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Energy management systems — Guidelines for a phased implementation

Systèmes de management de l'énergie — Lignes directrices pour une mise en œuvre par étapes

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Foreword

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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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 301, *Energy management and energy savings*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

0.1 General

It is important to engage all types of organizations and, in particular, small and medium-sized organizations (SMOs) into the broad scale implementation of energy management because of the significant potential such organizations have for energy performance improvement, associated energy cost savings and reductions in greenhouse gas (GHG) emissions.

This document is intended to enable organizations to initiate and improve energy management practices by following a systematic approach with appropriate effort given their resources and context, resulting in continual energy performance improvement.

This document provides practical guidance to undertake a phased implementation of an energy management system (EnMS), e.g. by using in-house capacity. The functioning EnMS can subsequently be extended to meet the requirements of ISO 50001. A well-planned phased implementation of an EnMS can reduce costs and the use of other resources while providing near-term success on which to build. This can help in overcoming barriers for implementation in organizations with limited resources, such as SMOs.

This document explains a phased implementation approach using twelve core elements based on ISO 50001:2018. It outlines the content of the elements and describes four different levels of maturity for each element. Annex A includes best practices for continual improvement of an EnMS by using a phased approach. An organization can select appropriate tools to find an effective and efficient approach to achieve the desired maturity of its EnMS. The element(s) and the corresponding maturity level(s) targeted depend on the organization's objectives and strategic direction. The EnMS can be integrated with other management systems to benefit from common structures.

In this document, both terms "energy performance improvement" (as defined in ISO 50001:2018) and "energy savings" are used. Energy savings is considered as a subset of energy performance improvement in this document.

0.2 Advantages of a phased implementation

Implementing an EnMS in an organization can be a challenge. Organizations can have limited resources (e.g. knowledge and availability of personnel) in order to successfully implement an EnMS. A phased implementation results in several benefits to the organization. The phased implementation described in this document offers flexibility that allows an organization to:

— decide the scope and pace of its EnMS implementation to suit available resources and organizational needs;

— decide on the elements to target and the desired maturity level(s);

— start with areas that indicate the greatest potential for energy performance improvement, return on investment or align with current operational practices;

— stimulate a positive culture towards energy management;

— deliver simple and/or low-cost energy performance improvements and associated energy cost savings, emission reductions and other benefits;

— build initial successes to increase credibility and thus secure commitment and support for further development of the EnMS;

— build a strong foundation to expand an existing EnMS towards meeting the requirements of ISO 50001.

Energy management systems — Guidelines for a phased implementation

1 Scope

This document gives guidance for organizations on establishing a phased approach to implement an energy management system (EnMS). This phased approach is intended to support and simplify the implementation of an EnMS for all types of organizations, in particular for small and medium-sized organizations (SMOs).

This document gives guidance on the use of twelve core elements with four levels of maturity for each element to establish, implement, maintain and improve an EnMS that results in energy performance improvement.

It enables the user of this document to implement a phased approach to achieve a level of energy management appropriate to its objectives and to build a strong foundation which can subsequently be extended towards meeting the requirements of ISO 50001:2018. This document is consistent with ISO 50001:2018 but does not cover all of its requirements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 50001:2018, *Energy management systems — Requirements with guidance for use*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 50001:2018 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 The maturity model approach to implementing an EnMS

4.1 Explanation and structure of the maturity model

Using a maturity model helps an organization to assess the effectiveness of its current business processes in order to follow a systematic and organized approach in achieving improved performance. The maturity model that forms the basis of this document consists of twelve core elements of energy management with four levels of maturity for each element.

The elements in this document either refer to a clause of ISO 50001:2018 or an important subclause such as energy review.

The maturity model provides a simplified, systematic framework to implement and improve an EnMS suitable to the organization's needs and capabilities by using a phased approach. It describes criteria including detailed behaviours, practices and processes. The organization initially uses the maturity

model to understand its current state and to establish initial improvement goals. Then the organization can implement EnMS improvements in phases.

