



Adopt the ISO High Level Structure (HLS), common for all ISO standards, to ensure compatibility with other ISO Management System standards.

Ensure that core concepts of 2011-edition are retained, such as:

Continual improvement of energy performance; focus throughout the standard to improve energy efficiency, energy consumption and energy use;
Include the necessary energy specific topics related to energy performance such as energy data, monitoring, measurement, analysis and evaluation.

Since ISO 50001:2018 applies the HLS, it follows the same structure as other widely applied ISO standards, such as ISO 9001 and ISO 14001. This simplifies integration with other management systems.

Users familiar with ISO 50001:2011 will recognize that most of the requirements of the ISO 50001:2011 are continued in ISO 50001:2018. This is particularly the case for the more energy specific elements and requirements, which is not a surprise with the stated objective for the revision. There are some new and revised requirements, most of them due to changes introduced by the HLS. However, there are also some other energy specific changes, mainly to foster clarifications to the requirements based on experience from use of the 2011-edition.

Key changes in ISO 50001:2018 compared with the 2011-edition
These are some of the changes to consider:

1) Changes due to the adoption of HLS

New clause for understanding the organization and its context (4.1)

An organization shall determine external and internal issues relevant to its purpose and that affect its ability to achieve the intended outcomes of its energy management system (EnMS) and improve its energy performance. This can be considered as a high level understanding of influential factors affecting, negatively or positively, energy performance and the EnMS of the organization.

New clause for systematic determination of the needs and expectations of interested parties (4.2)

The intent is to use the contextual information to identify the interested parties relevant to energy performance and the EnMS, and their needs and expectations (requirements) from a high-level perspective.

Strengthened emphasis on leadership and top management commitment

Clause 5.1 includes new demands to actively engage and demonstrate leadership for the effectiveness of the energy management system.



Risk and opportunity management

Clause 6.1 requires to determine and where necessary, take action to address any risks or opportunities that may impact (either positively or negatively) the ability of the management system to deliver its intended results.

Note that considerations of risk and opportunities are part of the high-level strategic decision-making in an organization. By identifying risks and opportunities when planning the EnMS, an organization is able to anticipate potential scenarios and consequences so that undesired effects can be addressed before they occur. Similarly, favourable considerations or circumstances that could offer potential advantages or beneficial outcomes can be identified and pursued. This process can be regarded as complementary to 6.3 "Energy review", which is a more detailed operational review in order to control and improve the energy performance.

Competence (7.2)

Requires an organization to determine the necessary competence of person(s) doing work under its control and that affects its energy performance and EnMS. In addition to evaluate effectiveness of actions taken to acquire necessary competence.

Extended requirements related to **communications (7.4)**

- Includes also external communication, not solely internal communication.
- It is more prescriptive in respect of the "mechanics" of communication, including determination of what, when, how and who to communicate and with whom to communicate.
- Requires that communicated information shall be consistent with information generated within the EnMS.

Operational planning and control (8.1)

Some add-ons in the requirements to be noted:

- Control of changes and review the consequences of unintended changes (from HLS)
- Ensuring the control of outsourced significant energy uses (SEU) or processes related to SEUs
- Documented information to be kept to the extent necessary to have confidence that processes have been carried out as planned (from HLS)

Monitoring, measurement, analysis and evaluation of energy performance and the EnMS (9.1)

Additional requirements:

- required to determine methods for monitoring, measurements, analysis and evaluation



- Unambiguous requirements for documented information, both from investigation and response after deviations in energy performance as well as from results from monitoring and measurements

Management review (9.3)

Some additional inputs and outputs to be considered for the energy management review.

Inputs:

Changes in external and internal issues and associated risks and opportunities that are relevant to the EnMS

Outputs:

The EnPI(s) or EnB(s);

Objectives, energy targets, action plans or other elements of the EnMS **and actions to be taken if they are not achieved**

Opportunities to improve integration with business processes.

The improvement of competence, awareness and communication.

Improvement (10)

Nonconformity and corrective action (10.1)

Preventive action removed.

Continual improvement (10.2)

The organization shall demonstrate continual energy performance improvement

Energy performance is a key element integrated within the concepts introduced in this document in order to ensure effective and measurable results over time.

Energy performance is a concept which is related to energy efficiency, energy use and energy consumption. Energy performance indicators (EnPIs) and energy baselines (EnBs) are two interrelated elements addressed in this document to enable organizations to demonstrate energy performance improvement.

Energy performance improvement can be demonstrated in several ways, such as:

- a) reduction in normalized energy consumption for the scope and boundaries of the EnMS;
- b) progress toward the energy target(s) and management of the SEUs.

It is recognized that improvements are achieved based on the priorities of the organization.



Examples of continual energy performance improvement include, but are not limited to, the following.

