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**Introduction**

This draft standard is based on European discussions in which the UK took an active part. Your comments on this draft are welcome and will assist in the preparation of the consequent British Standard. If no comments are received to the contrary, then the UK will approve this draft and implement it as a British Standard. Comment is particularly welcome on national legislative or similar deviations that may be necessary.

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1	2	(3)	4	5	(6)	(7)
MB	Clause No./ Subclause No./ Annex (e.g. 3.1)	Paragraph/ Figure/Table/ Note (e.g. Table 1)	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '... so that the mains connector to which no connection ...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

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February 2008

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ICS 27.010

English Version

## Energy management systems - Requirements with guidance for use

Systèmes de management de l'énergie - Exigences et lignes directrices pour leur utilisation

Energiemanagementsysteme - Anforderungen mit Anleitung zur Anwendung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/BT/TF 189.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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## Foreword

This document (prEN 16001:2008) has been prepared by Technical Committee CEN/BT/TF 189 “Energy Management and related services General requirements and qualification procedures”, the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

## Introduction

The overall aim of this European standard is to help organizations establish the systems and processes necessary to improve energy efficiency. This should lead to reductions in cost and greenhouse gas emissions through systematic management of energy. This standard specifies requirements for an energy management system to enable an organization to develop and implement a policy and objectives which take into account legal requirements and information about significant energy aspects. It is intended to apply to all types and sizes of organizations and to accommodate diverse geographical, cultural and social conditions. This standard applies to the activities under the control of an organization.

This standard for energy management systems can be used independently or integrated with any other management system. To facilitate its use, the structure of this standard is similar to the structure of ISO 14001.

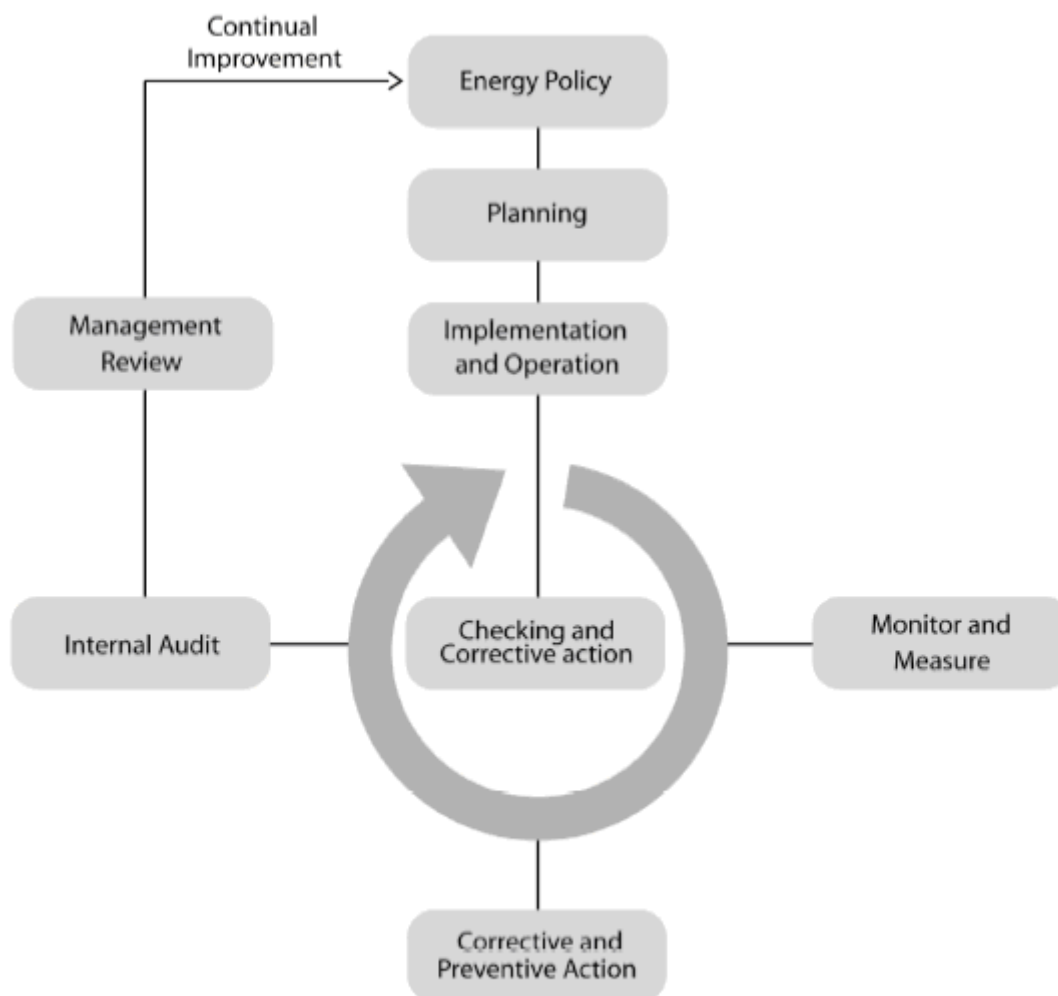
The basis of the approach is shown in Figure 1. The success of the system depends on commitment from all levels and functions of the organization, and especially from top management. A system of this kind enables an organization to develop an energy policy, establish objectives and processes to achieve the policy commitments, take action as needed to improve its performance and demonstrate the conformity of the system to the requirements of this European Standard.

There is an important distinction between this European Standard, which describes the requirements for an organization's energy management system and can be used for certification/registration and/or self-declaration of an organization's energy management system, and a non-certifiable guideline intended to provide generic assistance to an organization for establishing, implementing or improving an energy management system. Energy management encompasses a full range of issues, including those with strategic and competitive implications. Demonstration of successful implementation of this European Standard can be used by an organization to assure interested parties that an appropriate energy management system is in place.

NOTE This International Standard is based on the methodology known as Plan-Do-Check-Act (PDCA). PDCA can be briefly described as follows.

- Plan: establish the objectives and processes necessary to deliver results in accordance with the organization's energy policy.
- Do: implement the processes.
- Check: monitor and measure processes against energy policy, objectives, targets, legal obligations and other requirements to which the organization subscribes, and report the results.
- Act: take actions to continually improve performance of the energy management system.

This European Standard contains only those requirements that can be objectively audited.



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

This European Standard does not establish absolute requirements for energy performance beyond the commitments in the energy policy of the organization and its obligation to comply with relevant legislation. Thus, two organizations carrying out similar operations but having different energy performance can both conform to its requirements.

Adoption of prEN 16001 will contribute to the setting up of a continuous improvement process that will lead to more efficient energy use. It will encourage organizations to implement an energy monitoring plan as well as energy analysis.

The requirements of this European Standard can be aligned or integrated with those of other management systems, such as those for quality, environment, occupational health and safety, financial or risk management. It is therefore possible for an organization to adapt its existing management system(s) in order to establish an energy management system that conforms to the requirements of this European Standard.

See website [www.cen.org](http://www.cen.org) for cross-references to other management systems standards.

The level of detail and complexity of the energy management system, the extent of documentation and the resources devoted to it depend on a number of factors, such as the size of an organization, the scope of the

system, and the nature of its activities, goods and services. This may be the case in particular for small and medium-sized enterprises.

For ease of use, the clause numbers in the body of this European Standard and in Annex A have been related. For example, 4.3.3 and A.3.3 both deal with energy objectives, targets and programme(s), and 4.5.5 and A.5.5 both deal with internal audit of the energy management system.

## **1 Scope**

This standard specifies requirements for an energy management system, which is a system that will enable the organization to take a systematic approach to the continual improvement of energy performance, and which takes into account legal obligations and other requirements to which the organization needs to subscribe.

The standard lays down requirements for continual improvement in the form of a more efficient and more sustainable use of energy, irrespective of the type of energy. The standard does not itself state specific performance criteria with respect to energy.

The standard is valid for all factors affecting energy use that can be monitored and influenced by the organization.

