



**SRI LANKA ACCREDITATION BOARD  
FOR CONFORMITY ASSESSMENT**

**SPECIFIC CRITERIA FOR  
GHG VALIDATION & VERIFICATION BODIES**

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## 1. Introduction

1.1 The Accreditation Scheme for Greenhouse Gas (GHG) Validation/Verification Bodies (V/VBs) of the Sri Lanka Accreditation Board (SLAB) is based on the requirements laid down in *ISO 14065: 2013 – Greenhouse Gases - Requirements for Greenhouse Gas Validation and Verification bodies for use in accreditation or other forms of recognition*. Validation and verification cover a wide range of conformity assessments in different fields.

1.2 This document sets out specific technical criteria for greenhouse gas validation and verification bodies (GHG V/VBs) seeking accreditation for validation and/or verification of GHG assertions at organizational and project levels. It amplifies and interprets the requirements stipulated in ISO 14065, relevant International Accreditation Forum (IAF) mandatory documents and international standard as follows. This document should be read in conjunction with all the above and the *SLAB rules and procedures; GHG-RG(P)-02*

- *ISO 14064 – 1: Greenhouse gases – Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*
- *ISO 14064 – 2: Greenhouse gases – Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.*
- *ISO 14064 – 3: Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions.*
- *ISO 14066: Greenhouse gases – Competence requirements for greenhouse gas validation teams and verification teams.*
- *IAF MD 06: 2014 – IAF Mandatory Document for the Application of ISO 14065:2013.*
- *IAF MD 14: 2014 – IAF Mandatory Document for Application of ISO/IEC 17011 in Greenhouse Gas Validation and Verification (ISO 14065: 2013).*

1.3 GHG validation and/or verification are not ongoing certifications but which are implemented on a set programme over a specified period as agreed with relevant parties. Some GHG or related programmes may require certification by V/VBs of the GHG performance, achieved by responsible parties over a specific period of time. Such certifications are not covered under this accreditation scheme.

1.4 In certain instances, additional guidance is considered necessary to take into account the type of scope, sector, competency level of validators and verifiers, classification of risk levels and the expertise required for different risk levels. The competence requirements are specified in *ISO 14066: Competence requirements for greenhouse gas validation teams and verification teams*.

1.5 This specific criteria document has been prepared by the Technical Advisory Committee on GHG Validation and Verification and has been authorized for adoption by the Council of the Sri Lanka Accreditation Board (SLAB). Validation and verification bodies seeking accreditation are required to comply with all the requirements listed in the international standard ISO 14065. This document supplements International Standard ISO 14065 and provides guidance for the accreditation of GHG V/VBs for both assessors and for GHG V/VBs which are preparing for accreditation.

1.6 This Specific Criteria document must be used in conjunction with ISO 14065. It provides an interpretation of the latter document and describes specific requirements for those clauses of ISO 14065 which are general in nature. Corresponding reference to the clauses in ISO 14065 is indicated

in parenthesis in the text of the document. This document should be read in conjunction with the Rules and Procedures of SLAB as applicable to GHG validation and verification bodies. Further, all V/VBs which provide GHG validation or verification as per ISO 14064 Part 1-3 shall comply with any national, regional and local laws and regulations as applicable. In addition, other relevant standards prescribed by international organizations as decided by relevant parties may also apply.

1.7 The field of GHG validation and verification as per ISO 14064 Part 1-3 requires a wide variety of techniques requiring different levels of knowledge and expertise in the performance of validations and/or verifications. The competence requirements for GHG validation teams and verification teams are given in ISO 14066.

1.8 To provide for a higher level of consistency in the interpretation of requirements of ISO 14065 in the assessment process and to facilitate the accreditation procedure, the scope sectors are defined in section 2 below and Appendix A.

1.9 This document will be periodically reviewed and updated based on experience gained and developments in technology. The term 'shall' is used in this document to indicate those provisions which are mandatory. The term 'should' is used to indicate the guidance which, although not mandatory, is provided by SLAB as a recognized means of meeting the requirements of the standards.

## **2. Scope of accreditation**

The scope sectors of accreditation based on ISO 14065 applicable to GHG V/VBs at organizational and project level are given in Appendix A.

## **3. Terms and definitions**

For the purpose of this document, the terms and definitions given in ISO/IEC 17000, ISO 14064 Part 1-3, ISO 14065, ISO 14066 and the following apply.

