



EXCITING TIMES

HOW THE ENERGY TRANSITION IS ACCELERATING

Topics in this Issue

Load Management for Charging

Infrastructure: Part of a Larger Whole

–

Network Transparency:

Out of the Money Pit – with Software instead of Hardware

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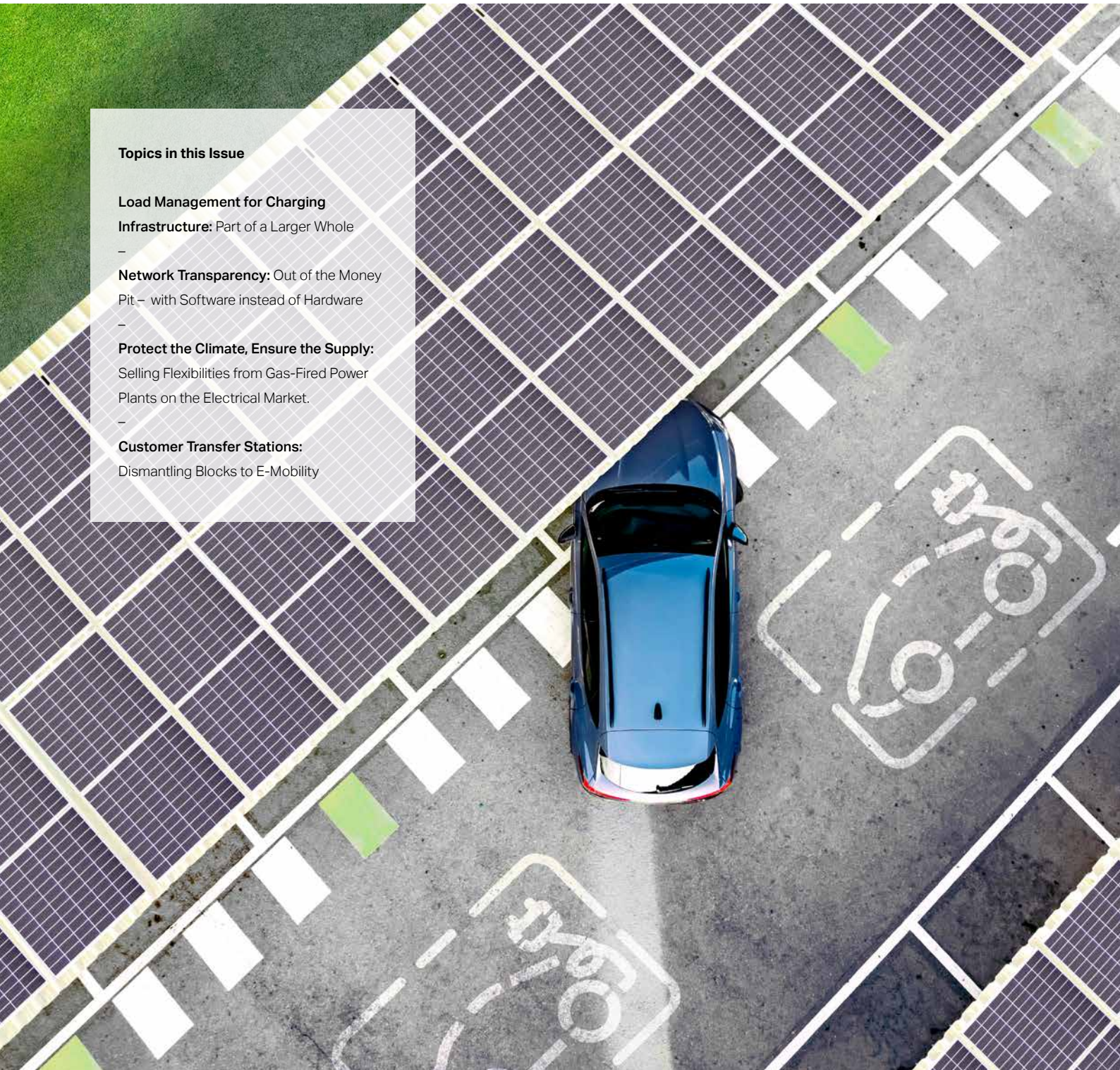
Protect the Climate, Ensure the Supply:

Selling Flexibilities from Gas-Fired Power Plants on the Electrical Market.

–

Customer Transfer Stations:

Dismantling Blocks to E-Mobility





SHAPING THE ENERGY INDUSTRY OF TOMORROW

DISCOVER PRODUCTS AND
SOLUTIONS NOW!

In the face of increasing decentralization and fluctuating power generation, the individual elements of an energy system must be linked together intelligently. WAGO offers a wide variety of solutions for these challenges.



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IS THE ENERGY TRANSITION IN CRISIS?

CLIMATE PROTECTION BETWEEN WAR, CONFLICTS AND SUPPLY SECURITY

Dear Reader,

Supply security in a time of war in the middle of Europe, is THE topic whenever discussions turn to energy. It also appears to be the focus when it's a matter of further inflaming the climate crisis. Because at the beginning, the energy experts were certain that, "The war will be a booster for the energy transition," another image has arisen in the country since then: coal power plants are coming back online, extensions to the lifetimes of nuclear reactors are subject to heated discussion, and, in a move that is neither economical nor sustainable, liquid natural gas is being shipped in tankers across the world's oceans. At the same time Europe and the world are feeling the effects of climate change – more noticeably than ever. Which leads me to the question: is the energy transition itself in crisis?

To which I clearly answer, "no!" even if the media perception differs. While saving energy is fashionable, it is insufficient by itself. Energy has become so expensive that there is an incentive to reward all investments by consumers in renewable energies – regardless of reduced incentives. This applies equally to businesses and private

households. The German government's "Easter Package" has accelerated the expansion of renewable energies in a way not seen in decades. It will thus quickly and certainly be possible to drive e-vehicles nationwide using green electricity and quick charging stations.

In these times of tension, allow yourself to remain optimistic and take a look at this **WAGO DIRECTENERGY**, and see how the energy transition is accelerating – technically and technologically. How are we bringing renewable energy systems and storage options quickly and safely into the grid? How can we efficiently manage the loads caused by increasing e-mobility, retain grid stability, and configure network expansions economically?

I wish you pleasant reading, because whatever the ad hoc measures are, I am certain about one point in securing the energy supply: energy independence is based on renewables, and will be an important guarantee over the middle and long terms for a sustainable and secure energy future, and that is were peace will be found.

Heiko Tautor
Head of Industry Management Utilities at WAGO



PLANTING A COMMON FLAG FOR THE ENERGY INDUSTRY OF TOMORROW

In the face of increasing decentralization and fluctuating power generation, the individual elements of an energy system must be linked together intelligently.

Energy generation, distribution, storage and consumption – the energy transition requires all the players to interact. This is why WAGO has been a reliable partner in the energy industry for many years – with municipal utilities, system operators, system integrators, station builders and industrial customers alike.

Technically and technologically, WAGO is represented in many different areas of the energy market by its automation technology, interface electronics and electrical interconnection technology. In addition, our Smart Grid symposium promotes idea sharing among colleagues – exploiting practical experience for practical applications. Furthermore, our WAGO Solution Provider Program brings project-specific clients and implementation experts together.

This is how we can enable the energy transition together!



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BRIEF ENERGETIC NOTES

IMPROVING QUALITY IN THE ENERGY GRID

A. Eberle GmbH & Co. KG and WAGO GmbH & Co. KG are launching a co-operative venture to monitor network quality in energy supply projects. The purpose of the project solution is network monitoring per EN 50160 with measurement technology per IEC 61000-4-30 Class A; it detects harmful network feedback effects, increases network quality and optimizes distribution network control, contributing significantly to the security of the power supply.



Official joint project launch (from left): Dr. Heiner Lang, WAGO CEO, and Dr. Christian Ruster, Managing Director of A. Eberle, shake hands to finalize the cooperation partnership. The cooperation is being implemented in specific projects with the WAGO SOLUTIONS business unit, which is headed by Ulrich Hempen.



