

Certified Professional Seminar



Vancouver
Plan



Embodied Carbon Requirements in Vancouver Building By-Law

December 7, 2023

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Senior Planner, Embodied Carbon

Agenda

Part 1: Context

Part 2: Code Changes

Part 3: The Process

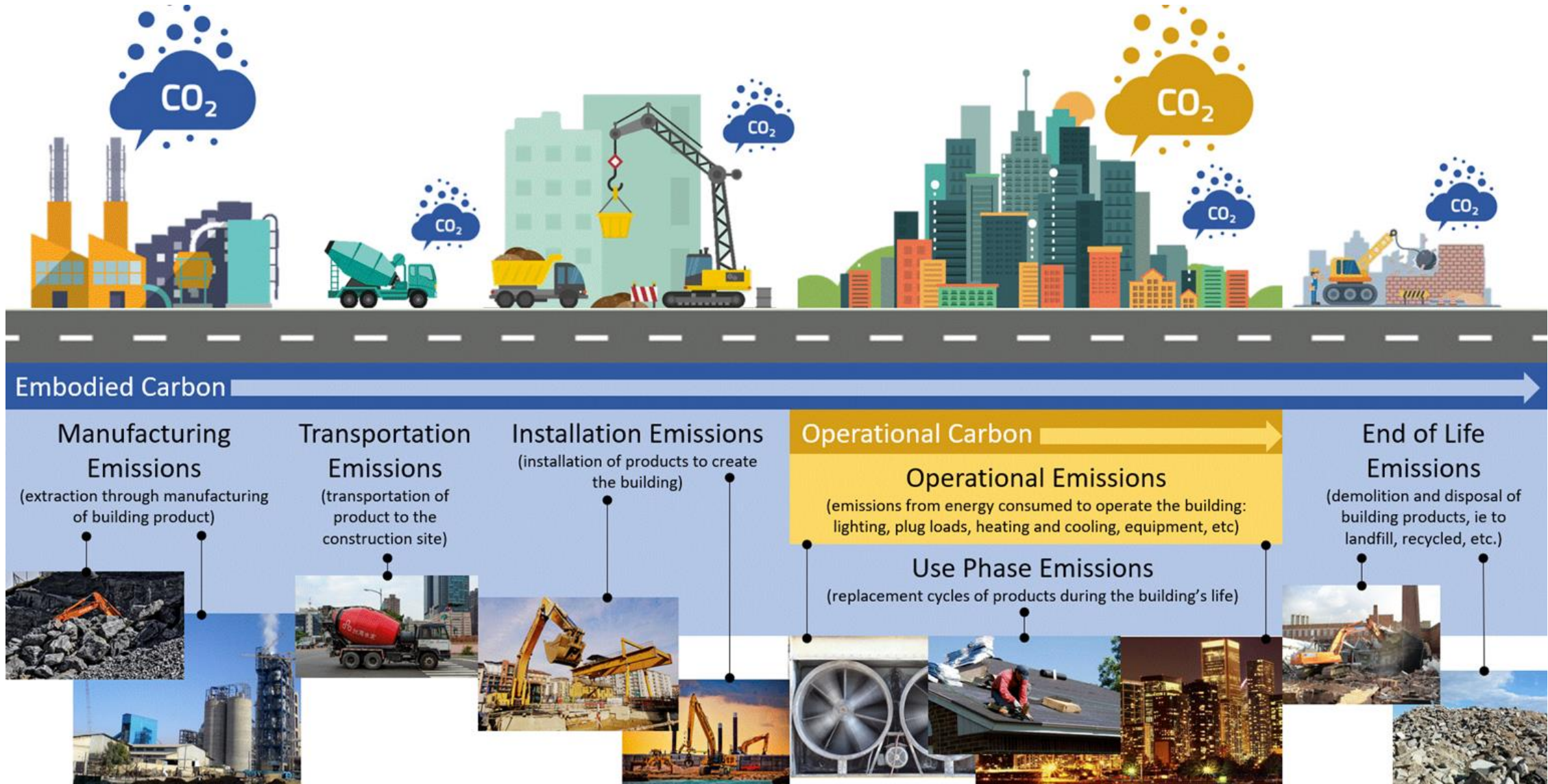


Part 1

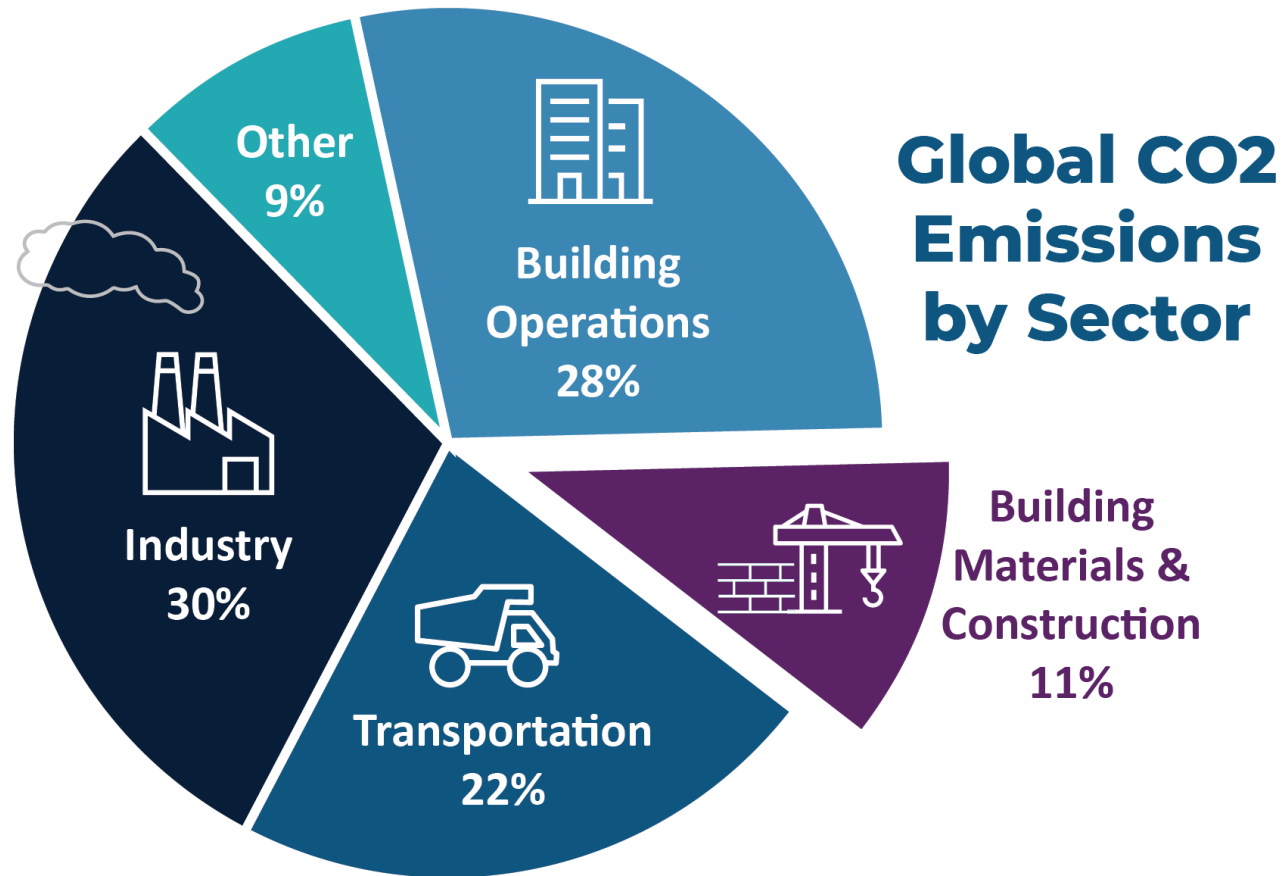
Context



What Are Embodied Carbon Emissions?