### **3.1 Client**

An organization seeking a validation or verification statement of greenhouse gas assertion from a greenhouse gas validation or verification body.

### **3.2 Technical expert**

Person who provides specific knowledge or expertise on a given technical area to the assessment team

### **3.3 Technical Area**

Area characterized by commonalities of processes relevant to greenhouse gas emission and/or removal.

## **4. Principles (Clause 4 of ISO 14065)**

The principles given in Clause 4 of ISO 14065 are the basis for the subsequent specific performance and descriptive requirements in this specific criteria document. This specific criteria document does not give specific requirements for all situations that can occur. These principles should be applied as guidance for the decisions that may need to be made for unanticipated situations. Principles are not requirements.

## **5. General requirements** *(Clause 5 of ISO 14065)*

### **5.1 Legal status** *(Clause 5.1 of ISO 14065)*

All the requirements given in Clause 5.1 of ISO 14065 apply.

### **5.2 Legal and contractual matters** *(Clause 5.2 of ISO 14065)*

The V/VB shall enter in to a legally enforceable agreement with each client for the provision of validation or verification services and it shall include the contents related to the marketing policy, GHG programme, validation/verification plan and sampling of validation or verification activities to be witnessed in consistent with national legal requirements, regulations and other relevant international guidelines.

All the other requirements given in Clause 5.2 of ISO 14065 apply.

### **5.3 Governance and management commitment** *(Clause 5.3 of ISO 14065)*

The V/VB shall develop and implement operational policies and carry out supervision of finances based on the validation or verification objectives.

All the requirements given in Clause 5.3 of ISO 14065 apply.

### **5.4 Impartiality** *(Clause 5.4 of ISO 14065)*

The V/VB shall have a statement that it understands the importance of impartiality with regard to GHG validation and verification. The V/VB shall publish an impartiality statement enabling easy access to the interested parties concerned and may post the impartiality statement in their home pages.

The V/VB and any part of the same legal entity shall not offer or provide consultancy on GHG validation or verification, training for customers of the validation/verification body, GHG assertion, GHG consultancy or management systems consultancy.

The fact that the V/VB employing the validator/verifier is known to have provided consultancy on GHG or management systems on the particular customer of the V/VB within two years following the end of the consultancy, is likely to be considered a high threat to impartiality.

All the other requirements given in Clause 5.4 of ISO 14065 apply

### **5.5 Liability and financing** *(Clause 5.5 of ISO/IEC 14065)*

The V/VB shall evaluate possible risks arising from its validation/verification activities and shall have arrangements to cover liabilities arising from its operations in each of its fields of activities and the geographical areas in which it operates. It is recommended to obtain an insurance cover or allocate a reserve for the above purposes.

It is recommended to evaluate validation/verification body's finances and sources of income and demonstrate initially and periodically that commercial or financial or other pressures do not compromise impartiality.

All the other requirements given in Clause 5.5 of ISO 14065 apply.

## 6. Competencies (Clause 6 of ISO 14065)

The V/VB shall have competence personnel responsible for the following tasks in pre-engagement and approach phases of the validation or verification process.

- a) To determine if the V/VB has the competence personnel and resources to complete the validation or verification and potential risks to impartiality based on received information from prospective clients;
- b) To prepare contract agreement taking into account the requirements of level of assurance, materiality, criteria, objectives and scope of validation or verification;
- c) To select validation or verification team members including lead verifier and validation or verification statement reviewer, and verify their competence;
- d) To communicate with clients and responsible parties effectively for all necessary issues related to validation or verification;
- e) To develop validation or verification and sampling plans based on received information from responsible parties.

Additionally, the V/VB shall have a process to ensure that personnel in a team have appropriate competencies relevant to the technical areas (see Appendix B) in which it operates and a documented procedure with defined criteria to evaluate the competence of validation/verification team leaders and validators/verifiers including on-site evaluation. The complex technical areas and categories covered by GHG validation and verification are given in Table 1 and Table 2 of Appendix A.

The V/VB shall demonstrate how personnel have been evaluated and found to satisfy the following competence requirements as applicable:

- a) Competence related to management of an engagement;
- b) Generic validation competencies as per Clause 6 and Appendix A of this document, plus any validation criteria and competencies related to specific sector and/or project. Generic verification competencies as per Clause 6 and Appendix A of this document, plus any validation or verification criteria specific and/or sector specific verification competencies.

**Note 1-** In case where organization verification includes project verification, the V/VB competence criteria needs to take account of all relevant competence criteria as per the above including those associated with project validation or project verification.

