



Lawrence Berkeley National Laboratory

ISO 50001:2011 to 2018 Transition Guide

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Introduction

As a certified ISO 50001 organization, you should be aware of recent changes made to the ISO 50001 standard. The International Organization for Standardization (ISO) requires all standards be reviewed every five years and in this second edition of ISO 50001, published in August 2018, there are several noteworthy changes. ISO 50001:2018 is available through the [Georgia Institute of Technology](#).¹

Although the updates to ISO 50001 do not significantly change the functionality of your energy management system (EnMS), you will want to make sure your organization understands the changes made to this edition, and updates any processes or documentation necessary to meet the requirements of this second edition. We recommend you review this document and the updated standard with ample time before your next planned certification.

As stated by ANSI in their [article](#)² about the 2018 version of ISO 50001, many of the changes made to ISO 50001 reflect the adoption of requirements for all ISO management system standards, known as the “High-Level Structure,” (HLS) which provides common core text and terms and definitions. The HLS is intended to ensure a high level of compatibility across the various ISO management system standards, including ISO 14001 on environmental and ISO 9001 on quality management systems.

Furthermore, ISO 50001:2018 now places a stronger emphasis on incorporating the context and business objectives of an organization into its energy management system, clarifies the role of top management, and features the Plan-Do-Check-Act (PDCA) cycle for continual improvement. ISO 50001 is also now better integrated with the strategic direction and management practices of the organization.

Other changes include some new definitions. One key new definition is “energy performance improvement,” which has been added with its related requirements. In addition, the concepts of normalization of energy performance indicators and associated energy baselines has been added.

ISO 50001:2018 was developed by ISO Technical Committee (TC) 301, which focuses on energy management and energy savings, for which the US holds the position of international Chair, Co-Secretary with SAC, ISO’s member for China, and convener for the working group responsible for development of ISO 50001. US delegates from the Technical Advisory Group (TAG) to ISO/TC 301 worked to ensure US interests were represented in the 2018 update of ISO 50001. For more information or to join the US TAG please contact the US TAG Administrator, Deann Desai.³

To help you understand the changes, DOE, LBNL, and the US TAG have created a section-by-section comparison of the differences between the 2011 and 2018 versions of ISO 50001. This comparison will help you identify and analyze the changes made to the standard. Your organization should review ISO 50001:2018 closely to make the appropriate changes that ensure conformance to the new version. If you have any questions about this document, please contact the US TAG Vice-chair, Peter Therkelsen.⁴

¹ https://epay.gatech.edu/C20793_ustores/web/classic/product_detail.jsp?PRODUCTID=4323

² <https://blog.ansi.org/2018/09/changes-iso-50001-2018-energy-management-system/#gref>

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Section by Section Changes

This document targets organizations that are already ISO 50001 certified and those that want more information on the changes between ISO 50001:2011 (2011 standard) and ISO 50001:2018 (2018 standard). The best value in using this document will be gained when it is used in conjunction with the 2018 standard.

The most significant structural change in the 2018 standard is that what was one section in the 2011 standard, Section 4 Energy management system requirements, is now separated into seven sections:

- **Section 4: Context of the organization**
- **Section 5: Leadership**
- **Section 6: Planning**
- **Section 7: Support**
- **Section 8: Operation**
- **Section 9: Performance evaluation**
- **Section 10: Improvement**

In this document the main changes in each section are explained and details about those changes are provided. The text for each change includes the number and name of the section as it appeared in the 2011 standard, the number and name of the section as it appears in the 2018 standard, a summary of the change that was made, and recommended actions to update your EnMS to the new standard.

In making recommendations, this document assumes the user has a fully conformant ISO 50001:2011 EnMS. Any recommendations are not intended to be definitive and it is critical that all users review and evaluate the new requirements in the context of their organization, existing EnMS and energy-related processes. Ultimately, it is the user's decision about what actions are needed to meet ISO 50001:2018 requirements based on an understanding of the new and changed requirements and the status and details of their own EnMS.

ISO 50001:2018 - Section 3 - Terms and definitions

In general, the terminology of the standard changed to improve alignment with other ISO management system standards (e.g. ISO 14001, ISO 9001, ISO 22000, etc.). As part of this alignment, some new terms have been introduced, and others have been deleted. Each of these are discussed in detail below. In addition, the standard makes it clear that the terms used by an organization's EnMS do not need to match the standard exactly (see Annex A.3 in the 2018 standard). For example, an organization will not need to go through its documentation to change "boundaries" to "boundary" just because the term changed in the standard. In one organization, the "energy management team" (see section 3.2.5 in the 2018 standard) may be called the "energy team," while in another organization it may be called the "continual improvement team." The important point is that the terms used in your EnMS can be different from the terms used in the standard; however, the definitions of those terms cannot vary. If your EnMS has copied without modifications the 2011 standard definitions into your EnMS documented information, then the definitions should be updated to the 2018 standard wording.

Followed by each of the sections are tables clarifying the changes to the terms and definitions. Items in blue are new to the 2018 standard, items in red were removed for the 2018 standard, and items in black had a change between the two versions of the standard. Terms defined by ISO's high-level structure (HLS) for management system standards are noted with "HLS" in parentheses following the term.

