Driving Sustainability: A Green Revolution in Automotive Manufacturing with Smart Energy Monitoring Technology

In an era marked by unprecedented surges in global electricity demand and energy market volatility, smart energy management using IIoT solutions can help control CO_2 emissions, cut energy costs, and reach sustainability goals.

The first step in understanding energy costs is to monitor power consumption, for one leading Tier 1 automotive lighting manufacturer, this was achieved by retrofitting energy monitoring devices into their existing production environment.

With Brainboxes Industrial Edge Controller (BB-400) added to the distribution panel, they are now able to monitor the power consumption of individual areas, machines and processes, capture timestamps, and record historical usage data. As each unit of energy is added to the sub-meters' tally, an electrical signal is sent to the BB-400 via its IO lines, which it then converts into digital data.

By installing Brainboxes remote IO devices (ED-008 and ED-516) to monitor additional sub-meters across their facility, data on every area, every breaker in the distribution panel, and every single kWh of energy usage is linked and sent over the network to the BB-400 Edge Controller.

This plant-wide energy monitoring data is then aggregated by the BB-400, and can either be sent into the cloud or integrated into the existing factory monitoring system. As the automotive manufacturer found, complex statistical analysis is not necessary as the dashboard was customised to their specific needs, decarbonisation goals, and cost-saving targets. Detailed information on units of power

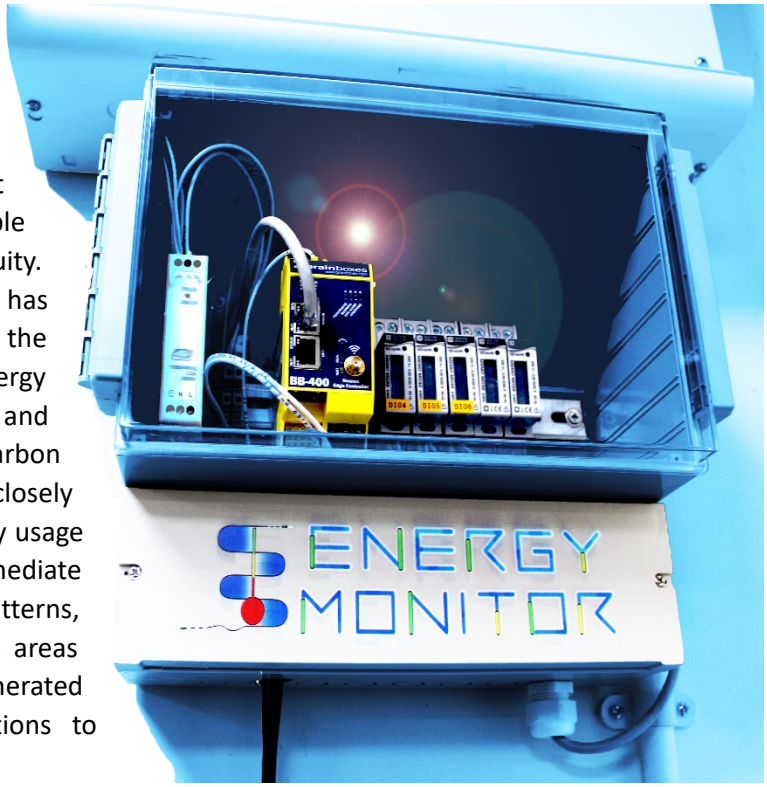
consumed, cost per kWh, and carbon footprint is gathered and aggregated by the BB-400 and presented in a centralised Energy Monitoring visual dashboard, powered by the open-source platform Grafana.

This real-time visualization allows the manufacturer to identify precisely where their resources are being expended, whilst comparing current data to historical performance metrics enables them to pinpoint potential inefficiencies to enhance their Enterprise Resource Planning (ERP).

With real-time data, the manufacturer can identify periods of peak energy demand, and adjust production schedules to avoid the simultaneous operation of high energy-consuming machines.

The ability to identify when machines are operating inefficiently or experiencing abnormal energy spikes allows the detection of potential mechanical issues and the scheduling of predictive maintenance to reduce unplanned downtime and costly repairs. By analysing historical data, the automotive manufacturer was also able to identify underutilised machines and processes. They then made informed, data-driven decisions about whether to upgrade, retire, or repurpose specific equipment, leading to more efficient resource allocation, and reducing the need for excess equipment whilst cutting capital expenditures.

In an era of evolving ESG (Environmental, Social, and Governance) regulations, reducing carbon emissions and accelerating sustainability drives has become not just a mandate but also an invaluable opportunity to enhance brand equity. The automotive manufacturer has transformed their operations through the capture and analysis of accurate energy data enabled by Brainboxes hardware and open-source software tools. Carbon tracking has empowered them to closely monitor emissions linked to electricity usage within their facility and gain immediate insights into energy consumption patterns, whilst the ability to identify specific areas where carbon emissions are generated allows them to take targeted actions to reduce their environmental impact.



As industry navigates a changing energy landscape, the importance of proactive energy management and data-driven decision-making cannot be overstated. By embracing innovative IIoT solutions, businesses can position themselves as pioneers in the green revolution. Simultaneously reducing their environmental footprint and securing a competitive edge, companies like the automotive manufacturer are not only driving sustainability but also shaping the future of responsible and cost-effective operations.