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Energetske presoje - 3. del: Procesi

Energy audits - Part 3: Processes

Energieaudits - Teil 3: Prozesse

Audits énergétiques - Partie 3 : Procédés

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Foreword

This document (EN 16247-3:2014) has been prepared by Technical Committee CEN/CLC/JWG 1 "Energy audits", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by November 2014 and conflicting national standards shall be withdrawn at the latest by November 2014.

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

This Part provides additional material to Part 1 for the Process sector and should be used in conjunction with Part 1.

This European Standard is part of the series EN 16247 "*Energy audits*" which comprises the following:

— Part 1 General requirement;

— Part 2 Buildings;

— Part 3 Processes;

— Part 4 Transport;

— Part 5 Competence of energy auditors.

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

0 Introduction

An energy audit can help an organization to identify opportunities to improve energy efficiency. It can be part of a site wide energy management system.

There are various sectors with important differences in processes and utilities. It should be emphasized that there are many types of processes in industry and commerce. In general, energy is used:

— directly by a process, e.g. furnaces, direct fired dryers, etc;

— indirectly by a process (e.g. heat exchange, distillation, extrusion, etc.) including the specific conditions of production (e.g. start-up, shut-down, product change over, cleaning, maintenance, laboratory and product transfer);

— utility processes (e.g. motor driven systems (fans, pumps, motors, compressors, etc.), steam, hot water), including on site power plants;

— other processes (e.g. sterilization in hospitals, fume cupboards, laboratories etc.).

This standard defines the attributes of a good quality energy audit on a site in addition to EN 16247-1, which gives the general requirements for energy audits.

1 Scope

This European standard specifies the requirements, methodology and deliverables of an energy audit within a process. These consist of:

a) organizing and conducting an energy audit;

b) analysing the data from the energy audit;

c) reporting and documenting the energy audit findings.

This part of the standard applies to sites where the energy use is due to process. It shall be used in conjunction with and is supplementary to EN 16247-1, Energy audits — Part 1: General requirements. It provides additional requirements to EN 16247-1 and shall be applied simultaneously.

A process could include one or more production lines, offices, laboratories, research centers, packaging and warehouse sections with specific operational conditions and site transportation. An energy audit could include the whole site or part of a site.

If buildings are included in the scope of the energy audit, the energy auditor may choose to apply EN 16247-2, *Energy Audits — Part 2: Buildings*. If on-site transport on a site is included in the scope of the energy audit, the energy auditor may choose to apply EN 16247-4, Energy audits — Part 4: Transport.

NOTE The decision to apply Parts 2 and 4 could be made during the preliminary contact, see 5.1.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 16247-1, *Energy audits - Part 1: General requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions in EN 16247-1 and the following apply.

3.1
production process
all the steps necessary to manufacture a product or delivery of a service

Note 1 to entry: Production process could include specific facilities for health, safety and environment pollution control.

3.2
utility
energy carrier necessary for the process and auxiliary

Note 1 to entry: A utility could be generated on-site, off-site, or purchased from a third party.

EXAMPLE Steam, hot water, compressed air, etc.

3.3
utility process
set of utility equipment and distribution

Note 1 to entry: If the utility is purchased from a third party, utility process is only the utility distribution.

3.4
site
processes within the boundary of the organization

Note 1 to entry: This may include pollution treatment processes and energy recovery, and waste product.

3.5
building
construction as a whole, including its envelope and all technical building systems, for which energy may be used to condition the indoor climate, to provide domestic hot water and illumination and other services related to the use of the building and the activities performed within the building

Note 1 to entry: The term can refer to the building as a whole or to parts thereof that have been designed or altered to be used separately.

Note 2 to entry: The building could include its site location and related external environment.

[SOURCE: EN 16247-2, 3.1]

3.6
energy
electricity, fuels, steam, heat, compressed air, and other like media

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

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

[SOURCE: EN ISO 50001, 2011, 3.5]

4 Quality requirements

4.1 Energy auditor

The qualification of an energy auditor is defined in prEN 16247-5[1].

[1] prEN 16247-5 is currently not yet published and under development.

4.2 Energy audit process

The quality of the energy audit depends on the knowledge of the processes, the site and available data and information. Close collaboration between the energy auditor and the organization is essential.

