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Sustainability criteria for bioenergy

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National foreword

This British Standard is the UK implementation of ISO 13065:2015.

The UK participation in its preparation was entrusted to Technical Committee PTI/20, Sustainability of bioenergy.

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INTERNATIONAL STANDARD

ISO 13065

First edition
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Sustainability criteria for bioenergy

Critères de durabilité pour la bioénergie

Reference number
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Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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 Project Committee ISO/PC 248, *Sustainability criteria for bioenergy*.

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Introduction

The production and use of bioenergy have potential roles in mitigating climate change, promoting energy security and fostering sustainable development. This International Standard is designed to provide a consistent basis on which the sustainability of bioenergy can be assessed within a defined context and for a specified purpose. This International Standard provides principles, criteria and indicators. The principles reflect aspirational goals while the criteria and indicators address sustainability aspects and the information that is to be provided. However, the indicators in this International Standard might not comprehensively capture all sustainability aspects for all bioenergy processes.

Virtually every country in the world uses some form of bioenergy. Various types of biomass are used for the production of bioenergy through many types and sizes of economic operations. The characteristics of bioenergy production therefore are heterogeneous and depend on several factors, such as geography, climate, level of development, institutions and technologies.

The purpose of this International Standard is to provide a framework for considering environmental, social and economic aspects that can be used to facilitate the evaluation and comparability of bioenergy production and products, supply chains and applications. As part of the development of this International Standard, other relevant sustainability initiatives and International Standards were considered.

This International Standard aims to facilitate the sustainable production, use and trade of bioenergy and will enable users to identify areas for continual improvement in the sustainability of bioenergy. It can be used in several ways. It can facilitate business-to-business communications by providing a standard framework that allows businesses to “speak the same language” when describing aspects of sustainability. Purchasers can use this International Standard to compare sustainability information from suppliers to help identify bioenergy processes and products that meet their requirements. Other standards, certification initiatives and government agencies can use this International Standard as a reference for how to provide information regarding sustainability.

This International Standard does not provide threshold values. Threshold values can be defined by economic operators in the supply chain and/or other organizations (e.g. government). Sustainability information provided through the use of this International Standard can then be compared with defined threshold values.

In International Standards, the following verbal forms are used:

— “shall” indicates a requirement;

— “should” indicates a recommendation;

— “may” indicates a permission;

— “can” indicates a possibility or a capability.

Further details can be found in the ISO/IEC Directives, Part 2.

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INTERNATIONAL STANDARD ISO 13065:2015(E)

Sustainability criteria for bioenergy

1 Scope

This International Standard specifies principles, criteria and indicators for the bioenergy supply chain to facilitate assessment of environmental, social and economic aspects of sustainability.

This International Standard is applicable to the whole supply chain, parts of a supply chain or a single process in the supply chain. This International Standard applies to all forms of bioenergy, irrespective of raw material, geographical location, technology or end use.

This International Standard does not establish thresholds or limits and does not describe specific bioenergy processes and production methods. Compliance with this International Standard does not determine the sustainability of processes or products.

This International Standard is intended to facilitate comparability of various bioenergy processes or products. It can also be used to facilitate comparability of bioenergy and other energy options.

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.

ISO/TS 14067:2013, *Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification and communication*

3 Terms and definitions

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

3.1
allocation
partitioning the input or output flows of a *process* (3.36) or a *product system* (3.38) between the product system under study and one or more other product systems

[SOURCE: ISO 14040:2006, 3.17]

3.2
biodiversity
biological diversity
variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic *ecosystems* (3.14) and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems

[SOURCE: United Nations Convention on Biological Diversity[27]]

3.3
bioenergy
energy derived from *biomass* (3.4)

Note 1 to entry: Biomass can be processed into solid, liquid or gaseous fuels or stored energy in biomass can be directly converted into other forms of energy (e.g. heat, light).

