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Energy efficiency and renewable energy sources — Common international terminology —

Part 2: Renewable energy sources

Efficacité énergétique et énergies renouvelables — Terminologie internationale commune —

Partie 2: Sources d'énergie renouvelables

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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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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*

0 Introduction

0.1 General

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

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

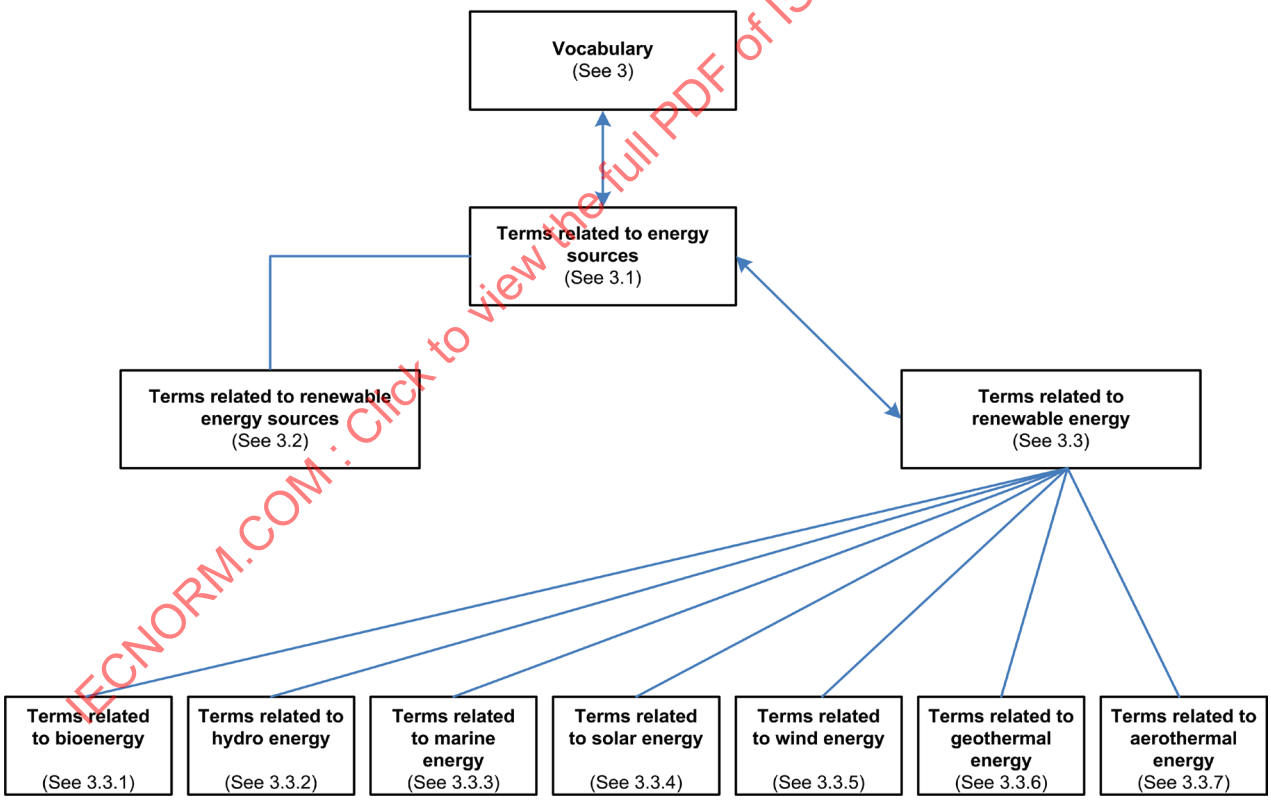


Figure 1 — Vocabulary structure

0.2 Vocabulary structure

This part of ISO/IEC 13273 deals with concepts belonging to the general energy subject field within which transversal concepts in the field of renewable energy sources. For energy efficiency, see ISO/IEC 13273-1.

