

Information Session

Sep 19, 2024

Embodied Carbon in Vancouver Building Bylaw 2025

Zahra Teshnizi

Senior Planner, Embodied Carbon



Vancouver
Plan



AGENDA

Part 1: industry presentations summary (recording)

Part 2: context

Part 3: proposed code changes

Part 4: what we have heard

Part 5: next steps



Part 1 INDUSTRY PRESENTATIONS

The recording will be shared on our website:

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

Find the full presentations in the CLF BC website:

<https://clfbritishcolumbia.com/embodied-carbon-in-vancouver-building-by-law-2025/>

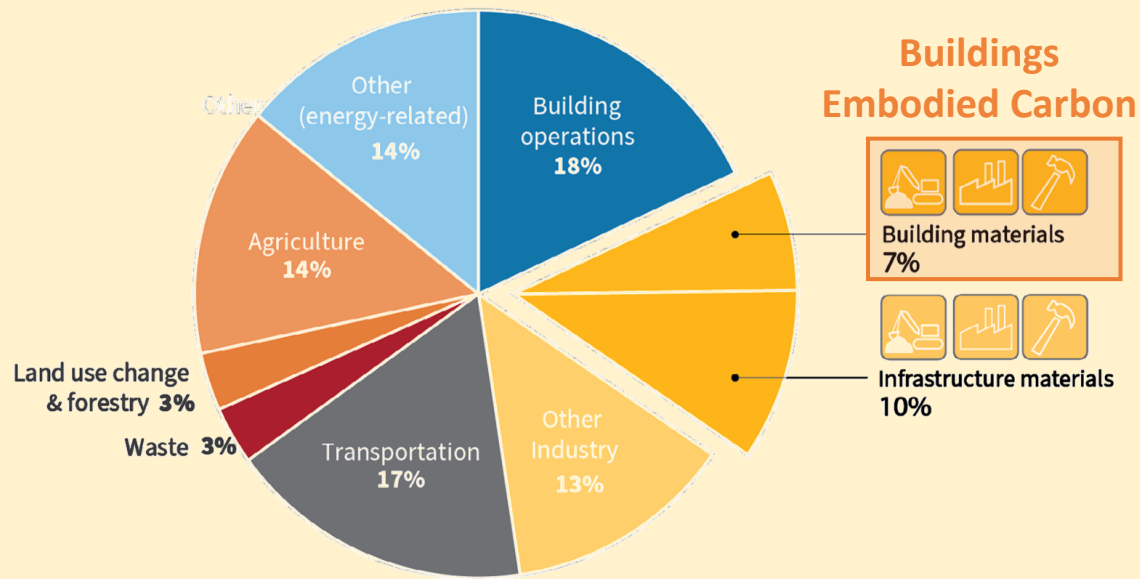


Part 2 CONTEXT

buildings vs. infrastructures

EMBODIED CARBON OF BUILDINGS IS SIGNIFICANT

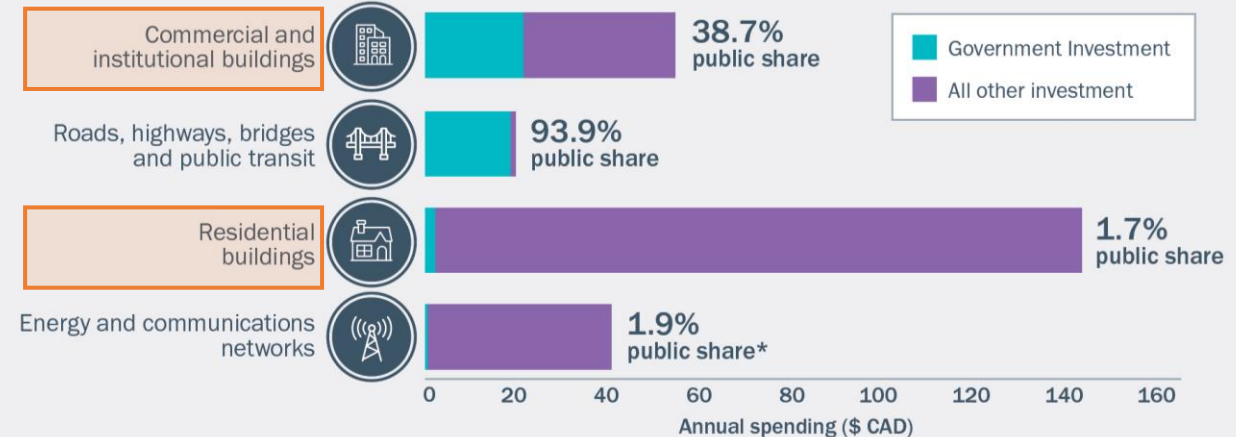
Global GHG Emissions (2019)



Carbon Leadership Forum (2024)
<https://carbonleadershipforum.org/embodied-carbon-101-v2/>

Canada Infrastructure Investment (2018)

Spending on Buildings



Clean Energy Canada (2022)
<https://cleanenergycanada.org/report/money-talks/>

Climate Emergency Action Plan

BIG MOVE 5

1

COMPLETE, WALKABLE NEIGHBOURHOODS

90% of people living within an easy walk or roll of their daily needs by 2030.

