ISO/TC 207
Environmental Management

ISO/TC 207 N635

Secretariat: Canada (SCC)
Secretary: A. Husseini

November 10, 2003

Subject: Circulation of Committee Draft 1 of ISO 14064 Greenhouse Gases Part 2

Dear Sir/Madam:

I am pleased to send you for comment, the fist Committee Draft of *ISO 14064: Greenhouse gases - Part 2: Specification for the quantification, monitoring and reporting of project emissions and removals*. Please return comments using the ISO comments template no later than February 10, 2004 to the ISO TC207 Working Group 5 on Climate Change Secretary Kevin Boehmer (kevin.boehmer@csa.ca).

ISO TC207 Working Group 5 on Climate Change has scheduled a meeting from March 8 to 12, 2004 in the United Kingdom to discuss and resolve Committee Draft comments. The Convenor of ISO TC207 Working Group 5, Dr. Chan Kook Weng, would like to sincerely thank all experts who have contributed to the development of the attached Committee Draft.

Yours Sincerely,

Ahmad Husseini
ISO TC207 Secretary

CANADIAN STANDARDS ASSOCIATION

Secretariat administered by:
Canadian Standards Association, 5060 Spectrum Way Mississauga, ON L4W 5N6
Email: ahmad.husseini@csa.ca TP+1-416-747-2697 TF+1-416-747-2473
Websites: www.csa.ca www.tc207.org

COMMITTEE DRAFT ISO/CD1 ISO 14064-2	
Date **2003-11-10**	Reference number **ISO/TC 207 / SC** N 635
Supersedes document	

WARNING: This document is not an International Standard. It is distributed for review and comment. It is subject to change without notice and may not be referred to as an International Standard.

ISO/TC 207 / SC

Title

ISO TC 207 on Environmental Management Working Group 5 on Climate Change

Secretariat **SCC**

Kevin Boehmer

Canadian Standards Association

5060 Spectrum Way, Suite 100

Mississauga, ON CANADA L4W 5N6

Tel: + 1 416 747 22 31

Fax: +1 416 747 67 43

Email: kevin.boehmer@csa.ca

Circulated to P- and O-members, and to technical committees and organizations in liaison for:

☐ discussion at on
[venue/date of meeting]

☒ comments by **2004-02-10**
[date]

☐ approval for registration as a DIS in accordance with 2.5.6 of part 1 of the ISO/IEC Directives, by

[date]

(P-members vote only: ballot form attached)

P-members of the technical committee or subcommittee concerned have an obligation to vote.

English title

ISO 14064: Greenhouse gases - Part 2: Specification for the quantification, monitoring and reporting of project emissions and removals

French title

ISO 14064: Gaz à effet de serre - Partie 2: Spécification pour la quantification, le contrôle et la déclaration des émissions au niveau de projet et leur suppresion

Reference language version: ☒ English ☐ French ☐ Russian

Introductory note

Attached for comment is Committee Draft 1 of ISO 14064 Part 2. Please prepare and return separate comments tables for each Part of the draft Standard.

ISO TC207/WG5 N122
ISO/CD 14064-2.1
Secretariat: DSM/CSA
November 10, 2003

Greenhouse gases - Part 2: Specification for the quantification, monitoring and reporting of project emissions and removals

Warning

This document is not an ISO International Standard. It is distributed for review and comment. It is subject to change without notice and may not be referred to as an International Standard.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Document type: International Standard
Document Subtype:
Document Stage: 30 (Committee)
Document Language: E

ISO TC207/WG5 N122
ISO/CD 14064-2.1
Secretariat: DSM/CSA
November 10, 2003

30

31

Contents

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 3.

The main task of technical committees is to prepare International Standards. Draft International Standards accepted 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 members casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard 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.

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 a number of earth's systems; natural, human and economic and could lead to significant changes in resource use, production and economic activity. In response, international, national, regional and local initiatives are being developed and implemented to limit the growth of greenhouse gas (GHG) concentrations in the Earth's atmosphere. Many GHG initiatives rely on the quantification, monitoring, reporting and verification of GHG emissions and/or removals.

ISO 14064 Greenhouse gases is comprised of three Parts:

- *ISO 14064 Greenhouse gases – Part 1: Specification for the quantification, monitoring and reporting of organization emissions and removals;*
- *ISO 14064 Greenhouse gases - Part 2: Specification for the quantification, monitoring and reporting of project emissions and removals;*
- *ISO 14064 Greenhouse gases - Part 3: Specification and guidance for validation, verification and certification.*

This International Standard is expected to benefit entities, governments, project proponents and stakeholders worldwide by providing clarity and consistency for quantifying, monitoring, reporting and verifying greenhouse gases. Specifically, this standard will:

- Enhance the environmental integrity of GHG quantification;
- Enhance the credibility, consistency, and transparency of GHG accounting and reporting, including GHG project emission reductions and removal enhancements;
- Facilitate the development and implementation of organization GHG management strategies and plans and GHG projects;
- Facilitate the development and implementation of GHG projects;
- Allow entities to track performance and progress in the reduction of GHG emissions and/or increase in GHG removals;
- Assisting in the identification of GHG risks or liabilities;
- Increase investor confidence;
- Facilitate the crediting and trade of GHG emission reductions or removal enhancements.

Users of this International Standard may find benefit in some of the following applications:

- Corporate risk management; for example, the identification and management of GHG-related liabilities and assets;
- 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 or national reporting/inventory schemes.

GHG projects aim to reduce GHG emissions and/or enhance GHG removals over a fixed duration. For GHG projects to be comparable and interchangeable among GHG schemes and project proponents, a standardized approach of GHG accounting is required. *ISO 14064 Greenhouse gases - Part 2: Specification for the quantification, monitoring and reporting of project emissions and removals* specifies requirements for quantifying, monitoring and reporting of GHG emissions reductions and/or removal enhancements from GHG projects.

Quantification of project-level GHG emissions, removals, emission reductions and removal enhancements is challenging because actual project performance is assessed against a hypothetical baseline. The baseline is a combination of the baseline scenario, which generally includes a qualitative assessment to justify the most appropriate baseline, and baseline procedures, which generally include methodologies to quantify GHG emissions and removals attributable to the baseline scenario. The baseline represents GHG emissions and removals that would have occurred in the absence of the project. Consequently, it is difficult, and generally impossible, to verify baseline GHG emissions and removals. Therefore, the project proponent should demonstrate that the baseline is conservative and robust, representing the best estimate of GHG emissions and removals that would have happened in the absence of the project. The project proponent must justify that the project would not have happened as part of "business as usual", in which case the project itself would form part of the baseline.

This International Standard specifies minimum requirements and additional information for the quantification, monitoring and reporting of GHG projects. However, this International Standard should be applied along with any additional requirements and guidance provided by an applicable GHG scheme(s) and relevant standard(s). In cases where the project proponent subscribes to a GHG scheme, the project proponent should consider applicable requirements and guidance before application of this International Standard. In cases where the project proponent subscribes to the United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol's Clean Development Mechanism (CDM) or Joint Implementation (JI) Mechanism, this International Standard provides additional information in Annex A.

ISO 14064 Greenhouse gases - Part 2: Specification for the quantification, monitoring and reporting of project emissions and removals does not specify requirements for second or third party validation/verification bodies and validators/verifiers in providing assurance against GHG claims from projects. Such requirements may be the authority of the applicable GHG scheme(s) or may be found in *ISO 14064 Greenhouse gases - Part 3: Specification and guidance for validation, verification and certification.*

The process to recognize certified GHG emission reductions or removal enhancements as GHG units (eg, credits) is an extension of the GHG project cycle. The crediting process, which is the authority of a GHG scheme, is not included in the specifications of this International Standard. Although the quantification of GHG emission reductions and removal enhancements forms the basis for certification and crediting of GHG units, the process of certification and crediting may vary by GHG scheme.

1 Scope

This International Standard specifies requirements for GHG projects to quantify, monitor and report GHG emissions, emission reductions, removals and removal enhancements.

This International Standard is GHG policy and scheme neutral. Where a GHG policy or scheme is applicable, the requirements of that policy or scheme shall be additional to the requirements of this International Standard. Where a requirement of this International Standard prevents a project proponent from complying with applicable GHG policy or scheme requirements, the requirement of the GHG policy or scheme shall take precedence.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Secretary's Note: Need for normative references to be determined.

3 Definitions

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

3.1 additionality
criterion for assessing whether a GHG project has resulted in emission reductions or removal enhancements in addition to what would have happened in the absence of that project

3.2 baseline
most appropriate and best estimate of GHG emissions and removals that would have occurred in the absence of the project

NOTE – The baseline is a combination of the baseline scenario, which generally includes a qualitative assessment to justify the most appropriate baseline, and baseline procedures, which generally includes methodologies to quantify GHG emissions and removals attributable to the baseline.

3.3 baseline scenario
hypothetical circumstances describing general conditions and GHG sinks and sources in the absence of the project

3.4 baseline GHG emissions and removals
quantitative value for the GHG emissions or removals corresponding to the baseline scenario

3.5 carbon dioxide equivalent (CO_2-e)

unit for comparing the radiative forcing of a GHG to carbon dioxide

NOTE - Generally calculated using the quantity of a given GHG multiplied by its global warming potential

3.6 equivalence of service

criterion to assess whether or not the services and/or products of the baseline are the same as the project

NOTE – For example, the purpose of the project may be to maintain community facilities. The service(s) and/or product(s) must be expressible by a quantitative measure; for example, to light 1000 m^3 of building floor space or to service 20 community facilities, in order to assure the equivalence of service of the baseline is the same as the project.

3.7 greenhouse gas (GHG)

any gaseous constituent of the atmosphere that absorb and re-emit 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)

3.8 GHG source

process or mechanism that releases GHG into the atmosphere

3.9 GHG sink

process or mechanism that absorbs GHG from the atmosphere or that captures and stores a GHG from an emission source

3.10 attributable GHG sources and sinks

criterion used for the assessment of GHG sources and sinks in order to assign responsibility for GHG emissions and removals, considering whether or not GHG sources and sinks are owned and/or controlled by the project proponent, related to the project, or affected by the project

NOTE – The project proponent is responsible for direct GHG emissions and removals by GHG sources and sinks owned and/or controlled by the project proponent, because it can direct the operation or activity. The project proponent is also responsible, as a consequence of the project, for changes of indirect GHG emissions and removals by GHG sources and sinks related by material and energy flows into and out of the project. Finally, the project proponent is responsible, as a consequence of the project, for changes of indirect GHG emissions and removals by GHG sources and sinks affected by the project. GHG emissions and removals by GHG sources and sinks affected by the project are generally beyond the control of the project proponent, and therefore, are often referred to as leakage.