The arrangement of terms and definitions in this part of ISO/IEC 13273 is based upon concept systems that show corresponding relationships among energy efficiency and renewable energy sources concepts

(see Annex A for additional diagrams on each group of terms). This arrangement provides users with a structured view of transversal energy concepts and facilitates their understanding. This terminology promotes a common understanding among all parties involved with renewable energy sources and facilitates effective communication. This part of ISO/IEC 13273 includes terms and definitions that are commonly used in renewable energy sources. The organization of terms is illustrated in Figure 1. ISO/IEC 13273 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.

Energy efficiency and renewable energy sources — Common international terminology —

Part 2: Renewable energy sources

1 Scope

This part of ISO/IEC 13273 contains transversal concepts and their definitions in the subject field of renewable energy sources. 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 undated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

This section has been maintained to match the numbering of ISO/IEC 13273-1 and for potential future use.

3 Terms and definitions

3.1 Terms related to energy sources

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 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.

3.1.3
intermittent energy source
source of energy that is not continuously available due to factors outside direct control

EXAMPLE Sun, wind.

Note 1 to entry: Note1 to entry: Imbalances between energy production and energy demand caused by intermittent energy sources can be managed by energy storage (see 3.1.5 in ISO 13273-1).

3.1.4
non-renewable energy source
energy source depleted by extraction

EXAMPLE Fossil fuels, uranium.

Note 1 to entry: Whether the energy stored in a technical system is renewable or not depends upon the nature of the original energy source.

[SOURCE: CEN-CLC/TR 16103:2010, 4.1.5, modified - The phrase “from a” was deleted before the word source, Note 1 to entry was added.]

3.1.5
renewable energy source
energy source not depleted by extraction as it is naturally replenished at a rate faster than it is extracted

Note 1 to entry: Renewable energy source excludes recovered or wasted energy.

Note 2 to entry: Organic fraction of municipal waste may be considered as a renewable energy source.

Note 3 to entry: Whether the energy stored in a technical system is renewable or not depends upon the nature of the original energy source.

Note 4 to entry: Criteria to categorise an energy source as renewable can differ amongst jurisdictions, based on local environmental or other reasons.

[SOURCE: CEN/CLC/TR 16103:2010, 4.1.3, modified – The phrase “as it is naturally replenished at a rate faster than it is extracted” was added to the end of the definition. The example was deleted. Note 1 to entry, Note 2 to entry, Note 3 to entry and Note 4 to entry were added.]

3.1.6
renewable energy
energy obtained from a *renewable energy source* (3.1.5)

Note 1 to entry: Criteria to categorise an energy as renewable can differ amongst jurisdictions, based on local environmental or other reasons.

[SOURCE: IEV 617-04-11 March 2009- modified- The words “primary” at the start of the definition and the word “constantly” were deleted. “at a rate faster than it is extracted” was added after “replenished”. The example has been replaced by Note 1 to entry.]

3.2 Terms related to renewable energy sources

3.2.1
biomass
renewable energy source (3.1.5) in the form of material of biological origin excluding material embedded in geological formations or transformed to fossilized material

Note 1 to entry: The biomass includes waste of biological origin.

Note 2 to entry: The material includes animal by-products and residues and excludes peat.

Note 3 to entry: Biogenic organic fraction of municipal waste may be considered as a renewable energy source.

Note 4 to entry: Jurisdictions may require additional conditions be met for biomass to be considered as renewable.

[SOURCE: ISO 14021:1999/Amd1:2011, 3.1.1, modified - By beginning the definition with the wording "renewable energy source in the form of". The words "and excluding peat" at the end of the definition was deleted and the exiting Note was replaced by adding four new notes.]

3.2.1.1
biofuel
fuel derived from biomass (3.2.1)

[SOURCE: IEA InterEnerStat, Harmonization of definitions of energy products and flows, Final definitions, Part 2: Products, IEA, Paris, 9 December 2010.]

