

Corporate Responsibility at Phoenix Contact

■ Contact

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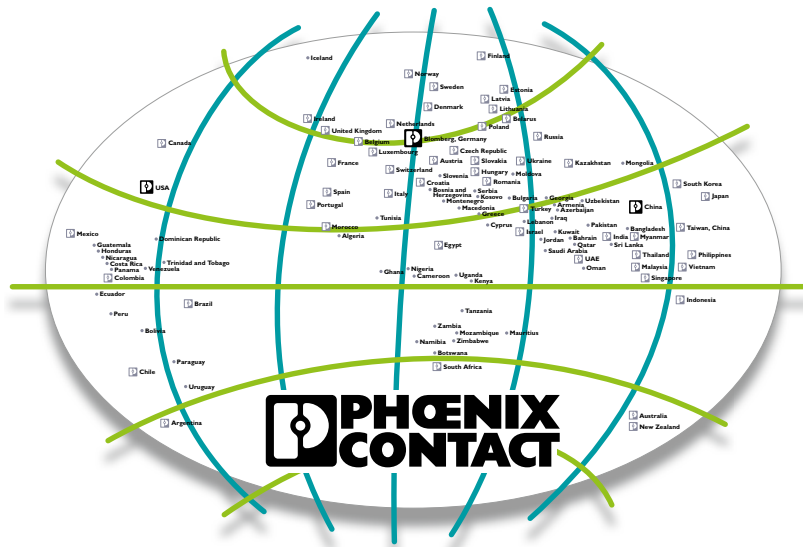
Environment: Conservation of resources at Phoenix Contact

Social responsibility: Commitment to our employees

Social responsibility: Commitment to society

In the text – without any intention of discrimination – the masculine form is used in some cases.
In principle, all genders are included.

Phoenix Contact Group 2020



Phoenix Contact is a worldwide market leader for components, systems, and solutions in the fields of electrical engineering, electronics, and automation. Today, the family-owned company employs around 17,100 people worldwide, with sales of €2.4 billion in 2020. The company headquarters are in Blomberg, Germany. The Phoenix Contact Group is made up of 15 German and four international companies, as well as 55 sales subsidiaries throughout the world.

The company manufactures products with a high level of production depth in 11 countries throughout the world. The product range consists of components and system solutions for generating, transporting, and distributing energy, for device manufacturing and machine building, and for control cabinet building. A wide range of modular and special terminal blocks, PCB terminal blocks and connectors, cable connection technology, and installation accessories offers innovative components. Electronic interfaces and power supplies, automation systems based on Ethernet and wireless, open control systems, safety solutions for people, machines, and data, along with surge protection systems provide smart solutions for the installers and operators of systems, facilities, and urban and traffic concepts. Markets within the manufacturing industry, the renewable energy industry, the mobility industry, and the smart building industry are supported with consistent concepts including engineering and services in line with their specific needs.

Phoenix Contact supports the digital transformation with products, systems, and solutions. With the experience gained from in-house machine building, the company is familiar with the requirements of digitalization and continuous data flow, from engineering, through production, all the way to installation and maintenance, throughout the entire product lifecycle.

Product innovations and specific solutions for individual customer requirements are created in the development facilities at our sites in Germany, China, and the USA. Numerous patents emphasize the fact that many developments from Phoenix Contact are unique. Working closely with universities and scientific institutes, technologies of the future such as e-mobility and digitalization are researched and transformed into marketable products, systems, and solutions.

■ Corporate Responsibility at Phoenix Contact



The company, with a history of almost 100 years, is committed to its corporate responsibility and, with its corporate guidelines, the “Corporate Principles”, and the Phoenix Contact Group Code of Conduct, provides customers, business partners, and employees the basis for sustainable action as well as the similarly anchored principle of dealing with one another in a spirit of partnership and trust. This includes a value-oriented and appreciative corporate culture with a corresponding management style, equality in business relationships, and social engagement in our communities, among other principles. The “Corporate Principles” and the Code of Conduct represent the central guidelines for day-to-day activities and are the core and superstructure of the company-wide Compliance Management System.

Phoenix Contact has recognized the enormous significance that its innovative product and solution portfolio can have for sustainable action: With the variety of products and solutions, for example in the field of renewable energies and energy-efficient application possibilities, Phoenix Contact meets the future megatrends head on and provides a “groundbreaking bridge to the future”. The declared aim is therefore to fill in the future vision of the “All Electric Society”. This vision of the future is based on a world that offers great growth and development prospects for all markets with unlimited energy based on renewable resources, with sustainable growth and the conservation of natural resources. This means that the economic aspirations of Phoenix Contact are linked directly with sustainability. Phoenix Contact not only wants to enable customers to act sustainably through the use of innovative products, thus triggering a significant leverage function, but also operates with sustainability at its own sites. The Executive Board issued the following statement regarding its position on corporate responsibility: “We feel that we are committed to the positive sustainable development of living and working environments. Phoenix Contact is aware of its role in society and in the environment. As part of our corporate social responsibility and corporate compliance, we take responsibility for adhering to laws, generally applicable values and principles, and the sustainable handling of resources, as well as promoting social commitment, integrity, and professionalism.” Phoenix Contact made this commitment clear in 2005 when it joined the United Nations Global Compact and in 2009 with its commitment to the “ZVEI Code of Conduct for Social Responsibility”, the Code of Conduct laid out by the German Electrical and Electronic Manufacturers’ association. This voluntary commitment includes the fields of human rights, work standards, environmental protection, and prevention of corruption. In addition, Phoenix Contact has also committed to its own corporate Code of Conduct. The following section highlights selected examples of Corporate Responsibility activities in the fields of economy, the environment, and social awareness for employees and society.

