

LINE PIPE GLOBAL

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Safeguarding supplies of energy and water

Essential for growth and prosperity

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Dear Reader,

The current issue of our Line Pipe Global concentrates on the topic of secure energy supplies. What we in Germany and the rest of Europe have taken for granted for many decades has suddenly thrust itself into the spotlight as a result of the war in Ukraine.

Swift political and economic action was needed to combat shortages and disruptions to the supply of oil and gas. As a result – and this can now be said with certainty – successful counter-measures have been taken.

The fact that we at Mannesmann Line Pipe have played a part in this brings our capabilities into sharp focus. At the same time, it clearly shows how essential it is

for the German and European economy to be and stay self-sufficient in this important industrial sector.

And from now on, another factor will play a key role in safeguarding a reliable supply of energy and water, for the entire energy sector is undergoing a massive transformation process as part of the planned energy transition.

As a production company in the steel industry, we face a twofold challenge here. Firstly, we have to change our production processes in order to establish a climate-friendly value chain. At the same time, we are called upon to develop innovative application products for our cus-

tomers and bring them to market maturity so that they too can operate sustainably and with carbon neutrality.

With over a century of experience and technically high-grade Mannesmann steel tubes, we meet these challenges day in, day out. In this issue, you can find out exactly how: from the delivery of HFI-welded H2-ready products for LNG terminals at short notice, through technically sophisticated Zap-Lok™ pipes and flow-lines to innovative system components for open district heating networks and material-saving load-bearing structures in stadium construction, such as at Everton FC in Liverpool.

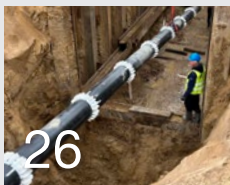
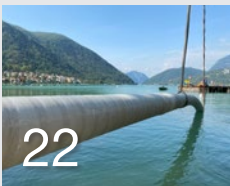
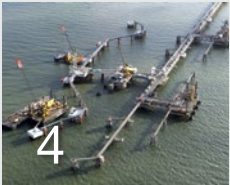
I wish you an inspiring and enjoyable read!

A handwritten signature in blue ink that reads "Betzler". The signature is fluid and cursive.

Andreas Betzler
Managing Director



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Title Story
**SAFEGUARDING
SUPPLIES**

Safeguarding supplies

Safeguarding Germany's and Europe's energy supplies

A reliable supply of energy is one of the essential prerequisites for economic growth, employment and prosperity. From energy extraction, efficient distribution and utilisation through to safe storage, HFI-welded steel pipes from Mannesmann Line Pipe make a vital contribution to supply security.



Photo: © BMWK /Dominik Butzmann

» The example of Wilhelmshaven shows that Germany can be quick off the mark and move infrastructure projects forward with great determination when federal and state governments and project stakeholders pull together.«

Dr. Robert Habeck,
Federal Minister for Economic Affairs and Climate Protection

With the escalation of the war in Ukraine in February 2022, global awareness of the importance of supply security and critical infrastructure was abruptly raised.

The sanctions imposed by the EU on Russia led to a ban on imports of Russian oil, gas and coal in the course of 2022. The price of wholesale gas soared, suddenly making gas about four times as expensive as before. Just how dramatic the effects of this were is illustrated by the example of the Uniper energy group, which was contractually bound to supply its 1,000 or so major customers and teetered on the brink of insolvency. Under its rescue package, the German government acquired 99 per cent ownership of Uniper as part of an EUR 8 billion capital increase at the end of 2022.

The cost of oil and electricity rose alongside gas. Private households and the economy are still feeling the effects.

Short-term safeguards

To compensate for the supply shortfalls from Russia, more gas was firstly imported from EU countries. In addition,

under the LNG Acceleration Act passed by the German government, work on building gas pipelines and infrastructure for liquefied natural gas terminals was already underway by summer 2022.

The role played by HFI-welded steel pipes from Mannesmann Line Pipe in this should not be underestimated. "We were fortunately able to fulfil the extremely short-notice requests for the LNG terminals in Wilhelmshaven and Brunsbüttel," says Head of Sales Konrad Thannbichler. "Of course, our supplies for the construction of this vital infrastructure to ensure security of supply in Germany and Europe had top priority for us."

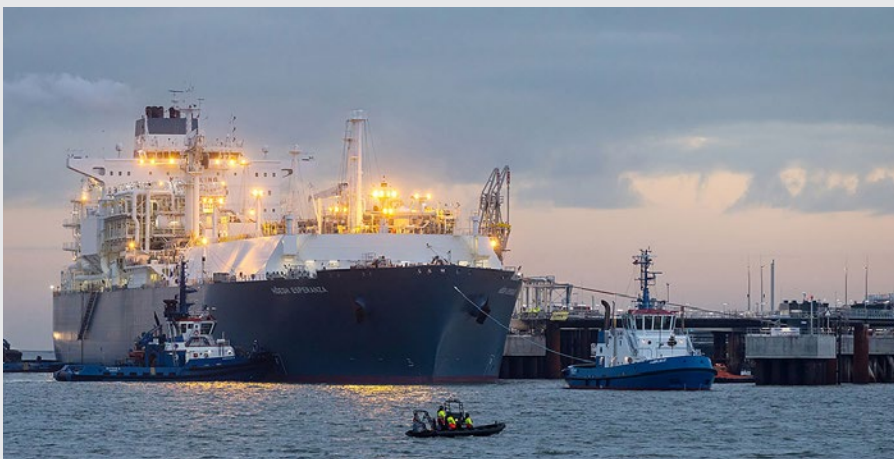
It was therefore possible to commission the Floating Storage and Regasification Unit (FSRU) in Wilhelmshaven at record speed at the beginning of 2023. Federal Minister for Economic Affairs and Climate Protection Robert Habeck was highly satisfied: "The example of Wilhelmshaven shows that Germany can be quick off the mark and move infrastructure projects forward with great determination when

federal and state governments and project stakeholders pull together." Commissioning in Brunsbüttel followed only a short time later. Two more LNG terminals, Stade and Wilhelmshaven II, are currently under construction.

Gas storage capacity as an indicator of supply security

The total capacity of German gas storage facilities is just under 25 billion cubic meters of gas, which is equivalent to around 28 per cent of Germany's annual consumption. Gas stored in Germany accounts for around 25 per cent of the European Union's gas storage capacity, which impressively underlines its importance for security of supply at European level.

The Bundesnetzagentur, the federal authority responsible for electricity, gas, telecommunications and postal infrastructures, is charged with continuously monitoring the filling levels. The achievement of the required filling levels on 1 October and 1 November ensured confidence in the security of supply in Germany in the winter of 2022/23.



The FSRU Höegh Esperanza is permanently moored to a jetty in the port of Wilhelmshaven, where it unloads the LNG from incoming LNG tankers moored to the FSRU's starboard side.

Photo: © NPorts, Andreas Burmann



» Our broad range of HFI-welded steel pipes means that we have high-quality, sustainable and cost-effective products for all areas of the energy industry.«

Konrad Thannbichler,
Mannesmann Line Pipe Head of Sales

Short-term supply security vs. medium-term energy transition

Because of the need to safeguard supplies, the energy transition necessitated by climate change and the associated transformation process for generation, distribution and storage shifted out of the public eye. Yet the issue also underlines the need to become less dependent on energy supplies from geopolitical unstable regions in the medium and long term. The possible solutions here also include the use of alternative and environmentally friendly energy sources, such as green hydrogen and ammonia. Gas and oil for heating can be easily substituted by heat pumps, solar thermal energy, and local and district heating, for example.

HFI-welded steel pipes – in demand across the board

Mannesmann Line Pipe has products and solutions that meet the highest international safety standards, both in the field of energy exploration and for the construction of the necessary infrastructure for energy distribution and storage. Thannbichler: "Our broad range of HFI-welded steel pipes means that we have high-quality, sustainable and cost-effective products for all areas of the energy industry." In addition to applications for oil and gas, this also includes LNG, hydrogen and ammonia, as well as steel pipes for onshore and offshore wind turbines. "We have also been supplying system solutions for district heating for decades." The best

examples of this are the WarmtelinQ and Warmtenetwerk Antwerpen Noord projects in the Netherlands and Belgium (see report from page 14).

