

QUALITYDIGEST

Published on *Quality Digest* (<http://www.qualitydigest.com>)

[Home](#) > Taking the Heat Off the Bottom Line

Taking the Heat Off the Bottom Line

When reducing energy costs, reach beyond the ‘low-hanging fruit’ with ISO 50001



Patti Arms

Published: 04/15/2014

When you consider rising energy costs, the uncertain nature of foreign fuel sources (regardless of the country in which you operate), and the environmental impact associated with many fuels, then any system that helps you wisely manage your energy consumption and improve your energy performance makes good business sense.

[ad:25064]

Growing fuel demands across the globe, uncertain fuel supplies, a tight economy, and increased competition in industrial markets have led organizations to seek innovative ways to produce their goods at lower costs and use less energy to improve business sustainability. Organizations are successfully implementing ISO 50001 energy management systems (EnMS) to improve their energy performance, reduce production costs, and improve their overall competitiveness in the marketplace. An EnMS provides a structured approach for organizations to “integrate energy efficiency into their management practices, including fine-tuning production processes and improving the energy efficiency of industrial systems. The standard gives organizations and companies technical and management strategies to reduce energy, carbon intensity, costs, and improve environmental performance.”¹

Implementing an EnMS can be fast-tracked in organizations that already have a fully-functioning ISO 14001 environmental management system (EMS) in place. With a relatively modest effort, an organization can realize a maximum return by leveraging its existing EMS to develop an EnMS to rein in energy costs. This is done by integrating EnMS requirements into the existing common elements from the EMS and focusing efforts on developing and implementing the remaining 25 percent or so of the elements unique to the EnMS (see figure 1).

Market drivers

Organizations with a robust EMS in place that have identified energy consumption as a significant issue have reduced their energy costs on average by 5–10 percent. However, fierce competition within

industrial markets continues to push organizations to reduce their production costs even more. Because energy costs can represent a significant portion of production costs, going beyond the low-hanging fruit to achieve even greater reductions in energy costs and energy intensity can help an organization remain competitive in the marketplace.

In many cases, organizations, particularly those headquartered in Europe and Asia, are requiring their plants to implement an EnMS using the ISO 50001 framework. ISO 50001-certified companies include several auto manufacturers (e.g., Toyota, Subaru, Nissan, Hyundai, Daimler, Mercedes, Volvo and Volkswagen), as well as other industrial, commercial, and service leaders (e.g., IBM, Samsung, Coca-Cola, Dow Chemical, Pfizer, Bayer, 3M, Alcoa, BASF, Proctor & Gamble). Now that some of these organizations are requiring their U.S.-based plants to implement a certified ISO 50001 EnMS, the trend is gaining traction here as well. Other U.S.-based plants and organizations are seeing the benefits and proactively implementing a certified ISO 50001 EnMS. As happened with ISO 9001 and ISO 14001, it's reasonable to expect ISO 50001 certification requirements to trickle down to other U.S. plants and key suppliers in the future.

In addition, the U.S. Department of Energy (DOE) has come out in full support of the ISO 50001 standard as a “foundational tool” and “approach for U.S. industrial and commercial facilities to plan, manage, measure, and continually improve energy performance.”² A DOE official has projected that “...the ISO 50001 standard could eventually influence up to 60 percent of the world’s energy demand.”³ DOE’s Office of Energy Efficiency and Renewable Energy (EERE) and the U.S. Council for Energy-Efficient Manufacturing (CEEM) have established a voluntary [Superior Energy Performance](#) (SEP) program that requires organizations to have a certified ISO 50001 EnMS in place in order to achieve SEP certification.

