

Nature & Technology



»We engineers have the responsibility to apply advanced technology in harmony with nature and for the benefit of mankind.«

Peter Schlossnikel



BISMUTH CRYSTAL

Natural bismuth is a silvery-white, coarsely crystalline mineral. However, artificial bismuth crystals look much more beautiful: the semi-metal shimmers in all colors through oxidation and filigree, geometric network structures are formed.

The economy is currently changing – industry is increasingly reacting to the current climate debate. Refineries and petrochemical companies are focusing on the production of alternative energies and a shift in the product range from fuel to petrochemical precursors. More and more bio-oils and plastic waste are being used and processed. With process expertise and proprietary know-how the Pörner Group supports its customers in converting the plants or restructuring refineries on their way to a sustainable and climate-friendly production.

Current situation

Due to Covid-19, projects across the globe were delayed or postponed altogether. The international plant engineering business strongly declined.

Fortunately, the companies of the Pörner Group continued to work at full capacity thanks to their customers on the home markets – proof of the existing foundation of trust.

In recent months, the need for new and modernized process plants has increased at a surprisingly rapid rate. The world wants to catch up with all that was not possible during the pandemic.

However, crucial equipment is not available or is delayed because optimized supply chains cannot be

maintained. There is a shortage of materials and special components, especially from Asia. Moreover, there is an increasing shortage of skilled engineers. The result is an overheating of the economy with a sharp increase in prices – making reliable project calculations difficult.

So we are in a very interesting, but also challenging situation. A time of high activity and workload lies ahead of us.

What matters in the future

There is no doubt: Resources must be used more efficiently, alternative energy sources must be introduced and products must be optimized to a greater extent in terms of application, service life and subsequent use.

With new legal framework conditions, the introduction of CO₂ pricing – with an upward trend – and following the increasing will of companies to become climate neutral, the demand for alternative processes and technical solutions is growing. The Pörner Group is fully committed to co-develop and apply sustainable processes.

For example: the HyKero plant of our EDL in Leipzig. It is planned to build the world's first commercial plant for the production of PtL kerosene at the Böhlen-Lippendorf site. As from 2026, this plant will produce PtL kerosene, green hy-

drogen and green naphtha from green electrical energy, green methane and water with a CO₂ neutral footprint.

A push for innovation

The new requirements of climate and resource conservation will inevitably lead to a strong surge in development: Processes, equipment and systems will be optimized using artificial intelligence for interactive networking. This will necessarily lead to a greater complexity of process plants.

The Pörner project teams consist of highly qualified specialists and experienced generalists who are well prepared to turn the plant into an optimized whole using the latest innovations – fully automated, energy-efficient, resource-saving, eco- and employee-friendly.

For the benefit of our customers, we are actively investing in organic growth and in the further development and training of our employees to continue providing the entire range of modern digitalized engineering “from a single source”.

Conclusion

The industry and, first of all, the engineers, who have to plan and engineer new plants according to new criteria, are facing completely new tasks.

Pörner's mission is clear: we

will turn new ideas and concepts into functional and efficient plants. We guarantee this based on our experience in planning and executing well over 2,000 projects and the long-term, cooperative relationships with the best industry partners for technologies, systems and equipment components.

Each project is a new challenge we take up and dedicate ourselves to with enthusiasm and commitment. With new solutions in plant engineering, we can shape the future together!

We wish you much success in these exciting times!

Yours,



Strengthening sustainability ➔

PAGE 4/5

Contributions made by Pörner Group for more sustainability: a bio-resin plant, a phosphorus recycling plant and the implementation of PtX technology.



Reason to celebrate ➔



PAGE 6

EDL celebrates its 30th anniversary this year. Moreover, Pörner Romania looks back on 15 successful years.

Revamp much different

Chemical park. Steam network and pipe bridge modification at BOREALIS LINZ.



BY EUGEN GOTTER
AND MARTIN BURESCH

LINZ. Borealis Agrolinz Melamine GmbH entrusted Pörner with two long-term and comprehensive revamp projects at the Linz chemical park to increase availability, and overall efficiency of the site.



Based on the final study conducted by Pörner in 2015/2016, the "execution phase" of the following projects started in 2018:

- Revamp of pipe racks ("Pipe Rack Refurbishment" - PRR project) and
- Standardization of medium-pressure steam networks ("MD Pipeline LTO" project)

Both projects have now successfully been completed.

Revamped pipe racks

To extend the service life of the structures, the aim of the PRR project was to provide complete structural analyzes for the existing pipe racks that have multiplied over decades.

The pipe rack supporting struc-

tures – some of which had existed for more than 70 years – were documented, inspected and updated to meet current structural requirements. Reinforcement measures were drawn up and structural analyzes for connections and joints (incl. nodal statics) were provided. Particular challenges were:

- Wherever possible bolting instead of welding for safety reasons
- Limited space on the existing, tightly built-up site, a challenge for Pörner's structural engineers
- The overlap with another project being executed at the same time required a high degree of coordination. The new steam pipes affected a large part of pipe rack sections to be engineered in parallel.

The smooth coordination of both projects "from a single source" and the maintenance of the interfaces between civil and mechanical engineering software and using point clouds from laser scans ensured the best overall result. Especially in times of the pandemic, integrated planning without restrictions paid off.

As an additional benefit of planning, the customer received a 3D model that can continuously be adapted to the current planning status.



Following the final study from 2015/2016 and the execution phase starting in 2018, both revamp projects were completed in time.

Revamped steam network

The aim of the MD Pipeline LTO project was to standardize the medium-pressure steam networks (20 and 25bar) and to upgrade them to a redundant 25bar medium-pressure steam system.

The entire MD piping system, including condensate pipes, was subject to a comprehensive analysis and testing. The results and findings obtained were taken into account in the static considerations (stress and internal pressure load)

of the existing steam pipes in coordination with TÜV (Technical Supervisory Association).

