



Reducing Energy Costs: **A Three-Layered Approach to Energy Consumption Management**



Manufacturers have three primary categories that are responsible for the bulk of their costs - raw materials, energy, and labor. Out of these three, energy is often overlooked compared to the tools and resources implemented to manage and optimize raw materials and labor. With Matics, manufacturers are able to take a new approach to energy consumption management that can reduce overall costs by reducing waste and optimizing use.

The Flaws of Conventional Energy Consumption Management

Many manufacturing operations continue to implement practices that are outdated in comparison to what modern Industry 4.0 solutions can provide. They are more likely to have made progress in raw material management, but energy consumption management has lagged behind.

These practices create an environment where manufacturers are more susceptible to fluctuations in energy prices, aren't keeping up with competitors, and are losing money to energy waste day in and day out. There are two key areas where the methods used by the majority of manufacturers are falling behind.



Energy Consumption Is Assessed Based on Long-Term Averages

Most manufacturing operations are able to provide some value for the energy consumed to manufacture a certain amount of product. However, the methods they use to derive these values don't provide truly valuable insight for production planning and other important tasks.

A manufacturer might arrive at this value by taking the entire facility's energy consumption over the course of an entire month and tying it to that month's production. While this does present an image of how much energy has been used per unit of production, it doesn't make any distinction about how much of that energy actually served production directly.

Any facility will have certain utilities overhead that doesn't correlate with production efficiency in a meaningful way, and this can wash out any true insight provided by these metrics. When values do fluctuate from month to month, no actionable information can be derived from the trends.

Establishing benchmarks in this way can provide rough numbers for forecasting and accounting but can't provide the insights needed to create energy consumption strategies or to implement them on the factory floor.

Energy Consumption Isn't Monitored With Sufficient Resolution

Even without considering the timeframes that are used to assess energy consumption, there is still a significant problem with the amount of real information available. Many manufacturers will only have access to energy consumption values for the facility as a whole.

This provides only a low-resolution view of what's actually happening. Only being able to notice fluctuations at the level of an entire facility, building, or even certain systems, makes it impossible to identify sources of electricity waste, diagnose issues, and take corrective action.

In raw material management, a manufacturer wouldn't be satisfied with the total weight of raw material used. Instead, they would want to know which production lines or even individual machines are using specific amounts. This makes it possible to identify waste, and the same should be true for energy consumption.

Without a high-resolution view of energy consumption, the impact of individual production lines and machines is lost in the total values. While the overall energy consumption of the facility might fluctuate, there's no way to tie these fluctuations to specific machines in order to address the source of energy waste.

A Three-Layered Approach to Energy Consumption Management

There is significant potential for savings and improvements in energy consumption management when manufacturers take a more deliberate approach. Matics Real-time Operational Intelligence (RtOI) provides manufacturers with the insight and control needed to implement such an approach. Manufacturers are able to monitor energy consumption in real time and with the resolution necessary to implement each of the three layers of this new energy consumption management approach.

Real-time Monitoring for Energy Waste

The first layer of this energy consumption management approach is focused on identifying issues and events that lead to energy waste on the factory floor. Manufacturers need a way to know when something is causing energy use, and production achieved to drift apart.

This includes monitoring the energy use by specific production lines or individual machines. Advancements in electricity meters and IoT technologies have made the hardware side of this challenge trivial compared to the overall cost of production, so the primary focus is on how to implement monitoring properly.

At the most basic level, a manufacturer can continuously monitor the amount of energy being used compared to the production rate, whether in terms of weight or other units. Increases in this value beyond a certain setpoint indicate that something is causing additional energy use without any additional production value.

This method is particularly useful for identifying the impact of idle time. Many types of machines have a consistent energy use while idle, whether or not production is being achieved. Continuous idling uses energy without any production, driving up the energy use per production.

Being alerted to these events allows production teams to respond to disruptions on the factory floor as they happen. Whether an individual machine is malfunctioning or bottlenecks are affecting production lines, the energy waste is identified and rectified much more quickly.

Many disruptions on the factory floor impact more than just energy consumption. They can also impact efficiency and productivity, reducing overall production and causing delays. Monitoring energy use in real-time this way adds another vector through which general production problems can be identified.





Creating and Using Energy Consumption Benchmarks

With both real-time monitoring capabilities and the required resolution, manufacturers can improve their approach to benchmarking. They can now develop accurate energy consumption profiles for individual machines and specific production lines that allow for significantly greater insight.

Each machine or production line will have a distinct energy consumption profile that can be monitored over different time frames. Recording and analyzing energy consumption makes it possible to compare different machines and production lines to evaluate performance, optimize production, and identify issues.

