Certified Carbon Accounting Specialist (CCAS)

Candidate Handbook

Beyond Smart Cities Pvt. Ltd.

Candidate Handbook — Certified Carbon Accounting Specialist (CCAS)

Version 2027 · Beyond Smart Cities

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Certified Carbon Accounting Specialist (CCAS)

Version 2027 (Handbook v1.0) · Aligned to CCAS Body of Knowledge v1.1 (January 2027)

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How to Use This Handbook

This handbook is written for three readers:

- **Prospective candidates** deciding whether CCAS fits their career. Start with Part I and the decision tree in Section 15.
- **Approved candidates** preparing to test. Focus on Part III, Part IV, and Appendix A.
- **CCAS holders** maintaining the credential. Use Parts VI and VII and Appendix B.

Each part stands alone. Cross-references point to section numbers (for example, “see §26”). The blueprint in Appendix A is the authoritative statement of what the examination covers.

CCAS at a Glance

Item	Detail
Credential	Certified Carbon Accounting Specialist (CCAS)
Owner and administrator	Beyond Smart Cities Private Limited
Level	Specialist (application, calculation, and judgment)
Scope	Organisation, city/community, product, and building/asset carbon accounting, plus GHG information management systems (IMS)
Body of Knowledge	CCAS BOK v1.1 (November 2026) — 11 domains
Examination	140 scored items · 3.5 hours · single-best-answer MCQ, multi-step calculations, and scenario sets
Unscored pilot items	May be included; number set by Beyond Smart Cities
Delivery	Proctored — online and/or test centre
Aids	Non-programmable basic or scientific calculator; on-screen formula and GWP reference sheet
Language	English
Passing standard	Criterion-referenced; indicative ~70% scaled
Eligibility	Four education/experience routes (A–D) plus credential-based experience credit
Maintenance	Indicative 3-year cycle with CPD
Fees	250$: application, exam, retake, and maintenance fees
Applications	CCAS application — announcements at beyondsmartcities.in and learn.beyondsmartcities.in

Part I — About Beyond Smart Cities and CCAS

1. Beyond Smart Cities

Beyond Smart Cities is a sustainability education and consulting organisation founded and led by **Krishnaji Pawar**, CEO & Founder. Its work covers sustainable design strategies for green building certification systems, energy management, energy efficiency, energy audit, building commissioning, environmental impact assessment, and environmental management systems.

Through its learning platform at learn.beyondsmartcities.in, Beyond Smart Cities publishes professional courses and exam-preparation resources in carbon accounting, GHG management, carbon markets, and building decarbonisation.

Mission for CCAS. Beyond Smart Cities created CCAS to give carbon-accounting practitioners one rigorous, independent credential that tests the full chain of work: measuring emissions at every scale, holding the data in controlled systems, reporting and assuring it, and turning it into credible reduction decisions.

Beyond Smart Cities **develops, owns, and administers** CCAS. It sets the Body of Knowledge, writes and maintains the examination, decides eligibility, issues the credential, and runs the maintenance programme.

2. Purpose of the CCAS Credential

CCAS recognises professionals who can:

1. **Build** GHG inventories fit for their intended use, at organisation, city, product, and building scale.
2. **Quantify** emissions and removals correctly, with sound emission factors, conversions, and data quality.
3. **Control** the data in information management systems that a verifier can trace end to end.
4. **Report and assure** results against recognised standards and disclosure frameworks.
5. **Act** on the results through credible targets, decarbonisation strategies, market instruments, and finance — without misleading claims.

The credential gives employers, clients, regulators, and the public a single signal that the holder can do this work competently and ethically across scales.

3. The CCAS Practice Model: Four Scales and One Data Layer

Carbon accounting is usually taught in silos. CCAS treats it as one practice applied at four scales, all resting on a shared data layer.

Layer	What the specialist does	Main BOK domains
Organisation	Sets organisational and operational boundaries, quantifies Scopes 1–3, manages base years, prepares inventory reports	D2, D3, D6
City / community	Compiles GPC inventories by sector, applies notation keys, avoids double counting, builds subnational MRV arrangements	D4
Product and project	Calculates product carbon footprints under ISO 14067 and PCRs; accounts for project reductions and removals under ISO 14064-2	D5
Building and asset	Audits building carbon, assesses whole-life carbon, plans and verifies decarbonisation measures	D8
Data layer (IMS)	Specifies, evaluates, implements, and operates the systems that collect, calculate, control, and report GHG data	D10

Five further domains run across every scale:

- **D1** Foundations, climate science, principles, policy, and ethics
- **D6** Reporting, disclosure, targets, and communication
- **D7** Verification, validation, and assurance
- **D9** Offsets, carbon markets, neutrality claims, and sustainable finance
- **D11** Professional practice, leadership, and continuous improvement

A CCAS holder should be able to follow one tonne of CO_2e from a fuel invoice, through a controlled calculation, into a corporate inventory, a building audit, a product footprint, or a city table — and defend every step to a verifier.

4. The CCAS Competency Model

The CCAS competency model has five competency clusters. Every examination item is written to one primary cluster and one BOK domain.

Cluster	Competency	Evidence a CCAS holder can produce
C1 Design	Define purpose, users, boundaries, scopes, base year, and methods for an inventory, footprint, project, or city	Inventory management plan; boundary decision record; project boundary and SSR list
C2 Quantify	Convert activity data into CO_2e with correct units, factors, GWPs, allocation, and uncertainty treatment	Calculation workbook or IMS record; EF register; uncertainty note
C3 Control	Run data through systems with QA/QC, access control, versioning, and audit trail	IMS requirements; control matrix; change log; evidence links
C4 Assure and disclose	Report transparently, map to frameworks, and prepare for or perform verification	Inventory report; disclosure map; verification-readiness pack
C5 Decide and lead	Set targets, prioritise reductions, evaluate credits and finance, manage engagements, and uphold ethics	Decarbonisation roadmap; credit-quality review; engagement plan; claims review

Appendix A, Section III, breaks each domain into task and competency statements under these clusters.

5. What "Specialist" Level Means

CCAS is a **specialist-level** credential. It is not an entry-level awareness certificate.

- **It assumes working familiarity** with energy, sustainability, engineering, finance, or public-sector practice.
- **It tests application, not recall alone.** Most items ask you to calculate, classify, choose between methods, or judge a situation (see §24).
- **It tests judgment under imperfect data.** Real inventories have gaps, conflicting sources, and client pressure. Items reflect this.
- **It expects you to know your limits.** A specialist recognises when a question needs a verifier, a lawyer, a licensed engineer, or a scheme-approved assessor, and says so.

Specialist does not mean narrow. CCAS expects breadth across all four scales and depth in the methods common to them.

6. Who CCAS Is For

CCAS is designed for professionals who measure, manage, report, or act on GHG data, including:

- Energy managers, energy engineers, and energy auditors
- Sustainability, ESG, and climate-reporting leads
- Facility, property, and asset managers
- Building services, HVAC, and commissioning professionals
- Industrial, process, and supply-chain professionals
- LCA, EPD, and product-footprint practitioners
- Municipal and regional climate officers and inventory compilers
- GHG data managers and IMS power users
- Consultants, contractors, and ESCO professionals
- Financial officers, analysts, and sustainable-finance professionals
- Internal auditors and assurance staff moving into GHG work
- Early-career professionals who meet the eligibility routes and want a structured, cross-scale foundation

7. How CCAS Relates to Single-Scope Credentials

Several respected credentials focus on one part of carbon practice — for example, organisational carbon auditing, building decarbonisation, community-scale inventories, or a specific product or regional scheme. Each serves its purpose well.

CCAS was built to answer a different need: **one credential that tests the connections between scales**. In practice, a building audit feeds a corporate Scope 2 figure; a product footprint becomes a customer's Scope 3 Category 1 and a CBAM declaration; a city inventory depends on the same utility data a company reports. CCAS tests those links, adds a full domain on the information systems underneath, and examines them in one sitting.

Feature	Typical single-scope credential	CCAS
Scale coverage	One scale or scheme	Organisation, city, product/project, building
Data systems	Usually, implicit	First-class domain (D10, 11 items)
Project accounting	Varies	Full ISO 14064-2 / Project Protocol sequence (D5)
Cross-scale links	Limited	Tested through scenario sets
Owner	Respective body	Beyond Smart Cities

CCAS does not replace or confer any other credential (see §9). Many professionals hold both a single-scope credential and CCAS; Beyond Smart Cities recognises relevant credentials through experience credit (see §13).

8. How the CCAS Examination Is Built

The examination follows recognised practice for professional credentialing. Beyond Smart Cities applies the following process.

1. **Body of Knowledge.** CCAS BOK v1.1 defines 11 domains, their topics, competencies, and weights.
2. **Practice analysis.** A review of the work carbon-accounting professionals perform, informed by public credential blueprints, standards, and practitioner input. A formal practice-analysis survey is planned.
3. **Blueprint.** Domain weights and item counts (Appendix A) control how many items each form contains.
4. **Item writing.** Subject-matter experts write original items to the blueprint. No item is taken from any other credential's examination.
5. **Item review.** Each item is reviewed for technical accuracy, currency, clarity, bias, and link to a BOK topic.
6. **Pilot testing.** New items may appear unscored before they count.
7. **Standard setting.** A panel of qualified practitioners sets the cut score using a criterion-referenced method such as modified Angoff.
8. **Ongoing review.** Item statistics, candidate comments, and changes to standards drive regular updates. The BOK is reviewed at least every 24 months or when a major standard changes.

Currency rule. Items test the editions of standards in force at the BOK's publication date, unless an item states otherwise. Where a standard is under revision, items avoid testing unsettled details.

9. Independence and Non-Affiliation Statement

CCAS is developed, owned, and administered by **Beyond Smart Cities Private Limited**.

CCAS is independent. It is **not affiliated with, endorsed by, or administered on behalf of** any other credentialing, training, or standard-setting body

What the BOK references mean. The BOK and this handbook name standards (GHG Protocol, ISO, GPC, IPCC, SBTi, IFRS, ESRS, HK Guidelines, CIC scheme documents, and others) as **knowledge content only**. Candidates must use the current official editions from their publishers. Where this handbook shows topic overlap with other programmes, it shows overlap of subject matter, not equivalence or endorsement.

No third-party content. The CCAS examination contains no items from any other organisation's examination, and Beyond Smart Cities materials reproduce no third-party course text.

Preparation materials. Purchasing or completing Beyond Smart Cities study materials does not guarantee passing the CCAS examination.

10. About This Handbook

This handbook describes the CCAS programme as of its version date. It does not create a contract between Beyond Smart Cities and any person or organisation.

Beyond Smart Cities may change policies, fees, and procedures. It will publish changes at CCAS programme page and give reasonable notice to affected candidates and holders. The policy in force on the date of your application or maintenance submission applies, unless a change is in your favour.

© Beyond Smart Cities. The CCAS name, BOK, blueprint, and examination are the property of Beyond Smart Cities. You may share this handbook unaltered for information. You may not sell it, adapt it into a competing scheme, or present it as your own.

Part II — Eligibility and Application

All eligibility values in this part are **Beyond Smart Cities policy drafts .**They are published so candidates can plan. Final values will be confirmed before applications open.

