



Faster to more sustainability

How EB promotes decarbonization - from process plants to mobility

Climate neutrality, decarbonization, carbon footprint, sustainability - we encounter these buzzwords almost daily. That's a good thing, too, because nothing less than our future is at stake, and there is much to be done. More and more customers - long-standing as well as new ones - come to AUCOTEC with the motivation to achieve more sustainability in their plants or through their products as quickly as possible. The rethinking is in full swing, also in engineering processes. AUCOTEC has solutions for this. Namely tangible, workable and proven solutions.

Contribution to less CO₂

The extent to which the topic of sustainability runs through AUCOTEC's success became particularly clear in the recently ended financial year. A **new high in sales** and even stronger growth in incoming orders are good news in themselves. However, it is the connection with the associated projects that makes people sit up and take notice and shows that the industry in the most diverse sectors takes the

CO₂ reduction seriously and that AUCOTEC makes an important contribution to the implementation.

Whether it's e-mobility, H₂-ready conversions in operation, a booming recycling industry, more output from hydrogen electrolyzers, or grid expansion, without which renewable energy would get nowhere - time is pressing everywhere. And AUCOTEC's Engineering Base (EB) platform is involved everywhere. Why is that?

Open for the mobile future

Let's start with e-mobility: While the tank of an internal combustion car only needs a level indicator, a battery system contains lots of controls. Modern high-voltage systems also require shielding and safety systems that batteries for conventional vehicles did not. This has to be wired, which has an impact on the complexity of the wiring systems. Related processes have to be reorganized, and new system suppliers have to be integrated.

All this with limited human resources, while the time pressure to "start production" tends to increase. The trend toward autonomous driving is multiplying sensor and control technology even further. New standards must be taken into account, for example to ensure functional safety. The aim is to make the development process traceable and to avoid systemic errors. Data analysis is indispensable for this purpose. This is impossible with conventional tools, because circuit diagrams do not provide all the data required for automated evaluation.

In EB, on the other hand, each component can be extended with any number of attributes, all of them evaluable. EB's data-centered on-board power supply model is transparent and up-to-date throughout the entire development cycle for all participants - also via web service - which shortens runtimes. Openness and flexibility for new processes, standards and growing complexity make EB future-proof.

Scaling by multiplying

Growth on another level is what drives the **manufacturers of electrolyzers**. Because of the increasing demand for hydrogen, they want to be able to supply more plants for more megawatts as quickly as possible. However, unlike in the process industry, reactors cannot simply be designed larger for this purpose. Manufacturers rely on highly standardized "click-together" modules whose output can be scaled by multiplying the modules. This is where EB's experience from the highly modular automotive industry comes into play, as well as that from major projects in the process industry. An internationally sought-after electrolysis expert has already attested to EB that some work now takes only six weeks instead of six months, thanks mainly to the cross-discipline "data home". This also makes it possible to provide complete, quality-tested modules, which have also been developed as a unit across disciplines.

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A big step towards a smaller (CO₂) footprint

Dear Readers,

More sustainability or the much-cited CO₂ footprint concerns us all. AUCOTEC, too. Now, an electrified vehicle fleet, e-fuel pumps or the use of 100% renewable electricity in our headquarters are only small adjusting screws, but we can achieve great things for and with our customers.

Because AUCOTEC has a solution for the enormously increased pressure to innovate due to the topic of decarbonization: the software platform Engineering Base (EB) - whether in energy distribution, plant construction or for mobility. You can find out why in this infopaper. And the interview on page 3

confirms that EB can play an important role in the transformation to greater sustainability. We also know from many discussions with customers and interested parties that the industry in the markets we address is very aware of its responsibility and is increasing the pressure itself.

We see this as an important reason for AUCOTEC's success. Based on the preliminary figures for the financial year that ended at the end of March, we assume that the sales record of the pre-Corona year 2019/20 has been exceeded. And incoming orders speak an even clearer language: 35% more than last year and 26% above the previous high. This positive development extends across

all our markets, and the very realistic potential of further projects promises to continue. Many of the projects aim for more sustainability.

Take a big step towards a smaller (CO₂) footprint with us and EB!

