Engineering-Times

PÖRNER GRUPPE | EDL PÖRNER GRUPPE

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ANNIVERSARY EDITION

Riding the wave of success

Five decades of steady development.

PHOTO: ADOBE STOCK / 3D RENDER: DOMINIK MIMRA

Pörner has been living the fascination of plant engineering for five decades now: half a century in which the world has changed fundamentally. Over this long period, we have always succeeded in having our finger on the pulse of development to realize the most efficient and productive process plants, both in our home markets and internationally.

Trust through continuity

Through constant advancement, we have succeeded in becoming a recognized and reliable player in the international "Plant Engineering Network" by shaping our customers' overall projects under our responsible leadership, together with all the manufacturers, system providers, and executing companies. Our flexibility and willingness to innovate have gained the trust of the best and most important industrial customers. They entrust us increasingly with projects of high technical demands and/or high investment volumes.

Progress meets experience

The recipe for our continuous success was and is a symbiosis of experience gained from more than 2,000 realized projects and openness to applying the latest process and technical knowledge and developments. The proven Pörner matrix organization combines project management and technical expertise in all engineering disciplines for integrated project handling. It is precisely these competencies that lead to the better result: value for money. Because good, in-depth engineering significantly saves investment costs. The result is a finished process plant with perfection and flexibility that will remain competitive for many years, even decades. This is and remains our mission on behalf of our customers!

Redesign across the board

Today, the process industry faces new challenges due to climate change and the current energy crisis. Probably the most far-reaching industrial upheavals of the century are on the horizon. Our contribution is the practical implementation of new concepts and innovations in concrete, productive plants. We support our customers, from the idea to the completion, in building new plants and in revamping existing plants with the Pörner-specific "decisive extra".

We are convinced that climate neutrality and economic efficiency can only be accomplished jointly through the interaction of many advanced technological elements. Therefore, we want to realize well-thought-out solutions for sustainable production: new, optimized, unique, and niche products with significant energy and resource savings achieved through intelligent process control and automation.

On the occasion of our anniversary, we would like to thank …

… all those who constantly contribute to our success: our industrial customers who entrust us with their important projects, our partners, suppliers, and contractors for their cooperation, and especially the 580 dedicated employees of the Pörner Group who face the significant challenges of modern process plant engineering. They plan, handle and realize our projects intelligently so that environmentally friendly and highly economic plants are created.

For the next 50 years, we wish you and us many new, challenging projects, joy in our everyday work, and much success in Europe and worldwide.

PHOTO: PHILLIP SIMONIS

Andreas Pörner

First-of-its-kind project: Bio-Silicates from rice hull ash ▸

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The world's first industrial plant for producing Pörner-Bio-Silicates from rice hulls is built in Thailand.

Revamp specialist: Modernized cracker plants ▸

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EDL successfully hands over petrochemical project to OMV in Burghausen after "first run on spec".

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RENDERING: DOMINIK MIMRA

PHOTO: ADOBE STOCK / 3D RENDER: DOMINIK MIMRA

A 50-year pioneering story

ANNIVERSARY. Progress meets experience.

The cradle of our company did not stand in a garage but in the "steel construction shack" in the middle of the factory premises of the VÖEST steelworks in Linz. Kurt Thomas Pörner, a young engineer, founded the "Technical Office Pörner" in 1972.

It soon received its first significant order: the detailed planning of a refinery in the Congo. The twelve-man team worked day and night and on many weekends, accomplishing the almost impossible with bravura: creating hundreds of hand-drawn layout plans and isometric drawings - and in the middle of the barracks, the 1:33 model of the plant grew before their eyes. Several orders followed this proof of commitment, and soon the name Pörner became a household name in Austria regarding reliability and exceptional performance.

Within a few years, the "Technical Office" extended its competencies to all engineering disciplines, such as process engineering, piping, apparatus and mechanical engineering, electrics and instrumentation, and finally, steel construction, and civil engineering.

A pioneer since day one

In automation, Pörner pioneered in Austria with its self-built control systems! As a result, Pörner has always been able to design and plan complete plants for its customers "from one source".

In 1978, K. Th. Pörner developed the entrepreneurial courage to offer a new process for producing road bitumen - the Biturox® process developed by ÖMV - worldwide. Thus Pörner became an internationally active plant engineering company. Pörner has granted more than 60 Biturox® licenses to refineries worldwide, which supply more than ten percent of the world's bitumen production.

Versatile overall planner active worldwide

In 1992, Pörner opened its first foreign subsidiary in Grimma (Germany). Then, with the acquisition of EDL Anlagenbau Gesellschaft in Leipzig, Pörner grew to become the "Pörner Group".

Thus, Pörner decided to continue to be there for the industrial customers in Austria and Germany and not outsource to a low-cost country. The planning competence was maintained and even expanded throughout all disciplines. The advantage of this strategy soon became apparent: Pörner and EDL found a niche with revamps that other companies could hardly serve from abroad. Not to mention that the know-how and experience of the highly specialized employees could even be increased instead of flowing off to subcontractors, never to be seen again.

With a work capacity of more than 750,000 hours per year, the Pörner Group can handle plants with more than 100 million Euros in investment. A decisive element is the competence to lead and control projects holistically, from the idea to planning and procurement, construction, installation, and commissioning.

Research & Development

Always with an eye on the future, the companies of the group are constantly researching and developing new processes and solutions with a focus on alternative technologies, both independently and with industry and research partners.

Because of our flexibility and versatility, in 2022, we could celebrate our 50th anniversary as an engineering company - with ten locations and 580 employees.

All the events mentioned above, initiatives, and successes in constant development over five decades have made Pörner Ingenieurgesellschaft what it is today: one of the most efficient, reliable, and innovative engineering companies for process plant engineering in Europe. ■

www.poerner.at/history

Man with vision

The courageous entrepreneur »KTH« Kurt Thomas Pörner†.

My brother Kurt Thomas Pörner led an eventful life. Born in 1941, he grew up with the privations of the post-war period, decided to go into technology, and learned the craft of refinery construction at the ÖMV. Then, in 1972, having returned from Germany with his first experiences, he started his own business with a team of colleagues, thus laying the foundation of our company.

The pioneering days and KTH, as we affectionately called him, are inseparably linked. His team completed all orders - even the seemingly impossible - on time and professionally. As a result, the company grew steadily in reputation and competence.

In challenging economic phases, he always encouraged everyone to take on new challenges and said yes to new initiatives and markets where others might have hesitated. Not without pride, Kurt Thomas said on the company's 45th anniversary: "If we weren't an outstanding engineering firm, the winds of the market would have swept us away long ago."

Kurt Thomas Pörner (1941-2018)

Our group of companies was able to steadily develop into an internationally successful engineering and plant construction network based on its courageous initiatives, personal commitment, and entrepreneurial values.

When he handed over his life's work to the younger successor generation in 1996, he remained a benevolent observer and always offered us advice and support.

In August 2018, we unexpectedly learned that our company founder and our experienced authorized signatory Gottfried Springer suffered a fatal accident during a sailing trip in Greece. As accomplished sailors, the two had traveled the seas together for over 20 years with great passion. Kurt Thomas was always a role model for his employees.

Andreas Pörner

WKO honors 50 years Pörner

ANNIVERSARY. Pörner is a “hidden champion“.

VIENNA. To crown the anniversary year, Pörner, as a “hidden champion” of the Austrian economic landscape, received an award from the Austrian Chamber of Commerce (WKO) for its 50th anniversary.

Andreas Pörner and Peter Schlossnikel accept the certificate for 50 years of excellent business performance on behalf of the Pörner Group.

