AS ISO 14064.3:2024
ISO 14064-3:2019

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Greenhouse gases

Part 3: Specification with guidance for the verification and validation of greenhouse gas statements

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This Australian Standard® was prepared by EV-021, Environmental Management and Sustainable Development. It was approved on behalf of Standards Australia's Standards Development and Accreditation Committee on 08 August 2024.

This Standard was published on 11 October 2024.

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This Standard was issued in draft form for comment as DR AS ISO 14064.3:2024.

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ISBN 978 1 76139 865 0

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Greenhouse gases

Part 3: Specification with guidance for the verification and validation of greenhouse gas statements

Originated as AS ISO 14064.3—2006.
Second edition 2024.

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Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee EV-021, Environmental Management and Sustainable Development, to supersede AS ISO 14064.3:2006 *Greenhouse gases, Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions.*

The objective of this document is to specify principles and requirements and provide guidance for verifying and validating greenhouse gas (GHG) statements.

It is applicable to organization, project, and product GHG statements.

This document is identical with, and has been reproduced from, ISO 14064-3:2019 *Greenhouse gases — Part 3: Specification with guidance for the verification and validation of greenhouse gas statements.*

As this document has been reproduced from an international document, a full point substitutes for a comma when referring to a decimal marker.

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The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

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Contents

Preface ii

Foreword v

Introduction vii

1 Scope 1

2 Normative references 1

3 Terms and definitions 1
- 3.1 Terms related to greenhouse gases 1
- 3.2 Terms related to entities involved in GHG verification and validation 2
- 3.3 Terms related to the GHG inventory 3
- 3.4 Terms related to the GHG statement 4
- 3.5 Terms related to GHG data and information management 5
- 3.6 Terms related to verification and validation 5

4 Principles 7
- 4.1 General 7
- 4.2 Impartiality 7
- 4.3 Evidence-based approach 7
- 4.4 Fair presentation 7
- 4.5 Documentation 8
- 4.6 Conservativeness 8

5 Requirements applicable to verification/validation 8
- 5.1 Pre-engagement activities 8
  - 5.1.1 General 8
  - 5.1.2 Type of engagement 8
  - 5.1.3 Level of assurance in the case of verification 8
  - 5.1.4 Objectives 8
  - 5.1.5 Criteria 9
  - 5.1.6 Scope 9
  - 5.1.7 Materiality thresholds 9
- 5.2 Verification/validation team selection 10
- 5.3 Verification/validation activities and techniques 10
- 5.4 Specific requirements 10
  - 5.4.1 Verifier/validator communication 10
  - 5.4.2 Sufficiency of evidence 11
  - 5.4.3 Intentional misstatement 11
  - 5.4.4 Documented information 11
  - 5.4.5 Process for completing a verification/validation 11

6 Verification 14
- 6.1 Planning 14
  - 6.1.1 Strategic analysis 14
  - 6.1.2 Risk assessment 15
  - 6.1.3 Evidence-gathering activities 17
  - 6.1.4 Site visits 19
  - 6.1.5 Verification plan 21
  - 6.1.6 Evidence-gathering plan 21
  - 6.1.7 Approval of verification and evidence-gathering plans 21
- 6.2 Execution 21
- 6.3 Completion 22
  - 6.3.1 Evaluation of the GHG statement 22
  - 6.3.2 Conclusion and draft opinion 22
  - 6.3.3 Verification report 23

7 Validation 24

Documents
Document Sharing Hub

Full document details: AS ISO 14064.3-2024

7.1 Planning 24
7.1.1 Strategic analysis 24
7.1.2 Materiality thresholds 25
7.1.3 Estimate testing 25
7.1.4 Assessment of GHG-related activity characteristics 25
7.1.5 Validation plan 28
7.1.6 Evidence-gathering plan 29
7.1.7 Approval of validation and evidence-gathering plans 29
7.1.8 Amendments to validation and evidence-gathering plans 29
7.2 Execution 29
7.2.1 General 29
7.2.2 Evaluation of the GHG statement 29
7.2.3 Proper disclosure 30
7.3 Completion 30
7.3.1 General 30
7.3.2 Opinion 30
7.3.3 Validation report 31

