that may be qualified for hydrogen applications, as per ASME B31.12", explains Efthymios Dourdounis, adding: "Grades L415, L450, and L485 are more commonly used. However, the selection of L485ME grade, as specified by GAZ-System, permits a lower wall thickness due to its high mechanical properties (i.e., yield strength), resulting in less steel being needed for the same design pressure."

Tailor-made heavy plates for hydrogen pipelines

The selection of Dillinger as the supplier was based on extensive data regarding steel properties, the specific requirements set by Corinth Pipeworks, and Dillinger's proven track record. According to Nikolaos Voudouris, what proved decisive for the pipe maker was the ability of the plates to be formed in a way that met the demanding specifications for hydrogen pipelines. "We set strict requirements for the chemical analysis and the mechanical properties of the steel, which we ourselves must guarantee in order to ensure high-quality pipes."

In this context, it was critical that the pipe plate behaved predictably during forming, so that welding preparation could be carried out correctly. The preceding FEM analysis defined in detail how each forming station and plate had to be applied for the specific pipe designs. "We don't produce standard, off-the-shelf pipes; every project is designed from scratch. Our customers provide designs for clearly defined applications, with requirements specified in detail."

The steel supplier must therefore design the steel not only to meet customer requirements but also to comply with all relevant technical standards, including those specific to hydrogen. "With Dillinger, we are confident that the plate will deliver on our

expectations and predictions: high oxide cleanliness due to low phosphorus and sulphur levels, a lean microstructure with low carbon content, low hardness, ductility, and excellent weldability."

Solidarity for certified safety

High delivery reliability, the availability of the required grade and thickness combination, and the mechanical properties of the plates also argued in favour of Dillinger. As Athanassios Tazedakis adds: "Hydrogen embrittlement is one of the greatest challenges that we have to overcome in this sector – especially in the case of high-strength steels. For us, it was a decisive factor in the selection of this high-strength material from Dillinger. Only in this way we can ensure that what has been promised will actually be supplied. And not only from Dillinger, but also from ourselves". Nikolaos Voudouris: "Our relations with Dillinger are based, however, not only on the quality of the materials supplied, but on the entire package: We are also given an extremely high-quality set of documentation on the steel. Everything is top level – the metallurgical know-how, the reaction capability, enabling rapid adaptation of specific items to tests, and, not least of all, communications. We speak the same language. This is why frequent meetings are held, to mutually bring projects up to the latest status and to update our own and Dillinger's agendas for these technically demanding projects".

The high-pressure gas pipeline delivered for GAZ-System has been in operation since 2023 and is, therefore, one of the first European pipelines certified for transmission of pure hydrogen. The first hydrogen pipeline of this type was also supplied by Corinth Pipeworks, for the Italian pipeline-grid operator SNAM S.p.A (Società Nazionale Metanodotti). This

CPW team in the hydrogen lab, from left: Dr Tim Dourdounis, Dr Athanassios Tazedakis and Dr Nikos Voudouris (Picture: Corinth Pipeworks)

