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Energy efficiency and renewable energy sources — Common international terminology —

Part 1: Energy efficiency

Efficacité énergétique et sources d'énergie renouvelables — Terminologie internationale commune —

Partie 1: Efficacité énergétique

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Contents

Page

Foreword

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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 (see www.iso.org/directives).

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

The committee responsible for this document is ISO/IEC JPC2, *Energy efficiency and renewable energy sources — Common terminology*.

ISO/IEC 13273 consists of the following parts, under the general title *Energy efficiency and renewable energy sources — Common international terminology*:

— *Part 1: Energy efficiency*

— *Part 2: Renewable energy sources*

Introduction

The aim of this part of ISO/IEC 13273 is to support activities related to energy and that deal with energy efficiency. The terms were selected based upon their relevance and transverse nature. This International Standard is a horizontal standard in accordance with IEC Guide 108. It addresses the fundamental principles and concepts of energy efficiency and energy management terminology, which is relevant to a number of technical committees, with the goal of improving coherence and common characteristics for energy terms. This International Standard does not address terms specific to topics such as environmental sustainability or nuclear energy but rather transverse energy terminology.

It is intended to be of help to technical practitioners and other interested parties who either use or develop International Standards in these subject fields.

With the growth in the number of International Standards that directly or indirectly relate to energy, there is an increasing need for an agreement on common language in the domain.

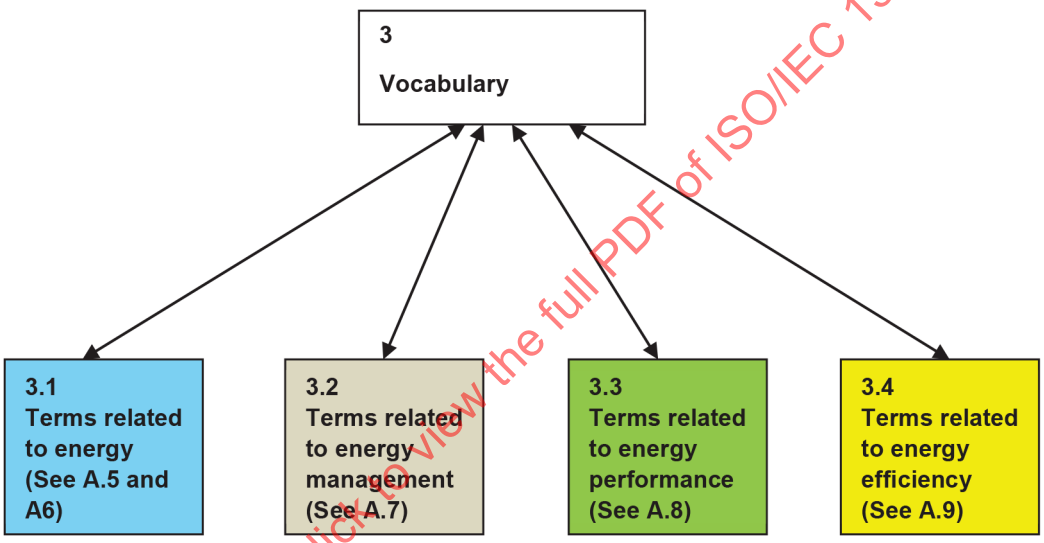


Figure 1 — Vocabulary structure

This part of ISO/IEC 13273 deals with concepts belonging to the general subject field of energy and, within that, transverse concepts in the field of energy efficiency. For renewable energy sources see ISO/IEC 13273-2.

The arrangement of terms and definitions in this International Standard is based upon concept systems that show corresponding relationships among energy efficiency and renewable energy sources concepts (see Figures A.4 to A.8 for additional diagrams on each group of terms). This arrangement provides users with a structured view of transverse energy concepts and facilitates their understanding. This terminology promotes a common understanding among all parties involved in energy efficiency and facilitates effective communication. This part of ISO/IEC 13273 includes terms and definitions that are commonly used in energy efficiency. The organization of terms is illustrated in Figure 1. This International Standard is a first effort in the development of a complete set of terms related to energy, and will be updated as further terms and definitions are agreed upon. (See Clause A.3, Figure A.4) .

Energy efficiency and renewable energy sources — Common international terminology —

Part 1: Energy efficiency

1 Scope

This part of ISO/IEC 13273 contains transverse concepts and their definitions in the subject field of energy efficiency. This horizontal standard is primarily intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 108.

One of the responsibilities of a technical committee is, wherever applicable, to make use of horizontal standards in the preparation of its publications. The contents of this horizontal standard will not apply unless specifically referred to or included in the relevant publications.

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.

This clause has been maintained to match the numbering of ISO/IEC 13273-2 and for potential future use.