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3.4
biomass
raw material (3.40) of biological origin excluding material embedded in geological formations or transformed to fossilized material

[SOURCE: ISO 13833:2013, 3.2, modified — The word "raw" has been added, because "*raw material* (3.40)" is also defined in this International Standard, and "fossil" has been changed to "fossilized material".]

3.5
book and claim
chain-of-custody (3.7) system where, from the production of *raw material* (3.40) to the final *product* (3.37) for consumption, the information on *sustainability* (3.48) is decoupled from the physical product

Note 1 to entry: The system allows for the product itself and attributes of sustainability to be traded separately.

3.6
carbon dioxide equivalent
CO_2 equivalent
CO_2e
unit for comparing the radiative forcing of a *greenhouse gas* (3.21) to that of carbon dioxide

Note 1 to entry: Mass of a greenhouse gas is converted into CO_2 equivalents using global warming potentials.

[SOURCE: ISO/TS 14067:2013, 3.1.3.2, modified — Original Note 2 to entry has been omitted.]

3.7
chain-of-custody
chain of responsibility for or control of materials as they move through each step of the *process* (3.36) or *product system* (3.38) under assessment

3.8
child labour
work that deprives children of their childhood, their potential and their dignity, and that is harmful to their physical and mental development

Note 1 to entry: This is a frequently used definition according to the International Labour Organization (ILO).

[SOURCE: International Labour Organization, "What is child labour"[22], modified]

3.9
competent national authority
applicable national regulatory body or authority designated or otherwise recognized as such by the national regulatory body for any purpose in connection with the requirements, recommendations and *principles* (3.34), *criteria* (3.11) and *indicators* (3.27) in this International Standard

[SOURCE: ISO 16883:2007, 3.1, modified — The word "national" has been added to term, "any" has been changed to "applicable", "by the national regulatory body" has been added and "regulations specified" has been changed to "requirements, recommendations and principles, criteria and indicators".]

3.10
co-product
any of two or more *products* (3.37) coming from the same *unit process* (3.51) or *product system* (3.38)

[SOURCE: ISO 14040:2006, 3.10]

3.11
criterion
requirement that describes what is to be assessed

Note 1 to entry: A criterion adds meaning and operability to a *principle* (3.34) without itself being a direct measure of performance.

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Note 2 to entry: A criterion is characterized by a set of related *indicators* (3.27).

3.12
direct effects
measurable environmental, social and economic effects under the direct control of the *economic operator* (3.13) and caused by the *process* (3.36) being analysed

Note 1 to entry: Activities under direct control are defined as activities conducted by or subcontracted by the economic operator.

Note 2 to entry: Subcontracted activities are activities undertaken by a subcontractor, being an *organization* (3.33) that undertakes aspects of the processing, handling, storage, transport or distribution of the *products* (3,37), *co-products* (3.10) or *waste* (3.52) on behalf of the *economic operator* (3.13), on a contractual basis, either paid or non-paid.

Note 3 to entry: Direct effects within the scope of this International Standard are considered under the *criteria* (3.11) and *indicators* (3.27) in Clause 5.

Note 4 to entry: *Processes* (3.36) inside the defined *system boundaries* (3.50) are included based on International Standards (e.g. ISO 14040 and 14044) even if they are outside the direct control of the economic operator.

Note 5 to entry: Other potential effects may be added to the consideration when an international consensus standard is established for the effect.

3.13
economic operator
individual or *organization* (3.33) that has ownership or control of one or more *processes* (3.36) of the bioenergy supply chain

3.14
ecosystem
system of complex interactions between communities of plants, animals, microorganisms and their *environment* (3.16), which functions as a unit

3.15
ecosystem services
benefits people obtain from *ecosystems* (3.14) including provisioning, regulating, supporting, and cultural services

[SOURCE: Millennium Ecosystem Assessment: Ecosystems and Human Well-being Synthesis[26]]

3.16
environment
surroundings in which an *organization* (3.33) operates, including air, water, land, natural resources, flora, fauna, humans and their interrelations

[SOURCE: ISO 14001:2015, 3.2.1, modified — Original Notes 1 and 2 to entry have been omitted.]

