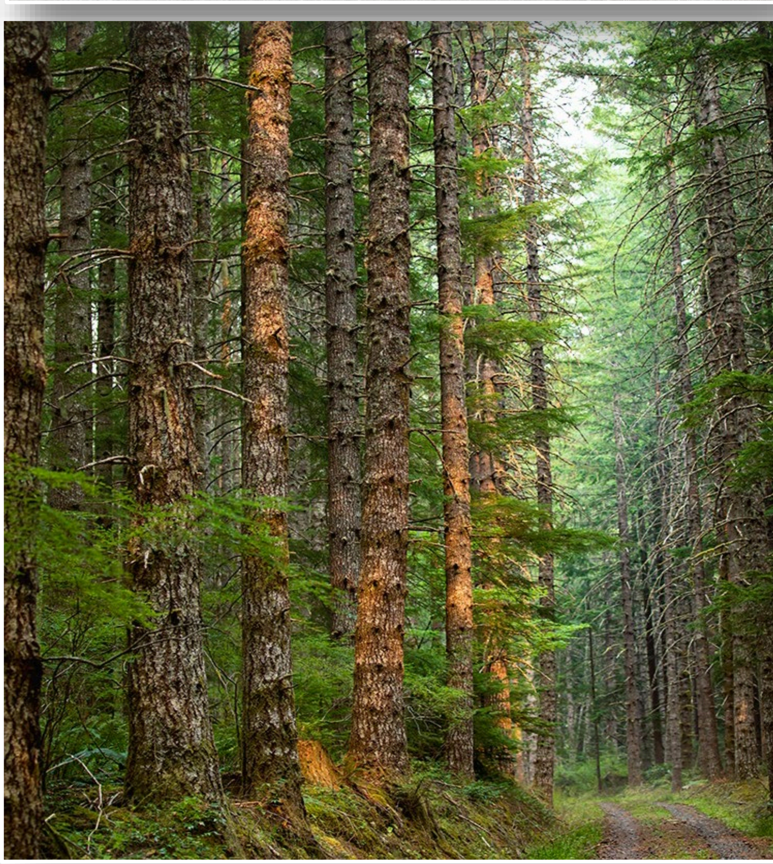
PORT BLAKELY

SUSTAINABLE NORTHWEST

Environmental Product Declaration for

Douglas-fir Solid Sawn Timbers



ASTM Certified Environmental Product Declaration

PROGRAM OPERATOR	ASTM International 100 Barr Harbor Drive PO Box C700 West Conshohocken, PA, 19428-2959 USA www.astm.org	ASTM INTERNATIONAL Helping our world work better
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	ASTM Program Operator Rules. Version: 8.0, Revised 04/29/20	
DECLARATION OWNER	Sustainable Northwest 233 SW Naito Parkway, Suite 200 Portland, OR 97204	SUSTAINABLE NORTHWEST
DECLARATION NUMBER	EPD 1175	Sustainable Northwest Douglas-Fir Solid Sawn Timbers
DECLARED PRODUCT	Douglas-fir Solid sawn timbers	
DECLARED UNIT	One cubic meter (1 m^3) of Douglas-fir Solid sawn timbers	
REFERENCE PCR AND VERSION NUMBER	ISO 21930:2017 Sustainability in Building and Civil Engineering works – Core Rules for environmental Product Declaration of Construction Products and Services. [9] UL Environment: Product Category Rules for Building-Related Products and Services Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report, v4.0 2022 [14] Part B: Structural and Architectural Wood Products EPD Requirements, v1.1 2020 [15]	
DESCRIPTION OF PRODUCT'S INTENDED APPLICATION AND USE	Douglas-fir solid sawn timbers are used in building construction (residential and commercial).	
MARKETS OF APPLICABILITY	Construction Sector,	
DATE OF ISSUE	May 15, 2026	
PERIOD OF VALIDITY	5 years	
EPD TYPE	Industry Average	
EPD SCOPE	Cradle to gate	
YEAR OF REPORTED MANUFACTURER PRIMARY DATA	2023	
LCA SOFTWARE	SimaPro v10.2	
LCI DATABASES	USLCI [11], Ecoinvent 3.11 [3], Datasmart 2023 [10]	

LCIA METHODOLOGY	TRACI 2.2 v1.0 [5], CML-IA Baseline V3.11, CED, LHV 1.01
THE SUB-CATEGORY PCR REVIEW WAS CONDUCTED BY:	Dr. Thomas Gloria (chair) t.gloria@industrial-ecology.com
LCA AND EPD DEVELOPER This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	The Consortium for Research on Renewable Industrial Materials (CORRIM) PO Box 2432 Corvallis, OR 97330 541-231-2627 www.corrim.org CORRIM Consortium for Research on Renewable Industrial Materials

This declaration was independently verified in accordance with ISO 14025:2006 [8].
The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," v4.0 (2022), in conformance with ISO 21930:2017 with additional considerations from the USGBC/UL Environment Part A Enhancement (2017).

Tim Brooke, ASTM International

☐Internal ☒ External

INDEPENDENT VERIFIER This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas Gloria, Ph.D., Industrial Ecology Consultants

LIMITATIONS

- Environmental declarations from different programs (ISO 14025) may not be comparable.
- Comparison of the environmental performance of Structural and Architectural Wood Products using EPD information shall be based on the product's use and impacts at the construction works level, and therefore EPDs may not be used for comparability purposes when not considering the construction works energy use phase as instructed under this PCR.
- Full conformance with the PCR for solid sawn timber products allows EPD comparability only when all stages of a life cycle have been considered, when they comply with all referenced standards (ISO 21930:2017 §5.5), use the same sub-category Part B PCR, and use equivalent scenarios with respect to construction works. However, variations and deviations are possible. It should be noted that different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared.