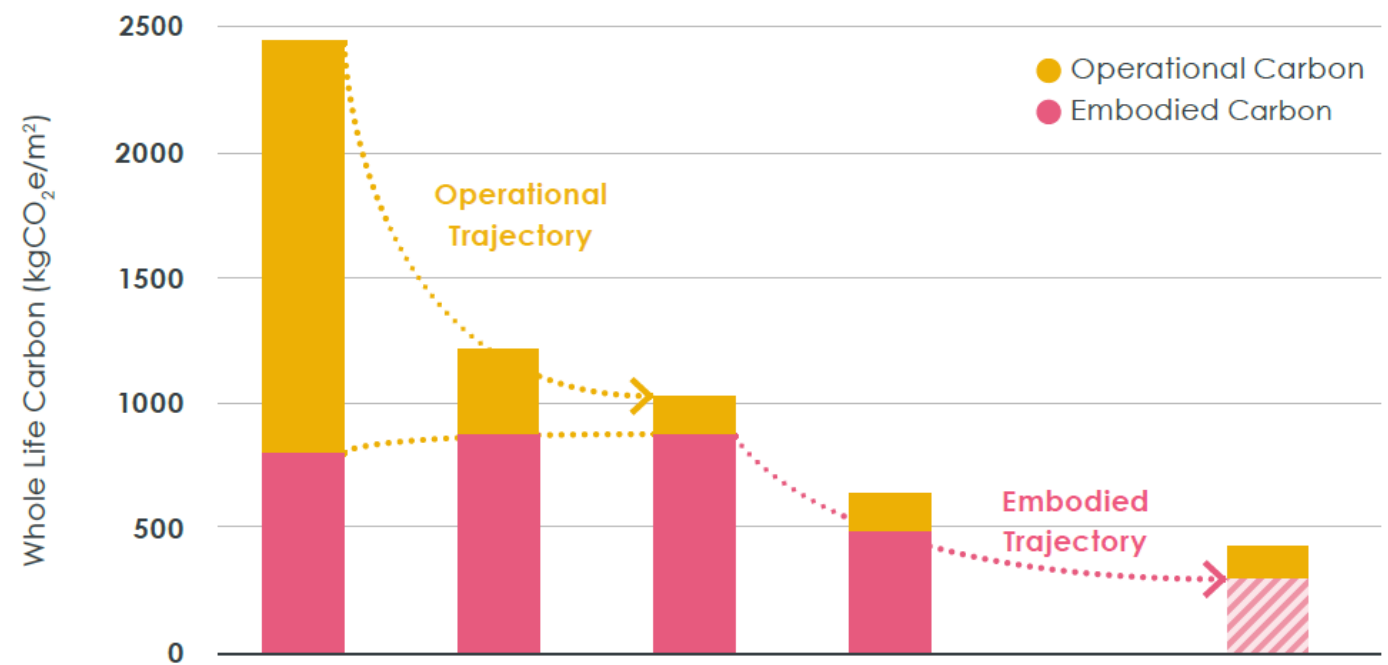
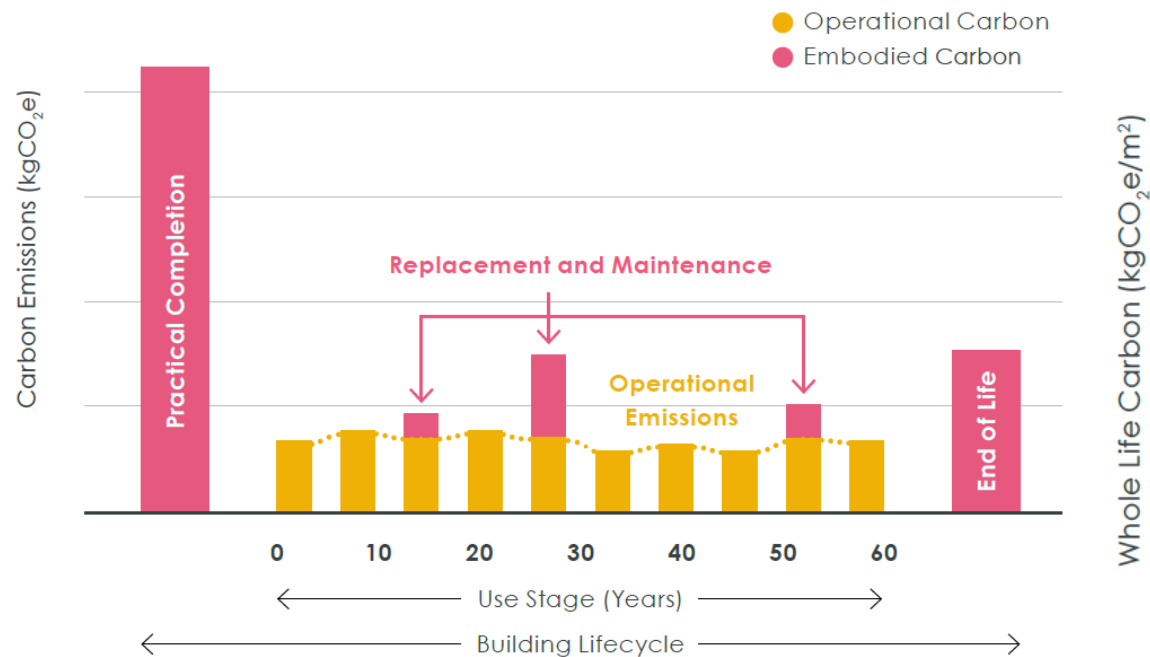


Embodied Carbon Emissions Are Significant



Source: Community Energy Association, A Local Government Guide (2022)

Embodied Carbon Emissions Are Upfront



Source: London Energy Transformation Initiative. LETI Embodied Carbon Primer (2019)

Climate Emergency

6 Big Moves

1

COMPLETE, WALKABLE
NEIGHBOURHOODS

2

ACTIVE
TRANSPORTATION
& TRANSIT

3

ZERO EMISSIONS
VEHICLES

4

ZERO EMISSIONS
SPACE & WATER
HEATING

5

LOW CARBON
MATERIALS &
CONSTRUCTION
PRACTICES

6

RESTORED
COASTS &
FORESTS

**40% Reduction in
New Buildings by 2030**



Part 2

Code Changes

Code Changes*

October 2023

- Reporting
- Equal or Less than 2x the Baseline
 - Follow the Embodied Carbon Guidelines for Assessment & Setting Baseline

January 2025**

- 20% Reduction: Up to 6-storeys, Can Be Built with Wood
- 10% Reduction: All Other Buildings
- 1 Responsible Materials Criteria
(Sustainable and Ethical Materials; Healthy and Transparent Materials; Circular Materials)

OR

Double the Percent Reduction

* Part 3 new buildings only (excludes 1-3 storeys residential)

** Approved in principle. The City Council will approve the final 2025 code changes in 2024.

Code Changes: October 2023

Division B: Acceptable Solutions

Part 10 – Energy and Water Efficiency

Section 10.4. Low Carbon Materials and Construction

10.4.1. Low Carbon Materials and Construction

10.4.1.1. Application

- 1) This Section applies to *buildings* described in Sentence 1.3.3.2.(1) of Division A.