Expansion of district heating

According to the district heating trade association AGFW, around six million of the approximately 43 million homes in Germany are currently heated with district heating. The industry sees potential for increasing this figure to 18 to 20 million. The trick here is that various renewable sources and technologies, such as large heat pumps, geothermal energy, solar thermal energy, biomass and waste heat from industry or data centers, can be integrated into district heating infrastructures.

According to AGFW's forecasts, this could enable heating networks to become climate-neutral by 2045. This would simultaneously reduce dependence on politically unstable regions and significantly improve security of supply and user acceptance with regard to the decarbonisation of the heating sector.

Salzgitter AG banks on green hydrogen

In February 2022, Uniper and Salzgitter AG signed a cooperation agreement under which Uniper is to supply the SALCOS project in Salzgitter with competitively priced green hydrogen for the production of climate-friendly steel. The basis for this is the Green Wilhelmshaven project, in the context of which an ammonia import terminal and a 1 GW electrolysis plant for hydrogen production are to be built by the end of the decade. In combination with the import terminal, the



District heating networks are also being expanded in the Netherlands. Mannesmann Line Pipe has supplied 600 tonnes of HFI-welded steel pipes to the WarmtelinQ project. Photo: © WarmtelinQ, Vincent Basler



electrolyser could supply around 300,000 tonnes of green hydrogen, says Uniper. What currently sounds futuristic must soon become common practice if the ambitious targets for the decarbonisation of industry are to be achieved.

Urgently needed market ramp-up for green hydrogen

This is because the demand for green hydrogen and hydrogen derivatives such as ammonia, methanol and sustainable aviation fuels (e-SAF) is huge. The National Hydrogen Strategy estimates an annual hydrogen demand totalling 90 to 110 terawatt hours (TWh) by 2030. Germany will therefore be dependent on imports. HINT.CO based in Leipzig, the world's first hydrogen trader, has been founded to get the market up and running. The company, which is part of the non-profit H2Global Foundation, aims to boost supply and demand for green energy produced abroad. To this end, hydrogen derivatives are purchased in bidding processes at the lowest price under 10-year contracts, which are sold on the demand side through short-term contracts. This is intended to incentivise companies to invest in renewable energies. The Federal Ministry for Economic Affairs and Climate Protection (BMWK) is providing up to EUR 4.4 billion in securities for new rounds of bidding for contracts running until 2036.

Measures taking effect

All in all, the short-term measures and the medium and long-term alternatives in the choice of energy sources appear to be strengthening security of supply in Germany and Europe. "With our Mannesmann HFI-welded steel pipes, we are now doing and will continue to do everything we can," says Thannbichler summing up.

Secure supplies

The constant availability of energy is indispensable for all participants in the global economy. Security of supply has far-reaching economic, environmental, social and geopolitical significance.

It all started with the 1973 oil crisis

The concept of energy security dates back to the first oil crisis in October 1973. This was when the Organisation of Arab Petroleum Exporting Countries (OPEC) cut oil production by 5%, which led to a dramatic increase in oil prices and in some cases to severe recessions in Western industrialised countries. As a result, numerous countries built up or massively expanded their strategic oil reserves. The oil reserve in Germany is organised and monitored by the dedicated Erdölbevorratungsverband (EBV) and meets 90 days' demand.

Selling reserves to stabilise markets

Some of the reserves in Germany were sold during the Gulf War in 1991, after the Hurricane Katrina disaster in the USA (2005), due to Libya's breakdown as an oil exporting nation in 2011, and in 2018 when the Rhine level fell to a level where ships could no longer be fully loaded. Most recently, oil reserves totalling 60 million barrels were released following Russia's invasion of Ukraine.

Monitoring the gas supply

A quarter of primary energy supplies in Germany are covered by natural gas. Since 23 June 2022, we have been in the "alert stage" of the Gas Emergency Plan in Germany.

This emergency plan defines three escalation levels – early warning, alert and emergency. The onset of the various levels depends on the degree of disruption, the anticipated economic and technical impact, and the urgency of resolving the disruption at the national level. The gas supply situation is monitored, analysed and evaluated by the Bundesnetzagentur, a federal authority within the remit of the Federal Ministry of Economic Affairs.

Regulating gas storage levels

The regulation of gas storage levels in Germany was adjusted several times in the course of 2022. This involved in particular the introduction of required filling levels to improve provision for the winter months. The filling levels must reach 85% by 1 October and 95% by 1 November. According to the Bundesnetzagentur, this was a key factor in preventing a gas shortage in the winter of 2022/2023.

Extra-high-voltage grid and power grid expansion

The Bundesnetzagentur is also responsible for planning and authorisation procedures in the German extra-high-voltage grid and for implementing planning approval procedures for national and cross-border power grid expansion projects.



Interview

"We put application security before delivery capability"

Security of supply is of key importance to many Mannesmann Line Pipe customers. Managing Director Andreas Betzler explains what lies behind the company's own delivery capability and why quality is nevertheless more important.

The war in Ukraine has shown how heavily our economy depends on the supply of energy. What conclusions should we draw from this?

Betzler: German industry is highly capable and maintains supplies of energy, food and water even in times of crisis. However, essential for this are fair competition on the international level and affordable energy. This is why – as in the case of Uniper, for example – decisive political action is also required in difficult times.

In addition, forward-looking infrastructure projects for the German and European economy must be implemented in a timely manner with reliable partners. The current LNG projects show that this is possible, given the political will.

Has Mannesmann Line Pipe itself been affected by the issue of supply security?

We have always sourced our pre-material from German steel and rolling mills. Our supply chains are firmly anchored here and we want to keep it that way. Thanks to HFI welding, we are fortunately not dependent on direct oil or natural gas imports for our energy supplies. So the issue has not affected us or our ability to supply our customers.

But security of supply doesn't only depend on one's own energy supply.

We have long-standing and dependable partnerships with our suppliers of steel, plastics, cement and energy. This not only ensures the reliable fulfilment of supply contracts, but also safeguards

the high quality of our materials and products.

We put application safety, i.e. maintaining high quality to the strictest international standards, before delivery capability. Reducing quality in favor of lower purchase prices would undermine the durability of our products, which are used for building safety-relevant systems such as pipelines and stadium roofs. Thanks to our safety-minded approach, we achieve maximum dependability and safety in use and, ultimately, supply security for our customers' customers.

For standard dimensions of gas and water pipes we maintain stocks that can be accessed extremely quickly in an emergency. In the event of damaged or burst pipes or even flood disasters, we have

» Forward-looking infrastructure projects for the German and European economy must be implemented in a timely manner with reliable partners.«

Andreas Betzler,
Mannesmann Line Pipe Managing Director

been able to mobilise our pipes worldwide within a very short space of time.

Mannesmann Line Pipe was able to deliver at very short notice to the LNG terminals in Wilhelmshaven, Brunsbüttel and also in Eemshaven. A real stroke of luck for customers!

The project in Eemshaven in particular was realised in record time, from the initial idea to the commissioning of the pipeline – a feat only possible because a team of employees worked on this key project with top priority and short decision-making paths. Incidentally, the client Gasunie presented us with a supplier award for this.

What part did production technology play in this?

Once again, we benefited from the reliability and speed of our plant. Just one example: we produce the steel pipes for a medium-sized 25 km pipeline in two shifts in a single working day. With the subsequent plastic coating, we can deliver such a pipeline, in its completed state, in just two production days. We were even able to boost our production capacity at short notice for the LNG projects just mentioned.

The issue of supply security will also affect the water supply sector from now on.

In many countries, water is already a scarce resource. Both nationally and internationally, raw and drinking water resources will have to be increasingly networked via transport pipelines in order to offset regional and seasonal droughts and water shortages. With this in mind, intelligent water strategies are needed for the storage, treatment and distribution of industrial and drinking water.

