

INDUSTRIAL EDGE

Greater efficiency thanks to more transparency

A production plant's cost-efficiency depends on the interaction of multiple factors. In the food and beverage industry, these include not only performance monitoring and energy efficiency but also guaranteed plant availability, short setup times, and consistently high quality – goals that all require maximum transparency throughout the entire production process.

The only way to identify deviations and critical operating states before they affect the results of production is by monitoring all of a plant's operational data. The solution is Industrial Edge, which makes it possible to acquire and analyze information for the purpose of rendering the entire production process more cost-effective and efficient. This solution is based on countless sensors like those present in practically every production step. The sensors record temperatures, monitor drives, measure levels, and verify each individual process step. They even recognize when a field device's behavior starts to change, indicating an impending failure.

In fact, this comprehensive data pool is present in every production plant, but data availability and assessment are challenging – especially when system environments differ as much as they do in the food and beverage industry.

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Becoming a digital enterprise with Industrial Edge

A major challenge the industry is facing is the fact that critical data isn't always available in the format needed, or else its quality is too low. Heterogeneous system environments frequently hinder a seamless data flow. What's more, data acquisition is often incomplete or even nonexistent due to a lack of connectivity between components from different manufacturers.

Industrial Edge greatly simplifies this challenge. Edge devices acquire and evaluate process data from a wide variety of sources. At the same time, hardware and software are always kept up to date, thanks to centralized device and application management. Data can be used in different ways depending on the structure of production. Operators can receive targeted support right at the machine in the form of detailed reports on problem sources. Evaluations that provide precise information on whether production targets are being reached are available both on the line level and factory-wide. Data can also be prepared on the field level, transferred to the cloud, and made globally available for ongoing analysis.

Transforming data into knowledge

Siemens provides plant operators with an entire range of tools that generate added value from production data. For example, they precisely analyze overall equipment effectiveness (OEE), energy consumption, and key performance indicators (KPIs).

Achieving this level of production and energy transparency typically involves several steps:

Step 1: Connecting the existing system environment.

The Industrial Edge Connectivity Suite supports all protocols that are typically used in the production area for connecting different data sources from different manufacturers, including OPC UA, Simatic S7, PROFINET, EtherNet/IP, and Modbus TCP.

Step 2: Access to historical process data.

Based on the existing plant topology, data is uniformly structured, stored, and processed on local edge devices to make it available in a standardized format, either for special edge applications or for higher-level systems.

Step 3: Greater data transparency for informed decision-making.

Special KPI, OEE, and energy analysis applications are used that can be run on specific components and machines as well as on the line and factory levels.

The system is set up with just a few clicks, after which employees in production can configure various dashboards, with no IT knowledge required. These dashboards present the data that's been identified and analyzed in a straightforward, graphical format so that specific conclusions can be drawn.



The result: Plant transparency at a glance

Once these three steps have been taken, connectivity to the individual data sources in the production plant is established and there are no more barriers to the comprehensive transparency and analysis of all production factors.

The example of a predefined OEE dashboard clearly illustrates how the graphically prepared process data contributes to making production transparent and to visualizing the effectiveness of the overall production plant or its individual areas. This is thanks to the Siemens Performance Insight app, which clearly and comprehensively compiles the OEE, KPIs, quality data, and machine statuses to provide plant operators and production managers with ideal decision-making insights.

The values identified can be visualized, for example, as a daily curve or in the context of historical data. This goes beyond a simple data display: Regression analyses and statistical methods – for example, used to calculate product output – can be used to identify specific starting points for further optimization.

The basic causes of productivity losses are also visualized: for example, reductions in the clock cycle, long setup times, idle time, and quality defects.



Full control of energy usage

The importance of environmentally safe production in the food and beverage industry is constantly growing. For many products, it's become a key competitive advantage.

Most of the field instruments used today are capable of supplying ongoing data on their electrical energy input. In addition, data on water, compressed air, and other resources provides information about ongoing consumption and therefore on the efficiency of production. This data can also be selectively prepared and graphically displayed on a dashboard.

The result is more than an overview of all the latest consumption data: The measured values can be linked to information from other systems in order to draw specific conclusions. For example, this allows operators to identify unnecessary energy consumption in standby mode or to determine the exact causes of energy spikes.

Digitalization in the food and beverage industry

In Industrial Edge, Siemens bundles edge applications, edge devices, and an edge management system to enable users to take advantage of the unlimited benefits of the data potential that's inherent in every production plant. This makes Industrial Edge and IoT solutions key technologies for creating a digital production environment along the lines of Industrie 4.0.

Industrial Edge breaks down all the traditional boundaries between a company's OT and IT. It not only permits unlimited use of all existing process and plant data, it also provides standardized access to IT systems. At the same time, IT managers can easily install additional software components via a microservice architecture and Docker container technology. This enables new application scenarios and unprecedented synergy effects between OT and IT departments.



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