

# **Format of Energy-Cum-Carbon Audit Report**

## **1. Executive Summary**

- (a) General description of purpose of conducting energy-cum-carbon audit (ECA) in the communal areas of the building(s) concerned.
- (b) The present level of energy consumptions and GHG emissions (under Scopes 1 and 2) associated with the activities covered in the audits.
- (c) A summary on the recommendations to reduce energy consumption and GHG emissions through, but not limited to, management measures; and enhancement of energy efficiency and conservation building services installation concerned.
- (d) The estimated costs and energy savings / GHG reduction associated with the recommendations in part (c) above.

## **2. Background**

- (a) Name of the reporting entity;
- (b) Description of the reporting entity;
- (c) Contact person of the reporting entity;
- (d) Reporting period (with start and end dates);
- (e) Scope of physical boundary chosen –
  - (i) Location of building(s);
  - (ii) Description of the purpose of the building(s) concerned and/or physical boundary chosen;
  - (iii) Description of the chosen physical boundary with detailed information (including the respective construction floor areas) on the communal area(s) / centralized building services covered in the exercise;
  - (iv) Description of communal area(s) / centralized building services excluded in the exercise with reasons; and
  - (v) Members of the audit team.

### **3. Carbon Audit**

- (a) Objective of carbon audit;
  
- (b) Scope of the Operational Boundary Chosen –
  - (i) Description of Scope 1 activities to be included and excluded (with justifications) in the ECA;
  - (ii) Description of Scope 2 activities to be included and excluded (with justifications) in the ECA; and
  - (iii) Description of Scope 3 activities to be included in the ECA.
  
- (c) Methodologies for quantifying emissions and removals –
  - (i) List of activities for which simplified methodologies and conversion factors in the latest edition of the **“Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong”** are used for quantification;
  - (ii) Details (including necessary reference) of other methodologies and conversion factors used for quantification;
  
- (d) Information on GHG emissions and removals (see sample reporting table in the latest edition of the **“Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong”**);
  
- (e) Recommendations on the strategies, measures, programmes, projects, activities (including those covered in 4(f)) which can reduce emissions of GHG in next few years immediately after the completion of ECA report and in the longer term together with their estimated (capital and running) costs, potential reduction in GHG (if quantifiable) and other benefits (in qualified terms).
  
- (f) Information on GHG offsets and programmes –
  - (i) Description of GHG performance against internal and / or external benchmark (if any) including any ratio indicators used;
  - (ii) Scopes and areas identified to improve GHG performance; and
  - (iii) Description of activities / programmes to improve GHG performance including provision of on-site offsetting activities.

- (g) Other optional information;
- (h) List of data sources, reference, etc.

#### **4. Energy Audit**

- (a) Objective of energy audit;
- (b) Scope of energy audit;
- (c) Description of equipment / system audit –
  - (i) All concerned equipment / system and their corresponding capacities, rating and design conditions;
  - (ii) Information provided by the building management, O&M personnel and end-users and site surveys;
  - (iii) Design conditions if known, and if not known the conditions adopted as the base reference and calculation in the ECA;  
*Some possible states are -*
    - i. Zoning of systems;*
    - ii. HVAC installation for different areas;*
    - iii. Lighting installation;*
    - iv. Electrical installation;*
    - v. Lift and escalator installation;*
    - vi. Plumbing and drainage System;*
    - vii. Hot water System;*
    - viii. Other notable energy consuming equipment/systems.*
- (d) Findings
  - (i) Findings in a systematic format (e.g. in the order of system, in the order of floors, in the order of usage, etc);
  - (ii) Descriptions of floor / areas with special requirements;
  - (iii) Calculation on cooling load, heating load, lighting load, electrical load and annual energy consumption (detailed calculations should be included as appendix);
  - (iv) Findings on O&M procedures and practices; and
  - (v) Preliminary identification of any possible Energy Management Opportunities (EMOs) against corresponding findings.

The descriptions should focus on issues related to the possible EMOs and provide systematic numbering to findings for purpose of easy cross-reference. Please refer to **Appendix J of “Guidelines on Energy Audit”** issued by the EMSD for reference.