INTILION Managing Director Dr. André Haubrock (left) and Ulrich Hempen, Vice President of the WAGO SOLUTIONS business unit, seal their companies' joint alliance.

NETWORK STABILITY DUE TO A "GRID BOOSTER"

INTILION GmbH und WAGO GmbH & Co. KG are offering joint project solutions to boost the power grid for the increasing loads attributed to e-mobility. A joint development by WAGO and energy storage specialist INTILION, the "Grid Booster," can prevent bottlenecks in the grid. Intelligent load management, including battery storage systems, ensures that energy is always provided with the necessary power during the charging process. This allows several EVs to be charged in parallel without overloading the grid.



More about engineering and system solutions from the WAGO SOLUTIONS Business Unit



WAGO ENERGY KNOWLEDGE: LIKE MUSIC TO OUR EARS

BOTTLENECK IN THE GRID?

Methods for controlling energy flows in the future – Ulrich Hempen, Vice President for the *SOLUTIONS* business unit at WAGO, responds to questions about how the grid can be better monitored, controlled and protected against cyber attacks in “The Smarter E Podcast #99.” It’s getting exciting, especially in the low-voltage network, where decentralized PV systems, heat pumps, charging stations and even entire microgrids are linked in.



INTELLIGENT SUBSTATIONS FOR THE ENERGY TRANSITION

Heiko Tautor, Head of Industry & Key Account Management Utilities at WAGO, explained in E&M Energiefunk, the podcast for the energy sector, speaks about how data from the substation are useful – from the controller up to the wall-mounted box. In an exclusive interview, he explains that, “Driven by service concepts, we offer tailored, digital system solutions in view of the energy transition.”



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IT JUST CLICKS!

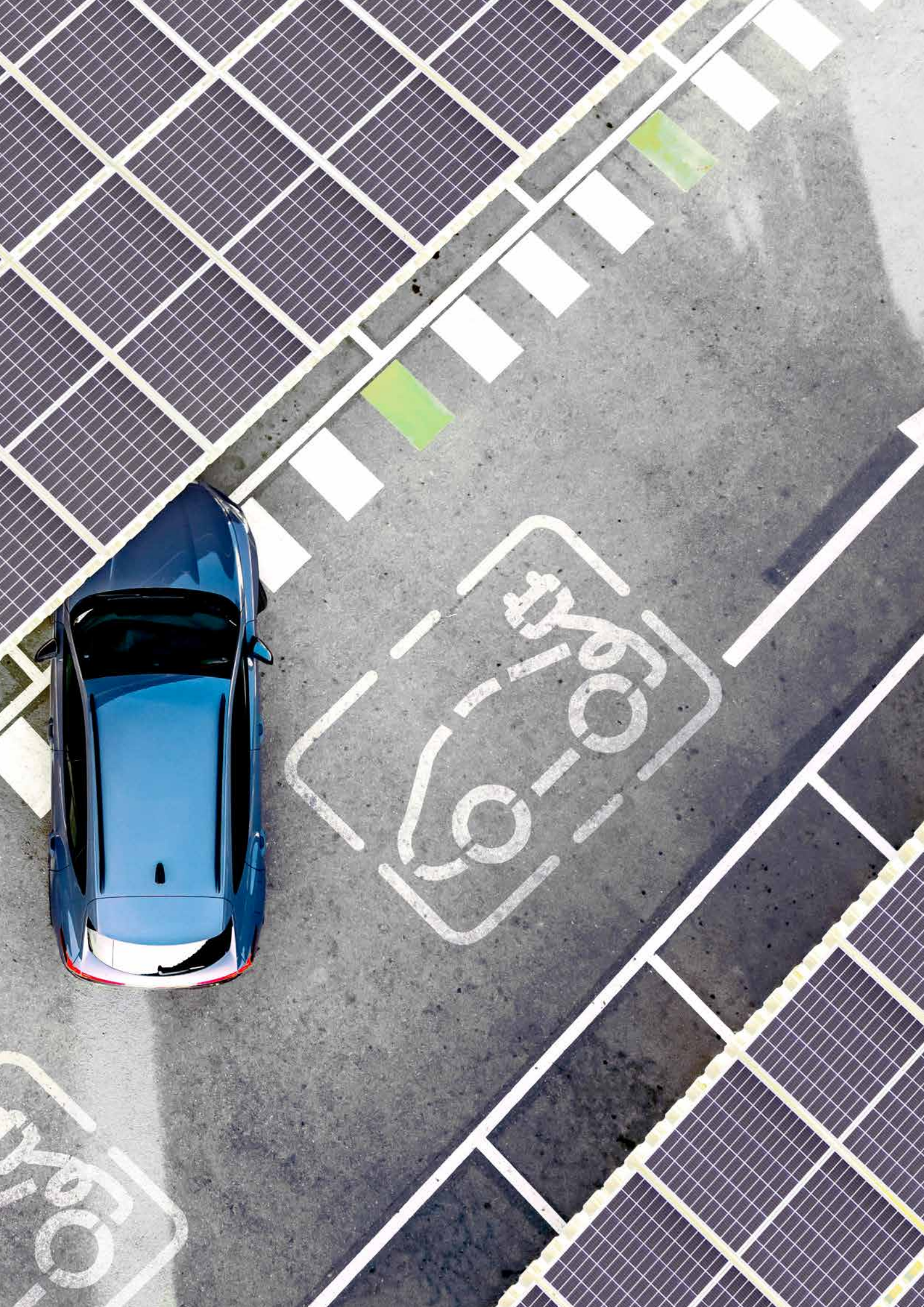
Connection technology for the energy transition – WAGO offers that, too. Regardless of whether for battery storage units, charging stations or inverters. Discover how WAGO’s spring pressure and lever technologies make connections, for example, of inverters fast, easy and safe.





LOAD MANAGEMENT FOR CHARGING INFRASTRUCTURE AS PART OF A BROAD AND COMPLETE CONCEPT

A charging station does not exist in a vacuum. This is where load management for the charging infrastructure becomes an important topic. To consider charging station management in isolation, is to consider the implementation of the energy transition too simplistically. With WAGO technology, the integration of e-mobility and load management can be implemented in the form of a holistic, future-ready energy management system.



Load management for green e-vehicle charging stations does not end at the charging column – especially when batteries are supposed to be charged or other connected buildings or production lines are also supposed to be supplied using renewable energy.



There is no e-mobility without charging points. The expansion of the charging infrastructure largely determines the growth of e-mobility. Entrepreneurial actions have also been supported in the meantime by this fact. But now everything is turbo-charged, and the tempo is double time: the federal tender for the Fast Charging Act is running. By the end of 2023, there should be around 1000 fast charging parks in the so-called German grid, with around 10,000 charging points.

In addition, the Building Electromobility Infrastructure Act (GEIG), which implements the EU building guidelines 2018/844, entered into national law on March 25, 2021. The provisions, roughly summarized, state: no new construc-

tion, and scarcely any modernizations of large residential buildings or functional buildings with parking spaces may be planned or implemented without charging points.

What remains to be seen in this context, is the specific configuration by the Federal Grid Agency regarding the amendment to § 14a of the Electricity and Gas Supply Act (EnWG) regarding peak load smoothing. As a reminder, a legislative proposal, desired by network operators, to remove "controllable consumption devices", like e-charging stations and wall-mounted boxes, from the mains supply using telecontrollers during grid overloads, failed to pass in 2021. As you know, this planned potential for limitations was met with resentment and resistance by



industry representatives and automotive manufacturers. An agreement was finally reached in the context of the Federal government's Easter Package. The energy sector now insists that this specific configuration must enable an as needed, pragmatic and efficient application. What has become clear, and which all of the cited guidelines imply, is that load management does not stop at the charging column.