Description of Industry

The industry for solid sawn timbers in the Pacific Northwest (PNW) is centered around the production of high-quality Douglas-fir (*Pseudotsuga menziesii*) timbers. Manufacturers in the region represent a subset of the lumber and wood products manufacturing industry, who produce smaller volumes of a wider array of products than a typical high production sawmill focused on dimension lumber. These "cutting mills" are order-driven facilities that focus on the manufacture of both structural and appearance grade products including beams, stringers, posts, bridge timbers, industrial lumber, transmission crossarms, and more. A majority of their products require logs 16" and larger on the small end, from which both the primary products and a collection of secondary products are sawn. These mills are also the primary consumers of logs 20" and larger, as their product offerings and mill design are well suited to utilization and processing large logs.

The raw material supply side of this industry includes public, private, and tribal forestlands. Due to the larger piece sizes required, forests supplying cutting mills with logs for timbers are often managed on rotations between 50-80 years, or using silvicultural practices specifically aimed at increasing the number of large diameter trees. The representative sample included a mix of ground-based and cable harvest systems as well as a cross section of efficiencies driven by site conditions. Allocations between sites were based on the weighted average of logs with a top diameter of 16 inches or greater as those trees typically become solid sawn timbers. The primary data derived from stands that produced these solid sawn timbers accurately portray the likely impacts from PNW Douglas-fir forests managed on these longer rotations.

The solid sawn timber producers in the region are estimated to produce 69 million board feet (MMBF) in 2023. Participating facilities produced a total of 18.5 MMBF of Douglas-fir solid sawn timbers in 2023 with a production high of 14.5 and a low of 4.0 MMBF. The weighted average was 12.2 MMBF (124,649 m^3) representing 18 percent of the region's solid sawn timber production. All facilities represented in this EPD obtain a percent of their logs from Port Blakely.

Description of Product

Solid sawn timbers are defined in the American Softwood Lumber Standard as "lumber of nominal 5-inch or greater in least dimension." This document extends that definition to include some 4-inch products, primarily due to the intended end use. Timbers are offered in both kiln dried (KD) (15% moisture content (MC)) and green conditions (>30% MC) representing 34 and 66 percent, respectively. Kiln dried timbers provide increased stability and reduced risk of warping, making them ideal for exposed architectural uses such as hotel lobbies, lodges, schools, and homes requiring high-quality finishes. Green timbers, with their higher moisture content, are often preferred for outdoor applications or situations where additional drying will occur on site. Douglas-fir timbers are valued for their strength, durability, and aesthetic appeal, supporting a wide array of uses from traditional timber frame construction, to clear finish boards, specialty architectural components, and industrial applications like dunnage, scaffolding, and bridge components.

Cutting mills that produce timbers make a range of wood products in dimensions from 1-inch to 12-inch and greater dimensions. This EPD includes production of products with dimensions nominal 4- by 6-inch and greater. Examples of solid sawn timber sizes could range from 4x6, 6x6, 6x8, 6x12, 8x8, and larger. Other products (dimension lumber and posts) and by-products are also made at solid sawn timber producing facilities. By-products might include bark, chips, sawdust, shavings, and general wood waste.

Timbers are categorized by United Nations Standard Products and Services Code (UNSPSC) and Construction Specifications Institute (CSI) codes for solid sawn timber construction and large, solid components such as beams, columns, and trusses (Table 1).

Table 1. United Nations Standard Products and Services Code (UNSPSC) and Construction Specification Institute (CSI) MasterFormat Code for Douglas-fir Solid Sawn Timbers

Classification Standard	Category	Subcategory	Product Code
UNSPSC	Heavy Timber Construction	Wood Structural Products	30103200
		Wood Structural Framing	30103600
CSI	Large , solid components (beams, column, trusses)	Heavy Timber Construction	06 13 00
		Heavy Timber Framing	06 13 23
		Heavy Timber Trusses	06 13 26

In addition to drying, timbers may be offered as Free of Heart Center (FOHC), Boxed Heart (BH), or Heart Center (HC), with the latter two being one in the same. Timbers specified as FOHC are sawn in a way that excludes the pith, or heart, of the tree. This allows moisture escaping the wood fiber to move in two directions instead of one, and results in less cracking and checking, and ultimately greater dimensional stability. In addition, FOHC timbers will often have 1-2 faces with an appearance similar to clear vertical grain (CVG), making them more visually appealing for certain applications. Boxed heart or heart center timbers have the pith centered in finished product, and are prone to a greater degree of crack, check, and twist, as they dry. The advantage of BH or HC timbers is that larger dimensions can be achieved with today's log supply, and they represent a more economical use of the log for product applications where dimensional stability and appearance are not top priorities.

Methodological Framework

The underlying LCA [13] was performed in conformance with ISO 14040/44 [6,7], ISO 21930 [9] and EN15804 [4], as well as the PCR.