11. Overview of Requirements

To earn CCAS, you must:

1. Meet **one eligibility route** (education plus relevant experience) — §12–§15.
2. Complete **recommended preparation** of at least 16 hours (CCAS preparation course or equivalent) — recommended, not mandatory.
3. **Agree to the CCAS Code of Conduct** (Part VI).
4. **Pass the CCAS examination** within your eligibility window (§16).

Membership of any association is not required.

12. Eligibility Routes A–D

Route	Highest education	Relevant experience (minimum)	Preparation (recommended)
A	Bachelor's degree or higher in engineering, environmental science, energy, architecture, building science, accounting/finance, or a related discipline	**2 years**	≥ 16 hours CCAS preparation or equivalent
B	Bachelor's degree or higher in an unrelated discipline	**3 years**	As above
C	Diploma or associate degree (any discipline)	**4 years**	As above
D	No post-secondary qualification	**6 years**	As above

Notes

- "Related discipline" includes STEM fields, built-environment fields, economics, accounting, finance, and public policy with a quantitative or environmental focus. Beyond Smart Cities decides borderline cases.
- Foreign qualifications are accepted at their recognised equivalent level. Beyond Smart Cities may ask for an equivalence statement.
- Experience must be gained in the **3 years** before application.
- Part-time experience counts pro rata (for example, 50% time for 2 years = 1 year).
- Experience in a full-time degree programme does not count, except paid internships or co-op placements with documented relevant duties.

13. Experience Credit for Existing Credentials

Holders of a current credential below may claim **up to 1 year** of experience credit. Only one credit applies, however many credentials you hold.

Credential (any current, recognised issuer)	Credit
LEED AP (any specialty)	Up to 1 year
Completed ISO 14064 lead verifier / lead auditor training	Up to 1 year

Experience credit does not reduce the examination requirement. It recognises related professional development only; it does **not** imply that CCAS is equivalent to, or affiliated with, any listed credential or its issuer.

14. What Counts as Relevant Experience

Relevant experience is paid or formally contracted professional work in which **GHG or energy data, carbon methods, or decarbonisation decisions** were a substantial part of your duties (indicatively, at least 30% of working time).

Qualifying work areas

Area	Examples that qualify	Examples that usually do not qualify
GHG inventories	Compiling Scope 1–3 inventories; maintaining an EF register; base-year recalculation	Entering meter readings without method responsibility
Energy audits and management	Level I–III audits; energy baselines; M&V; ISO 50001 implementation	Routine plant operation with no analysis role
Building services and decarbonisation	Electrification studies; WLCA; commissioning; refrigerant management programmes	General construction site supervision
Product footprints and LCA	CFP or EPD modelling; PCR application; supplier data collection for LCA	Marketing of eco-labelled products
City and subnational work	GPC inventory compilation; sector lead roles; climate action plan analytics	General municipal administration
Project accounting	Baseline and monitoring for reduction or removal projects; monitoring reports	Selling credits without methodology work
Verification and assurance	Verifier, validator, or internal audit roles on GHG data	Financial audit with no GHG element
Reporting and disclosure	Preparing CDP, IFRS S2, ESRS E1, or regulatory GHG disclosures	Copy-editing sustainability reports
GHG data systems	IMS requirements, configuration, administration, data governance	Generic IT support
Carbon markets and finance	Credit-quality due diligence; ETS compliance; green-finance KPI work	Generic lending or trading roles

Worked examples

- **Example 1 — Route A.** A mechanical engineer (B.E.) spent 2.5 years on building energy audits, 60% of which included converting audit results into carbon savings. *Eligible under Route A.*
- **Example 2 — Route B with credit.** A commerce graduate has 2 years compiling Scope 1–3 data for a manufacturer and holds a current CEM. Experience 2 years + 1 year credit = 3 years. *Eligible under Route B.*
- **Example 3 — Route C, not yet eligible.** A diploma holder has 3 years as a municipal energy officer, half of it on GPC data collection. Prorated relevant experience is under 4 years. *Not yet eligible; may reapply once 4 years are met or credit applies.*
- **Example 4 — Partial relevance.** An IT analyst configured a sustainability data platform for 18 months and then moved to general ERP work. Only the 18 months count. *Not eligible under Route A until 2 years are reached.*

[Examples are illustrative of draft policy, not individual eligibility decisions.]

15. Eligibility Decision Tree

Work through the questions in order.

```
START
  │
  ├─ Q1. Do you hold a bachelor's degree or higher?
  │      ├─ YES → Q2. Is it in a related discipline (see §12 notes)?
  │      │          ├─ YES → Route A: need ≥ 2 years relevant experience
  │      │          └─ NO → Route B: need ≥ 3 years relevant experience
  │      └─ NO → Q3. Do you hold a diploma or associate degree?
  │                 ├─ YES → Route C: need ≥ 4 years relevant experience
  │                 └─ NO → Route D: need ≥ 6 years relevant experience
  │
  ├─ Q4. Count your relevant experience (§14), prorating part-time work.
  │
  ├─ Q5. Do you hold a current credential listed in §13?
  │      ├─ YES → add up to 1 year (one credit only)
  │      └─ NO → no credit
  │
  ├─ Q6. Is (experience + credit) ≥ your route minimum?
  │      ├─ YES → Q7
  │      └─ NO → Not yet eligible. Build experience; consider CCAS
  │               preparation now; reapply later.
  │
  └─ Q7. Can you document it (§17) and agree to the Code of Conduct?
         ├─ YES → APPLY
         └─ NO → Gather documents first; contact Beyond Smart Cities
                  if your case is unusual.
```

16. Application Steps

1. **Check eligibility** using §12–§15.
2. **Create an account** on the CCAS application portal.
3. **Complete the application**: personal details exactly as on your photo ID; education; experience entries (employer, dates, % time, duties mapped to BOK domains); credential credit claimed.
4. **Upload documents** listed in §17.
5. **Sign the declarations**: accuracy of information, CCAS Code of Conduct, examination confidentiality agreement, and personal-data notice.
6. **Pay the application fee** (§19).
7. **Receive a decision** within 10 business days of a complete application: approved, more information needed, or declined with reasons.
8. **Schedule and sit the examination** within your eligibility window of 6 months from approval. One extension may be granted for documented reasons.

17. Documentation Checklist

✓	Document	Notes
☐	Government-issued photo ID (copy)	Name must match the application exactly
☐	Highest qualification certificate or transcript	Translation required if not in English
☐	Experience verification for each role	Signed letter from employer or client on letterhead: role, dates, % time on relevant work, duties
☐	Experience narrative	150–300 words per role, mapping duties to CCAS domains (e.g., "D3, D10")
☐	Self-employed evidence (if applicable)	Two client letters, contracts, or invoices showing scope; plus a statement from an independent referee
☐	Credential-credit evidence (if claimed)	Certificate, digital badge link, or registry entry showing current status
☐	Training evidence (recommended)	Course certificate showing hours (≥ 16 h)
☐	Accommodation request (if needed)	See §38; submit with or before the application
☐	Signed declarations	Accuracy, Code of Conduct, confidentiality, personal-data notice

Tips. Name the BOK domains your duties map to. Give percentages of time honestly. A referee must be able to confirm the duties directly, not by hearsay.

18. Application Review and Audit

Beyond Smart Cities reviews every application for completeness and against the eligibility rules.

- **Random audit.** A percentage of applications is selected for detailed audit. Selected applicants must provide further evidence within 30 days.
- **Targeted audit.** Beyond Smart Cities may audit any application where information is unclear or inconsistent.
- **Outcome.** If information is found to be incomplete, inaccurate, or false, Beyond Smart Cities may decline the application, withhold or void results, or withdraw a credential already issued — at any time.
- **Referee contact.** By applying, you consent to Beyond Smart Cities contacting your referees and issuers to confirm information.

19. Fees

Fee	Amount	Notes
Application and examination fee	250$	Covers review and one examination attempt
Bundle with CCAS preparation course	500$	If offered
Retake fee	150$	See §45
Reschedule / late cancellation fee	100$	See §33
Eligibility extension fee	50$	See §16
Score review fee	50$	See §46
Maintenance (renewal) fee	100$	Per cycle; see Part VII
Reinstatement fee	100$	See §56
Refund on declined application	Refund minus administrative charge	

Fees are payable in local currency/any currencies. Regional or early-career pricing may be introduced.

20. Candidate Rights and Responsibilities

You have the right to:

- Clear, published eligibility rules applied consistently.
- Reasons for any adverse decision, and a route to appeal it (§46).
- Confidential handling of your application and results (§21).
- Reasonable testing accommodations where needed (§38).
- Raise a complaint about the programme (§47).

You are responsible for:

- Giving complete, accurate information and updating it if it changes.
- Paying applicable fees.
- Scheduling and sitting within your eligibility window.
- Following examination rules and reporting any suspected breach you observe.
- Keeping examination content confidential, during and after the exam.
- After certification: telling Beyond Smart Cities promptly of anything that affects your ability to meet credential requirements, and using the designation correctly (§44).

21. Non-discrimination, Impartiality, and Personal Data

Non-discrimination. Beyond Smart Cities does not discriminate against any applicant, candidate, or holder on the basis of race, colour, caste, ethnicity, national origin, religion, sex, gender identity, sexual orientation, age, disability, marital or family status, or any other characteristic protected by applicable law. Eligibility and certification decisions rest only on published requirements.

Impartiality. Beyond Smart Cities separates its preparation and training activities from examination development and certification decisions. Staff and subject-matter experts who write or review examination items do not train candidates on those items and declare conflicts of interest. Use of Beyond Smart Cities study materials is not required and gives no advantage in eligibility or scoring.

Personal data. Beyond Smart Cities collects personal data to identify candidates, assess eligibility, deliver and secure the examination, issue and verify credentials, and maintain the register. Data is shared with the examination delivery provider only as needed to deliver the test. Data is handled under applicable data-protection law, including India's Digital Personal Data Protection Act, 2023 and, where relevant, other jurisdictions' laws. Item-level responses are used for examination development and security and are part of the confidential examination record.

Part III — About the Examination

22. Examination Format

Feature	Specification
Scored items	**140**
Unscored pilot items	May be added; they do not affect your score and are not identified
Time	**3.5 hours (210 minutes)** of testing time, plus a short tutorial and agreement screen
Delivery	Computer-based, proctored (§32)
Item types	Single-best-answer MCQ; multi-step calculation items; scenario sets of 2–4 linked items
Blueprint	11 domains, fixed item counts per form (Appendix A)
Navigation	Items may be flagged for review and changed until time ends
Scoring	Each scored item counts equally; no penalty for wrong answers

Pacing. 210 minutes ÷ 140 items = 1.5 minutes per item on average. Recall items take less; calculation items and scenario sets take more. Plan for about 20 minutes of review time at the end.

23. Item Types

23.1 Single-best-answer multiple choice

A stem and four options. One option is the best answer; the others are plausible but weaker or wrong. Expect “best”, “first”, or “most appropriate” wording — read the qualifier.

23.2 Multi-step calculation items

A stem gives data (activity data, emission factors, GWPs, efficiencies, prices) and asks for a single result. Options are numerical and distractors reflect common errors, such as:

- unit or energy-content errors (HHV vs LHV, kWh vs MJ);
- the wrong GWP set (AR4 vs AR5 vs AR6);
- location-based and market-based Scope 2 confused;
- leakage or project emissions not deducted;
- allocation or attribution applied to the wrong quantity.