3.11 GHG emissions
release of GHGs to the atmosphere by GHG sources

NOTE – GHG emissions may be captured from a GHG source and stored in a GHG sink.

3.12 GHG removals
absorption of GHGs from the atmosphere by biological GHG sinks

3.13 GHG emission or removal factor
factor relating activity data to absolute GHG emissions or removals

3.14 GHG emission reduction
difference (decrease) of GHG emissions between a baseline and project

3.15 GHG removal enhancement
difference (increase) of GHG removals between a baseline and project

3.16 GHG project
project that intends to cause GHG emission reductions and/or GHG removal enhancements

NOTE – A GHG project occurs within a finite spatial and temporal boundary.

3.17 GHG project proponent
individual or organization that controls and has responsibility for the GHG project

3.18 GHG report
self-contained document (in printed or electronic form) prepared in accordance with ISO 14064 Part 1 or Part 2 intended to communicate the organization's or project's GHG emissions, removals, emission reductions or removal enhancements during a specified period of time and other related issues to its intended users

3.19 GHG scheme
voluntary or mandatory international, national, sub-national governmental or non-governmental policy or regulatory authority that registers, accounts or manages GHG emissions or removals

3.20 global warming potential (GWP)
factor describing the radiative forcing impact of one unit of a given GHG relative to one unit of carbon dioxide

3.21 monitoring
assessment of GHG emissions and removals

NOTE – Assessments can be continuous or periodic and could include assessment of inputs or outputs of GHG sources and sinks and/or the general conditions that may influence GHG emissions and removals

3.22 normal conditions
range of values for specified parameters and typical practice used to describe and maintain the typical performance for a GHG source or sink

3.23 ownership and control
criterion to account for whether or not the project proponent can direct the operation or activity and has ultimate responsibility for an attributable GHG source or sink

3.24 stakeholder
individual or group concerned with, affected, or likely to be affected by the activities of the organization or project

3.25 uncertainty
parameter, associated with the result of measurement or estimation, which characterizes the dispersion of the values that could be reasonably attributed to the measured or estimated quantity

4 Principles

Project-level GHG quantification, monitoring and reporting is based on a number of principles to ensure reported data, information and related disclosures are:

- Free from material misstatement, avoid bias in their selection and presentation and provide a credible and balanced account;
- Capable of being depended upon by users to represent faithfully that which they either purport to represent or could reasonably be expected to represent.

The project proponent shall apply the following principles to establish the project master plan and GHG project reports and to quantify, monitor and report GHG emissions, removals, emission reductions and removal enhancements;

a) Completeness: Include all GHG emissions and removals within project and baseline GHG boundaries. Include GHG sources and sinks related to, or affected by, the project and corresponding baseline. Estimate and justify GHG sources or sinks not regularly monitored or quantified. Ensure that all information material to users appears in reported GHG data or information in a manner consistent with established project and baseline GHG boundaries, scope, time period, and objectives of reporting.
b) Consistency: Ensure that quantification, monitoring and reporting procedures for GHG emissions and removals are comparable over time and among projects. Clearly justify and document any changes to the basis of quantification, monitoring or reporting, and the consequences of such changes. In cases where specific measurement data for GHG sources and sinks or other evidence is not available, ensure consistency in the application of expert judgement, internally and externally, over time and among projects.
c) Accuracy: Ensure that GHG quantification is as close as possible to the true GHG emission or removal. Ensure that GHG quantification is systemically neither over nor under true emissions or removals, as far as can be judged, and that uncertainties are reduced as far as practicable. Ensure that sufficient

accuracy is achieved to enable users to make decisions related to reported GHG data or information with reasonable assurance.

d) Transparency: Report GHG data and information on a regular basis in a clear, factual, neutral and coherent manner cognizant of the needs and backgrounds of users of the reported data or information. Obtain, record, compile, analyze and document GHG data and information in a manner that enables validation and verification. Document assumptions, references and methodologies such that another party may reproduce reported data.

e) Conservativeness: In cases that lack transparency, completeness or certainty, use conservative assumptions, values and procedures and provide information to justify the conservativeness of the approach to ensure that GHG emission reductions and removal enhancements are not overestimated.

f) Robustness: Ensure that the dependability of the information, procedures, analysis and assertions are demonstrated in the project master plan and GHG project reports. Demonstrate that the baseline, and consequently, the GHG emission reductions and removal enhancements are conservative and dependable, such that reliable results are maintained over a range of probable assumptions.

5 Requirements for GHG projects

5.1 The GHG project cycle

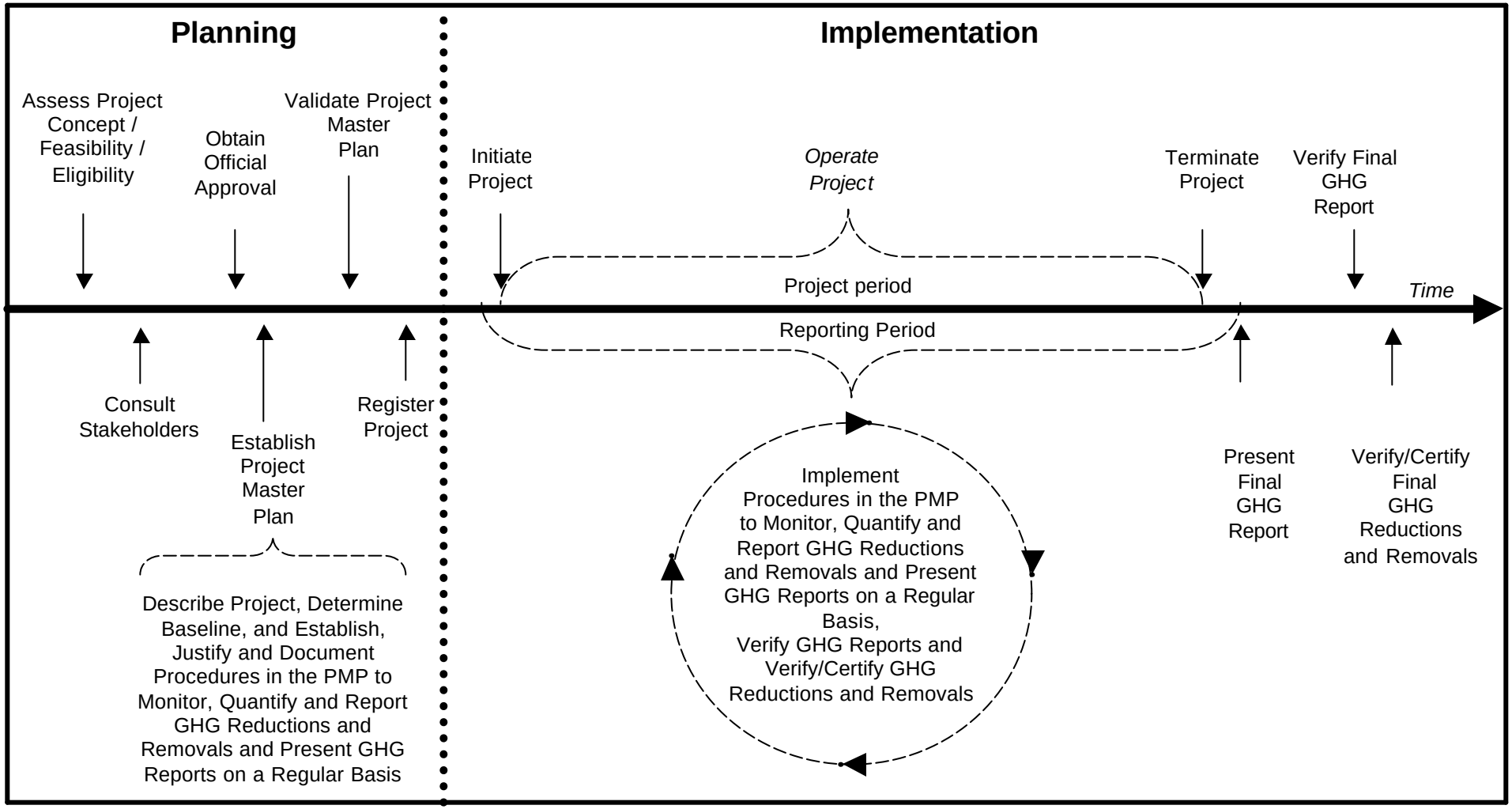
The GHG project cycle can be characterised by two distinct phases – a planning phase and an implementation phase (Figure 1).

This International Standard requires, during both planning and implementation phases, the project proponent ensure the GHG project conforms to relevant requirements of the applicable GHG scheme, legislation and standards (Clause 5.2).

The planning phase of this International Standard (Clause 5.3) specifies requirements for establishing a GHG project master plan. In the project master plan, the project proponent describes the project, determines the baseline, and develops procedures to estimate, monitor, quantify and report GHG emissions, emission reductions, removal and removal enhancements attributable to the project and the baseline. The project master plan should, as appropriate, be validated prior to project implementation.

The implementation phase of this International Standard (Clause 5.4) specifies requirements for implementing the GHG project master plan during the reporting period. The reporting period includes the project period, which begins with project initiation (ie, an action to install, implement, engage or other formal activity to start the project) and ends with project termination (ie, an action to complete, close, decommission or other formal activity to end the project). Based on actual data and information monitored and collected during project implementation, quantified GHG emissions, removals, emission reductions and removal enhancements should, as appropriate, be verified. Where appropriate, the project proponent may submit verified GHG project emission reductions or removal enhancements to a GHG scheme to generate certified GHG units.

411 **Figure 1 – GHG project cycle**
412



5.2 General requirements

The project proponent shall ensure the GHG project conforms to relevant requirements of the applicable GHG scheme(s), including eligibility or approval criteria, and legislation and standards.

The project proponent shall identify and consider relevant current good practice guidance.

5.3 GHG project planning: Establish the project master plan

The project proponent shall establish and document a project master plan [before the start of the reporting period] to:

a) Describe the project;
b) Determine the baseline;
c) Develop project and baseline quantification procedures;
d) Estimate GHG emission reductions and removal enhancements;
e) Develop quality, monitoring and reporting procedures;
f) Demonstrate GHG project conformance to relevant requirements of the applicable GHG scheme(s), including eligibility or approval criteria, and relevant legislation and standards;
g) Demonstrate consideration of relevant current good practice guidance;
h) Consider other information relevant to the project.

