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Standard on Embodied Carbon in Construction

1. Preamble

- 1.1 This standard is issued pursuant to the same authorities indicated in section 4 of the *Policy on Green Procurement* and is consistent with the *Policy on the Planning and Management of Investments* and the *Directive on the Management of Procurement*.

Embodied carbon forms a significant proportion of the whole life carbon emissions from construction projects. This standard sets minimum requirements for the procurement of design and construction services to disclose and reduce the embodied carbon of major construction projects. Major construction projects typically include the renovation or new construction of buildings or engineering assets.

The objective of this standard is to establish requirements to disclose and reduce the embodied carbon footprint of construction projects in accordance with the commitments in the *Greening Government Strategy*.

2. Effective date

- 2.1 This standard takes effect on December 31, 2022, and was last amended March 20, 2025 with additional requirements that take effect on September 1, 2025.
- 2.2 Procurements commenced after the effective date are required to apply this standard.

3. Standards

- 3.1 This standard provides details on the requirements set out in subsections 7.1, 7.2, and 7.3 of the *Policy on Green Procurement* and the low-carbon construction commitments in the *Greening Government Strategy*.
- 3.2 Organizations described in section 3 of the *Policy on Green Procurement* must:
 - 3.2.1 Adhere to all appendices, which set out specific conditions, including effective dates, project value thresholds and reduction targets, in relation to the disclosure of and reductions in the embodied carbon footprint of construction projects;
 - 3.2.2 Include the following requirements in the procurement of design services:
 - 3.2.2.1 Estimate the embodied carbon footprint of the construction project and demonstrate reductions in accordance with Appendix A;

- 3.2.2.2 Disclose the carbon footprint of structural materials in accordance with Appendix B;
 - 3.2.2.3 Reduce the carbon footprint of structural materials in accordance with Appendix B;
 - 3.2.2.4 Ensure that structural materials are specified by a professional engineer registered or licensed in the province or territory where the project will be implemented; and
 - 3.2.2.5 Review the completed embodied carbon disclosures for structural materials before project completion to ensure compliance with subsections 3.2.2.2 and 3.2.2.3 of this standard;
- 3.2.3 Include the following requirements in the procurement of construction services:
- 3.2.3.1 Ensure that embodied carbon disclosures for structural materials are secured by the organization before project completion, and that they list the required information for each type of material identified in Appendix B;
 - 3.2.3.2 Disclose the embodied carbon footprint of structural materials measured in global warming potential (GWP) with Environmental Product Declarations (EPDs) that:
 - 3.2.3.2.1 Reference the name of the material supplier's facility or professional

association as a contributor;

3.2.3.2.2 Comply with international standards noted in Appendix B within the period of validity; and

3.2.3.2.3 Are produced using the highest available resolution life cycle inventory (LCI) data as noted in Appendix B;

3.2.3.3 Where EPDs are not readily available, provide a life cycle assessment (LCA) report that complies with international standards (International Organization for Standardization (ISO) 14044, ISO 14025, and ISO 21930 or equivalent) and that is verified by an LCA reviewer as such a report is considered an acceptable equivalent form of disclosure; and

3.2.4 Submit the following information to the Treasury Board of Canada Secretariat to be used for other reporting obligations under the Federal Sustainable Development Strategy:

3.2.4.1 At the time of the annual call letter of the Greening Government Strategy:

3.2.4.1.1 All embodied carbon design estimates received in the previous fiscal year;

3.2.4.1.2 A consolidated report that details the results of all embodied carbon

disclosures for structural materials for all construction projects completed in the previous fiscal year that meet or exceed the thresholds identified in Appendix B;

- 3.2.4.1.3 A list and description of all projects completed in the previous fiscal year that received exemptions from any portion of this standard.

4. Application

4.1 This standard applies to:

4.1.1 Organizations described in section 3 of the *Policy on Green Procurement*; and

4.1.2 Any new construction or renovation of real property at or above the thresholds listed in appendices A and B at the time of solicitation of design services.