- (e) Analysis and identification of EMOs –
- (i) Comparison on actual performances of equipment / systems against original design (if information available) and / or actual site measurements for any discrepancies and identify the causes thereof;
  - (ii) Identification of all possible EMOs with the corresponding substantiations (calculations on achievable energy saving and descriptions should be included as appendix);
  - (iii) Implementation costs for the identified EMOs (making reference to corresponding reference numbers assigned to the findings, detailed calculations, schematics and drawings included as appendix);
  - (iv) Comparisons on the different solutions to the same EMOs;
  - (v) Classification of the EMOs into categories (Cat I, Cat II or Cat III);
  - (vi) List of EMOs in a systematic format (e.g. in the order of system, in the order of floors, in the order of usage, etc);
  - (vii) Programme for implementation of the identified EMOs;
  - (viii) Identification of areas for further study, if any;
  - (ix) Indication of parties concerned in the implementation of the identified EMOs and the difficulties that may encounter and general methodologies to overcome them; and
  - (x) Initial investment and payback of each identified EMO in the summary.
- (f) Recommendations
- (i) The initial and payback period of each identified EMO;
  - (ii) A summary of recommendations in a systematic order;
  - (iii) Grouping items of similar nature/location/usage together or group according to their categories (Cat I, Cat II and Cat III).

## **5. Summary**

To sum up the recommended measures for the applicant to adopt which can effectively reduce the emissions of GHG in next few years immediately after the completion of ECA report and in the longer term.

## **6. A Statement Signed by the Certifier**

A statement signed by the certifier (For the statement format and wordings, please refer to the general requirement under **Annex A.2.9.1 of “ISO 14064-3:2006”** with guidance in **Annex A.2.9.2 of “ISO 14064-3:2006”** to qualify the statement).

A number of sample statements from **Annex A.2.9.1 of “ISO 14064-3:2006”** are extracted in the following for reference

### *\*A.2.9.1 General*

*A.2.9.1.1 A measure of uniformity in the form and content of the validation or verification statement is desirable because this helps to promote the reader's understanding and to identify unusual circumstances when they occur.*

*The validation or verification statement should include the following elements:*

- a) Name, address and other relevant contact information for the responsible party and/or the client,*
- b) A statement that the validation or verification is performed according to this part of ISO 14064,*
- c) An opening or introductory paragraph containing*
  - 1. Identification of organization's or GHG project's GHG assertion against which the validation or verification testing was conducted, and*
  - 2. A statement of the roles and responsibilities of the organization's or GHG project's management and the roles and responsibilities of the verifier or validator,*
- d) A scope paragraph containing*
  - 1) reference to the principles and requirements of relevant standards or GHG programmes against which the validation or verification was conducted,*
  - 2) reference to the validation or verification scope, objectives and criteria agreed with the client, including the level of assurance required, and*
  - 3) a description of the work the validation or verification team performed, including the techniques and processes used to test the GHG information and associated GHG assertion,*
- e) A conclusion paragraph containing*
  - 1) a reference to the GHG reporting framework or standard, or the GHG programme requirements (as appropriate) used to prepare the GHG*

- assertion,
- 2) GHG information or performance validated or verified (e.g. project plan, baseline GHG emissions or removals, GHG emissions, removals, emission reductions, removal enhancements),
  - 3) the level of assurance provided by the validation or verification, consistent with the agreed validation or verification scope, objectives and criteria,
  - 4) presentation of qualifications, if any, and
  - 5) conclusions on the GHG assertion, including any limitations or qualifications to the conclusion,
- f) the date of validation or verification statement,
  - g) the validator or verifier contact details,
  - h) an authorized signature from the validator or verifier,

*A.2.9.1.2 Some engagements require more extensive reporting than the content of the statement as listed above. This could depend, for example, on reporting requirements in GHG programmes or the needs of the responsible party due to requirements of intended users. The extent of reporting should be agreed with the client but, as a minimum, should include the content as listed in A.2.9.1.1.*

*A.2.9.1.3. The validator or verifier should produce a draft validation or verification statement to be sent to the client and/or the responsible party to review for factual correctness. If the responsible party is satisfied that the validation or verification statement is factually correct, then the validation or verification body is able to release the validation or verification statement in a final form. If the responsible party requires any significant amendments to be made to the draft statement, then the revised content should be agreed with the team leader prior to publication.*