2011 Section #	2011 Term	2018 Section #	2018 Term	Notes on Changes from 2011 to 2018	Recommended Actions
3.10	boundaries	3.1.1	boundary	Term is now singular. Definition has been modified to remove "site limits" and "as defined by the organization."	This change is minor. No substantive changes to the definition that might need to be addressed.
		3.4.12	competence (HLS)	New term clarifies what is meant by "competence."	Recommended actions for this change are discussed in the 'Support' section under ISO 50001 2018 Section 7.2. Your EnMS should recognize that competence can be attained through a variety of methods, including training.
		3.3.2	conformity (HLS)	New term	No substantive changes to the definition that might need to be addressed.
3.2	continual improvement	3.4.16	continual improvement (HLS)	"Recurring process" is now "recurring activity." "...enhancement of energy performance and the EnMS" is now "enhance performance." NOTE 1 replaced. Note 2 deleted. Note now states that continual improvement refers to both energy performance and the EnMS.	At a minimum, your EnMS should recognize that both continual improvement of energy performance and continual improvement of the EnMS are the intended outcomes to be demonstrated.
3.3	correction			Term has been deleted. The concept has not been deleted. It is part of the corrective action requirements.	No substantive changes to the definition that might need to be addressed.
3.4	corrective action	3.3.4	corrective action (HLS)	"Detected nonconformity" is now just "nonconformity." All 3 NOTES are deleted.	This change is minor. No substantive changes to the definition that might need to be addressed.

2011 Section #	2011 Term	2018 Section #	2018 Term	Notes on Changes from 2011 to 2018	Recommended Actions
		3.3.5	documented information (HLS)	New term. Replaces "documentation," "documents" and "records" in the requirements. The standard now uses "retain documented information..." to mean records, and "maintain documented information" to mean documentation (other than records) that needs to be kept up to date.	No substantive changes to the definition that might need to be addressed. Recommended actions for this change are discussed in the 'Support' section under ISO 50001 2018 Section 7.5.
		3.4.14	effectiveness (HLS)	New term	No substantive changes to the definition that might need to be addressed.
3.5	energy	3.5.1	energy	"...and like media" is replaced by "...and similar media" NOTE 2 is deleted	This change is minor. No substantive changes to the definition that might need to be addressed.
3.6	energy baseline	3.4.7	energy baseline	NOTES were changed. No other changes to definition.	This change is minor. No substantive changes to the definition that might need to be addressed.
3.7	energy consumption	3.5.2	energy consumption	No changes, only section numbering change.	This change is minor. No substantive changes to the definition that might need to be addressed.
3.8	energy efficiency	3.5.3	energy efficiency	"commodities" was added to definition. "theoretical energy" is deleted from EXAMPLES.	This change is minor. No substantive changes to the definition that might need to be addressed.
3.9	energy management system EnMS	3.2.2	energy management system (EnMS)	"energy target" added to definition. "procedures" replaced by "action plans."	This change is minor. No substantive changes to the definition that might need to be addressed.
3.10	energy management team	3.2.5	energy management team	"authority" was added. "energy management system activities" replaced by "energy management system."	The responsibilities and authorities of the energy management team are explicit. This change is discussed in the 'Leadership' section under ISO 50001 2018 Section 5.3.

2011 Section #	2011 Term	2018 Section #	2018 Term	Notes on Changes from 2011 to 2018	Recommended Actions
3.11	energy objective	3.4.13	objective (HLS)	Term has been replaced with "objective." Notes have been added. The notes make it clear that objectives are not only for energy performance, but can be for the entire EnMS and can be strategic, tactical, or operational.	The change in definition allows for a broader set of objectives. Recommended actions for this change are discussed in the 'Planning' section under ISO 50001 2018 Section 6.2.
3.12	energy performance	3.4.3	energy performance	"results measured against the policy" was deleted in NOTE 1	This change is minor. No substantive changes to the definition that might need to be addressed.
		3.4.6	energy performance improvement	New term. The definition relates energy efficiency, energy consumption, energy use, and energy baseline.	Recommended actions for measuring energy performance improvement are covered in 'the 'Performance Evaluation' section under ISO 50001 2018 Section 9.1
3.13	energy performance indicator	3.4.4	energy performance indicator	"quantitative value or measure" replaced with "measure or unit"	This change is minor. No substantive changes to the definition that might need to be addressed.
		3.4.5	energy performance indicator value	New term to define the concept of the value assigned to an energy performance indicator	This change is minor. No substantive changes to the definition that might need to be addressed.
3.14	energy policy	3.2.4	energy policy	"overall intentions and direction" replaced with "overall intention(s), direction(s) and commitment(s)"	This change is minor. No substantive changes to the definition that might need to be addressed.
3.15	energy review	3.5.5	energy review	"determination of energy performance" replaced with "analysis of energy efficiency, energy use and energy consumption." "analysis...leading to..." now includes "SEUs" (significant energy uses). NOTE was deleted.	This change is minor. No substantive changes to the definition that might need to be addressed.

2011 Section #	2011 Term	2018 Section #	2018 Term	Notes on Changes from 2011 to 2018	Recommended Actions
3.16	energy services			Term has been deleted	No substantive changes to the definition that might need to be addressed.
3.17	energy target	3.4.15	energy target	Definition has been simplified to "quantifiable objective of energy performance improvement" A new NOTE was added to allow for energy targets to be included within objectives.	This change is minor. No substantive changes to the definition that might need to be addressed.
3.18	energy use	3.5.4	energy use	"manner or kind of" is deleted.	This change is minor. No substantive changes to the definition that might need to be addressed.
3.19	interested party	3.1.5	interested party (HLS)	"group" is now "organization." "perceive itself to be affected" is added. "affected by the energy performance" changed to "affected by a decision or activity."	The 2018 standard uses "interested parties" and "stakeholders" as synonyms. The primary change in this definition is that it includes people or organizations that can affect, be affected by, or perceive to be affected by both decisions and activities. Recommended actions for these changes are covered in the 'Context of the organization' section under ISO 50001 2018 Sections 4.1 and 4.2.
3.20	internal audit	3.3.8	audit (HLS)	Term has been replaced with "audit." "requirements" has been replaced by "audit criteria." Notes have been added.	This change is minor. No substantive changes to the definition that might need to be addressed
		3.2.1	management system (HLS)	New term	No substantive changes to the definition that might need to be addressed.
		3.4.1	measurement (HLS)	New term. Focuses on determining a value.	No substantive changes to the definition that might need to be addressed.