On December 15, 2022, we welcomed Commercial Councilor Alfred Suppin, chairman of the machinery and technology trade division of the WKO, in the Vienna office. He presented our Managing Directors Andreas Pörner and Peter Schlossnikel with a certificate of honor for 50 years of excellent business performance. In the presence of the Pörner site managers, who met in Vienna for the annual exchange, he expressed Austria’s thanks and recognition for the services rendered over half a century for the domestic industry and in the export of supplies and services worldwide. ■

A wealth of expertise in plant engineering

The Pörner Group has experienced many highs over the years but has also had to master some lows in times of crisis. Our business environment has changed dramatically in five decades due to globalization, concentration, and high-level specialization, especially in the new millennium.

What has always remained the same and distinguishes our work are our core competencies: well-controlled project management and deep expertise on the pulse of the latest developments, quality, and reliability - and that, in the long run - are what count.

To document our achievements in this half-century, we have created the book “The Projects of Pörner”. We guide you through the most exciting projects from 50 years of Pörner Group in eight categories.

Although we mainly focused on the projects of the last 20 years, the result is a comprehensive work with 148 pages. This is an expression of the diversity and efficiency of our company.

It has been a great pleasure to select the projects, collect data and look through the matching photos. We were touched by how Pörner has realized many projects in this half-century. Choosing which of them to portray in the book was a challenge. But one thing is effortless for us: to thank all those people who have developed and designed these more than 2,000 projects. Without their commitment and motivation, we would not have made it this far in all these years. So once again: WE THANK YOU! ■

PHOTO: ADOBE STOCK / 3D RENDER: DOMINIK MIMRA

Christmas party in 50-year tradition

INTERNAL. After a forced break due to the pandemic, the party was extensive again.

VIENNA. On December 16, 2022, the Pörner colleagues from Vienna, Linz, and Kundl dressed up again to celebrate Christmas and the successful year in the festively decorated Palais Berg at Schwarzenbergplatz in the center of Vienna until late at night. The Christmas party in the year of the company’s 50th anniversary ended the two-year break in celebrations caused by the pandemic.

After the champagne reception in the foyer of the Palais, the doors opened to the ballroom. In keeping with the occasion, Managing Director Andreas Pörner illustrated the exciting history and opportunities for the future of the Pörner Group in his traditional speech.

PHOTO: MAXIMILIAN RÖDER

Much reason to celebrate the 25th anniversary: (from left to right) Wolfgang Weissmann, Stefan Meixner, Markus Obermayr, Franz Aschauer, Thomas Eckl and Rajapakse Mudiyanselage, who is already celebrating his 30th company anniversary.

Highly esteemed on all sides: Werner Gindl has been part of the Pörner family for 40 years.

Afterward, Managing Director Peter Schlossnikel presented honors for ten, 20, 25, 30, and even 40 years of service to the company to deserving employees. Among them were some “old hands”: for example, our IT expert Rajapakse Mudiyanselage has been part of the Pörner family for 30 years and the ever-popular project manager Werner Gindl for 40 years.

After the banquet, the entertainment special was on the agenda - a live performance by magician and ventriloquist Tricky Niki. His interactive show interlude of stand-up comedy and amazing magic wowed the audience. After the varied dessert selection, the Pörnians enjoyed themselves at the bar and danced in the disco area until the morning.

Thus, the anniversary year found an appropriate „finale furioso” in the heart of Vienna. ■

¡Viva España!

COMPANY OUTING. Southern Spanish sun, sea, and culture.

TORREMÓLINOS. On the occasion of the fiftieth anniversary of the "Pörnerei" - after an interruption due to covid - an elaborate company trip finally took place. This time it took us to Andalusia in Spain.

After landing in Málaga, we stayed in a comfortable all-in hotel directly on the beach in fashionable Torremólinos. With shared culinary delights, a swim in the sea possible in the best weather, followed by a nightly stroll along the palm tree promenade, we observed the footsteps of the jet set that once made the place famous.

During several excursions, the competent tour guide gave exciting insights into this fertile and hospitable piece of Spain.

Gibraltar, an original historical remnant of England in the middle of Spain, welcomed us with passport controls and the airport runway crossing with traffic lights. The independent architecture of the pulsating city is impressive! On dangerously narrow roads, we climbed the famous rock with its very self-confident monkeys and enjoyed the clear view of Africa.

The town of Ronda, perched on a mountaintop, impressed with its breathtaking location above a deep gorge. This (El Tajo) divides the new city from the 15th century and the old town from the time of Moorish rule.

Málaga presented itself as a lively Spanish city with stylistically striking patrician houses along wide boulevards and squares. Here we enjoyed Andalusian flair with first-class Málaga ice cream.

These were wonderful days of celebration, friendly exchange, and intense impressions, which the approximately 60 travelers will surely remember for a long time.

¡Viva España! ■

Fiery flamenco in Ronda.

Gibraltar: Africa in the background is practically within reach at a distance of 14 km.

Five unforgettable days in the sunny south of Spain.

Partner of the pharma industry since 1992

PÖRNER GROUP. 30 years of Pörner Kundl: pharma specialist celebrates anniversary with Oktoberfest atmosphere.

KUNDL. For 30 years, the Tyrolean Pörner location has been a reliable partner of the regional and international pharmaceutical industry. For this occasion, the marquee was decorated for an Oktoberfest, where it was then also said: »O'zapft is'!« (»It's tapped!«). Location manager Stefan Meixner welcomed customers, business partners, and colleagues from near and far.

In his speech, he described the development of the location: „*We started in 1992 with a small ventilation project. This became the Pörner competence center in the pharmaceutical sector. This continuity, 30 years of pharmaceutical plant engineering, cannot be taken for granted.*" He added: „*For a long time, we have been offering the entire range of services as a full-service provider, from study and detailed planning to commissioning and maintenance. We consistently rise to the challenge of increasing requirements.*"

Well-known companies such as Novartis, Sandoz, Veolia, Fraunhofer Institute, Linde Gas, Borealis, ÖBB, and ASFINAG are among the illustrious circle of customers. Especially regarding utility systems and maintenance, the well-coordinated team is always working on new solutions to increase production efficiency, reduce energy consumption and thus improve long-term profitability and sustainability. ■

Managing Director Andreas Pörner thanks the employees for their constant and outstanding work over three decades. The competence of Pörner Kundl is an important element of the range of services of the Pörner Group.

Pörner Grimma celebrates 30th anniversary

PÖRNER GROUP. EPCM contractor and expert in formalin & Bio-Silicates.

GRIMMA. The Pörner Group founded its first subsidiary abroad in the Saxon district town of Grimma, on January 30, 1992.

Managing Director Gerhard Bacher was involved from the beginning, and with his team, he realized many remarkable small and large projects for the chemical and process engineering industry.

Since 2003, the subsidiary has been the technology center for formalin and its derivatives within the group. Together with renowned European licensors and know-how partners, Pörner Grimma, as an EPCM contractor, offers all services for the planning and construction of plants from this product family.

Since 2018, Pörner Grimma has operated a branch office in Burghausen (Bavaria), and provides on-site support for the investment projects of the regular customers OMV and Borealis.

The Grimma subsidiary advances its R&D with new forward-looking technologies. In Grimma and in the laboratory and pilot plant operated in Freiberg since 2018, the process engineers and chemists have developed the Bio-Silicate process, in which high-purity silicates are produced from rice hulls. ■

www.poerner.de

Gerhard Bacher has led the subsidiary in Grimma on the road to success for 30 years (photo from 1992).

At the Christmas party, the team from Grimma toasts to a very successful business year! Everyone has their hands full, as the world's first industrial Pörner Bio-Silicate plant is currently being planned in Thailand (more on page 9).