As the organization progresses from its individual starting point towards the desired level of EnMS maturity, it should improve energy performance. This improved energy performance is understood as an improvement in energy efficiency or energy consumption related to energy use which can result in reduced energy costs. The twelve elements of the maturity model are described in Clause 5. For each level in an element, the given criteria describe(s) "what" needs to be in place at that level. Where not stated otherwise, the criteria are addressed to the organization. This model does not provide specific approaches on "how" the level can be achieved. The elements are divided into topics for clarity and to make it easier for the user to implement the criteria for the elements.

Based on the analysis of the current state of energy management practices, the organization can choose an appropriate speed of implementation and the desired level of maturity for each element. Whatever be the starting point, the organization needs to work on each element. It is possible that the organization needs additional resources (e.g. time, personnel, knowledge, budget).

Predictability, effectiveness and control of the EnMS should improve as the organization moves up to higher levels in each element. The maturity model provides a continuum along which progress can be made incrementally from one level to the next. The four levels represent a progression from a low level of energy management experience to a level approaching ISO 50001 conformity. The four levels can generally be described as follows.

a) Level 1: Enabling energy management: initial management support, some awareness and understanding of energy use and opportunities for energy savings, collection of some energy data (e.g. energy bills), no systematic energy management practices.

b) Level 2: Enhancing energy management: energy policy in place, formal team, conduct basic analysis of energy consumption and energy cost data, evaluate opportunities for energy savings, some systematic energy management practices.

c) Level 3: Emerging EnMS: systematic energy management practices, energy management becomes strategic, monitoring and review improved, legal compliance is part of the EnMS, the organization learns.

d) Level 4: Established EnMS: continual improvement of the EnMS and energy performance, core elements of ISO 50001 implemented, ready for gap analysis versus ISO 50001, if desired.

NOTE Reaching Level 4 for all twelve elements does not necessarily lead to meeting all the requirements of ISO 50001:2018.

When using the maturity model, the organization should consider that for each topic under an element the criteria for a certain level can include the criteria of the previous levels in a cumulative manner. Although the levels build on each other, they do not necessarily have to be implemented in four sequential steps. If, for example, the organization has planned to reach Level 3 of a certain element, it does not have to first implement Level 1, Level 2 and then Level 3. It can implement Level 3 directly, taking into account the criteria of Levels 1 and 2.

Where there are blanks in the element tables, no criteria (e.g. see Figure 1 Level 1) or no additional criteria (e.g. see Figure 1 Level 3) are required at that level. This means to maintain the criteria implemented at the previous level.

For organizations that want to enhance their EnMS, additional advice and best practices are given in Annex A. A level version of the maturity model is given in Annex B. The twelve elements of the maturity model are described in Tables 1 to 12 in Clause 5.