2011 Section #	2011 Term	2018 Section #	2018 Term	Notes on Changes from 2011 to 2018	Recommended Actions
		3.3.7	monitoring (HLS)	New term. Focuses on determining status.	No substantive changes to the definition that might need to be addressed.
3.21	nonconformity	3.3.3	nonconformity (HLS)	No changes made.	No action is required.
		3.4.10	normalization	New term	Normalization is a new concept introduced in the 2018 standard. Where the organization has data indicating that relevant variables significantly affect energy performance, the baseline and indicators used to demonstrate energy performance must be normalized. Recommended actions are discussed in the 'Planning' section under ISO 50001:2018 Sections 6.4 and 6.5.
3.22	organization	3.1.1	organization (HLS)	Definition is simplified with details from 2011 placed in a NOTE.	This change is minor. No substantive changes to the definition that might need to be addressed.
		3.3.9	outsource (HLS)	New term	The introduction of this term means that some outsourcing may fall within the scope of the EnMS and will need to be controlled. Recommended actions are discussed in the 'Operation' section under ISO 50001:2018 Section 8.1.
		3.4.2	performance (HLS)	New term	No substantive changes to the definition that might need to be addressed.
		3.2.3	policy (HLS)	New term	No substantive changes to the definition that might need to be addressed.
3.23	preventive action			Term has been deleted but the concept has been retained.	The concept of preventive action is now part of the new ISO 50001:2018 standard requirements related to "actions to address

2011 Section #	2011 Term	2018 Section #	2018 Term	Notes on Changes from 2011 to 2018	Recommended Actions
					risks and opportunities." Consider decoupling preventive action from your corrective action system, while taking any steps needed to ensure that preventive action is part of risk-based activities.
3.24	procedure			Term has been deleted	No action is required. The focus has shifted away from "procedure" (often misinterpreted as a requirement for a document) to "process." This could be an opportunity to "clean out" unnecessary documents, including documented procedures.
		3.3.6	process (HLS)	New term	No substantive changes to the definition that might need to be addressed.
3.25	record			Term has been deleted. Replaced with "documented information."	This change is minor. Recommended actions are discussed in the 'Support' section under ISO 50001 2018 Section 7.5.
		3.4.9	relevant variable	New term	Although this term was used in the 2011 standard, it was not defined until the 2018 standard. No substantive changes to the definition that might need to be addressed.
		3.3.1	requirement (HLS)	New term	No substantive changes to the definition that might need to be addressed.
		3.4.11	risk (HLS)	New term	The requirements of the 2018 standard incorporate the concept of risk. Recommended actions are discussed in the 'Planning' section under ISO 50001 2018 Sections 6.1 and 6.2.

2011 Section #	2011 Term	2018 Section #	2018 Term	Notes on Changes from 2011 to 2018	Recommended Actions
3.26	scope	3.1.4	energy management system scope	Term replaced to provide more specificity.	This change is minor. No substantive changes to the definition that might need to be addressed.
3.27	significant energy use	3.5.6	significant energy use	New NOTE is added that SEUs can be facilities, systems, processes or equipment.	This change is minor. No substantive changes to the definition that might need to be addressed.
		3.4.8	static factor	New term. Addition of the term indicates that static factors are now included in the 2018 requirements.	No substantive changes to the definition that might need to be addressed.
3.28	top management	3.1.2	top management (HLS)	Two new NOTES are added.	This change is minor. No substantive changes to the definition that might need to be addressed.

ISO 50001:2018 - Section 4 - Context of the Organization & ISO 50001:2018 - Section 5 - Leadership

Section 4, Context of the Organization, is new to ISO 50001 in the 2018 version. This section is intended to help an organization better align the EnMS with the business and its strategic goals. It involves identifying the strategic-level external and internal issues that can affect, positively or negatively, the ability of the organization to continually improve both energy performance and the EnMS. The intended outcome is that those issues are understood by the organization as the scope of the EnMS and the EnMS is established or updated. Another goal is that those strategic issues are evaluated for any risks or opportunities that may need to be addressed within the EnMS. Top management should be able to discuss the strategic issues that impact or could impact the ability of the organization to achieve continual improvement in energy performance and the EnMS.

Section 4 Context of the organization includes four sub-sections:

- 4.1 Understanding the organization and its context
- 4.2 Understanding the needs and expectations of interested parties
- 4.3 Determining the scope of the energy management system
- 4.4 Energy management system

Sections 4.1 and part of 4.2 are new to the 2018 standard and thus we provide additional information to help understand these sections.

Section 4.1 Understanding the organization and its context

The intent of Section 4.1 is that the organization determines the relevant strategic issues, including input from top management on the organization's strategic direction that can affect whether the organization is able to achieve continual improvement. In the 2018 standard, the concept of continual improvement explicitly includes continual improvement in both energy performance and the EnMS.

The concepts of organizational context will be used when determining the scope of the EnMS and will be evaluated for actual and potential risks and opportunities. Examples of these issues, which are separated into internal and external issues, are provided in the Annex of the 2018 standard.