**Note 2 -** There are a number of tools used to evaluate personnel; these can be combined in any suitable manner. Typical tools include;

- Witnessing of a verification and/or validation activity as applicable;
- Internal peer review of validation or verification documentation;
- Structured interview to test knowledge and technical competence;
- Examination;
- Performance review – by management and/or other team member;
- Certification by an accredited personnel certification body to the extent that the certification provides a demonstration of the competencies specified in this V/VB system;
- Recognized technical standing in terms of being asked to speak at conferences, or publish papers if peer reviewed;
- Adequate evidence of relevant previous experience;

**Note 03-** validation and verification team's competencies based on ISO 14065 Clause 6 and ISO 14066 Clause 5 related to Project validation, Project verification and Organization verification are given in Annex A of IAF MD 06 for reference.

The competences of all personnel involved with GHG validation or verification shall be recorded for technical areas and specific fields which shall include at least the following;

- Competencies and performance evaluation
- Selection of personnel for different tasks
- Status and improvement of competence

The V/VB shall have a process to develop personnel as per the requirements of responsible parties and to ensure that continued competence of its validation/verification team leaders and validators/verifiers are maintained. The V/VB shall evaluate the performance of every validation/verification team leader and validator/verifier on-site at least once in every two years.

If contracted validators/verifiers are used, the V/VB shall collect information on prior association of them with other V/VBs, their clients and potential applicants and analyze such records for eliminating potential conflicts of interest on the GHG assertions performed project involvement.

All the other requirements given in Clause 6 of ISO 14065 apply

#### **7. Communication and records** (Clause 7 of ISO 14065)

All the requirements given in Clause 7 of ISO 14065 apply.

#### **8. Validation or verification process** (Clause 8 of ISO 14065)

A client of V/VB may possess one or more facilities. The V/VB shall develop a validation or verification plan regarding client's facilities, which addresses level of assurance, objectives, criteria, scope, materiality, verification activities and schedules. If required, the validated monitoring plan should be approved by the responsible party.

During the validation or verification process, the V/VB shall include on-site visits at client's facilities as they are included in the scope of validation or verification as per a site sampling plan developed to balance detection risk and inherent/control risk. The V/VB should have a procedure for selecting all the sites during the purview of validation or verification period stipulated with the client based on the base year's GHG inventory. In quantifying the inventory of GHG emissions and removals, GHG activity data of GHG sources, sinks and reservoirs should be collected. The verification plan and the sampling plan may be developed in parallel.

In a project, emission reduction (ER) can be calculated reducing project emission during the period (PE) and leakage (L) from the baseline emission during the period (BE); (ie.  $ER = BE - PE - L$ ).

When considering quoting for validation or verification of a GHG assertion, the V/VB shall consider the key issues related to developing a quote, as applicable, including the:

- Proposed level of assurance, materiality, criteria, objectives and scope;
- Complexity of the GHG assertion;
- Complexity of the project or organization and its measurement/monitoring processes;

- Organizational environment including the structure of the organization that develops and manages the GHG assertion;
- Baseline scenario for project validation and verification, including selection and quantification of GHG sources, sinks and reservoirs applicable to the baseline scenario;
- Identified GHG sources, sinks and reservoirs, and their monitoring for organization verification;
- Processes that deliver the information and data in the GHG assertion;
- Organizational links and interactions between stakeholders, responsible parties, client, and intended users; (for definition, refer to ISO 14064-3); and
- Validation or verification criteria requirements.

The time needed to carry out the validation or verification shall be determined by the V/VB. The time allocation shall be justified based on the review of the above information and recorded by the V/VB. Each engagement has unique aspects and the validation or verification process shall be customized accordingly.

When verification criteria include ISO 14064-1, where a GHG report is optional, and if the client chooses to issue a public GHG report which is verified, the V/VB shall confirm that the GHG report conforms to the applicable requirements for a GHG report reference Clause 7.2 and 7.3 of ISO 14064-1.

Verification of a project GHG assertion includes, in addition to verification of an organization GHG assertion:

- Review of the validation report for the project;
- Verification of any changes to the GHG project plan including:
  - \_ the identified GHG sources, sinks and reservoirs;
  - \_ baseline scenario;
  - \_ selection and quantification of GHG sources, sinks and reservoirs applicable to baseline scenario; and monitoring of the GHG project.
- Verification of any changes to the justification for “selection or establishment of the criteria and procedures” referred to in and its implementation;
- Verification of any changes to the organizational links and interactions between stakeholders, responsible party (project proponent in some GHG programmes), client, and intended users; (for definitions, refer ISO 14064-3).