Type of EPD and Life Cycle Stages

This EPD is intended to represent a product specific life cycle assessment (LCA) for Douglas-fir solid sawn timbers produced in PNW. The manufacturer provided production data, resource use, energy and fuel use, transportation distances, and onsite processing emissions. The underlying LCA [13] investigates Douglas-fir solid sawn timbers production from cradle-to-gate. Information modules included in the LCA are shown in Figure 1. This EPD includes mandatory modules A1-A3 for a cradle-to-gate analysis.

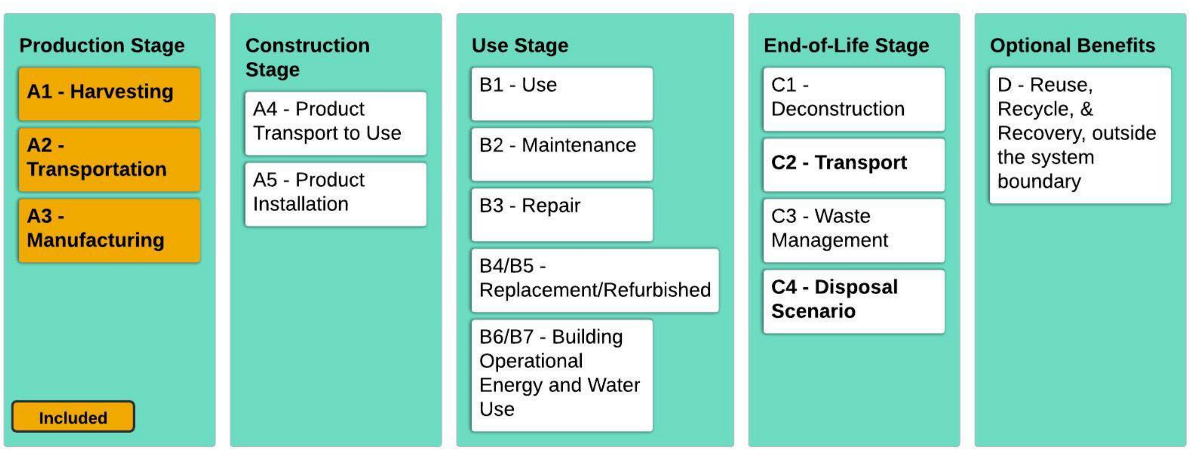


Figure 1 Description of System Boundary Modules.

System Boundaries and Product Flow Diagram

The product system described in Figure 2 includes the following information modules and unit processes:

A1 Extraction and upstream production	Included is the cradle to gate forestry operation are nursery operations, site preparation, as well as planting, fertilization, thinning and other management operations, and final harvest. This module also includes the loading of logs on a truck ready for transportation.
A2 Transport to facility	Transportation of logs from the extraction site to solid sawn timber producing facility.
A3 Manufacturing	Manufacturing Douglas-fir solid sawn timbers including packaging of product.

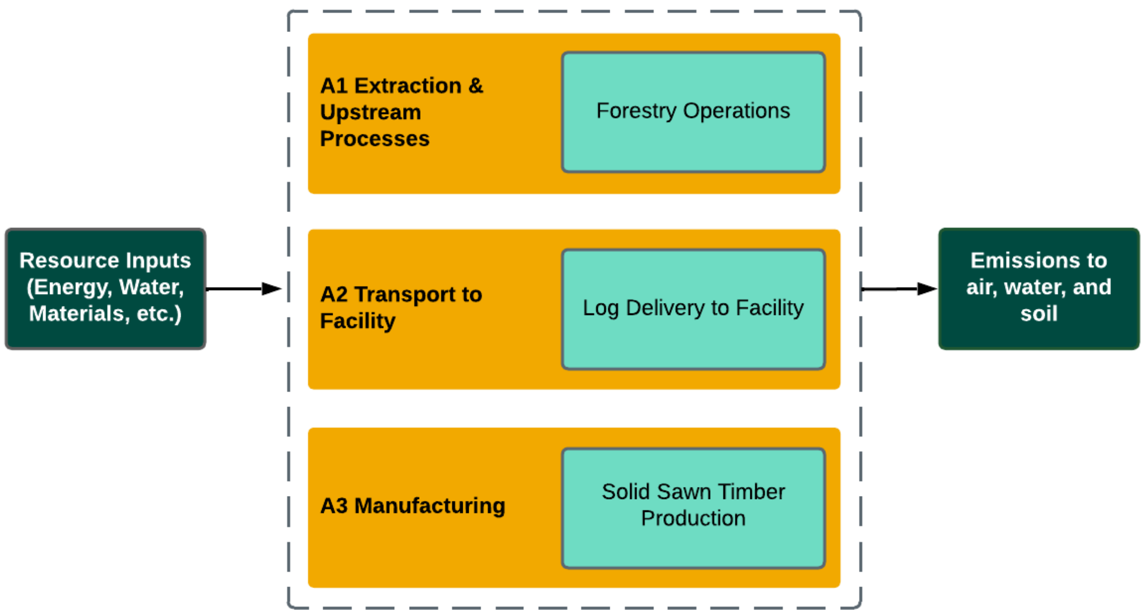


Figure 2. Cradle-to-Gate (A1-A3) System Boundary for Douglas-fir Solid Sawn Timber Production.

Declared Unit

The declared unit is the production of one cubic meter (1 m^3) of Douglas-fir solid sawn timbers produced in the Pacific Northwest. Table 2 shows the declared unit and additional product information.