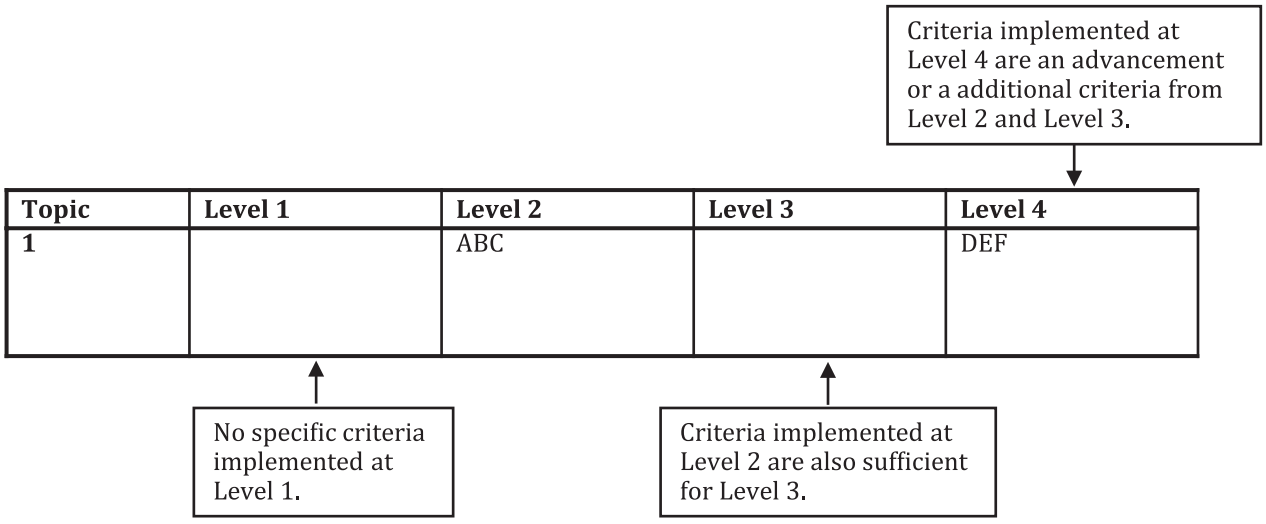


Figure 1 — Interpretation of "blanks" in the element tables

4.2 Phased implementation of an EnMS using the maturity model

4.2.1 General

The phased implementation is a project guideline consisting of elements and levels that target the desired state of an EnMS. The starting point depends on the previous experience and situation of the organization. It is also possible to focus only on some of the elements or topics individually. Nevertheless, if all elements, topics and criteria for each level are implemented, then conformity to ISO 50001 can be achieved with some additions and adjustments (see 4.2.7). An example of a practical procedure for the phased implementation is given in 4.2.2 to 4.2.7.

4.2.2 Assess the organization's initial situation

If the organization has no experience with a management system or specifically an EnMS, it is difficult to estimate the work that lies ahead. The practical guidance to a phased implementation approach provided in this document is based on the fact that every organization has some kind of energy management in place. However, perhaps it is not well structured or does not cover all elements of good practice of energy management.

It is often the case that some elements of an EnMS, such as energy performance improvement actions, are in place at some level, but are not yet systematically implemented in the context of a management system. The described elements and levels can be used as a self-assessment tool. A simple table can be created for this purpose that gives an overview of which elements and topics are already addressed in the organization and, if they do exist, at what level they are functioning with respect to the planned EnMS (see Figure 2). The organization can assess what has already been implemented and what steps still need to be taken.

Element: XYZ

Self-assessment →

		Criteria			
Topic	nothing yet	Level 1	Level 2	Level 3	Level 4
1	√	-	-	-	-
2		√	-	-	-
…	…	…	…	…	…

Figure 2 — Initial process

Self-assessment is a good starting point to show to top management where the organization stands with regard to an EnMS. Self-assessment should be used to determine the organization's status, as well as best practices both at an overall level and at the level of each element.

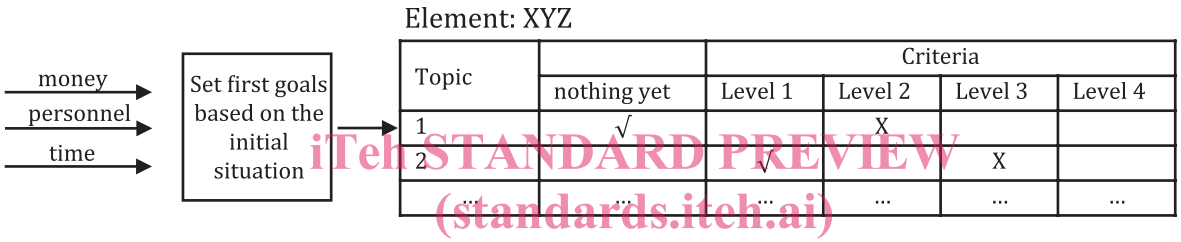
A level of a certain topic of an element is considered to be achieved when all listed criteria at that level for the topic have been fulfilled. Achievement of a particular level of a certain topic of the element requires that all lower-level criteria have been fulfilled.

The next step to pursue is determined by the goal of the organization for the phased implementation.

4.2.3 Set and confirm a goal for the phased implementation

There are several ways of defining an EnMS implementation goal. This subclause describes two useful approaches. They should be coordinated with top management so that the results and strategic direction resulting from the development of a business case (see 4.2.4) can be taken into account.