From solid craftsmanship to bits & bytes

HISTORY. Always on the pulse of time in five decades of plant engineering.

BY ANDREAS PÖRNER

As the longest serving employee - since my first holiday internship at the age of 16 in the founding year of 1972 - I have been able to personally experience the development of our work in plant engineering over five decades. So here is a short review of working methods that hardly anyone can imagine today.

Solid manual work

Almost everything was calculated and designed by hand in the early years of the company's existence. Large design rooms with drawing boards were the standard.

The Pörner office in 1978 - the drawing board was the center of attention.

Initially by pencil, drawings were done by hand to be drawn out with ink rapidographs afterward. Lastly, corrections and changes were done with razor blades.

Our first pocket calculators in 1972 cost 1,000 Deutsche Mark (which would correspond to about 2,000 Euros today) and could already square and draw logarithms. However, more extensive calculations, which any PC can do today, had to be outsourced to large computer centers at that time for a lot of money.

Paper only

Project execution involved tons of paper. Our customers' requirements for documentation were already lower because there were always vast amounts of paper to be distributed.

All information came by mail in letter form or by rattling telex exclusively to the project manager, who distributed it daily in paper form to the department's clerk - with the advantage of a very controlled flow of information.

Specification forms were filled out in pencil and then fixed by copying with giant Xerox copying monsters to be sent to suppliers and customers as a valid revision.

Since there was no Internet or databases, the company had to keep enormous numbers of brochures and catalogs of all equipment.

Full design rooms

Since there was a lot of drawing work to be done in detail engineering, we had to employ many more designers (mostly young ones) to do the same job. As a result, we always managed to form a great soccer team; the matches against ÖMV in the Vienna Prater were legendary.

»My first laptop: MS-DOS, no battery, 3.5" floppy disks, Wordstar and the brilliantly simple Lotus-1-2-3, greatly improved the handling of our Funder environmental project.«

SOURCE: HONDA

Messenger with four cylinders.

Being a separate service department, several employees continously produced tens of drawing proofs smelling of ammonia in the copy room. When a tight deadline had to be met, those were delivered across Vienna to the refinery in good time by a messenger on a motorcycle.

To physically document the planning progress, we built the plant in 1:33 scale, complete with all apparatus and pipelines as a model, in parallel with the construction. This made it possible to identify errors in the design immediately, the customer accepted the plant using the model, and on the construction site, it then served as a template for assembly. Some say such a tangible model was superior to today's virtual 3D representations ...

The computer enters the stage

Then modern computer technology overtook our industry: In 1986, when I was 30 years old, we invested 135,000 Austrian Schillings in the first Columbia PC with NASA software and a 5 MB hard disk - at that time, you could also get an S-class Mercedes for that. In addition, a dot matrix printer for 20,000 Austrian Schillings could print texts and tables.

In 1988, I was one of Austria's first proud AutoCad V1.1 users. Schematics and layouts with several layers were created in 2D and printed out on what we called the "crazy broomstick", a pen plotter. We could already plan, calculate,

Columbia PC, our modern computer in 1986.

and construct almost everything with it.

With the first laptop, equipped with MS-DOS and 512 KB floppy disks, we were already managing complete projects at the customer's site - like the Funder environmental project, with which we won the state prize for the first time in 1991.

Pörner pioneered the intelligent 3D design in Austria in 1992 for the Biturox® Lysychansk (Ukraine) project with Intergraph on Unix servers. The beginning of a new plant engineering era.

Conclusion

We have always been able to build first-class plants with the given means - due to the outstanding standardization in process plant engineering: most of them are still in productive operation today with several decades under their belt. What has remained is our constant enthusiasm to open up the new, and the better, in the service of our task of turning the ideas and requirements of our industrial customers into reality in a technically optimal, economical, and environmentally friendly way. ■

Running for better education in Tanzania

CSR. Corporate runs: Pörner athletes support Africa Amini Alama Vocational School.

VIENNA. Pörner employees have fit minds and muscles. They proved their fitness by participating in various company runs and sports events. On the 50th company anniversary, Pörner multiplies every run kilometer of our employees by a factor of eight to provide a corresponding amount in Euros for social projects.

The company runs of the Pörner Group 2022

The anniversary year began in May with the "**Wings for Life" run**, in which the employees of the Pörner Group jointly achieved an impressive 59 kilometers.

In June, the EDL runners took part in the **Leipzig company run**. The running distance was five kilometers.

The Pörner anniversary shirts found their first sportive use at the **Vienna Night Run** in September. 18 Pörner colleagues completed the five kilometers around the Vienna ring road and reached 112th place in the team ranking.

The sportive year was completed with the well-known **Vienna New Year's Eve Run** on December 31st. The colleagues conducted the five kilometers brilliantly despite freezing temperatures.

In the end, the sum of all performances of the persevering employees of the Pörner Group for the year 2022 amounted to a proud 250 kilometers. Thus, the Pörner runners collected an amount of 2,000 euros in donations. ■

EDL company run, June 2022.

The satisfied colleagues after the Vienna Night Run.

Our active Pörnians at the Vienna New Year's Eve run.

To celebrate the anniversary year, our employees received a sports shirt with the especially designed "Special Edition 50 years" Pörner logo.

INVESTMENT IN TECHNICAL AND CRAFT TRAINING IN TANZANIA

This year, the donation goes to Africa Amini Alama, a non-profit organization which operates a vocational school for carpenters, bricklayers, and mechanics in Tanzania.

This project aims to provide young people with a practical education so that they can not only support their families in the future, but also contribute to the development of their country.

"This is how we do good for our bodies and at the same time do good for others who need help." says Pörner HR manager Marie Lopatka, herself a competitive athlete.

The campaign #PörnerInMotion will continue in 2023.

africaaminialama.com

Industrial Tank Design

REFINERY. Modern large-scale tank for Petrobrazi refinery.

BY MICHAEL VOLKMANN

PETROBRAZI. In June 2020, Romania's leading oil and gas group OMV Petrom awarded Poerner Romania, based in Ploiesti, the EPCM contract for the design and construction of a storage tank at the Petrobrazi refinery. The tank is equipped with all operational and environmental features and has a diameter of 37 meters and a height of 12.5 meters. After successful performance tests, Poerner handed over the tank to Petrom at the end of May 2022.

Already established as tank specialists, the Poerner team planned the 10,000 m³ reformate storage tank equipped with a double-bottom, double-jacket, floating membrane, and aluminum dome "from the first screw to the last weld". The contract included authority engineering, detail engineering, procurement, construction and erection management, and commissioning support. "*With its outstanding dimensions and engineering requirements, this was our site's largest tank farm order to date*", says a delighted Michael Volkmann, Managing Director of Poerner Romania. In addition to developing a unique firefighting concept, the engineers had to consider the revamp of a neighboring tank on the construction site. At times, three cranes were in use in a very confined space.

The Pörner team in front of the 10,000 m³ reformat storage tank.

Poerner Romania specializes in the refinery, gas, and petrochemical sectors and provides all plant engineering disciplines from a single source to the construction of turnkey plants. The Romanian all-rounder has been a reliable partner in the industry for 16 years. ■

More ethylene and

PETROCHEMICALS. "First Run on Spec"

BY DANIEL MOHR

BURGHAUSEN. The refinery in Burghausen focuses on petrochemicals. This is why is not processed into gasoline, but into petrochemical feedstocks, such as ethylene, propylene, butadiene, and isobutene. To increase ethylene and propylene production capacity by 50,000 metric tons per year, the site invested in the expansion and modernization of its cracker facilities and the petrochemical refrigeration system. Apart from the capacity increase, energy efficiency and CO_2 savings should be further improved - an essential investment in environmental and economic sustainability.