■ Economy: Trend-setting products and solutions for climate-friendly electrification



Phoenix Contact wants to contribute to the success of an “All Electric Society” with its products. Empowering ourselves and others to do this is at the heart of what we do. The company is paving the way to this electrified world through joint pioneering solutions that it develops together with customers and partners, true to the corporate mission taken from the corporate guidelines: “We create progress with innovative and inspiring solutions”.

The Phoenix Contact products enable the needs of the “All Electric Society” to be met: The growing world population, with its need for prosperity, has an increasing demand for energy, meaning that carbon-neutral energy will be the key factor in reconciling climate protection and electrification to ensure prosperity. Renewable energy generation and increased energy efficiency are therefore elementary. However, against the backdrop of the volatility of energy sources – such as solar and wind – there is also a need for the comprehensive coupling of the energy, transport, building, infrastructure, and industry sectors. Data and functions must be exchanged between the individual areas in order to balance out the generation and consumption of energy. This requires smart systems, electrification, digitalization, and automation – the core fields of Phoenix Contact’s expertise. The company is helping to create a carbon-neutral world by actively contributing its industrial and digitalization expertise to the joint development of a global technical and economic ecosystem for electricity and energy. Five of the 17 SDGs (Sustainable Development Goals) are supported by the Phoenix Contact product and innovation portfolio.

No matter where in the world we live, climate change affects us to a greater or lesser extent through drought, heat waves, floods, and storms. Nevertheless, everyone wants to achieve or maintain a high standard of living, in most cases based on energy. In this respect, technology is a decisive way to meet humanity’s energy needs in the 21st Century sustainably and in a climate-neutral way. Phoenix Contact therefore considers itself a driving force working together with other players to develop and advance innovative solutions for today’s challenges.

Digital measured values for a stable power grid

The controllable secondary substation from Energienetze Mittelrhein with wide area control is a good example. Ensuring a stable power grid is an essential factor for the acceptance, and thus the commitment, of the population when it comes to photovoltaic systems and e-mobility.

Together with various partners, Energienetze Mittelrhein has therefore set up an innovative pilot project in which the Energy Control Interface (ECI) measured value gateway from Phoenix Contact is used. ECI is a solution for supplying processed measured values to a higher-level control system in an existing power grid.

As the grid overseer of the Koblenz-based Energieversorgung Mittelrhein AG power supply company, Energienetze Mittelrhein ensures the safe and reliable operation of the power grid. However, due to the expansion of renewable energy plants and the emergence of new loads – such as heat pumps or charging stations for electric cars – the latter increase the peak loads. This results in a change in the energy flow direction of secondary substations and cable distribution cabinets as well. This is where the electricity generated by the decentral generation plants is fed into the low voltage grid, which causes voltage fluctuations at the individual low voltage connections. As part of this, the approved system limits such as the voltage range and the thermal limit current, which power grid operators are obligated to comply with, may be exceeded. Another challenge is the lack of transparency with regard to load flows throughout the entire low voltage power grid.

The lack of measurement technology means that it is not possible to determine these at the grid nodes in low voltage power grids. It is therefore essential to have measured values from the areas of the grid that have not yet been digitalized. This is the only way that the effects of, for example, the considerable expansion of photovoltaics on single-family residences can be determined and how the power grid is influenced by the increasing number of public and private charging points and smart loads.

Another factor, however, is that fitting the entire low voltage power grid with measurement technology is currently still uneconomical. The goal therefore was to obtain a digital, and thus computable, node-specific image of the low voltage grid without having to install measurement technology throughout the entire grid. A calculation algorithm should supplement the missing measurements with data.

With the Energy Control Interface (ECI) from Phoenix Contact, the demands of Energienetze Mittelrhein have now been implemented in a smart grid project with other manufacturers.

Failsafe networking of photovoltaic systems

Photovoltaic systems have to play their part in ensuring high-level grid stability and supply reliability. Here, Ethernet-based networking from Phoenix Contact ensures the failsafe transmission of diagnostics data and control commands between the various inverters, transformer stations, grid connection points, and monitoring systems installed there – whether via cable-based or wireless communication.

