



# **Environmental Product Declaration Requirements in Procurement Policies**

An analysis of EPD definitions in Buy Clean and other North American procurement policies

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## About the Carbon Leadership Forum

The Carbon Leadership Forum is a non-profit industry-academic collaborative at the University of Washington. We are architects, engineers, contractors, material suppliers, building owners, and policymakers who work collaboratively, pioneering research, creating resources, and incubating member-led initiatives for greatest collective impact. Our goal is to accelerate transformation of the building sector to radically reduce and ultimately eliminate the embodied carbon in building materials and construction.

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## EXECUTIVE SUMMARY

A growing number of local, state, and federal procurement policies require environmental product declarations (EPDs) for reporting the embodied carbon of eligible products. Embodied carbon refers to the greenhouse gas emissions arising from the manufacturing, installation, maintenance, and disposal of construction materials used in the construction of buildings, roads, and other infrastructure. Procurement policies such as Buy Clean aim to leverage the purchasing power of government agencies to incentivize transparency and a shift toward lower-carbon options in the broader construction materials market.

EPDs are appropriate for use in procurement policies because they already exist as agreed-upon resources for calculating and documenting the embodied carbon of products. There are limitations on the use of EPDs for comparison, and there is room to improve EPDs and product category rules (PCRs). Policies aiming to compare products across categories (such as between concrete and steel) should consider a building-scale approach and use whole building life cycle assessment (LCA).

EPDs and PCRs can be improved in the following ways to support the use of relevant and accurate data for comparison:

- **Inclusion of supply chain-specific (i.e. primary) upstream data** for processes with large impacts where secondary data is currently allowed.
- **Inclusion of additional life cycle stages beyond A1-A3** into PCR requirements, where not already included.
- **Inclusion of standardized default datasets in PCRs for upstream processes**, including material manufacturing and transportation impacts.
- **PCRs can be improved to better support the ability of manufacturers to comply with policies**, such as facility-specific and supply chain-specific EPD guidance and guidance on inclusion of additional data in supplemental information.

Procurement policies are not currently harmonized in terms of the type of EPD that is required; existing and proposed legislation require facility-specific, product-specific, or supply chain-specific EPDs. Facility-specific and supply chain-specific EPD requirements were introduced by policymakers interested in upstream data that has not yet been included in the minimum requirements established by the PCR for an eligible product. Policymakers have also included requirements for additional data that can be reported in the supplemental information section of an EPD, such as the wood fiber sourcing data requirements proposed in Buy Clean Buy Fair Washington.

Policymakers may consider one of the following strategies to encourage harmonization and allow for the addition of eligible materials over time:

- Request supply chain-specific EPDs with additional life cycle stages beyond A1-A3.
- Require product-specific EPDs and participate in PCR development to encourage the inclusion of upstream data and additional life cycle stages in PCRs.

## INTRODUCTION

A variety of existing and proposed legislation regulating public procurement at the federal, state, and city levels require the collection of **environmental product declarations (EPDs)** for reporting the greenhouse gas (GHG) emissions associated with building material production, including resource extraction, transportation, and manufacturing. One of the most well-known versions of this type of procurement policy is Buy Clean California, which was introduced and passed into law by the State of California in October 2017. Buy Clean California and similar policies aim to reduce the **embodied carbon** associated with the construction of publicly owned facilities by leveraging the purchasing power of government agencies to incentivize transparency and encourage a shift toward lower-carbon options in the broader construction materials market.

This document provides an overview of current EPD requirements in existing and proposed policies and an analysis of the supply chain-specific EPD definition introduced by the Buy Clean Buy Fair Washington Act in 2021.

## MATERIAL-SCALE EMBODIED CARBON POLICIES

Buy Clean and other low-carbon procurement policies incorporate purchasing requirements that address the GHG emissions from construction materials. The material- and procurement-focused approach utilized by Buy Clean legislation is one of several complementary approaches for reducing embodied carbon with policy.

A **building-scale approach** focuses on the embodied carbon impact of a project as a whole, as well as the assemblies and systems that comprise a building. This approach addresses a broader scope of materials (rather than only focusing on the highest-impact materials) and can invite additional strategies for embodied carbon reduction, such as material and building reuse, system and material comparisons (such as mass timber vs. steel, or spray foam vs. batt insulation), and material efficiency. Because materials are compared across the product categories, the entire life cycle of a product must be included when using whole building **life cycle assessment (LCA)** to compare the impact of design choices on embodied carbon.

A **material-scale approach** focuses on the embodied carbon impact of individual construction materials and incentivizes transparency and availability of products made with lower-carbon manufacturing practices. A key component of this approach is requiring disclosure of high-quality embodied carbon data in the form of an EPD for materials specified by the policy. This approach is particularly relevant during the procurement phase of a project, when the product type and performance requirements have already been selected. Material-scale policies are well-suited for horizontal infrastructure, such as roads and bridges, in addition to buildings.

Currently, this approach is often limited to impacts in the early stages of a product's life, from extraction to manufacturing, and to a handful of carbon-intensive materials, but this can change over time as standards improve and materials are added to policies.

### Environmental product declaration (EPD)

EPDs are third-party-verified documents written in conformance with international standards that report the environmental impacts of a product, including its global warming potential, based on life cycle assessment models.

### Embodied carbon

Embodied carbon refers to the GHG emissions arising from the manufacturing, installation, maintenance, and disposal of construction materials used in the construction of buildings, roads, and other infrastructure. Embodied carbon is a life cycle impact called global warming potential calculated using LCA.

### Life cycle assessment (LCA)

LCA is a systematic set of procedures for compiling and examining the inputs and outputs of materials and energy, and the associated environmental impacts directly attributable to a building, infrastructure, product or material throughout its lifecycle (ISO 14040: 2006).