5.3.1 Project elements

5.3.1.1 Describe the project

The project proponent shall describe the project and its context, including:

a) Project title, purpose(s) and objective(s);
b) Type of GHG project;
c) Project location, including geographic/physical information allowing the unique identification and specific extent of the project and conditions prior to project initiation;
d) Project strategy to achieve GHG emission reductions and/or removal enhancements;
e) Project technologies, products, services and the expected level of activity;
f) Project performance risks that may affect actual GHG emission reductions or removal enhancements;
g) Roles and responsibilities, including contact information, of the project proponent, other project participants and of the relevant regulator(s) and/or official(s) of the applicable GHG scheme(s);
h) Relevant legislation, technical, [economic], sectoral, [socio-cultural], environmental, geographic, site-specific, and temporal information;
i) [Environmental impact assessment];
j) [Identification of and consultation with] stakeholders interested and/or involved in the project [and how stakeholder comments have been considered];

k) Chronological plan of the start dates, end dates and timeline for the reporting period(s) and the project period, including the project activities in each phase of the GHG project cycle;
l) [Project investment or funding].

5.3.1.2 Identify and select GHG sources and sinks attributable to the project

The project proponent shall [consider the project description] to identify GHG sources and sinks attributable to the project. The project proponent shall list attributable GHG sources and sinks as:

a) Owned and/or controlled by the project proponent;
b) Related to the GHG project, including upstream and downstream activities related by material and energy flows into and out of the project;
c) Affected by the GHG project.

The project proponent shall establish, justify and apply procedures to select project GHG sources and sinks, including relevant inputs and outputs, for regular monitoring and quantification [considering the relative contribution [and significance] of GHG sources and sinks to project GHG emissions and removals].

The project proponent shall identify and justify GHG sources or sinks attributable to the project not subject to regular monitoring or quantification procedures.

5.3.1.3 Develop project GHG emissions and removals quantification procedures

The project proponent shall establish an annotated process flow diagram, characterizing mass or energy flows for selected project GHG sources and sinks, including inputs and outputs.

As appropriate, the project proponent shall establish a mass balance, energy balance and/or other quantitative balance for the annotated process flow diagram for selected project GHG sources and sinks for normal conditions.

[The project proponent shall consider other potential conditions that may have significant GHG emissions and removals.]

The project proponent shall establish and justify procedures to quantify GHG emissions and removals for selected project GHG sources and sinks by GHG type, including:

a) Carbon dioxide (CO_2);
b) Methane (CH_4);
c) Nitrous oxide (N_2O);
d) Hydrofluorocarbons (HFCs);
e) Perfluorocarbons (PFCs);
f) Sulphur hexafluoride (SF_6).

When using established quantification procedures, the project proponent shall justify any departure from the procedures. When using GHG source, sink or other specific

procedures, the project proponent shall provide documentation sufficient to allow for reproduction of estimates or quantifications.

The project proponent shall establish and justify procedures to assess the permanence of estimated GHG removals or emissions captured and stored as appropriate for the type of GHG project and in accordance with the applicable GHG scheme(s).

5.3.2 Baseline elements

5.3.2.1 Determine the baseline

The project proponent shall identify and assess potential baseline scenarios considering:

a) Project description;
b) Existing baseline(s) and baseline procedures;
c) Existing and alternative project types, activities and technologies;
d) Data availability, reliability and limitations;
e) Other relevant information, such as legislation, technical, economic, socio-cultural, environmental, geographic, site-specific, and temporal conditions, projections and future assumptions.

The project proponent shall select and justify the baseline scenario that represents the most appropriate and best estimate of the GHG emissions and removals that would have occurred in the absence of the project.

The project proponent shall demonstrate equivalence of service between the project and the selected baseline scenario.

The project proponent shall establish and justify procedures to ensure the project is additional to the baseline.

5.3.2.2 Identify and select GHG sources and sinks attributable to the baseline

As appropriate, the project proponent shall consider the selected baseline scenario to identify GHG sources and sinks attributable to the baseline. The project proponent shall list GHG sources and sinks attributable to the baseline corresponding to the list of GHG sources and sinks attributable to the project (Clause 5.3.1.2). As appropriate, the project proponent shall justify any lack of comparability between GHG sources and sinks attributable to the baseline and GHG sources and sinks attributable to the project.

As appropriate, the project proponent shall establish, justify and apply procedures to select baseline GHG sources and sinks, including relevant inputs and outputs, for regular monitoring and quantification [considering the relative contribution [and significance] of GHG sources and sinks to project GHG emissions and removals].

The project proponent shall identify and justify GHG sources or sinks attributable to the baseline not subject to regular monitoring or quantification procedures.

5.3.2.3 Develop baseline GHG emissions and removals quantification procedures

The project proponent shall establish an annotated process flow diagram, characterizing mass or energy flows for selected baseline GHG sources and sinks, including inputs and outputs.

As appropriate, the project proponent shall establish a mass balance, energy balance and/or other quantitative balance for the annotated process flow diagram for selected baseline GHG sources and sinks for normal conditions.

[The project proponent shall consider other potential conditions that may have significant GHG emissions and removals.]

As appropriate, the project proponent shall establish and justify procedures to quantify GHG emissions and removals for selected baseline GHG sources and sinks by GHG type, including:

a) Carbon dioxide (CO_2);
b) Methane (CH_4);
c) Nitrous oxide (N_2O);
d) Hydrofluorocarbons (HFCs);
e) Perfluorocarbons (PFCs);
f) Sulphur hexafluoride (SF_6).

Where individual baseline GHG sources and sinks cannot be identified, the project proponent shall establish and justify procedures to estimate baseline GHG emissions or removals using established factors and assumptions.

When using established quantification procedures, the project proponent shall justify any departure from the procedures. When using GHG source, sink or other specific procedures, the project proponent shall provide documentation sufficient to allow for reproduction of estimates or quantifications.

5.3.3 GHG emissions reductions and removal enhancements

5.3.3.1 Develop GHG emission reduction and removal enhancement quantification procedures

The project proponent shall establish and justify procedures to quantify GHG emission reductions and removal enhancements.

The project proponent shall quantify GHG emission reductions and removal enhancements by calculating the difference between project GHG emissions and removals (quantified in accordance with Clause 5.3.1.3) from baseline GHG emissions and removals (quantified in accordance with Clauses 5.3.2.3).

The project proponent shall quantify GHG emissions reductions and removal enhancements separately corresponding to GHG sources and sinks listed in accordance with Clause 5.3.1.2.

5.3.3.2 Estimate GHG emission reductions and removal enhancements

The project proponent shall estimate GHG emissions and removals, separately for each type of GHG, for each GHG source and sink attributable to the project, including those not subject to regular monitoring or quantification.

The project proponent shall estimate GHG emissions and removals, separately for each type of GHG, and, as appropriate, for each GHG source or sink attributable to the baseline, including those not subject to regular monitoring or quantification.

The project proponent shall estimate GHG emission reductions and removal enhancements in accordance with the procedures established in this Clause 5.3.3.1.

The project proponent shall use metric tonnes as the unit of measure and shall convert the quantity of each type of GHG to metric tonnes of carbon dioxide equivalent (CO_2e) using [current] [valid] Global Warming Potentials determined by the Intergovernmental Panel on Climate Change.

5.3.4 Quality, monitoring and reporting elements

5.3.4.1 Develop uncertainty analysis procedures

The project proponent shall establish and justify procedures to assess and quantify uncertainty associated with the GHG emission reductions or removal enhancements.

5.3.4.2 Develop quality assurance and quality control procedures

The project proponent shall establish and maintain quality assurance procedures to manage data and information relevant to the project, including GHG sources and sinks attributable to the project and relevant to the baseline, including, as appropriate, GHG sources and sinks attributable to the baseline.

The project proponent shall establish and maintain quality control procedures to ensure that GHG sources and sinks owned and/or controlled by the project proponent are effectively controlled.

5.3.4.3 Develop monitoring procedures

The project proponent shall establish, justify and maintain monitoring procedures to obtain, record, compile and analyze, on a regular basis, data and information important for quantifying and reporting:

a) GHG emissions and removals attributable to the project;
b) GHG emissions and removals attributable to the baseline.

The monitoring procedures shall include:

a) Purpose of monitoring;
b) Types of data and information to be reported, including units of measure;
c) Origin of data;

d) Data and information monitoring methodologies, including estimation, measurement or calculation;
e) Monitoring times and periods;
f) Monitoring frequencies based on the needs of intended users;
g) Monitoring roles and responsibilities;
h) GHG information management systems, including location and duration of stored data.

5.3.4.4 Develop reporting procedures

The project proponent shall establish and justify reporting procedures to develop GHG reports that document GHG project planning and implementation.

The reporting procedures shall document conformance of the project to relevant requirements of the applicable GHG scheme(s), including eligibility or approval criteria, and legislation and standards.

In planning and developing the GHG report(s), the project proponent shall consider:
a) Report purpose in the context of the project objective;
b) Intended usage and potential users of the report;
c) Overall and specific responsibilities for preparing and producing the report;
d) Report frequency;
e) Period for which the report is valid;
f) Report format;
g) Aggregation of data and information to be included in the report;
h) Policy on report availability and methods of dissemination;
i) If applicable, procedures for independent verification of the GHG report.

The GHG report(s) shall include:
a) Responsibility for reporting;
b) Reporting period covered;
c) Description of the project;
d) GHG emissions and removals attributable to the project quantified in accordance with the procedures established in Clause 5.3.1.2;
e) Description of the baseline scenario;
f) GHG emissions and removals attributable to the baseline quantified in accordance with the procedures established in Clause 5.3.2.2;
g) GHG emissions reductions and removal enhancements quantified in accordance with the procedures established in Clause 5.3.3.1;
h) Description and results of the uncertainty analysis;
i) A statement describing whether the project master plan has been validated [including the level of assurance achieved];
j) A statement describing whether the actual GHG emission reduction or removal enhancements have been verified, including type of verification and level of assurance achieved.

The GHG report should include:

a) As appropriate, an assessment of performance against GHG emission reduction or removal enhancement targets or other benchmarks.

5.3.5 Validate the GHG project

As appropriate, the project proponent shall validate the project master plan established and documented in Clause 5.3.

5.4 GHG project implementation – Monitor, quantify and report

5.4.1 Implement project master plan procedures

5.4.1.1 Monitor the GHG project

The project proponent shall, during the reporting period, obtain, record, compile, analyze and document, on a regular basis, data and information important for quantifying and reporting in accordance with the monitoring procedures established in Clause 5.3.4.3.

