real.times

SECURITY

**INTERVIEW: NEW ALLIANCES | WIND: US JOB MACHINE
INDUSTRY: GOOGLE IN OPERATION | QUALITY: SECURITY AT BACHMANN
NEWS: PRODUCTS AND MARKETS**

DEAR READER,

IT security is a matter of education! We see this regularly when human errors are opening the door to IT attacks. Up to now, security authorities had been able to quickly bring situations under control. If you were lucky, you could continue. However, this approach is no longer possible! We must all become sensitive to data security issues – having one standard password in the controller must be strictly off limits. In my view, sensitivity to these issues must already be introduced in school, so that an awareness of the required need for privacy is already in place.

Markets can change overnight. Being a CEO has required me to learn one thing in this regard: how to be flexible without losing one's direction. This enabled us in 2016 to achieve the second highest sales figures in our history. How? By working as an independent family-owned company together with our customers to provide security for them and their processes. We can't solve all the problems of the world but we can demonstrate our attitude – in upholding the values of progress, respect and responsibility.

What I can definitely assure you is: This edition of real.times contains something of interest for everyone – covering topics from Macron to machine data, from Doppelmayr to DDoS and from Google to Gold.

Yours sincerely,

Bernhard Zangerl
CEO Bachmann electronic

Bernhard Zangerl in front of the castle wall of Schattenburg castle in Feldkirch, Austria

»Companies have to ensure security for themselves, just like they did with this castle.«

Bernhard Zangerl
CEO Bachmann electronic
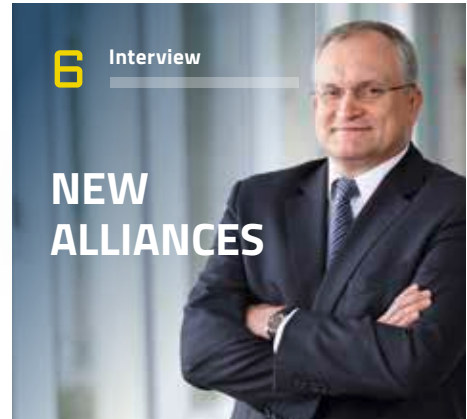
THE HORSES OF YESTERDAY AND TODAY

The siege of Troy was entering its tenth year when Odysseus committed the deception that decided the war. Pretending to give up the siege, the Greeks left behind a giant wooden horse, in which Odysseus and the soldiers under his command were hidden. In spite of the warnings from Cassandra the oracle, the Trojans dragged the horse up to their impenetrable city walls, which they breached, since the horse was too tall for the city gates. After the Trojans had celebrated their victory, the Greeks hidden inside the horse were able open the city gates unnoticed and let their returning army back into the city. Troy was burned down.

Nowadays, clever criminals leave USB sticks in employee car parks and use these to gain access to corporate secrets, send fake mail, attack password administrators or try to extort victims via unpatched software. These are the Trojans of our time. Historians doubt whether the historical structure was ever built.
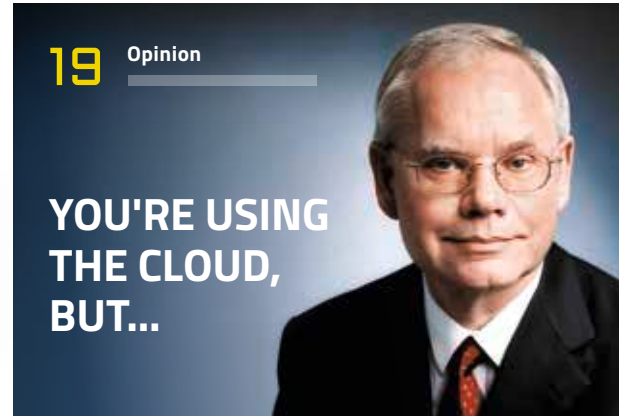
Recommendations: Prof. Dr. Christoph M. Schmidt and his colleagues in the team of economic experts can make suggestions, but it's the politicians who have to find the solutions.

Interview

NEW ALLIANCES

He has talked with Emmanuel Macron, Angela Merkel doesn't always listen to his advice and he wants the European Union to undergo five years of reforms. We spoke to Prof. Dr. Christoph M. Schmidt, president of the RWI – Leibniz Institute for Economic Research, chairman of the German Council of Economic Experts, and professor at the Ruhr University of Bochum.

»It's not the end of globalization.«

Prof. Dr. Christoph M. Schmidt
Chairman of the German Council of Economic Experts

To what extent is the world economy still predictable?

Prof. Dr. Christoph M. Schmidt: Macro-economic and political conditions for companies have become more volatile in recent years. Many people perceive what they consider to be the specter of globalization, while protectionist slogans have helped to win election votes in some countries. A few years ago, it would have been inconceivable for a US president to put free trade into question. However, it is not only macro-economic developments that have created uncertainty amongst companies. They also have to deal with upheavals in their particular field, which occur increasingly more rapidly, in both the industrial and service sector.

But uncertainties were also around as far back as the eighties, weren't they?

Prof. Dr. Christoph M. Schmidt: Of course, you're right. However, the risks and problems we face are always very prominent, even if we live in a prosperous society. Our younger generations grew up in a prosperous environment, and this is definitely a significant influence.

Are we afraid of losing?

Prof. Dr. Christoph M. Schmidt: Yes, that may also often be a key factor – and is perhaps why we avoid some risks, even if taking them could move us forward – economically, ecologically or socially. Prosperous societies in particular find sticking to existing structures very attractive, and their economists have no desire for change. Every generation certainly throws up its creative people, but if not enough of them are willing to give up their security, society misses out on many opportunities.

Are we witnessing the end of globalization?

Prof. Dr. Christoph M. Schmidt: No, it's not the end of globalization. However, you do have to distinguish between stasis and movement. In a state of stasis, one can assume that we will also be living in a globalized world also in the future. However, if we look at the movement towards a further opening and integration of markets, we also have to expect the dynamism of this process to decrease. The low hanging fruit present at the initial opening of global trade has been picked. It is now becoming increasingly more difficult to make further progress.

But is there also a lack of enthusiasm for global trade?

Prof. Dr. Christoph M. Schmidt: Not necessarily. While most trade agreements were signed by states in the nineties, there have been in recent years more difficult agreements and socially more controversial agreements on the agenda, such as TTIP. On the other hand, the idea of free trade is once more gaining traction over here – particularly with a US president calling for an "America First!" policy and many Europeans having to realize how much their prosperity depends on free trade. Free trade agreements are all of a sudden seen in a completely different and more positive light.

Is the world now coming closer together economically against Trump?

Prof. Dr. Christoph M. Schmidt: There are definitely new opportunities for partnerships appearing. China has for a long time been an important export market for European industry, particularly the German industry. However, it has not necessarily seemed to be a genuine partner. For several months many companies have been looking possibly quite differently at China, since President Trump and some of his administration have demonstrated an equally aggressive stance towards both Europe and China.

China is not a solution for everyone. Many companies are worried about their US business.

Prof. Dr. Christoph M. Schmidt: I hope that US President Trump will soon understand that he can't run the USA as if he was managing a company. A national economy doesn't work like that. Companies are free to choose their location and investment projects. Consumers everywhere equally make their own choices about consumption. President Trump can't force anyone to only buy products from the USA, regardless of their price and quality. For that reason alone I am fairly certain that European companies in the USA will continue to find good partners.

However, things are going quite well in Europe at the moment...

Prof. Dr. Christoph M. Schmidt: That may be true but this upturn is not self-

Manager: Donald Trump can't run the USA like a business.

supporting. In order to defend at all cost the integrity of the euro and revive the economy, the European Central Bank (ECB) has chosen a loose monetary policy and thus stabilized the situation. However, every medicine has its side effects: Due to the low interest rates, insurance companies and pension funds are being forced to take on greater investment risks, and property markets have severely overheated in several regions in Europe. It is now time for the ECB to gradually move away from this extremely expansionist policy, and force states to meet their responsibility to secure growth.

How will they do that?

Prof. Dr. Christoph M. Schmidt: The election of Macron as president of France was a good sign. However, European governments, particularly the French government, now have to use the next five years to make serious progress in increasing the competitiveness and consolidation of their economies. No-one can take that responsibility away from them.

Does that mean going into even cheaper debt?

Prof. Dr. Christoph M. Schmidt: No, quite the opposite. Interest rates won't continue staying so low for long. Example: If it was possible to create nationwide structures of e-government, the savings in schools and education

could be invested in future projects. Admittedly, freeing up resources in this way is more difficult for politicians than taking on more debt. However this last option would repeatedly force the ECB into to continuing its loose monetary policy.

Sounds difficult. What is your advice to an entrepreneur in this situation?

Prof. Dr. Christoph M. Schmidt: The conventional solution: diversify risk and reduce susceptibility to external shocks. For example, the equity base of German companies has risen considerably since the years of the financial crisis. In the next crisis, companies clearly don't want to be begging their bank for money in order to bridge a financial shortage. In the short term however, the putting aside of money for a crisis will naturally also reduce investment activity.

In recent years a lot of money was invested in the energy transition – was it right to do so?

Prof. Dr. Christoph M. Schmidt: The energy transition is right in principle but its implementation so far has been anything but successful. To reduce greenhouse gases effectively, we would in particular have to include all systems, i.e. heat and mobility as well as electricity, which has been the sole focus so far. And we would have to place more importance on implementing an energy transition more economically.

Are we on the right track?

Prof. Dr. Christoph M. Schmidt: I don't think so. First of all, we have increased the share of electricity generation coming from renewable energy without developing the power grid at the same rate. We have made virtually no progress at all in the area of heat and mobility. It would have been good if politicians were more open to

suggestions about the economy.

What do you mean by that?

Prof. Dr. Christoph M. Schmidt: Climate change is a global phenomenon, which can be tackled far better with a global approach. An expanded European wide trade in CO_2 emission certificates, extended to all sectors, would provide an opportunity to make an initial step towards a global alliance against climate change. National approaches, such as the Renewable Energy Law in Germany, have largely little effect in terms of global climate protection. Although agreeing on an international and collaborative approach to EU-wide emissions trading would be difficult to implement in Europe politically, it would be more practical than continuing the pursuit of individual national subsidy schemes.

Have categories of risks and insecurities changed?

Prof. Dr. Christoph M. Schmidt: I think the difference to previous crises like the Cold War is that you knew better

at that time who belonged to whom. Nowadays, we often don't know this so precisely.

Europe has around five years – what has to be tackled?

Prof. Dr. Christoph M. Schmidt: Policies are required on three levels: On the national level, the demographic change is one of the greatest challenges. We will have to accept a longer period of working life. More innovative spirit and trust in market mechanisms could also help to maintain growth in prosperity. At European level, an EU finance minister with a separate budget will not be able to substantially help the individual national economies. Every member state should instead secure the strength of its economy by its own effort. There is no way round implementing appropriate reforms. At the global level, new international alliances have to be set up if measures to fight climate change and poverty are to be effective.

Many thanks for this interview with real.times, Mr Schmidt.

Christoph M. Schmidt studied economics at the University of Mannheim, earned a Ph.D. at Princeton University, and received his habilitation in 1995 at the University of Munich.

Since 2002 he has been president of the RWI – the Leibniz Institute Economic Research and professor at the Ruhr University of Bochum.

In 2009 Christoph M. Schmidt became a member of the German Council of Economic Experts, and has been chairman since 2013.

