Declaration Owner

Fiber Composites, LLC
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New London, NC 28127
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Products

Composite Decking Systems:

- *Concordia (Symmetry & Horizon)*
- *Sanctuary*
- *ArmorGuard/Veranda*
- *Good Life (Escapes & Weekender)*
- *Perspective*
- *Paramount PVC*

Declared Unit

The functional unit is one square meter of Composite Decking System.

EPD Number and Period of Validity

SCS-EPD-07180
EPD Valid July 9, 2021 through July 8, 2026

Product Category Rule

ISO 21930:2017. Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services.

Program Operator

SCS Global Services
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Declaration Owner:	Fiber Composites, LLC (Fiberon)
Address:	181 Random Drive, New London, NC 28127
Declaration Number:	SCS-EPD-07180
Declaration Validity Period:	EPD Valid July 9, 2021 through July 8, 2026
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
LCA Practitioner:	Gerard Mansell, Ph.D., SCS Global Services
LCA Software and LCI database:	OpenLCA 1.10 software and the Ecoinvent v3.7 database
Product RSL:	n/a
Markets of Applicability:	Global
EPD Type:	Product-Specific
EPD Scope:	Cradle-to-Gate with options
LCIA Method and Version:	TRACI 2.1
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☐ internal ☒ external
LCA Reviewer:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
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 Review conducted by:	ISO Technical Committee
Independent verification of the declaration and data, according to ISO 14025 and the PCR	☐ internal ☒ external
EPD Verifier:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Declaration Contents:	

Disclaimers: *This EPD conforms to ISO 14025, 14040, 14044, and 21930.*

Scope of Results Reported: *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*

Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

Comparability: *The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.*

In accordance with ISO 21930:2017, EPDs are comparable only if they comply with the core PCR, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.

1. About Fiberon

A Composite Decking Green Story

You love the outdoors. And your beautiful new deck will be a living space that integrates your home seamlessly with the natural environment. We share this same passion.

And when you're choosing your decking, we want you to know that you're choosing a product that is both good for your home and for the environment.

You're usually asked to choose between wood or plastic. Natural or synthetic. Paper or plastic.

Our sustainability story starts with this unlikely match—all the best qualities of recycled wood, combined with the long-lasting resilience of recycled plastic. The blending of these two materials is the reason why our products last, and why they're sustainable from start to finish.

2. Product

2.1 Product Description

The product systems assessed include Fiber Composite's Fiberon® composite decking system products manufactured at the company's production facilities in New London, NC and Meridian, ID.

Product Name	Product Description
Concordia (Symmetry & Horizon) Sanctuary ArmorGuard/Veranda Good Life (Escapes & Weekender) Perspective	Fiberon® composite decking is manufactured using a co-extrusion process, combining wood fiber and polyethylene (PE) into the board core, and a polyethylene (PE) capstock. Both the core and capstock are inclusive of additives for color, weathering resistance and specific performance characteristics. Fiberon composite decking is intended for use as exterior walking surfaces, including decking, stair treads, and ramps.
Paramount PVC	Fiberon PVC composite decking is manufactured using a co-extrusion process, combining a cellular PVC core and a PVC capstock. Both the core and capstock are inclusive of additives for color, weathering resistance and specific performance characteristics. Fiberon composite decking is intended for use as exterior walking surfaces, including decking, stair treads, and ramps.

Impact results are presented as an average across products satisfying the variability criteria as specified in the PCR.

2.2 Application

The Fiberon Composite Decking System products provide the primary function of exterior decking.

2.3 Technical Data

Fiberon products are evaluated by a third party with respect to (a) the general properties of the product, (b) a limited spectrum of hazards to the life or property, (c) the pertinent Building Code for which this products fall under, or (d) such other conditions as considered by the third party registrar.

Technical specifications of the products included in the LCA scope, as well as product performance testing results are available on the manufacturer's website (https://www.fiberondecking.com/).

2.4 Base Materials

The primary materials include virgin and recycled polyethylene, PVC, recycled wood and various additives and pigments.

Table 1. *Material content for the Fiberon product in kg per square meter and percent of total mass.*

Material	Concordia (Symmetry & Horizon)	Sanctuary	Armor Guard/ Veranda	Good Life	Perspective	Paramount PVC
Polyethylene	7.73	7.31	7.32	6.92	7.03	0.00
	34%	32%	34%	33%	31%	0%
PVC	2.39	2.44	2.12	2.21	2.74	14.6
	11%	11%	9.9%	11%	12%	94%
Wood	11.8	11.8	11.3	10.7	11.7	0.00
	52%	53%	53%	52%	51%	0%
Other	0.751	0.953	0.740	0.871	1.31	0.887
	3.3%	4.2%	3.4%	4.2%	5.7%	5.7%
Product Total	**22.7**	**22.5**	**21.5**	**20.7**	**22.8**	**15.5**
	100%	**100%**	**100%**	**100%**	**100%**	**100%**

2.5 Manufacture

Fiberon composite decking system products are manufactured at the company's production facilities in New London, North Carolina and Meridian, Idaho. Resource use at the production facilities is allocated to the product based on mass.