Various federal and state entities and utility companies are also encouraging the implementation of energy efficiency programs through grants, rebates, matching funds, revolving loan funds, low-interest loans, and rate reductions. For example, through the Energy Independence and Security Act (EISA 2007) and the American Recovery and Reinvestment Act (Recovery Act 2009), federal funds were made available through the DOE in partnership with individual states under the [Energy Efficiency and Conservation Block Grant Program](#) (EECBG) and the State Energy Program (SEP) to develop, promote, implement, and manage energy efficiency and conservation projects.⁴ The EnMS framework can help organizations take advantage of these programs by using ISO 50001’s structured approach to identify opportunities for improvement, maximize energy savings, minimize greenhouse gas emissions, and improve sustainability.

Data collected by the DOE from its SEP program have shown that in the United States, organizations that have a certified ISO 50001 EnMS have achieved reductions in energy intensity of 6–25 percent within three years of implementation. This resulted in an annual savings of \$87,000 to \$984,000 using no-cost or low-cost operational measures. For example, during a three-year period after implementing a certified ISO 50001 EnMS, Volvo Trucks in Dublin, Virginia, improved its energy performance by 25.8 percent.⁵

EMS vs. EnMS: What’s the difference?

Both ISO 14001 and ISO 50001 are built on the plan-do-check-act (PDCA) model to achieve continual improvement. The EMS focuses on managing the risk of impacts to the environment from an organization’s activities, products, and services, such as waste generation, air emissions, energy consumption, and wastewater generation. However, the EnMS focuses *exclusively* on energy consumption and improving energy performance. The EnMS is strictly performance-based as opposed

to the risk-based EMS. Developed by leading experts in energy management from more than 60 countries, the EnMS provides a roadmap to establish proven processes to manage the supply, use, and consumption of energy for industrial, commercial, and institutional organizations to achieve energy objectives and targets. ISO 50001 helps companies zero in on their energy performance to reduce energy intensity (e.g., energy costs per produced item).

Organizations with an EMS certified to ISO 14001 may already have in place up to 75 percent of the elements required for an EnMS (figure 1). These common elements include monitoring and measurement, document control, records management, internal audits, management review, and several others. As a result, most of the effort needed to develop an EnMS can be dedicated to direct energy performance improvement activities, such as establishing an energy team, performing an energy review, identifying significant energy uses, and implementing the system.

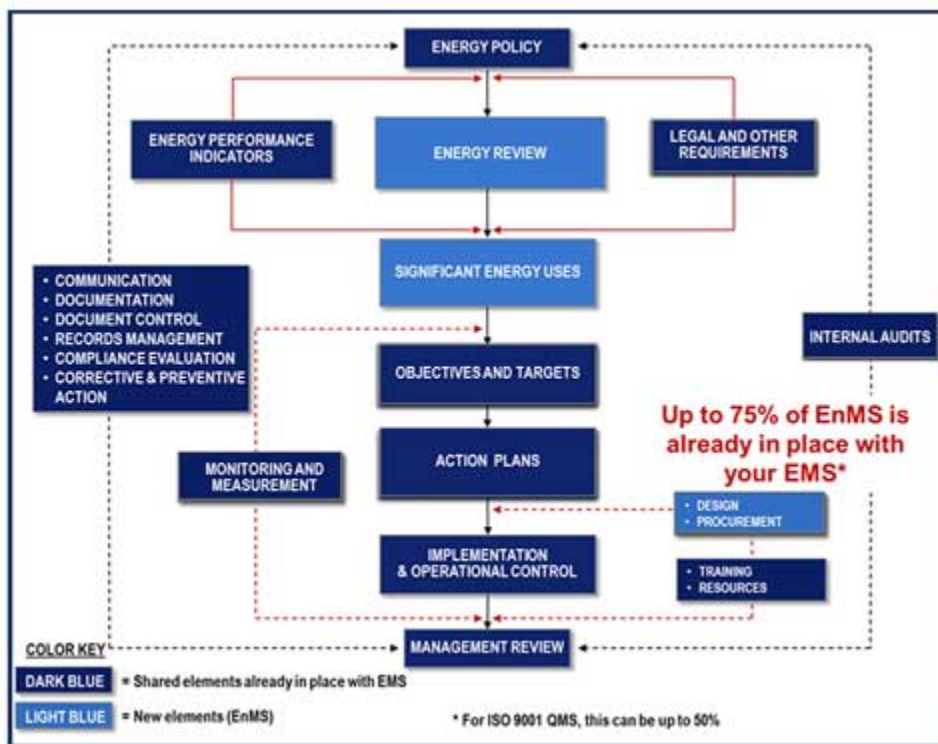


Figure 1: Example of Shared Elements of EMS and EnMS. Click [here](#) for larger image.