Forwarding the control data for grid feed-in in particular places high demands on the failsafe performance of this communication system. The Constance-based company Zebotec, which



has established itself as one of the world's leading independent system integrators for the control of photovoltaic power stations, was also confronted with another special feature with different networking requirements: a new type of photovoltaic system has other demands: photovoltaic power station on bodies of water that are not intended for tourism or ecological management. Transforming unused lakes into highly-efficient photovoltaic systems brings with it considerable advantages: They contribute, for example, to reducing carbon emissions, and generate high yields due to the water cooling effect. One example is the floating system anchored to the lake bed of the Bomhofspas gravel quarry close to the city of Zwolle in The Netherlands. Because of the positioning on the lake, cabling the transformer stations and the grid connection point would have been complicated and expensive. This is why Zebotec decided to use wireless Ethernet networking via WLAN here.



Certified solution for feed-in management controllers for photovoltaic systems

Grid operators are obligated to feed as much energy from renewable sources into the grid as possible, while not putting the stability of the grid at risk. To achieve this, controllers are used to control and regulate the active and reactive power. However, the certified devices from Phoenix Contact have a lot more features in store, due to the underlying PLCnext Technology. Phoenix Contact also offers additional function block libraries for implementing the requirement-specific interfaces of the controller. Among others, these include modules for integrating decentral systems via remote control technology. In addition, photovoltaic-specific function modules simplify communication with inverters, energy meters, and the connection to a manufacturer-independent portal. The open PLCnext Technology ecosystem is comprised of different components. On the hardware side, the portfolio includes controllers in different performance classes that can be flexibly adapted to the respective application conditions. The PLCnext Engineer tool is a software suite for all engineering tasks. The digital PLCnext Store marketplace features, among other things, function blocks, function extensions, cloud connectors, and other runtime environments to enable faster implementation of applications. And finally, users can exchange ideas in the PLCnext Community and provide each other with support in the realization of their projects. Due to its openness, for example with regard to programming languages and the integration of new communication standards, this ecosystem is a future-proof solution.



Identifying energy-saving potentials with measuring devices and a wireless solution

In order to produce agricultural products in large quantities, the agricultural sector uses industry-specific processes. To produce feed, for example, energy must be applied. If energy consumption is recorded and evaluated, the process's energy efficiency can usually be significantly increased. In places where the effort involved in laying the appropriate cables is too high, a wireless solution is a cost-effective alternative. The customer Atcetera was able to realize this for its customers with the help of Phoenix Contact products.

Usually, wireless systems need to have a line of sight in order to work reliably. The solution was the Radioline System from Phoenix Contact. Since there are several buildings and walls between

the individual wireless components at the customer's site, the Radioline modules, which transmit in the 868 MHz band, were used. With the flexibly usable wireless solution, I/O signals can also be forwarded in addition to serial data – and this is license-free, i.e. without follow-up costs. Working on the basis of the robust Trusted Wireless 2.0 technology, the modules have been specially developed for the exchange of signals over long distances. The technology is characterized by its high degree of robustness and reliability. To also cover great distances, the data rate of the wireless interface can be set individually, thus increasing the receiver sensitivity. Much greater distances can be covered at a low data rate than at a high transmission speed. The user can therefore tailor the devices perfectly to fit the corresponding application.



Trusted Wireless 2.0 also features good diagnostic options and coexists with other systems transmitting in the same frequency band.

Continuously recorded energy flows form the basis for a target-oriented energy management system. The solution implemented by the Atcetera Group in feed production shows that energy consumption can be determined transparently. In addition, the measuring devices of the EMpro product family from Phoenix Contact mounted at the energetic hot spots are combined with reliable wireless transmission based on the Radioline system and the higher-level energy controlling system. Potential energy savings can therefore be identified with little installation effort, and the utilization of the systems can be optimized.

The Atcetera customer also acquires data that it can use to precisely calculate manufacturing costs, carry out predictive maintenance, replace machines in good time, and document consumption within the scope of energy-intensive processes. The realization of the acquisition system described thus represents an investment in the future, in which the verification and optimization obligations will continue to increase due to the energy revolution. In combination with the energy controlling system of the Atcetera Group, the components from Phoenix Contact can be extended and upgraded at any time.

Energy savings through IoT-based building management

The ground station of the German aerospace center, the Deutschen Zentrums für Luft- und Raumfahrt (DLR) in Weilheim, Germany, acts as a central communication station for global satellite monitoring and control. The local servers must provide a huge amount of processing power for this. They generate a lot of heat, which is why the data center requires permanent cooling. After a while, replacement modules for the previously installed technology were no longer available, meaning that it was imperative to secure the operation of the refrigeration system for the future.

A new solution based on the Emalytics building management framework from Phoenix Contact, together with an e-chiller for controlling and monitoring the cooling system, has reduced energy consumption by 40 percent.

This state-of-the-art solution also offers the desired degrees of freedom. The customer was looking for a manufacturer-independent concept because the various trades, systems, and devices installed in the ground station have a large number of different interfaces. As a first step, the air-conditioning control unit should be integrated into the building management system used. The new concept also had to provide the technological framework to completely replace the building control system with almost 15,000 data points. The desire was to have a state-of-the-art, communicative, and secure solution and, at the same time, to have the freedom to incorporate our own ideas and make any adjustments ourselves. In addition, the new technology had to be installed “during open heart surgery” – that is to say, with the briefest interruption of the air conditioning system or a switch-over to manual operation.