All factors needed are given in the stem or the reference sheet. You are **not** expected to memorise emission-factor values.

23.3 Scenario sets

A short case (one to three paragraphs, sometimes with a small table) followed by 2–4 items. Each item is scored independently. Scenarios commonly link scales — for example, a building retrofit that changes a corporate Scope 2 figure, or a product footprint used in a CBAM declaration.

23.4 What the examination does not include

- Items copied or adapted from any other organisation's examination.
- Questions on proprietary software interfaces.
- Questions that hinge on a value or rule still under revision at the BOK date.

24. Cognitive Taxonomy

Every item is classified at one of three cognitive levels.

Level	What it asks you to do	Typical verbs	Target share	≈ Items
L1 Recall / Understand	Identify a definition, principle, requirement, or concept	define, identify, recognise, distinguish	~25%	~35
L2 Apply / Calculate	Use a method or formula on given data; classify a case	calculate, convert, classify, apply, select	~45%	~63
L3 Analyse / Judge	Weigh options, diagnose a problem, decide what to do under constraints	evaluate, prioritise, justify, diagnose, recommend	~30%	~42

The mix is a target across the full form; it varies slightly by domain. Domains with heavy calculation content (D3, D5, D8) carry more L2 items. Domains centred on judgment (D7, D9, D10, D11) carry more L3 items.

Example of the same topic at three levels (illustrative, not exam items):

- *L1:* Which consolidation approach accounts for emissions in proportion to ownership?
- *L2:* A company holds 40% of a joint venture that emits 10,000 t CO_2e. What does it report under the equity share approach?
- *L3:* The company has financial control but not operational control of that venture. Which approach best serves an investor-focused disclosure, and what must be disclosed about the choice?

25. Scoring Philosophy and Passing Standard

Criterion-referenced. CCAS measures whether you meet a defined standard of competence. You are not graded against other candidates, and there is no quota of passes.

Standard setting. The cut score is set by a panel of qualified practitioners who judge how a minimally competent CCAS specialist would perform on each item (a modified Angoff or comparable method). The indicative pass mark is **about 70%** on a scaled basis.

Scaled scores. Raw scores may be converted to a common scale so that results mean the same thing across different examination forms of slightly different difficulty.

Single pass/fail decision. The credential decision is based on your total scaled score. Domain-level feedback is diagnostic only; there is no separate pass mark per domain.

No negative marking. Answer every item.

26. Calculator and Reference-Sheet Policy

Calculator

- A **non-programmable basic or scientific calculator** is permitted.
- Not permitted: graphing, programmable, or communication-enabled calculators; phones; smart watches; calculators with stored text or formulas.
- An on-screen calculator will be available.

On-screen reference sheet (outline)

The reference sheet is provided within the exam. It is not a substitute for study. Its planned contents are final contents:

1. **GWP table** — values for the main Kyoto gases and common refrigerants, labelled by IPCC Assessment Report; each item states which set to use.
2. **Unit and energy conversions** — energy (kWh, MJ, GJ, therm, MMBtu), mass, volume, and SI prefixes.
3. **Core equations**
    - Emissions = activity data × emission factor × GWP
    - Refrigerant mass balance (inventory change + purchases − sales/disposal − capacity change)
    - Project reductions = baseline emissions − project emissions − leakage
    - Equity share / financed-emissions attribution concept
    - Heat: $Q = m \cdot c_p \cdot \Delta T$; COP and kW/ton relationships
    - Simple payback, NPV, and annual linear reduction to a target
4. **Abbreviations list** used in the item bank.

Emission factors needed for a calculation appear **in the item stem**, not on the sheet.

27. Language and Units

- The examination is in **English**.
- Items use **SI units** by default, with IP units where the practice is IP-based (for example, some HVAC relationships); conversions are given where needed.
- Spelling follows international English; terms from standards keep their published form.
- Candidates whose first language is not English may request extra time under the accommodations process if Beyond Smart Cities adopts that policy.

28. Preparing for the Examination

Preparation principles

1. **Study from the blueprint.** Appendix A tells you what is tested and how much.
2. **Use primary sources.** Read the current editions of the standards in Appendix C. Study guides help; they do not replace the standards.
3. **Practise calculations by hand.** Work every calculation type in Appendix A, Section IV, without a spreadsheet.
4. **Practise judgment.** For each domain, ask "what would a verifier challenge here?"
5. **Close gaps by scale.** Most candidates are strong in one scale. Identify your weakest scale early.

Beyond Smart Cities resources (optional)

Beyond Smart Cities offers CCAS preparation through learn.beyondsmartcities.in. Related existing courses include *Fundamentals of Organizational GHG Accounting*, *Global Carbon Markets – Emissions Trading*, and *Urban Greenhouse Gas Inventory Specialist – Exam Prep*.

Preparation is optional. Beyond Smart Cities item writers do not see preparation-course question banks during item development, and practice questions are not drawn from the live examination. Buying any resource does not guarantee a pass.

29. Study Plan Mapped to the 11 Domains

Recommended total: **about 120 study hours** for a candidate meeting Route A with experience in one scale. Adjust up for weaker scales. (Beyond Smart Cities guidance, not a requirement.)

Week (12-week plan)	Domain focus	Key outputs of your study
1	D1 Foundations, science, policy, ethics	GWP/CO_2e drills; principle trade-off notes
2	D2 Organisational boundaries	Consolidation worked cases; base-year recalculation rules
3–4	D3 Quantification, conversions, data quality	Scope 1, 2 (dual), 3 calculation sets; EF selection notes
5	D4 City inventories and subnational MRV	GPC sector table; notation-key cases; MRV institutional map
6	D5 Product CFP, PCR, project accounting	A1–A4 CFP worksheet; project baseline – project – leakage cases
7	D6 Reporting, disclosure, targets	Report-content checklist; target maths; framework map
8	D7 Verification and assurance	Materiality cases; evidence plan; readiness pack (Appendix E)
9–10	D8 Building and energy decarbonisation	Electrification, PV, chiller, refrigerant, WLCA calculations
10	D9 Markets, credits, neutrality, finance	Credit-quality checklist; ETS/CBAM calculations
11	D10 GHG IMS	IMS readiness checklist (Appendix D); control-failure cases
11	D11 Professional practice	Code of Conduct cases; role/licence limits
12	Mixed review	Two timed 140-item practice sittings; error log by domain

Per-domain hour guidance appears in Appendix A, Section V.

30. Examination Security and Intellectual Property

All CCAS examination content is the confidential intellectual property of Beyond Smart Cities. Before testing you will accept a confidentiality agreement.

You must not copy, record, memorise for disclosure, share, post, sell, or discuss any examination item, in any form or forum, during or after the examination. “Recalls” posted online are a breach. Beyond Smart Cities may withhold or void results, withdraw the credential, bar future applications, and pursue legal remedies for any breach.

If you see examination content being shared, report it to Beyond Smart Cities at info@beyondsmartcities.in OR specialists@beyondsmartcities.in .

Part IV — Scheduling and Testing

The delivery provider for CCAS is not yet confirmed. This part sets out Beyond Smart Cities requirements that will apply whichever provider is appointed. Provider-specific steps will be added when confirmed.

31. Scheduling Your Examination

1. After approval, you receive an **authorisation email** from Beyond Smart Cities with your candidate ID, eligibility window, and scheduling instructions.
2. Create or log in to your account with the delivery provider and book a date, time, and mode (online or test centre).
3. You receive a **booking confirmation**. Check that your name matches your ID exactly; if not, contact Beyond Smart Cities before test day.
4. Book early. Popular dates fill quickly, and you must sit within your eligibility window.

Your authorisation is personal and cannot be transferred. Walk-in testing is not available.

32. Delivery Options

Option	Description	Status
Online proctored	Take the exam at home or work with live or recorded remote proctoring and a secure browser	Online
Test centre	Take the exam at an approved proctored centre	Online
Scheduled group sittings	Supervised sittings for employer or partner cohorts	NA

Both modes use the same blueprint, timing, and scoring.

33. Rescheduling, Cancellation, and No-Shows

Situation	Policy
Reschedule or cancel ≥ 72 hours before appointment	No fee
Reschedule or cancel inside that window	Fee applies
No-show, or arriving / logging in more than 15 minutes late	Attempt forfeited; fee not refunded; a retake fee applies to rebook
Documented emergency (illness, bereavement, disaster)	Case-by-case review with evidence submitted within , 7 days.

Work commitments are not treated as emergencies.

34. Identification Requirements

Present **one valid, original, government-issued photo ID** with signature (where the document carries one). Acceptable examples:

- Passport
- National identity card (for example, Aadhaar card with photo is subject to acceptance)
- Driving licence
- Government-issued residence permit

Rules - The ID must be current (not expired) and undamaged. - The name must match your registration exactly, apart from accents and minor spacing. If your name has changed, send legal evidence to Beyond Smart Cities at least before testing. - Photocopies, digital images, and employee or student cards are not accepted as primary ID. - A secondary ID with your name may be required - Online candidates show the ID to the webcam and may be photographed.

If you cannot present acceptable ID, you will not be admitted and the attempt is forfeited.

35. What to Bring and What to Leave Behind

Bring - Acceptable photo ID - Your candidate ID / confirmation - A permitted calculator, if allowed for your mode (§26) - Reading glasses or medically required items (declare them to the proctor)

Leave outside the testing room (or out of camera view) - Phones, smart watches, earbuds, and any electronic device - Notes, books, standards, papers - Bags, coats, hats (unless for religious reasons, subject to inspection), wallets - Food and drink, unless approved as an accommodation

Scratch materials: test centres provide erasable boards or paper that are collected at the end. Online candidates use the on-screen whiteboard or a single blank erasable board shown to the camera.

36. Online-Proctored Testing Environment

- A private, quiet, well-lit room with a closed door; no other person present.
- A clear desk and walls free of notes or writing within view.
- One monitor only; a webcam and microphone that stay on throughout.
- A stable internet connection meeting the provider's minimum; run the system check at least 24 hours ahead.
- Close all other applications; the secure browser will check.
- Remain in camera view at all times except during authorised breaks.

37. Breaks

- There is **no scheduled break** within the 3.5-hour exam.
- If you take an unscheduled break at a test centre, the exam clock keeps running.

- Online candidates may not leave camera view unless the provider's policy allows a supervised break.
- You may not access phones, notes, or other materials during any break.

38. Testing Accommodations

Beyond Smart Cities provides reasonable accommodations to candidates with a documented disability or medical condition, consistent with applicable law, including India's Rights of Persons with Disabilities Act, 2016 where relevant.

Examples: extra time, separate room, screen magnification, reader or scribe, additional breaks, permission for medication or food.

39. Emergencies and Technical Failures

- **Centre closures** due to weather or emergency: the provider or Beyond Smart Cities will notify you and reschedule without fee.
- **Power or connection loss**: the exam normally resumes where it stopped with time remaining preserved. If it cannot resume, you will be rescheduled without fee.
- **Incident report**: if anything disrupts your exam, report it to the proctor at the time and email Beyond Smart Cities within 3 business days. Late reports may not be considered.