10.4.1.2. Low Carbon Materials and Construction

- 1) A *building* shall be designed and constructed to achieve whole-building embodied carbon impacts of not more than double that of a functionally equivalent baseline, as determined in compliance with the City of Vancouver Embodied Carbon Guidelines, or as *acceptable* to the *Chief Building Official*.

<https://free.bcpublications.ca/civix/document/id/public/vbbl2019/1069567153>



Part 3

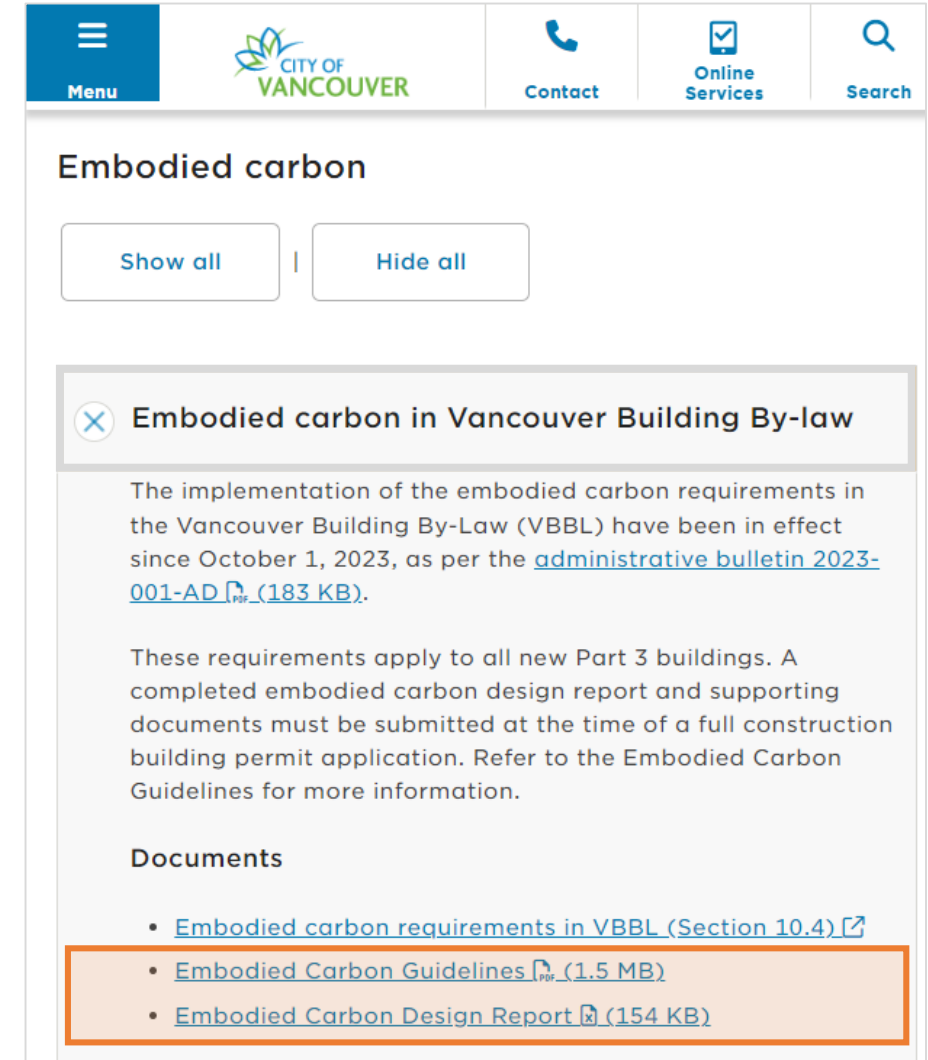
The Process

Which projects should comply & when?

- Part 3
- New buildings
 - New Buildings may include retention of existing structure, e.g. The Post project. This incentivizes retaining the existing structure.
 - Do not apply to existing buildings (Additions, Renovations, and Reconstruction).
- First BP submitted on or after Oct 1, 2023
- At Building Permit
 - For multi-staged Permits: At Full Construction

Where to find the resources?