Your
Uwe Vogt
Management
Board



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Energy transition requires more complex networks

The hydrogen produced is only described as "green" if the electricity required for electrolysis comes from renewable sources. But whether for H₂ production, for other industries or private households, the green electricity must first arrive. In addition, the network operators are under great pressure because they have to massively expand their network capacities due to decentralized energy generation - instead of one regional power plant

now hundreds of solar, wind power or biomass systems. At the same time, the technology in substations will change so profoundly in the next few years that conventional, drawing-oriented tools will no longer have a chance to depict them (see p. 3 above). Here, too, EB's central data model scores points together with the decades of experience from energy distribution that have been incorporated into the platform. You can read about this and why EB is seen as an enabler for faster network expansion – and thus for the energy transition

– and is even the basis for a new business model on page 4 in the article about BS|NETZ.

Process industry undergoing restructuring
EB also provides highly efficient support to the process industry - not only with high savings potential for engineering, but over the entire life cycle of plants, as former Namur Chairman Dr. Wilhelm Otten impressively describes on page 3. This is so important because brownfield plants around the world have to switch to new energy sources, raw materials

and/or products in order to be more sustainable. And recycling plants, for example, are expecting a considerable need for expansion due to the growing importance of the circular economy. For these conversions and expansions, operators need a complete and up-to-date digital twin. Dr. Otten also explains why this is to be found in EB and not in discipline-specific files.

Focus on digital transformation

New subsidiary in the Netherlands: Market development in the Benelux countries

Last year AUCOTEC founded two new subsidiaries. One in Pune, India (we reported in issue 02/2022) and one in Rotterdam, Netherlands. Gertjan Edelijn (47) is the AUCOTEC representative on site and responsible for the subsidiary's affairs. His focus is on his tasks as a key account manager and expert for process engineering systems. In this interview, he reports on developments over the past year and reveals what the future holds.

After many years with one partner for the Netherlands and Belgium, the subsidiary AUCOTEC Netherlands was founded one year ago. What have been the developments since then? How was the start?

An exciting year lies behind us. We want to actively develop the Benelux countries - starting with the Netherlands - as a market. This means that AUCOTEC moves closer and more directly to the customers and interested parties than is possible via a partner. After launching in April 2022, we initially focused on the process industry. Especially on plant owners and operators, contractors, EPCs and builders of plants or sub-plants. In the Benelux countries, it has long been common practice to outsource engineering. Plant owners and operators often have none or only little engineering capacities. In recent

decades this has become much stronger. Increasingly, there is collaboration with different contractors or EPCs.

That's why we want to bring the different parties together and figure out how we can improve everyone's engineering processes. And we are successful in this! Not only have we been able to make many new contacts in various fields, but there have also been many good prospects for interesting larger projects. This is one of the reasons why we have hired a new colleague as an Application Consultant



[▶ Gertjan Edelijn](#)

to support our customers in their digital transformation. This allowed us to convince and turn opportunities into real orders. In the meantime, we distribute AUCOTEC solutions not only locally, but beyond the Netherlands.

How do you assess the potential in the Benelux region? From which industries do the customers come?

The Benelux countries can develop into an important region for AUCOTEC in several sectors: in the process industry as well as in the energy and mobility sector. Since exactly in these areas AUCOTEC can score particularly well with its know-how, we will place our emphasis on them. With our still small team, this can of course only be done step by step. After all, we want to hold our own in the market in the long term and grow sustainably. Our strategy focuses on the energy transition and the digital transformation of our customers. They see a real plus in the fact that we always take their individual starting position into account and analyze it.

What are the next steps for the subsidiary?

2023/24 will be an important year for us. The path we have started on is promising, so we will continue to follow it in order to implement the interesting projects in the best possible way. At the same time, we are

examining the markets in which we can further expand our presence. In any case, we already see that we need to increase the number of employees.

How was this time for you personally? Why did you choose AUCOTEC and what was your entry like?

I was positively surprised by AUCOTEC from the first day. I received a very friendly welcome, and working together with colleagues around the world is extremely pleasant. The great thing about AUCOTEC is that we can move quickly from one project to the next with the team. This results-oriented flexibility and dynamism is entirely to my taste. In addition, AUCOTEC exudes "entrepreneurial spirit". Employees are allowed to make decisions very independently, and personal responsibility is of central importance to me. In doing so, AUCOTEC relies on an open corporate culture, direct communication and always looks ahead without ever losing sight of the big picture.

Thank you very much for the interview, Gertjan!

