

Intelligent networks - and how to get there

The energy revolution also requires a distinctly more intelligent engineering



The energy market is undergoing an upheaval that confronts the power supply companies (EVU) with tremendous new challenges. After the organizational separation of power generation, power transport and power distribution the challenge now is to make all networks fit for the renewable energy sources.

In this context, the subject energy feed-in is an important one. Be it offshore wind parks or solar roofs, electric vehicles at the charging station or cogeneration in the single-family home: All of these energy suppliers, which as a rule work in a very distributed manner, want to get rid of their energy. For this purpose network capacities must be adapted in many places, and what used to be only a distribution station is supposed to be able to manage energy bidirectionally. Simply because of the size of our networks and the number of such stations this is a gigantic task. To master it, the existing engineering structures must undergo a major jump in efficiency.

New technology

In addition, the engineering technology is under pressure to prepare for the future requirements. For the much-cited "smart grids" need a comprehensive energy management, which is not envisaged in the current engineering process. The many different, decentralized power generation companies must be controllable from the outside to accommodate and use their services in a calculable manner. Moreover this requires e.g. intelligent electricity meters to enable selective offers such as more favorable current collection times – the legislature demands that 80% of the households are to be equipped with them until 2020. Peak demands could be flattened with this "smart metering".

Therefore for gathering the enormous additional power generation and consumption data, the distribution facilities must be connected to intelligent devices and telecommunication functions as quickly as possible.

Smart engineering

Smart grids and smart metering therefore also require "smart engineering". With these challenges in mind, AUCOTEC's main focus has been on the variant "Power" when developing its most recent advancement of its platform Engineering Base (EB). At this year's Hanover Fair AUCOTEC will therefore be present not only in the "Digital Factory" in pavilion 17 but will for the first time also show its latest innovations in smart engineering for the EVU sector in the "Energy" pavilion 13.

AUCOTEC AG has for many years been the market leader for engineering software used for power distribution in Germany, the Czech Republic and Slovakia. The comprehensive solution offering of EB Power is based on these experiences, but with its database-based structure it offers a new approach and an ultra-modern technology that optimally meets the demands of the future.

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Editorial

Dear readers,



This issue is dedicated to energy. In addition to mechanical engineering and plant construction, process engineering and the cabling of mobile systems, power generation and distribution is a main segment of AUCOTEC AG. This sector has turned out to be particularly stable and has at the same time exhibited strong growth.

The radical upheaval that the branch is experiencing right now, which is sped up both by government regulations and technological change, requires special responses also on the part of the engineering. Some of these you will find in this INFOpaper. Examples such as 'renewable energies', 'smart grids' or 'electric mobility' highlight the greatly altered demands. All of these require support by highly efficient, flexible and cooperative software products.

With our branch know-how, accumulated in the course of several decades, and the platform Engineering Base we can offer power generation and distribution companies precisely that. Our experience with the integrative system confirms that synergies gained by combining disciplines can be enormously profitable also in the energy sector.

As a reliable, innovative partner of the energy sector we look forward to actively supporting you, our customers, in realizing your demanding goals.

Yours sincerely

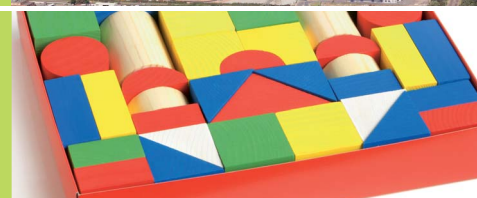


Markus Bochynek, Board of Directors

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This system technology combines interdisciplinary cooperation with continuous data consistency. EB creates an exceptionally efficient, networked planning process where several engineering disciplines access the same plant model.

Everything from a single source: generation, distribution and communication

For power generation, EB offers an absolutely consistent solution for the I&E design and engineering, whose central component is the P&I diagram for the power plant's process engineering. EB designs power distribution facilities from the generator to the end user and provides the appropriate services for all voltage levels. The EB solution for communication technology can be easily integrated into the total process – everything on one platform.

One design, several uses

The plant model automatically keeps all relevant data up to date in all views without redundancies. Arbitrarily nested device structures, customary in power distribution, can be projected easily – from large devices to circuit breakers.

What makes the system particularly economical is the reusable units. Thus e.g. following a single projecting job, the complete fields of a distribution facility are stored in the database as typicals – including all devices and diagrams. This can be used to put together new complete or partial plants simply by copy & paste.