*A.2.9.1.4 In GHG project validations, not all issues are resolved until the GHG project has been commissioned or has reached day-to-day operational status. This situation should be reflected in the validation statement in the form of limitations or qualifications that become invalid once the GHG project has achieved operational status.)*

The sample statements from **Annex A.2.9.2 of “ISO 14064-3:2006”** are as follows:

*(\*A.2.9.2 Qualifying the validation or verification statement*

*A.2.9.2.1 The validation or verification statement should clearly express any*

*circumstance where the validator or verifier*

- *is of the view that one, some, or all aspects of the GHG information does not conform to the agreed verification or validation criteria,*
- *is of the view that the responsible party's GHG assertion is inappropriate in relation to the agreed validation or verification criteria,*
- *is unable to obtain, appropriate, objective evidence to assess one or more aspects of conformity of the GHG information with the agreed validation or verification criteria and the responsible party's GHG assertion, or*
- *has found it necessary to limit or qualify the opinion.*

*A.2.9.2.2 Although circumstances that require the validator or verifier to qualify the validation or verification statement vary considerably, they can be categorized in two groups as follows.*

- a) *The GHG assertion is affected by a departure from the requirements specified by the GHG program, including*
  - *an inappropriate treatment (e.g. incorrect GWPs applied during the reporting period),*
  - *an inappropriate estimation or quantification of a GHG source, sink or reservoir in the GHG assertion (e.g. overestimation of carbon stocks),*  
*or*
  - *a failure to disclose essential information or to present information in an appropriate manner (e.g. inadequate explanation of the permanence of a GHG reservoir).*
- b) *The validator or verifier is unable to obtain sufficient appropriate evidence to determine whether there has been a departure from the requirements specified by the GHG programme. These are circumstances where the validator or verifier has not been able to apply all the tests and procedures considered necessary in the circumstances. The result is that there is not sufficient appropriate evidence to form an opinion as to whether the GHG assertion is presented fairly in accordance with requirements of the GHG programme. Such limitations arise in a number of situations, including*
  - *circumstances related to the timing of the validator's or verifier's work (e.g. a verification conducted during unplanned maintenance leading to inability to observe operational practices or monitoring equipment in operation),*
  - *circumstances beyond the control of the organization or GHG project, or the validator or verifier (e.g. destruction of GHG information in a fire), or*

- *a limitation imposed or created by the organization or GHG project (e.g. failure to maintain adequate GHG records).*

*A.2.9.2.3 When there is a departure from the requirements of the GHG programme or a scope limitation, the validator or verifier must decide what type of qualification or modification to the validation or verification statement is appropriate. In addition to materiality, the validator or verifier should consider*

- *the degree to which the matter impairs the usefulness of the GHG assertion,*
- *the extent to which the effects of the matter on the GHG assertion can be determined, and*
- *whether the GHG assertion is, or could be understood to be, misleading even when read in conjunction with the validator's or verifier's statement.*

*A qualified validation or verification statement, when read in conjunction with GHG assertion, normally will serve adequately to inform the intended user of any deficiencies or possible deficiencies in the GHG assertion.*

*A.2.9.2.4 When the validator or verifier concludes that a qualification is necessary, the validation or verification statement should clearly draw attention to the qualification by modifying the validation or verification statement. The statement should include the following.*

- a) A qualification paragraph, inserted between the scope and opinion paragraphs of the statement, that includes*
  - *all qualifications,*
  - *an adequate explanation of the reasons for each qualification,*
  - *a clear indication of how and, when reasonably determinable, to what extent the GHG assertion is affected, and*
  - *if the affect on the GHG assertion of the matter causing the qualification is not reasonably determinable, a statement of such and reasons for the determination.*
- b) The opinion paragraph should include*
  - *wording appropriate for the type of qualification(s), and*
  - *a reference to the qualification paragraph.*

*In addition, when the qualification results from a limitation in the scope, the*

*scope paragraph should contain a reference to the qualification paragraph.*

## **7. References**

- [1] International Standard ISO 14064-3:2006-Part 3: *“Specification with guidance for the validation and verification of greenhouse gas assertions”*
- [2] The Environmental Protection Department and the Electrical and Mechanical Services Department (2008), *“Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong (2008 Edition)”*
- [3] The Electrical and Mechanical Services Department (2004), *“Guidelines on Energy Audit”*.