Report
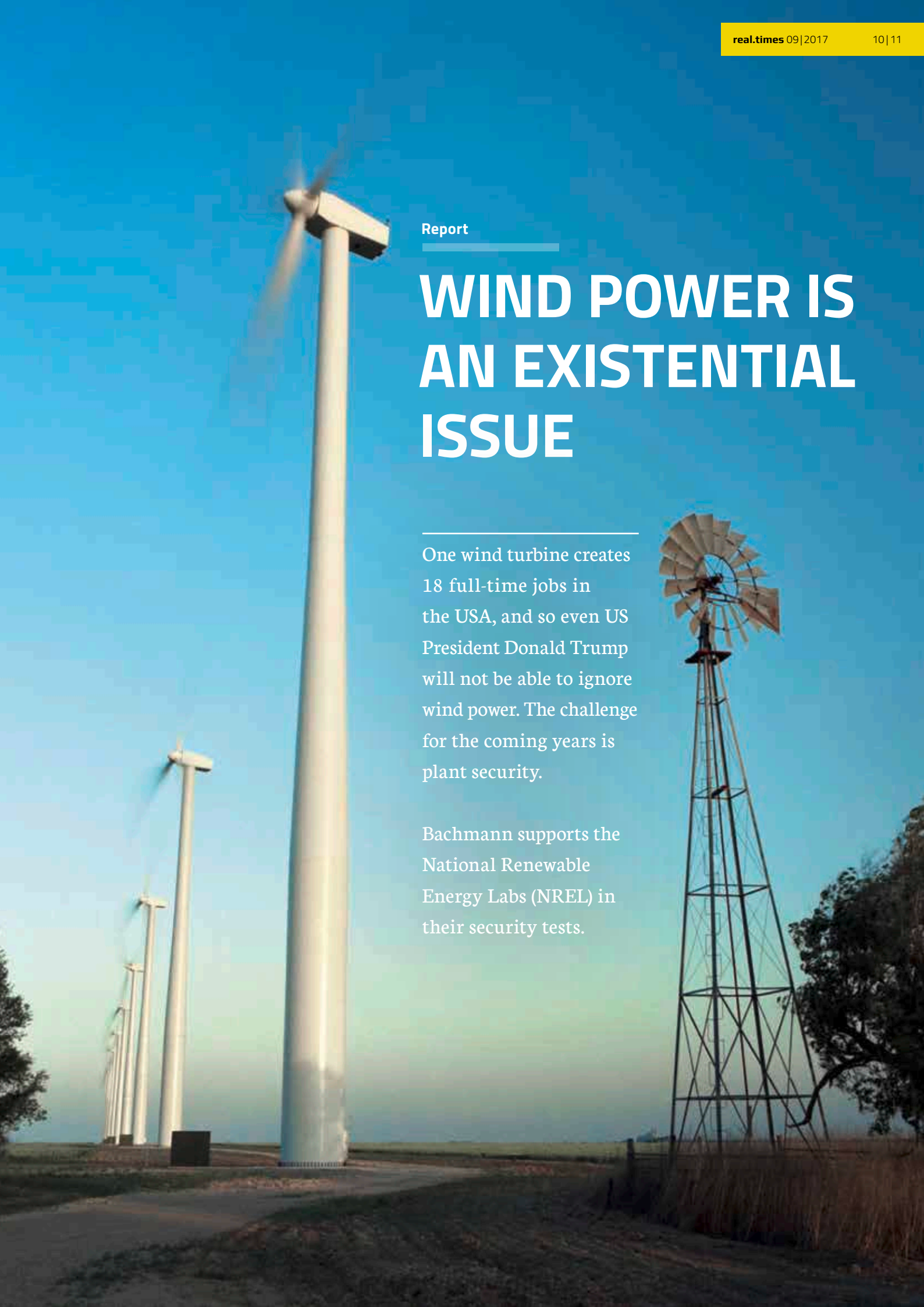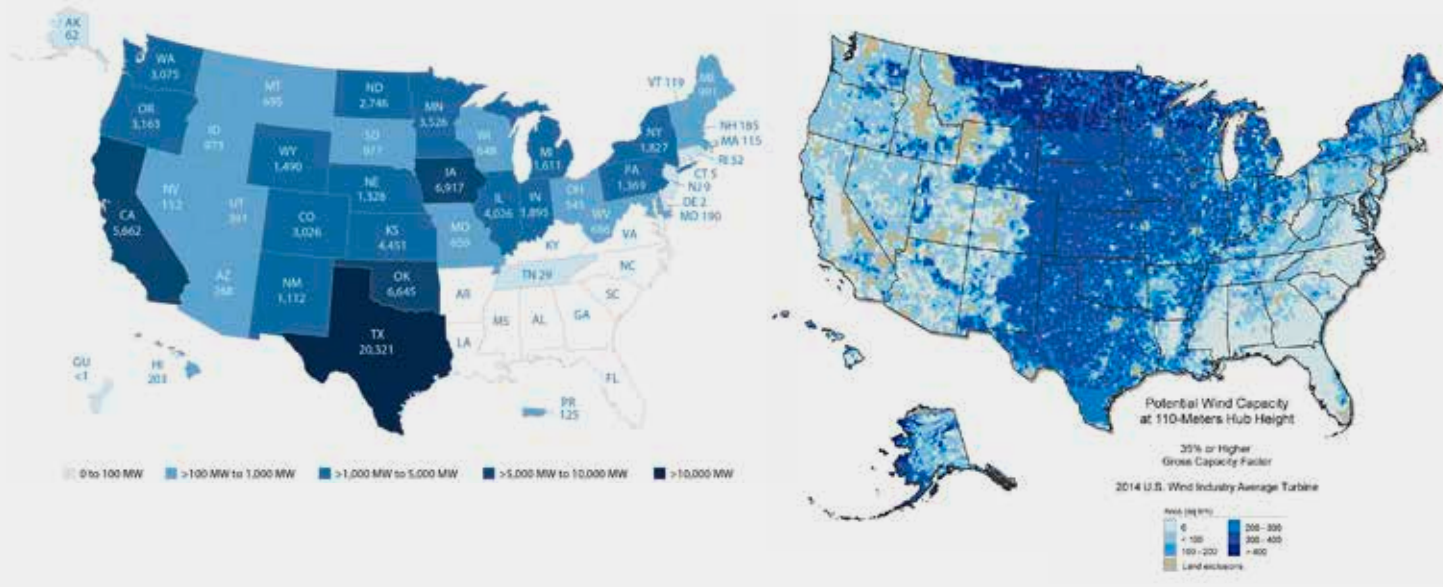
WIND POWER IS AN EXISTENTIAL ISSUE

One wind turbine creates 18 full-time jobs in the USA, and so even US President Donald Trump will not be able to ignore wind power. The challenge for the coming years is plant security.

Bachmann supports the National Renewable Energy Labs (NREL) in their security tests.

Potential Wind Capacity
at 110-Meters Hub Height

35% or Higher
Gross Capacity Factor

2014 U.S. Wind Industry Average Turbine

The best way to reach Maxim Rupp is on Twitter. For the past year, the security expert has been in great demand, particularly in the wind power sector. It was around a year ago when this security specialist published a document on the security vulnerabilities of wind turbines in the USA. Rupp discovered three security risks: He could change the administrator password using a so-called cross site request forgery, so that he could then make changes to the turbine blade or the network settings. He also found a security breach on the web connections of the plants. The results of Rupp's work were disturbing for operators and the entire industry. Forbes magazine published a major report on the discoveries.

"The problem starts when an application is developed. Suppliers still start from the premise that devices will be implemented in a secure network," Rupp told the magazine. The German security expert explained that this was an assumption that arose in the nineties. For Rupp, there is no difference between a web page or a wind turbine – both systems are susceptible to attack and must be protected. According to Forbes, Rupp said that

wind turbines were operating in Europe without protection. A simple search using the shodan.io search machine revealed security risks. However, PLC suppliers have responded to this with a solution. Rupp has also noticed this. "Companies are beginning to understand the situation and are making more effort to protect their products," Rupp reports. However, the issue seems initially limited to the USA. In Germany, there are only a few publications about attacks or security breaches on wind turbines. The German trade press is dominated by the coverage of design benefits or alternative materials.

Brian Hill, on the other hand, from Bachmann electronic in the USA, usually has to talk to his customers about security. "The importance of wind farm security has increased and is right at the top of the agenda for many customers." The US authorities set high standards with regard to security, since failures in infrastructure must be prevented. "The government is working on more stringent regulations and requirements for the operators," Hill reports. "We are ready to create secure infrastructures for our customers," the

American engineer assures. Bachmann electronic provides its customers worldwide with new hardware, and regularly supplies new software updates. Customers just have to install the patches on their own.

Bachmann is helping NREL

Hardware and software are critical for the secure and economical operation of wind turbines. For this reason, Bachmann electronic is involved in the retrofitting of existing systems. Hill and his colleagues are working together with the National Renewable Energy Labs (NREL). The authority intends to include the retrofitting of wind turbines with state-of-the-art Bachmann electronic technology, in order to draw conclusions about the entire wind farm sector in the USA.

The idea behind this is for researchers to carry out tests on wind turbines, change parameters and adapt them to actual conditions so that they can use the results for more efficient systems – laboratory tests for normal operation. "We are helping NREL with our controller systems," explains Hill, who is expecting new orders in the USA resulting from the collaboration with

Data on the US wind market

According to Forbes and other researchers, wind power output in the USA could supply 24 million homes with electricity. Wind power is the most important renewable energy source in the USA. The cost of wind power has dropped by 66 % since 2009. There are over 52,000 wind turbines in operation. Over 100,000 people are employed in around 500 factories in the sector. One wind turbine creates 18 full-time jobs in the USA.

wind power is a job machine? The US Ministry of Energy estimates that there will be around 250,000 Americans working in the wind power sector by 2020, and even up to 600,000 by 2050. The sector continues to be optimistic about the future – in spite of the new government, and in spite of the withdrawal from the Paris Climate Accord. Brian Hill still has some concerns. "We have a lot of space in the USA, but the energy from wind turbines has to be brought to the centers," Hill insists. Our US colleagues also understand the issues around the power grid. "It's easier to build power stations than power lines," Hill points out. Even he has to admit that "The grid is overloaded in some regions." However, new

lines are planned and this will help wind power in the USA. At the same time, NREL is doing good work in the field of battery technology and the development of new turbine generations, Hill states. Bachmann electronic supports its customers and research in the USA.

And Maxim Rupp? He is continuing to highlight the security features of the controller suppliers and is eagerly publishing security breaches – in wind turbines in the USA and in the entire world. There was one disturbing fact that arose from his discovery in June 2015. One entry in Wikipedia describes how the security breach could have been discovered. "It is not really difficult."

the NREL and the test results. "In the USA we are concentrating on existing systems," Hill reports. In the world's largest wind power market, Condition Monitoring Systems from Bachmann electronic are in demand.

The second largest wind power market – for how much longer? "If the Trump administration had been in power a few years earlier, the success of the wind power sector would never have happened. Although the current plans will have an effect on the market, the decisions cannot stop the growth of wind power in the USA," Hill asserts. Federal states and local governments will continue to invest in renewable energy, Hill says. There are also several companies who will invest in wind power in the USA and create new jobs.

"Donald Trump is not interested in science but in votes. If he tries to restrict the wind power sector through legislation, he will face a great deal of political resistance, as some of the largest wind farms are located in states where he had a voting majority," explains Dr. Tom Lombardo, professor for engineering and technology at Rock Valley College. Wind power creates jobs. Does this mean that

The Bachmann Contribution

Bachmann's US-Headquarters is based in Boston (Charlestown), Massachusetts. This location represents the company in engineering and sales for the Americas primarily focusing efforts on selling to owners and operators of wind farms. Pursuing opportunities in Condition Monitoring Systems (CMS), Wind Power SCADA (WPS) and Controls Retrofits, while supporting sales of spare parts, repairs and training customers keeps the team busy. Engineering support is also provided to other strategic market segments where Bachmann equipment is used.

Some recent successes include orders from a large Canadian utility for CMS and upgraded controllers for GE 1.5 turbines in a seven digit dollar range. In addition several projects are moving forward with large US owners/operators in the field of Wind park SCADA to remotely monitor and control sites and to gather specific data necessary for the grid operator to ensure a reliable and failsafe operation. Also moving forward is a special data acquisition project for them, in order to provide necessary data to the grid operator where their wind park is located.

10 THREATS TO INDUSTRY

Very few companies talk about IT attacks. Many people in authority are not aware of the dangers. Bachmann electronic as collated the results of the German Ministry for Security in Information Technology (BSI).

1. Social engineering and phishing

Access to information and IT systems through mostly non-technical means.

Countermeasures: Security awareness training, security policies, establishment of alarm channels, device control, access controls

Prevalence	Exposure	Exploitability	Detection
high	high	high	moderate

2. Infiltration of malware via removable media and external hardware

Removable media such as USB flash drives are very widely used. Company employees often use them both in the office and ICS networks.

Countermeasures: Introduction of strict organizational policies and technical controls

Prevalence	Exposure	Exploitability	Detection
high	moderate	moderate	high

3. Malware infection via Internet and Intranet

Enterprise networks use standard components such as operating systems, web servers and databases. Browsers or e-mail clients are typically connected to the Internet.

