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Greenhouse gases —

Part 2:

Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements

Gaz à effet de serre —

Partie 2: Spécifications et lignes directrices, au niveau des projets, pour la quantification, le contrôle et la déclaration des reductions d'émissions des gaz à effet de serre ou leur suppression

ICS 13.020.40

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 14064-2 was prepared by Technical Committee ISO/TC 207, *Environmental Management*, Working Group 5 on Climate Change.

ISO 14064 consists of the following parts:

— *Part 2: Specification with guidance at the project level for the quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements from projects*

— *Part 1: Specification with guidance at the organization level for the quantification and reporting of greenhouse gas emissions and removals from organizations*

— *Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions*

Introduction

Climate change has been identified as one of the greatest challenges facing nations, governments, business and citizens over upcoming decades. Climate change has implications for both human and natural systems and could lead to significant changes in resource use, production and economic activity. In response, international, regional, national, and local initiatives are being developed and implemented to limit greenhouse gas (GHG) concentrations in the Earth's atmosphere. Such GHG initiatives rely on the quantification, monitoring, reporting and verification of GHG emissions and/or removals.

ISO 14064-1 details principles and requirements for designing, developing, managing and reporting organization or company-level GHG inventories. ISO 14064-1 includes requirements for determining GHG emission 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.

This part of ISO 14064 focuses on GHG projects or project-based activities specifically designed to reduce GHG emissions or increase GHG removals. This part of ISO 14064 includes principles and requirements for determining project baselines and for monitoring, quantifying and reporting project performance relative to the baseline and provides the basis for GHG projects to be validated and verified.

ISO 14064-3 details principles and requirements for verifying GHG inventories and validating or verifying GHG projects. ISO 14064-3 describes the process for GHG-related validation or verification and specifies components such as validation or verification planning, assessment procedures and the evaluation of organization or project GHG assertions. ISO 14064-3 can be used by organizations or independent parties to validate or verify GHG assertions.

Figure 1 displays relationships among the three parts of ISO 14064.

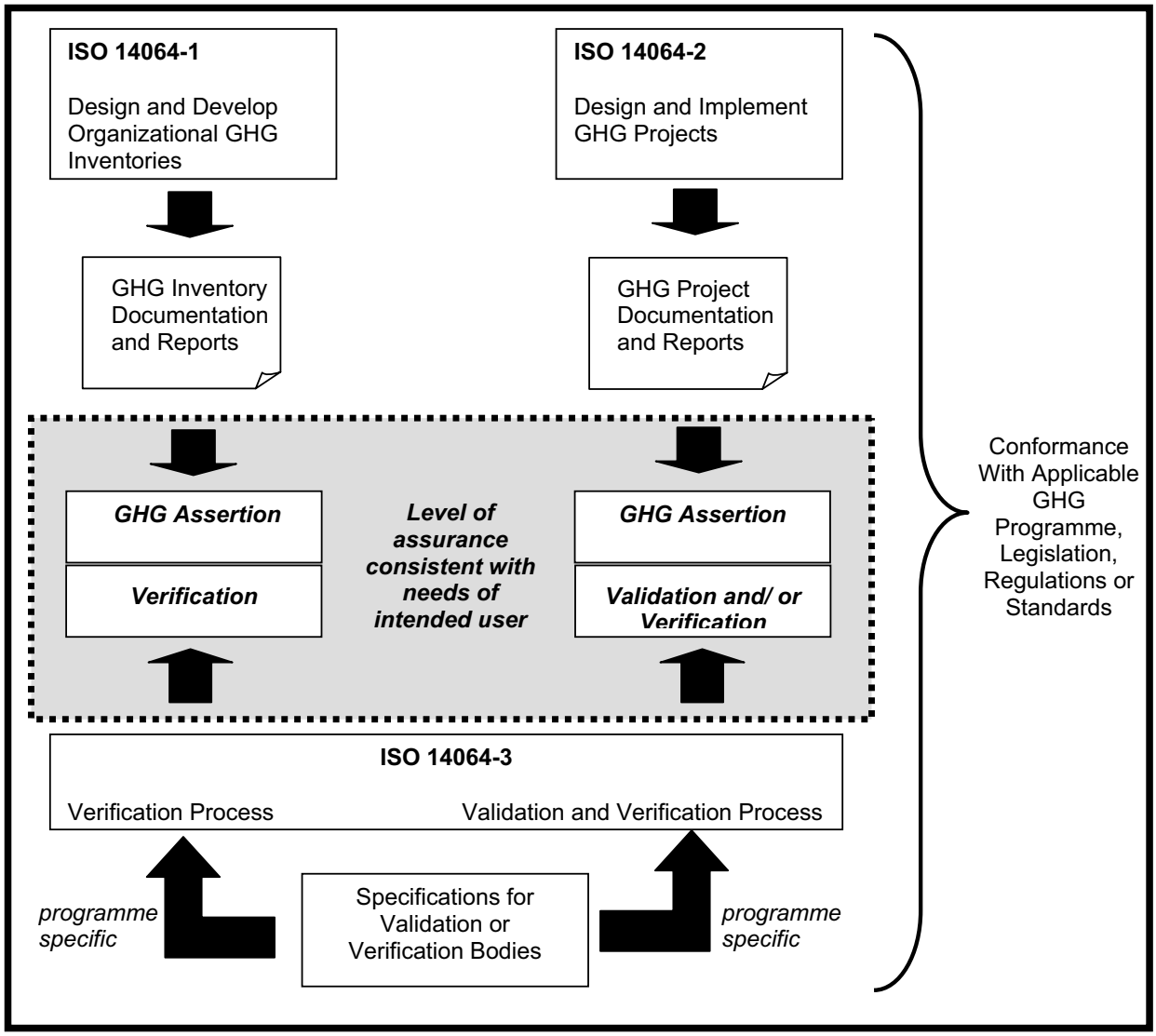


Figure 1 — Relationships among parts of ISO 14064

ISO 14064 is expected to benefit organizations, governments, project proponents and stakeholders worldwide by providing clarity and consistency for quantifying, monitoring, reporting and validating or verifying GHG inventories or projects. Specifically, use of ISO 14064 may:

— enhance the environmental integrity of GHG quantification;

— enhance the credibility, consistency, and transparency of GHG quantification, monitoring and reporting, including GHG project emission reductions and removal enhancements;

— facilitate the development and implementation of organization GHG management strategies and plans;

— facilitate the development and implementation of GHG projects;

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

— facilitate the crediting and trade of GHG emission reductions or removal enhancements.

Users of ISO 14064 may find benefit in some of the following applications:

— corporate risk management; for example, the identification and management of risks and opportunities;

— voluntary initiatives; for example, participation in voluntary GHG registry or reporting initiatives;

— GHG markets; for example, the buying and selling of GHG allowances or credits;

— regulatory/government reporting; for example, credit for early action, negotiated agreements or national reporting programmes.

A standardized approach for quantification, monitoring and reporting is required for GHG projects, and any resulting GHG emission reductions and/or removal enhancements, in order that they are comparable among intended users and GHG programmes. Accordingly, this part of ISO 14064 specifies a general, GHG programme-neutral framework and uses terms and concepts designed to be compatible with other requirements and guidance from relevant GHG policies and programmes, good practice, legislation and standards.

This part of ISO 14064 deals with the concept of additionality by requiring that the GHG project has resulted in GHG emissions reductions or removal enhancements in addition to what would have happened in the absence of that project. It does not use the term “additionality”, prescribe baseline procedures or specify additionality criteria. This part ISO 14064 requires the project proponent to identify and select GHG sources, sinks and reservoirs relevant for the GHG project and for the baseline scenario. In order to be compatible with the broadest range of GHG programmes, it does not use the term boundaries to describe which GHG sources, sinks and/or reservoirs are considered for quantification, monitoring and reporting but instead uses the concept of relevant GHG sources, sinks and/or reservoirs. Thus the project proponent may apply additionality criteria and procedures or define and use boundaries consistent with relevant legislation, policy, GHG programmes and good practice.

Quantification and monitoring of project-level GHG emissions, removals, emission reductions and removal enhancements is challenging because actual project performance is assessed against a hypothetical baseline scenario that represents what would have happened in the absence of the GHG project. Consequently, it is difficult to verify GHG emissions, removals and/or stocks of the baseline scenario. It is therefore important to demonstrate that the baseline scenario is consistent with the principles of this part of ISO 14064, including conservativeness and accuracy, in order to increase the level of confidence that GHG emission reductions and/or removal enhancements are credible and not over-estimated. Generally, the baseline scenario is determined on the basis of an assessment of alternative scenarios. For both the project and the baseline scenario, the quantification, monitoring and reporting of GHG emissions, removals and/or stocks by GHG sources, sinks and reservoirs is based on procedures developed by the project proponent or adopted from recognized authorities.

This part of ISO 14064 does not specify requirements for validation/verification bodies or validators/verifiers in providing assurance against GHG assertions or claims by GHG projects. Such requirements may be the authority of the applicable GHG programme or can be found in ISO 14064-3. The process to recognize certified GHG emission reductions or removal enhancements as GHG units, credits or offsets is an extension of the GHG project cycle. The certification and crediting process, which may be the authority of a GHG programme and may vary among GHG programmes, is also not included in the specifications of this part of ISO 14064.

In cases where the project proponent wishes to conform to the United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol’s Clean Development Mechanism (CDM) or Joint Implementation (JI) Mechanism, this part of ISO 14064 provides additional information in Annex A.

Greenhouse gases —

Part 2:

Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements

1 Scope

This part of ISO 14064 specifies principles and requirements and provides guidance at the project level for quantification, monitoring and reporting of activities intended to cause GHG emission reductions or removal enhancements. This part of ISO 14064 includes requirements for planning a GHG project, identifying and selecting GHG sources, sinks and reservoirs relevant to the project and baseline scenario, monitoring, quantifying, documenting and reporting GHG project performance and managing data quality.