## EPD REQUIREMENTS IN POLICIES

The use of EPDs as standardized reporting tools for disclosing the **global warming potential (GWP)** of construction materials is increasingly prevalent in public procurement policy. EPDs are already used by consumers in the building industry to assess environmental impacts, enabling policymakers to build and improve upon the existing standards described in this section.

International Standards Organization (ISO) standards identify three types of environmental claims for products:

- **Type I** claims are third party-verified labels based on criteria set by a third party and are governed by ISO 14024.
- **Type II** claims are self-declarations made by manufacturers or retailers and are governed by ISO 14021. Type II claims are not third party-verified.
- **Type III** claims contain quantified product information based on life cycle impacts and are governed by ISO 14025. Type III claims must be third party-verified.

Of these three types of claims, Type III declarations are preferred for embodied carbon policy because they are third party verified and contain the greatest amount of “quantified environmental information on the life cycle of a product,” which helps “enable comparisons between products fulfilling the same function” (ISO 14025: 2006).

The development of EPDs and **product category rules (PCRs)** are governed by a number of standards developed by the International Standards Organization (ISO), including:

- ISO 14025: *Environmental labels and declarations — Type III environmental declarations — Principles and procedures*
- ISO 14027: *Environmental labels and declarations — Development of product category rules*
- ISO 14040: *Environmental management — Life cycle assessment — Principles and framework*
- ISO 14044: *Environmental management — Life cycle assessment — Requirements and guidelines*
- ISO 21930: *Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services.*

Each material's PCR dictates methodological decisions that are relevant and fine-tuned to the material supply chain of that product category (e.g., concrete, floor coverings, insulated metal panels, etc.). A PCR dictates which life cycle stages and scopes must be included in the LCA, which background data sources are acceptable or mandatory, and other modeling choices such as allocation method and impact assessment method.

EPDs vary in their level of product, supply chain, and regional specificity. The following categories of EPDs are used by purchasers to identify which level of specificity is required to comply with an EPD requirement:

### Global warming potential (GWP)

The potential climate change impact of a product or process as measured by an LCA, reported in units (typically kg) of carbon dioxide equivalent (CO<sub>2</sub>e).

### Product category rule (PCR)

A PCR is a set of specific rules, requirements, and guidelines for developing Type III environmental declarations for one or more product categories. Product category rules are reviewed and improved periodically over time.

- **Industry-wide EPDs** represent typical manufacturing impacts for a range of products for a group of manufacturers. Industry-wide EPDs provide the least specific data on a product's embodied carbon footprint and cannot be used to compare products, but they are helpful in understanding the typical impact of a product.
- **Product-specific EPDs** represent the impacts for a specific product and manufacturer across multiple multiple facilities.
- **Supply chain-specific EPDs** are defined in HB 1103 (Buy Clean Buy Fair Washington) in January 2021. A supply chain-specific EPD is a product-specific EPD that uses [supply chain-specific data](#) in the LCA to model the impacts of key processes upstream in a product's supply chain.
- **Facility-specific EPDs** were introduced by the Buy Clean California Act in 2017. The California Department of General Services (DGS) defines a facility-specific EPD as a product-specific EPD in which the environmental impacts can be attributed to a single manufacturer and manufacturing facility.

Table 1 presents an overview of the EPD requirements in existing and proposed embodied carbon legislation.

PCRs provide guidelines for calculating industry-average EPDs and product-specific EPDs for each product type. For example, the PCR for concrete defines product-specific EPDs as one “for a specific product or group of concrete mix designs categorized by

## Supply chain-specific data

Supply chain-specific data refers to the use of primary, rather than secondary, data for upstream manufacturing or production processes.

An example of using supply chain-specific data is the use of a cement EPD from the cement plant sourced by a ready mix supplier rather than the use of generic data that represents industry average cement manufacturing in the United States.

**Table 1.** Overview of environmental product declaration (EPD) requirements in existing and proposed legislation focused on embodied carbon.

Year introduced	Source	Bill	Type of EPD required
2017	California Legislature	<a href="#">Buy Clean California Act</a>	Type III facility-specific EPD
2019	City of Portland	<a href="#">New requirements for concrete</a>	Type III product-specific EPD
2019	Minnesota Legislature	<a href="#">HF 2204</a>	Type III facility-specific EPD
2020	New York State Senate	<a href="#">S542 (Original)</a>	Type III product-specific EPD
2021	California Legislature	<a href="#">AB-1365</a> <a href="#">SB-778</a>	Type III supply chain-specific EPD Type III EPD that “makes use of supply chain-specific data for input materials whenever this data is available”
2021	Colorado State Assembly	<a href="#">HB 21-1303</a>	Type III EPD
2021	Oregon State Legislature	<a href="#">HB 2688</a>	“Product-specific measurement of the life cycle environmental impact of a product, from the point of raw material extraction to the point of manufacture, that is certified by a third party and in accordance with international standards”
2021	New Jersey Assembly	<a href="#">AB 5223</a>	Type III product-specific EPD
2021	Washington State Legislature	<a href="#">HB 1103</a>	Type III supply chain-specific EPD
2021	House of Representatives, 117th Congress	<a href="#">H.R.1512 CLEAN Future Act - Subtitle C - Federal Buy Clean Program</a>	Type III product-specific EPD “calculated for a specific facility”