3 Terms and definitions

3.1 Terms related to energy

3.1.1
energy
E
capacity of a system to produce external activity or to perform work

Note 1 to entry: Commonly the term energy is used for electricity, fuel, steam, heat, compressed air and other like media.

Note 2 to entry: Energy is commonly expressed as a scalar quantity.

Note 3 to entry: Work as used in this definition means external supplied or extracted energy to a system. In mechanical systems, forces in or against direction of movement; in thermal systems, heat supply or heat removal.

[SOURCE: 1986 World Energy Conference Energy Terminology glossary, modified – The word “the” at the beginning of the description was removed, the symbols were added as was the Note 1 to entry from ISO 50001:2011.]

3.1.2
energy carrier
substance or medium that can transport energy

EXAMPLE Electricity, hydrogen, fuels.

3.1.3
feedstock energy
energy (3.1.1) of material used for purposes other than producing work or activity

EXAMPLE Crude oil injected into steel smelting is for deoxidization but it contributes to the energy content in a limited manner.

Note 1 to entry: Care is necessary to ensure that the energy content of materials is properly accounted for in the energy balance.

3.1.4
energy source
material, natural resource or technical system from which *energy* (3.1.1) can be extracted or recovered

Note 1 to entry: A press spring, flywheel, or battery are examples of a technical system used as an energy source.

3.1.5
energy storage
action or method used to accumulate, retain and release *energy* (3.1.1) for later use in an *energy using system* (3.1.9)

Note 1 to entry: Energy storage is an important concept in terms of renewable energy, see ISO/IEC 13273-2, 3.1.5 for additional information.

3.1.6
primary energy
energy (3.1.1) that has not been subjected to *energy conversion* (3.1.7)

Note 1 to entry: Primary energy can be either a non-renewable or renewable energy or a combination of both.

[SOURCE: ISO 16818-3.177:2008, modified – the word "any" was deleted and the term energy conversion and reference was added; the phrase "or transformation process" was deleted; Note 1 to entry was added.]

3.1.7
energy conversion
transformation of one *energy carrier* (3.1.2) to another energy carrier or work

Note 1 to entry: The term "energy transformation" can be used in this sense.

3.1.8
cogeneration
energy conversion (3.1.7) from the same source into two or more utilized forms of energy in one common controlled process

Note 1 to entry: Combined heat and power (CHP) is a specific implementation of cogeneration used for the simultaneous production of heat and electricity.

3.1.9
energy using system
physical items with defined *system boundaries* (3.3.2), using *energy* (3.1.1)

EXAMPLE Facility, building, part of a building, machine, equipment, product, etc.

3.1.10
energy end user
individual or a group of individuals or organization with responsibility for operating an *energy using system* (3.1.9)

3.1.11
final energy
energy (3.1.1) as delivered to an *energy using system* (3.1.9)

Note 1 to entry: This concept is sometimes referred to as delivered energy.

Note 2 to entry: See also Annex B.

3.1.11.1
applied energy
energy (3.1.1) used for the intended purpose of the *energy using system* (3.1.9)

Note 1 to entry: to entry The system boundaries can be chosen based on the purpose of the energy using system..

Note 2 to entry: See also Annex B.

3.1.11.2
system energy loss
final energy (3.1.11) which is not *applied energy* (3.1.11.1)

Note 1 to entry: See also Annex B

3.1.11.2.1
recovered energy
energy (3.1.1) that is withdrawn from *system energy loss* (3.1.11.2) to become *applied energy* (3.1.11.1) at another *energy using system* (3.1.9)

Note 1 to entry: See also Annex B.

3.1.11.2.2
lost energy
system energy loss (3.1.11.2) that is not recovered energy

Note 1 to entry: See also Annex B.

3.1.12
energy use
manner or kind of application of *energy* (3.1.1)

EXAMPLE Ventilation; lighting; heating; cooling; transportation; processes; production lines.

Note 1 to entry: Characteristics of energy use include, but are not limited to, the purpose of the use, source(s) choice and application.

[SOURCE: ISO 50001:2011, 3.18, modified –added Note 1 to entry.]

3.1.13
energy consumption
quantity of *energy* (3.1.1) applied

Note 1 to entry: This is not *applied energy* (3.1.11.1).

[SOURCE: ISO 50001:2011, 3.7, modified to add Note 1 to entry]

3.1.14
energy intensity
quotient describing the total *energy consumption* (3.1.13) per unit of economic output

EXAMPLE Gigajoule per euro of GDP (gross domestic product); gigajoule per unit of turnover.

