

HONG KONG GREEN ORGANISATION
CERTIFICATION



減碳證書

Carbon Reduction
— Certificate —

GUIDEBOOK FOR
CARBON REDUCTION CERTIFICATE
2021

TYPE I

RESIDENTIAL BUILDINGS, COMMERCIAL BUILDINGS,
INDUSTRIAL BUILDINGS MAINLY OF OFFICE-BASED NATURE AND
BUILDINGS OF INSTITUTIONAL PURPOSES

Preface

The Carbon Reduction Certificate is one of the certificates under the Hong Kong Green Organisation Certification (HKGOC) scheme. HKGOC aims to benchmark green organisations with substantial achievements in green management, to encourage participants to adopt environmental practices in different aspects and to recognise their efforts and commitments to the environment. It is a prestigious certification scheme with high credibility. It also encourages participants to strive for self-improvement in specific environmental aspects.

The HKGOC is led by the Environmental Campaign Committee (ECC) alongside the Environmental Protection Department and in conjunction with nine organisations, in alphabetical order, the Advisory Council on the Environment, the Business Environment Council, the Chinese General Chamber of Commerce, the Chinese Manufacturers' Association of Hong Kong, the Federation of Hong Kong Industries, the Hong Kong Chinese Importers' & Exporters' Association, the Hong Kong Council of Social Service, the Hong Kong General Chamber of Commerce and the Hong Kong Productivity Council.

Starting from 2020, HKGOC consists of four Certificates, namely “**Wastewi\$e Certificate**”, “**Energywi\$e Certificate**”, “**IAQwi\$e Certificate**” and “**Carbon Reduction Certificate**”. The first three Certificates encourage initiatives on waste reduction, energy saving and improvement of indoor air quality (IAQ) respectively and recognise participating organisations that have attained specified environmental requirements and achieved self-improvement goals. In addition, the Carbon Reduction Certificate recognises organisations with quantifiable carbon reduction achievements.

Hong Kong Green Organisation Certification



Organisations applying for these Certificates will be required to demonstrate their commitment to environmental protection in specific aspects in order to be granted a respective Certificate. Organisations can join any of the HKGOC certificates at any time and there is no limit for the number of awardees for the certificates. Certificate holders can further obtain the title of “Hong Kong Green Organisation” by attaining the requirement in multiple aspects of environmental practices and the details could be found in the separate programme booklet of “Hong Kong Green Organisation”. In addition, participants are highly recommended to educate others, including organisations in the same sector and the community at large, on the benefits and practices of other environmental initiatives.

This **Carbon Reduction Certificate Guidebook** is designed for use by all companies / organisations operating in Hong Kong. It details the Carbon Reduction Certificate (Type I – Residential Buildings, Commercial Buildings, Industrial Buildings Mainly of Office-based Nature and Buildings of Institutional Purposes) rules, process and benefits of obtaining the Certificate. Furthermore, this Guidebook presents an overview of sustainable carbon reduction practices that companies / organisations could implement within their establishments. All companies / organisations are welcome to join this meaningful Certificate to demonstrate their commitment to creating a better environment for Hong Kong.



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Carbon Reduction
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Application Form and Appendices

- **Carbon Reduction Certificate Application Form (CRC/01R)**

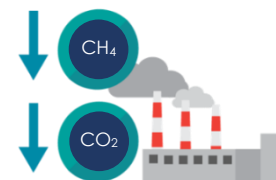
- **Appendix I: Enrollment Form for Qualified Service Provider of the Carbon Reduction Certificate Scheme (Type I establishments)**
- **Appendix II: Details of Carbon Reduction Certificate**
- **Appendix III: Simplified Quantification Approaches and Working Procedures**
- **Appendix IV: Sample Report Format**
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1. THE CARBON REDUCTION CERTIFICATE

1.1 Objectives of the Carbon Reduction Certificate

The **Carbon Reduction Certificate** is established to recognise those buildings or organisations that achieved a verified absolute reduction of overall carbon emissions. Specific objectives are to:

- ✎ Encourage local buildings or organisations to identify, and take measures to reduce their carbon footprints;
- ✎ Provide recognition to participants according to their respective levels of achievements in carbon footprint reduction; and
- ✎ Facilitate reporting of third-party verified achievements of overall carbon footprint reduction.



1.2 Co-operation Structure

The Environmental Campaign Committee (ECC) is the Organiser of the HKGOC in association with other joint Organisers. Carbon Reduction Certificate Technical Consultant (Technical Consultant) is responsible for coordinating, assessing and assisting the organisations that join the Certificate. The Technical Consultant will work with each applicant and help them to check against what carbon reduction measures have been implemented in their companies / organisations, and will educate them on what extra measures can be taken for further improvement.

1.3 Eligibility of the Carbon Reduction Certificate

The Certificate is open to all local private and public companies and organisations as well as their individual functional units located in Hong Kong.

The Carbon Reduction Certificate consists of three categories: (i) Type I – Residential Buildings, Commercial Buildings, Industrial Buildings Mainly of Office-based Nature and Buildings of Institutional Purposes; (ii) Type II – Office-based Organisations / Operational Units; and (iii) Type III – Other Non-industrial Trades. To start with, the three categories will be confined to certain types of buildings or business sectors where carbon footprinting processes are more readily defined in a local context. Participation should all be based on facilities/business units located in Hong Kong only. The eligibility of entities for Type I establishments is given in *Table 1*.

Table 1: Eligibility of the Carbon Reduction Certificate for Type I Establishment

Category	Type I – Residential buildings, commercial buildings, industrial buildings mainly of office-based nature and buildings of institutional purposes*	
Type / Sector	<ul style="list-style-type: none"> 🌱 Commercial buildings; 🌱 Residential buildings; 🌱 Industrial buildings mainly of office-based nature or for commercial purposes only; 🌱 Composite buildings comprising any two of the above three types; or 🌱 Buildings of Institutional purposes, including: <ul style="list-style-type: none"> • Schools / universities; • Community centres; • Sports complexes; or • Other accepted types# 	
Eligible Applicants	<p><u>For Buildings of Multiple Owners</u></p> <ul style="list-style-type: none"> 🌱 Owners' corporations; 🌱 Owners' organisations or residents' organisations; 🌱 Deed of Mutual Covenant (DMC) Managers; 🌱 Property management company or a qualified service provider on behalf of the above. 	<p><u>For Buildings of Single Owner or Government Ownership</u></p> <ul style="list-style-type: none"> 🌱 Owner or government as appropriate; or 🌱 Property management company or a qualified service provider on behalf of the above. 🌱 Legally responsible entity of the building; or 🌱 Property management company or a qualified service provider on behalf of the above.

* The physical boundary could cover the whole building or communal area and centralised building service facilities in buildings.

“Other accepted types” refers to institutional buildings where the Government’s “**Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong**” is applicable.

Note: The ECC reserves the right to determine the eligibility of any applicant.

1.4 Carbon Reduction Certificate Benefits

The **Carbon Reduction Certificate** is to recognise companies / organisations for their commitment and effort in environmental protection through carbon reduction. By joining and fulfilling the Certificate requirements, Certificate members can enjoy many benefits, such as –

Cost Savings

Carbon emission reflects some specific utilisations such as electricity, town gas, fuel, water, etc. Participating in Carbon Reduction Certificate and conducting improvement measures will enable the efficient use of utilisations within company / organisation operations, thereby achieving savings on utilisations.

Enhancing Productivity and Competitiveness

Carbon reduction measures help increase business competitiveness and enhance the corporate image by attracting those customers who value conducting businesses with companies that are committed to improving environmental quality.

Contribution to Environmental Protection

Everyone strives to live a comfortable and enjoyable life. Carbon reduction can help create a better quality of life for all. By reducing the amount of carbon emission, there will be less air pollution. Carbon reduction will also protect the Earth's climate.

Awarding Prestigious Carbon Reduction Certificate

The Certificate is synonymous with demonstrating exceptional leadership within the environmental arena and can be used for promoting Certificate holders' achievements regarding carbon reduction.

Recognition and Publicity of Carbon Reduction Achievements

Becoming a Carbon Reduction Certificate participant means entering into a partnership with the Government to achieve common environmental objectives. The ECC may commend the certificate holders for their efforts through publicity and marketing activities that will make their environmental achievements and contributions known to the public.

Participating in HKAEE

Certificate holders can also achieve relevant bonus points in the Hong Kong Awards for Environmental Excellence (HKAEE), which is an annual award led by the ECC, aiming to recognise the overall environmental achievements of an organisation. Details of the HKAEE are in the HKAEE Programme Booklet on the HKAEE official website (<http://www.hkaee.gov.hk>).



香港環境卓越大獎
Hong Kong Awards for Environmental Excellence

Recognition of Other Environment Protection Award Programme and Schemes¹

Carbon Reduction Certificate is well recognised by many environmental protection award programmes and schemes. The certificate holders will gain bonus point(s) / credit when joining the following environmental protection award programmes and schemes –

- **BOCHK Corporate Environmental Leadership Awards Programme**

Carbon Reduction Certificate holders under the HKGOC will be given 1 bonus point on top of the full marks of the BOCHK Corporate Environmental Leadership Awards Programme. For details, please visit the Programme's website at <https://oneoneone.industryhk.org/en/>.

- **BEAM Plus scheme**

Carbon Reduction Certificate holders under the HKGOC will be given 1 bonus credit in BEAM Plus Existing Buildings Version 2.0 – Comprehensive Scheme, or 1 credit in Energy Use Aspects under BEAM Plus Existing Buildings Version 2.0 – Selective Scheme. For details, please visit the HKGBC's website at <http://www.hkgbc.org.hk/eng/BEAMPlus.aspx>.

- **Caring Company Scheme**

Carbon Reduction Certificate holders under the HKGOC will be recognised as having fulfilled the criterion on "Caring for the Environment, Criteria 5 – Environmental Label or other recognition" under the Caring Company Scheme. For details, please visit the Caring Company's website at <http://www.caringcompany.org.hk>.

- **Green Office Awards Labelling Scheme (GOALS)**

Carbon Reduction Certificate holders under the HKGOC will be recognised as having fulfilled two Green Office Best Practice Criteria under the Green Office Awards Labelling Scheme (GOALS). For details, please visit the WGO's website at <http://thewgo.org/website/eng/goals-green-office>.

- **CLP Smart Energy Award**

Carbon Reduction Certificate Holders under the HKGOC will receive 5 points in CLP Smart Energy Award. For details, please visit the Smart Energy Award's website at <http://www.clp.com.hk/en/my-business/green-plus-programme/recognition>.

- **Green Shop Alliance Award (GSA)**

Carbon Reduction Certificate holders under the HKGOC will be given 1 bonus point in HKGSA Award assessment. For details, please visit the HKGBC's website at <http://hkgasa.hkgbc.org.hk/index.php>.

¹ Subject to the endorsement of the respective Scheme Organisers.