4.2 Subsection 3.2.2.1 of this standard does not apply to a project if the gross floor area to be constructed or renovated is below the minimum thresholds as identified in Appendix A;

4.3 Subsection 3.2.2.3 of this standard does not apply to a given structural material if the project value or specified quantities of that structural material are below the thresholds as identified in Appendix B;

- 4.4 Subsections 3.2.2.2 and 3.2.2.3 of this standard do not apply to a project if the project is in a geographic area excluded from a requirement as identified in Appendix B; or
- 4.5 Subsection 3.2.2.3 of this standard may not apply to a given structural material on a project if the required performance of the structural material or system hinders the implementation of the subsection or if a material is not available in a given region. If subsection 3.2.2.3 does not apply, an exemption rationale must be secured (refer to Appendix C). Projects exempt from subsection 3.2.2.3 must still disclose the embodied carbon of structural materials in accordance with subsections 3.2.2.1 and 3.2.2.2 of this standard, and reduce their embodied carbon to the greatest extent feasible.

5. References

- 5.1 This standard should be read in conjunction with:
- *Greening Government Strategy*
 - *Policy on Green Procurement*
 - Guide for implementing The Standard on Embodied Carbon in Construction
 - *National Whole-Building Life Cycle Assessment Practitioner's Guide*
 - *National Tiered Greenhouse Gas Emissions Limits for Steel Construction Products*
- 5.2 Related policy instruments:
- *Policy on the Planning and Management of Investments*

- *Directive on the Management of Procurement*
- *Directive on the Management of Real Property*
- *Directive on the Management of Projects and Programmes*
- *Directive on the Management of Materiel*

6. Enquiries

6.1 Direct enquiries about this standard to your organization's headquarters. For interpretation of this standard, organizational headquarters should contact Greening-Vert@tbs-sct.gc.ca.

Appendix A: embodied carbon design estimates and reductions

This appendix details the requirements to use whole-building life cycle assessments (WBLCA) to estimate and reduce the embodied carbon footprint of major construction projects.

Table A.1

Project category	Part 3 Buildings (as defined by the National Building Code)
Effective date	For design services solicited on or after September 1, 2025.
For projects or programs at or above	2,000 m ² of gross floor area for a new construction or an expansion of an existing building. 4,000 m ² of gross floor area for renovations that involve modifications to the building's structure or envelope.

Greenhouse gas estimation and reduction requirements

The embodied greenhouse gas (GHG) emissions of applicable projects shall be assessed on a project basis and be substantiated in accordance with the *Standard on Embodied Carbon in Construction* and the *National Whole-Building Life Cycle Assessment Practitioner's Guide* (the Practitioner's Guide).

Preliminary embodied carbon design estimates must detail the embodied carbon footprint of the project's early design (for example, conceptual or schematic design) as well as at least one design solution aimed at reducing embodied carbon that differs from the preliminary design in any of its substructure, superstructure, or building envelope elements. Preliminary estimates must also include costing estimates with a minimum precision equivalent to a Class-C (indicative) estimate for the proposed design and each variation.

Final embodied carbon design estimates must demonstrate a 30% reduction in the embodied carbon of the final design compared to a project baseline derived from the embodied carbon footprint of either the preliminary design or an alternate design that is representative of typical construction practices and in accordance with the Practitioner's Guide. Alternately, where a 30% reduction is not achievable, the final embodied carbon design estimate must demonstrate how the project's design was optimized to reduce embodied carbon to the greatest extent possible within a 2% premium in net construction cost.¹

