Engineering-Times

PÖRNER GRUPPE

EDL PÖRNER GRUPPE

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The future is being shaped now

The new growth: From mass to class

We are at the beginning of a new age in which humans have to readapt to natural cycles - using state-of-the-art technologies. In the future, it is rather a question of improving products and processes than just producing more.

Today, around 7.8 billion people live on our planet; by 2050 there will be around 9.7 billion: i.e. natural resources (ore, rare earths and mineral raw materials, water and food) will inevitably become scarcer and, at the same time, environmental pollution will increase rapidly.

We at Pörner, therefore, see three main areas in the process industry for the next decades, which we dedicate ourselves to with every effort:

1. new fuel & energy concepts,
2. innovative valuable materials, and
3. environmentally friendly production.

1. New fuel & energy concepts

In order to cover the increasing energy demand, the efficiency in the generation, storage and use of renewable energies (sun, wind, water, and geothermal energy) is being gradually increased.

Until then, there is no choice but to use fossil resources more efficiently and utilize released CO_2 industrially or restore it in reservoirs.

In the future, the process industry will face the task of providing alternative, liquid and gaseous fuels for aviation and heavy transport, as well as 'green' resources for modern plastics and materials.

Pörner is already active in many alternative projects with high-tech technologies (PtX processes, torrefication, gasification, Fischer-Tropsch synthesis, etc.), bio-ethanol or synthetic diesel production and assists the industry in realizing its plans.

2. New valuable materials - lighter, stronger, optimized

In the future, even higher-quality, energy-efficiently manufactured materials (hence valuable materials) will be required: optimized in terms of purity, strength, hardness and weight, with longer service lives, fully recyclable and reusable or biodegradable.

This includes modern plastics and compounds as well as renewable basic materials or industrial raw materials from previously unused by-products. New types of valuable materials allow for products to be completely redesigned and optimized in terms of energy and resources.

Pörner is the experienced engineering partner when process plants for special and niche products are required and develops its own 'green' value processes such as bio-silicates from the ashes of rice hulls.

3. Environmentally friendly production

Today, production processes must be designed in an environmentally neutral way: with clean, closed circuits, without harmful waste products and as emission-free as possible. Creating products and materials that are recyclable and recoverable at the end of their product life is becoming a design criterion from the very beginning. This also includes thinking of potential reuse of resources, e.g. generation of energy from waste wood through gasification.

For economic sectors that previously operated separately, e.g. transport, agriculture and industry, this opens up new opportunities for integration - from resources to the end product, from cradle to grave.

Conclusion

Investing in the environmentally friendly renewal of our energy and production systems will bring new added value towards quality to our economy and thus become a backbone for our economic development, prosperity and social balance in Europe and beyond in the next decade.

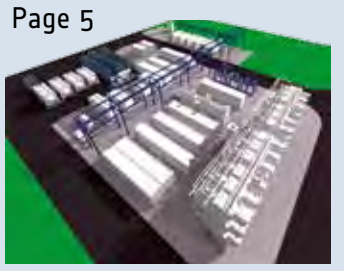
We at Pörner are ready to let the new projects become reality - together with our clients - with the right mix of experience and commitment to new technologies.

There is a lot to do -
Let's get started!

THE GREEN FUTURE OF PRODUCTION

Becoming climate-neutral with alternative energies and processes – the PtX technology paves the way.

Page 5



GROWTH DESPITE CORONA

PÖRNER WATER

The Pörner Group grows constantly: we welcome a new EDL team in Cologne and expand the portfolio with 'Pörner Water', the new competence center for water treatment in Vienna.

Pages 4 and 8

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Plant shutdown under corona conditions

Aromatics extraction. Successful ‘Spring Shutdown 2020’ at PCK Refinery despite corona crisis.

BY HOLGER LINKE

SCHWEDT. A virus keeps the whole world in suspense in 2020. There is almost no country, which is not affected. Due to the lockdown, many companies are in an extremely tense economic situation since production had to be shut down temporarily.

But there are also exceptions in this difficult time. At PCK Raffinerie GmbH in Schwedt the ‘Spring Shutdown 2020’ that had been planned for a long time, took place in April this year – in compliance with the strictest regulations and hygiene measures. The work mainly focused on revamp measures to improve the yield structure and availability of plants.


PCK RAFFINERIE GMBH

Lift of new extraction column under ideal conditions in April 2020

EDL and its team were on site to revamp the aromatics extraction plant (ARO).

Rejuvenating cure for aromatics plant

A plant modification needs to be prepared well. Based on a Process Design Package (PDP), EDL was commissioned to perform the extended basic engineering, detail engineering, procurement services as well as construction supervision. In addition, engineering and procurement services stipulated in a contract supplement were provided for the ARO flare system and for the implementation of HAZOP measures. The ARO and o-xylene (OXD) plant areas were connected to the refinery’s flare system in this additional project. These works were carried out at the same time as the revamp of the ARO plant.

In figures, these individual projects included:

- Approx. 130 equipment items to be prepared
- 400 pipelines as well as 270 t of structural steel to be engineered.

Preparatory work for connecting and integrating equipment and pipelines in the ARO plant was already done during the ‘Step 2 Shutdown’ in spring 2019. Following this, detail engineering was completed, equipment items were delivered to the customer site and the new columns were pre-dressed with all required parts to save valuable time during shutdown. In doing so, everything was optimally prepared for this year’s spring shutdown. However, what the best planning could not foresee was the corona crisis.

Nothing was as usual

Since the shutdown should not be postponed PCK Refinery elaborated a comprehensive concept with strict hygiene and safety measures, carried out hygiene training and instruction, and prepared much more. Nothing was as usual. Body temperature measurements at the gate, obligation to wear mouth / nose protection or face visors, hand disinfection, hygiene patrols on the refinery premises, compliance with the safety distances, etc. A shutdown under these conditions is not easy.