- Total energy consumption decreases over time under similar conditions, e.g. a commercial building in a region where the temperature does not vary significantly.
- Total energy consumption increases, but the measure of energy performance as defined by the organization improves. In this case, a simple ratio where there is one relevant variable and no baseload.
- Equipment has a predicted reduction in energy performance as it ages. A delay or reduction in the performance reduction curve due to proper operational and maintenance controls can demonstrate improved energy performance as defined by the organizational EnPIs.
- In resource extraction industries where energy performance tends to decline as resources are depleted, e.g. in a mining facility where the depth and production both vary, reducing the rate of decline relative to the EnB can be considered a performance improvement.
- In most situations and organizations, there are multiple relevant variables requiring normalization, e.g. a dairy producing three different products (milk, cheese, and yogurt) and affected by weather.

2) Changes that are specific to energy management

The Scope (4.3)

- Explicit that energy types within the scope and boundaries of the EnMS shall not be excluded.
- Organizations shall ensure that it has the authority to control its energy efficiency, energy use and energy consumption within the scope and boundaries

Energy review (6.3)

Clarified process related to significant energy uses (SEU) to make a more logic "flow" and connected criteria: Identify SEUs => For each SEU define the relevant variables, current energy performance and identify persons that influence or affect the SEU

**Energy performance indicators (6.4)**

Some amendments:

- Determined energy performance indicators (EnPIs) shall enable the organization to demonstrate energy performance improvement
- When the organization has data indicating that relevant variables significantly affect energy performance, such data shall be considered to establish appropriate EnPI(s) to make sure the EnPI is "fit for purpose"
- The EnPI value(s) shall be retained as documented information. (Note: As also required in 2011, the method for determining and updating the EnPIs shall be documented)

Energy baseline (6.5)

Changes to be noted:

- Where the organization has data indicating that relevant variables significantly affect energy performance, the organization shall carry out normalization of the EnPI(s) and corresponding energy baseline to compare energy performance changes.
- New definitions for "static factor", "relevant variable" and "normalization"
- The baseline shall be revised when there are "major changes to the static factors".

Planning for collection of energy data (6.6)

This term replaces the "energy measurement plan" in the 2011-edition. Add-ons are:

- Explicitly states that "The plan shall specify the data which is necessary to monitor the key characteristics and state how and at what frequency the data shall be collected and retained".
- Explicitly addresses for what "areas" data shall be collected: "Data to be collected (or acquired by measurement as applicable) and retained as documented information shall include:
 - the relevant variables related to SEUs;
 - energy consumption related to SEUs and to the organization;
 - operational characteristics related to SEUs;
 - static factors, if applicable;
 - data specified in action plans.
- The energy data collection plan shall be reviewed at defined intervals and updated as appropriate

Some other changes to be noted

Design (8.2)

This is to a large extent similar to 4.5.6 in the 2011-edition, but the following amendment should be noted: Explicitly states that performance over the planned or expected operating lifetime shall be looked at when considering energy improvement opportunities and operational control in the design of new, modified and renovated facilities, equipment etc. that can have a significant impact on its energy performance.

Procurement (8.3)

This is to a large extent similar to 4.5.7 in the 2011-edition, but the following amendment should be noted:

It is explicitly required that specifications are defined (as applicable) for the procurement of equipment and services, but now also for purchasing of energy.

Chapter 3 Terms and definitions:

40 terms are defined vs 28 in the 2011-edition.

18 terms are new. 13 of the new terms are adopted from the HLS, while 5 are new energy specific terms

The 5 energy specific terms are: "energy performance improvement", "static factors", "relevant variables", "normalization" and "energy performance indicator value (EnPI value)". These should be noted as they help provide clarity.

5 terms from 2011-edition have been discontinued. These are: "energy services", "correction", "preventive action", "record" and "procedure"

The HLS does not include a specific clause for or refer to the term "Preventive action". However, the concept of preventive action is considered to be implicitly embedded in the standards (e.g. through 4.1, 4.2, 6.1)

"Documented information" is now the term used as replacement of 'Documents' and 'Records'

The term "Management representative" is no longer used, however all responsibilities addressed to this role in the 2011-edition is now addressed to the energy management team

3.4.6**Energy performance improvement**

Improvement in measurable results of *energy efficiency*, or *energy consumption* related to *energy use*, compared to the *energy baseline*

**3.4.8****Static factor**

Identified factor that significantly impacts *energy performance* and does not routinely change.

Note 1 to entry: Significance criteria are determined by the *organization*

EXAMPLE Facility size; design of installed equipment; number of weekly shifts; range of products.

3.4.9**Relevant variable**

Quantifiable factor that significantly impacts *energy performance* and routinely changes.

Note 1 to entry: Significance criteria are determined by the *organization*.

EXAMPLE Weather conditions, operating conditions (indoor temperature, light level), working hours, production output.

3.4.10**Normalization**

Modification of data to account for changes to enable comparison of *energy performance* under equivalent conditions

3.4.5**Energy performance indicator value****EnPI value**

Quantification of the *EnPI* at a point in or over a specified period of time.