Low Embodied Carbon Compliance Guidebook

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Definitions

Asset reuse. This refers to repurposing or extending the life of an existing building or infrastructure project in-situ (or portion of a project, such as structure or envelope) rather than demolition and new construction. This does not require deconstruction and re-installation, but may require some minimal reprocessing in place. Asset reuse does *not* refer to salvaged materials, recycled content in manufactured materials, or to designs that create a future potential for reuse.

Biogenic carbon. Biogenic carbon refers to carbon that is derived from or contained in biomass (e.g. plants and trees) (EN 16485:2014). This is in contrast to fossil carbon, which comes from dead matter that has accumulated and been compressed over time into concentrated fuel. Fossil carbon from burning fossil fuels is the primary source of greenhouse gas emissions from human activities. In contrast, incorporating biogenic carbon into the built environment through the use of bio-based building materials can provide the benefit of storing carbon throughout the building's life cycle.

Carbon dioxide equivalent (CO_2e). Greenhouse gas emissions, including carbon dioxide, methane and nitrous oxide.

Concrete carbonation. A chemical reaction between carbon dioxide on one side and calcium hydroxide and hydrated calcium silicate in the concrete on the other side to form calcium carbonates leading to the sequestration of CO_2.

Embodied carbon. The greenhouse gas (GHG) emissions generated by the manufacturing, transportation, installation, maintenance, and disposal of construction materials used in buildings, roads, and other infrastructure. The terms "embodied carbon," "embodied carbon emissions," and "embodied emissions" can be used interchangeably. Embodied carbon can also refer to a subset of the emissions from the above activities.

Embodied carbon intensity (ECI). A metric to describe the global warming potential (GWP) associated with the embodied emissions of a building, and expressed as kilograms of carbon dioxide equivalents per square meter or square foot ($kgCO_2e/m^2$ or $kgCO_2e/ft^2$).

Environmental Product Declaration (EPD). Standardized, independently verified documents that report the environmental impacts of a construction product based on a product life cycle assessment. EPDs must conform to international standards and follow the rules for each product category. An EPD is referred to as a "Type III environmental declaration" in ISO 14025: 2006.

Global warming potential (GWP). The potential climate change impact of a product or process as measured by an LCA. GWP is reported in units of carbon dioxide equivalent (CO_2e) and is the agreed-upon metric for tracking embodied carbon.

Gross floor area (GFA). The sum of the floor areas of the spaces within the building, including basements, mezzanine and intermediate-floored tiers, and penthouses with a headroom height of 2.3 m (7.5 ft) or greater. It is measured from the exterior faces of walls or from the center-line of walls separating buildings, but excluding covered walkways, open roofed-over areas, porches and similar spaces, pipe trenches, exterior terraces or steps, chimneys, roof over-hangs, and similar features. All integrated or attached parking areas should not be included in the gross floor area.

Life cycle assessment (LCA). The agreed-upon methodology for measuring embodied carbon. LCA is a systematic set of procedures for compiling and evaluating the inputs and outputs of materials and energy, and the associated environmental impacts directly attributable to a product or process throughout its life cycle. LCA provides an estimate of greenhouse gas emissions over all (or a portion of) the building's life cycle, reported as global warming potential (GWP). The term building life cycle assessment is used to refer to LCA performed at the building scale, commonly including foundations, structure, and enclosure elements.

Life cycle stages. Life cycle stages (product, construction, use, end-of-life) and modules (A1, A2, etc.) subcategorize the life cycle of a building to communicate when environmental impacts occur and what parts of the life cycle are included in a life cycle assessment.

Reference study period. EN 15978:2011 defines reference study period (RSP) as the period over which the time-dependent characteristics of the object of assessment are analyzed in a life cycle assessment.

Salvaged materials. Previously used materials or products that require limited to no processing for reinstallation and use on the same or a different project, but are not asset reuse (EPA). Salvaged materials refer to materials that were deliberately deconstructed and reclaimed, stored, and reused on a separate project or within the same site by the same owner. This requires deconstruction and re-installation. Salvaged materials do not refer to asset reuse, recycled content in manufactured materials, or designs that create a future potential for reuse. A material that requires some minimal level of reprocessing (e.g., resawing salvaged lumber) would still be considered a salvaged material.

Upfront carbon. The emissions associated with manufacturing, transportation, and construction activities (life cycle stages A1-A5) occurring before a building is occupied. For the purposes of the DEQ housing program, the requirement is to report the product stages, A1-A3.

Embodied Carbon Reduction Pathways

This document is meant to be used alongside DEQ's **Applicant Guidebook,** which provides an overview of the grant program requirements, eligibility criteria, step-by-step guidance, and a comprehensive FAQ.

Projects seeking to meet *"Program Requirement 4: Reduce embodied carbon of new building materials by 10%"* must comply with one of the options in **Table 1**. All pathways in the program require that teams report and reduce the embodied carbon of their project using the metric of global warming potential (GWP).

Table 1. Embodied Carbon Pathways. Projects must use one of the following pathways to comply.

#	Pathway Name	Compliance Procedure
1	**Material Short List**	Teams must demonstrate a higher (20%) percent reduction in a few target materials (ready-mix concrete, rebar, insulation and flooring) that are indicative of project-level reductions of about 10%. A spreadsheet is available to assist teams in calculating a baseline and actual GWP for the subset of materials. This pathway rewards procurement reductions demonstrated using Environmental Product Declarations (EPDs).
2	**Material Select List**	Teams must demonstrate a higher (11%) percent reduction in a longer list of materials that are indicative of project-level reductions of about 10%. A spreadsheet is available to assist teams in calculating a baseline and actual GWP for the subset of materials. This pathway rewards procurement reductions demonstrated using EPDs.
3	**Prescriptive Checklist**	Teams must demonstrate compliance with a series of prescriptive items such as a prescribed structural system, insulation types per application, use of specific flooring materials, etc that together indicate the project has met the 10% reduction holistically. This pathway rewards design and procurement reductions demonstrated using project documentation. This pathway also rewards procurement reductions demonstrated using EPDs by incorporating Pathways 1 and 2, if desired.
4	**Performance/ Innovation**	Teams must demonstrate a 10% reduction from a baseline building using project life cycle assessment (LCA), allowing the flexibility to model a wide range of design, procurement and innovative strategies. This pathway focuses on design and procurement reductions demonstrated using project documentation and/or EPDs.

Overall Program Requirements

Impact Indicators

The calculations submitted for demonstrating compliance require the reporting of global warming potential (GWP) as the metric used for embodied carbon. GWP is quantified in kilograms of CO_2 equivalent (kg CO_2e) and is a metric reported in Environmental Product Declarations (EPDs) and LCAs.

Life Cycle Stages

Calculations submitted for compliance for **Pathway 1, 2 and 4** shall include the ”Product” life cycle stages, which include modules A1-A3 as shown in Figure 1. All EPDs cover life cycle modules A1-A3.

