BS EN ISO 50001:2011

BSI Standards Publication

# Energy management systems — Requirements with guidance for use

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## National foreword

This British Standard is the UK implementation of EN ISO 50001:2011. It is identical to ISO 50001:2011. It supersedes BS ISO 50001:2011 which is withdrawn, and BS EN 16001:2009 which will be withdrawn on 26 April 2012.

The UK participation in its preparation was entrusted by Technical Committee SEM/1, Energy Management, to Subcommittee SEM/1/1, Energy Management Systems and Energy Audits.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN ISO 50001

October 2011

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English version

# Energy management systems - Requirements with guidance for use (ISO 50001:2011)

Systèmes de management de l'énergie - Exigences et recommandations de mise en oeuvre (ISO 50001:2011)

Energiemanagementsysteme - Anforderungen mit Anleitung zur Anwendung (ISO 50001:2011)

This European Standard was approved by CEN on 25 October 2011.

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# Foreword

The text of ISO 50001:2011 has been prepared by Technical Committee ISO/TC 242 “Energy Management” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 50001:2011 by Technical Committee CEN/CLC/JWG 3 “Quality management and corresponding general aspects for medical devices” the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2012, and conflicting national standards shall be withdrawn at the latest by April 2012.

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# Foreword

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

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 50001 was prepared by Project Committee ISO/PC 242, *Energy Management*.


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# Introduction

The purpose of this International Standard is to enable organizations to establish the systems and processes necessary to improve energy performance, including energy efficiency, use and consumption. Implementation of this International Standard is intended to lead to reductions in greenhouse gas emissions and other related environmental impacts and energy cost through systematic management of energy. This International Standard is applicable to all types and sizes of organizations, irrespective of geographical, cultural or social conditions. Successful implementation depends on commitment from all levels and functions of the organization, and especially from top management.

This International Standard specifies energy management system (EnMS) requirements, upon which an organization can develop and implement an energy policy, and establish objectives, targets, and action plans which take into account legal requirements and information related to significant energy use. An EnMS enables an organization to achieve its policy commitments, take action as needed to improve its energy performance and demonstrate the conformity of the system to the requirements of this International Standard. This International Standard applies to the activities under the control of the organization, and application of this International Standard can be tailored to fit the specific requirements of the organization, including the complexity of the system, degree of documentation, and resources.

This International Standard is based on the Plan - Do - Check - Act (PDCA) continual improvement framework and incorporates energy management into everyday organizational practices, as illustrated in Figure 1.

NOTE In the context of energy management, the PDCA approach can be outlined as follows:

— Plan: conduct the energy review and establish the baseline, energy performance indicators (EnPIs), objectives, targets and action plans necessary to deliver results that will improve energy performance in accordance with the organization's energy policy;

— Do: implement the energy management action plans;

— Check: monitor and measure processes and the key characteristics of operations that determine energy performance against the energy policy and objectives, and report the results;

— Act: take actions to continually improve energy performance and the EnMS.