Safe acceptance

A package with branch-specific quality inspections automatically sees to it that the documentation complies with EVU standards. The supplier thus safeguards the delivery of a regulation-compliant facility. The operator gets a reliable documentation that does not have to be checked by expensive specialists. The acceptance procedure is considerably accelerated. In this context it is a matter of course that all customary standards and special requirements for the documentation can be taken into account also internationally.

In whatever direction the different EVU business segments may develop, with Engineering Base Power they are prepared for all future challenges and changes.

A step beyond: Engineering Base

Uniform engineering system from AUCOTEC for all RWE lignite power plants



For projecting all of its existing and future lignite power plants, RWE Power switches over to the database-driven platform Engineering Base (EB) from AUCOTEC. The kick-off meeting has already taken place. Thus a software system is introduced that consistently harmonizes the plant documentation from the P&I diagram to the complete electrical engineering.

RWE Power, an integral part of the RWE group, is one of the leading companies for energy generation in Germany, with

about 15,300 employees. The RWE motto "VoRWEg gehen" ("Be ahead") illustrates the company's focus, where example and innovation play an important role.

RWE has been working with AUCOTEC software products for many years. In parallel, additional tools for electrical engineering and P&ID's were used. "With the standardization of our planning process we achieve a distinctly higher quality of the documents, and the integration of process engineering also means a distinct plus in efficiency",

thus Jürgen Ecken, head of the design/documentation department for the RWE Power lignite power plants. With EB, a considerable number of coordination processes becomes superfluous, expenditure and error potential are minimized due to the omission of duplicate entries, and the IT department saves a lot of time for software and interface maintenance.

P&I creation integrated

What particularly strikes the energy experts as positive is the integration of the P&I creation into their workflow. Up to now flow diagrams existed only as pure graphics without logic. The switchover will lead to a considerably better consistency and quality of the overall documentation and thus also to an increased safety of the plants. All in all, for the five large RWE power plants almost 700,000 documents in four different formats must be imported into EB. AUCOTEC will support this process.

AUCOTEC will accompany the switchover from the first training course via the integration into the RWE IT to the documentation guideline for subcontractors. "RWE is an important and very innovative customer. We are of course happy that the experts there go ahead with us also in terms of an ultra-modern engineering software", thus AUCOTEC board member Uwe Vogt at the switchover kick-off meeting.

Polish AUCOTEC partner TEMERTECH:

"Competitive edge due to EB"



The new Polish partner TEMERTECH Sp. z o.o is an engineering specialist with the focus on software distribution, technical support, software training and digitization of existing documentation.

The dedicated professionals plan and realize their projects with know-how, experience and creativity. For their sales activities, they rely since 2010 exclusively on the software systems from AUCOTEC. "Our topmost priority is the absolute satisfaction of our customers, for whom we are accessible anytime", says Tomasz Łuczak, TEMERTECH managing director. "We achieve this with the tools from AUCOTEC, particularly Engineering Base (EB).

Thanks to its features we clearly stand out from our Polish competitors."

With EB, TEMERTECH has already convinced the Polish line of business of the globally operating power plant construction company Emerson. There the tool has already been synchronized with their control system and is used and sold under the name Ovation Documentation Builder also across the Polish borders. The vehicle manufacturer Solaris is also supported by TEMERTECH in the conversion of its existing software to EB. Here the system for wiring harness development is used e.g. for about 50 new streetcars meant to strengthen the infrastructure in Poznan, the Solaris location.

"With its unique openness and flexibility, EB is absolutely future-proof, that is another aspect that will convince many customers. After all the decision in favor of an engineering software means an investment that must pay off in the long run", thus the conclusion of Łuczak.

What counts is the connection

Porsche plans harness designs with AUCOTEC

Porsche AG (PAG) is the epitome of advanced technology, innovation and high-tech products worldwide. The research and development center Weissach manages more than 3,500 globally valid patents, and each year another 100 are added. Since 1972 the Porsche think tank with all development departments, workshops, test stands, laboratories, measuring centers, wind tunnel and crash facilities is located in Weissach. Here also the harness designs, i.e. the complete vehicle cabling are developed.

No movement without connection

Today, mastering these harness designs is extremely demanding because during the last decade vehicles have become much more complex: Electronics from a heated rearview mirror via infotainment to ESP. "However, no electric component will function without that little piece of connecting copper", says Uli Loser, IS project manager of the information systems for the product generation process in Weissach. Bus systems do indeed reduce the cable thickness, yet simultaneously the demands on a planning tool have increased once again, thus the IS expert. After all two to three kilometers of wiring harness with up to 2,000 individual wires are the rule these days.