This standard is applicable to any organization that wishes to manage its energy through:

- a) improving its energy performance in a systematic way;
- b) establishing, implementing, maintaining and improving an energy management system;

This standard is applicable to any organization that wishes to:

- a) ensure that it conforms with its stated energy policy;
- b) demonstrate such conformance to others;
- c) seek certification of its energy management system by an external organization;
- d) make a self-evaluation and self-declaration of conformance with the standard.

This energy management systems standard has been designed to be used independently but can be aligned or integrated with other management systems.

## 2 Normative references

This standard does not include normative references at present.

## 3 Terms and definitions

For the purposes of this European Standard, prEN 16001, the following terms and definitions apply.

### 3.1

#### **energy**

Electricity, fuel, steam, heat, compressed air and other like media.

NOTE Energy is abstract. The international unit for energy is Joule (J), and for electric energy, Watt-hour (Wh).

### 3.2

#### **energy consumption**

the amount of energy used in the operation of a facility or the organization

NOTE Although technically incorrect, energy consumption is a widely used term

### 3.3

#### **energy use**

manner or kind of application of energy

NOTE For example ventilation, heating, processes, production lines

### 3.4

#### **energy aspect**

elements of the organization's activities, goods or services that can affect energy use

### 3.5

#### **significant energy aspect**

energy aspect affecting a significant part of total energy consumption

NOTE A significant energy aspect has or can have a significant impact. It then has a potential for one or more of the following:

- More efficient energy use;
- Increased use of renewable energy;
- Increased energy exchange with the rest of society.

### 3.6

#### **energy management system**

the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the energy policy

### 3.7

#### **energy targets**

detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof that needs to be met in order to implement the energy policy

**3.8  
energy policy**  
statement by the organization of its intentions and principles in relation to its overall energy performance which provides a framework for action and for the setting and achieving of energy objectives and targets

**3.9  
energy objective**  
overall energy goal, consistent with the energy policy that the organization sets itself to achieve

**3.10  
energy efficiency**  
ratio between an output of performance, service, goods or energy, and an input of energy

**3.11  
energy performance**  
measurable results of the organization's energy management

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

**3.12  
energy management programme**  
action plan specifically aimed at energy performance improvement

**3.13  
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 that has the authority to control its energy usage, and can benefit from any savings achieved

**3.14  
preventive action**  
action to eliminate the cause of a potential nonconformity

**3.15  
corrective action**  
action to eliminate the cause of detected nonconformity

**3.16  
continual improvement**  
activities that result in improved energy performance and which are performed continually by the organization

**3.17  
procedure**  
specified way to carry out an activity or a process

**3.18  
top management**  
person or group of people who, at the highest level, direct and control the organization

**3.19  
document**  
information and its supporting medium

**3.20  
record**  
document stating results achieved or providing evidence of activities performed

**3.21**

**audit**

systematic, independent and documented process for obtaining evidence and evaluating it objectively to determine the extent to which the energy management system criteria set by the organization are fulfilled

**3.22**

**auditor**

person with the competence to conduct an audit

**3.23**

**nonconformity**

non-fulfilment of a requirement

**3.24**

**interested party**

person or group concerned with or affected by the energy performance of the organization

**3.25**

**energy performance indicator**

ratio chosen by the organization to follow up energy performance

**3.26**

**baseline**

energy consumption calculated over a period of time in relation to reference factors

**3.27**

**energy diagnosis**

systematic process to provide a description of the organization's overall energy situation, quantifying possible energy savings and defining the actions necessary to achieve such savings

**3.28**

**energy manager**

experienced person who has the responsibility and authority for preparing and implementing the organization's energy management system including the energy management program

## **4 Energy management system requirements**

### **4.1 General requirements**

The organization shall:

- a) establish, document, implement and maintain an energy management system in accordance with the requirements of this Standard.
- b) define and document the scope and the boundaries of its energy management system.
- c) determine and document how it will meet the requirements of this standard in order to achieve continual improvement of its energy performance.

### **4.2 Energy Policy**

Top management shall establish, implement and maintain an energy policy for the organization. The energy policy shall state the organization's commitment for achieving improved energy performance. Top management shall ensure that the energy policy:

- a) covers all energy aspects;

- b) is appropriate to the nature and scale of, and impact on, the organization's energy use;
- c) includes a commitment to continual improvement in energy performance;
- d) includes a commitment to ensure the availability of information and of all necessary resources to achieve objectives and targets;
- e) provides the framework for setting and reviewing energy objectives and targets;
- f) includes a commitment to comply with all applicable requirements relating to its energy aspects; whether legally required or agreed to by the organization;
- g) is documented, implemented, maintained and communicated to all persons working for and on behalf of the organization;
- h) is regularly reviewed and updated;
- i) is available to the public.

### **4.3 Planning**

#### **4.3.1 Identification and review of energy aspects**

The organization shall identify and document the energy aspects and prioritise significant ones for further analysis.

An inventory of energy aspects shall be continually updated and periodically reviewed by the organization at pre-defined intervals. As part of this review, all changes in energy consumption since the previous review shall be assessed and initiatives for the following period developed.

The organization shall maintain a register of opportunities for saving energy.

When identifying and reviewing energy aspects, the following shall be included:

- a) past and present energy consumption based on measurement and other data. Energy consumption shall be associated with data on production levels and/or other factors that would have affected energy use;
- b) identification of areas of significant energy consumption, in particular of significant changes in energy use during the past period;
- c) an estimate of the expected energy consumption during the following defined period;
- d) identification of opportunities for improving energy performance;
- e) identification of all persons working for and on behalf of the organization whose actions may lead to changes in significant energy consumption;
- f) assessment of the results of the previous energy management programme (if applicable);
- g) identification of necessary changes to the energy management programme for the following period;

The review shall be documented.

### 4.3.2 Legal obligations and other requirements

The organization shall

- identify and have access to the applicable legal requirements and other requirements to which the organization subscribes related to its energy aspects,
- determine how these requirements apply to its energy aspects.

The organization shall ensure that these legal obligations and other requirements to which the organization subscribes are taken into account in the energy management system.

### 4.3.3 Energy objectives, targets and programme(s)

The organization shall periodically establish, implement and maintain documented energy objectives and targets, at the relevant functions and levels within the organization.

The objectives and targets shall be consistent with the energy policy, including the commitments to improvements in energy efficiency and to comply with applicable legal obligations and other requirements to which the organization subscribes. The organization shall set specific targets for the key parameters that affect energy performance. The energy objectives and target(s) shall be measurable and documented, and a time frame set for achievement.

When establishing targets, the organization shall consider the significant energy aspects identified in the review as well as its technological options, its financial, operational and business conditions, legal requirements and the views of interested parties.

The organization shall draw up and maintain energy management programmes for achieving its objectives and targets. The energy management programmes shall include:

- a) designation of responsibility;
- b) the means and time frame by which individual targets are to be achieved.

The energy management programmes shall be documented.

## 4.4 Implementation and operation

### 4.4.1 Resources, roles, responsibility and authority

Top management shall ensure the availability of resources essential to establish, implement, maintain and improve the energy management system. Resources include human resources, specialized skills, technology and financial resources.

Roles, responsibilities and authorities shall be defined, documented and communicated in order to facilitate effective energy management.

The organization's top management shall appoint an energy manager reporting to the top management who, irrespective of other responsibilities, shall have defined roles, responsibility and authority for:

- ensuring that an energy management system is established, implemented and maintained in accordance with this standard;
- reporting on the performance of the energy management system to top management for their review, with recommendations for improvement.

The energy manager must be competent and qualified in energy use.

#### **4.4.2 Awareness, training and competence**

The organization shall ensure that its employees and all persons working on its behalf are and remain aware of:

- a) the organization's energy policy and energy management programs;
- b) the energy management system requirements, including the activities of the organization to control energy use and improve energy performance;
- c) the significant impact of their work activities, actual or potential with respect to energy consumption, and the benefits of improved individual performance;
- d) their roles and responsibilities in achieving the requirements of the energy management system;
- e) the benefits that they may enjoy as a result of improved energy efficiency.