Enjoy Discount on Other Green Mark and Label Schemes¹

○ **The Hong Kong Green Mark Certification Scheme**

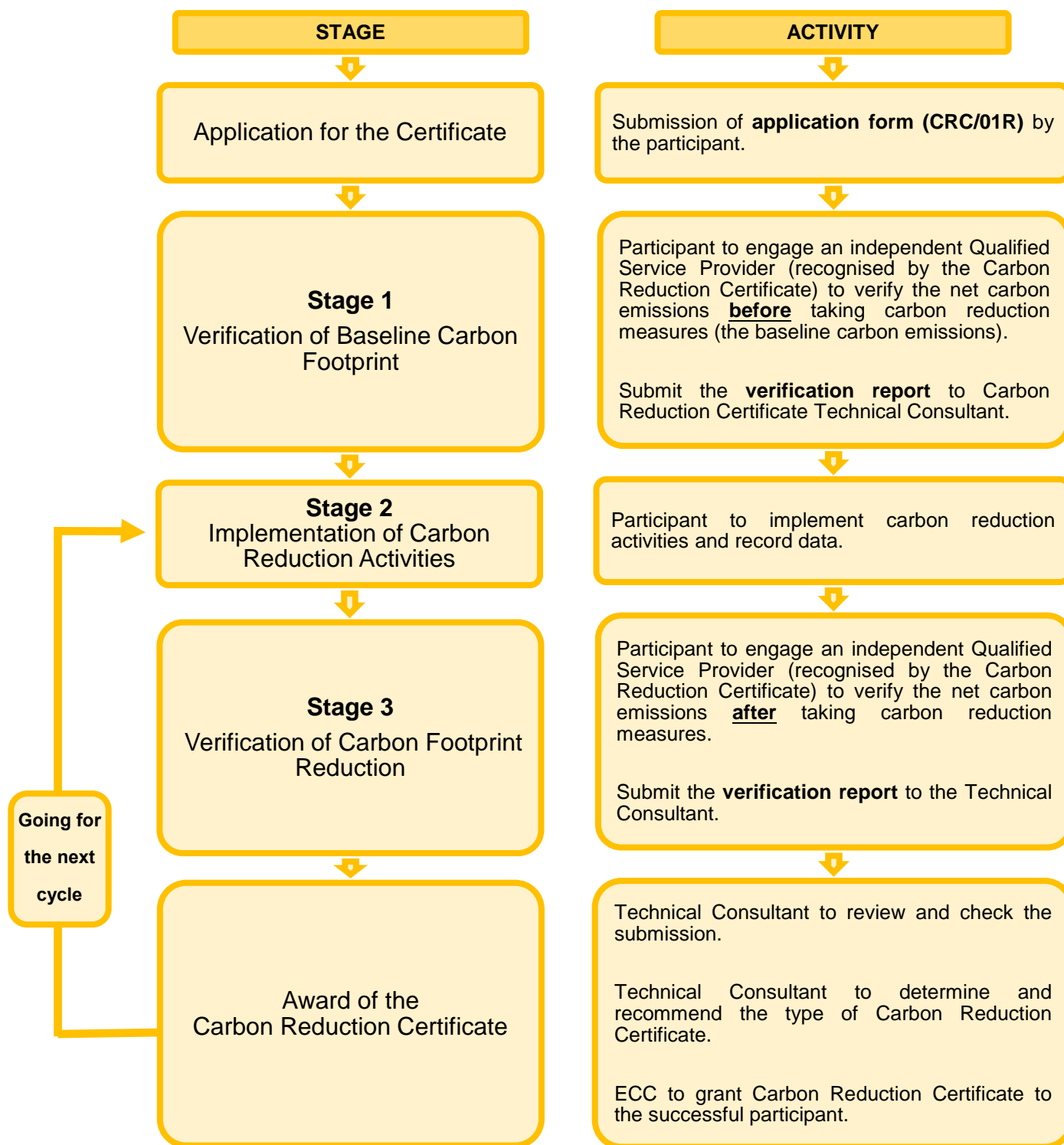
Carbon Reduction Certificate holders under the HKGOC will be offered discounts on application fee and quarterly surveillance fee for each first application for the Hong Kong Green Mark Certification Scheme. For details, please visit the FHKI's website at <http://www.qmark.org.hk>.

○ **Hong Kong Green Label Scheme**

Carbon Reduction Certificate holders under the HKGOC will be offered a discount on application fee for each first application for the Hong Kong Green Label Scheme. For details, please visit the Hong Kong Green Label Scheme's website at <http://www.greencouncil.org>.

2. CARBON REDUCTION CERTIFICATE CERTIFICATION CRITERIA AND PROCESS

Companies / organisations can join the Certificate all year round. Membership can last as long as companies / organisations comply with the Carbon Reduction Certificate requirements. The process for obtaining the Carbon Reduction Certificate for Type I establishments is illustrated in the following flow chart.



* The Qualified Service Provider who is appointed by the participant as both quantifier and verifier of carbon emissions should take effective means to maintain its independence in conducting verification work in accordance with the requirements in ISO 14064-3.

2.1 Application for the Certificate

To apply for the Carbon Reduction Certificate, an eligible participant should complete the Application Form (CRC/01R) and return it to the Technical Consultant. Once the application has been processed, the participant will receive a unique Carbon Reduction Certificate Identification Number. The number will serve as an identity of the participant for the duration of the time when certification status is still valid. It will be used in all future correspondence between the participant, the ECC and the Technical Consultant.



Obligations

Application for the Carbon Reduction certificate is free of charge. Under the Carbon Reduction Certificate for Type I establishments, participants are responsible for all fees related to carbon footprint verification charged by an independent Qualified Service Provider.

If companies / organisations are the first-time participant of the Carbon Reduction Certificate, they shall review the Certificate details thoroughly to fully understand the aim of the Carbon Reduction Certificate and how it works. Companies / organisations should ensure they are eligible for the application criteria. As participants are required to implement carbon reduction activities and collate carbon-related data systematically for verification purposes, they are also encouraged to understand the general carbon reduction principles and techniques as well as the data record and collation process.

Understanding Boundaries

First-time participants shall understand the concept of **physical and operational boundaries** (table 2) as well as the quantification methodologies that are essential to their carbon footprint accounting process.

Table 2: Concept of Physical and Operational Boundaries

Physical Boundary	Operational Boundary
<p>Physical boundaries are expressed in terms of the operations that a participant owns or controls to define the business and operations that constitute the participant entity for the purpose of counting carbon emissions in the context of this Certificate. Physical boundaries are presently confined to facilities / business units located in Hong Kong.</p>	<p>Operational boundaries refer to the direct and indirect emissions associated with the operations owned or controlled by the participant.</p> <p>Emissions² (direct and indirect) and removals for carbon footprint in relation to the buildings can be broadly classified into three separate scopes² as below:</p> <ul style="list-style-type: none"> ✿ Scope 1 – Direct emissions and removals by sinks; ✿ Scope 2 – Energy indirect emissions; and ✿ Scope 3 – Other indirect emissions.

² According to the “ISO 14064-1 Specification with Guidance at the Organisation Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals” and “Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong” https://www.emsd.gov.hk/filemanager/en/content_2/CAGuidelines_Eng.pdf.

Identify Emission and Removal Sources

Scope 1 – Direct Emissions and Removals by sinks

- Combustion of fuels in stationary installations and mobile facilities,
- Releases from equipment and systems,
- Planting of additional trees; or
- Any processing within the physical boundaries that will emit or remove carbon.

Scope 2 – Energy Indirect Emissions

- Generation of purchased electricity and/or town gas that is consumed within the physical boundaries defined

Scope 3 – Other Indirect Emissions

- Consequent on the relevant activities of the participant, but occur from sources not within the physical boundaries, such as –

<ul style="list-style-type: none"> ○ Waste disposal ○ Consumption of water ○ Discharge of wastewater 	<ul style="list-style-type: none"> ○ Transportation of purchased materials ○ Use of sold products and services ○ Business travel of employees, etc
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Determination of Carbon Footprint

Under the Carbon Reduction Certificate, each participant is required to determine its carbon footprint based on the quantification of Scope 1, 2 and 3 emissions / removals within the physical boundaries.

For individual categories defined in *Table 1*, the respective lists of sources of Scope 1, 2 and 3 emissions / removals are given in Appendix II. In all cases, quantification of Scope 1 and Scope 2 emissions / removals are mandatory. There shall also be mandatory quantification of Scope 3 emissions. The mandatory emission / removal sources that should be taken into account in the calculation of the carbon footprint for different categories are provided in Appendix II (shown as shaded elements in the tables). Apart from these mandatory sources, the eligible participants are encouraged to include those non-mandatory Scope 3 sources in the carbon footprint quantification process.

The quantification methodologies for the mandatory Scope 1 and 2 emission sources and the following Scope 3 emission sources (paper waste disposal; use of freshwater; and sewage discharge) should follow the suggested methods provided in the “**Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong**” (the Guidelines). Please refer to Appendix III for details. It is important to note that the quantification methods in the Guidelines are subject to change. The eligible participants are recommended to refer to the relevant website for the latest information.

2.2 Stage 1 – Baseline Carbon Footprint Verification

Third-party Verification

The first-time participants shall engage a Qualified Service Provider as defined in the below *Table 3* to verify their baseline carbon emissions by calculating / measuring their net carbon emissions before taking any carbon reduction measures within the physical and operational boundaries according to the Guidelines published by the Government.



Qualified Service Providers

The Technical Consultant will publish a List of Qualified Service Providers that meet the requirements. The List will be uploaded and published on the HKGOC official website (<http://www.hkgoc.gov.hk>). Appointment of any Qualified Service Provider by a scheme participant to verify carbon footprint shall be solely a commercial decision and responsibility of the participant. The ECC and the Technical Consultant will in no case be involved in any contractual relationship between the scheme participant and the appointed Qualified Service Provider.

Table 3: Requirements for Qualified Service Providers

Requirements for Qualified Service Providers
<p>For Type I establishment, Qualified Service Providers should be an individual, who is –</p> <p>[Option A] A Registered Professional Engineer in Building Services, Electrical, Mechanical or Environmental discipline registered under the Engineers Registration Ordinance (Cap. 409); or</p> <p>[Option B] A corporate member of Hong Kong Institution of Engineers (HKIE) in Building Services, Electrical, Mechanical or Environmental discipline, who has no less than 1-year relevant post qualification working experience (i.e. local working experience in engineering design, installation, commissioning, inspection, testing or maintenance of building services installations in buildings).</p> <p>For both options, he/she should have also attended seminar / training such as</p> <ul style="list-style-type: none"> • “Energy and Carbon Audits” by the Hong Kong Institution of Engineers; • “Certified Carbon Audit Professional (CAP)” by the Association of Energy Engineers administered by the Hong Kong Association of Energy Engineers; • “Certified Carbon Auditor Training Course” by the Energy Institute administered by the Energy Institute (Hong Kong Branch); • “Professional Training Course for Energy and Carbon Auditor” by Li Ka Shing Institute of Professional and Continuing Education, The Open University of Hong Kong in collaboration with School of Science and Technology, The Open University of Hong Kong & SGS Hong Kong Limited; <p>or</p> <ul style="list-style-type: none"> • equivalent carbon auditing seminar / training subject to the approval of the HKGOC’s Organisers.

Relevant qualification documents (e.g. professional qualification certificate, carbon auditing seminar attendance / training records) of the Qualified Service Provider who prepares / approves the carbon footprint verification report should be submitted together with the application. The Technical Consultant will process the application by reviewing the submitted documents and request for supplementary information on the particulars of the applicant if necessary.

The Technical Consultant will set up and manage a List of Qualified Service Providers for Type I establishments. The List is generally a directory of service providers who have self-declared to meet the criteria as Qualified Service Providers. The purpose for publication of the List of Qualified Service Providers for Type I establishments is to facilitate the participants to choose Qualified Service Providers who satisfy the minimum experience requirements for conducting the carbon footprint verification under the Certificate. Again, appointment of any Qualified Service Provider is entirely a commercial decision and responsibility of the participant.

Application for enrollment into the List can be submitted to the Technical Consultant for processing all year round. Relevant qualification documents (e.g. working experience of the organisation, staff status, etc.) should be submitted together with the application form (Appendix I) for becoming QSPs. The Technical Consultant will process the application by reviewing the submitted documents within one month and request for supplementary information on the particulars of the applicant if necessary.

If all the enrollment criteria are met, the Technical Consultant will inform the applicant of the decision in writing accordingly and include the enrolled applicant in the List and make the information publicly accessible on the official website. The Qualified Service Providers enrolled in the List shall ensure the updateness of any information in the List and notify the Technical Consultant immediately of any changes.

Any enrolled Qualified Service Providers may apply for removal from the List at their own commercial decisions. Besides, the ECC reserves the right to terminate the enrollment status of any organisation in the List.

The List operates on a self-declaration basis and the Technical Consultant will not be in a position to verify the validity of the submitted information. Both the ECC and the Technical Consultant accept no liability for any loss or damage arising from any use, misuse, inaccuracy or omission of the information published in the List. Disclaimer regarding the truthfulness of information provided by applicants will be given in the List.

