



White Paper

Monitoring how your assets use energy:

See what you've been missing

Executive summary

Organizations with major facilities have been practicing enterprise asset management (EAM) for years. Today, however, successful ones are relying more on technology and smarter asset management—a requirement for staying competitive within an uncertain economy, growing global competition, added regulatory pressures, and an aging infrastructure.

EAM's major objective has always been to maximize asset availability, reliability, and performance, while minimizing total cost of ownership for every asset in the enterprise. But EAM has also grown to include another major factor: sustainability that focuses on energy efficiency.

Companies with plants, facilities, and equipment are now facing a daunting reality: Energy consumption is eroding profit margins. As rising energy costs continue to take a larger part of the operating and maintenance budget, corporate executives must focus on the challenge of managing energy use, as well as growing public and government concerns about carbon emissions and other pollutants.

To meet that challenge, software companies are stepping up to provide advanced tools for monitoring energy consumption at the asset level to support maintenance, replacement, and process control decisions, and even behavioral change. These tools factor energy demand management with traditional asset management functions. The result is the elimination of waste for better operational efficiency, lower energy costs, and improved regulatory compliance from lower carbon emissions.

Asset costs: The role of energy

It's no secret that energy costs have been climbing over the years, and energy availability is a big uncertainty. Those facts have changed the business landscape forever as companies using sizable plants, facilities, and equipment have watched their profits fall. In fact, energy costs are taking up to 80% or more of a typical commercial or industrial company's non-labor operating and maintenance budget, according to the US Department of Energy.¹

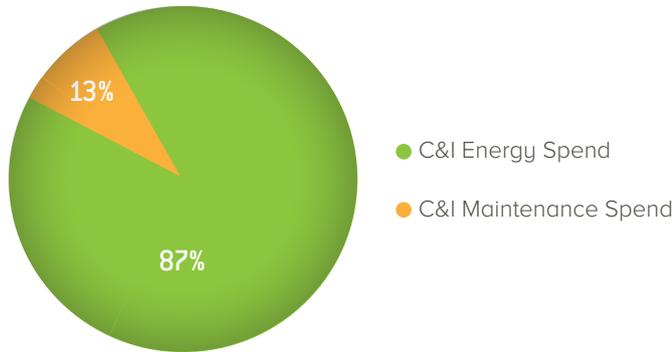


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¹ Daniel Stouffer, eZine Articles, "The New Trend Around Global Asset Sustainability."

Energy vs Maintenance Spend \$208 Billion Combined Spend in North America



Source: Dept. of Energy

Commercial and industrial companies often spend over 80% of their non-labor operating and maintenance budget on energy.

The environmental impact of consuming energy, which produces greenhouse gas emissions, is adding to energy worries. Global complexities and competitive constraints have applied even more pressure to the challenge of maintaining operational efficiency and meeting financial performance goals.

Companies are now reassessing the traditional factors they use to determine the efficiency of individual assets. It's no longer enough to look at excessive inventory, downtime, and non-value-adding paperwork to reduce waste without integrating energy performance.

A lean, best-practice approach to asset management called global asset sustainability provides a clear and comprehensive definition of efficiency.² It includes whether an asset is consuming more energy than it ought to, which has often been invisible. It allows enterprises to continuously monitor and manage the energy consumption of their assets, and drives improved financial results throughout the enterprise, all while managing assets for optimal performance.

Yet few organizations know how much energy a specific asset consumes and how well it performs.³ Asset management products that tag and record the existence of each piece of equipment with its vital statistics provide benchmark data to monitor the registered inventory against performance in real time. This vital intelligence will help organizations make those important decisions.

Managing energy efficiency

Most businesses rely heavily on energy-consuming assets such as motor-driven equipment; heating, ventilating, and air-conditioning (HVAC) systems; chillers and boilers; and materials handling and production equipment to achieve and maintain financial success. Traditionally, companies assessed three factors to determine overall equipment effectiveness (OEE): availability, performance, and quality. Their goals were to maximize uptime to ensure availability, guarantee that performance of an asset meets the specifications rating, and keep each asset's output at high-quality levels.

