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Efficient energy use in industry

Power monitoring system from Siemens helps Fraunhofer IISB

Customer
Fraunhofer Institute for Integrated Systems and Device Technology IISB

Location
Erlangen, Germany

Project
Power monitoring system for a research project

Project period
Since early 2013

Delivery and scope of performance
- 23 measuring devices of the 7KM PAC series
- 1 Sicam power quality recorder
- powermanager software

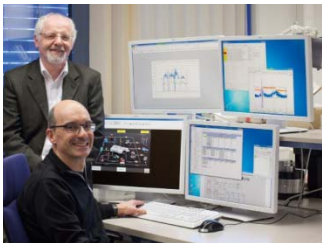
How can energy be used more efficiently in industrial companies? How can energy be generated and stored sustainably under industrial conditions? What effects do factors such as line harmonics and reactive power or secondary forms of energy such as cold, heat, and process gases have on the system as a whole? Since 2013, the Fraunhofer Institute for Integrated Systems and Device Technology (IISB) in Erlangen has been researching new ways to use energy efficiently on an industrial scale as part of its SEEDs project. The use of a power monitoring system plays a key role in this. The powermanager software from the Siemens Sentron portfolio is supporting the research, and Siemens measuring devices are also being used.

The challenge: Theoretical and practical research

The SEEDs research project is developping future-proof energy models and systems for small and medium-sized industrial enterprises. The focus is on companies with an energy base load in the single-digit megawatt range. Specifically, it is about finding out how to achieve maximum efficiency, cost-effectiveness, and self-sufficiency with regard to supply and stability in companies like these. Fraunhofer IISB's own building complex is serving as a study and demonstration platform. The complex's requirements and energy consumption are similar to those of a small-scale industrial company. The base load of the institute building is around 400 kW, but peak loads of up to about 1 MW are reached. This means that the research is being conducted based on real-life conditions, not a simulation. To fulfill the objectives of SEEDs, the researchers need to know exactly where and how the energy is flowing in practice. "This data forms the basis for all of our research in this area," says project leader Dr. Richard Öchsner, summing up the project. "That's why it was clear from the beginning that we would need an especially flexible and stable power monitoring system."

23 measuring devices from Siemens' 7KM PAC series measure values such as current, heating, cooling, or compressed air

"With the powermanager software, we have a high-performing, growing system, which also provides a very good starting point for broader research activities."



Dr. Richard Öchsner (back), project leader and group manager of the Energy Technologies Research Area at Fraunhofer IISB, with system administrator Heinz Schmid

The solution: A flexible and open power monitoring system

In the run-up to the project, the Fraunhofer team carried out intensive investigations into the leading power monitoring systems on the market. In the end, they opted for the power-manager software (version 3.0) from Siemens.

"Very flexible, very open, and yet extremely powerful – just what we need," concluded the experts. This assessment was also confirmed when it came to using the software in practice later on. At Fraunhofer IISB, the Siemens software runs as an independent system. It monitors and archives data from over 50 measuring points in various devices. In terms of hardware, powermanager only requires a Windows PC and a LAN network for Ethernet (MODBUS TCP).

A wide range of energy forms are measured, such as electric current, the power produced by three photovoltaic systems, heat, cooling, ventilation, and air-conditioning, and even the in-house compressed air system and a large DC system for research tasks. The measurement of the electrical energy data such as voltages, currents, power, energy values, and frequencies is usually performed directly via measuring devices from the Siemens Sentron portfolio.

A total of 15 standard 7KM PAC 3100/3200 models and 8 multi-master-compatible 7KM PAC 4200 models are in use. These devices enable detection up to the system level. A Sicam power quality recorder also documents voltage and network quality.

The benefit: Data for research and energy optimization

Some two years after the powermanager software was introduced, over 90 percent of the energy flows at Fraunhofer IISB can now be tracked precisely. The entire power monitoring system is updated every second in real time. Thanks to these short intervals, the SEEDs researchers are one crucial step closer to their goal of reducing load peaks, because it is primarily electrical energy stores that can be switched on and off so precisely and according to demand.

The data collected is used for documentation and as a basis for further research; however, Fraunhofer IISB is also using it to make real savings in terms of electrical and thermal energy, because increasing energy efficiency is naturally a key objective of their work with power monitoring systems. In other practical applications outside the IISB, savings of up to 20 percent have already been achieved using intelligent products and systems from Siemens.

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