Deadline reached

The hot phase of the shutdown began on April 19th, 2020. A few days later, on April 24th, 2020 at 6 a.m., the first column was lifted out of the ‘old’ ARO plant and brought to the pre-assembly area where the new, prefabricated steel construction modules and pre-dressed columns were already waiting to be ‘deployed’.

And then the day finally came. On April 27th, 2020, the new extraction column K401 was lifted in ideal weather conditions (no wind, no rain) at 6 a.m. The subsequent assembly work and the installation of further equipment went according to plan without incidents despite the special circumstances, so that mechanical completion was achieved in accordance with the target in week 21. ■

THE PROJECT

Aromatics extraction plants are used in refineries to separate a mixture of aromatics into pure benzene, toluene and xylene mixtures. The need for high-purity aromatics for the synthesis of petrochemical products is increasing steadily so that PCK Refinery decided to refurbish the existing Arosolvan plant. The aim of this plant modification under the project title ‘Aromatics Light’ was to replace the previously used solvent N-methyl-pyrrolidone (NMP) by the less toxic tetraethylene glycol (TTEG) as well as to increase capacity while using existing plant components as much as possible.

GRATITUDE

Complicated tasks require reliable partners. EDL would also like to thank everyone involved – the customer, partner companies and, of course, the colleagues who set the world on fire under these difficult circumstances.

Thomas Schulze, PCK Maintenance Manager:
„Our employees and our partners performed very well under these hard conditions. The people on site appreciated the measures taken and showed incredible discipline – regardless of their personal opinion on the corona measures. This is professional work.“


PCK

DANKSAGUNG

Die Corona-Krise stellt uns vor ganz neue Herausforderungen, so auch bei der Frühjahrsabstellung 2020. Alles steht unter den Zeichen von Abstand, Hygiene, Gesundheit und Infektionsschutz.
PCK hat die Herausforderungen und Projekte mit motivierten Mitarbeitern und kompetenten Partnern gemeistert und die gesetzten Ziele erreicht.

Die PCK Raffinerie in Schwedt/Oder bedankt sich bei

EDL Anlagenbau Gesellschaft mbH

für Flexibilität, Anpassungsfähigkeit, Disziplin, Ausdauer und konzentriertes, professionelles Arbeiten während der

FRÜHJAHRSABSTELLUNG 2020

unter verschärften Corona-Schutzmaßnahmen, wie Mindestabstand, Mund-Nasen-Schutz-Pflicht auf den Baustellen, zeitversetztem Arbeiten, Hygieneunterweisungen u.v.m.

BLEIBEN SIE GESUND!

Wulf Spitzley
Sprecher der Geschäftsführung

ppa. Thomas Schulze
Leiter Instandhaltung

Thank-you note by PCK for the ‘Spring Shutdown 2020’

From water to rails

Refinery. EDL successfully completes order for HOLBORN Refinery.

BY ANDREAS SCHWOPE

HAMBURG. Climate change has also an influence on the transport infrastructure. Due to the persistent drought in recent years, waterways with low water levels can be used less and less for heavy transport. Therefore, many companies are switching to rail or road - including HOLBORN Europa Raffinerie GmbH in Hamburg.

The refinery commissioned EDL with a study to optimize rail loading in order to identify ways of increasing rail handling to seven block trains per day. The construction of a new loading terminal was also scrutinized.

Unique flow model determines loading arms

Can the required number of trainsets be filled using a new tank wagon loading system? In order to determine the capacity of the loading system, EDL developed a calculation model, the so-called flow model, in close cooperation with the customer. This model is unique in this form on the market and can also be used for similar orders in the future.

On the one hand, the model takes into account the logistical requirements of the customer and on the other hand the requirements of Technical Rules for Hazardous Substances TRGS 727. Based on the flow model, the number of loading arms required can be determined and different loading options can be compared.

In mid-January 2020, EDL handed over the work results to HOLBORN Europa Refinery on time and in good quality.

„We are pleased to have found a promising solution for our rail loading together with the EDL engineers,“ says Frank Schulze, customer’s Project Manager in Hamburg. ■


HOLBORN EUROPA RAFFINERIE

Special bitumen for sustainable road building

Technology development. Pörner know-how makes best binder quality affordable worldwide.

BY MARK SEPER

VIENNA. Pörner is a globally recognized expert in bitumen research and application when it comes to turning residues from oil distillation into one of the most important construction materials.

For four decades, the specialists have been working on better binders that have 'multigrade' properties (both heat and cold resistance), are highly resistant to aging, are mostly recyclable, can be produced economically and are adapted to different climates.

Because one thing is certain: there will still be a high demand for bitumen in the future - regardless of the vehicle propulsion methods.

Sustainable road construction - influence on the national economy

Particularly, developing regions of the world lack efficient transport routes, which is one of the main obstacles to their economic development.

When roads are built, they should be constructed and operated efficiently, environmentally friendly and sustainably.

This refers to minimizing the 'total costs of ownership' of a traffic route, including the planned maintenance over an 'everlasting' period.

The bitumen binder must correspond to the required performance of the road in terms of traffic load, climatic conditions and their importance - the traffic route is crucial for the area (example city motorway).

Better quality and lower construction costs

By optimizing the production (e.g. with the Biturox® process, using inexpensive feedstock from the refinery), better bitumen qualities are produced very cost-effectively. These can then be specifically refined with additives.

Pörner process engineers develop tailor-made, advanced binders, including modification with polymers and synthetic waxes, tailored to the various requirements of the road profile (base and surface layers) for construction of new and repair of existing roads. This way, the proportion of expensive additives is minimized and at the same time, the road can be designed with significantly lower layer thicknesses - which substantially reduces construction costs.