Each level corresponds to an increasing progression for each criteria of a topic under an element. The first step is to define the desired level for each topic. Before setting a goal, it is necessary to ensure that resources such as money, time and personnel are available to complete the desired element level and whether it will be advantageous to the organization. This process is presented in Figure 3.



Key

√ achieved level

X set goal

Figure 3 — Set first goals

The organization has the choice between two approaches to define and schedule the specific goals depending on the desired outcome. The first one is an individual way where the goal for each topic is set at an individual level. The second approach is to choose a given level as a goal for all topics. Figure 4 shows an example of how a simple overview can look.

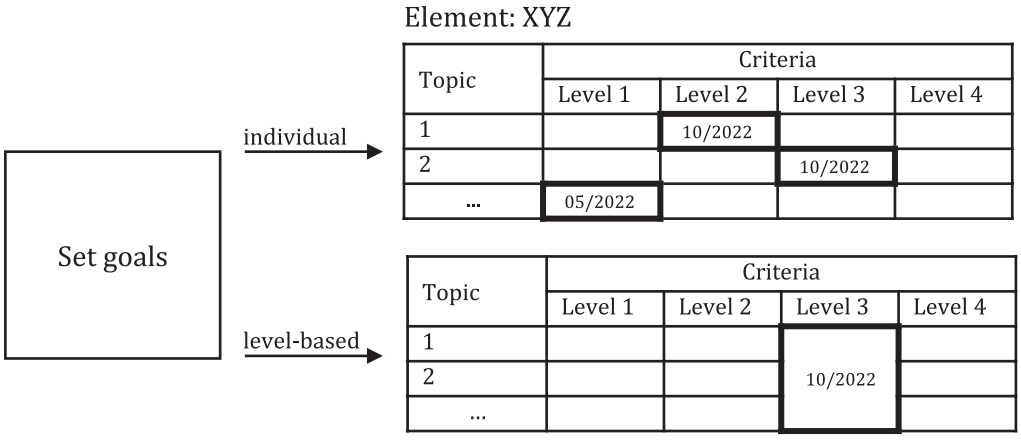


Figure 4 — Different approaches to define goals

The individual approach can suffer from the problem of interdependence between the processes described in the topics. The organization should ensure that it takes into account these interdependencies.

Given the individual approach in the example in Figure 4, Level 2 in Topic 1 and Level 3 for Topic 2 is expected to be reached in October 2022 while others are scheduled for May 2022. This also illustrates that different levels can be reached at the same time. If a level-based procedure is chosen, all topics reach the same level at the same time, e.g. in October 2022. Ultimately, the agreed goal should be adopted and approved by the top management. This ensures a certain security and support in the implementation of the necessary measures.

4.2.4 Set up a simple business case

Effective implementation of an EnMS can provide net benefits to most organizations. This means that a business case can be developed for the implementation of an EnMS. Although it is not easy to set up a very detailed business case directly at the beginning of the implementation process, it is crucial to get a first overview of potential benefits as a basis for further decisions or setting goals. Thus, a preliminary estimate of the costs and benefits and the connected investments should be developed.

4.2.5 Set up a project plan

The organization should develop a project plan with the number of elements and levels that will allow the desired goals to be achieved. The project plan should include tasks, responsibilities, resources, a timeline (e.g. GANTT chart), milestones, the aim and management reviews. The project plan should be approved by top management.

4.2.6 Monitor the implementation of the project plan

The following steps should be taken:

— regularly review ongoing project management activities;

— complete the implementation towards the goal;

— review the process;

— reassess the maturity model framework (e.g. bi-annually);

— improve and, if appropriate, set a new goal.

4.2.7 Gap analysis versus ISO 50001:2018

Achieving Level 4 in the maturity model for all elements does not mean that the organization's EnMS meets all the requirements of ISO 50001:2018. In the maturity model, core elements of ISO 50001:2018 have been selected. However, there can be other requirements to be met in order to achieve conformity to ISO 50001:2018 in addition to these. If the organization wishes to demonstrate conformity to ISO 50001:2018, a gap analysis will generally be needed.