Both PE (Polyethylene) and PVC (Polyvinyl Chloride) decking products are manufactured using co-extrusion processes. In co-extrusion manufacturing, multiple extruders are used to produce different layers of the finished product. Fiberon decking products have a central core that provides physical stability while an outer shell or cap provides visual aesthetics. Raw materials are mixed and blended for both the core and cap layers. The core layer materials are added to the main (core) extruder where heat and shear is used to soften the materials. This allows the blended material to be formed into the desired board shape. This is achieved by forcing the material through dies (in line molds) as it exits the extruder. While the core material is passing through the dies, secondary extruders will add the capping material through portals in the dies to form the outer shell or cap. Once the layered material or deck board exit the dies, it is cooled with chilled water to set its final shape and dimensions. Finishing operation such as embossing to provide wood grain texture, cutting the board to desire length and final packaging are completed prior to shipment to consumers.

Electricity use at the manufacturer's facilities is modeled based on the regional electricity supply mix using the USEPA eGRID emissions database. Electricity and resources used at the manufacturing facility are allocated to the products based on annual production data for 2019.

2.6 Environment and Health during Manufacture

No environmental or health impacts are expected during the manufacture of the products.

2.7 Packaging

The Fiberon products are packaged for shipment using plastic wrap and corrugated cardboard.

Table 2. *Material content for the Fiberon product packaging, per square meter.*

Material	Concordia (Symmetry & Horizon)	Sanctuary	Armor Guard /Veranda	Good Life	Perspective	Paramount PVC
Plastic	6.09×10^{-2}	6.09×10^{-2}	6.09×10^{-2}	6.09×10^{-2}	6.09×10^{-2}	6.09×10^{-2}
	10%	10%	10%	10%	10%	10%
Corrugated	0.543	0.543	0.543	0.543	0.543	0.543
	90%	90%	90%	90%	90%	90%
Packaging Total	**0.604**	**0.604**	**0.604**	**0.604**	**0.604**	**0.604**
	100%	**100%**	**100%**	**100%**	**100%**	**100%**

2.8 Condition of Use

No special conditions of use are noted.

2.9 Environment and Health during use

No environmental or health impacts are expected due to normal use of the movable wall system.

2.10 Reference Service Life

The EPD scope is cradle-to-gate with options – the Reference Service Life (RSL) is not relevant.

2.11 Extraordinary Effects

No environmental or health impacts are expected due to extraordinary effects including fire and/or water damage and unforeseeable mechanical destruction.

2.12 Further Information

Further information on the products can be found on the manufacturers' website at https://www.fiberondecking.com/.

3. LCA: Calculation Rules

3.1 Declared Unit

The declared unit used in the study is defined as 1 m^2 of composite decking system product. The reference flows and declared unit for each product are summarized in Table 3.

Table 3. *Declared unit and reference flows for the Fiberon products.*

Product Name	Declared Unit	Reference flow (kg/m^2)
Concordia (Symmetry & Horizon)	1 m^2 of decking system with a thickness of 23.2 mm	22.7
Sanctuary	1 m^2 of decking system with a thickness of 23.2 mm	22.5
Armor Guard/Veranda	1 m^2 of decking system with a thickness of 23.5 mm	21.5
Good Life	1 m^2 of decking system with a thickness of 23.5 mm	20.7
Perspective	1 m^2 of decking system with a thickness of 22.4 mm	22.8
Paramount PVC	1 m^2 of decking system with a thickness of 24.6 mm	15.5

3.2 System Boundary

The scope of the EPD is "cradle-to-gate with options", including raw material extraction, processing of raw materials, material transport, product manufacture, including packaging, and end-of-life. The life cycle phases included in the EPD scope are described in Table 4 and illustrated in Figure 1.

Table 4. *The modules and unit processes included in the scope for the Fiberon products.*

Module	Module description from the PCR	Unit Processes Included in Scope
A1	Extraction and processing of raw materials; any reuse of products or materials from previous product systems; processing of secondary materials; generation of electricity from primary energy resources; energy, or other, recovery processes from secondary fuels	Extraction and processing of raw materials for the composite decking system components.
A2	Transport (to the manufacturer)	Transport of component materials to the manufacturing facilities
A3	Manufacturing, including ancillary material production	Manufacturing of products and packaging (incl. upstream unit processes)
A4	Transport (to the building site)	Module Not Declared
A5	Construction-installation process	Module Not Declared
B1	Product use	Module Not Declared
B2	Product maintenance	Module Not Declared
B3	Product repair	Module Not Declared
B4	Product replacement	Module Not Declared
B5	Product refurbishment	Module Not Declared
B6	Operational energy use by technical building systems	Module Not Declared
B7	Operational water uses by technical building systems	Module Not Declared
C1	Deconstruction, demolition	Demolition of the product is accomplished using hand tools with no associated emissions and negligible impacts
C2	Transport (to waste processing)	Transport of the product to waste treatment at end-of-life
C3	Waste processing for reuse, recovery and/or recycling	The products are disposed of by landfilling or incineration which require no waste processing
C4	Disposal	Disposal of the product in a municipal landfill or incineration
D	Reuse-recovery-recycling potential	Module Not Declared