NOTE An example energy audit process is shown in Annex A.

5 Elements of the energy audit process

5.1 Preliminary contact

The energy auditor shall obtain a preliminary description of the site and the process from the organization or from a site visit.

NOTE The preliminary contact can be by telephone, webinar, meeting or other remote interactive discussions.

The energy auditor shall agree with the organization on the scope and boundary of the energy audit:

a) processes included in the energy audit;

NOTE A process can be defined as the whole process, part of a process, part of a system or a component.

b) whether or not outsourced utilities are included in the energy audit;

c) depending of the thoroughness of the energy audit, it is recommended to check if a detailed energy audit needs to be carried out for specific processes. In this case, reference shall be made to the relevant standard (see bibliography).

For energy use not directly related to process (e.g. storing, packaging, logistics, offices, research centre, laboratory and transport), the energy auditor shall agree with the organization the applicability of EN 16247-2 and EN 16247-4. This choice and the agreed scope shall be clearly stated in the final energy audit report (5.6).

For each audited process, the energy auditor and organization shall agree, the relevant personnel, their roles which have an impact on energy consumption, and propose a preliminary list of data to be collected.

5.2 Start-up meeting

The energy auditor and organization shall agree energy performance indicators which can be used in the energy audit.

5.3 Collecting data

5.3.1 General

The data collection could be carried out over several stages during an energy audit.

During data collection, the energy auditor shall:

a) verify the data and information provided by the organization (e.g. the power or the number of pieces of equipment);

b) obtain any missing data;

c) check the accuracy of the measuring device.

5.3.2 Information request

The energy auditor shall request from the organization the following:

a) site information;

b) utility processes information;

c) production processes information;

   1) product specification and quality;

   2) current operational conditions (set points) of utilities and production process;

   3) specific condition and constraint for process and environment (security, pollution, health, etc.);

d) building, boundary and other relevant information;

e) energy sources information.

NOTE 1 The collected data can be based on invoices, contracts, measurements, calculations from given operating hours and installed capacity (technical characteristics), operation and maintenance documents, meeting with operations and maintenance personnel, etc.

NOTE 2 See Annex B for examples of data to be collected.

5.3.3 Review of the available data

The energy auditor shall review the information collected for consistency and suitability.

The energy auditor shall assess whether the information provided is sufficient to achieve the agreed objective.

If data requested is not available, the energy auditor shall define the method to obtain the necessary information (e.g. measurements, estimates, modelling, etc.).

5.3.4 Preliminary data analysis

The energy auditor shall carry out an analysis of the data collected to:

a) undertake a preliminary analysis of the site's energy balance on the basis of energy bills and output;

b) establish the relevant adjustment factors;

c) establish the relevant energy performance indicator;

d) evaluate the distribution of energy consumption on the basis of sub-meter reading, installed capacity and operating time;

e) if there is sufficient information, establish an initial energy baseline;

f) plan further data collection and measurement to be carried out during field works (5.4).

The energy auditor should develop preliminary energy efficiency improvement opportunities.

The energy auditor shall agree with the organization about any data measurement plan on:

1) objectives and parameters;

2) content;

3) required measurement conditions.

NOTE See Annex C for quality data measurement plans.

5.4 Field work

5.4.1 Aim of field work

If necessary, the energy auditor shall carry out additional measurement to:

a) collect any missing data needed for analysis;

b) confirm the suitability of the baseline;

c) confirm the energy consumption, energy balance and adjustment factors;

d) confirm the current operational conditions (set points) of utilities and production processes and the impact with energy use and consumption;

e) relevant information from identification plates, runtime information, interviews with operators, etc.

5.4.2 Conduct

The conduct of energy auditor during field work is defined in EN 16247-1, 5.4.2.

5.4.3 Site visits

The energy auditor shall visit the site and audited processes.

NOTE The schedule for site visits is planned during the start up meeting (5.2).

5.5 Analysis

5.5.1 General

The energy auditor shall:

a) investigate the maximum achievable energy performance of the process and benchmark it with the actual energy performance;

b) calculate the actual energy performance of the process;

c) compare the actual sizing of process and the energy needs;

d) evaluate the optimal quantity of energy and utilities for the process.