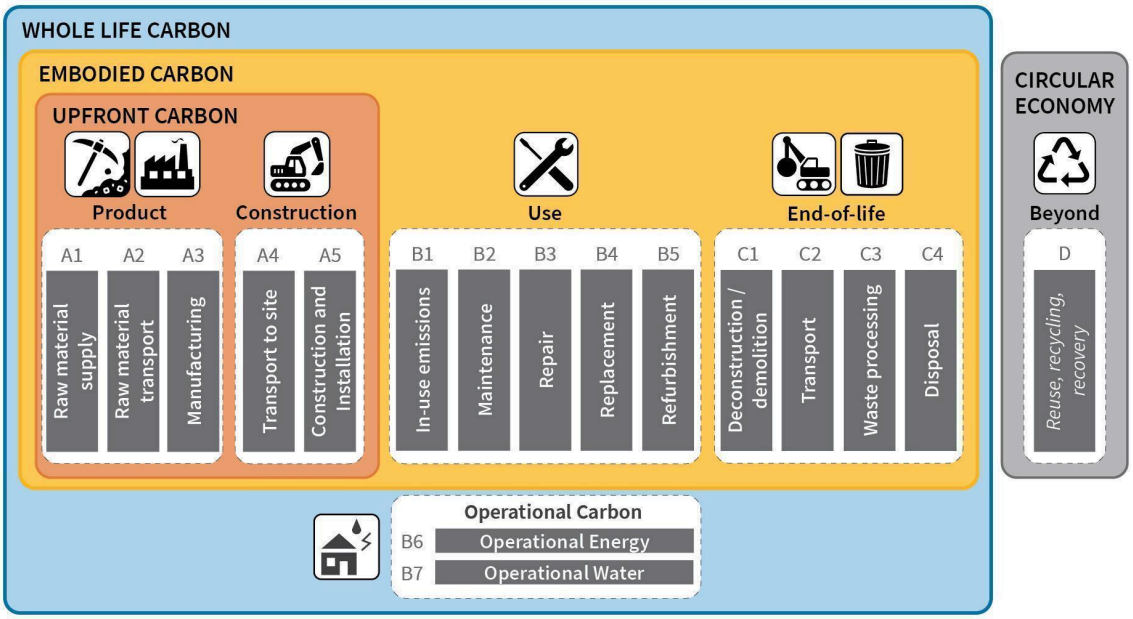

Figure 1. Life cycle stages and modules. Source: Carbon Leadership Forum (CLF), 2024. Building LCA 101: Embodied Carbon Accounting for Buildings.

Informative note: while Pathway 3 does not require users to calculate emissions associated with any specific life cycle stages, the development of the Pathway 3 considered replacement of materials in some cases. This led to higher point values for some strategies than would be expected if only the product stage was considered.

Treatment of Special Topics

Concrete Carbonation taking place in any of the installed products shall not be reported since standardized measurement methods have not yet been adopted in North America.

Biogenic carbon flows and biogenic carbon storage (i.e., negative emissions in the form of carbon storage or positive emissions in the form of biogenic carbon releases) shall be excluded from the reporting of embodied carbon for compliance.

Asset reuse and salvaged materials can not be credited in Pathways 1 and 2. Pathway 3 rewards some targeted scenarios of asset reuse and salvaged materials, including rewarding adaptive reuse projects that go beyond the 40% minimum requirement. Following the guidance in the Project Scope section, Pathway 4 can be used to reward the use of salvaged materials, and asset reuse in some cases where it goes beyond the minimum 40% base requirement for adaptive reuse projects.

1. Material Short List Pathway

Intent

Demonstrate a 10% reduction in the project's overall embodied carbon emissions by using lower carbon ready-mix concrete, rebar, insulation and flooring products compared to industry averages.

This streamlined approach allows a project to focus on fewer materials and demonstrate a greater percent reduction (**20%**), which is equivalent to approximately a 10% reduction at the scale of the building. This approach utilizes embodied carbon values per product type based on the Pacific Northwest regional concrete baselines and North American rebar, insulation and flooring baselines.[1]

Project Scope

The project scope includes all new building materials installed in the project, which excludes existing materials that remain in place due to asset reuse or salvaged materials. The project may exclude sitework and hardscape from the project scope, but can include if desired.

For a project site with multiple buildings, all buildings that include residential uses must be included in the project scope.

Compliance Requirements and Calculations

Projects must demonstrate that their *GWP actual total* satisfies the required **20 percent reduction** from the *GWP baseline total* at the time of project completion.

Project teams must use the following approach to demonstrate compliance:

1. Download the **DEQ Embodied Carbon Reporting Form**. This spreadsheet has built-in formulas to streamline compliance calculations.
2. In the Pathway 1 tab, enter the quantities of materials for all new covered products including concrete, rebar, insulation and flooring materials used on the project. This will calculate a *GWP baseline total* for the project by multiplying the installed material quantities by the *baseline GWP per product type* from **Appendix A** and sum these together for all covered product types. For reference, all the material types required for reporting and the baselines used are shown in Appendix A.
3. If available, enter the *Actual GWP (A1-A3)* and associated declared unit of the products used on the project using acceptable Environmental Product Declarations (see Embodied Carbon Data section). This will calculate the *GWP actual total* for the project by multiplying the installed

[1] Waldman, B., Habchi, R., and Palmeri, J. (2025). 2025 CLF North American Material Baselines Report. Carbon Leadership Forum.

material quantities by the *Actual GWP* values sourced from acceptable EPDs, and sum these together for all covered product types.

   a. NOTE: If the GWP of your product exceeds that of the baseline, you may omit an EPD from the Actual GWP column and assume the baseline value instead.

4. If EPDs are not available, the form will automatically calculate the *Actual GWP* using baseline GWPs. Reductions can only be shown using EPDs for the actual installed products.

5. The form will automatically run the reduction calculation, based on the project's material quantities and product GWPs. This will calculate an overall percent reduction between the *GWP baseline total* and *GWP actual total* across covered product types using the following equation:

$$Total\ Percent\ Reduction = \frac{GWP_{baseline\ total} - GWP_{actual\ total}}{GWP_{baseline\ total}}$$

6. If the project meets the **20%** reduction requirement and all required documentation is provided, then the project complies. Submit the Pathway 1 tab of the **DEQ Embodied Carbon Reporting Form** and required documentation at the time of project completion.

Covered Product Types

The following covered products that fall in the *project scope* and are included in **Table 2** must be included in the calculation submitted for compliance.

Table 2. Covered Product Types. All covered products installed in the project should be included in the calculations submitted for compliance. The Reporting Requirements section includes a link to the **DEQ Embodied Carbon Reporting Form** that integrates the baseline values into the calculation form to show compliance. Please refer to Appendix A or the reporting form to see the specific baseline GWPs.

Category	Product types	Baseline GWP Unit
Concrete	Ready-mixed concrete[1]	$kgCO_2e / m^3$
Steel	Rebar	$kgCO_2e$ / metric ton
Insulation	Board, Blanket, Foamed-in-place, Loose-fill	$kgCO_2e / m^2$@ RSI-1
Flooring	Tile, Resilient flooring, Carpet, Engineered wood, Hempwood	$kgCO_2e / m^2$

Material Quantity Data

Material quantity data used to demonstrate compliance shall include all new covered products and their final installed quantities at the time of project completion. All covered product types used on the project should be included in the scope - regardless of their quantity.