8 Independent review 31

9 Issuance of opinion 32
9.1 General 32
9.2 Types of opinions 32
9.3 Contents of opinion 33

10 Facts discovered after the verification/validation 34

Annex A (normative) **Limited level of assurance verifications 35**

Annex B (informative) **Considerations for verification 39**

Annex C (informative) **Agreed-upon procedures (AUP) 43**

Annex D (informative) **Mixed engagement 48**

Bibliography 56

Documents
Document Sharing Hub

Full document details: AS ISO 14064.3-2024

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 7, *Greenhouse gas management and related activities.*

This second edition cancels and replaces the first edition (ISO 14064-3:2006), which has been technically revised. The main changes compared with the previous edition are as follows.

— The structure of the document has been changed so that verification and validation are discussed in sequence (see Clauses 6 and 7) rather than in parallel, because the processes of verification and validation are significantly different.

— The definitions of verification and validation and other key terms have been changed (see Clause 3).

— A new section on validation has been added (see Clause 7). It applies to future estimates of emissions, removals, emission reductions and removal enhancements. The purpose of validation is to provide assurance on the assumptions, limitations and methods used to develop a GHG statement.

— A new Annex A has been added that defines requirements for verifiers to follow when undertaking engagements at a limited level of assurance.

— A new Annex B has been added on considerations for verification.

— A new Annex C has been added on a new process called agreed-upon procedures (AUP), which allows for a selection of verification activities to be performed and reported upon. No opinion is expressed on the result of an AUP engagement as the intended user(s) are responsible for interpreting the information reported on by the verifier.

— A new Annex D has been added that provides guidance on how verifiers and validators can provide statements on engagements that are mixed.

— Requirements and guidance on the use of levels of assurance have been added.

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A list of all parts in the ISO 14064 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

0.1 Background

Climate change arising from anthropogenic activity has been identified as one of the greatest challenges facing the world and will continue to affect business and citizens over future decades.

Climate change has implications for both human and natural systems and could lead to significant impacts on resource availability, economic activity and human wellbeing. In response, international, regional, national and local initiatives are being developed and implemented by public and private sectors to mitigate greenhouse gas (GHG) concentrations in the Earth's atmosphere as well as to facilitate adaptation to climate change.

There is a need for an effective and progressive response to the urgent threat of climate change on the basis of the best available scientific knowledge. ISO produces documents that support the transformation of scientific knowledge into tools that will help address climate change.

GHG initiatives on mitigation rely on the quantification, monitoring, reporting and verification of GHG emissions and/or removals.

The ISO 14060 family of standards provides clarity and consistency for quantifying, monitoring, reporting and validating or verifying GHG emissions and removals to support sustainable development through a low-carbon economy and to benefit organizations, project proponents and interested parties worldwide. Specifically, the use of the ISO 14060 family of standards:

— enhances the environmental integrity of GHG quantification;

— enhances the credibility, consistency and transparency of GHG quantification, monitoring, reporting, verification and validation;

— facilitates the development and implementation of GHG management strategies and plans;

— facilitates the development and implementation of mitigation actions through emission reductions or removal enhancements;

— facilitates the ability to track performance and progress in the reduction of GHG emissions and/or increase in GHG removals.

Applications of the ISO 14060 family of standards include:

— corporate decisions, such as identifying emission reduction opportunities and increasing profitability by reducing energy consumption;

— carbon risk management, such as the identification and management of risks and opportunities;

— voluntary initiatives, such as participation in voluntary GHG registries or sustainability reporting initiatives;

— GHG markets, such as the buying and selling of GHG allowances or credits;

— regulatory/government GHG programmes, such as credit for early action, agreements or national and local reporting initiatives.

ISO 14064-1 details principles and requirements for designing, developing, managing and reporting organization-level GHG inventories.

It includes requirements for determining GHG emission and removal boundaries, quantifying an organization's GHG emissions and removals, and identifying specific company actions or activities aimed at improving GHG management.

It also includes requirements and guidance on inventory quality management, reporting, internal auditing and the organization's responsibilities in verification activities.

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ISO 14064-2 details principles and requirements for determining baselines, and monitoring, quantifying and reporting of project emissions. It focuses on GHG projects or project-based activities specifically designed to reduce GHG emissions and/or enhance GHG removals. It provides the basis for GHG projects to be verified and validated.