Traceability

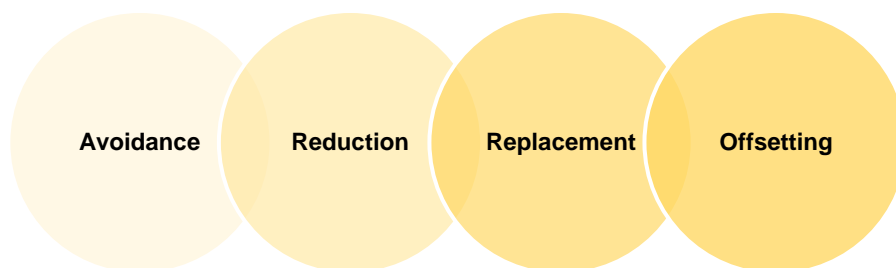
To reward those participants that have already started carbon reduction initiatives before joining this Certificate (i.e. early starters) for their carbon reduction efforts, they are allowed to shift the baseline period back to a maximum of **three** years. In other words, they are allowed to choose the annual emissions in any one year of the immediate past three years as the baseline carbon footprint, so that they could take into account any reduction efforts made before joining the Certificate.

2.3 Stage 2 – Implementation of Carbon Reduction

The participants can identify and implement carbon reduction activities within the defined physical and operational boundaries. The participants shall record and maintain 12 months of data* to facilitate the quantification of carbon emissions.

There are four types of carbon management options (*Figure 1*) that participants can adopt to reduce their carbon footprint.

Figure 1: Four Types of Carbon Management Options



🌱 Option 1 - Avoidance

Avoid carbon-intensive activities by means such as redefining business strategy or using own renewables;

🌱 Option 2 - Reduction

Reduce carbon emissions by enhancing energy efficiency, reducing business travels, product use and disposal, controlling outsourced activities, etc.;

🌱 Option 3 - Replacement

Replace high-carbon energy sources with low-carbon energy ones; and

🌱 Option 4 - Offsetting

Compensate those emissions that cannot be eliminated by the above (e.g. tree planting outside physical boundaries, carbon offsets from buying credits, etc.). As there would always be internal carbon reduction limits of any entity due to technological or business reasons, offsetting as a part of carbon management options for participants setting out on a carbon neutrality journey is understandable. Nevertheless, the development of offsetting mechanisms or the market maturity of carbon trading in the local context is yet to be fostered. For this reason, offsetting as a part of carbon management options for participants under this Certificate **will not** be accepted until further announcement.

*Note * It is the participants' responsibility to collect and provide all necessary data from relevant parties.*

2.4 Stage 3 – Verification of Carbon Footprint Reduction

Verification of Carbon Footprint Reduced

By taking measures to reduce carbon emissions, the participants should be able to achieve a net reduction in carbon footprint after a prescribed period. The carbon footprint reduction period (which is the period to be compared against the baseline period) should be of 12 months and the data should be in the current year.



The participants shall appoint a Qualified Service Provider to verify their carbon emissions by calculating / measuring their net carbon emissions after implementing carbon reduction measures within the defined physical and operational boundaries according to the “**Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong**” published by the Government. The achievement would be measured in terms of the percentage of carbon emissions reduced (or carbon footprint reduction) against the baseline.

The Qualified Service Provider shall submit the final carbon emissions report (see Appendix IV) to the Technical Consultant for review and confirmation. Depending on the percentage achieved, Carbon Reduction Certificate would be granted to the participant to recognise the efforts. The participant can then continue the efforts in the next cycle and migrate on the journey towards carbon neutrality.

Carbon Reduction Certificate

The Certificate will be presented in the following format: Carbon Reduction N% Certificate, where N% denotes a numerical symbol representing that the participant has achieved N% carbon footprint reduction against the baseline. It should be noted that the numerical symbol N% appearing on each Certificate does not mean to be an indication of the relative carbon management performance among various Carbon Reduction N% Certificate holders. The “N%” can conceptually be regarded as a “milestone” of respective participants on their journey towards carbon neutrality.

The requirement of Carbon Reduction Certificate is explained in *Table 4*.



Table 4: Requirement of Carbon Reduction Certificate

Requirements	Carbon Reduction N% Certificate
For First-time participants	<ul style="list-style-type: none"> 🌱 Achieve at least a 3% reduction in overall carbon footprint against baseline*
Participants applying for renewal of the certificate	<ul style="list-style-type: none"> 🌱 At least maintain the best carbon footprint reduction record among previous year(s), and having <ul style="list-style-type: none"> • achieved at least another 3% reduction in overall carbon footprint against baseline* within three consecutive years#; or • implemented new measures with education elements with a valid and convincing explanation in case participants cannot further reduce their carbon footprint in the next 3-year cycle. Examples of education elements include printing / using logos with proper user rights granted under HKGOC on their letterheads / name cards / websites, etc. to promote HKGOC. Explanation on and endorsement of such measures are subject to the final approval of the Organisers.

* Baseline refers to “baseline total emissions” or “baseline emission as measured by the value of an acceptable ratio indicator”.

Participants may opt to submit QSP Reports within the 3-year validity period of the Certificate for early renewal. They should also at least maintain the best carbon footprint record among previous year(s) and have achieved at least another 1% reduction per year in overall carbon footprint against baseline*.

Coping with Changing Operation or Business Mode

Since the operating environment of the Carbon Reduction Certificate holders may change over the years, it is desirable to have a fair like-to-like comparison to estimate their carbon emissions reduction efforts.

A ratio indicator, i.e. quantified carbon emissions and removals normalised by a certain operational measuring unit such as carbon emissions per gross floor area, can then be applied to allow for such comparison.

The use of ratio indicators is considered necessary when comparing year-to-year carbon footprints of an entity in consideration of its possible expansion or contraction of activities over time. This concept of using ratio indicators is also introduced in the “**Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong**”.

Carbon emissions may be affected by more than one factor. However, the participant should identify the major factor (ratio indicator) that is applicable to their physical and operational boundaries. To simplify, the use of ratio indicators (*Table 5*) in respective categories is suggested as follows:

Table 5: Ratio Indicators of Type I Establishment

Category	Ratio Indicators
Type I – Residential buildings, commercial buildings, industrial buildings mainly of office-based nature and buildings of institutional purposes	<ul style="list-style-type: none"> GHG emissions per gross floor area (GFA); or GHG emissions per employee; or Acceptable indicator justifiable by Qualified Service Providers

If a Carbon Reduction Certificate holder considers using ratio indicator to organise its activities to reduce emissions, the indicator should be reported with a clear description of the normalisation methodology used. The use of ratio indicator should be clearly defined during the baseline carbon footprint process and consistently adopted in the annual carbon footprint process unless with full justification.

Resetting Baseline

If an entity has experienced a substantial or material change in its operation, it is considered necessary to restart the baseline and treat its carbon footprint at that point as the new baseline as a reference for future improvement. Substantial or material change in the operation of the entity in this context refers to over 100% deviation of the selected ratio indicator or other justifiable changes subject to the final approval of the Organisers. For example, if a financial company has a 150% increase in GFA in its 2nd year of participation, it will need to reset the baseline to be the carbon footprint at the end of 2nd year and then start the new process. The Certificate however will indicate that the new baseline is used. The justification of resetting the baseline of the entity should be provided for the Organisers' approval.

Determination of Carbon Reduction Certificate in Different Scenario

Some illustrations of determination of certificate are given in *Table 6* below.

Table 6: Determination of Carbon Reduction Certificate

Type of participants:	First-time participants		Renewal participant	
Illustration:	Without previous verifiable carbon reduction achievements	With previous verifiable carbon reduction achievements since 2016	Carbon Reduction 10% Certificate Holder	
Baseline footprint:	<u>At time of application</u> 100 units	<u>At 2017</u> 100 units	<u>At time of application</u> 200 units	
Verified footprint:	<u>After 1 year</u> 97 units	<u>At time of application</u> 75 units	<u>Last year</u> 180 units	<u>This year</u> 170 units
Certificate to be granted:	Carbon Reduction 3% Certificate	Carbon Reduction 25% Certificate	Carbon Reduction 15% Certificate (Cumulative footprint reduction since baseline year: 15%)	

An example of the use of ratio indicator to account for the adjustment of carbon footprint due to change in operating conditions is given below:

Use of Ratio Indicators for the Adjustment of Carbon Footprint

Scenario – Change in Office Gross Floor Area

The carbon footprint of ABC Building with a gross floor area (GFA) of 11,250 m² in 2015 is 2,343,750 units. After an extension of the building, its floor area has been increased to 13,900 m² and the carbon footprint of the whole building in 2017 is 2,751,000 units.

The 2015 baseline value of the ratio indicator = Carbon Footprint in 2015 / GFA in 2015 = 2,343,750 / 11,250 = 208.33	The 2017 value of the ratio indicator = Carbon Footprint in 2017 / GFA in 2017 = 2,751,000 / 13,900 = 197.91
The reduction = $[1 - (197.91 / 208.33)] \times 100\% = 5\%$	

Discounting the effect due to an increased GFA in 2017, ABC Building reduced 5% carbon footprint against the baseline year 2015. The Certificate to be granted would be Carbon Reduction 5% Certificate.

2.5 Awarding of the Carbon Reduction Certificate

The Technical Consultant will submit the report and recommend the carbon reduction % of certificate of the participants to ECC Secretariat for final endorsement. Successful participants will then receive the Carbon Reduction Certificate accordingly.



3. CARBON REDUCTION CERTIFICATE MEMBERSHIP AND USE OF CERTIFICATE

3.1 Certificate Validity and Renewal

Certificate Validity

The Carbon Reduction Certificate granted to the participants will be valid for three years from the date of certificate accreditation and is subject to renewal before expiry.

Each certificate will indicate the period when the achievement was made, which means that it will be shown as a historical achievement. The participant could at most announce this historical achievement for three years and should seek further achievement in the next 3-year interval and announce the next interval's achievement accordingly.

Submission of Qualified Service Provider Report and Interim Report

After submitting the first-year carbon emission report prepared by the Qualified Service Provider (QSP Report), participants will, as a minimum requirement, submit another QSP Report in the fourth year and thereafter submit future QSP Reports at an interval of not more than 3 years. The QSP Reports obtained every 3 years will form the basis of determining whether or not the participant could meet the certification requirements and the percentage of carbon reduction achieved.

While it is not a must for QSP Reports to be submitted in the second and third year within the 3-year interval, participants are obligated to monitor their carbon footprint status and strive to achieve at least another 3% carbon reduction by the end of the 3-year period. Participants will need to submit an Interim Report (Please refer to Appendix V) at the end of the second and third year of each cycle to show that they are taking steps on their carbon reduction journey every year before an official QSP Report is submitted. Failure in completing the Interim Report could result in termination of the certification status. Alternatively, participants may also opt to submit QSP Reports within the 3-year validity period for early renewal of the Certificate (Please refer to *Table 4* at Section 2.4 of this Guidebook).

Certificate Renewal

Before the expiry date of the Certificate, the Carbon Reduction Certificate holders shall contact the Qualified Service Providers to conduct renewal verification. The Qualified Service Providers shall conduct renewal verification similar to the initial verification within a prescribed period to ensure that the accreditation status of participants can be continued. Certification status will be renewed subject to the attainment of the prescribed carbon footprint (Please refer to *Table 4* at Section 2.4 of this Guidebook).

For participant(s) who has reset its baseline, the certification status will be renewed subject to the attainment of at least a 3% reduction in overall carbon footprint against its new baseline.





The certification status of any participant will expire if the participant fails to complete the above renewal procedures before the expiry date.

Reactivation of Membership Status





If the participant wants to re-join after the expiry date of its last Certificate, the participant has to go through the same cycle as a first-time participant. However, the participant may no longer be regarded as an early starter. This means that the participant may neither use the original baseline carbon footprint established when the participant first joined the Certificate nor enjoy the flexibility of shifting the baseline period back to a maximum of three years. The participant may set the carbon footprint at the time of re-joining as a new baseline with full justification provided.