Embodied Carbon Data

This pathway must be documented using acceptable Environmental Product Declarations (EPDs) to show reductions from baseline. When EPDs are not available for a product type, *Baseline GWPs* will automatically be used as default values for the *Actual GWPs* and that line item will therefore not contribute to the 20% reduction.

- **Acceptable EPD types**: EPDs must represent the specific product being installed and the manufacturing facility that product came from. EPDs must have an active validity period (e.g. not expired).
- **Unacceptable EPD types**: Industry- wide EPD are not an acceptable form of compliance. Expired EPDs are not acceptable.

Reporting Requirements

Documentation can be submitted at any time during construction as long as all the required material quantities have been collected for all covered products, and EPDs are available for the materials where reduction strategies are claimed.

1. Submit the Pathway 1 tab of the **DEQ Embodied Carbon Reporting Form**, which includes:
    a. Installed material quantities
    b. Global Warming Potential sourced from acceptable EPDs of installed products
        i. Digital link to EPDs in EC3 or other web-based link to PDF
    c. Show a reduction consistent with the required 20% of the material short list.
2. Submit documentation in the form of receipts and other supporting information for the sources of the products and quantities data as a supplement to the reporting form. Receipts must show the quantities and costs of the specific product(s) installed.

2. Material Select List Pathway

Intent

Demonstrate a 10% reduction in the project's overall embodied carbon emissions by using lower carbon products compared to industry averages.

This streamlined approach allows a project to focus on a larger subset of materials and demonstrate a slightly higher percent reduction (**11%**), which is equivalent to approximately a 10% reduction at the scale of the building. This approach utilizes embodied carbon values per product type based on the latest CLF Material Baselines report and North American industry-average EPDs with a specific focus on concrete, steel, wood, insulation, cladding, and finishes.[2]

Project Scope

The project scope includes all new building materials installed in the project, which excludes existing materials that remain in place due to asset reuse or salvaged materials. The project may exclude sitework and hardscape from the project scope, but can include if desired.

For a project site with multiple buildings, all buildings that include residential uses must be included in the project scope.

Compliance Requirements and Calculations

Projects must demonstrate that their *GWP actual total* satisfies the required **11% percent reduction** from the *GWP baseline total* at the time of project completion.

Project teams must use the following approach to demonstrate compliance:

1. Download the **DEQ Embodied Carbon Reporting Form**. This spreadsheet has built-in formulas to streamline compliance calculations.
2. In the Pathway 2 tab, enter the quantities of materials for all new covered product types used on the project. This will calculate a *GWP baseline total* for the project by multiplying the installed material quantities by the *baseline GWP per product type* from **Appendix A** and sum these together for all covered product types. For reference, all the material types required for reporting and the baselines used are shown in Appendix A.
3. If available, enter the *Actual GWP (A1-A3)* and associated declared unit of the products used on the project using acceptable Environmental Product Declarations (see Embodied Carbon Data section). This will calculate the *GWP actual total* for the project by multiplying the installed

[2] Waldman, B., Habchi, R., and Palmeri, J. (2025). 2025 CLF North American Material Baselines Report. Carbon Leadership Forum.

material quantities by the *Actual GWP* values sourced from acceptable EPDs, and sum these together for all covered product types.

   a. NOTE: If the GWP of your product exceeds that of the baseline, you may omit an EPD from the Actual GWP column and assume the baseline value instead.

4. If EPDs are not available, the form will automatically calculate the *Actual GWP* using baseline GWPs. Reductions can only be shown using EPDs for the actual installed products.

5. The form will automatically run the reduction calculation, based on the project's material quantities and product GWPs. This will calculate an overall percent reduction between the *GWP baseline total* and *GWP actual total* across covered product types using the following equation:

$$Total\ Percent\ Reduction = \frac{GWP_{baseline\ total} - GWP_{actual\ total}}{GWP_{baseline\ total}}$$

6. If the project meets the **11%** reduction requirement and all required documentation is provided, then the project complies. Submit the Pathway 2 tab of the **DEQ Embodied Carbon Reporting Form** and required documentation at the time of project completion.

Covered Product Types

The following covered products that fall in the *project scope* and are included in **Table 3** must be included in the calculation submitted for compliance.

Table 3. Covered Product Types. The covered products installed in the project should be included in the calculation submitted for compliance. The Reporting Requirements section includes a link to the **DEQ Embodied Carbon Reporting Form** that integrates the baseline values into the calculation form to show compliance. Please refer to Appendix A or the reporting form to see the specific baseline GWPs.

Category	Product types	Baseline GWP Unit
Concrete	Cement, Ready-mixed concrete[1], Shotcrete[1], Concrete Masonry Units	$kgCO_2e / m^3$
Steel	Rebar, Structural Steel, Cold-formed steel framing	$kgCO_2e$ / metric ton
Wood	Sawn lumber, Structural Composite Lumber, Mass Timber, Wood Sheathing	$kgCO_2e / m^3$
Wood	Wood I-joists	$kgCO_2e$ / m
Insulation	Board, Blanket, Foamed-in-place, Loose-fill	$kgCO_2e / m^2$@ RSI-1
Cladding	Metal panel, Metal composite material panel, Insulated metal panel	$kgCO_2e$ / 100 m^2
Cladding	Brick	$kgCO_2e / m^3$
Cladding	Fiber cement siding, cedar siding, stone cladding, vinyl siding	$kgCO_2e / m^2$

Finishes	Gypsum board, Glass-mat gypsum board	$kgCO_2e$ / 92.9 m^2
Finishes	Tile, Resilient flooring, Carpet, Engineered wood, Hempwood	$kgCO_2e$ / m^2

Material Quantity Data

Material quantity data used to demonstrate compliance shall include all covered products and their final installed quantities at the time of project completion. All covered product types used on the project should be included in the scope - regardless of their quantity.

Embodied Carbon Data

This pathway must be documented using acceptable Environmental Product Declarations (EPDs) to show reductions from baseline. When EPDs are not available for a product type, *Baseline GWPs* will automatically be used as default values for the *Actual GWPs* and that line item will therefore not contribute to the 11% reduction.

- **Acceptable EPD types**: EPDs must represent the product being installed and the manufacturing facility that product came from. EPDs must have an active validity period (e.g. not expired).
- **Unacceptable EPD types**: Industry-wide EPD are not an acceptable form of compliance. Expired EPDs are not acceptable.

Reporting Requirements

Documentation can be submitted at any time during construction as long as all the required material quantities have been collected for all covered products, and EPDs are available for the materials where reduction strategies are claimed.

1. Submit Pathway 2 tab of the **DEQ Embodied Carbon Reporting Form**, which includes:
    a. Installed material quantities
    b. Global Warming Potential sourced from acceptable EPDs of installed products
        i. Digital link to EPDs in EC3 or other web-based link to PDF
    c. Show a reduction consistent with the required 11% of the material subset.
2. Submit documentation in the form of receipts and other supporting information for the sources of the products and quantities data as a supplement to the reporting form. Receipts must show the quantities and costs of the specific product(s) installed.

