

Terms of Reference (ToR)
Independent External Technical Review

BCR0020 – Material Recovery and Recycling from Solid Waste Streams

Draft for Public Consultation

1. Background

BioCarbon Cert has developed Methodology BCR0020, currently issued as a draft for public consultation.

BCR0020 establishes requirements and procedures for quantifying net greenhouse gas emission reductions resulting from the recovery and effective recycling of eligible materials from solid waste streams. It applies material-specific quantification pathways for eligible plastics, paper and cardboard, container glass, aluminum, steel and copper, and eligible constituent materials recovered from composite or multilayer waste.

The principal accounting mechanism is the demonstrated displacement of virgin-material production by usable secondary or recycled material. For eligible paper and cardboard, the methodology may also quantify avoided methane emissions where the applicable without-project scenario is disposal under methane-generating conditions.

The methodology establishes requirements for baseline recycling quantities, additionality, material-specific substitution, project emissions, leakage, uncertainty, mass balance, chain of custody, downstream evidence, attribution, monitoring and prevention of double counting. It also addresses formal and informal waste-sector participation and distributed recycling networks.

In accordance with BioCarbon's methodological governance framework and international best practices, the methodology is subject to an independent external technical review.

2. Objective of the Review

The objective of the independent external review is to assess whether the methodology:

- (a) ensures environmental integrity and conservative quantification of GHG emission reductions;
- (b) avoids systematic overestimation and non-additional crediting;
- (c) establishes scientifically robust, transparent and auditable baseline and material-specific quantification approaches;
- (d) adequately addresses project emissions, leakage, uncertainty, monitoring, data quality, mass balance, chain of custody and traceability;
- (e) appropriately addresses the waste hierarchy and avoids perverse incentives, artificial waste generation and diversion from existing higher-order uses or recycling activities;
- (f) provides adequate safeguards against double issuance, double use and double claiming; and
- (g) provides a robust and replicable framework for application across eligible materials, recycling configurations, technologies and jurisdictions.

3. Scope of Work

The external reviewer shall assess at a minimum:

(a) Applicability and Eligibility

- (i) clarity and enforceability of applicability conditions;
- (ii) eligibility and exclusions for waste streams, material categories, recycling processes, recycled outputs and project configurations;
- (iii) treatment of post-consumer materials, pre-consumer materials and production residues;
- (iv) treatment of composite and multilayer materials and mixed waste streams;
- (v) treatment of formal and informal waste-sector participation; and
- (vi) consistency with applicable waste-management, circular-economy and GHG accounting principles.

(b) Baseline and Additionality

- (i) robustness and plausibility of without-project scenarios and baseline recycling quantities;
- (ii) treatment of existing activities, new facilities, capacity additions, retrofits and operational improvements;
- (iii) treatment of regulatory surplus, prior consideration, investment or barrier analysis and common practice;
- (iv) application of the BioCarbon Baseline and Additionality Tool; and
- (v) safeguards against crediting quantities that would have been effectively recycled without the project activity.

(c) Material-Specific Quantification Approach

The reviewer shall assess the scientific and technical robustness, internal consistency and conservativeness of each applicable material-specific quantification pathway, including:

- (i) plastics: eligible polymers, recycled-output definition, substitution factors, domestic and imported virgin-production representation, production-energy inputs and baseline emission factors;
- (ii) paper and cardboard: virgin-fiber displacement, substitution factors and, where applicable, avoided methane emissions from baseline disposal under TOOL04;
- (iii) container glass: eligible cullet, substitution relationship, electricity associated with displaced virgin raw-material preparation and the defined baseline production boundary;
- (iv) metals: aluminum, steel and copper eligibility, substitution factors, default emission factors, production-origin treatment and equivalence of material and processing stages; and
- (v) composite and multilayer materials: identification and measurement of constituent materials, recovery yields, assignment to applicable material-specific pathways and prevention of crediting the total incoming composite mass as recycled output.

(d) Project Emissions and Leakage

The reviewer shall assess completeness and consistency in identifying, quantifying and conservatively treating material project emissions and leakage

sources, including electricity, heat or steam, fossil-fuel consumption, transportation, wastewater, rejects and residual streams, direct process emissions, shared sources, diversion effects, replacement effects and changes in pre-project recovery, recycling or productive uses.

