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Energy management systems — Guidance for the implementation, maintenance and improvement of an energy management system

*Systèmes de management de l'énergie — Lignes directrices pour la
mise en oeuvre, la maintenance et l'amélioration d'un système de
management de l'énergie*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is Technical Committee ISO/TC 242, *Energy management*.

Introduction

This International Standard provides guidance when implementing the requirements of an energy management system (EnMS) based on ISO 50001 and guides the organization to take a systematic approach in order to achieve continual improvement in energy management and energy performance. This International Standard is not prescriptive and each organization determines how to best approach meeting the requirements of ISO 50001.

This International Standard provides guidance to users with varying levels of energy management and EnMS experience, including those:

- with little or no experience of energy management or management system standards;
- undertaking energy efficiency projects but with little or no EnMS experience;
- having an EnMS in place, not necessarily based on ISO 50001;
- having experience with ISO 50001 and looking for additional ideas or suggestions for improvement.

Energy management will be sustainable and most effective when it is integrated with an organization's overall business processes (e.g. operations, finance, quality, maintenance, human resources, procurement, health and safety and environmental).

ISO 50001 can be integrated with other management system standards, such as ISO 9001, ISO 14001, and OHSAS 18001. Integration can have a positive effect on business culture, business practice, embedding energy management into daily practice, operational efficiency and the operating cost of the management system.

The examples and approaches presented in this International Standard are for illustrative purposes. They are neither intended to represent the only possibilities, nor are they necessarily suitable for every organization. In implementing, maintaining or improving an EnMS, it is important that organizations select approaches appropriate to their own circumstances.

This International Standard includes practical help boxes designed to provide the user with ideas, examples and strategies for implementing an EnMS.

Ongoing commitment and engagement by top management is essential to the effective implementation, maintenance and improvement of the EnMS, in order to achieve the benefits in energy performance improvement. Top management demonstrates its commitment through leadership actions and active involvement in the EnMS, ensuring ongoing allocation of resources, including people to implement and sustain the EnMS over time.

Energy management systems — Guidance for the implementation, maintenance and improvement of an energy management system

1 Scope

This International Standard provides practical guidance and examples for establishing, implementing, maintaining and improving an energy management system (EnMS) in accordance with the systematic approach of ISO 50001. The guidance in this International Standard is applicable to any organization, regardless of its size, type, location or level of maturity.

This International Standard does not provide guidance on how to develop an integrated management system.

While the guidance in this International Standard is consistent with the ISO 50001 energy management system model, it is not intended to provide interpretations of the requirements of ISO 50001.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 50001:2011, *Energy management systems — Requirements with guidance for use*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 50001 and the following apply.

3.1.1

commissioning

process by which equipment, a system, a facility or a plant that is installed, is completed or near completion is tested to verify if it functions according to its design specification and intended application

3.1.2

energy balance

accounting of inputs and/or generation of energy supply versus energy outputs based on energy consumption by energy use

Note 1 to entry: Where present, energy storage can be considered within energy supply or energy use.

[SOURCE: ISO 50002:2014, 3.6, modified — Deleted original Notes 1 and 2 to entry; added new Note 1 to entry]

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3.2 Abbreviated terms

EnMS	energy management system
EnPI	energy performance indicator
PDCA	Plan–Do–Check–Act
SEU	significant energy use
HDD	heating degree days

4 Energy management system requirements

4.1 General requirements

It is good practice to keep the EnMS as simple and easy to understand as possible while still meeting the ISO 50001 requirements. For example, organizational objectives for energy management and energy performance should be reasonable and achievable and aligned with current organizational or business priorities. Documentation should be straight forward and responsive to organizational needs, as well as easy to update and maintain. As the system develops based on continual improvement, simplicity should be maintained.

Defining the scope and boundaries of the EnMS allows the organization to focus their efforts and resources in energy management and energy performance improvement. When defining the scope and boundaries, an organization should not divide or exclude energy using equipment or systems unless it is separately metered or a dependable calculation can be made. Over time, the scope and boundaries may change due to energy performance improvement, organizational change or other circumstances, and the EnMS is reviewed and updated as needed to reflect the change.