3.2.1.1.1
solid biofuel
solid fuel derived from *biomass* (3.2.1)

[SOURCE: IEA InterEnerStat Harmonization of definitions of energy products and flows, Final definitions, Part 2: Products, IEA, Paris, 9 December 2010.]

3.2.1.1.2
liquid biofuel
bioliquid
liquid fuel derived from *biomass* (3.2.1)

[SOURCE: IEA InterEnerStat, Harmonization of definitions of energy products and flows, Final definitions, Part 2: Products, IEA, Paris, 9 December 2010, modified - By replacing "used as fuel" by "fuel".]

3.2.1.1.3
biogas
gas resulting from the fermentation or gasification of *biomass* (3.2.1)

Note 1 to entry: Biogas can be of two different origins:

a) biogas from anaerobic fermentation, principally composed of methane and carbon dioxide which two most notable examples are landfill gas and sewage sludge gas;

b) biogas from thermal processes composed by a mixture containing hydrogen and carbon monoxide (usually known as syngas) along with other components produced by gasification or pyrolysis of biomass.

Note 2 to entry: Biogas is used as a fuel and also as feedstock in industrial processes.

[SOURCE: InterEnerStat, Harmonization of definitions of energy products and flows, Final definitions, Part 2: Products, IEA, Paris, 9 December 2010, modified – By replacing in the definition "arising" by "resulting" and by deleting "anaerobic", "solid","(including biomass in waste)" and adding Note 2 to entry.]

3.3 Terms related to renewable energy

3.3.1 General

3.3.1.1
bioenergy
renewable energy (3.1.6) derived from *biomass* (3.2.1) through conversion to *biofuel* (3.3.1.1)

3.3.2 Terms related to hydro energy

3.3.2.1
hydro energy
renewable energy (3.1.6) harnessed by the conversion of kinetic energy gained from naturally flowing or falling water

Note 1 to entry: The energy produced by the water of the oceans and seas is covered in subclause 3.3.3.

Note 2 to entry: Hydro energy is made available in the form of electrical or mechanical energy.

[SOURCE: Passive solar energy book – Glossary of renewable energy terms and phrases, modified – By adding "or falling water" after "flowing". Note 2 to entry has been added.]

3.3.3 Terms related to marine energy

3.3.3.1
marine energy
renewable energy (3.1.6) that may be harnessed by exploiting an aspect of the physical chemical or thermodynamic characteristics of oceans and seas

Note 1 to entry: Characteristics of oceans and seas can be tidal movement, wave motion, thermal gradients, salinity gradients, currents.

[SOURCE: World Energy Conference – Energy terminology (1986), modified - By adding "or thermodynamic" and "renewable" to make it consistent with the other definitions at the same level and adding "seas" to clarify the concept; replacing "The oceans and seas characteristics" by "Characteristics of oceans and seas" in Note 1 to entry.]

3.3.3.2
tidal energy
marine energy (3.3.3.1) harnessed by exploiting the potential energy due to the vertical displacement of mass from still water level or the kinetic energy, both caused by the ebb and flow of the tides derived from gravitational forces of the Earth-Moon-Sun system

[SOURCE: World Energy Conference – Energy Terminology (1986), modified - By adding "marine" to make it consistent with the other definitions at the same level and replacing "that can be usefully recovered by exploiting" by "harnessed by" and adding "derived from gravitational forces of the Earth-Moon-Sun system".]

3.3.3.3
ocean current energy
marine energy (3.3.3.1) harnessed by exploiting kinetic energy of flowing water due to an ocean or sea current

3.3.3.4
wave energy
marine energy (3.3.3.1) harnessed by exploiting the potential energy in the vertical displacement of water or the kinetic energy of the moving water, or both

[SOURCE: World Energy Conference – Energy Terminology (1986), modified - By adding "marine energy" and "harnessed by exploiting" to make it consistent with the other definitions at the same level, deleting "particles" and replacing "the fluid displaced from still water level" by "in the vertical displacement of water" and adding "or both".]