Personnel performing tasks which can cause significant impacts on energy use shall be competent on the basis of appropriate education, training and/or experience. It is the responsibility of the organization to ensure that such personnel are and remain competent. The organization shall identify training needs associated with the control of its significant energy aspects and the operation of its energy management system.

The organization shall also ensure that each level of management is adequately informed and trained in the field of energy management in order to be able to establish pertinent objectives and targets and choose appropriate energy management tools and methodologies.

#### **4.4.3 Communication**

The organization shall communicate internally with regard to its energy performance and the energy management system. This shall ensure that all persons working for and on behalf of the organization can take an active part in the energy management and the improvement of the energy performance.

The organization shall decide whether to communicate externally about its energy management system and energy performance, and shall document its decision. If the decision is to communicate externally, the organization shall establish and implement an external communication plan.

#### **4.4.4 Energy management system documentation**

The organization shall establish, implement and maintain information, in paper or electronic form, to:

- a) describe the core elements of the energy management system and their interaction;
- b) identify the location of related documentation including technical documentation.

#### **4.4.5 Control of documents**

The organization shall control records and other documents required by this standard to ensure that:

- a) they can be located;
- b) they are periodically reviewed and revised as necessary;
- c) the current versions are available at all relevant locations;
- d) the documents are kept and maintained in such a way that they are easily accessible and protected against damage, loss or destruction. Their retention time shall be established and documented;

- e) obsolete documents are retained for legal and/or knowledge preservation purposes and suitably identified, or removed as appropriate.

#### **4.4.6 Operational control**

The organization shall identify and plan those operations that are associated with the significant energy aspects and ensure consistency with its energy policy, energy objectives and energy targets. This includes

- a) preventing situations that could lead to deviation from the energy policy, energy objectives and energy targets,
- b) setting criteria for operation and maintenance of installations, equipment and buildings,
- c) energy considerations in the acquisition and purchase of equipment and raw materials,
- d) evaluation of energy consumption when considering the design, change or restoration of all assets, including buildings. An evaluation of the potential for more efficient energy use should be made as early as possible during the process,
- e) appropriate communication in this regard to personnel, and people acting on behalf of the organization and other relevant parties.

NOTE Relevant parties may be suppliers, contractors, consultants, service companies, authorities etc

### **4.5 Checking**

#### **4.5.1 Monitoring and measurement**

The organization shall identify and describe the measuring and monitoring requirements of its energy management programmes.

On a regular basis, the organization shall measure, monitor and record significant energy consumption and the factors that affect it,

The organization shall ensure that the accuracy and repeatability of measuring and monitoring equipment used is appropriate to the task in question and remains so. Associated records shall be maintained.

NOTE Measurements can be used for setting targets for energy savings.

#### **4.5.2 Evaluation of compliance**

Consistent with its commitment to compliance, the organization shall periodically evaluate compliance with legal obligations and other requirements to which the organization subscribes. The organization shall keep records of the results of the periodic evaluations.

#### **4.5.3 Nonconformity, corrective action and preventive action**

The organization shall identify and handle non-conformance and initiate corrective and preventive action in a suitable manner within a specified time limit. The organization shall retain all relevant documentation in accordance with legal and/or documented time frames.

NOTE It is left to the organization to decide how action is to be taken on non-conformance, including criteria for determining when non-conformance is of such a nature that action is required.

#### **4.5.4 Control of records**

The organization shall document that the requirements of this standard have been met.

Records shall be tailored to the energy management system and the organization.

Records shall be and remain legible, identifiable, traceable and retrievable for a defined period.

#### **4.5.5 Internal audit of the energy management system**

Internal audits of the energy management system are carried out by, or at the request of, the organization itself, for internal purposes, and may be the basis for a self declaration of adherence to the management system.

The organization shall periodically carry out internal audits of the energy management system to ensure that it:

- a) conforms to the energy policy, objectives, programmes, and all other requirements of this standard;
- b) is compliant with relevant legal obligations and other requirements to which the organization subscribes;
- c) is effectively implemented and maintained.

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

The conduct of audits shall ensure objectivity and impartiality of the audit process. Auditor objectivity and impartiality can be demonstrated by the freedom from responsibility for the activity being audited.

Internal audit results shall be documented and reported to top management.

### **4.6 Review of the energy management system by top management**

Top management shall review the organization's energy management system at planned intervals to ensure continuing suitability, adequacy and effectiveness. The organization shall consider its commitment to continual improvement in decisions related to actions taken. Records of management reviews shall be maintained.

#### **4.6.1 Inputs to management review**

Inputs to the management review shall include:

- a) energy management programme reviews, energy diagnoses results, energy management system audits results;
- b) evaluation of legal compliance;
- c) the energy performance of the organization;
- d) the extent to which energy objectives and targets have been met;
- e) status of corrective and preventive actions;
- f) follow-up actions from previous management reviews;
- g) changes in legal obligations and other requirements to which the organization subscribes ;
- h) recommendations for improvement.

#### **4.6.2 Outputs from management review**

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

- a) the improvement in the energy performance of the organization since the last review,
- b) changes to the energy policy,
- c) changes to objectives, targets or other elements of the management system for energy consistent with the organization's commitment to continual improvement, and
- d) allocation of resources.

## **Annex A** **(informative)**

### **Guidance on the use of this European standard**

#### **A.1 General requirements**

The implementation of an energy management system specified by this standard is intended to result in improved energy performance. Therefore, this standard is based on the premise that the organization will periodically review and evaluate its energy management system to identify opportunities for improvement and their implementation. The rate, extent and timescale of this continual improvement process is determined by the organization in the light of economic and other circumstances. Improvements in the energy management system are intended to result in improvements in energy performance.

This Standard requires the organization to:

- a) establish an appropriate energy policy;
- b) identify the energy aspects arising from the organization's activities;
- c) identify applicable legal requirements and other requirements to which the organization subscribes;
- d) identify priorities and set appropriate energy objectives and targets;
- e) establish a relevant structure and programme(s) to implement the policy and achieve objectives and meet targets;
- f) facilitate planning, control, monitoring, preventive and corrective actions, auditing and review activities to ensure both that the policy is complied with and that the energy management system remains appropriate.

The organization should carry out an initial review, to identify areas of energy use and opportunities for improvement. This resulting information provides the basis for setting the energy management work programme, objectives and targets.

#### **A.2 Energy policy**

The energy policy is the driver for implementing and improving the organization's energy management system. The policy reflects the commitment of top management with respect to energy so that the organization is able to maintain and enhance its efforts continually to achieve improved energy performance and reduced energy use.

All management initiatives require clarity in terms of direction and relationship to corporate strategic goals. This corporate energy policy should take the form of an official, publicly available statement of the organizations commitment to achieve energy management objectives and to reduce energy related emissions. Absence of top-level commitment means that the energy policy will not become fully integrated into the underlying culture and ethos of the business. An unofficial / informal policy may be destabilised by a change in personnel or the wider business environment. Therefore the energy policy should integrate with existing policies to provide continuity and ongoing relevance to the organization.

The policy forms the basis for the setting of energy targets and it should be sufficiently clear to be capable of being understood by internal and external parties, i.e. employees, customers, authorities, investors, etc.

The organization should ensure that there is a consistent thread running from the energy policy to identified areas of significant energy consumption, through the targets set and extending to include plans of action and key figures, to allow the efforts to be concentrated in the areas where optimum effect is achieved.

Where the organization operates at several locations, the policy may be limited to include the activities at only some of those locations. This should be explicitly stated in the energy policy. Within the parts of the organization covered, the policy should encompass all processes and activities. If the energy policy does not specify any delineation, it is to be assumed that it applies to the entire organization, irrespective of the place of operation.