This document details requirements for verifying GHG statements related to GHG inventories, GHG projects, and carbon footprints of products. It describes the process for verification or validation, including verification or validation planning, assessment procedures, and the evaluation of organizational, project and product GHG statements.

ISO 14065 defines requirements for bodies that validate and verify GHG statements. Its requirements cover impartiality, competence, communication, validation and verification processes, appeals, complaints, and the management system of validation and verification bodies. It can be used as a basis for accreditation and other forms of recognition in relation to the impartiality, competence, and consistency of validation and verification bodies.

ISO 14066 specifies competence requirements for validation teams and verification teams. It includes principles and specifies competence requirements based on the tasks that validation teams or verification teams must be able to perform.

ISO 14067 defines the principles, requirements and guidelines for the quantification of carbon footprint of products. The aim of ISO 14067 is to quantify GHG emissions associated with the life cycle stages of a product, beginning with resource extraction and raw material sourcing and extending through the production, use and end-of-life stages of the product.

ISO/TR 14069 assists users in the application of ISO 14064-1, providing guidelines and examples for improving transparency in the quantification of emissions and their reporting. It does not provide additional guidance to ISO 14064-1.

Figure 1 illustrates the relationship among the ISO 14060 family of GHG standards.

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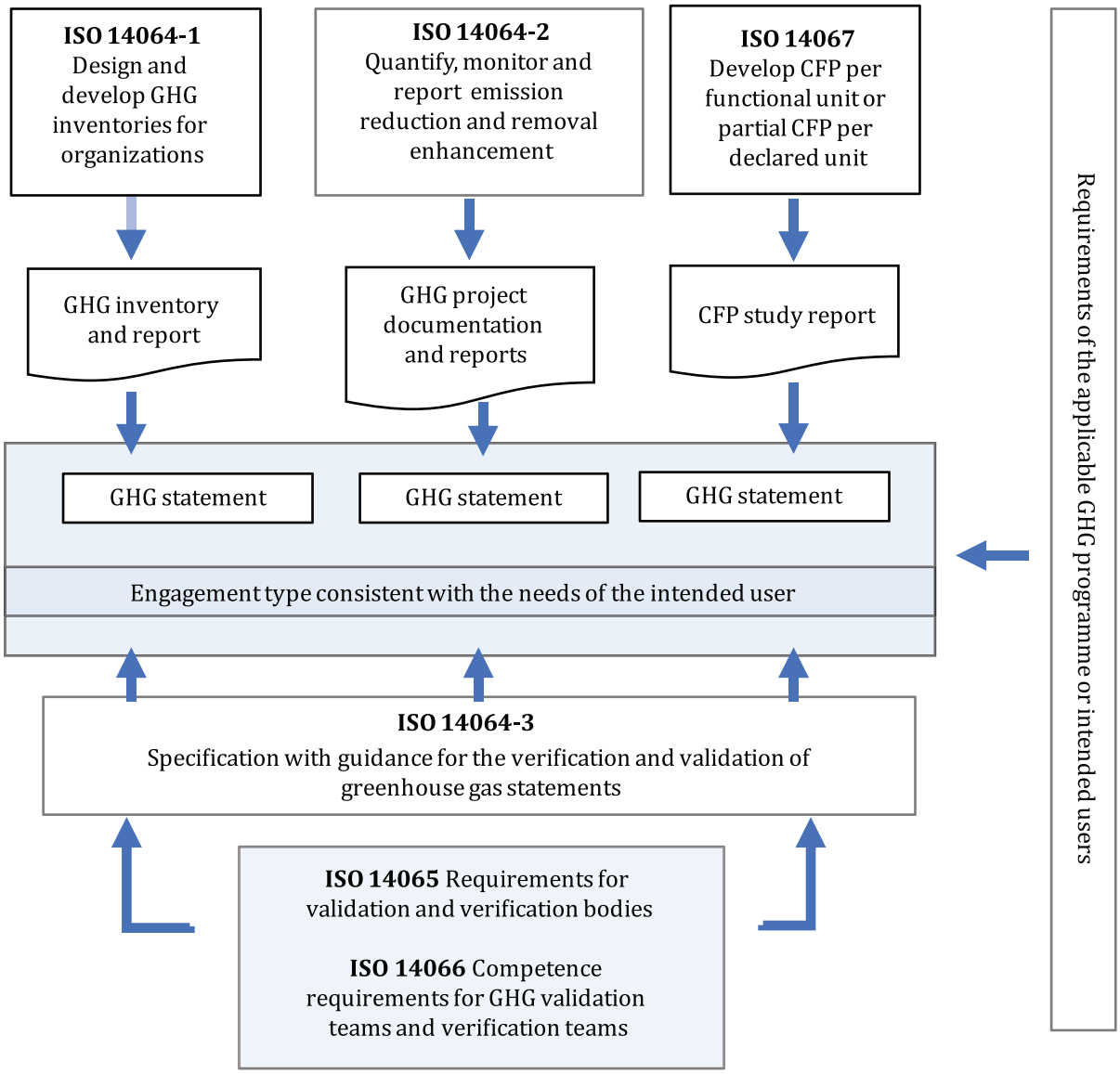