> By combining Biturox® bitumen with synthetic additives, tailor-made binders are created.
>
> Mark Seper, Head of Process Engineering, Pörner Vienna

The addition of synthetic waxes can have a beneficial effect on the temperature and compacting properties of asphalt. E.g. airport runways can be newly paved in the shortest possible time.

Longer life cycles of roads make special bitumen a sustainable resource. By combining special Biturox® bitumen components with additives, better:

- Emulsifiability
- Adhesion between road layers
- Cold properties of the bitumen (no cracks in winter)
- Specialties for repairs
- Stable emulsions as a transport alternative

can be achieved. Hard bitumen components, polymers and resins as well as synthetic waxes and adhesives are admixed.

BITUROX®
BITUMEN OXIDATION TECHNOLOGY

Everything for even better binders

In the future, all options for optimization at all levels (requirements for the road, road profile, binders, additives, aggregates, construction method, and maintenance strategy) need to be comprehensively considered and applied.

We at Pörner see it as our task to be a catalyst with our application research for more intensive exchange and further development worldwide. ■

Biturox® pilot plant in Schwechat

Scheduled reactor replacement

Modernization. Pörner/EDL successfully complete reactor replacement project in the HDS1 hydrodesulfurization plant at OMV.

OMV

BY THOMAS RIEDER

SCHWECHAT. The right mix is what counts. With the experience gained in more than 20 HDS projects executed by EDL and the on-site knowledge of the Pörner colleagues, the OMV project was accomplished across locations. Yet again, the know-how from Leipzig in the field of desulfurization was implemented smoothly by the Pörner team on the construction site.

Reactor replacement in the HDS1 plant

Subject of the project was the reactor replacement in the HDS1 desulfurization plant. The scope of services included a study in advance of the project as well as the FEED. The execution phase then followed with detail engineering as well as construction supervision.

The engineers at EDL and Pörner worked on the replacement of heat exchangers, the reactor and connecting pipelines as well as on the installation of the new steel structure and renewal of instruments in this plant area for almost three years.

Manufacturing and delivery of the long-lead items alone took about 14 months. As always in a refinery project, the space was limited and, therefore, it was a challenge for the engineers in terms of engineering and scheduling.

Routine equipment lifting

The highlight of the project was the precise lifting and installation of the heat exchangers and the reactor on a weekend in June.

The new plant components were placed on the existing foundations, and the connecting pipelines were rebuilt according to the current state of the art. Everything went according to plan – and the weather was also fine.

The refurbished plant was successfully put into operation on July 7th, 2020 - and it worked smoothly.

The modernization of the HDS plant ensures full use for many years to come. ■

> Another project under the 'Revamped by Pörner' flag that we completed on time and budget.
>
> Thomas Rieder, Project Manager at Pörner Vienna

The reactor on its way through the Schwechat Refinery

Lifting of the old reactor that reached the end of its life

Installation of the new reactor on a weekend in June 2020

Thanks to good engineering, the 55-ton reactor fits perfectly on the foundation. All equipment was replaced without a hitch.

Water technology refreshes Pörner portfolio

Expansion of services. New competence center Pörner Water established.

BY PETER SCHLOSSNIKEL

VIENNA. The safe supply of clean drinking water and healthy foods is based on an intact water economy. Pörner takes this into account with its own water technology department, which is focused on highly effective water use in the industry.

That's why, Pörner has taken over employees who previously worked in the business segment of water treatment plant engineering at Siemens Austria.

Under the lead of Dr. Robert Vranitzky, the new competence center Pörner Water started working on March 1st, 2020.

Dr. Vranitzky: *„Water treatment not only serves to protect the environment, but is also in the focus of many of our customers. Especially, in the oil and gas industry clean water is essential for the efficiency of processes and helps to keep the total cost of ownership low. At the moment, we are processing orders in both oil and gas industry as well as in the pharmaceutical industry."*

From basic concept to predictive maintenance

Pörner's mission is to execute the whole project, tailored to customer's requirements from basic concept to the entire engineering, procurement and site supervision up to commissioning. Additionally, Pörner Water offers predictive maintenance and service for plants during operation. With this, Pörner regards the plant's entire life cycle and ensures long-term value retention as well as high plant availability. This reduces unplanned downtimes, damage to key equipment and negative environmental impacts, and ensures a continuous, safe operation.

Pörner Water Technologies

Process Water Treatment

- Flocculation, coagulation, sedimentation, flotation,
- Media filtration (sand, activated carbon and mixed bed filters)
- Removal of iron and manganese
- Removal of hydrocarbons, BTXE, phenols
- Membrane processes (ultra-filtration, micro-filtration, nano-filtration, reverse osmosis)
- Ion exchangers with internal/ external regeneration
- CEDI (Continuous Electro Deionization)
- Integrated solutions of all listed technologies

Industrial Wastewater Treatment

- Media filtration (sand, activated carbon and mixed bed filters)
- Primary oil removal (API, CPI)
- Oil separation, flocculation, coagulation, sedimentation, flotation
- Biological wastewater treatment
- Wastewater treatment
- Membrane processes (MBR, ultra-filtration, micro-filtration)
- Integrated solutions of all listed technologies

The scope of services ranges from front-end-engineering to the execution of complete water treatment plants with related after-sales service.

Long-term preservation of the plant as well as its maximum usability are guaranteed with Pörner's life-cycle service concept.

Water treatment – an advantage for every process plant

Water supply of appropriate quality is an essential process requirement. On the other hand, proper treatment of process wastewater is also an essential requirement for maintaining the production at a location or even expanding it. Based on the experience of many international references, Pörner offers optimized solutions for every possible case from green field installations to extensions or modernizations.

