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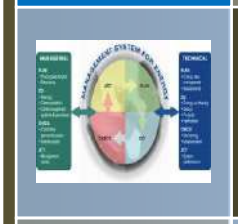

ISO 52001-1:2017- Energy performance of buildings.

What is ISO 52001-1:2017- Energy Performance of buildings?

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL:

ISO 52000-1 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 371, *Energy Performance of Buildings project group,* in collaboration with ISO Technical Committees TC 163, *Thermal performance and energy use in the built environment*, and TC 205, *Building Environment Design*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).
A list of all parts in the ISO 52000 series can be found on the ISO website.
This document cancels and replaces ISO/TR 16344:2012[3] and ISO 16346:2013[2].

Introduction

This document is part of a series aimed at the international harmonization of the methodology for assessing the energy performance of buildings. Throughout, this series is referred to as a “set of EPB standards”.
All EPB standards follow specific rules to ensure overall consistency, unambiguity and transparency.
All EPB standards provide a certain flexibility with regard to the methods, the required input data and references to other EPB standards, by the introduction of a normative template
in Annex A and Annex B with informative default choices.
For the correct use of this document, a normative template is given in Annex A to specify these choices.
Informative default choices are provided in Annex B.
The main target groups for this document are architects, engineers and regulators.
Use by or for regulators: In case the document is used in the context of national or regional legal requirements, mandatory choices may be given at national or regional level for such specific applications. These choices (either the informative default choices from Annex B or choices adapted to national/regional needs, but in any case, following the template of Annex A) can be made available as national annex or as separate (e.g. legal) document (national data sheet).

NOTE 1 So in this case:

— the regulators will specify the choices;
— the individual user will apply the document to assess the energy performance of a building, and thereby use the choices made by the regulators.
Topics addressed in this document can be subject to public regulation. Public regulation on the same topics can override the default values in Annex B. Public regulation on the same topics can even, for certain applications, override the use of this document. Legal requirements and choices are in general not published in standards but in legal documents. In order to avoid double publications and difficult updating of double documents, a national annex may refer to the legal texts where national choices have been made by public authorities. Different national annexes or national data sheets are possible, for different applications.
It is expected, if the default values, choices and references to other EPB standards in Annex B are not followed due to national regulations, policy or traditions, that:

- — national or regional authorities prepare data sheets containing the choices and national or regional values, according to the model in Annex A. In this case a national annex (e.g. NA) is recommended, containing a reference to these data sheets;
- — or, by default, the national standards body will consider the possibility to add or include a national annex in agreement with the template of Annex A, in accordance to the legal documents that give national or regional values and choices.

Further target groups are parties wanting to motivate their assumptions by classifying the building energy performance for a dedicated building stock.
More information is provided in the Technical Report accompanying this document ISO/TR 52000-2[6].
The framework for overall EPB includes:

- a) common terms, definitions and symbols;

b) building and assessment boundaries;

1 Scope

This document establishes a systematic, comprehensive and modular structure for assessing the energy performance of new and existing buildings (EPB) in a holistic way.
It is applicable to the assessment of overall energy use of a building, by measurement or calculation, and the calculation of energy performance in terms of primary energy or other energy-related metrics. It takes into account the specific possibilities and limitations for the different applications, such as building design, new buildings 'as built', and existing buildings in the use phase as well as renovation.

NOTE Table 1 in the Introduction shows the relative position of this document within the set of EPB standards in the context of the modular structure as set out in this document.

2 Normative references

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

- ISO 7345:1987, *Thermal insulation — Physical quantities and definitions*

NOTE Default references to EPB standards other than ISO 52000-1 are identified by the EPB module code number and given in Annex A (normative template in Table A.1) and Annex B (informative default choice in Table B.1).

EXAMPLE

EPB module code number: M5–5, or M5–5.1 (if module M5–5 is subdivided), or M5–5/1 (if reference to a specific clause of the documents covering M5–5).

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7345:1987 and the following apply.
Clause 3 includes terms that are not used in this document, but that are needed for overall consistency in the EPB standards.

NOTE 1 An alphabetic list of all terms defined in this document is given in Annex F.

NOTE 2 See ISO/TR 52000-2[6] for explanation on the overarching terms and definitions and how possible conflicts with national or regional (e.g., legal) specifications is avoided.

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

- — IEC Electromedical: available at http://www.electropedia.org/
- — ISO Online browsing platform: available at http://www.iso.org/obp

- c) building partitioning into space categories;
- d) methodology for calculating the EPB (formulae on energy used, delivered, produced and/or exported at the building site and nearby);

- e) a set of overall formulae and input-output relations, linking the various elements relevant for the assessment of the overall EPB;
- f) general requirements for EPB dealing with partial calculations;
- g) rules for the combination of different spaces into zones;
- h) performance indicators;
- i) methodology for measured energy performance assessment.