The decision was made in favor of Emalytics from Phoenix Contact as a hardware-independent, end-to-end software solution for both engineering as well as for automation and visualization. The integrated security of the system, which also enables interpretations – every change is immediately made available online – as well as the large portfolio of drivers for the support of different communication interfaces and finally also the flexible extension possibilities of the solution with future hardware and software products precisely met the needs of the customer, even over the long term.

Thus, the solution implemented in Weilheim is based entirely on products and systems from Phoenix Contact, which have been further refined by bit GmbH, a Karlstein-based general contractor specializing in the construction of new data centers and their modernization. bit GmbH was able to commission the control cabinet equipped with this new technology within a matter of weeks onsite at the Weilheim site. The switchover to the new hardware took just a few hours to complete, thus ensuring that air conditioning was provided for the server rooms at all times. The tool-free push-in technology of the Phoenix Contact terminal blocks ensured a short wiring time. Webpage-based operation is now performed on a WVP 4000 touch panel.

However, the IoT-based building management system from Phoenix Contact is also used in completely different areas, for example by the automotive supplier Isringhausen.

Isringhausen, a neighboring company in Lippe and an international leader in the development and production of innovative seating systems, relies on the IoT-based Emalytics building management system from Phoenix Contact because it allows it to monitor its energy consumption and system availability holistically and to optimize consumption. When developing the solution, a wide range of requirements had to be implemented, such as the historization of fault messages and energy flows of the systems, and the safety-related systems had to be integrated into a holistic fault signaling system. With the introduction of Emalytics, the system and building parts generate a message to Facility Management in the event of an error; which means that a defect can be identified in good time and rectified immediately. The energy requirements with regard to water, gas, and electricity are recorded to the second, digitally historicized, and visualized.

The simple engineering and high degree of data transparency achieved as a result of standardization now make it possible to network the building infrastructures and facilities intelligently and sustainably.

Pump monitoring with energy savings in a wastewater treatment plant

The feed pump station of the wastewater treatment plant in Constance has to be constantly available and operated at a high level of energy efficiency to reduce costs and preserve the environment. Those responsible found a suitable system in the ready-to-install PumpMonitor control cabinet solution from Phoenix Contact. Pumps play an essential role at the largest municipal wastewater company in the Lake Constance region, because only with them can the water management tasks be mastered. Therefore, their availability is just as important as the efficiency of the pump stations which, alongside biological treatment, are the utility's largest power consumer.



The focus was on system efficiency to reduce energy consumption. Attention was paid to the operating point at which the ratio of the electrical power supplied to the volume of wastewater pumped is best. Furthermore, the maintenance effort is reduced due to predictive maintenance including mechanical, electrical, and hydrodynamic measured variables. System availability is increased by taking vibrations and bearing patterns into account. All relevant values are displayed to the operating personnel as clear traffic lights. This way, they will know immediately if the efficiency begins to deteriorate.



Safe lighting with low maintenance in highway service stations

Automated Phoenix Contact solutions can, for example, safeguard lighting systems and thus contribute to continuous lighting and therefore to safety in highway service stations.

Wherever a large number of cars and trucks are driven, there also needs to be parking spaces along the freeways and highways that have adequate lighting. Components, systems, and services from Phoenix Contact therefore ensure the cost-effective and reliable operation of the respective system on the German autobahn network at the Nievenheim-Ost rest stop.

Phoenix Contact, as a solution provider for energy infrastructure, created an end-to-end system for safeguarding the new LED electronics. This included automation of the lighting systems with remote maintenance access that meets IT security requirements, a surge protection concept, and an on-site commissioning service. The use of high-availability automation components reduces the amount of maintenance required for the lighting system and consequently reduces the necessary trips to the service area, as well as the emissions associated with them.

Use of “PLCnext Control” for environmentally friendly weed management in the track bed

Phoenix Contact’s open PLCnext Technology and nature have something in common. Both are ecosystems, and the automation system solution by Phoenix Contact supports the Swiss railroad operator SBB in killing weeds growing alongside the tracks in an environmentally friendly manner while also saving time and money. Since 2018, various vegetation control solutions have been tested – for example, hot-water sprayers are undergoing test drives. A life cycle assessment is prepared for the individual processes and environmental compatibility is ensured.

Sensor systems are installed on the hot water sprayer. If they detect weeds, they relay their position and size to a PLCnext controller from Phoenix Contact, which also knows the train’s traveling speed. The control system opens the valves of the hot-water wagons with pinpoint accuracy. The water, heated to 95 degrees Celsius with instantaneous heaters, is then sprayed by nozzles onto the weeds; their cells explode, causing the plants to die. However, the train travels at a speed of up to 40 kilometers per hour, which corresponds to about eleven meters per second. The control system must therefore calculate the opening time, accurate to the millisecond, in real time. In addition to its real-time capability, PLCnext Technology is characterized by its openness: Developers can create their program part in their favorite programming language and, moreover, the solution can be integrated easily into the existing infrastructure and later adapted to new technologies.