Since the recalculation of the 20bar steam pipe ruled out its use as a 25bar steam pipe, it was finally decided to completely replace the 20bar steam pipe. The existing 25bar steam pipe was integrated in the new system.

In total, well over 300 new pipes were planned and structural analyzes for a smooth TÜV acceptance prepared.

All construction and installation work was executed without interrupting operations. Scheduled plant shutdowns were used for tie-in works on pressurized pipes.

Under the proven, cooperative overall project management of the customer Borealis and in close and permanent coordination with the companies at the chemical park as well as with the executing construction and installation companies, the project was successfully completed on time.

Gazintek rebrands to Poerner Kyiv

Corporate. Specialist in the oil and gas industry for 30 years.

BY OLEKSANDR BARANCHUK

KYIV. The Pörner Group has been active in Ukraine for 16 years. In 2005, Pörner acquired 70% of the shares in the Kyiv-based "Gazintek". In the following year, Pörner became the sole owner. Thanks to the unification of name, the subsidiary is integrated even more into the Pörner Group. Since September 2021, "JSC Gazintek" has officially operated under "Poerner Kyiv LLC".



Gazintek was founded in 1991 as a joint venture of three engineering companies. As a result, the company can look back on 30 years of experience in plant engineering.

The engineers work almost exclusively for Western European clients, are proficient in Western, Ukrainian, and Russian (GOST) standards, and work multilingual.

Currently, the Kyiv colleagues

are pleased about new orders for air separation units in Japan (greenfield), Italy, and Singapore (plant extension) from a regular customer. All projects are on schedule and are due for completion in the course of the year. Therefore, the Kyiv subsidiary looks to the future with great optimism.

www.poerner.kyiv.ua

Innovative technology for isobutene production implemented

Petrochemistry. Successful production start of ISO C4 plant in Burghausen



BY DANIEL MOHR

BURGHAUSEN.

The new ISO C4 plant, with an investment volume of EUR 64 million, was successfully put into operation at the end of 2020. Since then, OMV's refinery in Burghausen has been producing isobutene with a purity of 99.9%. The plant is based on a new technology jointly developed by OMV and BASF. Integrating the ISO C4 plant into the existing metathesis plant makes a decisive contribution to energy efficiency and avoids 20,000 tons of CO₂ emissions per year.



During the execution of this complex project, EDL - supported by the Pörner locations in Vienna, Grimma and Burghausen - proved once again that they are a reliable partner in turning innovative ideas into functioning plants.



Turning ideas into reality. Click here for OMV's movie.

New ISO C4 plant of OMV Germany / Burghausen; EPCm contractor: EDL.



SCAN ME

Major investment for HyLube3 plant



Re-Refining. EDL is planning a third used oil refinery for Puraglobe in the Zeitz Chemical Park.

BY HOLGER LINKE

TRÖGLITZ. Puraglobe GmbH already operates several used oil re-refining plants at the Tröglitz site and is now expanding its production capacities. The third HyLube plant for processing used engine oils is being built in the Zeitz Chemical Park. Thus, the Puraglobe production site will become the largest of its kind in the world. The company is investing EUR 70 million and creating 100 new jobs in the region.



Existing used oil re-refining plant in the Zeitz Chemical Park – designed by EDL in 2010 and 2016

EDL acts again as engineering partner to implement the plant

Puraglobe GmbH and its used oil re-refining plants are not unknown terrains for EDL. The HyLube2 plant is well known because EDL executed the detail engineering in 2007/2008. A few years later, EDL also received the order for basic and detail engineering to retrofit the HyLube2 plant and expand it by including a new process stage. With this technological innovation, Puraglobe converted

50% of its production capacity at the Tröglitz location to the produc-

tion of API Group III oils. The successful cooperation

between the two companies in implementing the HyLube3 project is being resumed, and EDL can contribute its extensive experience in plant engineering and construction.

The single-phase engineering project is already in full swing. According to the customer's target, the plant will be mechanically completed at the end of June 2023, and the plant will then go into operation immediately.

Large-scale investment program for the future

150,000 tons of used oil are currently processed in Tröglitz every year. The third used oil hydrogenation plant adds another 75,000 tons of processing capacity. The new HyLube3 plant will be the beginning of a major investment program of Puraglobe, as further plants are to be built on site and abroad. In addition, great importance is attached to sustainability, as the processes applied in the industrial production of base oils set new standards in terms of energy savings and CO₂ emission prevention.

New generation of Biturox[®] pilot plant



Bitumen. Pörner hands over the latest generation of a Biturox[®] pilot plant to PKN ORLEN for their own tests.

BY MARTIN SCHNEIDER

PŁOCK. Before a new Biturox[®] plant will be built, the future feedstock is tested for its suitability for the production of bitumen at the Pörner pilot plant in Vienna.



But even with running Biturox[®] plants, regular test runs make sense for feedstock from different crude oils in order to optimize the quality and production efficiency. That is why Pörner enables its customers to operate their own Biturox[®] pilot plants.

With its own pilot plant, a refinery can investigate various feed mixtures directly on site in order to achieve optimum product qualities and to determine the required process data.

The 11th Biturox[®] pilot plant

PKN ORLEN has been operating a Biturox[®] pilot plant at the Plock refinery in Poland since the 1990s. In late 2018, Pörner was commissioned to build a new generation of pilot plant.

This 11th Biturox[®] pilot plant by now was developed and built within three months and a 3D model was prepared for visualization.

The new Biturox[®] pilot plant

is equipped with an electronic visualization system and has two reactors – one with a conventional size and a content of about 12 kg and another one with twice the capacity. Modern process control technique allows high precision in executing test runs and permanent monitoring in research work.