Figure 1 — Relationship among the ISO 14060 family of GHG standards

0.2 Approach of this document

This document details requirements for verifying GHG statements related to GHG inventories, GHG projects and carbon footprints of products. It describes verification activities that can enable a verifier to issue an opinion on GHG statements regarding emissions that are attributed to any organization, project or normalized unit (e.g. product). The data and information that are subject to verification are historical in nature.

This document also details requirements for validating the assumptions, limitations and methods that support a statement about the outcome of future activities. Validation differs from verification because its subject is data and information that are prospective and generally based on past performance. This document recognizes the different process requirements that apply to the validation of assumptions and methods.

This document can be used by first-, second- and third-party GHG verifiers and validators. It is regime neutral, meaning that it can be used for verifying and validating GHG statements regardless of the criteria used to develop those statements.

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This document provides requirements and guidance for those persons performing verification and validation of GHG data and information. It is intended to be useful to a broad range of potential users, including:

— first-, second- and third-party GHG verifiers and validators;

— organizations and individuals involved in developing and commissioning GHG projects;

— organizations conducting internal audits of their GHG data and information;

— organizations involved in GHG verifier or validator training;

— voluntary and mandatory GHG programme administrators;

— investor, finance and insurance communities;

— regulators and those involved in the accreditation and conformity assessment of emissions trading and emission or removal offset programmes.

Figure 2 explains the application of verification, validation and AUP.