ISO 14064 is GHG programme neutral. If a GHG programme is applicable, the requirements of that policy or programme are additional to the requirements of ISO 14064. If a requirement of ISO 14064 prevents an organization or GHG project proponent from complying with applicable GHG policy or programme requirements, the requirement of the GHG policy or programme takes precedence.

2 Definitions

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

2.1
baseline scenario
hypothetical reference case that best represents the conditions most likely to have occurred in the absence of a GHG project

NOTE 1 The baseline scenario covers the same time period as the project.

NOTE 2 In the case of removal enhancement projects, the conditions identified in the baseline scenario will include the stock of relevant greenhouse gases accumulated or stored from GHG reservoirs related, affected, or controlled by the project.

2.2
carbon dioxide equivalent
CO_2-e
unit for comparing the radiative forcing of a GHG to carbon dioxide

NOTE The carbon dioxide equivalent is calculated using the mass of a given GHG multiplied by its global warming potential.

2.3
client
organization or person requesting validation or verification

2.4
greenhouse gas
GHG
gas that absorbs visible light and re-emits infrared radiation

NOTE Common GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

2.5
greenhouse gas source
physical unit or process that releases a GHG into the atmosphere

2.6
greenhouse gas sink
physical unit or process that removes a GHG from the atmosphere

2.7
greenhouse gas reservoir
physical unit or component of the biosphere, geosphere or hydrosphere with the capability to store or accumulate a GHG removed from the atmosphere by a GHG sink or a GHG captured from a GHG source

NOTE 1 The total mass of carbon contained in a GHG reservoir at a specified point in time may be referred to as the carbon stock of the reservoir.

NOTE 2 A GHG reservoir can transfer GHGs to another GHG reservoir.

NOTE 3 The collection of a GHG from a GHG source before it enters the atmosphere and storage of the collected GHG in a GHG reservoir may be referred to as GHG capture and storage.

2.8
greenhouse gas emission
total mass of a GHG released to the atmosphere over a specified period of time

2.9
greenhouse gas removal
total mass of a GHG removed from the atmosphere over a specified period of time

2.10
greenhouse gas emission reduction
calculated decrease of GHG emissions between a baseline scenario and project

2.11
greenhouse gas removal enhancement
calculated increase of GHG removals between a baseline scenario and project

2.12
greenhouse gas emission or removal factor
factor relating activity data to GHG emissions or removals

2.13
affected greenhouse gas source, sink or reservoir
GHG source, sink or reservoir influenced by a project activity by changes in market demand or supply for associated products or services

NOTE 1 While related GHG sources, sinks or reservoirs are physically linked to a GHG project, affected GHG sources, sinks or reservoirs are linked to a GHG project by changes in behaviour due to market demand and supply.

NOTE 2 An affected GHG source, sink or reservoir is generally off the project site.

NOTE 3 GHG emission reductions or removal enhancements offset by affected GHG sources, sinks or reservoirs are often referred to as leakage.

2.14
controlled greenhouse gas source, sink or reservoir
GHG source, sink or reservoir whose behaviour or operation is under the direction and influence of the project proponent through financial, policy, management or other instruments

NOTE A controlled GHG source, sink or reservoir is generally on the project site.

2.15
related greenhouse gas source, sink or reservoir
GHG source, sink or reservoir that has material or energy flows into, out of, or within the project

NOTE 1 A related GHG source, sink or reservoir is generally upstream or downstream from the project, and can be either on or off the project site.

NOTE 2 A related GHG source, sink or reservoir also may include activities related to design, construction and decommissioning of a project.

2.16
greenhouse gas assertion
declaration or factual and objective statement of performance made by the responsible party of actual or expected performance

NOTE 1 The GHG assertion may be presented at a point in time or may cover a period of time.

NOTE 2 The GHG assertion provided by the responsible party must be clearly identifiable, capable of consistent evaluation or measurement against suitable criteria and in a form that can be subjected to testing methodologies for gathering evidence to support that evaluation or measurement.

NOTE 3 The GHG assertion may be provided in the form of a GHG report or GHG project plan.

2.17
greenhouse gas information system
policies, processes and procedures to establish, manage and maintain GHG information

2.18
greenhouse gas project
activity or activities that alter the conditions identified in the baseline scenario intended to cause GHG emission reductions or removal enhancements

NOTE In the case of GHG removal enhancement projects, the specific conditions altered by the project will include all relevant changes in GHG stocks due to project activities.

2.19
greenhouse gas programme
voluntary or mandatory international, national or sub-national system or scheme that registers, accounts or manages GHG emissions, removals, emission reductions or removal enhancements outside the organization or GHG project

NOTE Regulatory GHG programmes are established by law, such as a treaty, statute or regulation.

2.20
greenhouse gas project proponent
individual or organization that has overall control and responsibility for a GHG project

2.21
greenhouse gas report
stand-alone document intended to communicate an organization or project's GHG-related information to its intended user

NOTE A GHG report may include a GHG assertion.

2.22
global warming potential
GWP
factor describing the radiative forcing impact of one mass-based unit of a given GHG relative to an equivalent unit of carbon dioxide over a given period of time

2.23
intended user
individual or organization identified by those reporting GHG-related information that relies on that information to make decisions

2.24
level of assurance
degree of assurance the intended user requires in a validation or verification statement

NOTE 1 The level of assurance is used to determine the depth of detail that a validator or verifier designs into their validation or verification plan to determine if there any material errors, omissions or misrepresentations.

NOTE 2 There are two levels of assurance, either high or moderate, which result in a positive or neutral validation or verification statement.

2.25
monitoring
continuous or periodic assessment of GHG emissions and removals or other GHG-related data

2.26
responsible party
person or persons responsible for the provision of the GHG assertion and the supporting GHG information

NOTE The responsible party can be either individuals or representatives of an organization or project and may or may not be the party who engages the validation or verification body. The validation or verification body may be engaged by the client or by other parties, such as the GHG programme administrator.

2.27
stakeholder
individual or organization that is affected by the development or implementation of a GHG project

2.28
uncertainty
parameter associated with the result of quantification which characterizes the dispersion of the values that could be reasonably attributed to the quantified amount

NOTE Uncertainty information typically specifies quantitative estimates of the likely or perceived dispersion of values and a qualitative description of the likely causes of the dispersion.

2.29
validation
systematic, independent and documented process for the evaluation of a proposed GHG assertion against agreed to validation criteria

NOTE In some cases, such as in first-party validations, independence can be demonstrated by the freedom from

2.30
validator
competent and independent person or persons with responsibility for performing and reporting on the results of a validation

NOTE This term can be used to refer to a validation body.

2.31
verification
systematic, independent and documented process for the evaluation of a proposed GHG assertion against agreed to verification criteria

NOTE In some cases, such as in first-party verifications, independence can be demonstrated by the freedom from responsibility for the development of GHG data and information.

2.32
verifier
competent and independent person or persons with responsibility for performing and reporting on the verification process

NOTE This term can be used to refer to a verification body.

3 Principles

3.1 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, requirements in this part of ISO 14064.

3.2 Completeness

Include all relevant GHG emissions and removals. Include all relevant information to support criteria and procedures.

3.3 Consistency

Enable meaningful comparisons in GHG-related information.

3.4 Accuracy

Reduce bias and uncertainties as far as practical.

3.5 Transparency

Disclose sufficient and appropriate GHG-related information to allow intended users to make decisions with reasonable confidence.

3.6 Relevance

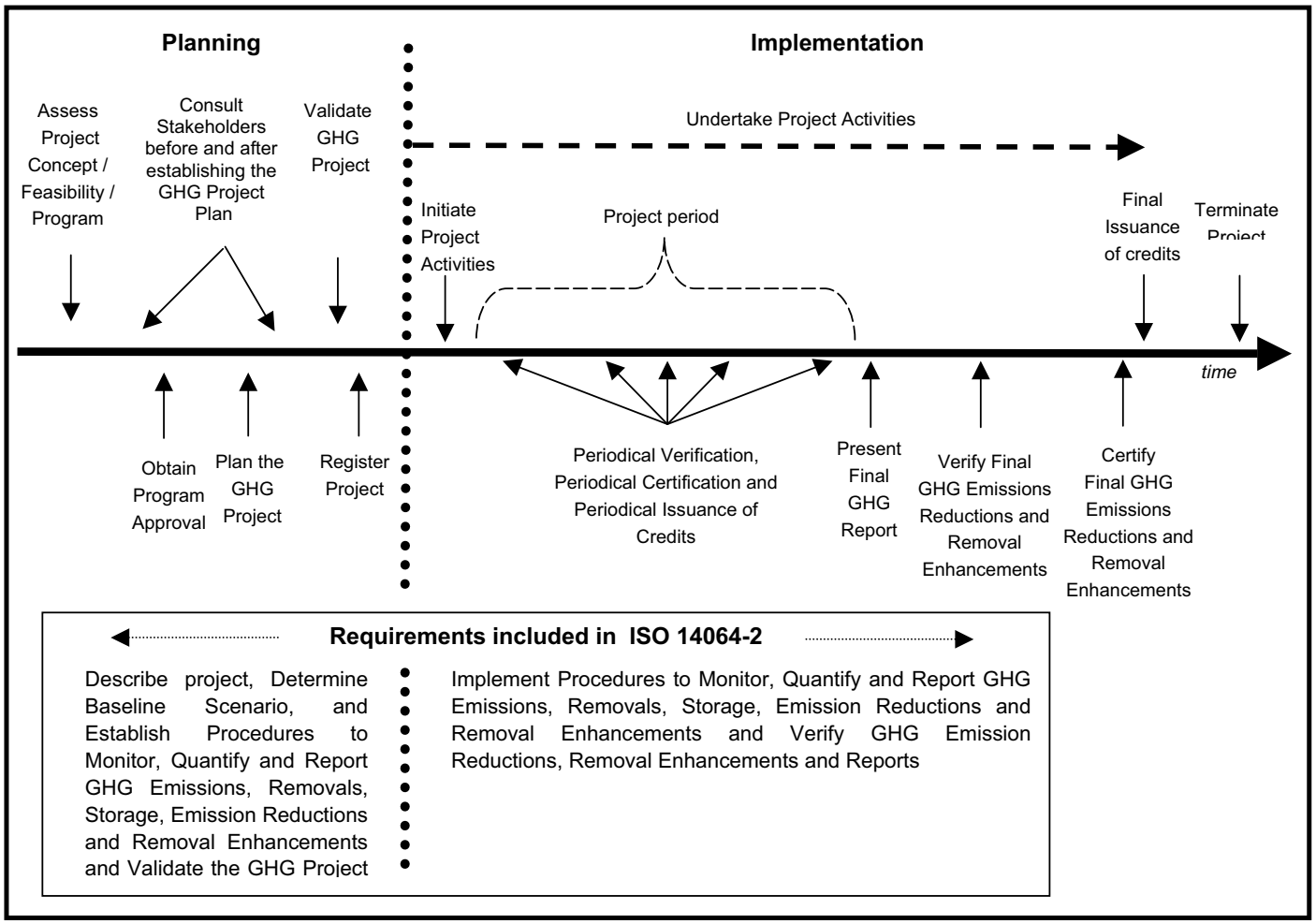
Select GHG sources, GHG sinks, GHG reservoirs, data and methodologies appropriate to the needs of the intended user.