Things will become interesting when significant quantities of water are needed for the production of green hydrogen

in connection with the energy transition. Where will these quantities come from and who decides how they are distributed? Will green hydrogen be produced where water is available or where renewable electricity is generated? When water becomes an important basis for clean electricity, it is again a matter of reliable and secure distribution and supply.

Where do you see the biggest challenges for Mannesmann Line Pipe and its customers?

Unstable and changing supply chains, the impending energy transition and also digitisation call for drastic adjustments at very short notice to established processes, structures and business models that have so far been considered written in stone. Like us at Mannesmann Line Pipe, many of our customers are in the throes of rapid transformation. This harbours certain risks, but also of course great opportunities.

Always setting the right course well ahead of time is certainly not easy for all concerned. That is why we continue to seek ongoing dialogue with our suppliers and customers and are well connected for all relevant developments in the market.

Green steel, transparency in terms of carbon footprints and digital documentation will be key factors going forward. Concurrently, our customers are calling for high-quality products for transporting new media and for new applications.

However, with our more than a century of expertise as a technical innovator and our highly skilled employees, I believe we are ideally equipped to take on these challenges and actively shape

the changes that lie ahead of us and our customers.

What would you like to see at the political level?

COVID-19 and the war in Ukraine have made it clear to us that Germany and Europe must again become less dependent on geopolitically unreliable sources. Almost all areas are affected: energy imports, electronic products, chip production and medicines. The price of a product or service must no longer be the only decisive factor. Sustainability, environmental compatibility and social standards must also be given greater consideration when public and critical private sector contracts are awarded.

Supply bottlenecks and delivery failures, combined with an economic downturn, soon come at a much higher price – not only economically, but also politically.



Andreas Betzler,
Managing Director, Mannesmann Line Pipe GmbH

After training as a bank clerk and successfully completing a degree in business administration alongside his work, Betzler initially worked for Hüttenwerke Krupp Mannesmann (HKM) in Duisburg for almost 13 years. In February 2016, he was appointed to the Management Board of Mannesmann Line Pipe, where he is responsible for Purchasing, Controlling, IT, Human Resources and Accounting as well as Sales & Marketing.



The Etzel natural gas storage facility operated by Uniper. Feeding natural gas into the long-distance pipeline grid and secure storage make LNG supplies a reliable component of an autonomous energy supply.

Photo: © Uniper SE, Thorsten Futh



Safeguarding supplies

LNG terminals – vital for security of supply in Germany and Europe

So that Germany and Europe have a reliable supply of energy without being dependent on Russia, the development of LNG infrastructure will be all-important. Mannesmann Line Pipe has supplied HFI-welded steel pipes to no fewer than three projects within a very short space of time, opening up long-term prospects for the transition from LNG to green gases.



Photo: © MWIKE NRW/Nils Leon Brauer



With steel pipes made in NRW, the Mannesmann Line Pipe plant is contributing significantly not only to the rapid construction of the LNG terminal in Wilhelmshaven, but also to the security of gas supplies throughout Germany.«

Mona Neubaur,

Minister of Economic Affairs, Industry, Climate Action and Energy and Deputy Minister President of North-Rhine/Westphalia

Germany and Europe wish to end their dependence on Russian gas supplies as quickly as possible. In Germany alone, around 50 billion cubic meters of gas will have to be substituted each year. The development of new import infrastructure is therefore of central importance. In the short term, so-called FSRUs (Floating Storage and Regasification Units) will be essential for deliveries of LNG by ship. FSRUs are in most cases chartered ships equipped with the appropriate equipment to convert liquefied natural gas back into its gaseous state.

In March 2023, a total of 48 LNG terminals were in operation in Europe, with 49 more in development.

Quality and speed of the essence

Mannesmann Line Pipe has served no fewer than three projects at short

notice: the German LNG terminals in Wilhelmshaven and Brunsbüttel, and Eemshaven in the Netherlands.

The decisive factors for awarding the contract to Mannesmann Line Pipe were its consultancy skills, product quality and rapid availability, as well as the possibility of supplying hydrogen and ammonia in the longer term. Mona Neubaur, Deputy Minister President of North-Rhine/Westphalia, also wanted to see this capability for herself. On 5 August 2022, she visited the Mannesmann Line Pipe plant in Hamm and had Managing Director Andreas Betzler explain the HFI welding process to her in detail. Afterwards, she said: "Today it has once again become clear that technical expertise from North Rhine-Westphalia is in greater demand than ever and indispensable for the huge challenges of the energy and climate transi-

tion. With steel pipes made in NRW, the Mannesmann Line Pipe plant is contributing significantly not only to the rapid construction of the LNG terminal in Wilhelmshaven, but also to the security of gas supplies throughout Germany."

Also present was Holger Kreetz, COO Asset Management of the LNG terminal operator Uniper. When asked about the extremely tight schedule, he added: "This is precisely why it is important to have dependable partners like Mannesmann Line Pipe GmbH, supporting us with the necessary pragmatism and expertise."

Wilhelmshaven LNG terminal – independent of the tides

As the only deep-water port in Germany, Wilhelmshaven offers the ideal conditions for the first FSRU at the LNG terminal. Building on the existing



Minister Mona Neubaur inspects HFI-welded steel pipes as used for connection to the natural gas pipeline network at the LNG terminal in Wilhelmshaven (from the left): Jürgen Olbrich, Buhlmann; Minister Mona Neubaur; Holger Kreetz, Uniper; and Andreas Betzler, Mannesmann Line Pipe.



The LNG terminal in Wilhelmshaven was completed at high speed. LNG in regasified form was already being fed via this terminal into the German long-distance natural gas pipeline network in December 2022.

infrastructure at the Voslapper Groden transshipment facility, the project was executed at high speed thanks to the LNG Acceleration Act.

Mannesmann Line Pipe wasted no time in producing the urgently needed pipes for the 3.3 km long high-pressure gas pipeline connecting the Wilhelmshaven LNG terminal to the transfer point of Open Grid Europe, the transmission system operator.

The 230 HFI-welded steel pipes with a diameter of 610 x 16 mm were given a special coating on the outside for improved UV and saltwater resistance and delivered to the construction site just in time in a total of 32 truckloads.

Even before Christmas 2022, regasified liquefied natural gas was flowing at a record rate into the German long-distance gas grid via Wilhelmshaven. Initially, this will meet 6 per cent of Germany's gas needs and compensate

for around 11 per cent of German gas imports from Russia.

Next step "Green Wilhelmshaven"

In the second project step, a permanent and extended port solution for the FSRU is to be realised in parallel to the floating transshipment facility. The plan is to create additional unloading and transshipment facilities for green gases, e.g. hydrogen and ammonia, so as to fully exploit the potential of this new infrastructure project.

Brunsbüttel LNG terminal

Schleswig-Holstein's largest continuous industrial and port location is strategically located where the Kiel Canal meets the Elbe. Even the largest tankers with up to 266,000 cubic meters of LNG on board can dock here. This equates to almost 160 million cubic meters of pipeline gas per delivery. Twelve such

tankers would be sufficient to supply Hamburg with natural gas for a year. To integrate the initial volumes from the floating terminal at short notice, Gasunie constructed a roughly 3.5 kilometer high-pressure gas pipeline in December 2022 that feeds into the Schleswig Holstein Netz regional grid. For this, Mannesmann Line Pipe supplied 587 tonnes of HFI-welded steel pipes with a diameter of 610 mm. The pipes were given an epoxy flow lining and an external special coating for improved UV and saltwater resistance. Following the successful commissioning of the pipeline, the Höegh Gannet docked at the Elbe port in Brunsbüttel in January 2023. Since then, the German long-distance natural gas grid has also been supplied with regasified LNG from here.

So that the Brunsbüttel capacity with an annual output of 7.5 billion cubic meters becomes fully available to consumers in Germany and neighboring European countries in the medium term, Gasunie is building its Energy Transmission Line (ETL) 180, an approximately 55 km long pipeline to Hetlingen (Pinneberg district).

