ARBOR WOOD Co
THERMALLY MODIFIED WOOD

Environmental Product Declaration

Environmental Product Declaration for Thermally Modified Wood Products produced by Arbor Wood Co at their St. Joe, Indiana facility

ADMINISTRATIVE INFORMATION

International Certified Environmental Product Declaration

Declared Product:	This Environmental Product Declaration (EPD) covers thermally modified wood products produced by Arbor Wood Co. Declared unit: 1 m3 of Thermally Modified Wood
Declaration Owner:	Arbor Wood Co
	1025 London Road
	Duluth, MN
	www.arborwoodco.com
Program Operator:	Labeling Sustainability
	11670 W Sunset Blvd.
	Los Angeles, CA 90049
	www.labelingsustainability.com
Product Category Rule:	ISO 21930:2017 Sustainability in buildings and civil engineering works Core rules for environmental product declarations of construction products and services
	PCR Program Operator: International Organization for Standardization
	PCR review was conducted by: Technical Committee: ISO/TC 59/SC 17 Sustainability in buildings and civil engineering works
Independent LCA Reviewer and EPD Verifier:	This declaration was independently verified in accordance with ISO 14025:2006.
	Independent verification of the declaration, according to ISO 14025:2006
	Internal ☐ ; External ☐ X
	Third Party Verifier
	Denice V. Staaf Certified 3rd Party Verifier under the Labeling Sustainability Program (www.labelingsustainability.com)
Date of Issue:	08 April 2025
Period of Validity:	5 years; valid until 08 April 2030
EPD Number:	ARWOCO04022500

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COMPANY DESCRIPTION

Arbor Wood Co. produces thermally modified wood for a variety of outdoor and indoor applications including siding, decking, and architectural millwork. Our process starts by using domestically sourced and responsibly harvested wood which is thermally modified using only heat and steam. The result is a high-quality, performance-driven material, which sustains the natural beauty and design element of wood all without the use of harsh chemicals.

STUDY GOAL

The intended application of this life cycle assessment (LCA) is to comply with the procedures for creating a Type III environmental product declaration (EPD) and publish the EPD for public review on the website, www.labelingsustainability.com. This level of study is in accordance with EPD Product Category Rule (PCR) for Thermally Modified Wood published by; International Standards Organization (ISO) 14025:2006 Environmental labels and declarations, Type III environmental declarations-Principles and procedures; ISO 14044:2006 Environmental management, Life cycle assessment- Requirements and guidelines; and ISO 14040:2006 Environmental management, Life cycle assessment-Principles and framework. The performance of this study and its subsequent publishing is in alignment with the business-to-business (B2B) communication requirements for the environmental assessment of building products. The study does not intend to support comparative assertions and is intended to be disclosed to the public.

This project report was commissioned to differentiate Arbor Wood Co from their competition for the following reasons: generate an advantage for the organization; offer customers information to help them make informed product decisions; improve the environmental performance of Arbor Wood Co by continuously measuring, controlling and reducing the environmental impacts of their products; help project facilitators working on Leadership in Energy and Environmental Design (LEED) projects achieve their credit goal; and to strengthen Arbor Wood Co's license to operate in the community. The intended audience for this LCA report is Arbor Wood Co's employees, their suppliers, project specifiers of their products, architects, and engineers. The EPD report is also available for policy makers, government officials interested in sustainability, academic professors, and LCA professionals. This LCA report does not include product comparisons of other facilities.

.DESCRIPTION OF PRODUCT AND SCOPE

The table below provides the specifications of the products covered in the study.

Table 1: **Products Specifications**

Parameter	Unit	Value
Length	m	Various Dimensions
Width	in	1.5 - 11.25

Thickness	mm	19.05 - 85.725
Moisture content	%	0
Modified density at moisture 0%	-	-
Ash	kg/m3	638.26
Douglas Fir	kg/m3	514.25
Poplar	kg/m3	399.97
Red Oak	kg/m3	704.71
Southern Yellow Pine	kg/m3	514.25

This LCA assumes the impacts from products manufactured in accordance with the standards outlined in this report. This LCA is a cradle-to-gate study.

THERMALLY MODIFIED WOOD DESIGN SUMMARY

The following tables provide a list of the thermally modified wood products considered in this EPD along with key performance parameters.

