Information Session Sep 19, 2024

Embodied Carbon in Vancouver Building Bylaw 2025

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Vancouver |



Part 1: industry presentations summary (recording)

AGENDA

Part 2: context

Part 3: proposed code changes

Part 4: what we have heard

Part 5: next steps

Part 1 INDUSTRY PRESENTATIONS

Find the full presentations in the CLF BC website: <u>https://clfbritishcolumbia.com/embodied-carbon-in-vancouver-building-bylaw-2025/</u>

Part 2 CONTEXT

Ave 400

W Broadway

GANBIN

buildings vs. infrastructures EMBODIED CARBON OF BUILDINGS IS SIGNIFICANT

Global GHG Emissions (2019)



Canada Infrastructure Investment (2018)



Carbon Leadership Forum (2024) https://carbonleadershipforum.org/embodied-carbon-101-v2/ Clean Energy Canada (2022) https://cleanenergycanada.org/report/money-talks/

Climate Emergency Action Plan BIG MOVE 5



key action areas EMBODIED CARBON STRATEGY (2020)

CHANGE THE RULES	CHANGE THE MARKET	CHANGE THE CULTURE	CHANGE THE CONTEXT
POLICY & REGULATION	REMOVE BARRIERS & PROVIDE INCENTIVES	CAPACITY BUILDING & INDUSTRY TRANSFORMATION	ALIGN WITH COMPLIMENTARY STRATEGIES & ACTIONS
NCLUDING CODE CHANGES through Vancouver Building Bylaw			

(VBBL)

Vancouver Building Bylaw PROPOSED IN 2022

2023 IN EFFECT

- wbLCA reporting
- Limit:

• +100% (double) of a baseline

2025 APPROVED IN PRINCIPLE

- wbLCA reporting
- limit
 - 6- storeys & wood: -20%
 - all Other: -10%
- a Responsible Materials Criteria
 OR
 double reduction (-40% or -20%)
- Only applies to new Part 3 buildings (excludes 1-3 storey residential buildings)
- The City Council will approve the final 2025 code changes in 2024.

Vancouver Building Bylaw EFFECTIVE SINCE OCT 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

implementation

EMBODIED CARBON GUIDELINES

- compliance pathways
- standardized modelling

DESIGN REPORT

- standardized reporting
- standardized data collection
- simplified review



Embodied carbon



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 <u>Administrative Bulletin 2023-001-AD</u> (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) [7]
 - The upcoming embodied carbon requirements in the 2025 update of VBBL are available in this <u>Council document</u> (648 KB). City Council has approved these requirements in principle, but the final 2025 code changes will be taken to the Council for approval in 2024.
- Embodied Carbon Guidelines []]: (1.5 MB)
- Embodied Carbon Design Report 🗟 (154 KB)

Resources and case studies

national alignment

ASSESSMENT GUIDELINES

- National Research Council of Canada
- Canada Green Building Council
- Other jurisdictions are encouraged to use the same guide

NRC·CNRC **NRC Publications Archive** Archives des publications du CNRC National whole-building life cycle assessment practitioner's guide Picken, Ryley; Bertrand, Fanny; Amor, Ben; Cooney, Rob; Gobadi, Mehdi; Hill, Fiona For the publisher's version, please access the DOI link below./ Pour consulter la version de l'éditeur, utilisez le lien DOI ci-dessous https://doi.org/10.4224/40003365 NRC Publications Archive Record / Notice des Archives des publications du CNRC : https://nrc-publications.canada.ca/eng/view/object/?id=533906ca-65eb-4118-865d-855030d91ef2 https://publications-cnrc.canada.ca/fra/voir/obiet/?id=533906ca-65eb-4118-865d-855030d91ef2 Access and use of this website and the material on it are subject to the Terms and Conditions set forth at https://nrc-publications.canada.ca/eng/copyrigh READ THESE TERMS AND CONDITIONS CAREFULLY BEFORE USING THIS WEBSITE L'accès à ce site Web et l'utilisation de son contenu sont assujettis aux conditions présentées dans le site https://publications-cnrc.canada.ca/fra/droits LISEZ CES CONDITIONS ATTENTIVEMENT AVANT D'UTILISER CE SITE WEB. Questions? Contact the NRC Publications Archive team at PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca. If you wish to email the authors directly, please see the first page of the publication for their contact information. Vous avez des guestions? Nous pouvons vous aider. Pour communiquer directement avec un auteur, consultez la première page de la revue dans laquelle son article a été publié afin de trouver ses coordonnées. Si vous n'arrivez pas à les repérer, communiquez avec nous à PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca. Canada National Research Conseil national de Council Canada recherches Canada