In order to be able to design these essential connections – the "nervous system of a vehicle", as Uli Loser calls it – in the best possible way, i.e. with as little material expenditure as possible, Porsche had been looking for a new software system before starting a new vehicle generation. After a thorough check of the market, Porsche found what it was looking for with AUCOTEC. "AUCOTEC is in the process of becoming the leading software vendor for harness design", thus the assessment of Uli Loser and his colleague Bernhard Metzenbauer, subject specialist for electrical systems/electronics/hardware integration. "We wanted a tool that is open to future challenges and suitable as branch solution. With our previous tool and the customer-specific extensions required for it we had a special insular solution that was very inflexible and could be maintained only with a major effort", thus the harness design professional.

The challenge: individuality

The customer-specific wiring harness (KSK) customary at Porsche means that only the amount of copper actually ordered by the customer is installed. "Hardly any two harness designs are alike, and that in series production, that is our daily challenge", recounts Bernhard Metzenbauer. For this purpose, he says, Engineering Base (EB) is the ideal tool because it can always optimally map cable harnesses as well as the intelligence behind the connections, from a 150 percent vehicle to a heavily reduced version. The as-built representation is particularly important for the service. The EB data is communicated one to one to the Porsche service, without time-consuming processing, and in fact precisely fitting each individual vehicle. This considerably reduces the fault localization in the garage.



Installation of the main headlights: Part of the Porsche philosophy is that certain parts such as the left headlight always get the same UL-ID (Usage Location Identification). In this way errors can be avoided both in development and in assembly plus service.

"The complete harness design view at all times"

"The beginning wasn't easy, we had many talks, but our advantage here at Porsche is the short distances and the good working atmosphere between the different experts", explains Uli Loser. "In any case our current experience clearly shows that our decision was absolutely appropriate."

With EB, now everybody involved in design uses only one database at the central development department of PAG at Weissach with its total of about 4,000 employees. This method of operation is the basis of a number of optimization steps in all product lines. With the large quantities typical of series production, each gram of copper that can be saved per wiring harness by interdisciplinary planning is multiplied tremendously.

"Formerly we were used to think in terms of circuit diagrams, but EB now offers us the complete harness design view anytime, and that is a major advantage. The person responsible for the components thus has the best possible overview, including all of the information about the control units. Previously we had to collect the information from different diagrams", thus Bernhard Metzenbauer. For his visions of the future, for example the complete 3-D integration, he considers EB the ideal platform.



The "nervous system" of a vehicle: the harness design

"These people understand us"

The short training period has impressed the users at Porsche. "It is different but easy to learn", thus the unanimous opinion of the practical users, reports Bernhard Metzenbauer. Initially only new employees worked with EB, but meanwhile even the skeptics that had to change their working practice are convinced.

And there is another aspect that Porsche developers consider important: "We trust specialists where the chemistry is right", says Bernhard Metzenbauer, and that he says was very good with AUCOTEC, not least because of the professional competence and the more than 25 years of experience. We quickly realized that "these people understand us", he recounts.

Branch solution

From the very start Porsche had the idea to initiate a branch solution with the new concept. "Harness designs are no purchasing criterion, besides all car makers work similarly", explains Uli Loser. That was another criterion in favor of EB: "EB was not yet overly sophisticated, its design is so open that it is optimally suitable as branch solution", thus the application manager. His conclusion: "Only now when working live with the system have we started to realize that EB offers additional possibilities. These we will exploit and expand step by step together with AUCOTEC."



We do not only want to design but also to simultaneously supply the service with the important information, says Uli Loser, IS project manager of the information systems for the product generation process at the development center Weissach. This he says immensely reduces the costs although the requirements of the service must also be taken into account. "However, we have always succeeded."



"One of the decisive points while selecting an E-CAE tool was the question whether it is actually possible to map all of our equipment varieties", says Bernhard Metzenbauer, subject specialist for electrical systems/electronics/hardware integration at the development center Weissach. For when designing a process we behave like an electric current: We always choose the path of the least resistance."

Mechatronics from the construction kit

Multiple use of proven engineering units results in high speed



The projecting workflow for machine and plant construction companies involves the mechanical system, the hydraulic/electric systems and the electrical engineering as well as the controller programming – in this order. However, sequential processing of these mechatronical disciplines never worked in practice, here the pressure for finishing was too great even in the past. Thus the mechanic, even while developing the project, issues a ‘fuzzy’ job description to the hydraulics or pneumatics expert, who acts precisely in the same way with his workflow successor etc.