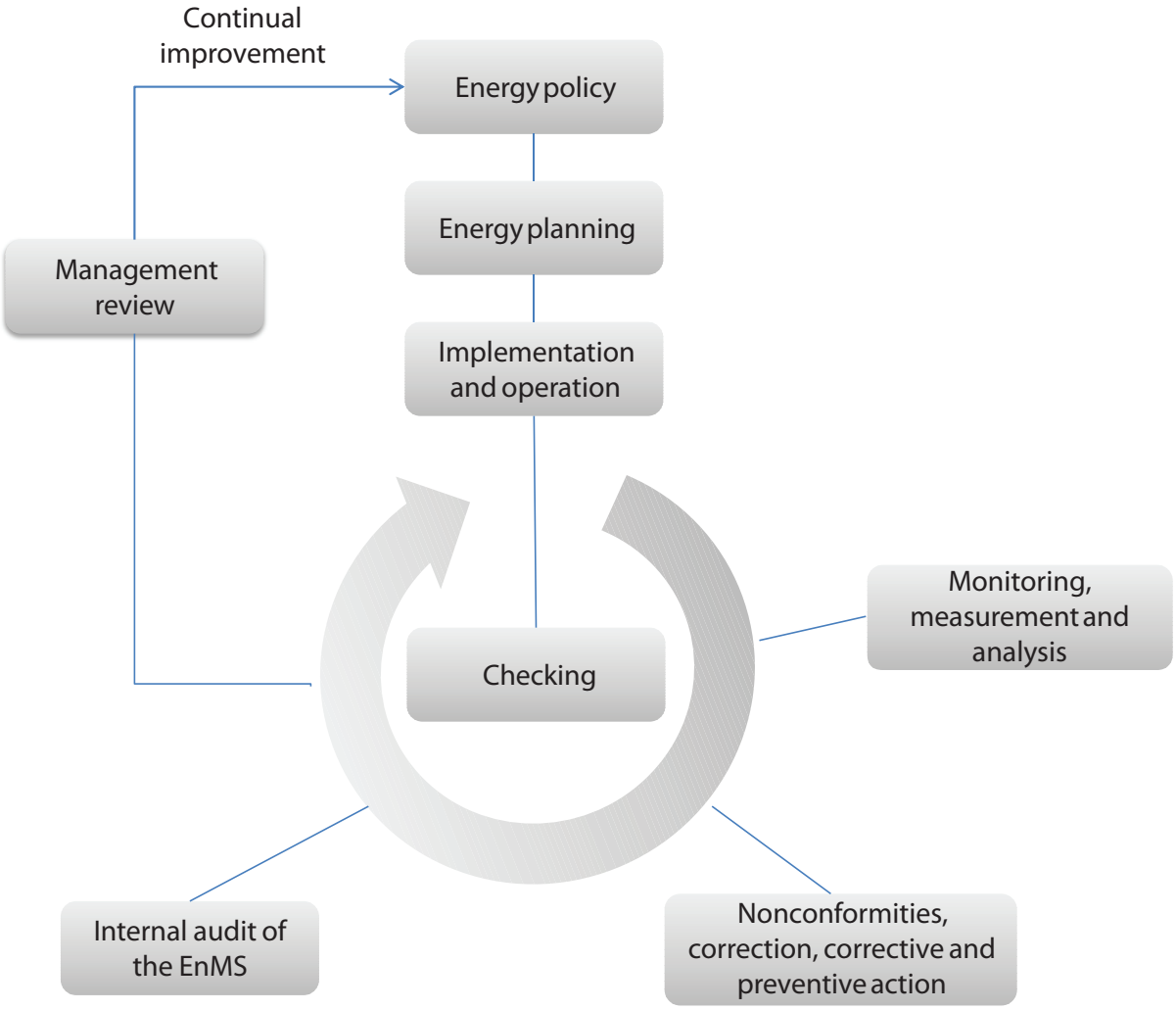


**Figure 1 — Energy management system model for this International Standard**

Worldwide application of this International Standard contributes to more efficient use of available energy sources, to enhanced competitiveness and to reducing greenhouse gas emissions and other related environmental impacts. This International Standard is applicable irrespective of the types of energy used.

This International Standard can be used for certification, registration and self-declaration of an organization's EnMS. It does not establish absolute requirements for energy performance beyond the commitments in the energy policy of the organization and its obligation to comply with applicable legal requirements and other requirements. Thus, two organizations carrying out similar operations, but having different energy performance, can both conform to its requirements.

This International Standard is based on the common elements of ISO management system standards, ensuring a high level of compatibility notably with ISO 9001 and ISO 14001.

NOTE Annex B shows the relationship between this International Standard and ISO 9001:2008, ISO 14001:2004 and ISO 22000:2005.

An organization can choose to integrate this International Standard with other management systems, including those related to quality, the environment and occupational health and safety.

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# Energy management systems — Requirements with guidance for use

## 1 Scope

This International Standard specifies requirements for establishing, implementing, maintaining and improving an energy management system, whose purpose is to enable an organization to follow a systematic approach in achieving continual improvement of energy performance, including energy efficiency, energy use and consumption.

This International Standard specifies requirements applicable to energy use and consumption, including measurement, documentation and reporting, design and procurement practices for equipment, systems, processes and personnel that contribute to energy performance.

This International Standard applies to all variables affecting energy performance that can be monitored and influenced by the organization. This International Standard does not prescribe specific performance criteria with respect to energy.

This International Standard has been designed to be used independently, but it can be aligned or integrated with other management systems.

This International Standard is applicable to any organization wishing to ensure that it conforms to its stated energy policy and wishing to demonstrate this to others, such conformity being confirmed either by means of self-evaluation and self-declaration of conformity, or by certification of the energy management system by an external organization.

This International Standard also provides, in Annex A, informative guidance on its use.

## 2 Normative references

No normative references are cited. This clause is included in order to retain clause numbering identical with other ISO management system standards.

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

**3.1**
**boundaries**
physical or site limits and/or organizational limits as defined by the organization

EXAMPLE A process; a group of processes; a site; an entire organization; multiple sites under the control of an organization.

**3.2**
**continual improvement**
recurring process which results in enhancement of energy performance and the energy management system

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NOTE 1 The process of establishing objectives and finding opportunities for improvement is a continual process.

NOTE 2 Continual improvement achieves improvements in overall energy performance, consistent with the organization's energy policy.

**3.3**
**correction**
action to eliminate a detected **nonconformity** (3.21)

NOTE Adapted from ISO 9000:2005, definition 3.6.6.

**3.4**
**corrective action**
action to eliminate the cause of a detected **nonconformity** (3.21)

NOTE 1 There can be more than one cause for a nonconformity.

NOTE 2 Corrective action is taken to prevent recurrence whereas preventive action is taken to prevent occurrence.

NOTE 3 Adapted from ISO 9000:2005, definition 3.6.5.

**3.5**
**energy**
electricity, fuels, steam, heat, compressed air, and other like media

NOTE 1 For the purposes of this International Standard, energy refers to the various forms of energy, including renewable, which can be purchased, stored, treated, used in equipment or in a process, or recovered.

NOTE 2 Energy can be defined as the capacity of a system to produce external activity or perform work.

**3.6**
**energy baseline**
quantitative reference(s) providing a basis for comparison of energy performance

NOTE 1 An energy baseline reflects a specified period of time.

NOTE 2 An energy baseline can be normalized using variables which affect energy use and/or consumption, e.g. production level, degree days (outdoor temperature), etc.

NOTE 3 The energy baseline is also used for calculation of energy savings, as a reference before and after implementation of energy performance improvement actions.

**3.7**
**energy consumption**
quantity of energy applied

**3.8**
**energy efficiency**
ratio or other quantitative relationship between an output of performance, service, goods or energy, and an input of energy

EXAMPLE Conversion efficiency; energy required/energy used; output/input; theoretical energy used to operate/energy used to operate.

NOTE Both input and output need to be clearly specified in quantity and quality, and be measurable.

**3.9**
**energy management system**
**EnMS**
set of interrelated or interacting elements to establish an energy policy and energy objectives, and processes and procedures to achieve those objectives

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**3.10**
**energy management team**
person(s) responsible for effective implementation of the energy management system activities and for delivering energy performance improvements

NOTE The size and nature of the organization, and available resources, will determine the size of the team. The team may be one person, such as the management representative.

**3.11**
**energy objective**
specified outcome or achievement set to meet the organization's energy policy related to improved energy performance

**3.12**
**energy performance**
measurable results related to **energy efficiency** (3.8), **energy use** (3.18) and **energy consumption** (3.7)

NOTE 1 In the context of energy management systems, results can be measured against the organization's energy policy, objectives, targets and other energy performance requirements.

NOTE 2 Energy performance is one component of the performance of the energy management system.

**3.13**
**energy performance indicator**
**EnPI**
quantitative value or measure of energy performance, as defined by the organization

NOTE EnPIs could be expressed as a simple metric, ratio or a more complex model.

**3.14**
**energy policy**
statement by the organization of its overall intentions and direction of an organization related to its energy performance, as formally expressed by top management

NOTE The energy policy provides a framework for action and for the setting of energy objectives and energy targets.

