



Toward the energy transformation with “peak shaving”

MANN company group optimizes energy consumption with energy meter modules from Helmholz

Green energy from regional sources is not only a successful business model for the MANN company group, but also a conviction. The company is now also embarking on new paths with the optimization of its own electricity consumption: through systematic “peak shaving,” the avoidance of load peaks, the Westerwald company saves power and money. The technical prerequisite for this is provided by a monitoring software and energy meter modules from Helmholz.

Whether wind power, biomass, or wood pellets: for more than 25 years now, the MANN company group, based in the Westerwald town of Langenbach, has stood for a sustainable, green energy supply from domestic sources. The vision of a regionally driven energy transformation is of course also being implemented by those responsible in one's own company, because the company is itself a major energy consumer.

A central starting point for the optimization of energy consumption is offered by the production of wood pellets by the subsidiary company, Westerwälder Holzpellets. The so-called hackers alone, for example, in which entire tree trunks are mechanically chopped up, require up to 320 kW of current. However, the subsequent pressing or the shredding of wood waste for the company's own biomass power plant also draw a lot of power. Just how much has recently been shown by the systematic recording and transparent evaluation of the electric energy flows on the works grounds.

Project “Peak Shaving”

The continuous documentation of instantaneous consumption especially enables forecasts of the short and medium-term electricity requirements and thus a “peak shaving”. Imminent load peaks can thus be recognized on time and

avoided by the temporary shutting down of individual consumers or through the intelligent chronological shift of shiftable loads. The data basis providing the foundation is thereby also visualized in a clearly structured fashion and represented in a “power tachometer” with three warning levels.



Installation-friendly wiring in the smallest space.

“Green” thereby signalizes low instantaneous consumption, “yellow” indicates increasing consumption, and “red” an imminent load peak.

The following example shows what that means in practical operation: the hacker of the pellet works is loaded with tree trunks by an excavator. The excavator operator always has a constant eye on the power consumption with a tablet. If this gets close to the “red” range, he can interrupt the supply of new tree trunks and thus temporarily reduce the energy requirement. This pause can then be used to bring new trunks from the log stocks.

Another example of consumers that can be shut down without problems is the e-charging stations on the company grounds, at which employees and external customers can charge their electrical vehicles. These are not affected if the charging procedure is interrupted for several minutes. Nonetheless, short-term load peaks can thus be effectively avoided in this way.

Technical realization

Florian Höfer, responsible for electrical engineering and system programming at Westerwälder Holzpellets, has realized this solution technically. To this purpose, he initially created an intelligent network structure as a prerequisite. The company-wide areal network encompasses both

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the individual consumers and full feeders like the biomass power plant, combined heat and power plant, and photovoltaic systems on the grounds. This infrastructure enables the systematic condition monitoring of all relevant systems.

To this purpose, central parameters on current and voltage like active/ apparent power, etc. are measured in the first step at a total of 14 measuring points in real time. This task assumes responsibility for the decentralized and fieldbus-overarching I/O system TB20 from Helmholtz. One I/O module is used for each measuring point.