Energy consumption can also be compared for individual work orders and across different shifts. Manufacturers are able to analyze and understand energy consumption in new ways, providing insight far beyond the overall use per month that conventional methods offer.

This insight makes it possible to establish meaningful benchmarks that can actually be used on the factory floor and when defining energy consumption management strategies. Setting a standard benchmark

for a given type of machine lets manufacturers compare performance for individual machines as time goes on, between different machines of the same type, and across different operators and shifts.

The same benefits are true for production lines. Energy consumption benchmarks help make it clear when something is irregular with the process and can be used to set goals for improvement and process optimization.

Having an accurate energy consumption profile is also vital to maximizing the impact of real-time monitoring. Machines and production lines will have fluctuations in energy use as they draw different amounts of power throughout cycles. However, having an energy consumption profile to compare production with makes it clear when fluctuations aren't within normal operating conditions.

When peaks in energy use do occur, production teams can be notified immediately to take action. There must be some cause behind the increased energy use, whether that's due to individual machine malfunctions, improper settings, or other issues.

Continuously Improving Energy Consumption

The third layer of this approach is for manufacturers to develop an ongoing strategy for energy consumption management in the same way that they do for raw material management. With real-time monitoring and benchmarks, manufacturers have the foundation needed to optimize how they manage energy consumption.

With a true understanding of energy consumption on the factory floor, manufacturers can develop energy use policies in line with their overall operational goals. Whether for cost reduction or to ensure regulatory compliance, manufacturers now have a starting point from which they can target continuous improvement.

The combination of high-resolution, real-time energy consumption data and accurate benchmarks allows manufacturers to set tangible goals and identify the changes on the factory floor necessary to reach those goals. They'll also be able to accurately track their progress and demonstrate improvements in energy consumption management with validatable data.

That validatable data plays an important role in internal accounting and forecasting. Instead of using

average energy consumption per production as measured over the course of a month or longer for the whole facility, production planning can rely on granular data to create accurate energy consumption forecasts based on anticipated demand for specific products and the use of individual machines and production lines.

That same validatable data allows manufacturers to demonstrate their energy consumption to third parties, whether in the government or partners throughout the supply chain. Certain regulations, taxes, and incentives may be tied to efficient electricity waste reduction, and many companies, whether buyers or suppliers, can have their own energy standards used to choose partners.

The ability to continuously optimize energy consumption in the same way they handle raw material management can be a considerable asset for manufacturers. Finally, they're able to handle this important cost with the precision, accuracy, and deliberateness it warrants.

The Benefits of Implementing This Approach to Energy Consumption Management

Establishing the capabilities to monitor in real-time, establish benchmarks, and optimize energy consumption management can provide a manufacturer with a variety of key benefits that improve their bottom line and enable them to thrive in a highly competitive landscape.

Direct Energy Savings

Improved energy consumption management provides an incredibly clear benefit in terms of direct energy savings. By eliminating waste and continuously improving usage, manufacturers will spend less on their utilities, both overall and in terms of cost per production.

Electricity costs, in particular, can be reduced significantly through even minor improvements, especially when dealing with major spikes. Manufacturers will have two distinct costs for electricity, consumption and demand. Of course, reducing energy use will reduce consumption costs.

The demand cost can be even more significantly impacted by improvements in energy consumption management. Along with the consumption charge for energy consumed in kWh, manufacturers have an additional demand charge for the power drawn in kW.

While contracts can vary, demand is generally calculated based on the peak power in intervals of fifteen minutes. This means that even brief spikes in power result in disproportionate increases in cost. Being able to reduce demand, in turn, has an increased benefit, along with having the ability to rapidly detect and resolve increases in power consumption.



Developing Energy Cost Reduction Strategies

Many manufacturers implement careful strategies to save on energy costs. However, they may not be saving as much as they could or as much as they think they are if they aren't working with the right data. Planning based on monthly averages with limited resolution can lead to sub-optimal strategies being put in place.

Differential tariffs are one of the main areas where manufacturers seek to reduce costs by adjusting their operations. As costs vary throughout the time of day during different seasons, manufacturers can adjust production schedules to take advantage of the lowest costs available and avoid peak load rates.

In many cases, energy consumption strategies are implemented differently for specific processes and lines within facilities. Understanding the true energy profiles of these individual elements provides the necessary information to link operations to energy costs accurately. Now, manufacturers will be able to truly optimize their cost reduction strategies instead of relying on low-resolution, inaccurate cost projections.