Documenting the scope and boundaries of the EnMS can be in any format. For example, it may be a simple list, or a map or line drawing indicating what is included within the EnMS.

Practical Help Box 1 – Items to consider in defining scope and boundaries

Scope:

- What facilities are included?
- What operations and activities are included?
- Is energy for transport included?
- Are other media, for example, water and gas flows such as nitrogen included?
- Who is top management within the defined scope and boundaries?

Boundaries:

- What parts of the site are included?
- Are all buildings and processes included?
- Are other sites included?
- What parts of the site or locations are not included?

4.2 Management responsibility

4.2.1 Top management

Ongoing top management commitment is a critical factor in the continued success of the EnMS and the improvement of energy performance. Top management demonstrates its commitment through its leadership actions and active involvement in the EnMS. Top management needs to retain its EnMS responsibilities and should make its actions visible to employees across the organization.

Top management should understand that a fundamental requirement for demonstration of its commitment is ongoing allocation of resources – which includes people to implement, sustain and improve the EnMS and energy performance over time. One resource area that is often overlooked and needs to be specifically addressed is the means of gathering and reporting data to support the ongoing maintenance and improvement of the EnMS.

Early in the EnMS implementation process, top management should initiate ongoing communications across the organization about the importance of energy performance and energy management. A communication approach that has proven itself within the organization and the organizational culture is more likely to be effective. Initial communication can be accomplished by top management's announcement of the appointment of the management representative, the establishment of the energy team and by presenting the energy policy and the decision to implement an EnMS directly to the employees.

Energy management and energy performance improvement should align with the organization's business strategy and long-term planning and resource allocation processes.

4.2.2 Management representative

Regardless of whether the management representative has a technical background, certain capabilities are key to the success of the role. The following capabilities should be considered in the choice of management representative:

- leading and motivating personnel;
- managing or effecting change;
- communicating effectively across all levels of the organization;
- problem solving and conflict resolution skills;
- understanding energy use and consumption concepts;
- basic analytical skills to understand energy performance.

Often the management representative is the individual responsible for the operation of a process or facility.

Whether the management representative is internal or external to the organization, top management needs to ensure that the representative has the appropriate authority to fulfil their duties. Additional communications by top management with employees may be needed in order to clearly establish the authority of an external management representative.

Practical Help Box 2 – Communication of energy management responsibilities and authorities

Energy management responsibilities and authorities can be defined and communicated in a variety of ways. For example, they can be:

- included in EnMS procedures or instructions;
- incorporated into job descriptions;
- identified in a responsibility matrix;
- set forth in an energy or EnMS manual;
- included in operational and technical training, including workbooks;
- part of employee performance reviews;
- reinforced during awareness training or shift meeting presentations.

Ways that the management representative can ensure that both the operation and control of the EnMS are effective could include:

- a) scheduling regular team meetings;
- b) reviewing internal audit and corrective action results;

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- c) the use of management tools such as business scorecards and trends in energy data;
- d) reviewing of energy performance indicator (EnPI) control limit anomalies.

Integration of energy management responsibilities with the organization's performance evaluation (appraisal) system may improve EnMS outcomes by institutionalizing responsibilities.

Good practice is to have a cross functional energy management team of more than one person that includes representatives from areas that can affect energy performance. This approach provides an effective mechanism to engage different parts of the organization in the planning, implementation and maintenance of the EnMS. Membership of the team may change over time and should be based on defined roles rather than named individuals.

Practical Help Box 3 – Considerations in selecting members of the energy management team
<p>Selection of members of the energy management team (as appropriate to the organization's size and complexity) should consider the following:</p> <ul style="list-style-type: none"> — personnel representing a mix of skills and functions to address both the technical and organizational components of the EnMS; — financial decision makers or access to them; — procurement personnel; — operational personnel, particularly those performing tasks associated with SEUs; — representatives of tenants in commercial buildings, where appropriate; — individuals who can take responsibility for operational controls or other elements of the EnMS; — maintenance and facility personnel; — production or other personnel who may be already involved in improvement mechanisms such as continuous improvement teams; — individuals that will further the integration of EnMS into the organization; — people who are committed to energy performance improvement and able to promote the EnMS throughout the organization; — representatives from different shifts, where applicable; — supply chain managers as appropriate; — personnel who may not be directly working with energy uses but may be important, for example accessing critical data (utility energy bills, building management data, financial data, etc.), making changes to work practices, raising awareness.