Interfaces are Key

The energy grid has developed into a complex energy system that must be balanced. This is especially the case when renewable energies are supposed to be used in a targeted way



The tremendous growth of electromobility is acting as a catalyst for the energy transition for cross-asset load management solutions. WAGO products help to ensure the flexible balancing of generation, storage and consumption of renewable energy with supply security.

on the supply side – to generate green electricity to charge EVs, supply buildings and production systems, or fill storage devices. Consumers in buildings, production lines and feed-ins like PV systems or batteries must be accounted for in the load management – by facility managers, industries, electrical installation companies and network operators alike. It is especially true for network operators that charging columns and wall-mounted boxes, connected to heat pumps, PV systems and residential energy stores, change the underlying load profile of entire local networks – this does not even begin to address the feasibility and viability of bidirectional loads.

What is certain, is that balancing all of these assets with one another to secure the supply requires an intelligent and secure network as a prerequisite. A multitude of interfaces and communication protocols are needed – for building control systems, inverters, battery storage systems, and billing-relevant back-end systems such as server databases, the cloud or even substations. WAGO technology in the form of the WAGO PFC200 PLC has the needed variety in interfaces and protocols, for example, Modbus TCP, SunSpec, Modbus RTU, BACnet®, CANopen®, OCPP 1.6, telecontrol protocols such as IEC 60870 and more. This enables the integration of all assets involved in the load management solution. In the future, a BSI-compliant CLS interface in the control boxes will definitely also play an important role in the smart meter rollout

for low-voltage connections with annual consumption of more than 6000 kV.

Neuralgic Network Node Point

Load management is thus indispensable, increasing in importance as e-mobility increases, as it is necessary to supply available electricity into the charging infrastructure and counteract grid overloading. Key roles are carried out at the network connection points. The limiting point is the fuse. It must not be overloaded. Aside from fuse boxes or cable distribution cabinets in the classic, residential context, so-called transfer stations with medium-voltage connections play the role of network connection point, NCP for short, in the industrial sector. Currently ongoing projects in existing electrical network infrastructure already have a security circuit. It is also applicable here to use the best of these for the charging infrastructure.

The interesting point in this conflict remains the simultaneity factor – when and where e-vehicles will charge in the future. At the moment, no one knows precisely. It remains unchallenged that most cars are primarily “stationary vehicles” – parked at home, at work, during errands, which is predominantly where charging is possible. Studies conducted in 2019 by innogy, a RWE subsidiary, and practical

tests, like the 18-month long E-Mobility Avenue test by Netze BW, an EnBW subsidiary, demonstrate that overloads or power failures are highly unlikely. Despite this, there are various overload scenarios, in which a critical asymmetry may occur. Depending on vehicle type and the number of charging columns, all three phases might be simultaneously or differently loaded, depending on the type of hybrid vehicle charging. Therefore, loads still must be measured and controlled.

Load Management with WAGO

For this purpose, WAGO offers both static and dynamic load management that is appropriate for the grid. A central element here is the PFC200, a programmable logic controller from WAGO. In static load management, a fixed current or a fixed output is sent to the charging station infrastructure. For this purpose, the network connection point (NCP) is measured, e.g., using WAGO's 3-phase power measurement modules or other, external 3-phase measurement devices. These transfer the measured values to the WAGO PFC200 via Modbus®. As a result, the NCP is recorded in real time, and a fixed current or output value is set per phase in the PFC200. This can be assigned by any protocol, often Modbus TCP, in the respective charging stations. However, dynamic load management is more flexible, more useful to the network, and thus more sustainable. The network connection point is also read across 3 phases; however, additional loads, like a building, can also be connected to the NCP, which requires dynamic energy – for the production lines, lighting, cafeteria. As this energy is not always used at the same level, varying load requirements result. This means that, at certain times, more output is available to supply the connected charging infrastructure with electricity. The WAGO PFC200 detects the prevailing load at the NCP and can provide available energy to the charging infrastructure at any time. This allows the best charging of e-vehicles at all times. A dynamic load management, that is useful to the network, permits simultaneous charging, even if the maximum electrical level is not available.

WAGO System Solution Made from Modular Hardware and Flexible Software

The WAGO Load Management System Solution consists of hardware and software. Modularly expandable components, tailored per the customer's request to the application, are delivered in a compact control cabinet. This contains, among other things, a WAGO Controller, including a power supply for providing power, transducer modules and interface modules, modules for uniquely measuring the voltage, a fiber optic cable coupler or an LTE modem

for communication. The software used for load management is so flexible that it is suited for many applications.

With its standard software package, the WAGO Application Load Management was initially concentrated on supporting a certain number of charging infrastructure manufacturers, to connect a PV system via an inverter and using the SunSpec protocol, which is based on Modbus TCP. In addition, at least three backend systems can be connected via OCCP 1.6. The WAGO **e!COCKPIT** Engineering Software forms the basis for configuration and commissioning, as it allows users to use parameter settings to connect and dynamically control a large number of master and slave charging stations via a webserver.

Multifunctional Gateway

Using WAGO's technology and dynamic load management, it is therefore possible to dimension the NCP quite economically, so that the connected charging infrastructure could be expanded by additional charging points in the future, without overloading the NCP itself.

Not least: the connection of the respective customer transfer station as a network connection point must also be performed network compliant with the technical connection requirements (TAB) of the respective network operator. By using the WAGO Customer Substation standard software product, this is also possible in many network areas in a fast and easy way.

In summary, WAGO offers a multifunctional gateway, that sustainably harmonizes building automation and load management, and establishes a TAB-compliant network connection. Load management for charging infrastructure is therefore only part of the entire energy management package – albeit an important part – of the entirety that makes up the energy transition.



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INCREASE EFFICIENCY – NOT COSTS – WITH NETWORK TRANSPARENCY!

Solve problems in digital network operation with the least amount of hardware and save costs: that's WAGO's design. With two new, add-on apps, those who use the Grid Gateway base application can now implement precise medium-voltage calculations or control tap changers in voltage regulating distribution transformers (VRDT).

The digitalization of substations promises high degrees of usefulness to distribution network operators. They could better judge the network state, operate networks in a more resource-conserving way and configure expansions more efficiently. Yet the prerequisite is an often substantial investment. This is exactly what we at WAGO want to change – by solving problems primarily with software instead of hardware. This yields direct savings potentials for distribution network operators in digitizing and operating their networks.

Two new software tools follow this objective, which WAGO has developed for medium-voltage measurement and for controlling voltage regulating distribution transformers (VRDT). They are designed as add-on apps for the WAGO Application Grid Gateway.

Grid Gateway Base Application

The Grid Gateway base app makes it possible – broadly speaking – to easily commission a small-scale telecontrol system in a local substation through simple parameter settings. Storage, transfer and visualization of measured data is performed in a decentralized way using a WAGO PFC200 PLC (2nd generation). The controller is installed in the station as a small-scale telecontrol system. A single WAGO PFC200