3.7 Conservativeness

Conservative assumptions, values and procedures are used to ensure that GHG emission reductions or removal enhancements are not over-estimated.

4 Introduction to GHG Projects

The GHG project cycle is generally characterised by two main phases – a planning phase and an implementation phase. GHG project cycle steps vary depending upon the project's scale and specific circumstances, including applicable legislation, GHG programmes or standards. Whereas this part of ISO 14064 specifies requirements for GHG project quantification, monitoring and reporting, a typical GHG project cycle may include additional elements as shown in Figure 2.



NOTE Not all GHG programmes will require all the elements included in this figure.

Figure 2 — A typical GHG project cycle

In many cases, the GHG project proponent might initially identify the project concept, design the project and evaluate its feasibility, consult stakeholders and assess GHG programme eligibility requirements. As appropriate, the project proponent might seek written approval of project acceptance by the applicable GHG programme or responsible government institution.

For the planning phase, this part of ISO 14064 specifies requirements for establishing and documenting a GHG project. In planning the GHG project, the project proponent describes the project; identifies and selects GHG sources, sinks and reservoirs relevant for the project; determines the baseline scenario; and develops procedures to quantify, monitor and report GHG emissions, removals, emission reductions and removal enhancements. GHG programmes may require official registration, validation, and public distribution of a GHG project plan before project implementation.

For the implementation phase, this part of ISO 14064 specifies requirements for the selection and application of criteria and procedures for regular data quality management, monitoring, quantification and reporting of GHG emissions, removals, emission reductions and removal enhancements. Implementation of a GHG project may be initiated by a specific activity (eg, an action to install, implement, engage or otherwise begin operations) and may end with a specific termination activity (eg, an action to complete, close, decommission or otherwise formally end the project). The reporting period and frequency may vary based on the specific requirements of the GHG project and/or GHG programme. Based on actual data and information monitored and collected during project implementation, quantified GHG emissions, removals, emission reductions and removal enhancements may be verified. In many cases, the project proponent would submit verified GHG emission reductions or removal enhancements to a GHG programme in order to generate certified GHG units within that GHG programme. Certification and issuance of certified GHG units (eg, credits) are beyond the scope of this part of ISO 14064.

In order to have broad and flexible application to different GHG project types and sizes, this part of ISO 14064 establishes principles and specifies process requirements rather than prescribing specific criteria and procedures. Therefore, as shown in Figure 3, additional requirements, criteria and guidance from relevant legislation, GHG programmes, good practice and standards are of vital importance for the credible application of this part of ISO 14064.

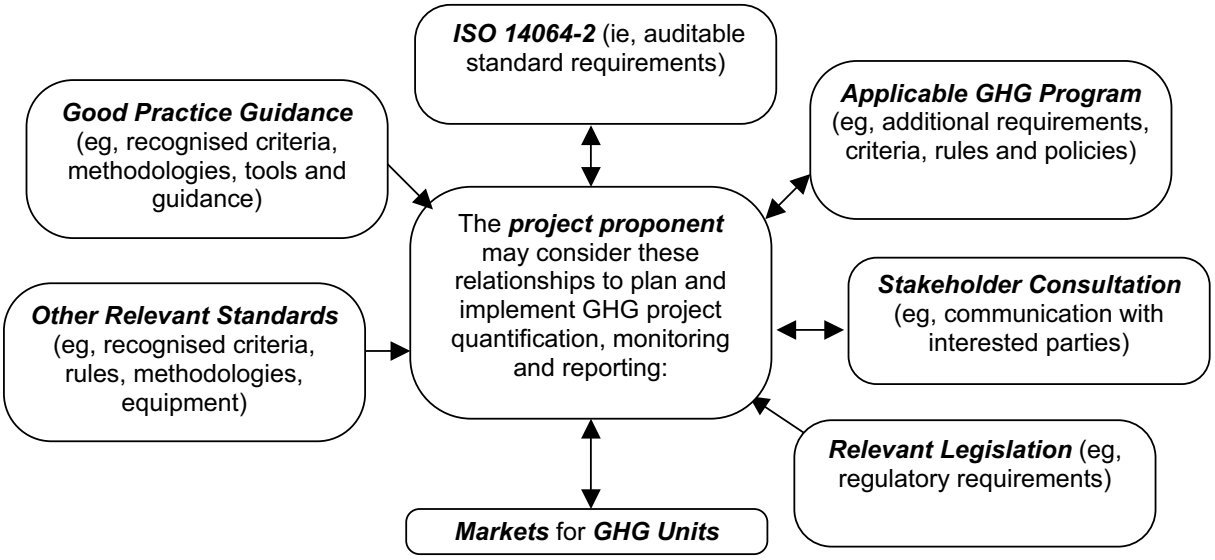


Figure 3 — Framework for the use of ISO 14064-2

Figure 4 illustrates the structure of this part of ISO 14064 requirements. Some specifications, such as the choice of criteria or methodologies, rationale for changing methodologies, choice of baseline scenarios and variation from recognized procedures, require the project proponent to "justify" certain decisions to intended users of the GHG information.). Justification will generally include a reasonable explanation of:

— Why decisions were made;

— How decisions are appropriate for the GHG project's specific circumstances;

— Why alternative options were rejected.

The justification would provide sufficient documentation and detail for validation and verification purposes and may be linked to good practice guidance or relevant standards.

Some specifications of this part of ISO 14064 require the project proponent to "explain" certain decisions. In these cases, it is not expected that the project proponent's explanation would provide documentation as to why alternative options were rejected.