Part 3 PROPOSED CODE CHANGES

Vancouver Building Bylaw PROPOSED 2025 CHANGES

2025 APPROVED IN PRINCIPLE IN 2022

- wbLCA reporting
- limit
 - 6- storeys & wood: -20%
 - all Other: -10%
- a Responsible Materials Criteria OR double reduction (-40% or -20%)

2025 REVISED PROPOSED IN 2024

- exempt small projects (≤ 1,800 m²)
- wbLCA reporting
- Limit: **-10%**
 - 5-10% reduction
 - 0-5% Industry Leadership Credits

- Only applies to new Part 3 buildings and additions (excludes 1-3 storey residential buildings)
- The City Council will approve the final 2025 code changes in 2024.

5-10% reduction NO/MINIMAL COST & SCHEDULE IMPLICATIONS

- 5% achievable at no cost & 10% likely at no cost
 - MOST COMMON SOLUTIONS: wood construction, low-carbon concrete & insulation, design efficiency
 - OTHER SOLUTIONS: mass timber construction, reuse
- AND we allow 0-5% Industry Leadership Credits
- AND in case of unforeseen circumstances, we allow reductions to the satisfaction of Chief Building Official

5-10% reduction 2 COMPLIANCE PATHS

Year	Absolute Path (kg CO ₂ /m ²)	Baseline Path (%)
Benchmark	400**	Equivalent Baseline
2023	800	+100%
2025 (Proposed) If no Industry Leadership Credit pursued (-0%)	360	-10%
2025 (Proposed) If maximum Industry Leadership Credit pursued (-5%)	380	-5%
2027***	TBD	TBD
2030	TBD	-40%

* More details will be available in the Embodied Carbon Guidelines. Version 2 will be available for review in Q4 2024.

** May be revised to make it more accurate, based on data collected since 2023 and an upcoming Vancouver-specific benchmarking study.

*** The exact timeline for the next update will be identified based on findings from data collected and consultation with industry and other partners.

5-10% reduction ABSOLUTE PATH

Building Permits (2018-2024)

Rezoning Applications (2017-2024)



5-10% reduction ABSOLUTE PATH

Building Permits (Oct 2023-2024)

Rezoning Applications (Oct 2023-2024)



5-10% reduction **BASELINE PATH**

MOST COMMON SOLUTIONS:

- design efficiency & reduced parking (↓10+%)
- low-carbon concrete & insulation
 (↓10+%)
- wood construction (¹√20+%)

The following strategies were used to reduce the parkade from two levels to one level:

- Replaced one loading space with two smaller stalls (which required city approval)
- Relocated the mechanical to the roof and above the parkade ramp
- Reduced the size of all the utility rooms

Initial

(1'6")

(2'2") 625.2mm

(3'2")

457.0mm

Full Transfer

660.4mm

Optimized car and bike stall layouts

Slab Reductions

Level 8

Level 7

Level 2

Level 1

Relocation of spaces allowed fire travel safety
 distances to work without an extra level

Current

203.2mm

965.2mm

304.8mm

(3'2")

(1'0")

Partial Transfer

(8")



Level 2



Examples from ZGF Life Cycle Assessment Case Study: A Mid-rise Rental Residential Building

0-5% Industry Leadership Credits OPTIONAL REPORTING

- Achieve up to 5% embodied carbon reduction through optional reporting of a selection of the following
 - embodied carbon of optional building elements
 - project-specific construction process emissions (A4-A5)
 - use of circularity practices (salvaging, design for deconstruction)
 - use of products with sustainability, transparency, or health certifications



More details will be available in version 2 of the *Embodied Carbon Guidelines*.

0-5% Industry Leadership Credits OPTIONAL BUILDING ELEMENTS

- 1% each, up to 5%
 - Interior Construction
 - Interior Finishes
 - Conveying
 - Plumbing
 - Heating, Ventilation, and Air Conditioning (HVAC)
 - Fire Protection
 - Electrical
 - Furnishings
 - Site Earthwork
 - Landscaping
 - All other site improvements (i.e. hardscaping)



More details will be available in version 2 of the *Embodied Carbon Guidelines*.