3.3.3.5
salinity gradient energy
marine energy (3.3.3.1) harnessed by exploiting the difference in the salinity of water sources

Note 1 to entry: The difference can be between seawater and river water, or between two different parts of sea.

Note 2 to entry: The energy may also come from movement of the water created by difference of specific gravity.

[SOURCE: Wave Energy Centre and IEA Ocean Energy Glossary, modified – By replacing "captured" with "harnessed", by replacing "the pressure difference at the boundary between freshwater and saltwater" by "the difference in the salinity of water sources". Note 2 to entry was added.]

3.3.3.6
thermal gradient energy
marine energy (3.3.3.1) harnessed by exploiting the temperature differences (thermal gradients) between two different sources

Note 1 to entry: In the case of marine energy the sources are typically two different water layers at different depths.

Note 2 to entry: Thermal gradient energy is also known as ocean thermal energy conversion (OTEC).

[SOURCE: Energy Information Administration (EIA) – Glossary renewable, modified – By beginning the definition with "harnessed by exploiting" adding "marine" and "obtained" to make it consistent with the other definitions at the same level and by replacing "between ocean surface waters and that of ocean depths" by "between two different sources". Additional explanatory text was moved to note 1 to entry. Note 2 to entry was added.]

3.3.4 Terms related to solar energy

3.3.4.1
solar energy
renewable energy (3.1.6) harnessed by exploiting radiation of the sun

Note 1 to entry: Solar energy can be converted into other forms of energy, such as heat or electricity, or directly used as light.

[SOURCE: Energy Information Administration (EIA) – Glossary renewable, modified - By adding "renewable" and "harnessed" to make it consistent with the other definitions at the same level.]

3.3.4.2
photovoltaic solar energy
solar energy (3.3.4.1) converted into the form of electric energy by means of photovoltaic cells

[SOURCE: Energy Information Administration (EIA) – Glossary renewable, modified - By adding "solar" to systematize the definitions related to solar energy, by replacing "radiated by sun as electromagnetic waves that is converted into electricity by means of solar cells" by "converted into electricity by means of photovoltaic cells" and by deleting "or concentrating (focusing) collectors" at the end.]

3.3.4.3
solar thermal energy
solar energy (3.3.4.1) that is converted into heat

Note 1 to entry: There are two types of solar thermal energy:

a) concentrating solar thermal energy, high temperature heat produced from solar radiation captured by concentrating solar thermal systems, that can be transformed to generate electricity, drive chemical reactions, or be used directly in industrial processes;

b) non-concentrating solar thermal energy, low temperature heat produced from solar radiation capture by non-concentrating solar thermal systems, that can be used for applications such as space heating, cooling, water heating, district heating and industrial processes.

[SOURCE: Ontario Government – Glossary of energy terms, modified - By adding "solar energy" to systematize the definitions related to solar energy; by deleting "of the sun" because of being redundant and by deleting "or concentrating (focusing) collectors" at the end.]

3.3.5 Terms related to wind energy

3.3.5.1
wind energy
renewable energy (3.1.6) harnessed by converting kinetic energy present in wind motion into mechanical energy

Note 1 to entry: Mechanical energy derived from wind can be used for water pumping or other direct mechanical work, and for generating electricity.

[SOURCE: Energy Information Administration (EIA) – Glossary of renewable, modified - By beginning with "*renewable energy* harnessed" for consistency with other definitions and by deleting "for driving pumps, mills, and electric power generators" at the end.]

3.3.6 Terms related to geothermal energy

3.3.6.1
geothermal energy
renewable energy (3.1.6) harnessed from within the earth's crust, in the form of thermal energy

Note 1 to entry: Jurisdictions may require that different conditions be met for geothermal energy to be considered as renewable.