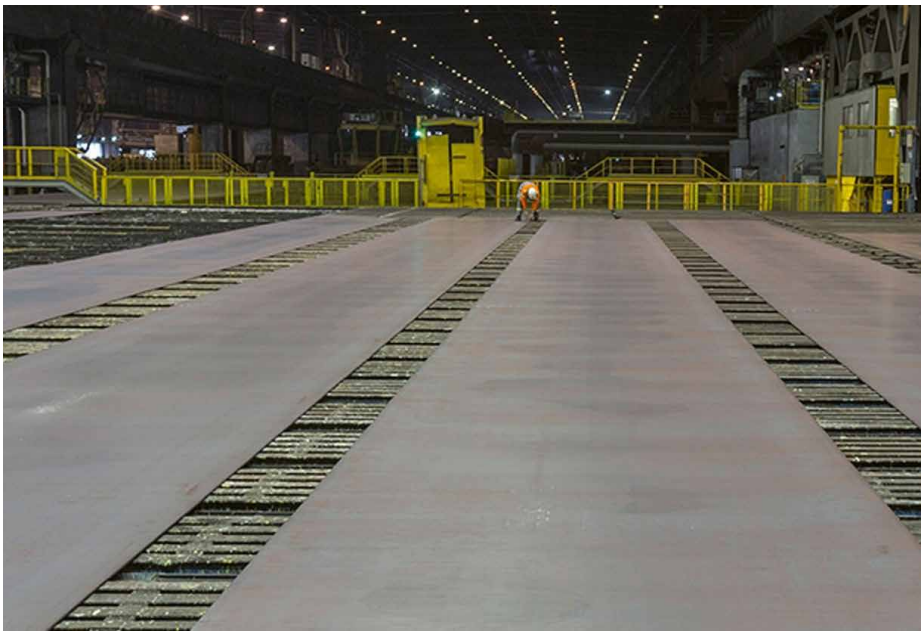
comprises up to today of more than 600 kilometres of hydrogen-certified pipes produced by the Greek pipe maker – also including, again, the high-strength L450 grade steel supplied by the Saarland steelmaker. "For us, cooperating with Dillinger means having double the support," notes Athanassios Tazedakis. "Dillinger supplies products for pipelines intended for transmitting large volumes of hydrogen. The company also produces this product with low CO_2 emissions thanks to enormous investments in its production facilities, and hydrogen is used in the production process. So, our philosophies and mentalities fit together extremely well. This is why Dillinger is at the top of our list".

Focusing on the next milestones in onshore and offshore pipelines

In the expert view, the critical applications for hydrogen will herald in a new era in which the challenges arising must be tackled together – success here is extremely important for both companies. The conversion of existing pipelines will demand high economic sacrifices from the gas-grid operators: they will be required to inspect the entire length of the pipeline and reduce the pipeline pressure for the transmission of hydrogen if any defects or suspect areas, which might be non-critical for natural gas, are found. In addition, and due to the lower energy density of hydrogen, hydrogen-transmission pipelines are profitable only with high flow rates, with the result that hydrogen is expected to arouse high demand for completely new pipelines. Corinth Pipeworks is once again pioneering a variety of projects aimed at developing the currently missing standards for offshore pipelines. "Qualification of these pipelines for submarine transmission must be based on stringent incoming goods inspections and material validations. So,

European hydrogen backbone

The European Union recognises hydrogen's key role in the decarbonisation of industry and thus in the energy turnaround with its hydrogen strategy. The goal of this strategy is to achieve annual production of ten million tonnes of green hydrogen within Europe by 2030, along with an additional ten million tonnes of hydrogen imports. The precondition for this is the availability of the corresponding infrastructure, in the form of a Europe-wide hydrogen transmission grid. The so-called European Hydrogen Backbone (EHB) will be established by converting approximately 70 percent of existing natural-gas pipelines and constructing new hydrogen pipelines for the remaining 30 percent.



High-quality heavy plates supplied by Dillinger are used around the world for technically demanding projects (Picture: Dillinger)

both we and Dillinger must be equally prepared for this!" Corinth Pipeworks and Dillinger, acting as partners, are ready for the future hydrogen market: "We have ready-to-run solutions, we have already supplied the market with state-of-the-art products, and we have the will to implement even more improvements and deepen our cooperation!"

About Corinth Pipeworks. Founded in Corinth in 1969, Corinth Pipeworks has been a subsidiary of Cenergy Holdings SA since 2016, following a cross-border merger that absorbed the formerly listed companies Corinth Pipeworks Holdings S.A. and Hellenic Cables Holdings S.A. The company opened its new production facility, featuring exclusive access to the harbour, in Thisvi, Viotia, in 2000. The plant site extends more than 800,000 square metres, of which 130,000 square metres are covered and accommodates ten major production sites:

- four welded pipe-making mills covering a wide diameter range of 2.5'' to 100'',
- two external and one internal coating mills,
- one concrete-weight coating mill and
- a pipe double-joining facility.