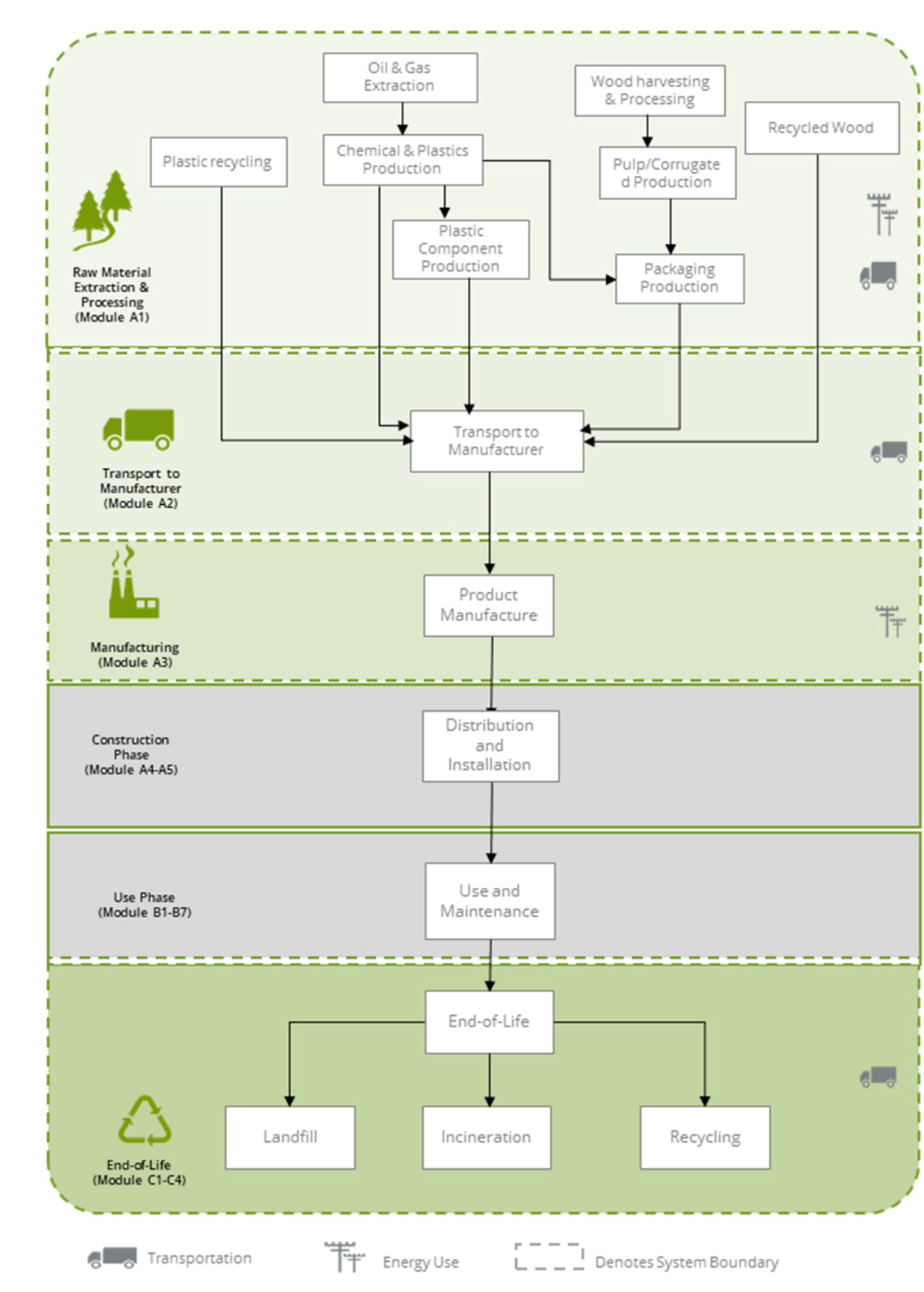

Figure 1. *Flow diagram representing the major unit operations in the life cycle of the Fiberon products.*

3.3 Estimates and Assumptions

- Fiberon's manufacturing facilities are located in New London, North Carolina and Meridian, Idaho. Ecoinvent inventory datasets for the appropriate eGRID energy grid mix were used to model resource use and emissions from electricity use at the manufacturing facilities.
- Electricity and resource use at the production facilities was allocated to the composite decking system products based on product mass utilizing production data for calendar year 2019 provided by the manufacturer.
- Primary data for upstream component fabrication were not available. Representative data from the Ecoinvent LCI databases were utilized as appropriate.
- Specific data to estimate the disposition of the product at end-of-life were unavailable. The study assumes no recycling of the product occurs at end-of-life. Assumptions regarding landfilling and incineration rates for the product materials are based on regional statistics regarding municipal solid waste generation.