Section 4.2 Understanding the needs and expectations of interested parties

Although the first part of this section is new, it consolidates and expands information from the previous standard. The 2018 standard requires that the organization determine:

- Who the relevant interested parties are,
- What their relevant requirements are, and
- Which interested party's needs and expectations are or will be addressed through the EnMS.

The intent of Section 5 Leadership is to ensure top management is proactive in both its leadership of and commitment to the EnMS. This section expands the responsibilities of top management and clarifies where top management can and cannot delegate responsibility, but not accountability. It also modifies

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the intent of the energy policy and shifts some of the responsibilities of the management representative to the energy team.

Section 5 Leadership includes three sub-sections:

- **5.1 Leadership and commitment**
- **5.2 Energy policy**
- **5.3 Organization roles, responsibilities, and authorities**

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
		4.1	Understanding the organization and its context	New requirement to determine the organization's strategic-level internal and external issues that affect achieving the intended outcomes of the EnMS	<p>Review internal and external issues. The 2018 standard provides examples (in the Annex) of both internal and external issues, which is a good starting place to understand the intent of the issues.</p> <p>Examples of internal issues:</p> <ul style="list-style-type: none"> • Core business objectives and strategy, which could include items like products, customers, competitors, key markets, trends in the industry or sector, strategic goals or initiatives. • Financial resources

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
					<p>(labor, financial, etc.) affecting the organization</p> <ul style="list-style-type: none"> Energy management maturity & culture. <p>Examples of external issues:</p> <ul style="list-style-type: none"> Issues related to interested parties such as existing national or sector objectives, requirements, or standards. Restrictions or limitations on energy supply, security and reliability. Energy costs or the availability of types of energy.

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
					Although there is no explicit requirement to document or record this information, we recommend that some form of documented information be kept, possibly a visual diagram or issues matrix, to help leadership demonstrate their commitments.
		4.2	Understanding the needs and expectations of interested parties	New requirements to determine relevant interested parties, their requirements and which needs and expectations are to be addressed in the EnMS. This section also includes the legal and other requirements from 2011 Standard, which had no substantive changes.	<p>To determine relevant interested parties and their needs and expectations, we recommended that organizations:</p> <ul style="list-style-type: none"> Review the stakeholders considered when objectives and targets were established. Review the interested parties associated with existing energy-

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
					<p>related legal and other requirements.</p> <ul style="list-style-type: none"> Consider others that are relevant to energy performance and the EnMS, including those who have communicated that they "perceive themselves affected" by the EnMS. Look across those interested parties and their needs and expectations and determine those that need to be addressed within the EnMS. For example, the needs and expectations of regulators or those associated with voluntary energy-related program which the organization subscribes to would

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
					have requirements that need to be addressed within the EnMS.
4.1	General requirements	4.3	Determining the scope of the EnMS	New separate section for scope. Requires consideration of 1) external and internal issues, and 2) interested party requirements (from Context of the organization). Adds the concept of authority to control energy efficiency, use and consumption. Clarifies that types of energy within the scope and boundaries cannot be excluded.	<ul style="list-style-type: none"> Once completed, review the strategic level external and internal issues and any interested party requirements to see if they affect the EnMS scope. Scrutinize the energy review and energy measurement plan, along with other relevant information, to ensure that no types of energy within the scope and boundaries are excluded. Confirm that the organization has authority to control energy efficiency, use and

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
					consumption within the scope defined. This includes looking at leased or shared buildings, metering of buildings, etc
		4.4	Energy management system	Requirement for continual improvement of energy performance is explicit. And, the EnMS and its processes must continually improve. A NOTE added about how processes can differ. Requirement to determine how ISO 50001 requirements will be met is deleted.	Use the EnMS processes for objectives and action plans to address not just energy performance improvement, but also the need for continual improvement of the EnMS. Objectives can be qualitative in nature and the standard gives a couple of examples (relating to energy behavior or cultural change). We recommend that: <ul style="list-style-type: none"> At least one objective relates to improvement of the EnMS

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
					<ul style="list-style-type: none"> Measurement of that objective is considered (see ISO 50001 section "Support" for more details).
4.2	Management responsibility	5.1	Leadership and commitment	Leadership in continual improvement of EnMS effectiveness and energy performance has been added to top management commitment. These additional top management responsibilities include aligning policy, objectives and energy targets with the organization's strategic direction; integrating EnMS into business processes; achieving EnMS intended outcomes; and change management processes. The requirement for a management representative has been	Brief leadership on the 2018 standard changes to management responsibility. Use that briefing to identify and address existing processes (e.g. strategic planning, change management, etc.) where energy is an input or needs to be an input in order to meet and demonstrate the new and changed requirements.

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
				deleted and replaced by requirements for top management to direct and support persons to contribute to EnMS and energy performance improvement and supporting other relevant management roles. The top management commitment has been expanded to include responsibility and accountability for continual improvement of energy performance. The use of the terms "leadership" and "demonstrate" indicate the proactive-focused expectations for top management. Where the verb "ensure" is used, management can delegate that responsibility, but not the accountability.	