Simulations: The preview makes all the difference

New option in EB significantly speeds up evaluation and decisions

The fact that the Engineering Base (EB) software platform helps plant engineers to realistically estimate the costs of their projects as quickly as possible and to make essential decisions has been known in the industry since at leastACHEMA 2018. At that time, EB's automated import of simulation data was introduced for the first time. Now AUCOTEC's development team has created a way to speed things up even more. In an initial pilot project, a preview function

saved almost an hour per simulation scenario.

Save many weeks of manual labor

A little reminder: Since 2018, the scope of EB Plant, the version of EB developed for planning and operating process plants, also includes FEED functionality (Front-End Engineering Design). Among other things, it includes a highly efficient import of simulation data to EB, where in no time at all the data of a scenario is integrated into the process flow diagram (PFD) and the appropriate worksheets and material balance documents are generated. This alone means saving weeks of otherwise extremely error-prone manual work for transferring a scenario into the engineering. Because this manual effort is so enormous, providers have so far only "managed" a few scenarios and could never be sure to offer the optimal plant.

The faster way to the optimum

But that is the actual purpose: to understand and evaluate how different parameters or recipes change the mass flows, devices and their scaling in order to finally obtain the optimum efficiency, functionality and, of course, cost constellation for the planned plant. With EB, days become minutes when importing by scenario. And at the push of a button, EB also clearly shows the differences between the variants, which otherwise had to be painstakingly gathered by visual check. No other system on the market can do that.

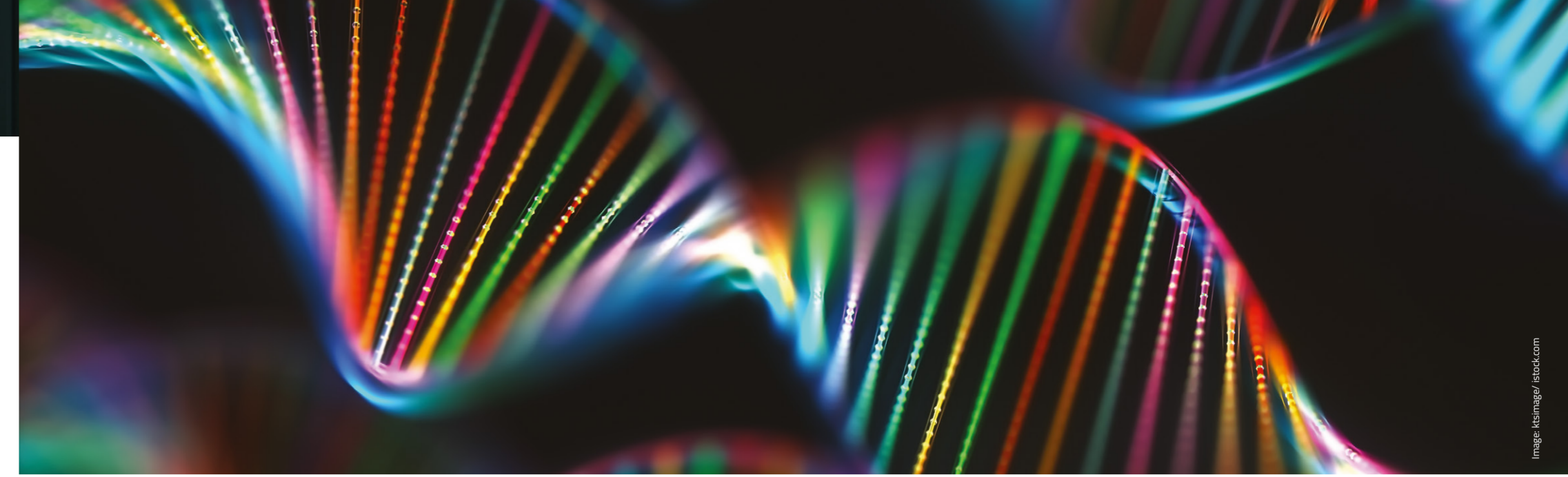
More tests - a better result

Nevertheless, there is further potential for improvement: the more simulations one can perform, the closer one comes to the optimal plant design. Often it is sufficient to view the result and immediately start the next simulation run with slightly changed parameters. Together with the customer, AUCOTEC's development team has come up with a solution for making simulation results visible even faster. With the help of a new preview function, the customer now saves the time

of the data import as soon as an initial basic import has taken place, through which the PFDs and datasheets "know" the basic constellation of the future plant. All parameter changes based on this, such as a higher flowstream temperature, different pressures or recipes, are displayed directly in the preview and can be compared as usual. However, the time span until the results are displayed in EB differs significantly: minutes become seconds.