The scope of work ranges from water treatment plants in industrial surrounding, such as de-oiling of reservoir water in oil production or the treatment of process water and wastewater in refineries and in the petrochemical industry to the treatment of seawater for further use as process or drinking water.

The specialists develop solutions with optimized total costs, put their focus on the minimal use of energy, chemicals and fresh water under the premise of minimizing emissions and maximizing the customer's operational benefits.

"Our goal are intelligent circulations that return water where it's useful, and channel as little wastewater as possible out of the process. The industry needs sustainable system solutions for an integrated water treatment," emphasizes Dr. Vranitzky. ■

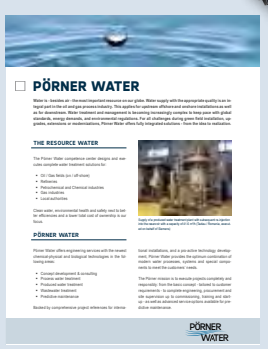
PÖRNER WATER

PÖRNER WATER

… provides the optimal combination of knowledge about modern water processes, systems and special components, backed by worldwide project references and a proactive technology development.

FLYER PÖRNER WATER

For more information please visit
www.poerner.at/technologies/poerner-water



INTERVIEW

Pörner Water: Added value for all Pörner customers

How all customers of the Pörner Group benefit from the additional water know-how.

We welcome Dr. Vranitzky with his team, who changed from Siemens Austria to Pörner in March 2020. You have set up the new Pörner Water department. How would you summarize the last six months?

Vranitzky: Very positive. At Pörner, the decision-making channels are clear, the hierarchy is flat and communication with the management has been very good from day one.We have quickly become an integral, value-creating part of the Pörner Group. It is our goal to let the customers of all Pörner locations benefit from our water competence. We are on the right track.

EngTimes: Where do you see the greatest synergies with Pörner projects?

Vranitzky: Over the past decade, our experts have successfully implemented complete water treatment plants in the oil and gas industry – mainly in Romania, Croatia and Kazakhstan. As Pörner Water department, all Pörner projects can make use of our experiences in water and wastewater treatment. Moreover, we will also contribute to all water-related Pörner technologies. The Bio-Silicate technology is an excellent example of this.

Dr. Robert Vranitzky, Head of Pörner Water

EngTimes: What do you appreciate about your team in particular?

Vranitzky: My employees are excellently trained and have developed a high degree of versatility due to the project work over the past years. Be it the preparation of a process concept, elaboration of offers under time pressure, handling projects for customers with demanding technical requirements or the commissioning support.

We have grown together to a strong team and are looking forward to many future projects at Pörner.

EngTimes: Your start at Pörner was marked by the lockdown. What are your thoughts on Covid-19 in everyday work?

Vranitzky: At first, the situation in home office was new and unusual. In fact, this crisis shows that there will be new ways of dealing with each other on a daily basis and various other work forms. It is up to us as individuals, to stay flexible in our minds, to deal with new circumstances and to do our work efficiently.

EngTimes: Thank you and every success for you and your team! ■

References that convince:

Process water treatment for Infraserv Höchst

Treatment of river water to boiler feed water with ultra-filtration, cation exchanger for decarbonisation, reverse osmosis, degassers and subsequent multistep ion exchangers with a flow rate of 300 m³/h (expansion stage 1) and 100 m³/h (expansion stage 2)

Scope of work: basic engineering, detail engineering, manufacturing and installation, commissioning

Execution on behalf of Siemens

When technology meets ecology

Green future. How we use new opportunities in times of change.

BY ANDREAS PÖRNER

VIENNA. The last report to the Club of Rome shows: the world faces more and more energy and resource problems – and to make matters worse, all this happens in combination with global warming caused by greenhouse gases. Within the next 30 years, 2 billion more people will live on our planet. The resources available on earth are limited – their exploitation is getting more and more difficult and energy-intensive.

As a result, the biosphere is increasingly suffering: natural landscapes are being destroyed, there is a lack of water in cultivated landscapes, animal species are becoming extinct... No doubt: We need to go back to natural cycles.

The problem of profitability

Many alternative manufacturing methods and processes are not yet economical enough. It cannot be asked of companies to invest in new processes and products if they are not profitable.

Alternative energy projects therefore require political support by 'incentives' such as tax concession, regulatory framework, etc. Particularly, if oil and gas might be available at a cheaper price in the near future due to the reduced demand.

How to eat an elephant?

If we would switch completely to alternative technologies all of a sudden, the prices for energy and important products would need to be increased enormously. However, this problem can be solved, since the transition to biogenic energy sources and valuable materials does not need to happen overnight, but rather gradually.

Initially, only a small part will be substituted by a (currently) more expensive alternative medium in order to keep the total costs in a tolerable range.

Over time, the costs should decrease thanks to integration, technical progress and a better economy of scale.

Green power

The next few years are crucial for the energy transition in order to achieve climate neutrality before long. Sustainable mobility, environmentally friendly energy generation and an efficient use of energy and resources are essential for maintaining prosperity and quality of life.

The energy issue is not just one of energy generation – it cannot be resolved separately from the sustainable, energy-saving production of investment and consumer goods.

From a national economic point of view

We face challenges and chances due to the comprehensive, environmentally-balanced renewal of our energy and production systems: new processes and products will be developed.