2

ACTIVE TRANSPORTATION
& TRANSIT

Two-thirds of trips in Vancouver to be by active transportation and transit by 2030.

3

ZERO EMISSIONS
VEHICLES

50% of the km driven on Vancouver's roads to be by zero emissions vehicles by 2030.

4

ZERO EMISSIONS SPACE &
WATER HEATING

By 2030, cut our carbon pollution from building in half, compared to what we had in 2007.

5

LOW CARBON MATERIALS &
CONSTRUCTION PRACTICES

By 2030, reduce embodied emissions from new buildings by 40% compared to 2018.

6

RESTORED COASTS &
FORESTS

By 2050, sequester 21,000 tCO₂e per year within city boundaries.

key action areas

EMBODIED CARBON STRATEGY (2020)

CHANGE THE RULES

POLICY &
REGULATION

INCLUDING CODE CHANGES
through
Vancouver Building Bylaw
(VBBL)

CHANGE THE MARKET

REMOVE BARRIERS &
PROVIDE INCENTIVES

CHANGE THE CULTURE

CAPACITY BUILDING &
INDUSTRY
TRANSFORMATION

CHANGE THE CONTEXT

ALIGN WITH
COMPLIMENTARY STRATEGIES
& ACTIONS

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

[Show all](#) | [Hide all](#)





 Embodied Carbon Strategy


 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 \(Section 10.4\)](#) 
- The upcoming embodied carbon requirements in the 2025 update of VBBL are available in this [Council document](#)  (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

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

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/objet/?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/copyright>
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 questions? 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.



National Research
Council Canada

Conseil national de
recherches Canada

Canada

<https://nrc-publications.canada.ca/eng/view/object/?id=533906ca-65eb-4118-865d-855030d91ef2>



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 ($\leq 1,800 \text{ m}^2$)
- 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) <i>If no Industry Leadership Credit pursued (-0%)</i>	360	-10%
2025 (Proposed) <i>If maximum Industry Leadership Credit pursued (-5%)</i>	380	-5%
2027***	TBD	TBD
2030	TBD	-40%

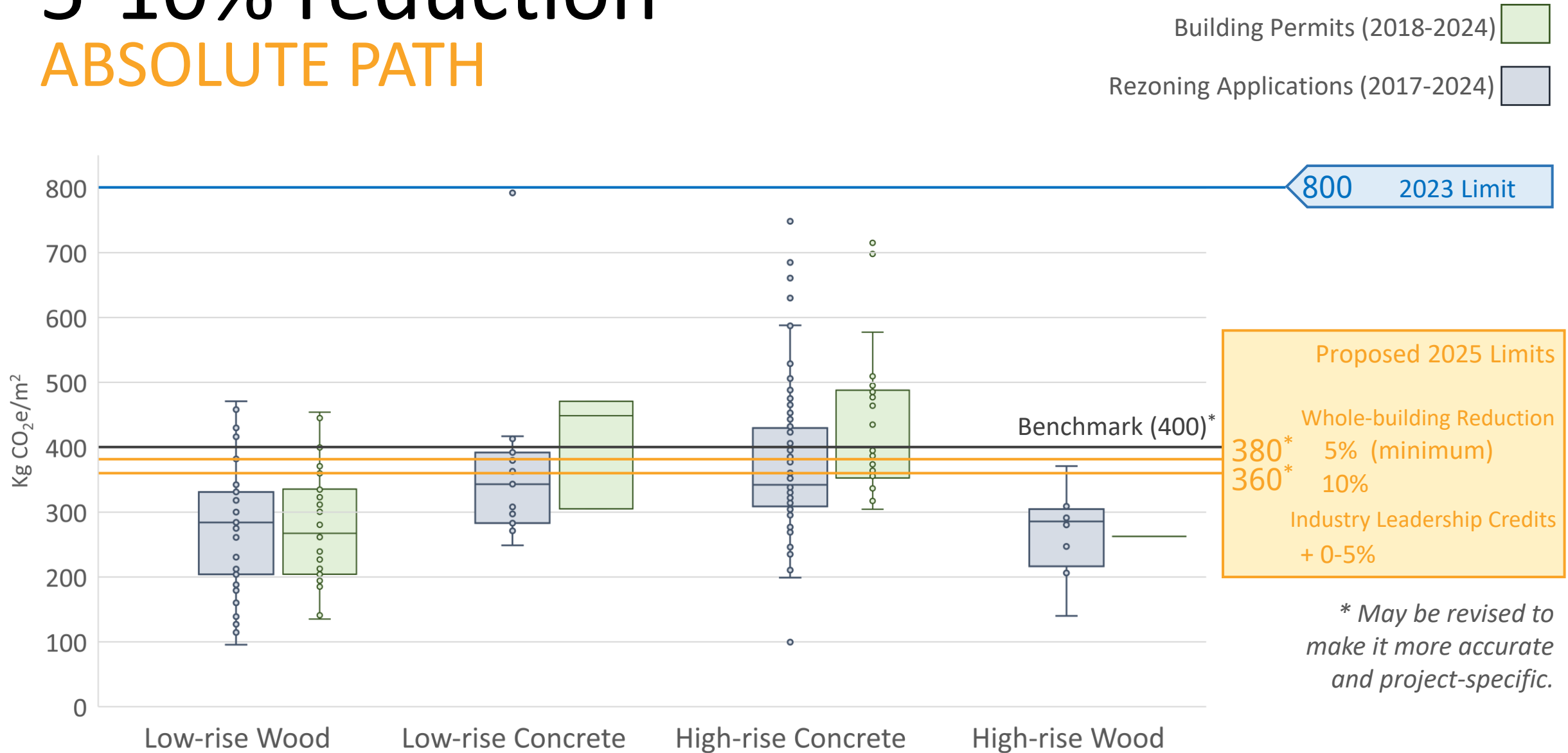
* More details will be available in the [Embodied Carbon Guidelines](#). Version 2 will be available for review in Q4 2024.