3.1.15
specific energy consumption
quotient describing the total *energy consumption* (3.1.13) per unit of output or service

EXAMPLE Gigajoule (GJ) per tonne of steel, annual kilowatt hour (kWh) per square metre (m^2), litres (l) of fuel per kilometre (km), etc.

3.2 Terms related to energy management systems

3.2.1
energy management system
EnMS
set of interrelated or interacting elements to establish an *energy policy* (3.2.2) and *energy objectives* (3.2.3), and processes and procedures to achieve those objectives

[SOURCE: ISO 50001:2011, 3.9]

3.2.2
energy policy
statement by the organization of its overall intentions and direction of an organization related to its *energy performance* (3.3.1) as formally expressed by top management

Note 1 to entry: The energy policy provides a framework for action and for the setting of energy objectives and energy targets.

[SOURCE: ISO 50001:2011, 3.14]

3.2.3
energy objective
specified outcome or achievement set to meet the organization's *energy policy* (3.2.2) related to improved *energy performance* (3.3.1)

[SOURCE: ISO 50001:2011, 3.11]

3.2.4
energy target
detailed and quantifiable *energy performance* (3.3.1) requirement, applicable to the organization or parts thereof, that arises from the *energy objective* (3.2.3) and that needs to be set and met in order to achieve this objective

[SOURCE: ISO 50001:2011, 3.17]

3.2.5
energy review
determination of the organization's *energy performance* (3.3.1) based on data and other information leading to identification of opportunities for improvement

[SOURCE: ISO 50001:2011, 3.15, modified – Note 1 to entry has been deleted since it only applied to management systems and was not transverse.]

3.2.6
energy action plan
decided actions to achieve the specified *energy targets* (3.2.4) and *energy objective* (3.2.3)

Note 1 to entry: Action plans may include designation of responsibilities, arrangements (means), method for verification and timeframe in support of the energy policy.

3.2.7
energy management team
person(s) accountable for effective implementation of the *energy management system* (3.2.1) activities and for delivering *energy performance* (3.3.1) improvements

Note 1 to entry: The size and nature of the organization, and available resources, will determine the size of the team. The team may be one person, such as the management representative.

[SOURCE: ISO 50001:2011, 3.10]

3.3 Terms related to energy performance

3.3.1
energy performance
measurable results related to *energy efficiency* (3.4.1), *energy use* (3.1.12) and *energy consumption* (3.1.13)

[SOURCE: ISO 50001:2011, 3.12, modified – Note 1 and Note 2 to entry have been deleted since the notes were specific to energy management and not transverse.]

3.3.2
system boundaries
physical or site limits as defined for a stated purpose

EXAMPLE A process; a group of processes; a site; an entire organization; multiple sites under the control of an organization; a region.

Note 1 to entry: The system boundaries are chosen based on the purpose of the energy using system.

3.3.3
energy measurement
verifiable and repeatable process to obtain a quantifiable value(s) in relation to *energy performance* (3.3.1)

3.3.4
energy metering
applying a device measuring *energy* (3.1.1) or other data in relation to *energy use* (3.1.12)

[SOURCE: CEN-CLC/TR 16103:2010, 4.7.2-modified deleted "other consumption" added "other data in relation with energy use after energy.]

3.3.5
measurement and verification
M&V
process of energy measurement to reliably determine data in relation to energy performance for defined system boundaries

3.3.6
energy performance indicator
EnPI
quantitative value or measure of *energy performance* (3.3.1)

Note 1 to entry: Note1 to entry: EnPIs for an energy management system (EnMS) are defined by the organization.

Note 2 to entry: EnPIs could be expressed as a simple metric, ratio or a more complex model.

[SOURCE: ISO 50001:2011, 3.13, modified – Deleted the phrase "as defined by the organization" at the end of the description and added it as Note 1 to entry, moving Note 1 to entry to Note 2 to entry.]

3.3.7
energy performance improvement action
EPIA
action or measure (or group of actions or measures) implemented or planned within an organization intended to achieve *energy performance* (3.3.1) improvement through technological, management, behavioural, economic, or other changes

3.3.8
energy baseline
quantitative reference(s) providing a basis for comparison of *energy performance* (3.3.1)

Note 1 to entry: An energy baseline can be normalized using variables affecting energy use and/or consumption such as production level, degree days (outdoor temperature), etc.

Note 2 to entry: Energy baseline is also used for calculation of energy savings, as a reference with and without implementation of energy performance improvement actions or evaluated over a period of time.

[SOURCE: ISO 50001:2011, 3.6, modified – Deleted Note 1 to entry; in Note 2 to entry: removed the term "which" after variables and added the suffix "ing" on the word "affect"; removed "e.g." and replaced with the phrase "such as". The word "The" as been removed at the beginning of Note 3 to entry.]