In cases where errors, omissions or misstatements are identified in the GHG data and information, the validation and verification team shall require that these are corrected by the client, and increase the sampling. Where errors, omissions or misstatements cannot be corrected, the V/VB shall qualify the validation or verification statement.

The validation and verification statement shall conform with ISO 14064-3, Clause 4.9, except in cases where regulated requirements overrule this, be consistent with the outcome of the V/VB review; and contain a validation/verification opinion and conclusion that reflects material discrepancies that remain after the conclusion of the validation or verification, and be issued to the responsible party.

An accredited validation and/or verification statement related to a GHG assertion that does not include quantified GHG emissions data related to an organization or GHG project shall only be issued if:

- There is a legal agreement between the V/VB and the client that any new GHG report, GHG project plan or GHG assertion released by the client subsequent to the initial validation or verification statement is validated or verified;



- For an organization, a (internal) GHG verification report conforming to ISO 14064-1, Clause 7.3, is part of the scope of the verification;
- ISO 14064-1 or ISO 14064-2 is part of the validation or verification criteria and the requirements are not reduced; and
- The validation or verification statement is clear about what has been validated / verified and does not use language associate with management system certificates or conformity statements.

In developing the site sampling plan, potential risks to the validation or verification process shall be taken in-to account. The potential risks include but not limited to the following.

- GHG sources, sinks and/or reservoirs (SSRs) cannot be checked on-site;
- Organization's boundaries, physical infrastructure, activities and technologies cannot be verified on site;
- Any change cannot be notified;
- GHG information system and its control cannot be checked on site.

The V/VB shall determine the validation or verification time needed for each on-site validation or verification activity. The V/VB shall ensure that a validation or verification team has sufficient time to carry out a complete and effective validation or verification and cover all essential elements. The validation or verification time determined by the V/VB and justification for the determination shall be recorded. In determining the validation or verification time, the V/VB should at least consider the following factors.

- proposed level of assurance, materiality, criteria, objectives and scope;
- type and number of GHG SSRs;
- complexity of responsible parties' structure and activities
- number, size and location of facilities
- complexity of GHG information system and its control;
- size of GHG data;
- complexity of GHG assertion;
- results of internal validation or verification of responsible parties;
- type and amount of field work necessary for validation or verification.

The V/VB shall assess facilities and GHG sources based on technical areas and categories as given in Appendix A considering the magnitude of potential errors, omissions and misrepresentations for further validation or verification activities and develop a strategic review and risk assessment (SRRA) report. The Strategic review should include GHG assertion and inventories reflecting the likely nature, scale and complexity of the verification activity to be undertaken. The GHG assertion can be provided in the form of a GHG report, GHG project plan, or per unit of product CO<sub>2</sub>-e emission (carbon foot print of product) quantification. GHG emissions shall be calculated as per ISO14064-1 Annexure unless otherwise specified in the national GHG programmes or regulations.

In the assessment, the risks associated with the technical area shall be estimated. Guidance on calculating potential risks is given in Appendix C. The risk assessment reflects the verification in the areas of data generation, control environment, control system and management and reporting processes. As higher inherent and control risk may cause errors and omissions, sampling numbers should be increased to lower detection risk and achieve the acceptable detection risk at assurance level. Also if the SRRA report indicates that there is high material risk, the sampling number should be increased.

Verification should include system testing and data testing. In system testing, the sources of potential errors, omissions and misrepresentations should be assessed and in that the following should be considered.

- a) GHG data and information
- b) Collecting, processing, consolidating and reporting GHG data and information
- c) Ensuring the accuracy of GHG data and information
- d) GHG information system.

During data testing, GHG data and information are assessed to develop evidence for assessment of GHG assertion. The verifier may collect evidence using the following means.

- a) Physical evidence – fuel or utility meters, emission monitors or calibration equipment
- b) Documentary evidence – log books, inspection sheets, invoices and analytical results
- c) Testimonial evidence – interviews with technical, operational, administrative or managerial personnel.

The validation and verification conducted by V/VB should be witnessed on-site on a sampling basis. The aspects to be witnessed should include pre data verification activities such as confirmation of sources, boundaries and assessment of the control environment. The witness programme should cover the scope of accreditation and be in accordance with GHG program and be consistent with national legal requirements, regulations, or other relevant authority that may stipulate level of witnessing. When deviating from this policy the justification should be documented.