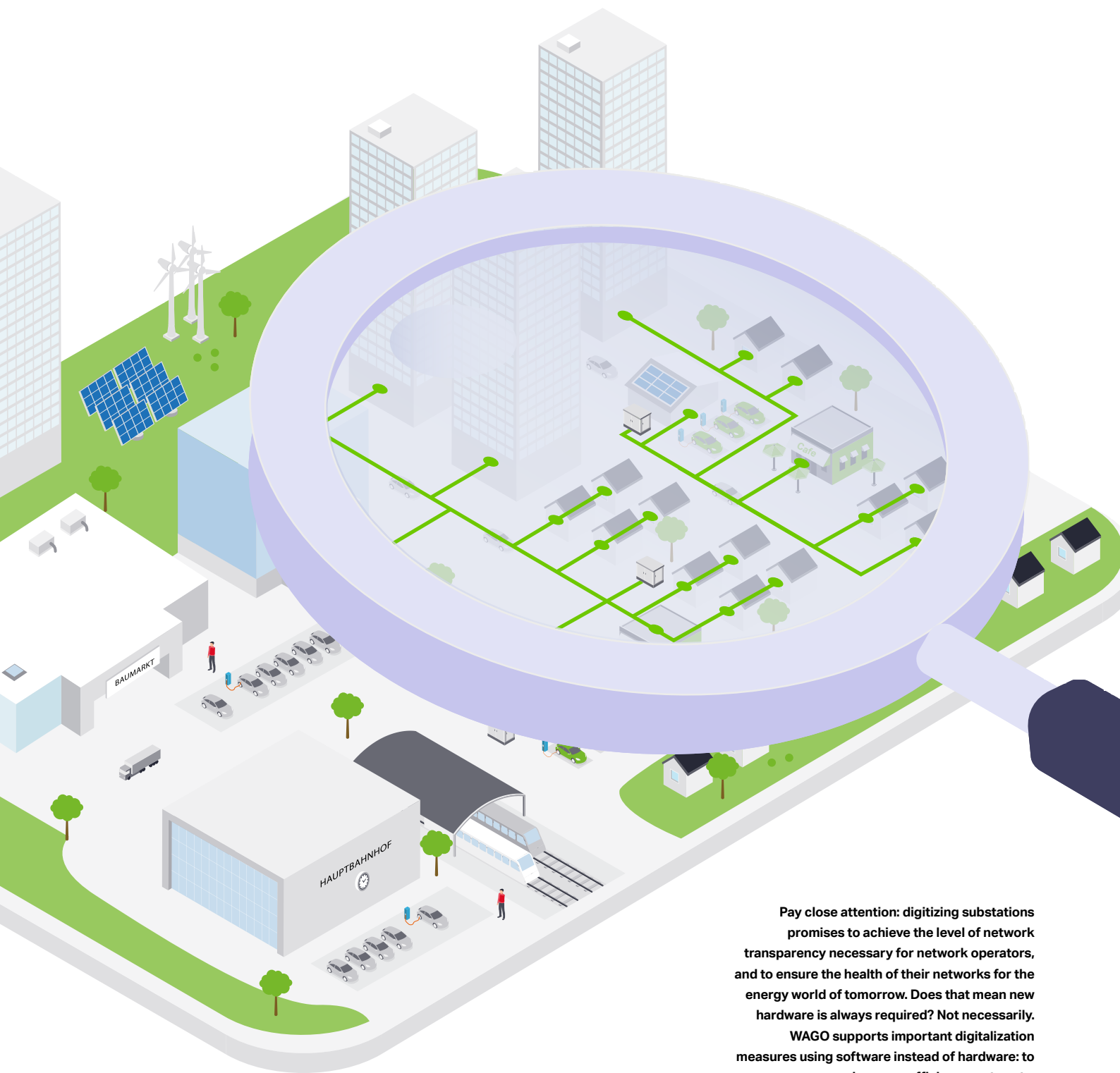
can acquire data from two transformers with 15 outputs each on the medium- and low-voltage outputs.

The measured values of the medium voltage, the transformer, the low-voltage outputs, status signals and temperatures are transmitted to the network control system via IEC 60870-5-104. Commands and setpoints can also be received and processed. Data from external measurement systems can be read out via Modbus®. The parameter settings can be stored and loaded into other stations as needed. Since measurement data can also be simulated, it is possible to commission new substations into the network control technology while at the station builders. Using an HTML5 Web visualization, the results of decentralized data collection are processed and prepared for different user groups in a clearly organized way. The firmware is hardened according to the BDEW White Paper standard, and the communication concept is ISMS-compliant.

Medium Voltage Calculation

The new WAGO Application Medium Voltage Calculation enables precise medium voltage calculation – without resistive couplers – in the accuracy class of 1.5 percent.

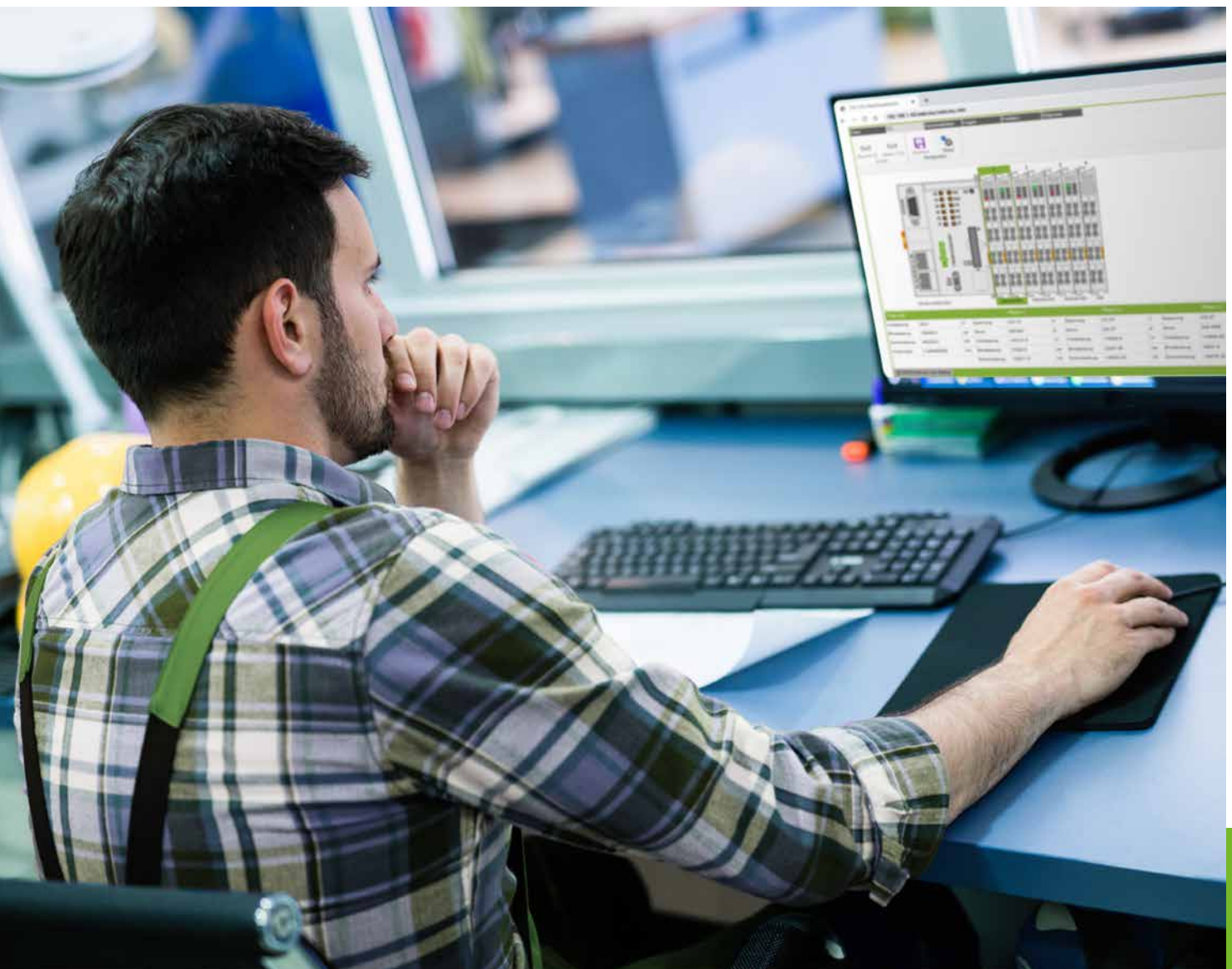




Pay close attention: digitizing substations promises to achieve the level of network transparency necessary for network operators, and to ensure the health of their networks for the energy world of tomorrow. Does that mean new hardware is always required? Not necessarily. WAGO supports important digitalization measures using software instead of hardware: to increase efficiency, not costs.

