White Paper
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Simplify Real-Time Electricity Monitoring in Manufacturing

EMERSON

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Using a scalable, pre-engineered solution, manufacturers can remove the complexity from energy monitoring and reduce energy cost, minimize environmental impact and improve operational efficiency.

The success of the manufacturing sector depends on many industrial processes, from the operation of machinery, production lines, and heating and cooling equipment to the generation of utilities such as compressed air and steam. However, all these essential processes are energy-intensive, directly impacting a company's environmental footprint and operating costs. Adding to this, older manufacturing facilities often feature outdated equipment and systems that are not energy-efficient and intensify the impact.

At the same time, tracking energy use is more important for manufacturers than ever. Most manufacturers have aggressive corporate sustainability initiatives and need to take bold steps to reduce waste, engage their supply chain and accelerate net-zero initiatives. To remain competitive, manufacturers must reduce utility costs, maximize operational efficiency, comply with environmental regulations and be ready for energy audits.

To achieve these goals, it is critical that manufacturers know how much energy individual assets and processes use in real time. Unfortunately, many facilities lack a dedicated way to track energy consumption and other valuable metrics, especially in key energy consuming areas. As a result, companies are investing in energy monitoring technologies and services.

Energy monitoring allows manufacturers to measure power consumption and energy usage, helping to reduce energy costs and carbon emissions. However, energy monitoring solutions and related offerings vary in complexity of design and use, which can create limitations for manufacturers.

For instance, some energy monitoring technologies require in-house engineering and programming or have complicated user interfaces. Not all companies have specialized personnel with the advanced skills needed to design systems or operate complex ones, especially given the ongoing talent shortage.

Other offerings may be difficult to integrate with existing systems and scale to other areas within a facility or other utilities and media. This inflexibility can be expensive to overcome and can prevent expanded data access.

To simplify energy monitoring, it's critical that solutions are ready to use, data is easy to access and understand, and technology can easily scale across a site. This combination of ease and flexibility makes it possible for manufacturers of all types and sizes to start monitoring electricity and gain deeper insight into energy consumption, energy costs and associated emissions.

Real-time, remote energy monitoring and management is ideal for:

- Heavy industry & manufacturing processes — automotive, tire, machine building, metalworking, stamping and forming process
- Factory automation — machine operation with combined use of compressed air and electricity
- Plastics manufacturing
- Semiconductors & electronics
- Food and beverage processing — filling, packaging, labelling and sealing, and conveying systems, machinery and refrigeration
- Pharmaceutical manufacturing — packaging and labelling machines
- Other manufacturing — electricity powering machines and lighting

Understanding the current state of energy management

There are several interrelated trends driving the need for energy monitoring and management. Rising energy prices are driving companies to look for ways to improve operational energy efficiency and optimize their energy consumption to minimize costs. An increasing focus on sustainability is causing companies to prioritize energy-efficient practices to reduce their carbon footprint and move toward net-zero emissions. And, at the same time, governmental bodies are implementing policies and incentives to promote energy efficiency and energy transition, as well as to curb emissions.

To address these factors, the energy monitoring market currently includes a range of energy monitoring technologies and services. Some are engineered in-house, such as PLC/SCADA-based energy monitoring systems. However, these DIY systems require programming and may have limited data analysis and complex visualization, and they may lack standard features and IIoT integration capabilities.

Other offerings include cloud-based applications. These often integrate with enterprise applications using software-as-a-service (SaaS) business models. Often, it is expensive to start small and can be complex to justify recurring software costs in a scalable way.