The verification statement (VS) should be submitted in line with SRRA. The VS should include verification findings along with corrective action requests (CAR), new information requests (NIR) and forward action requests (FAR), as applicable and available.

All the other requirements given in Clause 8 of ISO 14065 apply.

## **9. Appeals** *(Clause 9 of ISO 14065)*

All the requirements given in Clause 9 of ISO 14065 apply

## **10. Complaints** *(Clause 10 of ISO 14065)*

The complaints received from responsible parties to be first addressed by the relevant V/VB before they are handled by each responsible party.

All the requirements given in Clause 10 of ISO 14065 apply.

## **11. Special validation or verifications** *(Clause 11 of ISO 14065)*

All the requirements given in Clause 11 of ISO 14065 apply.

## **12. Management system** *(Clause 12 of ISO 14065)*

The V/VB shall establish, implement and maintain a management system appropriate to the scope of activities. The V/VB shall document its policies, systems, programmes, procedures and instructions to the extent necessary to conduct validation or verification based on the GHG assertion /programme. The

management system's policies shall be defined in a quality manual, however named, giving reference to supporting procedures.

The V/VB shall appoint a senior member of the staff as quality manager, however named, who irrespective of other duties and responsibilities shall have defined responsibility for ensuring that the management system related to GHG assertions is implemented and followed at all the times. The quality manager shall have direct access to the highest level of management at which decisions are made on GHG validations or verifications.

The roles and responsibilities of the personnel involved with GHG activities and the quality manager including their responsibility for ensuring compliance with GHG assertion /related programme shall be defined in the quality manual.

All the requirements given in Clause 12 of ISO 14065 apply.

**Appendix A**  
**Scopes of Accreditation**  
**Greenhouse Gas Validation and Verification**

Note: - For the purpose of scoping, the sectors as given below are categorized on the basis of risk such as:

- The typical magnitude of emissions per facility, which correlates with potential financial liability of material misstatement within a regulated emissions trading system.
- Potential process emission, which typically correlates with increased complexity of emissions calculation methodology.
- Potential for non CO2 emissions (CH4, N2O, etc.), typically correlates with increased complexity of emissions calculation methodology.
- Credibility (source) and application of emission factors.

**Table 1.1 Organizational level verification (ISO 14064-1)**

	<b>Technical area</b>	<b>Category covered by technical area</b>
1.	Power generation and power Transactions	<ul style="list-style-type: none"> <li>• Transmission of electricity</li> <li>• Generation of bulk electric power</li> <li>• Transmission from generating facilities to distribution centers and /or distribution to end users</li> <li>• Renewable energy systems</li> <li>• Purchased electricity, and heat</li> </ul>
2.	General manufacturing (Physical or chemical transformation of material or substances into new products)	<ul style="list-style-type: none"> <li>• Manufacturing - Electric and electronics equipment,</li> <li>• industrial machinery</li> <li>• Manufacturing of Food Beverages, tobacco and food processing</li> <li>• Manufacturing of Textile, wearing apparel and leather products</li> <li>• Manufacturing of Wood and wood products</li> <li>• Manufacturing of Paper and paper products</li> <li>• Manufacturing of Chemical, petroleum, rubber and plastic products</li> <li>• Manufacturing of Nonmetallic products</li> <li>• Manufacturing of Basic metal products</li> <li>• Manufacturing of Fabricated metal products</li> <li>• Manufacturing of Products not elsewhere specified</li> <li>• Civil construction</li> </ul>
3.	Oil and gas exploration, extraction, production and refining and pipeline distribution, including petrochemicals	<ul style="list-style-type: none"> <li>• Conventional exploration and production</li> <li>• Oil sand and heavy oil upgrading</li> <li>• Coal bed methane production</li> <li>• Gas processing plants</li> <li>• Gas well completion</li> <li>• Transportation and distribution</li> <li>• Natural gas storage and LNG operations</li> <li>• Crude oil transportation</li> <li>• Refilling</li> <li>• Petrochemical manufacturing</li> <li>• Emissions from process vents in oil and gas treatment</li> <li>• Process emission (eg: - glycol dehydration, acid gas removal/sulphur recovery, hydrogen production, fluid</li> </ul>