An energy policy should therefore:

- commit the organization to address the products, processes and other activities which affect the significant energy consumption, i.e. the areas which account for the highest energy use or which offer the most considerable potential for energy savings;
- commit the organization to continual improvement of its energy performance and investigation of alternative and renewable sources of energy. This means that, at the same time, the policy forms the framework for setting energy targets and continually reviewing them as the targets set are achieved or the need for changes arises;
- commit the organization to adhere to applicable laws and regulations which are relevant to the energy use of the organization. Any other agreements which the organization has made and which affect the energy use should also appear in the policy;
- be communicated to all persons who work for, or on behalf of, the organization and should be readily available to the public.

The energy policy may form part of a wider environmental policy or other corporate policies and may include life cycle cost. The commitment of the organization specifically with respect to energy should, however, always appear in the policy.

## A.3 Planning

### A.3.1 Identification and review of energy aspects

The purpose of identifying the energy aspects of the organization is to understand the areas of significant energy consumption, i.e. the equipment and processes which account for the greatest energy use or which offer the most potential for energy savings.

The organization shall maintain a register of opportunities for saving energy or reducing costs or carbon emissions. For each opportunity in the register, where possible, the following should be identified as a minimum:

- The energy aspect to which it relates
- Its value in financial or carbon terms
- Action required
- Estimated or actual cost
- Tasks involved including responsibilities and due dates
- For completed items, date completed and actual outcome

The identification of energy aspects is critical in understanding where energy is used within the organization and forms the basis for prioritising the efforts to reduce energy consumption. The organization that intends to implement an energy management system should start by establishing its current position with regard to energy consumption by means of an inventory of energy aspects. This is the fundamental cornerstone for establishing and maintaining an energy management system that is tailored to the organization's energy aspects. The inventory of energy aspects shall be kept and periodically reviewed and updated by the organization.

Each energy review shall include:

- a) past and present energy consumption based on measurement and other data. Energy consumption shall be associated with data on production levels and/or other factors that would have affected energy use

The degree of detail depends on the size of the organization and the energy consumption, but should as a minimum include energy inputs based on the distribution of fuels/forms (electricity, oil, natural gas or other) and final use estimations (drying, pumping, airconditioning, lighting, or other). Where the organization operates at several facilities, the energy supply and the energy consumption of each facility should be reviewed individually. Trends in energy use over previous years should be reviewed and form the basis for setting targets and assessing whether previous targets have been achieved. Information on energy use, which is already available, can be used in the review, e.g. energy bills, meter readings, building management energy reports or other existing information. Where there is no final use information the usage maybe determined by other means (e.g., name plate data, current readings, running hours, etc.);

**NOTE** Nameplate data must be used with extreme care, as it rarely corresponds to practical use. Nameplate data is normally specified for worst case or standard test conditions.

- b) identification of areas of significant energy consumption, in particular of significant changes in energy use during the past period

These areas should be subjected to a more detailed review. The significant energy consumption is that which accounts for a high proportion of the total energy consumption of the organization. The review should also be applied to other areas that offer considerable potential for energy savings. It is up to the organization to assess which energy consumption is significant. It is essential that the organization is able to substantiate why the energy consumption is regarded as significant;

- c) an estimate of the expected energy consumption during the following period

The estimate may be based on available sources of data, such as

- meter readings,
- hours run,
- name plate data,
- compiled monthly bills.

- d) identification of opportunities for improving energy performance

In addition to the identification of opportunities for improving energy performance, the organization may already have initiatives planned to improve energy performance. The combination of existing opportunities and newly identified opportunities from the review should form the basis for setting targets and energy management programmes. Often the greatest opportunities for improved energy performance will come from no-cost housekeeping measures i.e. training personnel to turn off equipment when not in use, promotion and awareness of energy performance in personnel's work practices, etc.;

- e) identification of all persons working for and on behalf of the organization whose actions may lead to significant changes in energy consumption

Their role, responsibilities and authority should be clarified. This also includes personnel that have an

indirect but significant influence on energy consumption, e.g. purchasing, design and training staff.

The organization should consider updating the review annually. Updated reviews should where possible be based on actual measurements. In updated reviews, there should be progressively more detailed analysis of all the areas of energy use. Account should be taken of essential changes of the energy aspects of the organization, e.g. expansion of production, plant modifications, changes of the organization, staff qualifications and job descriptions etc. The purpose of this is to allow the organization to assess progress during the past review period, and identify possible initiatives for the coming period;

- f) assessment of the results of the previous energy management programme (if applicable);

Patterns and trends in energy consumption over the previous programme period should be presented, where identifiable. The review should also include an assessment whether previous aims and targets have been achieved according to target dates, if appropriate education has been provided and if sufficient resources have been allocated to fully discharge required measures.

- g) identification of necessary changes to the energy management programme for the following period;

The energy management programme should be based on the register of opportunities for saving energy or reducing costs or carbon emissions identified in the review and on the opportunities identified in d). It should also take into account the organization's business plan for the period and include strategic aims, target dates, education provision, and allocation of sufficient resources to fully discharge required measures.

The review shall be documented.

### **A.3.2 Legal obligations and other requirements**

The organization needs to identify the applicable legal requirements and other requirements to which the organization subscribes related to its energy aspects,

These may include:

- a) national and international legal requirements;
- b) state/provincial/departmental legal requirements;
- c) local governmental legal requirements.

Examples of other requirements to which the organization may subscribe include, if applicable

- emissions trading requirements,
- agreements with customers,
- non-regulatory guidelines,
- voluntary principles or codes of practice,
- voluntary energy agreements,
- requirements of trade associations,
- agreements with community groups or non-governmental organizations,
- public commitments of the organization or its parent organization,
- corporate/company requirements.

The determination of how legal obligations and other requirements to which the organization subscribes apply to the organization's energy aspects is usually accomplished in the process of identifying such requirements. The organization should prepare and maintain a list of the pertinent energy legislation and other requirements, which affect the organization's activities, products or services. It may not be necessary, therefore, to have a separate or additional procedure in order to make this determination.

However, the company should identify, who is responsible for reviewing all legal obligations and other requirements to which the organization subscribes and ensuring compliance, how relevant information is communicated to the relevant employees and implemented, how documentation of the fact that the organization keeps up to date on new laws and regulations can be provided, how often the list of legislation is to be updated.

### **A.3.3 Energy objectives, targets and programme(s)**

Setting objectives and targets provides the means for transforming policy into action. The energy targets ensure that the organization has defined success criteria so that progress towards improved energy efficiency can be measured.

Targets should be:

- a) ambitious, so as to commit the organization to continual improvement;
- b) realistic, so that they can be achieved within the specified time limits;
- c) specific and measurable;
- d) should reflect published best practice energy performance.

As a minimum targets should be established for each of the significant energy aspects identified by the review. Some targets may apply to equipment or facilities (e.g. a specific production line), while others may address the energy use of departments (e.g. transport and logistics department), training or energy awareness, additional measurement and monitoring.

Energy reduction targets should be worded as relative measurements of the energy use, i.e. energy use per item, per kg, per m<sup>2</sup> or equivalent, thus making the energy target independent of variations of production.

Examples of targets include:

- actual energy savings within defined areas i.e. reduce compressed air usage by 10 %;
- the introduction of new energy conserving technology;
- projects to improve the energy review process and identify opportunities for energy conservation;
- training, awareness and motivation of employees;
- improving and expanding monitoring activities;
- establishing and implementing new procedures, work instructions etc.

The organization should ensure that the targets are consistent with the energy policy and the significant energy aspects. Targets should be reviewed and revised periodically, e.g. in connection with the management review or through the periodical revision of the energy management programmes etc.

The purpose of establishing energy management programmes is to ensure the organization achieves its objectives and targets. The energy management programmes should detail how the organization plans to improve energy efficiency and should contain a description of the tasks and resources required for their

implementation. To avoid duplication of resources, energy management programmes should be incorporated into normal business operations.