3.17
food security
physical and economic access, at all times, to sufficient, safe and nutritious food to meet dietary needs and food preferences for an active and healthy life

[SOURCE: Food and Agriculture Organization of the United Nations (FAO)[18]]

3.18
forced or compulsory labour
work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily

[SOURCE: International Labour Organization (ILO): Forced Labour Convention (No. 29)[21]]

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3.19
forest
land spanning more than 0,5 ha with trees higher than 5 m and a canopy cover of more than 10 percent or trees able to reach these thresholds *in situ*, not including land that is predominantly under agricultural or urban land use

Note 1 to entry: According to FAO, stands in agricultural production systems, such as agroforestry systems when crops are grown under tree cover, fruit tree plantations and oil palm plantations, are excluded. FAO provides additional explanation about what a forest includes (see Reference [19]).

[SOURCE: FAO Forestry Paper 163[19], modified — Additional explanation about what a forest includes has been omitted and Note 1 to entry has been added.]

3.20
global warming potential
GWP
characterization factor describing the radiative forcing *impact* (3.26) of one mass-based unit of a given *greenhouse gas* (3.21) relative to that of carbon dioxide over a given period of time

Note 1 to entry: "Characterization factor" is defined in ISO 14040:2006, 3.37.

[SOURCE: ISO/TS 14067:2013, 3.1.3.4, modified — Original Note 1 to entry has been omitted, because this is addressed in Note 1 to definition of "greenhouse gas".]

3.21
greenhouse gas
GHG
natural or anthropogenic gaseous constituent of the atmosphere that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the earth's surface, the atmosphere, and clouds

Note 1 to entry: A list of greenhouse gases with their recognized *global warming potentials* (3.20) is provided in ISO/TS 14067:2013, Annex A.

Note 2 to entry: Water vapour and ozone are anthropogenic as well as natural greenhouse gases but are not included as recognized greenhouse gases due to difficulties, in most cases, in isolating the human-induced component of global warming attributable to their presence in the atmosphere.

[SOURCE: ISO/TS 14067:2013, 3.1.3.1, modified — The qualifier "both natural and anthropogenic" has been changed to "natural or anthropogenic" and moved to beginning of definition.]

3.22
greenhouse gas emission
GHG emission
release of a *greenhouse gas* (3.21) to the atmosphere

[SOURCE: ISO/TS 14067:2013, 3.1.3.5, modified — The verb "released" has become the subject of the definition as "release", replacing "mass", and the original source reference has been omitted.]

3.23
greenhouse gas removal
GHG removal
removal of a *greenhouse gas* (3.21) from the atmosphere

[SOURCE: ISO/TS 14067:2013, 3.1.3.6, modified — The verb "removed" has become the subject of the definition as "removal", replacing "mass", and the original source reference has been omitted.]

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3.24
hazardous work
work which by its nature or the circumstances in which it is carried out is likely to harm the health, safety or morals of persons

Note 1 to entry: This definition refers specifically to hazardous work by persons as defined in Table G.1.

3.25
human rights
rights inherent to all human beings, whatever their nationality, place of residence, sex, national or ethnic origin, colour, religion, language or any other status

Note 1 to entry: Universal human rights are often expressed and guaranteed by law in the form of treaties, customary international law, general principles and other sources of international law. International human rights law lays down obligations of governments to act in certain ways or to refrain from certain acts in order to promote and protect human rights and fundamental freedoms of individuals or groups.

[SOURCE: United Nations Office of the High Commissioner for Human Rights[29], modified]

3.26
impact
change, adverse or beneficial, caused by the *process* (3.36) being assessed

[SOURCE: ISO 15392:2008, 3.13, modified — The words "any" and "that may be" have been omitted and "caused by the process being assessed" has been added.]