** 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

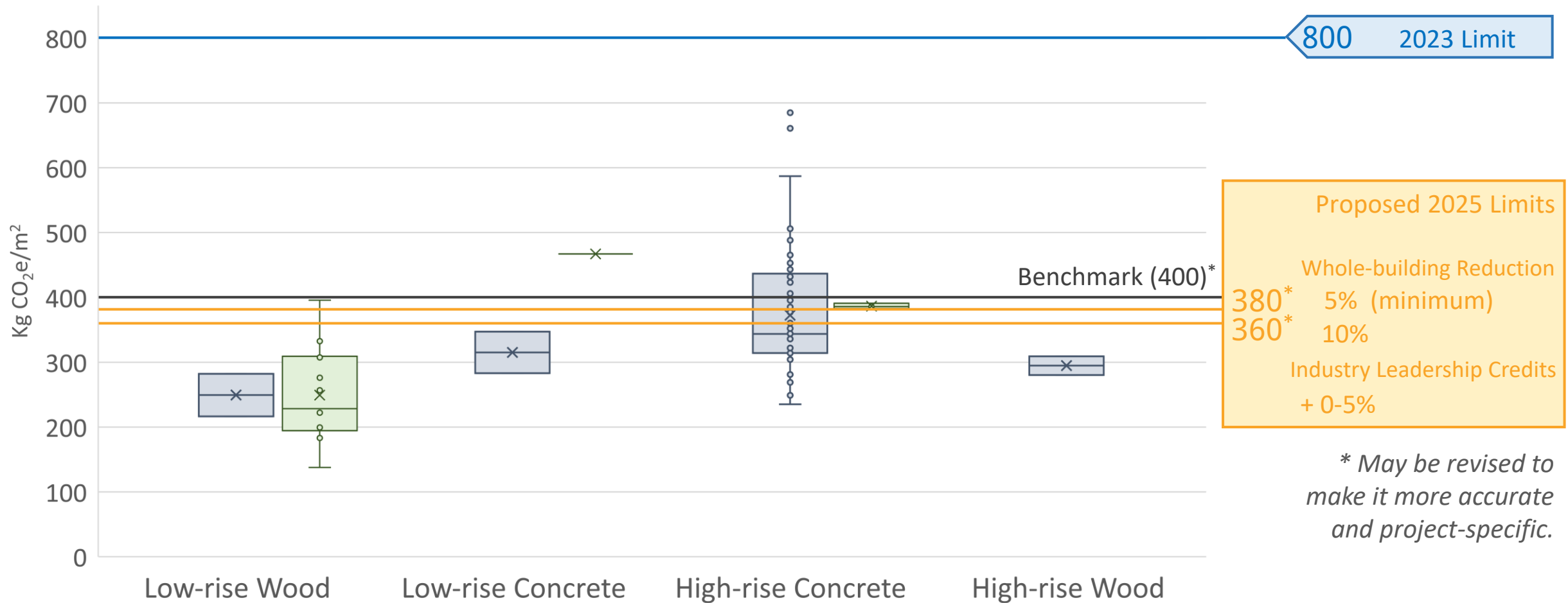


5-10% reduction

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 (↓ 20+%)