- Zero Emissions Buildings Webpage



The screenshot shows the City of Vancouver website's 'Embodied carbon' page. The header includes a blue 'Menu' button, the City of Vancouver logo, and links for 'Contact', 'Online Services', and 'Search'. The main content area is titled 'Embodied carbon' and features two buttons: 'Show all' and 'Hide all'. Below this is a section titled 'Embodied carbon in Vancouver Building By-law' with a close button (X). The text explains that embodied carbon requirements in the Vancouver Building By-Law (VBBL) have been in effect since October 1, 2023, as per the [administrative bulletin 2023-001-AD](#) (183 KB). It also states that these requirements apply to all new Part 3 buildings, requiring a completed embodied carbon design report and supporting documents to be submitted with a full construction building permit application. A 'Documents' section lists three links: [Embodied carbon requirements in VBBL \(Section 10.4\)](#), [Embodied Carbon Guidelines](#) (1.5 MB), and [Embodied Carbon Design Report](#) (154 KB). The last two links are highlighted with an orange border.

Menu

CITY OF VANCOUVER

Contact

Online Services

Search

Embodied carbon

Show all | Hide all

Embodied carbon in Vancouver Building By-law

The implementation of the embodied carbon requirements in the Vancouver Building By-Law (VBBL) have been in effect since October 1, 2023, as per the [administrative bulletin 2023-001-AD](#) (183 KB).

These requirements apply to all new Part 3 buildings. A completed embodied carbon design report and supporting documents must be submitted at the time of a full construction building permit application. Refer to the Embodied Carbon Guidelines for more information.

Documents

- [Embodied carbon requirements in VBBL \(Section 10.4\)](#)
- [Embodied Carbon Guidelines](#) (1.5 MB)
- [Embodied Carbon Design Report](#) (154 KB)

<https://vancouver.ca/green-vancouver/zero-emissions-buildings.aspx>

Embodied Carbon Guidelines

- Compliance Pathways
- Standardized wbLCA Scope
- Standardized Quantification Methodology
- Standardized Baseline Setting
- Standardized Documentation & Submittal

Guidelines

Embodied Carbon Guidelines

Version 1.0

Approved by Chief Building Official on October, 2023

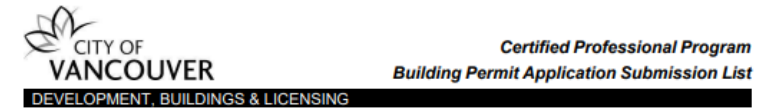
Last amended October 18, 2023

Submission Requirements

The submission requirements will be added to the [Building Permit Application Submission List](#)

- [Design Report](#)
- Raw Data from the Software Tool
 - Instructions: <https://tinyurl.com/COV-ECDR>
- Manual Calculations (*if applicable*)
- Supporting Report (*Optional*)

See Section 6 of the [Guidelines](#) for more information.



Name of CP: Project Address:
Date: Building Permit #:

Checklist represents minimum requirements for full or staged building permit applications. Find all City forms, guides, and resources at <https://vancouver.ca/home-property-development/certified-professional-program.aspx>.
NOTE: The CP should indicate documents submitted for each stage in the applicable column or mark N/A (not applicable).

No.	Item **All submitted documents and drawings must have original, verifiable professional seals and CP stamp.**	Excavation / Shoring		Fdn/Struct Up to Grade		Super-structure	
		CP	COV	CP	COV	CP	COV
1	Building Permit Application Form (including contractor's business licence number)	Y*					
2	Addressing drawings (site plan, all floor and roof plans, and elevations)	Y*					
3	Authorized Staged Construction Form and Drawing List	Y		Y*		Y*	
4	Project Directory	Y					
5	Land Title Charge Summary and Land Title Search	Y					
6	Building Permit Data Sheet	Y					
7	Building By-law Compliance Report	Y					
8	Development Permit Confirmation/Change Letter	Y		Y		Y	
9	Owner's Undertaking Letter (Schedule E-1)/Owner's and Tenant's Undertaking Letter (Schedule E-2)/Strata Letter	Y					
10	Schedule CP-1 (Confirmation of Commitment by Owner and CP)	Y					
11	TI Development Review Confirmation Letter (for first TIs in new buildings)	Y*					
12	Schedule A	Y					
13	Architectural Schedule B					Y	
14	Structural Schedule B			Y			
15	Structural Concept Review Checklist			Y			
16	Mechanical & Plumbing Schedule B					Y	
17	Confirmation of sprinkler permit application			Y		Y	
18	Electrical Schedule B					Y	
19	Geotechnical Schedule B	Y					
20	Building Envelope Schedule D					Y	
21	Confirmation of Home Warranty Insurance or Exemption	Y					
22	Adjacent Owner Notification (snow drifting)	Y					
23	Adjacent Owner Acknowledgement (encroachment)	Y					
24	Energy Compliance Documents (checklist and supporting documents)					Y	
25	Green Building Policy for Rezoning's Checklist & compliance documentation					Y	
26	BC Hydro Clearance Form	Y					
27	Electrical Plan Examiner's Transmittal Form	Y					
28	Kitchen Ventilation Details Checklist (Form K2) , Schedule B & drawings					Y	
29	Geotechnical Report	Y					
30	Sealed Topographical site survey	Y					
31	Building By-law Compliance drawings	Y					
32	Architectural drawings & Architectural/Building Envelope Detail Books					Y	
33	Landscape drawings (as issued by City of Vancouver for Development Permit)					Y	
34	Structural drawings			Y			
35	Mechanical & Plumbing drawings					Y	