Time means expenditure – not with EB!

Since meanwhile even shorter project throughput times are in demand, however, the data transfer to the subsequent discipline was frequently just made ahead of time. But this damages the data quality. The price paid for higher speed is an enormously increased change expenditure for all disciplines that in many cases is more severe than the time gained: more agreements and

corrections, multiple entries etc. Thus there is a good chance to incorporate errors.

By contrast, AUCOTEC’s Engineering Base (EB) includes several recipes at once. One of them is the property of EB to combine several disciplines on one platform. Here however we are dealing with another feature of EB: the procurement of verified components in a construction kit.

Function-oriented components

Such components can be complete function blocks, e.g. a gripper including the control, the mechanical and the hydraulic systems and the software programming, but also smaller units such as circuit components. They are projected once and then kept in the construction kit for multiple reuse. Changes must be entered there only once, the next user is sure to get the latest revision.

Up to now it is still very common to copy a complete existing project and to adjust it to the individual

customer requests. However, thus one also copies all errors that were eliminated when putting the original project into operation. Already delivered projects are often only incompletely revised. Improvements are thus lost and must therefore be newly elaborated each time.

EB halves the throughput times

With the functional construction kit principle, a machine or plant can be easily put together from up-to-date, quality-checked mechatronical components; a comfortable variant and option handling assists the user. All logic circuits and defining rules for usage – easily definable with VBA/VSTA – are also stored. Since in this way only the customer-specific portion must be newly designed, the entire projecting process is reduced by half – with accompanying higher data quality. Moreover the construction kit permanently secures precious engineering experience. The time gained is no longer time expended but can be entered on the credit side of the professionals – for more creativity and innovation!

“The old mechanisms are turned upside down!”

Interview with Thomas Engler on the challenges for power companies and AUCOTEC’s response to them

Since the fall of 2010, Thomas Engler (47) is member of the AUCOTE sales team as key account manager (KAM) ‘Energie’. Up to that time he was employed in the same position by a large American software group.

Mr. Engler, you have only recently entered AUCOTEC, have you already settled down?

Thanks for asking; yes, because of the pleasantly open corporate culture I have managed to quickly feel at home. However, being a Rhineland native, I had little fear of contact anyway.

What was the reason for you to change over to AUCOTEC, and what characterizes your current work?

Due to its advanced product portfolio AUCOTEC has an enormous growth potential. I was impressed by the clear focus of the board of directors on realizing this chance by concentrating on a few target markets. For me this offered interesting organizational opportunities. Another point is that a medium-sized business can or rather must act very flexibly. AUCOTEC focuses all of its energy on customer relations, and that meets my own tendency, this is the work style I like best.

As KAM you are quite close to the requirements of the businesses, what is currently the main concern of the power companies?

The established suppliers of large power plants are exposed to an aggressive worldwide competition with each other. Optimized development processes and consistent tools here offer the decisive competitive edge compared to the competitors. However, the numerous emergent market participants dealing with renewable energies in particular lack EVU-specific know-how, something their customers, the later operators of the energy sources, must absolutely take into account.

AUCOTEC supports both groups equally: the cooperation capability of EB permits completely new approaches for the engineering process of globally operating teams. Added to this is AUCOTEC’s long-standing lead in configuring the branch-specific standards. No other software supplier has got more experience.

And what is the situation with the energy distributors?

They are the ones who must ensure the balance between generation and consumption. Even if it sounds trite, it is precisely here that the distributors experience a fundamental upheaval. On the one hand political forces urge more competition by splitting up the business segments. On the other hand the rapidly increasing proportion of renewable energies turns the old market and network mechanisms upside down. A manageable number of large power plants faces a host of small and miniature suppliers. To upgrade the infrastructure fast enough and at the same time to install functioning regulatory mechanisms across borders is an enormous challenge for our customers.

How urgent is the realization of the new requirements, and what is at present the situation of the companies?

The consistent government support by the Renewable Energies Act (EEG) has led to a rapid-

but also strongly fluctuating-increase on the supplier side. But the expansion of the network infrastructure is a very lengthy process. Right now the balance is disturbed ever more often. In the short term, the only chance of the power companies is to master this balancing act using intelligent, actively regulating networks – the much-cited smart grids. The EEG stipulates that in 2020 already 80 % of all households must be equipped with ‘smart metering’. Time is pressing!