**3.15**
**energy review**
determination of the organization's energy performance based on data and other information, leading to identification of opportunities for improvement

NOTE In other regional or national standards, concepts such as identification and review of energy aspects or energy profile are included in the concept of energy review.

**3.16**
**energy services**
activities and their results related to the provision and/or use of energy

**3.17**
**energy target**
detailed and quantifiable energy performance requirement, applicable to the organization or parts thereof, that arises from the energy objective and that needs to be set and met in order to achieve this objective

**3.18**
**energy use**
manner or kind of application of energy

EXAMPLE Ventilation; lighting; heating; cooling; transportation; processes; production lines.

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**3.19**
**interested party**
person or group concerned with, or affected by, the energy performance of the organization

**3.20**
**internal audit**
systematic, independent and documented process for obtaining evidence and evaluating it objectively in order to determine the extent to which requirements are fulfilled

NOTE See Annex A for more information.

**3.21**
**nonconformity**
non-fulfilment of a requirement

[ISO 9000:2005, definition 3.6.2]

**3.22**
**organization**
company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration and that has the authority to control its energy use and consumption

NOTE An organization can be a person or a group of people.

**3.23**
**preventive action**
action to eliminate the cause of a potential **nonconformity** (3.21)

NOTE 1 There can be more than one cause for a potential nonconformity.

NOTE 2 Preventive action is taken to prevent occurrence, whereas corrective action is taken to prevent recurrence.

NOTE 3 Adapted from ISO 9000:2005, definition 3.6.4.

**3.24**
**procedure**
specified way to carry out an activity or a process

NOTE 1 Procedures can be documented or not.

NOTE 2 When a procedure is documented, the term “written procedure” or “documented procedure” is frequently used.

NOTE 3 Adapted from ISO 9000:2005, definition 3.4.5.

**3.25**
**record**
document stating results achieved or providing evidence of activities performed

NOTE 1 Records can be used, for example, to document traceability and to provide evidence of verification, preventive action and corrective action.

NOTE 2 Adapted from ISO 9000:2005, definition 3.7.6.

**3.26**
**scope**
extent of activities, facilities and decisions that the organization addresses through an EnMS, which can include several boundaries

NOTE The scope can include energy related to transport.


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**3.27**
**significant energy use**
energy use accounting for substantial energy consumption and/or offering considerable potential for energy performance improvement

NOTE Significance criteria are determined by the organization.

**3.28**
**top management**
person or group of people who directs and controls an organization at the highest level

NOTE 1 Top management controls the organization defined within the scope and boundaries of the energy management system.

NOTE 2 Adapted from ISO 9000:2005, definition 3.2.7.

# 4 Energy management system requirements

## 4.1 General requirements

The organization shall:

a) establish, document, implement, maintain and improve an EnMS in accordance with the requirements of this International Standard;

b) define and document the scope and boundaries of its EnMS;

c) determine how it will meet the requirements of this International Standard in order to achieve continual improvement of its energy performance and of its EnMS.

## 4.2 Management responsibility

### 4.2.1 Top management

Top management shall demonstrate its commitment to support the EnMS and to continually improve its effectiveness by:

a) defining, establishing, implementing and maintaining an energy policy;

b) appointing a management representative and approving the formation of an energy management team;

c) providing the resources needed to establish, implement, maintain and improve the EnMS and the resulting energy performance;

NOTE Resources include human resources, specialized skills, technology and financial resources.

d) identifying the scope and boundaries to be addressed by the EnMS;

e) communicating the importance of energy management to those in the organization;

f) ensuring that energy objectives and targets are established;

g) ensuring that EnPIs are appropriate to the organization;

h) considering energy performance in long-term planning;

i) ensuring that results are measured and reported at determined intervals;

j) conducting management reviews.

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#### 4.2.2 Management representative

Top management shall appoint a management representative(s) with appropriate skills and competence, who, irrespective of other responsibilities, has the responsibility and authority to:

a) ensure the EnMS is established, implemented, maintained, and continually improved in accordance with this International Standard;

b) identify person(s), authorized by an appropriate level of management, to work with the management representative in support of energy management activities;

c) report to top management on energy performance;

d) report to top management on the performance of the EnMS;

e) ensure that the planning of energy management activities is designed to support the organization's energy policy;

f) define and communicate responsibilities and authorities in order to facilitate effective energy management;

g) determine criteria and methods needed to ensure that both the operation and control of the EnMS are effective;

h) promote awareness of the energy policy and objectives at all levels of the organization.

### 4.3 Energy policy

The energy policy shall state the organization's commitment to achieving energy performance improvement. Top management shall define the energy policy and ensure that it:

a) is appropriate to the nature and scale of the organization's energy use and consumption;

b) includes a commitment to continual improvement in energy performance;

c) includes a commitment to ensure the availability of information and of necessary resources to achieve objectives and targets;

d) includes a commitment to comply with applicable legal requirements and other requirements to which the organization subscribes related to its energy use, consumption and efficiency;

e) provides the framework for setting and reviewing energy objectives and targets;

f) supports the purchase of energy-efficient products and services, and design for energy performance improvement;

g) is documented and communicated at all levels within the organization;

h) is regularly reviewed, and updated as necessary.

### 4.4 Energy planning

#### 4.4.1 General

The organization shall conduct and document an energy planning process. Energy planning shall be consistent with the energy policy and shall lead to activities that continually improve energy performance.


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Energy planning shall involve a review of the organization's activities that can affect energy performance.

NOTE 1 A concept diagram illustrating energy planning is shown in Figure A.2.

NOTE 2 In other regional or national standards, concepts such as identification and review of energy aspects or the concept of energy profile, are included in the concept of energy review.

### 4.4.2 Legal requirements and other requirements

The organization shall identify, implement, and have access to the applicable legal requirements and other requirements to which the organization subscribes related to its energy use, consumption and efficiency.

The organization shall determine how these requirements apply to its energy use, consumption and efficiency and shall ensure that these legal requirements and other requirements to which it subscribes are considered in establishing, implementing and maintaining the EnMS.

Legal requirements and other requirements shall be reviewed at defined intervals.