The organization should consider the possibilities of using the Best Available Technology (BAT) when establishing its energy management programmes. When establishing such programmes, the following should be identified and addressed:

- What are the priority activities and projects to be initiated, i.e. what actions will deliver the greatest improvements considering the available resources;
- What is to be achieved and what is the timescale for delivery, i.e. define the core objective of the action and when it is to be achieved;
- Who has the responsibility and what resources are required to implement the action plans, i.e. who has overall responsibility and authority to ensure that plans are implemented, what personnel are required and what funding is needed;
- How are the energy programmes to be monitored and revised, i.e. how is progress to be monitored and management informed when the objective is achieved or not and how are improvements in energy efficiency to be documented;
- Do energy programmes reflect the energy policy, objectives and targets together with legal and other obligations.

Energy management programmes should be documented and reviewed regularly to ensure they are up to date and relevant.

## **A.4 Implementation and operation**

### **A.4.1 Resources, roles, responsibility and authority**

The successful implementation of an energy management system calls for a commitment from all persons working for or on behalf of the organization.

This commitment should begin at the highest levels of management. Accordingly, top management should establish the organization's energy policy and ensure that the energy management system is implemented. As part of this commitment, top management should designate a specific management representative with defined responsibility and authority for implementing the energy management system. The management representative should also have the responsibility for reporting to top management on the performance and results of the system.

Top management should also ensure that adequate resources are allocated to the implementation and operation of the energy management system. Resources include human resources, specialized skills, technology and financial resources.

The operation of the energy management system should be the responsibility of experienced employees having the appropriate authority, skills and resources. It should not normally be the responsibility of one person, as this would make the energy management system vulnerable with changes of personnel. It is also important that the key energy management system roles and responsibilities are well defined and communicated to all persons working for or on behalf of the organization.

### **A.4.2 Awareness, training and competence**

The organization should identify the awareness, knowledge, understanding and skills needed by any person with the responsibility and authority to perform tasks on its behalf. Those persons identified by the organization whose work could impact on significant energy consumption should be competent to perform the

tasks to which they are assigned. Competency is assessed based on acquiring the relevant balance of education, training and/or experience. The company should define the criteria so as to know when competence has been achieved.

This training procedure should be documented and include

- requirements for maintaining training records,
- the responsibility for reviewing training programmes and determining ongoing training needs.

The organization should require that contractors working on its behalf are able to demonstrate that their employees have the requisite competence and/or appropriate training.

#### **A.4.3 Communication**

Effective communication is essential to ensure the successful implementation and operation of the energy management system. Relevant and regular information on the energy management system contributes to motivating and committing employees to comply with the organization's energy policy and take an active part in achieving the organization's energy objectives and targets.

Internal communication should address issues including:

- energy policy and the objectives and targets of the organization;
- opportunities for individuals to contribute;
- information about current energy use and the trends within the organization;
- compliance with legal obligations and other requirements to which the organization subscribes;
- opportunities for improvement, both organizationally and individually;
- financial benefits from energy management activities, other benefits i.e. environmental, social etc.;
- contact persons to approach for further details.

The organization should ensure that personnel at all levels within the organization are encouraged and facilitated to make proposals for improvements, and submit relevant comments on the energy management system. Such proposals and comments should be reviewed and responded to. The organization should establish, implement and maintain a procedure for communicating internally with personnel. The procedure should include the following:

- a) who has the responsibility for internal communication regarding the energy management system;
- b) relevant information on the establishment, implementation and operation of the energy management system;
- c) the means of communicating information (internal meetings, seminars, staff magazines, intranet, e-mail, energy boards, awareness campaigns etc.);
- d) the means by which proposals and comments from employees are reviewed and responded to.

If the organization communicates on energy matters externally, e.g. to voluntary schemes, by presentations etc., these activities should be recorded and communicated internally where relevant.

#### A.4.4 Energy management system documentation

The level of detail within the system documentation should be sufficient to describe the energy management system and the interrelation between its processes, systems and activities. It should also provide direction on where to obtain more detailed information on the operation of such system elements. This documentation may be integrated with the documentation of other management systems implemented by the organization. The extent of the energy management system documentation may differ from one organization to another, depending on:

- a) the size and type of organization and its activities, products or services;
- b) the complexity of processes and their interactions;
- c) the competence of personnel.

Examples of documents include:

- statements of policy, objectives and targets;
- information on significant energy aspects, procedures;
- process information;
- organizational charts;
- internal and external standards;
- records;
- technical documentation such as installation and equipment drawings, energy and utilities distribution drawings, maintenance plans, equipment operations manuals, etc;
- results of energy diagnosis;
- action plans with follow up indications.

Any decision to document procedures should be based on consideration of:

- the consequences of not doing so;
- the need to demonstrate compliance with legal and with other requirements to which the organization subscribes;
- the need to ensure that the activity is undertaken consistently;
- the advantages of doing so, which can include, easier implementation through communication and training;
- easier maintenance and revision, less risk of ambiguity and deviations, demonstrability and visibility;
- the requirements of this standard.

#### A.4.5 Control of documents

The intent of section 4.4.5 is to ensure that the organization establishes and maintains documents in a manner sufficient to implement the energy management system. The primary focus of the organization should be on improved energy performance and on effective implementation of the energy management system, not

on a complex document control system. However, documents specifically mentioned under this standard should be subject to a procedure for ensuring:

- that all relevant energy management system documents can be identified with respect to originator, the process, system or activity covered, contact persons etc. These documents should be reviewed regularly and revised as necessary, with any revisions subject to a formal approvals procedure;
- that current versions of the relevant documents are available in work areas where the relevant activity is being performed;
- that documents which are no longer applicable are marked clearly as such or removed;

Documents may be in hard copy or electronic form, depending on the most expedient manner of making documents available to employees who are to use them.

#### **A.4.6 Operational control**

The organization should evaluate operations that are associated with its identified significant energy aspects and ensure that they are conducted in a way that will control and reduce their energy consumption, in order to fulfil the requirements of its energy policy and meet its objectives and targets. This should include all parts of its operations, especially the operation, maintenance, design and procurement of plant, equipment, facilities, and raw materials and any other areas that could affect its significant energy aspects.

Often opportunities for improved performance will arise from the continual identification and implementation of no cost housekeeping measures i.e. shutdown equipment when not in use.

Procedures for operation and maintenance should include:

- housekeeping procedures and checklists to avoid and minimise wastage;
- operating and maintenance plans for machinery, equipment and facilities;
- description of service intervals for the pertinent equipment, including what is subject to servicing;
- identification of departments and personnel responsible for operation and maintenance of the equipment;
- schedules for inspection of the relevant equipment and description of how the inspection is to take place.

Energy conscious design ensures that energy efficient alternatives are considered when designing any new or modified equipment, plant, facilities or buildings which have the potential to impact on the significant energy aspects. This includes design of new production lines, utilities and facilities etc where it is feasible and economically practicable to do so. In general terms, this could be covered by awareness and training to all personnel as covered in section 4.4.2.

Energy conscious design should ensure that:

- a thorough analysis of the energy demands is performed at the very first stage of design projects;
- an energy assessment is subsequently carried out during relevant design stages where appropriate (tenders, initial detailed design, final design, equipment selection, delivery, commissioning etc.);
- the tasks of the people responsible in relation to energy conscious design are clearly defined.

Energy conscious procurement ensures that energy consumption is considered when decisions are made for the purchase of machinery, equipment, raw materials and services. Where procurement has the potential to impact to a significant degree on the significant energy consumption, then energy efficiency should become

part of the evaluation criteria. In general terms, this could be covered by awareness and training to all personnel as covered in section 4.4.2.

Suggested procedures should include:

- company wide procurement policies where applicable;
- purchasing guidelines i.e. criteria to be followed if proposed products have the potential to increase energy consumption by more than prescribed levels;
- detailed energy assessments as required;
- payback criteria and calculation methods i.e. financial appraisal;
- life cycle costing;
- vetted list of approved energy efficient spare parts and/or store of such parts.