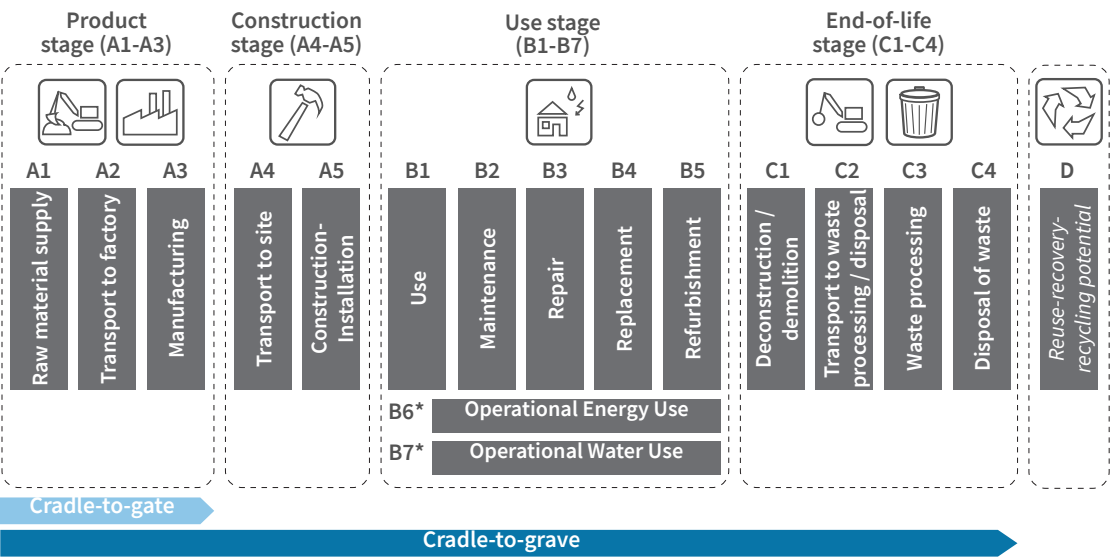
performance developed by a manufacturer for a specific ready mix plant location” and an industry-average EPD as one “for a specific product or group of concrete mix designs categorized by performance for a specified region.”<sup>1</sup> As of May 2021, PCRs do not provide facility-specific and supply chain-specific EPD guidance.

Many building sector professionals were first introduced to industry-wide and product-specific EPDs through the LEED v4 Materials and Resources credit *Building product disclosure and optimization - environmental product declarations*.<sup>2</sup> Facility-specific and supply chain-specific EPDs were introduced by policymakers interested in upstream data that is not yet included in the minimum requirements established by the PCR for an eligible product.

EPDs are appropriate for use in procurement policies because they already exist as agreed-upon resources for calculating and documenting the embodied carbon of products. Additionally, EPDs are already used by consumers in the building industry to assess environmental impacts, so the infrastructure already exists to continue using EPDs and improving them. However, there are [limitations on the use of EPDs](#) for comparison. Policies aiming to compare products across categories should consider a building-scale approach and use whole building LCA tools rather than EPDs.

## THE NEED FOR UPSTREAM DATA

The life cycle stages for building products included in an LCA are defined as shown in Figure 1 below. Cradle-to-gate or Product stage embodied carbon refers to GHG emissions associated with the Product stage, specifically A1: Raw material supply, A2: Transport, and A3: Manufacturing. Cradle-to-gate embodied carbon is the minimum scope of life cycle data that can be included in an EPD.



\*Operational carbon stages that are typically excluded from life cycle assessments focused on embodied carbon.

**Figure 1.** Life cycle stages for building products, based on EN 15978:2011 and ISO 21930:2017.

1. NSF International. “PCR for Concrete.” February 2019. [https://d2evkimvhatqav.cloudfront.net/documents/concrete\\_pcr\\_2019.pdf](https://d2evkimvhatqav.cloudfront.net/documents/concrete_pcr_2019.pdf)
2. United States Green Building Council, “Building product disclosure and optimization - environmental product declarations,” <https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-healthca-22>.

### Limitations on use of EPDs

EPDs cannot be used to compare the environmental performance of two different materials (e.g., concrete and wood).

Comparisons between EPDs should only be made if their impacts were calculated using the same methodologies and life cycle modules and the products being compared are functionally equivalent.

Policies aiming to compare products across categories should use a building-scale approach relying on whole building LCA rather than EPDs.

The term “supply chain” typically refers to the network of suppliers upstream of a company that are required to produce and distribute a product. “Supply chain” can refer to different ranges of life cycle stages depending on the context. For example, from the perspective of a building owner, “supply chain” would refer to everything upstream of construction, which would be in stages A1-A5. However, from the perspective of a ready mix supplier, “supply chain” would be limited to the life cycle stages that are upstream of the concrete manufacturing, which would be in stages A1-A2.

The GHG emissions generated in each life cycle stage of a product vary widely by material and type of product. For some products, the majority of emissions may be generated at one facility or step in the supply chain, whereas the emissions of other products may be distributed more evenly across a supply chain. Knowing whether emissions are distributed or concentrated at a point in the supply chain is key to answering important questions, such as:

- What data should be collected to accurately communicate the footprint of a product? And vice versa, when is it appropriate to save time and money by using generic data to estimate impacts that contribute only a very small portion of a product’s impact?
- Which facility or step in the supply chain should be the focus of research or policy incentives to drive the largest emissions reductions?

EPDs use a combination of **primary and secondary LCA data**. Most PCRs allow for secondary (generic) data to be used for calculating impacts in stages A1 and A2. Therefore, the degree of variability between the upstream impacts of two different manufacturers is unknown, as the same data would be used to estimate the upstream impact for both suppliers. In other cases, data on the variability of upstream impacts of products is unavailable to purchasers due to a lack of reporting or transparency, when data has been collected on the variability of upstream impacts but has not yet been reported publicly.