The facility's annual production capacity reaches up to 1 million tonnes.

The product and service portfolio of Corinth Pipeworks is enhanced by its leading Research & Development activities in linepipe systems for the energy sector. In all areas of activity, the company adheres to the principle of the 'one-stop shop,' ensuring that customers receive comprehensive solutions from a single source. This is why the company exclusively supplies all welded products for hydrogen pipelines, covering everything from production, certification (in its state-of-the-art hydrogen laboratory) and finally the delivery at site.

Inside welding of a pipe at the LSAW mill (Picture: Corinth Pipeworks)

Dillinger

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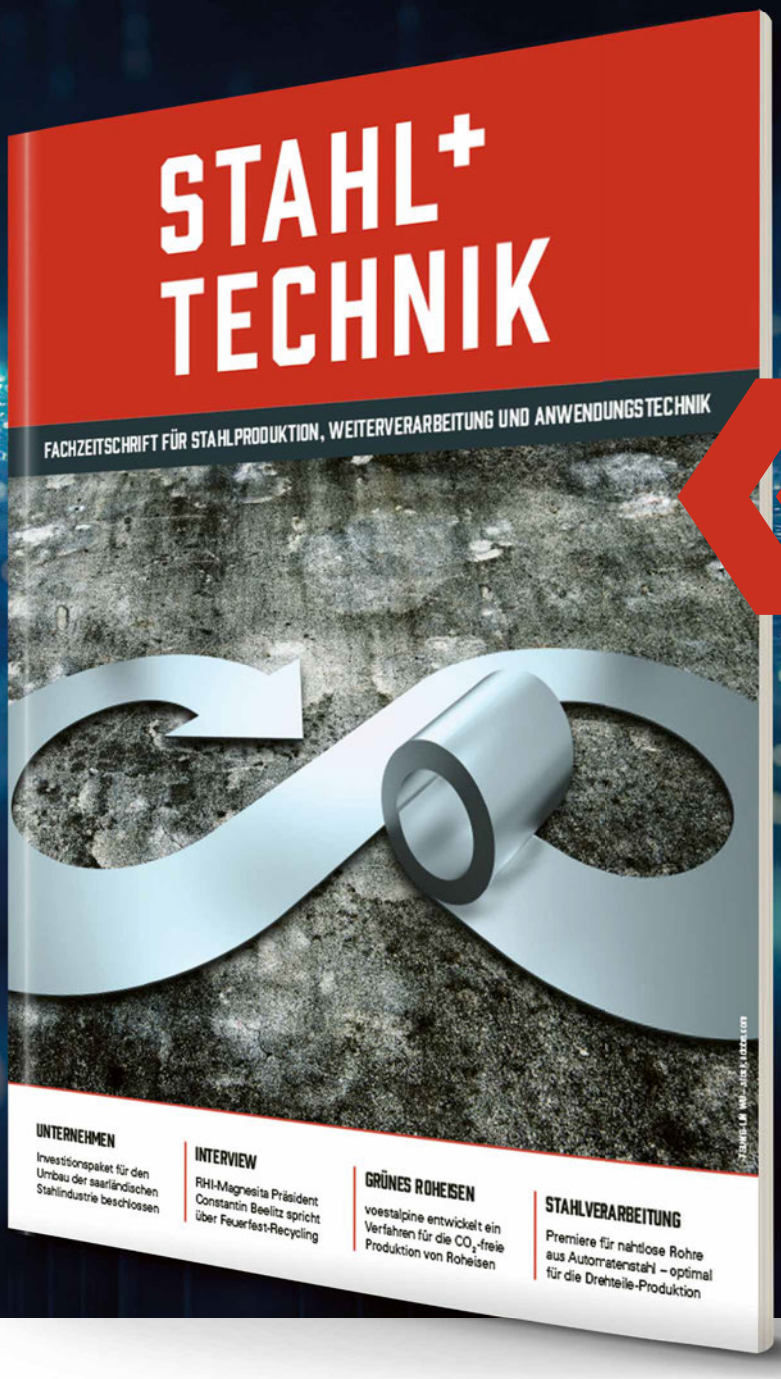