The pilot plant reached its destination by truck on schedule. Upon completion of the building of the Research and Development Centre by PKN ORLEN, the Pörner team carried out the inspection of the pilot plant, commissioning and

staff training in June 2021. Thus, the state-of-the-art plant could be handed over to a leading bitumen producer in Northeast Europe successfully.

PKN ORLEN is now in a position to supply its market with even better bitumen binders.



The proud team after successful commissioning



Patented process for lube oil blending

Technology. Quantum leap in product quality of multigrade oils with LEPD technology from EDL.

BY JAN SCHWARTZE

LEIPZIG. With its LEPD technology (LEPD = Low Energy Polymer Dissolving), EDL has been offering a new type of lube oil blending process since 2021.



LEPD EDL-TECHNOLOGY

In the patented process viscosity index improvers (VI improvers) are dissolved and mixed in base oils. Until now, VI improvers (solid polymers) have been mechanically crushed and dissolved in lube oils. EDL's new LEPD technology relies on melting the VI improvers in the base oil. First, the polymer is gently melted under pressure (8bar) and at increased temperature (80 to 100°C) in a liquefaction chamber using nitrogen. Then lube oil flows through the liquefaction chamber and is enriched with polymer up to approx. 70%. This is mixed with additional lube oil un-

til a polymer portion of approx. 10 - 30% is reached.

Benefit with added value

Compared to the current state of the art, the process has decisive advantages - both in terms of plant operation and the resulting product properties:

- High energy cost savings due to 50% lower energy consumption
- First-class product quality
- Better lubricating properties, as there is no change in the polymer chain structure

On-site application trials for safe plant design

EDL offers a pilot plant as skid-mounted option on a rental basis to perform tests directly at the customer's premises. This means that the customer's recipes can conveniently be tested on site. The test results achieved can easily be transferred to an industrial scale. Thus, the customer gets security for the plant design and plant engineering as well as for the requested product quality.



Bio-resin plant

Project launch. Pörner Grimma increases sustainability of resin plants by adding lignin.

BY GERHARD BACHER

RIGA. What was once only a by-product in the production of cellulose is now conquering the resin industry as an environmentally friendly alternative to fossil-based phenol. We are talking about lignin – the second most common natural raw material on earth. As one of the latest revolutions in wood processing technologies, it is now possible to extract chemically unmodified lignin from wood, which in turn is well suited for further chemical modification and adaptation.

A consortium for more sustainability

This potential must be exploited, which is why nine partners from five European countries have joined forces to form the cross-industry consortium VIOBOND.



EU economy. The total cost of the VIOBOND project sums up to EUR 35 million, of which EUR 16 million was contributed by EU (Bio-Based Industries Joint Undertaking) and the rest by the companies involved in the project.

Pörner Grimma - engineering specialist for resin plants

Project coordinator AS Latvijas Finieris Group appointed Pörner Grimma as engineering partner for the entire plant including modification of the tank farm and all off-sites. Based on its technical expertise and decades of experience in the planning and engineering of resin plants, Pörner Grimma is responsible for the design of the main equipment, the required utilities and technical solutions for storing and feeding lignin into the process.

After completion of the bio-based resin plant, it will be possible to produce environmentally friendly and less toxic materials



The project launch date for the lignin resin plant in Riga was September 1st, 2021.

Their common goal is to build the first commercially useable lignin-phenol-formaldehyde (LPF) resin plant in Riga / Latvia, where petrochemically produced phenol as well as formaldehyde will be partially replaced by renewable lignin. As one of the nine partners, engineering specialist Pörner Grimma is responsible for the planning of this bio-based resin plant.

The sustainability project was selected for funding as part of the HORIZON 2020 Europe Program for Research and Innovation because of its contribution to combating climate change and the sustainable development of the

VIOBOND

The consortium consists of:

- Latvijas Finieris A/S (Latvia)
- Graanul Biotech OU (Estonia)
- ST1 OY (Finland)
- Chempolis OY (Finland)
- Pörner Ingenieurgesellschaft mbH (Germany)
- Fundacio Universitaria Balmes (Spain)
- Latvijas Valsts Koksnes Kimijas Instituts (Latvia)
- Saint-Gobain Finland OY (Finland)
- Mirka OY (Finland)

for the manufacture of furniture, floor covering, thermal insulation, abrasive paper and other products for everyday use.

With the accumulated expertise and experience of all partners, the project is scheduled to be completed at the end of August 2026. ■

www.bbi.europa.eu/projects/viobond

LIGNIN

Most plants, including trees of all kinds, contain 20-30% lignin, which is a natural biopolymer that, together with cellulose and hemicellulose, forms the cell structure of wood and creates a tight bond between them. This allows trees to grow in length, while wood retains its excellent mechanical properties.

In the past, it was used as a fuel for energy production, while today research discovers more applications for lignin. With the VIOBOND project, an important step has been taken towards a more sustainable production.



Phosphorus recycling plant

Circular economy. TAF builds research plant for phosphorus recovery from sewage sludge.

RWE

BY JONAS KAPPELLER

NIEDERAUSEM.

In the fight for greater sustainability, phosphorus recycling from sewage sludge will be mandatory in Germany as from 2029. However, extensive development work is needed to implement this requirement technically. Thermische Apparate Freiberg GmbH (TAF) – member of the Pörner Group – is predestined for such special tasks. Therefore, the German energy supplier RWE awarded a contract to TAF for engineering and manufacture of a pilot plant for phosphorus recovery. The Multi-Fuel Conversion plant (MFC) in Niederaußem / Germany has been running at full speed since June 2021.

TAF's scope of services covered general planning, including basic and detail engineering, manufacture of equipment, procurement, assembly, site management, and commissioning. In addition, TAF received process engineering support from DBI-Virtuhcon GmbH, the spin-off company of TU Bergakademie Freiberg. The phosphorus recovery concept was jointly developed with RWE, Fraunhofer UMSICHT and Ruhr University Bochum. The EUR 6.7 million project supports the circular economy. The Federal Ministry of Economic Affairs and Energy funded the project.