		<p>catalytic cracker (FCC) catalyst regeneration).</p> <ul style="list-style-type: none"> <li>• Venting emission (eg;- vessel loading, tank storage and flashing, and venting of associated gas)</li> <li>• Fugitive emissions (e.g leaks from equipment and piping components)</li> <li>• Non - routine events (e.g gas releases during planned piped line and equipment maintenance releases from unplanned events)</li> </ul>
4.	Metals production	<ul style="list-style-type: none"> <li>• Production of processing of ferrous metals</li> <li>• Production of Primary and secondary aluminium</li> <li>• Production of non-ferrous metals including</li> <li>• production of alloys</li> <li>• Production of coke</li> <li>• Metal ore roasting or sintering including pelletisation</li> <li>• Production of pig iron or steel including continuous casting</li> <li>•</li> </ul>
5.	Mining and mineral production	<ul style="list-style-type: none"> <li>• Production of cement clinker and production of lime or calcinations of dolomite or magnetite</li> <li>• Glass and ceramic, mineral wool</li> </ul>
6.	Pulp, paper and print	
7.	Chemical Related Process	<ul style="list-style-type: none"> <li>• Production of carbon black</li> <li>• Production of ammonia</li> <li>• Production of bulk organic chemicals by cracking, reforming, partial or full oxidization or by similar processes</li> <li>• Production of hydrogen and synthesis gas by removing or partial oxidation</li> <li>• Production of soda ash and sodium bicarbonate</li> <li>• Production of nitric acids</li> <li>• production of adipic acid</li> <li>• production of glyoxal and glyoxylic acid</li> </ul>
8.	Carbon capture storage	<ul style="list-style-type: none"> <li>• Capture and transport of GHG by pipelines for geological storage</li> <li>• Geological storage of GHG in a storage site</li> </ul>
9.	Transport	<ul style="list-style-type: none"> <li>• Aviation</li> <li>• Other transportation</li> </ul>
10.	Waste handling and disposal	<ul style="list-style-type: none"> <li>• water and waste water treatment</li> <li>• Landfill and Composting Facilities</li> </ul>
11.	Agriculture, Forestry and Other Land Use	<ul style="list-style-type: none"> <li>•</li> </ul>
12	General	<ul style="list-style-type: none"> <li>• Building Services/ Facilities Management</li> <li>• Education</li> <li>• Hospital</li> <li>• Other</li> </ul>

**Table 2 - Project Level Validation and Verification (ISO 14064-2)**

	<b>Technical area</b>	<b>Category covered by technical area</b>
1.	Energy industries (renewable/non-renewable sources)	<ul style="list-style-type: none"> <li>• Thermal energy generation from fossil fuels and biomass including thermal electricity from solar</li> <li>• Energy generation from renewable energy sources</li> </ul>
2.	Energy distribution	<ul style="list-style-type: none"> <li>• Electricity distribution</li> <li>• Heat distribution</li> </ul>
3.	Energy demand	Energy Demand
4.	Manufacturing industries	<ul style="list-style-type: none"> <li>• Cement sector</li> <li>• Aluminium</li> <li>• Iron and steel</li> <li>• Refinery</li> </ul>
5.	Chemical industry	<ul style="list-style-type: none"> <li>• Chemical process industries</li> </ul>
6.	Construction	<ul style="list-style-type: none"> <li>• Construction</li> </ul>
7.	Transport	<ul style="list-style-type: none"> <li>• Transport</li> </ul>
8.	Mining/mineral production	<ul style="list-style-type: none"> <li>• Mining and mineral process excluding oil and gas industry, coal mine methane recovery and use</li> <li>• Oil and gas industry, coal mine methane recovery and use</li> </ul>
9.	Metal production	<ul style="list-style-type: none"> <li>• Metal production</li> </ul>
10.	Fugitive emissions from fuels (solid, oil and gas)	<ul style="list-style-type: none"> <li>• Mining and mineral process excluding oil and gas industry, coal mine methane recovery and use</li> <li>• Oil and gas industry, coal mine methane recovery and use</li> </ul>
11.	Fugitive emissions from production and consumption of halocarbons and Sulphur Hexafluoride	<ul style="list-style-type: none"> <li>• Chemical processing industries</li> <li>• GHG capture and destruction</li> </ul>
12.	Solvents use	<ul style="list-style-type: none"> <li>• Chemical process industries</li> </ul>
13.	Waste handling and disposal	<ul style="list-style-type: none"> <li>• Waste handling and disposal</li> <li>• Animal waste management</li> </ul>
14.	Afforestation and reforestation	
15.	Agriculture	<ul style="list-style-type: none"> <li>• Agriculture</li> </ul>
16.	Carbon Capture and Storage of CO <sub>2</sub> in Geological Formation	<ul style="list-style-type: none"> <li>• Carbon capture and storage of CO<sub>2</sub> in geological formation</li> </ul>