3.3.8.1
baseline period
specific period of time before the implementation of *energy performance improvement action* (3.3.7) selected for the comparison with the reporting period and the calculation of *energy performance* (3.3.1) and of energy performance improvement action

3.3.9
energy savings
reduction of *energy consumption* (3.1.13) following implementation of an energy performance improvement action

3.3.10
energy audit
systematic analysis of *energy use* (3.1.12) and *energy consumption* (3.1.13), within a defined scope, in order to identify, quantify and report on the opportunities for improved energy performance and energy saving actions

Note 1 to entry: "Energy assessment" and "energy diagnostic" are terms used for the same definition.

3.3.11
energy balance
accounting of inputs or generation of *energy supply* (3.3.12) versus energy outputs based on *energy consumption* (3.1.13) by *energy use* (3.1.12) for an *energy using system* (3.1.11)

3.3.12
energy supply
energy delivered to meet an energy demand at a given instant or over any designated interval of time

Note 1 to entry: This involves both the quantity and the process.

3.3.13
energy demand
quantity of *energy* (3.1.1) required by an *energy using system* (3.1.9) at a given instant or over any designated interval of time

3.4 Terms related to energy efficiency

3.4.1
energy efficiency
E_f
ratio or other quantitative relationship between an output of performance, service, goods or *energy* (3.1.1), and an input of energy

EXAMPLE Efficiency conversion energy; 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.

[SOURCE: ISO 50001:2011, 3.8, modified –The symbol Ef was added; the word "have" was replaced by "need" in the Note 1 to entry.]

3.4.2
energy efficiency indicator
EEI
value indicative of the *energy efficiency* (3.4.1)

Note 1 to entry: Mainly used as a metric in policy evaluation and in macroeconomic studies.

[SOURCE: CEN-CLC/TR 16103:2010, 4.3.8, modified – Added the abbreviation EEI.]

3.4.3
energy efficiency improvement
increase in *energy efficiency* (3.4.1) as a result of technological, design, behavioural or economic changes

[SOURCE: CEN-CLC/TR 16103:2010, 4.3.3.]

3.4.4
energy efficiency improvement action
measure intended to achieve technological, design, behavioural or economic changes providing *energy efficiency improvement* (3.4.3)

3.4.5
energy efficiency service
agreed task or tasks designed to lead an *energy efficiency improvement* (3.4.3) and other agreed performance criteria

Note 1 to entry: It is possible for the intended energy efficiency improvement to be agreed instead of the tasks designed to lead to that improvement.

[SOURCE: EN 15900:2010, 3.7, modified – The phrase "set of" was removed from the definition, replaced text of Note 1 to entry with "It is possible for the intended energy efficiency improvement to be agreed instead of the tasks designed to lead to that improvement".]

3.4.6
energy manager
person accountable for energy management and the coordination of *energy efficiency improvement* programme (3.4.3) of an organization

Note 1 to entry: The energy manager should be a person with adequate skills suitable to the size and complexity of what is being managed.

Note 2 to entry: The energy manager may delegate responsibilities to other individuals or an energy team.

[SOURCE: CEN-CLC/TR 16103:2010, 4.5.4, modified – Removed the phrase "and accountable" after responsible; added "the coordination of" before energy efficiency; added "improvement programme" after energy efficiency: and changed "entity" to "organization". Replaced the term "commensurate" with "suitable" in Note 1 to entry.]

3.4.7
energy efficiency mechanism
instrument used to create incentives or a supportive framework for market actors to follow an *energy efficiency improvement programme* (3..4.5) or to provide *energy efficiency service*s (3.4.5)

3.4.8
energy efficiency service company
organization that delivers *energy efficiency services* (3.4.5)

[SOURCE: CEN-CLC/TR 16103:2010, 4.6.4, modified – The term "entity" was changed to "organization" in the definition and the Note was deleted.]

Annex A

(Informative)Methodology used to develop the vocabulary

A.1 General

The transverse character of the energy efficiency concepts contained in this International Standard requires the use of

— clear technical descriptions, and

— a coherent and harmonized vocabulary that is easily understandable by all potential users.

Concepts are not independent of one another, and an analysis of the relationships between concepts within the field of energy efficiency and the arrangement of them into concept systems is a prerequisite of a coherent vocabulary. Such an analysis was used in the development of the vocabulary specified in this International Standard. Since the concept diagrams employed during the development process may be helpful in an informative sense, they are reproduced in A.3.