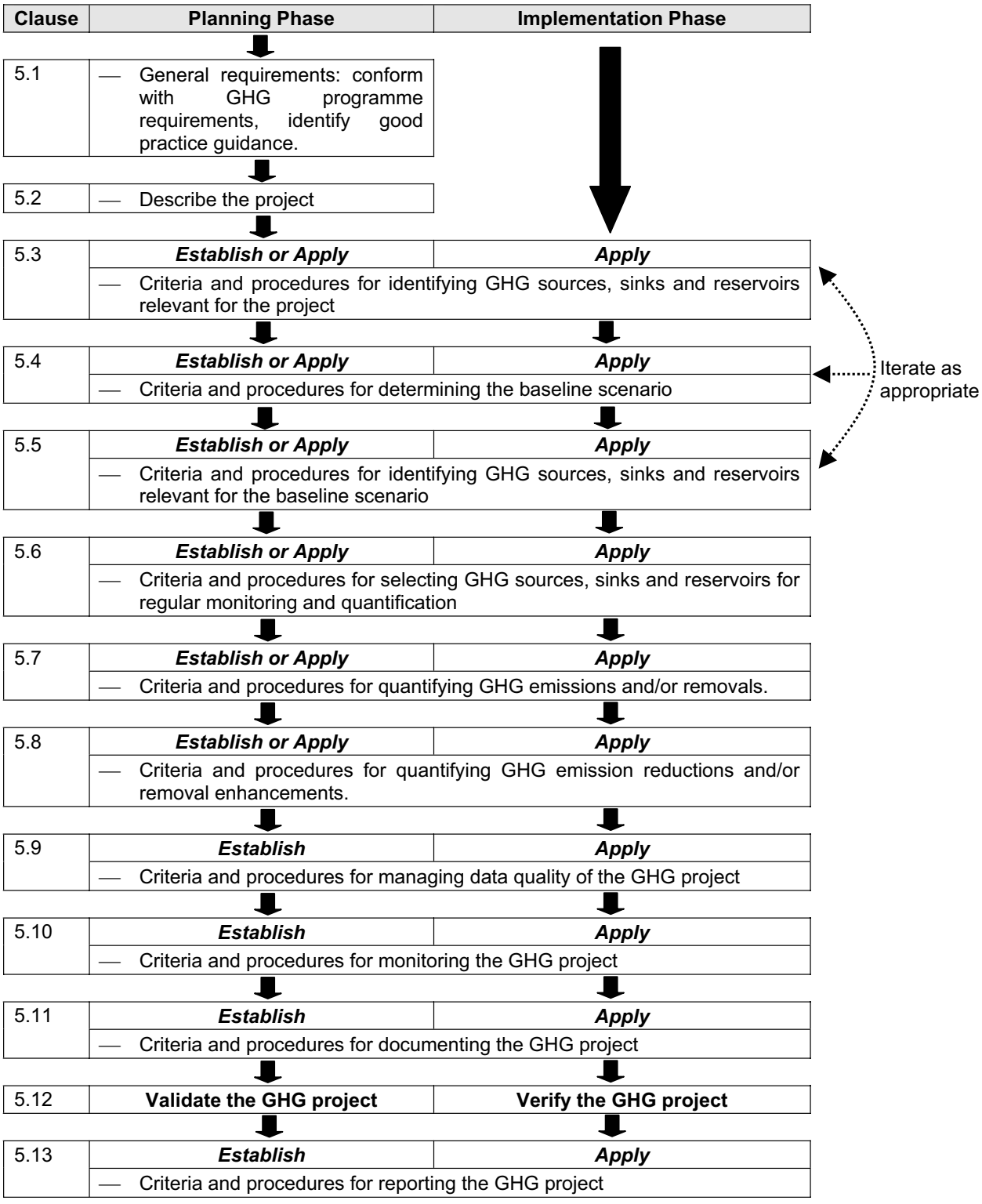


Figure 4 — Overview of ISO 14064-2 requirements

5 Requirements for GHG projects

5.1 General requirements

The project proponent shall ensure the GHG project conforms to relevant requirements of the GHG programme to which it subscribes, including eligibility or approval criteria, relevant legislation or other requirements.

In fulfilling the detailed requirements of Clause 5 of this part of ISO 14064 the project proponent shall identify, consider and use relevant current good practice guidance. If available, the project proponent shall select and apply established criteria and procedures from a recognized origin as relevant current good practice guidance.

In cases that the project proponent uses criteria and procedures from relevant current good practice guidance that derive from a recognized origin, the project proponent shall justify any departure from those criteria and procedures.

In cases that good practice guidance from more than one recognized origin exists, the project proponent shall justify the reason for using the selected recognized origin.

In cases that the project proponent does not use criteria and procedures from relevant current good practice guidance that derive from a recognized origin, the project proponent shall establish, justify and apply criteria and procedures to fulfil the requirements in this part of ISO 14064.

5.2 Describing the project

The project proponent shall describe the project and its context in a GHG project plan that includes:

a) project title, purpose(s) and objective(s);

b) type of GHG project;

c) project location, including geographic and physical information allowing the unique identification and delineation of the specific extent of the project and conditions prior to project initiation;

d) a description of how the project will achieve GHG emission reductions and/or removal enhancements;

e) project technologies, products, services and the expected level of activity;

f) aggregate GHG emission reductions and removal enhancements, stated in tonnes of CO_2-e, likely to occur from the GHG project;

g) identification of risks that may substantially affect the project's GHG emission reductions or removal enhancements;

h) roles and responsibilities, including contact information of the project proponent, other project participants, relevant regulator(s) and/or administrators of any GHG programme(s) to which the GHG project subscribes;

i) any information relevant for project eligibility and quantification of emission reductions or removal enhancements including legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and temporal information;

j) a summary environmental impact assessment when such an assessment is required by applicable legislation or regulation;

k) relevant outcomes from stakeholder consultations and mechanisms for on-going communication;

l) chronological plan of the start date, end date, frequency of monitoring and reporting and project period, including relevant project activities in each step of the GHG project cycle;

5.3 Identifying GHG sources, sinks and reservoirs for the project

The project proponent shall select or establish criteria and procedures for identifying and assessing GHG sources, sinks, and reservoirs controlled, related to, or affected by the project.

Based on criteria and procedures selected or established, the project proponent shall list GHG sources, sinks and reservoirs as:

a) Controlled by the project proponent;

b) Related to the GHG project;

c) Affected by the GHG project.

5.4 Determining the baseline scenario

The project proponent shall select or establish criteria and procedures for identifying and assessing potential baseline scenarios considering:

a) the project description, including identified GHG sources, sinks and reservoirs (5.3);

b) existing and alternative project types, activities and technologies;

c) data availability, reliability and limitations;

d) other relevant information concerning present or future conditions, such as legislative, technical, economic, socio-cultural, environmental, geographic, site-specific and temporal assumptions or projections.

The project proponent shall select and justify the baseline scenario that best represents what would have occurred in the absence of the project.

In developing the baseline scenario, the project proponent shall select assumptions, values, and procedures that help ensure that GHG emissions reductions or removal enhancements are not over-estimated.

The project proponent shall select or establish, justify and apply criteria and procedures for demonstrating that the project results in GHG emissions reductions or removal enhancements that are additional to what would have occurred in the baseline scenario.

5.5 Identifying GHG sources, sinks and reservoirs for the baseline scenario

In identifying GHG sources, sinks and reservoirs relevant to the baseline scenario and the project, the project proponent shall:

a) consider criteria and procedures used to select the project's GHG sources, sinks and reservoirs to identify and list relevant GHG sources, sinks and reservoirs for the baseline scenario;

b) if necessary, explain and apply additional criteria for identifying relevant baseline GHG sources, sinks and reservoirs;

c) list and compare the project's identified GHG sources, sinks and reservoirs with those identified in the baseline scenario;

d) demonstrate equivalence in type and level of activity and/or products provided between the project and the baseline scenario;

e) explain, as appropriate, any lack of comparability between the project and the baseline scenario.

5.6 Selecting relevant GHG sources, sinks and reservoirs for monitoring or estimation of GHG emissions and removals

The project proponent shall select or establish criteria and procedures for selecting relevant GHG sources, sinks and reservoirs for regular monitoring or estimation.

The project proponent shall justify not selecting any relevant GHG source, sink and reservoir for regular monitoring or estimation.

NOTE Figure A2 depicts a framework for identifying and selecting GHG sources, sinks and reservoirs for estimation or for regular monitoring or estimation.

5.7 Quantifying GHG emissions and/or removals

The project proponent shall select or establish criteria, procedures, and/or methodologies for quantifying GHG emission and/or removals for selected GHG sources, sinks, and/or reservoirs (5.6).

Based on criteria and procedures selected or established, the project proponent shall quantify GHG emissions and/or removals for each:

a) GHG source, sink and/or reservoir relevant for the project;

b) GHG source, sink and/or reservoir relevant for the baseline scenario;

c) relevant GHG.

When highly uncertain data and information are relied upon, the project proponent shall select assumptions and values that ensure that the quantification does not lead to over-estimation of GHG emissions reductions or removal enhancements.

The project proponent shall estimate GHG emissions and/or removals by GHG sources, sinks and reservoirs relevant for the project and relevant for the baseline scenario but not selected for regular monitoring

The project proponent shall establish and apply criteria, procedures, and/or methodologies to assess the permanence of quantified GHG removals.

5.8 Quantifying GHG emission reductions and removal enhancements

The project proponent shall select or establish criteria, procedures, and/or methodologies for quantifying GHG emissions reductions and removal enhancements during project implementation.

Based on criteria and methodologies selected or established, the project proponent shall quantify GHG emission reductions and removal enhancements as the difference of the GHG emissions and/or removals by GHG sources, sinks, and reservoirs relevant for the project and those relevant for the baseline scenario.

As appropriate, the project proponent shall quantify GHG emissions reductions and removal enhancements separately for each:

a) GHG source, sink and/or reservoir relevant for the project;

b) GHG source, sink and/or reservoir relevant for the baseline scenario;

c) relevant GHG.

If applicable, the project proponent shall select or develop GHG emissions or removal factors that:

— are derived from a recognized origin;

— are appropriate for the GHG source or sink concerned;

— are current at the time of quantification;

— take account of quantification uncertainty and are calculated in a manner intended to yield accurate and reproducible results;

— Are consistent with the intended use of the GHG project.

The project proponent shall use tonnes as the unit of measure and shall convert the quantity of each type of GHG to tonnes of CO_2-e using appropriate GWPs .

NOTE GWPs are available from the Intergovernmental Panel on Climate Change. GWPs current at the time of publication are included listed in Annex B.

5.9 Managing data quality

The project proponent shall establish and apply quality management procedures to manage data and information, including the assessment of uncertainty, relevant to the project and baseline scenario.

The project proponent should reduce as far as practical uncertainties related to the quantification of GHG emission reductions or removal enhancements.

5.10 Monitoring the GHG project

The project proponent shall establish and maintain criteria and procedures for obtaining, recording, compiling and analyzing data and information important for quantifying and reporting GHG emissions and/or removals relevant for the project and baseline scenario. Monitoring procedures should include:

a) Purpose of monitoring;

b) Types of data and information to be reported, including units of measure;

c) Origin of data;

d) Monitoring methodologies, including estimation, modelling, measurement or calculation approaches;

e) Monitoring times and periods, considering the needs of intended users;

f) Monitoring roles and responsibilities;

g) GHG information management systems, including the location and retention of stored data.

Where measurement and monitoring equipment is employed, the project proponent shall ensure equipment is calibrated according to current good practice.

The project proponent shall apply GHG monitoring criteria and procedures on a regular basis during project implementation.

5.11 Documenting the GHG project

The project proponent shall have documentation that demonstrates conformance of the GHG project with the requirements of this part of ISO 14064. This documentation shall be consistent with validation and verification needs (5.12).

5.12 Validation and/or verification of the GHG project

The project proponent should have the GHG project validated and/or verified.

If the project proponent requests validation and/or verification of the GHG project, a GHG assertion shall be presented by the project proponent to the validator/verifier.

The project proponent should ensure that the validation or verification conforms to the principles and requirements of ISO 14064-3.

5.13 Reporting the GHG project

The project proponent shall prepare and make available to intended users a GHG report. The GHG report shall:

— Identify the intended user of the GHG report;

— Use a format and include content consistent with the needs of the intended user.