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
4.2.1	Top management	4.3	Determining the scope of the EnMS	Top management now "ensures" rather than "identifies" the EnMS scope and boundaries. The 2018 standard adds the strategic internal and external issues and the requirements of interested parties as inputs to the determination of the scope of the EnMS	Examine the defined scope and boundaries of the EnMS, considering the information from ISO 50001 2018 Section 4.1 and 4.2. Determine if any changes to the defined EnMS scope and boundaries are warranted based on that information.
		5.1	Leadership and commitment	See 2018 Section 5.1 Leadership and commitment above.	
		7.1	Resources	"...providing the resources" has changed to "ensure ...the resources...are available."	No substantive changes to the requirement that might need to be addressed.
4.2.2	Management representative	5.1	Leadership and commitment	See 2018 Section 5.1 Leadership and commitment above.	
		5.3	Organization roles, responsibilities and authorities	Appointment of a management representative is deleted and replaced in part by the energy management team,	Although there is no requirement for the position of management representative to be dropped, one approach

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
				<p>whose authority and responsibilities are assigned by top management. New authorities and responsibilities (for the team) include implementing action plans and ensuring conformance with EnMS. Several responsibilities of the management representative in the 2011 edition are now the responsibility of the team.</p>	<p>could be to transition the management representative to be the leader of the energy management team. Ensure the team has been fully:</p> <ul style="list-style-type: none"> • Vested by top management with the authority required to carry out their responsibilities as set out in the standard. • Informed of their responsibilities and authority within the EnMS, including the implementation of action plans (see 2018 standard, Section 6.2.3), and • Provided resources as needed to carry out those responsibilities. <p>Also ensure that (see cell below):</p>

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
4.3	Energy policy	5.2	Energy policy	<p>Top management "establishes" the energy policy and no longer "defines" the policy:</p> <p>a) A policy "appropriate to the nature and scale of...energy use and consumption" is changed to "appropriate to the purpose of the organization."</p> <p>b) The commitment to continual improvement in energy performance expanded to include continual improvement of the EnMS.</p> <p>c) Procurement of energy efficient products and services qualified to those that impact energy performance.</p> <p>d) "Supports design for energy performance improvement" is now "supports design</p>	<ul style="list-style-type: none"> The team has reviewed the energy policy and determined how it is relevant and how it fits the purpose of the organization. If applicable, modify the energy policy to include a commitment to continual improvement of the EnMS, not just continual improvement of energy performance. As appropriate, make the energy policy available to interested parties. Top management approves the policy, if revised.

2011 Section #	2011 Requirement	2018 Section #	2018 Requirement	Notes on Changes from 2011 to 2018	Recommended Actions
				activities that consider energy performance improvement."	

ISO 50001:2018 - Section 6 - Planning

Section 6, Planning, was previously under Section 4.4 Planning in the 2011 standard. One of the most substantive changes in the Planning requirements is Section 6.1 Actions to address risks and opportunities. This new section reflects ISO's intent (through the HLS) to incorporate risk-based thinking into ISO management system standards.

The energy performance indicators (EnPIs) and the energy baseline (EnB) to be used to demonstrate energy performance must be normalized. The standard does not prescribe how to normalize but does state that depending on the nature of the activities, normalization can be a simple adjustment, or a more complex procedure. If needed, LBNL has on-line tools that can help normalize [data](#).⁵

Estimates of future energy use and energy consumption are no longer required at the SEU (significant energy use) level, but are now required for overall energy use and energy consumption. If not already available, the organization will need to develop future estimates of overall energy use and energy consumption. The organization can still estimate SEU-level energy use and energy consumption if desired.

Some of the requirements related to measuring and monitoring consumption and the components of the energy measurement plan have been moved into the planning requirements section.

Section 6 Planning includes six sub-sections:

- 6.1 Actions to address risks and opportunities
- 6.2 Objectives, energy targets and planning to achieve them
- 6.3 Energy review
- 6.4 Energy performance indicators
- 6.5 Energy baseline
- 6.6 Planning for collection of energy data

Section 6.1 Actions to address risks and opportunities

The intent of this new section is to ensure the organization takes actions to address any issues or opportunities that can affect the EnMS. The organization must identify the risks and opportunities that need to be addressed in order for the EnMS to achieve its intended outcomes; including continual improvement of the EnMS and energy performance. There are required considerations in determining these risks and opportunities, including the issues identified in the ISO 50001 2018 standard Section 4.1 and the requirements determined in Section 4.2. Once these risks and opportunities have been identified, the organization must plan how to address them and how to evaluate the actions taken. The 2018 standard provides details on what needs to be included in the planned actions.

⁵ <https://enpilite.lbl.gov>

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
4.4.1	General	6.1	Actions to address risks and opportunities	There is a new section that involves identifying and addressing the risks and opportunities arising from the strategic level external and internal issues that were identified as part of Section 4.1, the requirements determined in Section 4.2 and a review of your activities that could affect energy performance.	<ul style="list-style-type: none"> Engage the energy management team and representatives of top management in identifying the risks and opportunities associated with the strategic issues and interested parties' requirements that were determined in ISO 50001 2018 standard Sections 4.1 and 4.2. Examine Figure A.2 (Energy planning process) in the 2018 standard to understand the strategic nature of this part of Planning. Review the activities that could impact energy performance as another consideration in

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
					<p>determining risks and opportunities. Keep in mind that the risks and opportunities that need to be addressed are those relevant to the ability of the EnMS to achieve its intended outcomes.</p> <ul style="list-style-type: none"> Plan actions to address these risks and opportunities, including how they can be incorporated into the EnMS and how they will be evaluated for effectiveness.
4.4.2	Legal requirements and other requirements	4.2	Understanding the needs and expectations of interested parties	Legal requirements and other requirements subscribed to must be "taken into account" in the EnMS. No longer just "considered." Moved from "Planning" section (2011 standard) to the "Context of the	Review energy-related legal and other requirements to ensure that they have been addressed appropriately (i.e. taken into account) in the EnMS.