It should also be noted that LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The PCR allows for the results for several inventory flows related to construction products to be reported as "other parameters". These are aggregated inventory flows, and do not characterize any potential impact; results should be interpreted taking into account this limitation.

3.4 Cut-off criteria

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact are included in the inventory. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results. No known flows are deliberately excluded from this EPD.

3.5 Background Data

Primary data were provided by Fiberon for their manufacturing facilities. The sources of secondary LCI data are the Ecoinvent database.

Table 5. *Data sources for the Fiberon product system.*

Component	Dataset	Data Source	Publication Date
PRODUCT			
Polyethylene			
Recycled PE	Recycled PE	Primary data	2020
HDPE	polyethylene production, high density, granulate | polyethylene, high density, granulate | Cutoff, S/RoW	EI v3.7	2020
Polyvinyl Chloride			
PVC	polyvinylchloride production, bulk polymerisation | polyvinylchloride, bulk polymerised | Cutoff, S/RoW	EI v3.7	2020
Wood			
Recycled Wood Trim/Wood Chips	n/a	n/a	n/a
Other			
Additives & Colorants	Polyethylene grafted with maleic anhydride	EI v3.7	2020
	Ethylene-methacrylic acid copolymer	EI v3.7	2020
	polydimethylsiloxane production | polydimethylsiloxane | Cutoff, S/GLO	EI v3.7	2020
	limestone production, crushed, washed | limestone, crushed, washed | Cutoff, S/RoW	EI v3.7	2020
	zinc oxide production | zinc oxide | Cutoff, S/RoW	EI v3.7	2020
	chemical production, organic | chemical, organic | Cutoff, S/GLO	EI v3.7	2020
PACKAGING			
Cardboard	containerboard production, linerboard, testliner | containerboard, linerboard | Cutoff, S/RoW	EI v3.7	2020
Packaging Film	packaging film production, low density polyethylene | packaging film, low density polyethylene | Cutoff, S/RoW	EI v3.7	2020
TRANSPORT			
Road transport	market for transport, freight, lorry 16-32 metric ton, EURO4 | transport, freight, lorry 16-32 metric ton, EURO4 | Cutoff, S/RoW	EI v3.7	2020
RESOURCES			
Grid electricity	Electricity, medium voltage, per kWh - NWPP/NWPP	EI v3.7; eGRID	2020; 2018
	Electricity, medium voltage, per kWh - SRVC/SRVC	EI v3.7; eGRID	2020; 2018
Heat – natural gas	market group for heat, district or industrial, natural gas | heat, district or industrial, natural gas | Cutoff, S/GLO	EI v3.7	2020
Heat – propane	heat production, propane, at industrial furnace >100kW | heat, district or industrial, other than natural gas | Cutoff, S/RoW	EI v3.7	2020

3.6 Data Quality

The data quality assessment addressed the following parameters: time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty.

Table 6. *Data quality assessment for the Fiberon product system.*

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage Age of data and the minimum length of time over which data should be collected	The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 5 years old (typically 2016). All of the data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on annual production for 2019.
Geographical Coverage Geographical area from which data for unit processes should be collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Electricity use for product manufacture is modeled using representative data for the US. Surrogate data used in the assessment are representative of global or European operations. Data representative of European operations are considered sufficiently similar to actual processes. Data representing product disposal are based on regional statistics.
Technology Coverage Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative fabrication datasets, specific to the type of material, are used to represent the actual processes, as appropriate.
Precision Measure of the variability of the data values for each data expressed (e.g. variance)	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.
Completeness Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for production of the decking system products. In some instances, surrogate data used to represent upstream and downstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded.
Representativeness Qualitative assessment of the degree to which the data set reflects the true population of interest (i.e. geographical coverage, time period, and technology coverage)	Data used in the assessment represent typical or average processes as currently reported from multiple data sources and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.
Consistency Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used; with a bias towards Ecoinvent v3.7 data where available. Different portions of the product life cycle are equally considered.
Reproducibility Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.
Sources of the Data Description of all primary and secondary data sources	Energy use data at Fiberon's manufacturing facilities represents an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. For secondary LCI data, Ecoinvent v3.7 LCI data are used.
Uncertainty of the Information Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the products and packaging is low. Actual supplier data for upstream operations were not available and the study relied upon the use of existing representative datasets. These datasets contained relatively recent data (<10 years) but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method required by the PCR includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

3.7 Period under review

The period of review is calendar year 2019.

3.8 Allocation

Manufacturing resource use was allocated to the products based on mass. Impacts from transportation were allocated based on the mass of material and distance transported.