40. Candidate Conduct and Grounds for Dismissal

Beyond Smart Cities may dismiss a candidate, void results, withdraw a credential, and bar future attempts for conduct including:

1. Giving or receiving help, or attempting to.
2. Using or possessing unauthorised materials or devices.
3. Copying, photographing, recording, or transcribing items, or attempting to remove content.
4. Impersonation: taking the exam for someone else or having someone take it for you.
5. Falsifying identity, eligibility, or application information.
6. Leaving camera view or the room without authorisation.
7. Disruptive, abusive, or threatening behaviour toward staff or other candidates.
8. Tampering with the testing system or secure browser.
9. Sharing or soliciting examination content before or after testing.
10. Any other conduct that undermines the integrity of the examination.

Beyond Smart Cities also may withhold or cancel a result if a score appears invalid — for example, because of irregular response patterns or a security breach — after an investigation in which the candidate may respond.

41. Test-Taking Guidance

- **Read the last sentence first.** Know what is being asked before you read the data.
- **Check the qualifier.** “First”, “best”, “most conservative”, and “under the equity share approach” change the answer.
- **Track units.** Write units beside every number in calculations.
- **Use the stated GWP set and factor.** Do not substitute values from memory.
- **Flag and move on.** Do not spend more than about three minutes on one item on the first pass.
- **Answer everything.** There is no penalty for guessing.
- **Use the comment feature** if you believe an item is flawed (§46); it does not affect your time allowance.

Part V — After the Examination

42. Results and Score Reports

- **Provisional result:** shown on screen at the end of the exam, if the delivery provider supports it.
- **Official result:** issued by Beyond Smart Cities by email within 10 business days after any quality-assurance checks.
- **Score report content:**
  - Pass or fail
  - Scaled total score and the passing score
  - Domain-level performance indicators (for example, “Below / Near / Above standard”) for all 11 domains — **diagnostic only**
- Results are not given by phone.
- During the first administrations, results may be delayed while the passing standard is confirmed.

43. Earning the Credential: Certificate, Digital Badge, and Register

Successful candidates receive digital certificate.

- An electronic **certificate** with a unique credential number and dates of issue and expiry.
- A verifiable **digital badge** that can be shared on professional profiles.
- A listing on the **public CCAS register**, showing name, credential number, status, and expiry date. You may opt out of optional fields (for example, city) but not of status confirmation.

Certificates and badges remain the property of Beyond Smart Cities and must be returned or disabled if the credential is suspended or withdrawn.

44. Use of the CCAS Designation and Marks

Do - Write the designation after your name as **"Name, CCAS"** or "Certified Carbon Accounting Specialist (CCAS)". - Use the CCAS badge only while your credential is current. - Describe CCAS accurately as a Beyond Smart Cities credential.

Do not - Use CCAS for an organisation, product, report, or service; it applies to individuals only. - Imply that CCAS certifies, verifies, or assures a specific inventory, footprint, or claim. - Imply that CCAS is affiliated with or equivalent to any third-party credential. - Alter the badge or logo, or use them after expiry, suspension, or withdrawal.

45. Retake Policy

Item	Policy
Waiting period after a failed attempt	e.g., 60 days
Attempts per 12 months	e.g., up to 3
Retake fee	150$
Re-application	Not required within the eligibility window; required after it lapses
Same form	Retakes receive a different form where available

46. Item Comments, Score Review, and Appeals

Item comments. During the exam you may comment on any item you believe is flawed. Beyond Smart Cities reviews all comments before results are finalised. An item found to be defective may be removed from scoring or scored with more than one keyed answer. Individual replies are not provided.

Score verification. You may request a manual re-score within 30 days of results for a fee. Re-scoring confirms that responses were scored correctly; it does not re-open item content.

Appeals. You may appeal: - an eligibility decision; - a result affected by a documented administration irregularity; - a decision to void results, suspend, or withdraw a credential.

Submit a written appeal within 30 days with reasons and evidence. Appeals are decided by persons not involved in the original decision. The appeal decision is final within the CCAS programme. Disagreement with the content or keyed answer of an item, without a documented defect, is not grounds for appeal; use the comment process instead.

47. Complaints

Anyone — candidates, holders, employers, clients, or the public — may complain about the CCAS programme or about the conduct of a CCAS holder. Send complaints in writing to info@beyondsmartcities.in.

Beyond Smart Cities will acknowledge receipt, investigate impartially, keep the complainant and the subject informed as appropriate, and protect confidentiality.

48. Suspension and Withdrawal of the Credential

Beyond Smart Cities may suspend or withdraw CCAS for:

- breach of the Code of Conduct (Part VI);
- false or misleading application or maintenance information;
- examination misconduct discovered after certification;
- failure to meet maintenance requirements (Part VII);
- non-payment of required fees;
- misuse of the designation or marks.

Holders are notified of the grounds and may respond before a final decision, except where immediate suspension is needed to protect the public or the examination. Suspended or withdrawn holders must stop using the designation and badge immediately.

Part VI — Professional Practice and Code of Conduct for CCAS Holders

49. Professional Practice Standards

CCAS holders are expected to apply the following standards in every engagement. They describe good practice; the Code of Conduct (§50) sets the enforceable duties.

1. **Fitness for purpose.** Confirm the intended use and users of a GHG result before choosing boundaries and methods.
2. **Standard alignment.** Name the standard, edition, and programme rules applied, and any departures.
3. **Traceability.** Every reported figure should trace to source evidence through documented calculations and a controlled system.

4. **Transparency of limits.** Disclose exclusions, estimates, data gaps, uncertainty, and assumptions in plain language.
5. **Conservativeness where it matters.** For reductions, removals, and claims, prefer choices that do not overstate benefits.
6. **Separation of roles.** Do not verify work you prepared, designed, or materially advised on.
7. **Competence limits.** Accept only work within your competence or under appropriate supervision; refer legal, licensed-engineering, financial-advice, or scheme-restricted tasks to qualified persons.
8. **Record keeping.** Retain working papers for the period required by the engagement, programme, or law — and at 7 years where no rule applies.

50. CCAS Code of Conduct

As a condition of certification and maintenance, every applicant, candidate, and holder agrees to the following Code.

1. Integrity. I will act honestly and will not knowingly prepare, approve, or publish GHG information that is false or misleading.

2. Objectivity. I will not let bias, conflicts of interest, or undue influence from clients, employers, or others override professional judgment.

3. Conflicts of interest. I will identify and disclose actual, potential, and perceived conflicts to affected parties in writing, and decline or withdraw where a conflict cannot be managed.

4. Competence. I will provide services only within my competence, maintain that competence through continuing development, and state the limits of my work.

5. Due care. I will apply recognised standards and methods with diligence and document the basis for my conclusions.

6. Confidentiality. I will protect confidential client, employer, and personal data and disclose it only with authorisation or where required by law.

7. Claims integrity. I will not make, endorse, or help publish environmental claims — including “carbon neutral”, “net zero”, “low carbon”, or reduction claims — that are not supported by evidence and by the rules of the standard or programme cited.

8. Data integrity. I will not alter, suppress, or selectively exclude data to change a result, and I will correct material errors I discover, informing affected parties.

9. Responsibility to the public. I will place public interest, health, safety, and environmental integrity above the private interests of any party.

10. Lawful practice. I will comply with applicable laws, regulations, and scheme rules, including licence requirements for regulated roles.

11. Accurate representation. I will represent my qualifications and the CCAS credential accurately and will not imply that CCAS certifies an organisation, product, or claim, or that it is affiliated with any other body.

12. Examination integrity. I will keep CCAS examination content confidential and report suspected breaches.

13. Cooperation. I will cooperate with Beyond Smart Cities in audits, complaints, and investigations, and report promptly any criminal conviction, regulatory sanction, or professional disciplinary finding related to my professional conduct.

14. Respect. I will treat colleagues, clients, communities, and candidates with fairness and respect.

Breach of the Code may lead to reprimand, conditions, suspension, or withdrawal of the credential (§48).

51. Claims Integrity

Misleading environmental claims are among the most serious risks in carbon practice. CCAS holders apply these rules (expanded in Appendix F):

- **Inventory first.** No neutrality or net-zero claim without a complete, documented inventory for the stated boundary.
- **Reduce first.** Credits complement — and do not replace — a credible reduction plan.
- **Gross before net.** Report gross emissions by scope; report credits and removals separately; never net credits out of scope totals.
- **Say what standard.** Every claim names its standard or programme, boundary, period, and verification status.
- **Match the words to the evidence.** “Reduced”, “offset”, “compensated”, “neutral”, and “net zero” mean different things. Use the one the evidence supports.

Part VII — Credential Maintenance (CMP)

All maintenance values in this part are **Beyond Smart Cities policy.**

52. Purpose of Maintenance

Standards, factors, disclosure rules, and markets change every year. Maintenance confirms that CCAS holders keep their knowledge current and continue to practise ethically.

53. Maintenance Cycle

- **Cycle length:** 3 years from the date of certification.
- **Deadline:** the last day of the cycle's final month.
- **Requirements each cycle:**
    1. Earn 40 CPD hours, of which at least 50% come from structured learning (Category 1, Appendix B).
    2. Include at least 3 hours on ethics, claims integrity, or professional conduct.
    3. Cover at least 3 of the five competency clusters (C1–C5, §4) across the cycle.
    4. Re-affirm the Code of Conduct.
    5. Pay the maintenance fee.

54. CPD Requirements

One CPD hour = 60 minutes of qualifying activity (minimum unit 0.5 hour).

Qualifying topics are those in the CCAS BOK (any of the 11 domains), updates to standards in Appendix C, and directly related professional skills (for example, data governance for GHG systems, or LCA software methods).

Category	Description	Cap per cycle
1 — Structured learning	Courses, webinars with assessment, university modules, standard-update trainings	No cap; ≥ 50% of total
2 — Professional practice	Leading or performing GHG inventories, audits, verifications, CFPs, IMS implementations, city inventories	15 hours
3 — Contribution	Teaching, presenting, publishing, item writing, standards-committee work, mentoring	15 hours
4 — Self-directed study	Documented reading of new standards and guidance	10 hours

Appendix B gives detailed activity rules and evidence.

Carry-over. Hours earned above the requirement do not carry over to the next cycle.

55. Reporting, Audit, and Record Keeping

- Log CPD activities in the maintenance portal as you complete them: date, provider, title, hours, category, BOK domain(s), cluster.
- Keep evidence for **2 years after the cycle ends**: certificates, agendas, publication copies, project letters, reading logs.
- A random sample of holders is audited each cycle. If audited, you must upload evidence within 30 days. Hours without evidence are prohibited. If the requirement is then unmet, the credential lapses and the fee is not refunded.

56. Lapse, Grace Period, and Reinstatement

Status	Rule
Grace period	90 days after the deadline to complete maintenance with a late fee. CPD earned during the grace period counts only toward the lapsed cycle if declared as such and does not count again. The designation may not be used during the grace period.
Lapsed	After the grace period the credential expires; the register shows “Expired”.
Reinstatement	Within e.g., 12 months of expiry: complete the missed CPD plus a reinstatement fee. After that: re-apply and pass the examination.
Inactive / hardship	One extension of up to e.g., 12 months for documented illness, parental leave, or similar, on request before the deadline.

57. Alternative: Maintenance by Examination

A holder may maintain CCAS by **passing the current CCAS examination** within the final 3 months of the cycle, instead of reporting CPD hours. The Code of Conduct affirmation and maintenance fee still apply. Passing resets the cycle from the original expiry date.