3. Prescriptive Checklist Pathway

Intent

Demonstrate a 10% reduction in the project's embodied carbon emissions associated with design and construction choices using a simplified checklist method.

This approach rewards teams for design and construction choices that result in lower embodied carbon emissions. This checklist is based primarily on upfront emissions, but considers replacement stage emissions for select products, so places more significance on shorter-lived materials than the other pathways. The checklist also allows teams to input points earned through Pathways 1 and 2, so reductions from procurement using EPDs can also be credited.

Project Scope

The project scope includes all materials in the project –both new materials and those reused through asset reuse[3] –or salvage. The project may exclude sitework and hardscape from the project scope, but can include if desired.

For a project site with multiple buildings, all buildings that include residential uses must be included in the project scope.

Compliance Procedure

Projects must demonstrate that they earn a minimum of 10 points, which satisfies the required **10% percent reduction** at the time of project completion.

Project teams must use the following approach to demonstrate compliance:

1. Download and review the Pathway 3 tab of the **DEQ Embodied Carbon Reporting Form**.
2. Select the appropriate project type in Part 1.
3. Indicate yes or no to confirm the project's compliance with the prerequisites in Part 2. If the checklist is applicable to the project, continue to the next step. Provide documentation notes in the right side of the form to help the reviewer confirm your compliance with the prerequisites. These notes should indicate where in the drawings, specifications or receipts, the project's claims can be verified.
4. Indicate yes or no to the project features in Part 3, and the form will automatically calculate your penalty points. Provide documentation notes in the right side of the form to help the

[3] Asset reuse that goes beyond the base requirement of the 40% reuse needed to be enrolled as an adaptive reuse project, or asset reuse in space-efficient projects can be rewarded in Pathway 3. Reach out to deqhousing@carbonleadershipforum.org to learn more.

reviewer confirm the applicability of the penalties. These notes should indicate where in the drawings, specifications or receipts, the project's claims can be verified.

5. Indicate yes or no to the project features in Part 4, and the form will automatically calculate your strategy points. Provide documentation notes in the right side of the form to help the reviewer confirm your use of the noted strategies. These notes should indicate where in the drawings, specifications or receipts, the project's claim can be verified.

6. Review Part 5 to understand if your project complies with the approach by earning a total of 10 points, combining penalty and strategy points.

Reporting Requirements

Documentation can be submitted to DEQ at any time during construction as long as all the necessary documentation has been collected to validate the claims made on the prescriptive checklist are consistent with the final constructed project.

1. Submit Tab 3 of the **DEQ Embodied Carbon Reporting Form**, which includes:
    a. Parts 1 through 5 of the form
    b. Documentation notes giving direction to the reviewer on where evidence to support the claim can be found.
    c. Attach supporting documentation as a zipped file, that includes all the documentation to support the claims made in Parts 2-4.
    d. If taking credit for a calculation used to apply for the DEQ housing program (% reuse), or claiming points from one of the other two pathways, that documentation must also be submitted to support the earning of those points.
2. A total point value exceeding 10, combining penalty (negative) and strategy points (positive)
3. Supporting documentation for the checklist may vary based on which of the strategies are claimed, and should provide sufficient supporting evidence that the claim made in the checklist is consistent with the project at the time of project completion.
   For example:
    a. All quantities of key materials must have supporting documentation in the form of receipts that verify the quantity and cost of product purchased. Receipts will also be used to provide confirmation that the strategy was realized in the project.
    b. If using the options to include points from Pathway 1 or 2 in Pathway 3, all EPDs and receipts used to claim reductions from procurement decisions in the Reporting Form must also be provided.
    c. If a calculation is needed to prove compliance beyond what is directly supplied in the project documents, such as documentation of window-to-wall ratio, or cement content in submittals, manual calculations to support the strategy claimed in the checklist must be provided.

Additional Reference Information

This section provides context for the terminology, calculations and reference information needed to use the simplified checklist (Pathway 3).

Window to wall ratio calculation

In order to show compliance with prerequisite 2d, the window to wall ratio of total vertical fenestration area to total above-grade wall area should be calculated as:

$$Vertical\ fenestration\ area\ /\ Above\ grade\ wall\ area$$

Where:

- **Above-grade wall:** a wall associated with the building thermal envelope that is more than 15 percent above grade and is on the exterior of the building.
- **Vertical fenestration:** Windows that are fixed or operable, opaque doors, glazed doors, glazed block and combination opaque and glazed doors composed of glass or other transparent or translucent glazing materials and installed at a slope of not less than 60 degrees from horizontal.

This project-specific calculation must be documented and submitted as part of the proof of compliance.

Cement Content

In order to show compliance with Strategy 4a, documentation of concrete mixes must be shown to comply with the following maximum cement contents by mix type.

Table 4. Maximum cement content by mix type (applies to all cement types)

Concrete Mix Type	Tier 1 (lbs/cy)	Tier 2 (lbs/cy)
2500 psi(17.2 Mpa), Normalweight	326	272
3000 psi (20.7 MPa), Normalweight	365	305
3500 psi (20.7 MPa), Normalweight	408	340
4000 psi (27.6 MPa), Normalweight	450	375
4500 psi (20.7 MPa), Normalweight	504	420
5000 psi (34.5 MPa), Normalweight	557	464
5500 psi (34.5 MPa), Normalweight	573	478
6000 psi (41.4 MPa), Normalweight	590	491
8000 psi (55.1 MPa), Normalweight	712	593
8000 psi (55.1 MPa), Normalweight	712	593

3000 psi (20.7 MPa), Lightweight	366	305
4000 psi (27.6 MPa), Lightweight	450	375
5000 psi (34.5 MPa), Lightweight	537	448

In order to claim this strategy, this project-specific calculation for all mixes used on the project must be documented and submitted as part of the proof of compliance.

Concrete-free slab-on-grade

For residential projects, concrete-free slabs can have a potential embodied carbon advantage to traditional slab on grade. These projects utilize insulation boards, vapor barriers, and plywood to act as a concrete slab-on-grade replacement.[4] A great resource for understanding a concrete-free slab can be found at this link.

In order to show compliance with "Strategy 4b - A concrete-free slab-on-grade is used as ground floor slab system", documentation of the ground floor condition must be shown to include insulation board, membranes and plywood as the ground floor system instead of a typical slab on grade.

Timber joist over crawl space

For single family homes and small duplexes, a crawl space foundation can be constructed in lieu of the typical slab-on-grade. The ground floor can be constructed with typical timber joists that rest on foundation walls. The crawl space is an area that is not a full basement and occupies the space between the ground floor and the ground, typically at a height of 18"-24". In a crawl space, the bare dirt is typically covered by a vapor barrier. "A crawl space is sometimes referred to as an underfloor space that is not a basement. The story of a house that is entirely above the grade or ground surface is usually referred to as the main first floor".[5]

In order to show compliance with "Strategy 4b - A timber joist over crawl space is used as ground floor slab system (no rodent slab under joist)", documentation of the ground floor condition must be shown to include timber floor joists must be used as the ground floor system instead of a typical slab on grade.