The product system includes some recycled materials, which were allocated using the recycled content allocation method (also known as the 100-0 cut-off method). Using the recycled content allocation approach, system inputs with recycled content do not receive any burden from the previous life cycle other than reprocessing of the waste material. At end-of-life, materials which are recycled leave the system boundaries with no additional burden.

3.9 Comparability

The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.

4. LCA: Scenarios and Additional Technical Information

4.1 Product End-of-Life

The disposal stage includes removal of the products; transport of the products to waste treatment facilities; waste processing); and associated emissions as the product degrades in a landfill or is burned in an incinerator. For the composite decking system products, it is assumed no emissions are generated during demolition while no waste processing is required for incineration or landfill disposal.

No specific data are available regarding the recycling rate of materials in the product at end-of-life. Although some component materials of the product are recyclable, the form of the final product makes separation and recovery of these materials impractical. Therefore, the products are assumed to be landfilled or incinerated at end-of-life. Based on regional statistics for municipal solid waste disposal[1], 80% of the product materials are assumed landfilled and 20% incinerated.

Transportation of waste materials at end-of-life assumes a 20 mile (~32 km) average distance to disposal, consistent with assumptions used in the US EPA WARM model.

[1] Product Category Rules for Building-Related Products and Services. Part A: Life Cycle Assessment Calculation Rules and Report Requirements. UL Environment. UL 10010. Version 3.2. 2018

Table 7 *End-of-life disposal scenario parameters for the Fiberon products.*

Product	Scenario assumptions	Collection process		Recovery	Disposal			Removals of biogenic carbon[1]
		Collected	Collected with mixed waste		Recycling	Landfill	Incineration	
Concordia (Symmetry & Horizon)	80% Landfill 20% Incineration	-	22.7	n/a	0.00	18.2	4.54	21.7
Sanctuary	80% Landfill 20% Incineration	-	22.5	n/a	0.00	18.0	4.51	21.7
Armor Guard/Veranda	80% Landfill 20% Incineration	-	21.5	n/a	0.00	17.2	4.30	20.8
Good Life	80% Landfill 20% Incineration	-	20.7	n/a	0.00	16.5	4.13	19.6
Perspective	80% Landfill 20% Incineration	-	22.8	n/a	0.00	18.2	4.56	21.5
Paramount PVC	80% Landfill 20% Incineration	-	15.5	n/a	0.00	12.4	3.10	0.00

5. LCA: Results

Results of the Life Cycle Assessment are presented below. It is noted that LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Table 8. *Life cycle phases included in the product system boundary.*

Product			Construction Process		Use							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material extraction and processing	Transport to manufacturer	Manufacturing	Transport	Construction - installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, recovery and/or recycling potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	MND

X = Included in system boundary | MND = Module not declared

The following environmental impact category indicator are reported using characterization factors based on the U.S. EPA's Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts – TRACI:

Impact Category	Unit
Global Warming Potential (GWP 100)	kg CO_2 eq
Ozone Depletion Potential (ODP)	kg CFC 11 eq
Acidification Potential (AP)	kg SO_2 eq
Eutrophication Potential (EP)	kg N eq
Smog Formation Potential (POCP)	kg O_3 eq
Fossil Fuel Depletion Potential (FFD)	MJ Surplus, LHV

These six impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development, however the EPD users shall not use additional measures for comparative purposes.

The following inventory parameters, specified by the PCR, are also reported.

Resources	Unit	Waste and Outflows	Unit
RPR_E: Renewable primary resources used as energy carrier (fuel)	MJ, LHV	HWD: Hazardous waste disposed	kg
RPR_M: Renewable primary resources with energy content used as material	MJ, LHV	NHWD: Non-hazardous waste disposed	kg
$NRPR_E$: Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	HLRW: High-level radioactive waste, conditioned, to final repository	kg
$NRPR_M$: Non-renewable primary resources with energy content used as material	MJ, LHV	ILLRW: Intermediate- and low-level radioactive waste, conditioned, to final repository	kg
SM: Secondary materials	MJ, LHV	CRU: Components for re-use	kg
RSF: Renewable secondary fuels	MJ, LHV	MR: Materials for recycling	kg
NRSF: Non-renewable secondary fuels	MJ, LHV	MER: Materials for energy recovery	kg
RE: Recovered energy	MJ, LHV	EE: Recovered energy exported from the product system	MJ, LHV
FW: Use of net freshwater resources	m^3	-	-

The variability of indicator results was evaluated to determine whether any of the composite decking system products assessed for the EPD could be averaged and reported as a single representative set of results for the product group. Based on the requirements of the PCR, variability of indicator results across the products considered must not exceed +/- 10%. An evaluation of the assessment results reveals a single product grouping satisfying the variability criteria can be defined. In particular, all products, with the exception of the Paramount PVC decking, are considered for averaging.

Table 9 presents the average indicator results for the polyethylene decking products, as well as the percent difference from the corresponding average. As shown, the results within each product line considered satisfy the 10% variability requirement of the PCR and can therefore be included as a single set of results in this EPD.