## Appendix B

### Competence Requirements of t Validation/ Verification/ Personnel

<b>Personnel preparing contract statement</b>	
Education	Diploma or above from a recognized institute
Work experience	At least two years work experience in GHG assertions
Training	Training on GHG verification and assertion
Skills	Evaluated as to be competent
<b>Validator/Verifier</b>	
Education	Degree or above in an Engineering or Science discipline from a recognized University or equivalent qualification
Work experience	Minimum three years full time work experience with at least one year work experience in GHG assertion in the related sector or involved in 05 assertion projects.
Training	Successfully completed a training course on quantification and reporting of GHG emissions and removals at organizational and project level based on ISO 14064-1 & ISO 14064-2 and successfully completed appropriate training on validation or verification of GHG assertions based on ISO 14064-3
Skills	Within the last two years, validator/verifier has been trained on-site in at least four projects as a validator-in-training /verifier –in-training under the direction and guidance of a qualified validator/verifier in accordance with ISO 14064-3.
<b>Validation/Verification Team Leader</b>	
Education	Degree or above in an Engineering or Science discipline from a recognized University or equivalent qualification
Work experience	Minimum three years full time work experience with at least one year work experience in GHG assertion in the related sector or conducted in 05 assertion projects.
Training	Successfully completed a training course on quantification and reporting of GHG emissions and removals at organizational and project level based on ISO 14064-1 & ISO 14064-2, and successfully completed appropriate training on validation or verification of GHG assertions based on ISO 14064-3
Skills	Within the last two years, validation/verification team leader has been trained on-site in at least three different projects as a validation/ verification team leader-in-training under the direction and guidance of a qualified validation/verification team leader in accordance with ISO 14064-3.
<b>Technical expert</b>	
Education	Post secondary education in the discipline prescribed by relevant sector
Work experience	At least three years work experience in the relevant field
Training	Training on GHG validation, verification and assertions
Skills	Having demonstrated skills in GHG assertion in the relevant sector.
<b>Validation or Verification Statement Reviewer (This can be a committee.)</b>	
Education	Knowledgeable and sufficiently experienced on the specific area and conversant with the reviewing criteria
Training	Training on GHG validation, verification and assertion
Skills	Monitored and evaluated on the performance

## Appendix C

### Estimation of Risks in Technical Areas

The following guidelines may be used to calculate the potential risks associated with material discrepancies in technical areas.

#### **Step 1 – Risk of technical area**

The relative risk of technical area is first established based on;

- The typical magnitude of emissions per facility, which correlates with potential financial liability of material misstatement within a regulated trading system
- Potential process emission, which typically correlates with increased complexity of emissions calculation methodology
- Potential for non CO<sub>2</sub> emissions (CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, & SF<sub>6</sub>), typically correlates with increased complexity of emissions calculation methodology.

To determine the level of risk, the following attributes may be used.

- a) Total emissions
- b) Type of emissions
- c) Combustion vs. industrial process or non CO<sub>2</sub> emission
- d) Single site or multi site

The total typical emissions per facility in terms of tCO<sub>2</sub>e per annum may be calculated as follows.

Type of ranking	Risk	Extent of CO <sub>2</sub> e emission	Ranking
tCO <sub>2</sub> e	Low	< 25 kt	1
	Medium	26 – 50 kt	2
	High	51 - 250 kt	3
	Very high	> 251 kt	4
Process CO <sub>2</sub> e	Low	No	1
	High	Yes	2
Non CO <sub>2</sub> e	Low	No	1
	High	Yes	2

The sector risk may be calculated using the formula; Sector risk = tCO<sub>2</sub>e ranking x Process CO<sub>2</sub>e ranking x Non CO<sub>2</sub>e ranking



## **Step 2 – Organizational risk**

The sector risk is then multiplied with organizational risk. The organizational risk is determined based on the relative complexity of scope and boundaries as follows.

<b>Organizational structure</b>	<b>Risk</b>	<b>Ranking</b>
Single site	Low	1
Multi site – similar low risk sectors	Medium	2
Multi site –multiple sectors	High	2

## **Step 3 – Total risk**

The total risk is calculated by multiplying sector risk into organizational risk. The total risk can be used as a means of establishing or prioritizing the witness assessment schedule.