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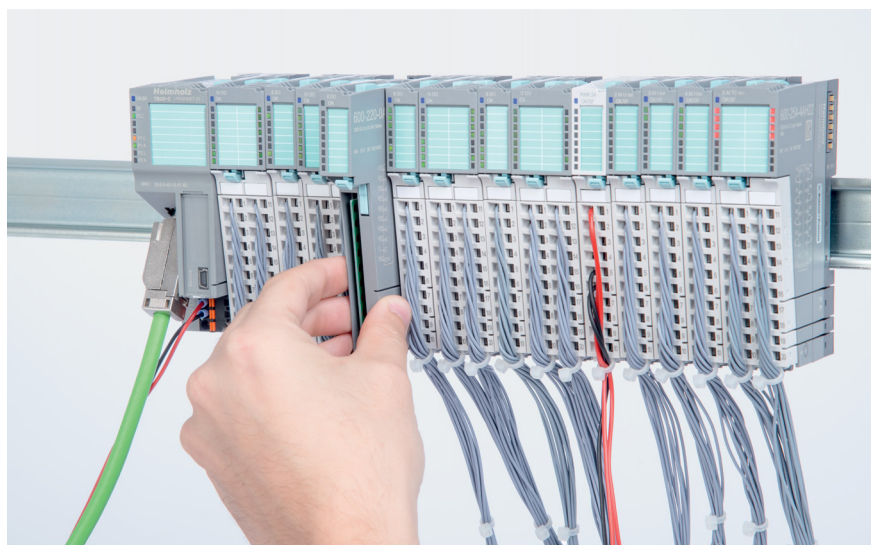
The compact devices are equipped with an “energy meter” function module. By way of a Modbus/TCP interface, the recorded data then finds its way into a monitoring software for further processing, where it is analyzed and visualized in the second step.

Florian Höfer configured the basic version of the software in keeping with his individual requirements and has since been continually developing it further.

A PROFINET/Modbus coupler, also delivered by Helmholtz, also integrates the pellet works into the Modbus. Process data from the corresponding PROFINET machine network can thus be directly visualized in the monitoring software and is used, for example, to monitor the efficiency and system operation.

Decision for Helmholtz

The decision in favor of the I/O system TB20 was made following extensive tests with Modbus/TCP-compatible measurement devices from various manufacturers. From the perspective of Florian Höfer, one argument in particular spoke in favor of Helmholtz as a provider: “The Helmholtz devices are really very easy to operate!” And the automation pro also provides an example right away: “The plugs



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All TB20 modules are plugged into the DIN rail quickly and with secure contacts while the rest of the system keeps running. The hot-swap-compatible electronics modules help keep downtimes to a minimum.



The 3-part module structure enables quick maintenance and/or expansion.

lying above can be easily removed and reconnected again. Thus, if a card is defective, for example, due to an operating error, this can be easily and quickly replaced without unclamping the wires.“ Höfer also names the “super support, especially during the test phase“ as a second argument. The Helmholz experts, he reported, “solved problems that were irresolvable for me in five minutes.“ And not least, he was also convinced by the price/performance ratio of the TB20 components.

Results and forecast

The load peaks could now in fact be reduced through the in the meantime executed “peak shaving” measures: while the maximum value previously lay at 1,780 kW, this was most recently only 1,507 kW at its peak.

This also becomes noticeable on the costs side: the so-called output price that companies pay in addition to the consumption costs, depends exclusively upon the maximum output during a billing period – irrespective of how long this is called upon.

Conversely, this means: thanks to lower load peaks, the performance price is reduced considerably. In the case of the companies of the MANN group, this savings was in any case a five-digit amount over the year. At the same time, practical operations have shown that the actual disconnection time is shorter than expected: The outages, considered across all consumers, don't amount to even one percent of operating hours. The amount is three percent for the most strongly affected consumers, the electricity charging stations.

“We thus proved at a small scale that the rectification of current peaks through intelligent management of shiftable loads works,“ Florian Höfer summarizes. “And we thus also see ourselves as pioneers for the realization of ‘peak shaving’ at a larger scale, because that is really an important matter for the future of the energy transformation.“

Until this occurs, company boss Markus Mann and his people from the MANN company group will first advance several other future projects: Thus, a 1.4 MW battery storage

device made of 114 recycled car batteries is currently being created for the buffering of regenerative power sources. And, through the incorporation of new wind turbines, the company will for the first time also produce power for feeding into the public power supply as of mid-2021. What is still on the way? – There is in any case no lack of innovative ideas in the Westerwald.

Discover the entire product portfolio of the TB20 I/O system.



Have a look online now!



Through its production, the Westervälder Holzpellets subsidiary company provides a central starting point for the optimization of the power consumption of the MANN company group.

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