3.27
indicator
quantitative, qualitative or binary variable that can be measured or described, in response to a defined *criterion* (3.11)

3.28
land use change
change in the use or management of land by humans, which can lead to a change in land cover

Note 1 to entry: A *rotation period* (3.43) in a management cycle does not constitute land use change.

[SOURCE: IPCC Fourth Assessment Report[24], modified]

3.29
land use rights
form of land tenure, whether formal or informal, including customary rights or traditions

Note 1 to entry: There is great variability in land use rights in different parts of the world as they relate to systems of ownership and property rights.

3.30
life cycle
consecutive and interlinked stages of a *product system* (3.38), from *raw material* (3.40) acquisition or generation from natural resources to final disposal

[SOURCE: ISO 14040:2006, 3.1]

3.31
light work
work that is not likely to be harmful to a person's health or development and does not interfere with a child's attendance at school or participation in vocational orientation or training programmes or a person's capacity to benefit from the instruction received

Note 1 to entry: This definition refers specifically to light work by persons as defined in Table G.1.

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3.32
mass balance
chain-of-custody (3.7) system where, from the production of a *raw material* (3.40) to the final *product* (3.37) for consumption, the information on *sustainability* (3.48) can be traced to a specific production quantity

Note 1 to entry: The system allows for mixing of products with differing information on sustainability or with no information on sustainability.

3.33
organization
company, corporation, firm, enterprise, cooperative, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration

Note 1 to entry: For organizations with more than one operating unit, a single operating unit may be defined as an organization.

[SOURCE: ISO 14064-1:2006, 2.22, modified — The word "cooperative" has been added to the definition and Note 1 to entry has been added.]

3.34
principle
aspirational goal that governs decisions or behaviour

3.35
procedure
specified way to carry out an activity or a *process* (3.36)

Note 1 to entry: Procedures can be documented or not.

Note 2 to entry: When a procedure is documented, the term "written procedure" or "documented procedure" is frequently used. The document that contains a procedure can be called a "procedure document".

[SOURCE: ISO 9000:2015, 3.4.5, modified — Note 2 to entry has been added.]

3.36
process
set of interrelated or interacting activities which transforms inputs into outputs

Note 1 to entry: Inputs to a process are generally outputs of other processes.

Note 2 to entry: Processes in an *organization* (3.33) are generally planned and carried out under controlled conditions to add value.

[SOURCE: ISO 9000:2015, 3.4.1, modified — The words "that use inputs to deliver an intended result" have been changed to "which transforms inputs into outputs" and Notes to entry have been modified.]

3.37
product
goods or service

[SOURCE: ISO 14040:2006, 3.9, modified — The word "any" has been omitted from the definition and the original Notes to entry have been omitted.]

3.38
product system
collection of *unit processes* (3.51) with elementary and product flows, performing one or more defined functions, and which models the *life cycle* (3.30) of a *product* (3.37)

[SOURCE: ISO 14040:2006, 3.28]

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3.39
protected area
clearly defined geographical space, recognized, dedicated and managed, through legal means, to achieve the long-term conservation of nature with associated *ecosystem services* (3.15) and cultural values

[SOURCE: International Union for Conservation of Nature (IUCN)[25], modified]

3.40
raw material
feedstock
primary or secondary material that is used to produce a *product* (3.37)

Note 1 to entry: Secondary material includes recycled, reused or recovered material.

Note 2 to entry: Raw material/feedstock also includes agricultural, forest and processing residues.

[SOURCE: ISO 14040:2006, 3.15, modified — Feedstock has been added as a second term, the words "reused or recovered" have been added to Note 1 to entry, and Note 2 to entry has been added.]

3.41
regular work
work with the condition that the health, safety and morals of the persons concerned are fully protected and that the persons have received adequate specific instruction or training in the relevant branch of activity

Note 1 to entry: This definition refers specifically to regular work by persons as defined in Table G.1.