A.2 Concept relationships and their graphical representation

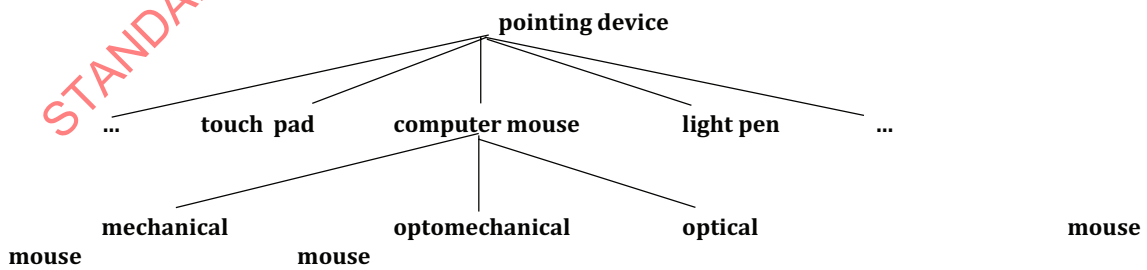
A.2.1 General

In terminology work the relationships between concepts are, as far as possible, based on the hierarchical relation because it enables the most economical description of a concept. In this annex, three primary forms of concept relationships are indicated: the hierarchical generic (A.2.2), and partitive (A.2.3) and the non-hierarchical associative (A.2.4).

A.2.2 Generic relation

Subordinate concepts within the hierarchy inherit all the characteristics of the superordinate concept and contain descriptions of these characteristics, which distinguish them from the superordinate (parent) and coordinate (sibling) concepts, e.g. the relation of touch pad, computer mouse and light pen to pointing device.

Generic relations are depicted by a fan or tree diagram without arrows (see Figure A.1).



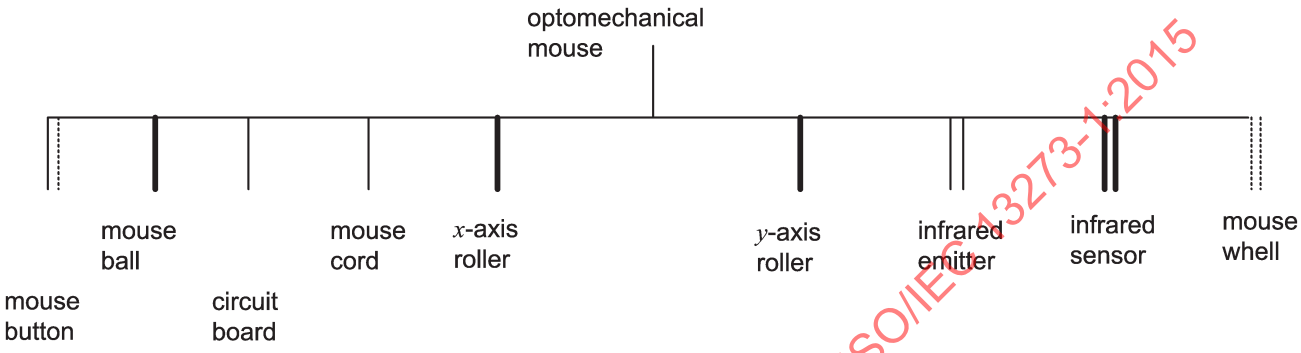
Note Reproduced from ISO 704:2009, 5.5.2.2.1, Example 1.

Figure A.1 — Graphical representation of a generic relation

A.2.3 Partitive relation

Subordinate concepts within the hierarchy form constituent parts of the superordinate concept, e.g. mouse button, mouse ball, circuit board, mouse cord, x-axis roller, y-axis roller, infrared emitter, infrared sensor and infrared wheel may be defined as parts of the concept optomechanical mouse. In comparison, it is inappropriate to define red cord (one possible characteristic of mouse cord) as part of an optomechanical mouse.

Partitive relations are depicted by a rake without arrows (see Figure A.2).



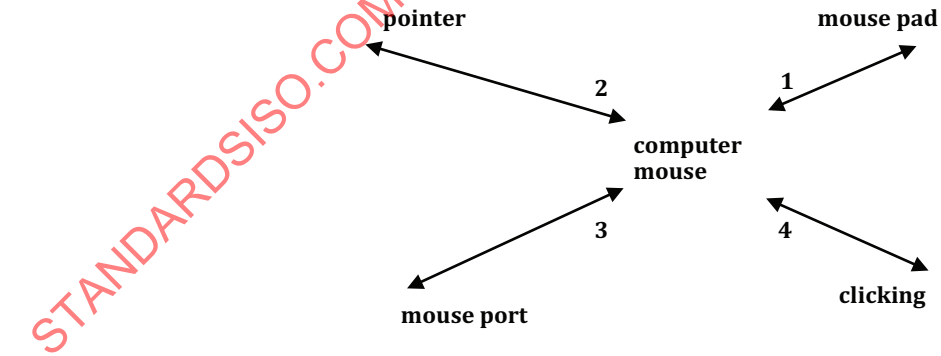
NOTE Adapted from ISO 704:2009, 5.5.2.3.1, Example 1.