Table 2. Declared Unit and Product Information

Property	Unit	Value
Mass, oven dry	kg	510.00
Moisture Content	%	15 – 64%

Allocation Methods

Allocation is the method used to partition the environmental load of a process when several products or functions share the same process. The input material for producing Douglas-fir timbers is a round log with bark. Following the PCR (UL 2022, 2020) and ISO 21930:2017, allocation is based on physical properties (e.g., mass or volume). For this study, a mass allocation was achieved for the primary product and subsequent by-products. All by-products were sold. Packaging inputs are not related to the by-products and are allocated 100% to the final product.

Cut off Criteria

The cut-off criteria for all activity stage flows considered within the system boundary conform with ISO 21930: 2017 Section 7.1.8. Specifically:

- All inputs and outputs for which data are available are included in the calculated effects and no collected core process data are excluded.
- A one percent cut-off is considered for a) renewable and non-renewable primary energy consumption and b) the total mass of inputs within a unit process. The sum of the total neglected flows does not exceed 5% of all energy consumption and mass of inputs.
- All flows known to contribute a significant impact or to uncertainty are included.
- The cut-off rules are not applied to hazardous and toxic material flows, all of which are included in the life cycle inventory.
- No material or energy input or output was knowingly excluded from the system boundary.

Data Sources

Primary and secondary data sources, as well as the respective data quality assessment, are documented in the underlying LCA project report in accordance with PCR (US 2020). Third party verified ISO [6,7,8] secondary LCI data sets contribute <20% of total impact to any of the required impact categories identified by the applicable PCR [14,15].

Treatment of Biogenic Carbon

Biogenic carbon emissions and removals are reported in accordance with ISO 21930 7.2.7. and 7.2.12. ISO 21930 requires a demonstration of forest sustainability to characterize carbon removals with a factor of -1 kg CO_2eq/kg CO_2. ISO 21930 Section 7.2.11 Note 2 states the following regarding demonstrating forest sustainability: “Other evidence such as national reporting under the United Nations Framework Convention on Climate Change (UNFCCC) can be used to identify forests with stable or increasing forest carbon stocks.” The United States UNFCCC annual report Table 6-1 provides annual NET GHG Flux Estimates for different land use categories. This report indicates non-decreasing forest carbon stocks and thus the source forests meet the conditions for characterization of removals with a factor of -1 kg CO_2eq/kg CO_2.

Environmental Parameters Derived from the LCA

The impact categories and characterization factors for the LCIA were derived from the U.S. EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts - TRACI 2.2 v1.00 [3]. The total primary energy consumption is tabulated from the LCI results based on the Cumulative Energy Demand Method (CED, LHV, v1.01) published by Ecoinvent [3]. Lower heating value of primary energy carriers is used to calculate the primary energy values reported in the study. Other inventory parameters concerning material use, waste, water use, and biogenic carbon were drawn from the LCI results. We followed the ACLCA's Guidance to Calculating non-LCIA Inventory Metrics in accordance with ISO 21930:2017 [1]. SimaPro 10.2 [12] was used to organize and accumulate the LCI data, and to calculate the LCIA results (Table 3).

Table 3. Selected Impact Category Indicators and Inventory Parameters.

Impact Indicators per ISO 21930	Abbreviation	Units	Method
Core Mandatory Impact Indicator			
Global warming potential, Total	GWP_{TOTAL}	kg CO_2 eq	$GWP_{BIOGENIC}$ + GWP_{FOSSIL}
Global warming potential, Biogenic	$GWP_{BIOGENIC}$	kg CO_2 eq	TRACI 2.2 V1.00+ LCI Indicator
Global warming potential, Fossil	GWP_{FOSSIL}	kg CO_2 eq	TRACI 2.2 V1.00
Depletion potential of the stratospheric ozone layer	ODP	kg CFC-11 eq	TRACI 2.2 V1.00
Acidification potential of soil and water sources	AP	kg SO_2 eq	TRACI 2.2 V1.00
Eutrophication potential, freshwater	EP_{FRESH}	kg P eq	TRACI 2.2 V1.00
Eutrophication potential, marine	EP_{MARINE}	kg N eq	TRACI 2.2 V1.00
Formation potential of tropospheric ozone	SFP	kg O_3 eq	TRACI 2.2 V1.00
Abiotic depletion potential (ADP fossil) for fossil resources;	ADPf	MJ, LHV	CML-IA Baseline V3.11
Use of Primary Resources			
Renewable primary energy carrier used as energy	RPRE	MJ, LHV	CED (LHV) V1.01
Renewable primary energy carrier used as material	RPRM	MJ, LHV	LCI Indicator
Non-renewable primary energy carrier used as energy	NRPRE	MJ, LHV	CED (LHV) V1.01
Non-renewable primary energy carrier used as material	NRPRM	MJ, LHV	LCI Indicator
Secondary material, secondary fuel and recovered energy			
Secondary material	SM	kg	LCI Indicator
Renewable secondary fuel	RSF	MJ, LHV	LCI Indicator
Non-renewable secondary fuel	NRSF	MJ, LHV	LCI Indicator
Recovered energy	RE	MJ, LHV	LCI Indicator
Mandatory Inventory Parameters			
Consumption of freshwater resources;	FW	m^3	LCI Indicator
Indicators Describing Waste			
Hazardous waste disposed	HWD	kg	LCI Indicator
Non-hazardous waste disposed	NHWD	kg	LCI Indicator
High-level radioactive waste, conditioned, to final repository	HLRW	m^3	LCI Indicator
Intermediate- and low-level radioactive waste, conditioned, to final repository	ILLRW	m^3	LCI Indicator
Components for re-use	CRU	kg	LCI Indicator
Materials for recycling	MR	kg	LCI Indicator
Materials for energy recovery	MER	kg	LCI Indicator
Recovered energy exported from the product system	EE	MJ, NCV	LCI Indicator
Additional Inventory Parameters for Transparency			
Biogenic Carbon Removal from Product	BCRP	kg CO2e	Manual
Biogenic Carbon Emission from Product	BCEP	kg CO2e	Manual
Biogenic Carbon Removal from Packaging	BCRK	kg CO2e	Manual
Biogenic Carbon Emission from Packaging	BCEK	kg CO2e	Manual
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	BCEW	kg CO2e	Manual