Although ISO 9001 quality management systems (QMS) are not as closely aligned with EnMS as ISO 14001, organizations can still leverage their QMS to gain a leg up on establishing an EnMS by using common elements and implemented procedures.

Benefits of an EnMS

1. An EnMS helps organizations manage energy performance from an overall system perspective vs. the limitations of a project-by-project approach.

An EnMS provides specific processes for energy planning using an internationally recognized best-management approach to improve energy performance. The energy review process helps an organization accomplish the following:

- Determine energy baseline
- Evaluate past trends as well as present and future energy consumption
- Establish processes for internal and external benchmarking

- Identify significant energy uses
- Identify greatest opportunities for improvement in energy intensity and energy cost savings

This proven approach has helped organizations that implemented a certified ISO 50001 EnMS to “identify operational improvements that previously had gone unnoticed.”⁶

2. An EnMS increases correlation between projected and realized results.

ISO 50001 requires appropriate energy performance indicators (EnPIs) to be established to monitor and measure energy performance and the methodology documented. This can be established as a simple metric, or the data can be normalized using a ratio or more complex model to factor out variables that are independent of energy performance.

For example, the data can be normalized by heating and cooling degree days to account for seasonal fluctuations on HVAC demand, or by production rates to measure the energy used per item produced (i.e., energy intensity) to factor out variations in production. Normalized EnPIs will help the organization more accurately monitor and measure its energy performance regardless of fluctuations in production level, shifts, climate, seasons, or other variables that may influence overall energy consumption but are independent of an organization’s energy performance. Normalized EnPIs also help the organization more accurately evaluate the effects of energy efficiency improvement initiatives by strengthening the data and performance verification processes and improving the accuracy of the organization’s data used to inform energy-related capital investment decisions. As a result, there will be a closer alignment between the projected cost-savings and returns on investment and realized results.

3. An EnMS establishes design and procurement functions that assess energy use, consumption, and efficiency over the operating lifetime of new processes or equipment.

Validated data also support the design and procurement functions. Whether an organization decides to buy a service, product, or a piece of equipment that could affect its energy consumption, the EnMS process will help set up criteria to examine energy performance and lifetime costs of purchases while maintaining the design and performance specifications for effective operation and use.

Implementing an EnMS

A readiness audit, or a gap analysis, is the first step to EnMS certification. While this audit will evaluate the readiness of an organization’s EnMS for certification to ISO 50001, it is not a certification audit. The registrar’s team performs a detailed and comprehensive review to evaluate the conformance, effectiveness, and degree of implementation of the company’s established EnMS procedures and processes, and ensures that its performance indicators are right on the mark. The auditing team validates the organization’s processes, reviews data, and identifies any missing EnMS elements or execution weaknesses. A readiness audit can provide added value to an organization’s EnMS even if certification is not the final goal. Depending on the nature and size of the organization, a readiness audit can typically be conducted in two to four days.

The time it takes to fully implement the EnMS processes depends on the robustness of the organization’s EMS and the number of system elements that will need to be developed (see figure 1). It typically takes an organization one to three years to reach the certification-ready state from initial development to implementation of its EnMS.

When the organization is ready, a third-party certification of the EnMS to verify conformance to ISO 50001 provides an enhanced level of confidence that increases recognition in the marketplace and improves corporate branding. The certification process includes a detailed review of the energy data

and projected vs. realized results. This helps validate the data used to track environmental performance, calculate returns on investment, and make capital investment decisions within an organization. If an organization has already implemented many of the EnMS requirements through a certified EMS, upgrading the EMS to EnMS will require only a relatively modest effort while generating significant returns through improved energy performance.