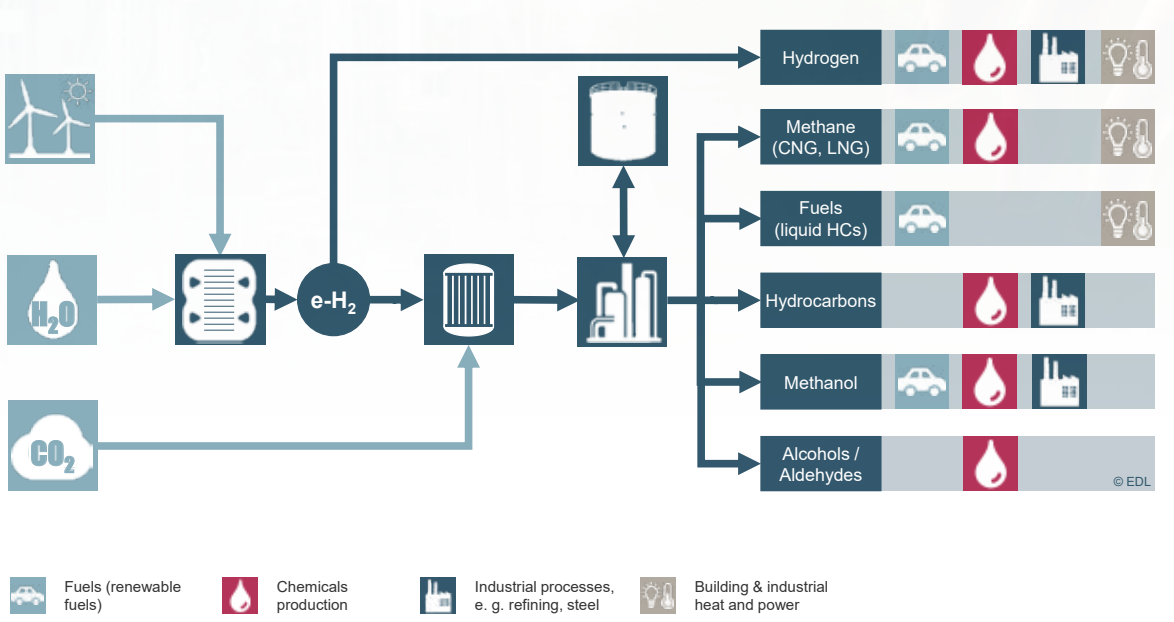
The reorganization of economies towards better integration of previously separated industry branches such as agriculture, transport, industry and commerce results in new profitability.

A lot needs to be invested, but the economies receive new impulses and new jobs are created. The use of locally available renewable resources facilitates local added value, avoids intercontinental transport and also ensures our high standard of living and social balance in the future. ■

'GREEN PRODUCTION'

As a competent engineering and technology partner, the Pörner Group supports the industry in significantly improving its carbon footprint and in realizing the changeover from fossil to renewable energy sources.
With the Pörner Group as process plant engineering contractor, customers have all options for a 'green production'.

Plant for the production of 15,000 t/a fuel and 2.3 MW electricity from 65,000 t/a wood, based on pyrolysis, gasification, synthesis gas purification and conditioning, Fischer-Tropsch synthesis, electricity and oxygen generation, built in 2007



PtX and BtX technologies for the generation of hydrogen and synthesis gas as base material for a sustainable industry in all sectors.

Decarbonization with PtX technology

Green potential. Promising way to reach the climate protection goals by 2050. EDL proves technical and economic feasibility of PtX plants.

BY DR. MICHAEL HAID

LEIPZIG. By 2050, the annual greenhouse gas (GHG) emissions are expected to fall by 80 to 85 % compared to 1990 figures. Both the EU and Germany have committed themselves to include these values in their climate protection goals. By 2030, a reduction in greenhouse gas by 40% is planned. But how can these goals be achieved?

The most important green resources are currently renewable electricity, biomass and CO_2, which is obtained from exhaust gases (Carbon Capture and Utilization, CCU) or the ambient air. They are the basis for the production of sustainable synthetic reaction products such as:

- Methane
- Hydrogen
- Methanol
- Fuels (gasoline, diesel, kerosene)
- Waxes and hydrocarbons for the chemical industry

With EDL's Power to X technology an intelligent sector coupling between electricity, heat, transport, chemistry and industrial processes is possible, thus obtaining the required magnitude of decarbonization.

Flexible PtX technology to produce valuable products

The PtX technology covers a wide range of both raw materials and product variety. In addition to CO_2 from industrial point sources, CO_2 can also be used from the ambient air. Hydrogen / synthesis gas is generated by electrolysis using renewable power. With processes further developed and adjusted by EDL to produce the requested final products an efficient overall PtX process is ensured.

No more utopia – Jet fuel from air

The production of renewable aviation fuel from air becomes the focus of special attention since aviation is the most difficult sector to decarbonize. Furthermore, it is to be expected that this area will cause 25 % of all CO_2 emissions of the transport sector by 2050.

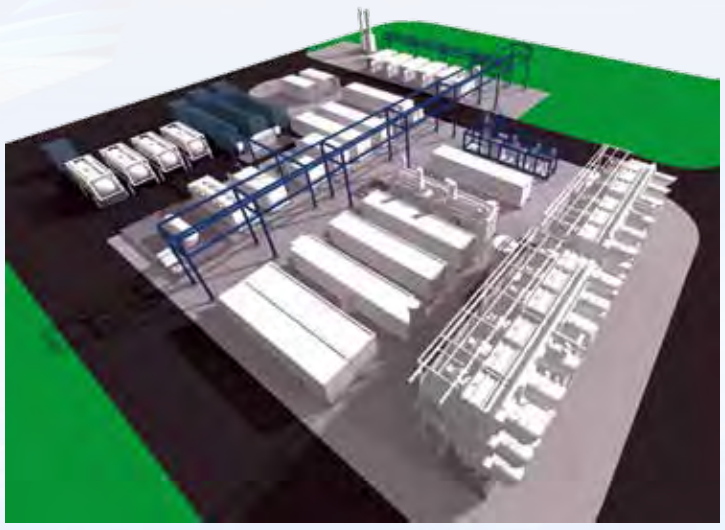
Advantages of renewable jet fuel are:

- 100% climate neutral
- Reduction of NOx emissions by 12 - 25 %
- Reduction of fine dust emissions by 95 %
- Up to 15 % less fuel consumption
- Almost no water consumption
- No new logistics infrastructure and no new propulsion systems required.