Equipment of another dimension and challenging deadlines

In spring 2020, OMV Germany awarded the contract for the basic engineering of the PetChem Cracker Creep Revamp project to EDL. After successful completion, EDL was also contracted for the detail engineering, construction supervision, and commissioning support in February 2021. The services to be provided were very complex and included the handling of major equipment packages: coldbox replacement, methane compressor revamp (including new 6 kV motor), ethylene compressor revision, replacement of two steam turbines (4 MW and 13 MW), major propylene compressor revision, and replacement of internals and cold insulation of the 65 m high ethylene splitter. In addition, about 700 instrumentations and 35 procurement pack- ↗

SELECTED PROJECT HIGHLIGHTS

01

1975-1979
POINTE-NOIRE REFINERY, CONGO

In 1972, VÖEST-Alpine was awarded the first overall refinery contract in Pt. Noire, Congo. After enquiring at ÖMV, they recommended Kurt Thomas Pörner for the detail engineering. The small Pörner team of professionals and novices worked around the clock for months in Linz in the "steel construction shack", building the plant model of the refinery and carrying out the complete detail engineering. The almost impossible was achieved and the reputation of the young company was built.

02

1997-1999
HIGH PRESSURE MELAMINE PLANTS, LINZ AND CASTELLANZA

In 1997, Pörner was entrusted with a significant part of the engineering for two melamine plants using the new process of Agrolinz (now Borealis) in Linz and Castellanza. Producing melamine employing high pressure (280 bar) and high temperature (420 °C) requires unique materials and equipment. In particular, the piping design was a significant challenge for the engineers.

For example, the jacketed high-pressure piping systems are heated with molten salt (liquid salt for piping with high-temperature requirements). During the detailed planning phase, many improvements to the new high-pressure process were implemented together with Agrolinz. Thus, Pörner once again proved its great flexibility.

propylene for OMV

thanks to joint team effort.

ages were prepared, and 280 pipelines were adapted.

An eye was always kept on the planned turnaround (TAR) period from June to August. The implementation of the PetChem project fell in this time frame, the legally required general inspection of the Burghausen refinery (which was last carried out in 2014). From then on, the motto was: "four projects, one execution", meaning the joint implementation of the various sub-projects: PetChem Cracker Creep Revamp, Replacement Coldbox I, New Insulation Ethylene Splitter, and Turbine Reliability & Maintenance Refrigeration System.

Successful and safe execution

Under the motto, "Safe or not at all." the EDL team worked their way to mechanical completion of the plant by the target date under very challenging site conditions. This required the support of each individual to achieve the goal of "zero accidents" through diligence, attentiveness, and cleanliness in their work.

Despite generally known difficulties, such as disrupted supply chains, etc., the target date for mechanical completion at the end of July 2022 was met by the EDL team and the partner companies. Shortly afterwards, the plants were "Ready for Start-up" (RFSU) - all according to plan. Four weeks after mechanical completion, the "First Run On Spec", the production of specification-compliant products, was completed as the final act.

Even in this final phase of hot commissioning, the well-coordinated team was able to build on its previous excellent performance in engineering and construction management. This was only achievable because all participants put all their energy and expertise into the joint work.

Therefore, EDL would like to express its gratitude again for the cooperative partnership and the mutual pragmatic support between OMV, EDL, and the partner companies. Without the commitment and passion of all employees, it would have been challenging to implement the project on time and within budget. However, it is an absolute pleasure to execute projects with such a spirit! ■

OMV

Everything according to plan and with precision: The new coldbox is lifted into place.

Read more about the project here: www.poerner/media

FROM FIVE DECADES

2005-2007
FCC-OVERCRACKING FOR PCK IN SCHWEDT, GERMANY

Pörner's subsidiary EDL installed an FCC overcracking plant with C_3 splitter as the core part at the PCK refinery in Schwedt (Germany). A literally "huge" task for EDL, as the C_3 splitter is still the tallest structure in the region with 84 m. Within the FCC complex, the new C_3 splitter process stage produces "polymer grade" propylene. Transporting and assembling the column sections was a logistical challenge (diameter 5.2 m). During the twenty-day shutdown, the EDL team mastered the task with flying colors and established itself as revamp specialists.

2015-2018
BITUROX® PLANT FOR BAKU, AZERBAIJAN

In 2015, Azerbaijan's SOCAR awarded Pörner with a contract for the engineering and supply of a Biturox® plant for the Heydar Aliyev refinery in Baku. The EPCM contract included licensing, basic and detail engineering, procurement and supply of key equipment, construction supervision, and commissioning support for the process and auxiliary equipment. With state-of-the-art off-gas cleaning and designed for an annual capacity of 400,000 tons of bitumen, this plant will meet the high demand for quality bitumen to expand the road network in Azerbaijan further. Moreover, handing over the entire plant "on spec, time and budget" underlines Pörner's position as the world market leader in bitumen plant engineering.

03 04 05

2006-2007
BIOETHANOL PLANT IN PISCHELSDORF, AUSTRIA

In 2006, Pörner was awarded the general planning contract for constructing a bioethanol plant at AGRANA's Pischelsdorf site. Pörner provided project management, basic and detail engineering, procurement, construction supervision, as well as commissioning support for the 125 million Euro project. From corn, wheat, and sugar juice, 240,000 m^3 of bioethanol with 99.5 % alcohol content is produced annually to blend with gasoline.

Only 14 months after the beginning of construction works, Austria's largest industrial plant in renewable energies was commissioned in October 2007.

In 2007, Pörner Ingenieurgesellschaft won the Austrian State Award in the category "Engineering Consulting" with this exceptional showcase project.

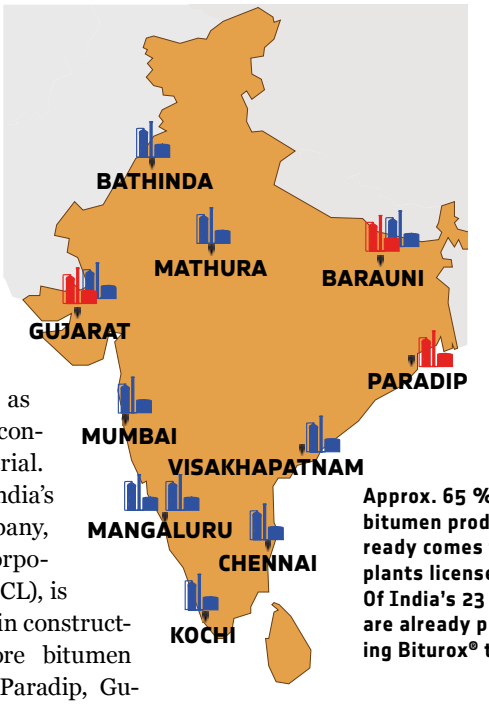
Three new Biturox® licenses for Indian Oil

BITUMEN. Pörner awarded with bitumen plants in Paradip, Gujarat and Barauni.

BY WOLFGANG HEGER

VIENNA. Forecasts estimate that by the middle of the century, India will grow into the most populous country and the world's third-largest economy (after the USA and China). The construction of new cities and the planned extensive industrialization will require the fastest possible infrastructure improvements - especially transport routes.

India's road network already totals around 6.2 million kilometers, making it the second largest in the world after the USA. In the fiscal year 2022/23 alone, India will expand the national road network by 25,000 kilometers.



Approx. 65 % of India's bitumen production already comes from Biturox® plants licensed by Pörner. Of India's 23 refineries, ten are already producing using Biturox® technology.