H2 Brunsbüttel

Brunsbüttel is an important location as a technology and industrial center, and also for imported green energy sources in the longer term. It is already obvious that domestic production will

German LNG Terminal GmbH is planning to build a multifunctional LNG terminal in Brunsbüttel. The terminal is scheduled to go into operation by the end of 2026. It will initially facilitate the import of LNG, then increasingly process "green" natural gas and later probably import hydrogen derivatives.



Visualisation:
© RWE/German LNG Terminal GmbH

Erik Habing, Gasunie, presented the supplier award for the EemsEnergyTerminal project to Regional Sales Manager Monika Langenbach.



not be able to meet the anticipated future demand for hydrogen. RWE is therefore building an import terminal for green ammonia, at which some 300,000 tonnes of green ammonia are to be imported annually from 2026. German LNG Terminal GmbH also plans to build and operate a multifunctional LNG terminal in the immediate vicinity.

EemsEnergyTerminal awarded the Langman Prize in 2022

Also completed in record time, the LNG terminal in Eemshaven in the Netherlands has been in operation since 15 September 2022 after just six months for construction. It consists of two FSRUs, each chartered for five years. The terminal's capacity of around 8 billion cubic meters of natural gas per year has been fully utilised since March 2023. This can be gradually increased to 10 billion cubic meters of gas per year going forward.

For their huge commitment and rapid project execution, several organisations were awarded the Langman Prize. This is presented annually at a New Year's reception and is an initiative of the Northern Netherlands Alliance. It is awarded to a person or organisation that goes beyond the bounds of conventional thinking, action, management and problem solving, thereby promoting social or economic development in the north of the Netherlands.

Confirmation of the H2ready® strategy

Mannesmann Line Pipe has supplied some 550 tonnes of HFI-welded steel pipes for an almost 4 km long pipeline to link up the LNG terminal in Eemshaven. Mannesmann Line Pipe has been commended by the terminal operator Gasunie for the production of the pipes to demanding customer specifications under high deadline pressure and for the rapid loading and delivery of the pipes.

Regional Sales Manager Monika Langenbach and Sales Manager Konrad Thannbichler personally accepted the certificate from Erik Habing, Senior Purchase & Contract Manager, in Siegen on 26 January 2023.

Thannbichler took the opportunity to give his interim verdict on LNG terminals: "We are naturally proud to be commended as a supplier to such important infrastructure projects. When we hear from our clients that the LNG terminals

should be designed to handle hydrogen in the medium to long term, we believe we are in an excellent position with our H2ready® products. Our products not only contribute significantly to security of supply in Germany and Europe, but are already paving the way for the transition from LNG to green gases."

Below: The EemsEnergyTerminal in Eemshaven was commissioned within six months.



Photo: © EemsEnergyTerminal

LNG – liquefied natural gas for Germany and Europe

In principle, LNG is nothing more than highly compressed natural gas. This liquefies it and reduces its volume by a factor of around six hundred. This makes the process economically viable for transport by ship, even over long distances. However, natural gas only liquefies at around minus 162 degrees Celsius. Liquefaction, transport and reprocessing are therefore energy-intensive and technically highly demanding.

To safeguard supplies in the short term, Germany resorts to special ships known as Floating Storage and Regasification Units (FSRU). The ships take the liquefied natural gas from tankers

and convert it on board into gas. For onward transport, a pipeline connection to the mainland is required in each case. At transfer stations the regasified LNG can then be fed into the long-distance gas network or stored in one of the numerous German natural gas storage facilities.

The FSRUs are to be replaced in the medium term by facilities close to the port so that regasification can take place on land.

In the long term, the facilities are also designed to process hydrogen and hydrogen derivatives so they can play a key role in the energy transition.



Photo: © WarmteIn, Vincent Baaijer

Safeguarding supplies

Open for the transition in the heating sector

The exploitation of so far unused waste heat not only reduces the dependence on fossil fuels, but also decarbonises the heating sector at the same time. Thanks to open-grid and open-access schemes, the potential is huge, as two current examples in the Netherlands and Belgium show. HFI-welded steel pipes from Mannesmann Line Pipe are being used in both projects.



Photo: © WarmtelinQ, Vincent Basler

Wherever possible, the district heating pipes are assembled into long strings and laid trenchlessly for minimum environmental impact.

Heated interiors and hot water are an integral part of an energy supply for home comfort. The majority of households still use fossil fuels for this purpose.

A more efficient alternative to this is district heating. So far unused waste heat from industry, cooling plant and data centers offer tremendous potential as heat sources for district heating grids. Its industrial and commercial use can also significantly reduce energy requirements from fossil sources.

Decades of product and pipe-laying experience

As a supplier of medium and jacket pipes, Mannesmann Line Pipe has decades of expertise with internationally reputed manufacturers of district heating system pipes. This is backed up by technical knowledge and experience of a wide range of laying methods, from traditional trench laying to ploughing and horizontal directional drilling (HDD).

The Netherlands – heat for the future

Located on the Rhine estuary south of The Hague, the port of Rotterdam is one of the world's largest seaports. Since April 2022, pipeline network operator Gasunie has been building an extensive district heating network with WarmtelinQ in order to harness the residual heat from local industrial companies to sustainably heat private households, industry and commerce.

In the first section of the project, the heat pipeline will run from the port of Rotterdam via Vlaardingen to The Hague. The second section is to follow directly afterwards so as to supply parts of the 120,000-population City of Leiden with sustainable heat.

Looking ahead, several T-pieces will be installed along the route so that additional local heat generators and consumers and local distribution networks can be flexibly connected in due course. Using this open-grid approach, up to 500,000

Video on the Internet



Watch the time-lapse video of the Denys company laying pipes for the WarmtelinQ district heating network on the Internet. magazine.mannesmann-linepipe.com/wl





Always great interest in the laying of long pipe strings.
Photo: © WarmtelinQ, Vincent Basler

residential units could ideally be connected to WarmtelinQ at some point in the future.

Work in progress

A period of 16 to 24 months was estimated for the 23 km long first Rotterdam-Vlaardingen-The Hague section. During this period, work is carried out at up to 30 different locations simultaneously.

This calls for meticulous production, delivery and construction site logistics in close consultation with the installation companies on site and FW Fernwärme Technik in Celle, the supplier of the district heating pipe system.

For the sophisticated pipe-in-pipe system pipes, Mannesmann Line Pipe supplied around 914 tonnes of HFI-welded steel pipes by September 2023. The various dimensions from DN 300 to DN 600 are fabricated to the tightest production tolerances (EN253)



The work on WarmtelinQ is being carried out at up to 30 locations simultaneously. Photo: © WarmtelinQ, Vincent Basler

in Siegen and Hamm and, after passing the full-body ultrasonic test (EN10893), delivered just-in-time by HGV to FW Fernwärme-Technik in Celle for further processing. This is where the pipes for the system pipes proper, consisting of medium and jacket pipes, inclusive of insulation and roller beds, are produced and prepared for dispatch.