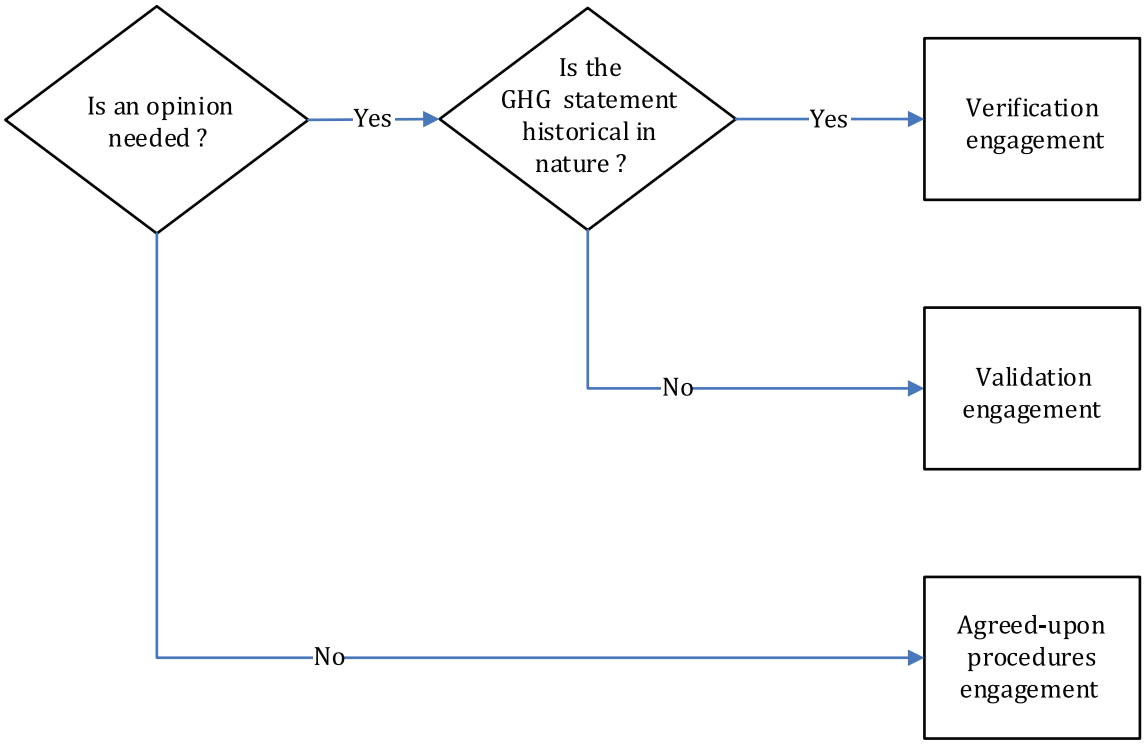

Figure 2 — Decision process for engagement type

In this document, validation is described as a specific type of engagement that assesses the assumptions, limitations and methods that generate hypothetical or projected data and information, i.e. estimates of the outcomes of future events.

0.3 Significance of the terms “explain” and “justify” in this document

Some clauses require users of this document to explain and justify the use of certain approaches or decisions taken.

Explanation generally includes:

a) how approaches were used or decisions taken;

b) why approaches were chosen or decisions made.

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Justification has two more criteria:

c) explain why alternative approaches were not chosen;

d) provide supporting data or analysis.

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Australian Standard®

Greenhouse gases

Part 3: Specification with guidance for the verification and validation of greenhouse gas statements

1 Scope

This document specifies principles and requirements and provides guidance for verifying and validating greenhouse gas (GHG) statements.

It is applicable to organization, project and product GHG statements.

The ISO 14060 family of standards is GHG programme neutral. If a GHG programme is applicable, requirements of that GHG programme are additional to the requirements of the ISO 14060 family of standards.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1 Terms related to greenhouse gases

3.1.1
greenhouse gas
GHG
gaseous constituent of the atmosphere, both natural and anthropogenic, 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: GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6).

Note 2 to entry: *Criteria* (3.6.10) may specify other radiative forcing constituents.

3.1.2
global warming potential
GWP
index, based on radiative properties of *GHGs* (3.1.1), measuring the radiative forcing following a pulse emission of a unit mass of a given GHG in the present-day atmosphere integrated over a chosen time horizon, relative to that of carbon dioxide (CO_2)

Note 1 to entry: A list of GHGs with their recognized GWPs is provided in the latest Intergovernmental Panel on Climate Change (IPCC) Assessment Report[15].

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3.1.3
greenhouse gas emission or removal factor
GHG emission or removal factor
coefficient relating GHG activity data with *GHG emissions* (3.3.2) or *GHG removals* (3.3.4)

3.1.4
carbon footprint of product
CFP
sum of *GHG emissions* (3.3.2) and *GHG removals* (3.3.4) in a product system, expressed as CO_2 equivalents and based on a life cycle assessment using the single impact category of climate change

Note 1 to entry: A CFP can be disaggregated into a set of figures identifying specific GHG emissions and GHG removals. A CFP can also be disaggregated into the stages of the life cycle.

Note 2 to entry: The results of the quantification of the CFP are documented in the CFP study report, called *GHG statement* (3.4.3) in this document, expressed in mass of CO_2e per functional unit.

[SOURCE: ISO 14067:2018, 3.1.1.1, modified — A reference to "GHG statement" has been added to Note 2 to entry.]

3.2 Terms related to entities involved in GHG verification and validation

3.2.1
greenhouse gas programme
GHG programme
voluntary or mandatory international, national or subnational system or scheme that registers, accounts or manages *GHG emissions* (3.3.2), *GHG removals* (3.3.4), *GHG emission reductions* (3.4.8) or *GHG removal enhancements* (3.4.9) outside the *organization* (3.2.2) or *GHG project* (3.4.1)

Note 1 to entry: In this document, a GHG programme may also register, account or manage GHG emissions, GHG removals, GHG emission reductions or GHG removal enhancements from products.