For products with large upstream impacts, using primary (e.g. supply chain-specific) data for key upstream processes can provide a more accurate picture of the GWP of a product in an EPD. For example, consider a ready mix concrete supplier who decides to increase their commitment to sustainable sourcing by switching from Cement Company A, whose cement plant is in the worst performing quartile (e.g. bottom 25%) of cement plants in the United States, to Cement Company B, a plant with a commitment to net-zero by 2050 that is in highest performing quartile (e.g. top 75%) of energy efficiency for cement plants. Given that the majority of the impacts of a ready mix concrete product can be attributed to cement, one would expect that the ready mix supplier’s new EPD would reflect the lower carbon footprint of the product resulting from their new supplier. However, if secondary, industry-average data was used to calculate the upstream cement (A1) impacts as is allowed by the current concrete PCR, a new EPD would show a similar GWP to the old product despite the newer product causing fewer emissions. If instead primary data from the cement supplier was collected to create a supply chain-specific EPD, then the company would be able to communicate the impacts of

## Primary LCA data

Primary data is a “quantified value of a unit process or an activity obtained from a direct measurement or a calculation based on direct measurements at its original source” (ISO / TS 14067). An example of primary LCA data is energy use and fuel source data collected for a manufacturing facility.

## Secondary (generic) LCA data

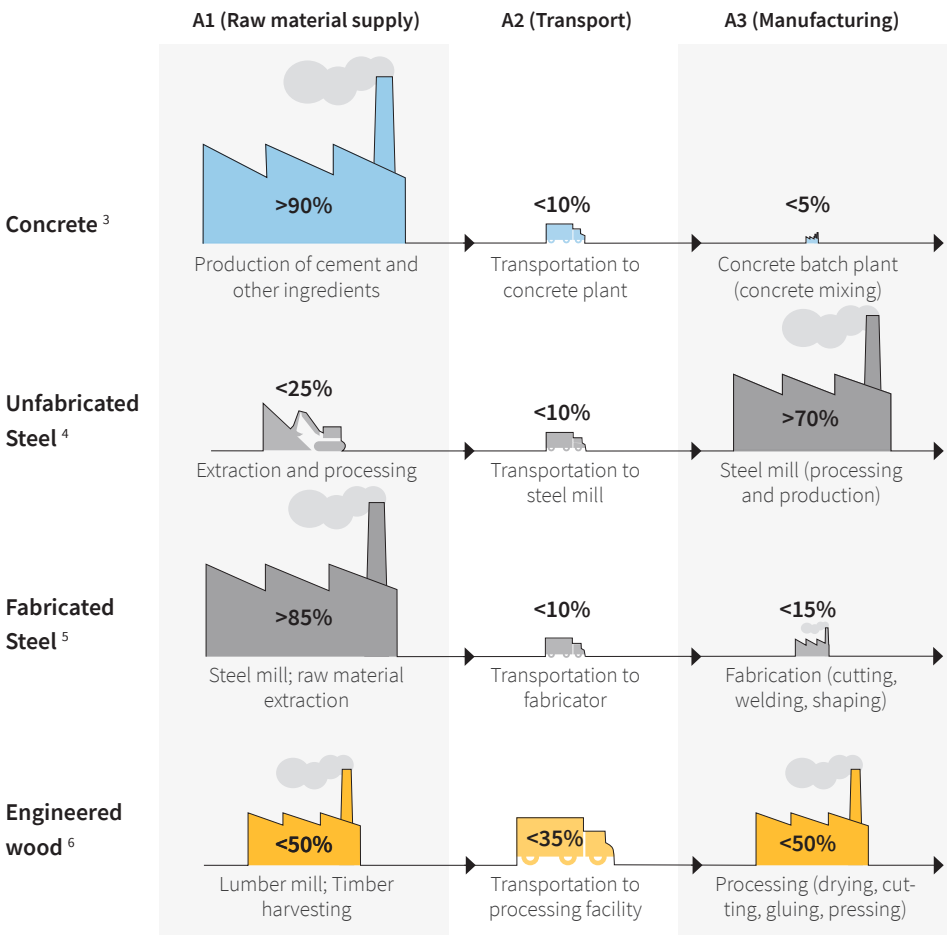
Secondary data is “data obtained from sources other than a direct measurement or a calculation based on direct measurements at the original source. Such sources can include databases and published literature validated by competent authorities.” (ISO / TS 14067). The use of LCA databases and other verified sources of industry-average LCA data is a typical and necessary component of LCA, particularly for representing processes that comprise only a small portion of a product’s impacts.



their sustainable sourcing practices and purchasers would have more accurate data to distinguish between products.

Figure 2 depicts the relative contribution to total A1-A3 GWP impacts in each life cycle stage for concrete, steel, and engineered wood products. Industry-wide EPDs commissioned by industry organizations represent multiple manufacturers and can provide insight into the typical distribution of cradle-to-gate global warming potential (GWP) impact across each stage, when included in the EPD. Where industry-wide EPDs were unavailable, product-specific EPDs were used to estimate relative contributions. Figure 3 on the following page provides an overview of the distribution of cradle-to-gate global warming potential (GWP) across A1-A3 for additional categories of building materials, based on data from industry-wide EPDs.

