

steel

compact

Green light for the transformation

Germany's national and regional governments are funding one of the biggest industrial decarbonization projects worldwide

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#nextgenerationsteel:

Green jobs for a green future

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Double reversing stand:

Concentrated expertise for electric mobility

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A boost for the hydrogen economy and climate protection

The biggest industrial decarbonization project in Germany – thyssenkrupp Steel's first direct reduction plant – is closely linked to the development of a hydrogen economy. A look behind the scenes.

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Bright prospects for special coatings

thyssenkrupp Steel is developing new coating systems for integrated photovoltaic (PV) installations in agriculture based on ZM Ecoprotect® Solar.

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Bright prospects for the solar and energy market

Interview with Dr. Janek Wysoglad on how organic coil coatings of the pladur® brand are helping thyssenkrupp Steel conquer a new market: the energy and solar sector.

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New grades for electric vehicles

Two new electrical steel grades of the powercore® Traction product family are in the final stage of development and will soon take their place in thyssenkrupp Steel's portfolio.

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“Now the way is clear for implementing tkH₂Steel®.”

July 26, 2023 will live long in the memory of many colleagues at thyssenkrupp Steel – and also for me personally. On this day, Robert Habeck, Germany's Vice Chancellor and Federal Minister for Economic Affairs and Climate Action, handed over a funding decision to us worth around two billion euros for the construction of our first green steel production plant. After four years of intensive planning, including two years from the submission of our grant application to its approval, the path is now clear for the first step to implement our tkH₂Steel® transformation concept. This is good news also for you, our customers, because we will be able to support your decarbonization strategies too with the CO₂-reduced steel from our first direct reduction plant. tkH₂Steel® can also become a global role model for the decarbonization of primary steel production.

The funding for our concept thus also sets an important political signal, as Economics Minister Habeck explains in his foreword to the cover story. He is convinced that a climate-friendly steel industry will be an integral part of Germany's industrial future.

Our planned new direct reduction plant, combined with two melters, is unparalleled to date in this plant configuration. It is designed for 2.5 million metric tons of directly reduced iron and – when operated fully with hydrogen – will avoid emitting up to 3.5 million metric tons of CO₂ alone. We will need enormous quantities of hydrogen for this – as much as 143,000 metric tons per year from 2029 onward. Our project will thus become the motor



Dr. Heike Denecke-Arnold,
COO thyssenkrupp Steel

of the German and European hydrogen economy. After all, it is only where there is a reliable demand for hydrogen in large quantities that it is worthwhile to build up the corresponding production and infrastructure.

We are also continuing to make progress with our 20-30 strategy: in Bochum, we have laid the foundation stone for a new annealing and isolating line. Also, we have recently started up a new double reversing stand for rolling electric mobility steels in particular. And work is also proceeding at full speed in Duisburg, where the main focus of the investment lies. There, the project foresees conversion of our casting rolling mill into a modern hot strip mill and a new continuous casting plant.

With these and many other measures, we are laying a sustainable foundation for our company and, at the same time, sending out clear signals for the future viability of Germany as an industrial center. With our steel products, we are becoming an enabler of the turnaround in climate policy, maintaining stable value chains, and securing high-quality jobs. We will also continue to be a reliable partner for our premium steel customers – in the "green" future as well.

I hope you enjoy reading this publication,
With best wishes,

Heike Denecke-Arnold



Steel impressions

For this year's new edition of the annual wall calendar from thyssenkrupp Steel, the company was able to count on cooperation with the Dortmund University of Applied Sciences. After a joint visit to the plant site in Duisburg, students from the Communication Design department were tasked with designing the twelve monthly pages for the coming year on the basis of existing visual material. This double page spread from *steelcompact* features the calendar page for April 2024 as a foretaste.



Steel News

Products

New chassis steel available

The new ultra-high-strength hot-rolled multiphase steel promises maximum weight-saving potential and maximum service life in the chassis. The chassis grade CH-W® 700Y950T with a strength of almost 1000 megapascals and optimized hole expansion offers not only a significant weight reduction but also high fatigue strength for complex chassis parts. In addition, the new steel grade offers highly convincing crash behavior, because high yield strength values combined with reserves in elongation after fracture ensure high resistance to deformation and thus high crash energy absorption. Ideal applications include single-skin control arms, axle beams, bumpers and similarly challenging components.



For more information about chassis steels from thyssenkrupp Steel, take a look at:
<https://www.thyssenkrupp-steel.com/en/ch-w/>



thyssenkrupp Steel –
on all channels!

Always keep up with the latest information and trends in the steel sector by following us on our social media channels.

Investments

Project launch in Bruckhausen



At the Duisburg site, new key facilities are being built for automotive and industrial applications, the hot strip mill (WBW) 4. The project is one of the biggest single construction activities in thyssenkrupp Steel's current investment portfolio. It includes construction of new continuous casting lines at the Bruckhausen steel mill and partial modernization of in situ hot rolling units by the equipment builder Primetals. In addition, Danieli is building a fully automated slab storage facility. Completion and integration are planned for the start of 2026. The planned modernizations will enable the casting and rolling capacities of the line to be increased and the capacity utilization of the upstream steel mill to be improved. In addition, process-optimized plant technology based on Industry 4.0 solutions allows the portfolio of higher-strength steels and premium surfaces to be expanded. Customers can expect improvements in quality, more flexible slab production, and positive effects on their schedule and supply security. The modernizations are part of the company's 20-30 strategy, which aims to address growing markets arising, for example, from the energy turnaround and advancing electric mobility. The focus is on high-quality steel grades which are required, among other things, for efficient electric mobility solutions in the area of motors and generators: powercore® Traction is one example of this. Products from the premium surfaces segment such as ZM Ecoprotect® and dual-phase steels, which are required above all for lightweight automotive construction in structural parts and for crash-relevant components in the automotive sector, also continue to be of great importance.

For more information about our investments:

Precision Steel

Modernization of furnace 3

We have completed the first phase of the modernization of our furnace 3. The furnace has been extended by 2.5 meters and fitted with a tight-fitting push-in door. Sealing the lower furnace chamber with new water seals in conjunction with automatic scale removal makes a significant contribution to improved energy efficiency. This investment aims to avoid breaks in heating and to comply with the



latest limit values demanded by the TA-Luft regulation regarding NO_x. In addition, the plant technology will allow the H₂-enriched natural gas to be burned in the future and, in the long term, the use of H₂. Two further conversion steps will follow this winter and in summer 2024, including the renewal of the burner technology.

International

Laying the foundation stone in Guangzhou

Simon Stephan, Senior Vice President Sales Automotive at thyssenkrupp Steel, attended the groundbreaking ceremony for the construction of a new hot-dip galvanizing line at GZ Ansteel in Guangzhou (China). This will be the second hot-dip galvanizing line operated by the company, in which thyssenkrupp Steel holds an indirect 15 percent stake through its Tagal joint venture. The aim of the plant expansion is to meet the growing demand for high-quality, surface-coated steels in the Chinese market. During the ceremony at the site, a tree was also planted next to the foundation stone, in line with traditional custom.



Logistics

Sustainable material transport

Locomotives are an indispensable resource for handling the immense flow of materials at the thyssenkrupp Hohenlimburg plant in Hagen. With an annual shipment volume of around one million metric tons, the iron horses shift almost four times this weight annually by rail in the course of the various warehousing and logistics processes. The fleet of locomotives in Hagen had already been reinforced by a 3-axle locomotive in 2021, and now a further locomotive has been added. The 66 metric ton, 789 hp powerhouse entered service in August 2023. As with its sister machine, which is identical in design, the exhaust emissions here also comply with the latest standards, and are filtered and purified using state-of-the-art technology.



Photos: thyssenkrupp Steel Photography, Rainer Schroer, Dirk Jochmann, Shutterstock

Customer service

New in SteelOnline – material cards for simulation

With the SteelOnline web portal, thyssenkrupp Steel is providing its customers with a wide range of different information on steel as a product. There is now a new feature: the ability to retrieve and export application-specific material cards for forming and crash simulation. Following a successful test phase, it has been possible to download thyssenkrupp Steel material cards directly from the web since July 2023. Previously, these were only available by sending a specific request to the Sales department. With the new tab in the portal, customers can quickly and easily access the material cards of different grades in combination with coatings. These are required for simulating a wide variety of processing operations. For example, on the subject of forming. Especially with the use of higher-strength and highest-strength steel materials, it is essential to know how a material hardens, and when it might fail. Stress-strain and forming limit curves are integrated into the cards for this purpose. Based on the simulation, customers can then assess whether or not the material is suitable for their component in the intended process. The limits here are very tightly drawn; after all, materials are becoming increasingly strengthened and OEM requirements more stringent.

The material cards are updated regularly so that the latest information on the material being searched for will always be available. In addition, the data is available for common forming and crash simulation programs. As an additional advantage: customers are already familiar with the SteelOnline portal, and they can now use the new material cards feature there too. thyssenkrupp Steel is continuously developing the tool, which will allow even higher-quality models to be provided in the future.

Click here to access SteelOnline:
<https://online.thyssenkrupp-steel.com>



Green light for transformation

The German government and the state of North Rhine-Westphalia are funding **the construction and operation of thyssenkrupp Steel's first direct reduction (DR) plant** to the tune of two billion euros in total. The biggest industrial decarbonization project in Germany is closely linked to the development of a hydrogen economy. A look behind the scenes.

Text Katja Marx





Hydrogen is needed to save large quantities of CO₂ in steel production as quickly as possible. A lot of hydrogen. thyssenkrupp Steel's calculations assume 143,000 metric tons per year for operation of the first direct reduction plant alone. In purely mathematical terms, around 500 wind turbines will be needed to produce the green electricity required for hydrogen production.

The funding commitment, which Germany's Minister of Economics Robert Habeck personally presented in Duisburg together with State Minister for Economic Affairs, Industry, Climate Action and Energy Mona Neubaur at the end of July, consequently pursues two objectives: it is expected to help save up to 3.5 million metric tons of CO₂ a year – a substantial contribution to achieving Germany's climate targets. At the same time, the funding is tied to the mandate to use green hydrogen at an early stage, and thus give the energy turnaround a powerful boost. Because as a major customer, thyssenkrupp Steel represents an important guarantor that the high costs of building up production and transport capacities will pay off.

