

FIRST TO THE FUTURE



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Energy management

FIRST TO THE FUTURE

By 2030, 80% of Germany's electricity will come from renewable sources. As the number of market entrants, interfaces, communication channels and control options rapidly increase, so will the complexity of the energy supply. This will lead to new requirements for generation and consumption systems. Bachmann's Smart Power Plant Controller will help MAN Augsburg to meet these requirements.





MAN has made a voluntary commitment to reduce absolute CO₂ emissions at its own production sites by 50% by 2030, compared with 2018. To this end, MAN is pursuing a centrally coordinated program to increase power generation. Another photovoltaic system will enter operation at the Augsburg plant in 2024. And more are planned.



The next decade will see a gradual shutdown of large fossil fuel power plants – part of the energy revolution. Demand for electricity will be increasingly covered by renewable energy sources. However, the volatility of renewables requires a sufficient number of large controllable loads and generation units in the grid to ensure stability. Studies by German transmission system operators have identified a load management potential of up to 4 GW, which could be switched off or redirected as required through appropriate demand-side management (DSM) over the coming years.

Electrification continues

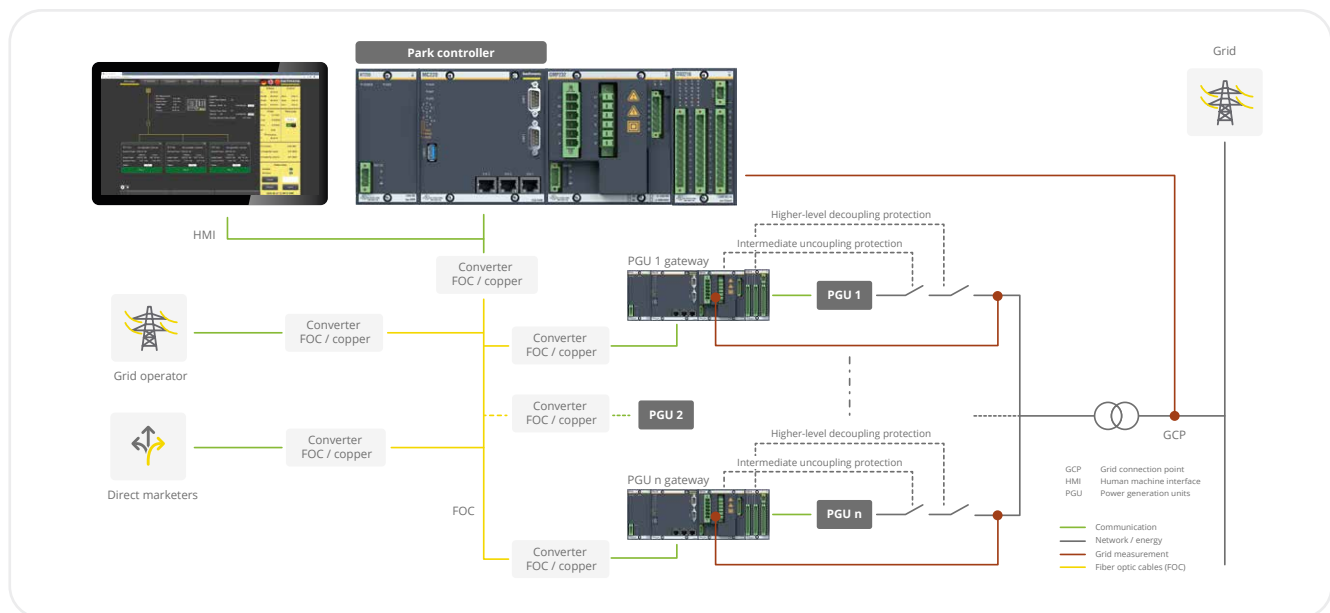
Further to this shift in power generation, companies like MAN are hard at work looking for solutions to electrify the supply of process heat. After all, around 75% of industrial greenhouse gas emissions can be attributed to this phenomenon, primarily found in

the production of steel, metal, glass or paper and in the chemical industry. Technologies that cross multiple industries such as heating, air conditioning and ventilation (HVAC), lighting and data centers also offer load management potential.

"This is a Herculean task for a large production site, and we don't know what the demands will be over in the coming years," says Michael Kramer, Head of Energy Systems, Work Services Production at MAN Energy Solutions in Augsburg. "In the past, networks were managed purely from a commercial point of view, but in the future, we have to focus on energy availability. We must be able to manage the networks much more dynamically than we do today."