Countermeasures: Firewalls, VPN, updates, supervision/ monitoring of log files, limitation of freely available information within the enterprise

Prevalence	Exposure	Exploitability	Detection
moderate	low	high	high

4. Intrusion via remote access

External access for maintenance purposes is very common in ICS installations. Poorly secured access e.g. via default passwords or even hardcoded passwords is a widespread issue.

Countermeasures: Deletion of default users/passwords SSL/TLS encryption, pre-shared keys, certificates, sufficiently granular segmentation of the networks, firewall, enabling of remote accesses by internal personnel, logging of remote accesses, personalization of accesses, audits

Prevalence	Exposure	Exploitability	Detection
moderate	moderate	moderate	high

SOURCE: BSI / KEY

high	moderate	low

5. Human error and sabotage

Staff working in an ICS environment are in a special position with regard to security.

Countermeasures: Introduction of the "need to know" principle, policies, automatic monitoring of system health and configurations

Prevalence	Exposure	Exploitability	Detection
⊕⊕	⊕⊕	⊕	⊕⊕⊕

6. Control components connected to the Internet

ICS components such as programmable logic controllers are often connected directly to the Internet.

Countermeasures: No direct connection of control components with the Internet, change default passwords, firewall, patches

Prevalence	Exposure	Exploitability	Detection
⊕	⊕⊕	⊕⊕	⊕⊕⊕

7. Technical malfunctions and force majeure

It is impossible to exclude software errors in security-specific components and ICS components that may lead to unexpected malfunction, as well as potential hardware defects and network failures.

Countermeasures: Establishing a business continuity management, exchange or replacement devices, test and staging systems, use of standardized interfaces, redundant design, checking of product vendors

Prevalence	Exposure	Exploitability	Detection
⊕⊕	⊕⊕⊕	⊕	⊕

8. Compromising of extranet and cloud components

The trend common in conventional IT to outsource IT components is now also gaining traction in the ICS sector.

Countermeasures: Service level agreement, use of certified suppliers, use of private cloud, cryptographic mechanisms, VPN

Prevalence	Exposure	Exploitability	Detection
⊕	⊕	⊕	⊕⊕⊕

9. (D)DoS attack

Wired as well as wireless connections are used for communication between the components of an ICS. If these connections are interrupted, measuring and control data for example cannot be transmitted anymore. Another option is to overload a component with a very high number of queries, making it impossible to deliver a timely answer.

Countermeasures: Hardening of network access points, dedicated, cabled connections for critical applications, intrusion detection systems (IDS) to detect attacks, redundant connection of components using different protocols

Prevalence	Exposure	Exploitability	Detection
⊕⊕	⊕⊕	⊕⊕	⊕

10. Compromising of smartphones in the production environment

Displaying and modifying operations or production on a smartphone or tablet computer is increasingly promoted and used as an additional product feature for ICS components.

Countermeasures: Only read access, mobile device management, VPN, verified app stores, no use of apps for direct access to ICS

Prevalence	Exposure	Exploitability	Detection
⊕	⊕	⊕	⊕⊕⊕

CLOUD TECHNOLOGY IN A TRADITIONAL COMPANY

Google in industry? In Germany's Siegerland, the mechanical engineering company Achenbach Buschhütten is successfully using the cloud technology of the US company. The next aim: The use of 'unsupervised machine learning' applications in order to improve machine performance.

Based in Germany's Siegerland region, Achenbach Buschhütten GmbH & Co. KG has experienced several technological and social revolutions in its time. The company was founded by three brothers in 1452. A massive iron hammer was for a very long time their sole working tool. With the increasing onset of new technical advances, the old iron hammer factory was pulled down in 1846 and a modern iron foundry was built in its place, which became a roller foundry towards the end of the nineteenth century. Mechanical engineering developed at the same time: In 1888, the first Achenbach rolling mill for producing sheet iron was sold, and this continued to enjoy lasting success. The company grew, building the first aluminum rolling mill in 1911, and subsequently specializing in the construction of non-ferrous metal rolling mills, which were also sold internationally from the fifties onwards. The company then became a world market leader, particularly for foil rolling mills, with markets in Asia, South America and Europe. Automation was introduced to the rolling mill industry at the end of

The company Achenbach Buschhütten was founded in 1452.

The company delivers rolling mill plants and slitting machines for the non-ferrous metal industry worldwide.

the seventies, followed by the digitization currently in place. Artificial intelligence is planned for the future – also thanks to the technologies provided by Google. Roger Feist is responsible for the automation technology at Achenbach. For around three years he has been intensively involved in the implementation of the digitization of the Achenbach rolling mills and foil slitting machines.

What questions can we ask the data?

"Our customers, like us, wanted to follow the production steps more closely, and correlate, for example, the data from the foil rolling mill with the slitting machine and the feedback from the customer." The aim is to make production more transparent. While all this was still just an ambition for Roger Feist and his team in 2014, they have now almost achieved this, in collaboration with their partners Scitis, Google and Bachmann electronic: Achenbach OPTILINK® has been running already for several months in test operation at a customer's site.

All the data from the Bachmann M1 controller is sent to a small single-board computer via OPC UA, where the information can then be subscribed and stored in a cloud memory. Access from the cloud to the machine? No chance!

"Our security concept guarantees that the data can only be transferred on connections that are established from the machine network. The machine controller can neither be viewed from the Internet nor addressed. Only the machine operator can thus decide whether data is transferred to the cloud or not," Feist explains. There can be around three gigabytes of data for each machine in one day, mostly consisting of OPC UA and SQL data. As the storage capacity of the cloud is virtually unlimited, data never has to be deleted to save space.

"Neither we nor our customers can say today what questions we will try to answer with the data. Only if actual problems with a particular material occur, or if a customer is struggling with a particular subsystem, will we know which data is relevant for solving

the problem. Problem solving would be much more difficult if this data was deleted too early." A machine can be equipped with Achenbach OPTILINK® in half a day, depending on the hardware present in the machine. "The Bachmann controllers have here some very useful features that simplify the installation of our system," the engineer said in praise of the controller. At present, OPTILINK® collects the data from individual machines, however, the next objective is to achieve process analysis across multiple machines.

The customer can query the current state of the machine via a web interface. Achenbach provides the customer with a basic set of analysis tools, but the customer can create and perform their own analyses. "We have been selling Achenbach OPTILINK® as an

Roger Feist uses data analysis to increase the productivity of machines.

add-on for our customers for several weeks," Feist reports. The system is generating a lot of interest. Chinese customers still have to wait for a connection since Google services are blocked there. "However, we are already working on a solution," says Feist optimistically.

Google in the Siegerland region

What is Internet giant Google actually doing in the project for the Siegerland company? The US concern supplies the cloud technology and partner Scitis has brought the know-how about the technology from Silicon Valley to the project. Combined with the expertise and experience of the machine builder, it has been possible to create a powerful portal for analyzing production data. "All the data is located on European servers," Feist explains. Did he ever have a bad feeling about using cloud services? "My gut feeling here was that it was fine," he states with confidence. Feist thinks the data centers of the major cloud supplier are safer than the IT systems of most medium-sized companies: "An enormous effort is taken to satisfy the highest security standards and the several measures are made transparent and certified by independent bodies. Over 700 employees at Google take care of IT security. If attackers had the resources to successfully attack Google, they could probably also infiltrate virtually any conventional corporate network and likewise steal, manipulate or destroy data."

Trust in data security at Google therefore seems justified, and Achenbach also intends to do more with the data. Artificial intelligence is a hot topic, and not only with the focus on 'deep learning' intensively promoted by Google. Achenbach is implementing 'unsupervised machine learning' in many solutions. For this, the rolling mill tries to detect patterns in the data that deviate from structureless noise. Ideally, this will provide the operator with an action recommendation, such as the ordering of a spare part. "We are currently working with our partners on this and similar applications," Feist reports, and with some obvious pride about the achievement of his highly motivated development team.

"Today we are offering cloud solutions and data analysis to many automation customers on the market. "At Achenbach we have some competitive edge and are working intensively on not only keeping it but also extending it further." Together with his colleagues, Roger Feist aims to create thoroughly and extensively new possibilities to improve production in rolling mills – bringing real innovations to market in line with the Achenbach Buschhütten tradition.

ACHENBACH BUSCHHÜTTEN

Achenbach is a global provider of non-ferrous metal rolling mills and foil slitting machines for the non-ferrous metal and finishing industry.

Achenbach machinery and equipment are used in production in around 60 countries worldwide. The company was founded in 1452 by the three Busch brothers.

Over 360 people now work for the company in the Siegerland region.

Opinion

USE THE CLOUD, BUT...

Prof. Dr. Hartmut Pohl
IT security expert from the German Informatics Society
and CEO of Softscheck GmbH

Using the cloud must not be a matter of trust. Instead, complete security tests must be carried out by independent testers at reasonable intervals (and in the event of modifications) in order to make a detailed examination of the safety level. Standard cloud security assessment questionnaires, for example, are helpful in any circumstance but in no way enough.

The view that large data volumes (Big Data) can no longer be (economically) protected is dangerous. Like a security strategy or access control (AIM) etc., security measures are ultimately entirely independent of volume. Already today, saving money in IT is a thing of the past: Securing the data required for the maintenance of operation is increasingly more important.

In times of political uncertainty worldwide, the risks to IT between nations is even stronger than was the case in the past. The industrial espionage and the sabotage (in recent times) repeatedly alleged by the NSA is being successfully perpetrated by many intelligence services and criminal groups and criminal companies internationally, also within the EU, and is rapidly increasing: The many reports of attacks perpetrated apply to practically all sectors, such as mechanical engineering, energy, banking and insurance, right through to life support equipment in hospitals – the entire health sector and IT – just to name a few examples. The attacks in the logistics sector are also of considerable importance, as the supply of the population with food, water and medicine is essential.

The use of cloud storage often starts with trials with small corporate areas. A security strategy with a risk analysis and an evaluation of the provided data is vital for the systematic use of clouds. Even the smallest companies have to develop the strategy in order to prevent possible data leaks and changes.

Data encryption is indispensable for the transfer to and from the cloud and inside it. The data, however, has to be decrypted for processing. If authentication and identity management are poorly implemented, valuable data can be easily leaked to third parties and attackers. The often discussed homomorphic encryption is (unfortunately) not yet ready for the market. Effective measures also have to be taken to achieve integrity and availability, as it may ultimately be impossible in certain circumstances to access data at the agreed time. All security measures, and also client capability must be continuously (automatically) audited. Experience has shown that virtually all IT products (software, firmware, apps and systems, also embedded) contain vulnerabilities that can be exploited by attacks – particularly the as yet undisclosed zero day vulnerabilities. This also applies to the software and applications controlling the cloud. A penetration test is not enough to identify them.

An ISO 27034-based security testing process (current state of the art) must be used instead to identify them. The following 5 methods are used: security requirements analysis, design testing with threat modeling, source code testing with static source code analysis, the conventional penetration testing, and finally the examination of the executable code with fuzzing (dynamic analysis). In the near future ISO 27034 certifications can also be expected.

Use the cloud, it is not dangerous – however, it must and can be well protected. Trust is good – but carefully check that the particular security level provided actually meets your requirements.

THE QUALITY AND IT VETERANS

Breaking routines: Business consultants long to find companies that are agile. However, the industrial sector makes this difficult in some areas, as it is often hindered by rigid internal processes. Uwe Fuchs is responsible for the processes at Bachmann electronic. His aim is to be agile with the standards.

DIN EN ISO 9001 provides the basis for his work. Uwe Fuchs is responsible for quality and risk management at Bachmann electronic. "Compared to the past, today's customers are more independent, active and assertive. They won't be put to one side but want to implement things themselves, and wish to accomplish something. Products are required to contribute to the customer's self identification. Nowadays, customers want to be inspired," explains Fuchs, who sees this to be precisely his responsibility. He ensures that the processes in which his colleagues can develop customized products are stable.