### 4.4.3 Energy review

The organization shall develop, record, and maintain an energy review. The methodology and criteria used to develop the energy review shall be documented. To develop the energy review, the organization shall:

a) analyse energy use and consumption based on measurement and other data, i.e.

   — identify current energy sources;

   — evaluate past and present energy use and consumption;

b) based on the analysis of energy use and consumption, identify the areas of significant energy use, i.e.

   — identify the facilities, equipment, systems, processes and personnel working for, or on behalf of, the organization that significantly affect energy use and consumption;

   — identify other relevant variables affecting significant energy uses;

   — determine the current energy performance of facilities, equipment, systems and processes related to identified significant energy uses;

   — estimate future energy use and consumption;

c) identify, prioritize and record opportunities for improving energy performance.

   NOTE Opportunities can relate to potential sources of energy, use of renewable energy, or other alternative energy sources, such as waste energy.

The energy review shall be updated at defined intervals, as well as in response to major changes in facilities, equipment, systems, or processes.

### 4.4.4 Energy baseline

The organization shall establish an energy baseline(s) using the information in the initial energy review, considering a data period suitable to the organization's energy use and consumption. Changes in energy performance shall be measured against the energy baseline(s).

Adjustments to the baseline(s) shall be made in the case of one or more of the following:

— EnPIs no longer reflect organizational energy use and consumption, or

— there have been major changes to the process, operational patterns, or energy systems, or

— according to a predetermined method.

The energy baseline(s) shall be maintained and recorded.

#### 4.4.5 Energy performance indicators

The organization shall identify EnPIs appropriate for monitoring and measuring its energy performance. The methodology for determining and updating the EnPIs shall be recorded and regularly reviewed.

EnPIs shall be reviewed and compared to the energy baseline as appropriate.

#### 4.4.6 Energy objectives, energy targets and energy management action plans

The organization shall establish, implement and maintain documented energy objectives and targets at the relevant functions, levels, processes or facilities within the organization. Time frames shall be established for achievement of the objectives and targets.

The objectives and targets shall be consistent with the energy policy. Targets shall be consistent with the objectives.

When establishing and reviewing objectives and targets, the organization shall take into account legal requirements and other requirements, significant energy uses and opportunities to improve energy performance, as identified in the energy review. It shall also consider its financial, operational and business conditions, technological options and the views of interested parties.

The organization shall establish, implement and maintain action plans for achieving its objectives and targets. The action plans shall include:

— designation of responsibility;

— the means and time frame by which individual targets are to be achieved;

— a statement of the method by which an improvement in energy performance shall be verified;

— a statement of the method of verifying the results.

The action plans shall be documented, and updated at defined intervals.

### 4.5 Implementation and operation

#### 4.5.1 General

The organization shall use the action plans and other outputs resulting from the planning process for implementation and operation.

#### 4.5.2 Competence, training and awareness

The organization shall ensure that any person(s) working for or on its behalf, related to significant energy uses, are competent on the basis of appropriate education, training, skills or experience. The organization shall identify training needs associated with the control of its significant energy uses and the operation of its EnMS. The organization shall provide training or take other actions to meet these needs.

Appropriate records shall be maintained.

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The organization shall ensure that any person(s) working for or on its behalf are aware of:

a) the importance of conformity with the energy policy, procedures and the requirements of the EnMS;

b) their roles, responsibilities and authorities in achieving the requirements of the EnMS;

c) the benefits of improved energy performance;

d) the impact, actual or potential, with respect to energy use and consumption, of their activities and how their activities and behaviour contribute to the achievement of energy objectives and targets, and the potential consequences of departure from specified procedures.

#### 4.5.3 Communication

The organization shall communicate internally with regard to its energy performance and EnMS, as appropriate to the size of the organization.

The organization shall establish and implement a process by which any person working for, or on behalf of, the organization can make comments or suggest improvements to the EnMS.

The organization shall decide whether to communicate externally about its energy policy, EnMS and energy performance, and shall document its decision. If the decision is to communicate externally, the organization shall establish and implement a method for this external communication.

#### 4.5.4 Documentation

##### 4.5.4.1 Documentation requirements

The organization shall establish, implement and maintain information, in paper, electronic or any other medium, to describe the core elements of the EnMS and their interaction.

The EnMS documentation shall include:

a) the scope and boundaries of the EnMS;

b) the energy policy;

c) the energy objectives, targets, and action plans;

d) the documents, including records, required by this International Standard;

e) other documents determined by the organization to be necessary.

NOTE The degree of documentation can vary for different organizations for the following reasons:

— the scale of the organization and type of activities;

— the complexity of the processes and their interactions;

— the competence of personnel.

##### 4.5.4.2 Control of documents

Documents required by this International Standard and the EnMS shall be controlled. This includes technical documentation where appropriate.

The organization shall establish, implement and maintain procedure(s) to:

a) approve documents for adequacy prior to issue;

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b) periodically review and update documents as necessary;

c) ensure that changes and the current revision status of documents are identified;

d) ensure that relevant versions of applicable documents are available at points of use;

e) ensure that documents remain legible and readily identifiable;

f) ensure documents of external origin determined by the organization to be necessary for the planning and operation of the EnMS are identified and their distribution controlled;

g) prevent the unintended use of obsolete documents, and suitably identify those to be retained for any purpose.

#### 4.5.5 Operational control

The organization shall identify and plan those operations and maintenance activities which are related to its significant energy uses and that are consistent with its energy policy, objectives, targets and action plans, in order to ensure that they are carried out under specified conditions, by means of the following:

a) establishing and setting criteria for the effective operation and maintenance of significant energy uses, where their absence could lead to a significant deviation from effective energy performance;

b) operating and maintaining facilities, processes, systems and equipment, in accordance with operational criteria;

c) appropriate communication of the operational controls to personnel working for, or on behalf of, the organization.

NOTE When planning for contingency or emergency situations or potential disasters, including procuring equipment, an organization may choose to include energy performance in determining how it will react to these situations.

#### 4.5.6 Design

The organization shall consider energy performance improvement opportunities and operational control in the design of new, modified and renovated facilities, equipment, systems and processes that can have a significant impact on its energy performance.