<https://vancouver.ca/files/cov/CP-building-permit-submission-list.pdf>

Design Report


Standardized Reporting

- Project & Building Information
- Structural Design Information
- Embodied Carbon Modelling Information
- Reduction Strategies
- Results & compliance Assessment

CITY OF VANCOUVER		Embodied Carbon Design Report Part 3 Buildings		Version 1.1 Updated: 2023-12-01																								
Instructions																												
Applicability <ul style="list-style-type: none">■ This Embodied Carbon Design Report (Design Report) is the reporting template designed to be used for demonstrating compliance with the embodied carbon requirements specified in Section 10.4 of the VBBL.■ These VBBL requirements apply to all <u>new Part 3 buildings</u>.■ These requirements do not apply to alterations to existing buildings, unless alterations are so significant that they are generally treated as the construction of a new building. Applicants should consult with building officials to confirm the applicability in these cases.■ For guidance on applicability and embodied carbon emissions modelling refer to the corresponding version of Vancouver Embodied Carbon Guidelines (Guidelines).																												
General Instructions <ul style="list-style-type: none">■ For additional submission requirements see Section 6.2 of the Guidelines.■ Projects with multiple buildings shall follow the guidance provided in Sections 2.4 (a) of the Guidelines to decide whether they should submit one Design Report per building or combine reporting in one report.■ This report shall be submitted in both Excel and PDF formats.■ Complete all fields that apply, using information that represents the current stage of design (For the City of Vancouver, submissions are required at Rezoning Permit and Building Permit).■ For fields that do not apply or for which there is no information available (e.g. at Rezoning Permit), leave them blank or enter "N/A".■ The row heights can be changed if more space is needed in any cell.■ For questions relating to this design report please email green.buildings@vancouver.ca																												
Cell Legends <table><thead><tr><th colspan="2">Legend</th></tr></thead><tbody><tr><td>Required Field</td><td></td></tr><tr><td>Required Field with Dropdown Options</td><td></td></tr><tr><td>Optional Field</td><td></td></tr><tr><td>Optional Field with Dropdown Options</td><td></td></tr><tr><td>No Manual Entry Required</td><td></td></tr></tbody></table>					Legend		Required Field		Required Field with Dropdown Options		Optional Field		Optional Field with Dropdown Options		No Manual Entry Required													
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Tabs Overview <p>The user is encouraged to fill in the tabs in the following order, as answers to some questions will impact the following sections or tabs</p> <table><thead><tr><th>Tabs</th><th>Requirement</th><th>Description</th></tr></thead><tbody><tr><td>1. Instructions</td><td>Informative</td><td>(The current tab) Provides an overview of this design report</td></tr><tr><td>2. Project Info</td><td>Required</td><td>General information about the proposed project and building(s)</td></tr><tr><td>3. EC Modelling Info</td><td>Required</td><td>Information on the embodied carbon model, including the tool used and the scope</td></tr><tr><td>4. Results & Compliance</td><td>Required</td><td>Embodied carbon emissions results and compliance assessment with Vancouver Building By-law</td></tr><tr><td>5. Carbon Storage</td><td>Optional</td><td>Biogenic carbon and concrete carbonation reporting</td></tr><tr><td>6. Raw Data</td><td>Required</td><td>File names and submission requirements of raw data from different embodied carbon assessment software tools</td></tr><tr><td>7. Definitions</td><td>Informative</td><td>Definition of terms and description of the structural systems in "Project Info" tab</td></tr></tbody></table>					Tabs	Requirement	Description	1. Instructions	Informative	(The current tab) Provides an overview of this design report	2. Project Info	Required	General information about the proposed project and building(s)	3. EC Modelling Info	Required	Information on the embodied carbon model, including the tool used and the scope	4. Results & Compliance	Required	Embodied carbon emissions results and compliance assessment with Vancouver Building By-law	5. Carbon Storage	Optional	Biogenic carbon and concrete carbonation reporting	6. Raw Data	Required	File names and submission requirements of raw data from different embodied carbon assessment software tools	7. Definitions	Informative	Definition of terms and description of the structural systems in "Project Info" tab
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<https://vancouver.ca/files/cov/embodied-carbon-design-report.xlsx>

Results & Compliance Tab



Embodied Carbon Design Report
Part 3 Buildings

Version 1.0
Updated: 2023-10-20

Results & Compliance

Instructions

- Use the form below to report the embodied carbon emissions and assess compliance with the embodied carbon requirements of Vancouver Building By-law.
- "Required Elements" should only include substructure and shell (i.e. structure and enclosure).
- "Optional Elements" shall include the other elements, indicated to be included in the "Building Elements" section of "EC Modelling Info" tab.
- Biogenic carbon and concrete carbonation shall not be included in this tab. They may be reported separately in "Carbon Storage" tab.