Material and System Reference Descriptions

The reference descriptions and guidance in Table 5 is meant to help inform compliance with the prescriptive checklist and indicate what kinds of materials and products are applicable to earn points. If you have questions about whether your product complies with one of the options on the checklist, please email deqhousing@carbonleadershipforum.org to get technical assistance.

[4] Salinger, J. (2022). Assembling a Concrete-Free Slab. Fine Homebuilding, Issue 305.
[5] International Association of Certified Home Inspectors. (InterNACHI). (2025). Crawl Space Construction.https://www.nachi.org/gallery/general-2/crawl-space-construction-11

Table 5. Material and system reference descriptions

System	Material Name	Material reference description*	Additional Guidance
Insulation	HFC-based	Insulations that use hydrofluorocarbon (HFC)-based blowing agents, either during manufacturing or installation. Common examples include conventional formulations of XPS and closed-cell spray foams. [6]	Open-cell spray foams are not HFC-based. Low-carbon formulations of XPS that are not HFC-based are on the market in the US, so some XPS products and spray foam products will not be HFC-based.
	Loose-fill cellulose	Conventional loose-fill cellulose insulation is made from any cellular plant source, most often waste paper products, installed by using an insulation blowing machine. [7]	Loose-fill mineral wool, loose-fill batt insulation, and natural wool products *are not* loose-fill cellulose.
Cladding	Synthetic stucco	Acrylic and/or polymer-based textured wall coating often including silica and mineral fillers.	Synthetic stucco is sometimes referred to, or used in EIFS (exterior insulation and finish systems).
	Aluminum panel	Aluminum panel products are made of aluminum and typically are roll-formed into the desired profile from 16-29 gauge sheet.[8]	
	Steel panel	Steel panel products are made of steel and typically are roll-formed into the desired profile from 1-29 gauge sheet.[8]	
	Other metal panel	Metal panel products may be made of any kind of metal or combinations of metals.	This includes insulated metal panels, metal composite panels [9](MCPs), and other similar products.
	Engineered wood	Engineered wood siding is a type of composite panels made from residual wood fiber, such as chips, strands and shavings. The residual wood is blended with resin, wax and other binders and formed into mats. The formed panels are pressed, cut and	Engineered wood cladding must be free of PVC. Fiber cement panels *are not* engineered wood.

[6] Waldman, B., Habchi, R., and Palmeri, J. (2025). 2025 CLF North American Material Baselines Report. Carbon Leadership Forum.
[7] Loose-fill cellulose industry-average EPD (CIMA, 2019)
[8] Adapted from Roll Formed Aluminum and Steel Cladding. Industry-Wide EPD. Metal Construction Association.
[9] Adapted from the Composite Panel Association website.

System	Material Name	Material reference description*	Additional Guidance
		trimmed and embossed. [10]	
	Natural wood	Harvested, debarked lumber is dried and milled to create planks of various widths. Products may be finished with a stain or protective coating.[11]	Natural wood siding is solid sawn wood products. Cedar siding is an example.
Flooring	Engineered wood	Engineered wood flooring has a real wood wear layer. It normally is made using multiple wood veneers or slats of wood glued together under pressure at opposing directions, or a variety of composites for core material such as MDF.[12]	Engineered wood products must be free of PVC and have a real wood wear layer as the top finish.
	Solid wood	Solid wood flooring is a solid piece of real wood from top to bottom. The most common thickness is ¾", and it can be sanded and refinished numerous times during its service life.[13]	-
	Carpet	Carpet is a textile floor covering that can be further categorized as either broadloom carpet or carpet tile.[14]	-
	Cork	Cork floor tiles are produced from cork and binders, sometimes finished with a varnish. [15]	-
	Sheet linoleum	Linoleum is made from linseed oil, gum rosin, bio-based waste and calcium carbonate. This composite is typically sandwiched between a backing of jute and a surface coating.[16]	Vinyl products, Plastic stone, or Luxury Vinyl Tile (LVT) *are not* sheet linoleum.

[10] Adapted from Smartside® Trim and Siding Production EPD (LP®, 2023).
[11] Adapted from Western Red Cedar Lumber Association (2023). Typical Western Red Cedar Lumber Association Bevel Siding EPD.
[12] Cradle-to-grave EPD for industry average engineered wood flooring products. National Wood Flooring Association, 2022. https://nwfa.org/wp-content/uploads/2025/06/Engineered-Wood-Flooring-EPD-20250603.pdf
[13] Cradle-to-grave EPD for industry average solid wood flooring products. National Wood Flooring Association, 2022. https://nwfa.org/wp-content/uploads/2025/06/Solid-Wood-Flooring-EPD-20250603.pdf
[14] Waldman, B., Habchi, R., and Palmeri, J. (2025). 2025 CLF North American Material Baselines Report. Carbon Leadership Forum.
[15] Adapted from European Resilient Flooring Manufacturer's Institute (2019). Environmental Product Declaration ERFMI – Cork floor tiles according to EN 12104 EPD.
[16] Adapted from Tarkett (2018). Linoleum Flooring EPD. and Forbo (2024). Resilient Linoleum Floor Covering EPD.

System	Material Name	Material reference description*	Additional Guidance
	Liquid linoleum	Liquid linoleum should use the same natural ingredients found in sheet linoleum plus vegetable oil.[17]	Resilient rubber flooring, vinyl products, plastic stone, or Luxury Vinyl Tile (LVT) *are not* liquid linoleum.
	Earthen floor	Earthen building materials combine earth with natural fibers such as straw, and water. This is mixed and applied wet and dries in place. [18]	Earthen materials that use any cement or concrete in the mix *are not* earthen floors.
	Bamboo flooring	Harvested bamboo is split into bamboo strips, combined with binders, and compressed to form planks of different sizes. [19]	-
	Ceramic tile	Ceramic tiles are composed of clays, sand, feldspar and other additives, then are pressed or extruded into shape and finally, fired in a kiln. They may be glazed or unglazed. [20]	
Roof	Clay tile	"Clay roofing tiles are made from clay or other argillaceous materials, with or without sand, fuel, or other additives, fired at a sufficiently high temperature to achieve ceramic bond." [21]	-

[17] Adapted from Mannington Commercial (2020). Legato Flooring EPD.
[18] Adapted from Ben-Alon, L., Loftness, V., Harries, K. A., & Hameen, E. C. (2021). Life cycle assessment (LCA) of natural vs conventional building assemblies. Renewable and Sustainable Energy Reviews, 144, 110951. https://doi.org/10.1016/j.rser.2021.110951
[19] Adapted from MOSO International (2022). MOSO® High Density® products.
[20] Adapted from Tile Council of North America (2019). North American Ceramic tile Industry-wide EPD.
[21] Spanish Association of Clay Brick and Roofing Tile Manufacturers (2017). Clay roofing tiles in accordance with EN 1304 EPD.

4. Performance/Innovation Pathway

Intent

Demonstrate a 10% reduction in the project's embodied carbon emissions by comparing to a baseline building.

This holistic modeling approach includes evaluating the embodied carbon of a project's structure, enclosure and interiors for life cycle stages A1-A3 and requires demonstrating at least a 10% reduction compared to a baseline building. Additional stages of life in the LCA may be included at the discretion of the project team.