A process with great potential

Mixtures of sewage sludge, sewage sludge ash, and lignite are exposed to high temperatures around 1,500°C and a severe lack of oxygen. This process releases gaseous phosphorus, which – separated as purely as possible – can be processed into phosphoric acid.



Synthesis gas is a by-product used as feedstock to produce methanol, methane, plastics, fuel, and other feedstock.

research plants to clients in 2021 – new developments are our hobbyhorse." ■

Two years after the project launch, the Multi-Fuel Conversion plant was handed over to RWE on schedule in June 2021.

TAF
Thermische Apparate Freiberg GmbH



Sustainable sewage sludge recycling

Until now, the vital raw material phosphorus has been extracted from mines. However, its fossil reserves are limited. On the other hand, sewage treatment plants accumulate large quantities of sludge remaining unused so far. With the use of the new process, this changes now.

RWE research manager Tilman Bechthold reports: "The MFC technology is a promising way not only for disposal of sewage sludge, but also to recover valuable components."

Jonas Kappeller, Managing Director of TAF, is satisfied with the completion of this project. "Thus, nothing blocks the new sewage sludge regulation. We are taking a decisive step towards a sustainable future!" says Kappeller and adds "We will hand over two more



Here you can see a film made by RWE in celebration of the commissioning. ■

PÖRNER WATER on course for clean water

PÖRNER WATER

BY DR. ROBERT VRANITZKY

VIENNA. For more sustainability in dealing with one of the essential resources of our planet, water, Pörner established the competence center PÖRNER WATER in March 2020.

The experts taken over from Siemens fulfill all water-specific tasks within Pörner's wide range of industries, from oil, gas, and chemicals to food and pharmaceuticals. The activities include all areas of water technology:

- Supplying water as food, raw material, and solvent: drinking and process water supply, for example, by desalination and/

or treatment of river, lake, and brackish water

- Using water as utility by optimizing water circulations in producing companies. To minimize material contamination, the focus is on the recovery of industrial water streams and wastewater treatment.
- Special industrial, process-related water issues, such as reservoir water treatment in oil production or current tasks such as the recovery of phosphorus in sewage sludge treatment.

Considering the worldwide dwindling freshwater resources and the simultaneous increase in environmental requirements, the efficient and economical use of water is becoming a priority. Therefore,

Pörner supports its customers holistically in sustainably minimizing the energy and water consumption, and their plant's emissions. ■

Currently, the Pörner Water team is developing a water management concept for the Pörner Bio-Silicate process, considering regional conditions in the Philippines. The Austrian Republic funds this project.



LHyVE: The hydrogen value chain

Energy transition. EDL with LHyVE - Leipzig Hydrogen Value Chain for Europe - involved in setting up a regional hydrogen value chain in Central Germany.

BY DR. RÜDIGER SCHWARZ

LEIPZIG. Three Leipzig-based companies - EDL Anlagenbau Gesellschaft, Leipziger Gruppe, and ONTRAS Gastransport GmbH - have pooled forces in the joint project LHyVE to create an intelligent and regionally connected green hydrogen system for efficient sector coupling and to integrate it into the emerging European hydrogen infrastructure.

With the implementation of the LHyVE project, the project partners achieve efficient and comprehensive regional and supra-regional sector coupling (including industry, transport, supply) and create new or secure existing jobs in the region. Furthermore, the project contributes to the transformation of the Central German coal district and to achieving global climate protection goals.



LHyVE - Generation



EDL's project (HyKero plant, see article below) combines the production of green hydrogen with a strongly mobility-oriented added value - the production of sustainable PtL kerosene. EDL plans to build and operate the world's first industrial Power-to-X (PtX) plant to produce renewable synthetic aviation fuel (PtL kerosene), green

hydrogen, and naphtha. The project is part of a hydrogen-based infrastructure chain that aims to provide the aviation industry with synthetic fuels and hydrogen, and process industries with green chemical precursors and products. Moreover, green process heat should support the municipal heat supply in a sustainable way.

LHyVE - System



The project of Leipziger Gruppe lays the foundation for efficient generation, transport, and use of green hydrogen in Leipzig. Green hydrogen is to be generated by electrolyzers in the old coal-fired power station. The world's first 100% hydrogen-capable gas turbine power plant is being implemented in cooperation with

Siemens Energy. The energy efficiency of the electrolysis is to be increased to over 90% by a heat pump using waste heat. Furthermore, it is planned to build H₂ filling stations, use H₂ buses and trams as well as special and commercial vehicles e.g. by the street cleaning service and the fire department in Leipzig.



LHyVE - Transport

The ONTRAS project creates an approx. 75km long hydrogen ring around and for the Leipzig region. It connects producers and users of the LHyVE project and can integrate other hydrogen projects with ONTRAS participation in Central Germany into the European hydrogen infrastructure (European H₂ backbone).

EDL brings PtL kerosene into aircraft tanks

Power-to-Liquid. Federal Government funds 62 major hydrogen projects in Germany - EDL's PtX project "HyKero" is one of them.



BY DR. MICHAEL HAID

LEIPZIG. As part of a pan-European hydrogen project, the hydrogen IPCEI (IPCEI = Important Projects of Common European Interest), the German Federal Ministry of Economic Affairs and Energy, and the Federal Ministry of Transport and Digital Infrastructure have selected 62 large-scale hydrogen projects from German companies. These will receive state subsidies totaling a sum of EUR eight billion. From 230 project sketches submitted, EDL's HyKero project for the production of PtL kerosene has also made it onto the exclusive project list.



Prime Minister of Saxony, Michael Kretschmer (left), met with Dr. Rüdiger Schwarz (EDL) at the exhibition of the Innovation Advisory Board of Saxony in July 2021.