3.2 Use of Certificate

The Certificate holder are encouraged to use the Certificate, which will be distributed to Certificate holders upon certificate conferment, on their premises, publicity materials or advertisement, etc. The Certificate holder shall at all time –

-  Comply with the certification criteria. The ECC may amend the criteria from time to time and the Certificate holder shall fulfill the amended accreditation criteria within the time specified by the ECC;
-  Allow the ECC to make publication or announcement about the successful application, suspension and/or termination of accreditation status for the Certificate;
-  Present honestly and truthfully to any person concerned that it is only accredited for the scope and status stated in the Certificate; and
-  Endeavour to ensure that the certificate granted by the ECC is not used in a misleading manner or in a way that will bring the ECC or the Certificate into disrepute.

The ECC may, at its sole and absolute discretion, terminate the accreditation status of a Certificate holder for any of the following reasons –

-  There is a reasonable ground to believe that the concerned Certificate holder does not have a genuine intention to honour and discharge its obligations under the Certificate;
-  The concerned business has been adjudicated bankrupt; or faces a winding-up order;
-  The concerned Certificate holder behaves in a dishonest or fraudulent manner which jeopardises or damages the reputation or interests of the Certificate, the ECC, or the Technical Consultant; and
-  The concerned Certificate holder ceases operation.

The use of the Certificate and its related publicity means (such as logos, right to use at participant(s)' website, name card, etc.) are according to the explanation of the ECC Secretariat and in accordance with the relevant guidelines about the usage of the Certificate(s) and Logo(s).

In the event that the certification status is terminated or not renewed, the Certificate holder shall immediately cease to use the Certificate in any advertisement.

4. ACKNOWLEDGMENT AND ENQUIRY

Acknowledgment

The Organisers wish to thank the Environment and Conservation Fund for sponsoring the HKGOC.

Sponsor



Environment and Conservation Fund

Organisers



Environmental Campaign Committee



Environmental Protection Department



Advisory Council on the Environment



Business Environment Council



Federation of Hong Kong Industries



Hong Kong General Chamber of Commerce



Hong Kong Productivity Council



The Chinese General Chamber of Commerce



The Chinese Manufacturers' Association of Hong Kong



The Hong Kong Chinese Importers' and Exporters' Association



The Hong Kong Council of Social Service

Enquiry



Tel: 2788 5903



E-mail: enquiry@hkgoc.gov.hk



Website: www.hkgoc.gov.hk

DISCLAIMER

The information contained in this guidebook has been produced for guidance only. While every precaution has been taken to ensure its accuracy, no responsibility for any claims, losses or expenses as a result of any material in this publication can be accepted by the Organisers or any organisations involved in this project.

HONG KONG GREEN ORGANISATION CARBON REDUCTION CERTIFICATE APPLICATION FORM

Please complete the following Application Form and send it by email or mail to:

<p>HKGOC Technical Consultant (Hong Kong Productivity Council) Address: HKPC Building, 78 Tat Chee Avenue, Kowloon Tel: 2788 5903 Email: enquiry@hkgoc.gov.hk</p>

SECTION 1 - Organisation Profile

Organisation Name	: (Chinese)	
	: (English)	
Building / Functional Unit (if applicable)	: (Chinese)	
	: (English)	
Contact Person	:	Position: _____
Telephone Number	:	Email: _____
Address	: (Chinese)	
	: (English)	
Number of employees in Hong Kong	: (Full time)	(Part time)

Please put a "✓" in the box provided to indicate the type of eligible entry

Type I	Buildings (please specify and indicate the type of building) <input type="checkbox"/> Commercial buildings <input type="checkbox"/> Industrial buildings mainly of office-based nature or for commercial purposes only <input type="checkbox"/> Buildings of institutional purposes <input type="checkbox"/> Residential buildings <input type="checkbox"/> Composite buildings comprising any two of the above three types
Type II	<input type="checkbox"/> Office-based Organisations / Operational Units
Type III	<input type="checkbox"/> Other Non-Industrial Trades (please specify: _____)

*The organisers reserve the right to determine the type of eligible entry of applicants.

SECTION 2 – Qualified Service Provider (please specify if you have engaged your Qualified Service Provider)

Name of Organisation	:
Name of Contact Person	:
Position	:
Telephone	:
E-mail	:

How do you know about the Hong Kong Green Organisation Certification? (can select more than one)

- | | |
|---|---|
| <input type="checkbox"/> Mass media (e.g. TV and newspaper)
<input type="checkbox"/> Social Media (e.g. Facebook, Youtube and Instagram)
<input type="checkbox"/> Roving exhibitions
<input type="checkbox"/> Through the Technical Consultant
<input type="checkbox"/> Referral from another company/organisation
(Please specify the name of the company/organisation: _____)
<input type="checkbox"/> Outdoor advertisement or posters | <input type="checkbox"/> Official website or eDMs
<input type="checkbox"/> Experience Sharing Seminars held by the Organiser
<input type="checkbox"/> Through participation in Hong Kong Awards for Environmental Excellence (HKAEE) or Hong Kong Green Innovations Awards (HKGIA)
<input type="checkbox"/> Through commerce chambers/trade associations
(Please specify name of chamber/association: _____)
<input type="checkbox"/> Others (Please specify: _____) |
|---|---|

Please read the consent statement below before signing and submitting this application form.

Signature

Organisation Chop

Please immediately call the HKGOC hotline at 2788 5903 if no acknowledgement of application is received within 7 working days from the date of application.

The HKGOC Technical Consultant (Hong Kong Productivity Council, HKPC) has adopted a Personal Data (Privacy) Policy. You may contact HKPC's Personal Data Controlling Officer for further details. You have the right to request access to, and amend your personal data in relation to your application. If you wish to exercise these rights, please send email to: edm@hkpc.org.

CONSENT STATEMENT

I hereby declare that the information given above is accurate to the best of my knowledge, and agree that all decisions made by the Organisers (i.e. Environmental Protection Department and Environmental Campaign Committee and its Secretariat) are final and binding in all aspects relating to the HKGOC.

I agree that personal data (including name, phone number, correspondence address and email address) provided by me will be used for the purpose of the administration, evaluation and management of my application. I understand if I cannot provide the relevant personal data, the assessment of my application by the Organisers and the Technical Consultant may be affected. HKGOC Technical Consultant (Hong Kong Productivity Council, HKPC) intends to use the personal data (including your name, phone number, correspondence address and email address) that you have provided to promote the latest development, consultancy services, events and training courses of HKPC. Should you find such use of your personal data not acceptable, please indicate your objection by ticking the box below.

I object to the proposed use of my personal data in any marketing activities arranged by HKGOC Technical Consultant (HKPC).

The Environmental Protection Department (EPD) and/or the Environmental Campaign Committee (ECC) and its Secretariat also intend to use the personal data (including your name, phone number, correspondence address and email address) that you have provided to promote the latest development, policies, activities and schemes of the EPD and /or the ECC. Should you find such use of your personal data not acceptable, please indicate your objection by ticking the box below.

I object to the proposed use of my personal data in any marketing activities arranged by the EPD and/or the ECC and its Secretariat.

Appendix I: Enrollment Form for Qualified Service Provider of the Carbon Reduction Certificate Scheme (Type I establishments)

Note: Please refer to the Guidebooks for Type II and III establishments for the enrolment form for Qualified Service Provider of Type II and III establishments.

Please complete this Enrollment Form and send it together with the supporting documents by email or mail to:

HKGOC Technical Consultant
 Hong Kong Productivity Council
 HKPC Building, 78 Tat Chee Avenue, Kowloon
 Tel: 2788 5903
 Email: enquiry@hkgoc.gov.hk

OFFICIAL USE ONLY

Application No.: _____
 Received Date: _____

Please call the HKGOC hotline (Tel: 2788 5903) for confirmation, if you do not receive any confirmation of your application from the organisations within two weeks.

PART I - Particulars of the Applicant

1. Name of Applicant	<input type="checkbox"/> Mr <input type="checkbox"/> Ms
2. Telephone	()
3. Contact Address	
4. Email	

For Official
 Use Only
 Part I

PART II - Application Categories

<input type="checkbox"/>	A Registered Professional Engineer in Building Services, Electrical, Mechanical or Environmental discipline registered under the Engineers Registration Ordinance (Cap. 409); <u>or</u>
<input type="checkbox"/>	A corporate member of Hong Kong Institution of Engineers (HKIE) in Building Services, Electrical, Mechanical or Environmental discipline, who has no less than 1-year relevant post qualification working experience (i.e. local working experience on engineering design, installation, commissioning, inspection, testing or maintenance of building services installations in buildings).
	AND should also have attended seminars / trainings recognised by the Carbon Reduction Certificate

Pat II

PART III - Supporting Documents to be Enclosed with this Application

Please check the boxes below relating the supporting documents for the application where applicable (please attach the supporting document to this enrollment form):

Supporting documents to prove that the applicant is either –

- A Registered Professional Engineer in Building Services, Electrical, Mechanical or Environmental discipline registered under the Engineers Registration Ordinance (Cap. 409); OR

A corporate member of Hong Kong Institution of Engineers (HKIE) in Building Services, Electrical, Mechanical or Environmental discipline, who has no less than 1-year relevant post qualification working experience (i.e. local working experience on engineering design, installation, commissioning, inspection, testing or maintenance of building services installations in buildings).

- AND should also have attended seminars / trainings recognised by the Carbon Reduction Certificate

Part III

1.

Part III

2.

PART IV - Declaration

I confirm that the information given in this application as well as the accompanying information is true and correct that reflects the status of affairs as at the date of submission. I understand that any inaccurate / incomplete information supplied in this application will delay my application for enrollment as a Qualified Service Provider under the Carbon Reduction Certificate. I shall inform the HKGOC Technical Consultant (Hong Kong Productivity Council, HKPC) immediately if there are any subsequent changes to the information provided in this application.

Part IV

Signature of Applicant : _____

Name (IN BLOCK LETTER) : _____

Date : _____

Notes for the Applicant:

1. Please complete the form from Part I to Part IV.
2. For details of the requirements on the enrolment of Qualified Service Provider, please refer to Section 2.2 of this Guidebook.
3. Please ensure that all relevant parts of this form are completed and the information is accurate. If there is insufficient space, please give details on separate sheets and attach the sheets to this form.
4. Please return the completed form attaching the necessary supporting documents i.e. staff experience records, job references, etc. to HKGOC Technical Consultant (Hong Kong Productivity Council, HKPC) at the address listed on Page 1 of this form.
5. This is an enrollment of Qualified Service Providers ONLY and there is NO contractual relationship between the Applicant as one party and the ECC or HKPC as the other party. The ECC or HKPC bears no responsibilities on any liability and cost incurred by the Applicant in connection with the activities related to this enrollment.
6. The applicant should possess valid Business Registration Certificate issued by competent authorities.
7. The information provided in this form will be used for processing the enrollment for Qualified Service Provider under the Carbon Reduction Certificate.
8. The ECC and HKQPC will not be in a position to verify the validity of the information submitted by the applicant. Both ECC and HKPC accept no liability for any loss or damage arising from any use, misuse, inaccuracy or omission of the information published for the Qualified Service Provider.
9. The ECC and HKPC have adopted a Personal Data (Privacy) Policy. Information about the policy is available at HKGOC Technical Consultant (Hong Kong Productivity Council, HKPC) for collection.

The HKGOC Technical Consultant (Hong Kong Productivity Council, HKPC) has adopted a Personal Data (Privacy) Policy. You may contact HKPC's Personal Data Controlling Officer for further details. You have the right to request access to, and amend your personal data in relation to your application. If you wish to exercise these rights, please send email to: edm@hkpc.org.

CONSENT STATEMENT

I hereby declare that the information given above is accurate to the best of my knowledge, and agree that all decisions made by the Organisers (i.e. Environmental Protection Department and Environmental Campaign Committee and its Secretariat) are final and binding in all aspects relating to the HKGOC.

I agree that personal data (including name, phone number, correspondence address and email address) provided by me will be used for the purpose of the administration, evaluation and management of my application. I understand if I cannot provide the relevant personal data, the assessment of my application by the Organisers and the Technical Consultant may be affected.