Biturox® plants for quality road bitumen

Premium quality bitumen plays a crucial role as an essential construction material. Therefore, India's largest company, Indian Oil Corporation Ltd. (IOCL), is now investing in constructing three more bitumen plants at the Paradip, Gujarat, and Barauni refineries.

Pörner has already realized plants for IOCL at two locations: 2002 in Gujarat, and 2017 in Barauni.

The Indian Oil refinery in Barauni will be expanded by a second Biturox® plant.

PHOTO: IOCL

Pörner is excited about the follow-up orders and the award of the 60th, 61st, and 62nd Biturox® licenses.

The new Biturox® plant in Barauni is designed to produce 300,000 TPA of bitumen in the future, meeting the demand for bitumen products in eastern India.

In western India, demand for bitumen will be met by the new Biturox® plant in Gujarat with a capacity of 500,000 TPA.

Since the summer of 2022, Pörner engineers have been working on the basic engineering at the Barauni and Gujarat refineries and preparing to deliver the key equipment.

Biturox® bitumen now also from Paradip

Pörner's first project at the Paradip refinery includes basic engineering and delivery of the key equipment for the Biturox® plant. The project started in December 2022 and is expected to be handed over in June 2023. ■

www.biturox.com

Largest Biturox® plant for Saudi Aramco

BITUMEN. Pörner doubles bitumen production at the Ras Tanura refinery.

BY CHRISTIAN FILZ

RAS TANURA. The state-owned Saudi Arabian Oil Company and Pörner have successfully commissioned a new Biturox® plant at the Ras Tanura refinery in eastern Saudi Arabia.

Saudi Aramco selected the globally proven Biturox® technology to increase its bitumen production capacity from 22,000 to 42,000 barrels per day.

Pörner's contract includes licensing, pilot testing, basic engineering, procurement and delivering key equipment, construction supervision, and commissioning support for the process plant.

Saudi Aramco is convinced of the technology. Equipped with two reactors and a production capacity of 1.2 million tons per year, it is the largest Biturox® plant in Pörner's history. So now, also the world's largest oil company is benefiting from the advantages of Biturox® technology.

With the license granted to Saudi Arabia, Pörner is also coloring one of the last "white spots" on the map of the Arabian Peninsula, where several countries already operate Biturox® plants. ■

»Biturox® is a more efficient, reliable, economical, safe and environmentally friendly technology than conventional asphalt processes.«

Megbel A. Al Shammari
Head of Refinery and NGL Project Department

BITUROX®
BITUMEN OXIDATION TECHNOLOGY

أرامكو السعودية
saudi aramco

Delivery of the Biturox® reactors to Ras Tanura.

State-of-the-art Biturox® test facility in Schwechat

R&D. Pörner operates a product development laboratory for bitumen that is unique in the world.

BY MARTIN SCHNEIDER

VIENNA. Pörner's Biturox® Research Center in Schwechat (near Vienna) is the world's recognized service provider for developing tailor-made quality bitumen from various crude oils and refinery intermediates.

Experience in a unique database

To optimally design a Biturox® plant to produce high-quality road and industrial bitumen, analyses of the intended feedstocks and practical pilot tests with the generation of reference samples as proof of product qualities are essential prerequisites. Based on the test results, the plant components (including reactor capacity) are then determined, and product guarantees are defined.

Pörner has analyzed almost all bitumen-capable feed components worldwide in more than four decades and conducted hundreds of pilot tests for bitumen-producing refineries. The results are available to Biturox® licensees in a comprehensive database.

Targeted application technology

The Biturox® pilot plants built by Pörner in the 1990s were previously located within the OMV laboratories. However, last year, Pörner decided to develop its own Biturox® product development laboratory in Schwechat. The new facility enables Pörner for even more targeted, faster processing of research orders by Pörner experts independent of external resources. For this purpose, own premises were rented in the new laboratory building of the OMV refinery Schwechat.

Pörner project manager Martin Schneider (left) hands over the key to Mark Seper, who as head of Pörner Process Engineering will conduct numerous test on the brand new plant and expand Pörner's knowledge of the complex substance bitumen.

PÖRNER GRUPPE

BITUROX®
BITUMEN OXIDATION TECHNOLOGY

Flexible pilot plant 2.0

For greater flexibility, the new pilot plant is equipped with two reactors of different batch sizes, a smaller one with about 7.5 liters and a larger one with 15 liters to produce reference samples. In addition, the laboratory is equipped with basic measuring instruments for determining penetration and softening points, among others. Furthermore, Pörner added a high-shear mixer to produce test quantities of polymer-modified bitumen (PmB).

With the completion in October 2022, Pörner will now carry out Biturox® pilot tests independently and, thus, support bitumen-producing refineries worldwide in the correct selection of their feedstocks and the right dimensioning of Biturox® plant components. ■

www.biturox.com

World's first industrial Bio-Silicate plant

SUSTAINABILITY. New cooperation with Evonik and Phichit Bio Power Thailand for "green tires".

BY GERHARD BACHER

BANGKOK. The Pörner Group enterd a partnership with Phichit Bio Power Co., Ltd., Thailand, and Evonik Industries AG, Germany, a leading global specialty chemicals company, to license, plan and build the world's first industrial Bio-Silicate plant in Thailand.

The sustainable technology developed by Pörner enables the production of high-purity biosilicates from rice hull ash generated in a CO_2-neutral manner in biomass power plants. The Pörner Bio-Silicate process extracts high-purity silicates from this renewable raw material while saving approximately 70 % CO_2 emissions compared to the conventional silicate high-temperature process.

Pörner licenses, plans, and realizes "turn-key"

As overall plant designer, Pörner provides the process, basic and detail engineering, and delivers the plant "turn-key", including construction as well as commissioning, which is scheduled for the end of 2024. On September 27, 2022, the companies' representatives signed an agreement to construct the Pörner Bio-Silicate plant in the center of the rice growing area of Phichit in Thailand.

From left to right: Gerhard Bacher, CEO Pörner Germany, Banjong Tangjitwattanakul, President Phichit Bio Power Co., Ltd. and Bernhard Schaefer, Senior Vice President Rubber Silica Evonik, at the signing ceremony.

According to the patented Pörner Bio-Silicate process, Pörner realizes the plant based on rice husks as a natural waste product of rice production. The ash from the hull combustion in biomass power plants is processed into a valuable industrial base material, silicates. With a minimal contamination content, for example, with metals, the patented plant configuration ensures high product purity.

Trendsetting tire production

The Pörner Bio-Silicate process has the potential to change the silicate world fundamentally. This is because the sustainably produced product, which is increasingly in demand worldwide, has a wide range of applications. For example, the Bio-Silicate made in Thailand is processed by Evonik into high-quality precipitated ULTRASIL® silica to support the global tire industry's quest for CO_2 neutrality. The end-product is reduced rolling resistance tires - also known as "green tires." Evonik wants to serve this market with sustainable silica produced based on Pörner Bio-Silicate.

The Pörner process enables Evonik to reduce the overall CO_2 footprint of its production by up to 30 % compared with standard silica. ■

Walnut shells for water purification

WATER. Produced water treatment at the Caspian Sea.

BY ROBERT VRANITZKY

KASHAGAN. In 2022, Pörner Vienna successfully expanded and modernized the produced water treatment plant for the Kashagan oilfield (Kazakhstan) of the North Caspian Operating Company N.V. (NCOC). NCOC operates the giant Kashagan oil field with approximately nine to 13 billion barrels of recoverable oil. It is one of the world's largest oil discoveries in the last four decades.