Table 1 shows the relative position of this document within the set of EPB standards in the context of the modular structure as set out in ISO 52000-1.

NOTE 2 In ISO/TR 52000-2[6] the same table can be found, with, for each module, the numbers of the relevant EPB standards and accompanying technical reports that are published or in preparation.

NOTE 3 The modules represent EPB standards, although one EPB standard could cover more than one module and one module could be covered by more than one EPB standard, for instance, a simplified and a detailed method respectively. See also Tables A.1 and B.1.

List of International Organization for Standardization standards

This is a list of publishedInternational Organization for Standardization (ISO) standards and other deliverables. For a complete and up-to-date list of all the ISO standards, see the ISO catalogue.

The standards are protected by copyright and most of them must be purchased. However, about 300 of the standards produced by ISO and IEC's Joint Technical Committee 1 (JTC 1) have been made freely and publicly available.

ISO Brand

This is a dynamic list and may never be able to satisfy particular standards for completeness. You can help by adding missing items with reliable sources.

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Background

Organizations of all types and sizes increasingly want to reduce the amount of energy they consume. This is driven by the need or desire to:

- reduce costs,

- reduce the impact of rising costs,
- meet legislative or self-imposed carbon targets,
- reduce reliance on fossil fuels, and
- enhance the entity's reputation as a socially responsible organization.

In tandem, governments increasingly want to reduce the Greenhouse Gas Emissions of their citizens and industries, and are imposing legislative mechanisms to compel carbon reduction more and more frequently.

In response, a range of energy management standards, specifications and regulations were developed in Australia, China, Denmark, France, Germany, Ireland, Japan, Republic of Korea, Netherlands, Singapore, Sweden, Taiwan, Thailand, New Zealand and the USA.

Subsequently, the European Committee for Standardization (CEN) developed EN 16001:2009 *Energy management systems. Requirements with guidance for use* as a first international energy management standard. This was published in July 2009 and withdrawn in April 2012 as it had been superseded by ISO 50001.

Development

The United Nations Industrial Development Organization (UNIDO) recognized that industry around the world needed to mount an effective response to climate change.[1] It also noted a proliferation of national energy management standards that were emerging as a response to market demand for help with energy efficiency.

In April 2007, a UNIDO stakeholders meeting decided to ask ISO to develop an international energy management standard.

ISO for its part had identified energy management as one of its top five areas for the development of International Standards and, in 2008, created a project committee, ISO/PC 242, *Energy management*, to carry out the work.

ISO/PC 242 was led by ISO members for the United States (ANSI) and Brazil (ABNT). In addition, its leadership included the ISO members for China (SAC) and the United Kingdom (BSI Group) to ensure that developed and developing economies participated together in the project committee.

Experts from the national standards bodies of 44 ISO member countries participated and another 14 countries sent observers. Development organizations including UNIDO and the World Energy Council (WEC) were also involved.

ISO 50001 also drew on existing national and regional energy management codes and standards, including ones developed in China, Denmark, Ireland, Japan, Republic of Korea, Netherlands, Sweden, Thailand, the US and the European Union.

ISO published a revised version of ISO 50001 in 2018. The revision reflects a desire to promote adoption of the standard among small and medium sized enterprises. It also incorporates ISO's "high level structure" for use where organizations wish to integrate a number of management system standards together.

Structure

The structure of ISO 50001 is designed according to other ISO management system standards, in particular ISO 9001 (Quality Management Systems) and ISO 14001 (Environmental Management Systems). Since all three management systems standards are based on the PDCA cycle, and now share the same high-level structure, ISO 50001 can be integrated easily to these systems.

There are ten major components to ISO 50001:2018:

- *1.*: Scope
- *2.*: Normative references
- *3.*: Terms and definitions
- *4.*: Context of the organization
- *5.*: Leadership
- *6.*: Planning
- *7.*: Support
- *8.*: Operation
- *9.*: Performance Evaluation
- *10.*: Improvement

Method

ISO 50001 provides a framework of requirements that help organizations to:

- develop a policy for more efficient use of energy
- fix targets and objectives to meet the policy
- use data to better understand and make decisions concerning energy use and consumption
- measure the results
- review the effectiveness of the policy and
- continually improve energy management.

ISO 50001 focuses on a continual improvement process to achieve the objectives related to the environmental performance of an organization (enterprise, service provider, administration, etc.). The process follows a plan – do – check – act approach.

The 4 phases of the PDCA circle

The overall responsibility for the installed energy management system must be located with the top management. An energy officer and an energy team should be appointed. Furthermore, the organization

has to formulate the energy policy in form of a written statement which contains the intent and direction of energy policy. Energy policy must be communicated within the organization. The energy team is the connection between management and employees. In this phase the organization has to identify the significant energy uses and prioritize the opportunities for energy performance improvement.