<b>Total risk</b>	<b>Total ranking</b>
Low	< 2
Medium	3 - 7
High	> 8

## **Step 4 – Sector wise categorization of risks**

The risks identified for different technical areas are given below.

	<b>Technical area</b>	<b>tCO<sub>2</sub>e</b>	<b>Process CO<sub>2</sub>e</b>	<b>Non CO<sub>2</sub>e</b>
1.	Power generation and electric power transmission	Very High	Low	High
2.	General manufacturing	Low	Low	High
3.	Oil and gas extraction, production and refining and pipeline distribution, including petrochemicals	High	Low	High
4.	Metals production 1 • Production of coke, metal ore, pig iron or steel	Very High	High	Low
	Metals production 2 • Production of processing of ferrous metals, Production of secondary aluminum, Production of processing of ferrous metals	High	Low	High
5.	Aluminium production	Very High	High	Low
6.	Mining and mineral production • Cement	Very High	High	Low
	Mining and mineral production • Glass and ceramic	High	High	Low
7.	Pulp, paper and print	Low	Low	High

	<b>Technical area</b>	<b>tCO2e</b>	<b>Process CO2e</b>	<b>Non CO2e</b>
8.	Chemical production 1 • Production of carbon black, ammonia, soda ash	High	Low	High
	Chemical production 2 • Production of nitric acid, adipic acid, glyoxal and glyoxalic acid	High	Low	High
9.	Carbon capture storage 1 • Capture and transportation	Very High	High	High
	Carbon capture storage 2 • Storage	Very High	High	High
10.	Aviation	Medium	Low	Low
11.	Waste handling and disposal	Medium	Low	High
12.	Agriculture, plantation, forestry and other land use (AFOLU)	Very High	Low	High
13.	General	Low	Low	Low

## Appendix D

### References

ISO14065:2013 Greenhouse gases: Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition

ISO 14064-1:2006 Greenhouse gases: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals

ISO 14064-2:2006 Greenhouse gases: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements

ISO 14064-3:2006 Greenhouse Gases-Part3: Specification with guidance for the validation and verification of greenhouse gas assertion

ISO 14066:2011 Greenhouse gases: Competence requirements for greenhouse gas validation teams and verification teams

VCS 2007 -Voluntary Carbon Standard-Specification for the project-level quantification, monitoring and reporting as well as validation and verification of greenhouse gas emission reductions or removals. Published by the VCS Org 19 November 2007, and available at [www.v-c-s.org](http://www.v-c-s.org)

ISO/IEC 17030:2003 Conformity Assessment --General requirements for third-party marks of conformity.

IAF MD 06: 2014 – IAF Mandatory Document for the Application of ISO 1465:2013.

IAF MD 14: 2014 – IAF Mandatory Document for Application of ISO/IEC 17011 in Greenhouse Gas Validation and Verification (ISO 14065: 2013).

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## Appendix E

### Composition of Technical Advisory Committee

1. Prof. R A Attalage, Department of Mechanical Engineering, University of Moratuwa,, Moratuwa (Chairman)
2. Mr. Samantha Kumarasena, Chief Executive Officer, National Cleaner Production Centre
3. Dr. (Ms) M Y Gunasekara, Senior Lecturer, Department of Chemical Process Engineering, University of Moratuwa,
4. Dr. Suren Batagoda, Managing Director, Sri Lanka Carbon Fund (Pvt) Ltd.
5. Mr. Ruwan Weerasuriya, Environmental Officer, Air Resources Management & International Relations Division, Ministry of Environment
6. Mrs. Hiranthi Jansz, Assistant Director –Air Quality Monitoring Unit, Central Environmental Authority
7. Dr. R.D.S Jayatunga, Director, Climate Change Secretariat, Ministry of Environment
8. Mr. Thilak Gunasekara, Principal Research Engineer, Environmental Technology Division, Industrial Technology Institute
9. Mr. Ravi De Silva, Representative, Environmental Management System Users and Promoters Association
10. Dr. W.M. P.S.B. Wahala, Senior Lecturer, University of Sabaragamuwa
11. Mr. Thilak Wickramasinghe, Director/CEO, Sri Lanka Accreditation Board.
12. Ms. Jeewani Karunasagara, Assistant Director, Sri Lanka Accreditation Board (Secretary to the Technical Advisory Committee.)

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