Use of the open “PLCnext Technology” in a compressed air storage and gas turbine power plant for energy storage

In order to achieve the goal of an All Electric Society, where our energy demand is covered entirely by renewable energy, suitable storage technologies are needed due to the volatility of the sun and wind. One such example is the Huntorf power station, where PLCnext Technology is being used to safely integrate the existing technology into the control system.

Europe's only compressed air storage and gas turbine plant was originally built to store inexpensive base-load electricity at night and release it into the electricity grid during peak loads during the day. Today, the Huntorf power station uses air as a working medium to store any surplus electricity during periods of high wind power feed-in. When electrical energy is required at a later time, the stored compressed air is directed from the underground caverns to the gas turbine where it drives the generator that feeds the energy back into the power grid. The plant thus contributes significantly to maintaining the stability of the grid. However, the previous technology could no longer meet the future challenges. The open ecosystem now enables the older existing communication paths to be combined flexibly with new solutions. The open support for new technologies – such as blockchain – is a critical factor for the use of PLCnext Technology. In the context of the energy revolution, blockchain technology is becoming more and more important. In contrast to the existing controller, the PLCnext Control device can transmit the read values in a blockchain. For example, this allows the wind power generated in the region to be recorded and balanced in relation to the energy that is fed in and taken from the Huntorf plant. Furthermore, the solution satisfies all requirements for increased data security. In addition, technologies that may not even exist right now can be easily integrated at a later point – for example, using apps from the PLCnext Store.



E-mobility as a component of building automation at Phoenix Contact

Phoenix Contact is also a customer of its own Facility Management department and is able to check its own products in the application itself. At the Bad Pyrmont location in Lower Saxony, for example, the in-house developed “Emalytics” software is used as a platform for a state-of-the-art building management system in which all data, messages, and operating states, including those of the e-vehicles, can be mapped. In addition, the interaction between industrial buildings and charging points is easily managed with the “Charx manage” charging management software. The software can be integrated conveniently into the building and energy management system and ensures the intelligent distribution of energy throughout the building network.



“Building automation is the heart of facility management at our site,” explains Frank Schröder, Head of Facility Management at Phoenix Contact Electronics in Bad Pyrmont, Lower Saxony. “All the threads come together in the technical room.” Schröder’s tasks include managing the power supply of the company location that includes production facilities in three-shift operation. Schröder is also responsible for the connection of the electric and hybrid vehicles. “Our facility in Bad Pyrmont includes four buildings with over 1,500 employees, and we generate 60 percent of our electricity in our in-house combined heat and power plant,” Schröder explains. “We use the waste heat to heat the buildings and generate cooling in the process. We store this in the sprinkler tank and use it to cool the buildings and supply the cooling water for production. On the roof, we use a photovoltaic system and an electricity storage system.” It is a highly complex network, with many different interacting factors.

“Covering the energy requirements of the technology site optimally requires a clever management of all functional processes,” Schröder acknowledges. “The interplay between IoT (Internet of Things) and smart building automation is what makes this optimization possible.”

In an industrial company, all loads – from the heating pump to the elevator to the coffee machine – must be included in the energy management system. “This is the only way we can efficiently manage the flow of energy in the company – constantly dependent on electricity generated from renewable sources,” Schröder tells us. At the Bad Pyrmonst location, more and more charging stations for the electrical company cars and the electric vehicles of the employees are also being integrated into the company infrastructure.

To optimize the company’s energy flow, the facility manager can use the data that is exchanged between the electric vehicles and buildings. The electric vehicles are thus also used as buffers for the energy generated from renewable sources.

“As a driver of an electric car, I don’t want to deal with the technology in the background at all. I just want to reach my destination as comfortably and safely as possible,” Schröder reflects from the user’s perspective. “With CHARX manage, the driver starts the charging process after a quick authentication – for example, with the RFID card. Energy consumption is then assigned to the user in the background, without depending on the overlying management system.”

The perspective of a building manager, on the other hand, is primarily technical: “Each charging station is assigned to a building or infrastructure,” says Schröder. “Communication between the individual systems is a key tool for goal-oriented energy use.” For example, the building management system can control the energy flow of the individual charging points or the entire charging park just like it controls the ventilation or air-conditioning system. Generating our own electricity with a combined heat and power plant and a photovoltaic system on the roof significantly reduces the need to purchase external energy, which has a clear impact on operating costs. “Ideally, my vehicle should already know when and where I want to drive it, and when it is most convenient for me to recharge energy,” Schröder said. “The charging management software also grants me this wish.”

In Bad Pyrmonst, the entire automation system was also equipped with the “Emalytics” software. This also includes the oldest buildings, which have now been standing for 25 years.