Appendix A — CCAS Exam Blueprint

Source: CCAS Body of Knowledge v1.1 (Beyond Smart Cities, January 2027). This appendix is the authoritative statement of what the CCAS examination covers. Where this appendix and any study material differ, this appendix governs.

Section I: Domain Weightings and Item Counts

#	CCAS Domain	Published weight	Scored items	Exact item share	Primary clusters
1	Foundations, Climate Science, Principles, Policy & Ethics	7%	10	7.1%	C1, C5
2	Organizational GHG Inventory Design & Boundaries	10%	14	10.0%	C1
3	Quantification Methodologies, Conversions & Data Quality	13%	18	12.9%	C2
4	Community-Scale / Urban GHG Inventories (GPC) & Subnational MRV	9%	13	9.3%	C1, C2, C3
5	Product Carbon Footprints, PCR & Project-Level Accounting	10%	14	10.0%	C1, C2
6	Reporting, Disclosure Frameworks, Target Setting & Communication	9%	13	9.3%	C4, C5
7	Verification, Validation, Assurance & Audit Readiness	9%	13	9.3%	C4
8	Building & Energy Decarbonization Strategy	14%	20	14.3%	C2, C5
9	Offsets, Carbon Markets, Neutrality Claims & Sustainable Finance	6%	8	5.7%	C5
10	GHG Information Management Systems (IMS)	8%	11	7.9%	C3
11	Professional Practice, Leadership & Continuous Improvement	5%	6	4.3%	C5
	Total	**100%**	**140**	**100%**	

Item check: 10 + 14 + 18 + 13 + 14 + 13 + 13 + 20 + 8 + 11 + 6 = **140**.

Weights note. The **item counts are authoritative**: every examination form contains exactly these numbers of scored items per domain. The published weights are whole-

number planning figures that sum to 100%. Because 140 items cannot match every whole-number weight exactly, D11 is published at **5%** but holds **6 items** (4.3% of the form). D11 content is also tested through scenario sets in other domains. The exact-share column shows each domain's true proportion of the 140 items (one decimal; display rounding sums to 100.1%).

Scale map. Organisation (D2, D3, D6) · City (D4) · Product and project (D5) · Building (D8) · Data layer (D10) · Cross-cutting (D1, D7, D9, D11).

Section II: Domain Descriptions and Key Topics

Domain 1 — Foundations, Climate Science, Principles, Policy & Ethics (7% · 10 items)

Why carbon accounting exists and the rules every inventory follows.

- Greenhouse effect, radiative forcing; the seven Kyoto gases; GWP100 vs GWP20; CO_2e; carbon budget; IPCC AR4/AR5/AR6 GWP changes
- Physical vs transition risk; 1.5 °C and well-below-2 °C scenarios (concept level)
- Core terminology: inventory, footprint, scope, category, activity data, emission factor, removal, offset, credit, allowance, neutrality, net zero, residual emissions, abatement, MAC
- Accounting principles: relevance, completeness, consistency, transparency, accuracy; conservativeness for projects; trade-offs between them
- Policy history: UNFCCC 1992, Kyoto Protocol 1997 and mechanisms, Paris Agreement 2015 (NDCs, Article 6, global stocktake)
- Regulatory and voluntary drivers: mandatory reporting, ETS, building codes and disclosure, investor and supply-chain demand
- Regional context, including Hong Kong and India examples.
- Ethics: integrity, objectivity, confidentiality, competence, conflicts, greenwashing
- Organisational drivers and business applications: framing "carbon neutral" or "net zero" requests — boundary, scopes, base year, data, intended claim — before any claim

Domain 2 — Organizational GHG Inventory Design & Boundaries (10% · 14 items)

Designing an organisational or asset inventory fit for its intended use.

- Inventory purpose, intended users, design (GHG Protocol; ISO 14064-1)
- Organisational boundaries: equity share, financial control, operational control; JVs, subsidiaries, associates, franchises
- Leased assets: lessor and lessee; landlord–tenant splits in buildings

- Operational boundaries: Scopes 1–3; ISO 14064-1 categories 1–6 mapped to scopes; significance of indirect emissions
- Building-level boundaries under Hong Kong building guidelines (2027 edition concepts)
- Carbon-audit planning: scope, walk-through, source identification, data request lists, interviews
- Base year: selection, fixed vs rolling, recalculation triggers, significance thresholds
- Special cases: biogenic CO_2, removals, land use, exclusions and their disclosure
- Inventory management plan (IMP) contents

Domain 3 — Quantification Methodologies, Conversions & Data Quality (13% · 18 items)

The calculation core of CCAS.

- Calculation hierarchy: direct measurement, activity data × EF × GWP, mass balance
- Unit and energy conversions: kWh, MJ, GJ, therms, MMBtu, litres, m^3, kg; HHV vs LHV; density; heat rate; tonnes vs short tons
- Scope 1: stationary, mobile (fuel- vs distance-based), process, fugitive (refrigerant mass balance, screening, life-cycle methods), SF_6
- Scope 2: location-based and market-based dual reporting; grid and supplier factors; residual mix; contractual instruments and quality criteria; purchased steam, heat, cooling
- Scope 3: 15 categories; screening and prioritisation; spend-based, average-data, supplier-specific, hybrid methods; EEIO; allocation
- Transport and fleet quantification; waste and water factors
- Emission-factor selection: hierarchy, source, vintage, geography, consistency
- Uncertainty: parameter, model, scenario; qualitative and quantitative approaches; sensitivity
- Data quality management: QA/QC, completeness, outliers, gap estimation, documentation
- Engineering equations used in carbon work: energy = power × time; $Q = m \cdot c_p \cdot \Delta T$; COP, EER, kW/ton; affinity laws; degree-day normalisation; regression baselines

Domain 4 — Community-Scale / Urban GHG Inventories (GPC) & Subnational MRV (9% · 13 items)

City and community inventories, and the systems and institutions that make them repeatable.

- Inventory planning: purpose, stakeholders, institutional arrangements, team, timeline

- Geographic and temporal boundaries; inventory year; gases
- GPC sectors: Stationary Energy, Transportation, Waste, IPPU, AFOLU, Other Scope 3
- City Scopes 1/2/3 vs corporate scopes; BASIC vs BASIC+; city-induced vs scopes frameworks
- Notation keys: NO, IE, NE, C
- Managing data: sources, top-down vs bottom-up, scaling and downscaling, proxies, data gaps, data-quality ratings, data management plans
- Sector methods: transport (fuel sales, induced activity, geographic, resident activity); waste (first-order decay vs methane commitment); wastewater; IPPU; AFOLU
- Double-counting avoidance; synthesis, trends, recalculation; reporting and use in climate action plans
- Subnational MRV: MRV of emissions, actions, and support; lead agency, sector leads, data-sharing agreements, QA roles, archiving, capacity building
- Cross-cutting: consistency with IPCC national methods and tiers; key category analysis; time-series consistency; uncertainty

Domain 5 — Product Carbon Footprints, PCR & Project-Level Accounting (10% · 14 items)

Product footprints under ISO 14067 and PCRs, and project reductions and removals under ISO 14064-2.

- LCA phases (ISO 14040/14044); ISO 14067 and GHG Protocol Product Standard; partial vs full CFP
- Functional unit, declared unit, reference flow
- Life-cycle modules A1–A4 (and EN 15978 A–D for context); cut-off; allocation (co-products, recycling)
- Primary vs secondary data; site-specific data; database selection; PCR data-quality requirements
- Construction-product PCR concepts: cement (clinker, kiln fuel, calcination, SCMs), ready-mixed concrete (mix design, cement content, delivery), steel rebar (EAF vs BF-BOF, scrap)
- Product certification scheme concepts, Carbon Label and EPD routes; ISO 14025, ISO 21930, EN 15804; comparability
- Embodied carbon links: product CFP → building WLCA → corporate Scope 3 Category 1
- Project accounting: allocational vs consequential frameworks; standards and programmes; project description; SSRs; GHG assessment boundary

- Leakage and secondary effects; baseline candidates; project-specific vs performance-standard baselines; additionality tests (concept)
- Reductions = baseline − project − leakage; removals, permanence, reversal and buffers; ex-ante vs ex-post
- Monitoring plans; validation vs verification of projects; registration and issuance concepts

Domain 6 — Reporting, Disclosure Frameworks, Target Setting & Communication (9% · 13 items)

Turning results into credible reports, disclosures, and targets.

- Inventory report content under GHG Protocol and ISO 14064-1
- Building carbon-audit reports (HK guideline concepts) ; GPC city reports
- Disclosure frameworks: CDP questionnaire concepts, IFRS S2, TCFD (legacy), CSRD/ESRS E1, regional schemes
- Targets: absolute vs intensity; near- vs long-term; SBTi concepts; net-zero definitions; residual emissions
- Scope 3 targets and supplier engagement; KPIs, normalisation, variance analysis
- Financed emissions (PCAF concepts: attribution factor, asset classes)
- Roadmaps, abatement wedges, MAC curves
- Communication: audiences, plain-language summaries, limitations, greenwashing avoidance
- Next steps after the first inventory: improvement plan, base year and target, platform, assurance preparation, sequencing reductions before claims

Domain 7 — Verification, Validation, Assurance & Audit Readiness (9% · 13 items)

Independent review from both preparer and verifier sides.

- Validation vs verification vs agreed-upon procedures; first-, second-, third-party
- ISO 14064-3 process: pre-engagement, strategic analysis, risk assessment, evidence-gathering plan, verification plan, evaluation, opinion
- Limited vs reasonable assurance; ISAE 3000/3410 concepts
- Materiality (quantitative and qualitative); errors, omissions, misrepresentations
- Evidence: sampling, recalculation, vouching, tracing, site visits, interviews, analytical review
- Verifier independence and competence (ISO 14065, 14066, ISO/IEC 17029); accreditation
- Verifying CFPs and EPDs, building carbon audits, and city inventories

- Common findings; audit-readiness pack (see Appendix E); commissioning as evidence of performance

Domain 8 — Building & Energy Decarbonization Strategy (14% · 20 items)

Decarbonising buildings and energy systems across the asset life cycle.

- Planning: energy and carbon audits (Levels I–III concepts), codes and building performance standards, LCC/NPV/IRR/payback, carbon pricing, roadmaps
- Project development: integrated delivery, energy and carbon simulation, whole-life carbon assessment, BIM
- Construction and renovation: reuse, low-carbon materials, low-GWP refrigerants and Kigali phase-down, construction waste, commissioning (OPR, BOD, functional testing)
- Passive measures: envelope, shading, airtightness, thermal bridging, natural and mixed-mode ventilation
- Active measures: high-performance HVAC&R, heat pumps, heat recovery, electrification, BMS and analytics, lighting and plug loads, water–energy nexus
- Facility management: IEQ trade-offs, refrigerant management, retro- and ongoing commissioning, M&V (IPMVP option concepts)
- Distributed energy: on-site PV, storage, EV charging, demand flexibility, off-site renewables and Scope 2 effect
- Industrial efficiency: motors, drives, compressed air, steam, CHP, process heat
- Transport and fleet; recycling and circularity; ISO 50001 and building energy-and-carbon management

Domain 9 — Offsets, Carbon Markets, Neutrality Claims & Sustainable Finance (6% · 8 items)

Markets, credit quality, claims, and finance.