Therefore, synthetic fuels are an excellent alternative to using fossil fuels. ■

References that convince:

PtX plant for the production of e-kerosene



In early 2020, EDL successfully completed the first phase to set up a demonstration plant for the production of aviation fuel from air at the Rotterdam The Haag Airport.

The planned, fully integrated demonstration plant is intended to produce 1,000 l/d e-kerosine using CO_2 and water from the ambient air as well as renewable power.

All resulting by-products will be reused in the plant. Both the technical and economic feasibility have been proven in a large-scale study.

Success for DOW with methylcellulose

REVAMPED BY PÖRNER GROUP

Plant expansion. EDL and DOW are glad about successful project completion to increase sales and efficiency in Bitterfeld and Bomlitz.

BY DR. OLAF BOHLEMANN

BITTERFELD/BOMLITZ. Only a few kilometers from Leipzig, DOW Deutschland Anlagengesellschaft mbH produces high-quality methylcellulose for the construction industry at its Bitterfeld location (Saxony-Anhalt). The product is mixed, packed and logistically marketed to various brand-name products at the Bomlitz location (Lower Saxony).

In order to meet the growing demand for methylcellulose in the expanding construction industry DOW has implemented an ambitious investment plan over the past two years. This plan covered various plant expansions at the Bomlitz and Bitterfeld sites aimed at an increase in sales and production efficiency.

Two locations and eleven sub-projects

In order to achieve the ambitious goal, a reliable engineering partner was sought - and found with EDL from Leipzig. In January 2018, EDL was commissioned with a total of eleven sub-projects, eight of which were implemented at the Bitterfeld site and three at the Bomlitz site.

EDL was responsible for the technical planning across all disciplines as well as for the as-built documentation in Bomlitz. The first three sub-projects were successfully completed there in spring 2019.

With respect to the eight sub-projects in Bitterfeld EDL's engineers also did the technical planning in all disciplines and were responsible for construction supervision. The decisive factor was, on the one hand, in-depth engineering and coordination of all disciplines to implement the tie-in points during the main shutdown in March 2019. On the other hand, the work on various sub-projects during ongoing operation until March 2019 required a high degree of coordination work and cooperation with the customer.

Milestone reached – customer satisfied

Expansions in existing systems require target-oriented and, if necessary, pragmatic solutions. The EDL team had been especially set up for the requirements of this job and was able to handle the projects efficiently to DOW's satisfaction based on the experience gained in more than 50 major revamp projects. ■

DOW DEUTSCHLAND ANLAGENGESELLSCHAFT MBH

l.: An important milestone reached in September 2019: the silo for vehicle loading is installed without any complications. Based on a new loading technology transport vehicles are now filled. Because of the inclined position of the vehicle tank, it is filled to a significantly higher level than before, thus saving necessary truck transports while having the same production quantity. This saves approx. 150 trucks per year! A great contribution to reduce costs and protect the environment!

DOW DEUTSCHLAND ANLAGENGESELLSCHAFT MBH

l.: The new double-wall ethylene oxide tank having a volume of 100 m³ is being lifted into place.

DOW DEUTSCHLAND ANLAGENGESELLSCHAFT MBH

a.: The ethylene oxide tank is buried and safely covered. The last step in the overall project is completed! A reduced number of ethylene oxide loading operations from tank wagons into the new underground ethylene oxide tank leads to a lower risk for overall rail traffic, since fewer tank wagons with dangerous goods are on the way.

»A great achievement of a great team! Thank you!«

Andreas Rogenhofer, Project Manager
DOW Deutschland Anlagengesellschaft mbH

OUR CUSTOMER SAYS

Andreas Rogenhofer, DOW Project Manager, spoke in high terms of the entire team consisting of employees of DOW, EDL, suppliers and installation companies.

„Today (April 1st, 2020, editor's note) the test operation of the new Ethylene Oxide Tank (100 m³) was performed safely and successfully. [...] This is a great milestone for the entire project and this represents the last pending test operation of this project. The expansion project in Bitterfeld is now heading towards project closure. In total, we have achieved more than 160,000h of Engineering and Construction activities without any safety issues.

The sub-project EO Tank was one of the most challenging sub-projects due to a 6.5 m deep excavation and a drawdown of groundwater required. I want to thank everyone who contributed to this great achievement. [...]"

The tub to accommodate the larger EO tank is being prepared, sheet piling with groundwater lowering, excavation depth approx. 6.5 m.

METHYLCELLULOSE

Since 1994, methylcellulose has been produced from the renewable raw material cellulose at the Bitterfeld site. Methylcellulose is used as an additive in the building materials industry, e.g. for tile adhesive, grout, filler, joint sealant.
It improves consistency of the products and makes processing easier. Methylcellulose is also used in the food sector as a gelling and thickening agent and as an emulsifier and stabilizer.

INTERNAL MATTERS

1st Pörner Virtual Run

Since we have to do without public running events this year, but our employees do not want to miss running, Pörner came up with a new idea. According to the coronacrisis motto 'Together alone', the first Pörner Virtual Run took place on September 26th, 2020.

All 23 participants ran five km without being tied to a place or time. It did not matter where they were, be it at 8 a.m. on the beach, lunchtime in the Vienna Prater or afternoon in Kundl, Tyrol. Pörner employees could not be stopped – not even by the coronavirus. It took the first contestant 22 minutes and 42 seconds to finish the five kilometers.