Establishing More Accurate Pricing

Manufacturers will already have measures in place that tie their pricing to raw materials. As the cost of raw materials changes, they are able to quickly and accurately adjust their pricing to reflect the changes in the market and the impact on their bottom line. However, manufacturers don't have these same capabilities regarding energy.

Energy costs fluctuate, and this is something that manufacturers should take into account when establishing pricing. Not only can overall energy rates vary, but the relative energy cost compared to production can change as well. With high-resolution insight and established benchmarks, manufacturers can better understand these changes and how they relate to production.

Manufacturers have always been able to identify a rise in overall energy costs but couldn't tie that to specific products. Now, they are able to see how energy consumption affects overall costs for specific products and even individual work orders. This enables the manufacturer to accurately reflect energy consumption in their pricing the same way they do so with raw materials.

Matics RtOI Lets Manufacturers Realize This Approach on the Factory Floor

The ability to monitor, analyze, and optimize energy consumption in real time and in high resolution is a significant improvement over the methods that manufacturers have used in the past. However, manufacturers need the right tools for the job if they're going to successfully change the way they handle energy consumption management.

Matics RtOI is the ideal solution for implementing this approach. The real-time system aggregates and analyzes all production data, including energy consumption data. Capturing this data provides the foundation for the additional features of RtOI to transform how manufacturers handle energy consumption management on the factory floor.

Manufacturers can define, monitor, track, and analyze an extensive range of energy consumption management KPIs, including custom KPIs to provide the most accurate insight into their processes. Energy consumption metrics, both overall and per weight or unit of production, can be monitored and assessed in terms of individual machines, production lines, work orders, shifts, operators, and other factors.

All of this real-time data and analysis serves to enable a wide range of Matics RtOI work management tools. Automated alerts can notify the appropriate production team members, technicians, and managers as soon as energy consumption metrics drift outside of set points or beyond thresholds.

These alerts contain the context and information needed for an immediate response, cutting short energy waste as quickly as possible. Entire custom workflows can be linked to events to minimize latency and maximize the impact of corrective action.

Matics RtOI also features the latest in statistical process control (SPC), a key component in addressing complex causes of energy waste. With advanced statistical analysis, Matics RtOI can trigger alerts and workflows based on the earliest signs that a process is about to experience energy consumption issues. With SPC, manufacturers can identify and target energy waste events before they even happen.

Achieve Energy Savings for Your Manufacturing Operations

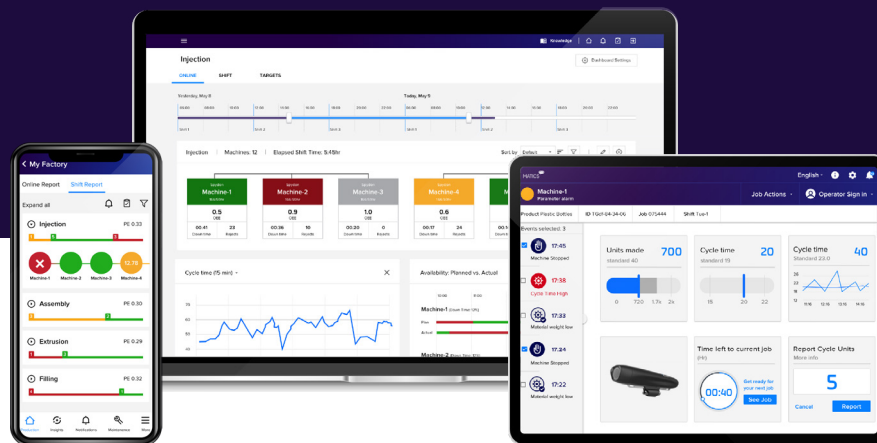
Matics RtOI combines real-time monitoring with the granular insights and work management tools needed to implement a truly modern approach to energy consumption management. Manufacturers can reduce their energy costs and ensure that they remain competitive in the rapidly changing manufacturing industry with Matics. To find out more, reach out to our team to schedule a demo of Matics RtOI today.



About Matics

Matics is a Real-Time Operational Intelligence (RtOI) solution that was designed to enable rapid industry 4.0 best practice adoption via user-friendly non-disruptive digitalization platform. The Matics RtOI solution instantly improves visibility and shop-floor management, reducing response time to critical events, and increasing OEE and profitability.

The Matics solution continually aggregates data in real-time, transforming it into knowledge manufacturers can use to optimize key metrics in their shop-floor. Matics provides manufacturers with powerful work management tools that deliver notifications when attention is needed, and enables remote tasks management, process automation, and more.



Over 80% of manufacturers do not have real-time solutions on their shop-floor. Here are a few leading manufacturers who choose to digitalize their plant with Matics:



Ready to digitalize
your shop-floor?

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