Over the course of the energy transition, grid operators have gained increasing interest in having precise medium-voltage information. Highly precise values are likewise needed in the process control systems or data clouds of these network operators, just as for operating or calibrating the short circuit/ground fault indicators. These measured values are also essential for control over a wide range. The add-on app for medium-voltage calculation runs on a Docker® container, which exchanges data with the WAGO Application Grid Gateway via the Modbus TCP protocol. The necessary transformer parameters can be

conveniently entered via the web interface or a CSV file upload. The low-voltage side is measured, either with WAGO's 3-phase power measurement modules or devices from other vendors. A complex algorithm calculates the medium-voltage side from the measurements on the low-voltage side, taking various parameters into account, such as winding ratios, loads and temperatures. The calculation also incorporates individual transformer parameters, such as the short-circuit voltage, no-load losses or the losses in the event of a short circuit.



WAGO Application Grid Gateway allows easy commissioning of a small-scale telecontrol system in a substation – by simply setting parameters.

WAGO Application Medium Voltage Calculation enables precise medium voltage calculations – without resistive couplers – in the accuracy class of 1.5 percent.



Controlling VRDT via Software

The WAGO Application Voltage Regulating Distribution Transformer enables control of the tap changers in a voltage regulating distribution transformer (VRDT) without the need for additional hardware. This add-on app is an efficient and economical solution for network operators, so they can couple in voltage regulating distribution transformers using telecontrol technology or ensure improved control behavior. The app enables control of the tap changers in VRDTs via Modbus RTU and thus dynamically adjusts the voltage value between the medium and low-voltage network – without an additional, separate control unit. This both avoids another possible source of errors in the substation, and also saves space and costs.

Commissioning this app does not require additional programming: the simple parameterizing or configuration is performed via a web visualization, in which the control parameters can be set and the controller monitored. Optionally, the control parameters can be acquired via the IEC 60870-5-104 telecontrol protocol and transmitted to the tap changer.

Distribution network operators may thus set up VRDTs economically, flexibly and sustainably, using proven WAGO telecontrol technology, like the WAGO Application Grid Gateway and new and prospective add-on apps. The indispensable digitalization of the energy grid need not lead to incalculable costs.



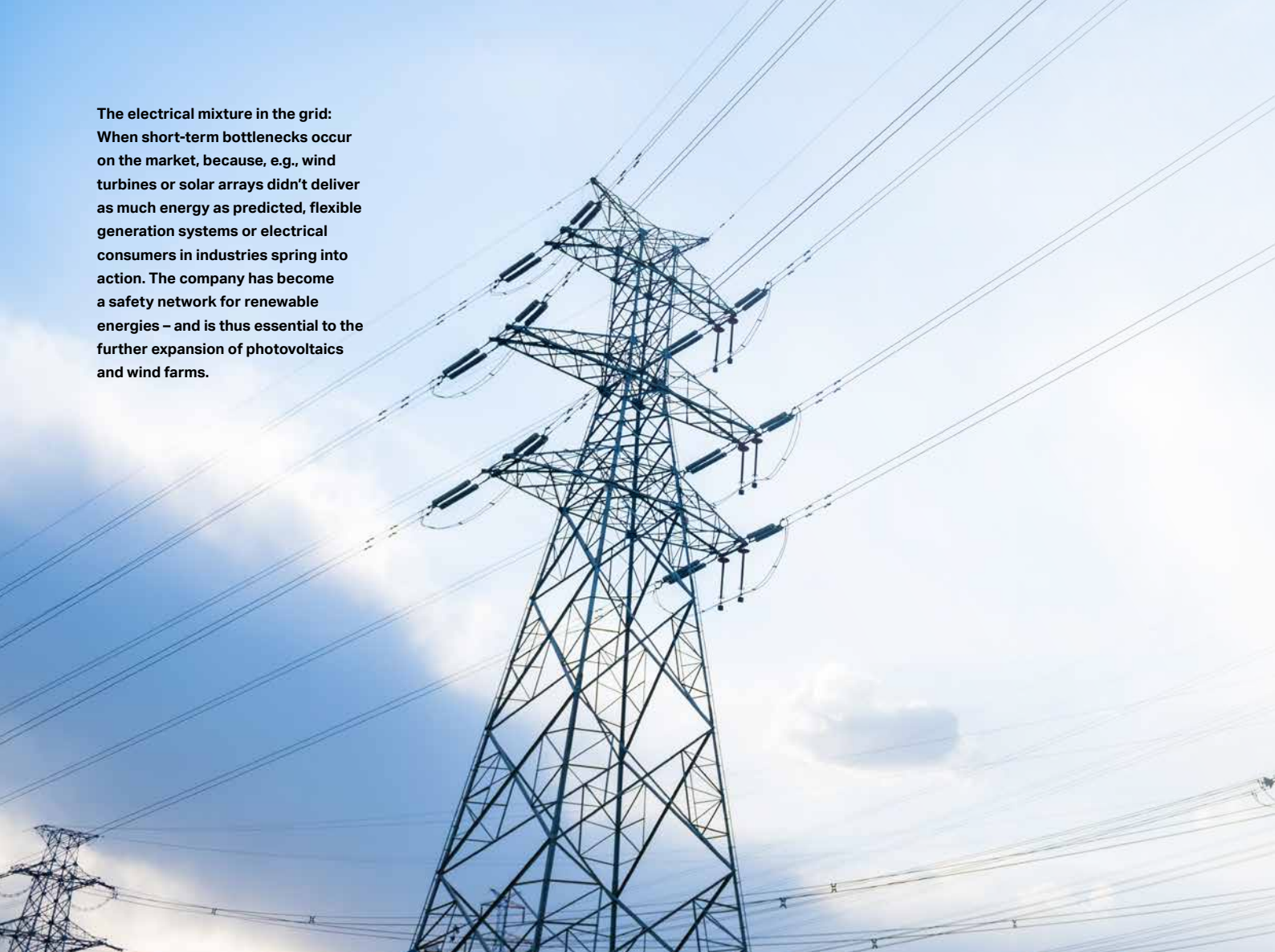
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The second-generation WAGO telecontroller is a programmable logic controller (PLC) with various interfaces. According to your needs, 3- or 4-wire measurement modules as well as digital input and output modules can be added for controlling medium-voltage switchgears.



The electrical mixture in the grid:
When short-term bottlenecks occur on the market, because, e.g., wind turbines or solar arrays didn't deliver as much energy as predicted, flexible generation systems or electrical consumers in industries spring into action. The company has become a safety network for renewable energies – and is thus essential to the further expansion of photovoltaics and wind farms.



PROTECT THE CLIMATE, ENSURE THE SUPPLY



Esforin sells flexibilities from gas-powered generators and other systems to the spot market of the energy exchange, a business model that depends on speed and reliability. Good reasons for the company, and its customers, to rely on WAGO Controllers and WAGO Cloud.

Esforin, headquartered in Essen, protects the environment with fossil fuel energy generation. How so? Esforin sells flexibilities from gas-fired power stations – and other energy producers, like industrial systems or battery storage systems – on the intraday market of the energy exchange. When short-term bottlenecks occur on the market, because, e.g., wind turbines or solar arrays didn't deliver as much energy as predicted, the systems that Esforin has under contract fill the gap. The company has become a safety network for renewable energies – and is thus essential to the further expansion of photovoltaics and wind farms.

"We use existing systems to integrate renewable energies into the system," explains Christoph Gardlo, cofounder and COO of Esforin. "This lets us contribute to the energy

transition, protect the climate and also ensure the electrical supply." Gardlo employs the following rule of thumb: selling one megawatt of flexible output from gas-fired plants and other systems enables the expansion of twenty megawatts of wind or solar energy. As confirmed by TÜV Rheinland, Esforin prevented a total of 197,000 tons of CO₂ emissions in 2021 due to its marketable services in the upper three-digit megawatt range.

The model represents more than a simple victory for climate protection; the system operators also win. "We generate attractive revenues for our clients, because we optimally use our automated marketing to optimally exploit the price fluctuations in the intraday trading market," explains Gardlo.