Table 2: **Declared products with All declared products considered in this environmental product declaration**

Prod#	Unique name/ID	Short description	Product type	Unit	Density, dry kg/Unit	bio-carbon content, kg C/FU dry basis	productGroup
1	Ash Decking	Ash Decking – Standard, Narrow, Narrow Short, and Short	Thermally Modified Wood	m3	0.00107036	0.00054	Solid Wood
2	Ash Dimensional	Ash Dimensional – Standard and Short	Thermally Modified Wood	m3	0.00107036	0.00054	Solid Wood
3	Ash Siding	Ash Siding – Custom, Narrow, Short, and Narrow Short	Thermally Modified Wood	m3	0.00107036	0.00054	Solid Wood

4	Modified Rough Ash	Modified Rough Ash – Standrad	Thermally Modified Wood	m3	0.00107036	0.00054	Solid Wood
5	Douglas Fir Dimensional	Douglas Fir Dimensional – Standrad	Thermally Modified Wood	m3	0.00085629	0.00043	Solid Wood
6	Poplar Dimensional	Poplar Dimensional – Standrad	Thermally Modified Wood	m3	0.00085629	0.00043	Solid Wood
7	Poplar Siding	Poplar Siding – Standrad	Thermally Modified Wood	m3	0.00085629	0.00043	Solid Wood
8	Modified Rough Red Oak	Modified Rough Red Oak – Standrad	Thermally Modified Wood	m3	0.00085629	0.00043	Solid Wood
9	Modified Rought Southern Yellow Pine	Modified Rought Southern Yellow Pine – Standrad	Thermally Modified Wood	m3	0.00085629	0.00043	Solid Wood
10	Southern Yellow Pine Decking	Southern Yellow Pine – Standrad and Short	Thermally Modified Wood	m3	0.00085629	0.00043	Solid Wood
11	Southern Yellow Pine Dimensional	Southern Yellow Pine Dimensional – Standrad	Thermally Modified Wood	m3	0.00085629	0.00043	Solid Wood
12	Southern Yellow Pine Siding	Southern Yellow Pine Siding – Standrad	Thermally Modified Wood	m3	0.00085629	0.00043	Solid Wood

THERMALLY MODIFIED WOOD DESIGN COMPOSITION

The following figures provide mass breakdown (kg per functional unit) of the material composition of each thermally modified wood design considered.

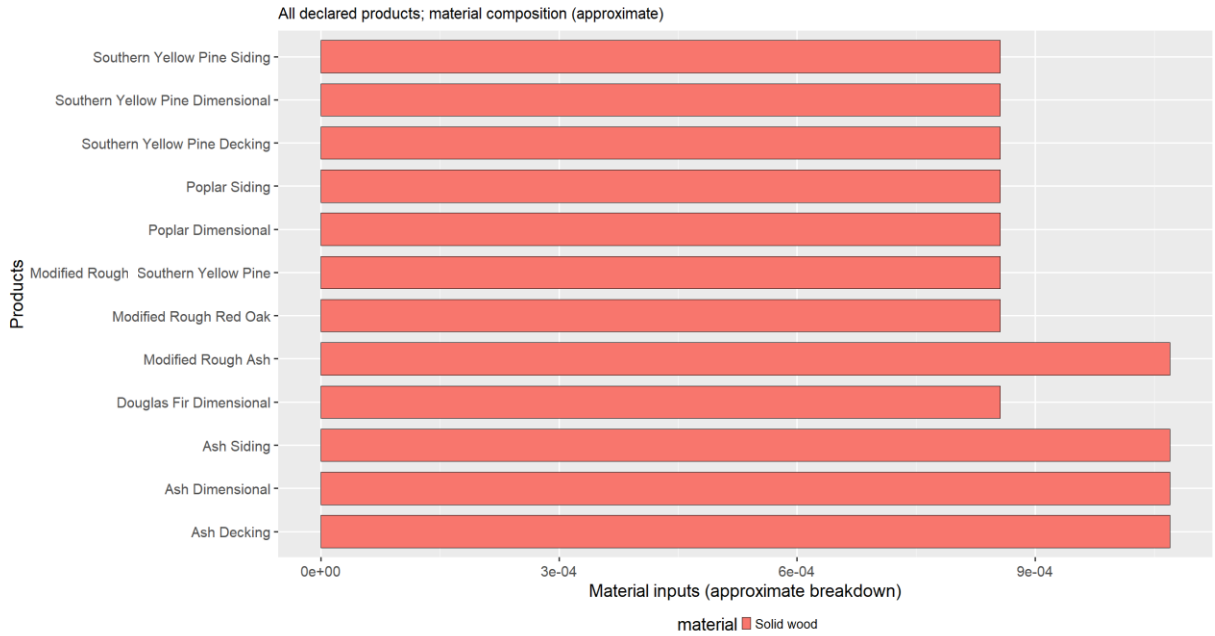

Figure 1: **Material composition - All declared products per 1 m3 of Thermally Modified Wood**

A1 RAW MATERIAL RECYCLED CONTENT AND MATERIAL LOSSES

The following table provides a list of the raw material inputs (module A1) across all products considered, their recyclability content and assumed material losses.