The facility-specific and supply chain-specific EPD requirements introduced by policymakers in California and Washington aim to capture a more accurate picture of the carbon footprint of a product to incentivize transparency and availability of low-carbon



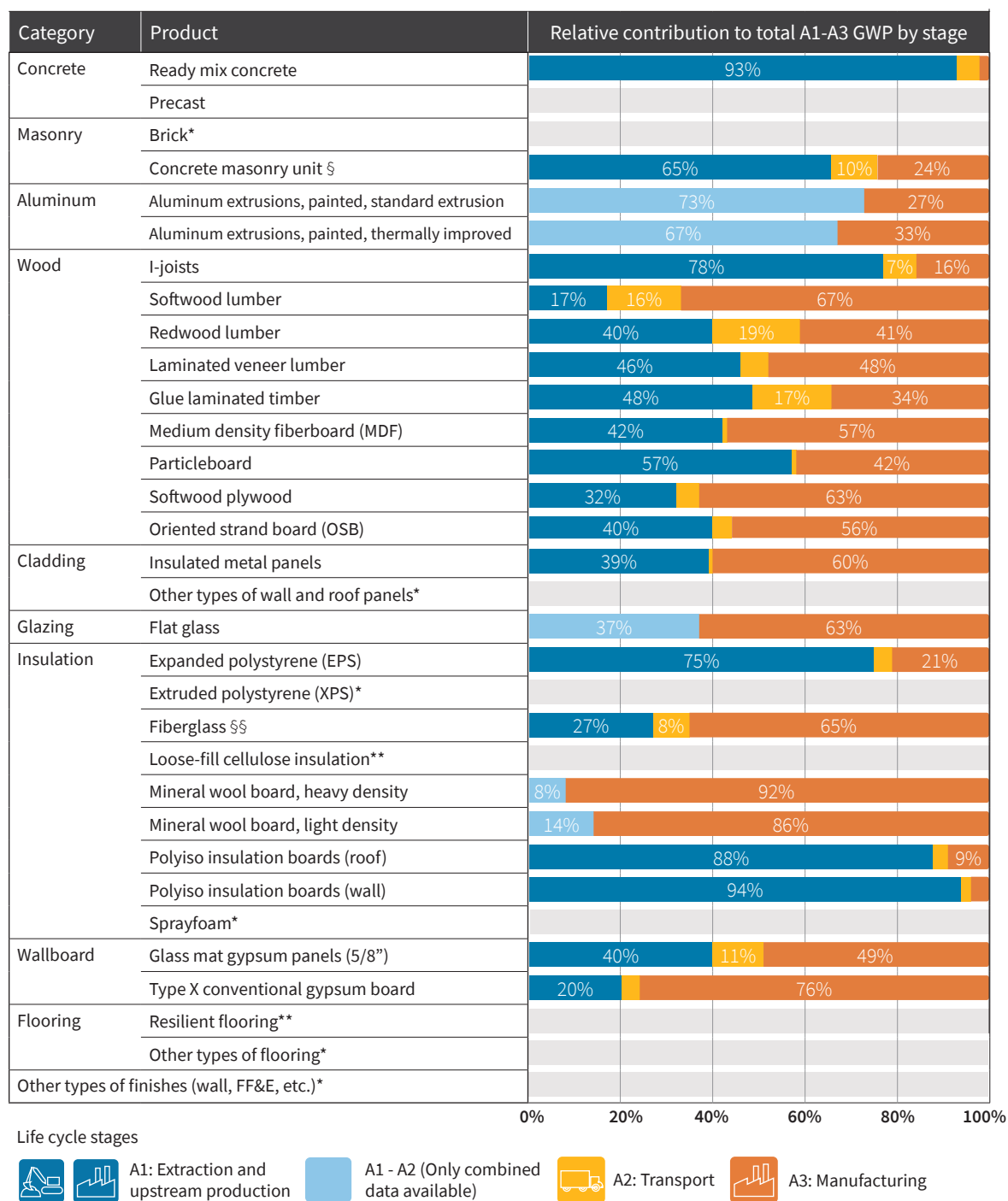
**Figure 2.** Relative contribution to an average product's cradle-to-gate global warming potential (GWP) for concrete, steel, and engineered wood products based on industry-average and product-specific (where industry average unavailable) data. Analysis of relative contribution of A1-A3 impacts for concrete completed in June 2021 by Mikaela DeRousseau at Building Transparency.

3. Based on concrete mix data from the NRMCA Member National and Regional LCA Benchmark (Industry Average) Report and life cycle inventory data from the USLCI and Ecoinvent databases.

4. Based on product-specific EPD data for steel concrete reinforcing bar, merchant bar products, and light structural shapes from Nucor Steel and Commercial Metals Company.

5. Based on industry-wide EPD data for fabricated steel plate, open web steel joists, steel deck, fabricated hollow structural sections (HSS), fabricated hot-rolled structural sections, and cold-formed steel studs and tracks.

6. Based on industry-wide EPD data for North American glued laminated timbers and laminated veneer lumber products and product-specific data for cross-laminated timber from StructurLam and Nordic Structures.



\*No industry-wide EPD available at time of analysis

\*\*Industry-wide EPD available, but GWP is not broken down by A1-A3

§ Based on a Canadian, rather than United States, industry-average EPD.