The project's operating conditions were very challenging, as weather conditions in the region vary from -35 to +35 °C, and associated gas contains up to 15 % hydrogen sulfide.

Capacity increased, function improved

In 2016, the water engineering team was responsible for providing a functional system with a treatment capacity of 164 m³/h for the first two oil trains commissioned in 2020. Now, the third oil train system with a treatment capacity of 82 m³/h has been provided with an additional functional improvement to be realized in the coming years.

Complete performance

The scope of work for "Pörner Water" included: project management, basic and detail engineering, including process engineering, design and planning of the aggregates, the instrumentation and control equipment as well as the piping, procurement and delivery of the individual components, construction supervision as well as documentation for export to Kazakhstan.

In the project, all three process stages of primary, secondary, and tertiary purification were upgraded, with the tertiary purification stage being extended by four walnut shell filters connected in parallel. Thus, modernization makes a significant contribution to the efficiency and environmental protection.

The successful project is another example of Pörner's industrial niche competence in the key water area. ■

The skid-mounted Bolashak Onshore Processing Facility (OPF) is located near Atyrau, where oil and gas from the offshore Kashagan field is processed.

Green kerosene and hydrogen

SUSTAINABILITY. Free State of Saxony supports hydrogen projects. EDL's HyKero project is one of them.

BY MICHAEL HAID

LEIPZIG. In November 2022, the Saxon State Ministry for Economic Affairs, Labor, and Transport set the course for funding another three hydrogen projects in the Free State. Two EDL projects are among the selected:

- **LHyVE** Generation - the production of sustainable hydrogen by means of 110 MW electrolysis;
- **HyKero** - the production of green PtL kerosene, green naphtha, and green hydrogen.

With both forward-looking projects, EDL contributes to developing an efficient hydrogen economy in the Free State of Saxony and thus increase regional value creation, especially in the industrial, logistics, aviation, mobility, and energy sectors.

Model of the HyKero plant for the production of green hydrogen, PtL kerosene and PtL naphtha to be built south of Leipzig.

The HyKero project

With the HyKero (derived from hydrogen and kerosene) project, EDL has developed an overall process based on TRL 9 technologies that already allows the commercial production of PtL kerosene. The green hydrogen required for the process is produced from water and renewable electricity using a 110 MW electrolysis plant. Synthesis gas is produced from hydrogen, sustainable carbon, and CO_2 in subsequent steps. The syngas is further processed into PtL kerosene using Fischer-Tropsch synthesis and subsequent hydrocracking.

With an annual capacity of 50,000 TPA. of sustainable aviation fuel based on renewable electricity, the HyKero plant will be the world's largest industrial-scale plant. It will be built in Böhlen-Lippendorf, south of Leipzig. The plant site offers ideal infrastructure conditions and is located not far from Leipzig-Halle Airport. The plant is already in the planning stage. The first green kerosene is expected to be available in 2026, helping to make the dream of "green" flying a reality. ■

WALNUT SHELL FILTRATION

The treatment of produced water is crucial for the efficiency of oil production and, at the same time, has a high environmental protection aspect. Since produced water contains many impurities, several water treatment technologies are used. One particularly resource-saving and environmentally compatible process is filtration using walnut shells. In this process, the oil-binding properties of the walnut shell ensure that traces of oil are removed, producing filtered water of very high quality. Then, by introducing rinsing water and gas, the walnut shell medium is regenerated, and after a short time, it is again available for continued filtration.

Review: ACHEMA 2022

EXHIBITION. Sustainability and industrial transformation in focus.

BY LYDIA BRANDTNER

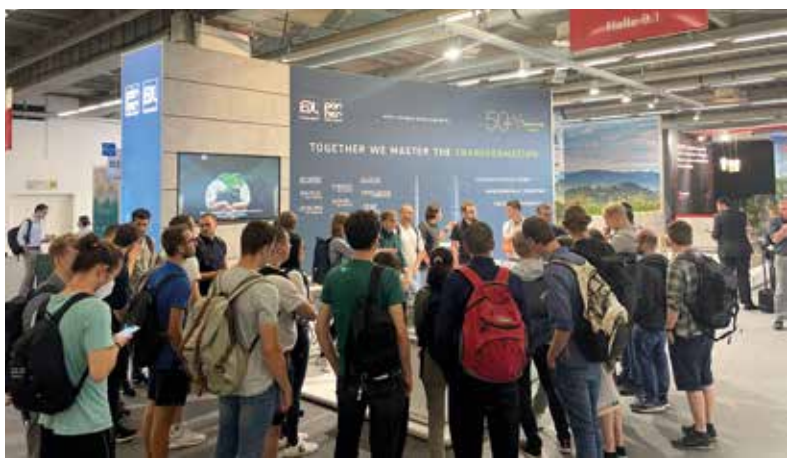
FRANKFURT A.M. For the first time after 2018 and following two postponements, ACHEMA took place again in public in 2022. It is the leading international trade fair for the process industry, with approximately 2,200 national and international exhibitors presenting their current products, processes, and services in Frankfurt am Main (Germany). Pörner and EDL used this marketplace for networking and exchange of experiences in August. Under the slogan "Together we master the transformation", the Pörner Group presented its comprehensive expertise, focussing on "green" technologies (PtX, BtX, Bio-Silicates, Pörner Water), but also in sustainable revamps of existing process plants.

Renewable and sustainable are the latest trends

Among the highlights were the topics of PtX and hydrogen, on which a panel discussion was held on the first day of the trade fair, where EDL Sales Director Peter Sonntag discussed the challenges of the future with VDMA Executive Board member J. Nowicki, among others. At the same time, EDL CEO Michael Haid held a presentation on PtX applications.

The already traditional Pörner Engineers' Café, this time designed as a terrace café in the Viennese vineyard idyll, invited potentially new and old customers to discuss upcoming projects. It became apparent that most plant operators must react quickly to changing market conditions and higher raw material and energy costs. The Pörner Group is well positioned for the realization of these transformation projects in most plants.

Despite the unusual date in the middle of summer, the exhibition was a success for Pörner and EDL. Customers from all over the world and from every industrial sector visited the booth with exciting, concrete project ideas. ■



Group summit

INTERNAL. Finally back in person in one place.

BY LYDIA BRANDTNER

VIENNA. After two years of abstinence due to the pandemic, Pörner Vienna invited to the traditional winter meeting of the group in December 2022. The group location managers presented the diverse ongoing projects from all areas of process plant engineering. As a result, they were able to give a very positive outlook on orders expected for 2023.

The video message of our colleagues from Pörner Kyiv with harrowing pictures from their home country was very touching. They work under unimaginably difficult conditions and will undoubtedly continue to need our exceptional support until peace hopefully returns to Ukraine.

In times of upheaval in our industries, one focus was mutual support for significant projects. The participants also exchanged ideas on how the Pörner Group can shape the working environment in a modern way for a healthy work-life balance to attract the best brains; for the complex challenges of the future, and to inspire activities that are important for society. ■

PHOTO: PHILLIP SIMONIS

▲ **The participants of the pre-Christmas location managers meeting in Vienna: with satisfying order books, the focus was on the needs of employees and the collaborative handling of major projects.**

▲ **f.l.t.r.: M. Obermayr (Location Manager Linz), W. Kursch (Managing Director EDL), St. Meixner (Location Manager Kundl), L. Brandtner (Head of Marketing), E. Racanel (Managing Director Poerner Romania), M. Haid (CEO EDL), Ch. Geyrhofer (Head of Advanced Energies), A. Pörner (Managing Partner Pörner Group), P. Schlossnikel (Managing Partner Pörner Group), J. Kappeller (Managing Director TAF), G. Bacher (Managing Director Pörner Grimma), M. Nehring (Dep. Managing Director Pörner Grimma), P. Sonntag (Director Sales & Contracting EDL), K. Bongartz (Director EDL Rhine-Ruhr office), W. Heger (Director Sales Pörner), J. Krendl (Location Manager Burghausen), R. Vranitzky (Manager Pörner Water), M. Volkmann (Dep. Managing Director Pörner Group).**

EDL APPOINTS NEW MANAGING DIRECTOR

Daniel Oryan has been Managing Director of EDL in Leipzig since mid-August 2022. He takes over from Wolfgang Kursch, who has successfully led the company as Managing Director since 2010 and will take his well-deserved retirement at the end of February 2023.