Submittal requirements	<p>Embodied carbon project design reports must include both preliminary and final design estimates. Preliminary embodied carbon design reports shall comply with the requirements for early design stage assessments, and final reports shall comply with the requirements for construction documents stage assessments of the <u>Practitioner's Guide</u> using an analytical boundary that includes the required scope of building elements at the minimum and life cycle stage modules A1–A5, B1–B5, and C1–C4.</p> <p>Projects where a portion of a building's design must be highly prescriptive to meet specialized functional requirements may exclude the associated building elements from the project's embodied carbon design estimates.</p> <p>Projects located outside of Canada may deviate from the default assumptions outlined in the <u>Practitioner's Guide</u> where necessary to define a functionally equivalent project baseline.</p> <p>All reports must be submitted using a template or reporting system as prescribed by the Government of Canada and be secured by the organization prior to the start of construction. Completed final embodied carbon design reports must include a detailed description of how embodied carbon reductions are expected to be achieved based on the design strategies outlined in the headings of Table 3 in the <u>Practitioner's Guide</u>.</p> <p>The Government of Canada reserves the right to publish or submit to third parties all reported design estimates, either in part or in full.</p>
Exemptions and exclusions	<p>Projects may be exempted from subsection 3.2.2.1 where the entirety of a building's design must be highly prescriptive to support its specialized functional requirements or to maintain heritage value.</p>

1	Net construction cost is the difference in the total estimated cost associated with construction of the asset based on the proposed project design (according to the preliminary estimate) relative to the project baseline, and incorporates any anticipated cost savings (for example, from reduced construction timelines, simplified design, material efficiencies, transportation savings). The scope of the estimated cost difference is limited to the scope of materials and systems covered by the underlying WBLCA.
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Appendix B: structural material embodied carbon disclosures and reductions

This appendix details the requirements for the disclosure of and reduction in the embodied carbon footprint of the following structural materials: ready-mixed concrete (Table B.1) and construction steel (Table B.2).

Table B.1 Concrete

Material category	Concrete
Material subcategory	Ready-mixed concrete
Effective date	Where design services are solicited on or after December 31, 2022.
For projects or programs at or above	\$5 million where design services are solicited after December 31, 2024.
Minimum material quantity 1	100 m ³ (sum of all mixes used)

**Minimum
resolution for
disclosure
requirement**

The highest-resolution Environmental Product Declaration (EPD) available must be used to source the global warming potential (GWP) for each mix used in the project (for example, facility and product-specific, product-specific, regional average, in that order).

Greenhouse gas reduction requirement

The embodied greenhouse gas (GHG) emissions of procured ready-mixed concrete shall be disclosed on a project basis and be substantiated with EPDs in accordance with the *Standard on Embodied Carbon in Construction*.

Project GHG emissions from ready-mixed concrete are the sum of GHG emissions from all mixes used, calculated using the GWPs for life cycle stage modules A1–A3 and volumes of each mix supplied. The total project GHG emissions from ready-mixed concrete shall be at least 10% less than those calculated using the GWPs of the baseline mix in the Regional Industry Average EPD for the strength class of each mix and the volume of each mix supplied (see equations 1 and 2). This outcome must be demonstrated in the project's embodied carbon disclosure for structural materials.

Equation 1

$$\text{GHG Reduction} = \text{CO}_2\text{e Baseline} - \text{CO}_2\text{e Project}$$

► Figure 1 - Text version

Equation 2

$$\% \text{ GHG Reduction} = \frac{(\text{GHG Reduction}) \cdot 100}{\text{CO}_2\text{e Baseline}}$$

► Figure 2 - Text version

Where:

Carbon dioxide equivalent (CO₂e) baseline represents the emissions calculated by the volumes of all the mixes used in the project multiplied by their regional average GWP as represented by:

$$\text{CO}_2\text{e Baseline} = \sum_{n=1}^n \text{Vol}_n \cdot \text{BaseGWP}_n$$

► Figure 3 - Text version

CO2e project represents the emissions from the concrete used in the project calculated by the volumes of all the mixes used in the project multiplied by their GWP as represented by:

$$CO2e\ Project = \sum_{n=1}^n Vol\ n \cdot GWPn$$

► Figure 4 - Text version

n = the total number of concrete mixes used in the project

$Vol\ n$ = the volume of mix n (concrete to be placed)

$GWPn$ = the global warming potential of mix n

$BaseGWPn$ = the global warming potential of the regional baseline mix taken from the Regional Industry Average EPD for the strength class of mix n

Special application requirements

Where a specialized concrete mix is required for high early strength, high or ultra-high performance, or cold-weather application, the benchmark $BaseGWP$ used for that mix shall be 130% of the baseline mix in the Regional Industry Average EPD for that strength class.