² Daniel Stouffer, eZine Articles, "The New Trend Around Global Asset Sustainability."

³ Daniel Stouffer, Efficient Home Energy Saving, "Pure Business Efficiency Now Relies on Asset Management Products," September 1, 2010.

But today, many companies are also focusing on a fourth important component to optimize asset performance: energy efficiency. These four major components make up the global asset sustainability index. This new measure is the key performance indicator (KPI) that allows organizations to not only gauge individual asset performance, but obtain a global, enterprise-wide view of all asset performance to minimize energy waste and the associated costs to ensure best operational, financial, and environmental performance for the company.

Asset management systems also need to facilitate continual improvement in energy performance. The systems need to combine people, processes, and technology that support energy policy and strategic planning to provide visibility for monitoring, measuring, and analyzing asset performance. The systems also need to identify nonconformities, corrective actions, and preventive measures, with auditing capabilities for conformance.

Savings from Energy Management

An asset's energy consumption may change over time under different operating and maintenance conditions, which can eat into profit margins. For example, a single 100-hp motor running continuously at 95% efficiency over a five-year period will cost a company nearly \$350,000 in energy (\$0.10/kWh). If the same motor consumes only 5% more energy under less than optimal conditions (energy waste), the motor will cost almost \$17,500 more to operate. By monitoring energy usage, an organization can view the asset's true operating costs and take action (notify maintenance and operations) when energy consumption exceeds the specifications rating.

Tools for Monitoring Energy

Asset sustainability combines energy management with existing EAM functions to proactively identify, optimize, and automate maintenance, comparing assets' performance with their energy usage across the enterprise. Best-of-breed EAM products provide tools to help organizations gather information from all their energy-consuming assets to support better decision-making about how and when to maintain, replace, or alter assets based on all relevant costs. These products also help organizations meet the requirements of environmental sustainability by reducing energy consumption and carbon emissions. Furthermore, the solutions provide alerts when asset performance is degrading—much earlier than traditional asset management systems—to allow corrective action to reduce operating and maintenance costs while reducing the risk of asset failure.

With best-of-breed asset sustainability solutions, enterprises can:

- **Maximize maintenance effectiveness:** Streamline maintenance process to extend the lifecycle of assets and improve productivity.
- **Reduce inventory costs:** Avoid unneeded inventory—or downtime resulting from inadequate inventory—by using tools to monitor and control inventory levels, and automate purchasing and inventory management.

- **Increase warranty recovery:** Track repairs eligible for warranty claims.
- **Boost equipment uptime:** Improve asset performance and extend asset life to avoid production or service operations downtime, by forecasting failures and recommending alternatives.
- **Improve reliability and risk management:** Foresee and mitigate asset reliability and regulatory risks by performing asset profiling, tracking changes to data and attributes, and forecasting performance against key performance indicators (KPIs).
- **Reduce energy consumption:** Improve asset performance by incorporating energy into the maintenance decision process at the asset level to eliminate inefficiency and reduce operational cost.

Global Asset Sustainability Example

One retailer's energy consumption data at three stores in Florida showed a distinct difference in energy cost per square foot for its HVAC chillers. Each store had two chillers of equivalent design specifications and operated at the same ambient temperature. After analyzing energy consumption at the individual asset level, the retailer discovered that the stores were employing different operating and control strategies for the two chillers. The retailer identified the best-practice chiller control strategy by benchmarking energy consumption across assets and applied it at the store with the highest consumption.

Result: 23.7% reduction in energy consumption of the chiller, amounting to approximately \$8,000 in annual savings for one asset in one store. Full enterprise benefits come as the company rolls out this practice to the two chillers in all 850 stores.