The team approach takes advantage of the diversity of skills and knowledge of individuals. The organization should consider building energy management and improvement capability and capacity throughout the organization. This could include additional training and rotation of the management representative position and membership of the energy management team.

4.3 Energy policy

The energy policy sets the direction for implementing and improving the organization's EnMS and energy performance. The policy demonstrates the commitment of top management so that the organization is able to continually maintain and enhance its efforts to achieve improved energy performance.

The energy policy can be developed either before or after the initial energy review. In either case the energy policy should be reviewed to ensure its appropriateness to the nature and scale of the organization's energy use and consumption. Developing the energy policy before the initial energy review can provide a strong platform of management commitment on which to build the initial energy review. Developing it after the energy review can provide solid data and information on which to build a strong policy. Developing the energy policy before the energy review and then revisiting it to ensure its appropriateness to energy use and consumption afterwards is a good practice.

Whether the energy policy is made available to the public is a decision by the organization, consistent with its own priorities and needs. Once the EnMS is fully implemented and begins to mature, the policy could be made publicly available as part of an improvement to the system (e.g. the energy policy could be included in sustainability, corporate social responsibility and other annual reports, the organization's website, etc.).

Top management's commitment is required to fully integrate the energy policy into the underlying culture of the organization to ensure its continuity. As a part of an integrated management system, it may be possible to integrate an energy policy with an existing organizational policy (e.g. environmental, sustainability, health and safety, quality). Care should be taken to ensure that the energy policy is not weakened or compromised and conforms with ISO 50001 requirements.

During the initial EnMS implementation, defining the energy policy should focus on the commitments explicitly required. The commitments can be stated using terminology consistent with the culture of the organization. It is recommended to avoid lengthy policy statements that may be difficult for personnel to understand and apply. Implementation of lengthy policies can consume significant training and communication resources. The organization should avoid duplicating within the policy other components of the EnMS i.e. scope and boundaries. The policy statement itself need not include the fact that it is documented, communicated, regularly reviewed and updated as necessary, however, it includes the required commitments of ISO 50001.

The energy policy's support for the procurement of energy efficient products and services and design would not require the organization to always purchase the most energy efficient items. Support for the purchase of energy efficient products and services and design for energy performance improvement should support business productivity and longer term profitability.

In general, the energy policy does not change often. Decisions on changes to the policy are made as part of the management review process. Possible reasons to change the policy include changes in organizational ownership, structure, legal and other energy requirements, and major changes in energy uses, sources, operations or business conditions or as part of continual improvement.

NOTE Examples of energy policies are given in [Annex A](#).

4.4 Energy planning

4.4.1 General

Energy planning is the "Plan" part of the PDCA cycle of the EnMS.

Energy planning provides the foundation for developing an EnMS that is based on an understanding of an organization's energy performance. This is the step where the organization's analysis of its energy data, along with other energy information is used to make informed decisions on actions to continually improve energy performance.

Examples of the relationship between objectives, associated energy targets, action plans, EnPIs, operational control, monitoring and measurement are given in [Table E.1](#). Examples of the relationship between significant energy uses (SEUs), operational controls, competency and training, procurement, associated EnPIs, monitoring and measurement and calibration are given in [Table E.2](#).

4.4.2 Legal requirements and other requirements

Legal requirements refer to applicable mandatory requirements related to an organization's energy use, consumption, or energy efficiency.

Other requirements could refer to voluntary agreements, contractual arrangements or corporate requirements subscribed to by the organization related to energy use, energy consumption and energy efficiency.

Information on legal requirements and other requirements can be obtained from a variety of sources, such as in-house legal departments, government or other official websites, consultants, professional bodies and various regulatory bodies. If the organization already has a process to determine legal requirements, that process may be used to identify and access energy related legal requirements. The process used to identify and evaluate legal compliance should be clear and include a description of how compliance is assessed. In addition, it should establish the responsibilities for monitoring, reviewing and ensuring compliance.