Table 9. *Life Cycle Impact Assessment Results for the Fiberon PE decking system products. Percent difference from average shown for each product model.*

Impact Category	Average	Concordia (Symmetry & Horizon)	Sanctuary	Armor Guard/Veranda	Good Life	Perspective
Core Impact Indicators						
Global warming	27.0	3%	1%	-4%	-5%	6%
Ozone depletion	$4.60x10^{-3}$	1%	2%	-3%	-6%	6%
Acidification	$9.64x10^{-2}$	2%	1%	-6%	-6%	8%
Eutrophication	0.229	3%	2%	-3%	-6%	4%
Smog	1.41	3%	1%	-4%	-5%	5%
Fossil fuel depletion	37.1	6%	-2%	-2%	-3%	2%

Life cycle impact assessment results for the PE and PVC decking system products are presented below. Note that Modules C1 and C3 are not associated with any impact as the products are expected to be manually deconstructed. Additionally, Modules A4, A5, B1-B7 and D are not declared. In the interest of space and table readability, these modules are not included in the results presented below.

Table 10. *TRACI Life Cycle Impact Assessment (LCIA) results for the* ***PE Composite Decking System*** *products (Concordia (Symmetry & Horizon), Sanctuary, ArmorGuard/Veranda, Good Life, Perspective). Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.*

Impact Category	Unit	Total	Raw Materials	Transport	Manufacturing	Transport to Disposal	Disposal
Global warming	kg CO_2 eq	26.8	11.7	0.962	6.07	0.895	7.24
	%	100%	43%	3.6%	23%	3.3%	27%
Acidification	kg SO_2 eq	$9.55x10^{-2}$	$5.39x10^{-2}$	$5.13x10^{-3}$	$2.79x10^{-2}$	$5.15x10^{-3}$	$3.45x10^{-3}$
	%	100%	56%	5.4%	29%	5.4%	3.6%
Eutrophication	kg N eq	0.229	$3.02x10^{-2}$	$1.18x10^{-3}$	$2.20x10^{-2}$	$6.63x10^{-4}$	0.174
	%	100%	13%	0.51%	9.6%	0.29%	76%
Smog	kg O_3 eq	1.40	0.715	0.132	0.329	0.146	$7.51x10^{-2}$
	%	100%	51%	9.5%	24%	10%	5.4%
Ozone depletion	kg CFC-11 eq	$4.57x10^{-3}$	$4.57x10^{-3}$	$2.17x10^{-7}$	$3.00x10^{-7}$	$2.07x10^{-7}$	$1.02x10^{-7}$
	%	100%	100%	0.0047%	0.0066%	0.0045%	0.0022%
Fossil fuel depletion	MJ surplus	37.0	23.1	1.98	9.19	1.85	0.872
	%	100%	62%	5.3%	25%	5%	2.4%

Table 11. *Resource use and waste flows for the **PE Composite Decking System** products (Concordia (Symmetry & Horizon), Sanctuary, ArmorGuard/Veranda, Good Life, Perspective). Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.*

Parameter	Unit	Total	Raw Materials	Transport	Manufacturing	Transport to Disposal	Disposal
Energy Use							
Use of renewable primary energy	MJ	31.8	12.6	0.189	18.8	$4.59x10^{-2}$	0.240
	%	100%	40%	0.59%	59%	0.14%	0.75%
Use of renewable primary energy resources used as raw materials	MJ	0.00	0.00	1.00	2.00	12.0	14.0
Use of nonrenewable primary energy	MJ	INA	INA	INA	INA	INA	INA
Use of nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA
Use of secondary materials	kg	20.6	20.6	0.00	0.00	0.00	0.00
	%	100%	100%	0%	0%	0%	0%
Renewable secondary fuel use	MJ	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Nonrenewable secondary fuel use	MJ	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Use of net fresh water	m^3	1.37	0.757	$1.11x10^{-2}$	0.537	$3.94x10^{-3}$	$6.05x10^{-2}$
	-	100%	55%	0.81%	39%	0.29%	4.4%
Waste Flows							
Nonhazardous waste disposed	kg	24.5	4.88	0.604	0.958	$5.82x10^{-2}$	18.0
	%	100%	20%	2.5%	3.9%	0.24%	73%
Hazardous waste disposed	kg	$2.66x10^{-4}$	$1.12x10^{-4}$	$3.82x10^{-5}$	$6.66x10^{-5}$	$3.33x10^{-5}$	$1.51x10^{-5}$
	%	100%	42%	14%	25%	13%	5.7%
High-level radioactive waste	kg	$2.40x10^{-4}$	$1.31x10^{-4}$	$8.76x10^{-7}$	$1.07x10^{-4}$	$2.03x10^{-7}$	$1.00x10^{-6}$
	%	100%	55%	0.36%	45%	0.084%	0.42%
Intermediate and low-level radioactive waste	kg	$1.60x10^{-3}$	$8.10x10^{-4}$	$9.15x10^{-5}$	$5.78x10^{-4}$	$8.71x10^{-5}$	$3.44x10^{-5}$
	%	100%	51%	5.7%	36%	5.4%	2.1%
Use of secondary materials	kg	20.6	20.6	0.00	0.00	0.00	0.00
	%	100%	100%	0%	0%	0%	0%
Materials for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00
Components for re-use	kg	0.00	0.00	1.00	2.00	12.0	14.0
Materials for energy recovery	kg	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Exported energy	MJ	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.