Table 3: **Module A1 raw material inputs, the recyclability content and assumed material losses (dry basis)**

product.name	mix.category	primary.content	post.industrial.content	post.consumer.content	material.losses
Solid wood	Hardwood lumber	100%	0%	0%	5%

SYSTEM BOUNDARIES

The following figure depicts the cradle-to-gate system boundary considered in this study:

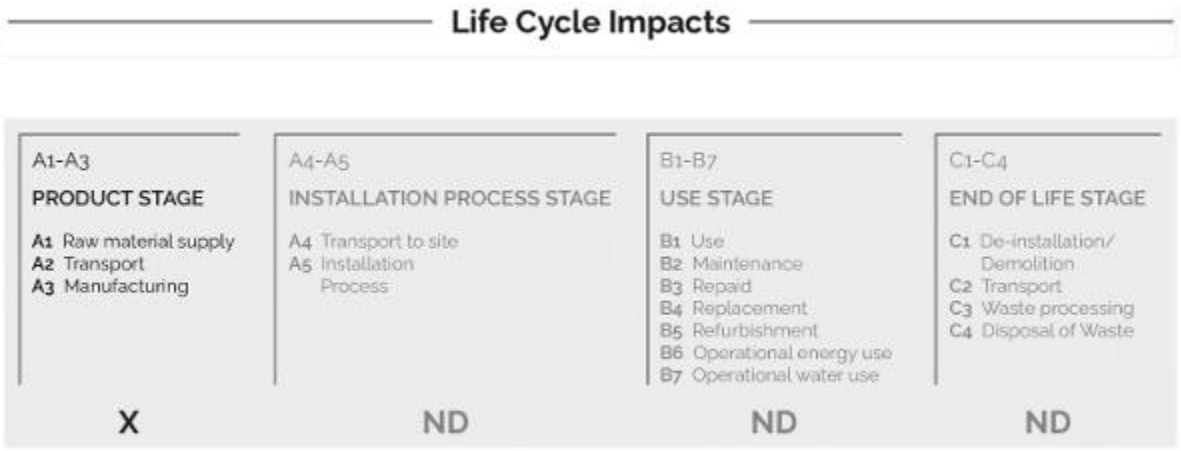

Figure 2: **General life cycle phases for consideration in a construction works system**

This is a Cradle-to-gate life cycle assessment and the following life cycle stages are included in the study:

- A1: Raw material supply (upstream processes) - Extraction, handling, and processing of the materials used in manufacturing the declared products in this LCA.
- A2: Transportation - Transportation of A1 materials from the supplier to the "gate" of the manufacturing facility (i.e. A3).
- A3: Manufacturing (core processes)- The energy and other utility inputs used to store, move, and manufacture the declared products and to operate the facility.

As according to the PCR, the following figure illustrates the general activities and input requirements for producing thermally modified wood products and is not necessarily exhaustive.