As appropriate, monitoring equipment shall be calibrated and maintained and records of this process shall be stored and maintained.

5.4.1.2 Quantify the GHG project

The project proponent shall quantify GHG emissions and removals attributable to the project separately, for each type of GHG, and for each GHG source and sink identified and selected in Clause 5.3.1.2, in accordance with the quantification procedures established in Clause 5.3.1.3.

The project proponent shall quantity GHG emissions and removals attributable to the baseline separately, for each type of GHG and, as appropriate, for each GHG source and sink identified and selected in Clause 5.3.2.2, in accordance with the quantification procedures established in Clause 5.3.2.3.

The project proponent shall estimate GHG emissions and removals by GHG sources and sinks not selected for regular monitoring or quantification.

The project proponent shall quantify GHG emission reductions and removal enhancements in accordance with the quantification procedures established in Clause 5.3.3.1.

5.4.1.3 Assess and quantify uncertainty

The project proponent shall assess and quantify the uncertainty associated with the GHG project emission reductions or removal enhancements in accordance with the uncertainty assessment procedures established in Clause 5.3.4.1.

5.4.1.4 Assure and control quality

The project proponent shall manage data and information relevant to the project, including GHG sources and sinks attributable to the project and relevant to the baseline, including, as appropriate, GHG sources and sinks attributable to the baseline, in accordance with the quality assurance procedures established in Clause 5.3.4.2.

The project proponent shall ensure that GHG sources and sinks owned and/or controlled by the project proponent are effectively controlled in accordance with the quality control procedures established in Clause 5.3.4.2.

5.4.2 Report on GHG project implementation

The project proponent shall develop GHG reports that document GHG project planning and implementation in accordance with the reporting procedures established in Clause 5.3.4.4.

5.4.3 Verify the GHG project assertion

As appropriate, the project proponent shall verify the GHG assertion and/or GHG report(s) with appropriate context and data.

766 **Annex A**
767 **(informative)**
768 **Guidance for the use of the standard**
769
770 Annex A provides guidance for applying requirements contained in this International
771 Standard. Annex A is informative and does not include mandatory requirements.
772 Guidance notes are numbered consistent with respective Clauses of the Standard.
773 Additional guidance is provided in boxes explaining relevant components of the United
774 Nations Framework Convention on Climate Change's (UNFCCC) Kyoto Protocol project
775 mechanisms and other good practice guidance (eg, World Business Council for
776 Sustainable Development (WBCSD)/World Resources Institute's (WRI) Greenhouse
777 Gas Protocol Project Module).
778

779 ## A1 Scope

780
781 *(Secretary's Note – additional informative guidance may be required)*
782
783 This International Standard specifies minimum requirements to quantify, monitor and
784 report GHG emissions, emission reductions, removals and removal enhancements of
785 GHG projects. This standard and informative guidance is intended for use by project
786 proponents undertaking GHG projects, by validators and verifiers in their assessment of
787 GHG projects, and the managers of voluntary programmes and mandatory GHG
788 schemes.
789
790 This International Standard and informative guidance is regime neutral, but is designed
791 for use in connection with internal or external voluntary programmes and mandatory
792 GHG schemes. Many international and national GHG schemes are currently under
793 development. It is expected that some GHG schemes will have additional requirements,
794 particularly where crediting is concerned. This standard does not specify validation or
795 verification of GHG projects directly, nor does it deal with crediting. As a result, project
796 proponents should consider additional guidance regarding GHG schemes requirements.
797 When used in connection with specific GHG schemes, project proponents, validators
798 and verifiers should take care to comply with any additional or more-stringent
799 requirements.
800
801 This is of particular importance where offsetting or the crediting of projects is intended,
802 as particular GHG schemes will have detailed requirements to ensure the equivalence,
803 and to prevent double counting, of GHG emission reductions and removal
804 enhancements from GHG projects. Where application of the requirements of this
805 standard prevent the application of more stringent requirements, the more stringent
806 requirements of the particular GHG scheme must be applied. In the context of crediting
807 and emissions trading or use of credits to offset entity emissions, a less rigorous
808 approach to quantification, monitoring or reporting will distort the emissions trading
809 market and create a loss in the overall environmental integrity of the scheme.
810

811 ## A2 Normative references

812
813 *(Secretary's Note – additional informative guidance may be required)*

Normative references are intended to direct users to useful material including relevant requirements of applicable GHG scheme(s), legislation, standards and good practice guidance.

A3 Definitions

The definitions in this International Standard are standard specific and when the standard is used in the context of particular regimes users should take care refer apply the definitions relevant to those schemes.

A4 Principles

(Secretary's Note – additional informative guidance may be required)

The principles are intended to ensure a dependable representation and a credible and balanced account of GHG emissions reductions and removals from projects. The principles should also be used to assist in the general interpretation of the requirements. In particular, the principles are intended to apply to the exercise of judgement by users where judgement and discretion is called for in fulfilling requirements. The principles should form the basis for the justifications and explanations required in the standard, and users should in each case make reference to the relevant principles and how they have been applied in respect of each requirement.

The application of each principle will vary according to the nature of the judgement involved. This is most clear where the application of the principles of accuracy, completeness, conservativeness and robustness to project and baseline emissions is concerned.

Whereas project GHG emissions and removals can be accurately estimated *ex ante* on the basis of the project description and predicted activity levels and quantifications of actual project emissions and removals can be accurately verified *ex post* on the basis on monitoring, generally baseline emissions cannot. Project emissions and removals should neither be an over nor under estimate of GHG emissions or removals and the completeness principle requires the estimation, monitoring and quantification of all significant GHG sources.

Baseline estimations are based on *ex ante* estimation of a hypothetical and counterfactual scenario for GHG emissions and removals that would have occurred in the absence of a project, and once the project has occurred baseline emissions cannot generally be verified *ex post.* The predictive quality of many baseline quantifications requires a different approach where the risk of over estimation of the baseline necessitates the application of principles. Accordingly, completeness requires consideration of all plausible scenarios for GHG emissions in the absence of a project, robustness requires that the scenario should be plausible over the range of assumptions for the duration of the baselines application and conservativeness requires that the least favourable scenario is adopted.

Completeness

Users should quantify, monitor and report all significant GHG emissions reductions and removal enhancements attributable to the project and the baseline scenario over the lifetime of the project.

A complete account of the projects impacts requires the identification of:

- All sources and sinks impacted by the project;
- All plausible baseline scenarios;
- All comparable GHG source and sinks in the baseline scenario, or where this is not possible;
- Appropriate GHG emissions or removals factors and assumptions.

Sources and sinks impacted by the project include GHG sources and sinks:

- Under the ownership and control of the project proponent;
- Related to the project because GHG emissions from the GHG source or GHG removals by the GHG sink are directly impacted by a direct or indirect input or output of the project activity;
- Affected by the project proponent because GHG emissions from the GHG source or GHG removals by the GHG sink are indirectly impacted by a project activity or a direct or indirect input or output of a project activity.

For baseline estimation, completeness is satisfied by examining all representative baseline scenarios within the relevant geographic area and time period. Where comparable individual GHG sinks and sources cannot be identified in the baseline, appropriate default values and assumptions should be used to define baseline GHG emissions and removals. In the absence of such direct evidence, expert judgement is often required, in varying degrees, to provide information and guidance in establishing and justifying elements of the project master plan and GHG reports. This should include the appropriate use of models and conversion factors, as well as the estimation of ranges of error applied in the uncertainty assessment.

Consistency

Consistency requires that information is quantified, monitored and reported consistently between projects and, over time, that project and baseline sources and sinks are comparable and that emissions are estimated in the same way for both the project and the baseline. Changes or differences in quantification, monitoring and reporting methodologies should be transparently documented and justified. To ensure consistency it is necessary to:

- Clearly state all information and changes in monitoring methodologies;
- Treat all decisions regarding the project and baseline GHG source and sinks, emissions and removals in the same fashion;
- Treat all decisions regarding attributable emissions and removals in the same fashion;
- Apply all tests and assumptions equally across baseline candidates when establishing a baseline.

Accuracy

Actual and predicted data should be sufficiently precise to enable intended users to make decisions with reasonable assurance as to the credibility of the GHG information. Users should ensure that GHG measurements, estimates or calculations are neither over, nor under, the true emissions value as far as can be judged, and that uncertainties are reduced as far as practicable. All calculations should be conducted in a manner so that uncertainty is minimised. In the specific case of baseline calculations, accuracy requires that baseline emissions are calculated in a way that are both conservative and robust.

Transparency

Transparency requires that information is compiled and reported in a manner that enables its independent verification. An audit trail should be generated which is based on open, clear, factual, neutral and coherent documentation. In establishing and justifying project and baseline cases, the application of principles should be documented. For the baseline, the plausible baseline candidates, including assumptions, methodologies, parameters, data sources, key factors, and the criteria and justification, including conservativeness and robustness of the baseline as well of as the additionality of the project, should be explained and documented.

The transparent reporting of GHG emission reductions or removal enhancements requires that:

- All assumptions are clearly stated and documented;
- All background material is clearly referenced;
- The rationale for the selection and use of methodologies is clearly explained;
- Calculations and methodologies are stated;
- Changes in documentation as a result of validation are clearly identified in revised documents.

Conservativeness

Uncertainty regarding the estimation and calculation of the baseline needs to be reflected in the choice of baseline. These uncertainties include:

- The path of technological development and the rate of implementation in the relevant geographic area and timescales;
- The impact of the project on the path of development and rate of implementation;
- Physical factors affecting the projects GHG emissions, removals, sources and sinks.

The principle of conservativeness has to be applied where highly uncertain parameters or data sources are relied upon for the quantification of baselines GHG emissions and removals. In this case, the conservativeness of the baseline shall be established with reference to the choice of approaches, assumptions, methodologies, parameters, data sources, and key factors so that baseline emissions are estimated so as to underestimate rather than overestimate project GHG emission reductions or removal

enhancements. An explanation of how assumptions and choices are conservative should be provided in project documentation in all aspects of the project and baseline.

Robustness

Uncertainty regarding project emissions and the baseline case require that all assumptions and factors are robust and that the project and baseline case and quantification remain the best estimate of project and baseline within the range of plausible circumstances. The level of the baseline quantification should not vary substantially depending on the impact a small range of highly uncertain factors or assumptions but remain plausible and consistent over the range of plausible scenarios.