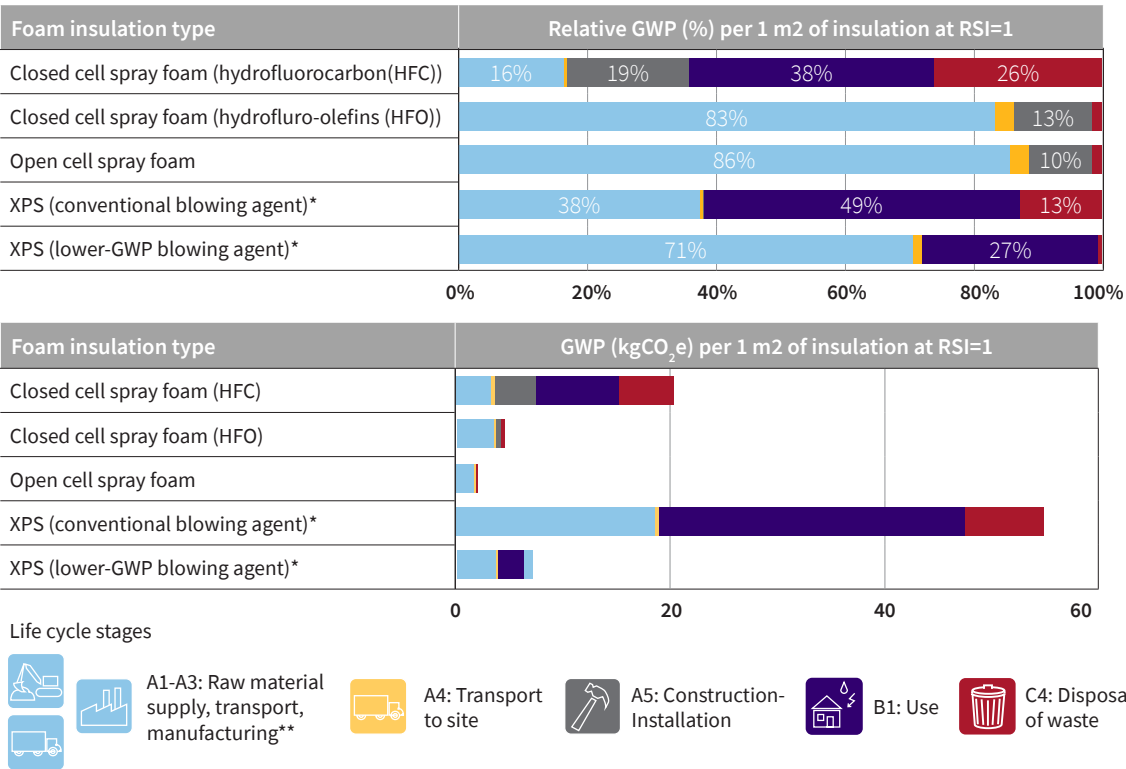
§§ Fiberglass percentages were calculated based on five product-specific EPD values from 3 manufacturers.

**Figure 3.** Relative contribution to an average product's cradle-to-gate global warming potential (GWP) in North America for common building products, based on industry-wide environmental product declarations. Analysis of relative contribution of A1-A3 impacts for concrete completed in June 2021 by Mikaela DeRousseau at Building Transparency.

products. However, facility-specific EPDs capture a more accurate carbon footprint only for products where the majority of GHG emissions and opportunities for decarbonization are at a single facility, rather than spread across a supply chain.

When over 75-80% of impacts are in the A3 Manufacturing stage (orange in Figure 3), a facility-specific EPD may capture the majority of a product’s footprint. An example of this as seen in Figure 3 is mineral wool, where the inputs (rocks and slag) are very low-impact, but the energy required to melt the materials drives up the emissions at the manufacturing facility. In this case, a facility-specific EPD would capture the bulk of the emissions. However, for other insulations like expanded polystyrene (EPS) and polyiso insulation boards, the majority of emissions are produced upstream of the manufacturing plant during chemical production, in modules A1-A2. A key difference is that a supply chain-specific EPD would better capture emissions for *all three* examples of insulation, limiting the need of policymakers to specify different EPD types for different products.

An additional consideration for including key data in the scope of the LCA for an EPD is life cycle modules. Figure 4 describes the distribution of GWP for some foam insulations across life cycle stages A1-A3, A4, A5, B1, and C4 (where B1 and C4 impacts are



\*No industry-wide EPD available at time of analysis. Product-specific EPD used for reference.  
\*\*Only data for A1-A3 modules combined is available.

**Figure 4.** Contribution to global warming potential (GWP) for foam insulation products by life cycle stage for A1-A3, A4, A5, B1, and C4 stages, based on industry-wide environmental product declarations (closed cell and open cell spray foams) and product-specific environmental product declarations.

predominantly due to blowing agent emission during building use, and after disposal, respectively). As seen in Figure 3, some foam insulation types offer an example of when A1-A3 does not capture the majority of impacts across the full life cycle. This relates primarily to the gradual leakage of high-GWP blowing agents to the atmosphere for some foam types.

Information for additional life cycle stages such as use (B) and end-of-life (C) are included in some EPDs, but are not yet widely available. PCRs can require or provide options for additional life cycle stages beyond A1-A3 to be included in the system boundary, such as the inclusion of C1-C4 or C1-C4+D in the steel PCR.<sup>7</sup>

7. UL Environment. (2020). Product Category Rule (PCR) Guidance for Building-Related Products and Services; Part B: Designated Steel Construction Product Requirements.

8. Washington State Legislature, "HB 1103 - 2021-22 - Improving environmental and social outcomes with the production of construction materials," 2021, <https://app.leg.wa.gov/billsummary?BillNumber=1103&Chamber=House&Year=2021>.

## ANALYSIS OF BUY CLEAN BUY FAIR WA REQUIREMENTS

In January 2021, members of the Washington (WA) State House of Representatives introduced House Bill (HB) 1103 – *Improving environmental and social outcomes with the production of construction materials* to the state legislature. HB 1103, also referred to as the Buy Clean Buy Fair Washington Act, proposes reporting requirements for a list of eligible structural materials purchased for public works in the State of Washington, including material quantities, EPDs, and information about basic labor conditions at production facilities.

While HB 1103 did not make it out of committee before the relevant Washington State Legislature deadlines, provisos were included in Washington State's capital and operating budgets to (1) develop a database to collect the information required by this bill and (2) coordinate with pilot projects teams to conduct a case study analysis.