InfraServ Gendorf's GuD Power Plant

One of the systems Esforin uses is located in the Gendorf chemical industrial park in southeastern Bavaria. InfraServ's gas and steam turbine power plant (GuD) supplies its electrical needs and also covers the heating requirements for the chemical industrial park. The gas turbine also has reserves in its electrical generation, depending on the season. "We intensively considered how we could exploit this potential and gain additional profits with our system – naturally without negatively impacting the supply security for our site operations. We were already familiar with selling flexibilities; however, we wanted to service the entire bandwidth of possibilities, and thereby optimize our marketing performance," reports Peter Geyer, coordinator at InfraServe Gendorf.

InfraServe now predicts daily how much maximum additional output the gas turbine will be able to provide, at what times, on the following day, for the short-term market, and what the minimum price for the electricity must be, in order to cover the costs of ramping up the gas turbine. InfraServe shares this data with its partner Esforin as a limit condition for each following sales day.



For Esforin, a central benefit of using WAGO controllers lies in their wide variability. "While these products are standardized hardware, they are, due to a very broad range of interfaces, sufficiently flexible to easily handle the heterogeneity encompassed by our customers' process control technology," explains Christoph Gardlo, co-founder and COO of Esforin (left).

Speed and Reliability

Electricity is sold on the intraday market in blocks of 15 minutes to an hour. Trading starts at 3 pm on the previous day, and ends five minutes before the respective start of delivery. For example, if a participant wants to sell electricity for the 15 minutes from 8 pm to 8:15, trading is open until 7:55 pm.

Like a leopard waiting in ambush, Esforin bides its time on the intraday trading market. According to Gardlo, "We strike immediately when someone is prepared to pay the price that InfraServ Gendorf demands for the 15-minute blocks of their output." To do this, Esforin uses a proprietary algorithm, which is programmed for each customer and automatically bids according to the stipulations of the boundary conditions specified by the system operators. If a deal is completed, it must move quickly, because there are only five minutes between the close of trading and the service provision. "We translate the deal into a request signal, which the telecontrol technology transmits to the control center in the power plant without any delay. This ensures that it induces the necessary increase in the turbine's output at the right time," explains the Esforin CEO. After speed, reliability is another point of importance in

this data transport chain. "It is extremely important that the output request reaches the system, so that it can actually provide the necessary output, and stop it again, at the proper point," explains Gardlo. Reliability is also essential for the power plant operator. "Signals that are repeatedly incorrect, with relation to the times or the output levels, would end the sales of our flexibility over the short or long terms. This is, after all, just a side gig, which cannot have a negative impact on the regular operation of our system," states Geyer.

Transmitting Commands Practically in Real-Time

These are good reasons for Esforin to rely on WAGO products for their projects. WAGO Cloud functions as a platform to output the algorithm commands to the customers' control systems; the WAGO PFC100 and PFC200 Controllers serve to quickly and securely deliver the request signals to the customer systems. In addition, they backup the data from the signals into the cloud. "In light of our responsibility for securing the electrical supply, there is no doubt but that we use industrial standard components, which have been tested over the long term and function reliably," says Gardlo. Geyer confirms this

fact, "After a year's experience with the system, we can truly say that it works."

For Esforin, a central benefit of using WAGO Controllers lies in their wide variability. "While these products are standardized hardware, they are, due to a very broad range of interfaces, sufficiently flexible to easily handle the heterogeneity encompassed by our customers' process control technology," explains Gardlo. WAGO's Cloud Connectivity Protocol guarantees seamless connection to the cloud. After consulting with the system operators about the data points to be transferred in both directions, Esforin runs proprietary software on the controllers to ensure communication. The customers then install the controllers in their control centers. "WAGO's controllers can be implemented as plug-and-play components. This corresponds to our approach of burdening our customers with the least amount of effort," states the ESFORIN CEO.

WAGO Cloud, operated using Microsoft Azure, also ensures that the tens of thousands of commands, output every day by the Esforin algorithm, are correctly delivered to the customer systems in the available time intervals – thus virtually in real-time. This is one of the more unusual applications of WAGO Cloud, as most use it as a data hub. Esforin's applications demonstrate, however, that it also reliably satisfies these demands.

Flexibility in Selling Flexibilities

"After only a few months since the beginning of our collaboration on the marketing models defined by Esforin, we have learned one thing: one must be flexible when selling flexibilities. Which means that the strategy must be able to adapt to changing circumstances (technical/operational in addition to energy economics) – and this can do that," states Geyer.

With Esforin, we have a competent partner at our side. And with WAGO Cloud and WAGO's controllers, we also have strong technologies available to assist in optimally exploiting the multiple opportunities offered by the energy market.



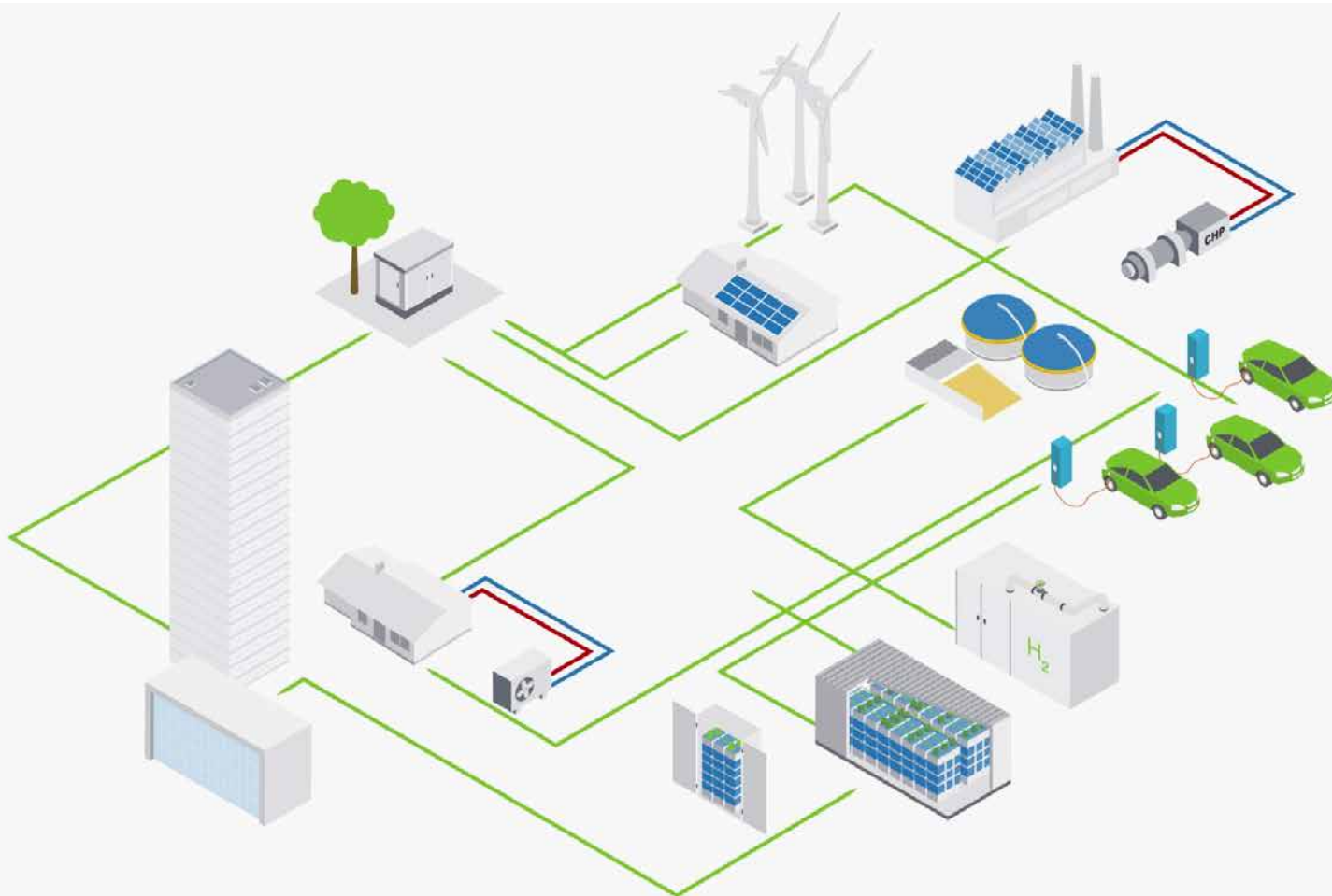
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cloud-automation](http://www.wago.com/de/offene-automatisierung/cloud-automation)



Experts from the company predict daily how much output the gas-fired plant can provide the following day, and at what times it will be available to the short-term market. This depends on, among other things, the needs of their customers and weather conditions.