A contribution to mobility transition

With the HyKero project, EDL in Leipzig is facing a crucial task for the economy. The aviation industry is the sector of economy whose

decarbonization is particularly difficult. In addition, the aviation industry has set itself the ambitious goal of drastically reducing its CO₂ emissions: by 2050, these are to be reduced by 50% worldwide.

The green plant

The world's first commercial plant for the production of PtL kerosene is planned to be set up at the Böhlen-Lippendorf site. Only green feedstock will be used for

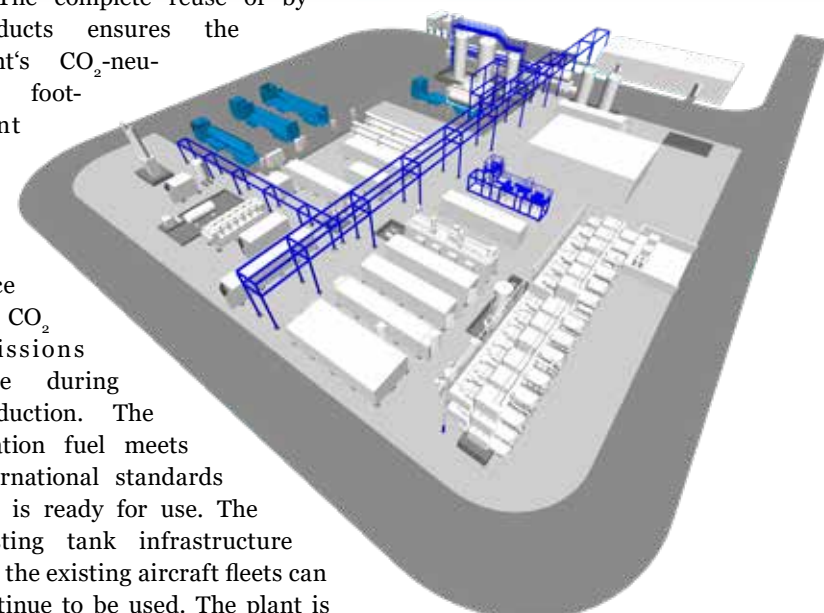
production: renewable electrical energy, water, and green methane. The HyKero plant is expected to produce 41,200t of PtL kerosene, 1,430t of green hydrogen, and 10,960t of green naphtha per year.

The complete reuse of by-products ensures the plant's CO₂-neutral footprint

since no CO₂ emissions arise during production. The aviation fuel meets international standards and is ready for use. The existing tank infrastructure and the existing aircraft fleets can continue to be used. The plant is scheduled to be put into operation in 2026.

The project enables the start

into CO₂-free air traffic and is an excellent alternative to fossil-based kerosene and thus an essential component for decarbonizing the economy.



3D model of a plant for the production of PtL kerosene

30 years EDL: Engineering made in Leipzig

Anniversary. From a pure detail engineering provider to a technology-driven engineering contractor.

BY ULRIKE FISCHER

LEIPZIG. EDL was founded in 1991. Since then, not only has society changed a lot, EDL has also changed. Starting as a pure detail engineering provider, the company became one of Germany's leading, technology-driven engineer-



ing contractors today. The large number of reference plants that have been implemented in these 30 years provides impressive evidence of this.

To assert oneself in a challenging competitive environment for such a long time and to grow steadily is remarkable for a company being active in a sector that is constantly changing and where project cycles are getting shorter and shorter.

But the success is no mere coincidence. The employees who have contributed to this reputation over three decades with a lot of passion, commitment, and diligence and who have backed many changes in the company were and are decisive for this.

Fit for the future with new technology solutions

For several years, EDL has been investing in the development of



own technologies so as to offer its customers new and tailor-made solutions for demanding process-related tasks. This path is the right one and will be consistently pursued - for the future of EDL! ■

BROCHURE 30 YEARS OF EDL

For more information about 30 exciting years of EDL use the QR code.



SCAN ME



Due to the pandemic, the big anniversary outing was postponed to 2022. So instead, the company jubilee in 2021 was celebrated with a proper barbecue party.

Diploma theses with Pörner



Pharmacy. When ultrapure water should not remain a theory.

BY STEFAN MEIXNER

KUNDL. Two graduates of the HTL (higher technical school) for mechanical and plant engineering in Jenbach were looking for practical knowledge. They found what they were looking for at Pörner Kundl: for over 25 years, the Tyrolean Pörner location has been implementing ultrapure water plants for the pharmaceutical industry.

For this integral part of industrial infrastructure technology, Pörner Kundl awarded the diploma thesis "Ultrapure water production, storage and distribution" to two graduates - Florian Meixner and Jakob Szczupak. As a result, they can now practically develop



and document their scientific work based on Pörner's expert knowledge and a concrete project. Specifically, it is about:

- the determination of ultrapure water producing capacities based on consumer surveys,
- the determination of buffer storage volume for the suspension of consumption peaks and
- the design of the distribution loop in terms of dimensioning, ultrapure water ozonation, or maintaining a defined loop speed to minimize the risk of contamination.

Pörner regularly offers students at university, HTL and vocational academies the opportunity to

»Thanks a lot for the valuable support from the Pörner team of experts!«

Jakub Szczupak & Florian Meixner
HTL-Graduates in Jenbach

write their thesis on a specific Pörner project or an interesting technology or plant engineering related topic. Many of the gradu-

ates then embarked on a career at Pörner Ingenieurgesellschaft. ■

15 years of Pörner Romania

Anniversary. From studies to a full-service provider for the Romanian industry.