3.2.2
organization
person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives

3.2.3
responsible party
person or persons responsible for the provision of the *GHG statement* (3.4.3) and the supporting *GHG* (3.1.1) information

Note 1 to entry: The responsible party can be either individuals or representatives of an *organization* (3.2.2), *GHG project* (3.4.1) or product, and can be the party who engages the *verifier* (3.2.6) or *validator* (3.2.7).

3.2.4
intended user
individual or *organization* (3.2.2) identified by those reporting GHG-related information as being the one who relies on that information to make decisions

Note 1 to entry: The intended user can be the *client* (3.2.5), the *responsible party* (3.2.3), *GHG programme* (3.2.1) administrators, regulators, the financial community or other interested parties, such as local communities, government departments or non-governmental organizations.

3.2.5
client
organization (3.2.2) or person requesting *verification* (3.6.2) or *validation* (3.6.3)

Note 1 to entry: The client could be the *responsible party* (3.2.3), *GHG programme* (3.2.1) administrator or other interested party.

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3.2.6
verifier
competent and impartial person with responsibility for performing and reporting on a *verification* (3.6.2)

3.2.7
validator
competent and impartial person with responsibility for performing and reporting on a *validation* (3.6.3)

3.2.8
verification/validation team
person or persons conducting *verification* (3.6.2) / *validation* (3.6.3) activities

Note 1 to entry: One person of the verification/validation team is appointed as the team leader.

3.2.9
independent reviewer
competent person, who is not a member of the *verification/validation team* (3.2.8), who reviews the *verification* (3.6.2) or *validation* (3.6.3) activities and conclusions

3.2.10
retracing
test (3.6.21) that uncovers errors in *GHG* (3.1.1) information by following *data trails* (3.5.2) back to primary data

3.2.11
tracing
test (3.6.21) that uncovers errors in *GHG* (3.1.1) information by following primary data to GHG information

3.3 Terms related to the GHG inventory

3.3.1
greenhouse gas source
GHG source
process that releases a *GHG* (3.1.1) into the atmosphere

3.3.2
greenhouse gas emission
GHG emission
release of a *GHG* (3.1.1) into the atmosphere

3.3.3
greenhouse gas sink
GHG sink
process that removes a *GHG* (3.1.1) from the atmosphere

3.3.4
greenhouse gas removal
GHG removal
withdrawal of a *GHG* (3.1.1) from the atmosphere by *GHG sinks* (3.3.3)

3.3.5
greenhouse gas reservoir
GHG reservoir
component, other than the atmosphere, that has the capability to accumulate *GHGs* (3.1.1), and to store and release them

Note 1 to entry: The total mass of carbon contained in a GHG reservoir at a specified point in time could be referred to as the carbon stock of the reservoir.

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Note 2 to entry: A GHG reservoir can transfer GHGs to another GHG reservoir.

Note 3 to entry: The collection of a GHG from a *GHG source* (3.3.1) before it enters the atmosphere and storage of the collected GHG in a GHG reservoir could be referred to as GHG capture and *GHG storage* (3.3.6).

3.3.6
greenhouse gas storage
GHG storage
process for retaining captured *GHGs* (3.1.1) so that they do not reach the atmosphere

3.4 Terms related to the GHG statement

3.4.1
greenhouse gas project
GHG project
activity or activities that alter the conditions of a *GHG baseline* (3.4.6) and which cause *GHG emission reductions* (3.4.8) or *GHG removal enhancements* (3.4.9)

3.4.2
greenhouse gas report
GHG report
standalone document intended to communicate an *organization's* (3.2.2) or *GHG project's* (3.4.1) GHG-related information to its *intended users* (3.2.4)

Note 1 to entry: A GHG report can include a *GHG statement* (3.4.3).

3.4.3
greenhouse gas statement
GHG statement
DEPRECATED: GHG assertion
factual and objective declaration that provides the subject matter for the *verification* (3.6.2) or *validation* (3.6.3)

Note 1 to entry: The GHG statement could be presented at a point in time or could cover a period of time.

Note 2 to entry: The GHG statement provided by the *responsible party* (3.2.3) should be clearly identifiable, capable of consistent evaluation or measurement against suitable *criteria* (3.6.10) by a *verifier* (3.2.6) or *validator* (3.2.7).