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DVS MEDIA

The next issue of STAHL + TECHNIK in German will be out in February covering the following topics:

STEEL TECHNOLOGY

Bar rolling mill with two reducing and sizing blocks

German GMH Group is setting new standards, which offers more flexibility, higher precision, and faster delivery. At the heart of their new specialty bar plant are two high-performance three-roll reducing and sizing blocks that can be operated together or independently. The principal innovation with the system is that both Kocks blocks can be flexibly combined in a technical breakthrough that allows the production of specialty steels with diameters from under 35 mm to over 100 mm that cover a wide size range. Moreover, the new RSB can be moved between the two rolling lines within minutes, no small matter as the block weighs 185 tons.

New strip guiding system enhances operations at the hot strip mill

With a focus on modernizing its seven-stand hot strip mill, Salzgitter Flachstahl has successfully achieved a significant milestone. This investment project, completed in March 2025, involved the implementation of an integrated strip guiding control system. Since, rolling stability has improved and manual interventions in operation of the hot strip mill have been minimized.

STEEL DISTRIBUTION AND PROCESSING

Redesigned tool assembly for slitting lines

Until now, manually changing the roll shear blades on many slitting lines was time-consuming and caused bottlenecks in many plants. This meant that the capacity of the lines could not be fully utilised. GEORG therefore developed the Tooling Robot, which significantly increases productivity with many new approaches – for example, short handling and set-up times, machine learning and predictive planning.

Value creation restructured

In order to continue actively shaping market developments in a dynamically changing environment, Knauf Interfer has reorganised its Steel business unit with a new structure and significant investments. In future, the Steel business unit will comprise two divisions. The product ranges, expertise and logistics capacities of the Steel Service Centres, the blanking plant and the Benelux sales office will be bundled in the Steel Service division. The Functional Metals division will focus on the production and finishing of cold-rolled strip.

STEEL+ TECHNOLOGY

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04 Steelmaking

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5150 Forging manipulators

Glama Maschinenbau GmbH
Hornstr. 19
45964 Gladbeck, Germany
☎ +49 2043 9738-0
🖷 +49 2043 47268
Internet: www.glama.de

5155 Forging manipulators, rail-mounted

Glama Maschinenbau GmbH
Hornstr. 19
45964 Gladbeck, Germany
☎ +49 2043 9738-0
🖷 +49 2043 47268
Internet: www.glama.de

5160 Forging robots

Glama Maschinenbau GmbH
Hornstr. 19
45964 Gladbeck, Germany
☎ +49 2043 9738-0
🖷 +49 2043 47268
Internet: www.glama.de

10 Cold rolling

10.01 Cold rolling mills

5490 Strip, sheet, cold and metal rolling mills

hpl-Neugnadenfelder Maschinenfabrik GmbH
Spangenbergstr. 20
49824 Ringe/Neugnadenfeld, Germany
☎ +49 5944 9301-0
E-Mail: info@hpl-group.de
Internet: www.hpl-group.de

10.04 Annealing lines

5670 Annealing lines

LOI Thermprocess GmbH
Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

11 Surface treatment

11.04 Surface treatment plants

6270 Strip edge trimming

hpl-Neugnadenfelder Maschinenfabrik GmbH
Spangenbergstr. 20
49824 Ringe/Neugnadenfeld, Germany
☎ +49 5944 9301-0
E-Mail: info@hpl-group.de
Internet: www.hpl-group.de

11.04 Surface treatment plants

6280 Strip processing and finishing lines

hpl-Neugnadenfelder Maschinenfabrik GmbH
Spangenbergstr. 20
49824 Ringe/Neugnadenfeld, Germany
☎ +49 5944 9301-0
E-Mail: info@hpl-group.de
Internet: www.hpl-group.de