We asked Oryan about his first experiences in his new job and the associated challenges in the coming years.

IB: Mr. Oryan, how did you experience your first few months at EDL?
Oryan: Very exciting, challenging, diverse.
IB: You last worked at H&R in Salzbergen. Was it a significant change for you to now act on the contractor side?
Oryan: This change was not difficult for me. My philosophy as a client has always been that only both parties (client and contractor) can win together and lose together. Nothing has changed in that regard. I hope that based on my former customer approach, I can impart a different perspective on specific issues to some employees at EDL.
IB: Is the job what you thought it would be?
Oryan: No, better and more interesting!

IB: What do you want to focus on in your work?
Oryan: Although I am mainly responsible for engineering and project management, I don't want to limit my activities to these areas. I see the following tasks for the near future:

- Further development of EDL as a technology-oriented plant engineering company
- Intensification of the HSE philosophy
- Expansion of existing and development of new internal processes
- Acquisition of new customers
- Talent management

Our employees are our potential. And this potential is enormous!
IB: What challenges do you see for EDL in the short term?
Oryan: The greatest challenge is, at the same time, our most incredible chance: We have the opportunity to actively shape the energy transition with innovative and environmentally compatible plant concepts - both as a technology provider and as a reliable plant construction partner for our customers in the refinery, petrochemical, and chemical industries. We want to accompany them on their very individual transformation path.

In any case, the energy transition will not work without first-class engineering services! And accordingly, not without EDL!

Camera rolling, and ... action!

INTERNAL. EDL company outing to Babelsberg Film Park.

BY ULRIKE FISCHER

BABELSBERG. On September 2, 2022, EDL's management invited to the company outing to Filmpark Babelsberg, the cradle of German film. In its 110-year existence, from UFA to DEFA to the present, film classics such as "Metropolis," "The Blue Angel", and "The Legend of Paul and Paula" were created in the studios around Babelsberg. Today, Hollywood stars such as Tom Hanks, Cate Blanchett, and Brad Pitt turn up to shoot major Hollywood productions such as "Inglourious Basterds."

In the film park and the visitor studios, the colleagues marveled at original sets, a stunt show and practiced fencing and stick fighting under expert guidance.

Pure thrills

That was the case with the fire stunts! Even when rappelling from the stunt scenery, some people overcame their fear of heights. Respect! The stunt crew also provided exclusive insight into the work of the stuntmen and -women.

The eventful day ended with a lovely evening event in a villa overlooking lake Tiefer See in Potsdam. During the evening event, employees were honored for their many years of service to the company. And, of course, as it is a good Saxon tradition at EDL, there was a lot of partying and dancing until late at night. ■

TAF integrated into Pörner Group

DEVELOPMENT/PRODUCTION. "Green" pilot and research facilities.

BY JONAS KAPPELLER

FREIBERG. Founded 25 years ago, Thermische Apparate Freiberg GmbH (TAF) is known for its intelligent, unique solutions to meet customer requirements at the limit of what is doable. The mechanical engineering company has approximately 30 employees and has been operating as a Pörner subsidiary since April 2022. In the external communication, only the logo of TAF changes to match the corporate design of the Pörner Group.

TAF has developed into a specialist in constructing experimental plants in the past decade. Their know-how, in combination with Pörner's plant construction experience, opens many advantages for customers:

- accelerated order processing of urgent components: shift operation if required
- use of practical experience in the construction and operation of special equipment
- long-term cooperation with universities and research institutes opens access to the latest scientific research findings
- a functioning network with regional partners enables the efficient realization of complete plants.

Together with TAF, Pörner is now able to realize innovative technological solutions in a tailor-made manner and implement unique designs for proven and novel processes. ■

Special process equipment is manufactured in-house in the 1,900 m² hall in Freiberg.

»We are proud to set an important symbol of sustainability here. The new pilot plant will lead to significant research advancements in the utilization of renewable resources for many companies.«

Jonas Kappeller
Managing Director TAF

Next-level research

SUSTAINABILITY. TAF builds pilot plant for thermal processing of biomass.

FREIBERG. The Technical University of Dresden is exploring how innovative waste products from agriculture, forestry, and grass can be sustainably produced using a new pilot plant planned and manufactured by TAF.

The research focuses on using agricultural waste products (such as straw, hemp, and flax), wood and forest industry waste (such as damaged wood, sawdust, and bark), and fast-growing plants (such as miscanthus/elephant grass). By analyzing these different biomasses, the best possible production of cellulose for the paper, textile, and chemical industries, delignified woods and veneers for functional materials, and other innovative products will be researched.

Utilization of straw & Co.

TAF's contract included the new conception, design, engineering, construction, assembly, commissioning, and staff training. As a result, the plant is currently nearly unique in Central Europe. The highly modern and flexible pilot plant enables the research and verification of alternative methods, the adjustment of essential parameters such as time, temperature, or pH, and the minimization of energy and chemical use. ■

LEPD technology for better lube oils

PATENTS. EDL puts pilot plant for gentle lube oil blending into service.

MORE ABOUT THE BENEFITS HERE:
www.poerner.at/en/technologies

LEIPZIG. EDL offers its customers an innovative solution for producing high-quality lubricants with a 50 % reduction in energy consumption: the patented LEPD process (Low Energy Polymer Dissolving). The innovative process allows for the direct and gentle dissolving of viscosity improvers (VI improvers) in the base oil with impressive advantages over the state-of-the-art.

On-site test pilot plant

The LEPD offering was expanded at the end of 2022 with a pilot plant. The test plant, constructed and manufactured by TAF according to EDL plans, is skid-mounted for transportability and can be used directly at the customer's site. With the plant, customer can test their lubricant recipes on-site. Advantages: The test results provide a secure basis for the design and engineering of blending plants, and the desired product quality can easily be transferred to an industrial scale.

Customers can now test their own lube oil formulations on site with EDL's portable LEPD pilot plant. The plant was manufactured by TAF.

High energy and time savings

In the patented LEPD process, the polymer is gently dissolved in the base oil under the pressure of up to 10 bar and temperatures below 120 °C in a liquefaction chamber under inert gas. The process saves a third of the time compared to the conventional production process.

Due to the lower process temperature, the heat input is lower. Compared to conventional systems, about half of the energy required for the process can be saved.

There is also no risk of turbidity or coking, so that the final quality of the finished oils is significantly higher, and no additional additives such as antioxidants are required. Moreover, since the polymer chain structure is not modified in the gentle solution process, better lubricating properties of the product are achieved. ■

Improved recycling of plastics

CIRCULAR ECONOMY. Novel, patented process for depolymerization of plastics.

LEIPZIG. As versatile and valuable as plastics are, plastic waste is problematic for the environment. Because it is difficult to almost impossible to degrade it, disposing of plastics is one of the most significant environmental problems worldwide today.

On the other hand, utilizing these materials offers a tremendous economic opportunity. Plastic waste can either be recycled (reusable or raw materials) or used for energy recovery. Currently, more than half of plastic waste in Germany is incinerated, as certain plastic products are not recyclable, or recycling does not pay off financially.