Life Cycle Impact Assessment Results

Tables 4-6 present the cradle-to-gate (A1-A3) LCIA and LCI parameter results for the declared unit of one m^3 of Douglas-fir timbers. No permanent carbon storage is included in the cradle-to-gate (A1-A3) results. As a result, the biogenic carbon balance for the cradle-to-gate portion of the life cycle is net neutral. Cradle-to-gate results for Douglas-fir timbers on a relative basis are presented in Tables 7-9 and Figure 3.

Table 4. Cradle-to-Gate LCIA Results for 1 m^3 of Douglas-fir Solid Sawn Timbers – Absolute Basis.

Core Mandatory Impact Indicator	Total	A1	A2	A3
GWP_{TOTAL} [kg CO_2 eq]	44.45	(1,402.02)	7.79	1,438.68
$GWP_{BIOGENIC}$ [kg CO_2 eq]	0.00	(1,408.77)	0.00	1,408.77
GWP_{FOSSIL} [kg CO_2 eq]	44.45	6.75	7.79	29.91
ODP [kg CF-11eq]	4.73E-08	2.54E-08	7.17E-09	1.47E-08
AP [kg SO_2 eq]	0.1992	0.0995	0.0431	0.0566
EP_{FRESH} [kg P eq]	0.0021	0.0001	0.0001	0.0019
EP_{MARINE} [kg N eq]	0.0499	0.0261	0.0104	0.0134
SFP [kg O_3 eq]	5.79	2.98	1.24	1.57
ADP_{FOSSIL} [MJ, LHV]	605.01	84.73	97.86	422.43

Table 5. Cradle-to-Gate Resource use Results for 1 m^3 of Douglas-fir Solid Sawn Timbers – Absolute Basis.

Use of Primary Resources	Total	A1	A2	A3
RPRE [MJ, LHV]	28.61	0.40	0.21	28.00
RPRM [MJ, LHV]	10,659.00	10,659.00	0.00	0.00
NRPRE [MJ, LHV]	621.16	86.09	99.28	435.79
NRPRM [MJ, LHV]	0.00	0.00	0.00	0.00
SM [kg]	0.00	0.00	0.00	0.00
RSF [MJ, LHV]	0.00	0.00	0.00	0.00
NRSF [MJ, LHV]	0.00	0.00	0.00	0.00
RE [MJ, LHV]	0.00	0.00	0.00	0.00
FW [m^3]	0.0320	0.0070	0.0008	0.0243

Table 6. Cradle-to-Gate Output Flows for 1 m^3 of Douglas-fir Solid Sawn Timbers – Absolute Basis.

Indicators Describing Waste	Total	A1	A2	A3
HWD [kg]	1.45E-02	5.48E-03	8.49E-04	8.13E-03
NHWD [kg]	5.24E+00	1.98E+00	8.10E-01	2.45E+00
HLRW [m^3]	1.27E-08	5.95E-11	0.00E+00	1.26E-08
ILLRW [m^3]	1.29E-07	8.85E-09	4.64E-09	1.15E-07
CRU [kg]	0.00	0.00	0.00	0.00
MR [kg]	0.00	0.00	0.00	0.00
MER [kg]	0.00	0.00	0.00	0.00
EE [MJ, LHV]	0.00	0.00	0.00	0.00

Table 7. Cradle-to-Gate LCIA Results for 1 m^3 of Douglas-fir Solid Sawn Timbers – Relative Basis.