Where a lower volume of higher-strength concrete can be substituted for a standard concrete without the addition of other structural materials (for example, additional reinforcing steel), this volume and its associated GWP should be used in the $CO2e$ project calculation while the initial volume and GWP of the standard mix should be used to calculate the $CO2e$ baseline.

Product Category Rule for Environmental Product Declarations	EPDs must follow the current versions of NSF International’s Product Category Rule for Concrete and International Organization for Standardization (ISO) 14025 Type III.
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Standards for Environmental Product Declaration ²	<p>Type II EPDs conforming to ISO 14021:2016 and ISO 21930:2017 may be used to substantiate the GWP of materials used in a project if the Type II EPDs provide higher resolution than the available Type III EPDs and if the Type II EPDs were created using an independently verified tool.</p> <p>Where carbon capture utilization and storage technologies are used to reduce the GWP of a portion or all concrete supplied to a project, such as through carbon mineralization, a Type III facility and product-specific EPD shall be provided to substantiate the associated reduction in GHG emissions.</p>
Project disclosure methodology	<p>Embodied carbon disclosures for structural materials must be submitted using a template or reporting system as prescribed by the Government of Canada.</p>
Exemptions	<p>Projects may be exempt from applying subsection 3.2.2.3 to ready-mixed concrete where materials needed to achieve embodied carbon reductions are not available, or where performance needs inhibit their use (refer to Appendix C).</p> <p>Projects located in the Yukon, Nunavut or the Northwest Territories or outside of Canada are exempt from subsections 3.2.2.2 and 3.2.2.3 in relation to ready-mixed concrete. Organizations should encourage designers of major construction projects in these locations to specify low-carbon concrete where available.</p>
<hr/> <p>¹ A structural material may be exempt from the requirement if, once a Class A estimate of material quantities is complete, the estimated quantity of that structural material is below the minimum quantity threshold noted here.</p> <p>² All EPDs must be ISO 14025:2006 Type III and ISO 21930:2017 compliant unless noted here.</p> <hr/>	

Table B.2 Steel

Material category	Structural and reinforcement steel
Effective date	For design services solicited on or after September 1, 2025.
Minimum material quantity ¹	200 metric tonnes (sum of all eligible steel products used)
Greenhouse gas reduction requirement	<p>The embodied GHG emissions of each category of steel products shall be reduced by procuring in accordance with the current version of National Research Council Canada's <i>National Tiered Greenhouse Gas Emissions Limits for Steel Construction Products</i> (the National GHG Limits for Steel).</p> <p>The National GHG Limits for Steel sets embodied GHG emissions limits for steel product categories based on the distribution of their emissions related to steel manufacturing. A product is eligible for procurement if the embodied GHG emissions associated with the production of its steel content are in the best performing 20% (lowest 20% in embodied carbon) and is available to be reasonably sourced for a specific project. If products in the best performing 20% cannot be sourced, then a product qualifies if its embodied carbon are in the best performing 40% (lowest 40% in embodied GHG emissions). If products in the best performing 40% cannot be sourced, then a product qualifies if its embodied carbon is less than the estimated industry average (lower than average embodied GHG emissions). The National GHG Limits for Steel documents the method used to determine whether a product qualifies in the best 20%, the best 40% or as below average and provides the corresponding thresholds.</p>