Principles – Kyoto mechanisms

(Secretary's Note – additional informative guidance is required)

Under the Kyoto regime, the principle of conservativeness has to be applied in establishing a baseline, specifically in the choice of approaches, assumptions, methodologies, parameters, data sources and key factors and in the demonstration of additionality and assessment of uncertainties.

Principles – Other good practice

(Secretary's Note – additional informative guidance is required)

A5 Requirements for GHG Projects

A5.2 Relevant requirements of applicable GHG scheme(s), standards, legislation and good practice guidance

(Secretary's Note – additional informative guidance is required)

Where a project proponent seeks approval of a project under a specific programme or regime, the proponent should take care that the project complies with the specific criteria of the particular scheme. Where this International Standard prevents the application of these criteria, GHG scheme criteria take precedence. For example, many GHG schemes will require the prior validation and registration of projects and associated GHG emissions reductions or removal enhancements on the basis of submitted documentation to ensure that they are valid in accordance with the requirements of the applicable GHG scheme and relevant standard(s).

Many GHG schemes will also require the verification and certification of GHG emission reductions or removal enhancements on the basis of a separate and verified report. Certification is the written assurance by the applicable GHG scheme that, during a specified time period, a project achieved the GHG emission reductions and removal

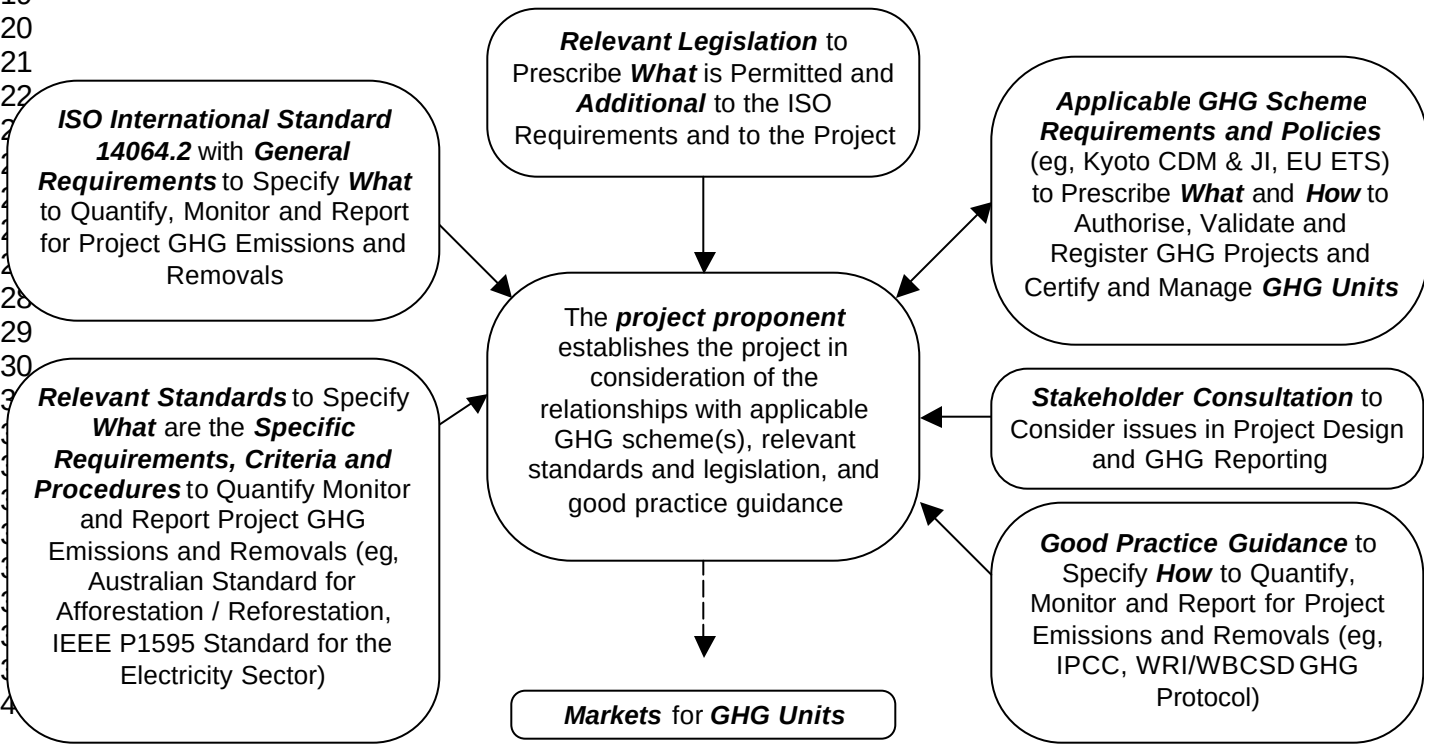
enhancements as verified in accordance with the requirements of the applicable GHG scheme and relevant standard(s).

Some schemes will facilitate trade and offsetting, by the issuance of credits, of GHG emissions on the basis of certification. Credits are issued on the basis of *ex post facto* reports of GHG emissions reductions against a previously validated baseline. The crediting period is the time during which credits may be issued in respect of GHG emission reductions and removal enhancements from validated projects that are verified and certified in accordance with the requirements of the applicable GHG scheme and relevant standard(s).

Projects should 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. Compliance with standards and legislation will also help to ensure that the project is additional and goes beyond the baseline scenario. The project proponent should complete an environmental and social impact assessment, demonstrate a contribution to sustainable development, and be consistent with national environment and development priorities and strategies.

Figure A1 illustrates considerations and relationships that the project proponent may encounter and, therefore, should recognize and understand.

Figure A1
Considerations and relationship of the GHG project to relevant requirements of applicable GHG scheme(s), standards, legislation, good practice guidance and stakeholder consultation



Eligibility requirements – Kyoto mechanisms

Under the Kyoto regime two project based mechanisms have been created: The Clean Development Mechanisms (CDM) and Joint Implementation (JI).

Article 12 of the Kyoto Protocol (KP) defines the CDM as follows: "The purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments under article 3 KP". The created tradable unit is called a "Certified Emissions Reduction" (CER).

The adopted modalities and procedures for the CDM can be found in the annex to decision 17/CP.7, document FCCC/CP/2001/13/Add.2. To supervise the CDM the Executive Board was established, which is above others responsible for the accreditation of Designated Operational Entities. A Designated Operational Entity is an independent entity that is engaged by the projects participants to validate or verify and certify the CDM 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 emissions reduction the Executive Board will issue the achieved credits 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 line that includes GHG emission reductions and removal enhancements that are verified and certified. In case of the CDM the project participants should select a period from the following alternative approaches, for which crediting will occur:

- Renewable crediting period: A maximum of seven years, which may be renewed a maximum of two times;
- Fixed crediting period: A maximum of ten years with no option of renewal.

In order to reduce transactions costs in case of CDM simplified modalities and procedures may be applied for small-scale projects, which are defined as follows:

a) Energy efficiency improvement project activities that reduce energy consumption, on the supply and/or demand side, by up to the equivalent of 15GWh per year;
b) Renewable energy project activities with a maximum output capacity equivalent of up to 15MW or appropriate equivalent;
c) Other project activities that both reduce anthropogenic emissions by sources and that directly emit less than 15Gg of carbon dioxide equivalent annually.

Article 6 of the Kyoto Protocol defines the JI as follows: "For the purpose of meetings its commitments under Article 3, any Party included in Annex I may transfer to, or acquire from, any other such Party emission reduction units resulting from projects aimed at reducing anthropogenic emissions by sources or enhancing anthropogenic removals by sinks of greenhouse gases in any sector of the economy (...)" The adopted modalities

and procedures for JI can be found in the annex to decision 17/CP.7, document FCCC/CP/2001/13/Add.2). To supervise JI a Supervisory Committee was established.

Examples of eligibility criteria that the project proponent should identify and consider while developing the concept of the JI project and assessing feasibility include completion of environmental impact assessment and social impact assessment, demonstrable contribution to sustainable development, and support of national environment and development priorities and strategies. The specific eligibility requirements that have to be fulfilled by the project, the host Party and Investor Party under the Kyoto regime are listed below.

Party	**Mechanism and Requirement**		
	CDM		**JI***
	Regular CDM	Small Scale CDM	
Project		Meet Small-scale definition (see above)	
	Only emissions of greenhouse gases listed in Annex A of the KP (see 5.2)		
	Demonstrable contribution sustainable development	Demonstrable contribution sustainable development	
	Written Approval of voluntary participation of project participants	Written Approval of voluntary participation of project participants	Written approval by the Parties involved.
	Refrain from using official development aid	Refrain from using official development aid	
	Additionality	Additionality: Barriers or quantitative evidence	Additionality
	Refrain from credits generated from nuclear facilities	Refrain from credits generated from nuclear facilities	Refrain from credits generated from nuclear facilities
	Projects starting as of the year 2000 may be eligible	Projects starting as of the year 2000 may be eligible	Projects starting as of the year 2008 may be eligible
	Analyse environmental impacts **as** required by the host Party	Analyse environmental impacts **if** required by the host Party	
	Stakeholder comments inclusion in the project design document	Stakeholder comments inclusion in the project design document	
Host Party	Designate a national authority	Designate a national authority	See Investor Party requirements, whereas the Party has as a minimum fulfil the criteria a) to d). If it meets all criteria it can use the so called first track and can set up own rules for verification etc.
	Has ratified the Kyoto Protocol	Has ratified the Kyoto Protocol	
Investor Party	Has designated a national authority	Has designated a national authority	a) Has designated a focal point
	Has ratified the Kyoto Protocol	Has ratified the Kyoto Protocol	b) Has ratified the Kyoto Protocol
	Has calculated its assigned amount pursuant to the rules	Has calculated its assigned amount pursuant to the rules	c) Has calculated its assigned amount pursuant to the rules

	Has in place a national system for estimation of emissions in accordance with the rules	Has in place a national system for estimation of emissions in accordance with the rules	d) Has in place a national registry in accordance with the rules
	Has in place a national registry in accordance with the rules	Has in place a national registry in accordance with the rules	e) Has in place a national system for estimation of emissions in accordance with the rules
	Has submitted annually the most recent required inventory in accordance with the rules	Has submitted annually the most recent required inventory in accordance with the rules	f) Has submitted annually the most recent required inventory in accordance with the rules.
	Has submitted supplementary information on assigned amount in accordance with the rules.	Has submitted supplementary information on assigned amount in accordance with the rules.	g) Has submitted supplementary information on assigned amount in accordance with the rules.