Note 3 to entry: The GHG statement could be provided in a *GHG report* (3.4.2), *GHG project* (3.4.1) plan or CFP study report. "CFP study report" is defined in ISO 14067:2018, 3.1.1.5.

3.4.4
greenhouse gas inventory
GHG inventory
list of *GHG sources* (3.3.1), *GHG sinks* (3.3.3) and *GHG reservoirs* (3.3.5) and their quantified *GHG emissions* (3.3.2) and *GHG removals* (3.3.4)

Note 1 to entry: An inventory is established to cover a defined period of time.

3.4.5
base year
specific, historical period identified for the purpose of comparing *GHG emissions* (3.3.2) or *GHG removals* (3.3.4) or other GHG-related information over time

Note 1 to entry: Base-year emissions, removals or storage may be quantified based on a specific period (e.g. a year) or averaged from several periods (e.g. several years).

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3.4.6
greenhouse gas baseline
GHG baseline
quantitative reference(s) of *GHG emissions* (3.3.2) and/or *GHG removals* (3.3.4) that would have occurred in the absence of a *GHG project* (3.4.1) and provides the *baseline scenario* (3.4.7) for comparison with project GHG emissions and/or GHG removals

3.4.7
baseline scenario
hypothetical reference case that best represents the conditions most likely to occur in the absence of a proposed *GHG project* (3.4.1)

Note 1 to entry: The baseline scenario concurs with the GHG project timeline.

3.4.8
greenhouse gas emission reduction
GHG emission reduction
quantified decrease in *GHG emissions* (3.3.2) between a *baseline scenario* (3.4.7) and the *GHG project* (3.4.1)

3.4.9
greenhouse gas removal enhancement
GHG removal enhancement
quantified increase in *GHG removals* (3.3.4) between a *baseline scenario* (3.4.7) and the *GHG project* (3.4.1)

3.5 Terms related to GHG data and information management

3.5.1
greenhouse gas information system
GHG information system
policies, processes and procedures to establish, manage, maintain and record *GHG* (3.1.1) information

Note 1 to entry: A GHG information system can include measurements, spreadsheets, samples, calibration instructions, etc.

3.5.2
data trail
complete record by which *GHG* (3.1.1) information can be traced to the *GHG source* (3.3.1)

3.5.3
monitoring
continuous or periodic collection of *GHG emissions* (3.3.2), *GHG removals* (3.3.4) or other GHG-related data

3.6 Terms related to verification and validation

3.6.1
engagement
arrangement between two parties, with the terms usually specified in a contract, to perform services

3.6.2
verification
process for evaluating a statement of historical data and information to determine if the statement is materially correct and conforms to *criteria* (3.6.10)

3.6.3
validation
process for evaluating the reasonableness of the assumptions, limitations and methods that support a statement about the outcome of future activities

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3.6.4
agreed-upon procedures
AUP
engagement (3.6.1) that reports on the results of *verification* (3.6.2) activities and does not provide an *opinion* (3.6.18)

3.6.5
level of assurance
degree of confidence in the *GHG statement* (3.4.3)

Note 1 to entry: Assurance is provided on historical information.

3.6.6
reasonable assurance
level of assurance (3.6.5) where the nature and extent of the *verification* (3.6.2) activities have been designed to provide a high but not absolute level of assurance on historical data and information

3.6.7
limited assurance
level of assurance (3.6.5) where the nature and extent of the *verification* (3.6.2) activities have been designed to provide a reduced level of assurance on historical data and information

3.6.8
material
information capable of influencing the decisions of *intended users* (3.2.4)

3.6.9
materiality
concept that individual *misstatements* (3.6.15) or the aggregation of misstatements could influence the *intended users'* (3.2.4) decisions

3.6.10
criteria
policy, procedure or requirement used as a reference against which the *GHG statement* (3.4.3) is compared

3.6.11
controls
responsible party's (3.2.3) policies and procedures that help ensure that the *GHG statement* (3.4.3) is free from *material misstatements* (3.6.17) and conforms to the *criteria* (3.6.10)

3.6.12
cut-off
point in time for starting or ending *GHG* (3.1.1) reporting periods

Note 1 to entry: In this document, cut-off has a different meaning than in ISO 14067.