Model for Energy and Environmental Management

In reducing energy consumption, costs, and environmental impact, organizations need to:

- Identify energy conservation opportunities.
- Mitigate energy loss.
- Optimize energy demand.
- Increase stakeholder awareness.
- Identify billing anomalies.

To achieve these goals, enterprises typically follow an energy and environmental maturity model involving five attitude stages. Best-of-breed asset sustainability products promote the organization's energy and environmental maturity through these five stages:

- **Stage 1, Consume**—No comprehension of how energy and environmental management impacts operational, financial, or environmental performance, with energy waste levels of 40% or higher

- **Stage 2, Quantify**—Recognition that energy and environmental management could be improved, but unwilling to provide funding
- **Stage 3, Assess**—Understanding of fast return on investment and even more positive future returns
- **Stage 4, Optimize**—Full understanding of financial, operational, and social benefits, with internal mandate to support
- **Stage 5, Innovate**—Global view promoting innovation in energy efficiency and social responsibility to internal and external stakeholders, with energy waste dropping to less than 7.5%

Utility Bill Management

Utility bill management is a critical success factor for an effective energy management program. When these intelligence capabilities are built into an asset management system, organizations can make sound energy management decisions to achieve real cost savings. By capturing their utility bills, they can get answers to the following questions:

- Are we saving energy or increasing our consumption?
- Which building or operations are using too much energy?
- Are our energy management efforts achieving our goals?
- Are there errors in utility billing or metering?
- Are usage or metering anomalies occurring?

Five procedural techniques can help identify anomalies and achieve major cost savings:

- **Audits**—Compare bills against expected numbers, identifying anomalies such as overlapping billing periods, gaps between billing periods, missing utility bills, rate variance, and abnormal consumption from one period to another.
- **Benchmarking**—Compare energy efficiency of facilities or operations against peers or industry criteria, and easily single out buildings likely to yield large energy efficiency payoffs.
- **Load factors**—Analyze energy use among buildings to identify those with suspiciously high peak demands or large continuous loads, and resolve scheduling and time-of-use issues.
- **Weather normalization**—Monitor and correct excessive energy usage with degree-day-based monitoring and targeting. (A degree day equals an estimated unit of energy demand required for heating or cooling. If the standard indoor temperature is 65oF, each 1oF decrease or increase from this standard in average outside temperature equals one heating or cooling degree day.)
- **Peak demand analysis**—Get alerts of peak load-cutting opportunities by monitoring real-time energy consumption or identifying the billing period peak load anomaly. Also, identify the potential loadcutting assets, components, or systems.

By using asset sustainability systems with best-of-breed capabilities and following these simple procedures, enterprises can generate more revenue, minimize operational costs, and reduce environmental risks, as well as improve customer satisfaction and fend off competitive threats.

Optimizing asset performance

On average, companies waste 20% to 30% of their maintenance resources and considerably more energy in the process of supporting peak performance of their operations. In fact, energy consumption constitutes 50% of operational and maintenance budgets. But they can reduce that number using technology that monitors energy consumption and integrates it with the conditional status of their asset infrastructure. They need to know that their assets are healthy by being able to detect weaknesses and find solutions.

Best-of-breed asset sustainability systems make energy consumption visible at meaningful and actionable levels, with automatic alerts that notify the right person at the right time to take corrective action when assets are operating at an unhealthy level. These solutions integrate real-time equipment data to provide a single, holistic view of plant and asset conditions.

For example, an asset sustainability system automatically sends an engineering manager an early warning of a condition on his EAM dashboard. He assesses the KPIs, views the work order showing increased power usage compared to normal operating conditions, views asset records and maintenance history, and concludes that it may be worth changing filters early to save wear and energy usage. He then checks whether that asset is within a planned maintenance program window, and if needed parts are available. Next, he opens a labor scheduling screen and concludes that he also needs an electrical engineer. He checks for the first available date, assigns the extra person required, and keeps the assets on his watch list.

