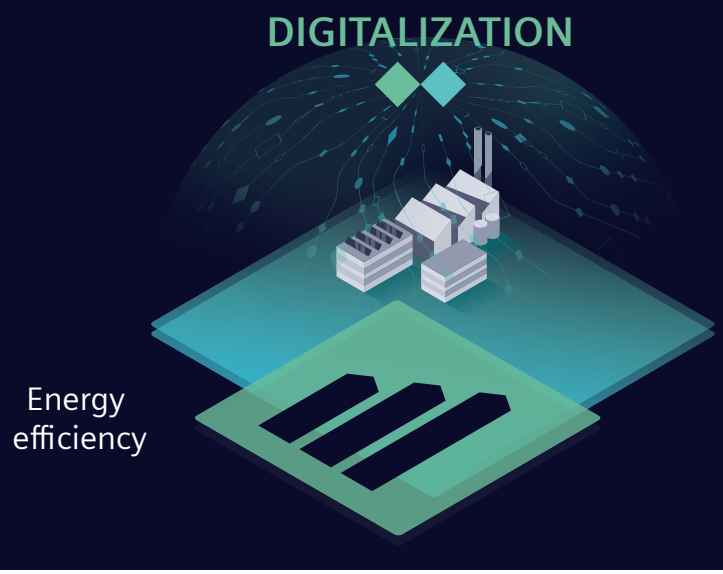

Energy efficiency through **power monitoring**

siemens.com/lowvoltage/digitalization

Electricity prices have multiplied in recent years. A particularly sharp increase was already noticeable in 2021. Since then, the situation – against the backdrop of the current geopolitical situation and the resulting shortage of raw materials – has worsened considerably once again. In the wake of the transition to a new energy mix and the global climate protection agreement, government regulations are calling for ever-higher efficiency standards. For building and infrastructure operators and for energy-intensive industrial plants in particular, there's increasing pressure to reduce electricity consumption, which will in turn reduce costs.

One way to manage this challenging situation is with systematic power monitoring, which makes all electrical energy flows highly transparent. This lays the groundwork for operational power management based on the ISO 50001 and 50003 global standards and for regular energy audits. It's also an important way to reduce energy costs, optimize plant operation, and improve fault tolerance. The technological foundation is power monitoring systems.

Power monitoring: Measurement and analysis

A power monitoring system consists of measuring devices that acquire energy data and analysis software that visualizes and assesses this data. Digitalization makes it possible to monitor the electrical infrastructure in previously unknown ways and to make energy data visible.

One example of this type of analysis software is SENTRON powermanager from Siemens. This tool has comprehensive basic features that process and export data for energy reports. SENTRON powermanager can be used both as standalone software and as an integral part of the Desigo CC building management system. It also permits the straightforward analysis of energy consumption by displaying important characteristics on a dashboard. The evaluation of load peaks and the load profile quickly results in energy savings.

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Last but not least, continuously monitoring power distribution allows operators to identify critical plant states early on, which in turn ensures high plant availability.

Communication-capable protection and switching devices do more

Energy data can be acquired by measuring devices as well as communication-capable protection and switching devices. The latest 3WA air circuit breakers from Siemens' SENTRON portfolio are a practical example. They combine protection and measurement functions in a single device. The electronic trip unit (ETU) is designed to acquire a variety of data on energy, power quality, and circuit breaker states in normal operation. The data acquired is usually transferred to higher-level systems via standard protocols. Multiple communication protocols can also be used simultaneously for fast and powerful data transfers.

Another example is the 5ST3 COM auxiliary switch/fault signal contact. It supplements standard circuit breakers with additional monitoring features like operating hours, operating cycles, and trip counters. It also has all the communication options of the products in the SENTRON portfolio.

Cloud applications create new possibilities

Direct data transfer to the cloud is also made possible by the 7KN Powercenter 3000 IoT data platform and the SENTRON powermind cloud-based app.
The 7KN Powercenter 3000 fits inside any control panel where it serves as a central interface. The IoT data platform offers a number of options for visualizing and analyzing data and lays the groundwork for operational power management. All data from communication-capable field devices, including measuring, switching, and protection devices, is transferred to the 7KN Powercenter 3000 and displayed right in the Web interface in a customizable format.

The SENTRON powermind cloud application enables location-independent, real-time analysis of energy and plant data in the MindSphere cloud solution. It provides an overview of current power consumption – by individual electrical consumers or entire plants – and a comparison of different time periods. It also allows operators to identify power-guzzlers, balance load peaks, and reduce overall energy costs. SENTRON powermind and the 7KN Powercenter 3000 IoT data platform work together smoothly, making it easy to transition to cloud-based power monitoring.

This creates brand-new possibilities. The systematic use of IoT platforms has additional advantages for electrical engineering and building technology, even beyond cloud-based power monitoring. It greatly reduces expenditures for a separate IT infrastructure for technical building management. In addition, huge amounts of data can be stored and processed in the cloud and then made available for comprehensive analyses regardless of location.
For example, Siemens' open IoT platform MindSphere makes it possible to process, evaluate, and compare large volumes of data from different devices and systems in buildings and infrastructures. The potential is enormous. Much shorter downtime and even higher energy efficiency are just two examples.

More uses for data

However, today's new communication-capable devices go one step further by transferring measured values from the electrical infrastructure itself to the IoT. All the acquired data on energy, power quality, and circuit breaker states can also be integrated in cloud-based power management and medium-voltage systems.

The data from the electrical infrastructure can be used for much more than just improving energy efficiency.
It provides information on energy consumption as well as the state of the plants themselves. This condition monitoring then enables predictive maintenance.

The interplay between software, the associated hardware, and apps from SENTRON digital offers all kinds of opportunities for making electrical energy flows transparent and fully exploiting a plant's efficiency potential.

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