When undertaking energy efficiency assessments, whether in the design or purchasing of equipment that will affect significant energy aspects, the following should be established:

- criteria for when assessments are required;
- those responsible for performing the assessment;
- the resources (time and financial) available;
- investigation into the economic and technical energy efficient alternatives;
- those responsible for the review and approval of the assessment;
- those responsible for making final decisions on the options available.

There can be varying levels of assessment, depending on the criteria the organization establishes. The greater the energy consumption, the more reason to focus on the possibilities of reducing the consumption by designing and/or procuring the most energy efficient equipment on the market.

These procedures should apply to all parties performing work on behalf of the organization, including contractors, consultants, etc. The procedures should therefore describe:

- communication to external contractors, service companies, consultants etc.,
- how required documented actions have been recorded.

By informing suppliers of the energy policy and procurement procedures the organization will encourage dialogue with the supplier regarding the possibility of improving energy efficiency.

## **A.5 Checking**

### **A.5.1 Monitoring and measurement**

Monitoring and measurement is the management of energy consumption by means of detailed ongoing measurement of consumption against established targets.

Monitoring and measurement should be appropriate to the needs of the organization and should facilitate the analysis of energy consumption (on for example processes, compressed air, heating and lighting), variations

over time, achievement of targets etc. This means that the significant energy consumption should be assessed and evaluated at a frequency that allows energy performance indicator (EPI's) to be established (e.g. kWh per unit of production and/or kWh per m<sup>2</sup> floor area). Key figures should be used as an ongoing control to ensure intervention in the event of deviation from baseline usage.

The organization should be able to justify the relevance of the measurement frequency applied in relation to the identified energy consumption. Examples of monitoring and measurement include the following activities:

- ongoing monitoring and recording of the significant energy consumption;
- summarising the significant energy consumption in the form of key figures;
- analysis of key figures and comparison of figures with a documented basis of assessment (normal values, budget figures, maximum and minimum limits, statistical methods);
- intervention in the case of deviation from the indexed baseline usage;
- review of performance and amendment of targets.

Measuring equipment should be calibrated to ensure accuracy and records retained. The requirement is to identify improvement. Measurements and measurement techniques shall be consistent period to period. Repeatability of measurement, rather than absolute accuracy, is pre-eminent.'

The organization should establish processes and procedures for monitoring and measuring all significant energy consumption. The procedures should include a description of the following:

- a) how significant energy consumption is measured, recorded and monitored;
- b) the extent of monitoring, including the frequency of measurements; calibration and maintenance of measuring equipment;
- c) roles and responsibilities of relevant personnel;
- d) how the energy consumption is presented against the energy performance indicators.

### **A.5.2 Evaluation of compliance**

The organization should establish, implement and maintain procedures for monitoring the conformity of the energy management system with legal obligations and other requirements to which the organization subscribes, relating to the significant energy consumption. Records of these results should be maintained to demonstrate conformance. For control of records see section 4.5.4

### **A.5.3 Nonconformity, corrective action and preventive action**

The organization should ensure that non-conformances are investigated and appropriately actioned. Non-conformances exist when the organization's energy policy, objectives, targets, programmes or documented procedures are not complied with.

The organization should establish, implement and maintain a procedure for the practical handling of non-conformances and for corrective and preventive action. The organization should:

- identify the cause of the non-conformance;
- take the appropriate action to correct the non-conformance;
- initiate the action required to prevent recurrence of the non-conformance;

- change the documented procedures if necessary to ensure that they are consistent with new initiatives or actions;
- identify who is responsible for recording non-conformances and how they are recorded, and ensure that the process of corrective and preventive action is initiated;
- retain all relevant documentation in accordance with legal and/or documented time frames.

#### **A.5.4 Control of records**

The purpose of recording is to ensure that the necessary documentation is provided to substantiate the achievement of targets, action plans and other requirements of the energy management system.

The extent of the documentation may vary according to each organization's requirements. These records may include:

- information about relevant laws and regulations;
- applicable training records;
- relevant energy management communication material to all stakeholders such as press releases, awareness campaigns, presentations, websites, awards etc.;
- significant energy consumption and energy performance indicators;
- records of installation, inspection, maintenance and calibration of measuring equipment;
- communication of energy policy to contractors, subcontractors and suppliers;
- dates of inspection and servicing of energy using equipment;
- procurement of energy efficiency equipment;
- design activities which have considered energy efficiency;
- results of audits;
- management reviews.

All records kept should be legible, identifiable, traceable and readily retrievable. These records should support the processes and procedures of the energy management system.

#### **A.5.5 Internal audit of the energy management system**

The purpose of an internal audit is to carry out a systematic review of the energy management system and assess whether the system operates in accordance with the organization's own requirements together with those of the Energy management system standard. The Internal audit procedure should address requirements for defining the scope of the audits, the frequency and scheduling of audits, how audits are to be conducted and the training required for auditors. The procedures should also consider how audit findings are recorded and reported and how any required corrective action is managed.

Examples of subjects for consideration by internal auditing include:

- effective and efficient implementation of energy management programmes, processes and systems;
- opportunities for continual improvement;

- capability of processes and systems;
- effective and efficient use of statistical techniques;
- use of information technology.

Internal audits may be performed by employees of the organization and/or by external parties appointed by the organization. In both cases the person or persons performing the audits shall be qualified, experienced, impartial and independent of the area of the organization to be audited.

The energy management system should typically be reviewed and audited on an annual basis as a minimum. The results of the internal audit should be documented and communicated to senior management.

## **A.6 Review of the energy management system by top management**

The purpose of the management review is to ensure continual improvement and adaptation of the system so that the system operates in line with company energy policy. The review implies that the individual elements and overall operation of the energy management system are evaluated in a critical manner in relation to the ability of the system to comply with the energy policy and achieve the energy targets. It should be the top management of the organization that reviews the system at specified intervals.

By extending management review beyond verification of the energy management system, the outputs of management review can be used by top management as inputs to improvement processes. Top management can use this review process as a powerful tool in the identification of opportunities for performance improvement by the organization. The schedule of reviews should facilitate the timely provision of data in the context of strategic planning for the organization. Selected output should be communicated to demonstrate to the people in the organization how the management review process leads to new objectives that will benefit the organization.

## Annex B (informative)

### Checklist for implementing an energy management system

**Table B.1 — Checklist for implementing an energy management system**

CEN/CLC BT/TF 189 WI CSF23001 (2007-05) Version 2.1c	Checklist questions referred to Standard text
<p><b>4.2 Energy policy</b></p> <p>Top management shall establish, implement and maintain an energy policy for the organization. The energy policy shall state the organization's commitment for achieving improved energy performance. Top management shall ensure that the energy policy:</p>	<p>Has the energy policy been authorized by the highest control (operational) level (top management) within the organization?</p>
<p>a) covers all energy aspects;</p>	<p>Does the policy reflect the relation between the company activities and (most) relevant energy aspects and the principles for management of these aspects?</p>
<p>b) is appropriate to the nature and scale of, and impact on, the organization's energy use;</p>	
<p>c) includes a commitment to continual improvement in energy performance;</p>	<p>Does the policy state that the organization strives for ongoing improvement of energy-efficiency?</p>
<p>d) includes a commitment to ensure the availability of information and of all necessary resources to achieve objectives and targets;</p>	
<p>e) provides the framework for setting and reviewing energy objectives and targets;</p>	<p>Does the policy contain an overall sense of direction and set principles with respect to improvement of energy-efficiency and prevention of energy consumption?</p>
<p>f) includes a commitment to comply with all applicable requirements relating to its energy aspects; whether legally required or agreed to by the organization;</p>	<p>Does the policy state commitments to, among other things, comply with or exceed applicable legal requirements and other requirements to which the organization subscribes which relate to its energy aspects?</p>
<p>g) is documented, implemented, maintained and communicated to all persons working for and on behalf of the organization;</p>	<p>Has the energy policy been communicated to all personnel working for or on behalf of the organization and is it acted upon? (policy statement is included in management system manual, available on intranet, periodically communicated in newsletters or operational meetings, included in information/instructions to contractors).</p>