3.6.13
site
location where an *organization* (3.2.2) carries out work or a service

Note 1 to entry: A site may include one or several *facilities* (3.6.14).

3.6.14
facility
single installation, set of installations or production processes (stationary or mobile), which can be defined within a single geographical boundary, organizational unit or production process

3.6.15
misstatement
errors, omissions, misreporting or misrepresentations in the *GHG statement* (3.4.3)

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3.6.16
uncertainty
parameter associated with the result of quantification that characterizes the dispersion of the values that could be reasonably attributed to the quantified amount

Note 1 to entry: Uncertainty information typically specifies quantitative estimates of the likely dispersion of values and a qualitative description of the likely causes of the dispersion.

3.6.17
material misstatement
individual *misstatement* (3.6.15) or the aggregate of actual misstatements in the *GHG statement* (3.4.3) that could affect the decisions of the *intended users* (3.2.4)

3.6.18
verification/validation opinion
DEPRECATED: verification/validation statement
formal written declaration to the *intended user* (3.2.4) that provides confidence on the *GHG statement* (3.4.3) in the *responsible party's* (3.2.3) *GHG report* (3.4.2) and confirms conformity with the *criteria* (3.6.10)

3.6.19
nonconformity
non-fulfilment of a requirement

3.6.20
analytical procedure
evaluation of *GHG* (3.1.1) information made by an analysis of plausible relationships among GHG and non-GHG data

3.6.21
test
technique used to assess a characteristic of items in a sampled population of *GHG* (3.1.1) data and information against *verification* (3.6.2) or *validation* (3.6.3) *criteria* (3.6.10)

4 Principles

4.1 General

The application of principles is fundamental to ensure that GHG-related information is a true and fair account. The principles are the basis for, and will guide the application of, the requirements in this document.

4.2 Impartiality

Design and execute the verification/validation engagement so that it is objective and does not introduce bias.

4.3 Evidence-based approach

Ensure the verification/validation engagement employs a rational method for reaching reliable and reproducible verification/validation conclusions and is based on sufficient and appropriate evidence.

4.4 Fair presentation

Ensure the verification/validation activities, findings, conclusions and opinions are truthfully and fairly presented. Report significant obstacles encountered during the process, as well as unresolved, diverging opinions among verifiers or validators, to the responsible party and the client.

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4.5 Documentation

Document the verification/validation and ensure it establishes the basis for the conclusion and conformity with the criteria.

4.6 Conservativeness

When assessing comparable alternatives, use a selection that is cautiously moderate.

NOTE For further details, see B.9.

5 Requirements applicable to verification/validation

5.1 Pre-engagement activities

5.1.1 General

The verifier/validator shall confirm the following aspects of the engagement:

a) type;

b) objectives: verification/validation;

c) scope: boundary, period;

d) criteria: materiality, level of assurance, etc.

NOTE Engagement types specified in this document include verification and validation. Annex C describes an engagement type called "agreed-upon procedures".

5.1.2 Type of engagement

The verifier/validator and the client shall agree on the engagement type(s) and shall consider the needs of the intended user. The verifier/validator shall assess the appropriateness of the proposed engagement type.

NOTE A verifier/validator can conduct a mixed engagement, as described in Annex D, when:

a) the scope of each type of engagements is clearly defined;

b) the GHG statements are developed in accordance with criteria.

5.1.3 Level of assurance in the case of verification

For verification, the verifier and the client shall agree on the level of assurance to be applied and shall consider the needs of the intended user. The verifier shall assess the appropriateness of the level of assurance. The verifier shall not change the level of assurance during the verification, but may terminate the engagement and start a new engagement with a different level of assurance. The level of assurance shall be specified prior to the start of the verification because the level of assurance establishes the nature, extent and timing (the design) of the evidence-gathering activities.

This document describes requirements applicable for verification at a reasonable level of assurance. In cases of limited level of assurance, the requirements in Annex A shall be met.

Considerations for verification are given in Annex B.

5.1.4 Objectives

The verifier/validator and client shall agree on the verification/validation objectives at the beginning of the verification/validation engagement.

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