"Quality cannot be achieved through subsequent checking and controlling. It can only be ensured by a well thought-out design, ordered manufacturing and ongoing quality control during the entire creation of a product. It must be ensured that checks and controls are only implemented where success has been achieved. The optimum is found in between testing and controlling – a healthy middle way," Fuchs states. How then, does Fuchs and his colleagues convey these quality requirements to co-workers and suppliers? "On joining

the company, we provide every new employee with the best possible support. We also encourage a family mindset, with flat hierarchies and an open door policy," Fuchs explains. In addition to this, we implement both internal and external audits, continuous training measures and: "feedback discussions as an incentive to improve – not as an opportunity to unload frustrations and criticism," Fuchs adds. When customers make a complaint, Fuchs and his colleagues don't look for the person to blame, but seek to find improvements (error avoidance).

Fuchs' philosophy: whether in the supermarket or in business – we buy where we can find our values represented. Maxim: Quality, delivery reliability and punctuality are no longer enough. In future, service will take on increasing importance.

And do customers have to be more agile!? "Current processes should regularly be put into question. We also do this continuously with ourselves. By subjecting regular and constantly unchanged work processes to tests we intentionally break through routines."

Uwe Fuchs
Quality and risk management
Bachmann electronic

Routines for security: Monitoring, patching and explaining - Marc Taucher is responsible for IT security at Bachmann electronic. He fights against hackers and fake mail. The Vorarlberg team use multifactor authentication and automated patches.

Marc Taucher is responsible for IT security at Bachmann electronic, together with five other colleagues. His working day always starts the same way – coffee and the daily morning security check. Early in the morning, Taucher checks the infrastructure and server activity. Were there any attacks or other technical problems overnight? "I check the servers, the firewalls, the antivirus software, and do this several times a day." What happens then? "Sometimes, there is a hard disk failure or we have to fight infections," explains Taucher, who has been in charge of network security at the Vorarlberg headquarters for almost a year. "However, colleagues did also practice IT security previously," he says in jest. Penetration tests were also included. Bachmann electronic complies with all ISO certifications in the area of IT.

Besides the daily threat situation, the team also covers the prevention of attacks. "Our patch management has long been automated. Java or Microsoft applications are thus always immediately adapted to match the latest threat scenarios." Any missing updates are not therefore a danger to Bachmann electronic. Where do the dangers lie? "Spam mail has increased and have become even better at the same time," Taucher reports. Better? "More professional. They are now very difficult to distinguish from genuine messages," the IT expert adds. Besides spam mail, Taucher and his team at Bachmann electronic also identify fake mail. "Criminals send messages with authentic names from the company, in order to clear money transfers under false pretenses." Any damage? None so far.

The IT security team is sensitizing employees to the problem and a new penetration test is being planned. A few months ago, Taucher saw the need for action on the issue of password security. "Users want simple passwords, while we want secure passwords," Taucher explains. Is the use of the fingerprint coming? "Hardly. Once the fingerprint is hacked, it is no longer useful at all. Passwords, however, can be changed." The plan: multi-factor authentication with password and smartphone.

Marc Taucher
IT Security
Bachmann electronic
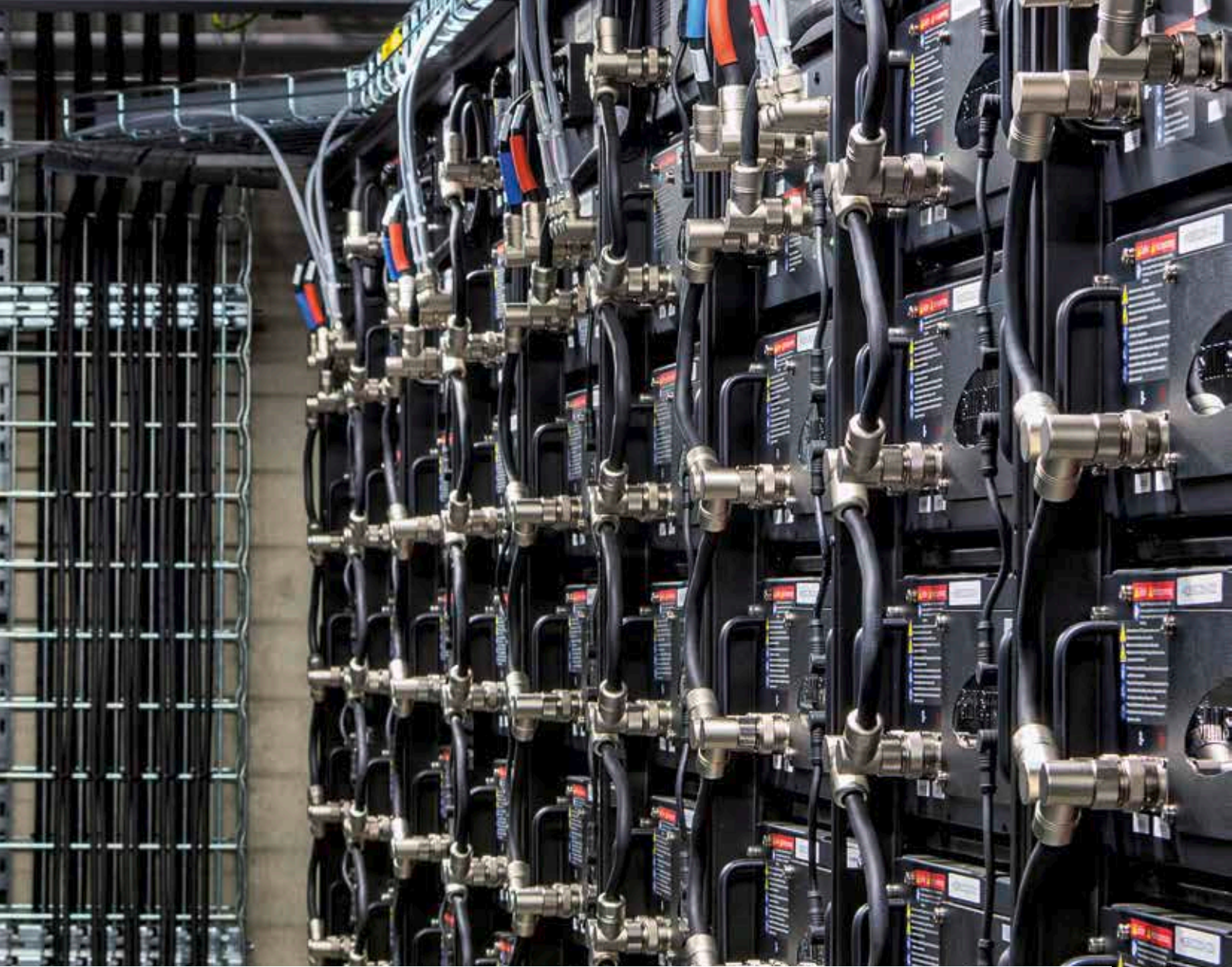
INTELLIGENTLY CONTROLLED ENERGY STORAGE SYSTEMS

Reliable grid operation fed 100 % by renewable energy sources is one of the key objectives of the energy transition. Younicos, a supplier of battery-based smart grid and energy storage solutions, has devoted itself to achieving this goal. Besides battery technology, smart software and not least robust and modular control technology play a major role here.
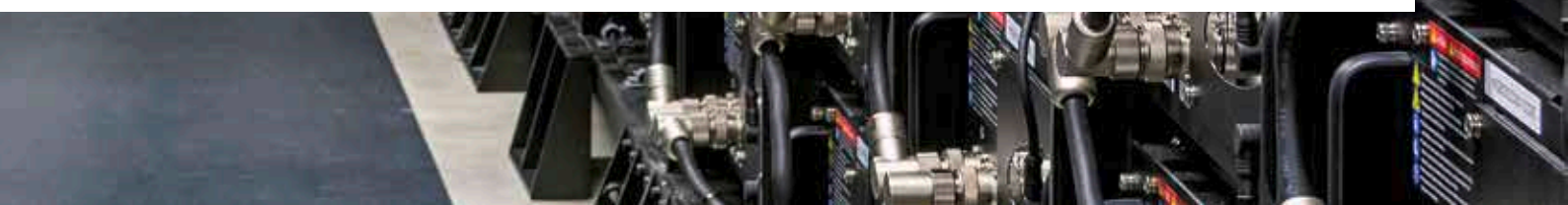
A look inside the Notrees 36 MW battery park – the largest battery storage system in the USA connected to a wind farm.

Test rig for lithium ion batteries in the Younicos Technology Center in Berlin-Adlershof.

Younicos has been supplying battery storage solutions to different sectors and application areas since 2005. Worldwide, 37 energy storage projects with outputs of 150 MW have been installed to date. "The aim of the founders of Younicos was to improve the technical and economic integration of renewables in the energy system by using storage media," says Ines Auweiler, head of Marketing and Communications. These pioneers, based in Adlershof, Germany, are repeatedly setting new standards here: In 2009, a megawatt battery was installed in European grids for the first time. A unique technology center was formed, in which the supply of grids with up to 100% renewable energy at any location in the world was simulated and readjusted with actual current flows. In 2012, a battery was prequalified in Europe for the first time for the supply of control energy. Younicos subsequently designed and constructed Europe's first commercial battery park, as well as Europe's first multi-functional battery power station. A number of game-changing systems were also developed at the same time in America.

Today, Younicos is a leader in intelligent grid and energy storage solutions based on battery technology. Its customers include energy suppliers, independent electricity producers, industrial or commercial electricity consumers as well as island grid operators. Since 2015, the company has focused on the commercial and industrial sector. Storage systems have really 'grown up' and are not just of interest to grid suppliers or idealistic private users.

The portfolio in detail

"Medium-sized plug-and-play systems offer several benefits, particularly for industrial or commercial electricity users. These kinds of storage systems secure production by ensuring optimum supply quality. They also optimize energy consumption and thus save a lot of money. At the same time, the storage systems can be used in different markets, generating also additional income," Auweiler explains. "Our storage systems can offer different applications, even simultaneously, in line with this wide range of requirements." She gives the following examples: absorbing load peaks, implementing an uninterruptible power supply, compensating reactive power etc. "These applications are implemented in the software and can be run together or individually," Auweiler explains.

The Younicos portfolio essentially comprises two solutions: the Y.Cube plug-and-play solution and the pre-engineered building solution Y.Station. The core of both solutions is the intelligent Y.Q. "Younicos Quotient controller software – 'Y.Q' – containing all our experience," says Auweiler. All Younicos storage solutions consist of different battery cells from different manufacturers, which are enclosed in modules, which are then combined in a rack. They are controlled via a battery management system, the so-called ACBM (AC Battery Manager), for example, via CAN bus or Modbus. A Bachmann controller solution is implemented at this level: An M1 controls several racks and provides the connecting link to the converter. "The capability of the converter determines the number of battery racks that can be connected to it," says Philipp Hundemer, requirements engineer. He further explains: "Several of these racks are used inside a power station, according to the combined output (MW output) required. Between 700 kW and 2 MW can be effectively used on average, depending on the converter."

An air conditioning system and fire extinguishing system are some of the additional variables that are monitored and regulated within a system. "If necessary, we also use Bachmann controllers for the fire extinguishing systems. Air conditioning systems have their own controller, although they can be connected to the M1 via their integrated interface," Hundemer explains.

Bachmann's GMP module is also used, for example, to measure the grid frequency. The GMP232/x offers an outstanding measuring accuracy of 1 mHz, as is required in energy applications. "The data from the system worlds are routed via an IoT protocol, such as MQTT, to higher-level systems, such as the Battery Power Plant Manager (BPPM), or the Web User Interface, such as Data Historian. In the stand-alone power station, the BPPM represents virtually the highest level on the software layer. It can route commands to the individual system components," the software expert explains.

Satisfied reference customers

The data can be visualized remotely in parallel. "The idea behind it is to completely prevent with our software the possibility of critical states developing in devices like the converter. This means that additional safety controllers on this level become unnecessary," he continues. The BPPM can also be used to measure the energy content of batteries. Alternatively, if several strings are connected together in a power station, it is important to know the SOC of the individual components, otherwise the compensation currents may be too high in certain circumstances. "In such cases, we disconnect the appropriate batteries, and charge or discharge them in order to adjust them to the SOC of the others," Hundemer explains. The control options of the ACBM also enable different storage solutions to be run as hybrid systems. All information of the individual units, such as operating data, error states etc. are shown via the web interface.