The project proponent should prepare and make available to the public a GHG report that provides a credible and balanced account of the GHG project.

If a project proponent makes a public GHG assertion claiming conformance to this part of ISO 14064, the project proponent shall make available to the public a GHG report that includes, at a minimum:

a) name of the project proponent;

b) the GHG programme(s) to which the GHG project subscribes;

c) a list of GHG assertions, including a statement of GHG emission reductions and removal enhancements stated in tonnes of CO_2-e;

d) if applicable, the level and type of validation and/or verification including the level of assurance achieved;

e) a brief description of the GHG project including size, location, duration and types of activities;

f) a statement of the aggregate GHG emissions and/or removals by GHG sources, sinks and reservoirs controlled by the project proponent stated in tonnes of CO_2-e for the relevant time period (eg, annual, cumulative to date, total);

g) a statement of the aggregate GHG emissions and/or removals by GHG sources, sinks and reservoirs for the baseline scenario stated in tonnes of CO_2-e for the relevant time period ;

h) a description of the baseline scenario and demonstration that the project GHG emissions reductions or removal enhancements are additional to what would have happened in the absence of the project;

i) as applicable, an assessment of permanence;

j) a general description of the criteria, procedures or good practice guidance used as a basis for the calculation of project GHG emission reductions and removal enhancements ;

k) the date of the report and time period covered.

The project proponent is not required to include confidential information in a GHG report made available to the public.

Annex A
(informative)

Guidance for use of the standard

A.1 Background

A.1.1 General

This Annex provides guidance for the use of this part of ISO 14064. Annex A does not describe in detail “how” to implement standard requirements because of rapid development in this area. Guidance is provided explaining how concepts contained in this part of ISO 14064 relate to project-based mechanisms under the United Nations Framework Convention on Climate Change’s (UNFCCC) Kyoto Protocol.

This part of ISO 14064 is intended for use by project proponents undertaking GHG projects, by validators and verifiers in their assessment of GHG projects, and the managers of voluntary or mandatory GHG programmes. It may be applied to projects in planning or implementation phases.

This part of ISO 14064 establishes principles and specifies process requirements rather than prescribing specific criteria and procedures. Additional requirements, criteria and guidance from relevant GHG programmes, good practice, legislation and standards are important for the credible application of this part of ISO 14064. Additional guidance, programme requirements, and good practice will come from many sources, and is continually evolving.

This part of ISO 14064 is GHG programme neutral but is designed for use with internal or external voluntary or mandatory GHG programmes. Many international and national GHG programmes are currently under development. It is expected that some GHG programmes will have additional requirements, particularly where crediting is concerned.

This part of ISO 14064 does not require the validation or verification of GHG projects directly or address crediting from GHG projects. As a result, project proponents should consider additional guidance from GHG programmes requirements. When used in conjunction with specific GHG programmes, project proponents, validators and verifiers should comply with any additional requirements.

Figure A1 illustrates the use of several key carbon cycle-related definitions in ISO 14064:

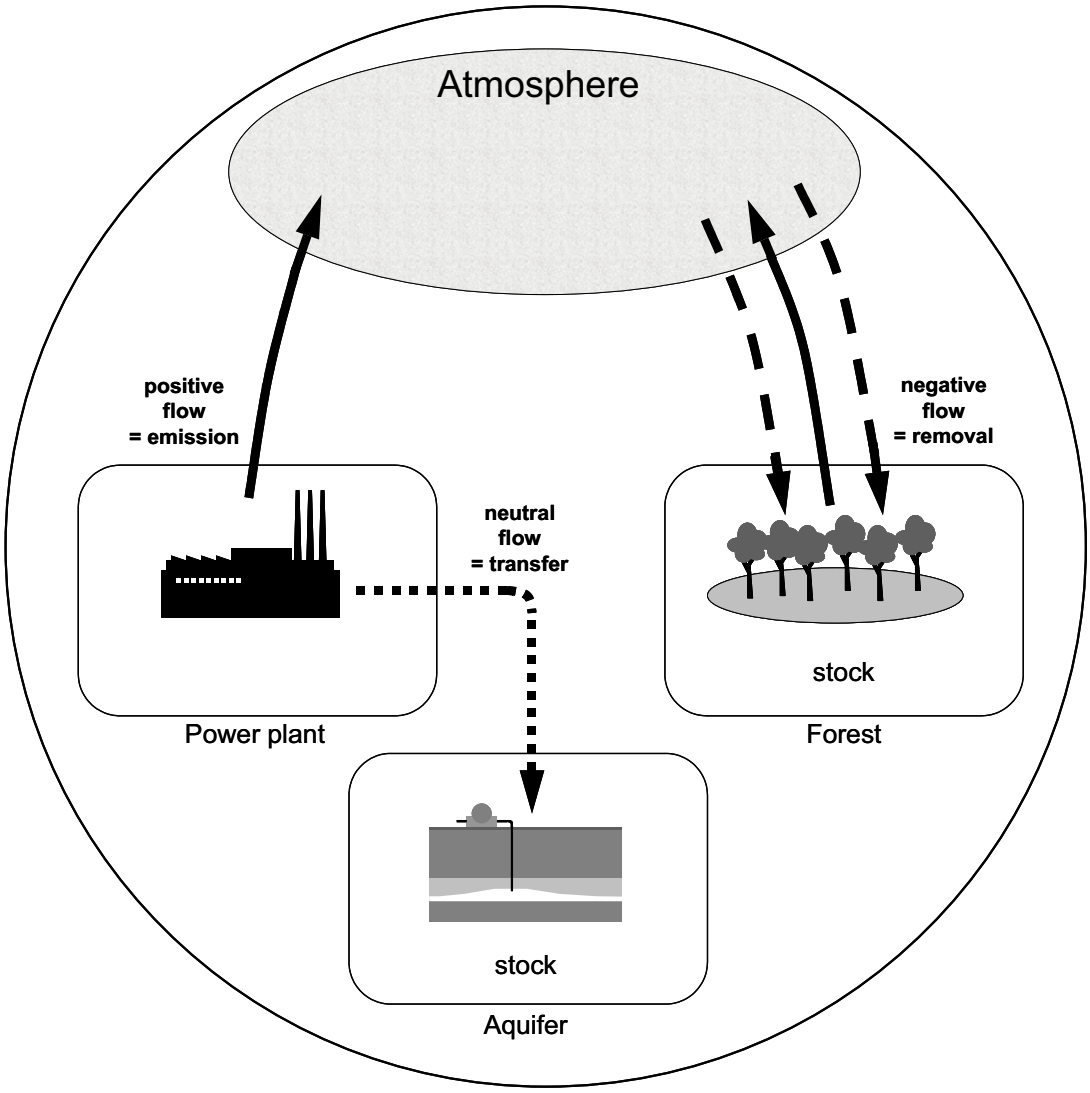
— GHG source;

— GHG sink;

— GHG reservoir;

— GHG emission;

— GHG removal.



Key

GHG source, sink or reservoir	Physical unit, process or component
← - - -	GHG removal
← ———	GHG emission
← ·····	GHG transfer

Figure A.1 —Carbon-cycle related definitions in ISO 14064

A.2 Principles

A.2.1 General

Principles in this part of ISO 14064 are intended to ensure a fair representation and a credible and balanced account of GHG emission reductions and removal enhancements from projects. Principles are used to assist in the general interpretation of requirements. In particular, the principles are intended to apply when judgement and discretion is called for in fulfilling requirements. The principles form the basis for justifications and explanations required in this part of ISO 14064 and users should make reference to the relevant principles and how they have been applied. The application of each principle will vary according to the nature of the judgement involved. Principles should be applied holistically, with each principle considered within the context of the overall intent of particular clauses. This part of ISO 14064 includes principles common with ISO 14064-1 and unique to this part of ISO 14064.

A.2.2 Completeness

Completeness is usually satisfied by:

— identifying all GHG sources, sinks and reservoirs controlled, related to, or affected by, the GHG project and corresponding baseline scenario;

— estimating GHG sources, sinks and reservoirs not regularly monitored or estimated;

— ensuring that all information relevant to intended users appears in reported GHG data or information in a manner consistent with established project and baseline boundaries, scope, time period, and objectives of reporting;

— considering representative baseline scenarios within the relevant geographic areas and time periods.

Where comparable individual GHG sinks, sources and reservoirs cannot be identified in the baseline scenario, appropriate default values and assumptions are used to define baseline GHG emissions and removals. In the absence of such direct evidence, expert judgement is often required to provide information and guidance in establishing and justifying elements of the GHG project plan and GHG reports. This might include the appropriate use of models and conversion factors, as well as estimation of uncertainty. The same will also often apply to the project estimations for GHG removal projects.

A.2.3 Consistency

Consistency is usually satisfied by:

— using uniform procedures among projects;

— using uniform procedures between the project and the baseline scenario;

— using functionally equivalent units, that is, the same level of service is provided by the project and the baseline scenario;

— applying tests and assumptions equally across potential baseline scenarios;

— ensuring the equivalent application of expert judgement, internally and externally, over time and among projects.

The principle of consistency is not intended to prevent the use of more accurate procedures or methodologies as they become available. However, any change in procedures and methodologies should be transparently documented and justified.

A.2.4 Accuracy

Accuracy is usually satisfied by avoiding or eliminating bias from sources within estimations and through describing and improving precision and uncertainties as far as practical. In order to ensure an estimate is as accurate as possible, while reducing the possibility of over-estimating, especially where highly uncertain sources are used, conservativeness is applied.

Project proponents will pursue accuracy insofar as possible, but the hypothetical nature of baselines, the high cost of monitoring some types of GHG emissions and removals, and other limitations make accuracy unattainable in many cases. In these cases, conservativeness serves as a moderator to accuracy in order to maintain the credibility of project GHG quantification.