Extensive PR

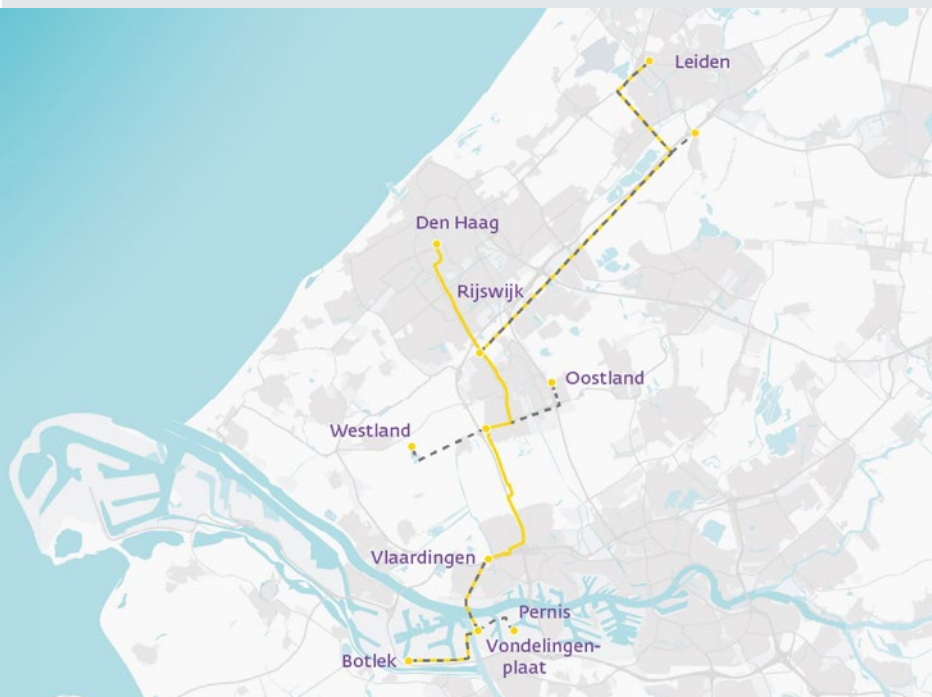
To ensure a high level of acceptance for the large-scale engineering project from the outset and to dispel any concerns,

Gasunie has kept citizens and stakeholders fully informed. At numerous on-site meetings and with a detailed, interactive website, all project stages are clearly explained and the most important questions answered: When and where will the work take place; how exactly are the pipes laid; and what disruption can residents, business people and commuters expect?

During the project, great importance is also attached to environmental compatibility. Along the planned route of the first section, for example, there are around 2,000 trees of different species and sizes. In consultation with the Tree Conservation Foundation in Vlaardingen, two large swamp oaks have been dug up and replanted elsewhere, for example.

Belgium – "Warmtenetwerk Antwerpen Noord"

Based in North Antwerp, the waste disposal company Indaver releases a great deal of heat during the thermal processing of industrial waste. Some of this is already being used for the company's own business processes and to generate electricity. In future, however, the remaining residual heat is also to be put to sensible and sustainable energy use. The first step is therefore to build



Network plan for the first sections of the WarmtelinQ district heating network.



Pipe laying for the “Warmtenetwerk Antwerpen Noord”

a district heating link to Boortmalt, the world’s largest malt group, 8 kilometers away. With an annual production capacity of 470,000 tonnes, the Antwerp site produces enough malt to brew around 16 billion beers. Malting and especially the drying processes require huge amounts of heat. From 2024, heat at a temperature of around 105°C will be fed from Indaver to Boortmalt.

Deliveries for medium and jacket pipes

For Isobrugger GmbH’s district heating system pipes in Lehrte, Mannesmann Line Pipe has supplied a total of 413 tonnes of HFI-welded steel pipes in diameters DN 400 and DN 600 for use as medium and jacket pipes. The customer’s technical specification focused primarily on the outer pipes with a diameter of 609 mm and a wall thickness of 8.8 mm, which were to be given an extra-strong PP coating conforming to ISO 21809-1 with a layer thickness of 6 mm.

In the run-up to this, project participants from Isobrugger, Salzgitter Handel

in Hannover and Indaver Antwerp travelled to Siegen for a plant visit to see the production of steel pipes using the HFI method and the coating process at first hand.

The pipes were transported by truck to Isobrugger in Lehrte and from there by truck to the job site.

Just like WarmtelinQ, this heating network is also designed as an open access network. Immediately after completion of the first section, it will be extended and thus become an essential part of Antwerp’s urban climate policy towards climate neutrality. The client will then be the City of Antwerp itself, which will supply sustainable heat to major customers such as the Woonhaven social housing organisation with around 3,200 flats in the Luchtbal and Rozemaai districts, as well as schools and public buildings.

150 GWh of network capacity per annum

With the heating network operating at full capacity, the switch from fossil fuels to waste heat will reduce carbon

emissions by around 80,000 tonnes per year. This is equivalent to the emissions of around 25,000 households.

Open for the transition in the heating sector

Thanks to its open design, local companies that emit or use heat can also be connected at a later date. This will tap further enormous carbon savings potential and reduce the dependence on natural gas and oil.

In terms of climate neutrality, both projects are excellent examples of how the transition to renewable heating can be achieved step by step, sustainably and successfully – with HFI-welded steel pipes from Mannesmann Line Pipe.

The Indaver location in Antwerp.

Photo: © Indaver





New Everton FC stadium

Worthy successor to the "Grand Old Lady"

At a club whose motto is "Nil satis nisi optimum" ("Nothing but the best is good enough"), there is a taste for the out-of-the-ordinary. This is also the case with the long-awaited construction of a new home for the club and fans of Everton Football Club. It was therefore a special honor for Mannesmann Line Pipe to be involved in the construction of the new stadium.



**Nil satis nisi optimum –
"Nothing but the best
is good enough"**

Not only was Everton FC founded in 1878, but it also plays in one of the world's oldest football stadiums. Goodison Park was built in 1892, and its name "The Grand Old Lady" is always uttered with reverence and respect. Like perhaps no other stadium, the Grand Old Lady stands for the tradition and history of English football. It was the first stadium to have a stand divided into three tiers and the first English football stadium to have a heated pitch. Its record attendance is 78,299 for the First Division fixture against Liverpool FC on 18 September 1948. With the onset of the 1990s seating

era, spectator capacity was reduced to what is now just under 39,500.

The venue is located in a densely built-up residential area of Liverpool, which makes an extension or expansion to modern international standards impossible. For this reason, ideas for building a new stadium elsewhere had been floated since the 1990s.

But it was not until mid-2019 that Everton FC unveiled its plans for a new stadium. Some four kilometers from Goodison Road, the Blues' new stadium, the Bramley-Moore Dock Stadium, has been under construction since 2021. It will



The detailed visualisations of the new stadium building illustrate the building typology, roof and grandstand construction as well as its location on the Bramley-Moore Dock.

Renderings: © Everton FC, MEIS Architects



» HFI-welded steel tubes are lighter than seamless tubes, for example. This is consistently reflected in the delicate appearance of the 45 m high roof.«

Thomas Reinhardt,
Regional Sales Manager Mannesmann Line Pipe

accommodate around 52,000 spectators, its estimated cost is around £500 million and construction is scheduled to take around three years.

Much like Tottenham Hotspur Stadium, there is to be a 13,000-seat grandstand modelled on the "Yellow Wall" of the south stand of Borussia Dortmund's Signal Iduna Park. If everything goes to plan, Everton FC could move into its new home ground for the 2024/25 season.

Part of Liverpool's urban renewal

The new stadium will give a boost to urban regeneration at the northern end of Liverpool's historic dockland. The design is inspired by the historic docks and warehouses around the stadium. The architecture is being led by New York-based MEIS Architects.

As the entire riverfront is a UNESCO World Heritage Site, the Meis Architects team decided to divide the stadium into two horizontal forms. The lower part borrows from the warehouse typology of neighboring buildings such as the Bramley-Moore Dock's Tobacco Warehouse and Titanic Hotel. Its criss-cross brick façade is a tribute to Archibald Leitch, the Goodison Stadium architect who is often referred to as the father of English stadium architecture. The upper design is more modern and visually much lighter. Steel, concrete and glass create an undulating form that seems to flood the lower storey. The curved roof with its stadium-wide panoramic window offers sweeping vistas of Liverpool and Merseyside, while the cantilevered south-facing balcony promises stunning views of Liverpool city center.

Video on the Web



Watch the spectacular video of Everton FC installing the trusses in the roof structure of the new building. Severfield site manager Stephen Osborne answers questions about the execution, equipment and logistics.
magazine.mannesmann-linepipe.com/fce



Perfect setting at a historic location

The stadium blends sensitively into its surroundings. It keeps sufficient distance from the listed buildings on the site, while the design also succeeds in creating a spacious plaza in the east where fans can gather before and after matches. To the west, an elevated viewing platform offers broad views of the Wirral Peninsula, the Mersey riverside and the Irish Sea beyond.