- Cap-and-trade design; ETS concepts; national schemes
- Kyoto mechanisms; Paris Article 6.2 / 6.4; corresponding adjustments
- Voluntary market: avoidance vs removal credits; additionality, permanence, leakage, MRV, double-counting; integrity principles and claims guidance (concepts)
- Neutrality claims: ISO 14068-1 concepts; reduce-first hierarchy; residual emissions; claim language
- Credits reported separately from gross inventory
- CBAM concepts and embedded emissions
- Green and sustainability-linked finance; taxonomies; ESCO/EPC models; incentives; internal carbon pricing

Domain 10 — GHG Information Management Systems (IMS) (8% · 11 items)

The systems that collect, calculate, control, and report GHG data. CCAS tests the specialist as owner, requirements lead, power user, and audit-ready operator — not as software developer.

- What an IMS is (people, process, data, technology); when controlled spreadsheets suffice and when they fail
- Accounting concepts an IMS must embody: boundaries, scope structure, base year, EF and GWP libraries, IMP as policy layer
- Roles: sponsor, project manager, data manager, power user, data providers, reviewers, auditors, IT; segregation of duties
- Planning and scope: business case, objectives, reporting obligations, budget, risks, success criteria
- Requirements: data inventory and collection methods; calculation engine; EF library management; built-in QA/QC; analysis and framework-ready reporting; UI; integration and IT (ERP, BMS, security, data residency)
- Evaluation: gap analysis; build vs buy vs configure; vendor criteria and scoring; proof of concept
- Design: data model; workflow (collect → validate → review → approve → lock → report); access control; maker-checker; period locking; audit trail; traceability
- Implementation and deployment: testing, parallel run and reconciliation, migration and base-year load, training, go-live, change management
- Operations: access reviews, versioning, period close, backup and recovery, change control, issue logs, evidence packs
- Cross-scale: organisational, national, and subnational/city IMS

Domain 11 — Professional Practice, Leadership & Continuous Improvement (5% · 6 items)

How specialists run engagements and programmes responsibly.

- Roles in carbon schemes: preparer, auditor, assessor, verifier, certification body; scheme licence concepts
- Competence frameworks, CPD, supervision of junior staff
- Engagement management: scope, proposal, resourcing, deliverables, quality review
- Building a GHG emissions management programme: governance, policy, procedures, training
- Stakeholder leadership: executives, cross-functional teams, suppliers, tenants, city working groups

- Continuous improvement: PDCA, lessons learned, improvement plans, management review
- Ethics in practice: client pressure, confidentiality, liability, scope creep, competence limits
- Emerging topics: digital MRV, AI-assisted data processing, removals, evolving standards
- MRV institutional leadership: mandates, budgets, cross-agency coordination, continuity planning

Section III: Task and Competency Statements

Each statement describes what a competent CCAS specialist can do. The cluster code (C1–C5, see §4) shows the competency type. Items are written to these statements.

Domain 1 — Foundations, Climate Science, Principles, Policy & Ethics

1. Explain the physical basis of GHG metrics and convert any listed gas to CO_2e using a specified IPCC GWP set. (C2)
2. Apply the five accounting principles — and conservativeness for projects — to choose between competing accounting options. (C1)
3. Identify which policy instruments and regulatory or voluntary drivers apply to an organisation, city, product, or building. (C5)
4. Distinguish emissions, removals, reductions, allowances, offsets, and credits. (C1)
5. Translate a client's neutrality or net-zero ambition into the inventory questions that must be answered first. (C5)
6. Recognise ethical conflicts and greenwashing risks and choose an appropriate professional response. (C5)

Domain 2 — Organizational GHG Inventory Design & Boundaries

1. Define inventory purpose, intended users, and design requirements. (C1)
2. Select and justify a consolidation approach for groups, JVs, franchises, and leased assets. (C1)
3. Classify sources into Scopes 1–3 and ISO 14064-1 categories, and apply significance criteria. (C1)
4. Set building-level boundaries for landlord, tenant, common, and shared-service areas. (C1)
5. Plan a carbon audit: scope, walk-through, source list, data request list, interviews. (C1)
6. Select a base year and decide whether a structural, methodological, or error change triggers recalculation. (C1)
7. Treat biogenic CO_2, removals, and exclusions correctly and disclose them. (C4)
8. Draft the contents of an inventory management plan. (C1)

Domain 3 — Quantification Methodologies, Conversions & Data Quality

1. Perform multi-step unit and energy conversions without error, including HHV/LHV. (C2)
2. Calculate Scope 1 stationary, mobile, process, and fugitive emissions, including refrigerant mass balance. (C2)
3. Calculate location-based and market-based Scope 2, applying instrument quality criteria. (C2)
4. Screen Scope 3 categories and select spend-based, average-data, supplier-specific, or hybrid methods. (C2)
5. Select and defend emission factors by source, vintage, geography, and consistency. (C2)
6. Apply allocation methods and justify the choice. (C2)
7. Assess uncertainty qualitatively and identify the dominant contributors. (C2)
8. Design QA/QC checks, estimate missing data defensibly, and document the method. (C3)
9. Apply engineering relationships (energy, heat, COP, degree days, regression) to energy baselines before carbon conversion. (C2)

Domain 4 — Community-Scale / Urban GHG Inventories (GPC) & Subnational MRV

1. Plan a city inventory: purpose, team, boundary, year, gases, sectors, reporting level. (C1)
2. Distinguish city scopes from corporate scopes and choose BASIC or BASIC+. (C1)
3. Assign notation keys correctly and identify double counting. (C1)
4. Select data sources and methods by sector; scale or downscale data and state limitations. (C2)
5. Calculate sector emissions for energy, transport, waste, IPPU, and AFOLU at concept level. (C2)
6. Synthesise results into GPC tables, trends, and hotspots. (C4)
7. Design MRV institutional arrangements: lead agency, sector leads, data agreements, QA roles, archiving. (C3)
8. Maintain time-series consistency with national methods and recalculate correctly. (C2)
9. Communicate results to councils and the public with clear limits. (C4)

Domain 5 — Product Carbon Footprints, PCR & Project-Level Accounting

1. Define functional or declared unit, reference flow, and A1–A4 boundary for a construction product. (C1)
2. Calculate a cradle-to-gate CFP from material, energy, and transport data. (C2)
3. Apply PCR-specific rules for cement, ready-mixed concrete, and steel rebar. (C2)

4. Apply cut-off and allocation rules for co-products and recycled content. (C2)
5. Distinguish CFP, carbon-label, and EPD routes, their claims, and comparability conditions. (C4)
6. Link product CFP data to building WLCA, corporate Scope 3, and CBAM declarations. (C2)
7. Describe a GHG project and identify controlled, related, and affected SSRs. (C1)
8. Identify and quantify leakage. (C2)
9. Select a baseline procedure and test additionality at concept level. (C1)
10. Quantify net reductions or removals; address permanence and reversal. (C2)
11. Draft a monitoring plan and distinguish project validation from verification. (C3)

Domain 6 — Reporting, Disclosure Frameworks, Target Setting & Communication

1. Assemble a complete, transparent inventory report meeting ISO 14064-1 / GHG Protocol content. (C4)
2. Map inventory data to IFRS S2, ESRS E1, and CDP disclosure requirements. (C4)
3. Set absolute and intensity targets and calculate required reduction rates. (C5)
4. Track progress with KPIs, normalisation, and variance analysis. (C4)
5. Calculate financed emissions with a given attribution approach. (C2)
6. Build an emissions roadmap with abatement wedges and MAC data. (C5)
7. Communicate results, limitations, and uncertainty to different audiences without overstatement. (C4)
8. Advise management on next steps after a first inventory. (C5)

Domain 7 — Verification, Validation, Assurance & Audit Readiness

1. Distinguish validation, verification, and agreed-upon procedures, and levels of assurance. (C4)
2. Describe and apply the ISO 14064-3 verification process. (C4)
3. Assess quantitative and qualitative materiality and its effect on an opinion. (C4)
4. Design an evidence-gathering plan for high-risk sources. (C4)
5. Evaluate verifier independence, impartiality, and competence. (C5)
6. Prepare an organisation, product, project, or building audit for third-party review. (C4)
7. Anticipate and correct common findings. (C3)

Domain 8 — Building & Energy Decarbonization Strategy

1. Plan energy and carbon audits and interpret findings. (C1)
2. Evaluate measures with LCC, NPV, IRR, simple payback, and carbon price. (C5)
3. Build a prioritised, costed decarbonisation roadmap with interim milestones. (C5)
4. Compare design options by whole-life carbon (operational plus embodied). (C2)

5. Quantify savings from envelope, HVAC, electrification, lighting, controls, and water measures. (C2)
6. Select refrigerants balancing GWP, safety, efficiency, and regulation; quantify leakage impacts. (C2)
7. Specify commissioning, retro-commissioning, ongoing commissioning, and M&V to secure savings. (C3)
8. Evaluate on-site and off-site renewables, storage, EV charging, and demand flexibility, including Scope 2 effects. (C2)
9. Identify industrial, fleet, and circularity opportunities. (C5)
10. Operate an energy-and-carbon management system. (C3)

Domain 9 — Offsets, Carbon Markets, Neutrality Claims & Sustainable Finance

1. Explain cap-and-trade design and calculate compliance positions and costs. (C2)
2. Explain Article 6 mechanisms and corresponding adjustments. (C1)
3. Evaluate a credit portfolio for quality and claim eligibility. (C5)
4. Judge whether a neutrality or net-zero claim is supportable under a named standard. (C5)
5. Report credits separately from gross emissions. (C4)
6. Estimate embedded emissions for CBAM-type declarations from CFP data. (C2)
7. Structure finance for decarbonisation projects (green or sustainability-linked instruments, EPC, incentives). (C5)
8. Apply internal carbon pricing to investment decisions. (C5)

Domain 10 — GHG Information Management Systems (IMS)

1. Decide when a controlled spreadsheet is adequate and when a dedicated IMS is justified. (C3)
2. Define IMS roles and segregation of duties. (C3)
3. Define IMS scope, objectives, reporting obligations, and success criteria. (C3)
4. Write prioritised requirements for collection, calculation, EF library, QA/QC, reporting, UI, and integration. (C3)
5. Evaluate build, buy, or configure options and score vendors against methodology, control, and audit-trail criteria. (C3)
6. Specify a data model, approval workflow, and audit trail tracing any reported tonne to source evidence. (C3)
7. Plan testing, parallel run, reconciliation, migration, training, and go-live. (C3)
8. Operate the IMS with access reviews, versioning, period locking, backup, and change control. (C3)
9. Adapt IMS design for organisational, national, and subnational contexts. (C3)

Domain 11 — Professional Practice, Leadership & Continuous Improvement

1. Determine the correct professional role in an engagement and its limits. (C5)
2. Plan and lead an inventory, audit, or footprint engagement end to end. (C5)
3. Build and govern a GHG emissions management programme. (C5)
4. Lead stakeholders across functions, suppliers, tenants, or agencies. (C5)
5. Drive continuous improvement using PDCA and improvement plans. (C5)
6. Resolve ethical and client-pressure dilemmas in line with the Code of Conduct. (C5)

Section IV: Sample Judgment Themes (not exam items)

These themes illustrate the **kinds** of reasoning tested. They are not examination items, are not drawn from any examination, and include no answer options. Numbers are illustrative.