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
				Organization" section (2018 standard)	
4.4.3	Energy review	6.3	Energy review	There is a change in terminology from "energy sources" to "energy types" or "types of energy." The estimation of future energy use and consumption have been simplified to look at energy at a higher level than SEUs. Minor wording changes from "Identify...personnel that significantly affect energy use and consumption" to "identify...persons...that influence or affect the SEUs." The 2011 standard SEU-related text "facilities, equipment, systems and processes" is now a NOTE following the definition of SEU in 2018 standard Section	If not already available, develop estimates of future energy use and consumption at a level higher than individual SEUs. For example, at a facility-level.

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
				3.5.6. Updating the energy review in response to major changes in processes has been clarified as "energy-using processes."	
4.4.4	Energy baseline	6.5	Energy baseline	<p>The order of the requirements for energy performance indicators (EnPIs) and energy baselines (EnBs) has changed so indicators are chosen and then an appropriate EnB is developed. In setting EnBs, "considering a suitable data period" has changed to "taking into account a suitable period of time." (See Annex Section A.3 in the 2018 standard to understand the difference.)</p> <p>A key change in 2018 is the indicators and</p>	<p>Recommended actions included below:</p> <ul style="list-style-type: none"> • Review relevant variables. • Determine which indicators (EnPIs) will be used for demonstration of energy performance. • Determine which indicators will be used for operational controls and should or should not be normalized. • Keep records of the variables used and which must be normalized for both

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
				baseline(s) to be used to demonstrate energy performance must be normalized. A new NOTE indicates that normalization can be simple or more complex. "Major changes to static factors" replaces "changes to process, operational patterns or energy systems" as one of the situations when revision of the baseline is needed. New required records include relevant variable data and modifications to EnBs	relevant variables and static factors, as well as records of changes to EnBs.
4.4.5	Energy performance indicators	6.4	Energy performance indicators	In the 2018 standard, the section on EnPIs now precedes the section on EnBs. EnPIs must include those that work for measuring and monitoring energy performance and those that allow the organization to	No significant change to how this was implemented in the 2011 standard.

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
				demonstrate energy performance improvement. There is a new requirement for considering relevant variables that significantly affect energy performance in establishing EnPIs. Records of EnPI values are needed.	
4.4.6	Energy objectives, energy targets and energy management action plans	6.2	Objectives, energy targets and planning to achieve them	The term "energy objective" has been replaced with the more general term "objective." Wording about objectives at relevant functions and levels has been simplified. Objectives and energy targets must be monitored, communicated and updated as appropriate. Must consider how actions can be combined with business processes. Action plans must include the	Typically, an organization has multiple objectives, and energy targets are relevant to only some of them. Ensure that energy targets have been set for objectives related to energy performance improvement. Review the details of what must be included in action plans.

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
				resources that are required.	

ISO 50001:2018 - Section 7 - Support & ISO 50001:2018 - Section 8 - Operation

What was previously Section 4.5 Implementation and Operation, is now covered by two sections, Section 7 Support and Section 8 Operation.

Although the names of the sections under Section 7 Support are similar to those present in the 2011 standard, there are notable changes to the 2018 standard. These include:

- **Competence, Training and Awareness:**

What was previously Section 4.5 in the 2011 standard, is now organized into two different sections, 7.2 Competence and 7.3 Awareness. Competence becomes a higher-level priority with “training” now addressed as an example of an action that can be taken to achieve competency. In addition, ensuring the competence of personnel is now required for all persons whose work impacts energy performance and the EnMS. In addition, the effectiveness of any actions taken to acquire a needed competency must be evaluated.

- **The three individual topics; Documentation, Control of Documents and Control of Records now are combined into a single topic titled “Documented information.”**

The requirements have been rearranged and some minor changes made, including requirements for creating and updating documented information.

Section 7 Support includes five sub-sections:

- **7.1 Resources**
- **7.2 Competence**
- **7.3 Awareness**
- **7.4 Communication**
- **7.5 Documented information**

Section 8 Operation provides clarification and details on concepts introduced in the 2011 standard.

Section 8.1 Operational Planning and Control, adds the concept of control of planned changes (i.e. change management) and review of the consequences of unintended changes. Control of outsourced processes related to SEUs also is a new requirement.

Section 8 Operation includes three sub-sections:

- **8.1 Operational planning and control**
- **8.2 Design**
- **8.3 Procurement**

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommendations
4.5.1	General			This section was removed	
4.5.2	Competence , training and awareness	7.2	Competence	The three topics of Competence, Training and Awareness are now organized into two different sections: Competence and Awareness. Competence is defined as the "ability to apply knowledge and skills to achieve intended results". Ensuring the competence of personnel is no longer limited to persons whose work is related to the SEUs. The competence requirements apply to persons whose work impacts energy performance and the EnMS. There is now an explicit requirement that the effectiveness of any actions taken to acquire a needed competency be evaluated. The requirement to identify training needs associated with control of SEUs and operations of the EnMS has been removed.	Review how competency is defined and who it applies to. Make sure it is not only for SEUs but for any persons whose work impacts either energy performance or the EnMS. Make sure that measures are in place to evaluate the effectiveness of any actions taken to acquire competence.
		7.3	Awareness	Minor changes in wording. General intent has not changed.	No significant changes in this section.
4.5.3	Communica tion	7.4	Communication	Requirement for internal communication on energy performance and EnMS is removed. Determine EnMS internal and external communications including what, when, with whom, how and who communicates. New requirement that information communicated is consistent and dependable. Must consider keeping records of suggested improvements.	There is now a list of what needs to be determined within both the internal and external communication processes. <ul style="list-style-type: none"> • Use this list as a checklist to determine if any changes or additions to communications are needed. • Check that any information communicated is based on information generated by the EnMS.