LIGHTS, CAMERA, ACTION! TH



THIS IS HOW WE ENABLE THE ENERGY TRANSITION

Energy is increasingly generated in a regenerative and decentralized way – and it fluctuates. In order to prevent blackouts and ensure security of supply, the individual participants in the energy system must be intelligently networked with one another. This is precisely where WAGO's solutions come in – for municipal planners, network operators and industrial companies.



Watch an animated video and discover
WAGO's energy solutions, fast and compact
in 3 minutes.

THE ENERGY WORLD IN MOTION

ENABLING SELF-SUFFICIENT ENERGY ISLANDS IN THE USA

The changeover from carbon-based fuels to renewable energies requires commitment – like that of the Ageto Energy company. At their Headwaters Center in Winter Park, USA, Ageto ensures, for example, that all of the energy consumed there can be generated and stored on site. An important detail in this: WAGO's technology forms a bridge between the Modbus TCP/IP microgrid controller from Ageto and the CAN-based battery storage system.



THE PEAK ENERGY MOMENT

WAGO MOMENTS OF SUCCESS



THE ENERGY FOR THE FUTURE MOMENT

WAGO MOMENTS OF SUCCESS

SUSTAINABLE ENERGY SECTOR IN POLAND

Configuring renewable energy systems to be more efficient: this is the focus of P&Q. Passion and Quality distinguish this young Polish company, not only by name, but also in their work. The employees are especially proud of its software solution, which makes managing and operating photovoltaic systems and wind turbines more efficient and economical, thus smoothing the path to a sustainable energy sector.





© LEONHARD WEISS

Station Design at LEONHARD WEISS implements telecontrol station connections across Germany according to the respective technical connection requirements (TAB).

DISMANTLING BLOCKS TO E-MOBILITY

How the network connection for charging infrastructure succeeds quickly and easily with WAGO and the station design by LEONHARD WEISS.

The country needs charging stations. However, they must be connected using telecontrol technology – and be grid compatible. The LEONHARD WEISS company does this and more all across Germany. The Station Design department in the company from Göppingen relies on flexible hardware and software from WAGO – not only because the connections function quickly and easily in around two-thirds of all network areas, but also in order to retain expertise and added value within the company and remain sustainable.

In the mean time, the development and expansion of the charging infrastructure for e-mobility significantly determines the station design. “We are currently working to a large extent on e-mobility. This refers not only to charging columns, but everything else: from the mains transfer point up to after-sales and maintenance services,” states Christian Kong-Lochbihler, senior site engineer in the Station Design department at LEONHARD WEISS. With 20 employees, his department builds successful AC and DC charging stations across Germany. These are high-power charging columns with a charging capacity of 350 kW.

Telecontrol Connection per Plug & Play

As an experienced service provider, LEONHARD WEISS covers the entire value added chain in e-charging technology, from the transformer station up to roof canopies for the charging columns – from the initial consultation, through site analysis, implementation and commissioning, up to operational management, servicing and maintenance, all from one provider. “We work for the three largest charging network operators in Germany,” states Kong-Lochbihler. This also means that, “We implement telecontrol station connections according to the technical connection requirements (TAB) of many different network operators. Using a telecontrol system and the WAGO Application Customer Substation, we can completely cover around 80 percent of the different TABs per plug & play.

Flexible System Offers Openness and Added Value

As a power engineering vendor, WAGO's plug & play solution for telecontrol connections arrived at the right time. "Of course we took a look at what was on the market – we even checked out other telecontrol system producers that we had already used," reports Kong-Lochbihler. The problem was that these were often closed, proprietary systems. "We, however, didn't want to completely tie ourselves to one option, but retain value creation in house, and, for example, perform the cable wiring and built-in tests ourselves. This was astonishingly easy to do with WAGO," he reports. In Kong-Lochbihler's eyes, the handling is another plus point, "The software is clear and easy for my colleagues to operate."

Commissioning Comes after the Precommissioning

How does station commissioning actually work? It can be said that commissioning comes after the precommissioning. "For us, there is a precommissioning with an I/O or built-in test. As soon as we receive the telecontrol system, the project is selected and the remote control center is connected to the medium-voltage system during production. This means that we then perform the entire control wiring, the parameterization and a so-called pre-test, that is, an I/O pre-test, using the switchgear

unit." This way, Kong-Lochbihler and his colleagues know that all commands and messages arrive correctly, the fieldbus connections function, and the corresponding registry can be read out.

"Afterwards, everything is disassembled, delivered to the station manufacturer, completely wired again there, and then delivered to the transformer station as a complete, manufactured unit." Only then does the actual commissioning of the remote control center take place. "This is then performed together with the respective network operator; however, it's done remotely. That is to say, one of our technicians is on site, and our software commissioner logs in remotely and supervises everything from our headquarters in Göppingen."

Cooperation Creates Added Value

"We can use the hardware/software solution from WAGO in the majority of our transfer stations in infrastructure projects, and also for all of the service customers we supply." LEONHARD WEISS has already installed 30 control cabinets in 2021 that include parameterizing software from WAGO, another 40 have been ordered for 2022 and are already in the design stages – this time with an integrated modem. They are already working with WAGO on another visualization method. "We can and will use this to create added value for us, as operators of a number of transformer stations, but also for our customers, because



Upon request, LEONHARD WEISS also takes over operational management of the transformer stations. This also includes cyclical actions related to AC and DC charging stations, for example, the repeat tests according to DGUV 3.



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Final installation of a DC charging column: the Station Design team from LEONHARD WEISS set up AC and DC charging columns (High Power Charging) of up to 350 kW throughout Germany.

we will then also have remote access to those stations after commissioning, and will be able to monitor them.”

The European charging network connection situation is difficult. As a construction company, LEONHARD WEISS is active in track infrastructure construction, engineering and turnkey construction, roadway and network construction, and is currently numbered among the largest construction companies in southern Germany. The company is not just active in Germany; it also has customers

of many types across Europe, particularly in northern and eastern European countries.

The charging network is also being rolled out across Europe, and German vendors are expanding their charging networks with European locations. Aren't charging infrastructure connections and operation also a market for Station Design at LEONHARD WEISS? “Not at the time, no,” is the response. This is because connections that comply with standards are still difficult, acknowledges

Kong-Lochbihler. "The legal and technical guidelines are laid out and constructed quite differently among European countries. Therefore, we in Station Design at LEONHARD WEISS are working in the German market." In this case, LEONHARD WEISS isn't just focused on one customer or service, but instead, as mentioned earlier, covers the entire value added chain – from consultation up to transformer station delivery, establishment of network transfer points, delivery and installation of charging columns and charging infrastructure, and also after-sales support and maintenance services. "We thus also take on operational responsibilities, like operational management of transformer stations, and also carry out the cyclical actions for AC and DC charging columns," he states, meaning the annual visual inspections and also the repeat tests required by DGUV 3.

From Network Connection to Load and Energy Management

As a construction company with three business areas, LEONHARD WEISS does not view e-mobility as a topic in isolation. The tender for the German network for quick charging stations, as well as the large charging network operators and automotive manufacturers, who are establishing and expanding their own charging hubs, is one reason. The other is the industries, businesses and residences connected to it, that must also be retrofitted for e-mobility. "We see a large business opportunity here, in particular." Business and industry have to be conceived of a bit differently. "There is usually a transformer station here, which is then retrofitted for charging infrastructure." In addition to the physical space in the station, there are



Before e-vehicles can charge at these DC charging columns, they must still be commissioned.