The bottom line

With a relatively modest effort, an ISO 14001-certified organization can leverage its EMS and significantly improve its energy performance by incorporating ISO 50001 to establish processes that will facilitate a sharper focus on energy performance. An official with the US DOE has projected that "...the ISO 50001 standard could eventually influence up to 60 percent of the world's energy demand."⁷ With these EnMS processes in place, your organization's energy performance could substantially improve, which will have a positive impact on your organization's bottom line, competitive edge, and sustainability in the marketplace.

Sources cited

1. Therkelsen, Peter, et al. ["Assessing the Costs and Benefits of the Superior Energy Performance Program."](#) Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory under contract by the Assistant Secretary for Energy Efficiency and Renewable Energy, Energy Efficiency Department, Advanced Manufacturing Office of the U.S. Department of Energy. July 2013.
2. U.S. Department of Energy, Energy Efficiency & Renewable Energy, Advanced Manufacturing Office. [Global Superior Energy Performance Partnership.](#)
3. Lambert, Gary. ["ISO 50001 Pilot Programme."](#) *ISO Focus*, quoting Paul Sheihing, acting supervisor of the U.S. Department of Energy's Energy Efficiency and Renewable Energy (EERE), Advanced Manufacturing Office, Technical Assistance, Industrial Technologies Program. May 2011.
4. U.S. Department of Energy, Energy Efficiency & Renewable Energy. [Energy Efficiency and Conservation Block Grant Program.](#)
5. U.S. Council of Energy-Efficient Manufacturing. [Achieving Superior Energy Performance.](#)
6. Therkelsen, Peter, et al. ["Assessing the Costs and Benefits of the Superior Energy Performance Program."](#) Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory under contract by the Assistant Secretary for Energy Efficiency and Renewable Energy, Energy Efficiency Department, Advanced Manufacturing Office of the U.S. Department of Energy. July 2013.
7. Lambert, Gary. ["ISO 50001 Pilot Programme."](#) *ISO Focus*, quoting Paul Sheihing, acting supervisor of the U.S. Department of Energy's Energy Efficiency and Renewable Energy (EERE), Advanced Manufacturing Office, Technical Assistance, Industrial Technologies Program. May 2011.

About The Author



Patti Arms

[Patti Arms](#) has consulted and audited organizations worldwide in energy and environmental arenas for more than 25 years. She is the environmental management system (EMS) program manager and

the energy management system (EnMS) program lead for quality registration services at [TÜV Rheinland of North America](#). She is also president and owner of PAX Energy and Environmental Systems LLC consulting firm. Arms is an RABQSA-certified lead auditor for ISO 50001 and ISO 14001, and a LEED-accredited professional. TÜV Rheinland provides ISO 9001, ISO/TS 16949, TL9000, AS9100, VDA 6.1, ISO 13485, ISO 14001, ISO 50001, OHSAS 18001, and TAPA certifications.

© 2014 Quality Digest Magazine. Copyright on content held by Quality Digest or by individual authors. [Contact](#) Quality Digest for reprint information.



Source URL (retrieved on 04/16/2014): <http://www.qualitydigest.com/inside/quality-insider-article/taking-heat-bottom-line.html>

Links:

- [1] <http://superiorenergyperformance.energy.gov/>
- [2] <http://www1.eere.energy.gov/wip/eecbg.html>
- [3] http://www.qualitydigest.com/IQedit/Images/Articles_and_Columns/2014/April_2014/EnEMS-Lrg.jpg
- [4] http://superiorenergyperformance.energy.gov/pdfs/sep_costbenefits_paper13.pdf
- [5] <http://energy.gov/eere/buildings/global-superior-energy-performance-partnership>
- [6] http://www.iso.org/iso/home/news_index/news_archive/news.htm?Refid=Ref1615
- [8] <http://www.superiorenergyperformance.net/results.html>