The results of the energy performance evaluation shall be incorporated where appropriate into the specification, design and procurement activities of the relevant project(s).

The results of the design activity shall be recorded.

#### 4.5.7 Procurement of energy services, products, equipment and energy

When procuring energy services, products and equipment that have, or can have, an impact on significant energy use, the organization shall inform suppliers that procurement is partly evaluated on the basis of energy performance.

The organization shall establish and implement the criteria for assessing energy use, consumption and efficiency over the planned or expected operating lifetime when procuring energy using products, equipment and services which are expected to have a significant impact on the organization's energy performance.

The organization shall define and document energy purchasing specifications, as applicable, for effective energy use.

NOTE See Annex A for more information.

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## 4.6 Checking

### 4.6.1 Monitoring, measurement and analysis

The organization shall ensure that the key characteristics of its operations that determine energy performance are monitored, measured and analysed at planned intervals. Key characteristics shall include at a minimum:

a) significant energy uses and other outputs of the energy review;

b) the relevant variables related to significant energy uses;

c) EnPIs;

d) the effectiveness of the action plans in achieving objectives and targets;

e) evaluation of actual versus expected energy consumption.

The results from monitoring and measurement of the key characteristics shall be recorded.

An energy measurement plan, appropriate to the size and complexity of the organization and its monitoring and measurement equipment, shall be defined and implemented.

NOTE Measurement can range from only utility meters for small organizations up to complete monitoring and measurement systems connected to a software application capable of consolidating data and delivering automatic analysis. It is up to the organization to determine the means and methods of measurement.

The organization shall define and periodically review its measurement needs. The organization shall ensure that the equipment used in monitoring and measurement of key characteristics provides data which are accurate and repeatable. Records of calibration and other means of establishing accuracy and repeatability shall be maintained.

The organization shall investigate and respond to significant deviations in energy performance.

Results of these activities shall be maintained.

### 4.6.2 Evaluation of compliance with legal requirements and other requirements

At planned intervals, the organization shall evaluate compliance with legal requirements and other requirements to which it subscribes related to its energy use and consumption.

Records of the results of the evaluations of compliance shall be maintained.

### 4.6.3 Internal audit of the EnMS

The organization shall conduct internal audits at planned intervals to ensure that the EnMS:

— conforms to planned arrangements for energy management including the requirements of this International Standard;

— conforms with the energy objectives and targets established;

— is effectively implemented and maintained, and improves energy performance.

An audit plan and schedule shall be developed taking into consideration the status and importance of the processes and areas to be audited as well as the results of previous audits.

The selection of auditors and conduct of audits shall ensure objectivity and impartiality of the audit process.

Records of the audit results shall be maintained and reported to top management.

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#### 4.6.4 Nonconformities, correction, corrective action and preventive action

The organization shall address actual and potential nonconformities by making corrections, and by taking corrective action and preventive action, including the following:

a) reviewing nonconformities or potential nonconformities;

b) determining the causes of nonconformities or potential nonconformities;

c) evaluating the need for action to ensure that nonconformities do not occur or recur;

d) determining and implementing the appropriate action needed;

e) maintaining records of corrective actions and preventive actions;

f) reviewing the effectiveness of the corrective action or preventive action taken.

Corrective actions and preventive actions shall be appropriate to the magnitude of the actual or potential problems and the energy performance consequences encountered.

The organization shall ensure that any necessary changes are made to the EnMS.

#### 4.6.5 Control of records

The organization shall establish and maintain records, as necessary, to demonstrate conformity to the requirements of its EnMS and of this International Standard, and the energy performance results achieved.

The organization shall define and implement controls for the identification, retrieval and retention of records.

Records shall be and shall remain legible, identifiable and traceable to the relevant activity.

### 4.7 Management review

#### 4.7.1 General

At planned intervals, top management shall review the organization's EnMS to ensure its continuing suitability, adequacy and effectiveness.

Records of management review shall be maintained.

#### 4.7.2 Input to management review

Inputs to the management review shall include:

a) follow-up actions from previous management reviews;

b) review of the energy policy;

c) review of energy performance and related EnPIs;

d) results of the evaluation of compliance with legal requirements and changes in legal requirements and other requirements to which the organization subscribes;

e) the extent to which the energy objectives and targets have been met;

f) EnMS audit results;


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g) the status of corrective actions and preventive actions;

h) projected energy performance for the following period;

i) recommendations for improvement.

#### 4.7.3 Output from management review

Outputs from the management review shall include any decisions or actions related to:

a) changes in the energy performance of the organization;

b) changes to the energy policy;

c) changes to the EnPIs;

d) changes to objectives, targets or other elements of the EnMS, consistent with the organization's commitment to continual improvement;

e) changes to allocation of resources.

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# Annex A
(informative)

# Guidance on the use of this International Standard

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## A.1 General requirements

The additional text given in this annex is strictly informative and is intended to prevent misinterpretation of the requirements contained in Clause 4. While this information addresses and is consistent with the requirements of Clause 4, it is not intended to add to, subtract from, or in any way modify these requirements.

The implementation of an energy management system specified by this International Standard is intended to result in improved energy performance. Therefore, this International Standard is based on the premise that the organization will periodically review and evaluate its energy management system in order to identify opportunities for improvement and their implementation. The organization is given flexibility in how it implements the EnMS, e.g. the rate, extent and timescale of the continual improvement process are determined by the organization.

The organization can take into account economic and other considerations when determining the rate, extent and timescale of the continual improvement process.

The concept of scope and boundaries allows flexibility to the organization to define what is included within the EnMS.

The concept of energy performance includes energy use, energy efficiency and energy consumption. Thus the organization can choose from a wide range of energy performance activities. For example, the organization could reduce peak demand, utilize surplus or waste energy or improve the operations of its systems, processes or equipment.

Figure A.1 provides an illustrative conceptual representation of energy performance.