Faster to market with more quality

This makes it even easier for planners and EPCs to determine the optimum quality of a system in the shortest possible time and to offer the appropriate configuration. Only the final selected scenario is then actually imported into EB and then "only" needs to be elaborated. All of this together significantly shortens the famous "time to market" and thus also ensures that sustainability goals can be achieved more quickly.



The DNA of the substation in the data model

IEC 61850: The future is object-based, circuit diagram loses its importance

IEC 61850 is THE topic in power distribution circles and is causing headaches for many network operators. In any case, they are under enormous planning pressure (see p. 1). "Nearly all operators worldwide need to significantly expand their capacity. But substations live for decades, so securing the future is elementary," says AUCOTEC's product manager Michaela Imbusch. This also includes being able to take into account the requirements of IEC 61850.

Servers instead of control cabinets

In addition to a uniform, manufacturer-independent description of the structure of digital substations, the international standard also regulates the type of communication of control and protection devices. For this the

IEC uses the SCL (Substation Configuration Language) format. This language will become even more important in the future, as plants will undergo significant changes on the control side. "Bus technology is moving in here, too, from the field to the control system," Imbusch says. Information is passed on by bus line, IEC-compliant in SCL. This reduces the cabling considerably. "There are already fewer control cabinets in substations, and in the longer term there will only be servers there," says the product manager.

Intelligent modeling instead of painting

This not only reduces circuit diagrams and makes cross-connection diagrams superfluous, but also the classic engineering tools become less important because they cannot

display any detailed information without a circuit diagram. AUCOTEC's Engineering Base (EB) platform is different: The uniquely deep integration of IEC 61850 is an essential step towards future-proofing the planning and documentation of substations, explains Michaela Imbusch. "The standard is the DNA of the Digital Twin of these plants. It describes it as an object model. In order to model and represent the twin in accordance with standards, an intelligent object-oriented system is required that also adopts the DNA. So far, only EB can do that because the system is consistently data-centric." Since this also enables purely alphanumeric work, not a single circuit diagram has to be drawn in EB for secondary technical details.

Entire substation in one model

In addition, the system "understands" the required SCL thanks to AUCOTEC's partnership with the German system house H&S, whose SCL-based configuration tool can be integrated into EB. In addition, the platform is the only system that transparently combines the digital twin of substations in just one consistent data model: from the single-line diagram and the objects of the primary technology to the secondary detailed planning and the protection and control technology - without discipline-specific data silos, manual transfers and corresponding sources of error. "Future-proofing customers means giving them the tools of the future. EB is one of those," emphasizes Michaela Imbusch.

"Sustainability is the main driver of the process industry"

How digitization and modularity enable innovation

Dr. Wilhelm Otten (64) has a doctorate in mechanical engineering in the field of process engineering and has accumulated an enormous wealth of experience, from process development and technical controlling to responsibility for process technology and engineering, i.e. the major investment projects at Evonik. For eight years he was also chairman of NAMUR, the international user association of the process industry. His areas of expertise range from process optimization, simulation and maintenance to engineering management and, most importantly for him, digitization strategies. Since 2020, he has been traveling the world with his consulting firm WOTTEN Consulting, supporting large companies as well as start-ups.



[▶ Dr. Wilhelm Otten](#)

Dr. Otten, one of your current projects is a "Carbon Capture and Utilization" pilot plant in Singapore. In other words, a highly topical sustainability issue. Is this an isolated case?

No, not at all. Sustainability, the reduction of the CO₂ footprint, is currently the main driver in the process industry. This includes switching the entire supply and value creation of their plants to renewable products or raw materials. For example, based on hydrogen or ammonia, always in connection with renewable energy. So there is an enormous need for innovation

Where exactly is this need and where do you start?

Existing plants have to be converted. Either to be able to run on renewable energy sources such as green hydrogen or to switch to more sustainable processes and products, in some cases both. In addition, there are a number of recycling projects using renewable energies. The pressure to innovate is high and also means that the engineering processes and systems needed for the transformation must be highly efficient.

Our approach to this has two main strands, so to speak: One is digitization, and a truly end-to-end one at that. File formats like PDFs are not digitization. We need plant data models - true, cross-discipline consistent and complete digital twins.

And they are twins only if they correspond one to one to the plant, that is, if they are current. The second strand is modularization. Both in terms of products and engineering. Both strands still have significant room for improvement.