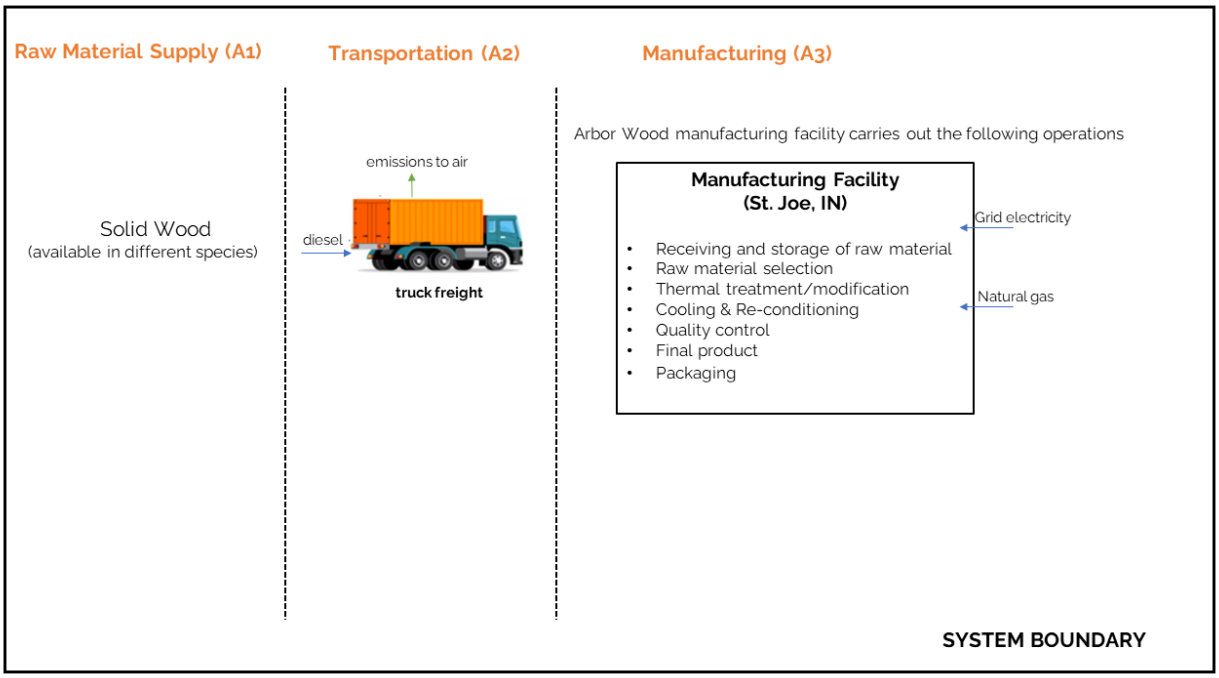

Figure 3: **General system inputs considered in the product system and categorized by modules in scope**

In addition, according to the relevant PCR, the following requirements are excluded from this study:

- Production, manufacture and construction of A3 building/capital goods and infrastructure.
- Production and manufacture of steel production equipment, steel delivery vehicles, earth-moving equipment, and laboratory equipment.
- Personnel-related activities (travel, furniture, office supplies).
- Energy use is related to company management and sales activities.

For this LCA the manufacturing plant, owned and operated by Arbor Wood Co, is located at their St. Joe facility in Indiana. All operating data is formulated using the actual data from Arbor Wood Co's plant at the above location, including water, energy consumption and waste generation. All inputs for this system boundary are calculated for the plant.

This life cycle inventory was organized in a spreadsheet and was then input into an RStudio environment where pre-calculated LCIA results for relevant products/activities stemming from the ecoinvent v3.10 database and a local EPD database in combination with primary data from Arbor Wood Co were utilized. Explanations of the contribution of each data source to this study are outlined in the section 'Data Sources and Quality. Further LCI details for each declared product are provided in the sections 'Detailed LCI tables' and 'Transport tables' of the detailed LCA report. A parameter uncertainty analysis was also performed where key statistical results (e.g. min/mean/max etc.) are provided in the detailed LCA report.

No known flows are deliberately excluded from this EPD.

CUT-OFF CRITERIA

ISO 14044:2006 and the focus PCR requires the LCA model to contain a minimum of 95% of the total inflows (mass and energy) to the upstream and core modules be included in this study. The cut-off criteria were applied to all other processes unless otherwise noted above as follows. A 1% cut-off is considered for all renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process where the total of the neglected inputs does not exceed 5%.

DATA SOURCES AND DATA QUALITY ASSESSMENT

No recovered on-site energy occurs at this facility.

No re-used or recycled material for utilization on-site or off-site was reported at this facility.

The following statements explain how the above facility requirements/generation were derived:

Raw material transport: Arbor Wood provided all primary information for the reporting year 2024, including comprehensive details on raw material consumption and logistics data for its St. Joe, IN manufacturing plant. The transportation of these materials was determined based on the actual distance from the manufacturers or distributors. Logistics for A2 requirements relied on primary data to document transportation specifics, including the exact distance, mode of transport, and location details such as city, state, and country.

Electricity: The reported electricity consumption is based on primary data from Arbor Wood's utility bills for the reporting period. The allocation of electricity was initially determined by normalizing the annual electricity consumption to the declared unit, i.e., 1 m^3. Subsequently, this value was multiplied by the total cubic meter (m^3) production for each product covered in this study.

Process/space heating: The facility incorporates natural gas within its production processes. The reported natural gas consumption is based on Arbor Wood's primary information derived from utility bills for the reporting period. The allocation methodology for natural gas consumption follows the same approach as that of electricity. The conversion factor used for mmBTU to MJ to represent the natural gas heating values in Mega joules (MJ) was, 1 mmBTU equating to 1055.055 MJ.

Fuel required for machinery: The facility does not use any on-site machinery fuel.

Waste generation: No additional waste is associated with the products, as thermally modified wood is treated exclusively with heat and steam, ensuring that no waste is generated during the process.

Recovered energy: No on-site energy is recovered on site.

Recycled/reused material/components: No recycling was considered in this cradle-to-gate study.