To continue using the systems of the “old” building control system, some hardware had to be replaced. Team leader Christina Süß from Facility Management in Bad Pyrmonst explains, “We were less concerned with short-term savings. Above all, we wanted to build a uniform system for the entire location in order to exploit the full potential of this technology. Furthermore, we have already demonstrated to many visitors what our technology can do in the newest building. Now we are proving that this works not just in new buildings.” Not only did around 25,000 individual data points from over 50 control systems have to be integrated. “We also had to recreate, link, and test the corresponding plant images for monitoring and operating the technical sub-sections.” In addition to pure data transfer, more than 7,000 data records (histories) and around 130 automatic time schedule programs were also transferred. “Currently, Emalytics therefore is comprised of more than 61,000 data points at the Bad Pyrmonst location.” As Christina Süß says, “This is not a completely risk-free undertaking. With such a high number of interventions in such a complex system, unforeseen disruptions can occur.” All the more reason to be pleased that there has not been a single failure of production equipment so far. This demonstrates that “old” buildings are also suitable for the digital transformation.



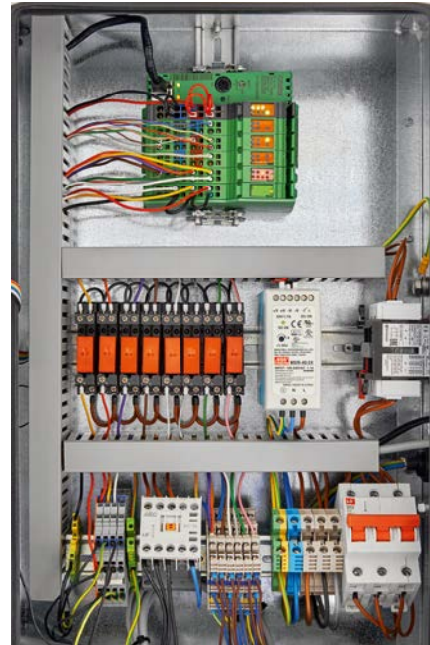
Tracking solar trackers for aligning with the sun in the Falkenberg photovoltaic park

By tracking solar systems, operators can significantly increase the amount of energy generated. The Ecker electrical company in Landshut in Lower Bavaria, therefore, uses one of these solutions from Phoenix Contact in its photovoltaic park. The company's solar specialists and the reliable functionality of the tracking solution won the company over. The electrical company specializes in the installation, repair, monitoring, and maintenance of photovoltaic systems.

In the beginning, the tracking system for the individual trackers was controlled with non-industry-standard Raspberry Pi mini computers. But it soon became apparent that this solution was not working reliably. After a short time in operation, it failed entirely. To keep the loss of yields that resulted from the trackers not being aligned toward the sun as low as possible, a suitable alternative had to be found quickly. Elektro Ecker had already had good experiences with control technology from Phoenix Contact in the past for the feed-in control of photovoltaic parks. Josef Ecker therefore decided to also implement the tracking system for the photovoltaic trackers with the company's industrial controllers.

Thanks to the comprehensive Solarworx library with function blocks to calculate the sun's position and the tracking system for the photovoltaic trackers, Josef Ecker and his team were able to quickly program the photovoltaic application. The library, which also includes other drivers for data loggers and interfaces for inverters, is constantly being extended. Since the pre-programmed function blocks are thoroughly tested, they ensure not just quick project implementation, but also reliable system operation. The master controller constantly measures the current wind speed using a wind sensor. If the wind loads are too high, the controllers receive the command to move the trackers out of the wind. This ensures that the photovoltaic modules do not become damaged.

There is a transformer station directly next to the control cabinet with the master controller. Here, the alternating voltages inverted by the inverters are transformed from the low voltage to the medium voltage level. At the grid connection point, which is located outside the tracking park, the generated solar power is fed into the grid. To ensure that there is no overload on the local power grid, Elektro Ecker has installed a certified feed-in controller (PCU) from Phoenix Contact.



If the photovoltaic trackers produce too much current, the power control unit ensures that the individual inverters are shut down.

The maximum possible system yield is determined using an irradiance sensor. The grid operator can therefore always calculate how much current the photovoltaic system generates and whether it is allowed to feed it back into the grid.

As the builder and operator of the tracking park, Josef Ecker was impressed by Phoenix Contact's solution for the tracking system. It works reliably and does not need to be "paid for twice".

■ Environment: Conservation of resources at Phoenix Contact

In line with the Corporate Mission taken from the corporate guidelines, “We create progress with innovative and inspiring solutions”, Phoenix Contact develops products and solutions for the challenges of the future. Their use should help in the fight against climate change. Of course, the company’s own locations also lend themselves to utilizing their own products and solutions themselves. One goal defined in the field of energy management was to reduce the amount of electricity consumed by nine percent based on our 2012 consumption by the end of 2020 through the implementation of energy efficiency measures, for example by replacing air compressors, the precise distribution of cooling and heating flows in the computing center, replacing lighting, and using geothermal and other renewable energies. The 2020 energy target was exceeded significantly, shooting up to 13 percent from 9 percent. In total, more than 8 million kWh of electricity is saved each year.