Compliance Path and Requirements

The embodied carbon of the proposed design should be 20% below the benchmark for Part 3 buildings that are up to 6 storeys and can be built with wood structure and 10% for all other Part 3 buildings. The benchmark is set based on the compliance path.

	Compliance Path	Baseline Path
Gross Floor Area without Parkade (m ²)		50,000
Projected Date of First Building Permit Application		2025/01/01
Storeys Above Grade		5
According to VBBL, is the building 1-6 storeys in height and can the primary building structure be wood or mass timber construction?		Yes
Is the project planning to achieve any of the "Responsible Material Sourcing" criteria?		Yes

Specify and describe the Responsible Material Sourcing criterion or criteria the project is meeting.
Additional details may be provided in a supporting report, as described in Section 6.2 (d) of the Guidelines.

Compliance Assessment

	Embodied Carbon Limit		
	Proposed	Benchmark	Limit
Total Embodied Carbon Emissions (kg CO ₂ e)	42,300,000	55,400,000	44,320,000
Embodied Carbon Intensity (without Parkade) (kg CO ₂ e/m ²)	846.00	1,108.00	886.40

Embodied Carbon Reduction from the Benchmark (%)

The proposed design meets the embodied carbon limit	Yes
Minimum Reduction Required	20%
Reduction Achieved	24%
Required Scope Reduction (Substructure & Shell)	31%

Results			
Proposed Design			
	(Reporting)	(Compliance)	(Reporting)
	Required Elements	Required+Optional Elements (Partial)	Required+Optional Elements (All)
Total Embodied Carbon Emissions (kg CO ₂ e)			
Product (A1-A3)	20,000,000	30,000,000	40,000,000
Transport - Construction Process (A4)	5,000,000	6,000,000	7,000,000
Construction - Construction Process (A5)	1,200,000	1,800,000	2,400,000
Use (B1-B5)	2,000,000	3,000,000	4,000,000
End-of-Life (C1-C4)	1,000,000	1,500,000	2,000,000
Total (A-C)	29,200,000	42,300,000	55,400,000
Beyond the Building Life (D1-D4)			
Embodied Carbon Intensity (without Parkade) (kg CO ₂ e/m ²)			
Modules A-C	584	846	1,108
Modules D			
Embodied Carbon Intensity (with Parkade) (kg CO ₂ e/m ²)			
Modules A-C	531	769	1,007
Modules D			
Design for Disassembly and Adaptability (DfD) Credit (kg CO ₂ e)			
Report default values from the software tool for modules C1-C4 of elements designed with DfD strategies			
End-of-Life (C1-C4)			
Elements Designed with DfD Strategies			
Contribution of DfD Credit to the Total Reduction Achieved	0%		
Baseline			
	(Reporting)	(Compliance)	(Reporting)
	Required Elements	Required+Optional Elements (Partial)	Required+Optional Elements (All)
Total Embodied Carbon Emissions (kg CO ₂ e)			
Product Stage (A1-A3)	30,000,000	40,000,000	50,000,000
Transport - Construction Process (A4)	6,000,000	7,000,000	8,000,000
Construction - Construction Process (A5)	1,800,000	2,400,000	3,000,000
Use Stage (B1-B5)	3,000,000	4,000,000	5,000,000
End-of-Life Stage (C1-C4)	1,500,000	2,000,000	2,500,000
Total (A-C)	42,300,000	55,400,000	68,500,000
Beyond the Building Life (D1-D4)			
Embodied Carbon Intensity (without Parkade) (kg CO ₂ e/m ²)			
Modules A-C	846	1,108	1,370
Modules D			
Embodied Carbon Intensity (with Parkade) (kg CO ₂ e/m ²)			
Modules A-C	769	1,007	1,245
Modules D			

Raw Data from the Software Tool

► One Click LCA

► Athena

► Tally (tallyLCA)