Domain	Sample themes
D1	Recompute CO_2e after a programme moves from AR4 to AR6 GWPs · Completeness vs accuracy when a source has poor data · A CEO wants a "carbon neutral next year" announcement before any inventory exists: which questions come first?
D2	A 40% JV under financial control: what is reported under each approach? · Tenant-controlled chiller in a landlord-owned building: whose Scope 1 and 2? · A mid-year acquisition above the organisation's significance threshold: recalculate the base year?
D3	Diesel litres → GJ → t CO_2e with a stated EF and GWP set · Location- vs market-based Scope 2 with a partial PPA · Refrigerant top-up → CO_2e · Spend-based vs supplier-specific data: which to prioritise? · Degree-day normalised baseline before carbon conversion
D4	Waste from a neighbouring city landfilled inside the boundary: scope and notation key · Downscaling regional fuel sales by population vs vehicle registrations · BASIC vs BASIC+ given data · A waste agency stops sharing data after a reorganisation: which arrangement should have prevented it?
D5	Cement CFP from clinker ratio, fuel, and electricity · RMC per m^3 including A4 transport · EAF vs BF-BOF rebar and scrap allocation · Plant-specific vs industry-average EPD comparability · Landfill-gas project: baseline − project − leakage · A project assumes 100% non-renewable baseline biomass: what evidence is needed?
D6	Annual linear reduction needed to meet a target year · Does an intensity target hide absolute growth? · Financed emissions using an attribution factor · What is missing from a draft report for ISO 14064-1 content?
D7	Is a stated misstatement material against an illustrative threshold? · Which evidence best supports a market-based Scope 2 claim? · A verifier prepared the client's inventory last year: independence issue?
D8	Gas boiler → heat pump CO_2e change using efficiency, COP, and grid EF · PV yield and its location- vs market-based effect · Carbon payback of extra insulation · Chiller kW/ton improvement and payback · Refrigerant retrofit leak-rate × charge × GWP before and after
D9	Allowance shortfall × price vs abatement at a given MAC · Can avoidance credits alone, with no reduction plan, support a neutrality claim? · Embedded emissions per tonne of rebar from CFP data
D10	A 40-site company in 40 linked spreadsheets cannot trace Scope 2 to invoices: which three controls first? · A vendor cannot show EF source and vintage per record: which requirement fails? · Parallel run shows a lower Scope 1 than the legacy workbook: reconciliation steps · An admin edits an approved prior-year value with no change record: which control failed? · Three city agencies submit data in different formats: template, validation, and workflow
D11	A client asks you to exclude a high-emitting site "to keep the trend positive" · Who may sign a CFP report under a product scheme, and who verifies it? · Resource plan for a 30-site inventory in 12

Domain	Sample themes
	weeks

Section V: Study-Hour Guidance per Domain

Beyond Smart Cities guidance for a candidate with relevant experience in one or two scales. Total about **120 hours**. Not a requirement.

#	Domain	Items	Suggested hours	Emphasis
1	Foundations, science, principles, policy, ethics	10	8	GWP conversions; principle trade-offs; claim framing
2	Organisational inventory design & boundaries	14	12	Consolidation cases; base-year recalculation
3	Quantification, conversions & data quality	18	18	Hand calculations for every scope; EF selection; QA/QC
4	City inventories (GPC) & subnational MRV	13	11	Sectors, notation keys, double counting, institutions
5	Product CFP, PCR & project accounting	14	13	A1–A4 calculations; PCR rules; project sequence
6	Reporting, disclosure, targets & communication	13	10	Report content; target maths; framework mapping
7	Verification & assurance	13	10	ISO 14064-3 process; materiality; evidence
8	Building & energy decarbonisation	20	17	Electrification, PV, HVAC, refrigerants, WLCA, finance
9	Markets, credits, neutrality & finance	8	6	Credit quality; claims; ETS and CBAM calculations
10	GHG IMS	11	10	Lifecycle; controls; audit trail; vendor evaluation
11	Professional practice & leadership	6	5	Roles; ethics cases; programme governance
	Total	**140**	**120**	

Adjustments. Add 15–25 hours for each scale (organisation, city, product/project, building, IMS) in which you have no working experience. Reserve 8–10 of the total hours for two timed full-length practice sittings.

Section VI: Cross-Cutting Skills

Tested inside items across all domains:

- Calculation accuracy and unit discipline
- Documentation, data control, and audit trail
- Professional judgment under data limitations
- Ethics and claim integrity
- Clear communication of methods and uncertainty

Appendix B — Acceptable Professional Development Activities

All hour values and caps are Beyond Smart Cities policy. Activities must relate to the CCAS BOK (any domain), updates to standards in Appendix C, or directly related professional skills.

#	Activity	Category	CPD hours	Cap per cycle	Evidence
1	Courses, workshops, seminars, live or on-demand webinars with attendance tracking	1	1 per hour	None	Certificate with name, date, title, hours
2	Courses ending in a passed assessment	1	1.25 per hour	None	Certificate showing pass
3	University or college course in a related subject	1	15 per semester credit (10 per quarter credit)	None	Transcript
4	Standard-update training (e.g., new edition of a GHG, ISO, or disclosure standard)	1	1 per hour	None	Certificate
5	Conferences and technical sessions	1	1 per hour of sessions attended	15	Registration plus session log
6	Leading a GHG inventory, carbon audit, verification, CFP/EPD, city inventory, project monitoring report, or IMS implementation	2	5 per engagement	15 (Category 2 total)	Client or employer letter describing role and scope
7	Performing a substantial role in one of the above	2	3 per engagement	Within Category 2 cap	As above
8	Teaching or presenting a related course or session (first delivery)	3	2 per hour presented	15 (Category 3 total)	Agenda, slides, or syllabus
9	Repeat delivery of the same material	3	0.5 per hour	Within Category 3 cap	As above
10	Peer-reviewed article, book chapter, or technical guidance authored	3	10 per item	Within Category 3 cap	Copy or link
11	Trade or professional article (non-peer-reviewed)	3	3 per item	Within Category 3 cap	Copy or link
12	Writing or reviewing CCAS examination items for Beyond Smart Cities	3	5 per 10 accepted items	Within Category 3 cap	Beyond Smart Cities record
13	Service on a standard, technical, or professional committee	3	2 per year per body	Within Category 3 cap	Letter or minutes
14	Mentoring a candidate or junior professional in a structured programme	3	1 per 2 hours	5	Mentoring log signed by mentee
15	Documented self-study of new standards or guidance	4	1 per 2 hours reading	10	Reading log with summary notes
16	Passing the current CCAS examination	—	Satisfies all CPD for the cycle	—	Score report

Not accepted: sales or marketing events; general management training unrelated to the BOK; routine duties already counted under activities 6–7; attending the same course twice in one cycle.

Ethics hours. Activities on professional ethics, claims integrity, greenwashing, data integrity, or conflicts of interest count toward the ethics requirement (§53).

Appendix C — Standards and References Spine

The documents below define the knowledge CCAS tests. They are listed **for knowledge only**; listing does not imply affiliation with or endorsement by any publisher. Always use the current official edition. Items test the edition in force at the BOK date unless stated.

Family	Documents and concepts
GHG Protocol	Corporate Accounting and Reporting Standard; Scope 2 Guidance; Corporate Value Chain (Scope 3) Standard and Technical Guidance; Product Life Cycle Standard; Project Protocol; Policy and Action Standard and Mitigation Goal Standard (concepts); Land Sector and Removals guidance; ongoing Corporate Standard and Scope 2 revisions
ISO GHG series	ISO 14064-1 (organisations); ISO 14064-2 (projects); ISO 14064-3 (validation and verification); ISO 14065 (VVB requirements); ISO 14066 (competence); ISO 14067 (product CFP); ISO 14068-1 (carbon neutrality); ISO/IEC 17029 (conformity assessment)
LCA and EPD	ISO 14040 / 14044; ISO 14025; ISO 21930; EN 15804; EN 15978 (modules A–D)
Community scale	Global Protocol for Community-Scale GHG Inventories (GPC): sectors, BASIC/BASIC+, notation keys, city-induced framework
National / subnational MRV	2006 IPCC Guidelines for National GHG Inventories and 2019 Refinement; UNFCCC Enhanced Transparency Framework / Biennial Transparency Reports (concepts)
Science	IPCC Assessment Reports (AR4, AR5, AR6) — GWP100 values and programme-specific use
Targets and net zero	SBTi Corporate Near-Term Criteria and Corporate Net-Zero Standard; FLAG concepts; ISO Net Zero Guidelines concepts
Disclosure	IFRS S1 and S2; TCFD recommendations (legacy); CSRD / ESRS E1; CDP disclosure concepts; PCAF financed-emissions standard (concepts)
Markets and finance	Kyoto mechanisms; Paris Agreement Article 6.2 / 6.4; EU ETS; CBAM; voluntary-standard concepts; ICVCM Core Carbon Principles; VCMI Claims Code; green bond and loan principles
Hong Kong buildings	Guidelines to Account for and Report on GHG Emissions and Removals for Buildings — 2026 edition concepts
Product scheme (Hong Kong)	CIC Green Product Certification scheme concepts; PCRs for cement, ready-mixed concrete, steel reinforcing bar; carbon label and EPD routes
Buildings practice	ASHRAE 90.1, 62.1, 189.1 concepts; whole-life carbon practice; commissioning process concepts; IPMVP concepts; ISO 50001; Kigali Amendment
Data and information systems	GHG Protocol inventory quality management chapter; ISO 14064-1 information-management and retention requirements; ISO/IEC 27001 concepts; general data-governance and IT change-control practice

Appendix D — GHG IMS Readiness Checklist

Use this checklist to assess whether a GHG information management system — spreadsheet-based or software — is ready for reporting and verification. It supports Domain 10 study and practice.

D.1 Governance and roles

- ☐ Executive sponsor and system owner named
- ☐ GHG data manager / inventory lead named
- ☐ Power user / administrator named, with a backup
- ☐ Data providers listed by site, source, and frequency
- ☐ Reviewers and approvers named; segregation of entry, approval, and administration
- ☐ Inventory management plan (IMP) approved and linked to the system

D.2 Scope and accounting configuration

- ☐ Organisational hierarchy matches the consolidation approach
- ☐ Scope and category structure configured (Scopes 1–3; ISO categories if used; GPC sectors for cities)
- ☐ Base year and recalculation policy recorded in the system
- ☐ Reporting obligations mapped to required outputs

D.3 Data collection

- ☐ Data inventory complete: source, owner, unit, frequency, format
- ☐ Collection templates or feeds defined for each source (manual, ERP, BMS, utility, API)
- ☐ Units and conversions controlled centrally
- ☐ Evidence attachment required for material sources

D.4 Calculation and factor library

- ☐ Single EF library with source, vintage, geography, and effective dates
- ☐ GWP set selectable and recorded per reporting period
- ☐ Location- and market-based Scope 2 both supported
- ☐ Scope 3 methods and allocation rules documented
- ☐ Gap-estimation methods documented and flagged in results

D.5 Quality controls

- ☐ Validation rules (ranges, mandatory fields, unit checks)
- ☐ Variance checks against prior periods
- ☐ Completeness tracker by site and source
- ☐ Maker-checker approval before lock

- ☐ Issue and correction log

D.6 Security and change control

- ☐ Role-based access; quarterly access review
- ☐ Approved periods locked; reopening needs documented approval
- ☐ Audit trail records who, what, when, and why; superseded values retained
- ☐ Changes to configuration and calculation logic go through change control and testing
- ☐ Backup and recovery tested
- ☐ Data residency and confidentiality requirements met

D.7 Reporting and traceability

- ☐ Any reported total can be drilled down to source records and evidence
- ☐ Framework-ready outputs (inventory report, CDP, IFRS S2/ESRS, GPC tables, building audit) generated from the same data
- ☐ Methodology notes exported with results

D.8 Implementation (new systems)

- ☐ Requirements prioritised and signed off
- ☐ Vendor or build option scored on methodology, controls, audit trail, integration, cost, viability
- ☐ Unit, integration, and user-acceptance testing complete
- ☐ Parallel run reconciled with the legacy method; differences explained
- ☐ Historical and base-year data migrated and verified
- ☐ Role-based training delivered; user guides published
- ☐ Post-implementation review scheduled

Appendix E — Verification-Readiness Pack Outline

A verification-readiness pack is the set of documents a preparer gives a verifier or assurance provider. A well-built pack shortens fieldwork and reduces findings. Adapt it for organisations, buildings, products, projects, and cities.