What is a complete digital twin for you?

By this we mean the digital image of the entire process plant, including operating equipment, over its entire life cycle. There is a consensus in the industry that this includes, on the one hand, the process model, the structure model and the asset model to cover processes and the plant. On the other hand, we need behavior models, i.e. simulations, for design and optimization as well as the so-called "operation model" - in the case of the pilot plant mentioned, this model is the Model Type Package (MTP). It describes the services of ready-modeled, tested subsystems such as dosing units, mixers and so on, i.e. modules that can be flexibly combined and orchestrated to form larger units. The MTP is practically the "print driver" of the module.

What exactly is your pilot project in Singapore about?

The plant is called the "Low Carbon Transitional Testbed" and its main purpose is to demonstrate how methanol and its downstream products are produced using CO₂ from exhaust gases and renewable hydrogen - a very ambitious project. My part as a senior consultant is mainly to support engineering and technology transfer. The pilot plant is to be equipped with state-of-the-art technology and be highly flexible in order to shorten the time to market for new technologies or products. We achieve this with a complete Digital Twin of the plant as well as modularization - also of the automation technology - via MTP.

You implement all of this with Engineering Base (EB). Why?

Because the system does not only develop and map the core of the Digital Twin, with master data, structure and asset information. Since you need this data for simulations as well as in operation, we wanted to go further and use an integrated system that does not only cover all disciplines from flow diagram to piping and detail engineering to automation. It should also communicate per open standard with

simulation, 3D and other tools. And it must comply with international standards such as ISO 15926 and DEXPI. It was also very important to us that the system allows modular data management in the data model because we are building a modular system. That's how we came up with EB. It can be integrated into the entire life cycle of the plant, the intersection effort is considerably reduced, and, more importantly, we have a consistent database instead of distributed tools for drawings, tables, etc. This is the only way that the modules with all their aspects can also be represented as a unit, and change management is made much easier.

How does this make itself felt?

We have made significant quality gains in engineering and design. In a pilot, we also found that integrated engineering saves 15% of investment. Even in the operating phase, with an up-to-date data model, i.e. digital twin, another 15% savings are possible in brownfield projects and in maintenance, which can result in total savings in the triple-digit millions per year for large plant operators. 70% of this is accounted for by maintenance and changes in the running plants, which "live" significantly longer than the engineering phase. That's why covering the entire plant lifecycle is so important.

So you are using quasi-sustainable engineering for the sustainability of the process industry?

That's one way to look at it. In doing so, we bring together digitization and modularization. In a common digital twin with a common language for engineering. However, we are still in the early stages of modularization. I see a development here like that of the automotive industry: from individual products and production plants to modular cars and plants that can manufacture any type of car. Modularity will drive the process industry over the next 10-20 years. And for this, the engineering must be open.

Thank you very much for the interesting interview, Dr. Otten!

In the interview

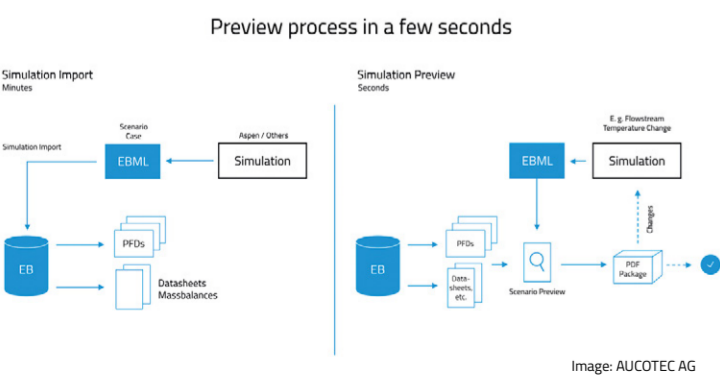


Image: AUCOTEC AG

[▶ Only when a scenario shows the optimum, is it imported via EBML](#)



Engineering Base enables third-party business for BS|NETZ

Engineering expertise in plant modeling accelerates expansion of grid

Braunschweiger Netz GmbH (BS|NETZ) is not only locally responsible for thousands of kilometers of electricity, gas, district heating and water networks, associated equipment and their further development. Its engineering team also helps other network operators in the German-speaking area in taking their plant documentation to a new level digitally. After all, substations and smaller switching stations are usually decades old, with the data about them often being far from the as-built status – a showstopper for the grid expansion urgently needed for the energy transition.