Intricate design and impeccable appearance with Mannesmann tubes

The north and south roofs consist of five wide-span trusses – two in the north and three in the south – each 170 meters long. Due to the oversized length and weight, each truss was pre-assembled in three sections. For installation, these were then supported

on temporary trestles inside the stadium and precisely fitted together in situ.

For the large trusses and other elements of the roof structure, Mannesmann Line Pipe supplied HFI-welded steel tubes in diameters of 406 to 508 mm with wall thicknesses of 20 to 25 mm to Severfield, highly reputed British steel fabricators.

Regional Sales Manager Thomas Reinhardt once again highlights the weight and material savings and the tight manufacturing tolerances: "HFI-welded steel tubes are lighter than seamless tubes, for example. This is consistently reflected in the delicate appearance of the 45 m high roof." The manufacturing tolerances also proved themselves once again. For the precise assembly of the 200 t trusses, the dimensional tolerance was only 20 mm per 170 m width.

In addition to straight and curved tubes for the roof structure, Mannesmann Line Pipe also supplied 610 x 12.5 mm tubes for the new stadium building.

"All in all, the whole stadium concept suits our tubes down to the ground perfectly – Nil satis nisi optimum – Nothing but the best is good enough," says Reinhardt summing up.

And the Grand Old Lady ought to be well pleased.



For the steel structure of the new stadium, Mannesmann Line Pipe supplied HFI-welded steel pipes in diameters of 406 to 610 mm with wall thicknesses of 12.5 to 25 mm.

Photos: © Everton FC, Tony McArdle



Everton Football Club

Its nine championships, five FA Cup victories and one success in the European Cup Winners' Cup make Everton Football Club one of the most successful English football clubs.



Rendering: © Everton FC, MEIS Architects

Everton FC – officially Everton Football Club – also known as "The Toffees" or "The Blues", was founded back in 1878. As a founder member of the Football League, it has spent more time in England's top division than any other club, with only four years in the second tier to date.

Everton FC's first golden era coincided with the time of Dixie Dean, arguably Everton FC's best-known player. His tally of 60 goals in the 1927/28 season in the English First Division is unsurpassed and helped Everton to win the championship. Two more league titles followed in 1932 and 1939, with Dean's second FA Cup triumph

coming in 1933. When they flourished again in the mid-1980s, the Blues won two more league titles and the European Cup Winners' Cup in 1985. The FA Cup victory in 1995 is currently the club's last major success.

Separation from Liverpool FC

In 1892, a dispute over the rent for the Anfield stadium split the club. The new Liverpool Football Club stayed at Anfield and Everton Football Club moved to Goodison Park, which is still their home ground today.

With Liverpool FC founded 14 years later, Everton FC has since been linked by a long-

standing rivalry. The encounters between the two clubs are known as Merseyside derbies.

The Grand Old Lady

More top division football has been played at Goodison Park than at any other stadium in the UK to date. It was also the only club stadium to host a semi-final match in the 1966 World Cup and the first English venue to have pitch heating and double decker stands on all sides of the pitch.

Goodison Park was also the world's first stadium with a church. St Luke's is located in the corner between the main stand and the Gwladys Street End.



Lake Lugano natural gas pipeline

Shortcut through the lake

To enhance supply security between the Lugano region and Mendrisiotto in the south of Switzerland, the Ticino utility company Aziende Industriali di Lugano (AIL) SA has built a new natural gas pipeline. The shortest, fastest and most economical route was through Lake Lugano – using HFI-welded steel pipes from Mannesmann Line Pipe.

The new 6.1 km long natural gas lake pipeline connects the communities of Bissone in the north and Capolago in the south of Lake Lugano. Due to the confined topographical conditions and to prevent disruption to traffic, the project managers opted for a connection through the lake. This involved far less excavation work and environmentally damaging movements of materials than laying the pipeline on land – a fact

also reflected in the costs, with savings estimated at roughly 30 per cent.

Compliance with various nature conservation and environmental standards

The overall supervision of the work required elaborate coordination, especially with regard to the water and soil protection regulations as well as the environmental regulations for the pro-

tection of flora and fauna. A specialist was therefore appointed to monitor and ensure compliance with all regulations.

Teamwork with Indufer AG

In the course of well-versed cooperation, Mannesmann Line Pipe supplied around 380 HFI-welded steel pipes with an outer diameter of 323.9 mm and triple-layer PE coating via its long-standing Swiss distributor Indufer AG.



The pipe strings welded together on land were subjected to a pressure test at 7.5 bar.



The new low-pressure natural gas pipeline runs through Lake Lugano and supplies the southernmost part of Switzerland.

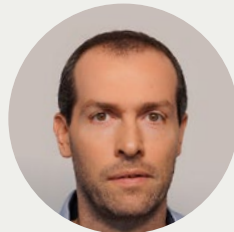
The 16-meter-long steel pipes were supplied by truck as unusual loads approved by the canton of Ticino. For reasons of space, it was only possible to supply the pipes in instalments as construction work progressed.

Welding on water and on land

On a specially erected welding stand, the pipes were first welded on land to form 96 m long strings. These were then welded together on an in-water track to form strings each 288 m long. To prevent uncontrolled sinking, suitably dimensioned floats were attached to the pipe strings.

Challenging lake shore

The biggest challenge, however, was the very uneven, craggy lake shore at Capolago. Here, to suit the profile of the shore, a pipe weighing approx. 5 t was cold-preformed on land and welded into a 350 m long floating pipe string. This required meticulous coordination between the crane operator, welders and the assembly team on the floating pontoon. The pipes were then bedded in the prepared shore trench. To protect



» The construction of the lake pipeline was completed on schedule in 20 months. Paradoxically, planning took two and a half times as long.«

Andrea Quadri,
ALL SA Project Manager

the pipes from mechanical damage, the steel pipes were additionally coated with fibre cement mortar. The weld seams were subsequently isolated with corrosion protection tape and a cement bond.

GPS positioning in the lake

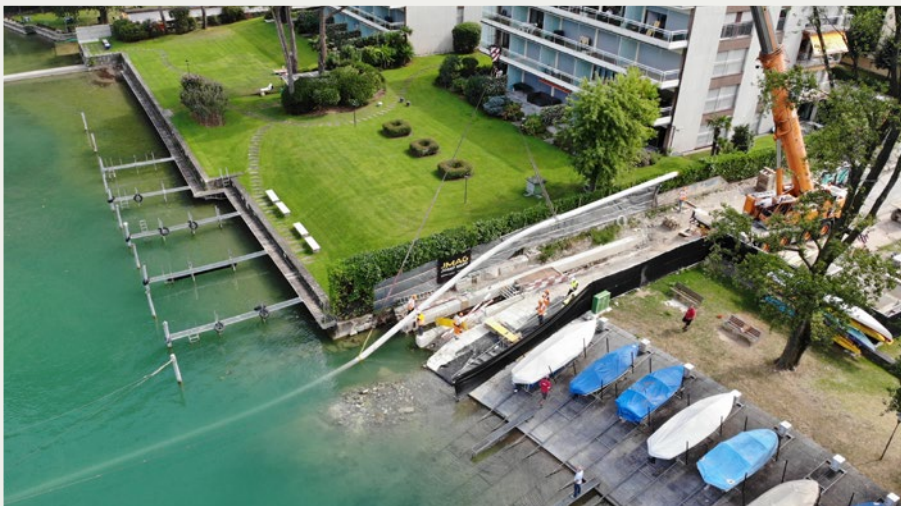
On the assembly pontoon, the other pipe strings were then welded together to form a continuous string, tested to ISO 9606-1, X-rayed and then pushed into the lake. Positioning was done by GPS so as to determine the exact location in 70 to 80 meters of water depth. Over time, the pipeline will sink into the layer of mud at the bottom of the lake.