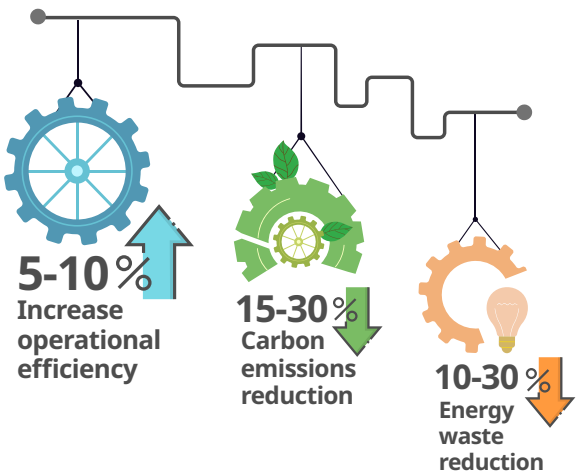
There are also energy consulting firms and energy metering vendors. Energy consulting firms offer energy audits and consulting services, which may not provide a comprehensive, automated solution that is easy to use and scale. And energy metering vendors provide energy monitoring and power management equipment typically in conjunction with a vendor-specific energy management application. This may lock manufacturers into vendor hardware and not provide solutions that can easily integrate third-party energy meters.

In comparison to these offerings, there is now a flexible, pre-engineered hardware and software solution designed to simplify the complexities of electricity monitoring while offering more standard features than other products.

With pre-installed software in RXi2-BP/UP Edge hardware with PACEdge, the Energy Manager from Emerson is a plug-and-play solution that allows manufacturers to monitor asset energy use in real time right out of the box. Its easy-to-read dashboards allow operators to gain deeper insight into energy consumption and energy costs, and associated emissions, so companies can reduce costs, minimize their environmental footprint, meet regulations and much more.

As it is highly scalable, manufacturing facilities of all types and sizes can benefit from energy monitoring. Facilities can start with a single machine or asset to showcase ROI potential and then expand to a full production line, facility and multiple sites to attain the expected ROI.

Maximizing Efficiency and Sustainability Through Proactive Energy Management



Through initiatives and proactive energy management, most facilities can reduce energy waste by 10-30% and carbon emissions by 15-30%. Additionally, most manufacturers can increase operational efficiency by 5-10% by taking a data-driven approach to energy efficiency programs based on energy monitoring and consumption insights.

Monitoring and comprehending energy usage with the Energy Manager

While simplified energy monitoring and management starts with a solution that is quick and easy to install, it's also critical that data be easy for operators to access and use.

Typical manufacturing facilities have complex processes and equipment, making it difficult to identify and address energy inefficiencies without an energy monitoring platform. In addition to complex processes and equipment, many manufacturers lack the necessary expertise and knowledge to effectively gain insights into energy efficiency and energy waste. The vast amount of data generated by machines and other assets, including their sensors, can be overwhelming to analyze and interpret.

The Energy Manager software application includes a user-friendly interface and intuitive dashboards that provide an effective way to deal with data overload.

The software interface is easy to remotely access through computer or smart device, and dashboards are visualized and displayed in real time for up to 10 end points. An end point is a physical asset that connects to and exchanges information with energy monitoring applications, such as a machine, motor or distributed electrical line. By increasing the software license, this is expandable to up to 50 end points.

The dashboards show asset-specific energy consumption, power demand, voltage- and frequency-related charts, associated energy costs and CO2 emissions. Real-time monitoring and quick access to these values can reveal opportunities to reduce energy consumption and related costs, as well as lead to more efficient, streamlined operations. By reducing energy consumption, manufacturers can also reduce carbon emissions and their related footprint.

Visual, valuable insights from predefined dashboards make energy monitoring technologies easy to adopt and use, and the collected data can support informed decision-making, closing knowledge gaps and supporting upskilling.

Operations and sustainability teams alike can remotely access energy measurements in real time and quickly visualize detailed views and related monitored and calculated values. Using this information, operations teams can identify areas of opportunity for improvement, such as idle consumption, peak loads, energy use intensity, energy costs and CO2 emissions of specific assets.

A plug-and-play solution makes it possible for companies to start monitoring energy, right out of the box.

- Connect — easily connect to energy-metering data sources through a guided, step-by-step process
- Collect — unlock and collect meaningful energy data from across machines, production lines and entire facility
- Consume — visualize energy use on the factory or plant floor with live, reliable data
- Comprehend — make decisions based on the data collected and the insights gained with energy-saving strategies

By visualizing energy consumption patterns, they can then pinpoint areas of underperformance and optimize machine schedules for maximum productivity and efficiency, such as during off-peak hours.