BS|NETZ is developing its own engineering and third-party orders with AUCOTEC's data-centric Engineering Base (EB) platform. The main reason is EB's ability to build and maintain a consistent, central data model that also complies with international standards across disciplines, from primary technology, i.e. large appliances in the field, to the last terminal in the control cabinet as well as automation.

From documents to data

Michael Wedde, Group Manager "Digital Plant" at BS|NETZ: "In the past, it was all about pure documentation work – the most digital thing was PDFs. With EB, we map our substations in the digital world in an object-oriented way." This creates a digital twin that makes it possible to link the same objects in different disciplines and systems such as 2D and 3D engineering or ERP. "We only carry out changes at one point, but one which can be reached from all discipline-specific sides. This 'one source of truth' saves an incredible amount of coordination and corrections. Double entries and transmission errors are a thing of the past," says Wedde.

Future perspective

With his team, he has already planned distribution stations for all voltage levels, but also the control technology of the gas and water network facilities. "EB offers us the best perspective, also for future requirements," says the digital expert. Many functions

would be "not feasible with classic CAE systems". For example, EB's QA tools, whose automated checks and comparisons significantly accelerate engineering despite the increasing flow of data.

Added value increased

It is no wonder therefore that other operators are also using this know-how to accelerate their network expansion. "Many of the customer's challenges coincide with ours, which creates trust," says the group leader. For example, the expertise in creating structured catalog devices that fit seamlessly into the plant model, as well as in setting up typical projects, which provide highly efficient reusability with the help of EB's Typical Manager, has met with a great response. "However, we are open to all contract work surrounding EB," emphasizes Michael Wedde and adds: "We really appreciate being able to increase the added value of EB and our team even more in this way."

Less effort for more reliable data

Weber Engineering relies on a central database for all disciplines



Image: Weber Engineering GmbH & Co. KG

Weber Engineering GmbH & Co. KG. forms part of the Weber Group with around 2000 employees. The company, which is over 100 years old and now in its fourth generation, is the market leader in industrial piping construction for the process industry. In addition to services, energy services, scaffolding and more, the group also offers engineering for the (petro)chemical and oil and gas industries. Weber Engineering employs around 100 experts.

One of them is Dieter Dimmers, for many years site manager in Rheinberg, where he and his team maintain a major chemical plant operator whose products are world leaders. When the complete plant documentation was transferred to AUCOTEC's database-based cooperation platform Engineering Base (EB) a few years ago, he quickly recognized its potential: system discontinuities, interfaces and time-consuming "passing" of data through the disciplines were eliminated.

"Shared database is no alternative"

In 2019, Weber Engineering received an order for a modern greenfield project: an environmentally friendly power plant fired by waste wood. "We agreed with the client to use EB for this right from the start," Dimmers reports. Whether substations, protective devices, control system components, safety switches, motors, cables or measuring transducers: "If you have your central catalog in EB up to date, creating the documentation is easy," he says, emphasizing that there is no alternative for him to ensure that everyone involved has access to the same database. This is the only way to prevent duplicate entries, transmissions and the associated errors. And since there is no need to pass on information to neighboring disciplines, nothing can be forgotten. This creates significantly more reliable data. Thanks to initial experience, the team found it quite easy to work with EB, especially the colleagues without prior tool imprinting. "Users of a new system should be open

to it. EB is different, promotes more efficient and digital processes, and that requires rethinking," says the site manager.

"Complete success" times two

For the new building project, he speaks of a complete success. A second "Woodpower" power plant is currently being planned and built by Weber Engineering to make the Rheinberg industrial site independent of coal and to reduce its CO2 footprint. According to Dimmers, the close resemblance to the first plant means enormous savings potential. The typicals, for example for transformer feeder fields, can be reused almost 1:1, and additional fields can be documented in no time at all using drag & drop. "Since we are using as many components and suppliers as possible for this new building as well, I am very relaxed about the engineering. Thanks to EB, the effort involved will be comparatively low," says a pleased Dieter Dimmers.

And we also welcome the following new customers to the AUCOTEC family:



Golden Grain Group Co., Ltd.
Zhengzhou | China



HK Solution
Pohang | South Korea



Kölnener Verkehrs-Betriebe AG
Cologne | Germany



Pama (Shanghai) Machine Tool Co., Ltd.
Shanghai | China



Fields Engineering
Seoul | South Korea



POSCO E&C
Pohang-Si | South Korea



SOLTEC
Miraflores | Peru

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