# SLOVENSKI STANDARD
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**Metodologija za primerjalno analizo energijske učinkovitosti**

Energy efficiency benchmarking methodology

Energieeffizienz-Benchmarking-Methodik

Méthodologie de benchmarking de l'efficacité énergétique



**Ta slovenski standard je istoveten z:** **EN 16231:2012**

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# Energy efficiency benchmarking methodology

Méthodologie de benchmarking de l'efficacité énergétique

Energieeffizienz-Benchmarking-Methodik

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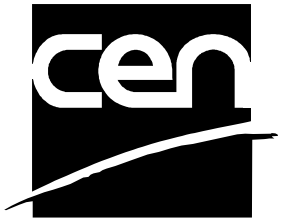

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## Foreword

This document (EN 16231:2012) has been prepared by Technical Committee CEN/CENELEC JWG 3 “Energy Management and related services — General requirements and qualification procedures”, 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of an identical text or by endorsement, at the latest by March 2013, and conflicting national standards shall be withdrawn at the latest by March 2013.

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.

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# Introduction

The overall aim of this European standard is to provide organisations with a methodology for collecting and analysing energy data with the purpose of establishing and comparing energy efficiency between or within entities.

It may lead to reductions in total energy consumption by showing improvement opportunities and consequently possible reductions in costs and emissions of carbon dioxide. This standard addresses the general aspects of benchmarking. This does not include the definition and establishment of sector specific benchmarks.

Energy efficiency benchmarking may be motivated by different needs, among which are:

— awareness of energy performance levels of peers to trigger energy efficiency improvement actions;

— definition of energy performance objectives;

— knowledge and follow up of the energy performance of a group and the related (best) practices.

Energy efficiency benchmarking applies to specific energy consumption whereby other performance aspects like technologies and operating practices may be taken into account.

The benchmarked entity can be a facility, an activity, a process, a product, a service or an organisation.



Energy efficiency benchmarking is related to energy management, energy audits and energy efficiency calculation methods.



The benchmarking methodology model for this standard is shown with the main steps in Figure 1.


**Figure 1 — Benchmarking methodology model**

The basis of the approach can be briefly described as follows:

— purpose & planning (see 4.2.1): define the objectives for the benchmarking, including definition and select the approach and type of benchmarking, produce a project plan and assign resources;

— data collection & verification (see 4.2.2): agree on data collection method, collect and verify data and collate the findings to enable analysis;

— analysis & results (see 4.2.3): assess current performance levels, produce tables, charts and graphs to support analysis and seek explanations for the differences in performance;

— reporting (see 4.2.4): communicate results including lessons learned.

The following step is optional in accordance with management systems in the organisation (see Annex F):

— monitoring & actions: implement specific actions, monitor progress and implement specific actions including those from lessons learned.

# 1 Scope

This European Standard specifies requirements and provides recommendations for energy efficiency benchmarking methodology. The purpose of energy efficiency benchmarking is to establish the relevant data and indicators on energy consumption, both technical and behavioural, qualitative and quantitative in comparing performance between or within entities.

Energy efficiency benchmarking can be either internal (within a specific organisation) or external (between organisations including competitors). This standard describes how to establish the boundaries of what is being benchmarked, including for example facilities, activities, processes, products, services and organisations.

This European Standard provides guidance on the criteria to be used in order to choose the appropriate level of detail for the data collection, processing and reviewing which suits the objective of the benchmarking.

This European Standard does not itself state specific performance requirements with respect to energy use. For all activities related to the continual improvement cycle (such as the Plan-Do-Check-Act methodology) reference shall be made to management systems in the organisation.

# 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

No normative references are cited.



# 3 Terms and definitions

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



**3.1**
**benchmark**
reference or standard value for comparison derived from benchmarking

**3.2**
**benchmarking**
process of collecting, analysing and relating performance data of comparable activities with the purpose of evaluating and comparing performance between or within entities

Note 1 to entry: Different types of benchmarking exist, ranging from internal benchmarking to establishing the "best in industry/sector" performance. Internal benchmarking is looking for differences in energy efficiency within an organisation and highlighting best practices for dissemination to other parts of that organisation. External benchmarking may be used to establish a range of energy performance indicators for an installation/facility or a specific product/service in the same field or sector.

**3.3**
**benchmarking boundary**
limit to the process installation, facility, product, building or organisation being benchmarked

Note 1 to entry: The boundary may relate to a single process installation or facility, a finished product, a single building (including all the products or processes carried on inside that building), a division or operational unit of an organisation, or an entire organisation or group of organisations.

Note 2 to entry: The energy efficiency of an installation/facility or a specific product depends on the boundary of the process that is being benchmarked and how all energy flows, feedstock(s)/raw material(s) and (by)product(s) crossing the boundary of the process installation are to be taken into account.