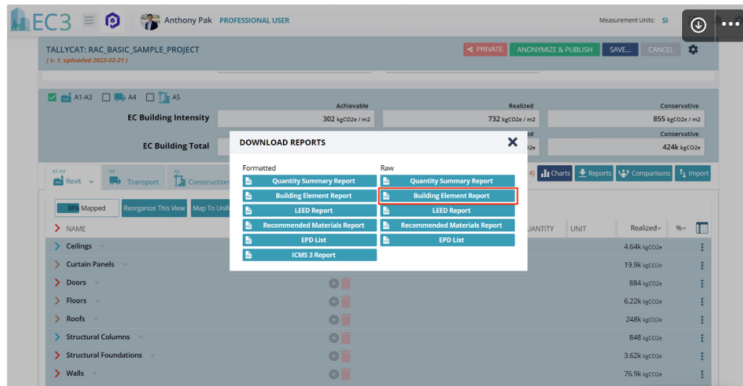
▼ EC3 or tallyCAT

Instructions

• Results Export Sheets

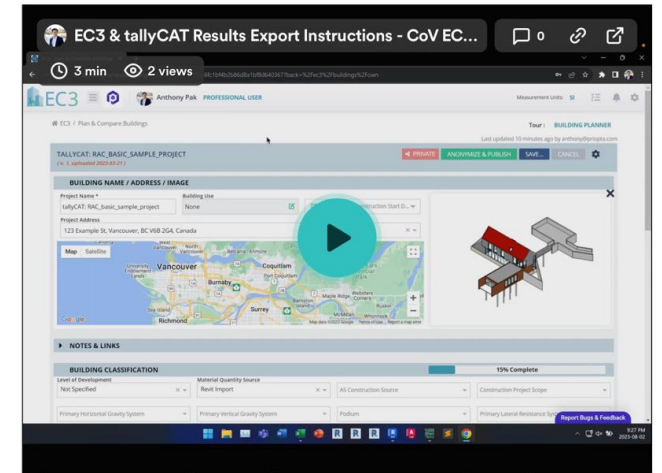
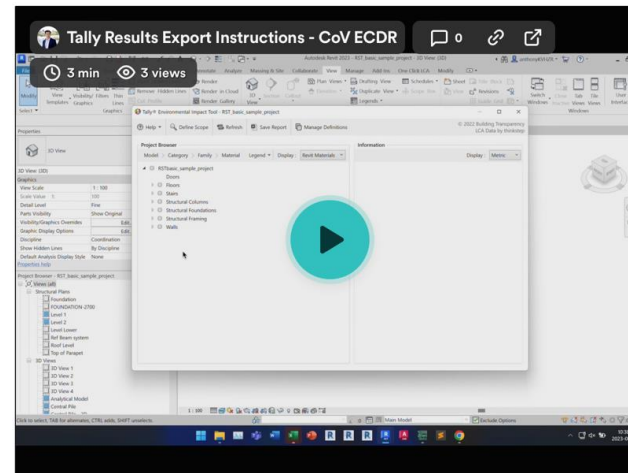
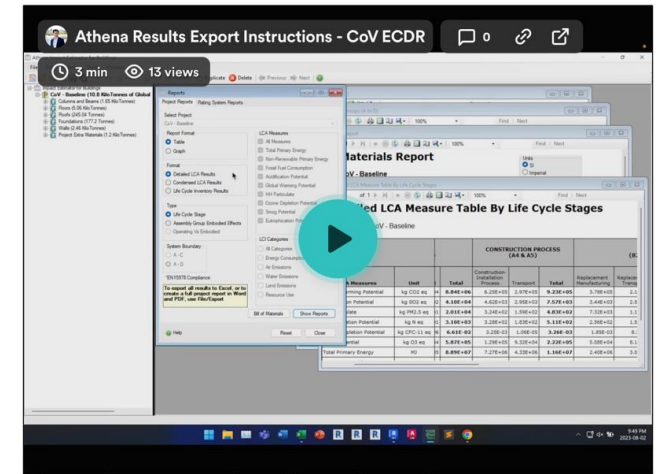
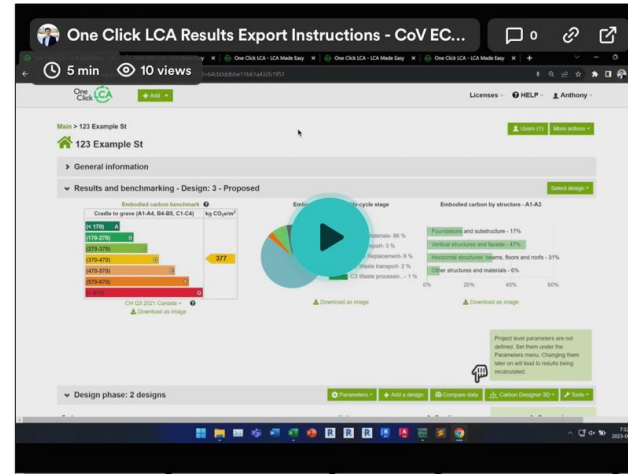
◦ Required: Building Elements Report (Raw)

- Select **Reports** and under the **Raw** column, click on **Building Element Report** spreadsheet.



◦ Optional: Building Elements Report (Formatted)

- Select **Reports** and under the **Formatted** column, click on **Building Element Report** spreadsheet.



<https://tinyurl.com/COV-ECDR>

Additional Notes

- The number and types of supporting documents vary depending on the modelling assumptions and tool used.
- Send any questions on embodied carbon requirements to
 - Zahra Teshnizi (zahra.teshnizi@vancouver.ca), Senior Planner, Embodied Carbon; or
 - Green Building team (green.buildings@vancouver.ca).



Thank you!