A.2.5 Transparency

Transparency is usually satisfied by:

— clearly and explicitly stating and documenting all assumptions;

— clearly referencing background material;

— stating all calculations and methodologies;

— clearly identifying all changes in documentation;

— compiling and documenting information in a manner that enables independent validation and verification;

— documenting the application of principles (eg, in selecting the baseline scenario);

— documenting the explanation and/or justification (eg, choice of procedures, methodologies, parameters, data sources, key factors);

— documenting the justification of selected criteria (eg, for the determination of additionality);

— documenting assumptions, references and methodologies such that another party may reproduce reported data;

— Documenting any external factors to the project that may affect decisions of intended users.

A.2.6 Relevance

Relevance is important in the context of:

— selection of GHG sources, sinks and reservoirs of the GHG project and the baseline scenario;

— selection of procedures to quantify, monitor, or estimate GHG sources, sinks and reservoirs;

— selection of potential baseline scenarios.

Relevance is assessed against the influence on the decisions or conclusions of intended users of the information and may be implemented by defining and justifying qualitative and/or quantitative criteria. For example, minimum thresholds might be used to justify the aggregation of minor GHG sources or in the choice of quantification methodologies or the number of data points monitored. Implementing the principle of relevance can help reduce the cost of GHG projects, however, users of the information still require the ability to make decisions with reasonable assurance as to the integrity of quantification and reporting.

A.2.7 Conservativeness

Conservativeness is usually satisfied by:

— the appropriate choice of the path of technological development and the rate of implementation in the relevant geographic area and time periods absent the project;

— taking into account the impact of the project on the path of development and rate of implementation in the relevant geographic area and time periods;

— appropriate choice of parameters affecting the project's GHG emissions, removals, sources, sinks and reservoirs,

— providing reliable results maintained over a range of probable assumptions.

The principle of conservativeness is applied where highly uncertain parameters or data sources are relied upon for the determination of the baseline scenario and the quantification of baseline and project GHG emissions and removals. In particular, the conservativeness of the baseline is established with reference to the choice of approaches, assumptions, methodologies, parameters, data sources, and key factors so that baseline emissions and removals are more likely underestimated rather than over-estimated and that reliable results are maintained over a range of probable assumptions. Explanations of how assumptions and choices are conservative should be provided in project documentation. The implementation of the conservativeness principle frequently is a matter of balance (eg, between accuracy and conservativeness or accuracy and relevance) and therefore almost always involves compromise.

A.3 Requirements for GHG Projects

A.3.1 General requirements

Projects may have to comply with relevant standards and legislation as well as good practice. Prior approval of authorities and compliance with standards and legislation may determine eligibility of the project. The project proponent may have to complete an environmental and social impact assessment, demonstrate a contribution to sustainable development, and plan the project to be consistent with national environment and development priorities and strategies.

This part of ISO 14064 does not differentiate between types and scales of projects. This part of ISO 14064 can be applied to all projects because the standard provides flexibility in the implementation of the requirements by referring to good practice guidance. Some programmes (eg, Kyoto regime) have differentiated between small-scale and other projects and have defined simplified rules that might be used as guidance.

A.3.1.1 Kyoto mechanisms – Joint Implementation and Clean Development Mechanism

Under the Kyoto regime two project-based mechanisms have been created: The Clean Development Mechanisms (CDM) (see [1] Article 12) and Joint Implementation (JI) (see [1] Article 6). The adopted modalities and procedures for the CDM can be found in [3] and for reforestation and afforestation projects in [4]. The CDM Executive Board was established as a supervisory body to the implementation of the CDM, playing a role for example in the approval of baseline methodologies and in the registration of projects.[1)] . The Executive Board has developed a glossary of approved terminology [5]. A Designated Operational Entity (DOE) has to be accredited by the CDM Executive Board and is an independent entity that is engaged by the project participants to validate the CDM project or to verify and certify its Certified Emission Reductions (CER). Once projects are validated, the DOE requests their registration. Registration is referred to as the formal

1) Clean Development Mechanism Executive Board information and decisions can be found at http://cdm.unfccc.int/EB.

acceptance of a validated project as a CDM project activity. Registration is the prerequisite for the verification, certification and issuance of CERs related to the project activity. Certification under the Kyoto Protocol is the written assurance that, during a specified time period, a project achieved the GHG emission reductions and removal enhancements as verified. Only after the successful certification of the emission reduction the Executive Board will issue the achieved credits – called CERs or for reforestation and afforestation projects temporary CERs (tCER) or long-term CERs (lCER) - to the project participants and subtract the share of proceeds. The share of proceeds (which consists of 2 % of the CERs) is to assist developing country Parties that are particular vulnerable to the effects of climate change. Projects in least developed countries are exempted from this share of proceeds. Furthermore a registration fee has to be paid to cover administrative costs.

Credits can only be achieved during the crediting period, which is the time period that includes GHG emission reductions and removal enhancements that are verified and certified. In case of the CDM, the project participants select a period from the following alternative approaches:

— For emission reduction projects, see Annex p. 37, Para. 49 [3];

— For reforestation and afforestation projects, see Annex p. 21,Para. 23 [4].

In order to reduce CDM transactions costs, simplified modalities and procedures may be applied for small-scale projects:

— For emission reduction projects, see Decision p. 21, Para. 6 [3];;

— For reforestation and afforestation projects, see Annex p. 16, Para. 1,i [4]..

The adopted modalities and procedures for JI can be found in the annex of [3]. JI project development, and host country approval, can vary depending on the country in which projects are implemented. To supervise JI it was decided to establish of a Supervisory Committee at the first Conference of Parties serving as Meeting of Parties.

A.3.1.2 Kyoto Mechanisms - Eligibility Criteria

Specific eligibility requirements that have to be fulfilled by the project, the host Party and Investor Party under the Kyoto regime are shown in **Table** A.1 **— Kyoto Mechanism Eligibility Criteria**

<table>
<tr><th rowspan="2">Aspect</th><th rowspan="2">JI</th><th colspan="3">CDM</th></tr>
<tr><th>Regular CDM</th><th>Small Scale CDM</th><th>Sinks Project</th></tr>
<tr><td rowspan="6">Project</td><td></td><td></td><td>Meet Small-scale definition.
Decision p. 21, Para. 6 [3]</td><td>Only afforestation and reforestation are eligible. Special treatment for small-scale Annex p. 4, Para. 1,i [4]</td></tr>
<tr><td colspan="4">Only emissions of greenhouse gases listed in Annex A of the KP (Article 3 KP).</td></tr>
<tr><td>Written approval by the Parties involved (Annex p. 14, Para. 31b [2]</td><td colspan="3">Written Approval of voluntary participation of project participants, including confirmation by the host Party that the project activity assists it in achieving sustainable development (Annex p. 35, Para. 40a [3])</td></tr>
<tr><td></td><td colspan="3">Public funding is not to result in the diversion of ODA (Decision p. 20 [3])</td></tr>
<tr><td>Additionality</td><td>Additionality (Annex p. 34, Para. 37d [3])</td><td>Additionality: Barriers or quantitative evidence</td><td>Additionality (Annex page 18, Para. 12d [4])</td></tr>
</table>

Aspect	JI	CDM		
		Regular CDM	**Small Scale CDM**	**Sinks Project**
	Refrain from credits generated from nuclear facilities (JI: Decision p. 5 [2] / CDM: Decision p. 20 [3])			A systematic coincidence of verification and peaks in carbon stocks is avoided (Annex p. 18, Para. 12e [4])
	Projects starting as of the year 2000 may be eligible for crediting from 2008. (Draft Decision p. 6, Para. 5 [2])	Projects starting as of the year 2000 may be eligible (Decision p. 13, Para. 13 [3])		
		Analyze environmental impacts. Undertake environmental impact assessment if required by the host party or project participants. (Annex p. 34, Para. 37c [3])	Analyze environmental impacts if required by the host Party	Analyze the socio-economic and environmental impacts, including impacts on biodiversity and natural ecosystems, and impacts outside the project boundary. (Annex p. 18, Para. 12c [4])
		Stakeholder comments and a report to the designated operational entity on how due account was taken of any comments has been received (Annex p. 14, Para. 31 [3])		
Host Party	See Investor Party requirements, whereas the Party has as a minimum fulfil the criteria a)-d) (second track). If it meets all criteria a)-g) it can use the so-called first track and can set up own rules for verification etc. (Annex p. 13, Para. 24 [2])	Has designated a national authority (Annex p. 11, Para. 20a [2] / CDM)		Select and report to the Executive Board which definition of "forest" was chosen: a single minimum tree crown cover, a single minimum land area value and a single minimum tree height value. (Annex p. 17, Para. 8 [4])
	Has ratified the Kyoto Protocol (JI: Annex p. 12, Para. 21a [2] / CDM: Annex p. 32, Para. 31a [3])			
Investor Party	Has designated a focal point (Annex p. 11, Para 20a [2])	Has designated a national authority. (Annex p. 32, Para. 30 [3])		

Aspect	JI	CDM		
		Regular CDM	Small Scale CDM	Sinks Project
	Has ratified the Kyoto Protocol (JI: Annex p. 12, Para. 21a [2] / CDM: Annex p. 32, Para. 31a [3])			
	Has calculated its assigned amount pursuant to the rules (JI: Annex p. 12, Para. 21b [2] / CDM: Annex p. 32, Para. 31b [3])			
	Has in place a national registry in accordance with the rules (JI: Annex p. 12, Para. 21d [2] / CDM: Annex p. 32, Para. 31d [3])			
	Has in place a national system for estimation of emissions in accordance with the rules. (JI: Annex p. 12, Para. 21c [2] / CDM: Annex p. 32, Para. 31c [3])			
	Has submitted annually the most recent required inventory in accordance with the rules. (JI: Annex p. 12, Para. 21e [2] / CDM: Annex p. 32, Para. 31e [3])			
	Has submitted supplementary information on assigned amount in accordance with the rules. (JI: Annex p. 12, Para. 21f [2] / CDM: Annex p. 32, Para. 31f [3])			
				There is a quantitative limit: For the first commitment period ≤ 1 % of base year emissions times five of the country that is using the CERs to fulfil its commitments. (Decision p. 22, Para. 7b [3])

Table **A.1** — Kyoto Mechanism Eligibility Criteria

A.3.1.3 Kyoto mechanisms – Clean Development Mechanism project design document

The requirements of the GHG project plan in this part of ISO 14064 are similar to the contents of the project design document (PDD) as specified under the Kyoto Protocol's CDM. The requirements of the PDD can be found in Appendix B of [3]) and in [6]]. In addition to the elements of the GHG project plan, the PDD requires:

— An explanation as to how technology will be transferred, if any;

— Information on public funding of the project activity, if any;

— Information on the choice of the crediting period.