The 37 projects implemented so far worldwide includes the project at Wemag, headquartered in Schwerin, Germany. In the autumn of 2014, Europe's first commercial battery park for stabilizing short-term grid fluctuations was connected to the grid. The large-scale turnkey storage system implemented by Younicos in lithium ion
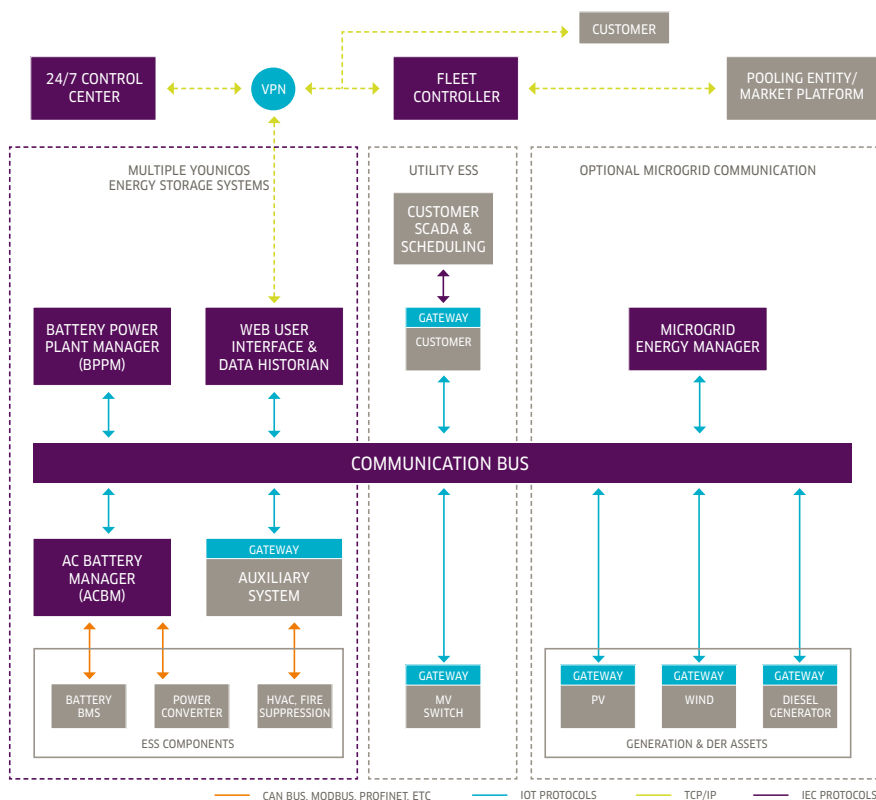
What intelligent energy management looks like: architecture of the Y.Q software from Younicos

technology helps to stabilize the grid frequency on the transmission network level and integrate wind and solar power safely into the existing grid. Coal-fired power stations, which previously performed this function, can be left out during good "energy weather". Here too, the battery management was implemented with the M1 controller system from Bachmann. The control system for the converters and batteries was implemented on the MX220-CPU of the M1 automation system. It provides a standard interface to the BPPM at the same time. Younicos highlights the high CPU performance, as well as the ability to program in C++, as the benefits of the Bachmann solution. This also comes with the important interfaces and protocols, such as CAN, Profinet, IEC 61850 and IEC 60870-5-104, already on board. The high availability and EMC performance of the M1 system were other reasons for choosing Bachmann. Over a dozen M1 controllers have

now been successfully controlling the battery management of the 5 MWh storage system at Wemag since the second half of 2014.

The latest and largest Younicos projects include the delivery of a 49 MW battery storage system at Centrica, the UK energy supplier. From the winter of 2018, the lithium ion system will respond in less than one second to fluctuations in current consumption in the UK grid. The installation is being built at the site of the former Roosecote coal-fired power station in Barrow-in-Furness in northwest England. The intelligent controller ensures here that the battery system meets the demanding requirements of the British transmission network operator, National Grid. Here too, the Bachmann solution stood out on account of its wide range of interfaces. The project was also a highlight for Bachmann: In all, 63 M1 controller systems are deployed here. "The M1 is

»Storage systems have really 'grown up' and are not just of interest to grid suppliers or idealistic private users.«

Ines Auweiler
Head of Marketing and Communications
Younicos

a stable, certified hardware that is designed for industrial applications and long-term availability. Expansion modules can be connected quickly thanks to the modular design. It also offers software developers the benefits of a comprehensive software library," says Hundemer.

Conclusion and outlook

Energy storage systems can be used for a wide range of reasons. "For Wemag, the storage system was used for storing primary energy with which the company intends to earn money," Auweiler explains. In other cases, such as on the Portuguese island of Graciosa, the project involved the replacement of the diesel units in place and the im-

plementation of up to 100 % renewable energy usage. "In India, energy storage solutions are used to prevent production breaks caused by unreliable grids," she adds.

However, many other scenarios are conceivable in future. Hundemer: "A fleet controller enables several of our Y.Cube container solutions to be connected together. This makes it possible to achieve a higher storage volume." As one example, he states discount stores, wishing to offer charging facilities for electric cars in their parking lots around Germany and provide an energy storage solution for this task. "Each individual energy storage system is too small for primary control. However, some interesting possibilities are created if

several of these individual energy storage systems are combined together as a group. This is what we are working on at present," says Hundemer. "This example also illustrates the potential of the commercial and industrial sector, which is only just beginning," Auweiler explains. She expects this sector to grow quickly in the near future. "Customers have now realized what storage solutions involve. Four to five years ago, many still believed that energy storage systems were mainly deployed as a long-term storage system. We are now far away from this situation, so that larger industrial companies are asking about systems for the already described tasks increasingly more often," says Auweiler optimistically about the future.

Younicos

Younicos is the pioneer and market leader in smart grid and energy solutions based on battery storage.

The company was founded in 2005 and has 130 employees at sites in Berlin, Germany and Austin, Texas, USA.

KNOWLEDGE NOT ADVERTISING

At the Expert Days held by Bachmann electronic, participants discussed the latest topics of the automation world – products took only a secondary role. Bachmann electronic wants to share its knowledge.

Over 25 customers from industry met at Bachmann electronic headquarters.

The flood of email invitations has no end. If they wanted to, automation engineers could attend one event on the subjects of digitalization, Industry 4.0, Engineering 4.0, the future of the factory or IT security every day of the week. The event market is growing, and for some people invitations are becoming a nuisance. Most of them are uninspiring sales events – financed by sponsors who are given the stage and presumably audience attention. "Nowadays, we no longer get a travel allowance for product presentations," joked one participant at the Bachmann electronic Expert Days event 2017. Over 25 participants from the mechanical engineering sector took up the invitation from Bachmann electronic in April.

The main reason: The Vorarlberg controller experts are taking a different approach with regard to the content of their Expert Days – in which discussions on issues like IT security, usability or engineering take center stage, and the outside speakers are an actual enrichment to the event. Participants are allowed to give their own talks on issues, and the product world of Bachmann is kept out, particularly on the first day. The sales organization has to accept this, as well as the evening discussions that take place at the bar about competitors and other solutions on the market. Over these two days, employees of Bachmann are tasked with listening, learning and understanding; this enables companies to develop successful products and get closer to the customer.

On the first day, some particularly lively discussions were held on the subject of IT security, such as "What are the real risks for my company?" Terror? Intelligence services? Organized crime or script kids? Can my Bachmann controller be found with shodan.io? Who has changed their default password and what is a good password? Answers to these questions can be found in many articles of this issue of real.times. In line with the discussion on IT security, Roger Feist from Achenbach Buschhütten spoke about his preference for the Google Cloud. According to him, there was nothing more secure than the Google Cloud. How he analyzes data from the Cloud is also described in this magazine.

Besides IT security, engineering was another important item on the agenda of the Expert Days. The Bachmann engineers presented new applications for the SolutionCenter related to the subject of engineering.

The engineering is one of the key disciplines in machine building. Many companies long for quicker ways of programming codes and reducing development times. They are following the path from the electrical and controller world to the IT world. This is not always

easy but the attractions are great. One method that is still unknown to many companies is MDD – modular driven development. The promise: The code is generated virtually by itself.

A new machine and its controller require the cooperation of many departments and suppliers. Initially, only a pencil or photos and icons are required to visualize connections. In the first step, the most important people must be brought together. Basic requirements must be defined and the scope of the system must be modeled. The system architecture should also already be modeled by the team. The developers can also make several corrections and simulation runs after consultations with the team. Important: MDD needs a lot of information, otherwise the code will ultimately not work.

The main problem for many machine builders and MDD users: There are only a few software applications available on the market. One solution is Rhapsody from IBM. The IBM Rational Rhapsody developer software is a visual development environment for the development of embedded, real-time or technical application software based on Unified Modeling Language (UML). It generates application code for C, C++, Java and Ada languages, including architecture and action views. According to IBM it also includes: animation functions that help to debug the model at design level while it is being created, so that the user can rectify faults early on. With the support of animations, customers can control designs in the same way as with a traditional debugger but on a higher abstract level.

MDD fascinated many attendees, as they had never heard of this method before. The participants ended the Expert Days with a greater awareness of IT security and some new engineering know-how. Passing on knowledge not product advertising – the idea of the organizers was a success. Another meeting is planned in 2018.

Opinion

REFLECTIONS ON THE
EXPERT DAYS

Clearing my head

These were two exciting and informative days that introduced new topics and approaches. The exchange with other sectors in particular – the chance to look outside the box – is a tremendous benefit. I could also make some useful contacts. Clearing one's head from the daily routine helps to shape the future more efficiently.

Stefan Spiegel
Control Engineering,
Soplar sa,
Switzerland

Individual security structures

During the Expert Days, it was important to show that the threat to industrial companies varies considerably. For this reason, their security structures are also individually tailored. Our task is to equip the M1 controller with all the security features required to implement the appropriate structure. There is as yet no industrial standard for encrypted communication with the controllers.

Christoph Scherrer
Product Line Manager,
Bachmann electronic,
Austria

@ Would you like to attend the Expert Days in the early part of next year for further training? Why not register now? Mail the company at expertenworkshop@bachmann.info

SAFE RIDE UP THE MOUNTAIN

Modern human machine interfaces supply the right information, data or prompts at the right time and at the right place. Good usability or user experience therefore create safety and process stability.

»Nowadays, many people expect to operate products as intuitively as their phone and this is absolutely justified.«

Philipp Maul
Senior designer,
Schindler Creations

Skiers and locals in Arlberg had to wait a long time before the link between Zürs and Stuben was built. Furthermore, the weather at the official opening ceremony didn't play ball, so that this often had to be postponed. The great day then finally came: The brass band, the dignitaries and a large number of skiers could rejoice – the Flexenbahn cableway, an investment of several million euros in the future of the skiing area, ensures greater skiing enjoyment and is economically important for the Vorarlberg hospitality industry. This only earns money when the cableway is operating reliably. Modern cableways transport up to 5,000 people an hour up the mountain. Any breakdowns cause holiday frustration, something no skiing area wants to experience. Reliability and process stability are therefore critical success factors, both for cableway operators as well for the machine builders. Doppelmayr, the cable car builders from the Vorarlberg, know this and have therefore revolutionized their control system and also the operating elements for users at the mountain stations.

Flexenbahn cableway mountain station

In May, these were presented to the public. But what are modern operating elements? "Good usability alone is not enough. The right mixture of culture, usability, user experience (UX) and technology, however, ensures a stable process," explains Philipp Maul from Schindler Creations. Schindler supported the engineers at Doppelmayr with their project for the safe and rapid mountain ascent. From the start, the team observed the cable car employees in their daily work, analyzed their processes, their communication and commands. They carried out several interviews with them in order to better understand and find out about their work, and what kind of operating functions they were expecting – operation as easy as a smartphone?

Usability and UX belong together

There is naturally a great demand for good usability and UX: Operators must be provided with the right information, data, or prompts at the right time and place, as well as to individual requirements. This allows them to make the right decision for the specific situation at hand. Operation must also be a pleasurable experience, even after several months or years. "One difference between usability and user experience is particularly the fact that good usability can also be achieved without good visual design. This is naturally at the cost of the user experience, in which the emotional experience of a software product

takes center stage. The terms are therefore closely related and are partly mutually interdependent," says Tom Cadera, industrial designer and usability specialist from Würzburg.