In 2020, a total of eight million kilowatt hours of electricity were saved as a result of the efficiency measures implemented in recent years. Investments are being made in the extension and construction of owner-utilized solar systems with capacities of more than two megawatts peak per year. The alignment of the buildings with climate neutrality is also already underway. In terms of carbon emissions, in particular those caused by heat generation in Germany, the investment in the expansion of wind and solar systems compensated for the equivalent of more than 20,000 metric tons of carbon dioxide. In the case of critical materials, we have started to remove the lead content, which is classified as hazardous to health, from large parts of the contact technology and to switch to lead-free production.

The Training Center in Schieder-Schwalenberg has its own combined heat and power plant, which is used to generate electricity and heat for the building and for cooling in summer. Here, 1 kWh of natural gas produces 0.38 kWh of electricity and 0.41 kWh of heat. In the process, 0.202 kg of carbon dioxide is generated. Conventional generation would result in 0.254 kg of carbon dioxide being produced. That is a savings of more than 20%. In 2020, the Training Center alone was able to save 135,140 kg of carbon dioxide. In addition, the CHP plant is more economical than purchasing electricity from the conventional grid.

Saving energy in compressed air systems

“Compressed air is the jack-of-all-trades in production,” says Stefan Gottschalk, Energy Manager at Phoenix Contact, describing the many applications of compressed air. However, he also immediately points out its disadvantage. “It is the most expensive energy source because it must be produced in a compressor and held in storage. That is why it is all the more bitter when the compressed air escapes somewhere in the system due to leakage.” This results in consumption increasing. Finding leaks like this is not easy. “If an electric cable is broken, you notice it very quickly. This is different with compressed air. If you are lucky, you can hear it hissing.” In the meantime, he has found a more reliable option. “We have acquired a ‘Leak Reporter.’” It works much like a thermal imaging camera, except that this device detects the telltale frequencies of leaks. “In principle, the Leak Reporter listens into the building or machine with its ears open.” The device, also known as an industrial sound camera, filters out the ambient noise and then displays the exact point at which it detected the leak on a small screen. This device is used for routine checks in the production facilities.



In order to become even more efficient in the generation of compressed air as well, a new compressed air compressor was procured in 2020. This alone saves Phoenix Contact over 100,000 kWh of electricity and 40,000 kg of carbon dioxide per year.

Digital formats and less business travel – making the most of the pandemic situation

The pandemic has at least had one positive effect in that Phoenix Contact, like others, has been able to make great strides in terms of digitalization, and in the process has also been able to save on numerous business trips. In doing so, Phoenix Contact did not just follow the general trend, but rather was itself able to implement digital internal as well as external formats in a short time as a pioneer which were then adapted by others. However, business trips still took place on a smaller scale in 2020. As part of the “bahn.business” business customer program, business trips in Germany could be taken carbon-neutrally. The trains run on green electricity, and emissions from upstream and downstream processes have been offset by emissions projects. In 2020, passengers traveled more than 400,000 kilometers as a part of this initiative.

Dialog Days as our own customer trade fair event and inspiration for others

When the Hannover Messe company decided in mid-March that there would not be a real Hannover Messe this year, Phoenix Contact decided to offer the “Dialog Days” as an equivalent event in digital format, to be held on the actual trade fair dates in April. What the employees achieved within six weeks impressed both customers and the business community. There were over 10,000 registrations for the mix of product presentations, virtual trade fair tours in eight different languages, conferences, videos, and live chats. All these otherwise necessary journeys could thus be dispensed with. Those responsible for the Hannover Messe took their cue from this at their “Messe Digital Days” in July, and of course Phoenix Contact also took part in this trade fair. Phoenix Contact was then able to round off this pioneering digital achievement in a second round in the fall with the learning experiences of the first “Dialog Days” and to give the event even more of an experiential character. This expertise and equipment is constantly being put to further use. In the Dialog Space, the virtual visitor center, individual tours with customers through the virtual, ever-changing exhibition are offered throughout the year. “This is an advantage for the international subsidiaries in particular, which can save interested parties long journeys,” explains Katrin Fasse, who is responsible for the “Dialog Days” project.

Digital Technology Day

A good example of a large internal online event was the Technology Day, which in fact has already been held for the eleventh time – usually at the headquarters in Blomberg. This time, it was held for the first time as an online event with 400 participants. The organizing team reported that this was a record number of participants, and the digital format also meant that significantly more presentations could be offered. Here, too, a number of business trips could be spared. Numerous training events were also switched to live online training events during the pandemic period, which meant that participants from subsidiaries throughout Germany in particular were able to avoid traveling for several hours to their headquarters. These opportunities will also remain in the future.