INA = Indicator not assessed | Neg. = Negligible

Table 12. *TRACI Life Cycle Impact Assessment (LCIA) results for the **PVC Composite Decking System** products (Paramount). Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.*

Impact Category	Unit	Total	Raw Materials	Transport	Manufacturing	Transport to Disposal	Disposal
Global warming	kg CO_2 eq	54.7	42.2	0.141	4.41	0.632	7.33
	%	100%	77%	0.26%	8.1%	1.2%	13%
Acidification	kg SO_2 eq	0.201	0.169	$6.38x10^{-4}$	$1.92x10^{-2}$	$3.64x10^{-3}$	$7.70x10^{-3}$
	%	100%	84%	0.32%	9.6%	1.8%	3.8%
Eutrophication	kg N eq	0.231	0.113	$1.56x10^{-4}$	$1.52x10^{-2}$	$4.68x10^{-4}$	0.102
	%	100%	49%	0.068%	6.6%	0.2%	44%
Smog	kg O_3 eq	2.71	2.26	$1.54x10^{-2}$	0.242	0.103	$9.58x10^{-2}$
	%	100%	83%	0.57%	8.9%	3.8%	3.5%
Ozone depletion	kg CFC-11 eq	$2.03x10^{-5}$	$1.96x10^{-5}$	$3.27x10^{-8}$	$2.31x10^{-7}$	$1.47x10^{-7}$	$2.62x10^{-7}$
	%	100%	97%	0.16%	1.1%	0.72%	1.3%
Fossil fuel depletion	MJ surplus	125	114	0.298	7.63	1.30	1.50
	%	100%	91%	0.24%	6.1%	1%	1.2%

Table 13. *Resource use and waste flows for the **PVC Composite Decking System** products (Paramount).. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits*

Parameter	Unit	Total	Raw Materials	Transport	Manufacturing	Transport to Disposal	Disposal
Energy Use							
Use of renewable primary energy	MJ	41.0	34.4	$2.35x10^{-2}$	5.61	$3.24x10^{-2}$	0.951
	%	100%	84%	0.057%	14%	0.079%	2.3%
Use of renewable primary energy resources used as raw materials	MJ	0.00	0.00	1.00	2.00	12.0	14.0
Use of nonrenewable primary energy	MJ	INA	INA	INA	INA	INA	INA
Use of nonrenewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA
Use of secondary materials	kg	2.17	2.17	0.00	0.00	0.00	0.00
	%	100%	100%	0%	0%	0%	0%
Renewable secondary fuel use	MJ	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Nonrenewable secondary fuel use	MJ	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Use of net fresh water	m^3	4.21	3.37	$1.48x10^{-3}$	0.508	$2.78x10^{-3}$	0.329
	-	100%	80%	0.035%	12%	0.066%	7.8%
Waste Flows							
Nonhazardous waste disposed	kg	20.7	5.74	$9.99x10^{-2}$	0.615	$4.11x10^{-2}$	14.2
	%	100%	28%	0.48%	3%	0.2%	69%
Hazardous waste disposed	kg	$6.90x10^{-4}$	$5.85x10^{-4}$	$5.54x10^{-6}$	$5.33x10^{-5}$	$2.35x10^{-5}$	$2.30x10^{-5}$
	%	100%	85%	0.8%	7.7%	3.4%	3.3%
High-level radioactive waste	kg	$3.09x10^{-4}$	$1.77x10^{-4}$	$1.10x10^{-7}$	$1.28x10^{-4}$	$1.43x10^{-7}$	$3.48x10^{-6}$
	%	100%	57%	0.036%	42%	0.046%	1.1%
Intermediate and low-level radioactive waste	kg	$1.95x10^{-3}$	$1.13x10^{-3}$	$1.38x10^{-5}$	$6.81x10^{-4}$	$6.16x10^{-5}$	$6.43x10^{-5}$
	%	100%	58%	0.71%	35%	3.2%	3.3%
Use of secondary materials	kg	2.17	2.17	0.00	0.00	0.00	0.00
	%	100%	100%	0%	0%	0%	0%
Materials for recycling	kg	0.00	0.00	0.00	0.00	0.00	0.00
Components for re-use	kg	0.00	0.00	1.00	2.00	12.0	14.0
Materials for energy recovery	kg	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.
Exported energy	MJ	Neg.	Neg.	Neg.	Neg.	Neg.	Neg.