Figure A.2 — Graphical representation of a partitive relation

A.2.4 Associative relation

Associative relations cannot provide the economies in description that are present in generic and partitive relations but are helpful in identifying the nature of the relationship between one concept and another within a concept system, e.g. cause and effect, activity and location, activity and result, tool and function, material and product. Besides, associative relations are the most commonly encountered in terminology practical work, as they correspond to the concept relations established in the real world.

Associative relations are depicted by a line with arrowheads at each end (see Figure A.3).



NOTE Reproduced from ISO 704:2009, 5.6.2, Example 1.

Figure A.3 — Graphical representation of associative relation

A.3 Concept diagrams

Figures A.4 to A.8 show the concept diagrams on which the thematic groups of the energy efficiency vocabulary are based.

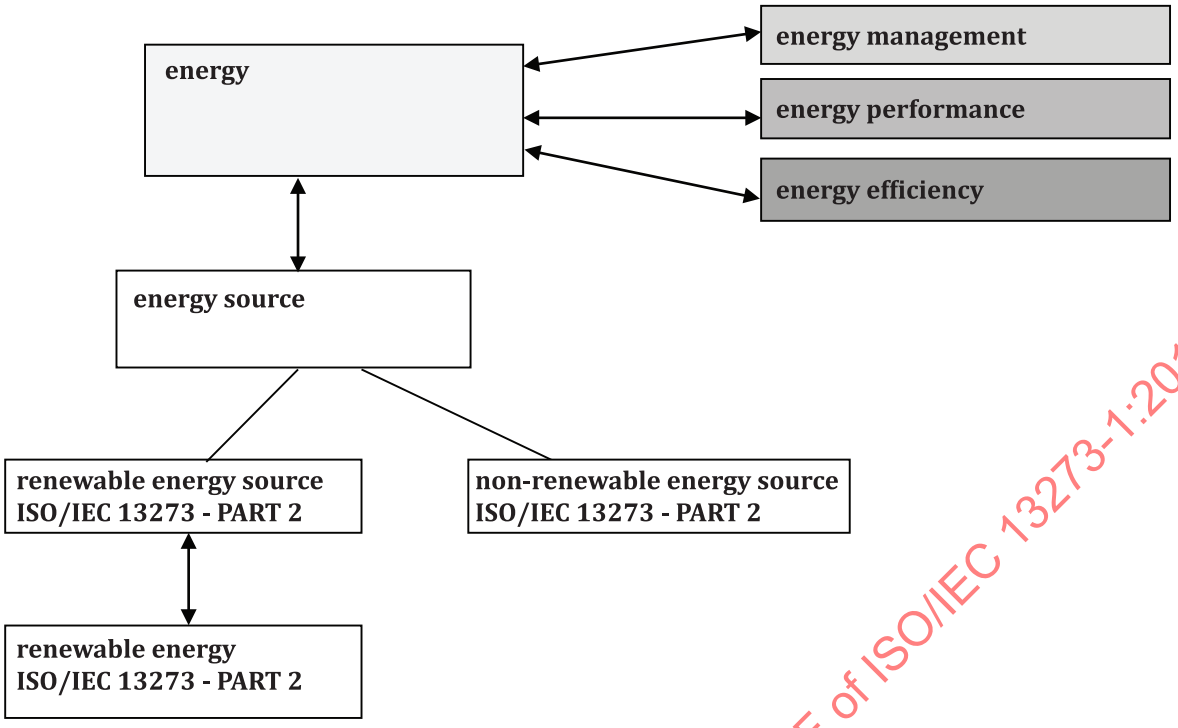


Figure A.4 — High level: Concept diagram

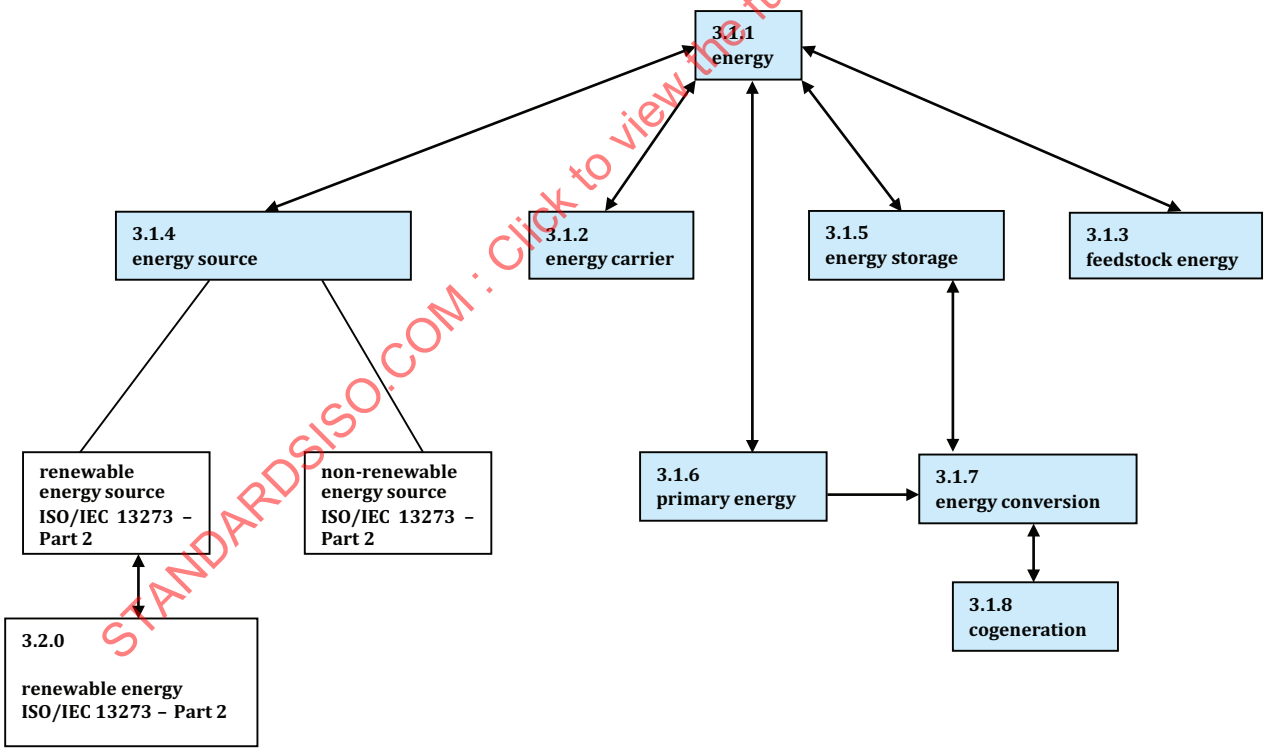


Figure A.5 — 3.1 Terms related to energy: Concept diagram

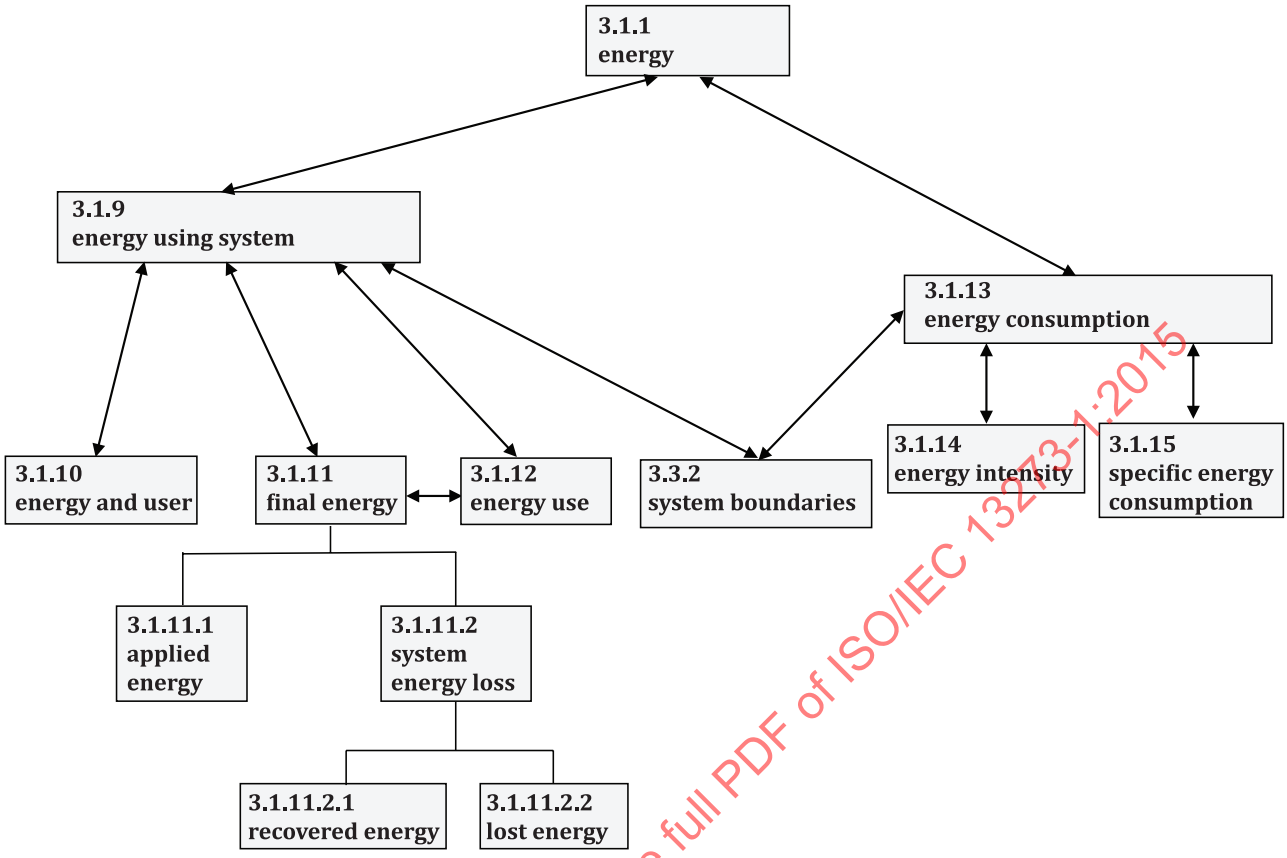


Figure A.6 — 3.1.1 Terms related to energy: Concept diagram

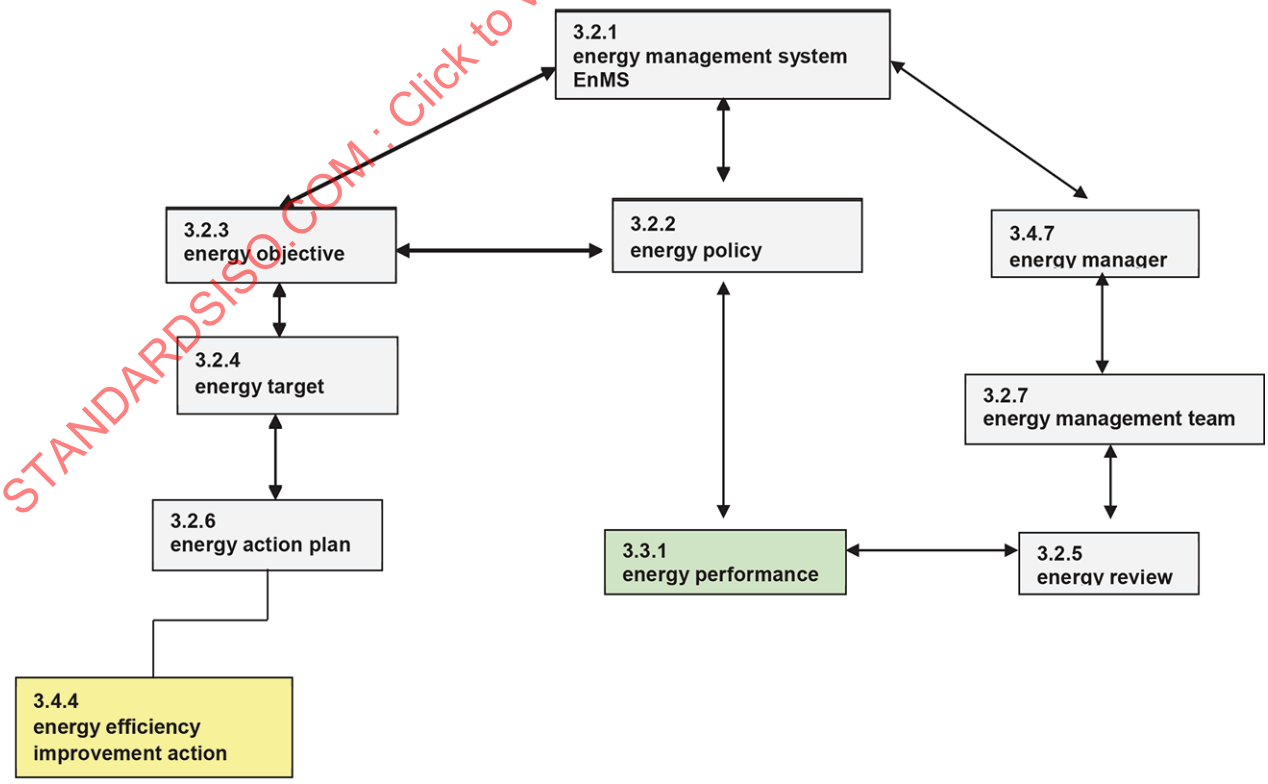


Figure A.7 — 3.2 Energy management: Concept diagram