Parkade

Structure Optimization

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
- Optimized car and bike stall layouts
- Relocation of spaces allowed fire travel safety distances to work without an extra level

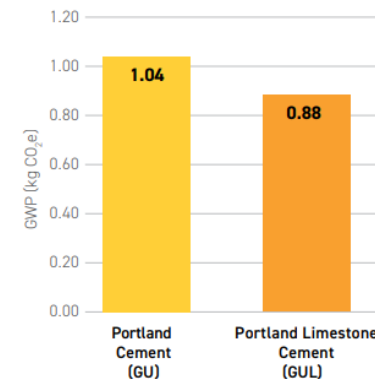


Slab Reductions

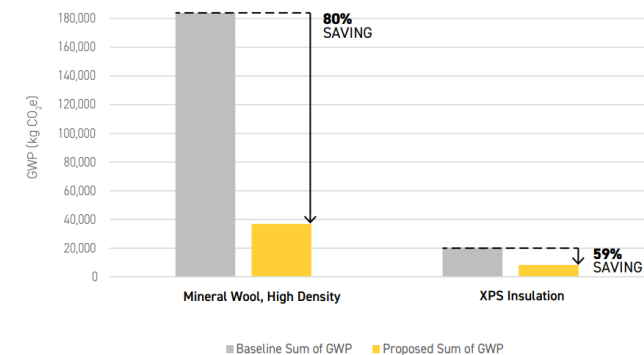
	Initial	Current
Level 8	457.0mm (1'6")	203.2mm (8")
Level 7	Full Transfer	Partial Transfer
Level 2	660.4mm (2'2")	965.2mm (3'2")
Level 1	625.2mm (3'2")	304.8mm (1'0")

Concrete

Insulation



Tally Insulation GWP



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](#).

Legend:

Required	Exclude
Optional	Optional (R): Required if Industry Leadership Credit is claimed.

UniFormat	OmniClass		Level 4		Inclusion in Scope
Level 3	Level 3	Level 3	Level 4		
C	03 00 00	Interiors			
C10	03 10	Interior Construction			
C1010	03 10 10	Interior Partitions	03 10 10 10	Interior Fixed Partitions	Optional (R)
			03 10 10 20	Interior Glazed Partitions	
			03 10 10 40	Interior Demountable Partitions	
			03 10 10 50	Interior Operable Partitions	
			03 10 10 70	Interior Screens	Optional
			03 10 10 90	Interior Partition Supplementary Components	
C1020	03 10 20	Interior Windows	03 10 20 10	Interior Operating Windows	Optional (R)
			03 10 20 20	Interior Fixed Windows	
			03 10 20 50	Interior Special Function Windows	
			03 10 20 90	Interior Window Supplementary Components	Optional
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	
			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	Interior Grilles and Gates	03 10 40 10	Interior Grilles	Optional
			03 10 40 50	Interior Gates	
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	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	
			03 10 90 30	Service Walls	
			03 10 90 35	Wall and Door Protection	
			03 10 90 40	Toilet, Bath, and Laundry Accessories	
			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

A wide-angle photograph of a city street at dusk. The street is paved and has white lane markings. On the left side, there are large, leafless trees. On the right side, there are modern multi-story apartment buildings with balconies. In the background, a body of water is visible, and beyond that, a range of mountains under a cloudy sky with a hint of sunset colors. A few cars are visible on the road, and a traffic light is visible on the right. The overall atmosphere is calm and urban.

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)



<https://clfbritishcolumbia.com/365-railway-street-reducing-embodied-carbon-through-building-reuse/>

45% REDUCTION

$<350 \text{ kgCO}_2\text{e/m}^2$

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

1210 Seymour St.
(AFFORDABLE
HOUSING)



<https://vancouver.ca/files/cov/embodied-carbon-case-study-mid-rise-rental-residential-building-zqf-2023.pdf>

22% REDUCTION

$342 \text{ kgCO}_2\text{e/m}^2$

- reduced parkade
- low-carbon concrete & insulation

what we're seeing

INDUSTRY LEADERS



MARPOLE COMMUNITY CENTRE

<https://clfbritishcolumbia.com/marpole-community-centre/>

40% REDUCTION

$362 \text{ kgCO}_2\text{e/m}^2$

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



Percentage reductions are from an equivalent baseline, defined following the [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