The focus of the running event was on having fun, but we also unleashed the competitive spirit and are looking forward to next year's run.

At the finish line: Michael Volkmann

High-quality additives – produced in Germany

MÜNZING
CREATING ADDITIVE VALUE

Greenfield project. MÜNZING invests in a new production plant for wax and polymer emulsion and commissions Pörner as general planner.

BY GERHARD BACHER

ELSTERAUE. On September 9th, 2020, representatives of politics and business gathered and celebrated the groundbreaking ceremony of the new production plant for wax and polymer emulsions in Elsteraue / Saxony-Anhalt. The traditional family business MÜNZING invests EUR 35 million to produce emulsions in the Zeitz Chemical and Industrial Park as from the end of 2021.

Pörner in Grimma was commissioned with the general planning for this project and performs the entire engineering from study to commissioning including procurement services.

Engineering despite corona

The concept phase started in summer 2019. Despite some unpredictable restrictions due to the COVID-19 pandemic, engineering and tendering was right on schedule. In March and April 2020, in the middle of lockdown, the Pörner engineers completed the basic engineering as well as the building application and worked on the value engineering to determine saving potentials and technical optimizations.

After having successfully accomplished the authority engineering, the execution phase and detail engineering has been in progress since May. Civil engineering works started in August as scheduled.

22 plant units including five production lines will be built. Water-based wax emulsions and other special additives such as powdered defoamers will be produced by means of batch process. The products will mainly be used in the building industry and for building coatings. They are crucial for a better processing and durability of plaster as well as exterior and interior coating in the building sector.

50 % less CO_2 emissions

When engineering the plant, great stress was put on an energy-saving design as well as a complete cross-linkage of production, logistics and infrastructure via process control systems as 'smart factory'. This includes a cogeneration unit with micro gas turbines, where environmentally friendly electricity and heat is generated, as well as a sophisticated system for recovering energy in all heating and cooling processes. Up to 50 % of CO_2 emissions can be saved this way, compared to conventional plant technology.

"With this investment we are doubling the number of jobs for qualified employees and send a clear signal for the location and our involvement in the structural change in this region", explains Managing Partner Dr. Michael Münzing.

Gerhard Bacher, General Manager of Pörner Grimma: *"We are delighted to implement this future-oriented plant for our partner MÜNZING. The design of the plant meets the latest and most efficient energy consumption values as well as environmental standards and can be expanded at any time, if necessary. We are pulling together with the customer to ensure the scheduled commissioning in the second half of 2021."* ■

PLANT SCOPE

The plant consists of 22 plant units, including:

- Complete infrastructure for the operation of the plant, such as office and social rooms for employees, workshop, roads, pipe bridges
- Supply and disposal systems of all utilities
- Modern, environmentally friendly electrical energy supply and distribution units
- Auxiliary and secondary units for utilities
- Unloading / loading units for tank wagons
- Water treatment plant
- Cogeneration unit with micro turbines and energy recovery unit
- Packaging unit for liquid and solid products
- Semi-automated storage building with appropriate storage and logistics systems

YVETTE MEINHARDT

Groundbreaking of the new MÜNZING plant with Dr. Reiner Haseloff, Prime Minister of Saxony-Anhalt (front left), Gerhard Bacher, CEO of Pörner Grimma (front center) and Dr. Michael Münzing, Managing Partner MÜNZING (front right)

Groundbreaking ceremony on September 9th, 2020

MÜNZING CHEMIE GMBH

KEY FACTS & FIGURES:

EUR 35 million investment
22,000 m² built-up area
about **600** pipelines
more than **150** machines/apparatuses
1,100 t steel construction
more than **400** field instruments

3D model of the wax and polymer emulsion plant. Production and logistics are optimally interlinked in the smart factory which has an up-to-date energy-saving concept.

Bio-Silicates in high demand - successful upscaling

There is no corona stop for bio-silicates. Given the high interest in Pörner's sustainable technology, the Pörner experts continuously work on process optimization and upscaling to an industrial scale. Together with a well-known European machinery and equipment manufacturer, the engineers performed separation tests, which allow for a process simplification. At the same time, several equipment items of the same type are being replaced by one, thus lowering investment and operating costs. Additionally, the washing water consumption could be reduced considerably and the quality of Bio-Silicates further increased. The by-product 'carbon cake' was improved as well and proof of a high adsorption capacity for e.g. hydrocarbons could be furnished.

SILICATE
PÖRNER RICE HULL TECHNOLOGY

Trips to Malaysia and the Philippines last spring with the aim to evaluate locations confirmed the interest of several clients in the 'green added value'.

The next task is to implement first plants with local production partners in order to provide international industrial consumers and local markets with high-quality silicates.

The Pörner Bio-Silicate team is glad about the progress: "Despite corona we managed to do our homework and optimized the process and performed upscaling tests. Now, we are ready for the international roll-out."

Andreas Pörner in front of a heap of rice hulls

The perfect alternative project

At the beginning there is a brilliant idea: a natural resource in large quantities, high product quality is possible, a huge, growing market with plenty of development opportunities has to be supplied and an alternative process with enormous energy and CO_2 savings is available ...

If this vision is to become a globally applied process to enable an entire industry to switch to renewable resources, then an internationally experienced plant engineering company like Pörner can provide crucial support.

Because all kinds of obstacles block the way of the project: new is risky; buyers and investors want to have evidence and that costs a lot of time and money; renewable raw materials must first be available in large quantities so that the process becomes more economical - a chicken-and-egg problem. The green alternative product should not cost too much more than the conventional one? Initially, an almost unfulfillable wish, because the 'economy of scale' faces the 'risk of first implementation' in a pilot project.

In order not to fail right from the start, one should fit into the established structures with experienced market participants.