Remote Assist solution does not require travel

In the spring, a production machine was to be set up at the subsidiary in the USA. But the worldwide lockdown got in the way. “Since nobody could foresee how things would develop at that time, we were on the brink of missing out on the market launch of the new item,” reports

Raphael Rohde, who heads process development in the Manufacturing Solutions unit. Augmented reality glasses were the solution here. Instead of looking at a monitor, you look all around into an artificial or augmented reality. However, the glasses can also transmit what the person is seeing to a screen. “For example, an expert can peer over the shoulder of someone on the other side of the world and suggest what needs to be done. The highlight here is that the colleague in Germany can feed assembly information directly into the glasses of their colleague in the USA.” The team identified and procured the best “Remote Assist” solution on the market. “The costs for the hardware and software were surprisingly low compared to a business trip to the USA.” Thanks to the digital capabilities, the colleagues were able to manage the setup in the USA entirely while staying in Germany. In addition to securing the market launch and a high level of cost savings, more than eight metric tons of carbon emissions were also saved as a result of the saving on business trips. The augmented reality glasses are therefore meeting with great interest throughout the Group. Another advantage is the fast response times provided by this solution. Therefore, many other uses, even beyond the field of tool and machine building, are being planned or have already started.

Virtual product bus

“At first, we thought it was a crazy idea,” reports René Bruins, Product Manager Industrial Components in the Netherlands. The “crazy” suggestion came about when his team was looking for an alternative for the Infoliner that could not make the trip because of COVID-19. Infoliners are converted small buses that travel to customer locations to demonstrate products in an on-board display. In March 2020, it became clear that this was no longer possible because of COVID-19. So the project team came up with an idea. “Why don’t we just build a virtual Infoliner? At that time, it was already clear which trade show walls ought to be installed in the bus. “We then built the panels as planned with minor changes. Just not mounted in the vehicle.” Instead, a suitable room was re-purposed as a “bus”. “We were therefore able to make the exhibition walls a little bigger.” Finally, the media technology needed for a virtual visit had to be provided: spotlights and a remote-controlled camera that could be operated by the “host” while attending to the visitors. Customers were invited to online meetings and were also given a short video in which the customer was able to see the marketing colleagues behind a virtual steering wheel. Just as if they were already on their way to the customer. The Infoliner will continue to be used. “Once the COVID-19 pandemic is over, customers can choose between the original or the virtual bus. The virtual bus is being enthusiastically received by customers, and our sales team is also having great fun working in the virtual bus,” René Bruins summarizes things.

Flower meadows instead of fallow land

The large Blomberg company premises always offer corners for nature conservation. For this reason, Corporate Facility Management is always considering suitable areas for flower meadows. For example, a 5,000-square-meter field was recently sown with a mixture of flowers. Since the idea came about, 12,000 square meters are now being used for nature conservation. Setting aside and reserving areas provide a natural environment for insects – such as bees and other small animals such as rabbits and pheasants – even if the gesture is small.

■ Social responsibility: Commitment to our employees

“Trusting partnerships” is the basis on which interactions within the company and with external business partners should be structured every single day – this is also anchored firmly in the corporate guidelines. It is therefore important for Phoenix Contact to provide quality support for its employees and to create a positive working environment – both based on the immediate working environment, qualifications, and continuing education and with regard to the opportunities going beyond the immediate work-related relationship. These include a comprehensive health management program, company sports activities, and running events, which have been reported repeatedly in previous years.

In 2020, the primary focus was on working together to best address the COVID-19 challenges.

In-house test center

At the end of August, Phoenix Contact opened its own test center on the company premises in Schieder. What at the time was still easy to plan and provided test results within 24 hours has become a valuable asset with the second wave of COVID-19. “You would not believe how many people envy Phoenix Contact having its own test center,” Professor Ohlendorf, the company physician, describes the situation. Anke Schlingmann who oversees the telephone hotline, says “In the beginning, after the end of the summer vacation period, I was answering up to 70 telephone calls a day. It involved a great deal of awareness training at first. During the testing phase, we really stepped on the gas to work through a lot of tests, five people per hour.” Petra Wittbrock, who was instrumental in setting up the on-site testing, adds, “I really enjoyed working on location, it was a great experience. I have met wonderful people and received very motivating feedback. I was also very impressed by the rapid setup and the close cross-departmental cooperation.” The test operation was expanded with a second line, for rapid tests. This was aimed at securing the business operations, but employees and their families also benefited from having PCR testing funded by the company.

■ Social responsibility: Commitment to society

Running for a good cause

Participating in regional runs as an employee and keeping fit as a result is already a long-standing tradition. In 2020, on the other hand, Phoenix Contact launched the “Virtual Runs by Phoenix Contact”. Within eight weeks, 115 employees ran for a good cause and covered a total distance of 7,324 km.

For every kilometer run, Phoenix Contact donated €1 (€7,324.00 in total), and this amount was donated in equal parts to the Kinderschutzbund child protection agencies in Bad Pyrmont and Blomberg.

Commitment of the women's network Ing'enious

Ing'enious – the women's network for women in technical professions – adapted flexibly to the pandemic situation and creatively absorbed the loss of numerous face-to-face events.

Since many activities could not be held, the members of the network donated an amount of €3,000 to the AWO Frauenhaus Lippe women's refuge instead.

The network members were available as role models for the female students at the University of Paderborn – at least digitally. With their digital profiles, they were able to present female professionals from the industry as role models to the students.