The coordinator: New building is uncharted territory

The people working in various positions at thyssenkrupp Steel to prepare for the transition to hydrogen-based steel production are well aware of the scale of the undertaking. One of them is Markus Wischermann. He is an engineering graduate, and was previously responsible for hot metal production at thyssenkrupp Steel. In spring 2023, he took over project management for the building of the first direct reduction

plant. Markus Wischermann likes to step into uncharted territory. Ensuring that the new build, which is so important for the future of the steel industry, is well planned and coordinated with the various sections from the very beginning is right up his street.

"Specifically, we are currently coordinating the preparatory work on the construction site. This includes the official permits we need so that we can lay the foundations of the plant soon," says Wischermann. "Above all, our task is to bring everyone involved in the project together consistently and regularly, and to fit the giant project into a very focused process structure. In this way, we'll make sure that everyone involved knows exactly what to do during the peak phase."

It takes a bit of imagination to grasp the pace with which construction of the first direct reduction plant at the harbor site in Duisburg-Walsum will proceed from January 2024 onward. Within three years, an industrial complex will be built on the huge brownfield site on the bank of the Rhine, which at its highest point will almost rival the spires of Cologne Cathedral.

Symbolic start of the tkH₂Steel® project on the construction site in Duisburg (from left): Vice Chancellor and Federal Minister of Economics Robert Habeck, Miguel Ángel López Borrego, CEO thyssenkrupp, Bernhard Osburg, CEO thyssenkrupp Steel, North Rhine-Westphalia Deputy Minister President and State Minister for Economic Affairs, Industry, Climate Action and Energy Mona Neubaur and Chairman of the General Works Council at thyssenkrupp Steel Tekin Nasikkol.

Funding decision handed over: Vice Chancellor and Federal Minister for Economic Affairs and Climate Action Robert Habeck personally presented thyssenkrupp Steel CEO Bernhard Osburg with the decision in July.



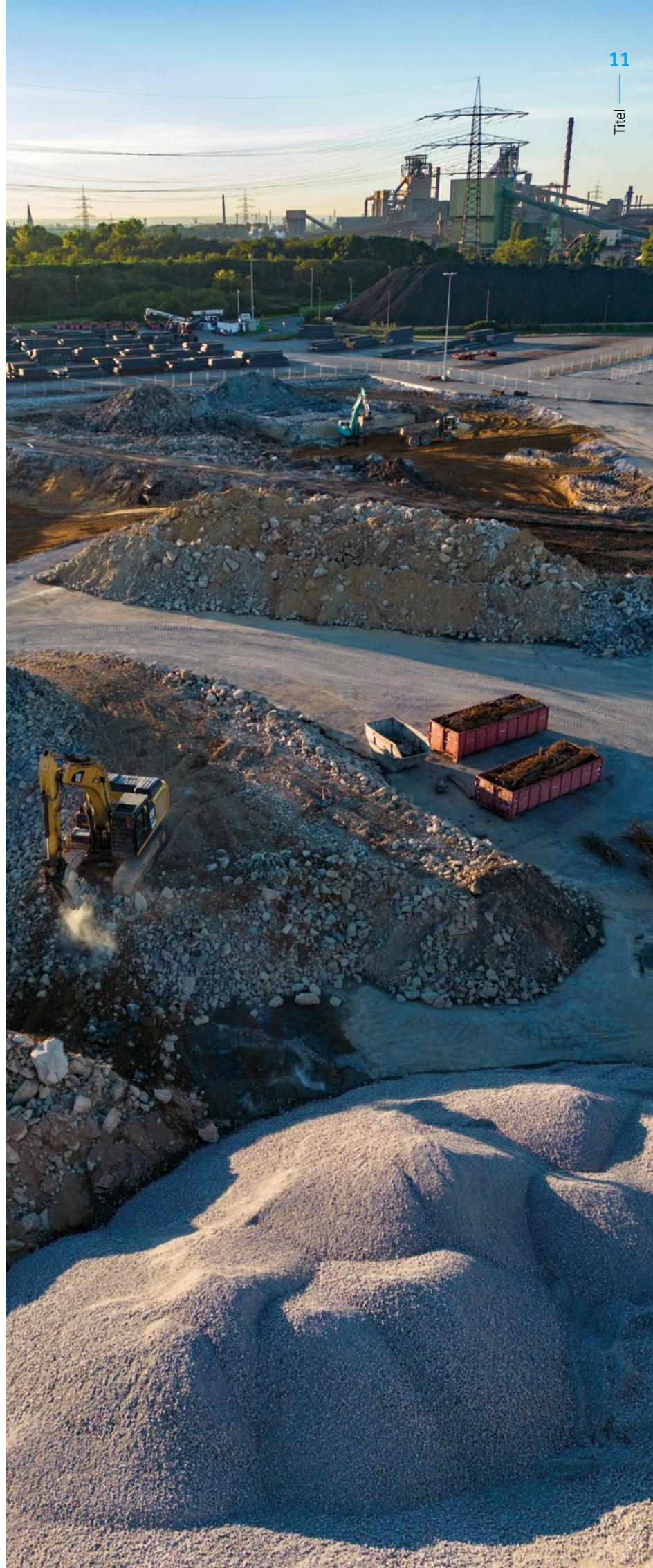
In late summer, excavators prepare the construction site for the direct reduction plant.

However, the grayish-brown soil still dominates the scenery here between the striking cooling tower of the nearby power plant and the extensive Schwelgern steelworks site. Many excavators can be seen digging up and removing the last remnants of the former slab warehouse.

Planning is the be-all and end-all

That will change in 2024: up to 1500 people from a range of companies will then be working in parallel on the construction site for three years. "Those are the SMS group employees who will be responsible for building the plant and designing the technological details. That company is also the prime contractor who not only lays the foundations, but also plans and implements all other buildings on the site. And then they are joined by colleagues from our own companies who, for example, plan roadways and warehouses to supply the plant with energy and materials," says Markus Wischermann. "Coordinating these people and making sure that every single step is well planned out in advance is a daunting task, just as much as making certain that everything runs smoothly in terms of occupational safety, too."

Markus Wischermann also needs a good imagination: Where exactly will the required material be landed at the harbor? What will be stored temporarily? What maintenance processes need to be considered when it comes to designing the roadways and buildings? The coordinator participates in the regular meetings that are held in the Green Transformation Office in order to answer all these questions not only at an early stage, but also competently. This is where teams from different departments meet to coordinate and keep each other up to date. To accompany this, thyssenkrupp Steel keeps the neighborhood informed about the progress of the project in regular citizen meetings.





The technology expert: tests in advance

Dr. Matthias Weinberg represents the technological perspective in the transformation project. The head of the Metallurgy Competence Center and his staff are working on the fundamentals for hydrogen-based operation of the DR plant, and the connected melting units. The fact that the eleven colleagues are primarily known in-house as "Ocean's Eleven" shows Matthias Weinberg that the HR department did a very good job in selecting the team members. "We bring together a fair bit of expertise, including chemistry, metallurgy, general engineering, process and electrical engineering," explains the materials specialist. "This broad perspective is very important in answering novel and complex procedural questions."

At its core is the question of how the hydrogen behaves in the reactor. To this end, the experts are conducting extensive series of tests to determine the influence of different charge



materials on the reaction rate, and ultimately on the quality of the end products. "You have to remember that a direct reduction plant of this size has never been run on hydrogen before," the metallurgist reminds us. thyssenkrupp Steel calls it the "first of its kind", as this is the first time that this combination of DR plant with melters is being implemented anywhere in the world.

The direct reduction plant technology itself, on the other hand, has been in use all over the world for decades already. In the 1980s, thyssenkrupp Steel, too, operated a direct reduction plant which produced 100,000 metric tons of hot metal every year. It ran on natural gas. "Hydrogen has always been considered an expensive energy carrier, and has therefore only been used in academic research," says Weinberg. "Consequently, for some time now we have been looking into all the conceivable risks associated with the development that operation with hydrogen could entail. We are investigating some of these issues in our in-house laboratories. For others, we need a larger scale, because that's the only way to get transferable results. Until our own test facility is up and running, we are working with partners on whose facilities we are able to run specific test series in real operation."





The coordinator and the technology expert: Markus Wischermann (I.) and Matthias Weinberg exchange views on the project almost daily.

The matter with the slag

Another focus of the team's work is to transfer findings from the use of melters to hot metal production. In this case too: the melting process itself is not new, but the context in which it is used is. Matthias Weinberg: "Unlike traditional electric arc furnaces, which are operated in batch mode, we are dealing here with the continuous melting of directly reduced iron using electricity. Tapping of the molten metal and slag will also be required, like in the blast furnace."

In non-ferrous metallurgy, one of the applications of the process involves producing alloys from different metals, including ferro-nickel or ferro-manganese. These latter are compounds that produce a significantly higher proportion of slag, among other things, compared with the iron ores from the direct reduction plant. In other words: when melting hot metal, essential process parameters have to be readjusted.

Matthias Weinberg is nevertheless convinced: there is no better solution than the combination of direct reduction and melting units chosen by thyssenkrupp Steel. This is because, compared to other processes, slags do not cause problems for the smelters. This in turn means that the compact units can cope with different grades of iron ore. "Consequently, we are



not dependent on buying only particularly high-quality iron pellets.

And that's good news, because there's already a bottleneck looming in this market which is ramping up the price pressure."

Rather than investing in special ores, the steel producer is devoting resources to building up special expertise. "We need people to work out the fundamentals and boundary conditions for the new process to be used efficiently," says the head of the Metallurgy Competence Center. "Smart people who can work as pioneers and are skillful enough to approach new challenges in a systematic way. Above all, however, we need engineers and technicians who are good at passing on their knowledge to others. After all, working with hydrogen is a demanding challenge and everyone in the company needs specific knowledge for this. From the Executive Board right through to the colleagues in the control room who are responsible for the day-to-day operation of the plant."





The strategist: working on the network

Hydrogen. The energy carrier of the future already plays a central role in Henning Weege's day-to-day work. As Head of Hydrogen & Green Energy, one of his tasks is to meet his employer's hydrogen needs by purchasing as many of the green molecules as possible. The official tendering phase will start shortly at thyssenkrupp Steel. "Our goal is to sign binding contracts next year. Then, the suppliers have a good three years to build up the corresponding production and transport capacities," says Henning Weege.

When changing over, thyssenkrupp Steel will be able to exploit its locational advantage in the heart of the Rhine-Ruhr industrial triangle. Here, energy producers and consumers have been working hand in hand for decades close to former coal mines. Consequently, there is already an extensive network of natural gas pipelines in the region, through which hydrogen will also be piped to customers in the future. "The first publicly accessible hydrogen network in Germany is currently being created here under the name GET H2," says Henning Weege. "It runs from Lingen in Lower Saxony to Gelsenkirchen. In the future, wind and solar

power will be used for producing green hydrogen at the starting point, which will then be transported to industrial customers in the Ruhr region."