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommendations
					<ul style="list-style-type: none"> Consider retaining documented information on improvement suggestions.
4.5.4	Documentat ion	7.5	Documented information	"Documents" and "records" are now combined into the concept of "documented information." "Retain documented information" refers to records and "Maintain documented information" refers to documents.	Use the requirements for Documented Information as a checklist to evaluate your current processes for controlling documents and records. Overall, few changes were made in the requirements. Review the 2018 standard for occurrences of "retain documented information" (referring to records) to ensure the EnMS includes all of the records that are now explicitly required. Many of these records are likely already part of the EnMS.
		7.5.1	General	The list of required EnMS documentation in this section is reduced to documented information required by the Standard and documented information that the organization decides is necessary for EnMS effectiveness and to demonstrate energy performance improvement.	Although the list of required documents in this section has been reduced, the EnMS scope and boundaries, energy policy, objective, energy targets and action plans must still be documented. So, as a practical matter, nothing has changed in this part of the documentation requirements.

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommendations
		7.5.2	Creating and updating	Specific requirements related to creating and updating documented information have been added.	Review your current document control and records control processes against the requirements in 2018 Section 7.5.2. Decide what the appropriate identification and description, format and media, and review and approval is for the organization's documented information (which includes both documents and records)
		7.5.3	Control of documented information	Controls for documents and records have been combined.	Review Annex A.3 on terminology clarifications in the 2018 standard. Review your existing processes for controlling documents and records against the 2018 Section 7.5.3 requirements. Determine the applicable controls from those listed, depending on whether it is maintained documented information (i.e. documents) or retained documented information (i.e. records). Make changes as needed. There is no requirement that you combine your existing processes for controlling documents and records, but it may be worth considering.
4.5.5	Operational control	8.1	Operational planning and control	In addition to SEUs, operational planning and control applies to the actions plans (see 2018 Section 6.2) for achieving the objective(s) and energy target(s). This is not a change from 2011 standard but is a clarification. A	It is important to review the operational controls needed for:

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommendations
				NOTE has been added that significance criteria (for "significant deviation") is determined by the organization. Documented information is required. Explicit requirements for change management and control of outsourced processes have been added. The 2011 standard NOTE about planning for contingency or emergency conditions is removed.	<ul style="list-style-type: none"> • action plans to achieve objectives and energy targets (2018 Section 6.2), • actions to address risks and opportunities (2018 Section 6.1.2), and • SEUs (2018 Section 6.3) <p>If not already in place, determine criteria for what is a significant deviation from intended energy performance. Incorporate the EnMS into existing change management processes. Apply controls to outsourced processes related to SEUs. Such controls might already be in place under an existing quality management system. Address the documented information requirement.</p>
4.5.6	Design	8.2	Design	Clarifies that significant impact on energy performance is over the planned or expected operating lifetime. Clarifies that the records retained are those of design activities related to energy performance.	Review your criteria for "significant impact on energy performance" to ensure it addresses "over the planned or expected operating lifetime."

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommendations
4.5.7	Procurement of energy services, products, equipment and energy	8.3	Procurement	New requirement to not only define specifications, as applicable, for purchase of energy but also to communicate those specifications. Specifications for energy performance of procured equipment and service must also be defined and communicated, where applicable.	Ensure that specifications for the purchase of energy are communicated.
4.6.1	Monitoring, measurement and analysis	6.6	Planning for collection of energy data	Previously known as the energy measurement plan. Now called "energy data collection plan." In 2018, the requirements for the energy data collection plan have been moved from "Checking" to "Planning." Specifics for the plan have been added, including specifying the data needed to monitor the key characteristics and the how and how often the data will be collected and kept. New requirements for data to be collected include SEU operational criteria, static factors (if applicable) and data in action plans. The plan must be reviewed and updated (as appropriate) at defined intervals.	Review the measurement plan to see if it meets the more detailed requirements.

ISO 50001:2018 - Section 9 - Performance Evaluation

Section 9 Performance Evaluation is a new section in the 2018 standard that takes most of the content from what was Section 4.6 Checking in the 2011 standard. The intent of this section is that the organization must understand what needs to be measured and monitored, what methods are to be used, when it will be done, and how the results will be analyzed and evaluated. In this edition, monitoring, measurement, analysis and evaluation now apply to both energy performance and the effectiveness of the EnMS.

Section 9 Performance Evaluation includes three sub-sections:

- **9.1 Monitoring, measurement, analysis and evaluation of energy performance and the EnMS**
- **9.2 Internal Audit**
- **9.3 Management Review**

The following sections that were part of the 2011 standard under 4.6 Checking, have been moved to the following sections:

- **Nonconformity and corrective action is now part of Section 10 Improvement (10.1)**
- **Control of records is now addressed in Section 7 Support (7.5)**
- **The energy measurement plan requirements are now part of Section 6 Planning (6.6)**

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
4.6.1	Monitoring, measurement and analysis	9.1	Monitoring, measurement, analysis and evaluation of energy performance and the EnMS	Organization determines what needs measured and monitored, but must include the key characteristics at a minimum. "Operation of SEUs" has been added as a key characteristic. Also, the organization determines the methods to ensure valid results, when performed, and when results are analyzed and evaluated. Must evaluate both energy performance and the effectiveness of the EnMS. Energy performance improvement is evaluated by comparing the EnPI value(s) to corresponding EnB(s).	Review current practices to ensure they include the evaluation of the EnMS and energy performance. Make sure operation of SEUs and the other key characteristics are included.
		6.6	Planning for collection of energy data	Previously known as the energy measurement plan. Now called "energy data collection plan." In the 2018 standard, the requirements for the energy data collection plan have been moved from "Checking" to "Planning." Specifics for the plan have been added, including specifying the data needed to monitor the key characteristics and the how and how often the data will be collected and kept. New requirements for data to be collected include SEU operational criteria, static factors (if applicable) and data in action plans. The plan must be reviewed and updated (as appropriate) at defined intervals.	Review the measurement plan to see if it meets the more detailed requirements.
4.6.2	Evaluation of compliance with legal requirements and other requirements	9.1.2	Evaluation of compliance with legal requirements and other requirements	Retain records on both the results and any actions taken ("actions taken" is new).	Other than a minor change in records, there are no actions needed.