<p>h) is regularly reviewed and updated;</p>	<p>Is the energy policy or components of it periodically reviewed and modified as appropriate by top management?</p>
<p>i) is available to the public.</p>	<p>Is the energy policy available for external interested parties? (available on internet web sites, reflected in brochures, newsletters annual reports and/or contracts, included in instructions for contractors, set arrangements for communicating policy on request).</p>
<p><b>4.3.3 Energy objectives, targets and programme(s)</b></p>	
<p>The organization shall establish periodically, implement and maintain documented energy objectives and targets, at the relevant functions and levels within the organization.</p> <p>The objectives and targets shall be consistent with the energy policy, including the commitments to improvements in energy efficiency and to comply with applicable legal obligations and other requirements to which the organization subscribes.</p> <p>The organization shall set specific targets for the key parameters that affect energy performance.</p> <p>The energy objectives and target(s) shall be measurable and documented, and a time frame set for achievement.</p> <p>When establishing targets, the organization shall consider the significant energy aspects identified in the review as well as its technological options, its financial, operational and business conditions, legal requirements and the views of interested parties.</p> <p>The organization shall draw up and maintain energy management programmes for achieving its objectives and targets. The energy management programmes shall include:</p> <ul style="list-style-type: none"> <li>a) designation of responsibility</li> <li>b) the means and time frame by which individual targets are to be achieved</li> </ul> <p>The energy management programmes shall be documented.</p>	<p>Has the organization set, on a periodically basis, measurable energy-efficiency improvement objectives and targets to fulfil the commitments established in its energy policy?</p> <p>Is there a timeframe set for meeting these objectives and targets?</p> <p>Is it demonstrable that the following is being considered when setting objectives and targets: the significant energy aspects identified in the review as well as its technological options, financial, operational and business conditions, legal obligations and other requirements and the views of interested parties?</p> <p>Has the organization translated the objectives in programmes reflecting roles, responsibilities, processes, resources, timeframes, priorities and the actions necessary for achieving the energy objectives and targets?</p>

<b>4.4 Implementation and operation</b>	
<b>4.4.1 Resources, roles, responsibility and authority</b>	
<p>Top management shall ensure the availability of resources essential to establish, implement, maintain and improve the energy management system.</p> <p>Resources include human resources, specialized skills, technology and financial resources.</p> <p>Roles, responsibilities and authorities shall be defined, documented and communicated in order to facilitate effective energy management.</p>	<p>Does the management determine and make available appropriate resources to establish, implement, maintain and improve the energy management system? (These resources should be provided in a timely and efficient manner): decisions for financial resource provision during management meetings or reviews, investment programs, allocation of required personnel, training etc.</p> <p>Does resource allocation consider both the current and future needs of the organization?</p> <p>Are the tasks, responsibilities and authority determined for employees involved in energy management:</p> <ul style="list-style-type: none"> <li>— documentation of responsibilities and authorities (possibly in manuals/procedures/training packages);</li> <li>— organization structure diagrams and job descriptions (reflecting tasks and responsibilities)</li> </ul>
<p>The organization's top management shall appoint an energy manager reporting to the top management who, irrespective of other responsibilities, shall have defined roles, responsibility and authority for:</p> <ul style="list-style-type: none"> <li>— ensuring that an energy management system is established, implemented and maintained in accordance with this standard</li> <li>— reporting on the performance of the energy management system to top management for their review, with recommendations for improvement</li> </ul> <p>The energy manager must be competent and qualified in energy use.</p>	<p>Has top management assigned (a) representative(s) or function(s) with sufficient authority, awareness, competence and resources to ensure the establishment, implementation and the maintenance of the energy management system and to report to the top management on energy management system performance and its opportunities for improvement?</p>

<b>4.4.2 Awareness, training and competence</b>	
<p>The organization shall ensure that its employees and all persons working on its behalf are and remain aware of:</p> <ul style="list-style-type: none"> <li>a) the organization's energy policy and energy management programs;</li> <li>b) the energy management system requirements, including the activities of the organization to control energy use and improve energy performance;</li> <li>c) the significant impact of their work activities, actual or potential with respect to energy consumption, and the benefits of improved individual performance;</li> <li>d) their roles and responsibilities in achieving the requirements of the energy management system;</li> <li>e) the benefits that they may enjoy as a result of improved energy efficiency.</li> </ul> <p>Personnel performing tasks which can cause significant impacts on energy use shall be competent on the basis of appropriate education, training and/or experience. It is the responsibility of the organization to ensure that such personnel are and remain competent. The organization shall identify training needs associated with the control of its significant energy aspects and the operation of its energy management system.</p> <p>The organization shall also ensure that each level of management is adequately informed and trained in the field of energy management in order to be able to establish pertinent objectives and targets and choose appropriate energy management tools and methodologies.</p>	<ul style="list-style-type: none"> <li>a) Are employees and persons working on behalf of the organization familiar with the energy-efficiency values, energy policy and energy management programs, the impact of their activities on energy consumption and the importance of achieving the objectives and targets for which they are responsible or accountable or effect?</li> <li>b) Is there a process implemented to ensure that persons undertaking work activities that can cause (a) significant actual or potential energy aspect(s) or associated impact(s) are competent to do so? (For those activities that are most important in the management of its energy aspects, the organization should identify the knowledge, understanding, skills, or abilities that make an individual competent to perform them. Once required competencies are identified, the organization should ensure that persons performing these activities have the required competencies): competence requirements for individual roles, training programmes, records providing evidence of how the competence needs were addressed and records of evaluation of effectiveness of actions taken.</li> </ul>
<b>4.4.3 Communication</b>	
<p>The organization shall communicate internally with regard to its energy performance and the energy management system. This shall ensure that all persons working for and on behalf of the organization can take an active part in the energy management and the improvement of the energy performance.</p>	<p>Is energy performance information periodically communicated at all relevant levels of the organization (demonstrable by for example minutes of meetings, bulletin board postings, internal newsletters, suggestion boxes/schemes, websites, e-mail, meetings and joint committees)?</p>
<p>The organization shall decide whether to communicate externally about its energy management system and energy performance,</p>	<ul style="list-style-type: none"> <li>a) Has the organization decided whether to communicate about its energy management system and energy performance with</li> </ul>

<p>and shall document its decision. If the decision is to communicate externally, the organization shall establish and implement an external communication plan.</p>	<p>external parties and has it document this decision?</p> <p>b) If the decision is to communicate, then has the organization defined and implemented the methods of communication (informal discussions, organization open days, focus groups, community dialogue, involvement in community events, websites and e-mail, press releases, advertisements and periodic newsletters, annual reports)?.</p>
<p><b>4.4.4 Energy management system documentation</b></p>	
<p>The organization shall establish, implement and maintain information, in paper or electronic form, to:</p> <p>a) describe the core elements of the energy management system and their interaction;</p> <p>b) identify the location of related documentation including technical documentation.</p>	<p>Has the organization documented how the energy management system works? (details of the documented procedures and operating instructions and description of the interaction between processes related to significant energy aspects).</p>
<p><b>4.4.5 Control of documents</b></p>	
<p>The organization shall control records and other documents required by this standard to ensure that:</p> <p>a) they can be located;</p> <p>b) they are periodically reviewed and revised as necessary;</p> <p>c) the current versions are available at all relevant locations;</p> <p>d) the documents are kept and maintained in such a way that they are easily accessible and protected against damage, loss or destruction. Their retention time shall be established and documented;</p> <p>e) obsolete documents are retained for legal and/or knowledge preservation purposes and suitably identified, or removed as appropriate.</p>	<p>Has the organization defined controls for the identification, review, approval, issue and removal of documents containing information critical to the operation of the energy management system and made sure that they are protected against damage, loss or destruction</p>