HKGOC Technical Consultant (Hong Kong Productivity Council, HKPC) intends to use the personal data (including your name, phone number, correspondence address and email address) that you have provided to promote the latest development, consultancy services, events and training courses of HKPC. Should you find such use of your personal data not acceptable, please indicate your objection by ticking the box below.

I object to the proposed use of my personal data in any marketing activities arranged by HKGOC Technical Consultant (HKPC).

The Environmental Protection Department (EPD) and/or the Environmental Campaign Committee (ECC) and its Secretariat also intend to use the personal data (including your name, phone number, correspondence address and email address) that you have provided to promote the latest development, policies, activities and schemes of the EPD and /or the ECC. Should you find such use of your personal data not acceptable, please indicate your objection by ticking the box below.

I object to the proposed use of my personal data in any marketing activities arranged by the EPD and/or the ECC and its Secretariat.

- END -

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Enrolment accepted

Enrolled categories

For Type I Establishment

An individual who is either -

A Registered Professional Engineer in Building Services, Electrical, Mechanical or Environmental discipline registered under the Engineers Registration Ordinance (Cap. 409); **or**

A corporate member of Hong Kong Institution of Engineers (HKIE) in Building Services, Electrical, Mechanical or Environmental discipline, who has no less than 1-year relevant post qualification working experience (i.e. local working experience on engineering design, installation, commissioning, inspection, testing or maintenance of building services installations in buildings).

AND should also have attended seminars / trainings recognised by the Carbon Reduction Certificate

Further information required (please specify): _____

Registration declined (please specify the reasons): _____

Appendix II: Details of Carbon Reduction Certificate

Category	Type I - Residential buildings, commercial buildings, industrial buildings mainly of office-based nature and buildings of institutional purposes	
Type / Sector:	<ul style="list-style-type: none"> 🌱 Commercial buildings; 🌱 Residential buildings; 🌱 Industrial buildings mainly of office-based nature or for commercial purposes only; 🌱 Composite buildings comprising any two of the above three types; or 🌱 Buildings of Institutional purposes, including <ul style="list-style-type: none"> • schools / universities; • community centres; • sports complexes; or • other accepted types. <p>(All buildings are located in Hong Kong)</p>	
Eligible Applicants	<p>For Buildings of Multiple Owners</p> <ul style="list-style-type: none"> 🌱 Owners' corporations; 🌱 Owners' organisations or residents' organisations; or 🌱 Property management company or a qualified service provider on behalf of the above. <p>For Buildings of Single Owner or Government Ownership</p> <ul style="list-style-type: none"> 🌱 Owner or government as appropriate; or 🌱 Property management company or a qualified service provider on behalf of the above. 🌱 Legally responsible entity of the building; or 🌱 Property management company or a qualified service provider on behalf of the above. 	
Reference Standard	Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong	
Physical Boundaries	Site boundaries of the building concerned or of a group of buildings if these buildings are adjoining one another and / or sharing some centrally provided services	
Operational Boundaries#	<p><u>Scope 1</u></p> <ul style="list-style-type: none"> • Stationary sources combustion • Mobile sources combustion • Releases from equipment and systems • Assimilation of CO₂ into biomass • Other physical and chemical processing 	<p><u>Scope 2</u></p> <ul style="list-style-type: none"> • Purchased electricity • Purchased town gas
	<p><u>Scope 3</u></p> <ul style="list-style-type: none"> • Paper waste disposal • Use of fresh water • Sewage discharge • Extraction and production of purchased materials and fuels for sources covered in Scope 1 and 2 • Transportation of purchased materials or goods, fuels, products, waste, employees, occupants and guests to & from the buildings; • Business travel of employees • Outsourced activities or contractual arrangements • Use of sold products and services • Waste disposal other than above 	

Shaded elements are mandatory in calculation of the carbon footprint

Appendix III: Simplified Quantification Approaches and Working Procedures

Introduction

The quantification methodologies presented in this Appendix follow the suggested methods provided in the “Guidelines to Account for and Report on Greenhouse Gas Emissions and Removals for Buildings (Commercial, Residential or Institutional Purposes) in Hong Kong” (the Guidelines). It is important to note that the quantification methods in the Guidelines are subject to change. The eligible entities are recommended to refer to the relevant website to retrieve the latest information. Participants shall use the latest available emission factors in their calculations if possible.

Scope 1: Direct Emissions and Removals

(i) GHG Emissions from Stationary Combustion Sources

Introduction

The combustion process is defined by the rapid oxidation of substances (i.e. fuels) with the release of thermal energy (i.e. heat). Stationary combustion activities emit direct greenhouse gases (GHG) such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) as well as ambient air pollutions. Emission of these gases from stationary combustion sources depend upon fuel characteristics, size along with combustion technology. Emissions also vary with operation and maintenance practices. This guidance only addresses direct emissions of the following types of GHG, i.e., CO₂, CH₄ and N₂O.

Definitions

Most stationary combustion devices can be classified into one of the following categories-

- Boilers
- Burners
- Turbines
- Heaters
- Furnaces
- Ovens
- Dryers
- Internal Combustion Engines (e.g. Emergency Electricity Generator)
- Any other equipment or machinery that combusts carbon bearing fuels or waste streams.

It should be noted that non-combustion type electrical equivalent should not be counted for calculation.

Within the physical boundary, multiple combustion units may be operated. Emissions from all combustion units located within the physical boundary which are managed or controlled by the reporting entity should be included in the GHG inventory.

Description of Approach and Procedure

A fuel-based approach will be applied to calculate GHG emissions. The approach typically requires the collection of activity data, in the form of the type and quantity of fuel consumed for combustion purposes.

In order to calculate CO₂ emissions using fuel type, fuel consumption and emission factor data, the following equations can be applied:

$$\text{Emission (CO}_2\text{)} = \Sigma \text{ Amount of Fuel Consumed} \times \text{Emission Factor of CO}_2$$

where

Emission, in terms of tonnes of CO₂-equivalent, is summed over all types of fuel used;

Amount of fuel consumed is in terms of volume (e.g. litre) or mass (e.g. kg) for particular fuel; and

Emission Factor of CO₂ = Net Calorific Value of the Fuel x Carbon Factor of Fuel x Fraction of Carbon Oxidised x (44 / 12)

To calculate CH₄ and N₂O emissions, the equation below can be applied:

$$\text{Emission (CH}_4\text{ / N}_2\text{O)} = \Sigma \text{ Amount of Fuel Consumed} \times \text{Emission Factor of (CH}_4\text{ / N}_2\text{O)} \times \text{Relative GWP}$$

where

Emission, in terms of tonnes of CO₂-equivalent, is summed over all types of fuel used;

Amount of fuel consumed is in terms of volume (e.g. litre) or mass (e.g. kg) for particular fuel;

Emission Factor of (CH₄ / N₂O) = Net Calorific Value of the Fuel x Specific (CH₄ / N₂O) Conversion Factor; and

Relative GWP = Relative Global Warming Potential (GWP) of CH₄/ N₂O

To apply the equation, the following steps should be taken

Step 1

Collect data on the quantity of fuel consumed on volume / weight basis. These data can be based on fuel receipts, purchase records or metering of the amount of fuel entering the combustion device of the reporting period.

Step 2

Check to ensure that all units are consistent.

Step 3

Estimate GHG emissions by multiplying the amount of fuel use by the relative emission factor and the corresponding relative GWP.

Activity data, in the form of the type and quantity of fuel consumed, is the key input parameter to calculation-based methods. It is the one data variable that is completely dependent on the reporting entity to collect because no default

values are possible. All activity data are therefore required to be in good record keeping by the reporting entity.

A sample reporting format and tables on emission factors are in Tables B1, B1-1, B1-2, B1-3 for reference.

Documentation and Archiving

In order to ensure that the quantification process is transparent and verifiable, information and data should be documented. All raw data used to estimate emissions should also be archived for a reasonable period of time. The following information is recommended to be documented for stationary combustion emission estimates:

- Description of the physical boundary
- Description of the type of stationary sources carried out that result in GHG emissions
- Description of fuel consumed by each activity related to GHG emissions
- Description and list of metering or monitoring devices for each source
- Description of any cases of missing data for fuel based methods and the steps taken to approximate and / or replace missing data
- Description of management procedures implemented to ensure quality of the quantification process
- Discussion of the likely causes of uncertainty (statistical and systematic bias) and available data on the precision of measurement instrumentation or calibration errors.
- Description of steps taken to deal with confidential business information

Special Note: Direct Emissions from Stationary Combustion Sources Using town gas

GHG emissions due to combustion of town gas at stationary sources are required to be quantified and reported separately under Scope 1 (as direct emissions within the physical boundary) and Scope 2 (as indirect emissions outside the physical boundary due to generation and transportation of town gas from the production plant to the building of concern).

Reference

Michael Gillenwater, Environmental Resources Trust (2005), *Calculation Tool for Direct Emissions from Stationary Combustion*, World Resources and World Business Council for Sustainable Development (WRI / WBCSD). Copyright remains with WRI / WBCSD. More information is available at website: <http://www.ghgprotocol.org>

(ii) GHG Emissions from Mobile Combustion Sources

Introduction

The following categories of mobile sources are covered:

- Road transport
- Air transport
- Water transport

Emissions from all mobile sources which serve within the physical building boundary, and mobile sources dedicated to provide transportation services for the concerned building (e.g. shuttle bus services provided by the building) should be included in the GHG inventory. The electricity purchased to operate the concerned mobile sources should be reported as energy indirect emissions under Scope 2 in the Guidelines.

Description of Approach and Procedure

As fuel consumption data will usually be available from fuel receipts or other purchase records, a fuel-based method is applied to calculate GHG emissions. The following equation outlines the recommended approach to calculating GHG emissions based on fuel use.

$$\text{Emission (CO}_2\text{)} = \Sigma \text{ Amount of Fuel Consumed} \times \text{Emission Factor of CO}_2$$

where

Emission, in terms of tonnes of CO₂-equivalent, is summed over all types of fuel used, all transport modes and vehicle categories;

Amount of fuel consumed is in terms of volume (e.g. litre) for particular fuel, transport mode and vehicle category; and
Emission Factor of CO₂ = Net Calorific Value of the Fuel x Carbon Emission Factor of Fuel x Fraction of Carbon Oxidised x (44 / 12)

To calculate CH₄ and N₂O emissions, the equation below can be applied-

$$\text{Emission (CH}_4\text{/ N}_2\text{O)} = \Sigma \text{ Amount of Fuel Consumed} \times \text{Emission Factor of (CH}_4\text{/ N}_2\text{O)} \times \text{Relative GWP}$$

where

Emission, in terms of tonnes of CO₂-equivalent, is summed over all types of fuel used, all transport modes and vehicle categories;

Amount of fuel consumed is in terms of volume (e.g. litre) for particular fuel, transport mode and vehicle category;
Emission Factor of (CH₄/ N₂O) = Net Calorific Value of the Fuel x Specific (CH₄/ N₂O) Conversion Factor; and
Relative GWP = Relative Global Warming Potential (GWP) of CH₄/ N₂O

The calculation requires essentially two main steps-

Step 1: Gather fuel consumption data by fuel type, by vehicle category and by transport mode. Fuel use data can be obtained from several different sources including fuel receipts, financial records on fuel expenditures, or direct measurements of fuel use.

Step 2: Convert fuel estimate to GHG emissions by multiplying results from Step 1 by relative emission factor and corresponding relative GWP.

A sample reporting format and tables on emission factors are in Tables B2, B2-1, B2-2, B2-3 for reference.

Reference

World Resources Institute and World Business Council for Sustainable Development (WRI / WBCSD). (2005), *Calculating CO₂ Emissions from Mobile Sources- Guidance to calculation worksheets*, WRI / WBCSD. Copyright remains with WRI / WBCSD. More information is available at website: <http://www.ghgprotocol.org>

(iii) HFC and PFC Emissions for Refrigeration / Air-conditioning

Introduction

Hydrofluorocarbons (HFC) and perfluorocarbons (PFC), which are commonly used in refrigeration and air conditioning sectors, are GHGs with global warming potentials (GWP) much higher than that of carbon dioxide. Therefore, uncontrolled release of these gases into atmosphere may have significant potential impact on climate change.