BY MICHAEL VOLKMANN

PLOIESTI. What began in 2005 in Romania with a tank farm logistics study of 1001 tanks for OMV Petrom, led to the founding of a location in November 2006. While this study was still prepared in Vienna, the great potential in the oil town Ploiești - one of the oil technology centers of the 20th century - was obvious. Thus, the expansion of the Pörner network with a subsidiary in Romania was almost instantly a done deal. This year, we can celebrate the 15th anniversary of Pörner Romania.



Team spirit leads to success

In 2006, S.R.L. Pörner Romania started with 10 employees and has been growing continuously ever since. Therefore, in 2010, it was necessary to move to the spacious office building in Hasdenau Street. It serves as a representative and excellently equipped center of Pörner's activities in Romania. Now there are about fifty engineers and specialists in Ploiești, who have grown together into a strong team over the last 15 years. They provide all disciplines of plant engineering from a single source.

Thanks to the central location

»For over 15 years, our teams have worked side by side. Together, we completed various significant projects and many more will follow.«

Roland Rabitsch,
Head of Project Management,
OMV Petrom

in the immediate vicinity of three refineries, Pörner Romania has become the regular supplier of these refineries and has built up an excellent reputation in the refining, petrochemical and gas industries because of dedicated and conscientious project work. "Our clients see us as a stable and reliable partner even in times of a crisis," states Michael Volkmann, Managing Director of Pörner Romania, quite proudly in hindsight.

Today: Turn-key and international

The projects became more and more complex and comprehensive over time. For example, the team executed an international EPC

project for Alexandria Mineral Oils Company (AMOC) for the optimization and expansion of a wax slabbing plant including delivery of equipment to Alexandria, Egypt.

For Kremsmüller Romania, the engineers designed a gasoline blending plant for blending different gasoline components to specific gasoline blends.

OMV Petrom commissioned Pörner Romania with its first turn-key project in 2015 - a liquefied petroleum gas (LPG) truck loading station with a capacity of 240 TPD in Petrobrazî.

Also for OMV Petrom, Pörner Ploiești built a 5.8MW back-pressure turbine for power generation in Petro-

brazî. Projects running over many years, such as the comprehensive refurbishment of existing tanks at OMV Petrom, complemented the positive development of Pörner Romania.

New social and commercial values created during the past one and a half decades are an excellent basis for more successful years to come. ■

The Pörner colleagues in Ploiești have grown to a strong team.



PROJECT HIGHLIGHTS OF 15 YEARS		
Plant	Customer	Year
Installation of a new 10,000m ³ storage tank for heavy reformat	OMV Petrom	2022
Revamp of rail loading stations	J. Christoph Group	2021
Modernization and capacity expansion of rail unloading ramps	Kremsmüller	2020
Upgrading of gas processing plant Barbuncest	OMV Petrom	2019
BPTG – Back-pressure turbine with generator	OMV Petrom	2014
Wax slabbing production plant	AMOC	2014
Construction of a liquid gas loading ramp	OMV Petrom	2014
Gasoline blending plant	Kremsmüller	2009

Pörner again involved in railroad project

Mobility. Pilot project “Modular drainage flushing system for railroads” prevents long tunnel closures.

BY MARTIN SCHNEIDER

VIENNA. ÖBB (Austrian Federal Railways Holding Stock Company) has more than 250 tunnels to guide trains through the alpine country as quickly as possible. Many tunnels are located below the groundwater level. Accumulating groundwater must be drained in order to maintain traffic.

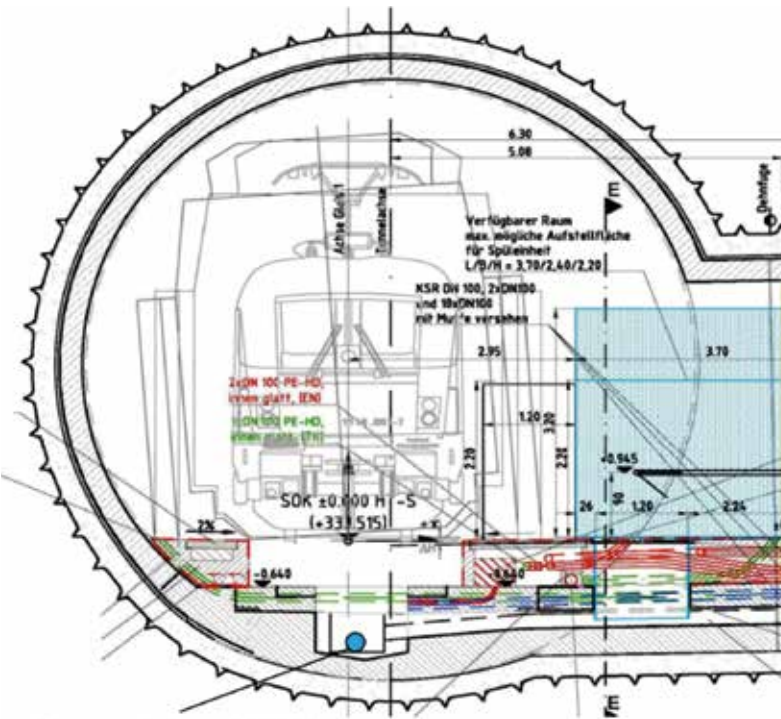


In summer 2020, Pörner Vienna was contacted by ÖBB-Infra to provide technical support as a plant engineer for this pervasive issue.

The classic tunnel cleaning

Groundwater entering tunnel systems is usually trapped behind the tunnel lining and directed into drainage systems. Mountain water naturally contains many different minerals, which lead to rapid sintering of drainage pipes. Therefore, they must be regularly maintained and cleaned to avoid clogging and damage.

Until now, this has been done by using suction/flusher vehicles known from sewer cleaning. For this purpose, the vehicles are



Tunnel cross-section with the drainage systems marked in red. The new modular rail drainage flushing system “MDB” prevents long tunnel closures, is remote controlled and has with 500 meters an enormous reach. A small-series production is intended.

loaded onto a maintenance train with flat wagons and moved into the tunnel. Through special central flushing shafts the drains are cleaned with high-pressure flushing nozzles. The glaring disadvantage of this method: the track is blocked by the maintenance train.