Network redundancy improves supply security

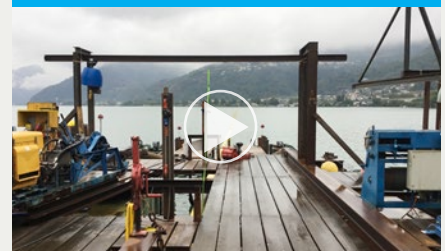
The commissioning of the 4.9 bar lake pipeline in December 2022 has bolstered the region's existing supply network significantly. At the same time, there is now also network redundancy, thus also preventing future supply shortfalls in the event of maintenance work or disruptions and improving the security of supply in the entire region.

The fact that everything proceeded so smoothly and quickly was due to the impeccable coordination of all those involved – and certainly also to the shortcut through the lake.

Pipe-laying on the shore at Capolago required a delicate touch from everyone involved.



Video on the Web



Watch the Josef Muff AG video of the pipe-laying process.
magazine.mannesmann-linepipe.com/lug





Flowlines for OMV in Austria

First choice for secondary recovery

OMV operates its Innovation & Technology Center (ITC) in the heart of one of Europe's oldest oil production areas, the Austrian Weinviertel region east of Vienna. One of its research focuses is on optimising de-oiling rates by means of secondary oil recovery.

Although domestic oil and gas production in Austria recently accounted for only about 10 per cent of supplies from its own sources, this is still important as an alternative to Russian energy supplies.

In order to further increase the yields of developed oilfields, OMV is conducting in-depth research into the optimisation of secondary oil recovery. In this process, the pressure in the oilfield is maintained by injecting water. This significantly increases an oilfield's production rates and overall yield.

Technically, this is achieved by using injection lines for water inflow and

oil-gathering lines, so-called flowlines, for the pumped medium consisting of an oil-water mixture.

Aggressive production media call for high internal corrosion protection

Since 2020, a project has also been underway in this context to investigate the corrosion resistance of oil-gathering and water injection pipes. This is because the composition and properties of the pumped media change significantly during secondary oil recovery, with the oil-water mixtures showing high mineralisation rates, solids con-

tents and, in some cases, dissolved gases such as hydrogen sulfide and carbon dioxide.

The media pipes must be suitably corrosion-resistant – and that at operating pressures of up to 100 bar.

Steel beats GRP and stainless steel

The original project planning of the OMV engineers favored the use of non-metal (GRP) and stainless steel pipes and excluded steel pipes.

Fortunately, during a presentation in Gänserndorf in February 2020, Mannesmann Line Pipe employees



» Lines of pipes without internal corrosion protection would have had to be replaced by now. This in itself is proof of the system's economic viability.«

Dr. Juri Rosen,
Product Manager at Mannesmann Line Pipe

Thorsten Schmidt, Manuel Müller and Dr Juri Rosen were able to persuade the project managers of the technical and economic merits of HFI-welded steel pipes. They presented a solution with an outer PE coating and inner corrosion protection with a cement mortar lining. "First of all, we were able to refer to a pilot project in which similar pipes had already been in maintenance-free use for nine years," Rosen recalls, "and then we were able to plausibly demonstrate how the cost in the specific application would be significantly lower than with the pipes so far preferred." And this at pressure loads of up to 100 bar with simultaneous extreme bending stress, as demonstrated by a study conducted by the University of Siegen.

Intelligent systems approach

The project engineers were also swayed by the straightforward installation system of pipes with push-in welding sockets, which are first mechanically assembled with little technical effort and only then welded together.

Thanks to the design and con-

nection technology of the push-in sockets, they permit absolutely continuous corrosion protection of the pipe's inner surface

Thorough consultation and project support on site

Working with OMV's engineers, Dr Hans-Jürgen Kocks and Dr Juri Rosen first established the precise technical specifications and defined the production parameters.

Rosen and Müller were then finally on site in September 2021 during the laying of the pipelines to provide advice and assistance to OMV staff. PE-coated push-in welding socket pipes with cement mortar linings based on modified blast furnace cement (Variodur 50) were used.

196 steel pipes measuring 114.3 x 5.0 mm were welded together with 38 DN 100 bends to form a 2.8 km water injection pipeline. The 82 168.3 x 4.5 mm pipes were joined with 19 DN 150 bends to form a 1,200 m oil-gathering pipeline.

After hydraulic testing, which was also assisted by Mannesmann Line Pipe



i Flowlines

Information on "HFI-welded steel pipes for oil-gathering systems in water-flooded oilfields" can be found on the Internet.

www.mannesmann-innovations.com



employees, the pipes went straight into operation.

Viability proven in practice

The pipes from Mannesmann Line Pipe have been in continuous maintenance-free operation for two years now. "Lines of pipes without internal corrosion protection would have had to be replaced by now," Rosen is certain. "This in itself is proof of the system's economic viability."

In this respect, he is confident that the system will remain the first choice for secondary oil recovery from now on – and perhaps not only at OMV.

Pigging device lance for pipe joints.



Pipe puller in action.





Kłodawa to Mościszki high-pressure natural gas pipeline

A secure supply for consumers and investors

Poland also attaches great importance to a dependable supply of natural gas. With the expansion of the gas grid around Gorzów Wielkopolski (formerly Landsberg an der Warthe) in 2023, a further step has been taken towards safeguarding the supply. A fine opportunity for Salzgitter Mannesmann Stahlhandel Poland and Mannesmann Line Pipe to demonstrate their tried-and-tested teamwork once again.

The new Gorzów II reduction and metering station
Photo: © Polska Spółka Gazownictwa



The investment was aimed at expanding the gas distribution grid in the area around Gorzów Wielkopolski and Kostrzyn nad Odrą as well as in the Kostrzyn-Slubice Special Economic Zone along the German-Polish border and improving the security of supply.

Grid expansion in three stages

The initial prerequisite for the grid expansion was the building of the Gorzów II reduction and metering station in 2020, followed two years later by the laying of a 43 km long DN 300 high-pressure gas pipeline from Kłodawa to Mościczki and, at around the same time, the construction of an almost 5 km DN 250 medium-pressure natural gas pipeline in Kostrzyn nad Odrą. This will increase the natural gas grid capacity for the further expansion of the Kostrzyn-Slubice Special Economic Zone.

The client was Poland's largest gas network operator, Polska Spółka Gazownictwa. With over 11,000 employees, the company operates a natural gas grid over 200,000 kilometers long and supplies around 7.5 million customers throughout Poland.

Tried-and-tested teamwork

To realise the project, Salzgitter Mannesmann Stahlhandel Poland ordered around 2,800 tonnes of HFI-welded steel pipes from Mannesmann Line Pipe in Siegen. Bartłomiej Gajowiak and Thorsten Schmidt were the responsible employees who jointly advanced the project and brought it to a successful

conclusion. Gajowiak, project manager at Salzgitter Mannesmann Stahlhandel Poland: "We once again placed our faith in the excellent tried-and-tested teamwork with Mannesmann Line Pipe going back many years."

Around 2,700 pipes were supplied in grades L360 NE and S235 JRH with a 3-layer PE outer coating and an epoxy lining. "Thanks to the smooth cooperation with Mannesmann Line Pipe, our entire site logistics proceeded without a hitch. All 135 deliveries from Germany arrived on time at the storage areas at the work sites," says Gajowiak.

Further expansion of the Kostrzyn-Slubice Special Economic Zone

The technical acceptance and commissioning of the new supply lines at the end of October 2023 resulted in the tripling of the natural gas grid capacity

in the region around Gorzów Wielkopolski, setting the stage for further expansion of the Kostrzyn-Slubice Special Economic Zone.

"All in all, we once again have every reason to be satisfied with the cooperation with our long-standing partner Mannesmann Line Pipe," says Gajowiak. "The successfully completed project is another important milestone in improving the security of supply to private households and stimulating further investment in the Kostrzyn-Slubice Special Economic Zone."

Pipe-laying took place in some cases on challenging terrain.