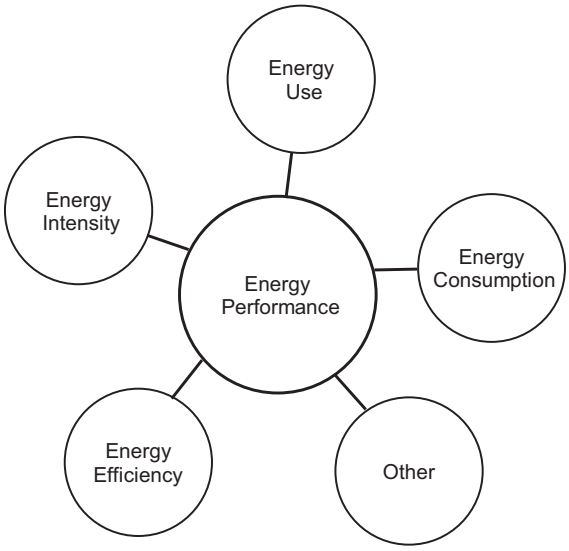


**Figure A.1 — Conceptual representation of energy performance**


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## A.2 Management responsibility

### A.2.1 Top management

Top management, or its representative, when communicating to those in the organization, can support the importance of energy management through employee involvement activities such as empowerment, motivation, recognition, training and rewards and participation.

Organizations conducting long-term planning can include energy management considerations such as energy source, energy performance, and energy performance improvements in the planning activities.

### A.2.2 Management representative

The management representative may be a current, new or contracted organization employee. The responsibilities of the management representative may represent all or part of the job function. Skills and competencies can be determined as to an organization's size, culture and complexity, or to legal requirements or other requirements.

The energy management team ensures delivery of energy performance improvements. The size of the team is determined by the complexity of the organization:

— for small organizations, it can be one person, such as the management representative;

— for larger organizations, a cross-functional team provides an effective mechanism to engage different parts of the organization in the planning and implementation of the EnMS.

## A.3 Energy policy

The energy policy is the driver for implementing and improving an organization's EnMS and energy performance within its scope and boundaries. The policy may be a brief statement that members of the organization can readily understand and apply to their work activities. The energy policy dissemination can be used as a driver to manage organizational behaviour.

Where transportation is procured or used by the organization, the energy use and consumption of transport can be included in the scope and boundaries of the EnMS.

## A.4 Energy planning

### A.4.1 General

Figure A.2 provides a conceptual diagram intended to improve understanding of the energy planning process. This diagram is not intended to represent the details of a specific organization. The information in the energy planning diagram is not exhaustive and there may be other details specific to the organization or to particular circumstances.

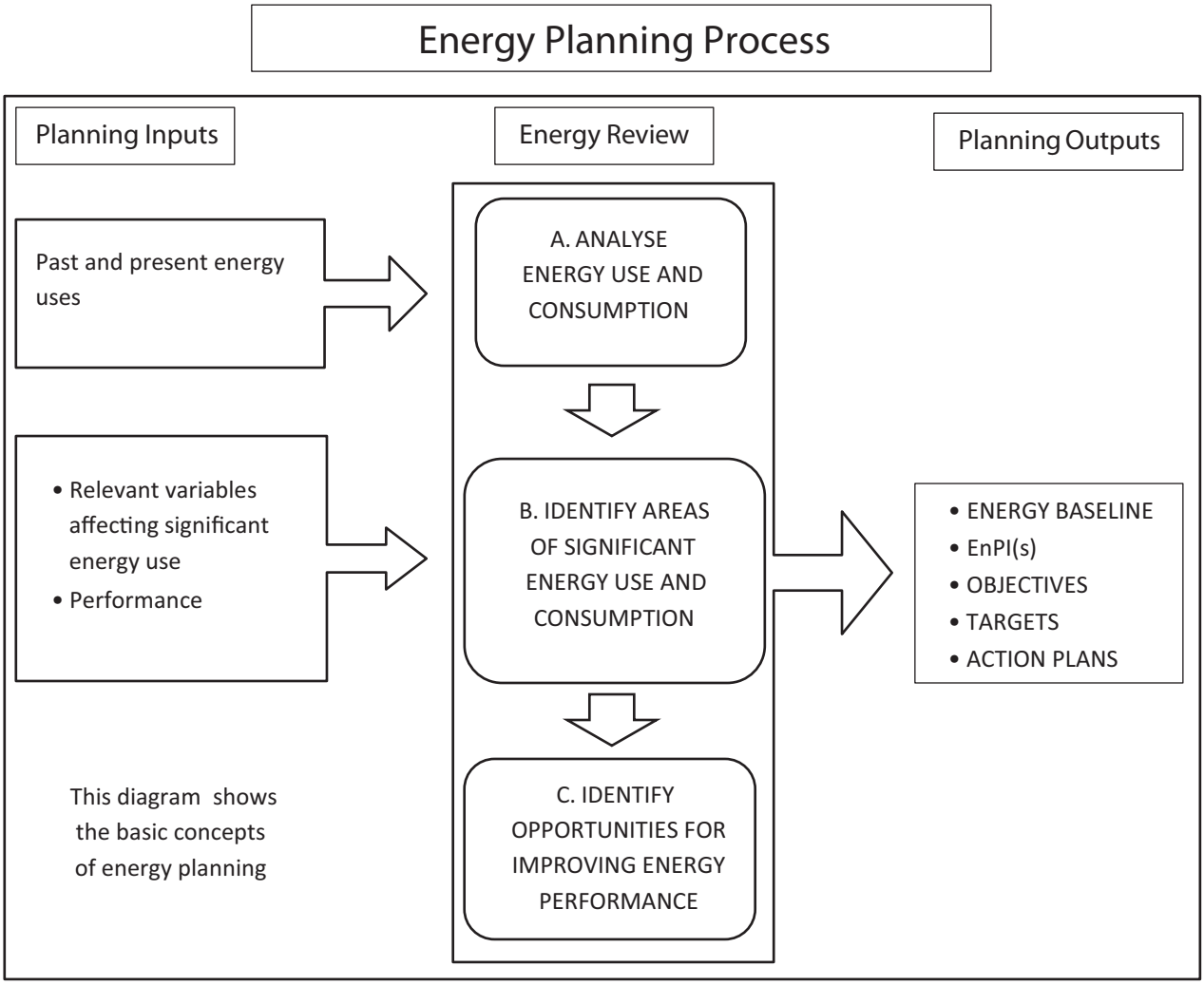


**Figure A.2 — Energy planning process concept diagram**

This clause focuses on the energy performance of the organization and tools to maintain and continually improve energy performance.