There is one thing of which the experts are certain: Good user experience can be measured by increased productivity, improved operator safety and greater process stability. After all, the production process is safer if the operator can spot a problem quickly on the operator panel, or is prevented from accidentally changing settings by pressing the wrong buttons during operation or maintenance. "Previously, there was one user interface for everything. Today, many machine buyers require individual user types in the user interface, from commissioning to maintenance and to daily operation. Users should only be shown the information required for their defined role," Cadera explains. Furthermore: Ideally, HMI applications should document processes and procedures automatically, fetch feedback from the operator, automatically learn from the results, as well as provide the user with support and context-sensitive information. In the pharmaceutical industry, for example, this data is indispensable. The digitalization of the HMIs (human machine interfaces) is gathering momentum.

Added to this is the fact that, fewer employees will be working in future with several different machine types

since the training required for individual machines is expensive. Modern user interfaces are therefore required to be more self-explanatory, and this is a task facing Maul and Cadera.

Flat or almost flat?

Thanks to smart phone manufacturers, operators have been spoilt. "Nowadays, many expect to be able to operate products as intuitively as their phone, and quite justifiably," Maul says and adds: "Just because the product I am working with is a necessary part in my job, this is no justification for burdening myself with old methods and illogical processes, even if it is more complex than my home applications. In fact, the motivation and requirement should be precisely the opposite."

This is reminiscent of the late Steve Jobs, the former Apple CEO, and his "super easy to use philosophy". At its presentation in 2007, Jobs promised that the iPhone would actually "only redefine" the telephone. However, the US company has for ten years actually forged a whole new generation of machine operations or interfaces in the industrial sector – regardless of whether in flat or almost flat design. The sector cannot explain the iPhone effect away. "The interaction and the generally good design generated the expectation, that all today's products could be operated just as simply or with the same principles as the corresponding mobile devices," Cadera confirms.
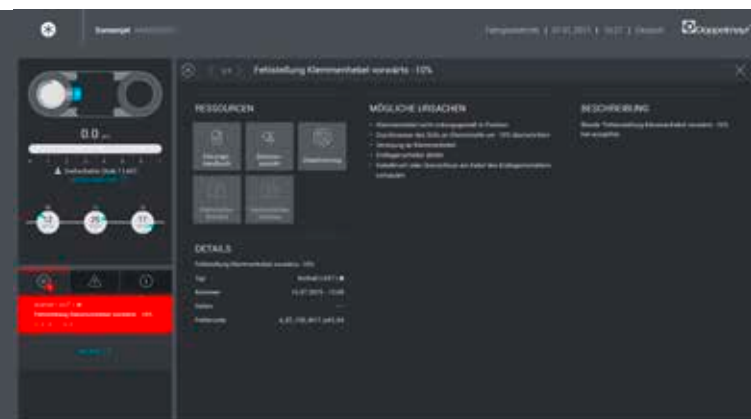
Operators must be provided with the right information, data, or prompts at the right time and place, as well as to individual requirements.
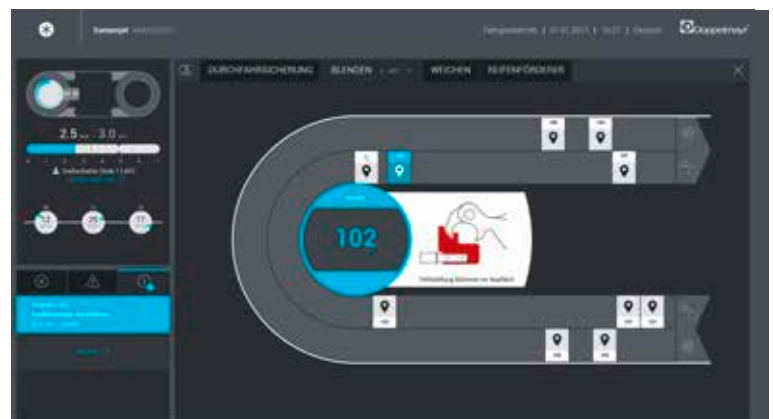
Good user experience can be measured by increased productivity, improved operator safety and greater process stability.

But swiping alone is not enough – the coolness factor is not always critical in production. "In the industrial sector, there is normally a great dependence on standard electronic components that are industry-compatible. These always slightly lag behind the current state of the art in the consumer sector, as well as being larger and slower," says Cadera, and Maul can confirm this: "In 2003, studies showed for example that the use of AR (Augmented Reality) instructions decreased the error rate during mounting by 82 percent compared to printed or digital instructions. But do you see AR applications in production lines today, 14 years later? Only slowly do scenarios arise, in which all areas combine and make the use of these kinds of solutions possible."

The pushbutton also still has a place because operators can't swipe in every situation. The industrial designers combine modern software user interfaces with hardware operating elements, even if 3D touch and haptic feedback sensors are for the operator generations of the future.

Doppelmayr also uses both – touch screen or several haptic operating elements. The fan base in the sector is delighted. The video on the new controller and operator logic has had several views and comments on Youtube. Not only the operating behavior but also the information response has changed.

The Bachmann Contribution

Doppelmayr chose atvise®SCADA as the HMI product, since it had the greatest product maturity in this innovative technology. Today, a major part of the plant operation, as well as the visualization and monitoring of all individual functions, is implemented via the atvise®SCADA. Its open communication via OPC UA enables communication with the different data sources. This SCADA system runs on a customized terminal from the OT1300 Series, a 21.5" TFT system with full HD resolution, and a capacitive touch screen.

The special features of this terminal are the customized branding, the individual pedestal installation and an innovative packaging concept that was specially designed for the demanding conditions during commissioning.

Doppelmayr uses both – touch screen or several haptic operating elements.

Doppelmayr®

As quality, technology and market leader in ropeway engineering, Doppelmayr/ Garaventa operates production plants as well as sales and service centers in over 35 countries worldwide.

To date, the Group has built more than 14,800 installations for customers in 91 nations.

BIG DATA PORTAL

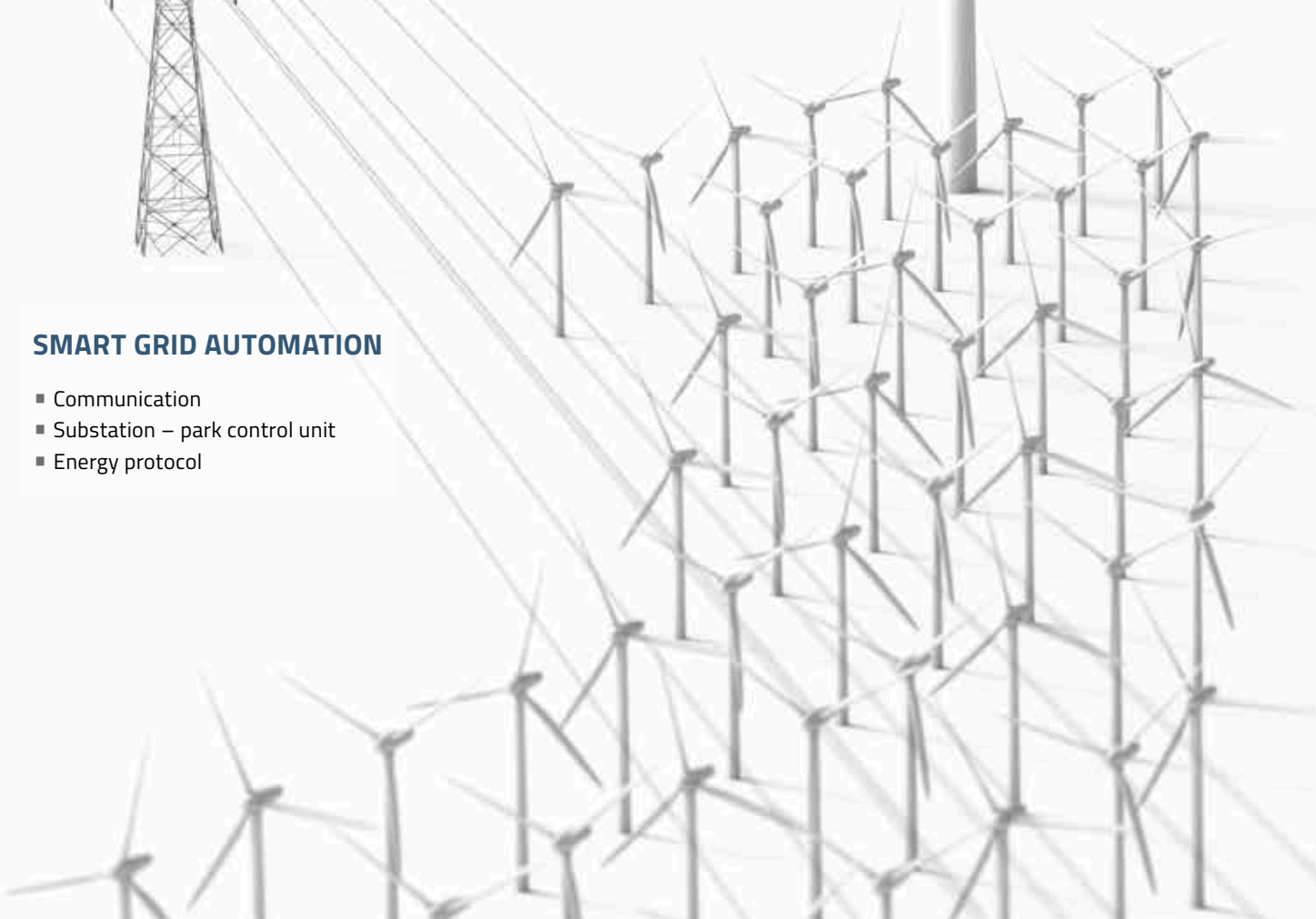- Data acquisition
- Data analysis
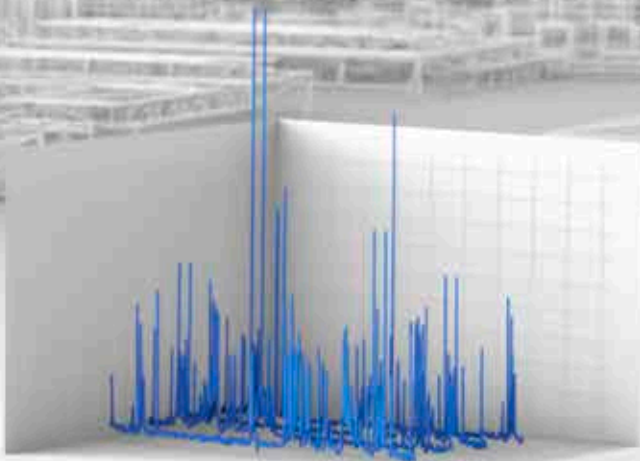- Data correlation

SMART TURBINE AUTOMATION

- IEC 61400-25 structure
- Integrated safety and CMS
- Grid measurement/protection

SMART GRID AUTOMATION

- Communication
- Substation – park control unit
- Energy protocol

CONDITION MONITORING

- CMS analysis
- Monitoring
- Reporting

WIND POWER SCADA

- Online data
- Historical data, park overview
- CMS-ISO3834

Infographic

SMART TURBINE AUTOMATION

Wind turbines of the future will be integrated in complex data communication systems – with meteorological, grid and CMS sensor data. Bachmann has concepts and solutions for smart turbine automation und the experience of 100,000 automated turbines.

thermo scientific

SAFETY CONCEPT FOR THE METAL INDUSTRY

Certified solutions and rapid integration

Dirt and dust, high temperatures, as well as water and vapor from oils and solvents are everyday issues in industrial production plants in the metal industry. The trouble-free operation of the measurement and control technology required nevertheless has to be ensured. Thermo Fisher Scientific Messtechnik GmbH is headquartered in Erlangen, Germany, and supplies system solutions for thickness and coating weight gauging. It has now added safety functions to the Bachmann controllers used. The radiation control used in radiometric measuring and the monitoring of the solvent application before entering the furnace have thus been integrated in the safety concept of the entire plant according to the latest standards and regulations. Thermo Fisher chose the M1 automation system as it meets all requirements in terms of performance and user-friendliness, and allows the straightforward implementation of safety concepts.

HYPS
HYBRID POWER SYSTEMS

FULL SPEED AHEAD TO CLIMATE-NEUTRALITY

Flexible hybrid automation system

Hybrid drive systems, in which an electric motor is combined with a battery storage system and a diesel engine, also reduce emissions and greenhouse gases in the shipping industry. The Dutch company HyPS specializes in hybrid technology for the propulsion and power supply of ships.