Circular economy with EDL process

The type of utilization to be chosen mainly depends mainly on the purity of the plastic waste. After all, there is a great variety of plastic types and additives. Furthermore, single-origin plastic waste can be recycled to reusable materials, i.e., this waste is processed so that base materials for new products are created.

The patented EDL process offers such an opportunity for material utilization of plastic waste. In the process, polyolefinic plastics, such as polyethylene (LDPE, LLDPE, HDPE) and polypropylene (PP), are subjected to thermal depolymerization. Depolymerization is based on the decomposition of polyolefins, initiated by free radicals and achieved under the influence of moderate heat. The macromolecular chains of the starting materials are split into smaller molecular structures, and the polyolefins are converted into waxes and hydrocarbons.

The EDL process focuses on producing synthetic waxes to simplify the entire process layout and minimize the production of light ends and unwanted cyclic and aromatic compounds. In addition, the waxes obtained are excellent for direct marketing as high-quality products.

With this patented technology, plastic waste is transformed into a valuable raw material for the industry. In doing so, an essential contribution is made to develop a well-functioning circular economy. ■

FOTO: ADOBE STOCK

REVAMPED
BY PÖRNER GROUP

AN INDUSTRY IN UPHEAVAL: GREEN REVAMP

The way to an efficiently modernized plant for the energy transition.

BY PETER SCHLOSSNIKEL

Current climate protection guidelines, volatile energy and raw material costs, and the shift away from fossil fuels challenge the process industry to adapt their productions comprehensively. Therefore, it is necessary to re-think processes to utilize the enormous potential of the upcoming transformation positively. However, as with any upheaval, exceptional opportunities arise from those who react most flexibly.

As complex as the tasks of green transformation are, the technology approaches required are often already available. For example, alternative processes such as Power-to-X-(PtX-)/Biomass-to-X-(BtX-) technologies are bringing about a sustainable change in plant engineering. Using PtX products such as green hydrogen or green Fischer-Tropsch hydrocarbons, conventional refineries can, for example, improve their CO_2 balance significantly.

High-level plant modernization

To make the transformation sustainable and cost-effective, the motto is to reuse as much as possible instead of tearing it down. Instead of starting expensive and years-long new construction projects, the potential of existing plants should be utilized. Although from the technical point of view, a plant overhaul can be even more challenging than a greenfield project, it is often less costly, and production can be resumed more quickly. Often, minor changes to the plant configuration can achieve the desired results. Planning and execution are, however, very complex and require extensive know-how and profound expertise.

While in the past modernization projects primarily aimed at optimizing products and increasing capacities while reducing production costs, ecological aspects involving alternative resources and renewable energy sources are now coming more and more to the fore.

Aromatics extraction plant at the PCK refinery: Classic revamp with minimization of energy and operating material consumption combined with innovative EDL technology for extractive distillation to minimize of toxic solvents.

Since the demand for products from fossil feedstock decreases, the production of bio-based and primarily synthetic fuels (e-fuels) or a shift of the product portfolio from fuel to petrochemical feedstock are, for instance, options for refineries. In addition, refineries' existing plants and infrastructure can be utilized to produce alternative products.

Green Revamp by Pörner

Given the urgency of adapting to new conditions, starting with small, effective steps is recommended as soon as possible.

To comprehensively bring existing plants up to the latest standards with manageable effort, a thorough analysis of existing production concepts, developing strategic goals, and an in-depth process-related assessment are necessary. A FEED (Front End Engineering Design) with sustainability goals is the content of the pre-project planning phase. Then, Revamps can be executed in several phases with increasing processing depth.

1. As part of the energy transition, renewable feedstocks and sustainable technology approaches should gradually find their way into existing plants. Savings through energy optimization, recycling, and closed material and water cycles are often a rewarding first step in consideration.

2. To achieve further ecological goals such as reducing pollutants in air, water, and soil – besides the economical use of resources or energetically optimized processes – thoroughly analyzing the applied process with its feedstocks and final products is helpful, e.g. employing process simulation. Furthermore, under new conditions, there are opportunities to convert previous by-products or waste products into environmentally compatible and economically producible products through recycling and processing. Pörner and EDL, as technology-oriented plant designers, have always had strong process engineers and proprietary technologies, including the latest alternative processes. This includes, for example, the know-how to environmentally process heavy residues in refineries into valuable products or recycle plastic through depolymerization. In the field of Pörner's bitumen core competence, the aim is to integrate lignin as renewable raw material, which occurs in the pulp industry, into the road construction material, even positively affecting the properties of the bitumen.

3. Finally, renovating equipment under sustainability criteria is essential to a „green revamp". Through appropriate optimization and selection of innovative equipment and systems in the context of »Plant Engineering 4.0«, existing facilities can be modernized sustainably, and operating costs can be reduced simultaneously through targeted investments. Regarding sustainability, engineers, for example, examine whether environmentally friendly wooden structures instead of steel structures are possible for production halls, whether lightweight structures are useful, or whether extraordinary longevity of components can be set to continue using existing infrastructure. Significant savings can also be achieved through rationalization and automation using artificial intelligence.

Precise planning and preparation remain the key to success

The implementation should be efficient and eco-friendly, no matter how significant the changes are. For this, precise preparation and planning of dismantling and assembly work and the preparation of detailed logistics concepts and pre-assembly activities are important. In doing so, the focus should always be on the implementation with the lowest possible loss of production within short plant shutdowns. Pörner and EDL have numerous references for this particular task.

As a result, the customer receives the individually designed plant: for cost-effective and sustainable production over the entire extended life-cycle. ■

Renewable energy from biomass

SYNTHESIS GAS. Pörner subsidiary TAF realizes BtX plant for pyrolysis of wood.

TAF PÖRNER GRUPPE

GRONINGEN. The energy transition requires sustainable electricity and increasingly more gas based on renewable sources. In this context, the Dutch company Torrgas has built a 1 MW pilot plant based on their technology, to produce synthesis gas in Groningen/Netherlands. TAF, as a manufacturing company and process know-how provider, was awarded a contract with the planning, manufacturing and supply of the pyrolysis unit.

TAF has been pooling the know-how for gasification technologies available in Freiberg for decades and perfecting the process equipment required. As a result, it is one of the most advanced in Europe.

The results of the 1 MW pilot plant in Groningen led to the design contract for a 25 MW plant for Pörner.

Torrefaction as a basis for profitability

Raw materials are waste wood, fallen wood, storm wood, aged wood, and other wood waste, which are converted into torrefied material and pelletized at relatively low temperatures under atmospheric pressure. This creates a dry feedstock with a very high energy density that can be transported cost-effectively and ensures a stable heating value for the subsequent two-stage gasification process.

From green synthesis gas to diverse products

The product of gasification is high-quality, green synthesis gas. In addition, the gasification process is more sustainable and environmentally friendly than the direct combustion of biomass.

The further processed synthesis gas is a versatile, scalable, and cost-effective alternative to fossil fuels. By further process steps, bio-methane can be produced as a replacement for natural gas, bio-methanol, hydrogen, or fuel. In addition, high-quality bio-char and pure CO_2 are produced in the process.

Higher renewable energy share to achieve climate goals

Based on the positive results of the pilot plant test series, Torrgas decided to develop a 25 MW project at the location in Delfzijl/Netherlands. Currently, Pörner is finalizing the pre-planning for this project.

This industrial-scale plant will produce bio-methane, which will replace conventional gas and be fed into the local natural gas network. As another product of gasification, high-quality bio-char will be produced. ■