Project Scope

The project scope excludes existing materials that remain in place due to asset reuse[22], but salvaged materials can be included in the project scope. If applicable, salvaged reuse may be credited as a GWP of zero for A1-A3 in the actual project LCA. The project may exclude sitework and hardscape from the project scope, but can include if desired.

For a project site with multiple buildings, all buildings that include residential uses must be included in the project scope.

Compliance Requirements and Calculations

Projects must demonstrate that their *GWP actual total* satisfies the required **10% percent reduction** from the *GWP baseline total* at the time of project completion.

Project teams must use the following approach to demonstrate compliance:

1. Download and review the Pathway 4 - Performance Reporting Form.
2. Perform project life cycle assessments of your project and the baseline building, following the guidance in the following sections.
3. Calculate an overall percent reduction between the *GWP baseline total* and *GWP actual total* using the following equation:

$$Total\ Percent\ Reduction = \frac{GWP_{baseline\ total} - GWP_{actual\ total}}{GWP_{baseline\ total}}$$

   The reporting form will automatically run the calculations based on the baseline and proposed modeling results provided.

[22] Asset reuse that goes beyond the base requirement of the 40% reuse needed to be enrolled as an adaptive reuse project, or asset reuse in space-efficient projects may be able to be rewarded in Pathway 4. Reach out to deghousing@carbonleadershipforum.org to learn more.

4. Determine if the project met the **10%** reduction requirement and submit the Pathway 4 - Performance Reporting Form (see Reporting Requirements section), LCA raw results, and any manual calculations

Covered Project Elements

The minimum project life cycle assessment submitted for compliance shall include substructure, superstructure, enclosure and interiors consistent with the detailed list of included and excluded elements provided in **Table 6.**

Parking structures and elements (below or above-grade) must be included in the embodied carbon estimate, but the square footage of parking is not included in the adjusted gross floor area used for LCA reporting (see gross floor area in the Definitions section).

Table 6. Covered Elements. This table outlines the detailed list of elements that are required to be included in the life cycle assessments submitted for compliance. Adapted from ASHRAE, ICC, & BSR. (2025). *Standard 240P: Quantification of Life Cycle Greenhouse Gas Emissions, Second ISC Publication Public Review Draft*. ASHRAE.

OmniClass* Number	Element Category	Required	Exclude
21-01 00 00	**Substructure**	**X**	
21-01 10	Foundation	X	
21-01 10 10	- Standard Foundations	X	
21-01 10 20	- Special Foundations	X	
21-01 20	Subgrade Enclosure	X	
21-01 20 10	- Walls for Subgrade Enclosure	X	
21-01 40	Slabs-on-grade	X	
21-01 40 10	- Standard Slabs-on-grade	X	
21-01 40 20	- Structural Slabs-on-grade	X	
21-01 40 30	- Slab Trenches	X	
21-01 40 40	- Pits and Bases	X	
21-01 40 90	- Slabs-on-grade Supplementary Components	X	
21-02 10	**Superstructure**		
21-02 10 10	- Floor Construction	X	
21-02 10 20	- Roof Construction	X	
21-02 10 80	- Stairs		X
	Enclosure		
21-02 20	Exterior Vertical Enclosure		
21-02 20 10	- Exterior Walls	X	
21-02 20 20	- Exterior Windows	X	
21-02 20 50	- Exterior Doors and Grilles		X
21-02 20 70	- Exterior Louvers and Vents		X
21-02 20 80	- Exterior Wall Appurtenances		X

OmniClass* Number	Element Category	Required	Exclude
21-02 20 90	- Exterior Wall Specialties		X
21-02 30	Exterior Horizontal Enclosure		
21-02 30 10	- Roofing	X	
21-02 30 20	- Roof Appurtenances		X
21-02 30 40	- Traffic Bearing Horizontal Enclosures	X	
21-02 30 60	- Horizontal Openings	X	
21-02 30 80	- Overhead Exterior Enclosures	X	
	Interiors		
21-03 10	Interior Construction		
	- Interior Partitions	X	
	- Interior Windows		X
	- Interior Doors		X
	- Interior Grilles and Gates		X
	- Raised Floor Construction	X	
	- Suspended Ceiling Construction	X	
	- Interior Specialties		X
21-03 20	Interior Finishes		
	- Wall Finishes		X
	- Flooring	X	
	- Stair Finishes		X
	- Ceiling Finishes	X	

*OmniClass™ is a North American classification system of construction information commonly used in the construction industry.

LCA Tools

Software tools used for the submission of the LCA for compliance shall conform to the international standard EN 15978:2011 with datasets compliant with the international standards ISO 14040 and ISO 14044. The following pre-approved tools include:

- BEAM Estimator Tool *(free)*
- EC3 *(free)*
- tally
- One Click LCA LEED US tool
- Athena Impact Estimator *(free)*

If the project team wishes to use a tool not on this list, the project team should provide a narrative describing how the project team's suggested tool meets all the standards outlined above and the requirements throughout this guidance document.

Material Quantity Data

For key materials (including at a minimum concrete, reinforcing, insulation, cladding and flooring), material quantity data used for the building LCA submitted for compliance shall reflect the final installed quantities at the time of project completion. For other material quantities, project documentation including models, drawings, and specifications may be used to develop quantity takeoffs.

Baseline Building

To comply with the reduction requirement, a baseline building LCA shall be created against which reductions can be demonstrated. The baseline building shall be functionally equivalent to the actual project: the two must be compliant with applicable building codes and laws, and have the same massing, function, thermal and structural performance. The same LCA tool, life cycle stages and datasets should be used for both models. Embodied Carbon reduction strategies that can be used to demonstrate reductions of the actual design against the baseline include, but are not limited to:

Table 7: Embodied Carbon Reduction Strategies

Embodied Carbon Reduction Type	Example Strategies
Material quantity reduction	• Asset reuse (beyond base requirement for adaptive reuse projects) • Advanced structural design for material efficiency • Prefabricated construction
Material alternative	• Structural type alternative • Wall, roof or floor assembly alternative • Salvaged products • Insulation type alternative
Product alternative*	• Lower carbon products (documented through Acceptable EPDs)

*Like the other pathways, in order to claim reductions from product alternatives, EPDs must represent the product being installed and the manufacturing facility that the product came from and not be expired.

Optional Guidance: Method to create the baseline LCA

1. Model the project's actual design and materials in your selected LCA tool.
2. Create a copy of your project's actual LCA to act as the basis of your baseline model LCA.
3. Edit the relevant constructions in the baseline model to reflect industry-standard materials and assemblies, while maintaining functional equivalence.
4. Use the models to show the differences between your design and the baseline:
    a. **During design or construction documents:** Use the LCA model to explore and evaluate opportunities to reduce embodied carbon compared to typical practice.

b. **During construction:** Consider which strategies your team deployed from **Table 7**, and document which constructions and materials in the actual design do not reflect industry-standard construction (atypical or innovative).