Benchmarking is the process of collecting, analysing and relating energy performance data of comparable activities with the purpose of evaluating and comparing performance between or within entities. Different types of benchmarking exist, ranging from internal benchmarking, for the purpose of highlighting good practices within the organization, to external benchmarking, in order to establish the “best in industry/sector” performance of an installation/facility or a specific product/service in the same field or sector. The benchmark process can be applied to any or all of these elements. Provided relevant and accurate data are available, benchmarking is a valuable input to an objective energy review (see 4.4.3), and consequent setting of energy objectives and energy targets (see 4.4.6).

### A.4.2 Legal requirements and other requirements

Applicable legal requirements can be, for example, those international, national, regional and local requirements that apply to the scope of the energy management system related to energy. Examples of legal requirements may include a national energy conservation regulation or law. Examples of other requirements may include agreements with customers, voluntary principles or codes of practice, voluntary programmes and others.

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### A.4.3 Energy review

The process of identification and evaluation of energy use should lead the organization to define areas of significant energy use and identify opportunities for improving energy performance.

Examples of personnel working on behalf of the organization include service contractors, part-time personnel and temporary staff.

Potential sources of energy can include conventional sources that have not been previously used by an organization. Alternative energy sources can include fossil or non-fossil fuels.

Updating the energy review means updating the information related to the analysis, determination of significance and determination of improving energy performance opportunities.

An energy audit or assessment comprises a detailed review of the energy performance of an organization, of a process, or both. It is typically based on appropriate measurement and observation of actual energy performance. Audit outputs typically include information on current consumption and performance, and they can be accompanied by a series of ranked recommendations for improvement in terms of energy performance. Energy audits are planned and conducted as part of the identification and prioritization of opportunities to improve energy performance.

### A.4.4 Energy baseline

A suitable data period means the organization accounts for regulatory requirements or variables that affect the energy use and consumption. Variables can include weather, seasons, business activity cycles and other conditions.

The energy baseline is maintained and recorded as a means for the organization to determine the records maintenance period. The adjustments to the baseline are also considered maintenance and the requirements are defined in this International Standard.

### A.4.5 Energy performance indicators

EnPIs can be a simple parameter, a simple ratio or a complex model. Examples of EnPIs can include energy consumption per time, energy consumption per unit of production, and multi-variable models. The organization can choose EnPIs that inform the energy performance of their operation and can update the EnPIs when business activities or baselines change that affect the relevance of the EnPI, as applicable.

### A.4.6 Energy objectives, energy targets and energy management action plans

In addition to action plans focused on achieving specific improvements in energy performance, an organization may have action plans that focus on achieving improvements in overall energy management or improvement in the processes of the EnMS itself. Action plans for these types of improvements can also state how the organization will verify the results achieved by the action plan. For example, an organization may have an action plan designed to achieve increased employee and contractor awareness of energy management behaviour. The extent to which the action plan achieves the increased awareness and other results should be verified using the method determined by the organization and documented in the action plan.

## A.5 Implementation and operation

### A.5.1 General

No additional clarification required.

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### A.5.2 Competence, training and awareness

The organization defines competence, training and awareness requirements based on its organizational needs. Competency is based on a relevant combination of education, training, skills and experience.

### A.5.3 Communication

No additional clarification required.

### A.5.4 Documentation

The only procedures that have to be documented are ones that are specified as a documented procedure.

The organization can develop any documents that it deems necessary to effectively demonstrate energy performance and support the EnMS.

### A.5.5 Operational control

An organization should evaluate those of its operations that are associated with its identified significant energy use and ensure that they are conducted in a way that will control or reduce the adverse impacts associated with them, in order to fulfil the requirements of its energy policy and meet its objectives and targets. This should include all parts of its operations, including maintenance activities.

### A.5.6 Design

No additional clarification required.

### A.5.7 Procurement of energy services, products, equipment and energy

Procurement is an opportunity to improve energy performance through the use of more efficient products and services. It is also an opportunity to work with the supply chain and influence its energy behaviour.

The applicability of energy purchasing specifications may vary from market to market. Energy purchasing specification elements could include energy quality, availability, cost structure, environmental impact and renewable sources.

The organization may use the specification proposed by an energy supplier, as appropriate.

## A.6 Checking

### A.6.1 Monitoring, measurement and analysis

No additional clarification required.

### A.6.2 Evaluation of compliance with legal requirements and other requirements

No additional clarification required.

### A.6.3 Internal audit of the EnMS

Internal audits of an energy management system can be performed by personnel from within the organization, or by external persons selected by the organization, working on its behalf. In either case, the persons conducting the audit should be competent and in a position to do so impartially and objectively. In smaller organizations, auditor independence can be demonstrated by an auditor being free from responsibility for the activity being audited.


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If an organization wishes to combine audits of its energy management system with other internal audits, the intent and scope of each should be clearly defined.

An energy audit or assessment is not the same concept as an internal audit of an EnMS or an internal audit of the energy performance of an EnMS (see A.4.3).

### A.6.4 Nonconformities, correction, corrective action and preventive action

No additional clarification required.

### A.6.5 Control of records

No additional clarification required.

## A.7 Management review

### A.7.1 General

The management review should cover the scope of the energy management system, although not all elements of the energy management system need to be reviewed at once and the review process may take place over a period of time.

### A.7.2 Input to management review

No additional clarification required.

### A.7.3 Output from management review

No additional clarification required.