Module A1 material losses: Default material losses, 5%, were used.

Direct A3 emissions accounting: Direct emissions on-site were modeled with the best available ecoinvent processes (see LCI list).

The following tables depict a list of assumed life cycle inventory utilized in the LCA modeling to generate the impact results across the life cycle modules in scope. An assessment of the quality of each LCI activities utilized from various sources is also provided.

Table 4: **LCI inputs assumed for module A1 (i.e., raw material supply)**

Input	LCI.activity	Data.source	Geo	Year	Technology	Time	Geography	Reliability	Completeness
Solid wood	Hardwood lumber production, Planed, Kiln-dry/Solid wood/US/m3	ecoinvent v3.10 in 2024	Multiple States	2024	2	3	2	3	3

Table 5: **LCI inputs assumed for module A2 (i.e. transport of A1 inputs)**

Input	LCI.activity	Data.source	Geo	Year	Technology	Time	Geography	Reliability	Completeness
Plastic strap-freight transport via Truck	market for transport, freight, lorry 7.5-16 metric ton, EURO4/transport, freight, lorry 7.5-16 metric ton, EURO4/RER/tkm	ecoinvent v3.10 in 2024	RER	2024	2	3	1	3	3
Plastic wrap-freight transport via Truck	market for transport, freight, lorry 7.5-16 metric ton, EURO4/transport, freight, lorry 7.5-16 metric ton, EURO4/RER/tkm	ecoinvent v3.10 in 2024	RER	2024	2	3	1	3	3
Solid wood-freight transport via Truck	market for transport, freight, lorry 7.5-16 metric ton, EURO4/transport, freight, lorry 7.5-16 metric ton, EURO4/RER/tkm	ecoinvent v3.10 in 2024	RER	2024	2	3	1	3	3

Table 6: **LCI inputs assumed for module A3**

Input	LCI.activity	Data.source	Geo	Year	Technology	Time	Geography	Reliability	Completeness
Electricity	market for electricity, medium voltage/electricity, medium voltage/US-RFC/kWh	ecoinvent v3.10 in 2024	Indiana	2024	2	3	2	3	3
Natural gas	market for heat, district or industrial, natural gas/heat, district or industrial, natural gas/RoW/MJ	ecoinvent v3.10 in 2024	Indiana	2024	2	3	2	3	3
Plastic strap	market for extrusion, plastic film/extrusion, plastic film/GLO/kg	ecoinvent v3.10 in 2024	Indiana	2024	2	3	2	3	3
Plastic wrap	market for packaging film, low density polyethylene/packaging film, low density polyethylene/GLO/kg	ecoinvent v3.10 in 2024	Indiana	2024	2	3	2	3	3

DATA QUALITY ASSESSMENT

Data quality/variability requirements, as specified in the PCR, are applied. This section describes the data quality achieved relative to the ISO 14044:2006 requirements. Data quality is judged based on its precision (measured, calculated or estimated), completeness (e.g., unreported emissions), consistency (degree of uniformity of the methodology applied within a study serving as a data source) and representativeness (geographical, temporal, and technological).

Precision: Through measurement and calculation, the manufacturers collected and provided primary data on their annual production. For accuracy, the LCA practitioner and 3rd Party Verifier validated the plant gate-to-gate data.

Completeness: All relevant specific processes, including inputs (raw materials, energy and ancillary materials) and outputs (emissions and production volume) were considered and modeled to represent the specified and declared products. The majority of relevant background materials and processes were taken from ecoinvent v3.10 LCI datasets where relatively recent region-specific electricity inputs were utilized. The most relevant EPDs requiring key A1 inputs were also utilized where readily available.

Consistency: To ensure consistency, the same modeling structure across the respective product systems was utilized for all inputs, which consisted of raw material inputs and ancillary material, energy flows, water resource inputs, product and co-products outputs, returned and recovered Thermally Modified Wood materials, emissions to air, water and soil, and waste recycling and treatment. The

same background LCI datasets from the ecoinvent v3.10 database were used across all product systems. Cross checks concerning the plausibility of mass and energy flows were continuously conducted. The LCA team conducted mass and energy balances at the plant and selected process level to maintain a high level of consistency.

Reproducibility: Internal reproducibility is possible since the data and the models are stored and available in a machine-readable project file for all foreground and background processes, and in EPD Express proprietary Thermally Modified Wood LCA calculator for all production facility and product-specific calculations. A considerable level of transparency is provided throughout the detailed LCA report as the specifications and material quantity make-up for the declared products are presented and key primary and secondary LCI data sources are summarized. The provision of more detailed publicly accessible data to allow full external reproducibility was not possible due to reasons of confidentiality.