3.42
riparian zone
area bordering on streams, lakes and wetlands that links water to land

[SOURCE: Government of British Columbia, Ministry for Environment[20], modified]

3.43
rotation period
amount of time required to complete a full management cycle associated with the growth and harvesting of *raw material(s)* (3.40) to be used in the *process* (3.36) being analysed

Note 1 to entry: In forestry, the rotation period is the time required to establish and grow the forest to merchantable size including fallow periods.

Note 2 to entry: In agriculture, the rotation period can vary between a single, annual crop rotation and more complex rotations involving several annual and perennial crops and/or fallow periods.

3.44
segregation
chain-of-custody (3.7) system where, from the production of a *raw material* (3.40) to the final *product* (3.37) for consumption, the information on *sustainability* (3.48) remains traceable to the physical product

Note 1 to entry: The system does not permit mixing other products with differing information on sustainability or with no information on sustainability with the segregated product.

3.45
social security
access to health care and income security, particularly in cases of old age, unemployment, sickness, invalidity, work injury, maternity or loss of a main income earner

Note 1 to entry: Social security can vary from one country to another.

[SOURCE: International Labour Organization, "Social protection"[23], modified].

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3.46
stakeholder
individual, group or *organization* (3.33) that can affect or be directly affected by the *process* (3.36) under assessment within the *supply chain* (3.47)

Note 1 to entry: Stakeholders may include regulatory bodies, customers, neighbours, local communities, employees, suppliers, etc.

[SOURCE: ISO 13824:2009, 3.20, modified — Wording aligned to the context of this International Standard instead of general principles on risk assessment of systems involving structures, and Note 1 to entry has been added.]

3.47
supply chain
linked set of resources and *processes* (3.36) that begins with the sourcing of *raw material* (3.40) (including *biomass* (3.4) production where applicable) and extends through transport and storage of *products* (3.37) to the end user

Note 1 to entry: The supply chain may include raw material producers, vendors, manufacturing facilities, logistics providers, internal distribution centres, distributors, wholesalers and other entities that lead to the end user.

[SOURCE: ISO 28000:2007, 3.9, modified — The words "including biomass production where applicable", "and including" and "raw material producers" have been added; "the delivery" has been changed to "transport and storage", and "or services" and "across the modes of transport" have been omitted.]

3.48
sustainability
goal of sustainable development which encompasses environmental, social and economic aspects, in which the needs of the present are met without compromising the ability of future generations to meet their needs

Note 1 to entry: Environmental, social and economic aspects interact and are interdependent. They are referred to as the three pillars of sustainability.

Note 2 to entry: Sustainability is a comparative concept, not a state or absolute value.

3.49
sustainability aspect
element of activities or *products* (3.37) of an *economic operator* (3.13) that can have environmental, social and economic *impacts* (3.26)

3.50
system boundary
set of criteria specifying which *unit processes* (3.51) are part of a *product system* (3.38)

[SOURCE: ISO 14040:2006, 3.32, modified — Original Note to entry has been omitted.]

3.51
unit process
smallest element considered in the life cycle inventory analysis for which input and output data are quantified

[SOURCE: ISO 14040:2006, 3.34]

3.52
waste
substances or objects which the holder intends or is required to dispose of

[SOURCE: ISO 14040:2006, 3.35, modified — Original Note to entry has been omitted.]

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3.53
water-scarce country
country where annual water supplies drop below 1 000 m^3 per person

[SOURCE: United Nations Department of Economic and Social Affairs, Freshwater availability in the world, on a country basis, in 2007]

4 General requirements and recommendations

4.1 General

Clause 4 contains overarching elements that are applicable to the indicators in this International Standard. This clause includes requirements that need to be fulfilled when providing information in accordance with Clause 5 and recommendations as well as guidance to help the user to better understand this International Standard.