Energy management and sustainability teams can use precise, accurate energy consumption data and relevant local and asset-specific parameters to calculate the energy costs and associated CO2 emissions of their facility or specific assets. This can simplify utility management and streamline data collection for reporting, helping organizations keep pace with energy goals and meet regulations while identifying ways to minimize costs.

Implementing energy management solutions can require significant up-front investment, which can be challenging without a compelling ROI. By identifying opportunities for reducing energy costs and potential energy efficiency improvements that reduce costs, companies can quickly validate ROI potential and scale to prove it.

In addition to the established benefits, it's important that energy monitoring technologies offer other key advantages, including standardization, open integration, scalability and extensibility. The Energy Manager solution delivers out-of-the-box features that require no engineering or customization, with low setup and commissioning effort. It also seamlessly integrates with existing systems and enterprise applications through OPC UA, a widely accepted open standard, and connects to energy meters using open standards Modbus TCP and OPC UA.

The Energy Manager software application can also run as a stand-alone application installed in a virtualized environment, or the integrated solution can also be adapted to meet site specifications.

Monitoring media using a scalable, Floor to Cloud approach

The flexibility of a highly scalable platform can meet the unique short- and long-term needs of different manufacturing facilities. For instance, it provides the adaptability to expand to other media.

For more extensive utilities monitoring, the Energy Manager can be paired with the Emerson Compressed Air Manager, running both applications on the same edge hardware. Like the Energy Manager for electricity monitoring, the Compressed Air Manager is a ready-to-go software and hardware solution that jumpstarts the journey toward optimizing compressed air consumption. Its software provides continuous compressed air consumption data, trends and costs, from an individual machine level up to the complete line or facility.

Available from one supplier and designed to integrate with the present and future Emerson family of solutions, edge hardware and sensors, this combined multimedia monitoring solution enriches the value of data to save energy and prevent energy waste. Together, the Energy Manager and Compressed Air Manager solution provides a streamlined view of energy costs and compressed air usage of machines across a production line, factory and site.

Simplify Real-Time Electricity Monitoring in Manufacturing

This level of scalability is a hallmark of a Floor to Cloud™ approach. A Floor to Cloud approach to factory automation enables manufacturers to unlock and access trapped data that connects physical and digital processes, get visibility and insights to make data-driven decisions to optimize operations, and automate and perform tasks effectively and efficiently. As a result, it empowers manufacturers to accelerate and transform their operations, drive productivity, increase sustainable growth and unleash workforce potential.

Moving forward, IoT, AI, machine learning and advanced analytics will enable a sophisticated approach to energy management through automated utility monitoring, forecasting and prescriptive insights with Generative AI user enablement. Manufacturers that start the journey with a highly scalable and adaptable approach to monitoring now can be better prepared to take advantage of these capabilities in the future.

Simplify electricity monitoring with a scalable, ready-to-use solution that empowers manufacturers to:

- Reduce energy costs
- Decrease carbon footprint
- Meet regulations
- Make data-driven decisions
- Adapt to specific immediate and future needs
- Prove ROI

Conclusion

Manufacturers face increasing pressure to raise productivity to meet demand while reducing energy use and environmental impact. Yet industrial machinery is energy-intensive, consuming high power even when idle and with associated processes operating at suboptimal levels. To better meet efficiency and sustainability goals, operations and sustainability teams need visibility into facility energy use so they can address energy waste and inefficiencies.

A scalable, integrated solution and Floor to Cloud approach make it possible for companies to simplify the complexities of energy monitoring and start tracking use right out of the box. By monitoring asset energy use in real time, manufacturers and facilities can gain deeper insight into energy consumption and operating costs.

This level of immediate visibility can empower facility teams to reduce utility costs, lower carbon dioxide (CO_2) emissions and maximize energy and operational efficiency. In turn, manufacturers can enhance corporate sustainability by using real-time data to accelerate sustainability goals, comply with regulations and demonstrate commitment to reduce environmental impact — all of which can help companies gain a competitive advantage and contribute to a more sustainable future.

Are you ready to gain deeper insights into your energy consumption? Our team of experts are eager to meet with you to discuss your goals.
Visit this page to schedule a meeting

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