Description of Approach and Procedure

The approach below covers only emissions from operating phase of refrigeration / air conditioning system. If reliable data are collected, the reporting entity is encouraged to consider accounting for emissions of HFC / PFC during the assembly / installation as well as the disposal processes which are regarded as Scope 3 emissions in the Guidelines.

This methodology requires data including the type of refrigerant used, the inventory of refrigerant and the amount of refrigerant purchased for each type of equipment. The equation for calculating emissions for operating stage of refrigeration / air-conditioning systems can be summarised as follows-

$$OE = \sum (C_s + C_i - C_d - C_e)_j \times GWP_j$$

where:

OE = Emissions from operation of equipment due to release of refrigerant j (in CO₂-equivalent)

C_s = Refrigerant inventory at beginning of the reporting period (in storage, not equipment) (kg)

C_i = Refrigerant added to the inventory during the reporting period (kg)

C_d = Refrigerant disposed of through environmentally responsible means (e.g. collected by contractor for recycling) during the reporting period (kg)

C_e = Refrigerant inventory at end of the reporting period (in storage, not equipment) (kg)

GWP=100-year global warming potential of the refrigerant j . Global Warming Potential (GWP) of the corresponding refrigerant can be obtained using Table B3-1.

The calculation requires five main steps-

Step 1: Gather information on the type of refrigerants used and the GHG composition for each refrigerant.

Step 2: Gather data by amount of each refrigerant which is in stock at beginning and end of the reporting period.

Step 3: Gather data by amount of each refrigerant added to the stock during the reporting period.

Step 4: Gather data by amount of each refrigerant disposed of through environmentally responsible means during the reporting period.

Step 5: Convert into GHG emissions by multiplying the amount of each refrigerant escaped / leaked by relevant GWP of its constituent GHGs.

A sample reporting format and tables on GWP of common refrigerants are in Tables B3, B3-1 for reference.

Documentation and Archiving

To ensure that quantification process is transparent and verifiable, information and data should be documented by equipment users who maintain their own equipment. For equipment users who have contractors that provide maintenance service on their equipment, reporting entity is recommended to obtain a record from the corresponding contractors.

Special Note: Climate change impact due to the use of hydrochlorofluorocarbons (HCFCs) in refrigeration and air conditioning systems

HCFCs are still commonly found in some refrigeration and air conditioning systems. Although these chemicals have high GWP, they are not listed in Kyoto Protocol to the United Nations Framework Convention on Climate Change as they are in the process of being phased out under Montreal Protocol on Substances that Deplete the Ozone Layer. To make the accounting and reporting system consistent with the Kyoto Protocol, the reporting entity is not required to report the release of HCFCs but is encouraged to report the efforts to reduce the production and consumption as well as to phase out these chemicals in the report.

Reference

World Resources Institute and World Business Council for Sustainable Development (WRI / WBCSD) (2005), *Calculating HFC and PFC Emissions from the Manufacturing, Installation, Operation and Disposal of Refrigeration & Air-conditioning Equipment (Version 1.0)- Guide to calculation worksheets*, WRI / WBCSD. Copyright remains with WRI / WBCSD. More information is available at website: <http://www.ghgprotocol.org>

(iv) GHG Removals from Newly Planted Trees

Introduction

Planting of trees can help reduce GHG from the atmosphere by assimilating CO₂ in the plant tissues when the trees grow with time. A default figure for the removal potential of each unit of tree is suggested based on Hong Kong's location, woodland types, and estimated density of trees. The figure is applicable to all trees commonly found in Hong Kong which are able to reach at least 5 metres in height. Since this figure is derived as annual average based on an extended period of time corresponding to the life cycle of the trees, the figure is suggested to be applicable to trees at all age unless the concerned trees are intended to be planted for a period significantly shorter than their natural life cycles.

However, the removal potentials of trees varied according to tree species, climate zones, management approach, etc. The reporting entity is encouraged to estimate the removal potentials based on recognised approach such as those provided by Intergovernmental Panel on Climate Change and reliable information.

Description of Approach and Procedure

The basic equation is as follows-

CO₂ removed by trees in one year = net number of additional trees planted since the concerned building is constructed x Removal Factor (estimated at 23kg / tree).

The calculation of GHG removals requires two main steps-

Step 1:

Gather data of the net number of plants **newly planted** within the physical boundary after the beginning stage of construction, or in cases when no reliable record is available for the pre-construction status, the net number of newly planted trees recorded since the operation of the building of concern.

Step 2:

Convert CO₂ removals by multiplying the data at Step 1 by the removal factor.

Note: Reporting entity should make reference to internationally recognised methodology for specific calculation of removal factors for different tree species if reporting entity can gather sufficient reliable information.

A sample reporting format is in Table B4 for reference.

Reference

Intergovernmental Panel on Climate Change (IPCC) National Greenhouse Gas Inventories Programme (1996), *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter 5: Land Use and Forestry*, IPCC.

Scope 2 Energy Indirect Emissions

(v) Energy Indirect GHG Emissions due to Electricity and town gas Purchased

Introduction

Electricity is produced when fossil fuels are burned in stationary combustion units or when other fuel sources (e.g. natural gas, nuclear, wind, etc.) are consumed to produce energy. Town gas is produced from naphtha, landfill gases and natural gas.

While GHG emissions that result from the purchased electricity and town gas are physically emitted at off-site facilities where the electricity and town gas are converted from their fuels and raw materials, the emissions are still a consequence of the activities of the consumer that purchases the energy. Therefore, GHG emissions from the consumption of purchased energy are considered to be “indirect” emissions as they are the indirect consequence of purchase and consumption of electricity and town gas.

Description of Approach and Procedure

Indirect GHG emissions from the consumption of purchased electricity / town gas can be estimated by the equation-

$$\text{GHG Emission} = \text{Quantity of purchased electricity / town gas} \times \text{Emission Factor}$$

where

purchased electricity is measured in kilowatt-hours (kWh) and town gas is charged in unit (i.e. 1 unit registered by the gas meter = 48 megajoules (MJ) consumed).

The calculation requires 3 main steps-

Step 1: Determine the facility (e.g. area that the meter covers) involved in the report.

Step 2: Collect the amount of electricity / town gas consumed for the facility mentioned.

Step 3: Calculate the emissions by filling in Tables B5 and B6.

Emission Factors^{Note}

The reporting entity is required to account for GHG emissions associated with the electricity purchased in Hong Kong based on two emission factors. First, the reporting entity will quantify the emissions based on a territory-wide default value of **0.7kg / kWh**. Second, the reporting entity will quantify the emissions based on specific emission factors provided by its respective provider of electricity. In case that the specific emission factor for the reporting period is not available at the time of accounting, the latest specific emission factor from the power company may be used as an approximation.

These specific emission factors are available from the power companies' websites.

For purchased town gas, the emission factor may be obtained from the public information provided by the town gas company. In case that the emission factor for the reporting period is not available at the time of accounting, the latest emission factor from the town gas company may be used as an approximation.

Sample reporting formats are in Tables B5 and B6 for reference.

Note:

For the emission factors of the power companies, more information is available at websites:

China Light & Power Company Limited (CLP group): <https://www.clpgroup.com>

Hongkong Electric Holdings Limited (HEC): <http://www.hec.com.hk>

The emission factor of The Hong Kong and China Gas Company (Towngas) is available in the Annual report issued by the company. More information is available at website: <http://www.hkcg.com/>

Reference

References to power companies' and gas company's websites/ reports World Resources Institute and World Business Council for Sustainable Development (WRI / WBCSD). (2007), *Indirect CO₂ Emissions from the Consumption of Purchased Electricity, Heat, and / or Steam- Guide to calculation worksheets v1.2*, WRI / WBCSD. Copyright remains with WRI / WBCSD. More information is available at website: <http://www.ghgprotocol.org>

Scope 3 Other Indirect Emissions

Introduction

Apart from Scope 1 and Scope 2 emissions, reporting entity may choose to quantify and report other kinds of indirect GHG emissions that are applicable in Hong Kong. Simplified approaches for the following areas are developed for the reporting entity to consider-

- Methane gas generation at landfill in Hong Kong due to disposal of paper waste.
- GHG emissions due to electricity used for fresh water processing by Water Supplies Department.
- GHG emissions due to electricity used for sewage processing by Drainage Services Department (if the sewage collected within physical boundary is treated by Government department).

(vi) GHG Emissions from Paper Waste Disposed at Landfills

Description of Approach and Procedure

GHG, mainly methane (CH₄), are generated from decomposition of organic carbon content of paper waste at landfills. While such emissions from landfills will usually continue over a long period of time, most of them are generated in the first few years after disposal. For simplifying the accounting process, the suggested calculation method assumes that the **total raw amount** of CH₄ emitted (i.e. the amount generated without taking into consideration of collection, recovery and utilisation of landfill gas due to the management practices at landfills) throughout the whole decomposition process of the paper waste disposed at landfills will be emitted into the atmosphere within the same reporting period as paper waste collected.

The methodology requires data including the inventory of paper (kg), the amount of paper purchased (kg) and the amount of paper recycled (kg). It is assumed in the Guidelines that all paper (i.e. paper which is stored or purchased within the organisation boundary) will eventually be disposed at landfills unless collected and recycled. The equation for calculating emissions for operating process can be summarised as follows-

$$E = (P_s + P_i - P_r - P_e) \times \text{Emission Factor (estimated at 4.8 kg CO}_2\text{-e / kg)}$$

where

E = Emissions from paper waste disposed at landfills

P_s = Paper inventory at the beginning of the reporting period (in storage) (kg)

P_i = Paper added to the inventory during the reporting period (kg)

P_r = Paper collected for recycling purpose (kg)

P_e = Paper inventory at the end of the reporting period (in storage) (kg)

The suggested calculation method of GHG emissions result from paper waste disposed at landfills in Hong Kong requires four main steps-

Step 1: Gather data by amount of paper which is in stock at beginning and end of the reporting period.

Step 2: Gather data by amount of paper purchased during the reporting period.

Step 3: Gather data by amount of paper disposed of through environmentally responsible ways (e.g. through collection of recycler) during the reporting period.

Step 4: Convert into GHG emissions by multiplying the net amount of paper consumed (i.e. the sum of amount collected in Steps 1 and 2 minus that in Step 3) by the emission factor which takes into account the carbon content of the paper waste and the GWP of CH₄.

A sample reporting format is in Table B7 for reference.

Reporting entity is encouraged to use more elaborated accounting method based on established internationally recognised approaches if the reporting entity maintains a good database on the necessary raw information.

Special Note: Reporting the GHG avoided by recycling waste paper

In case that the reporting entity can only collect information on the amount of waste paper recycled, he is encouraged to quantify the amount of GHG avoided by multiplying the amount of waste paper recycled with the emission factor above and to report the amount as part of the off-site GHG emission reduction efforts.

Reference

Intergovernmental Panel on Climate Change (IPCC) National Greenhouse Gas Inventories Programme (1996), *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Chapter6: Waste*, IPCC.

(vii) GHG Emissions due to Electricity Used for Processing Fresh Water and Sewage by Government Departments

Description of Approach and Procedure

The calculation takes into account the indirect GHG emissions due to electricity used for processing fresh water by Water Supplies Department and sewage by Drainage Services Department in departments' fresh water / sewage treatment plants. The calculation requires two main steps-

Step 1: Gather water consumption data from water supply bill.

Step 2: Convert to GHG emissions by multiplying the amount of water consumed by relevant emission factor.

Sample reporting formats are in Tables B8 and B9 for reference.

Reference

Drainage Services Department (DSD) (2007), *DSD Environmental Performance Report 2006*, DSD. More information is available at website: <http://www.dsd.gov.hk> Water Services Department (WSD) (2007), *Annual Report – Water Supplies Department 2006-2007*, WSD. More information is available at website: <https://www.wsd.gov.hk/>

(viii) Emissions / Removals not Covered in Previous Parts

If the reporting entity possesses necessary information to quantify GHG emissions / removals which are not covered in the Guidelines, it is encouraged to quantify and report them by making use of internationally recognised quantification approaches.

