

# Should There Be A Separate Management System for Energy?

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Organizations that institute a systematic approach for energy management can significantly reduce their operating expenses and positively impact their bottom line. While some large international firms, 3M and BASF for example, have successfully implemented an energy management program based at the corporate level, no standardized system to allow widespread replication yet exists. To remedy the lack of a formal management system for energy, Georgia Tech has developed the Management System for Energy 2000 (MSE 2000). It is a management system defined by a standard document and destined to fill gaps not adequately addressed by other management systems.

The existing ISO 9000 and 14000 management systems are widely implemented, and many managers think they adequately cover energy issues. In truth, these standards were not developed to address energy resources and miss many unique aspects of effective energy management practice. In this article, novel aspects of MSE 2000 and the advantages it offers over competing management systems are presented. Through closer examination we will see that, contrary to widely held belief, energy management is not a subset of environmental management. Although complementary, these disciplines are different and need different management approaches.

## MANAGEMENT SYSTEMS—SHARED ASPECTS

Like all management systems, MSE 2000 shares the organizational adaptation of continuous improvement, documentation, corrective/preventive action, management review, records and training. Continuous improvement offers the prospect of always making the organization better. Documentation helps to institutionalize operating practices by providing written procedures. Corrective and preventive action promotes learning by repairing old problems and anticipating new ones. Management review makes top management a participant in the system, and this helps ensure its suitability, adequacy, and effectiveness. Records are necessary to maintain a documentary history. Training of managers and employees is mandatory to achieve continuous improvement and system stability.

## MANAGEMENT SYSTEMS—INTENT

All management systems share certain features, but one unique aspect is found by looking at their intent. Even if two systems appear similar, different intents will produce different results. The intent or purpose of three major management systems are presented in Table 1 and discussed in the following paragraphs.

### 1. ISO 9000

ISO 9000, quality management, has as its primary objective compliance with customer specifications. The management system must be

**Table 1. Management System Intent**

Management System	Primary Intent (Purpose)
1. ISO 9000 2. ISO 14000 3. MSE 2000	Compliance with Customer Specifications Compliance with Environmental Policy Direct Cost Savings

adequate to assure that the output from production satisfies customer specifications. Improved quality management then can be used as a marketing advantage.

While ISO 9000 will result in improvements to manufacturing process control and documentation, there is no overt reference to energy management. Because energy is not a direct concern of this management system, it's usage may increase, decrease or remain the same.

## **2. ISO 14000**

The primary objective of ISO 14000 is conformance to the stated organizational environmental policy. By conforming to the stated environmental policy, an organization can improve their record of compliance with prevailing environmental legislation and advance overall environmental practice. Improved public relations may result from the firm's reputation as environmentally conscientious.

## **3. MSE 2000**

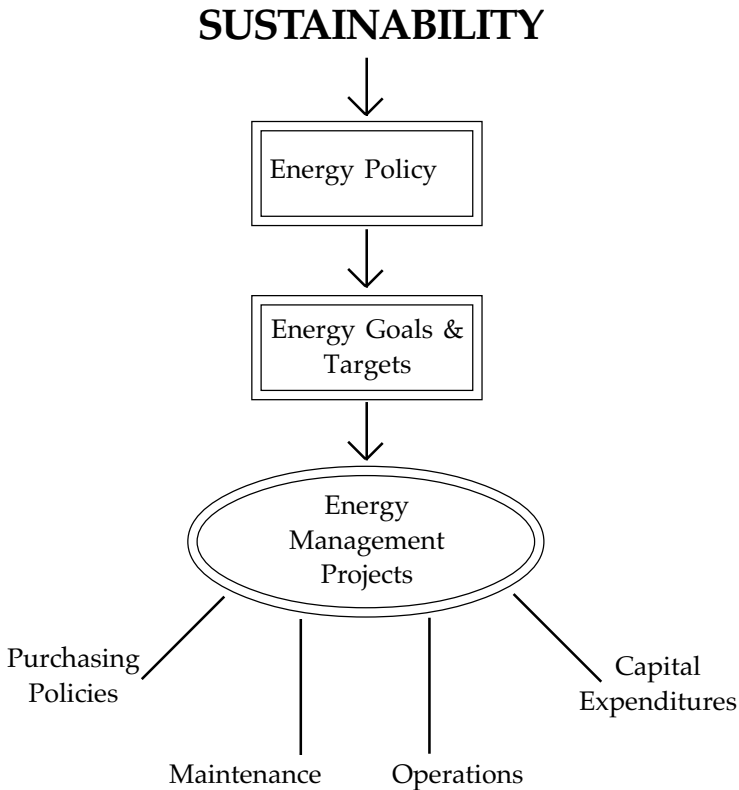
The proposed MSE 2000 standard is different from the ISO standards in that it does not focus first on conformance. Although conformance with the adopted standard and the organization's energy policy are required for registration, the incentive to achieve registration is cost savings through improved efficiency and enhanced management practice. Inefficient industrial operations persist because profit can be generated despite the inefficiencies. However, energy waste always reduces profit below the optimum. Investments in energy efficiency improvements are frequently precluded because decisions are based on first cost instead of life cycle costs.

