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### Energetske presoje - 1. del: Splošne zahteve

Energy audits - Part 1: General requirements

Energieaudits - Teil 1: Allgemeine Anforderungen

Audits énergétiques - Partie 1: Exigences générales

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## Energy audits - Part 1: General requirements

Audits énergétiques - Partie 1 : Exigences générales

Energieaudits - Teil 1: Allgemeine Anforderungen

This European Standard was approved by CEN on 3 July 2022.

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## European foreword

This document (EN 16247-1:2022) has been prepared by the Joint Technical Committee CEN-CENELEC/JTC 14 “Energy management and energy efficiency in the framework of energy transition”, the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN-CENELEC shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 16247-1:2012.

Significant changes compared to the previous edition are:

- a) Terms and definition updated to be compliant with ISO 50001;
- b) New Annex A Energy Audit Process Flow Diagram added;
- c) New Annex B Examples of energy Audit level added;
- d) New Annex C Sampling (Based on ISO 19011:2018 Guidelines for auditing management systems) added.

This Part covers the general requirements common to all energy audits. There are four further parts of the EN 16247 series, which provide additional material to Part 1 for four specific sectors.

The other parts of EN 16247 “Energy audits” are:

- *Part 2: Buildings;*
- *Part 3: Processes;*
- *Part 4: Transport;*
- *Part 5: Competence of energy auditors.*

This document has been prepared under a mandate given to CEN and CENELEC by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users’ national standards body/national committee. A complete listing of these bodies can be found on the CEN and CENELEC websites.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

## Introduction

An energy audit is an important step for an organization, whatever its size or type, wanting to improve its energy performance, reduce energy consumption and bring related environmental and other benefits.

This document defines the attributes of a high-quality energy audit. It states the requirements for energy audits and corresponding obligations within the energy auditing process. It recognizes that there are differences in approach to energy auditing in terms of scope, aims and thoroughness, but seeks to harmonize common aspects of energy auditing in order to bring more clarity and transparency to the market for energy auditing services. The energy audit process is presented as a simple chronological sequence; this does not preclude however repeated iterations of certain steps.

This document applies to commercial, industrial, residential and public-sector organizations. This document does not deal with the energy audit programme/scheme properties (such as programme administration, training of energy auditors, quality control issues, energy auditors' tools, etc.).

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## 1 Scope

This document specifies the requirements, common methodology and deliverables for energy audits. It is applicable to all forms of establishments and organizations, all forms of energy and energy uses.

This document covers the general requirements common to all energy audits. Specific energy audit requirements complete the general requirements in separate parts dedicated to energy audits for buildings, industrial processes and transport.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### **energy audit**

systematic inspection and analysis of energy use and energy consumption of a site, building, system or organization with the objective of identifying energy flows and the potential for energy efficiency improvements and reporting them

### 3.2

#### **energy auditor**

individual, group of people or body carrying out an energy audit

Note 1 to entry: A group or body can include subcontractors.

### 3.3

#### **audited object**

site, building, equipment, system, process, vehicle, service or *organization* (3.4) which is the subject of the *energy audit* (3.1)

### 3.4

#### **organization**

person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives

Note 1 to entry: The concept of organization includes, but is not limited to, sole-trader, company, corporation, firm, enterprise, authority, partnership, charity or institution, or part or combination thereof, whether incorporated or not, public or private.

[SOURCE: ISO 50001:2018, 3.1.1]

### 3.5

#### **energy consumption**

quantity of *energy* (3.16) applied

[SOURCE: ISO 50001:2018, 3.5.2]

**EN 16247-1:2022 (E)****3.6  
energy efficiency**

ratio or other quantitative relationship between an output of performance, service, goods, commodities, or *energy* (3.16), and an input of energy

EXAMPLE Conversion efficiency; energy required/energy consumed.

Note 1 to entry: Both input and output should be clearly specified in terms of quantity and quality and be measurable.

[SOURCE: ISO 50001:2018, 3.5.3]

**3.7  
energy performance**

measurable result(s) related to *energy efficiency* (3.6), *energy use* (3.10) and *energy consumption* (3.5)

Note 1 to entry: Energy performance can be measured against the *organization's* (3.4) objectives, *energy targets* (3.20) and other energy performance requirements.

Note 2 to entry: Energy performance is one component of the *performance* of the *energy management system* (3.18).

[SOURCE: ISO 50001:2018, 3.4.3, modified]

**3.8  
energy performance indicator****EnPI**

measure or unit of *energy performance* (3.7), as defined by the *organization* (3.4)

Note 1 to entry: EnPI(s) can be expressed by using a simple metric, ratio, or a model, depending on the nature of the activities being measured.

Note 2 to entry: See ISO 50006 for additional information on EnPI(s).

[SOURCE: ISO 50001:2018, 3.4.4]

**3.9  
energy performance improvement action****EPIA**

action or measure or group of action or measures implemented or planned within an *organization* (3.4) intended to achieve *energy performance improvement* (3.21) through technological, managerial or operational, behavioural, economical, or other changes

[SOURCE: ISO 50015:2014, 3.5]

**3.10  
energy use**

application of *energy* (3.16)

EXAMPLE Ventilation; lighting; heating; cooling; transportation; data storage; production process

Note 1 to entry: Energy use is sometimes referred to as “energy end-use”.