By continuously monitoring and managing asset performance, organizations can detect any weakness in assets across the enterprise and make a complete assessment to find the best solution that reduces energy consumption, optimizes the lifecycle of each asset (operational), improves uptime, saves costs, and reduces environmental risks.

To optimize asset performance, organizations also need to be able to tailor the asset sustainability system to suit their unique needs so they can focus on their business and avoid firefighting. They need to define their unique processes and fine-tune the system on the fly, creating tools to solve day-to-day business challenges.

Market leaders in industries such as chemicals, paper, food and beverage, petroleum, transportation, and healthcare are moving to reduce energy consumption and costs as a top priority. In fact, a large pharmaceutical company claims that focusing on sustainability not only demonstrates good corporate citizenship, but is a business driver and differentiator in the industry.⁴ They're using asset sustainability solutions to maximize asset availability, reliability, and performance, while minimizing energy consumption and costs for each asset across the enterprise.

⁴ Paul Thomas, "New DSM CEO Says Sustainability Is Not Just a Good Idea," Sustainable Plant , July 8, 2011.

Cases in Point: Energy and Cost Savings from Sustainability Projects

The City of Des Moines, Iowa, operates a treatment facility processing wastewater from several counties, municipalities, and sewer districts.⁵ Using an asset sustainability product from Infor™, the organization's original project objective was to reduce energy usage by about 200,000 kWh. Bill Miller, CMM, MMC, MRO, ASE-EAM system administrator, facilities management, City of Des Moines WRF, explains: "We've reduced our energy consumption by 100,000 kWh in the first six months, achieving over \$200,000 in savings—almost five times our original projections." The strategy involved identifying key integration points with the latest software upgrade, and working on continuous improvement.

The Wisconsin Manufacturing Extension Partnership (WMEP) and the Wisconsin Department of Commerce launched the Wisconsin Profitable Sustainability Initiative pilot program in April 2010.⁶ With 45 state manufacturers participating in the project, the financial and environmental benefits resulting from this program exceeded expectations. The five-year financial impacts for 87 projects included \$26.9 million in savings, \$54 million in total economic benefits, and a host of environmental advantages.

Conclusion

To stay competitive in a rapidly changing market, organizations need to incorporate asset management capabilities that optimize not only their assets' availability, performance, and quality, but also their energy consumption. With energy costs draining more than 80% of a company's operational and maintenance budget, asset sustainability that focuses on energy efficiency is becoming a top priority for many companies within industries such as chemicals, paper, iron and steel, petroleum, transportation, and healthcare to improve their operational, financial, and environmental health.

Best-of-breed enterprise asset management systems provide tools that incorporate the global asset sustainability index using four components—availability, performance, quality, and energy efficiency—to gauge individual asset health as well as the total asset health across the enterprise. These systems provide visibility into asset performance at meaningful and actionable levels and automatically send alerts to the right person at the right time to take corrective actions and preventive measures.

Companies that have added the energy consumption component to their asset management systems have realized big reductions in energy usage, a quick return on investment, and improved environmental conditions, as well as increased shareholder value and new market opportunities.

⁵ Sustainable Plant, "Wastewater Treatment Plant Pares Energy Consumption," June 28, 2011.

⁶ "WMEP Releases First Report on Wisconsin Profitable Sustainability Initiative," Wisconsin Manufacturing Extension Partnership.

About Infor EAM Asset Sustainability

Infor EAM Asset Sustainability provides a strategic view to help organizations plan and manage assets with the materials required to keep them running. It also provides day-to-day tactical support for maintenance technicians, supervisors, and plant employees. EAM Asset Sustainability is a breakthrough new solution that integrates energy management with asset management. With EAM Asset Sustainability, Infor has redefined enterprise asset management from a solution that helps enterprises maintain and extend the life of their assets to a solution that also can help lower costs by reducing energy consumption. To learn more, visit www.infor.com/eam.



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