During charging column installation and maintenance, the station design team from LEONARD WEISS also takes over measurements according to DIN VDE 0100-600.

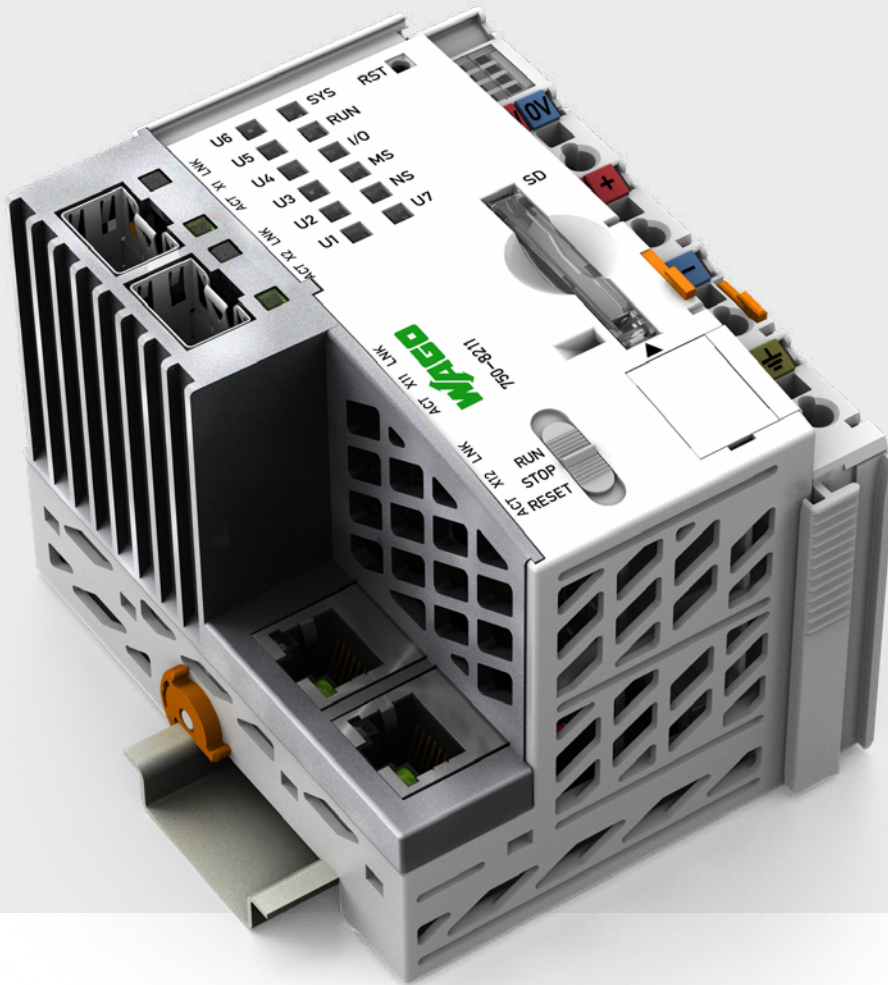
also various assets, like generating systems and consumers, as well as buildings or production that can be linked to the charging infrastructure using dynamic load management. The challenges here include system compatibility and interface management. WAGO has already been tasked with designing a load management system according to LEONHARD WEISS' requirements.



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WAGO's second generation PFC200 Controller features two additional SFP slots. The benefits: ports for different SFP modules, direct connection without an additional switch, ideal for high EMC applications or long transmission paths (item number: 750-8211)

FLEXIBLE CONNECTION OF FIBER OPTIC CABLES

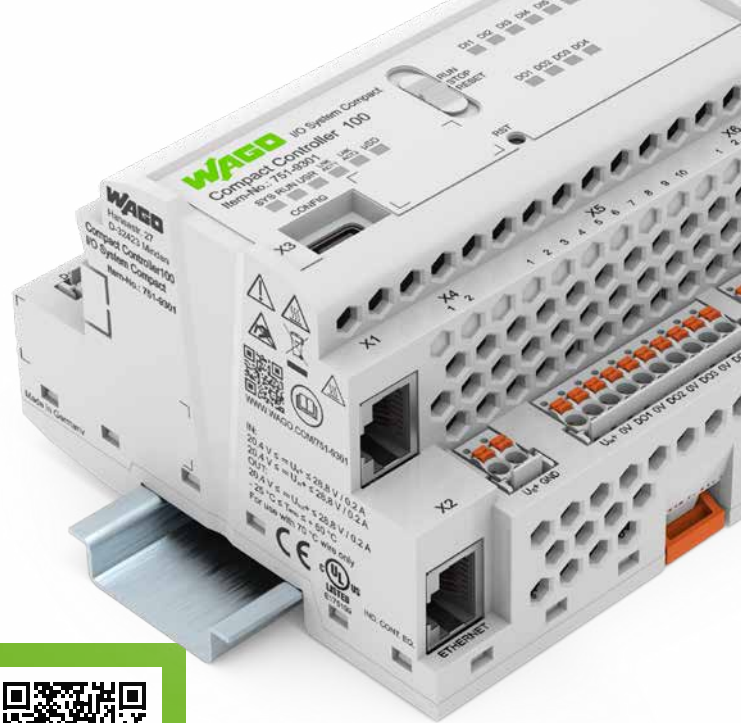
Fiber optic cables excel at transferring data over long distances or in environments with many interfering electromagnetic signals. For such applications, WAGO has expanded its portfolio with a PFC Controller model that dramatically simplifies fiber optic communication. The PFC200 has two SFP (Small Form-factor Pluggable) connection slots; SFP is a common IT interface. The PFC200 also has two RJ-45 ports for 100BASE-TX. Various modules can be installed in the SFP slots (e.g., for connecting single-mode or multimode optical fiber), allowing LC connectors to be plugged into these. For users who need a fiber-optic network connection, this PFC200 eliminates the need for an additional media converter in the control cabinet.

Did you know?

Telecontrol technicians should take a look! For automation solutions in the energy sector, the second-generation PFC200 is worth an in-depth look at the item number – more specifically, the last character in the specifying version numbers after the slash, e.g., 750-8212/025-00X. If the last character is a 1 or 2, then this is a telecontrol PFC200 of the second generation. (The telecontrol license is already included. For other second-generation PFC200 Controllers without these version numbers, the necessary telecontrol licenses must be ordered as an addition.)

MAXIMUM FLEXIBILITY IN SOFTWARE ENGINEERING

The WAGO Compact Controller 100, with a real-time Linux® operating system, gives users maximum freedom. This compact device is freely programmable with CODESYS V3, but can also be used with IEC 61131-independent software, for example, Node-RED, Python or C++. Subsequent installation of Docker® as a virtualization environment is also straightforward. This addition makes the WAGO Compact Controller 100 a full-fledged IIoT device with gateway functionality. Thanks to its design as a DIN-rail built-in installation device (per DIN 43880), the new controller can also be mounted on small distribution boards. The I/O unit is housed in a compact enclosure along with the controller, so no additional space is required for extra control components. In addition, the wiring interface is removable, providing advantages for installation and commissioning.



Learn more!

MEASURE ENERGY TRANSPARENTLY, COMPLIANTLY AND CONVENIENTLY



Regardless of whether it relates to charging infrastructure, order-based production or distributed real estate: comprehensive energy measurement is necessary to optimize energy consumption. WAGO has energy meters in its portfolio that comply with the European Measuring Instruments Directive (MID) and thus also enable applications with consumption calculations.



They use Push-in CAGE CLAMP® with levers, making them connect quickly and easily. The devices for direct measurement have a width of just 72 mm; versions for current transformers are even slimmer at only

36 mm. This saves a tremendous amount of space in the control cabinet.



Learn more about the features and benefits!

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