A.3.1.4 Product-related GHG projects

GHG projects may also be performed as a result of product development, where the GHG emission reductions or the GHG removal enhancements mainly occur in the use stage of the product life cycle (eg, development of an air conditioning system with lower energy requirements for a given cooling function than the baseline product). For product-related GHG projects, the life cycle assessment (LCA) tool can be used to calculate GHG emission reductions or GHG removal enhancements [9].

In using an LCA approach, GHG sources and sinks can be considered as unit processes of the product systems that describe the project and baseline. Only those unit processes where significant differences exist can be considered as relevant. Unit processes related to the use stage of the product life cycle would be considered as "affected by the project". For each unit process the GHG emission can be calculated by classification and characterisation.

A.3.2 Identifying GHG sources, sinks and reservoirs for the project

A.3.2.1 General

The project proponent is required to identify all relevant GHG sources and sinks controlled by the project proponent, as well as those related to or affected by the project. However, the quantification of GHG emissions and removals generally does not involve all of the potentially large number of GHG sources and sinks. Therefore, criteria to identify and select GHG sources and sinks relevant to, but not controlled by, the project proponent are necessary.

To ensure an appropriate comparison of the project and baseline (to calculate GHG emission reductions and removal enhancements), the services, products or function, generally include a quantitative measure, and demonstrate functional equivalence.

The project proponent is also accountable for changes in GHG emissions and removals by GHG sources and sinks affected by the project through activity shifting or market transformation, often referred to as leakage. For example, a project that increases energy efficiency may also reduce energy prices, and result in an increase in energy demand (that is, 'rebound'). Negative leakage refers to emission increases or removal decreases by GHG sources and sinks affected by the project, whereas positive leakage refers to GHG emission reductions or removal enhancements by GHG sources and sinks affected by the project.

Figure A2 illustrates an example of a decision tree that provides a procedure to assist project proponents to consider GHG sources, sinks and reservoirs to fulfil, and document conformance with, some of the requirements of this part of ISO 14064. This framework might be used to identify and select GHG sources, sinks and reservoirs for estimation or for regular monitoring and quantification of GHG emissions and removals. The criteria used in the procedure by the project proponent should be consistent with the GHG project principles; good practice guidance, policies and rules of applicable GHG programmes, as well as other relevant sources. The project proponent should justify the choice of criteria used in the procedure, as well as the procedure being used – whether this example is used or another approach. For example, the criteria may consider a balance between practicality and cost-effectiveness with the GHG project principles. The project proponent should also consider good practice guidance for how to answer some of the decision criteria – for example, when considering if a GHG source, sink or reservoir is related by flows into or out of the project or baseline scenario. In such cases, the project proponent might consider good practice guidance that provides established approaches related to the level of aggregation to represent sources, sinks and reservoirs (eg, each boiler or the entire heating plant as the level of detail), the criteria used (eg, mass fraction or material input, such as a co-solvent or catalyst represents more than 5% of inputs on a mass basis) or percentage of costs (eg, a product/output represents 10% of project value and therefore should be considered). Ultimately, the decision whether or not to monitor or estimate a source, sink or reservoir directly might be based on the monitoring costs versus the market price of GHGs.

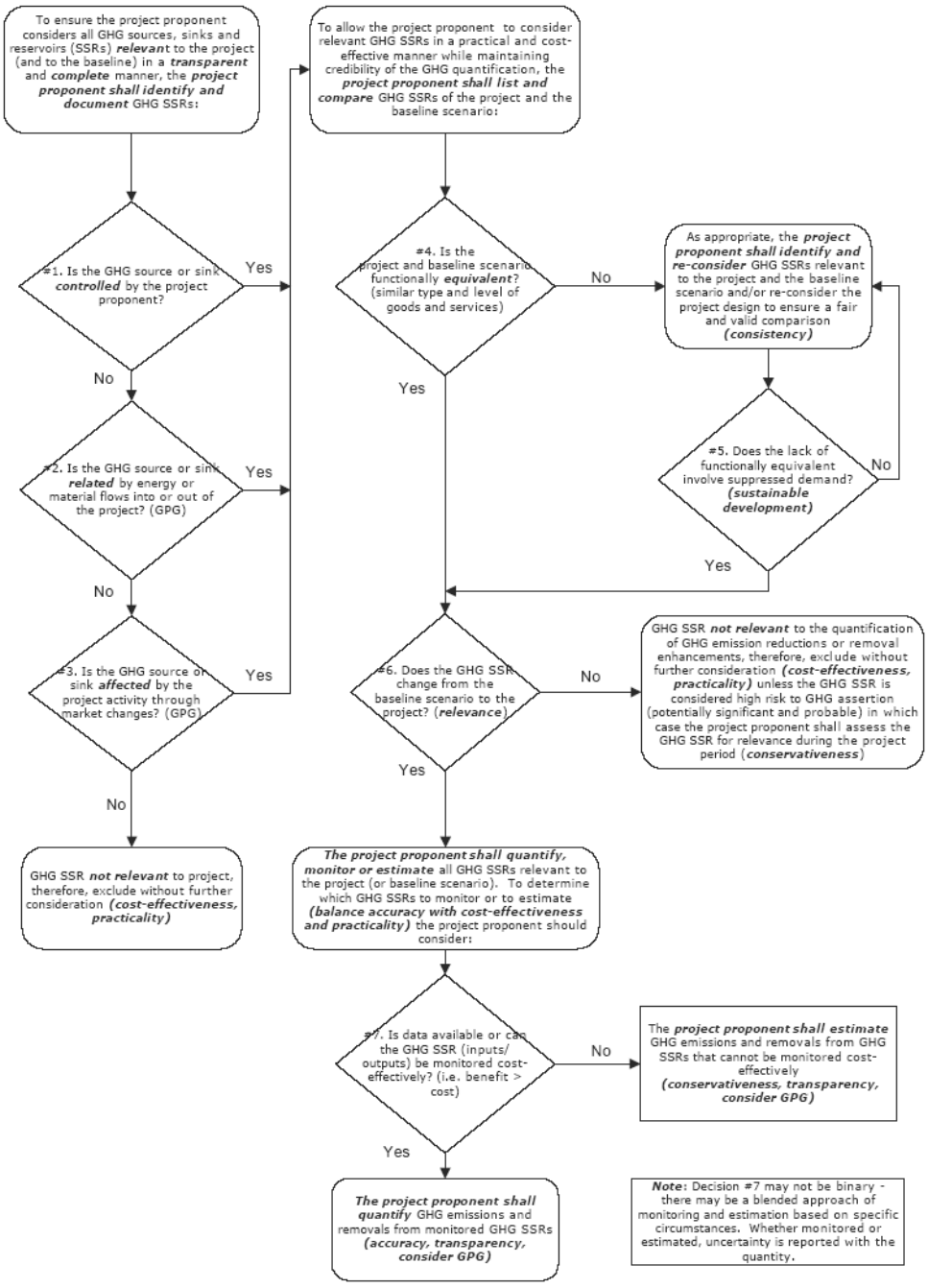


Figure A.2 —Identifying and selecting GHG sources, sinks and reservoirs

Exclusion of GHG sources from regular monitoring and quantification may also be justified when comparison of the project and baseline sources show no change from the baseline to the project. In the case of GHG removal enhancement projects, a GHG source and/or sink may be excluded from regular monitoring and

quantification requirements if the project proponent can demonstrate that the GHG source and/or sink is not a net source of GHG emissions over the project period.

A.3.2.2 Kyoto mechanisms - Project boundaries

Unlike the Kyoto mechanisms and other programmes, this part of ISO 14064 does not use the terms “project boundary” or “leakage”. Instead, this part of ISO 14064 refers to sources, sinks and reservoirs that are “relevant” to the project. Relevant sources, sinks and reservoirs include those that are “controlled” by the project proponent, those “related” to the project by material or energy flows, and those “affected” by the project. Affected and related sources represent those that in Kyoto terminology would cause “leakage”. The choice of terminology in these cases is intended to make this part of ISO 14064 neutral and compatible among a range of programmes by avoiding programme-specific definitions and requirements for “leakage” and for “boundaries”. A comparison of how these terms are used in this part of ISO 14064 and the Kyoto mechanisms follows:

Relevant Sources, Sinks and Reservoirs Under ISO 14064-2	Corresponding Categories Within the Kyoto Protocol (Annex p. 37, Para. 51 & 52 [3])
Controlled	Directly attributable (inside project boundary)
Related to the project	Leakage (outside the project boundary)
Affected by the project	Leakage (outside the project boundary)

A.3.3 Determining the baseline scenario

A.3.3.1 Selection of the baseline scenario

Baseline scenarios are always hypothetical scenarios for GHG emissions and removals that would have occurred in the absence of a project. The predictive quality of quantifying many baseline scenarios, where there is the risk of over estimating GHG emissions, requires a different approach. Consideration is given to all feasible baseline scenarios for GHG emissions, and the selected scenario should be plausible over a range of assumptions for the duration of the baseline application. Usually a baseline methodology is used to select the baseline scenario. A conservative scenario is usually adopted. Baseline scenarios should cover the same period of time as the project.