[SOURCE: International Energy Agency (IEA) - Glossary modified - By beginning with "*renewable energy* harnessed" for consistency with other definitions, and replacing "hot water, steam" by "thermal energy".]

3.3.6.2
shallow geothermal energy
geothermal energy (3.3.6.1) extracted from ground immediately below the surface to provide heating or cooling

Note 1 to entry: This is called "ground source energy" in some countries.

Note 2 to entry: This kind of geothermal energy is based on the fact that at a low level of deepness, in relation to the ambient air, the temperature of the soil is stable.

3.3.6.3
hydrothermal energy
*geothermal energy (*3.3.6.1) extracted from surface or underground water

3.3.6.4
hot dry rock thermal energy
geothermal energy (3.3.6.1) harnessed in the form of heat residing in impermeable, crystalline rock

Note 1 to entry: Hydraulic fracturing can be used, in order to create permeability and enable circulation of water and removal of the heat.

[SOURCE: Encyclopaedia of Alternative Energy and Sustainable Living, modified – By replacing "that consists of" by "in the form of" and adding "residing in" in front of "impermeable". Note 1 to entry has been added to include the additional explanatory text.]

3.3.7 Terms related to aerothermal energy

3.3.7.1
aerothermal energy
renewable energy (3.1.6) harnessed in the form of heat in the ambient air

Note 1 to entry: This is called "air source energy" in some countries.

Annex A
(informative)

Methodology used in the development of the vocabulary

A.1 General

The transversal character of the energy efficiency and renewable energy sources concepts contained in this International Standard requires the use of:

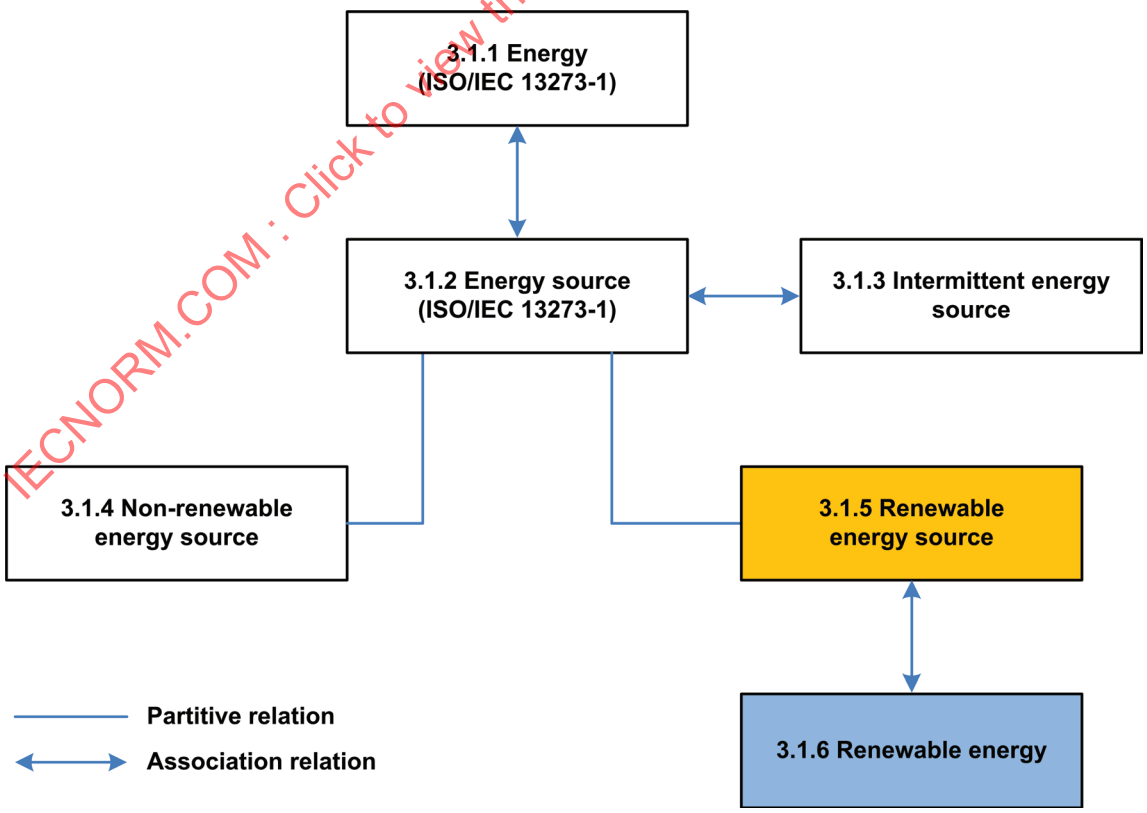
— clear technical descriptions;