Lower maintenance costs and higher availability with MDB

Since cleaning means blocking the track, the directional lane or even the tunnel, the cleaning process must be as efficient and fast as possible. This is where the new modular rail drainage flushing system – short MDB – comes into



play – a completely new invention that has been available in rudimentary form only so far, but not as a finished product.

All system components required for flushing are installed in a common, self-propelled housing. Thus, the MDB can be placed above the central flushing shaft in the cross passages of the tunnels, the maintenance train leaves the tunnel and the rail remains free. The MDB is remotely controlled from the tunnel’s respective plant service center (ASC). Thus, there is no personnel in the tunnel and the rail can be used without restrictions.

Pörner – the chosen engineering partner

Since ÖBB-Infra – the company in the ÖBB Group responsible

for maintenance – was looking for a plant engineering company, Pörner comes into play. The two companies already successfully cooperated during dewatering of the pilot tunnel of the Semmering Base Tunnel in the late 1990s. Now with the third contract award, Pörner is supporting ÖBB-Infra in two concept phases including technical development and providing basic engineering. The completion of the basic engineering is scheduled for December 2021.

The particular challenge for Pörner is the development of the robotics to be installed in the machine; the enormous reach of 500m and the associated hydraulic requirements, so that this prototype will ultimately lead to a small-series production. ■

Gas stations of the future

Mobility. Go well: Pörner’s C/S/A department builds new Shell gas stations with shops and e-mobility.



BY MICHAEL MAZZUCATO

VIENNA. For almost 30 years, Pörner has been performing engineering services for Shell in Austria. Recently, the program included renewals of fuel tanks, piping, refueling stations, and the establishment of AdBlue drop-offs for Euro6 vehicles.



Now, the Shell gas stations are being equipped with a new store concept. Electromobility is becoming more and more crucial: Energy from Shell Recharge ultra-fast charging stations increasingly complement Shell’s standard fuels and V-Power premium products.

Pörner’s C/S/A department is working for Shell in Upper Austria, Lower Austria, and Vienna as well as in Burgenland and Salzburg on the modernization of gas stations in technical and visual terms.

Shell & Pörner: almost 30 years of constructing gas stations

The range of services extends from preparing layout and design to authority engineering, site supervision, coordination, and commercial execution. In recent years, besides

the expansion of the car dealership in Suben, several conversions to “BILLA Unterwegs” have been carried out.

Furthermore, 14 locations benefited from the rollout with AdBlue compact units for passenger cars in 2021.

“Shell constantly relies on the proven Pörner support when it comes to fast and efficient conversions and extensions,” says Michael Mazzucato happily. For several de-

acades, he executed Shell projects in a highly standardized way.

A completely new store building using modular construction methods is currently being built in Vienna: the new Shell service station with expanded refueling stations and AdBlue dispensers for passenger cars and trucks under an enlarged gas station roof has been available to drivers since November. ■

Overnight, a 350t crane lifts the modules (up to 4.90 x 13.10 x 3.85m and 31 tons) into position. Everything fits – in the morning, traffic flows again without disruption.



EDL Cologne plans prestigious project

Civil engineering. Deutsche Bahn digitizes railway hub.

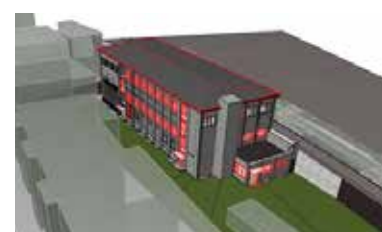


BY THOMAS BÖSEL

COLOGNE. EDL at its Rhine-Ruhr location in Cologne was commissioned with civil engineering services for a prestigious project of Deutsche Bahn Netz AG (DB - German Railways).



DB is digitizing the Cologne railway hub and in this context EDL is planning to add another



3D planning of the new signal tower at the railway hub Cologne

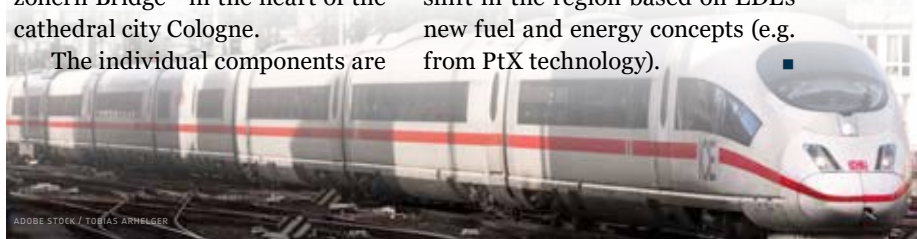
story to a building at Hansaring as well as to convert and construct gantries for optical signaling systems in and around the main station, at Hansaring and on Hohenzollern Bridge - in the heart of the cathedral city Cologne.

The individual components are

prefabricated in modular design, which requires precise planning of the assembly sequences. A particular challenge: For all assemblies, the specific train service interruptions for individual track sections to be scheduled years in advance have to be adhered to. The project is divided into several construction phases, which will be executed step by step and will extend well into 2022.

Positive summary of the first 18 months

The EDL Rhine-Ruhr location was opened in March 2020 and has been developing very positively since then. In terms of personnel, the EDL team in Cologne has meanwhile grown to almost 20 employees - large enough to completely handle smaller plant engineering projects. Engineers and technicians from all disciplines as well as in project management are wanted due to the good backlog of orders. Apart from the traditional plant engineering business, the Cologne team wants to play a key role in helping shape the green shift in the region based on EDL’s new fuel and energy concepts (e.g. from PtX technology). ■



Construction Management

Crucial for the success of the overall project.