A pioneer stands up to the challenge

A Volkswagen subsidiary, MAN Energy Solutions is aware of its role



The Bachmann park controller can manage up to 100 power generation units (PGUs). PGUs are connected to MAN via standardized gateways, which can be quickly parameterized for the respective PGU.

as a pioneer within the Volkswagen key industries, and its responsibility for identifying solutions that enable sustainable progress. Michael Kramer has also taken on this task for the energy management at the Augsburg site: "Our corporate goal is to halve CO₂ emissions at our global production sites by 2030. But, in order to achieve this, we have to set a course today that prepares us, as a manufacturing company, for the upcoming changes in energy supply."

His assessment of the situation delivers one challenge: "In the future, there will be a large number of energy producers, storage facilities, and large loads to control. Climate legislation and building regulations require the expansion of rooftop photovoltaics. VDE-AR-4110/4120 requires the central control of car and truck charging stations. To prevent voltage dips, it may be necessary to coordinate startup of different drives.

And so on and so forth. These are just some of the players. We can't name all that will come along," explains the engineer.

Searching for a solution

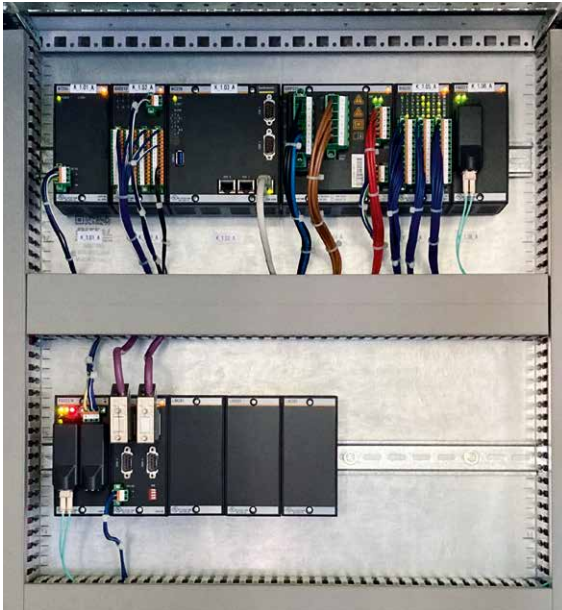
Kramer and his team set out to explore how such a transformation could succeed on site. The facts were clear: MAN had to meet the regulatory and legal grid connection requirements at all times. And, despite the challenging conditions, operations management had to remain efficient, sustainable and economical. Today, these two requirements are separated by standards: VDE-AR-N 4110/4120 defines the requirements for grid stability based on power supply and delivery, while the Energy Industry Act sets average power values that define energy optimization.

"We were looking for a system that could combine both requirements and

be future-proof enough to allow us to integrate several dozen generation units over the next few years, but not all at once. At the same time, it had to be open enough to provide us with the information we need to control a conglomerate of relevant loads that are still largely unmanageable." This task brought Kramer to Bachmann.

Bachmann park controller for the production site

Kramer has now implemented a redundant park controller based on the M200 control system: The functions of the Bachmann Smart Power Plant Controller, certified according to VDE-AR-N 4110/4120, enable MAN to certify the power generation of the entire site and connect it to the power grid. The process is based on power generation gateways which integrate the individual power generation units (PGU) and secure their protection against decoupling. The theoretical limit of 100



With this control system, implemented on the M200 controller, MAN can certify the power generation of the entire Augsburg site and to connect it to the power grid.

PGUs is unlikely to be reached in the foreseeable future, but Kramer still sees it as a crucial aspect: "Bachmann is one of the few suppliers whose systems already meet these requirements.

The integration of the system was tested together with Bachmann on two large PV roof systems at the Augsburg site. Kramer praises the partnership: "All parties worked together to develop a solution that allowed an in-depth connection between our existing load management and the power generation. The system openness really stands out.

Just the beginning...

The most important component is already in place: A platform that combines the different systems and requirements of network operators and the energy industry. But for Kramer, this is just the beginning: "We have a standard on which to build. We are continuing to add further functions to integrate generators in a system-friendly way and for the efficient control of energy consumers." And Bachmann is by his side.



» Network management has to become much more dynamic than it is today. «

Michael Kramer

Head of Energy Plants,
Work Services Production,
MAN Energy Solutions

MAN ENERGY SOLUTIONS

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