Preparations for a pipeline passing under a road.





Zap-Lok™ offshore pipeline in Cameroon

Into the blue ...

All over the world, steel pipes made by Mannesmann enjoy a reputation of top quality and precision – the best prerequisite for ensuring a stable and secure energy supply. In July 2023, HFI-welded steel pipes embarked on their 10,000 km journey from Siegen to Douala for a pipeline off the coast of Cameroon.

To boost its economic development in the long term, Cameroon is endeavoring to increase the production, monetisation and exploitation of its 200 million barrels of crude oil reserves and 4.8 trillion cubic feet of natural gas. The aim is, firstly, to improve energy access and availability locally and throughout the region and, secondly, regular income from exported energy is an important factor in the national budget. However, the expansion of offshore production capacities requires a high level of tech-

nical expertise and suitably high investment. Cameroon is seeking to address both challenges by awarding development and production concessions in the medium and long term.

Project partner Perenco

With many years of experience in oil business with Cameroon, the energy company Perenco signed a 20-year production sharing agreement with the Cameroonian national oil and gas company Société Nationale des

Hydrocarbures (SNH) in mid-2023 for the further development of the Rio del Rey basin off the coast of the West African country.

With an average production of 35,000 barrels of oil per day, the production field accounts for around 70 per cent of Cameroon's total oil production. Perenco's aim is to further develop and increase production rates in the oil sector and to transfer the technology to natural gas production so as to produce exportable LNG going forward.



Above: Pipe production calls for compliance with the tightest manufacturing tolerances.

Left: Nils Schmidt monitored proper handling during loading and the safe storage of around 650 HFI-welded Zap-Lok™ pipes in the ship.



» The production of Zap-Lok™ pipes requires a high degree of precision and experience along with compliance with the tightest manufacturing tolerances. However, thanks to our long-established collaboration with the NOV Tuboscope team, the entire process went off like clockwork.«

Valentina Berger,
Mannesmann Line Pipe Business Area Manager Sales

Saving time and money

Mannesmann Line Pipe has manufactured around 650 HFI-welded steel pipes with a diameter of 323.9 mm and a wall thickness of 12.7 mm for a nearly 16 km long offshore oil pipeline planned by Perenco off the coast of Cameroon since 2022. The pipes were manufactured in March 2023 and then fitted with the Zap-Lok™ ends on site in Siegen by a team of employees from NOV Tuboscope in Gladbeck. Each pipe has a bell end and a pin end. During later installation, the pin end is coated with a two-component epoxy compound and then pressed into the bell end.

The Zap-Lok™ joint developed and patented by NOV Tuboscope enables a weld- and X-ray-free, semi-autonomous laying process both onshore and offshore. This significantly reduces the time and money spent on pipe laying.

Precision, experience and teamwork

"The production of Zap-Lok™ pipes requires a high degree of precision and

experience along with compliance with the tightest manufacturing tolerances. However, thanks to our long-established collaboration with the NOV Tuboscope team, the entire process went off like clockwork," says Valentina Berger, who was involved in the project on behalf of Mannesmann Line Pipe right from the start. "Most importantly, we were able to build on our positive joint experience, as recently gathered in the offshore Zap-Lok™ project in Malaysia."

After HFI welding, the pipes were first given an epoxy resin lining in Gladbeck before being transported back to Siegen for a 3 mm thick PE rough coating.

Piecemeal logistics

Although Mannesmann Line Pipe has a quota of around 90 special freight cars from Deutsche Bahn and the port of Antwerp actually has sufficient storage capacity, overall handling had to be planned again and again. The actual aim was, of course, to organise and deliver the entire shipment in a single

batch. However, due to bottlenecks in rail car availability and the fact that the time and place of loading at the port of Antwerp were unclear until the last moment, the pipes had to be delivered in several instalments.

Extensive on-site checks

To make sure everything went smoothly during dispatch, Mannesmann Line Pipe employee Nils Schmidt was on site. "At first, the situation was a little confusing and we didn't even know the name of the ship until the very end," he recalls. "So once again, it was important for us to gain our own impression directly on site."

In addition to verifying that the consignment was in perfect condition and complete, he also checked compliance with all handling regulations when the Zap-Lok™ pipes were loaded onto the ship.

On 25 July 2023, they set off on their 10,000 km voyage into the blue, arriving safely in the port of Douala around three weeks later.



1. Germany
 Plant visit to Salzgitter Flachstahl GmbH on 7 June 2023 in Salzgitter. Taking part: customer representative Jack Sweere from CCI Leidingsystemen, Klundert, NL (top row left) and Erik Habing from Nederlandse Gasunie, Groningen, NL (top row right).



1. Germany
 Dr Holger Brauer at the Pipeline Symposium of TÜV Nord on 13/14 September 2023 in Hamburg.



1. Germany
 Michele Colonna, ZaCo GmbH, during a demonstration of weld seam coating with cement wrappers at the Customer Conference on Water Pipes in Siegen, September 2023.



1. Germany
 Customer Conference on Steel Pipes in the Utility and Energy Industry on 23/24 November 2023 in Siegen.



6. USA
 Meeting at Salzgitter Mannesmann International USA in Houston. From the left: Joerg Tilly, SMIH, Michael Kleinsorge, Anna Huynh and Kurt Swendson, SMIH, Olesja Krüger and Marilee Canady, April 2023.



6. USA
 Visit to Edgen Murray in Houston. From the left: Greg Baker, Andy Fox, Kurt Swendson, SMIH, Phil Tucker, Sharon Zipprian, Michael Kleinsorge (at the back), Olesja Krüger, Kyle Knox, April 2023.



6. USA
 Sharing information at Weiler Pipe in Houston. From the left: Mason Weiler, Brandon Mitchell, Landon Weiler, Kurt Swendson, SMIH, Ben Ashley, Olesja Krüger, Jess Kindig, Michael Kleinsorge, Dee Prieto, April 2023.



6. USA
 Meeting with representatives of Mammoth Carbon Products. From the left: Michael Kleinsorge, Kurt Swendson, SMIH, Jeremy Smith, Mammoth Carbon Products, Olesja Krüger, Mike Ellis and Jerry Rogers, Mammoth Carbon Products, April 2023.



On the go – from global to local



1. Germany
Employees of OGE (Open Grid Europe GmbH) on a visit to the Hamm plant to share information on 5 May 2023.



2. Norway
Kevin Kroh and Stephan Scherf with Fabrice Pascal and Olena Moroz, Salzgitter Mannesmann International GmbH, Mülheim and Gerald Peer, Salzgitter Mannesmann Scandinavia AB, November 2023.



3. Austria
A visit to Erne Fittings GmbH in Schlins. From the left: Konrad Thannbichler, Kerstin Becker, Alexander Heimbeck, Head of Purchasing at Erne Fittings, and Thorsten Schmidt, March 2023.



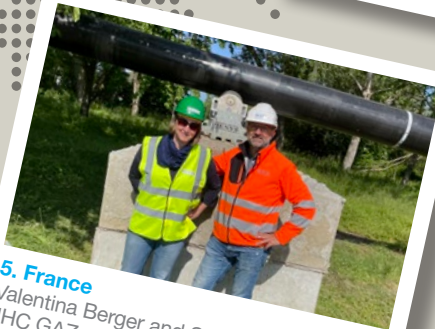
5. France
Employees from the purchasing department of the French gas transport and storage company Terega and our representative Stéphane Toss, JHC GAZ, on a visit to Hamm, November 2022.



4. Switzerland
Kerstin Becker and Thorsten Schmidt on a visit to 360° AG, Zurich. Accompanied by Kay Kemmer, Team Leader for grid construction at 360°, March 2023.



5. France
Employees from the technology and project management departments of the French gas transport and storage company Terega on a visit to Siegen, September 2023. On the right: Valentina Berger and Stéphane Toss, JHC GAZ.



5. France
Valentina Berger and Stéphane Toss, JHC GAZ, together during an installation site inspection.

Legal notes

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English translation

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