Organizations that emphasize energy saving and efficiency often have difficulty retaining improvements because there is no process to document effective procedures and retain them. The objective of MSE 2000 is to create an organizational culture that encourages, rewards, and perpetuates energy efficiency improvements. This approach has appeal because saving energy has the effect of reducing direct operating costs and contributing to the bottom line. Since excessive energy use directly contributes to greater emissions and pollution, MSE 2000 has another

benefit of improving an organization's public image due to a reduction in environmental impact due to greater operating efficiency. If sustainability is an organizational objective, it can legitimately be integrated into the firm's energy policy as shown in Figure 1.

## ISO 14000, MSE 2000 CONTRASTS

Some critics hold that MSE 2000 is a subset of ISO 14000. By contrasting these two management systems, we can support the uniqueness of MSE 2000. Earlier it was shown that the two systems' express different



**Figure 1. Sustainability can easily be incorporated throughout MSE 2000 because the organization's energy policy drives the rest of the systems activities.**

intents. ISO 14000 is a broad-based management system intended to foster compliance with an established environmental policy. The broad focus of ISO 14000 misses some unique aspects of energy management. MSE 2000 and ISO 14000 differences are presented below:

### **MSE Team vs. Structure & Responsibility (ISO 14000)**

One problem with effective energy management results from the number of separate functions involved. Energy is bought by purchasing, used by production, and energy equipment is maintained by maintenance or engineering. Because so many groups with different objectives share the responsibility for energy, communication often breaks down and compromises effective energy management. MSE 2000 solves this dilemma with the formation of an energy management team.

The energy team is comprised of representatives from the disparate areas associated with energy. This allows a comprehensive energy management plan to be formulated that considers purchasing, maintenance, and operation in addition to capital improvements.

The ISO 14000 management team is not as strictly defined as the energy team because the functional areas impacting the environment may not be as apparent as those impacting energy. The organization must define, document and communicate roles, responsibilities, and authorities for those participating in the environmental management system. Responsibilities for jobs that impact the environment must be reviewed and documented. Because ISO 14000 seeks to address all environmental aspects and impacts, it may miss some small, yet important, energy related items. Examples of energy items missed could include policies on motor rewinding versus replacement, group lighting change outs, utility purchasing agreements, and HVAC, boiler, and air compressor maintenance.

### **Energy Profile**

MSE 2000 requires an energy profile be created for a facility. The profile is a documented overview of the organization's energy situation including facts and calculations on energy use, production data and financial information. The profile can also contain an energy balance, which ranks facility energy users from highest to lowest. The profile succinctly portrays the current energy situation and points out where improvements can be made.

ISO 14000 is much less specific on information requirements. Environmental assessments are much less defined than energy assessments so

the information required must be specified on a case by case basis. Because MSE 2000 is limited to energy, the standard is definite on these requirements.

### **Energy Assessment**

After all the relevant data has been identified and collected, MSE 2000 requires the facility be assessed to determine the current state of operation and potential for improvement. Energy assessments, referred to as audits in previous times, have been a consistent part of energy management for over 30 years. During an assessment, energy intensive processes and equipment are examined to determine if operating and maintenance practices are documented and followed and if capital improvements might be feasible. The initial facility assessment should serve as a master plan for continuous improvement in energy management.

ISO 14000 contains no specific references to facility assessments. Identification of environmental aspects and impacts is part of the planning element in the standard.