GET H2 (see info box) is just one building block in the Germany-wide core hydrogen network which is currently being designed by the transmission system operators, and will be formally approved by the German government in the fall of 2023. The network is expected to connect all major hydrogen infeed sources to their industrial consumers by 2032, and 60% of it is expected to consist of converted natural gas pipelines. Gaps are being filled by new construction projects. This also includes the DoHa hydrogen pipeline: a 25-mile pipeline between Dorsten and Duisburg-Hamborn, which thyssenkrupp Steel is integrating into the new regional hydrogen network. Less than four years have been scheduled for its implementation, DoHa is expected to enter operation in 2027. The timetable dovetails with the commissioning of the DR plant, which is planned to run on 100 percent green hydrogen from 2029 onwards, after a gradual conversion phase.

The strategist: Henning Weege is working to meet thyssenkrupp Steel's future hydrogen needs.

"We've got to start now"

In the meantime, the rules of the game for hydrogen supply must also be established. Among other things, there is a need to clarify the level of the grid fees as well as the question of who bears the risks in the area of grid build-up. Henning Weege: "Just as we have no guarantee that the market will actually buy our green steel, the network operators are now obliged to put their money on the table in advance. This requires regulatory rules of the game that make the market fair and transparent for all participants alike."

For himself and his colleagues, the strategist hopes above all that there will be a steady and stable supply of hydrogen. This in turn means that there must be sufficient storage capacity within the infrastructure to compensate for fluctuations in the production of green energy. "Otherwise, we would have to switch to blue hydrogen during the transition to compensate for the volatility." Despite the imponderables of the planning process, Henning Weege is pleased with the many small and large steps he has already taken together with his colleagues in the Green Transformation Office. Will everything run as smoothly as planned? Of course it won't. "But I'm convinced that we've got to start now if we're going to see all the upcoming problems at an early stage, and find solutions," he says, optimistically. "We're very well prepared for that."

Web

Go here for the online version of our cover story:
www.thyssenkrupp-steel.com/en/push-for-climate-protection/

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Greeting Dr. Robert Habeck

German Federal Ministry for Economic Affairs and Climate Action

Dear Readers,

Green steel will be produced in Duisburg in the future. Many dedicated people have contributed to this success, and it has been a long road. I well remember my visits to Duisburg last summer, the "Steel Hammer" and the "Heart of Steel" – and with pleasure. Yes, at first the workforce was skeptical – but not about the plan to produce green steel; on the contrary: the workers are on board with the project because it gives steel production in the region a future. In fact, the skepticism was actually rooted in the concern that this very project might not materialize. So, it was all the nicer that I was able to be there on a second occasion in July – this time not just with a promise of support from the national and regional governments for the project, but with a cast-iron commitment: with the funding decision and the approval by the EU, we were able to keep the promise! I am sure that the tkH₂Steel® project will be a beacon for Germany as an industrial location. It proves that the future doesn't just "happen": we can also shape it with our hands. And so Duisburg's Heart of Steel continues to beat – and the climate-friendly renewal of the basis for our prosperity will become something tangible!



With best wishes from

Dr. Robert Habeck

GET H2

The nationwide initiative in Germany is backed by companies, municipalities and institutions that are actively working to establish a competitive hydrogen market. The aim is to link regions with a high proportion of renewable energies from wind and solar power with hydrogen production on an industrial scale. To this end, one of the first publicly accessible hydrogen networks is to be established initially between Lower Saxony and North Rhine-Westphalia. It is being built by the network operators Open Grid Europe (OGE), Nowega and Thyssengas.

tkH₂Steel

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Pilot-scale electrolysis for hydrogen production: Carbon2Chem technical center in Duisburg supports further refinement of electrolysis for the production of green hydrogen.

Green hydrogen: on the path to serial production

Electrolysis is the technology of choice for manufacturing **green hydrogen**. For decades, it has been tested and refined on a small scale. Now the challenge is to scale up quickly.

Text Katja Marx

Only a few meters separate the entrance area of the Carbon2Chem Technical Center in Duisburg from the green hall. Here, thyssenkrupp nucera is testing a technology that is so important for the energy transition: the water electrolyzer with a capacity of 2 megawatts supplies a steady stream of data and insights for further refinement of water electrolysis. And this highly efficient electrolysis technology enables green hydrogen to be produced on an industrial scale.

The German Federal Ministry of Education and Research has been funding the large-scale collaborative project since 2016 (see info box).

thyssenkrupp nucera

With more than 50 years of electrolysis experience, thyssenkrupp nucera has implemented projects with a total capacity of more than 10 gigawatts. The former Electrolysis division of thyssenkrupp Uhde has been an independent company since 2013; its name was changed to thyssenkrupp nucera in 2022. In July 2023, the company went public and was admitted to the SDAX in the same year.

This is because the insights that the 16 participating cooperation partners can gain in real operations are also relevant for many other industrial processes. "For example, we proved that our plant reliably produces green hydrogen even with rapidly changing load profiles," says Dr. Jens Kuhlmann, who is responsible for the pilot plant on behalf of the project partner thyssenkrupp nucera. "This reliability is central to the successful decarbonization of industry."

Ambitious expansion targets

The production of green hydrogen is a central component of the energy transition.

Just this summer, the German government reaffirmed the key role of electrolysis in its adapted

National Hydrogen Strategy: by 2030, Germany is expected to possess 10 gigawatts of installed electrolysis capacity to meet the growing demand for green energy, at least in part from its own production.

2030 is an ambitious target in terms of time, says Dr. Jens Mathiak, Head of Sales for green hydrogen at thyssenkrupp nucera: "In plant engineering, we start planning big projects four to five years in advance. So there's a maximum of three years left to lay the groundwork for achieving 10 gigawatts."

Strong sales growth

The electrolysis specialist from Dortmund knows what he is talking about. For more than 50 years now, thyssenkrupp nucera – the former Electrolysis division of thyssenkrupp Uhde – has been planning and implementing projects with its partners worldwide. The many years of experience gained in chloralkali electrolysis form the basis for the second major area of activity: alkaline water electrolysis, in which water is split into hydrogen and oxygen by applying electrical voltage. Business is booming: for example, sales in the water electrolysis sector increased almost tenfold in the first nine months of the year compared with the same period of the previous year. The stock market newcomer has already signed binding contracts for more than three gigawatts of capacity. This includes a plant with more than 2 gigawatts in Saudi Arabia, one of the world's largest projects for the production of green hydrogen. And in Germany? "Here, we are still in the starting blocks," says Jens Mathiak. "Large plants in particular are currently being implemented in countries where green energy sources can be developed cheaply and without too much red tape, and where there is little demand for electricity."

Favorable locational conditions

Nevertheless, the expert thinks Germany offers potential as well, because the ideal location for

water electrolysis should fulfill two factors: proximity to the green power source and proximity to the consumer. "These were the very principles that made the steel and chemical industry so big in the Rhine-Ruhr region. Energy-intensive industries were located where the energy was available." Today, in the age of decarbonization, the industrial center of North Rhine-Westphalia benefits from its proximity to the Dutch ports with their convertible LNG terminals, a growing network infrastructure for future hydrogen transportation, and the wind farms of the Netherlands and northern Germany. In addition, the construction of local electrolyzers will become more attractive as plant and operating costs fall.

Powerful standard modules

Companies are already benefiting from the high scaling effects and standardization of thyssenkrupp nucera's electrolysis technology. "Manual labor was yesterday, today we're ready for product-oriented mass production," says Jens Mathiak. "This is what our cost-effective Scalum® standard module stands for. Not only does it have a high current density, it can also be scaled as desired." Scalum® is currently one of the biggest electrolysis modules available on the market. A single module has an output of 20 megawatts and is designed to be easy to install and connect. In this way, thyssenkrupp nucera's electrolyzers are not only suitable for very large projects, but also harmonize with supply concepts that are close to the consumer, such as in the "Carbon2Chem" project.

That leaves the question of operating costs. For Jens Mathiak, one thing is clear: for electrolysis projects to be realized in Germany in the future, the prices paid by industry for green electricity will have to fall. Meanwhile, the company is working flat out to expand its own production capacity – from the current one gigawatt to five gigawatts per year.

Carbon2Chem

In the joint "Carbon2Chem" project, 16 partners from industry and universities are conducting research into the use of steel mill gases from steel production as a precursor for chemical products – including the CO₂ they contain. The aim is to use surplus power from renewable energies as an energy source. The project is being funded by the German Federal Ministry of Education and Research until 2024.



Jens Mathiak is Head of Sales for green hydrogen at thyssenkrupp nucera, and supports electrolysis projects worldwide.

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www.thyssenkrupp-steel.com/en/push-for-climate-protection/

Kontakt

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H₂ transport: cheaper with ammonia

For the transition to a hydrogen economy, industry not only needs electricity from renewable energy sources but also the **expertise of plant builder thyssenkrupp Uhde**. And: ammonia. Karsten Rick Radtke, Global Head of Business Development, Sales & Strategy, explains the role that the gas plays within the industrial value chain.

Text Katja Marx

Green hydrogen is seen as a central element in the energy turnaround. But you say that the energy carrier also suffers from disadvantages. What are they?

First of all, green hydrogen is unquestionably an excellent energy carrier to counter climate change. However, it can be produced most efficiently in countries where renewable energies are abundant, and the framework conditions are good for producing hydrogen in large electrolyzers. This is the case in North America, and also in the Middle East. In contrast, other regions, including the European industrialized nations, have a demand that exceeds their own production capabilities. And that is a disadvantage, because hydrogen is not so easy to transport.

And this is where thyssenkrupp Uhde comes into play ...

Exactly. We've got the technologies and we're building plants to convert green hydrogen into ammonia using nitrogen from the ambient air. This compound has a higher energy density than hydrogen, and is therefore more stable and cheaper to transport over long distances. Before use, the previously liquefied gas is split again to recover the hydrogen. In this way, the entire hydrogen chain can be mapped in a completely carbon-free way, from production in countries where solar and wind power are plentiful right

through to consumption in the steel mill process, for example.

How exactly does the ammonia get to the major consumers?