#	Section	Contents
1	Engagement basis	Intended user and purpose; standard and programme criteria; level of assurance sought; materiality expectations; reporting period
2	Management assertion	Signed statement of the GHG figures and the criteria applied
3	Boundary documentation	Organisational chart and consolidation approach; asset or site list; operational boundary and exclusions with justification; for products: functional/declared unit and A1–A4 boundary; for projects: SSRs and assessment boundary; for cities: geographic boundary and GPC level
4	Inventory management plan	Roles, procedures, schedules, QA/QC, retention
5	Methodology register	Calculation methods by source; Scope 2 approach; Scope 3 methods; allocation; estimation methods; PCR or methodology references
6	Emission-factor and GWP register	Each factor's value, unit, source, vintage, geography, and effective dates; GWP set
7	Calculation workbook or IMS extract	Locked, versioned results with drill-down to activity data
8	Source evidence index	Invoices, meter reads, fuel logs, refrigerant service records, contracts (PPAs, certificates), supplier data — indexed to each figure
9	QA/QC record	Checks performed, issues found, corrections, sign-offs
10	Change and recalculation log	Base-year recalculations; methodology or factor changes; error corrections
11	Uncertainty and limitations statement	Main uncertainties, data gaps, estimates, and their effect
12	Prior findings	Previous verification findings and corrective actions
13	Contact and access plan	Data owners, site-visit arrangements, system access for the verifier
14	Claims file (if any)	Exact wording of claims, credits retired (registry evidence), and the standard applied

Appendix F — Claims and Ethics Code: Practice Guidance

This appendix applies the CCAS Code of Conduct (§50) to the situations CCAS holders meet most often. It is guidance for good practice; the Code itself sets the enforceable duties.

F.1 Claims ladder

Claim	Minimum evidence before use
"We measure our emissions"	Documented inventory for a stated boundary and period
"Our emissions fell X%"	Consistent boundary and methods across periods, or recalculated base year; absolute and intensity both disclosed if growth changed
"Verified emissions"	Verification statement naming the standard, level of assurance, scope, and period
"Low-carbon product"	Product CFP to a named standard/PCR, with the comparison basis stated
"Offset" / "compensated"	Credits retired in a registry, with quality evidence, reported separately from gross emissions
"Carbon neutral"	Inventory, reduction plan, retired credits for residual emissions, and conformity with a named standard (e.g., ISO 14068-1 concepts)
"Net zero"	Science-aligned long-term target, deep reductions achieved, neutralisation of residual emissions by removals, per a named standard

F.2 Red lines for CCAS holders

- Do not net credits out of gross scope totals.
- Do not exclude sources to improve a trend.
- Do not change methods mid-series without disclosure and recalculation.
- Do not verify, validate, or assure your own work.
- Do not describe a product, organisation, or report as "CCAS certified".
- Do not use avoided emissions (for example, from products sold) to reduce reported inventory scopes.

F.3 Handling client pressure

1. Restate the requirement and the standard behind it in writing.
2. Offer compliant alternatives (for example, disclose the exclusion; use an intensity metric alongside absolute; delay the claim until evidence exists).
3. Escalate within the client or your firm.
4. Record the issue and outcome.
5. Withdraw if the client insists on a misleading result.

F.4 Conflicts of interest — quick test

Ask: *Would a reasonable informed person think my judgment could be affected?* If yes, disclose in writing; if it cannot be managed, decline.

F.5 Data and confidentiality

Use client data only for the engagement. Anonymise case studies. Do not upload confidential data to tools whose terms allow reuse unless the client has agreed.

Appendix G — Glossary of Key Terms

Selected terms from the CCAS BOK v1.1 glossary. Definitions are written for candidates and are not quotations from any standard. Where a standard defines a term, the standard's definition governs.

Term	Meaning
Activity data	A quantified measure of an activity that causes emissions or removals (e.g., litres of fuel, kWh, tonne-km).
Additionality	The condition that a reduction or removal would not have occurred without the project or the incentive it receives.
Allocation	Partitioning inputs or emissions among co-products or users, by physical or economic relationship.
Allowance	A tradable permit in an emissions trading system authorising the emission of one unit (usually one tonne CO_2e).
Assurance (limited / reasonable)	Levels of confidence a verifier provides; reasonable assurance requires more evidence and gives a positive opinion; limited assurance gives a negative-form conclusion.
Audit trail	A record showing who created or changed data, what changed, when, and why, so results can be traced and reconstructed.
BASIC / BASIC+	GPC reporting levels; BASIC covers core city sectors, BASIC+ adds sectors and sources with more demanding data.
Base year	The reference period against which emissions are tracked over time.
Baseline scenario	In project accounting, the hypothetical emissions that would occur without the project.
Biogenic CO_2	CO_2 from combustion or decomposition of biomass, reported separately from scopes under major standards.
Carbon footprint of a product (CFP)	The sum of GHG emissions and removals across a product's life cycle or a defined part of it, expressed as CO_2e per functional or declared unit.
CBAM	Carbon Border Adjustment Mechanism — a border measure requiring declaration and pricing of embedded emissions in certain imported goods.
Change control	A process that reviews, approves, tests, and records changes to systems, calculations, or configuration.
CO_2 equivalent (CO_2e)	The amount of CO_2 with the same warming effect as a quantity of another gas, using its GWP.
Consequential accounting	Accounting for the change in emissions caused by a decision or project, compared with a baseline.
Consolidation approach	The method for setting organisational boundaries: equity share, financial control, or operational control.
Corresponding adjustment	An accounting entry under Paris Agreement Article 6 that prevents a transferred mitigation outcome from being counted by two countries.
Cradle-to-gate	A partial life-cycle boundary from raw-material extraction to the factory gate.
Data quality indicator	A criterion (e.g., technological, temporal, geographical representativeness; completeness; reliability) used to rate data.
Declared unit	The reference quantity for a partial CFP or EPD when the product's function in

Term	Meaning
	use is not defined.
Double counting	Counting the same emission, reduction, or credit more than once across entities, scopes, or claims.
Embodied carbon	Emissions from producing, transporting, installing, maintaining, and disposing of materials and products.
Emission factor (EF)	A coefficient converting activity data into emissions.
Emission factor library	A controlled register of emission factors with source, vintage, geography, and effective dates.
Environmental Product Declaration (EPD)	A Type III declaration of a product's life-cycle environmental impacts, prepared to PCR and independently verified.
Financed emissions	Emissions attributed to a financial institution's loans and investments.
Functional unit	The quantified performance of a product system used as the reference for a full CFP.
Fugitive emissions	Unintended releases, such as refrigerant leaks or methane from gas systems.
GHG information management system (IMS)	The people, processes, data, and technology used to collect, calculate, control, store, and report GHG data.
Global warming potential (GWP)	A gas's warming effect relative to CO_2 over a time horizon (commonly 100 years).
Greenwashing	Making misleading environmental claims.
Institutional arrangements	Roles, mandates, agreements, and procedures that allow an inventory to be compiled repeatedly.
Intensity target	A target expressed per unit of output, area, revenue, or other activity.
Inventory management plan (IMP)	The documented policies and procedures governing how an inventory is prepared and maintained.
Key category analysis	Identifying sources that contribute most to total emissions, trends, or uncertainty.
Leakage	An increase in emissions outside a project boundary caused by the project.
Location-based method	Scope 2 method using average grid emission factors for the location of consumption.
Maker-checker control	A control where one person enters data and a different person review and approves it.
Market-based method	Scope 2 method using emission factors from contractual instruments, supplier-specific rates, or residual mix.
Materiality	The threshold at which a misstatement, alone or combined, could change the decisions of intended users.
Measurement and verification (M&V)	Determining actual savings from an energy measure by comparing measured use with an adjusted baseline.
MRV	Measurement, reporting, and verification — the system for tracking emissions, actions, or support over time.
Net zero	A state in which residual emissions after deep reductions are balanced by removals, under a defined standard.
Notation keys	GPC codes for sources not reported as numbers: NO (not occurring), IE (included elsewhere), NE (not estimated), C (confidential).
Operational boundary	The emission sources and scopes included within the organisational boundary.
Parallel run	Operating a new system alongside the old one for a period and reconciling

Term	Meaning
	differences before go-live.
Period locking	Preventing changes to approved reporting periods unless a documented reopening is approved.
Permanence	The duration for which a removal or stored carbon is kept out of the atmosphere.
Product Category Rules (PCR)	Rules for calculating and declaring the environmental performance of a product category.
Removal	Withdrawal of a GHG from the atmosphere into a sink or reservoir.
Renewable energy certificate (REC / GO / I-REC)	A contractual instrument representing the attributes of one unit of renewable electricity.
Residual emissions	Emissions remaining after all feasible reductions.
Residual mix	Grid emission factor after removing claimed contractual instruments, used in market-based Scope 2.
Retro-commissioning (RCx)	Commissioning an existing building's systems to restore or improve performance.
Science-based target	A reduction target consistent with limiting warming in line with the Paris Agreement goals, per defined criteria.
Scope 1 / 2 / 3	Direct emissions; indirect emissions from purchased energy; all other indirect value-chain emissions.
Segregation of duties	Separating data entry, approval, and system administration to prevent undetected error or manipulation.
SSRs	Sources, sinks, and reservoirs relevant to a GHG project (controlled, related, affected).
Spend-based method	Estimating Scope 3 emissions from expenditure multiplied by EEIO factors.
Territorial emissions	Emissions occurring within a geographic boundary.
Time-series consistency	Using consistent methods and boundaries across years so trends are meaningful.
Uncertainty	A measure of the range within which the true value is expected to lie.
User acceptance testing (UAT)	Testing by intended users that a system meets requirements before go-live.
Validation	Evaluation of the reasonableness of assumptions and plans, typically before implementation (e.g., of a project).
Verification	Evaluation of historical data and information against criteria, resulting in an opinion or conclusion.
Whole-life carbon assessment (WLCA)	Assessment of a building's operational and embodied emissions across its life cycle.

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