BY CHRISTIAN BIRGFELLNER

Whether it is a greenfield or a re-vamp project, the overall success of the project finally depends on the construction and erection of the process plant. The plant must be installed and commissioned, in time and on budget, and without any accident. It is the riskiest phase of the project, accounting for a significant portion of the total cost. That is why "the construction site" must be considered as a separate organizational, logistical and human resource project.



Holistic preparation

It is essential to incorporate the requirements of the construction and installation phase in the project already from the very beginning of the pre-project. This is necessary because many problems occurring during execution are not caused on the construction site, but beforehand during planning and execution. If inadequate documentation or equipment arrives at the construction site, it must be

supplemented or repaired on site - at great expense and effort - with drastic consequences for construction progress and costs.

Matrix organization on the construction site as well

It has paid off to establish a matrix organization on the construction site with two organizational elements: Site Management for overall management, coordination, site safety/HSE, scheduling and financial control, and Technical Site Supervision for the quality of execution in all engineering disciplines including construction and installation.

The most important task of the Site Management is to organize and continuously adjust the workflow - always keeping an eye on safety and environmental protection. It is crucial to maintain a proactive and professional climate of cooperation between all parties involved, because there is simply no time for emotional disputes.

Uniform contract arrangements

The key to efficient management is a balanced, standardized drafting of contract documents with contractors, based on a well thought-

out split into defined packages. To ensure a good overall team spirit on the construction site, all contractual obligations of the contractors as well as the compensation for services have to be defined as uniformly as possible. Clearly defined interfaces between the contractors and binding completion dates ("key dates") are to be agreed on.

Operations research, scheduling and tracking

The site management's main focus is set on the sequence planning, which links the delivery of equipment and materials with the site activities.

All project activities are determined in their logical sequence with necessary buffer times using network planning techniques. First, critical equipment (long lead items) are identified for their priority ordering. Special logistics concepts have to be worked out for the transport of oversized equipment. Tie-in works are performed at an early stage during maintenance shutdowns. The earliest possible design of civil works enables the timely completion of critical foundations to install apparatuses and



An example of successful construction site management

The Pörner Group is renowned as a revamp specialist. Major turnarounds such as those in 2016 and 2017 at OMV bear testimony to the construction site experience of Pörner's engineers. In addition to three of five major projects that were mechanically completed during the OMV TAR and other small projects, Pörner also supported the OMV TAR team by coordinating the integrated scheduling for the entire shutdown.

To coordinate all 2,500 employees of 50 partner companies involved, a master schedule for all shutdown activities was developed. This schedule prepared by means of Primavera software included

not only the actual maintenance, but also shutdown and start-up activities in the respective plants including interlinking them.

In several workshops, all interfaces between shutdown activities, projects, maintenance, operational requirements (shutdown, startup, etc.) were visualized and a common work load and setup planning was achieved.

This allowed the critical path to be viewed objectively, synergies to be exploited and conflicts to be resolved even before they arose. During the turnaround, planning was updated on a daily basis and reports were generated per plant unit or per project.

Together "on tour"

Company outing. Under the motto "outdoor for a strong togetherness".

SCHLADMING. In the past months, our employees have spent a lot of time in home office - with all advantages and disadvantages. Pörner has maintained the remote work concept beyond the pandemic, wherever it makes sense, on a voluntary basis to strengthen the work-life balance.

To further encourage social togetherness, Pörner's popular

company trip took place again this year.

The Austrian colleagues spent four days in September in Schladming / Styria, Austria. Under the motto "Outdoor" many sports activities were offered: mountain go-kart, 3D archery, rafting, climbing, hiking and swimming... A whiskey tasting, mine tour and a glacier program including sus-

pension bridge and ice palace on the "Dachstein" were also available.

The management and the works council thanked our employees for their exceptional performance in these special times with this event, which was blessed by glorious weather. The trip into nature came just in time to recharge batteries. ■



Getting to know each other in private, networking and exchanging opinions, having fun, relaxing, laughing and dancing - all this experienced the Pörner team during these four days.

machinery.

Further acceleration potential can be achieved through deeper "operations research", whereby the management of interfaces and the permanent adjustment of the time schedule to changing conditions is essential.

The early detection of deviations and the targeted introduction of corrective measures ensure the success of the project.

Logistics

Due to the highly labor-intensive nature of installation works, the aim in modern plant engineering is to achieve a high degree of pre-fabrication of components and systems and "just-in-time delivery".

This is easier to achieve when it comes to new green-field installations than in case of revamps, where unexpected surprises are always likely to occur in existing facilities.

Monitoring, reporting and trouble shooting

Continuous monitoring with planned/actual comparisons in progress meetings enables accounting in line with progress and transparent relations with the customer and the executing companies. To avoid disputes, any deviations from the contractual agreements, such as additional or reduced services or defective workmanship, are to be recorded in full so that they can be balanced or rectified with the contractors on

an ongoing basis - until the project is handed over free of defects.

Any postponement or superseding of claims can lead to escalations and thus to a climate of mistrust that is harmful to the project.

The human factor

Site managers - as well as technical supervisors - must have a high level of interpersonal skills to ensure the best performance of people from different companies. In addition to technical knowledge, experience in contract law, business administration, IT, languages, and understanding of other cultures is required. Diplomatic negotiation skills with the customer, authorities, and executing companies will generate a spirit of cooperation on the construction site, in which even difficult situations can be mastered in a team effort.

Conclusion

Industrial customers - and especially their financing banks - are placing more and more importance on the contractor's overall responsibility for the work. However, contracts alone do not lead to success. The capable individuals - willing to perform and always flexibly committed to the ultimate goal - are the ones who jointly implement the plant.

It is one of the most memorable moments in an engineer's career when he can look at the completed plant that is handed over for its long-term operation. ■