Table B1: GHG Emissions from Stationary Sources

Step 1	Step 2			Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
A	B	C	D	E	F	G	H	I	J
Source description with location (e.g. boilers, furnaces, ovens and emergency electricity generator etc.)	Fuel Information			CO ₂ emission factor ^{Note 2}	CO ₂ emissions in tonnes of CO ₂ equivalent ((BxE) ÷ 1000)	CH ₄ emission factor ^{Note 3}	CH ₄ emissions in tonnes of CO ₂ equivalent ((BxG) ÷ (1000x1000) x GWP ^{Note 4})	N ₂ O emission factor ^{Note 3}	N ₂ O emissions in tonnes of CO ₂ equivalent ((BxI) ÷ (1000x1000) x GWP ^{Note 4})
	Fuel used		Fuel type ^{Note 2}						
	Amount	Unit ^{Note 1}							
Total									

Please insert more rows as necessary

IMPORTANT: Combustion of town gas from stationary sources should also be reported in Table 1 (refer to Tables B1-1 to B1-3 for the emission factors) as it falls into the category of direct emissions. Indirect emission of purchased town gas should be calculated in Table B5.

Note 1: Select the appropriate fuel unit

Note 2: Select the appropriate fuel type and the corresponding emission factor (from Table B1-1) for calculation

Note 3: Refer to Table B1-2 for calculating CH₄ emissions and Table B1-3 for N₂O emissions

Note 4: Global Warming Potential (GWP) of CH₄ is 21 while it is 310 for N₂O

Emission Factors for Stationary Combustion Sources

Table B1-1 CO₂ Emission factor by fuel type (for stationary combustion sources)

Fuel Type	Emission Factor	Unit
Diesel Oil	2.614	kg/litre
LPG	3.017	kg/kg
Kerosene	2.429	kg/litre
Charcoal	2.970	kg/kg
Town gas	2.549	kg/Unit

Table B1-2 CH₄ Emission factor by fuel type (for stationary combustion sources)

Fuel Type	Emission Factor	Unit
Diesel Oil	0.0239	g/litre
LPG	0.0020	g/kg
Kerosene	0.0241	g/litre
Charcoal	5.5290	g/kg
Town gas	0.0446	g/Unit

Table B1-3 N₂O Emission factor by fuel type (for stationary combustion sources)

Fuel Type	Emission Factor	Unit
Diesel Oil	0.0074	g/litre
LPG	0.0000	g/kg
Kerosene	0.0076	g/litre
Charcoal	0.0276	g/kg
Town gas	0.0099	g/Unit

Table B2: GHG Emissions from the Mobile Sources

Step 1	Step 2		Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
A	B	C	D	E	F	G	H	I
Source description (by different vehicle and fuel types)	Fuel Information		CO ₂ emission factor ^{Note 1}	CO ₂ emissions in tonnes of CO ₂ equivalent ((BxD) ÷ 1000)	CH ₄ emission factor ^{Note 2}	CH ₄ emissions in tonnes of CO ₂ equivalent ((BxF) ÷ (1000x1000) x GWP ^{Note 4})	N ₂ O emission factor ^{Note 3}	N ₂ O emissions in tonnes of CO ₂ equivalent ((BxH) ÷ (1000x1000) x GWP ^{Note 4})
	Amount of fuel used (in litres)	Fuel type						
Road Transport								
Navigation								
Aviation								
Total								

Please insert more rows as necessary

Notes for GHG Emissions from Mobile Source

Note 1: Refer to Table B2-1 for CO₂ emission factors for different vehicle and fuel type.

Note 2: Refer to Table B2-2 for CH₄ emission factors for different vehicle and fuel type.

Note 3: Refer to Table B2-3 for N₂O emission factors for different vehicle and fuel type.

Note 4: Global Warming Potential (GWP) of CH₄ is 21 while it is 310 for N₂O.

Emission Factors for Mobile Combustion Sources

Table B2-1 CO₂ Emission factor (For mobile combustion sources)

Fuel Type	Emission Factor	Unit
Diesel Oil (DO)	2.614	kg/litre
Unleaded Petrol (ULP)	2.360	kg/litre
Liquefied Petroleum Gas (LPG)	1.679	kg/litre
	3.017	kg/kg
Gas Oil (For Ships only)	2.645	kg/litre
Kerosene (Including Jet Kerosene)	2.429	kg/litre

Table B2-2 CH₄ Emission factor (For mobile combustion sources)

Vehicle Type	Fuel Type	Emission Factor	Unit
Motorcycle	ULP	1.422	g/litre
Passenger Car	ULP	0.253	g/litre
	DO	0.072	g/litre
Private Van	ULP	0.203	g/litre
	DO	0.072	g/litre
	LPG	0.248	g/litre
Public Light Bus	DO	0.072	g/litre
	LPG	0.248	g/litre
Light Goods Vehicle	ULP	0.203	g/litre
	DO	0.072	g/litre
Heavy Goods Vehicle	DO	0.145	g/litre
Medium Goods Vehicle	DO	0.145	g/litre
Ships	Gas Oil	0.146	g/litre
Aviation	Jet Kerosene	0.069	g/litre
Other Mobile Machinery	DO	0.0239	g/litre
	LPG	0.0036	g/litre
		0.006	g/kg
	Kerosene	0.0241	g/litre

Table B2-3 N₂O Emission factor (For mobile combustion sources)

Vehicle Type	Fuel Type	Emission Factor	Unit
Motorcycle	ULP	0.046	g/litre
Passenger Car	ULP	1.105	g/litre
	DO	0.110	g/litre
Private Van	ULP	1.140	g/litre
	DO	0.506	g/litre
	LPG	0.000	g/litre
Public Light Bus	DO	0.506	g/litre
	LPG	0.000	g/litre
Light Goods Vehicle	ULP	1.105	g/litre
	DO	0.506	g/litre
Heavy Goods Vehicle	DO	0.072	g/litre
Medium Goods Vehicle	DO	0.072	g/litre
Ships	Gas Oil	1.095	g/litre
Aviation	Jet Kerosene	0.000	g/litre
Other Mobile Machinery	DO	0.007	g/litre
	LPG	0.000	g/litre or g/kg
	Kerosene	0.0076	g/litre

Table B3: HFC and PFC Emissions from Refrigeration / Air-conditioning Equipment (Operation Process)

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
A	B	C	D	E	F	G
Type of refrigerant ^{Note 1}	Amount of HFC / PFC at the beginning of the reporting period (kg)	Amount of HFC / PFC purchased during the reporting period (kg)	Amount of HFC / PFC disposed (through environmentally responsible means) during the reporting period (kg)	Amount of HFC / PFC at the end of the reporting period (kg)	GWP of refrigerant ^{Note 2}	HFC / PFC emissions in tonnes of CO ₂ equivalent ((B + C – D – E) x F ÷ 1000)
Total						

Please insert more rows as necessary

Note 1: Enter the type of refrigerant of the equipment

Note 2: Refer to Table B3-1 for the Global Warming Potential (GWP) of the corresponding refrigerant

Table B3-1 Global Warming Potentials (GWP) of Common Refrigeration / Air-Conditioning Refrigerants ^{Note 1}

Gas or Blend	GWP	Information Source ^{Note 2}
HFC-23	11,700	A
HFC-32	650	A
HFC-125	2,800	A
HFC-134a	1,300	A
HFC-143a	3,800	A
HFC-152a	140	A
HFC-236fa	6,300	A
R-401A	18	B
R-401B	15	B
R-401C	21	B
R-402A	1,680	B
R-402B	1,064	B
R-403A	1,400	B
R-403B	2,730	B
R-404A	3,260	B
R-406A	0	B
R-407A	1,770	B
R-407B	2,285	B
R-407C	1,526	B
R-407D	1,428	B
R-407E	1,363	B
R-408A	1,944	B
R-409A	0	B
R-409B	0	B
R-410A	1,725	B
R-410B	1,833	B
R-411A	15	B
R-411B	4	B
R-412A	350	B
R-413A	1,774	B
R-414A	0	B
R-414B	0	B
R-415A	25	B
R-415B	105	B
R-416A	767	B
R-417A	1,955	B
R-418A	4	B
R-419A	2,403	B
R-420A	1,144	B

Gas or Blend	GWP	Information Source ^{Note 2}
R-500	37	B
R-501	0	B
R-502	0	B
R-503	4,692	B
R-504	313	B
R-505	0	B
R-506	0	B
R-507 or R-507A	3,300	B
R-508A	10,175	B
R-508B	10,350	B
R-509 or R-509A	3,920	B
PFC-116 (C ₂ F ₆)	9,200	A
PFC-14 (CF ₄)	6,500	A

Note 1: Refrigerants, with components other than HFCs and PFCs, have been well-recognised to have effects on our climate systems. Nevertheless, the Guidelines only cover those which are in the group of Kyoto protocol recognised gases (CO₂, CH₄, HFC, PFC, SF₆ and N₂O). Hence, in the Guidelines, GWPs of all refrigerants other than HFCs and PFCs are considered to be zero.

Note 2: Information sources:

A: IPCC Second Assessment Report (1995)

B: "World Resources Institute (2005), *Calculating HFC and PFC Emissions from the Manufacturing, Installation, Operation and Disposal of Refrigeration & Air-conditioning Equipment (Version 1.0) - Guide to calculation worksheets*, World Business Council for Sustainable Development", in which the latter states that the source of reference is from ASHRAE Standard 34.

Table B4: Direct GHG Removals from Newly Planted Trees

Step 1	Step 2	Step 3	Step 4	Step 5
A	B	C	D	E
Source description (Location of the trees planted)	No. of trees planted (unit)	No. of trees removed (unit)	CO ₂ removal factor ^{Note} (kg / unit / year)	CO ₂ removals in tonnes of CO ₂ equivalent ((B-C) x D ÷ 1000 x length of reporting period (in years))
			23	
Total				

Please insert more rows as necessary

Note: The default figure for the removal potential of each unit of tree is suggested based on Hong Kong's location, woodland types, and estimated density of trees. The figure is applicable to all trees commonly found in Hong Kong which are able to reach at least 5 metres in height.

Table B5: GHG Emissions from Electricity Purchased from Power Companies

Step 1	Step 2	Step 3		Step 4	
A	B	C ^{Note}		D	
Facility / source description (i.e. Area / facilities the electricity bill is reporting)	Amount of electricity purchased (in kWh)	Emission factor (kg / kWh)		Indirect GHG emissions in tonnes of CO ₂ equivalent (B x C ÷ 1000)	
		Power company - specific	Territory-wide default value	Power company - specific	Territory-wide default value
Total					

Please insert more rows as necessary

Note : The reporting entity is required to account for GHG emissions associated with the electricity purchased in Hong Kong based on two emission factors. First, the reporting entity will quantify the emissions based on a territory-wide default value of **0.7kg / kWh**. Second, the reporting entity will quantify the emissions based on specific emission factors provided by its respective provider of electricity. In case that the specific emission factor for the reporting period is not available at the time of accounting, the latest specific emission factor from the power company may be used as an approximation. These specific emission factors are available from the power companies' websites. For reference, the table below indicates the emission factors of the two power companies in Hong Kong for the past 6 years.

GHG Emission Factor for Different Power Companies in Hong Kong (in kg CO₂-e / kWh)

Power company	2002	2003	2004	2005	2006	2007	2008
CLP#	0.48	0.56	0.53	0.52	0.53	0.57	0.54
HEC*	0.96	0.98	0.98	0.92	0.91	0.83	0.84

Emission factors for CLP were derived from information in *CLP Holdings Annual Report* and *CLP's Key Performance Statistics*.

* Emission factors for HEC were derived from information in *HEC's Environment, Quality, Health and Safety Report* and HEC's website.