Terrestrial GHG removal projects are likely to use only selected GHGs in the assessment and determination of the baseline scenario. Only the sum of changes of carbon stocks in GHG reservoirs or carbon pools are likely to be considered. Additionality would also be assessed only against changes in GHG reservoirs or carbon pools. Resulting GHG removal enhancements would then be the sum of changes in carbon stocks in the GHG reservoirs or carbon pools less any increase in GHG emissions of all GHGs by GHG sources.

A.3.3.2 Baseline GHG emissions and removals estimation

Baseline procedures or methodologies to calculate or estimate baseline GHG emissions are generally customized (ie, developed by the project proponent) or standardized (ie, developed by the project proponent or programme authority for specific project types).

Historical conditions, such as GHG emissions or activity level data; market conditions, such as common technology usage; and best available technology, such as the top 20% of similar activities, also can be the basis for the development of baseline methodologies. Baseline scenarios may be static (constant with time) or dynamic (vary over time).

GHG programmes may adopt simplified approaches related to baseline estimation for some GHG removal enhancement projects, such as adopting a zero baseline for afforestation and reforestation on certain land use types, where prior land-use is assumed to be in carbon balance and hence sequestration is zero. This would then constitute an appropriate standardized/performance baseline scenario for such projects.

A.3.3.3 Kyoto mechanisms - Baselines

Under the Kyoto regime, as part of the PDD, one of the following three baseline methodologies has to be applied to the individual project activity and justified:

a) Existing actual or historical GHG emissions, as applicable;

b) GHG Emissions from a technology that represents an economically attractive course of action, taking into account barriers to investment;

c) The average GHG emissions of similar project activities undertaken in the previous five years, in similar social, economic, environmental and technological circumstances, and whose performance is among the top 20 per cent of their category.

To ensure the project is additional, the project proponent has to describe how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered project

More details on project baselines under the Kyoto mechanisms can be found in paragraphs 45 to 48 (Annex p. 36f, [3]). For afforestation and reforestation projects under the CDM baseline information can be found under paragraphs 19 to 22 _(Annex p. 20 [4])[2)] .

A.3.4 Quantifying GHG emissions and/or removals

The first step in the quantification of GHG emissions and/or removals is identification of the relevant GHGs for each source, sink, or reservoir. The nature of information available to the project proponent determines whether GHG emissions or removals are estimated or quantified. For example, before the start of project initiation, in general, GHG emissions or removals are estimated, whereas during project operation, GHG emissions or removals can be directly monitored and measured to provide actual data for quantification.

Permanence is a criterion to assess whether GHG removals and emission capture and storage are long-term, considering the longevity of a GHG reservoir or carbon pool and the stability of its stocks, given the management and disturbance environment in which it occurs. How permanence is addressed in the Kyoto Protocol in the context of biological sinks can be found under paragraphs 38 to 50 [4].

Recalculation may occur at the end of the project period to ensure that the quantity of GHG emission reductions and removal enhancements are not over-estimated. Recalculation may also occur during the project period when the project proponent considers appropriate, for example, when better data becomes available. Recalculation should cover the entire project period since implementation commenced.

Additional good practice guidance with regard to land-use, land-use change and forestry (LULUCF) projects can be found in Chapter 4.3 of [10].

A.3.5 Managing data quality

Project data quality can be improved by:

— Using a common system to quantify GHG emissions and removals;

— Establishing and maintaining a complete GHG information management system;

— Completing regular accuracy checks for technical errors;

— Conducting periodic internal audits and technical reviews;

— Appropriate training for project team members; and,

2) Baseline methodologies approved by the CDM's Executive Board can be found at http://cdm.unfccc.int/EB.

— Performing uncertainty assessments.

An uncertainty assessment can involve either a qualitative (eg, high, medium, low) or quantitative procedure and typically is less rigorous than an uncertainty analysis, which is a statistically detailed quantitative and systematic procedure to ascertain and quantify uncertainty. Generally an uncertainty assessment is appropriate during the planning phase of a project and an uncertainty analysis during the implementation phase. It would be up to programs to decide and stipulate whether an uncertainty analysis is appropriate for implemented projects. For those using the standard outside of a programme an uncertainty analysis is recommended for implemented quantifications.

Good practice guidance with regard to quality assurance and quality control for LULUCF projects is included in Chapter 4.3.4 of [10].

A.3.6 Monitoring the GHG project

A.3.6.1 General

Monitoring procedures may include schedules, roles and responsibilities, equipment, resources, and methodologies to obtain, estimate, measure, calculate, compile, and record GHG data and information for the project and baseline scenario.

A.3.6.2 Kyoto Mechanisms - Monitoring

Monitoring of CDM projects under the Kyoto Protocol is regulated under the annex to decision 17/CP.7, details can be found in paragraphs 53 to 60 in Annex p. 38 [3]. In the PDD, the monitoring plan is included as Annex 4 in [6]. For afforestation and reforestation projects under the CDM monitoring information can be found under paragraphs 25 to 30 in Annex p. 21 [4].

Good Practice guidance with regard to monitoring for LULUCF projects is included under chapter 4.3.3 of [10].

A.3.7 Documenting the GHG project

This part of ISO 14064 refers to documenting in the context of internal needs linked to auditing and validation and/or verification. It is complement to reporting that should serve external purposes.

Documentation is linked to the GHG information system and information system controls of the GHG project as well as to the GHG data and information of the GHG project. Documentation should be complete and transparent.

A.3.8 Validation and/or verification of the GHG project

A.3.8.1 General

This part of ISO 14064 does not require validation or verification. Usually such requirements are elements of a GHG programme. If a GHG project has not been linked to a specific GHG programme, the project proponent has to decide on the type of validation and/or verification (1^{st}, 2^{nd} or 3^{rd} party verification) and the level of assurance (eg, high or moderate) required against the GHG assertion. The GHG assertion is a statement on the performance of the GHG project usually made by the project proponent. ISO 14064-3 specifies principles and requirements for the validation and verification of GHG assertions.

A.3.9 Reporting the GHG project

A.3.9.1 General

Reporting keeps stakeholders and other intended users informed about the GHG project. The content and form of information reported should be tailored to the needs and expectations of the intended user. Project proponents may develop project-specific procedures for reporting depending upon the circumstances of the

project, the objectives of reporting, the information needs of stakeholders and other intended users, and the requirements of programmes in which a project participates. In all cases, reporting is based on GHG project documentation.

This part of ISO 14064 does not require the project proponent to make a GHG report available to the public unless a public GHG assertion or claim is made about the conformance of the GHG project to this part of ISO 14064. In such cases, minimum elements for GHG reports ensure completeness, accuracy and transparency in the public reporting of project information. The information released to the public should allow for fair comparison between various projects.

A high degree of transparency and opportunity for public comment can greatly increase the credibility of a project and is important for the market to assess the value of credits. Moreover, making project information public is necessary in order to obtain stakeholder comments for use in project development and management. Project proponents may also use public reports for publicity purposes.

A.3.9.2 Kyoto Mechanism - Reporting

The PDD and the validation report have to be made publicly available from the operational entity (see Annex p. 36, Para. 40 b and g [3]). Good practice guidance with regard to reporting of afforestation and reforestation projects is included in Table 4.2.6c on Page 4.48 of Chapter 4 of [10].

Annex B
(informative)

Greenhouse gas global warming potentials

Global Warming Potential (GWP) is an index used to convert relevant non-carbon dioxide gases to a carbon dioxide equivalent (CO_2-e) by multiplying the mass-based quantity of the gas by its GWP. The table below provides various GWPs for a 100-year time horizon published by the Intergovernmental Panel on Climate Change (IPCC) in [8]. Users are encouraged to obtain the most recent GWPs from the IPCC.

Gas	Chemical Formula	IPCC 1996 Global Warming Potential
Carbon dioxide	CO_2	1
Methane	CH_4	21
Nitrous oxide	N_2O	310
Hydrofluorocarbons HFCs		
HFC-23	CHF_3	11,700
HFC-32	CH_2F_2	650
HFC-41	CH_3F	150
HFC-43-10mee	$C_5H_2F_{10}$	1,300
HFC-125	C_2HF_5	2,800
HFC-134	$C_2H_2F_4$ (CHF_2CHF_2)	1,000
HFC-134a	$C_2H_2F_4$ (CH_2FCF_3)	1,300
HFC-143	$C_2H_3F_3$ (CHF_2CH_2F)	300
HFC-143a	$C_2H_3F_3$ (CF_3CH_3)	3,800
HFC-152a	$C_2H_4F_2$ (CH_3CHF_2)	140
HFC-227ea	C_3HF_7	2,900
HFC-236fa	$C_3H_2F_6$	6,300
HFC-245ca	$C_3H_3F_5$	560
Hydrofluoroethers(HFEs)		
HFE-7100	$C_4F_9OCH_3$	500
HFE-7200	$C_4F_9OC_2H_5$	100
Perfluorocarbons PFCs		
Perfluoromethane (tetrafluoromethane)	CF_4	6,500
Perfluoroethane (hexafluoroethane)	C_2F_6	9,200
Perfluoropropane	C_3F_8	7,000
Perfluorobutane	C_4F_{10}	7,000
Perfluorocyclobutane	c-C_4F_8	8,700
Perfluoropentane	C_5F_{12}	7,500
Perfluorohexane	C_6F_{14}	7,400
Sulfer hexafluoride	SF_6	23,900
NOTE From [8]		

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