Minimum resolution for disclosure requirement	<p>The GHG emissions for life cycle stages A1–A3 and, where available, the percentage of recycled steel content of procured steel eligible products shall be disclosed on a project basis and be substantiated with EPDs in accordance with the <i>Standard on Embodied Carbon in Construction</i>.</p> <p>The highest-resolution EPD or life cycle inventory (LCI) data available must be used to source the GWP for life cycle stages A1–A3 for each eligible steel product procured for the project. The EPD or LCI data source used for disclosure must include facility-specific data on the steel-making activities involved in the production of the steel content of eligible products. Where no EPD meeting these criteria is available for an eligible product, disclosure may alternately be achieved by using facility-specific EPDs of the unfinished steel products that the final eligible products are composed of.</p>
Product Category Rule for Environmental Product Declarations	<p>EPDs must comply with the current versions of the UL Product Category Rule Guidance for Building-Related Products and Services Part B: Designated Steel Construction Product EPD Requirements, or the Smart EPD Part B PCR for Steel Construction Products, or equivalent, as recognized by the Government of Canada.</p>
Standards for Environmental Product Declaration ²	<p>Type III EPDs conforming to ISO 14025 and ISO 21930:2017, or EN 15804+A2, shall be used to substantiate the GWP of materials used in a project.</p>
Project disclosure methodology	<p>Embodied carbon disclosures for structural materials must be submitted using a template or reporting system as prescribed by the Government of Canada.</p>

Exemptions	<p>Projects may be exempt from applying subsection 3.2.2.3 to a given steel product category where products with a lower than average GHG emissions for that category cannot be sourced while keeping within a 2% premium in the construction cost of the project's structure (refer to Appendix C).</p> <p>Projects located outside of Canada are exempt from subsections 3.2.2.2 and 3.2.2.3 in relation to steel products. Organizations should encourage designers of major construction projects in these locations to specify steel products with a low carbon footprint to the extent available.</p>
<p><u>1</u></p> <p><u>2</u></p>	<p>A structural material may be exempt from the requirement if, once a Class A estimate of material quantities is complete, the estimated quantity of that structural material is below the minimum quantity threshold noted here.</p> <p>All EPDs must be ISO 14025:2006 Type III and ISO 21930:2017 compliant unless noted here.</p>

Appendix C: About Exemption Rationales

When an exemption may apply

Subsection 3.2.2.1 of the *Standard on Embodied Carbon in Construction* sets out requirements to use whole-building life cycle assessments to estimate and reduce the embodied carbon footprint of projects. Exemptions may apply to these requirements where the project's design must be highly prescriptive to meet specialized functional requirements or maintain heritage value. Projects exempt from subsection 3.2.2.1 must still reduce the embodied carbon of structural materials in accordance with subsection 3.2.2.3 and Appendix B.

No exemption may apply for the disclosure of embodied carbon in structural materials as set out in subsection 3.2.2.2 of this standard, except as specified in Appendix B.

Subsection 3.2.2.3 of this standard sets out requirements to reduce the embodied carbon footprint of structural materials. Exemptions may apply to these requirements because of a project's performance needs or because the structural materials needed to reduce embodied carbon are not available. Projects exempt from subsection 3.2.2.3 for a given structural material still must apply subsection 3.2.2.3 to other structural materials listed in Appendix B.

Who can provide an exemption rationale and what must be included

The engineer or architect of record can provide an exemption rationale for a project. The rationale must cite clauses in relevant codes or industry standards or otherwise describe the reason for the exemption and how the project will reduce embodied carbon to the extent feasible. The exemption rationale must be composed using company letterhead and must indicate their professional designation and signature.

The following information must also be provided in the exemption rationale:

- name of federal organization
- division
- name of contact
- title of contact
- role of the contact in the project
- name of the project
- contract number
- date

- client approval signature block

Where the completed rationale should be submitted

The completed rationale must be secured by the relevant federal organization.

Where the rationale is stored

The exemption rationale must be signed by the responsible official at the relevant federal organization and kept with the procurement file.

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