There are different scenarios. In Germany, discussions are underway about converting LNG terminals at ports and on the coast over to ammonia in the future. Conversion plants, called ammonia crackers, could be built in the vicinity of these terminals. From there, the hydrogen will be transported by pipeline, so there would be a widely branched hydrogen network in the future. Another variant would be decentralized supply, close to the major centers of consumption, for example the Rhine-Ruhr region. Ammonia would then first be transported far inland, either for direct use or for conversion in smaller plants.

Production, conversion, transport: many stakeholders will have to play their part in turning the vision of a completely green hydrogen chain into reality ...

Absolutely. For the turnaround in energy and industrial policies to succeed, new collaborations and openness on the part of companies are called for. Perhaps the Scottish offshore wind turbine operator and the chemical company will then join forces to produce green chemicals.

Cooperation also makes sense for keeping energy losses within the chain as low as possible. Whereby losses is actually the wrong word.

As Global Head of Business Development, Sales & Strategy at thyssenkrupp Uhde, Karsten Radtke also looks after solutions for transporting hydrogen, for example in the form of ammonia.

Green ammonia – superpower for the energy turnaround



Ammonia has a 33 percent higher energy density than liquid hydrogen. As a result, fewer ships are needed for transporting it.



Hydrogen must be cooled down to -253 degrees Celsius for transport, while ammonia only requires -33 degrees Celsius. This is more efficient and saves energy.



Ammonia is already traded worldwide: 120 ports, 170 ships for transportation, tanks and warehouses, as well as global standards are in place.

After all, the energy is not lost, but is converted into heat, for example. And as such, it can also be used to some extent. The same applies to other byproducts, especially the climatically harmful CO₂. In the Carbon2Chem joint project, we are testing these close-coupling mechanisms jointly with partners from industry and science. We use steel mill gases from steelmaking, and convert them into carbon-neutral chemical precursors with the help of green hydrogen. The test facility is located in Duisburg, and we are working there not only with thyssenkrupp Steel and thyssenkrupp nucera, but also with partners throughout the chemical industry. These are companies that will move closer together in green value chains.

thyssenkrupp Steel aims to cease emitting CO₂ in the future. Do the CO₂ utilization technologies we have just been talking about represent a transitional phase on the way to the hydrogen economy?

Don't forget that we still live in a hydrocarbon world, and carbon is not going to disappear overnight. In addition, many industrial processes worldwide will continue to use fossil fuels in the long term. Consequently, carbon recycling, or Carbon Capture & Utilization (CCU), will help us achieve climate-friendly technology chains for decades to come. In the USA, for example, with its large natural gas reserves, huge investments are currently being made in the production of so-called blue hydrogen. This means the

CO₂ released is captured and stored, or reused. In the import markets of Europe and Asia, however, there is still a lack of political clarity as to the conditions under which blue energy carriers will be permitted and, above all, for how long. This attitude, in turn, is making the transition more difficult, because hardly any investor will take the risk of building a plant that does not have a long-term secure market. I am convinced that, 200 years from now, we'll still be living in a world where hydrocarbons exist. And these hydrocarbons must be as green as possible.

Mr. Radtke, thank you very much for the interview!

thyssenkrupp Uhde

thyssenkrupp Uhde is known worldwide for the engineering, construction and service of chemical plants. The company is making an important contribution to the decarbonization of value chains by providing industry and the energy sector with technologies to produce carbon-neutral chemicals such as green ammonia, green methanol or synthetic natural gas (SNG).

Web

Go here for the online version of our cover story:
www.thyssenkrupp-steel.com/en/hydrogen-transport/

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Weighing up dependencies and balancing them out effectively”

Make or import: what is the right strategy for massively increasing the available quantities of green hydrogen within a few years? Answers can be found in a **recent study by the Wuppertal Institute**. An interview with study author Frank Merten.

Text Katja Marx

Mr. Merten, in summer you published a study into hydrogen requirements for the green transformation. What exactly did you investigate?

We looked at existing studies and scenarios to derive future hydrogen requirements for individual sectors. We also evaluated studies into the costs of producing hydrogen at home and abroad. The study was an update; we had already investigated similar issues in 2020. We therefore also wanted to know what had changed in the meantime.

And, what differences did you find?

First, the projected demands for green hydrogen out to 2030 have decreased, in some cases significantly, compared to the previous study. Current estimates suggest that we will need between 30 and 100 terawatt hours (TWh) of hydrogen annually for the green transformation. Three years earlier, the figure was 80 to 110 TWh. The most important customers are the industrial and energy sectors. Demand will continue to rise in the long term. We will then be

talking about ranges between 200 and 700 TWh for the years 2045 and 2050, respectively, with the high consumption levels predicted by some studies resulting from additional, intensive use in the transport and heating sectors. The significant quantity differences within the studies are striking. They show that there are substantial uncertainties about how supply and demand will develop. And that, in turn, is a challenge when it comes to planning the infrastructure, i.e. pipelines and storage.

How have the costs developed?

The specific investment costs for electrolysis plants are declining. This has improved the conditions for producing green hydrogen in Germany as well. In the studies examined, they are mostly below the costs of importing by ship. In the medium and long term, however, imports via pipelines from North Africa, Spain, Eastern and Northern Europe are more favorable in terms of costs. Europe in particular is a good trading partner for us, because we already have a good infrastructure here that enables us to import hydrogen at low cost.

Biographical

Frank Merten is joint head of the Systems and Infrastructures Research unit at the Wuppertal Institute for Climate, Environment and Energy. Currently, the graduate physicist is mainly concerned with the supply sources of green hydrogen and its derivatives, as well as with the transport and storage media required for this.

The material of the future: estimates suggest that we will need between 30 and 100 terawatt hours (TWh) of hydrogen annually for the green transformation.

grid and the gas network. In addition, they can be operated very flexibly. For example, they can take surplus electricity from the wind farms in northern Germany and transmit it to the gas network. Today, this electricity output is throttled back. And to a big extent: overall, the reduction in electricity production from renewables amounts to a loss of volumes which would be sufficient to produce the hydrogen required by thyssenkrupp Steel. In addition, the smart use of electrolyzers would relieve the burden on the power grids, and in some places help to compensate for gaps in the buildout of power grids, at least temporarily. We need these systemic properties, i.e. smoothing out feast and famine, so to speak, if we are going to obtain electricity from 100% renewable energies in the future. From that point of view, there is always a trade-off between the cost-effective production of hydrogen and its production in the best way for the system itself.

So, first of all, it comes down to a focused application of green hydrogen?

Exactly. We need it for steel production, because we'll stop large emissions of CO₂ there by substituting coal and coke. The situation is similar in chemicals production, where electrification is difficult and not yet very advanced. And then we'll need hydrogen in the energy supply to run backup power plants. Other areas, including transport and construction, can be electrified directly.

So, we'll keep our fingers crossed that the focusing succeeds ...

Indeed. And we mustn't forget what we have already accomplished. PV capacity addition is booming, and I hope we'll also overcome the obstacles to wind power, and that expansion there will also proceed rapidly. The energy crisis has shown us that there are different ways to use resources efficiently. And that there is more going on than we sometimes think.

Germany currently imports more than two-thirds of its energy needs. Will this dependence be reduced in a hydrogen economy?

The task here is to weigh up various dependencies against one another and balance them out as well as possible. In terms of volume potential, we in Germany are in a worse position than many other countries. But that doesn't automatically mean we have to live with high levels of dependency. Hydrogen will remain a scarce commodity for the foreseeable future, which is why it is advantageous for us initially to focus on "no-regret" applications, i.e., areas that are difficult to decarbonize by any other means. In this way, it will be possible to manage the transformation with comparatively little hydrogen. Whether this would also be the optimal path in the long term cannot be answered from today's perspective. This is because the use of electrolysis plants, and thus in-house production, does have very positive systemic effects.

What are the systemic effects?

Electrolyzers use electricity and produce gas. In this way, they create a link between the electricity

The colors of hydrogen

Gray – hydrogen obtained from fossil sources. As a rule, natural gas is converted into hydrogen and CO₂ by the application of heat. Producing one ton of hydrogen generates around 10 metric tons of CO₂.

Blue – hydrogen produced from fossil sources, but with the CO₂ emissions from production being captured and stored. If the greenhouse gas is not completely released into the atmosphere, production can be considered carbon-neutral on the balance sheet.

Green – hydrogen produced by electrolysis with electricity from renewable energy sources. The production is CO₂-free.

Web

Go here for the online version of our cover story:
www.thyssenkrupp-steel.com/en/hydrogen-application/

#nextgenerationsteel: Green jobs for a green future

The labor market is undergoing a process of change. thyssenkrupp Steel is not unaffected by this. The company appeals to the managers of tomorrow with **exciting industrial jobs centered around green transformation.**

Text Julia Joswig



Kerstin Dähne from thyssenkrupp Steel in conversation with BIBB President Friedrich Hubert Esser: "We are looking for motivated colleagues who want to be part of the green transformation and make a significant contribution."

Long-term projections by the Federal Institute for Vocational Education and Training (BIBB) show that the labor market is facing shortages that are likely to lead to upheavals. "The current crises have caused prices and interest rates to rise, and put pressure on the economy," explains BIBB President Friedrich Hubert Esser. "Nevertheless, there will continue to be a high demand for skilled workers, especially in the healthcare sector, IT and technical professions, as well as in the construction industry. The reason for this is digitalization and the investments that will be needed for an ecological transformation."

thyssenkrupp Steel is also in the middle of the green transformation. The objective: carbon neutrality. This involves nothing less than the renewal of basic industrial foundations. "To move toward a carbon-neutral future, we need people who are highly motivated to make a difference. That's why we're looking for motivated colleagues

who want to become part of the green transformation and make a significant contribution," says Kerstin Dähne from the Recruiting & Development team at thyssenkrupp Steel.

New technologies are opening up new opportunities

But the green transformation is not the only challenge facing the labor market. Demographic change has long since arrived in Germany. One in two German citizens is now more than 45 years old, and on in every five is older than 66. The lack of qualified employees not only has a negative impact on productivity, but also on innovation and economic growth.

According to the BIBB, around 4.7 million baby boomers are leaving the workforce and their jobs will have to be filled by 2027. "The consequences of the increasing shortage of skilled workers," says BIBB President Esser, "will soon be felt by companies. They will no longer be able to produce certain goods and services, or

will only be able to offer them at higher prices. Possible ways to overcome these bottlenecks include: more training, more immigration of skilled workers, as well as adapting production processes with new technologies, for example AI – i.e. artificial intelligence."