Certification

Certification proves that the energy management system meets the requirements of ISO 50001. This gives customers, stakeholders, employees and management more confidence that the organization is saving energy. It also helps to ensure that the energy management system is working throughout the organization.

Another advantage of a certification is its emphasis on continual improvement. The organization will continue to get better at managing its energy. Additional cost savings can be generated over several years. Furthermore, certifying an organization shows your public commitment to energy management.

UKAS, the certification bodies' accreditation scheme in UK, accredits certification bodies to carry out certification of business energy management systems to ISO 50001. In July 2018, there were 15 UK bodies with the necessary accreditation to carry out independent audits and issue Energy Management Systems Certification to ISO 50001.

Impact

ISO reported that the standard was warmly received by the market when it was first published. To the end of January 2012, around 100 organizations in 26 countries had already achieved certification to ISO 50001. ISO also listed several users who had reported significant early cost savings and benefits.

In China, Delta Electronics, a provider of power and thermal management solutions, reported reducing power consumption by 10.51 million kWh as compared to the same period in 2010. This is equivalent to a reduction of 10.2 thousand tons of carbon emissions and a saving of CNY 8 million ($1.2m).

In India, the Dahanu Thermal Power Station in Maharashtra expected to accrue annual savings of about INR 96.4 million ($1.7m) from raised energy efficiency and management.

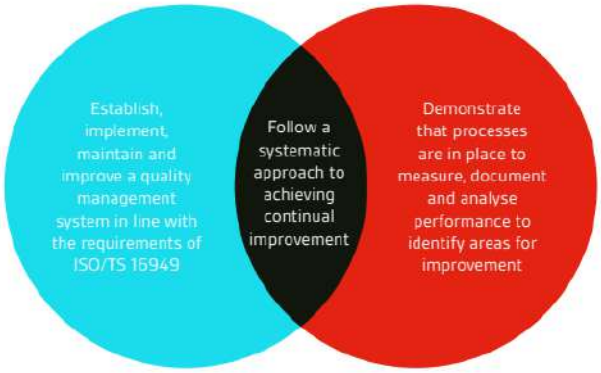
In Austria, the municipality of Bad Eisenkappel, with 2,400 inhabitants, expected its consumption of energy to be reduced by nearly 25 per cent, with the main savings achieved by updating the waste water plant and reducing energy consumption by 86 000 kWh, equivalent to €16,000 ($20.7k).

BSI Group published a case study showing that Sheffield Hallam University in the UK reduced its carbon emissions by 11 per cent once it was certified to ISO 50001. This yielded annual savings of over £100,000 ($160.7k).

In December 2013, the UK Department of EnergyandClimateChange became the first Central Government department to achieve certification against the requirements of ISO 50001, leading by example with the belief that structured energy management will lead to substantial energy reductions and thus mitigatetheeffectsofclimatechange.

ISO has stated that it believes in due course the standard could influence up to 60 per cent of the world's energy use.

The principal requirements of the standard are illustrated below:

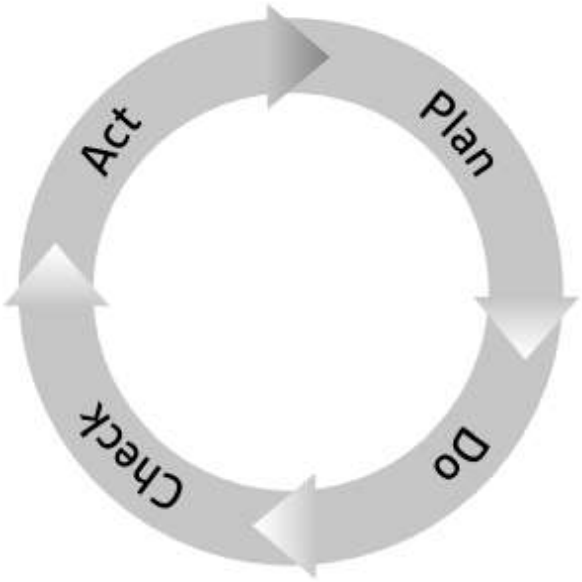


The next few pages of the guide takes you through the Plan-Do-Check-Act (PDCA) methodology, common in all ISO management systems and how DCS can help and support you on your ISO/TS 16949 journey.

Understanding the principles of continual improvement

Act

Correct and improve your plans to meet and exceed your planned results



Plan

Establish objectives and draft your plans (analyse your organization's current systems, establish overall objectives, set interim targets for review and develop plans to achieve them)

Check

Measure and monitor your actual results against your planned objectives

Do

Implement your plans within a structured management framework