A5.3 The project master plan

The project master plan (PMP) is a document that includes the project description, baseline determination, procedures to quantify, monitor, and report GHG emissions, emission reductions, removals and removal enhancements, procedures for quality assurance/quality control, and other information in accordance with the relevant requirements of applicable GHG scheme(s), standard(s), legislation, and good practice guidance.

Project design document – Kyoto mechanisms

The requirements of the project master plan are similar to the contents of the project design document (PDD) as specified by the United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol Clean Development Mechanism (CDM). However, the PMP does not specify a verification plan. Under the Kyoto regime a CDM-project has to be validated by a Designated Operational Entity on the basis of the PDD. After the validation the project must be registered by the CDM Executive Board. Registration is referred to as the formal acceptance by the Executive Board of validated project as a CDM project activity. Registration is the prerequisite for the verification, certification and issuance of CERs related to the project activity.

As part of the documentation of the objectives and purpose of the project, the project proponent should document any intention to participate in any GHG scheme(s) and/or earn GHG units. The project proponent should consult interested parties to consider potential positive and negative impacts in the design of the project. General examples of types of GHG emission reduction projects include new projects, which are generally referred to as greenfield, or retrofit projects, which generally involve the replacement of existing equipment with new equipment that has a lower GHG emission intensity.

In case of the CDM the project design is part of the PDD and project participants should include in addition to the criteria listed in chapter 5.3.1:

- An explanation 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.

A5.3.1 Project Elements

Identifying and selecting GHG sources and sinks attributable to the project

(Secretary's Note – additional informative guidance is required)

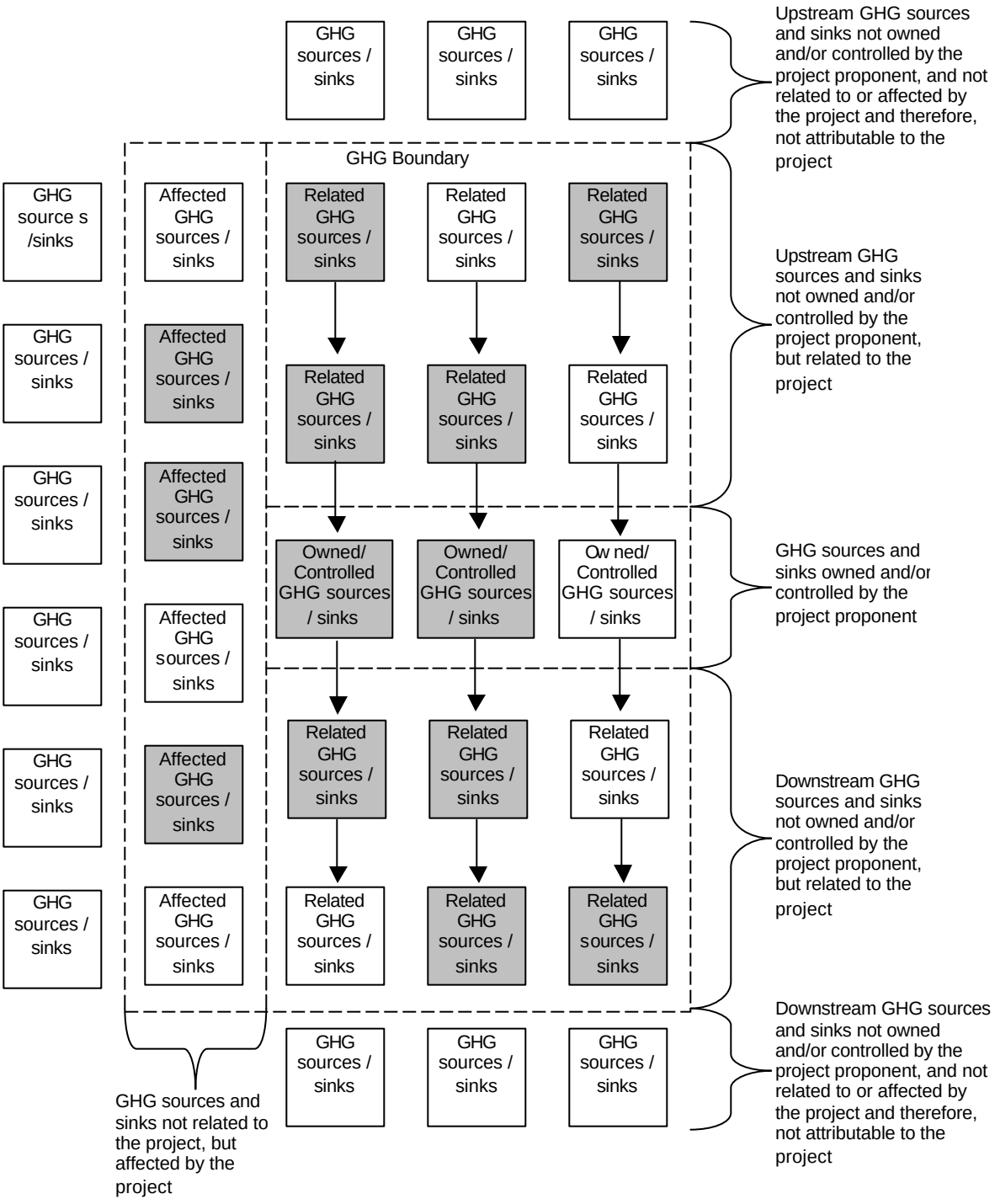
As illustrated in Figure A2, the project proponent is required to identify all GHG sources and sinks attributable to the project, including GHG sources and sinks owned and/or controlled by the project proponent, as well as GHG sources and sinks related to or affected by the project. However, the quantification of GHG emissions and removals generally does not involve all GHG sources and sinks, which may refer to a potentially countless array of GHG sources and sinks within a life-cycle assessment of the project. Therefore, criteria to identify and select GHG sources and sinks not owned and/or controlled by the project proponent are necessary and include significance, relevance, and influence.

GHG sources and sinks "owned and/or controlled" by the project proponent are generally referred to as "direct", implying the project proponent can direct the operation or activity and has full responsibility for the GHG sources and sinks. According to good practice guidance, "direct" GHG sources and sinks are often referred to as within "Scope 1" GHG accounting.

All other GHG sources and sinks are generally referred to as "indirect", or not owned and/or controlled by the project proponent. GHG emissions and removals by some indirect GHG sources and sinks may be attributable to the project. Examples of indirect GHG sources and sinks attributable to the project include GHG sources and sinks "related" by material (eg, feedstock, metals, biomass) or energy (eg, fuel, electricity, heat, steam) flows into or out of the project. The energy-related GHG sources and sinks, including electricity, steam and heat are often referred to as within "Scope 2" GHG accounting. The other related GHG sources and sinks are often referred to as within "Scope 3" GHG accounting.

In addition, the project proponent is accountable for changes in GHG emissions and removals by GHG sources and sinks affected by the project through activity shifting or market transformation. GHG sources and sinks affected by the project are not related to the project and generally are not owned and/or controlled by the project proponent. As a consequence, these GHG sources and sinks are generally outside the project boundary (ie, offsite) and are often referred to as leakage. However, in accordance with good practice guidance, GHG sources and sinks affected by the project are included within the GHG boundary. 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. In cases that a GHG scheme permits accounting for positive leakage, positive leakage should not exceed negative leakage in the quantification of GHG emission reductions or removal enhancements.

Figure A2
Simplified overview of assessing GHG sources and sinks



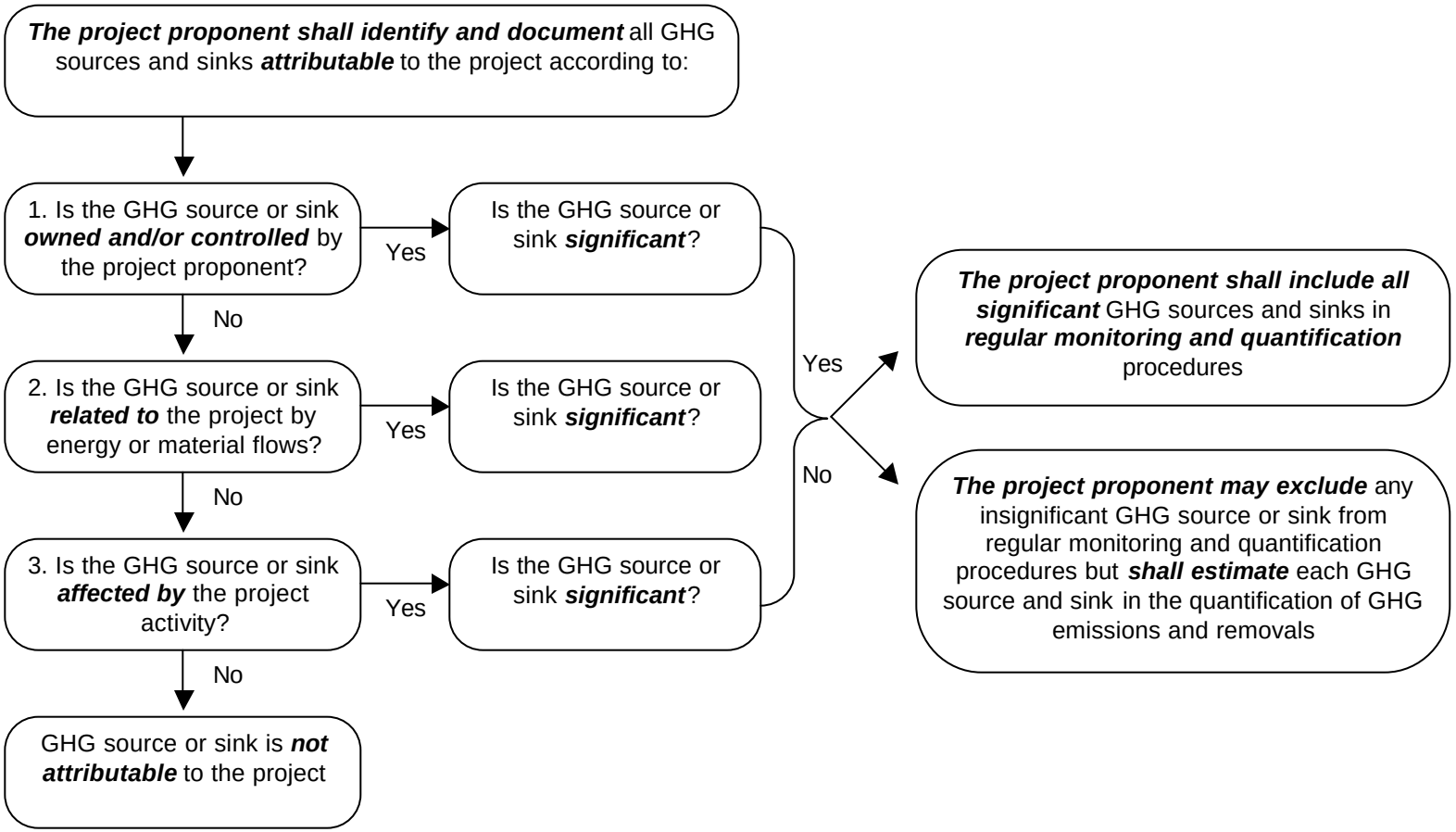
NOTE – Coloured boxes represent materially significant GHG sources and sinks that must be monitored and quantified. Immaterial (insignificant) GHG sources and sinks may be excluded from regular monitoring and quantification procedures; however, all exclusions shall be estimated and accounted for in the quantification of GHG emission reductions and removal enhancements.