This also applies to thyssenkrupp Steel. "Approximately 30% of employees are expected to retire in the next few years. Of course, these positions will have to be filled," explains Kerstin Dähne.

Fostering and developing talented individuals

The steel company has several strategies to counter the shortage of skilled workers in the changing world of work. These kick in early on with the recruiting of talented potential employees. "Any company that is intending to attract skilled workers should take a close look at the wishes and ideas of young, talented people," says Kerstin Dähne. "The younger generation is looking even harder than their predecessors for meaningful work that reflects their personal values and beliefs. They want to make a positive contribution and feel that their work has a purpose. They're also looking for employers who can provide them with opportunities for professional development and new skills development."

However, BIBB President Esser believes that not only companies but also policymakers have a responsibility here, because the choice of occupation depends to a large extent on how society values the respective educational pathway. "A positive image of dual vocational training must be actively cultivated through political initiatives on the equivalence of vocational and academic education. This is the only way to stop the loss of image of dual vocational training and counteract the shortage of skilled workers."

Jobs with a future

Generation Z has grown up in a digitalized world. They take technology and social media for granted. As a result, they bring with them a high level of digital competence and flexibility, and they expect employers to use modern tech-



Exciting topic? Then listen in to the current episode of our podcast "Gekocht, gewalzt, veredelt" (Smelted, rolled, refined).

nologies to make their work efficient and flexible. These are topics that the digital experts at thyssenkrupp Steel are also intensively dealing with. "Depending on their area of assignment, participants in the company's trainee program gain insights into smart sensor processes for steel production, networked supply chains and digital twins, for example," explains Kerstin Dähne.

Potentials and prospects

thyssenkrupp Steel welcomes different perspectives and gives employees the opportunity to try out and prove themselves in various projects. The company also offers digital coaching for individual development to all managers and those who would like to become managers. Because women are still represented less in technical professions, the company is working on attracting female professionals to pursue a career with the company. "We specifically contact women's networks at universities, for example at RWTH Aachen University, to make women from technical courses aware of our exciting entry-level opportunities," explains Dähne.

Industry must embrace the new challenges of the labor market and be ready for the new generation of workers. #nextgenerationsteel. With the green transformation, thyssenkrupp Steel is taking responsibility for future generations, reducing its CO₂ emissions and creating very concrete future prospects for Germany as a steel location.



Web

Go here for the podcast:
The Steel Podcast | Gekocht, gewalzt, veredelt | thyssenkrupp Steel
www.thyssenkrupp-steel.com/de/podcasts/

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Discussing the future of electric mobility at the Bochum site: Svetlana Regner, Cold Rolling project manager, in conversation with Tom Bendel, team leader Double Reversing Stand and Annealing and Isolating Line (GIL).

Concentrated expertise for electric mobility

With the new double **reversing stand at the Bochum site**, thyssenkrupp Steel is further expanding its capabilities in the areas of electric mobility and higher-strength steels.

Text Julia Joswig

Hall 80 at the thyssenkrupp Steel site in Bochum resounds with hammering, banging and drilling noises. Every now and then, a hissing sound can be heard, as well as the sound of oil flowing through pipes. Voices are raised, attempting to make themselves heard above the noise of building work. But it's not so easy when the muffled sounds of another building site can also be heard from the hall next door. The work is progressing steadily. So fast that the structure now changes almost hourly. It's hardly surprising, since almost 400 people work here every day on the line which is more than 435 meters long.

The major construction site marks a milestone for the Bochum site: here, on Essener Strasse, a center for electric mobility will be built by 2025. For this purpose, equipment builders, project and process managers are integrating an annealing and isolating line (GIL) as well as an electrical steel strip inspection line (EBIL) in addition to a double reversing stand (DRG).

Special requirements call for special expertise

The double reversing stand, representing an investment of almost 96 million euros, will be used in the future to produce even thinner, stronger steels for use in electric mobility. Tom Bendel, DRG and GIL team leader at thyssenkrupp Steel, explains: "The trend in electric mobility is also moving toward increasingly demanding grades. With the new double reversing stand, we are once again significantly strengthening our expertise in the areas of electric mobility and higher-strength steels. This means we can differentiate ourselves even more consistently through the quality of our products."

Today, thyssenkrupp Steel is already one of the global market leaders in non-grain-oriented electrical steel under the brand names powercore® and powercore® Traction, which are supplied to home appliance manufacturers, energy providers and the automotive industry all over the world. One of the main goals during production of the high-tech material is to minimize re-

magnetization core losses and, for example, to help boost the energy efficiency and thus range of electric vehicles further. The new double reversing stand will meet these demands and significantly enhance the site's capabilities. Bendel explains further: "With its back and forth – i.e. reversing – action, the mill stand will be able to roll particularly thin materials with excellent flatness and tightest thickness tolerances. This is particularly important for strips used in electric motors and generators, because it helps minimize core losses."

Trial operation starts in January 2024

The first strip has passed through the double reversing stand in late summer. The entire line can now start up. The DRG will then be put to the test in January 2024, running around the clock for four weeks. The performance test will show whether the hard work has paid off. The next step will be to begin the ramp-up phase of the annealing and isolating line in April 2024, which will then be completed about six months later. In the new line, the microstructure of the cold-rolled strip is recrystallized during the annealing process, following which it is adjusted to the corresponding texture. After the annealing process, it is provided with an insulating layer, which is particularly important for the strips used in electric motors and generators to increase the efficiency of the drives. The electrical steel strip inspection line will be set up and put into operation during the same period. The function of this line is to repair detected defects (holes) after cold rolling, so that only faultless products are transferred to the GIL.

Special challenges arise from the fact that the double reversing stand is being installed while normal work is ongoing. While the plant team focuses on ensuring smooth processes in the production of non-grain-oriented electrical steel strip, other colleagues are working on the rapid integration and commissioning of the new lines. Construction workers and project managers are coming and going. One of them is Svetlana Regner, Cold Rolling project manager at thyssenkrupp Steel: "The way people are working together on the plant floor is unprecedented. Everyone helps where they can, because they know how important the lines are for the future of the Bochum site. After all, we're not just building plants here, we're also securing jobs."

Top quality for electric mobility

With the expansion of its Bochum site, thyssenkrupp Steel is helping its customers in the automotive industry meet the growing demand for electric vehicles: More than 220,000 of the new cars registered in Germany in the first half of 2023

were electric cars – a year-on-year increase of 31.7 percent. At the same time, demand for higher-grade electrical steel has increased. "This special steel has been produced in the Bochum plant for decades, so we have been able to build on our experience as market leader and our expertise in the field of high-tech materials. With the investment in our plants and equipment and the expansion of our capacities, we're excellently positioned to meet the steadily increasing volume demand," says Svetlana Regner. "This is a groundbreaking project for electrical steel. We are very pleased to be able to take part in it. However, the success is also and above all due to the magnificent commitment of the team, which is working every day with great motivation towards completing the line," concludes Svetlana Regner.



The new DRG marks a milestone for the Bochum site.

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These and other investments under Strategy 20-30:
www.thyssenkrupp-steel.com/en/investments

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Thin electrical steel for higher energy efficiency: New grades for electric vehicles

Two new electrical steel grades from the **powercore® Traction** product family are in the final development phase. Shortly, they will join thyssenkrupp Steel's portfolio of materials for particularly energy-efficient electric motors. At just 0.25 mm, the particularly thin electrical steel strips of type N025 have excellent magnetic properties, high mechanical strength, and are characterized in particular by very low remagnetization core losses – important for **use in high-performance traction motors** of electric vehicles.

Text Julia Joswig



David Pieronek, Product Manager NGO Electrical Steel, taking a look at the particularly thin electrical steel grades of type N025.

Photos: Jennifer Chaeer

Electrical steel, a magnetically soft iron-silicon alloy, is an elementary component of almost all generators, transformers and electric motors. thyssenkrupp Steel is one of the leading manufacturers of high-performance electrical steel.

Its portfolio features a wide range of grain-oriented (GO) and non-grain-oriented (NGO) top grades. High-purity, non-grain-oriented electrical steel with particularly good material properties is in demand when it comes to high performance and energy efficiency of drive motors for electric vehicles. The trend is toward high-quality, particularly thin products with a high silicon content, such as those offered by thyssenkrupp Steel under the powercore® Traction brand. One of the particularly important characteristics of electrical steel strip is what is referred to as the remagnetization core losses.

Focus on energy efficiency

David Pieronek, product manager for non-grain-oriented electrical steel, explains why this material property is so important: "Core losses are significantly influenced by the sheet thickness, alloy and material production process. It determines how efficiently a motor can utilize electrical energy and convert it into rotational energy. Low power losses are synonymous with high motor efficiency. If the efficiency increases, an electric vehicle can drive more miles on one battery charge or, alternatively, the battery capacity can be reduced while maintaining the same range. This then saves weight and costs." Pieronek continues: "Our new developments are characterized by very low core losses of 12.5 watts per kilogram and 13 watts per kilogram, respectively. This means we've been able to improve them by up to 11% compared to current reference grades. Of course, the other magnetic parameters of the new grades, such as polarization, also achieve peak values."

Exacting demands on mechanical properties

However, high-speed drive motors in modern electric vehicles not only require excellent magnetic properties, they also place exacting demands on the mechanical properties of the electrical steel – primarily on the strength of the material. Dr. Thorsten Böger, product coordinator for non-grain-oriented electrical steel at thyssenkrupp Steel: "The air gap between the stator and rotor of the electric motor, i.e. between the rotating part and the stationary part, is extremely narrow. Strong centrifugal forces act on the rotor at very high speeds. Material contact must be excluded, whatever the motor temperature. The high strength of 420 megapascals provides the necessary strength reserve here, even for high-performance drives." He adds: "Given the low electrical steel strip thickness of only 0.25 mm combined with the high-quality magnetic and strength properties of the product, we are looking at production challenges in all process stages. We are well prepared in this regard with the commissioning of new production facilities."

Web

More information about non-grain-oriented electrical steel is available here:
www.thyssenkrupp-steel.com/en/powercore-traction

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A step into the future already today

High demands are placed on the production plants in order to achieve the corresponding product properties and quality of these top-quality, high-tech electrical steel strips. thyssenkrupp Steel is therefore expanding the Bochum location and building a center of excellence for electric mobility: Among other things, the company is investing in a state-of-the-art double reversing stand and a coupled annealing and isolating line. In the future, these lines will be able to roll thin electrical steel strips with the highest flatness and tightest thickness tolerances. They will manufacture it with particularly homogeneous mechanical and magnetic properties. The commissioning of the double reversing stand is scheduled for this fall, and that of the annealing and isolating line for spring 2024. The series ramp-up of the new NO25 grades in the new plants is planned; sampling and homologation inquiries can be made immediately.