The effort expended to respond to the indicators in Clause 5 should not impose undue administrative or economic burden for the economic operator. This International Standard therefore offers flexibility, allowing the economic operator to deal with the sustainability aspects that are relevant and significant to the operator's activities (see 4.5) and to use aggregated data and information (see 4.9).

4.2 Purpose and context

The purpose of conducting the assessment using this International Standard shall be clearly documented. The context shall also be documented including geographic areas, level of aggregation and affected stakeholders. The purpose and context are necessary to determine the scope of assessment (see 4.3) relevance and significance (see 4.5) and methods for data representation (see 4.9).

4.3 Scope of assessment

The scope of assessment describing the bioenergy process(es) and products, resources and business units to be included, shall be documented. Processes under direct control include activities conducted by or subcontracted by the economic operator (see 3.12). Any exclusion of a process or part of a process under the direct control of the economic operator (e.g. raw material selection, processing or waste disposal) shall be documented and justified.

The economic operator should consider the ability to facilitate comparability (see 4.11).

4.4 Stakeholder involvement

Stakeholders can have concerns related to the economic operator's activities.

Where required in this International Standard, the economic operator shall document how stakeholders were engaged.

NOTE "Engaged" means both that stakeholders were informed and provided opportunity to comment and that the economic operator provided a documented response to legitimate grievance presented by stakeholders.

The economic operator:

— shall identify stakeholders that are relevant to achieving the outcomes of this International Standard;

— should identify relevant concerns (e.g. requirements) of these stakeholders;

— should identify which of these concerns will be dealt with by legal requirements.

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4.5 Relevance and significance

The economic operator shall provide the information required by every indicator of this International Standard for all relevant and significant sustainability aspects within the scope of the assessment. The economic operator may exclude aspects that it documents and justifies as not being relevant or significant.

A sustainability aspect is relevant if it is part of or affected by the process within the scope of the assessment and has a clear relationship to the purpose and context (see 4.2).

Significance may be determined by a risk assessment or other procedures (e.g. buyer requirements, regulatory requirements, concern of stakeholders, scale of operation).

Figure 1 provides a decision tree on how to categorize relevance and significance for each aspect.