In cooperation with Bachmann electronic, the company has developed the HAS hybrid automation system, which processes the propulsion commands of the bridge, provides the required power and continuously optimizes operation. The core of the HAS is a Bachmann MX213 processor module, which runs in the compact, modular and expandable control system. All configurations are defined easily in C++ in the Bachmann SolutionCenter.

ONE FOR ALL IN THE COMBINED HEAT AND POWER UNIT

The open and flexible openECS hardware and software components can be used to implement virtually any engine and CHP unit control system

The generation and distribution of current and heat is being extensively automated. AVAT is headquartered in Tübingen, Germany, specializes in gas and dual fuel engine controllers, and has developed a complete CHP unit control system based on the Bachmann M1 system. Ready-made and tested configurations are available for the latest engines and requirements – an excellent basis for builders of CHP units to create scalable solutions quickly.

With just a single concept, it is possible to implement control systems for the engine, generator, auxiliary units, right through to SCADA systems. The multitasking-capable M1 controller, with its wide range of standard interfaces, enabled AVAT to create this type of innovative system, which is a milestone in the age of Industry 4.0. Switch cabinet volume could also be considerably reduced, thanks to the high packing density of the M1 modules.

AVAT

SMART DISTRICT HEATING AND HEATING SYSTEMS WITH THE LATEST IN CONTROL TECHNOLOGY

Advanced control technology based on
OPC UA and pure web technology

The increasing demands placed on intelligent district heating systems call for an advanced control technology that analyzes and adjusts a multitude of parameters in the supply grid. The OPC UA-based data exchange enables users to establish standards compliant communication with other controllers or control systems. In this way, it is also possible for ERP systems to access the standard interface.

Visualization based on pure web technology, allowing access via standard web browsers, is unrivalled. For this reason, Hoval chose Bachmann's subsidiary, Certec, and its atvise® product line. All Hoval heating systems can now be integrated in the control technology. For example, it is now possible to optimize the efficiency of a Hoval UltraGas® gas condensing boiler.

CLEVER MANEUVERING

Tailored communication for rapid turning

Today, large ships like this offshore supply ship are anything but slow. They have to be able to make complex maneuvers quickly.

This has been made possible through a joint development with Schottel, the world's leading manufacturer of controllable propulsion and maneuvering systems. The software developers of both companies have ported a communication library to different operating systems.

In this way, it was possible to meet the demand for a fast and tailored communication solution of Bachmann, while enabling customers to concentrate fully on the development of their own applications.

©Ulstein Group/Marius Beck Dahle

FLEET REPORT OPTIMIZES SERVICE CALLOUTS

Locating error sources and gaining an overview at lightning speed

So-called Fleet Reports are not so common in the wind sector. These provide a rapid overview of the status of the turbine fleet.

Wind turbine manufacturer Nordex is breaking new ground with Bachmann. The 22 employees in Bachmann Monitoring's CMS Service Center evaluate the data of the plants, assess their status and save the results in the customer's database.

Nordex uses the WebLog Expert, a client-based software, to access the error messages at the click of a mouse, quickly obtain an overview and optimize its service organization.

NORDEX

PRODUCTS

atvise® portal

PORTAL TO NEW WORLDS

The easy way to turn plant data into profit

Entering the world of smart data can also be achieved without any major investment in the network infrastructure or years of product development. Bachmann electronic's atvise® portal, in conjunction with a connected M1 controller is opening the door to the future compatible use of data. The portal bundles data points from different sources and systems so that they can be selected and visualized as required. Big data is turned into smart data, since services are integrated in the atvise® portal that allow each user to have displayed precisely the information required. Companies thus detect patterns that indicate wear or inefficient operation – the starting point for digital business ideas.

7 BENEFITS OF THE ATVISE® PORTAL COMPARED TO THE CLOUD

- Data transfers set up within a few minutes
- atvise® visualizations can be reused
- New HMI objects and pages are easy to create
- Installation in the closed private cloud or open network
- Server administration and protection through in-house IT specialists
- No hidden costs
- Open and expandable platform for developing new services

AS IF CAST ON

Reference application reduces engineering costs for die casting machines

Bachmann electronic has developed a reference application for control and visualization so that manufacturers of die casting machines can concentrate on their core expertise. This features a special HMI solution in pure web technology for setting parameters and operating the system as well as the standard functions in the controller.

When combined with the model-based path/pressure controller, this enables time-to-market to be considerably reduced.

LOGGING, READING, SOLVING

Data acquisition and analysis greatly simplified

The latest version of Wind Power SCADA (WPS) places even more value on the evaluation and analysis of data. Thanks to the highly granular and efficient data logging of the WTT software on the M1, cyclically logged data can be analyzed together with highly resolved data in the event of a fault.

A freely configurable windows arrangement inside the browser ensures a customizable workflow. WTT (Wind Turbine Templates) also makes it easy to create the operational control application, which is now automatically generated from the core, the project configuration file.
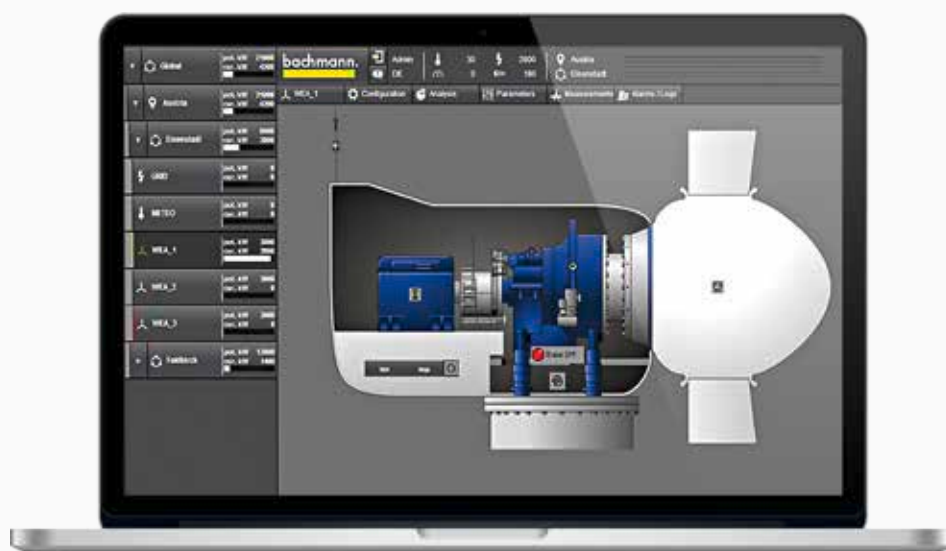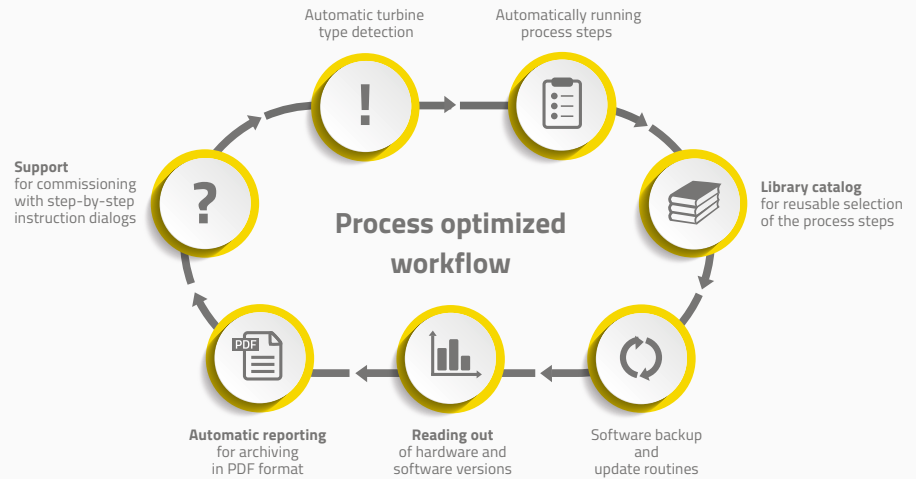
STEP BY STEP GUIDANCE

Service operations become child's play on the M1

The M1 ServiceCenter is a new engineering tool for simplifying service operations on machines fitted with the M1. Software back-ups and updates, modifications to hardware configurations right through to the step-by-step guided replacement of hardware.

All process steps are run automatically so that operation can also be carried out without any in-depth knowledge of the system. A PDF report at the end of each pass documents the results.

Automatic turbine type detection

Automatically running process steps

Support for commissioning with step-by-step instruction dialogs

Process optimized workflow

Library catalog for reusable selection of the process steps

Automatic reporting for archiving in PDF format

Reading out of hardware and software versions

Software backup and update routines

EFFICIENT CMS DATA ANALYSIS

Rapid overview thanks to the traffic light system, integrated trend analysis and acoustic monitoring

'WebLog Expert' is the web-based front end of the Bachmann Condition Monitoring System. It functions as the communication interface to the diagnostics system and enables the secure and location-independent access to the condition data of the wind turbine. If predefined limit values are exceeded, WebLog Expert initiates an alarm message, which is indicated to the user in a status window, and which can be sent by email.

An integrated database enables the trend analysis of the data recorded from individual machine components and units over an extended time period. It is also possible to make sensor signals audible. In this way, irregularities in the measured spectrum can be assessed acoustically.

MASTER DETECTIVE RELOADED

The Scope 3 software oscilloscope
conveniently detects faults.

For a long time, the Scope 3 software oscilloscope from
Bachmann electronic has been an excellent tool for
troubleshooting, diagnostics and long time archiving.

The update to version 3.20 offers even more user-
friendly operation: Convenience features, such as a
fully configurable stacked plot, simple function acces-
ses for inexperienced users and other additions
enhance usability.
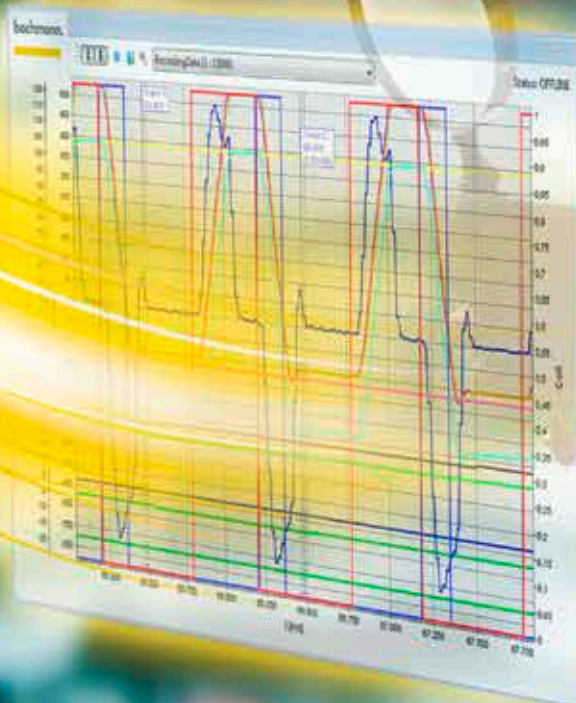
Robert Weber,
Journalist

Bernhard Zangerl,
CEO Bachmann electronic

Anton Steinberger,
Board Chairman Sparkasse Feldkirch

FAKE MAIL FROM FELDKIRCH

Bernhard Zangerl from Bachmann electronic and Anton Steinberger from the
Sparkasse Feldkirch savings bank are business partners with similar concerns.
Automation engineer and banker talk about the uncertainties in the markets,
new data businesses and the false security created by regulation.

The world has become restless. The financial crisis in Europe is returning and international security has become strained. Can you remember similar times?

Anton Steinberger: I remember the situation during the financial crisis in 2008 and 2009, which caused major turbulence on the international financial markets. At the Sparkasse Feldkirch, we fortunately managed this really well, even in cases where customers had withdrawn money and deposited it in safes.

Politics relieved the situation then…

Anton Steinberger: Yes, the Austrian federal government issued a guarantee for savings accounts. This has helped us and settled the markets.

But the politicians have not yet solved the crisis!?