Table B6: GHG Emissions from town gas Purchased from the Hong Kong and China Gas Company (Towngas)

Step 1	Step 2	Step 3	Step 4
A	B	C	D
Facility / source description (i.e. Area / facilities the town gas bill is reporting)	Amount of town gas purchased (Unit ^{Note})	Emission factor (kg/Unit)	Indirect GHG emissions in tonnes of CO ₂ equivalent (B x C ÷ 1000)
Total			

Please insert more rows as necessary

Note : Each unit registered by gas meter represents that the town gas with a heat value of 48 MJ. Based on the information from the Hong Kong and China Gas Company, the emission factors for the past three years were derived as below. This factor only accounts for the emissions during the production of town gas within the company. Reporting entity should report in Table B1 as well the GHG emissions associated with combustion of town gas within the physical boundary under Scope 1

In case that the emission factor for the reporting period is not available at the time of accounting, the latest emission factor from the town gas company may be used as an approximation.

GHG Emission Factor (in kg CO₂-e / Unit of town gas purchased)

Year	2005	2006	2007	2008
Emission Factor	0.735	0.693	0.592	0.593

Table B7: Methane Generation at Landfill in Hong Kong due to Disposal of Paper Waste

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
A	B	C	D	E	F	G
Source description (i.e. Area / floor)	Amount of paper in storage at the beginning of the reporting period (kg)	Amount of paper purchased during the reporting period (kg)	Amount of paper collected for recycling during the reporting period (kg)	Amount of paper in storage at the end of the reporting period (kg)	Emission factor (kg CO ₂ -e / kg of waste) ^{Note}	Indirect emissions in tonnes of CO ₂ equivalent ((B + C – D – E) x F ÷ 1000)
					4.8	
Total						

Please insert more rows as necessary

Note: For simplifying the accounting process, the default emission factor assumes that the **total raw amount** of CH₄ emitted throughout the whole decomposition process of the paper waste disposed at landfills will be emitted into the atmosphere within the same reporting period as paper waste collected. Besides, the default value does not take into account the reduction in emission due to collection, recovery and utilisation of landfill gas due to the management practices at landfills.

Table B8: GHG Emissions due to Electricity Used for Fresh Water Processing by Water Supplies Department

Step 1	Step 2	Step 3	Step 4
A	B	C	D
Source description (i.e. Area / facilities the water service bill is reporting)	Amount of water consumed as listed on the water service bill (m ³)	Emission factor (kg / m ³) ^{Note}	Emissions in tonnes of CO ₂ equivalent (B x C ÷ 1000)
Total			

Please insert more rows as necessary

Note: Emission factor of GHG emissions due to electricity used for processing fresh water = Unit electricity consumption of fresh water (from WSD) x Territory-wide default value (i.e. 0.7kg / kWh) of purchased electricity provided in Table B5. In case that the unit electricity consumption for processing fresh water for the reporting period is not available at the time of accounting, the latest emission factor from table below may be used as an approximation.

GHG Emission Factor (in kg CO₂-e / m³)

Year	2003	2004	2005	2006	2007	2008
Emission Factor	0.440	0.463	0.476	0.438	0.414	0.424

Table B9: GHG Emissions due to Electricity Used for Sewage Processing by Drainage Services Department

Step 1	Step 2	Step 3	Step4
A	B	C	D
Source description (i.e. Area / facilities the water service bill is reporting)	Fresh water consumption (m ³)	Default Emission Factor (kg/m ³) ^{Note}	Emissions in tonnes CO ₂ equivalent (B x C ÷ 1000)
Total			

Please insert more rows as necessary

Note: The default emission factor is determined according to the purpose of water used as follows:

Source Description	Default Emission Factor (kg/m ³)
Restaurants and catering services	(0.7 x Emission Factor) assuming 70% of the fresh water consumed will enter the sewage system.
Other commercial, residential and institutional purposes	(1.0 x Emission Factor) assuming 100% of the fresh water consumed will enter the sewage system.

In which emission factor is the emission factor of GHG emissions due to electricity used for processing fresh water derived from the following equation. Emission Factor = Unit electricity consumption of processing sewage (from DSD) x Territory-wide default value (i.e. 0.7kg / kWh) of purchased electricity provided in Table B5.

In case that the unit electricity consumption for processing sewage for the reporting period is not available at the time of accounting, the latest emission factor from table below may be used as an approximation.

GHG Emission Factor (in kg CO₂-e / m³)

Year	2003	2004	2005	2006	2007	2008
Emission Factor	0.172	0.155	0.160	0.171	0.174	0.172

Appendix IV: Sample Report Format

1. Name of the reporting entity
2. Description of the reporting entity
3. Reporting period (with start and end dates)
4. Scope of physical boundary chosen
5. Scope of operational boundary chosen
6. Methodologies for quantifying emissions and removals
7. Information on GHG emissions and removals
8. Information on GHG emissions and removals over time
9. Information on GHG reduction programmes / initiatives
10. Other optional information
11. Contact person of the reporting entity
12. List of data sources, references, etc.
13. Total and breakdown of the carbon footprint
14. Calculated reduction of carbon footprint
15. Signature and contact of the Qualified Service Provider

Appendix V: Interim Report

Carbon Reduction Certificate Interim Report

For Official Use Only:
Technical Consultant:

1) Carbon Reduction Membership No.:	CL-XXXX-XXXX
2) Contact Person of the Reporting Entity:	Name: Company: Address: Tel: Email Address:
3) Applicant Name (English):	Company name (the name as shown on the Carbon Reduction certificate)
4) Applicant Name (Chinese):	Company name (the name as shown on the Carbon Reduction certificate)
5) Building Name (English) (For Type I applicants only)	The name as shown on the Carbon Reduction certificate
6) Building Name (Chinese): (For Type I applicants only)	The name as shown on the Carbon Reduction certificate
7) Property Management Company Name (English) (For Type I applicants only):	The name as shown on the Carbon Reduction certificate
8) Property Management Company Name (Chinese) (For Type I applicants only)	The name as shown on the Carbon Reduction certificate
9) Type of Application:	Type I – Residential buildings, commercial buildings, industrial buildings mainly of office-based nature and buildings of institutional purposes / Type II – Office-based organisations/operational units within Hong Kong / Type III – Other non-industrial trades operated within Hong Kong
10) Expiry Date of the Latest Carbon Reduction Certificate:	DD/MM/YYYY
11) Reporting Period for Interim Report:	DD/MM/YYYY to DD/MM/YYYY
12) Significant Changes in Operations or Boundary during the Reporting Period:	
13) Scope of Physical Boundary (English)	Scope for Carbon Audit (the address as shown on the Carbon Reduction certificate)
14) Scope of Physical Boundary (Chinese)	Scope for Carbon Audit (the address as shown on the Carbon Reduction certificate)

Carbon Reduction Certificate Interim Report

15) Carbon Reduction Programmes Taken:

Please indicate the carbon reduction programmes your organisation has carried out during the reporting period. Please fill in the below items and put "Not Applicable" for items which are not applicable to your organisation.

a) Emergency Electricity Generator Fuel Consumption	Action(s) Taken: Completion Date: Annual Fuel Consumption: xxx Litres										
b) Company Vehicles or Shuttle Bus Fuel Consumption	Action(s) Taken: Completion Date: Vehicle Type: <table border="1"> <thead> <tr> <th>Fuel Type:</th> <th>Diesel</th> <th>Unleaded Petrol</th> <th>LPG</th> <th>Others</th> </tr> </thead> <tbody> <tr> <td>Annual Consumption</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Fuel Type:	Diesel	Unleaded Petrol	LPG	Others	Annual Consumption				
Fuel Type:	Diesel	Unleaded Petrol	LPG	Others							
Annual Consumption											
c) Other Fuel Consumption	Please Specify: Action(s) Taken: Completion Date: <table border="1"> <thead> <tr> <th>Fuel Type:</th> <th>Diesel</th> <th>Unleaded Petrol</th> <th>Kerosene</th> <th>LPG</th> </tr> </thead> <tbody> <tr> <td>Annual Consumption</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Fuel Type:	Diesel	Unleaded Petrol	Kerosene	LPG	Annual Consumption				
Fuel Type:	Diesel	Unleaded Petrol	Kerosene	LPG							
Annual Consumption											
d) Electricity Consumption	Action(s) Taken: Completion Date: Annual Consumption: xxx kWh										
e) Town gas Consumption	Action(s) Taken: Completion Date: Annual Consumption: xxx Unit										
f) Paper Consumption / Paper Recycling	Action(s) Taken: Completion Date: Annual Consumption: xxx kg Annual Recycling Amount: xxx kg										
g) Water Consumption	Action(s) Taken: Completion Date: Annual Consumption: xxx m ³										
h) Others	Please Specify: Action(s) Taken: Completion Date:										

16) Declaration:

I hereby declare and ensure that all the information submitted is true, accurate, current and complete to the best of my knowledge.

Name:

Company:

Address:

Tel:

Email Address:

Date:

Carbon Reduction Certificate Interim Report

The HKGOC Technical Consultant (Hong Kong Productivity Council, HKPC) has adopted a Personal Data (Privacy) Policy. You may contact HKPC's Personal Data Controlling Officer for further details. You have the right to request access to, and amend your personal data in relation to your application. If you wish to exercise these rights, please send email to: edm@hkpc.org.

CONSENT STATEMENT

I hereby declare that the information given above is accurate to the best of my knowledge, and agree that all decisions made by the Organisers (i.e. Environmental Protection Department and Environmental Campaign Committee and its Secretariat) are final and binding in all aspects relating to the HKGOC.

I agree that personal data (including name, phone number, correspondence address and email address) provided by me will be used for the purpose of the administration, evaluation and management of my application. I understand if I cannot provide the relevant personal data, the assessment of my application by the Organisers and the Technical Consultant may be affected.

HKGOC Technical Consultant (Hong Kong Productivity Council, HKPC) intends to use the personal data (including your name, phone number, correspondence address and email address) that you have provided to promote the latest development, consultancy services, events and training courses of HKPC. Should you find such use of your personal data not acceptable, please indicate your objection by ticking the box below.

I object to the proposed use of my personal data in any marketing activities arranged by HKGOC Technical Consultant (HKPC).

The Environmental Protection Department (EPD) and/or the Environmental Campaign Committee (ECC) and its Secretariat also intend to use the personal data (including your name, phone number, correspondence address and email address) that you have provided to promote the latest development, policies, activities and schemes of the EPD and /or the ECC. Should you find such use of your personal data not acceptable, please indicate your objection by ticking the box below.

I object to the proposed use of my personal data in any marketing activities arranged by the EPD and/or the ECC and its Secretariat.

Data Retention Policy

This policy stipulates the kinds of personal data collected, means of collecting personal data, duration of retention, ways of using the personal data and data security measures for the HKGOC.

1. Purpose of collection of personal data

The personal data provided in the Application Form and Assessment and Reporting Form for the HKGOC will be used for the following purposes –

- (a) for the administration, evaluation and management of the application for HKGOC by the Technical Consultant(s) of the HKGOC; and
- (b) for the promotion of latest environment-related development, policies, activities and schemes by the Environmental Protection Department and/or the Environmental Campaign Committee and its Secretariat.

2. Category of personal data

Each participating company / organisation of HKGOC is asked to provide the (i) name, (ii) phone number, (iii) correspondence address and (iv) email address of a contact person ("Contact Person") in the Application Form and Assessment and Reporting Form of HKGOC.

3. Means of collection

The provision of personal data by the Contact Person in the HKGOC Application Form and Assessment and Reporting Form is voluntary. The HKGOC Application Form and Assessment and Reporting Form can be submitted by email. If participating companies / organisations of HKGOC do not provide sufficient information, the processing of their applications may be affected.

4. Access to Personal Data

Each Contact Person has the right to request access to and correction of his/her personal data as stipulated in the Personal Data (Privacy) Ordinance (Chapter 486). Enquiries concerning the personal data collected by means of the HKGOC Application Form and Assessment and Reporting Form should be addressed to edm@hkpc.org.

5. Duration of retention

The personal data collected from the Contact Person will be erased or destroyed 24 months after the completion of the assessment of HKGOC each year.