11.05 Aluminizing, tin plating, galvanizing

6630 Hot dip galvanizing lines

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47059 Duisburg, Germany
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🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

14 Sheet metal processing

14.03 Welding technology

8120 Strip welding machines

GUILD International
7273 Division Street
Bedford, OH 44146, USA
☎ +1 440-232-5887
E-Mail: sales@guildint.com

14.03 Welding technology

8205 Laser welding machines

GUILD International
7273 Division Street
Bedford, OH 44146, USA
☎ +1 440-232-5887
E-Mail: sales@guildint.com

8210 Laser beam welding machines

GUILD International
7273 Division Street
Bedford, OH 44146, USA
☎ +1 440-232-5887
E-Mail: sales@guildint.com

8220 MIG, MAG and TIG\057TIG welding torches

GUILD International
7273 Division Street
Bedford, OH 44146, USA
☎ +1 440-232-5887
E-Mail: sales@guildint.com

8257 Rolling seam resistance welding equipment

GUILD International
7273 Division Street
Bedford, OH 44146, USA
☎ +1 440-232-5887
E-Mail: sales@guildint.com

14.03 Welding technology

8330 Welding machines, general

GUILD International
7273 Division Street
Bedford, OH 44146, USA
☎ +1 440-232-5887
E-Mail: sales@guildint.com

8360 Welding accessories, general

GUILD International
7273 Division Street
Bedford, OH 44146, USA
☎ +1 440-232-5887
E-Mail: sales@guildint.com

8380 Butt welding machines, electric

GUILD International
7273 Division Street
Bedford, OH 44146, USA
☎ +1 440-232-5887
E-Mail: sales@guildint.com

8400 Resistance welding equipment

GUILD International
7273 Division Street
Bedford, OH 44146, USA
☎ +1 440-232-5887
E-Mail: sales@guildint.com

16 Furnace and energy technology

10170 Furnace optimization (conversion to low NOx combustion)

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WS Wärmeprozesstechnik GmbH
Dornierstr. 14
71272 Renningen, Germany
☎ +49 7159 1632-0
🖷 +49 7159 2738
E-Mail: ws@flox.com
Internet: www.flox.com

10190 Rational use of energy

WS Wärmeprozesstechnik GmbH
Dornierstr. 14
71272 Renningen, Germany
☎ +49 7159 1632-0
🖷 +49 7159 2738
E-Mail: ws@flox.com
Internet: www.flox.com

16.02 Forging furnaces

10230 Forging furnaces

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47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

16.03 Roller Hearth Continuous Furnaces

10260 Roller Hearth Continuous Furnaces

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Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

10270 Roller hearth and walking beam furnaces

LOI Thermprocess GmbH
Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

16.05 Top-hat furnaces

10310 Top-hat furnaces

LOI Thermprocess GmbH
Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

16.08 Heating furnaces and heat treatment plants

10408 Continuous furnaces

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47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

10410 Co-step furnaces

LOI Thermprocess GmbH
Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

10430 Bogie hearth furnaces

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47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

10460 Chamber furnaces

LOI Thermprocess GmbH
Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

16.08 Heating furnaces and heat treatment plants

10510 Roller hearth and walking beam furnaces

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47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

10540 Pusher-type, roller and rotary hearth furnaces

LOI Thermprocess GmbH
Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

10560 Heat treatment plants

LOI Thermprocess GmbH
Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

10562 Heat treatment furnaces (continuous and discontinuous)

LOI Thermprocess GmbH
Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

10570 Heat treatment furnaces for batch operation, open heated

LOI Thermprocess GmbH
Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

16.09 Bath furnaces

10580 Aluminum melting furnaces

LOI Thermprocess GmbH
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47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

16.13 Components

10890 Natural gas burners

WS Wärmeprozesstechnik GmbH
Dornierstr. 14
71272 Renningen, Germany
☎ +49 7159 1632-0
🖷 +49 7159 2738
E-Mail: ws@flox.com
Internet: www.flox.com