5. If claiming any Product alternatives, edit the material data in the baseline building to reflect industry typical GWP values, and collect the Acceptable EPDs for relevant installed products. Reductions can only be shown using EPDs for the actual installed products. Confirm and document that these assemblies and products maintain functional equivalence.
6. Document all the changes between the baseline and actual model in a table. See Tab 4 in the Pathway 4 - Performance Reporting Form to see how these changes should be documented.
7. Fill out the reporting form to compare the results of the baseline and actual LCA models to check if you have met the required 10% reduction.

Embodied Carbon Data

Embodied carbon data sources used for the LCA submitted for compliance shall be selected based on the data hierarchy guidance in **Table 8**. Projects should choose data sources and EPDs based on the capabilities of the LCA tool chosen and the level of detail in the project specifications. Acceptable EPDs must be submitted for compliance for products claiming a product alternative strategy as the reduction method.

Table 8. Embodied Carbon Data Hierarchy. This table outlines which embodied carbon data sources are acceptable for use based on the project documentation available.

Modeling Context	Embodied Carbon Data Hierarchy (listed in order of preference)
For baseline models or if the actual product installed does not have an EPD	1. Industry-wide EPD (use values specific to Oregon, if available) 2. Regionally appropriate generic values from LCA tool dataset or appropriate proxy data if generic values are not available
If the actual product has been installed and has an EPD	1. Facility-specific and/or supply-chain specific EPD 2. Product-specific EPD

Reporting Requirements

Documentation must be submitted at project completion, once all the necessary documentation has been collected to provide evidence that the embodied carbon reduction strategies have been realized in the final constructed project.

Compliance requirement:

1. **Reporting Form (required).** To submit the LCA for compliance, project teams are required to report the results of the life cycle assessment in the reporting spreadsheet Pathway 4 - Performance Reporting Form to demonstrate compliance. Projects shall report results in total embodied carbon ($kgCO_2e$) and normalized per gross floor area in units of embodied carbon intensity (ECI) per the definition in this guidance. A table of the reduction strategies used must be provided to support the claimed reductions, and acceptable EPDs must be submitted for any Product Alternatives. Any manual calculations should be included in the results reported in this form.
2. **Supporting documentation.** Supporting documentation should provide sufficient supporting evidence that the claim made in the WBLCA is consistent with the project at the time of project completion. All quantities of key materials must have supporting documentation in the form of receipts that verify the quantity and product purchased. Receipts will also be used to provide confirmation that the strategy was realized in the project and permit DEQ to issue rebates to the project team.
3. **Raw results from software tools (required).** Project teams are required to submit spreadsheet tabular LCA results exported by the LCA tool. The export of raw data from the software tool used should contain both the embodied carbon emissions breakdown and the bill of materials (i.e. material quantities). Depending on the software tool used, this data may be provided in a spreadsheet format as a single document or multiple separate documents.
4. **Manual calculations (required).** Where manual calculations have optionally been conducted outside the software tool due to the limitations in the tool, a document or documents containing these calculations shall be submitted. This submission shall be documented in the Pathway 4 - Performance Reporting Form. This is in addition to the raw results submission. The manual calculations may be a modified version of the raw data exported from the software tool, if changes are made directly on the raw data from the tool, or may also be a separate file containing the manual calculations.

Treatment of Special Topics

Salvaged materials: If materials meeting the definition of salvaged materials are in the project scope, or in qualifying cases[23] of asset reuse, the A1-A3 emissions for the *GWP actual* from these materials shall be set to zero in the LCA for compliance.

[23] Asset reuse that goes beyond the base requirement of the 40% reuse needed to be enrolled as an adaptive reuse project, or asset reuse in space-efficient projects may be able to be rewarded in Pathway 4. Reach out to deghousing@carbonleadershipforum.org to learn more.

Appendix A

Table A documents the material baselines that are used in the reporting form and for compliance in Pathways 1 and 2. Full references and methods for the Baseline GWP values is available in the Conversions & Data tab of the **DEQ Embodied Carbon Reporting Form**. The target values for pathways 1 and 2 provide indicative global warming potential targets based on the reductions required in those pathways.

Table A. Low embodied carbon program baselines by product category ($kgCO_2e$/ declared unit)

Pathway		Table of CLF's Baseline Values* (kgCO2e/ declared unit)			Target Value (kgCO2e/ declared unit)		Declared unit
1	2	Product category	Product type	Baseline GWP	Pathway 1 (80% of baseline)	Pathway 2 (89% of baseline)	Declared unit
	X	Cement	Masonry cement (mortar)	587	470	522	metric ton (tonne)
X	X	Ready-mix	2500 psi(17.2 Mpa), Normalweight	235	188	209	m3
X	X	Ready-mix	3000 psi (20.7 MPa), Normalweight	261	209	232	m3
X	X	Ready-mix	3500 psi (24.1 MPa), Normalweight	289	231	257	m3
X	X	Ready-mix	4000 psi (27.6 MPa), Normalweight	316	252	281	m3
X	X	Ready-mix	4500 psi (31.0 MPa), Normalweight	351	281	312	m3
X	X	Ready-mix	5000 psi (34.5 MPa), Normalweight	386	309	344	m3
X	X	Ready-mix	5500 psi (37.9 MPa), Normalweight	397	318	353	m3
X	X	Ready-mix	6000 psi (41.4 MPa), Normalweight	408	326	363	m3
X	X	Ready-mix	7000 psi (48.3 MPa), Normalweight	448	358	399	m3
X	X	Ready-mix	8000 psi (55.1 MPa), Normalweight	487	390	433	m3
X	X	Ready-mix	3000 psi (20.7 MPa), Lightweight	518	414	461	m3
X	X	Ready-mix	4000 psi (27.6 MPa), Lightweight	575	460	512	m3

Pathway		Table of CLF's Baseline Values* (kgCO2e/ declared unit)			Target Value (kgCO2e/ declared unit)		Declared unit
1	2	Product category	Product type	Baseline GWP	Pathway 1 (80% of baseline)	Pathway 2 (89% of baseline)	Declared unit
X	X	Ready-mix	5000 psi (34.5 MPa), Lightweight	632	506	562	m3
	X	Shotcrete	Shotcrete, 4000 psi	362	290	322	m3
	X	Shotcrete	Shotcrete, 5000 psi	411	329	366	m3
	X	Shotcrete	Shotcrete, 6000 psi	402	322	358	m3
	X	Concrete masonry units	CMU, USA, normal weight, f'm = 2000psi	208	166	185	m3
	X	Concrete masonry units	CMU, USA, normal weight, f'm = 2500psi	232	186	206	m3
	X	Concrete masonry units	CMU, USA, normal weight, f'm = 3000psi	241	193	214	m3
	X	Concrete masonry units	CMU, USA, medium weight	300	240	267	m3
	X	Concrete masonry units	CMU, USA, lightweight	340	272	303	m3
X	X	Rebar	Unfabricated	753	602	670	metric ton (tonne)
X	X	Rebar	Fabricated	854	683	760	metric ton (tonne)
	X	Structural steel	Hot-rolled sections, unfabricated	901	721	802	metric ton (tonne)
	X	Structural steel	Hot-rolled sections, fabricated	1080	864	961	metric ton (tonne)
	X	Structural steel	Steel plate, unfabricated	1480	1184	1317	metric ton (tonne)
	X	Structural steel	Steel plate, fabricated	1730	1384	1540	metric ton (tonne)
	X	Structural steel	Hollow Structural Sections (HSS), unfabricated	1710	1368	1522	metric ton (tonne)
	X	Structural steel	Hollow Structural Sections (HSS), fabricated	1990	1592	1771	metric ton (tonne)
	X	Cold-formed steel framing	Cold-formed steel framing	2440	1952	2172	metric ton (tonne)
	X	Steel decking	Steel deck	2330	1864	2074	metric ton (tonne)
	X	Sawn lumber	Softwood lumber, U.S. Pacific Coast	73.8	59	65.7	m3