The project proponent may document GHG sources and sinks "related" to the project separately according to energy inputs (eg, power, heat, steam, fossil fuel energy) and other GHG sources and sinks "related" to the project.

As illustrated in Figure A3, all significant GHG sources and sinks, including those owned and/or controlled by the project proponent related to, or affected by, the project shall be monitored and quantified by the project proponent.

To ensure an accurate, transparent and robust comparison of the project and baseline (to calculate GHG emission reductions and removal enhancements), the products and/or services (ie, its purpose, for example, to provide lighting or to maintain community assets), including a quantitative measure (eg, to light 1000 m^3 of building floor space or to service 20 community facilities) must be demonstrated to be equivalent. In addition, the GHG boundary of the project and the GHG boundary of the baseline should be comparable to justify the quantification of GHG emission reductions and removal enhancements.

Figure A3
Overview of a framework of identifying and selecting GHG sources and sinks for estimation or for regular monitoring and quantification of GHG emissions and removals



In addition to the practice that exclusions are permitted if not significant, there may be other cases that justify the exclusion of GHG sources and sinks, or the inputs or outputs of GHG sources and sinks, from the regular monitoring and quantification of GHG emissions, removals, emission reductions and removal enhancements. For example, when comparison of the GHG sources and sinks attributable to the project and those attributable to the baseline indicates that there are GHG sources and sinks that are the same (ie, do not change from the baseline to the project), then these GHG sources and sinks may be excluded based on the justification that there is no change in the GHG emissions or removals from the baseline to the project (ie, no GHG emission reductions or removal enhancements). What is considered "regular monitoring and quantification" can be determined from relevant good practice guidance and standards.

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.

Project boundary – Kyoto mechanisms

In order to make this International Standard regime neutral and compatible among regimes and good practice guidance, the terminology and concept of project boundary and leakage used in this International Standard differs from, but is compatible with, the Kyoto regime. Whereas the Kyoto regime considers the "project boundary" to include GHG sources and sinks "directly attributable" to the project and leakage outside the "project boundary", this International Standard considers all GHG sources and sinks "attributable" to the project inside the "project GHG boundary". The terminology used in this International Standard considers GHG sources and sinks according to those that are "owned and/or controlled" by the project proponent, are "related" to the project (by material and energy flows), or are "affected" by the project. These ISO terms correspond to the Kyoto regime as follows:

ISO 14064 Part 2	Kyoto Protocol
Owned and/or controlled (attributable, inside GHG boundary)	Directly attributable (inside project boundary)
Related to the project (by material or energy inputs or outputs) (attributable, inside GHG boundary)	
Affected by the project (attributable, inside GHG boundary)	Leakage (outside project boundary)

Project boundaries – Other good practice

(Secretary's Note – additional informative guidance is required)

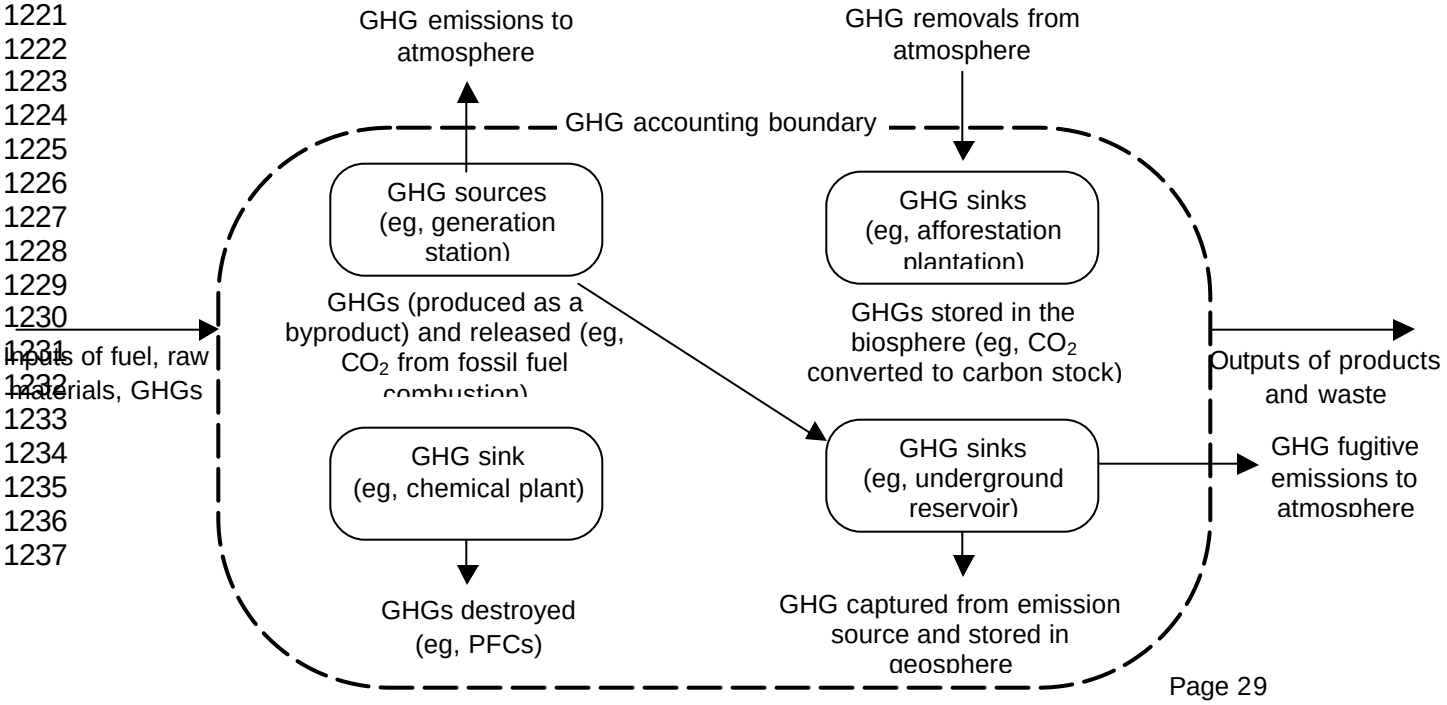
Project GHG emissions and removals quantification

(Secretary's Note – additional informative guidance is required)
The nature of information available to the project proponent determines whether GHG emissions are estimated or quantified. For example, before the start of project initiation, in general, information is estimated, whereas during project operation, information can be directly monitored and measured to provide actual data to quantify GHG emissions and removals.

In the context of the quantification of GHG emissions and removals, the purpose of a mass balance and energy balance is to provide an accurate, complete, consistent, transparent and robust accounting of the GHG emissions to the atmosphere and GHG removals from the atmosphere by GHG sources and sinks within a GHG boundary. The mass balance is generally established on the basis of inputs and/or outputs of material (eg, feedstock, metals, biomass) or energy (eg, fuel, electricity, heat, steam) entering in and leaving from (eg, exports of product, production and release of GHG emissions) the GHG boundary, as well as the accumulation/storage (eg, carbon stock) or destruction (eg, of PFCs) of GHGs within the GHG boundary. A mass balance and/or energy balance may be applied to different phases of the project cycle (eg, initiation, operation, termination), as well as different systems (eg, generation facility, underground reservoir) within the GHG boundary. Figure A4 illustrates a simplified overview of a mass balance approach to assess GHGs for different types of GHG sources and sinks.

Permanence is a criterion to assess and justify that GHG removals and emission capture and storage are long-term, considering the longevity of a carbon pool and the stability of its stocks, given the management and disturbance environment in which it occurs.

Figure A4
Simplified overview of a mass balance framework of estimating and quantifying GHGs



From perspective of the atmosphere, a GHG Mass Balance equals GHGs leaving the GHG boundary (eg, specific GHGs with outputs; inputs x GHG emission factor = GHGs produced and emitted to atmosphere) – GHGs entering the GHG boundary (ie, specific GHGs with inputs; GHGs removed from atmosphere by biological process) – GHGs accumulated within the GHG boundary (ie, GHGs stored in biological or geological carbon sinks by removal or capture and storage processes) – GHGs destroyed within the GHG boundary (ie, artificial GHGs such as PFCs).

There are different methods to establish GHG emission factors, which have different accuracies. To promote the use of GHG emission factors that are the most robust and with the highest possible accuracy, the project proponent should use the following methods in decreasing order of preference:

a) Empirical evidence of:
   i) Standard GHG emission outputs for measured inputs under known conditions of a specific GHG sources and sinks; or
   ii) Stoichiometric and mass balance measurements and calculations for a specific GHG sources and sinks or process with all losses accounted;
b) Empirical evidence for similar or comparable GHG sources and sinks or processes;
c) Manufacturers' specification of output for specific or similar GHG sources and sinks under known conditions;
d) Externally supplied emission factor specific to a specific area, region, province or state;
e) Externally supplied emission factor specific to a country or region of countries;
f) Externally supplied average emission factor for international use.

Recalculation is an important issue regarding both monitoring and quantification. As a minimum, recalculation should occur at the end of the project period to ensure that the quantity of GHG emission reductions and removal enhancements are not overestimated. Recalculation may also occur at any time during the project when the project proponent considers appropriate (eg, with the acquisition of better data). Any recalculation should be justified and documented.

Project quantification– Kyoto mechanisms

(Secretary's Note – additional informative guidance is required)

Project quantification– Other good practice

(Secretary's Note – additional informative guidance is required)

A5.3.2 Baseline elements

Determining the baseline

(Secretary's Note – additional informative guidance is required)

Identifying and selecting GHG sources and sinks attributable to the baseline

For guidance, refer to text on identifying and selecting GHG sources and sinks attributable to the project.