EPD Express has developed a proprietary tool that allows the calculation of PCR-compliant LCA results for Thermally Modified Wood product designs. The tool auto-calculates results by scaling base-unit technosphere inputs (i.e. 1 kg sand, 1 kWh electricity, etc.) to replicate the reference flow conversions in openLCA.

Representativeness: The representativeness of the data is summarized as follows.

- Time related coverage of the manufacturing processes primary collected data from 2023-08-01 to 2024-07-31.
- Upstream (background) LCI data was either the PCR specified default (if applicable) or more appropriate LCI datasets as found in the country-adjusted ecoinvent v3.10 database.
- Geographical coverage for inputs required by the A3 facility(ies) is representative of its region of focus; other upstream and background processes are based on US, North American, or global average data and adjusted to regional electricity mixes when relevant.
- Technological coverage is typical or average and specific to the participating facilities for all primary data.

ENVIRONMENTAL INDICATORS AND INVENTORY METRICS

Per the PCR, this EPD supports the life cycle impact assessment indicators and inventory metrics as listed in the tables below. As specified in the PCR, the most recent US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI), impact categories were utilized as they provide a North American context for the mandatory category indicators to be included in the EPD. Additionally, the PCR requires a set of inventory metrics to be reported with the LCIA indicators (see tables below).

Table 7: **Life cycle impact categories and life cycle inventory metrics**

ID	LCIA.indicators	Abbreviations	Units
1	Climate change: global warming potential (GWP100)	GWP	kg CO2-eq
2	Ozone depletion: ozone depletion potential (ODP)	ODP	kg CFC-11-eq
3	Acidification: acidification potential (AP)	AP	kg SO2-eq
4	Eutrophication: eutrophication potential	EP	kg N-eq
5	Smog formation potential	SFP	kg O3-eq
6	Energy resources: non-renewable: abiotic depletion potential (ADP): fossil fuels	ADPfossil	MJ
Inventory metrics			
7	Inventory indicators ISO21930: Cumulative Energy Demand - renewable energy resources	RPRE	MJ
8	Inventory indicators ISO21930: Renewable primary resources with energy content used as material (i.e., PERM)	PRM	MJ
9	Inventory indicators ISO21930: Cumulative Energy Demand - non-renewable energy resources	NRPRE	MJ
10	Inventory indicators ISO21930: Non-renewable primary resources with energy content used as material (i.e., PENRM)	NRPRM	MJ
11	Inventory indicators ISO21930: use of secondary material	SM	kg
12	Inventory indicators ISO21930: use of renewable secondary fuels	RSF	MJ
13	Inventory indicators ISO21930: recovered energy	RE	MJ
14	Inventory indicators ISO21930: use of net fresh water	FW	m3
15	Inventory indicators ISO21930: hazardous waste disposed	HWD	kg
16	Inventory indicators ISO21930: non-hazardous waste disposed	NHWD	kg
17	Inventory indicators ISO21930: high-level radioactive waste disposed	HLRW	kg
18	Inventory indicators ISO21930: intermediate and low-level radioactive waste disposed	ILLRW	kg
19	Inventory indicators ISO21930: materials for recycling	MR	kg
20	Inventory indicators ISO21930: materials for energy recovery	MER	kg
21	Inventory indicators ISO21930: exported energy - electricity	EEel	MJ
22	Inventory indicators ISO21930: exported energy - heat	EEheat	MJ

It should be noted that emerging LCA impact categories and inventory items are still under development and can have high levels of uncertainty that preclude international acceptance pending further development. Use caution when interpreting data in any of the following categories.

- Renewable primary energy resources as energy (fuel);
- Renewable primary resources as material;
- Non-renewable primary resources as energy (fuel);
- Non-renewable primary resources as material;
- Secondary Materials;
- Renewable secondary fuels;

- Non-renewable secondary fuels;
- Recovered energy;
- Abiotic depletion potential for non-fossil mineral resources.
- Land use related impacts, for example on biodiversity and/or soil fertility;
- Toxicological aspects;
- Emissions from land use change [GWP 100 (land-use change)];
- Hazardous waste disposed;
- Non-hazardous waste disposed;
- High-level radioactive waste;
- Intermediate and low-level radioactive waste;
- Components for reuse;
- Materials for recycling;
- Materials for energy recovery;
- Recovered energy exported from the product system.