Pathway		Table of CLF's Baseline Values* (kgCO2e/ declared unit)			Target Value (kgCO2e/ declared unit)		Declared unit
1	2	Product category	Product type	Baseline GWP	Pathway 1 (80% of baseline)	Pathway 2 (89% of baseline)	Declared unit
	X	Structural composite lumber	Laminated strand lumber (LSL)	275	220	245	m3
	X	Structural composite lumber	Laminated veneer lumber (LVL)	361	289	321	m3
	X	Mass timber	Cross Laminated Timber (CLT), Western US	156	125	139	m3
	X	Mass timber	Mass ply panel (MPP)	259	207	231	m3
	X	Mass timber	Dowel Laminated Timber (DLT)	121	97	108	m3
	X	Mass timber	Glue-laminated timber (GLT)	137	110	122	m3
	X	Mass timber	GLT, British Columbia	103	82.4	91.7	m3
	X	Wood sheathing	Wood sheathing (includes plywood and OSB)	231	185	206	m3
	X	Wood I-joists	Wood I-joist, 300mm (≅11-7/8")	1.97	1.58	1.75	m
X	X	Board insulation	Expanded polystyrene (EPS) Type I	2.53	2.02	2.25	m2@RSI-1
X	X	Board insulation	Fiberglass board	5.02	4.02	4.47	m2@RSI-1
X	X	Board insulation	Heavy density mineral wool board	6.82	5.46	6.07	m2@RSI-1
X	X	Board insulation	Polyisocyanurate (Polyiso), aluminum foil facer	4.1	3.28	3.65	m2@RSI-1
X	X	Board insulation	Polyisocyanurate (Polyiso), Glass-Fiber-Reinforced Cellulosic (GRF) facer	2.11	1.69	1.88	m2@RSI-1
X	X	Board insulation	Polyisocyanurate (Polyiso), Coated Glass Facer (CGF)	2.95	2.36	2.63	m2@RSI-1
X	X	Board insulation	Polyisocyanurate (Polyiso), wall	3.5	2.8	3.1	m2@RSI-1
X	X	Board insulation	Polyisocyanurate (Polyiso), roof	2.5	2.0	2.23	m2@RSI-1
X	X	Board insulation	Extruded polystyrene (XPS) board, ≤25 psi	8.9	7.1	7.9	m2@RSI-1
X	X	Board insulation	Extruded polystyrene (XPS) board, 40 psi	10.9	8.72	9.70	m2@RSI-1

Pathway		Table of CLF's Baseline Values* (kgCO2e/ declared unit)			Target Value (kgCO2e/ declared unit)		Declared unit
1	2	Product category	Product type	Baseline GWP	Pathway 1 (80% of baseline)	Pathway 2 (89% of baseline)	Declared unit
X	X	Board insulation	Extruded polystyrene (XPS) board, 60 psi	14.1	11.3	12.5	m2@RSI-1
X	X	Board insulation	Extruded polystyrene (XPS) board, 100 psi	20.1	16.1	17.9	m2@RSI-1
X	X	Blanket insulation	Blanket insulation (all types)	1.9	1.5	1.7	m2@RSI-1
X	X	Foamed-in-place insulation	Closed-cell spray polyurethane foam, medium density	2.63	2.1	2.34	m2@RSI-1
X	X	Foamed-in-place insulation	Closed-cell spray polyurethane foam, roofing	3.87	3.1	3.44	m2@RSI-1
X	X	Foamed-in-place insulation	Open-cell spray polyurethane foam	1.17	0.94	1.04	m2@RSI-1
X	X	Loose-fill insulation	Loose fill insulation (all types)	1.1	0.88	0.98	m2@RSI-1
	X	Metal panel cladding	Roll-formed metal panel - steel	1530	1224	1362	100 m2
	X	Metal panel cladding	Roll-formed metal panel - aluminum	1860	1488	1655	100 m2
	X	Metal panel cladding	Metal Composite Material (MCM) panel, aluminum	2800	2240	2492	100 m2
	X	Insulated metal panel cladding	Insulated metal panel (IMP), 2" thick	10,700	8560	9523	100 m2
	X	Insulated metal panel cladding	Insulated metal panel (IMP), 4" thick	19,100	15,280	17,00	100 m2
	X	Insulated metal panel cladding	Insulated metal panel (IMP), 6" thick	27,400	21,920	24,390	100 m2
	X	Other Cladding	Clay brick	503	402	448	m3
	X	Other Cladding	Fiber cement siding	6.39	5.11	5.69	m2
	X	Other Cladding	Cedar siding	2.14	1.71	1.90	m2
	X	Other Cladding	Stone cladding	21.4	17.1	19.0	m2
	X	Other Cladding	Vinyl siding, insulated	6.05	4.84	5.38	m2

Pathway		Table of CLF's Baseline Values* (kgCO2e/ declared unit)			Target Value (kgCO2e/ declared unit)		Declared unit
1	2	Product category	Product type	Baseline GWP	Pathway 1 (80% of baseline)	Pathway 2 (89% of baseline)	Declared unit
	X	Other Cladding	Vinyl siding, not insulated	4.71	3.77	4.19	m2
	X	Other Cladding	Other cladding	8.14	6.51	7.24	m2
	X	Gypsum board	Gypsum board, 1/2 in	207	166	184	92.9 m2
	X	Gypsum board	Gypsum board, 5/8 in	277	222	247	92.9 m2
	X	Glass-mat gypsum board	Glass-mat gypsum board, 1/2 in	437	350	389	92.9 m2
	X	Glass-mat gypsum board	Glass-mat gypsum board, 5/8 in	504	403	449	92.9 m2
X	X	Tile	Ceramic tile	14.1	11.3	12.5	m2
X	X	Resilient flooring	Resilient flooring (all types)	7.49	5.99	6.66	m2
X	X	Flooring	Broadloom carpet	10.1	8.1	9.0	m2
X	X	Flooring	Carpet tile	9.37	7.5	8.34	m2
X	X	Flooring	Hempwood Flooring	11.62	9.3	10.3	m2
X	X	Flooring	Engineered wood	6.85	5.48	6.1	m2
X	X	Flooring	Other flooring	8.43	6.74	7.5	m2

*Full references and methods for the Baseline GWP values is available in the Conversions & Data tab of the **DEQ Embodied Carbon Reporting Form**.