<p><b>4.4.6 Operational control</b></p> <p>The organization shall identify and plan those operations that are associated with the significant energy aspects and ensure consistency with its energy policy, energy objectives and energy targets. This includes:</p>	
<p>a) preventing situations that could lead to deviation from the energy policy, energy objectives and energy targets,</p>	<p>Has the organization work instructions to control significant energy aspects? The choice of the specific control methods depends on a number of factors, such as the skills and experience of people carrying out the operation and the complexity and energy significance of the operation itself.</p>
<p>b) setting criteria for operation and maintenance of installations, equipment and buildings</p>	<p>Are there working instructions in which is described how equipment with significant impact on energy consumption must be operated and maintained?</p>
<p>c) energy considerations in the acquisition and purchase of equipment and raw materials</p>	<p>Is energy consumption being considered when purchasing identified equipment and raw materials?  Have suppliers of equipment and raw materials been informed that energy use is a criterion in the purchasing process (contracts, agreements, briefings etc)?</p>
<p>d) evaluation of energy consumption when considering the design, change or restoration of all assets, including buildings. An evaluation of the potential for more efficient energy use should be made as early as possible during the process</p>	<p>Are energy aspects used as criteria in process/facility/equipment/building change, design and engineering procedures?</p>
<p>e) appropriate communication in this regard to personnel, and people acting on behalf of the organization and other relevant parties.</p>	<p>Are stipulated issues being effectively communicated to employees and persons acting on behalf of the organization?</p>
<p><b>4.5 Checking</b></p>	
<p><b>4.5.1 Monitoring and measurement</b></p>	
<p>The organization shall identify and describe the measuring and monitoring requirements of its energy management programmes</p> <p>On a regular basis, the organization shall measure, monitor and record significant energy consumption and the factors that affect it,</p>	<p>Has the organization planned what will be measured, where and when it should be measured, and what methods should be used with respect to energy use?</p> <p>Is the energy consumption of most relevant energy consuming processes, machines and/or products being measured, monitored, recorded, analyzed and reported on a regular basis?</p> <p>Are other parameters effecting energy</p>

	consumption being measured and monitored on a regular basis?
The organization shall ensure that the accuracy and repeatability of measuring and monitoring equipment used is appropriate to the task in question and remains so. Associated records shall be maintained.	Are measuring and monitoring devices being maintained adequately and periodically calibrated (if required)?
<b>4.5.2 Evaluation of compliance</b>	
Consistent with its commitment to compliance, the organization shall periodically evaluate compliance with legal obligations and other requirements to which the organization subscribes. The organization shall keep records of the results of the periodic evaluations.	
<b>4.5.3 Nonconformity, corrective action and preventive action</b>	
The organization shall identify and handle non-conformance and initiate corrective and preventive action in a suitable manner within a specified time limit. The organization shall retain all relevant documentation in accordance with legal and/or documented time frames.	<p>Has the organization defined responsibilities, authority and steps to be taken in planning and carrying out corrective and preventive action?</p> <p>Are nonconformities investigated to determine the cause, so that corrective action can be focused on the appropriate part of the system and adequate corrective and preventive actions are taken to prevent recurrence? (The character and timing of such actions should be appropriate to the nature and scale of the nonconformity).</p> <p>Are preventive actions taken using a similar approach when a potential problem is identified but no actual nonconformity exists? (Potential problems can be identified using methods such as extrapolating corrective action of actual nonconformities to other applicable areas where similar activities occur, trend analysis, or operability studies)</p> <p>Is there a process in place that ensures that corrective and preventive actions have been implemented and that there is systematic follow-up to ensure their effectiveness?</p>
<b>4.5.4 Control of records</b>	
<p>The organization shall document that the requirements of this standard have been met.</p> <p>Records shall be tailored to the energy management system and the organization.</p> <p>Records shall be and remain legible, identifiable, traceable and retrievable for a defined period.</p>	<p>Has the organization determined which records are required to manage its energy matters effectively (probably in a list)?</p> <p>Has the organization defined the means of identification, collection, indexing, filing, storage, maintenance, retrieval and retention?</p> <p>Optional: Records should include</p>

	<p>monitoring data, information on compliance with applicable legal requirements and other requirements to which the organization subscribes, details of nonconformities and corrective and preventive actions, results of energy management system audits and management reviews, evidence of fulfilment of objectives/targets, information on participation in training, permits, licenses or other forms of legal authorization, results of inspection and calibration activity; and results of operational controls (maintenance, design, manufacture).</p>
<p><b>4.5.5 Internal audit of the energy management system</b></p>	
<p>Internal audits of the energy management system are carried out by, or at the request of, the organization itself, for internal purposes, and may be the basis for a self declaration of adherence to the management system.</p> <p>The organization shall periodically carry out internal audits of the energy management system to ensure that it:</p> <ul style="list-style-type: none"> <li>a) conforms to the energy policy, objectives, programmes, and all other requirements of this standard;</li> <li>b) is compliant with relevant legal obligations and other requirements to which the organization subscribes;</li> <li>c) is effectively implemented and maintained</li> </ul> <p>An audit schedule shall be planned, taking into consideration the status and importance of the processes and areas to be audited, as well as the results of previous audits.</p> <p>The conduct of audits shall ensure objectivity and impartiality of the audit process. Auditor objectivity and impartiality can be demonstrated by the freedom from responsibility for the activity being audited.</p> <p>Internal audit results shall be documented and reported to top management.</p>	<p>Are internal audits of the energy management system conducted at planned intervals (once a year at a minimum) to determine and provide information to management on whether the system conforms to planned arrangements and has been properly implemented and maintained (procedures, working instructions, legal requirements, meeting objectives)?</p> <p>Do the internal audits focus on processes, functions and areas relevant to the significant energy aspects of the organization?</p> <p>Are the internal audits planned and conducted by objective and impartial auditor(s) aided by technical expert(s) where appropriate selected from within the organization or from external sources? Their collective competence should be sufficient to meet the objectives and scope of the particular audit and provide confidence as to the degree of reliability that can be placed on the results.</p>

<b>4.6 Review of the energy management system by top management</b>	
<p>Top management shall review the organization's energy management system at planned intervals to ensure continuing suitability, adequacy and effectiveness. The organization shall consider its commitment to continual improvement in decisions related to actions taken. Records of management reviews shall be maintained.</p> <p>Inputs to management review shall include:</p> <ul style="list-style-type: none"> <li>a) energy management programme reviews, energy diagnoses results, energy management system audits results;</li> <li>b) evaluation of legal compliance;</li> <li>c) the energy performance of the organization;</li> <li>d) the extent to which energy objectives and targets have been met;</li> <li>e) status of corrective and preventive actions;</li> <li>f) follow-up actions from previous management reviews;</li> <li>g) changes in legal obligations and other requirements to which the organization subscribes ;</li> <li>h) recommendations for improvement.</li> </ul> <p>Outputs from the management review shall include any decisions or actions related to:</p> <ul style="list-style-type: none"> <li>a) the improvement in the energy performance of the organization since the last review,</li> <li>b) changes to the energy policy,</li> <li>c) changes to objectives, targets or other elements of the management system for energy consistent with the organization's commitment to continual improvement, and</li> <li>d) allocation of resources,</li> </ul> <p>Records of the management review shall be retained.</p>	<p>Does top management review the adequacy and effectiveness of the energy management system minimum once a year and does the review cover all relevant energy aspects and performance? Records of management review can include copies of meeting agenda items, lists of attendees, presentation materials or handouts, and management decisions recorded in a memo to file, reports, minutes, or tracking system.</p> <p>Is it demonstrable that during the reviews possible modification of the policy and objectives are discussed as a result of changed circumstances and the obligation to continually improve energy-efficiency?</p>

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