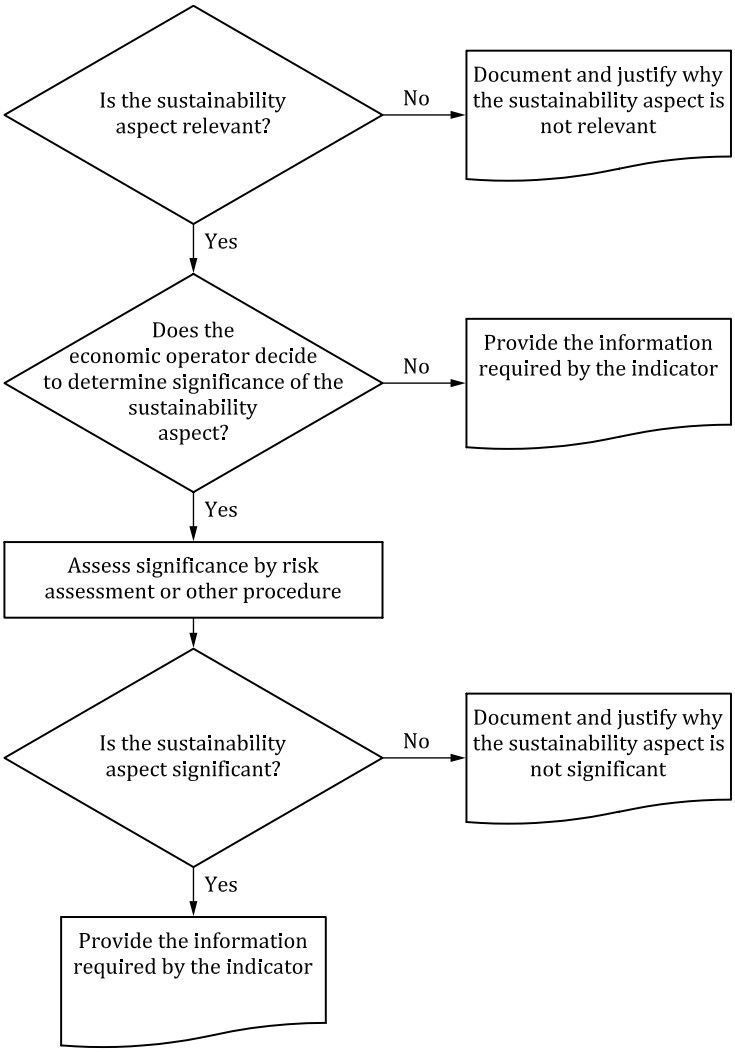

Figure 1 — Decision tree for categorizing relevance and significance for each indicator

4.6 Recording of legal requirements

The economic operator shall identify legal requirements related to the relevant sustainability aspects described in Clause 5, and shall document how these are addressed within the responses to the indicators of this International Standard. An economic operator may also document instances where laws applicable to the economic operator establish different requirements compared to the sustainability aspects of this International Standard.

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4.7 Time periods

The assessment of sustainability aspects shall cover the relevant time period in the life cycle. Sustainability aspects can have different time periods. The time period selected for each sustainability aspect shall be documented and justified.

In case of production of primary raw materials, the crop rotation period could vary from a few months in paddy crops to more than 100 years in long-rotation forestry, for example. Time periods for handling of secondary raw materials can vary greatly depending on time needed for transport, storage and processing/refinement.

The choice of time periods for which data are collected shall consider the potential intra- and inter-annual variations and, if relevant, use values representing the trend over the selected periods.

The time period for which data and information are collected shall be documented and justified.

4.8 Science-based approach

When making assumptions or selecting data or methodologies to be used in reporting under this International Standard, preference shall be given to scientific approaches or traditional practices based on natural, social or economic sciences.

Science is the pursuit of knowledge and understanding of the natural and social world following a systematic methodology based on evidence. Scientific methodology typically involves the following:

— objective observation: measurement and data (possibly although not necessarily using mathematics as a tool);

— evidence;

— experiment, models and/or observation as benchmarks for testing hypotheses;

— induction: reasoning to establish general rules or conclusions drawn from facts or examples;

— repetition;

— critical analysis; and

— verification and testing: critical exposure to scrutiny, peer review and assessment.

4.9 Data and information

The data, information sources and assumptions used shall be documented and justified. The economic operator shall provide information on direct effects of its process(es).

NOTE Providing information does not imply that the economic operator is required to publicly provide its proprietary information, being information that is not public knowledge (such as certain financial data, test results or trade secrets) and that is viewed as the property of the holder. The recipient of proprietary data, such as a contractor in the procurement process, is generally duty bound to refrain from making unauthorized use of the information.

Primary data should be collected for all individual processes under the direct control of the economic operator and shall be representative of the processes for which they are collected. Primary data should be used for all significant sustainability aspects and can be collected from a specific site, or can be averaged across all sites that contain the processes within the scope of the assessment. Primary data can be measured or modelled.

Secondary data should only be used for inputs where the collection of primary data is not possible or practicable, or for minor processes. Secondary data may include literature data, calculated data, estimates or other representative data. Use of secondary data shall be documented and justified with references.

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Data may be aggregated. The level of aggregation shall be consistent with and appropriate to the purpose. The aggregation of the data shall be consistent with the scope of the assessment, scale of operation, requirement or level of concern of stakeholders, and shall be representative of the operations being assessed.

The economic operator may prepare a report summarizing the results of the assessment along with a description of any bioenergy processes that were included in the assessment. Annex A provides a format that can be used to summarize information.

Information may be shared and aggregated between or across stages of supply chains.

When there is agreement to share information, it shall be done in a way that allows the information to be combined within one supply chain or aggregated across supply chains.