niFormat	OmniClass				Inclusion in	
vel 3	Level 3		Level 4		Scope	
С	03 00 00	Interiors				
C10	03 10	Interior Construction				
C1010 03 10 10	0 Interior Partitions	03 10 10 10	Interior Fixed Partitions	Optional (R)		
			03 10 10 20	Interior Glazed Partitions	Optional	
			03 10 10 40	Interior Demountable Partitions		
			03 10 10 50	Interior Operable Partitions		
			03 10 10 70	Interior Screens		
			03 10 10 90	Interior Partition Supplementary		
C1020	03 10 20	Interior Windows	03 10 20 10	Interior Operating Windows	Optional (R)	
CICLO	00 10 20		03 10 20 20	Interior Fixed Windows	optional (R)	
			03 10 20 50	Interior Special Function Windows	-	
			03 10 20 90	Interior Window Supplementary	Optional	
				Components		
C1030	03 10 30	Interior Doors	03 10 30 10	Interior Swinging Doors	Optional	
			03 10 30 20	Interior Entrance Doors	Optional (R)	
			03 10 30 25	Interior Sliding Doors	Optional	
			03 10 30 30	Interior Folding Doors		
			03 10 30 40	Interior Coiling Doors		
		03 10 30 50	Interior Panel Doors			
		03 10 30 70	Interior Special Function Doors			
		03 10 30 80	Interior Access Doors and Panels			
		03 10 30 90	Interior Door Supplementary			
				Components		
C1040	03 10 40	0 Interior Grilles and Gates 03 10 40 10 Interior Grilles 03 10 40 50 Interior Gates	Interior Grilles	Optional		
			03 10 40 50	Interior Gates	1	
C1060	03 10 60	Raised Floor Construction	03 10 60 10	Access Flooring	Optional (R)	
			03 10 60 10	Platform/Stage Floors	Optional	
C1070	03 10 70	Suspended Ceiling Construction	03 10 70 10	Acoustical Suspended Ceilings	Optional (R)	
			03 10 70 20	Suspended Plaster and Gypsum Board Ceilings		
		03 10 70 50	Specialty Suspended Ceilings	Optional		
		03 10 70 70	Special Function Suspended Ceilings			
		03 10 70 90	Ceiling Suspension Components			
C1090 03 10 90	03 10 90 Interior Specialties	03 10 90 10	Interior Railings and Handrails	Optional (R)		
			03 10 90 15	Interior Louvers	Optional	
		03 10 90 20	Information Specialties	Exclude		
		03 10 90 25	Compartments and Cubicles	1		
			03 10 90 30	Service Walls	-	
			03 10 90 35	Wall and Door Protection		
			03 10 90 40	Toilet, Bath, and Laundry Accessories	1	
			03 10 90 45	Interior Gas Lighting		
			03 10 90 50	Fireplaces and Stoves		
			03 10 90 60	Safety Specialties		
			03 10 90 70	Storage Specialties		
		03 10 90 90	Other Interior Specialties			

An example of sub-elements required for the credit for Interior Construction

Part 4 WHAT WE HAVE HEARD

Feedback Received to Date

- Keep the code language simple
- Prescriptive pathways
 - Existing framework already has simple pathways
 - May not achieve the intended reductions
- Build Industry Capacity and Provide Clear Guidance
- Continue requiring and collecting wbLCA data

Why Continue Requiring wbLCA?

- Inform design holistically from the early stages
 - Prompts questions from design team that help identify no/low-cost solutions
- Give credit to whole-life carbon reduction solutions
 - Go beyond only focusing on low-carbon material selection, e.g. reuse
- Sets up the industry to prepare for future reduction requirements
- Reliable data is crucial for future policy & regulatory steps
 - Including setting reduction targets

365 RAILWAY St. (OFFICE)

carbon-through-building-reuse/

45% REDUCTION <350 kgCO₂e/m²

- reused existing building
- mass timber structure
- low-carbon concrete & insulation

1210 Seymour St. (AFFORABLE HOUSING)

https://vancouver.ca/files/cov/embodied-carbon-case-study-mid-riserental-residential-building-zaf-2023.pdf

what we're seeing INDUSTRY LEADERS

https://clfbritishcolumbia.com/365-railway-street-reducing-embodied-

22% REDUCTION 342 kgCO₂e/m²

- reduced parkade
- low-carbon concrete & insulation



40% REDUCTION 362 kgCO₂e/m²

- reduced parkade
- mass timber structure
- low-carbon concrete & insulation



Percentage reductions are from an equivalent baseline, defined following the <i>Embodied Carbon Guidelines.

Part 5 NEXT STEPS

next steps



work with partners to: IMPLEMENT

- refine absolute benchmarks
- improve compliance processes (online submission platform)
- continue to build industry capacity

EXPAND

- prescriptive compliance pathways (Part 9 buildings)
- explore expanding scope to interior, MEP, and renovations
- enable more applications of mass timber