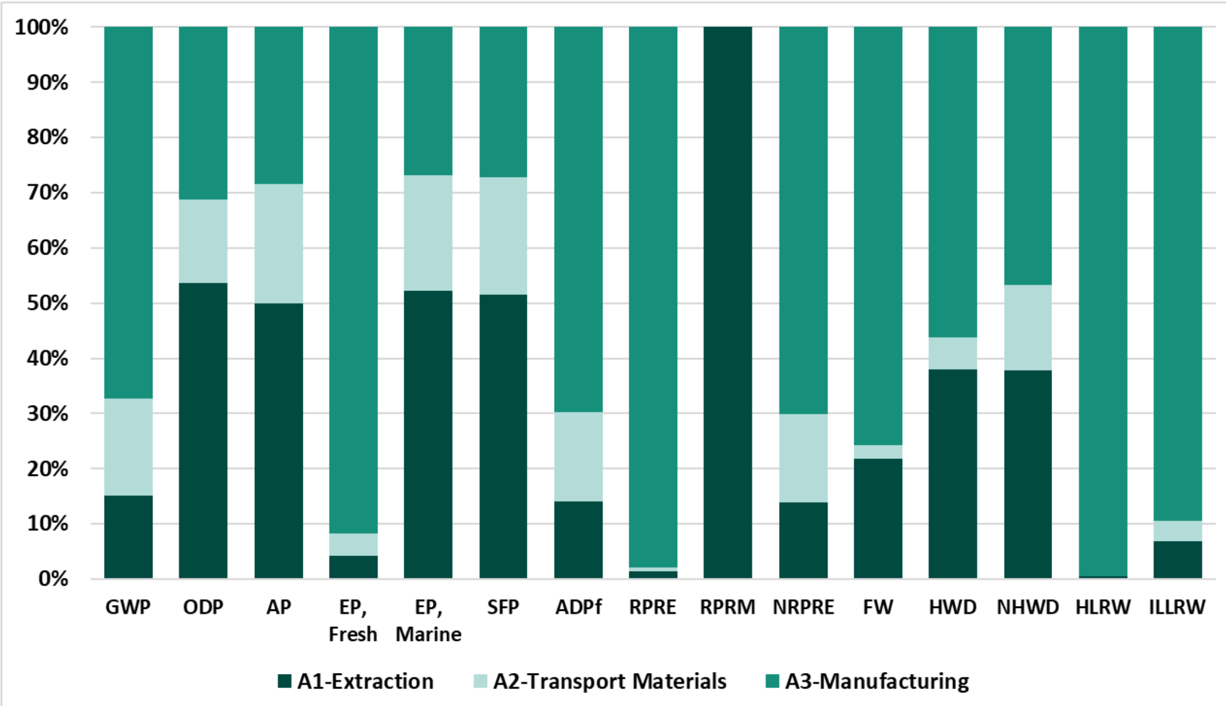
Core Mandatory Impact Indicator	Total	A1	A2	A3
GWP_{FOSSIL} [kg CO_2 eq]	100%	15.2%	17.5%	67.3%
ODP [kg CF-11eq]	100%	53.7%	15.2%	31.2%
AP [kg SO_2 eq]	100%	50.0%	21.6%	28.4%
EP_{FRESH} [kg P eq]	100%	4.3%	3.9%	91.8%
EP_{MARINE} [kg N eq]	100%	52.2%	20.8%	26.9%
SFP [kg O_3 eq]	100%	51.4%	21.4%	27.1%
ADP_{FOSSIL} [MJ, LHV]	100%	14.0%	16.2%	69.8%

Table 8. Cradle-to-Gate LCIA Results for 1 m^3 of Douglas-fir Solid Sawn Timbers – Relative Basis.

Use of Primary Resources	Total	A1	A2	A3
RPRE [MJ, LHV]	100%	1.4%	0.7%	97.9%
RPRM [MJ, LHV]	100%	100.0%	0.0%	0.0%
NRPRE [MJ, LHV]	100%	13.9%	16.0%	70.2%
NRPRM [MJ, LHV]	0.0%	0.0%	0.0%	0.0%
FW [m^3]	100%	21.8%	2.5%	75.8%

Table 9. Cradle-to-Gate LCIA Results for 1 m^3 of Douglas-fir Solid Sawn Timbers – Relative Basis.

Indicators Describing Waste	Total	A1	A2	A3
HWD [kg]	100%	37.9%	5.9%	56.2%
NHWD [kg]	100%	37.8%	15.4%	46.8%
HLRW [m^3]	100%	0.5%	0.0%	99.5%
ILLRW [m^3]	100%	6.9%	3.6%	89.5%



GWP	Global warming potential	RPRM	Renewable primary energy carrier used as material
ODP	Depletion potential of the stratospheric ozone layer	NRPE	Non-renewable primary energy carrier used as energy
AP	Acidification potential of soil and water sources	NRPRM	Renewable primary energy carrier used as material
EP_{FRESH}	Freshwater Eutrophication potential	FW	Consumption of freshwater resources
EP_{MARINE}	Marine Eutrophication potential	HWD	Hazardous waste disposed of
SFP	Formation potential of tropospheric ozone	NHWD	Non-hazardous waste disposed of
ADPf	Abiotic depletion potential (ADP fossil) for fossil resource	HLRW	High-level radioactive waste, conditioned, to final repository
RPRM	Renewable primary energy carrier used as energy	ILLRW	Intermediate- and low-level radioactive waste, conditioned, to final repository

Figure 3. Cradle-to-Gate LCIA Results for 1 m^3 of Douglas-fir Solid Sawn Timbers – Relative Basis.

Biogenic Carbon Results

Cradle-to-Gate Results

Wood is a biobased material and thus contains biogenic carbon. The accounting of biogenic carbon follows the requirements set out in ISO 21930:2017 where biogenic carbon enters the product system (removal) as a primary or secondary material. Carbon removal is considered a negative emission. The biogenic carbon leaves the system (emission) as a product, by-products, or directly to the atmosphere when combusted for heat energy. These mass flows of biogenic carbon from and to nature are listed in the LCI and are expressed in kg CO_2.