No energy and mobility revolution without steel. Electrical steel strips from thyssenkrupp are our contri-

bution to greater energy efficiency, sustainable mobility and renewable energy generation. With our new, particularly high-quality non-grain-oriented electrical steel grades, we are helping our customers to increase the efficiency of automotive electric motors. As a result, our products make a major contribution to responsible, sustainable use of energy and raw materials, as well as to reducing CO₂ emissions."

Miguel Arrabal,
 Head of the NGO business sector



Bright prospects for special coatings

With the planned expansion of solar energy, material suppliers to the industry are facing additional challenges. Consequently, thyssenkrupp Steel is developing new coating systems for **integrated photovoltaic (PV) installations in agriculture** based on **ZM Ecoprotect® Solar**.

Text Jan Ritterbach

The solar package adopted by the German government in August 2023 will give photovoltaics in Germany an additional boost. "We need to triple the pace and succeed in adding 22 gigawatts annually by 2026 to meet our expansion targets," said German Economics Minister Robert Habeck in a press release issued along with the decision. Based on 2022, an additional capacity of only 7.5 gigawatts has been installed, which is not nearly enough to build the total planned capacity of 215 gigawatts of photovoltaics in Germany by 2030.

Significant funding for agrivoltaics

Capacities must be built up, especially in the free-field sector, in order for new solar installations to be connected to the grid on the desired scale. Experts see great development potential in what is called agrivoltaics. This involves installing PV systems on agricultural land in a way that does not restrict its agricultural use. A good example of this are pastures for cattle or poultry farming which are spanned by PV mounting structures. Similar concepts exist for fruit and vegetable cultivation; indeed, PV systems even add value here since they offer protection against extreme weather conditions such as hail. The plan is for these and similar approaches to be promoted more strongly in the

future through the German government's initiative. Robert Habeck: "A key focus of the package is to provide land for solar parks in a sustainable and environmentally friendly manner, so that agricultural land is used twice over with agrivoltaics – for agriculture and for power generation."

Partners of the suppliers

The challenge: because the materials of the mounting systems are exposed to extreme weather conditions in the open air, it must be ensured that no metal particles will get into the soil due to corrosion processes. As a partner of the energy sector with great expertise in materials, thyssenkrupp Steel is actively addressing these new requirements. The advantage: with ZM Ecoprotect® Solar, the manufacturer already has a suitable basic product. The coating is already being used today for robust solar mounting racks and, with its zinc-magnesium-based corrosion protection, is ideal for use in outdoor areas.

The König company from Moringen has already had good experience with ZM Ecoprotect® Solar. As a producer of special profiles, the company's product range includes high-quality components for solar mounting racks. Managing director Meiko Fiedler appreciates that thyssenkrupp is involved in the process in a variety of ways: "Not only do we get the material we need for manufacturing, but we also receive expert consulting services for the required material

specifications and corrosion protection. This is very important in lightweight construction because, aside from efficiency, it goes without saying that we need high rigidity and durability in the design at all times." Fiedler also appreciates the possibility of being able to source CO₂-neutral steel grades in the future. "Sustainability is increasingly important for us and our customers – especially when it comes to renewable energies. With bluemint® Steel, thyssenkrupp is providing us with a suitable solution for the future."

Intensive research work

Sustainability and ecological compatibility are also relevant to agrivoltaics in other ways. Jennifer Schulz, development engineer at thyssenkrupp Steel: "Depending on the area of application, the location of the mounting rack and the nature of the soil, it is necessary to adapt the coatings and subsequent treatments, such as passivations. For example, because no heavy metal such as chromium is allowed to be present." Against this background, thyssenkrupp Steel is also benefiting from the investments in its own production network. "The new hot-dip galvanizing line (FBA) 6 with its state-of-the-art coater affords us the opportunity of testing novel chrome-free pre- and post-treatments efficiently. This means we can successfully respond to the specific requirements of new markets," Schulz added. The option of coating thicker sheets or higher-strength steels in the FBA 6 also gives the manufacturer more scope

for developing innovative products in the future.

thyssenkrupp Steel is supporting the various development approaches to the topic of agrivoltaics through intensive studies in the company's own corrosion laboratories. thyssenkrupp Steel has engaged external partners and institutes, such as the Karlsruhe Institute of Technology (KIT), to carry out additional test series. Individual material properties are also repeatedly tested. The most recent example concerns how coatings made of ZM Ecoprotect® Solar behave in soils and whether they are resistant to a range of pH values. "Such tests and corresponding validations are important so that farmers know whether they can stick to proven fertilizers despite the steel profiles being anchored in the ground," explains Arne Schreiber from thyssenkrupp Steel's Industry Product Management.

Concept is picking up speed

Solar providers and their material suppliers still have a lot of convincing to do to make the dual use of land for agriculture and energy production more popular. To date, agrivoltaics accounts for just one percent of free-field solar installations. "However, the topic was already widely known and talked about among those attending industry events such as the leading trade fair Intersolar. And we notice how the importance is increasing elsewhere too. This will be an important building block for the energy turnaround," Arne Schreiber is certain. "That's why we're already paying a lot of attention to the issue."

ZM Ecoprotect® Solar is already being used today for robust solar mounting racks and, with its corrosion protection, is suitable for use in outdoor areas.



Web

More information about the topic of effective corrosion protection for PV mounting systems is available at:
<https://www.thyssenkrupp-steel.com/de/solar/>

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Jennifer Schulz and Arne Schreiber from thyssenkrupp Steel are responsible for ZM Ecoprotect® Solar, and also work on the various development approaches in agrivoltaics.

Sustainable component development: Weight plays a decisive role

thyssenkrupp Steel pursues a **technology-open approach** in the manufacture of lightweight steels: For both **cold and hot forming**, customers have access to comprehensive portfolios that support efficient and sustainable component production.

Text Jan Ritterbach



As a product manager for multiphase steels, Dr. Patrick Kuhn knows what matters in a crash: the component must absorb a particularly large amount of energy. Cold-formed highest-strength AHSS materials are ideal for this.

Photos: Jennifer Chaeer

Public perception of industrial processes is not always unprejudiced. A current example of this is the discussion that has arisen about the hot forming process, since it requires heating materials to temperatures of 900 degrees Celsius and more. At first glance, this sounds like high energy consumption and high CO₂ emissions – and thus not very sustainable. However, looking at the procedure in terms of the application often reveals a different situation. Hardly anyone knows this better than Thomas Flöth from the Application Technology department at thyssenkrupp Steel. "There are good reasons to use both cold and hot forming, depending on the application," says the engineer, referring to the individual requirements in component production. "In the automotive sector, it's often a matter of getting as much as possible out of lightweight construction. Here, depending on the task, hot forming can also save quite a lot of material – and thus also CO₂." Another aspect for saving material is the material utilization factor, where hot forming also tends to offer advantages over cold forming.

The lighter, the better

Particularly when it comes to the life cycle assessment of forming processes, internal studies at thyssenkrupp Steel have revealed that material reductions are decisive. Thomas Flöth: "The

When should which material and which process be used?

With regard to sustainability, thyssenkrupp Steel not only looks at the material but also takes the upstream chains, processes and the subsequent use phase of the products into account as part of the life cycle assessment (LCA). The company is happy to make the expertise of its technical experts available to its customers and partners when it comes to the early-stage analysis of which material and which manufacturing concept are suitable for a specific application. We look forward to hearing from you about this.

studies we've done show very clearly: The production process is less important than the weight and material utilization of the subsequent component: the lighter the component and the better the material utilization, the greater the sustainability." He is convinced that the forming process will play an even more marginal role in considerations of sustainability in the future, and all the more so when heating processes are decarbonized through the use of green electricity or hydrogen. Following the guiding principle: "The most environmentally friendly material is the one that doesn't have to be produced in the first place" – after all, lightweight construction reduces the amount of material used in a component for the same performance, and less steel has to be produced – thyssenkrupp Steel pursues a technology-open strategy: in each individual case, we carefully examine which material and which process are optimally suited to the respective field of application.

High potential for both processes

If a component has to be able to absorb a particularly large amount of energy in a crash, as is the case with a front longitudinal member, for example, cold-formed highest-strength AHSS materials such as jetQ® 980 and jetQ® 1180 are ideal thanks to their outstanding ductility. These latest-generation modern multiphase steels are ready for series production now, and they are currently undergoing the approval process at various OEMs. "The initial feedback from our customers on processing is very positive," reports Dr. Patrick Kuhn, product manager for multiphase steels at thyssenkrupp Steel.

jetQ® grades also perform well in terms of resistance to deformation, while highest-strength hot-forming steels such as MBW® 1500 or MBW® 1900 show even better performance here. For example, when used in safety-relevant body components such as B-pillars, which must not deform significantly in an accident and can fail in the worst case. However, ductility is now also a major issue in hot forming – with MBW® 1200, the strength is moderately reduced in favor of



Georg Parma, product manager for hot forming, focuses on the ductility of his steel grades and lowers the strength accordingly: A prominent application example is the all-electric VW ID Buzz.

increased ductility. "These properties also impressed Volkswagen so much that the material is being used alongside other hot forming grades to build the new all-electric VW ID Buzz," explains Georg Parma, thyssenkrupp Steel's product manager for hot forming.

Technology and material selection depends on many factors

The automotive industry will continue to require a balanced mix of cold- and hot-formed steels in the future, and in terms of competition with lightweight body materials, steel is therefore hardly likely to surrender its dominant position in the coming years. "The question of balancing the respective proportions of cold and hot forming depends not least on the carmaker's highly individual material concept. In essence, however, the respective component requirements determine the use of technology," says Thomas Flöth, summarizing the situation for OEMs.

Until now, lightweight construction has primarily been an issue of reducing fuel consumption and emissions in vehicles running on conventional fossil fuels. However, against the backdrop of locally emission-free electric mobility, the sustainability focus is shifting from the use phase to the production phase. Lightweight construction therefore remains an important issue – the requirements for crash safety (for example the protection of the battery) are even increasing in the case of electric cars. For this reason, thyssenkrupp Steel will continue to invest in developing new lightweight steels with improved material properties – both for cold and hot forming.

For Thomas Flöth from the Application Technology department at thyssenkrupp Steel, both cold and hot forming are equally valid forming processes, including in terms of sustainability.