11010 Regenerative burners

WS Wärmeprozesstechnik GmbH
Dornierstr. 14
71272 Renningen, Germany
☎ +49 7159 1632-0
🖷 +49 7159 2738
E-Mail: ws@flox.com
Internet: www.flox.com

11020 Recuperative burners

WS Wärmeprozesstechnik GmbH
Dornierstr. 14
71272 Renningen, Germany
☎ +49 7159 1632-0
🖷 +49 7159 2738
E-Mail: ws@flox.com
Internet: www.flox.com

16.13 Components

11070 Radiant tube burners

WS Wärmeprozesstechnik GmbH
Dornierstr. 14
71272 Renningen, Germany
☎ +49 7159 1632-0
🖷 +49 7159 2738
E-Mail: ws@flox.com
Internet: www.flox.com

18 Machinery and plant engineering

12210 Plant engineering, general

LOI Thermprocess GmbH
Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

18.06 Ventilation plants and equipment

12660 Air conditioners for heat plants

FrigorTec GmbH
Hummelau 1
88279 Amtzell, Germany
☎ +49 7520 914820
E-Mail: info@frigortec.com
Internet: www.frigortec.com

12670 Air conditioners for crane lances, crane bridges, etc.

FrigorTec GmbH
Hummelau 1
88279 Amtzell, Germany
☎ +49 7520 914820
E-Mail: info@frigortec.com
Internet: www.frigortec.com

18.10 Power and work machines

13070 Piston pumps

HYDROWATT AG
Freistrasse 2
8200 Schaffhausen, Switzerland
☎ +41 52 624 53 22
E-Mail: info@hydrowatt.com
Internet: www.hydrowatt.com

18.10 Power and work machines

13160 Vacuum pumps

LOI Thermprocess GmbH
Schifferstraße 80
47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

21 Measuring and testing technique

21.02 Measurement of physical properties

16608 Strip thickness control (AGC)

POLYTEC GmbH
Polytec-Platz 1-7
76337 Waldbronn, Germany
☎ +49 7243 604-0
🖷 +49 7243 69944
E-Mail: info@polytec.de
Internet: www.polytec.de

21.02 Measurement of physical properties

16652 Dressing degree and mass flow measuring systems

POLYTEC GmbH
Polytec-Platz 1-7
76337 Waldbronn, Germany
☎ +49 7243 604-0
🖷 +49 7243 69944
E-Mail: info@polytec.de
Internet: www.polytec.de

21.02 Measurement of physical properties

16830 Speed measuring devices

POLYTEC GmbH
Polytec-Platz 1-7
76337 Waldbronn, Germany
☎ +49 7243 604-0
🖷 +49 7243 69944
E-Mail: info@polytec.de
Internet: www.polytec.de

21.02 Measurement of physical properties

16910 Length measuring devices for tubes

POLYTEC GmbH
Polytec-Platz 1-7
76337 Waldbronn, Germany
☎ +49 7243 604-0
🖷 +49 7243 69944
E-Mail: info@polytec.de
Internet: www.polytec.de

16950 Length and speed measuring systems (optical)

POLYTEC GmbH
Polytec-Platz 1-7
76337 Waldbronn, Germany
☎ +49 7243 604-0
🖷 +49 7243 69944
E-Mail: info@polytec.de
Internet: www.polytec.de

16960 Laser speed and length measuring systems

POLYTEC GmbH
Polytec-Platz 1-7
76337 Waldbronn, Germany
☎ +49 7243 604-0
🖷 +49 7243 69944
E-Mail: info@polytec.de
Internet: www.polytec.de

24 Environmental protection and disposal

24.01 Dedusting and gas cleaning

18360 Exhaust gas cooling systems

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47059 Duisburg, Germany
☎ +49 203 80398-900
🖷 +49 203 80398-901
E-Mail: loi@tenova.com
Internet: www.loi.tenova.com