Table 10 shows the biogenic carbon removal and emissions. All carbon dioxide flows (kg CO_2) presented in Table 10 are unallocated to include products and by-products leaving the system boundary in module A3. Module A3 includes long-lived products (dimension lumber, 18%) and by-products such as bark, chips, and sawdust, 22%). Even though the system boundary for this LCA only includes module A1-A3, in accordance with ISO 21930, emission from packaging (BCEK) is reported in A5-Construction and emission from the main product (BCEP) is reported in C3/C4-End-of-Life[1]. The net carbon emission across the cradle-to-gate life cycle is zero. It is assumed that all carbon removed from the atmosphere is eventually emitted to the atmosphere as CO_2.

Table 10. Biogenic Carbon Inventory Parameters for 1 m^3 of Douglas-fir Solid Sawn Timbers, Unallocated.

	A1	A2	A3	A5	C3/C4	Total
BCRP [kg CO_2]	(1,408.77)	0.00	0.00	0.00	0.00	(1,408.77)
BCEP [kg CO_2]	0.00	0.00	473.77	0.00	935.18	1,408.77
BCRK [kg CO_2]	0.00	0.00	(5.50)	0.00	0.00	(5.50)
BCEK [kg CO_2]	0.00	0.00	0.00	5.50	0.00	5.50
BCEW [kg CO_2]	0.00	0.00	0.00	0.00	0.00	0.00

Cradle-to-Grave Results

The product system represented in this EPD includes the information modules 'A1 Extraction and upstream production', 'A2 Transport to factory' and 'A3 Manufacturing'. As per ISO 21930, the net biogenic carbon emissions across the reported modules are zero (carbon neutral). This conservative assumption excludes the permanent sequestration of biogenic carbon if the LCA were to consider the typical end-of-life treatment for wood products, landfilling.

UL Environment published an addendum to the reference PCR that estimates the emissions from landfilling of wood products (UL 2020 Appendix A). The carbon sequestration addendum is based on the United States EPA WARM model and aligns with the biogenic accounting rules in ISO 21930 Section 7.2.7 and Section 7.2.12. Because the end-of-life fate of this material is unknown, we have applied the default disposal pathway from the PCR Part A (UL 2022) Section 2.8.5, 100% landfill.

---

[1] These products are reported in modules outside the scope of this LCA system boundary to provide reference for EoL waste and emissions if a full cradle-to-grave LCA were to be performed.

The following results apply the addendum methodology (UL 2020 Appendix A) to the biogenic carbon present in the primary product as it leaves the manufacturer in Module A3[2].

1 m^3 Wood Timbers = 510 oven dry kg = 255 kg carbon = 935 kg CO_2 eq

Carbon sequestered in product at manufacturing gate:
935 kg CO_2 eq = -935 kg CO_2 eq

Methane emitted from fugitive landfill gas:
1.80 kg CH_4 = 45.10 kg CO_2 eq emission[3]

Carbon dioxide emitted from fugitive landfill gas and the combustion captured landfill gas:
105.06 kg CO_2 eq emission[4]

Permanent carbon sequestration, net of biogenic carbon emissions:
784.84 kg CO_2 eq = -784.84 kg CO_2 eq emission[5]

[2] Background assumptions for EoL and 100% Landfill: methane emission = 3.53E-03 kg CH4/kg dry wood; carbon dioxide emission = 2.06E-01 kg CO2/kg dry wood (UL 2020).
[3] Methane emissions= 3.53E-03 kg CH4/kg of dry wood X 510 kg of dry wood = 1.80 kg CH4; kg CO2 eq = 1.80kg CH4 X 25.05 kg CH4/kg CO2 eq = 45.10 kg CO2 eq
[4] Carbon dioxide emissions= 2.06E-01 kg CO2/kg of dry wood X 510 = 105.06 kg CO2
[5] Final sequestration, net of biogenic emissions = CO2 eq in product at gate = 935 – (45.10 + 105.06) = 784.84 kg CO2 eq

LCA Interpretation

Comparability

Environmental declarations from different programs [8] may not be comparable. Comparison of the environmental performance using EPD information shall consider all relevant information modules over the full life cycle of the products within the building. This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 §5.5 are met. In addition, to be compared, EPDs must comply with the same core and sub-category PCRs (Part A and B) and include all relevant information modules. It should be noted that different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared.

Limitations

This LCA was created using manufacturer average data for upstream materials. Variation can result from differences in supplier locations, manufacturing processes, manufacturing efficiency, and fuel type used. This LCA does not report all of the environmental impacts due to manufacturing of the product but rather reports the environmental impacts for those categories with established LCA-based methods to track and report. Unreported environmental impacts include (but are not limited to) factors attributable to human health, land use change, and habitat destruction. In order to assess the local impacts of product manufacturing, additional analysis is required.

Additional Environmental Information

According to ISO 21930 section 9.6, a manufacturer is required to report hazardous and/or dangerous substances. Under this EPD for Douglas-fir solid sawn timber, no substances apply.

Pacific Northwest Douglas-fir solid sawn timber facilities obtain their wood fiber from sources that are legally and sustainably sourced. Participating facilities reported Fiber Sourcing data for the three sourcing categories established in ASTM-D7612: Standard Practice for Categorizing Wood and Wood-Based Products According to Their Fiber Sources [2]. The standard provides criteria for differentiating wood products into three categories:

1. Non-controversial Sources of Forest Products,
2. Responsible Sources of Forest Products, and
3. Certified Sources of Forest Products.