Web

For more information about steels for hot and cold forming: <https://www.thyssenkrupp-steel.com/en/lightweight-steels-for-vehicle-construction/>

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Bright prospects for the solar and energy market

thyssenkrupp Steel has been Europe's coil coating specialist for more than 60 years. The organic coil-coated high-grade flat steel under the **pladur®** brand is now poised to conquer new markets: the **energy and solar sectors**. Dr. Janek Wysoglad, product manager and expert for coil coating products at thyssenkrupp Steel, explains what this means in steel^{compact}.

Text Julia Joswig



Coil coating expert at thyssenkrupp Steel:
Dr. Janek Wysoglad.

Mr. Wysoglad, what are the advantages of the coil coating product pladur®?

The advantages are indisputable: economy, efficiency, quality, processability and sustainability for countless surfaces. Our pladur® already represents the optimum solution for housings and claddings in a wide variety of applications. For many years already, it has satisfied exacting demands in terms of corrosion protection, aesthetics and functionality – such as in construction of multi-story and industrial buildings, in the household appliance, commercial vehicle and garage door industries. We're talking about over 700 different color shades, which we also offer in various finish types – and indeed in the highest level of finishing that thyssenkrupp Steel has in its portfolio: a composite material consisting of a steel substrate, hot dip galvanizing and the organic coating.

In addition, the coil-coating process is one of the most sustainable coating concepts available. This is due to the peak ratio of coated area per minute to solvent emissions, the improved energy balance thanks to heat recovery from burned solvents, the almost 100% application efficiency and lower water consumption.

Coil coating is a particularly sustainable coating concept for flat steel.



What makes pladur® so interesting for the solar and energy markets?

Until now, the components for these sectors have been spray-coated in an expensive process which takes longer and imposes additional costs on our customers for storage, material and production, among other things. With pladur® on the other hand, the customer receives a product with a finished surface that has been coated in an environmentally friendly manner, is available in many different color shades and surface finishes, and is suitable for further processing right away. True to the motto "finish first, fabricate later", our customers can shorten their production processes by dispensing with the painting step, and thus simplify them considerably.

We believe this represents an innovative alternative for the sector. And the exchange with customers at the Intersolar trade fair in June 2023 reinforced our assessment. Wallboxes, air-conditioning or heating units as well as transformers and batteries for solar applications - our organic coil-coated high-grade flat steel pladur® can be used for all these and many more products.

What are the next steps?

Our pladur® portfolio is ideal for the solar and energy sectors. We are currently examining how we can optimize it to precisely reflect customer requirements. For example, we can respond to new surface requirements such as colors, structures and effects. We are also able to implement special protection requirements and already offer pladur® in the CO₂-reduced bluemint® Steel variant. To put it briefly: we are now already establishing the definitive requirements for the specific cladding elements in initial discussions together with our customers. For us, the transformation to a carbon-neutral future offers a huge opportunity, and we want to support our customers in this common endeavor with the best materials and our expertise.

In coil coating, high-quality flat steel is continuously coated on one side, or both sides at the same time. For this purpose, the galvanized steel coil is first unwound as it enters the line, then wet-chemically cleaned and pretreated so that the coating can bond optimally to the strip. After that, several coatings can be applied and dried in one run through the line. In addition, protective mechanisms for further processing can be provided in a post-treatment step, for example by laminating a film. Finally, the strip is recoiled, packaged and made ready for shipment to the customer.

Coil coating is faster and more efficient than piece or partial coating, resulting in higher product yield and shorter lead times. In addition, the coating is applied on a continuous strip, which results in a more uniform surface with fewer defects due to defined surface parameters. This is one of the reasons why coil coating is one of the most sustainable coating concepts of all.

Investments in the Siegerland region – new coater in FBA 6

In June 2023, the new double chem-coater was taken into operation at the hot-dip galvanizing line (FBA) 6 in the Siegerland region. The coater, which runs in changeover mode, meets more exacting customer expectations for the highest quality surfaces, and now allows significantly more precise passivation overlays to be applied – for a surface free of streaks and spots. Furthermore, nothing now stands in the way of the development and application of new surface treatments, such as chromium-free passivations. For example, thyssenkrupp Steel is now able to apply passivation or sealing media to galvanized material up to 4 millimeters thick. A combination of intermatched induction and circulating air dryers is used to dry the coating. covex® T passivation as well as covex®S and covex®E transparent coatings for metallic hot-dip coated surfaces are important for temporary corrosion protection, as forming aids and the basis for painted and anti-fingerprint coatings. Tele-scopic rails, door frames and electrical cabinets in particular benefit from the new coating technology, and are now produced with improved surface quality.



The coater meets customer requirements for the highest quality surfaces.

Web

More information on coil coating for the energy and solar sectors:
<https://www.thyssenkrupp-steel.com/en/coil-coated-housing>

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Sustainable logistics: Full steam ahead with Biodiesel

Rail logistics between the thyssenkrupp Steel sites is becoming more climate-friendly. This is made possible by an offering from long-term partner DB Cargo, which sets great store by innovative processes and new fuels.

Text Julia Joswig



Sustainability on the railroad: DB Cargo's transport concept relies on electric locomotives powered by renewable energy and diesel locomotives running on Hydrotreated Vegetable Oil (HVO).

Photos: DB Cargo and thyssenkrupp Steel

As part of the green transformation, thyssenkrupp Steel has also adapted its logistics processes to operate with more sustainable deliveries and shipments in the future. A strategy to reduce CO₂ emissions is being implemented for rail transport. Together with DB Cargo, the first step was taken since the beginning of April to convert all rail transport between Duisburg and the seven locations in the Siegerland region, Finnentrop, Hagen, Dortmund, Bochum, Gelsenkirchen and Andernach to the EcoSolutions sustainable transport concept. Electric locomotives powered exclusively by renewable energy sources and diesel locomotives running on Hydrotreated Vegetable Oil (HVO) now operate on the aforementioned routes.

HVO is a type of biodiesel produced using organic residues from the food industry. These include, but are not limited to, frying fat, oil or other organic waste. So, for example, extra rapeseed does not have to be grown to produce the fuel. The residual materials are treated in a technical process to obtain an organic equivalent to diesel, one that replaces the fuel originally used. In a second step, the CO₂ emissions from all diesel locomotives at thyssenkrupp Steel will be reduced gradually using this process, making all plant transportation significantly more sustainable. This means that the company's decarbonization strategy is also being actively supported in logistics.

Savings without technical conversion

thyssenkrupp Steel is already saving more than 6500 metric tons of CO₂ every year with this process. Particularly practical: thyssenkrupp Steel can continue to use its own rail vehicles in the event of a changeover, as HVO is compatible with conventional fuel. "We can continue to use the diesel engines we have now. This also has other advantages, because we reduce soot particles in the environment," explains Frank Brockel, head of transportation and rail operations at thyssenkrupp Steel. "Consumption is only minimally higher in the process, while the service life of our machines is unaffected."

At thyssenkrupp Rasselstein, the HVO offering from DB Cargo also fits in perfectly with the marketing of bluemint® Steel. This is because transporting the input stock (around 1.7 million



1.7 million metric tons of hot strip are transported from Duisburg to Andernach every year. A major lever for reducing CO₂ emissions.



Oliver Pellin, distribution logistics manager at Rasselstein, is going all out and wants to use EcoFuel for all raw material procurement.

metric tons of hot strip per year) from Duisburg to Andernach represents a major lever for reducing CO₂ in the supply chain if it is switched over completely to HVO (which by the way is called EcoFuel at DB Cargo). "We want to get straight to the point and use EcoFuel for all raw material procurement," explains Oliver Pellin, responsible for distribution logistics at thyssenkrupp Rasselstein. "We keep a constant eye on the utilization of transport wagons as well as other modes of transport in this regard. The aim is to make the most effective use of all transport modes," says Frank Brockel. "When it comes to logistics, in addition to transport itself, avoiding transport runs and increasing transport efficiency are the key ways to reduce CO₂." Rasselstein therefore checks its transport chain, for example by a mapping procedure, to see where utilization can be improved further if necessary. CO₂ emissions are also measured, and high emission values are reduced through optimization. In the future, the propulsion units in the transport vehicles will be developed further to allow green drive technologies to be used. This is usually achieved by electricity within the company, as well as using solar cells or electro-hybrid drive technologies for large vehicles such as locomotives. Corresponding studies have already been set in motion.

New generation logistics

Looking to the future, thyssenkrupp Steel is pursuing the goal of providing its customers with a sustainable all-round package: ranging from products such as bluemint® Steel to more climate-friendly transportation, which is being extended from inter-plant logistics across the entire route network. "To make our steel products carbon-neutral, it is not enough to decarbonize the CO₂-intensive production process. We are thus also looking at individual processes for avoiding CO₂ emissions. Against this background, I am delighted that in logistics we are already able to take the first steps towards reducing our carbon footprint through our cooperation with DB Cargo," says Carmen Ostwald, Head of Business Development bluemint® Steel at thyssenkrupp Steel. Customers can also benefit from the added sustainability in the supply chain, because the volumes of CO₂ saved have a positive impact on their Scope 3 emissions. The cooperation with DB Cargo is a step in the climate-friendly

direction. Work is being carried out on further drive approaches for operating locomotives, which are also technically innovative. We are also monitoring how the market is developing and where things are heading for thyssenkrupp Steel's logistics. A new generation of logistics for steel.

Oliver Pellin and Frank Brockel are clear in their own mind: "Biofuel as well as the path to green electricity once again reveal how important sustainable processes are at thyssenkrupp Steel. Decarbonization of the product and supply chains affects not only our customers, but also ourselves. That's why we want to shed light on the topic with this conversion, and inform our customers in a proactive way: You're welcome to jump on the bandwagon – in the truest sense of the word."



The goal is to use all of our modes of transport in a more optimum way.

Consequently, minimizing the use of transportation and increasing transport efficiency for logistics are major levers for CO₂ reduction."

Frank Brockel,
Head of Transport and Railway Operations

Web

More information about logistics can be found here:
www.thyssenkrupp-steel.com/en/sustainable-logistics/

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From galvanized coil to smart electrical enclosure and back again

Controlling industrial production plants is a demanding task – without powerful control and switchgear systems, nothing would function. The new FBA 10 is a good example of this: a **quartet of partner companies** are contributing their specific expertise from planning to operation throughout the process and value chain to ensure that everything runs smoothly in the project.