No statements or communications about the sustainability of bioenergy processes or products shall be made based solely on the use of this International Standard.

4.10 Traceability

Traceability relates to the origin of raw materials and parts, the processing history and the distribution and location of the product after delivery. If the economic operator decides to or is required to inform about traceability, the economic operator shall at least disclose the following information:

a) part(s) of the supply chain applying this International Standard;

b) whether or not a chain-of-custody system is adopted; and

c) chain-of-custody system(s) adopted.

NOTE Not all economic operators will be able to inform about traceability, and when such condition occurs aggregated data can be used.

Three common chain-of-custody systems are:

— segregation (see 3.44);

— mass balance (see 3.32); and

— book and claim (see 3.5).

Chain-of-custody systems may be used singly or in combination.

4.11 Comparability

The use of this International Standard for comparison of indicators between various energy options (both bioenergy and non-bioenergy) is optional. Some principles, criteria and indicators in this International Standard may not be applicable to all other energy options. Further, other energy options may have additional principles, criteria and indicators that are not included in this International Standard.

If energy options are compared, all indicators in this International Standard should be considered. Each indicator relevant to an energy option compared should be assessed using a consistent approach, consistent system boundaries, and relevant data. Comparing the GHG emissions of the bioenergy option to another energy option shall be in accordance with 6.9.

The complete results should be transparently presented in any comparison. Any divergences in indicators considered or divergences in methods to measure the indicators should be identified and reported. Additionally, sustainability information tables (see Annex A) can be used to present the results.

The sustainability of compared energy options cannot be determined based solely on the use of this International Standard. No statements or communications about the sustainability of an energy option should be made based on the use of this International Standard.

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4.12 Direct and indirect effects

In developing this International Standard, issues concerning direct and indirect effects were carefully considered. The aim of this International Standard is to provide clear guidance to produce consistent and replicable results. The term "indirect effects" can be understood in different ways due to various opinions and definitions. This International Standard considers the measurable environmental, social and economic effects that are under the direct control of the economic operator and caused by the process being assessed. For the purpose of this International Standard, these are defined as "direct effects". Other effects that do not meet these requirements are not included in this International Standard.

4.13 Ecosystem services

A concept that was examined during the development of this International Standard was the importance of functional ecosystems and the services that they provide to the production of bioenergy.

Ecosystems contribute to the well-being of society by providing services such as food, water, fuel, flood control, soil, pollinators, natural fibres, recreation and the absorption of pollution and waste. As ecosystems are degraded or destroyed, they lose the ability to provide these services. Several of the criteria in this International Standard relate to the functions of healthy ecosystems that provide natural goods and services that contribute to human well-being.

5 Principles, criteria and indicators

5.1 General

The economic operator shall document the purpose, context and scope of the assessment (see 4.2 and 4.3).

The economic operator shall address all criteria by responding to all indicators regarding activities under its direct control in accordance with 4.5.

5.2 Environmental principles, criteria and indicators

5.2.1 GHG

Principle: Reduce anthropogenic GHG emissions.

5.2.1.1 Lifecycle GHG emissions and GHG removals

Criterion: The economic operator provides information regarding life cycle GHG emissions and GHG removals.

5.2.1.1.1 Indicator: Provide, in accordance with Clause 6:

a) Sufficient data to allow the calculation of GHG emissions and GHG removals of a life cycle stage; or

b) Partial carbon footprint of the bioenergy product calculated as the sum of GHG emissions and removals of one or more processes expressed in gCO_2 equivalents per delivered unit; or

c) Life cycle carbon footprint calculated as the sum of GHG emissions and GHG removals expressed in gCO_2 equivalents per MJ energy delivered and functional unit.

5.2.1.1.2 Indicator: When a comparison is done, the life cycle GHG emissions and GHG removals of the energy that the bioenergy replaces expressed in gCO2 equivalents per functional unit shall be calculated and documented in accordance with Clause 6.

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