— 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 fields of energy efficiency and renewable energy sources 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.2.

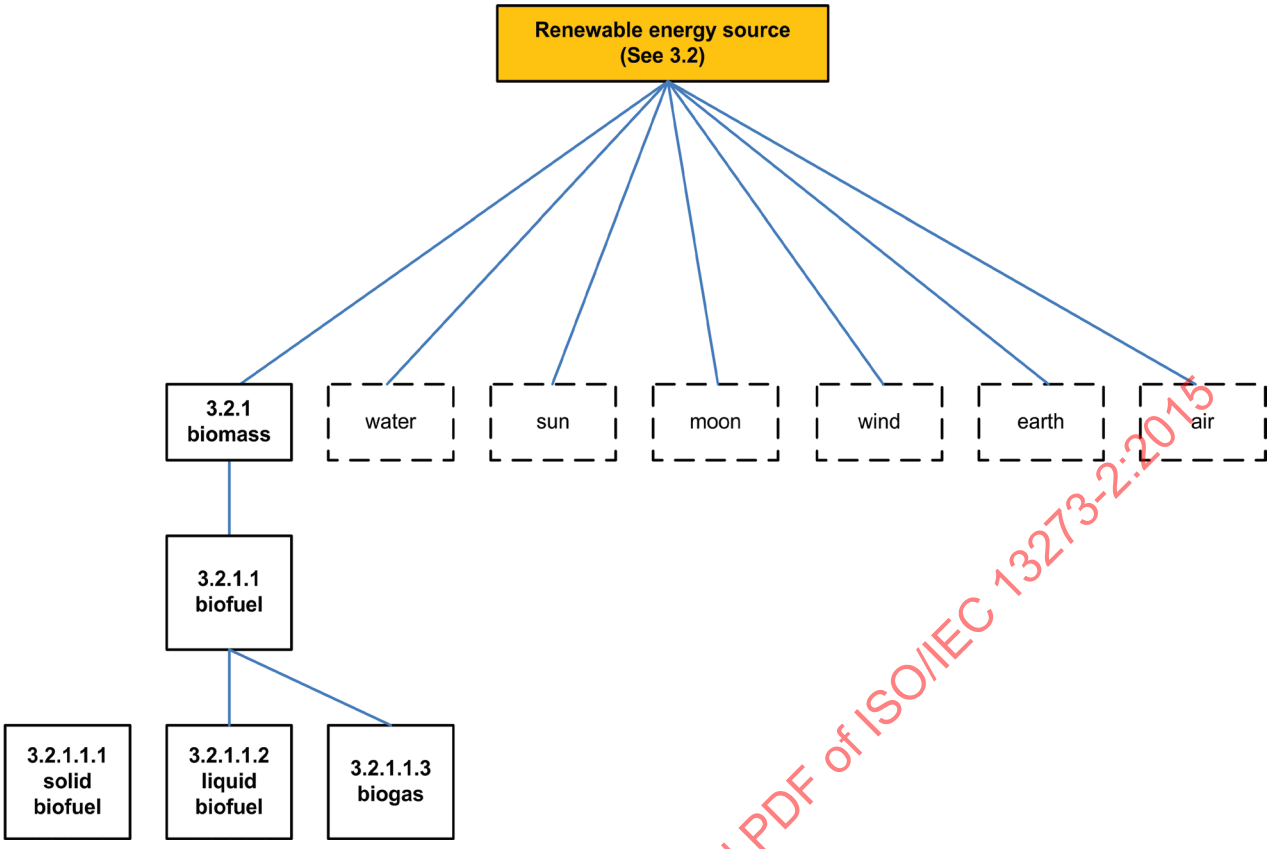
A.2 Concept diagrams

This ISO/IEC approach will be displayed by the concept diagrams shown in Figures A.1, A.2 and A.3 on which the thematic groupings of the renewable energy sources vocabulary are shown.



NOTE The coloured boxes denote the link to the concept diagram in Figure A.2.

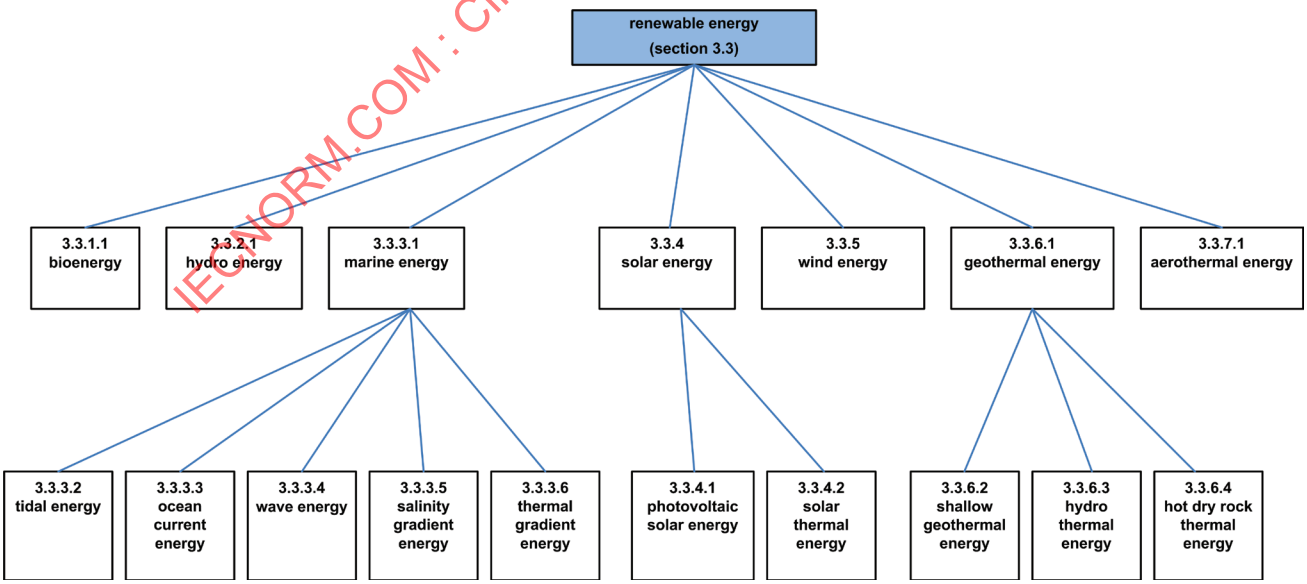
Figure A.1 — Terms related to energy sources: Concept diagram



NOTE 1 This part of ISO/IEC 13273 does not provide definitions for the terms in the dashed boxes as these are straightforward from everyday language. They were only included in the diagram to illustrate the concept.

NOTE 2 The dashed lines denote relationships between terms belonging to different subclauses of this part of ISO/IEC 13273.

Figure A.2 — Terms related to renewable energy sources: Concept diagram



NOTE The coloured boxes denote the link to the concept diagram in Figure A.1.

Figure A.3 — Terms related to renewable energy: Concept diagram