Text Jan Ritterbach

High-tech steel from Dortmund: This is what thyssenkrupp Steel's hot-dip galvanizing line FBA 10 stands for. With a capacity of around 600,000 metric tons of flat steel per year, the investment north of 250 million

euros will serve the growing demand for hot-dip galvanized premium surfaces – for example from the automotive and household appliances industries. But the material is also used for the company's own purposes. A good example of this is the complex automation system used to operate the production facility. "The electrical enclosures required for this are manufactured along an innovative value chain by four partner companies, fitted with automation technology and finally assembled into a smart system," reports Axel Pohl, Head of Sales Industry OEM and Steel Service Center at thyssenkrupp Steel.

Wall of enclosures in XXL format

Around 3500 electrical enclosures can be found in the FBA 10. Depending on their design, they are used, among other things, to distribute the electrical power in the plant and to control and regulate the drives and units of the production line. 13,000 square meters of hot-dip galvanized sheet with a total weight of around 150 metric tons were required in the manufacturing process – produced by thyssenkrupp Steel, it goes



without saying. To enable functional and robust system cabinets to be created from the corrosion-resistant and durable starting material for sensitive automation technology, six coils went on a tour to undergo further processing steps at specialized service providers.

Development from station to station

First stop: Dillenburg in central Hesse. This town is home to Stahlo, a company in the Friedrich Loh Group, and one of the largest steel service centers in Germany to operate independently of any steel mill. Among other things, the company produces slit strip, sheets, shaped blanks and contours in all commonly encountered grades: from ultra-high strength to sensitive outer skin quality. As an interface, Stahlo is of central importance in the overall process. "We are the link between companies producing steel and those processing it; we specialize in the use of materials, and we network resources, people and technologies in an efficient way," explains CEO Oliver Sonst.

Stahlo aims to position itself as a "green steel provider" in the future and has already signed an agreement with thyssenkrupp Steel to



The starting material for 3500 electrical enclosures was six hot-dip galvanized coils with premium surfaces.



Turning steel into smart systems (from left): Adrian Martin from Andritz, Stahlo CEO Oliver Sonst, Dr. Dirk Pieler from Rittal and Axel Pohl from thyssenkrupp Steel.

supply CO₂-reduced bluemint® Steel. At Stahlo, the starting material was precisely cut into suitable blanks for further processing. In other respects: "The production processes are highly optimized in terms of dimensional accuracy and offcuts. We always provide the steel surfaces ready for painting on a just-in-time basis."

Flexible system technology

In the next step, the processed plates were sent to the small town of Rittershausen, birthplace of Stahlo's sister company Rittal. Rittal is one of the world's leading suppliers of electrical enclosure systems, automation and infrastructure. Rittal uses roll forming processes to shape the plates cut by Stahlo into frame and enclosure parts, and processes them so that subsequent process steps require little outlay on the part of the customer. "A key feature of our system technology is that the design of the enclosures is completely flexible. It can be implemented efficiently and with a high degree of automation, based on a digital twin – including mechanical processing of the mounting plate and flat parts," says Dr. Dirk Pieler, head of the Industry business unit at Rittal.

The virtual images of the individual enclosures – referred to as digital twins – are created in the early planning phase and migrate throughout the entire process. They are developed with the help of software developed by Rittal's sister company Eplan, and are used by the Graz-based technology company Andritz as the basis for configuring and equipping the many different enclosures.

Efficiency through digital workflow

Andritz provides plants, systems, and services for various industries – and was responsible for implanting the necessary intelligence into the overall system at FBA 10. "The highly complex and extensive project, with a circuit diagram spanning more than 100,000 pages and millions of data points, was planned and designed using a highly automated database-supported engineering process. This enables a continuous, digital and efficient workflow from planning to production," explains Michael Luu, Head of Engineering Processes E&A at Andritz Metals. "This resulted in thousands of cabinets and boxes for efficient energy distribution and smart plant automation at the production facility that we took into operation at FBA10," adds Michael Czakert, Andritz Vice President Global Metals Automation.

The success story continues

The fully equipped system enclosures have now already been in operation in FBA 10 since mid-2022, ensuring in various ways that the plant runs smoothly. They thus represent yet another of many dozens of successful examples of the effective and proven cooperation between thyssenkrupp Steel, Stahlo, Rittal and Andritz. Axel Pohl: "This cooperation between the four companies demonstrates how the process steps in our joint projects are always enriched with expertise and knowledge. In this way, intelligent, innovative and, in the future, increasingly sustainable products and solutions will ultimately be created."

Web

For more information about FBA 10 and its smart electrical enclosures: www.thyssenkrupp-steel.com/en/galvanized-electrical-enclosures/

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“Together we are ready for green steel”

Knauf Interfer is one of the leading independently operating service providers for steel solutions in Europe, and Schrag is the leading processor of lightweight profiles for industrial and commercial construction. The two companies are linked by a decades-long partnership with thyssenkrupp Steel – and future challenges will also be tackled jointly. For example, when it comes to developing **sustainable solutions for industrial customers**. Initial projects are already underway in this area.

Text Jan Ritterbach

This is the Knauf Interfer Group

As a family-owned company with approximately 1400 employees at 12 sites in Germany and elsewhere in Europe, the independently operating Knauf Interfer Group generated annual sales of more than €1 billion in 2022. With a clear focus on industrial and automotive customers, the multi-material processing company offers products and solutions made of both steel and aluminum, and supports customers along global value chains.

The portfolio of Knauf Interfer's steel service centers ranges from sheets and slit strip to wound rings. It is supplemented by special grades and intermediate thicknesses for the prototype sector. Another characteristic feature is the extensive range of organically coated products for industrial applications, which will soon be supplemented by particularly sustainable solutions.

In May 2023, Knauf Interfer and thyssenkrupp Steel already signed a joint memorandum of understanding (MoU) on the supply and purchase of CO₂-reduced steels.

Commitment to environmental protection

As a first step under the memorandum of understanding, the Knauf Interfer plants will be supplied right this year forward with steels that have a significantly lower carbon footprint thanks to the use of specially processed scrap. In the future, Knauf Interfer also intends to source materials from the bluemint® Steel product family for its entire Steel business unit. These are produced in a direct reduction process

using hydrogen, and help to avoid emissions that are harmful to the climate.

"The significant reduction in the carbon footprint of our precursor products is an important milestone in the decarbonization of the entire chain from production to the end consumer," says Domenico Marino, COO on the Executive Board of Knauf Interfer SE. Axel Pohl, Head of Sales Industry OEM & SSC at thyssenkrupp Steel, sees the alliance between the two companies as setting an important signal: "We are equally committed to sustainability and climate change mitigation. The agreement therefore not only represents another joint step in our strategic partnership, but also proves that major tasks facing society as a whole can only be tackled by working together."

Ecological materials are becoming more important

Knauf Interfer and thyssenkrupp Steel are quickly following up their announcement in the spring with action. Driven by the idea of solving customer challenges together, the two partners are working hand-in-hand to win over potential

customers with their material and consulting expertise. And the same goes for sustainability. This is a philosophy that is also pursued by the Schrag Group – an association of networked specialists offering comprehensive solutions for roofs and facades in lightweight metal construc-



Together in the production at Knauf Interfer (from l.): Axel Pohl from thyssenkrupp Steel, Thomas Goswin from Schrag and Torsten Gieseke from Knauf Interfer.

tion. Depending on the order and requirement profile, Schrag sources its material directly from thyssenkrupp Steel or through steel service centers such as Knauf Interfer. In the steel service center, the steels are stored temporarily and tailored as required before being sent to the individual Schrag production sites for further processing. And in the future, this will also include CO₂-reduced steels of the brand bluemint® Steel. "Considering materials from an ecological perspective is gaining importance in construction," says Thomas Goswin, Managing Director of the Schrag Group. Sustainable materials are playing an increasingly important role, particularly in tenders for contracts for administrative

This is the Schrag Group

The Schrag Group is a successful, owner-managed and independent family business founded more than 130 years ago. The Europe-wide specialist for roof and facade solutions in lightweight metal construction currently operates 15 sites in six countries, employing a total of over 500 people. Total sales last year amounted to around €125 million.

complexes or other public sector buildings. Goswin: "Construction is a price-sensitive industry and not every customer is yet willing to pay a premium for carbon-neutral steel. But the issue will grow in importance as policymakers exert more influence through regulatory measures."

With vision into the future

For this reason, Schrag, Knauf Interfer and thyssenkrupp Steel are already laying the foundations for a more sustainable product portfolio, and testing out the processing of bluemint® Steel from thyssenkrupp along the entire process chain. In addition, the roof and facade specialist will present its first exhibit at the Blechexpo 2023 trade fair: Schrag purlins are profiles for the load-bearing construction of hall roofs, and they are made of CO₂-reduced steel. This is not the first time that Schrag has set new standards. As a market leader and trendsetter, the company was one of the first in the industry to use higher-strength grades, for example, in order to achieve greater spans and material savings in industrial construction projects. The same now applies in the area of environmentally friendly materials.

The cooperation between thyssenkrupp Steel, Knauf Interfer and the Schrag Group is on more than just an economic level. It also underscores the three companies' shared vision of building sustainable business models for the long term, and taking a stand on socially relevant issues. "For us, this means setting an example of resource conservation. Sustainable prosperity is based on responsible actions. We are fair, conserve resources, use renewable energy for our modern machines and constantly strive to improve our manufacturing processes," says Thomas Goswin. Torsten Gieseke, Head of Business Unit Steel/Managing Director at Knauf Interfer adds: "As the Business Unit Steel, we take on a central function in the green transformation: namely, accompanying our customers on the way to CO₂-reduced products and pointing out optimum solutions in line with the steel-makers' production capabilities: We now want to show that, together, we are ready for green steel."

Knauf Interfer's steel service centers offer sustainable solutions for the industry in the form of sheets, slit strip and wound rings, among other products.



Web

For more information about our tubor® product:
www.thyssenkrupp-steel.com/en/portrait-knauf-interfer-and-schrag/

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#nextgenerationsteel

Sustainable steel

for Germany's independence
and economic might.

The German economy needs high-quality steel with a low carbon footprint. That is exactly what we are making possible by building our hydrogen-powered direct reduction plant with newly developed melters. In this way, we are strengthening Germany as a business location on the way to achieving its climate targets.

Our steel: the starting point for the industrial value chain of the future, the success of the turnaround in energy and climate policy, and lots of high-quality jobs in Germany and throughout Europe. [nextgenerationsteel.com](https://www.nextgenerationsteel.com)



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