**3.4**
**benchmarking target group**
organisations with comparable activities, products or services which are potential participants in a benchmarking

**3.5**
**benchmarking participants**
organisations taking part by providing data for a benchmarking

**3.6**
**correction factor**
factor agreed to be applied to make data in the benchmarking comparable

**3.7**
**energy consumption**
amount of energy used

[SOURCE: CEN/CLC/TR 16103]

Note 1 to entry: Although technically incorrect, energy consumption is a widely used term.

Note 2 to entry: The manner or kind of application of energy is expressed as energy use.

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



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



Note 1 to entry: Both input and output need to be clearly specified in quantity and quality, and be measurable.

Note 2 to entry: Energy efficiency is commonly used with the meaning of "optimum energy efficiency" namely "to operate (an entity) with the minimum energy consumption".

Note 3 to entry: Commonly used sense of energy efficiency is doing at least the same with less energy.

Note 4 to entry: In energy efficiency benchmarking, energy efficiency is usually based on the specific energy consumption of the manufacture or supply of the product, activity or service being benchmarked and is expressed for example as GJ/tonne or GJ/standard activity.

**3.9**
**energy performance**
measurable results related to energy efficiency, energy use and energy consumption

[SOURCE: EN ISO 50001:2011]

Note 1 to entry: In the context of energy management systems, results can be measured against the organisation's energy policy, objectives and targets.

**3.10**
**entity**
object of benchmarking

EXAMPLE Process installations, products, services, retail shops, buildings.

**3.11**
**organisation**
company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration and that has the authority to control its energy use and consumption

[SOURCE: EN ISO 50001:2011]

**3.12**
**primary energy**
energy that has not been subjected to any conversion process

[SOURCE: CEN/CLC/TR 16103]

Note 1 to entry: Primary energy includes energy from:

1) non-renewable sources such as natural gas, oil, coal;

2) renewable sources such as biomass, biogas, solar thermal energy;

3) electricity such as that produced from wind, hydro, solar or nuclear power.

**3.13**
**secondary energy**
energy resulting from energy conversion of primary energy

[SOURCE: CEN/CLC/TR 16103]



EXAMPLE Electricity, steam or hot water.



**3.14**
**specific energy consumption**
energy consumption per (physical) unit of output

[SOURCE: CEN/CLC/TR 16103]

Note 1 to entry: In energy efficiency benchmarking, the output can be a product, activity or service.

EXAMPLE Gigajoule (GJ) per tonne of steel, annual kWh per $m^2$, kWh per full time employee (fte).

**3.15**
**validation**
confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled

Note 1 to entry: Validation can be expressed by the query “Are you building the right thing?”.

Note 2 to entry: In benchmarking, checking that the methodology is suitable for intended use.

**3.16**
**verification**
confirmation, through the provision of objective evidence, that specified requirements have been fulfilled

Note 1 to entry: Verification can be expressed by the query “Are you building it right?”.

Note 2 to entry: In case of benchmarking, testing of data for completeness and accuracy.

# 4 Energy efficiency benchmarking methodology

## 4.1 Minimum requirements for energy efficiency benchmarking

The energy efficiency benchmarking process shall, as a minimum, include the following:

— definition of deliverables for each step;

— definition of the energy efficiency benchmarking objective(s) and the entitie(s) and boundarie(s);

— definition of the target group of the benchmarking;

— definition of the characteristics for selecting the sample;

— selection of participants and designation of the coordinator and establishing their roles;

— definition of conditions for accurate, reliable and comparable data collection;

— definition of level of confidentiality of collected data and of database ownership and access conditions;

— verification of collected data;

— validation of the benchmarking results by coordinator and participants;

— definition of reporting content, depending on objective and participants.



## 4.2 Benchmarking steps

### 4.2.1 Purpose and planning



Energy efficiency benchmarking starts with the definition of specific objectives of that benchmarking.

The type of benchmarking (i.e. internal or external) shall be selected depending on:

— the need that has motivated the benchmarking;

— whether a particular benchmark shall be derived.

EXAMPLE 1 Example of need triggering and leading to internal benchmarking: comparison of energy performance on different locations within the same organisation in order to improve energy performance.

EXAMPLE 2 Example of need triggering and leading to external benchmarking: better understanding of the statistical energy performance (average, minimum, maximum, scattering, etc.) of a sector.

Management commitment for carrying out the benchmarking is important. Approval for resources shall be obtained.

The coverage of the energy efficiency benchmarking (i.e. geographical, sector specific and/or technical) shall be defined.

The participants and their main characteristics shall be determined in relation to the product(s), service(s) and associated technologies which are subject of the benchmarking.

The data collection method shall be determined depending on the objectives, participants and allocated resources.

Annex A provides an example of a checklist for an energy efficiency benchmarking.

A coordinator shall be nominated and their role shall be established.

In case of external benchmarking, participants shall approve the nominated coordinator, in order to ensure confidentiality of collected data and information. The coordinator of the energy efficiency benchmarking should