Process optimizations and upscaling tests using the Bio-Silicates demonstration plant in Freiberg

The development phases:

1. Theoretical development
One begins with the theoretical development - with a process layout and the consideration of economic efficiency and growth potential.

2. Laboratory scale
The physical and chemical processes are now being practically verified on a laboratory scale for the first time. This makes it possible to address potential interested parties and buyers.

3. Industrial pilot plant
If interest is given, the next step into the deep end of a higher investment must be made: the construction of an industrial pilot plant. This pilot plant already includes, mostly in a simplified form, all essential equipment on the smallest possible production scale. Special process components are tested and test batches of the product are produced in such a large quantity that the users / processing sectors can test their own applications.

The reward for the work is the confirmation of potential customers that the green product has been certified as being excellently suited.

4. Finer product development
In further series of tests, the finer product development based on natural resources from various sources now advances. In addition to specialties, new product ideas are often created (e.g. besides industrial products also agricultural fertilizers ...).

At the same time, the process is further fine-tuned by testing new system components as regards upscaling and saving operating costs. After all, considering the 'green' advantages, the products must be competitive compared to conventionally manufactured ones in terms of quality and value.

5. The first commercial project
The correct size and low feedstock costs are decisive for the success of such an first-of-its-kind plant - if they are boosted too much, the limit of feasibility is quickly exceeded. It is recommended to enter into long-term cooperation with raw material suppliers.

An initial project is financed - using subsidies - ideally jointly by all partners involved. After all, when a new investment has been made, you have to compete against competitors using existing conventional plants that have mostly already been written off.

Financing and marketing
Modern network thinking means: if something great is to come about, everyone along the value chain has to contribute. The green factor needs to be acknowledged - i.e. paid for. Higher CO_2 emission credits will make this easier in the future.

It makes sense to include large buyers via off-take contracts, that take a large part of production in the long term. At the same time, local markets can be developed.

Result
In the ideal case, a holistic, optimized 'cybernetic' growth project is created: at suitable locations (upswing, jobs, tax revenue), using renewable resources (by-product of agriculture) completely independent of fossil energies (biomass power plant with co-generation of electrical and thermal energy), better, cleaner products (higher added value) are produced by energy-saving, efficient alternative processes, that serve both industry (green resource) and agriculture (fertilizer in the cycle) - and are mostly consumed in the local area (low logistics effort).

For a better future on this planet!

The Pörner Bio-Silicate Team

SILICATE
PÖRNER RICE HULL TECHNOLOGY

'Green' products such as Pörner Bio-Silicates have a high economic value if they are made from renewable resources and with locally available, alternatively generated energy and with a minimal CO_2 footprint. Sustainable technologies are fostered worldwide and there is generally an increased willingness to invest. Even though the transition initially costs money for new plants, product development and marketing, which means that the alternative products are initially a bit more expensive. But whoever invests now will be one step ahead of the world market for the next decades!

Differences to 'normal' plant engineering

- A development project runs over a very long period of time. The resources are limited. Heuristically, through permanent improvement the operational process is gradually created. The project needs to be executed in a cost- and resource-conscious way.
- When it comes to engineering and procurement, a distinction must be made between standard components / systems and process-critical equipment that is specially designed for this application.
- With regard to many future projects, attention will be paid to the standardization of equipment and plant sizes as well as time-saving and cost-effective production in modules.
- The pilot plant requires the highest level of flexibility: small teams with the right specialists for suitable subsystems and constantly available partners for apparatus construction, electrical, I&CS and installations during ongoing expansion and refurbishment.
- The upscaling of a pilot plant requires the think about process-related issues and tests with larger equipment in order to rule out functional risks in the first-of-its-kind plant.
- Natural resources, in contrast to petrochemical feedstock, are subject to fluctuations that must be taken into account.

INTERNAL MATTERS

EDL opens office in North Rhine-Westphalia

Growth. EDL establishes its presence at Germany's most important chemical site.

COLOGNE. On March 1st, 2020, EDL opened its Rhine-Ruhr office managed by Thomas Bösel in Cologne.

North Rhine-Westphalia with chemical parks in Marl, Dormagen or Leverkusen is Germany's most important chemical site and the fifth largest in Europe. The companies located here are of different sizes and active in different sectors, and offer huge market potential.

Highly qualified for customers on-site
With opening its office in Cologne, EDL relies on the principle of customer proximity. From now on, customers can be supported in an area reaching from Frankfurt to the Ruhr district and from Cologne to the Low Countries.

With its high-qualified and motivated professionals and managers in all technical disciplines the Cologne team is in a position to react very flexibly to customer requests and to assist customers in all phases of plant engineering projects with integrated engineering concepts.

The Rhine-Ruhr office will generate and handle its own orders, but also cooperate with the head office in Leipzig and, if need be, with other Pörner sites in projects across locations.

ADOBE STOCK

We spoke to Thomas Bösel, Director of the Rhine-Ruhr office, about his goals at EDL.

EngTimes: Mr. Bösel, first of all, a warm welcome to EDL and the Pörner Group. You had experienced hard practical work on building and customer sites for 10 years, worked in project management almost exclusively in general planning / EPC / EPCm projects coupled with 15 years as department head and location manager resp. at five known engineering offices and plant construction companies in North Rhine-Westphalia. What are your goals for the EDL Rhine-Ruhr office?

Bösel: We want to have specialists of all technical disciplines at the highest technical level here in the office, elaborate USPs for each discipline and handle general planning and EPCm projects across locations safely and profitably for all parties involved. We want to convince by quality, reliability and competence and simply enjoy our work.

EngTimes: What challenges are waiting for you?

Bösel: Well, right now in the start-up phase to find lead personnel and specialists to achieve our goals.

EngTimes: We wish you and your team every success! ■