Baseline GHG emissions and removals estimation

(Secretary's Note – additional informative guidance is required)

Each baseline GHG source and sink corresponding to a project GHG sources and sinks may be quantified using different procedures. Baseline procedures are generally referred to as customized, meaning developed by the project proponent, or standardized, meaning recognized by an authority such as a GHG scheme, as a performance standard. The customized baseline is generally developed either with one specific GHG sources and sinks or more than one GHG sources and sinks, such as a sector or similar types of technologies or applications. In the case of GHG emission reduction projects, baseline procedures also exist for retrofit projects.

Furthermore, there are static baselines, which are constant with time, and dynamic baselines, which are not constant with time. For example, a PV roof project with an off-grid application may offset a diesel generator as a static baseline, or a PV roof project with an on-grid application may offset the electricity mix as a dynamic baseline because the electricity mix changes with time. As well, historical conditions, such as emissions or activity level data; market conditions, such as common technology usage; and, best available technology, such as the top 20% performance standard are examples of different types of baseline methodologies.

Baselines – Kyoto mechanisms

(Secretary's Note – additional informative guidance is required)

Under the Kyoto regime a baseline methodology has to be applied and justified, which is part of the PDD. A baseline methodology is an application of one of the three approaches as defined in chapter A5.4, to an individual project activity, reflecting aspects such as sector and region. Furthermore details on the baseline development have to be provided such as the date of completing the final draft of the baseline section and the name of the person/entity determining the baseline.

Under the Kyoto Protocol the most appropriate of the following baseline approaches, shall be selected:

a) Historical Emissions: Assume a baseline from a projection of historic and current trends, or business-as-usual, where emission factors are based on this trend and reductions are calculated from this trend;
b) Market Conditions: Assume a baseline from current market conditions where emission factors are based on the technology used in the market and reductions are calculated by applying this technology;
c) Best Available Technology: Assume a baseline from the most efficient technological processes (the top 20% of their category under similar

circumstances) available where emission factors are based on commercial availability of this technology and reductions are calculated by applying this technology.

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. This might include as many additionality tests as possible, including environmental additionality, regulatory additionality, investment ranking, technological additionality and barriers assessment.

Baselines– Other good practice

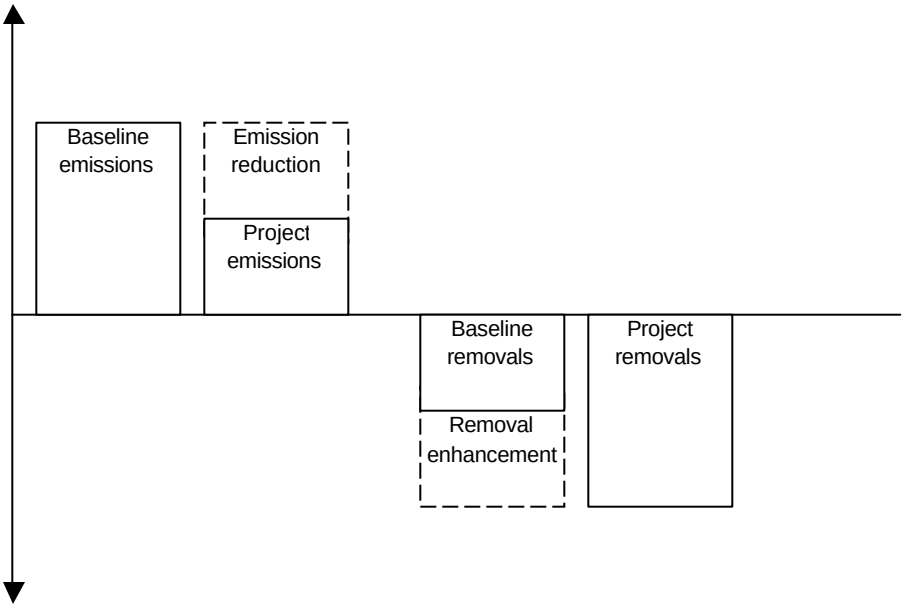
(Secretary's Note – additional informative guidance is required)

A5.3.3 GHG emission reductions and removal enhancements

(Secretary's Note – additional informative guidance is required)

Figure A5 is an example of how emission reductions or removal enhancements may be quantified from baseline and project emissions and removals.

Figure A5
Illustration of GHG emission reductions and removal enhancements



A5.3.4 Quality, Monitoring and reporting elements

Uncertainty assessment and analysis

(Secretary's Note – additional informative guidance is required)

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 more rigorous quantitative, systematic procedure to ascertain and quantify uncertainty.

An uncertainty analysis may include a probability distribution function. An uncertainty analysis involves a quantitative assessment of the uncertainty of output values caused by uncertainties in the input values. Generally, a 95% confidence interval is used to describe the error margins about a mean value (where there is a 5% chance of the true value falling outside the margins described). However, this does not give guidance on whether a mean or lower limit value should be taken. The asymmetry (skewness) and kurtosis of the distribution are important to understand the relative likelihood of that value being reached. A symmetrical distribution indicates that there is an equal chance of the true value being either greater or less than the mean value. The kurtosis (flatness about the mean of the distribution curve) indicates the relative likelihood of the true value being close to the mean. GHG accounting systems are likely to adopt a conservative approach to risk management.

Uncertainty analysis – Kyoto mechanisms

(Secretary's Note – additional informative guidance is required)

Uncertainty analysis – Other good practice

(Secretary's Note – additional informative guidance is required)

Quality assurance and control

(Secretary's Note – additional informative guidance is required)

To improve project data quality, the project proponent should consider the Principles (Clause 4) in all steps of the project cycle; use a common system to quantify GHG emissions and removals; establish and maintain a robust GHG information management system; complete regular accuracy checks for technical errors; conduct periodic internal audits and technical reviews; organize and deliver appropriate training for project development team members; and, perform uncertainty analysis.

Projects may be subject to unpredictable influencing factors that may cause changes to the performance or operation of GHG sources and sinks. Examples of relatively unpredictable influencing factors that may significantly affect GHG removal projects may include substantial climatic variation, fire and pests and diseases. In cases that influencing factors have been identified, the project proponent should perform a sensitivity analysis to assess the effect of influencing factors and should consider the results in the risk management plan. In addition, appropriate monitoring and recalculation should be considered to reconcile these sources of unpredictable uncertainty.

Quality assurance and control – Kyoto mechanisms

(Secretary's Note – additional informative guidance is required)

Under the Kyoto regime the quality assurance and quality control are under the CDM an element of the monitoring methodology and plan, including for each identified gas and source the estimated uncertainty level and the undertaken or planned QA/QC procedures, or explanation why no such procedures are planned.

Quality assurance and control – Other good practice

(Secretary's Note – additional informative guidance is required)

Monitoring

(Secretary's Note – additional informative guidance is required)

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

Monitoring – Kyoto mechanisms

(Secretary's Note – additional informative guidance is required)

The monitoring plan under the Kyoto regime is part of the PDD and will be validated by the Designated Operational Entity. The monitoring plan has to provide detailed information related to the monitoring methodology, that means on the collection and archiving of all relevant data, for example:

- Collected or monitored data (owned and/or controlled, affected or related emissions and/or removals which are materially significant) to quantify project GHG emissions and removals;
- Data that are used to calculate the baseline.

The monitored data should be kept for two years after the end of the crediting period or the last issuance of CERs for the project activity.

Monitoring – Other good practice

(Secretary's Note – additional informative guidance is required)

Reporting

(Secretary's Note – additional informative guidance is required)

To enable and facilitate verification, the project proponent should be transparent when reporting GHG emissions, removals, emission reductions and removal enhancements.

Table A2 illustrates an example of a template to report project and baseline GHG data and information.

Examples of methods of distribution of GHG reports and/or information include hardcopy reports and pamphlets distributed by post or meetings, electronic files downloadable from the internet, and websites.

Reporting – Kyoto mechanisms

(Secretary's Note – additional informative guidance is required)

Under the Kyoto regime GHG reports are called monitoring reports. The following information has to be included in the monitoring report:

- ID number;
- Data type;
- Data variable;
- Data unit;
- Quantification method (measured, calculated, estimated);
- Recording frequency;
- Proportion of data to be monitored;
- How the data will be archived (electronic, paper);
- How long the data will be archived;
- Other comments.

This kind of information has to be provided for:

- Collected or monitored data (owned and/or controlled emissions and/or removals);
- Data of affected or related emissions which are materially significant;
- Data that are used to calculate the baseline.

Reporting – Other good practice

(Secretary's Note – additional informative guidance is required)

Table A2
Example of GHG documentation template

List of GHG Sources and sinks		Baseline GHG Emissions and Uncertainty								Baseline GHG Removals and Uncertainty			Project GHG Emissions and Uncertainty								Project GHG Removals and Uncertainty			GHG Emission Reductions and Uncertainty								GHG Removal Enhancements and Uncertainty		
		CO_2	CH_4	N_2O	PFC	HFC	SF_6	Other	CO_2e	CO_2	Other	CO_2e	CO_2	CH_4	N_2O	PFC	HFC	SF_6	Other	CO_2e	CO_2	Other	CO_2e	CO_2	CH_4	N_2O	PFC	HFC	SF_6	Other	CO_2e	CO_2	Other	CO_2e
GHG Sources and sinks Owned and/or Controlled by the project Proponent (Direct - Scope 1)	GHG sources and sinks 1																																	
	GHG sources and sinks 2																																	
GHG Sources and sinks Related to the Project or Baseline - Electricity, Steam, Heat (Indirect - Scope 2)	GHG sources and sinks 3																																	
	GHG sources and sinks 4																																	
GHG Sources and sinks Related to the Project or Baseline - other material and energy inputs or outputs (Indirect - Scope 3)	GHG sources and sinks 5																																	
	GHG sources and sinks 6																																	
GHG Sources and sinks Affected by the Project (Leakage)	GHG sources and sinks 7																																	
	GHG sources and sinks 8																																	
Totals																																		

[Editorial note: a corresponding documentation template should be included for removals projects.]

A5.3.5 Project validation

(Secretary's Note – additional informative guidance is required)

Validation– Kyoto mechanisms

(Secretary's Note – additional informative guidance is required)

Vailidation – Other good practice

(Secretary's Note – additional informative guidance is required)

A5.4.3 GHG assertion verification

(Secretary's Note – additional informative guidance is required)

GHG assertion verification – Kyoto mechanisms

(Secretary's Note – additional informative guidance is required)

GHG assertion verification – Other good practice

(Secretary's Note – additional informative guidance is required)