18400 Treatment of dusts from steel mills and foundries

Maschinenfabrik
Gustav Eirich GmbH & Co KG
Walldürner Str. 50
74736 Hardheim, Germany
☎ +49 6283 51-0
🖷 +49 6283 51-325
E-Mail: eirich@eirich.de
Internet: www.eirich.de

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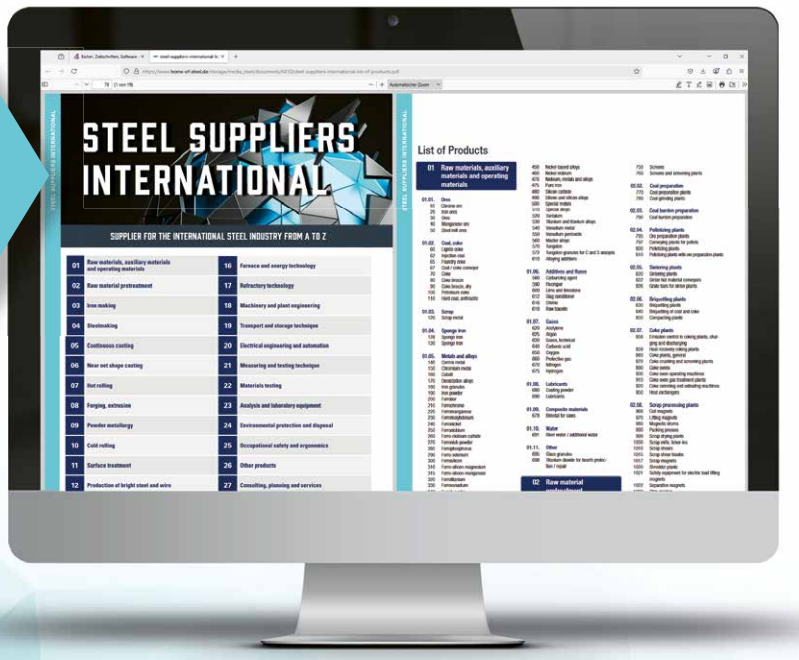

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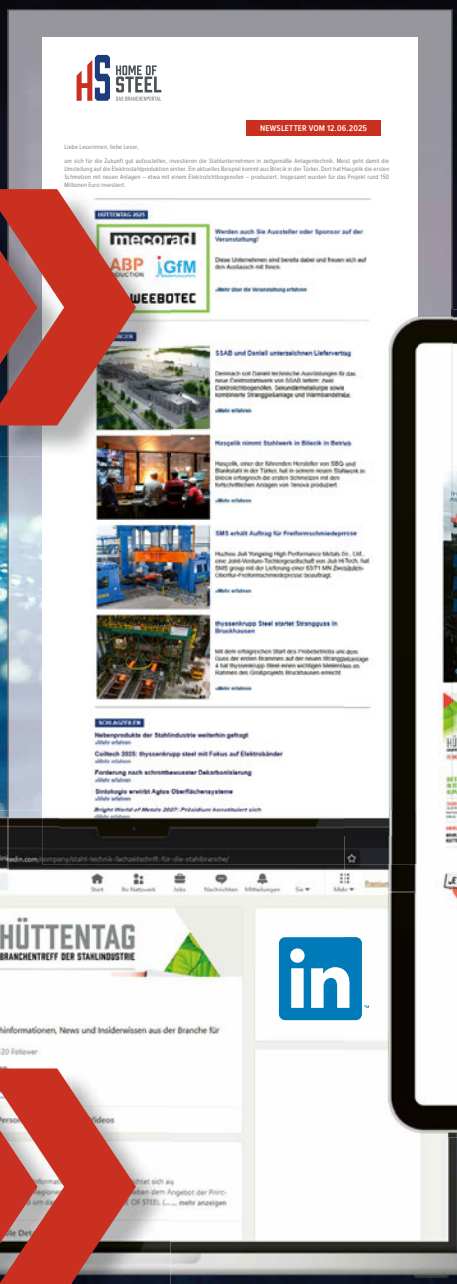

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