Bernhard Zangerl: The repercussions of the financial crash are still present in some markets. We have a lot of equity capital and therefore low borrowing requirements. Bachmann even grew during the crisis years, but afterwards there were changes in the market, which forced us to make our processes more efficient. Local political conditions, which are changing increasingly more rapidly, are a major challenge for us.

What does this mean in real terms?

»We have the sector expertise, and knowledge about industrial processes, not Google.«

Bernhard Zangerl
CEO Bachmann electronic

Bernhard Zangerl: Politicians are passing new laws in order to control sectors specifically. The energy transition in Germany is a good example. It gives positive incentives for some companies, while others moan about the regulations involved. This has put the biogas market in crisis.

A few years ago, some were even talking of the end of regional or national political power – was this a false conclusion?

Anton Steinberger: Since the financial crisis, we are struggling with a number of new regulations, which suggest security and are slowing down the process of digitalization. We have too many laws and regulations. Good banks with a good equity ratio are also suffering, since small banks have to comply with the same stringent requirements as large institutions.

But isn't this providing security?

Bernhard Zangerl: Over regulation is creating a false sense of security and also is placing a considerable strain on companies. The political framework must be practical and sensible. We ought to frequently take pauses in the political process and ask ourselves: What are we actually aiming for?

But society needs new laws in Austria for the Work 4.0 program or for the unconditional basic income!?

Bernhard Zangerl: I don't believe in the unconditional basic income. A society can only create prosperity and security if the background conditions make sense and flexibility is allowed at the same time – we can see that very well in California. The more the state has an influence on companies and business, the less the community works well.

However this does work well in China.

>> Laughter <<

Anton Steinberger: I have to disagree with you there. Europe is the world champion in over regulation. China's society is highly regulated, but they have a lot more freedom in business.

Bernhard Zangerl: There are good and bad examples of all social and economic trends. The question is what is good for us in the long term? You can't compare China with Europe. Although the conurbations create the illusion of the Western world, the poverty gap is enormous. The political challenge is to keep people contented. Decisions, such as in wind energy or electric mobility, are made much faster in China due to the centralization.

In Europe, some people are afraid of Chinese investors. Alibaba or Midea are penetrating the market behind Google and Co. Do we then need regulation at this point?

Anton Steinberger: Isolationist policies worldwide are having a negative effect on the economy and only offer security for the short term. Digitalization is presenting all companies with new opportunities and risks.

Bernhard Zangerl: I am not afraid. Medium-sized companies represent the stable platform of our economic system. We are more agile and more flexible than big corporations – this is where our opportunities lie.

When big companies, and also large medium-sized companies, have to learn to work together with small companies, new value chains will form up?

Bernhard Zangerl: Yes, we have to network together, change organizational structures and not think along the lines of classical industrial hierarchies.

Anton Steinberger: With us it's different. Amazon and Google don't want to become banks. They offer credit cards and payment services in order to collect data, as this is very valuable. Banks have been reliable data managers for years and we do it well. But Amazon and Google have fewer restrictions than banks. This leads to unfair competition. We therefore have to pull together – both nationally and internationally. The Erste Group in Vienna is the result. Here we are developing online banking solutions and providing local advisory support in Feldkirch. We can implement both digital and analog technology.

The German savings banks have also tried this and offer smarter payment services. Is it a case of sticking to what you know?

Anton Steinberger: Our campus in Vienna is also researching these issues – mainly without bankers in the team, which is an advantage in my view.

And for Bachmann – surviving in the niche market?

Bernhard Zangerl: No, it should grow in the niche sectors and search for new areas. In future, the number of large structures will tend to decline and customers will still continue to want an appointed customer contact for projects. This will increase in importance: We are the ones with the sector expertise, and knowledge about industrial processes, not Google.

But it will be the software that decides the fate of these processes.

Bernhard Zangerl: Yes, but to develop industrially robust software, companies must know the industries of their customers. This is where we have the competitive edge. At the same time we are also training our employees in high-level languages like Phyton. That's where the future is.

Back to the secure data managers. The Wanna Cry ransomware was ultimately not as dangerous as feared. However, the weak points are still there. What has to be done?

Anton Steinberger: For us these are unbelievable changes. When I started at the Sparkasse, nobody had the idea of connecting networks. In the nineties, CDs would disappear now and again, but this was nothing compared to what is happening now. Today we have to invest a lot in security. However, the main problem comes from careless bank customers at the computer.

Do you have to sensitize your customers more to the issues, so that they really do reset the factory password?

Bernhard Zangerl: Social network users show exhibitionist behavior. People have not yet learned how to use these networks. Behavior that is too open therefore makes infiltration easier. We too have to deal with fake mail intended to clear bank transfers. We are responsible for ensuring that the controllers protect the systems for our products – and we are able to do this. But you are right. Many customers don't use this. That's why we do a lot of intensive training.

But isn't greater insecurity the trade-off for more productivity?

Anton Steinberger: No, that doesn't have to be so. Today it is still the human that is the security problem. But this will change through information and education.

Where do you see this development?

Anton Steinberger: Young people are paying their debts by smartphone, and lending each other money via an app. Yes, we have to start early in companies – not to obstruct progress but to continue being secure financial partners and data managers for our customers.

Bernhard Zangerl: We have to start already in schools to talk about security on the Internet. I don't know whether young people are too careless today and older people too incompetent – what's important is to explain the risks and offer solutions how to prevent them.

»The main problem is the careless bank customer at the computer.«

Anton Steinberger
Board Chairman Sparkasse Feldkirch

Facts

The Sparkasse Feldkirch has been an important savings institute in the region since 1842. The bank manages 1 bn euros of customer funds. Over 200 employees look after 46,000 customers. According to its own figures as at 31.12.2016, the Sparkasse Feldkirch has an equity ratio of over 22 %.

Report

THE RETURN OF THE PASSWORD ATTACKS

63 % of the data thefts in the past were due to weak passwords.
The attackers are focussing again on the technical administrator.
Biometric scanning is not an alternative.

For us, data is the gold of the 21st century. Industrial leaders have been singing its praise on panel discussions for years, and some are already building data warehouses for customers. That's all very well, but many companies are not yet prepared for it according to the data security sector.

One insider reports that the security level at around 95 % of companies is disastrous. The reason for this is simple: "Data security and IT centers are not the core business of the production industry and many find it difficult to find well trained and suitable IT personnel," explains Costin Enache, IT security expert at Detack. Added to this is the fact that although many companies protect themselves from Internet attacks, the dangers are mostly elsewhere. "In recent years, technical security measures have constantly improved and attackers have responded to this quickly. Criminals are increasingly carrying out password attacks. The CPU power they require for this is now no longer a problem," Enache explains.

The response of many CEOs has been: "Introduce fingerprint scanning and provide employees with smart cards." Enache concedes, however, that "Companies continue to need secure passwords since, in our view, the alternatives to this are not secure enough. Professional attackers can overcome these obstacles and biometric data cannot be changed like a password." In other words, once the data of a fingerprint has been identified, they represent a considerable security risk.

Enache and his colleagues have developed a software that helps companies to increase the strength of their passwords. The EPAS (Enterprise Password Assessment Solution) application provides password audits for the company infrastructure and regularly and automatically checks the different target systems at customizable intervals. All password related data is initially extracted from the target system, examined on the basis of structural entropy and other criteria, and evaluated in a comprehensive data protection report. The security experts install the software at the customer's premises. The audits are carried out at regular intervals automatically. At some customers, EPAS runs 24/7 due to the number of target systems. Little effort with a large result for medium-sized companies: "the audit of a Microsoft A/D is very quick," Enache explains. And the information as to the size of the vulnerability is enormously useful. The end report provides the conclusion. It shows the password weaknesses but not the password itself. "EPAS enables us to restore 60 percent of the passwords

M1 Security features

The ability for industrial companies to communicate with their controllers with encryption has not yet become standard. The M1 controller from Bachmann electronic can do this. The security capability features the following:

- SSL encryption
- Role-based access
- Log-in checker
- LDAP-supported user management
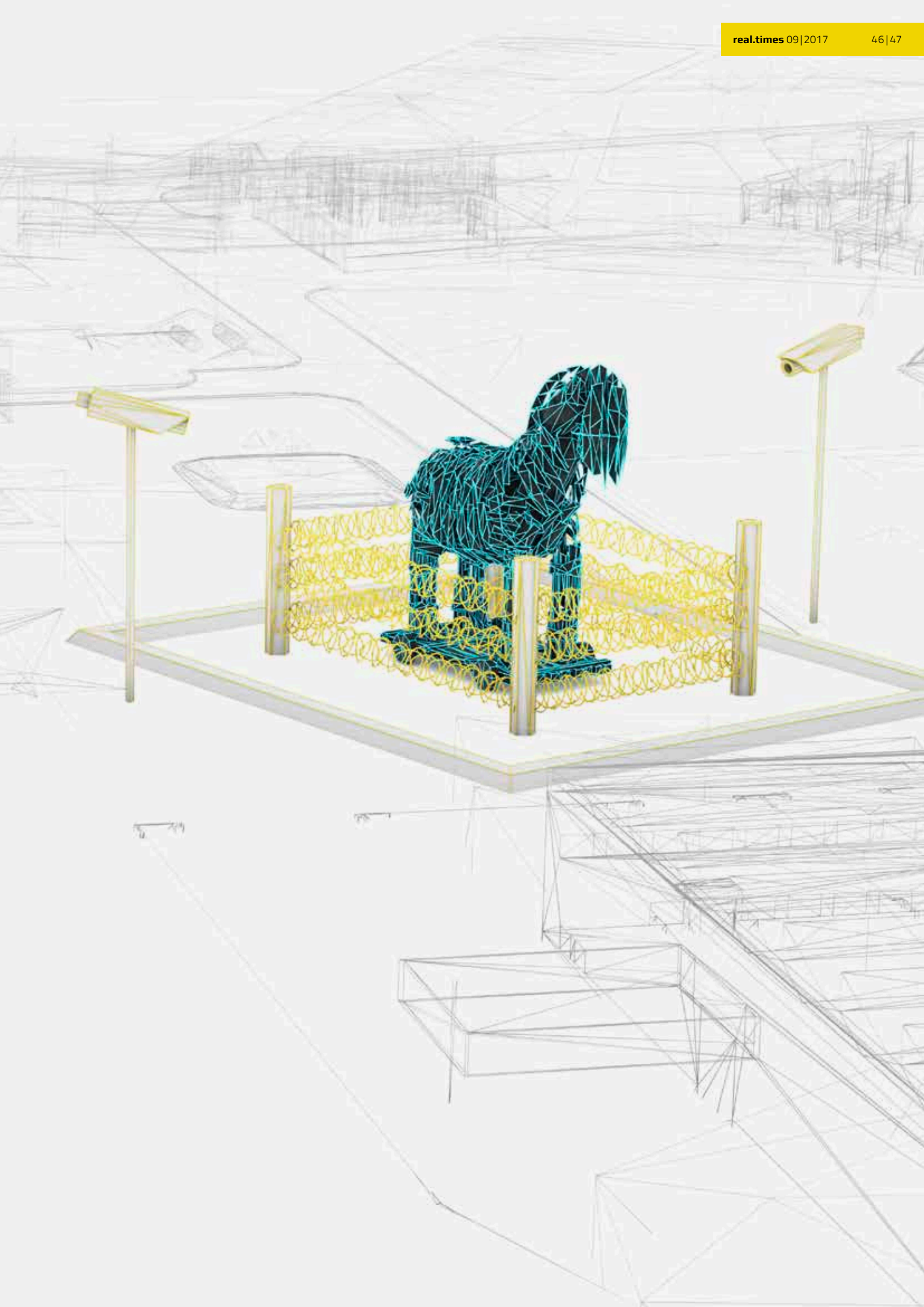- SCEP infrastructure for identification

Each user just has to define one strong password on their own.

in seconds after an audit," Enache points out – an alarm signal for the industry. "With a few fine adjustments, such as including additional dictionaries, such as those for other languages, or specific corporate word lists and a simulated brute force attack, we can increase performance considerably," Enache assures. The auditors visualize the objective strength of the password in relation to time and the resources that an attacker would need to break in. The experts also provide the client with information about whether passwords are being used in multiple systems and whether several people are using the same password.

»We supply technology for secure applications but must promote greater awareness of the risks involved with data, information and attackers.«

Bernhard Zangerl
CEO Bachmann electronic

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