(e) Uncertainty and Conservativeness

The review shall assess measurement and sampling uncertainty, material composition, moisture and contamination, recovery yields, baseline recycling quantities, substitution factors, emission factors, allocation of shared emissions, missing or incomplete data, conservative adjustments and safeguards against over-crediting.

(f) MRV, Mass Balance, Chain of Custody and Data Integrity

The reviewer shall assess:

- (i) robustness of monitoring requirements;
- (ii) adequacy of measurement and sampling requirements;
- (iii) mass-balance and inventory-reconciliation procedures;
- (iv) chain-of-custody requirements and the physical link between material source, processing, recycled output and required downstream use;
- (v) treatment of distributed networks, intermediaries and third-party facilities;
- (vi) QA/QC and data-management requirements;
- (vii) treatment of unresolved discrepancies and missing evidence; and
- (viii) consistency between monitored parameters, material flows and quantification equations.

(g) Waste Hierarchy and Circularity Safeguards

The review shall assess whether the methodology adequately prevents:

- (i) diversion from waste prevention, reuse, repair, refurbishment or remanufacturing;
- (ii) artificial generation of waste for crediting purposes;
- (iii) displacement of existing formal or informal recycling without a net and attributable increase in effective recycling;

(iv) crediting of materials used as fuel, sent to energy recovery, incinerated or disposed of; and

(v) other perverse incentives or outcomes inconsistent with the waste hierarchy.

(h) Attribution and Double Counting

The reviewer shall specifically assess whether the methodology adequately ensures:

(i) clear attribution of the right to claim the greenhouse gas outcome;

(ii) disclosure and treatment of other certificates, environmental attributes, regulatory claims or credits associated with the same material;

(iii) separation of distinct physical emission sources where more than one accounting mechanism applies to the same eligible material;

(iv) prevention of duplicate quantities or mitigation outcomes across material-specific pathways, projects, methodologies or environmental crediting programs; and

(v) appropriate treatment of shared material flows, project emissions and leakage when BCR0020 is applied together with another BioCarbon methodology.

(i) Transparency and Replicability

The reviewer shall assess methodological clarity, internal consistency, transparency of assumptions and parameters, dimensional consistency, reproducibility of calculations, adequacy of data hierarchies and applicability across different technologies and jurisdictions.

4. Deliverables

The external reviewer shall provide:

(i) a written independent technical review report;

(ii) identification of material methodological risks, if any;

(iii) clear and structured recommendations for improvement; and

(iv) an overall conclusion regarding methodological robustness, environmental integrity and suitability for application in high-integrity carbon markets.

The report shall clearly distinguish between:

- (i) critical issues, affecting methodological integrity or credibility; and
- (ii) advisory recommendations, representing methodological improvements.

5. Eligibility Requirements for Applicants

Applicants may be individuals or multidisciplinary review teams. Where a team is proposed, a lead reviewer shall be designated.

Collectively, the reviewer or review team shall demonstrate sufficient expertise in the material technical areas covered by the methodology.

Relevant expertise may include:

- (a) solid waste management, material recovery and recycling technologies;
- (b) plastics, paper and cardboard, container glass, aluminum, steel and copper recycling;
- (c) composite and multilayer material recovery and recycling;
- (d) waste characterization, material composition, sampling and mass balance;
- (e) life-cycle or GHG accounting for virgin and recycled material production;
- (f) landfill methane modelling and GHG accounting for paper and cardboard disposal;
- (g) chain of custody, traceability, recycling supply chains and downstream-use verification;
- (h) GHG methodology development, validation, verification or technical review;
- (i) uncertainty analysis, MRV and data quality;
- (j) waste hierarchy, circular-economy principles and formal/informal waste-sector systems; and
- (k) high-integrity carbon market accounting and avoidance of double counting.

Applicants shall disclose any past or present involvement in the development of BCR0020 and any actual or potential conflict of interest.

6. Selection Process

BioCarbon Cert shall evaluate proposals through a documented, merit-based process, considering:

- (a) technical competence;
- (b) relevant sectoral expertise;
- (c) experience in GHG methodologies and carbon accounting;
- (d) independence and conflict-of-interest screening; and
- (e) capacity to complete the review within the specified timeline.

7. Independence and Financial Arrangements

To safeguard independence:

- (a) the external reviewer shall not have participated in the development of the methodology;
- (b) the reviewer shall sign a conflict-of-interest declaration; and
- (c) all costs associated with the review shall be borne exclusively by BioCarbon Cert.

8. Timeline

The external review is expected to be completed within two (2) weeks from contract signature.