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# Annex B
(informative)

## Correspondence between ISO 50001:2011, ISO 9001:2008, ISO 14001:2004 and ISO 22000:2005

| ISO 50001:2011 | | ISO 9001:2008 | | ISO 14001:2004 | | ISO 22000:2005 | |
|---|---|---|---|---|---|---|---|
| **Clause** | **Criteria** | **Clause** | **Criteria** | **Clause** | **Criteria** | **Clause** | **Criteria** |
| — | Foreword | — | Foreword | — | Foreword | — | Foreword |
| — | Introduction | — | Introduction | — | Introduction | — | Introduction |
| 1 | Scope | 1 | Scope | 1 | Scope | 1 | Scope |
| 2 | Normative references | 2 | Normative references | 2 | Normative references | 2 | Normative references |
| 3 | Terms and definitions | 3 | Terms and definitions | 3 | Terms and definitions | 3 | Terms and definitions |
| 4 | Energy management system requirements | 4 | Quality management system | 4 | Environmental management system requirements | 4 | Food safety management system |
| 4.1 | General requirements | 4.1 | General requirements | 4.1 | General requirements | 4.1 | General requirements |
| 4.2 | Management responsibility | 5 | Management responsibility | — | — | 5 | Management responsibility |
| 4.2.1 | Top management | 5.1 | Management commitment | 4.4.1 | Resources, roles, responsibility and authority | 5.1 | Management commitment |
| 4.2.2 | Management representative | 5.5.1<br>5.5.2 | Responsibility and authority<br>Management representative | 4.4.1 | Resources, roles, responsibility and authority | 5.4<br>5.5 | Responsibility and authority<br>Food safety team leader |
| 4.3 | Energy policy | 5.3 | Quality policy | 4.2 | Environmental policy | 5.2 | Food safety policy |
| 4.4 | Energy planning | 5.4 | Planning | 4.3 | Planning | 5.3<br>7 | Food safety management system planning<br>Planning and realization for safe products |
| 4.4.1 | General | 5.4.1<br>7.2.1 | Quality objectives<br>Determination of requirements related to the product | 4.3 | Planning | 5.3<br>7.1 | Food safety management system planning<br>General |
| 4.4.2 | Legal requirements and other requirements | 7.2.1<br>7.3.2 | Determination of requirements related to the product<br>Design and development inputs | 4.3.2 | Legal and other requirements | 7.2.2<br>7.3.3 | (no title)<br>Product characteristics |
| 4.4.3 | Energy review | 5.4.1<br>7.2.1 | Quality objectives<br>Determination of requirements related to the product | 4.3.1 | Environmental aspects | 7 | Planning and realization of safe products |
| 4.4.4 | Energy baseline | — | — | — | — | 7.4 | Hazard analysis |
| 4.4.5 | Energy performance indicators | — | — | — | — | 7.4.2 | Hazard identification and determination of acceptable levels |
| 4.4.6 | Energy objectives, energy targets and energy management action plans | 5.4.1<br>7.1 | Quality objectives<br>Planning of product realization | 4.3.3 | Objectives, targets and programme(s) | 7.2 | Prerequisite programmes |

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| ISO 50001:2011 | | ISO 9001:2008 | | ISO 14001:2004 | | ISO 22000:2005 | |
|---|---|---|---|---|---|---|---|
| **Clause** | **Criteria** | **Clause** | **Criteria** | **Clause** | **Criteria** | **Clause** | **Criteria** |
| 4.5 | Implementation and operation | 7 | Product realization | 4.4 | Implementation and operation | 7 | Planning and realization of safe products |
| 4.5.1 | General | 7.5.1 | Control of production and service provision | 4.4.6 | Operational control | 7.2.2 | (no title) |
| 4.5.2 | Competence, training and awareness | 6.2.2 | Competence, training and awareness | 4.4.2 | Competence, training and awareness | 6.2.2 | Competence, training and awareness |
| 4.5.3 | Communication | 5.5.3 | Internal communication | 4.4.3 | Communication | 5.6.2 | Internal communication |
| 4.5.4 | Documentation | 4.2 | Documentation requirements | — | — | 4.2 | Documentation requirements |
| 4.5.4.1 | Documentation requirements | 4.2.1 | General | 4.4.4 | Documentation | 4.2.1 | General |
| 4.5.4.2 | Control of documents | 4.2.3 | Control of documents | 4.4.5 | Control of documents | 4.2.2 | Control of documents |
| 4.5.5 | Operational control | 7.5.1 | Control of production and service provision | 4.4.6 | Operational control | 7.6.1 | HACCP plan |
| 4.5.6 | Design | 7.3 | Design and development | — | — | 7.3 | Preliminary steps to enable hazard analysis |
| 4.5.7 | Procurement of energy services, products, equipment and energy | 7.4 | Purchasing | — | — | — | — |
| 4.6 | Checking | 8 | Measurement, analysis and improvement | 4.5 | Checking | 8 | Validation, verification and improvement of the food safety management system |
| 4.6.1 | Monitoring, measurement and analysis | 8.2.3<br>8.2.4<br>8.4 | Monitoring and measurement of process<br>Monitoring and measurement of product<br>Analysis of data | 4.5.1 | Monitoring and measurement | 7.6.4 | System for monitoring of critical control points |
| 4.6.2 | Evaluation of compliance with legal requirements and other requirements | 7.3.4 | Design and develop review | 4.5.2 | Evaluation of compliance | — | — |
| 4.6.3 | Internal audit of the EnMS | 8.2.2 | Internal audit | 4.5.5 | Internal audit | 8.4.1 | Internal audit |
| 4.6.4 | Nonconformities, correction, corrective action and preventive action | 8.3<br>8.5.2<br>8.5.3 | Control of nonconforming product<br>Corrective action<br>Preventive action | 4.5.3 | Nonconformity, corrective action and preventive action | 7.10 | Control of nonconformity |
| 4.6.5 | Control of records | 4.2.4 | Control of records | 4.5.4 | Control of records | 4.2.3 | Control of records |
| 4.7 | Management review | 5.6 | Management review | 4.6 | Management review | 5.8 | Management review |
| 4.7.1 | General | 5.6.1 | General | 4.6 | Management review | 5.8.1 | General |
| 4.7.2 | Input to management review | 5.6.2 | Review input | 4.6 | Management review | 5.8.2 | Review input |
| 4.7.3 | Output from management review | 5.6.3 | Review output | 4.6 | Management review | 5.8.3 | Review output |

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