Fiber from non-controversial, or legal, sources are from geographic areas with a low risk of illegal activity and are compliant with legal or other proprietary standards. Products from responsible sources are produced with wood fiber acquired according to an independently certified procurement standard or are from jurisdictions with regulatory or quasi-regulatory programs to implement best management practices. Independently certified procurement standards include FSC Controlled Wood and SFI Fiber Sourcing. To qualify for either standard, a lumber mill must have a system in place that verifies their logs are coming from areas in compliance with forestry best management practices to protect air and water quality and ensure all fiber comes from known and legal sources. Products from certified sources are independently certified to an internationally recognized forest management certification standard, such as those from the Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC), Programme for the Endorsement of Forest Certification (PEFC), American Tree Farm System (ATFS), or the Canadian Standards Association (CSA).

The facilities represented in this regional LCA reported, have 100 percent of the fiber entering their mills to be non-controversial (legal), responsible, and independently certified forests.

Forest Management

While this EPD does not address landscape level forest management impacts that influence forest carbon, wildlife habitat, endangered species, and soil and water quality, these potential impacts may be addressed through requirements put forth in regional regulatory frameworks, ASTM 7612-21 guidance, and ISO 21930 Section 7.2.11 including notes therein. These documents, combined with this EPD, may provide a more complete picture of environmental and social performance of wood products.

A representative sample of primary production data used to generate the Forestry LCA (A1) were provided by Port Blakely Timber Company. These data reflect the type of forest management that is required to grow the feedstock of sufficient size to create solid sawn timber products within an acceptable time frame. Key **Photo Credit New Energy Works** parameters that make these timberlands uniquely suited for production of large diameter high-quality Douglas-fir include:

- forests are managed almost exclusively on even-aged rotations;
- sites are highly productive for the growth of Douglas-fir;
- the time from planting to final harvest (rotation age) averages around 55 years or more.

Managed Douglas-fir forests in the PNW typically reaches minimum merchantable size suitable for dimension lumber at around age 30, and many land managers across the region choose to harvest anywhere from age 35-45. There are many benefits of growing trees for an additional 15-25 years which produces the larger logs that are necessary for solid sawn timbers represented in this EPD. Additional benefits include having improved visual characteristics due to greater ring count, and improved strength characteristics from the higher proportion of mature wood.

Scope of the EPD

EPDs can complement but cannot replace tools and certifications that are designed to address environmental impacts and/or set performance thresholds, e.g., Type 1 certifications, health assessments, and declarations, etc.

Data

National or regional life cycle averaged data for raw material extraction does not distinguish between extraction practices at specific sites and can greatly affect the resulting impacts.

Accuracy of Results

EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any product line and reported impact when averaging data.

References

1. American Center for Life Cycle Assessment. 2019/ ACLCA Guidance to Calculating Non-LCIA Inventory Metrics in Accordance with ISO 21930:2017.
2. ASTM Standard D7612-21. 2021. “Standard Practice for Categorizing Wood and Wood-Based Products According to Their Fiber Sources.” ASTM International, West Conshohocken, PA, 2021. DOI: 10.1520/D7612-21.
3. Ecoinvent. 2025. Ecoinvent Database v 3.11 . Documentation of changes implemented in the Ecoinvent database v3.11. Ecoinvent Database_v311. (Accessed February 2026). 201 pp.
4. EN 15804. 2012. Sustainability of construction works, Environmental product declaration, Core rules for the product category of construction products. 47 pp.
5. Henderson, A.D., B. Niblick, H.E. Golden, and J.C. Bare. 2021. Modeling spatially resolved characterization factors for eutrophication potential in life cycle assessment. Int J of Life Cycle Assess, 26: 1832 – 1846.
6. International Organization for Standardization ISO. 2006a. Environmental management—Life-cycle assessment—Requirements and guidelines. ISO 14044:2006/Amd1:2017/Amd:2:2020. International Organization for Standardization, Geneva, Switzerland. 46 pp/8 pp/12 pp/.
7. International Organization for Standardization ISO. 2006b. Environmental management—Life-cycle assessment—Principles and framework. ISO 14040. International Organization for Standardization, Geneva, Switzerland. 14040:2006/Amd1:2020. 20 pp/8 pp.
8. International Organization for Standardization ISO. 2006c. Environmental labels and declarations—Type III environmental declarations—Principles and procedures. ISO 14025. International Organization for Standardization, Geneva, Switzerland. 25 pp.
9. International Organization for Standardization ISO. 2017. Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services. International Organization for Standardization. Second edition (ISO 21930:2017-07) 80pp.
10. LTS. 2023. DataSmart: DataSmart. (Accessed February 2026).
11. National Renewable Energy Laboratory. 2023. U.S. Life Cycle Inventory Database US LCI Database. (Accessed February 2026).
12. Pré Consultants, B.V. 2023. SimaPro 10.2 Life-Cycle Assessment Software Package. Plotter 12, 3821 BB Amersfoort, The Netherlands. Http://www.pre.nl/.
13. Puettmann, M. and E. Oneil. 2026. Life Cycle Assessment of Douglas-fir Solid Sawn Timber Production – Pacific Northwest, CORRIM Report. February 2026. 32pp.
14. UL. 2022. Product Category Rules for Building-Related Products and Services - Part A: Life Cycle Assessment Calculation Rules and Report Requirements, UL 10010, v 4.0.
15. UL. 2020. Product Category Rule Guidance for Building-Related Products and Services, Part B: Structural and Architectural Wood Products, EPD Requirements UL 10010-9 v.1.1.