INA = Indicator not assessed | Neg. = Negligible

6. LCA: Interpretation

The interpretation phase conforms to ISO 14044 with further guidance from the ILCD General Guide for Life Cycle Assessment. The interpretation included the use of evaluation and sensitivity checks to steer the iterative process during the assessment, and a final evaluation including completeness, sensitivity, and consistency checks, at the end of the study.

With the exception of the Eutrophication Potential indicator, which is dominated by the disposal phase, the contributions to total impact indicators are dominated by the raw material extraction and processing phase. The product manufacturing phase is generally the next highest contributor followed by product disposal. Impact contribution from transport phases are generally less than ~5-10% of the total, depending on the specific indicator considered.

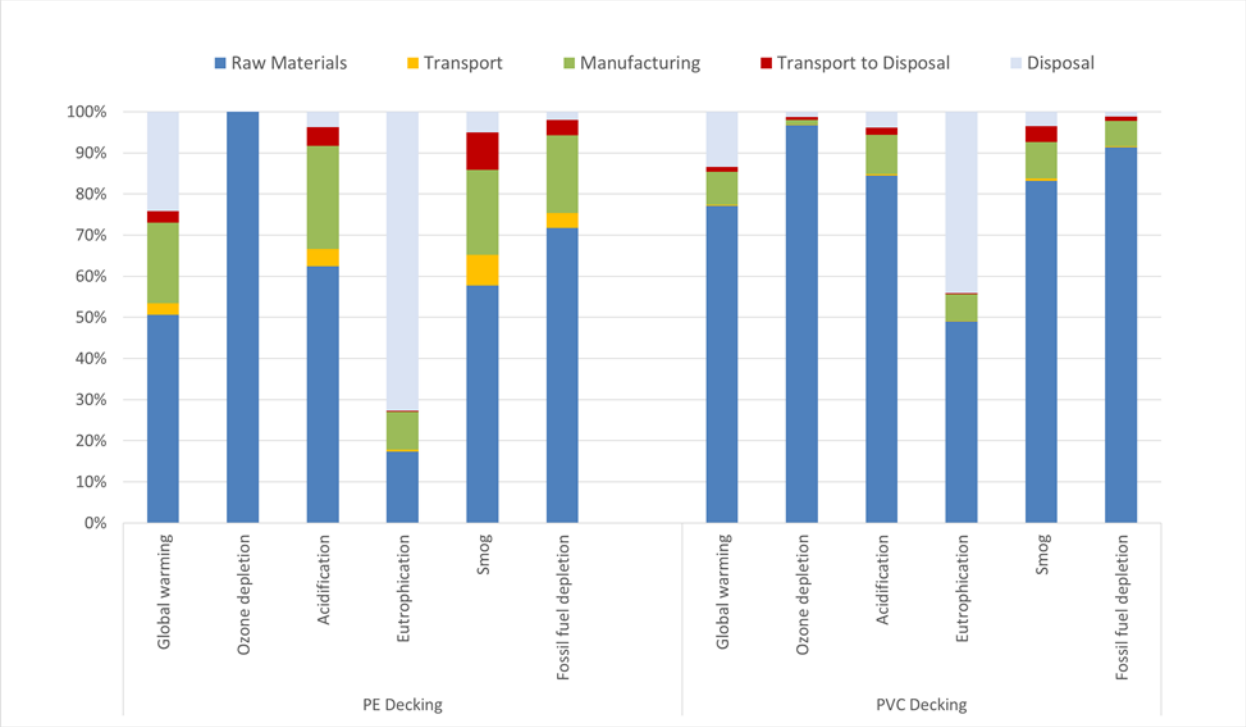

Figure 2. *Contribution analysis for the Fiberon products – TRACI 2.1.*

7. References

1. Life Cycle Assessment of Composite Decking Systems. SCS Global Services Report. Prepared for Fiberon. July 2021.
2. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
3. ISO 14040: 2006 Environmental Management – Life cycle assessment – Principles and Framework
4. ISO 14044: 2006/AMD 1:2017/ AMD 2:2020 Environmental Management – Life cycle assessment – Requirements and Guidelines.
5. ISO 21930: 2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services.
6. SCS Type III Environmental Declaration Program: Program Operator Manual. V10.1 May 2021. SCS Global Services.
7. Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI). Dr. Bare, J., https://www.epa.gov/chemical-research/tool-reduction-and-assessment-chemicals-and-other-environmental-impacts-traci
8. Ecoinvent Centre (2020) ecoinvent data from v3.7. Swiss Center for Life Cycle Inventories, Dübendorf, 2020, http://www.ecoinvent.org
9. US EPA. Advancing Sustainable Materials Management: 2018 Fact Sheet. Assessing Trends in Material Generation, Recycling and Disposal in the United States. July 2018. https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/advancing-sustainable-materials-management
10. European Joint Research Commission. International Reference Life Cycle Data System handbook. *General guide for Life Cycle Assessment – Detailed Guidance.* © European Union, 2010.

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