TOTAL IMPACT SUMMARY

Interpretation

The EPD of Arbor Wood's consist of 4 main classifications with respect to application of thermally modified wood, focusing on stages A1-A3, highlights several key environmental impacts. The thermal modification process, which uses high heat and steam to alter the wood's cellular structure, relies heavily on natural gas, contributing 24.3% to the total impact. Electricity consumption during production also plays a significant role, accounting for 21.1% of the impact. Additionally, the transportation of solid wood via truck contributes 13% to the total impact, emphasizing the importance of efficient logistics in reducing environmental footprint. The use of domestically sourced and responsibly harvested timber reduces reliance on non-renewable resources, aligning with sustainable forestry practices. Overall, optimizing energy sources and supply chain efficiency could significantly enhance the environmental sustainability of Arbor Wood's thermally modified wood products.

Table 8: **Total life cycle (across modules in scope) impact results for All declared products, assuming the geometric mean point values on a per 1 m3 of Thermally Modified Wood basis**

a) Midpoint Impact Categories:

Indicator/LCI Metric	GWP	ODP	AP	EP	SFP	ADPfossil
Unit	kg CO2-eq	kg CFC-11-eq	kg SO2-eq	kg N-eq	kg O3-eq	MJ
Minimum	630	1.78e-05	2.03	0.833	32.4	6570
Maximum	678	1.88e-05	2.19	0.886	36.9	7230
Mean	662	1.85e-05	2.14	0.863	35.4	7010
Median	666	1.86e-05	2.15	0.867	35.8	7080
Ash Decking	630	1.78e-05	2.03	0.833	32.4	6570
Ash Dimensional	636	1.79e-05	2.05	0.838	33	6660
Ash Siding	665	1.86e-05	2.15	0.864	35.7	7050
Modified Rough Ash	646	1.82e-05	2.08	0.847	33.9	6790
Douglas Fir Dimensional	675	1.88e-05	2.18	0.886	36.3	7190

Poplar Dimensional	666	1.86e-05	2.15	0.869	35.8	7080
Poplar Siding	667	1.86e-05	2.15	0.866	35.8	7070
Modified Rough Red Oak	646	1.82e-05	2.08	0.85	33.9	6790
Modified Rough Southern Yellow Pine	678	1.88e-05	2.19	0.876	36.9	7230
Southern Yellow Pine Decking	678	1.88e-05	2.19	0.876	36.9	7230
Southern Yellow Pine Dimensional	678	1.88e-05	2.19	0.876	36.9	7230
Southern Yellow Pine Siding	678	1.88e-05	2.19	0.876	36.9	7230

b) Resource Inventory Metrics:

Indicator/LCI Metric	**RPRE**	**PRM**	**NRPRE**	**NRPRM**	**SM**	**RSF**	**RE**	**FW**
Unit	**MJ**	**MJ**	**MJ**	**MJ**	**kg**	**MJ**	**MJ**	**m3**
Minimum	19700	8530	19600	0.066	2.05	0.0243	7.39	2.26
Maximum	20000	8620	19900	18.9	2.34	0.0445	8.34	2.38
Mean	19800	8550	19700	2.91	2.24	0.0289	8.02	2.33
Median	19800	8550	19700	0.31	2.27	0.0272	8.12	2.34
Ash Decking	19800	8550	19700	0.089	2.05	0.0243	7.39	2.26
Ash Dimensional	19800	8540	19700	0.109	2.09	0.0247	7.51	2.27
Ash Siding	19800	8550	19700	0.387	2.26	0.0267	8.09	2.33
Modified Rough Ash	19800	8550	19700	0.066	2.15	0.0252	7.7	2.29
Douglas Fir Dimensional	20000	8620	19900	18.9	2.31	0.0445	8.23	2.38
Poplar Dimensional	19700	8530	19600	9.65	2.27	0.0356	8.12	2.34
Poplar Siding	19800	8540	19700	0.515	2.27	0.0269	8.12	2.33
Modified Rough Red Oak	19800	8550	19700	4.37	2.15	0.0293	7.7	2.3
Modified Rough Southern Yellow Pine	19800	8540	19700	0.264	2.34	0.0274	8.34	2.35
Southern Yellow Pine Decking	19800	8550	19700	0.181	2.34	0.0273	8.34	2.35
Southern Yellow Pine Dimensional	19800	8550	19700	0.356	2.34	0.0275	8.34	2.35
Southern Yellow Pine Siding	19800	8550	19700	0.0889	2.34	0.0272	8.34	2.35

b) Waste/Output Inventory Metrics:

Indicator/LCI Metric	HWD	NHWD	HLRW	ILLRW	MR	MER	EEel	EEheat
Unit	**kg**	**kg**	**kg**	**kg**	**kg**	**kg**	**MJ**	**MJ**
Minimum	18.9	400	0.00362	0.0141	0.0905	0.000139	4.51	2.67
Maximum	19.9	431	0.00372	0.0144	0.096	0.000157	4.69	3.46
Mean	19.5	416	0.00367	0.0142	0.094	0.00015	4.61	3.19
Median	19.6	418	0.00367	0.0142	0.0945	0.000152	4.62	3.28
Ash Decking	18.9	400	0.00362	0.0141	0.0905	0.000139	4.51	2.67
Ash Dimensional	19	403	0.00363	0.0141	0.0912	0.000141	4.53	2.77
Ash Siding	19.6	416	0.00367	0.0142	0.0943	0.00015	4.62	3.24
Modified Rough Ash	19.2	407	0.00365	0.0142	0.0922	0.000144	4.56	2.93
Douglas Fir Dimensional	19.9	431	0.00372	0.0144	0.096	0.000157	4.69	3.32
Poplar Dimensional	19.6	421	0.00367	0.0142	0.0945	0.000153	4.62	3.28
Poplar Siding	19.6	416	0.00367	0.0142	0.0945	0.00015	4.63	3.27
Modified Rough Red Oak	19.2	410	0.00365	0.0142	0.0923	0.000145	4.57	2.92
Modified Rough Southern Yellow Pine	19.8	421	0.00369	0.0143	0.0957	0.000154	4.66	3.46
Southern Yellow Pine Decking	19.8	421	0.00369	0.0143	0.0957	0.000154	4.66	3.46
Southern Yellow Pine Dimensional	19.8	421	0.00369	0.0143	0.0957	0.000154	4.66	3.46
Southern Yellow Pine Siding	19.8	421	0.00369	0.0143	0.0957	0.000154	4.66	3.46

ADDITIONAL ENVIRONMENTAL INFO

Table 9: **Biogenic carbon content per declared unit.**

Product Name	kg biogenic carbon/DU	kg bio-CO2 eq/DU
Ash Decking	319.130	1170.143
Ash Dimensional	319.130	1170.143
Ash Siding	319.130	1170.143
Modified Rough Ash	319.130	1170.143
Douglas Fir Dimensional	257.125	942.792
Poplar Dimensional	199.985	733.278
Poplar Siding	199.985	733.278
Modified Rough Red Oak	352.355	1291.968
Modified Rough Southern Yellow Pine	257.125	942.792
Southern Yellow Pine Decking	257.125	942.792
Southern Yellow Pine Dimensional	257.125	942.792
Southern Yellow Pine Siding	257.125	942.792

Note: 1 kg biogenic carbon is equivalent to 44/12 kg of CO2

Table 10: **Density**

Wood Specie	Typical Wood Density, dry (kg/m3)	Modified Density (kg/m3)
Ash	670	638.26
Douglas Fir	540	514.25
Poplar	420	399.97
Red Oak	740	704.71
Southern Yellow Pine	540	514.25

No regulated substances of very high concern are utilized on site.

REFERENCES

ISO Standards:

- ISO 6707-1: 2014 Buildings and Civil Engineering Works - Vocabulary - Part 1: General Terms
- ISO 14021:1999 Environmental Labels and Declarations - Self-declared Environmental Claims (Type II Environmental Labeling)

- ISO 14025:2006 Environmental Labels and Declarations - Type III Environmental Declarations - Principles and Procedures
- ISO 14040:2006 Environmental Management - Life Cycle Assessment - Principles and Framework
- ISO 14044:2006 Environmental Management - Life Cycle Assessment - Requirements and Guidelines
- ISO 14067:2018 Greenhouse Gases – Carbon Footprint of Products – Requirements and Guidelines for Quantification
- ISO 14050:2009 Environmental Management - Vocabulary
- ISO 21930:2017 Sustainability in Building Construction - Environmental Declaration of Building Products

EN Standards:

- EN 16757 Sustainability of construction works - Environmental product declarations – Product Category Rules for concrete and concrete elements
- EN 15804 Sustainability of construction works - Environmental product declarations -Core rules for the product category of construction products

Other References:

- USGBC LEED v4 for Building Design and Construction, 11 Jan 2019 available at https://www.usgbc.org/resources/pcr-committee-process-resources-part-b
- USGBC PCR Committee Process & Resources: Part B, USGBC, 7 July 2017 available at https://www.usgbc.org/resources/pcr-committee-process-resources-part-b.
- US EPA (2020) Advancing Sustainable Materials Management: 2018 Fact Sheet, https://www.epa.gov/sites/production/files/2021-01/documents/2018_ff_fact_sheet_dec_2020_fnl_508.pdf