Do all these new demands have consequences for AUCOTEC’s software development?

Rather not because with our long-standing EVU experience and the cooperation platform Engineering Base (EB) we are optimally prepared for this. Of course the concrete technical solutions on the network communication level must be promptly integrated into the product development. Here the pilot projects are currently in their decisive phase. The model-based structure and the flexibility of EB are ideal for this purpose, however. In turn we rather see a consequence for the users: we are convinced that today there is only one system that is capable of coping with the foreseeable and future demands in real time, and that is EB.

Where do you then see the greatest potential for the engineering future of the power companies?

The image of an energy supplier will become far more modern. The companies will have to integrate technologies from the communication industry. Here quite different disciplines and perceptions come together, which will have to be reconciled. This can however also be seen as a chance. Especially the cooperation capability of EB and the flexibility enabling mapping of quite different corporate processes will be an essential facet in helping the companies. Create Synergy – Connect Processes, our corporate vision, will offer the power companies new options and give them the stability required in these turbulent times.



Mr. Engler, thank you very much for the interview



Benning endorses Engineering Base

Complete workflow coverage plus electric utility know-how



Benning GmbH & Co. KG counts on continuous advancement of its portfolio for the industry, for power plants, telecommunication and vehicles as well as for rail and air traffic safety. This requires an absolutely safe, flexible and future-oriented engineering tool. For a while now Benning engineers have been working with the database-driven AUCOTEC software system Engineering Base (EB), whose workflow-oriented design convinced the experts after a thorough comparison.

Energy

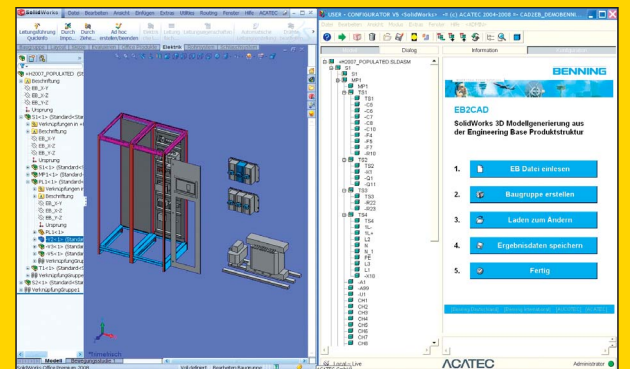
Be it the emergency power supply for the New York subway or nuclear power plants, vehicle battery charging systems or the power supply for mobile network operators, the demands on Benning are varied. Therefore Benning relies on the combination of EB's openness and AUCOTEC's engineering know-how in power distribution. The system provides the graphic

equipment lists required in the energy sector and is familiar with all designation requirements specific for energy supply systems. In order to e.g. find the appropriate Chinese designation standards corresponding to Western standards, AUCOTEC has integrated a tabular tool into EB that inserts the Chinese equivalents in addition to the European terms. This greatly simplifies later manufacturing and labeling.

Complete

"The solution now covers our planning workflow and offers potential for future expansions", explains Zoran Jakovljevic, technical director at Benning. EB supports among other things the use of ERP data, a comfortable variant and option selection and a new, highly automated cabinet planning tool with 2-D and 3-D components. Jakovljevic states: "The coordination processes between the design and manufacturing personnel were – also due to the complexity of

our cabinets – tremendously time-consuming, and that has luckily ended. With the 3-D coupling we can now provide the customer with a spatial representation of the cabinet before he starts producing power."



The projecting job is rounded off by EB's intelligent final documentation and drawing-independent revision technology.

And besides ...

... most recently among others the following companies opted for AUCOTEC:



Alemon s.r.o.
Kosice, Slovak Republic



Banedanmark
Kopenhagen, Denmark



CIEMAT-CEDER Centro de Desarrollo de Energías Renovables
Lubia, Spain



CSR Qishuyan Locomotive Co., Ltd.
Changzhou, People's Republic of China



Kuna Group AB
Järfälla, Sweden



LubTec elektro spol. s.r.o.
Michalova, Slovak Republic

North American Höganäs

North American Hoganas
Hollisopple, USA



NOVING NOVAKY, spol. s.r.o.
Novaky, Slovak Republic



PRO INTEGRIS d.o.o.
Zagreb, Republic of Croatia



Rörvik Timber Boxholm AB
Boxholm, Sweden



PUP SKAMER-ACM Sp. z o.o.
Tarnów, Poland



Tugeb-Polbud Sp z o.o.
Milicz, Poland