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
4.6.3	Internal audit of the EnMS	9.2	Internal audit	Audit program requirements have been expanded from the "audit plan and schedule" in the 2011 standard. Audit program must include frequency, methods, responsibilities, planning requirements and reporting. Must define criteria and scope for the individual audits and retain evidence of audit program implementation. A connection between internal audits (9.2), corrective action (10.1), and continual improvement (10.2) is made by taking appropriate actions on audit results.	Review what has been added to the audit program and make any needed modification. This should already be in place - but the organization will need to schedule an internal audit that shows there has been an audit of the 2018 standard requirements.
4.6.4	Nonconformities , correction, corrective action and preventive action	10.1	Nonconformity and corrective action	Preventive action has been removed from this section. It is now part of the processes in 6.1 Actions to address risks and opportunities. Details are provided on correction (although the term is deleted from title of this section). A part of the corrective action process includes determining if the same nonconformity exists elsewhere or can potentially occur.	Although not required, if desired, the preventive action procedure could be removed from the corrective action system. Ensure that preventive measures are now addressed in decisions on actions to address risks and opportunities.
4.6.5	Control of records	7.5	Documented information	Controls of records is now combined with Documentation and Control of documents under a single section, "Documented Information."	See 2018 Section 7.5 Documented information in section "Support"
4.7.1	General	9.3.1	Management review	New requirement for top management to ensure that the EnMS continues to align with the strategic direction of the organization.	Ensure the management review discussion on risks and opportunities includes a review of the strategic direction of the organization.

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
4.7.2	Input to management review	9.3.2	Management review	This Section involves consideration of inputs related to the EnMS. These inputs for consideration in management review now include changes in external and internal issues and related risks and opportunities. EnMS performance must be considered, including trends in internal audits and evaluation of compliance results, as well as trends in monitoring and measuring results, along with non-conformities and corrective actions (i.e. no longer limited to "status" of these items). Opportunities for continual improvement now must include those for competence.	Ensure data is gathered and shown on trends of EnMS performance. Incorporate opportunities for continual improvement in competence into the management review process.
		9.3.3	Management review	This section addresses the energy performance inputs to management review. The term "status of action plans" has been added as an input.	Ensure the management review includes status of action plans.
4.7.3	Output from management review	9.3.4	Management review	Decisions and actions as management review outputs have been clarified as decisions related to continual improvement opportunities and any need for changes to the EnMS. New outputs related to any changes needed to the EnMS include EnBs; action plans; actions to be taken if objectives, energy targets and action plans are not achieved; opportunities to improve integration with business processes and the improvement of competence, awareness and communication.	Ensure the management review has at least the outcomes listed in this section of the standard.

ISO 50001:2018 - Section 10 - Improvement

Section 10 Improvement is a new in the 2018 standard that expands on the content from 2011 standard section 4.6.4 Nonconformities, correction, corrective action and preventive action. This new section adds continual improvement to now include two sub-sections.

Section 10 Improvement is new with two sub-sections:

- **10.1 Nonconformity and corrective action**
- **10.2 Continual improvement**

Section 10.1 Nonconformity and Corrective Action provides details on requirements when a nonconformity is identified. Preventive action has been removed from section 10.1 and the concept is now part of Section 6.1 Actions to Address Risks and Opportunities (see Section “Planning”).

Section 10.2 Continual Improvement has been added and explicitly requires continual (not continuous) improvement of both energy performance and the EnMS.

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
4.6.4	Nonconformities, correction, corrective action and preventive action	10.1	Nonconformity and corrective action	<p>The only notable change to corrective action is in evaluation of the need for action which now includes determining if similar problems exist or could occur.</p> <p>Preventive action has been removed from this section. It is now part of the processes in 2018 standard Section 6.1 Actions to address risks and opportunities (see section "Planning"). Details are provided on correction (although the term is deleted from title of this section). A part of the corrective action process includes determining if the same nonconformity exists elsewhere or can potentially occur.</p>	<p>If not already addressed in the corrective action process, add determination of whether similar problems exist or could occur. Although not required, if desired, the preventive action procedure could be removed from the corrective action system. Ensure that preventive measures are now addressed in decisions on actions to address risks and opportunities.</p>

2011 Section #	2011 Name	2018 Section #	2018 Name	Notes on Changes from 2011 to 2018	Recommended Actions
		10.2	Continual improvement	This is a new section that explicitly requires continual improvement in the suitability, adequacy and effectiveness of the EnMS, as well as demonstration of energy performance improvement.	The data that shows trends, and is also an input to management review (see the table in section "Performance evaluation" under 2018 section 9.3.2), can be used to help evaluate the performance of the EnMS. Also, compare the EnPI with the EnB to show the improvement in energy performance. This could be done at the equipment, process, system and/or organizational level.