[SOURCE: ISO 50001:2018, 3.5.4]



**3.11****sampling method**

method of studying from representative selected audited objects, instead of the entire number of objects

Note 1 to entry: The selection is called sample.

Note 2 to entry: The principle of sampling is to analyse the samples selected in order to issue recommendations that will be valid for all audited object.

**3.12****significant energy use****SEU**

*energy use* (3.10) accounting for substantial *energy consumption* (3.5) and/or offering considerable potential for *energy performance improvement* (3.21)

Note 1 to entry: Significance criteria are determined by the organization (3.4).

Note 2 to entry: SEUs can be facilities, systems, processes, or equipment.

[SOURCE: ISO 50001:2018, 3.5.6]

**3.13****energy balance**

accounting of inputs and/or generation of energy supply versus energy outputs based on *energy consumption* (3.5) by *energy use* (3.10)

Note 1 to entry: Energy storage is considered within energy supply or energy use. If included in the energy audit scope (3.23), an energy balance needs to include energy storage and feedstock variation, as well as wasted energy, or energy content in material flows.

Note 2 to entry: An energy balance reconciles all energy, goods and products that enter the system boundary against the energy, goods and products leaving the system boundary.

[SOURCE: ISO 50002:2014, 3.6]

**3.14****static factor**

identified factor that significantly impacts *energy performance* (3.7) and does not routinely change

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

Note 1 to entry: Significance criteria are determined by the *organization* (3.4).

[SOURCE: ISO 50015:2014, 3.22, modified — Note 1 to entry added, and EXAMPLE 1 have been modified and EXAMPLE 2 has been deleted.]

**3.15****relevant variable**

quantifiable factor that significantly impacts *energy performance* (3.7) and routinely changes

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

Note 1 to entry: Significance criteria are determined by the *organization* (3.4).

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[SOURCE: ISO 50015:2014, 3.18, modified — Note 1 to entry has been added and wording of examples has been modified]

**3.16****energy**

electricity, fuels, steam, heat, compressed air and other similar media

Note 1 to entry: For the purposes of this document, energy refers to the various types of energy, including renewable, which can be purchased, stored, treated, used in an equipment or in a process, or recovered.

[SOURCE: ISO 50001:2018, 3.5.1]

**3.17****process**

set of interrelated or interacting activities which transform inputs into outputs

Note 1 to entry: A process related to an *organization's* (3.4) activities can be

- physical (e.g. energy-using processes, such as combustion), or
- business or service (e.g. order fulfilment).

[SOURCE: ISO 50001:2018, 3.3.6]

**3.18****energy management system****EnMS**

*management system* (3.19) to establish an energy policy, objectives, *energy targets* (3.20), action plans and *process(es)* (3.17) to achieve the objectives and energy targets

[SOURCE: ISO 50001:2018, 3.2.2]

**3.19****management system**

set of interrelated or interacting elements of an *organization* (3.4) to establish policies and objectives and *processes* (3.17) to achieve those objectives

Note 1 to entry: A management system can address a single discipline or several disciplines.

Note 2 to entry: The system elements include the organization's structure, roles and responsibilities, planning and operation.

Note 3 to entry: In some management systems, the scope of a management system can include the whole of the organization, specific and identified functions of the organization, specific and identified sections of the organization, or one or more functions across a group of organizations. The EnMS scope includes all energy types within its boundaries.

[SOURCE: ISO 50001:2018, 3.2.1]

**3.20****energy target**

quantifiable objective of *energy performance improvement* (3.21)

Note 1 to entry: An energy target can be included within an objective.

[SOURCE: ISO 50001:2018, 3.4.15]

**3.21****energy performance improvement**

improvement in measurable results of *energy efficiency* (3.6), or *energy consumption* (3.5) related to *energy use* (3.10), compared to the *energy baseline* (3.22)

[SOURCE: ISO 50001:2018, 3.4.6]

**3.22****energy baseline****EnB**

quantitative reference(s) providing a basis for comparison of *energy performance* (3.7)

Note 1 to entry: An energy baseline is based on data from a specified period of time and/or conditions, as defined by the *organization* (3.4).

Note 2 to entry: One or more energy baselines are used for determination of *energy performance improvement* (3.21), as a reference before and after, or with and without implementation of energy performance improvement actions.

Note 3 to entry: See ISO 50015 for additional information on measurement and verification of energy performance.

Note 4 to entry: See ISO 50006 for additional information on EnPIs and EnBs.

[SOURCE: ISO 50001:2018, 3.4.7]

**3.23****energy audit scope**

extent of *energy uses* (3.10) and related activities to be included in the *energy audit* (3.1), as defined by the *organization* (3.4) in consultation with the *energy auditor* (3.2), which can include several boundaries

EXAMPLE Organization, facility/facilities, equipment, system(s) and process(es)

Note 1 to entry: The energy audit scope can include energy related to transport.

[SOURCE: ISO 50002:2014, 3.4]

**3.24****site**

activities of *organization* (3.4) within the boundaries of the audited object, service or system

**3.25****interested party**

person or *organization* (3.4) that can affect, be affected by, or perceive itself to be affected by a decision or activity

[SOURCE: ISO 50001:2018, 3.1.5]

**3.26****net present value****NPV**

sum of discounted cash flows over the whole lifetime of an investment

[SOURCE: EN 17463:2021, 3.13]