### **Facility Design**

Not only must existing operations be scrutinized for energy efficiency, but the MSE 2000 standard recognizes that new processes, operations and facilities will come on line that must be considered. Facility design is addressed in section 4.5.2 of the standard. Existing energy policy and goals must be integrated into a new design. This will assure that new systems or locations satisfy the prevailing corporate energy objectives.

The ISO 14000 standard contains no reference to new facility design. Once completed, a new facility can be integrated into the existing corporate environmental management.

### **Energy Management Projects**

Energy management projects are the vehicle used to accomplish corporate energy objectives. A primary objective of MSE 2000 energy management is continual improvement in energy practice. Improvements made through projects may consist of purchasing, maintenance, or operating practices or capital investment in equipment. By considering the entire spectrum of improvement opportunities, the reliance on only one tactic is avoided.

The ISO 14000 standard lists no methods by which continual improvement is achieved. In an ideal situation, the entire range of opportu-

nities would be considered, but there is no guarantee since the standard is mute and open to interpretation. This management approach would seem to create a wide variety of approaches. While variety might be appropriate in environmental management, energy management is well defined and broad management latitude is not needed nor recommended.

### **Energy Purchasing**

Energy purchasing is a management concern unheard of a few years back. Now, deregulation of electrical and natural gas utilities is occurring across the nation. Energy purchasing was important before deregulation, but today it is vital. Deregulation holds the prospect of removing the "obligation to serve" mandate required by regulatory agencies, and substituting an energy market where the consumer must identify, select, and define a supplier for their requirement.

Optimizing energy purchasing is a fundamental requirement of any successful energy management system. Management of energy purchasing is defined in section 4.7 of the MSE 2000 standard. It contains clauses that reference general energy purchasing, evaluation of energy suppliers, purchasing specifications, bids, and contracts. Energy purchasing is complex, and it requires a comprehensive management approach.

ISO 14000 focuses on environmental conformance and compliance. Because purchasing is not normally related to either conformance or compliance, ISO 14000 contains no specific references to purchasing.

### **Energy Accounting**

Unlike environmental efficiency that can assume an almost unlimited number of definitions, measurement of energy efficiency is quite clearly defined. Energy indexes, that is energy per some known unit, can accurately describe the efficiency at a location. Energy accounting requires that you collect appropriate energy and site data in order to calculate a suitable energy index for a location. The energy index, found by accounting for the energy at a site, is an indicator of present efficiency and can be used to measure future efficiency for determining continual improvement gains.

ISO 14000 contains no stipulations on information to be used for management. Unlike energy efficiency, each location can formulate a definition of environmental efficiency and collect the data necessary to determine it. While this lack of specificity allows ISO 14000 to be applied across a wide range of sites and situations in environmental management, its use

strictly for energy management is compromised.

### **Conclusion**

ISO 14000 is a proven international standard for effective and comprehensive environmental management. It is broad enough to also encompass energy management. However, greater command and control of energy management practices for the goal of cost reduction can be achieved by implementing the management system standard specifically formulated for energy, MSE 2000. Choosing to apply the more specific over the more general standard can mean the difference between cutting your organization's energy costs a little or a lot.

For example, the energy team at BASF Chemicals has identified over \$8 million in cost savings opportunities during the past 3 years. In this same period, almost \$2 million in cost savings has actually been achieved (~5 percent of total energy costs). Because a systematic energy management approach is followed, approximately 60 percent of the measures implemented are low cost or no cost.

MSE 2000 is a management system specific enough to address all the problems in managing a heterogeneous resource like energy. Yet, it is general enough to be applied in diverse situations such as manufacturing, commercial, hospitality, institutional, and government facilities. We submit that MSE 2000, the first ever management system adopted by ANSI to address energy resources, is synonymous with effective energy management.

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### **Georgia Tech's MSE 2000 energy standard is adopted by ANSI (American National Standards Institute)**

As a recognized standards developer, the Georgia Tech Energy and Environmental Management Center submitted its management system for energy standard to the American National Standards Institute (ANSI) for adoption a national standard. ANSI approval of the standard verifies that the principles of openness and due process have been followed in the approval procedure and that a consensus of those directly and materially affected by the standard has been achieved. The standard was formally adopted as an American National Standard on April 6, 2000.

### **MSE 2000 standard information**

With the energy management system standard officially adopted,