5 Description of elements and levels

5.1 Element 1 — Context of the organization

To be aware of its own context, the organization needs to determine:

— external and internal issues such as resources, personnel capacities and energy types;

— needs and expectations of its interested parties such as legal requirements and agreements with suppliers.

External and internal issues as well as the needs and expectations and associated risks and opportunities that are relevant to the EnMS should be considered by the organization. Building on that analysis, the organization can take action to address identified opportunities (e.g. external funding of energy performance improvement actions such as incentives and subsidies) and risks (e.g. insufficient resources to implement the EnMS) in order to achieve the best possible outcome from its EnMS.

The organization should determine how legal requirements and other requirements apply to its EnMS. Common business practices in the industry sector in which the organization functions can also affect the design and implementation of the EnMS. The criteria related to the element "context of the organization" are shown in Table 1.

The content of this element relates to ISO 50001:2018, 4.1, 4.2 and 6.1.

Table 1 — Context of the organization

Topics	Criteria			
	Level 1	Level 2	Level 3	Level 4
Context	Create some awareness within the organization about energy-related environmental and other impacts.	Collect information about energy-related environmental and other impacts within the organization.	Determine energy-related external and internal issues that affect the organization's ability to improve energy performance.	Top management ensures that the energy-related needs and expectations of the relevant interested parties are determined.
Risks and opportunities	—	—	Identify the risks and opportunities associated with external and internal issues that affect the organization's ability to improve energy performance.	Top management ensures that risks and opportunities associated with the energy-related needs and expectations of interested parties are determined in order to ensure that the EnMS achieves its intended outcomes. Top management ensures that measures to address the determined risks and opportunities are established. The organization determines changes in external and internal issues and associated risks and opportunities that are relevant to the EnMS and energy performance improvement.

Table 1 *(continued)*

Topics	Criteria			
	Level 1	**Level 2**	**Level 3**	**Level 4**
Legal requirements and other requirements	Create an awareness about the applicable legal requirements and other requirements related to energy.	—	Determine how legal requirements and other requirements apply to the organization's EnMS.	Establish a system to apply legal requirements and other requirements throughout the processes of the EnMS. Review at defined intervals the organization's legal requirements and other requirements.

5.2 Element 2 — Leadership

It is essential that top management demonstrates its leadership and commitment with respect to continual improvement of energy performance and effectiveness of the EnMS. In this element, the tasks of top management are described to demonstrate ongoing engagement and commitment. An energy policy gives evidence of the support and commitment of the leadership to implement and improve the organization's EnMS and energy performance.

Top management should assign the responsibility to at least one person for leading the implementation of an EnMS. Depending on the size and complexity of the organization, the person(s) to whom the responsibility is assigned should form a team to execute the necessary tasks. In this document, the term "energy management team (EnMT)" is used although a single person can perform the role of the team in some organizations. The EnMT should comprise personnel representing different functions of the organization forming an interdisciplinary team. This helps to get a broader view of the energy-related topics within the organization and to promote acceptance of the EnMS.

The responsibility and authority of the EnMT should be set out clearly by top management. This can be greatly facilitated if top management supports resource allocation within the organization for the formation of the EnMT. Active involvement of the relevant personnel who can impact energy performance or the EnMS is essential for a successful implementation of an EnMS. The criteria related to the element "leadership" are shown in Table 2.

The content of this element relates to ISO 50001:2018, 4.3, 4.4, 5.1, 5.2 and 5.3.

Table 2 — Leadership

Topics	Criteria			
	Level 1	**Level 2**	**Level 3**	**Level 4**
	Top management:	**Top management ensures that:**	**Top management ensures that:**	**Top management demonstrates leadership and commitment by:**
Energy policy	Provides verbal support for energy management. Ensures that informal policies or commitments relating to energy management are in place.	An energy policy is established.	The energy policy includes a commitment to continual improvement of energy performance and the EnMS.	Ensuring that the energy policy is periodically reviewed and updated as necessary. Ensuring that the energy policy is compatible with the strategic direction of the organization.