### **HB 1103 requires a supply chain-specific EPD to be submitted for eligible materials.**

According to the bill, a "supply chain specific" EPD is defined as:<sup>8</sup>

... an environmental product declaration that includes supply chain specific data for production processes that contribute to 80 percent or more of a product's cradle-to-gate global warming potential, as defined in international standard for organization 21930, and reports the overall percentage of supply chain specific data included. For engineered wood products, supply chain specific also means an environmental product declaration that reports:

- (a) Any chain of custody certification;
- (b) Percent volume contribution to wood sourcing with forest management certification;
- (c) Percent volume contribution to wood sourcing by state or province and country; and
- (d) Percent volume contribution to wood sourcing by owner type, e.g., federal, state, private, or other.

A supply chain-specific EPD therefore cannot be based on an LCA that uses industry-average generic data to model upstream (A1 or A2) processes when those processes are responsible for >80% of overall A1-A3 impacts. For cases where the A1 and A2 impacts are <80% of total A1-A3 impacts, the bill requires no additional reporting related to supply chain-specificity.



Eligible materials under HB 1103 include structural concrete, reinforcing steel, structural steel, and engineered wood. An analysis of what these requirements mean for each eligible material and a brief overview of the relevant manufacturing processes for each material is discussed below.

**Concrete** is a material created by mixing cement, aggregate, water, and admixtures. The proportion of ingredients used in each batch of concrete varies, and the embodied carbon of each mix is driven primarily by the quantity of cement.

Concrete EPDs are generated by the concrete manufacturer. Contractors work directly with concrete manufacturers to refine the mix design for each batch of concrete used in a building. Manufacturers can use tools created specifically for the concrete industry to quickly generate mix-specific EPDs and reference the list developed by the National Ready Mix Concrete Association (NRMCA) to facilitate creation.

If a structural concrete EPD included supply chain-specific data that represented the production processes at the cement plant(s) that supplied cement to the concrete manufacturer, then that EPD would meet the requirements for supply chain-specific data set by HB 1103. An example of an EPD that meets this requirement is CalPortland's EPD that "was calculated using manufacturer-specific cement data that represents an average of 100% of the total cement used in each mix included in this EPD."<sup>9</sup>

**Steel** is typically produced in either (1) a basic oxygen furnace (BOF) using mostly raw material inputs and requiring significant fossil fuel combustion, or (2) an electric arc furnace (EAF) using mostly scrap or recycled steel inputs. These furnaces are located in steel mills, which is where the majority of emissions for steel products originate. In the steel mill, the steelmaking process results in basic feedstock shapes (e.g., blooms, billets, slabs), which are then rolled into more specific shapes (e.g., rods, bars, wide-flanges, or sheets).

EPDs for structural or reinforcing steel can be published by a steel **manufacturer** or by a **fabricator**. Similarly, a contractor can purchase structural steel products directly from a mill to be fabricated on-site, or they can purchase from a fabricator that sources steel from a mill or service center. EPD availability varies by product type and region.

EPDs, whether generated by a manufacturer or fabricator, that include primary data for the steel mill(s) used to manufacture the product meet the requirements for supply chain-specific data set by HB 1103. Examples of EPDs that meet the requirements of HB 1103 are (1) Cascade Steel Rolling Mill's EPD for fabricated reinforcing bar because "primary data for Cascade Steel's manufacturing processes in module A1 were collected from the McMinnville mill"<sup>10</sup> and (2) Nucor's EPD for fabricated hot-rolled structural steel sections which provides facility-specific GWP data for the Nucor-Yamato Steel and Nucor Steel Berkeley plants.<sup>11</sup> In both cases, these EPDs would meet both the facility-specific and supply chain-specific EPD definitions and would therefore be eligible for use on California or Washington projects.

9. CalPortland Company, (2020). EPD for concrete produced at 8 CalPortland California Facilities. Athena Sustainable Materials Institute. <https://www.nrmca.org/wp-content/uploads/2020/08/Cal-portlandCaliforniaNRMCAEPD20035.pdf>

10. Cascade Steel Rolling Mills, Inc. Environmental Product Declaration - Fabricated Reinforcing Bar. SCS Global Services. [https://www.scs-certified.com/products/cert\\_pdfs/SCS-EPD-04335\\_Cascade-Steel\\_011917.pdf](https://www.scs-certified.com/products/cert_pdfs/SCS-EPD-04335_Cascade-Steel_011917.pdf)

11. Nucor Corporation. Environmental Product Declaration - Fabricated Hot-Rolled Structural Steel Section. UL Environment. [https://assets.ctfassets.net/aax1cfbwhqog/1mMFYnxCAZy-cF3Mxt0gToN/cf67188ef39e039ebb-c632eefb0256fd/102.1\\_Nucor\\_Corporation\\_EP\\_D\\_Fabricated\\_Hot-Rolled\\_Structural\\_Steel\\_Sections.pdf](https://assets.ctfassets.net/aax1cfbwhqog/1mMFYnxCAZy-cF3Mxt0gToN/cf67188ef39e039ebb-c632eefb0256fd/102.1_Nucor_Corporation_EP_D_Fabricated_Hot-Rolled_Structural_Steel_Sections.pdf)

## Manufacturer or fabricator?

A steel manufacturer produces basic steel products in a steel mill (e.g., rebar, structural plate, rolled shapes). Steel mills typically account for over 85% of cradle-to-gate GWP for fabricated steel products (see Figure 2).

A fabricator shapes, welds, cuts, or assembles a secondary steel product (e.g., trusses, studs, grates) from basic steel products. Fabricators typically account for <5% of cradle-to-gate GWP, but may account for up to 15% for some steel products (see Figure 2).

**Engineered wood** is produced by binding together basic wood products (such as sawn lumber, wood chips, or boards) to form a larger product that is stronger and/or more durable. The binder can be chemical (adhesives) or mechanical (nails or similar). Examples of engineered wood products include plywood, I-joists, trusses, laminated veneer lumber (LVL), cross-laminated timber (CLT), and glued laminated timber (glulam).

EPDs for engineered wood are generated by the wood product manufacturer. The PCR for structural and architectural wood products does not require EPDs to disclose information about wood fiber sourcing (such as forest management certification), although an increasing number of manufacturers are including this information as an optional disclosure.<sup>12</sup> HB 1103 requires additional sourcing data, including geographic origin and owner type, that could be included alongside forest management certification status in the **supplemental information** section of an EPD.

Table 3 summarizes the reporting requirements for the eligible materials in HB 1103, specifying (1) the typical EPD provider and (2) what upstream data may be required to meet the supply chain-specific data requirements.

**Table 3.** Summary of the supply chain-specific data requirements proposed by HB 1103.

Eligible (covered) material		EPD provider	Requirements for upstream primary data
Structural concrete	Ready mix	Concrete batch plant	Manufacturer-specific primary data from the cement plant is required.
	Shotcrete		
Reinforcing steel	Rebar	Rebar manufacturer	Manufacturer-specific primary data from the steel mill is required.
	Post-tensioning (PT) tendons	PT tendon manufacturer	
Structural steel	Hot-rolled sections	Steel manufacturer (or steel fabricator)	Note that if the steel manufacturer, rather than the fabricator, generated the EPD then this is likely already included.
	Hollow structural sections		
	Plate		
	Cold-formed steel		
Engineered wood	Composite lumber	Wood product manufacturer, such as a LSL factory	Wood fiber sourcing data is required, including: <ul style="list-style-type: none"> <li>Any chain-of-custody certification;</li> <li>% volume contribution to wood sourcing with forest management certification;</li> <li>% volume contribution to wood sourcing by state or province and country; and</li> <li>% volume contribution to wood sourcing by owner type, e.g., federal, state, private, or other.</li> </ul>
	Mass timber	Wood product manufacturer, such as a CLT factory	

## CONCLUSION

Procurement policies are not currently harmonized in terms of the type of EPD that is required; existing and proposed legislation require facility-specific, product-specific, or supply chain-specific EPDs. Facility-specific and supply chain-specific EPD requirements were introduced by policymakers interested in upstream data that has not yet

12. UL Environment. (2020). Product Category Rule (PCR) Guidance for Building-Related Products and Services; Part B: Structural and Architectural Wood Products EPD Requirements (version 1.1).

### Supplemental information

Manufacturers can provide supplemental information in EPDs to provide additional product information in one location for purchasers, such as health or forest management certifications the product has received.

been included in the minimum requirements established by the PCR for an eligible product. EPDs and PCRs can be improved in the following ways to support the use of relevant and accurate data for comparison:

- **Inclusion of supply chain-specific (i.e. primary) upstream data** for processes with large impacts where secondary data is currently allowed.
- **Inclusion of additional life cycle stages beyond A1-A3** into PCR requirements, where not already included.
- **Inclusion of standardized default datasets in PCRs for upstream processes**, including material manufacturing and transportation impacts such as done by the 2019 concrete PCR.<sup>13</sup>
- **PCRs can be improved to better support the ability of manufacturers to comply with policies**, such as facility-specific and supply chain-specific EPD guidance and guidance on inclusion of additional data in supplemental information.

Table 4 summarizes the trade-offs between the use of different types of EPDs in procurement policies. To balance these trade-offs and encourage harmonization, policymakers may consider the following strategies:

1. Request supply chain-specific EPDs with additional life cycle stages beyond A1-A3.
2. Require product-specific EPDs and participate in PCR development to encourage the inclusion of upstream data and additional life cycle stages in PCRs.

**Table 4.** Summary of the pros and cons associated with different types of EPDs currently included in policies.

Type of EPD	Pros (for use in policy)	Cons (for use in policy)
<b>Supply chain-specific</b> Product-specific EPD that uses supply chain-specific (primary) data to model the impacts of key upstream processes (e.g. contribute >80% relative impact).	<ul style="list-style-type: none"><li>• More accurately represents impacts of products with large upstream impacts</li><li>• Appropriate for use across product types without identifying additional requirements, e.g. requires additional data only where significant (reducing burden on manufacturers)</li><li>• Incentivizes sustainable sourcing and supply chain transparency</li></ul>	<ul style="list-style-type: none"><li>• Less widely available</li><li>• Guidance not yet available for manufacturers in PCRs</li></ul>
<b>Product-specific</b> Represent the impacts for a specific product and manufacturer across multiple facilities.	<ul style="list-style-type: none"><li>• More commonly available, reducing burden on manufacturers to create new EPDs</li><li>• Appropriate for use across product types</li></ul>	<ul style="list-style-type: none"><li>• Requires reliance on PCRs to be updated to include key data to meet policy goals</li><li>• PCRs are slow to update and may not require key upstream supply chain data quickly enough to meet policy goals</li></ul>
<b>Facility-specific</b> Product-specific EPD in which the environmental impacts can be attributed to a single manufacturer and manufacturing facility.	<ul style="list-style-type: none"><li>• More accurately represents impacts of products sourced from a specific facility (e.g. grid mix, production methods, etc.) if impacts are concentrated in a single facility.</li></ul>	<ul style="list-style-type: none"><li>• Less widely available</li><li>• Incentivizes manufacturers to focus decarbonization efforts at only one facility</li><li>• Appropriate for use only for products where the majority of impacts are at a single facility, rather than spread across a supply chain</li><li>• Requires policymakers to set new EPD requirements as additional materials are required</li></ul>

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