Declaration Owner
Owens Corning
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Products
PINK Next Gen™ Fiberglas™ Insulation

Functional Unit
1 m² of insulation with a thickness required for an average thermal resistance RSI = 1 m²K/W maintained for 75 years

EPD Number and Period of Validity
SCS-EPD-09348
EPD Valid September 1, 2023 through August 31, 2028

Product Category Rule
PCR Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements. Version 4.0. Mar. 2022

PCR Guidance for Building-Related Products and Services Part B: Building Envelope Thermal Insulation EPD Requirements. Version 3.0. April 2023

Program Operator
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Declaration Owner:	Owens Corning
Address:	One Owens Corning Parkway, Toledo, OH, USA
Declaration Number:	SCS-EPD-09348
Declaration Validity Period:	EPD Valid September 1, 2023 through August 31, 2028
Product:	PINK Next Gen™ Fiberglas™ Insulation
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
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Market(s) of Applicability	North America
EPD Type	Product-specific
EPD Scope	Cradle-to-Gate with Options
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☐ internal X external
LCA Reviewer:	Beth Cassese, LCACP, SCS Global Services
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PCR Review conducted by:	Lindita Bushi, PhD (Chair); Hugues Imbeault-Tétreault, ing., M.Sc.A.; Jack Geibig
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Part B PCR Review conducted by:	Thomas Gloria (chair), Industrial Ecology Consultants; Christoph Koffler, thinkstep; Andre Desjarlais,Oak Ridge National Laboratory
Independent verification of the declaration and data, according to ISO 14025, ISO 21930, and the PCR	☐ internal X external
EPD Verifier:	Beth Cassese, LCACP, SCS Global Services
Declaration Contents:	1. About Company Name ..... 2 2. Product ..... 2 3. LCA: Calculation Rules ..... 12 4. LCA: Scenarios and Additional Technical Information ..... 18 5. LCA: Results ..... 21 6. LCA: Interpretation ..... 29 7. Additional Environmental Information ..... 29 8. References 34

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.

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1. About Owens Corning

Founded in 1938, Owens Corning is a global building and construction materials leader committed to building a sustainable future through material innovation. Our three integrated businesses – Composites, Insulation, and Roofing – provide durable, sustainable, energy-efficient solutions that leverage our unique material science, manufacturing, and market knowledge to help our customers win and grow.

2. Product

2.1 Product Description and Application

Owens Corning® PINK Next Gen™ Fiberglas™ insulation is a preformed, flexible blanket insulation. It is produced in R-values from 8 to 49 in US production facilities and R-values from 8 to 54 in Canadian production facilities, with thicknesses ranging from 2 ½ inches to 14 inches (US) and 2 ½ inches to 16 inches (Canada). It is available unfaced, or faced with Kraft, foil, or foil-scrim-Kraft (FSK). The products covered by this EPD are used as cavity wall insulation, cavity floor insulation, and attic insulation. PINK Next Gen™ Fiberglas™ insulation has excellent stiffness and recovery characteristics. Finished, unfaced products manufactured in the US have an average total recycled content of 65%. Finished, unfaced products manufactured in Canada have an average total recycled content up to 73%.

The following product names reflect differences in final product dimensions, application, and R-value only. All PINK Next Gen™ Fiberglas™ insulation products included in this study are made using consistent binder chemistry, and manufacturing processes, making it appropriate to group them within a single EPD.

Unfaced PINK Next Gen™ Fiberglas™ Products	PINK Next Gen™ Fiberglas™ Insulation (US)
	PINK NEXT GEN™ Fiberglas® Insulation (Canada)
	PINK Next Gen™ Fiberglas™ Sonobatts®
	QUIETZONE® PINK Next Gen™ Fiberglas® (Canada)
	PINK Next Gen™ Sound Attenuation Batts (SAB)
	PINK Next Gen ™ Fiberglas™ FastBatt®

PINK Next Gen™ Fiberglas™ Sonobatts® insulation is specifically designed for use behind suspended ceiling panels to economically improve both the noise control and thermal performance of new or existing ceiling systems. Depending on the final product thickness, adding Sonobatts® insulation can improve the room to room CIC (Ceiling Insulation Class) rating by 10-18 points. The product is sized to fit behind standard ceiling panels.

QUIETZONE® PINK Next Gen™ Fiberglas® insulation is flexible, acoustic fiberglass insulation. QuietZone® insulation is sound absorptive material for various interior load bearing and non-load bearing sound and fire rated wall, ceiling, and floor assemblies. It is designed to help control sound transfer by absorbing sound vibrations transmitted through interior walls, ceilings, and floors. Permitted installation within various fire rated assemblies to maintain or achieve fire resistance rating.

PINK Next Gen™ Fiberglas™ Sound Attenuation Batts (SAB) are unfaced, lightweight, flexible fiberglass insulation batts, designed to deliver noise control in wall cavities of interior partitions. Depending on the construction method and components used, SABs can improve STC (Sound Transmission Class) ratings by 4-11 points over an empty cavity.

PINK Next Gen ™ Fiberglas™ FastBatt ® is a fiber glass insulation batt with a flangeless Kraft facing. This product is designed for "friction fit" application, requiring no stapling to hold the batt in the cavity. In addition, the Kraft facing provides a vapor retarder membrane required by some building codes.

These products are covered by Construction Specification Institute (CSI) Masterformat code 07 21 16 Batt and Blanket Insulation.

2.2 Methodological Framework

This declaration is a product-specific EPD and is cradle-to-installation with end-of-life. The underlying LCA upon which this EPD is based included the following life cycle modules: *Raw Material supply* (A1); *Inbound Transportation* (A2); *Manufacturing* (A3); *Distribution* (A4); *Installation* (A5); *End-of-life, Transport* (C2); and *End-of-life, Disposal* (C4). No known flows have been deliberately excluded. The product is expected to perform as claimed for the 75-year reference service life (RSL) if it remains clean and dry in its installed state.

2.3 Technical Data

At a minimum, the insulation products covered by this EPD meet or exceed the following:

Table 1. *Technical specifications for US PINK Next Gen™ Fiberglas™*

Property	Test Method	Result
Thermal Resistance	ASTM C518	R11 – R49
Surface Burning Characteristics[1] (flame spread/smoke developed) Unfaced Kraft faced Foil faced	ASTM E84/ UL 723	 < 25 / <50 NR / NR 75 / 150
Critical Radiant Flux (W/cm^2)	ASTM E970	> 0.12
Water Vapor Permeance (perms) Water Vapor Permeance Kraft Facing (perms) Water Vapor Permeance Foil Facing (perms)	ASTM E96	1.0 0.5
Water Vapor Sorption (by weight)	ASTM C1104	< 5%
Odor Emission	ASTM C1304	Pass
Corrosion Resistance	ASTM C665, Part 13.8	Pass
Fungi Resistance	ASTM C1338	Pass

[1]The surface burning characteristics of insulation were derived from products tested in accordance with ASTM E84. This standard is used solely to measure and describe properties of products in response to heat and flame under controlled laboratory conditions and should not be used to describe or approve the fire hazard of materials under actual fire conditions. However, the results of these tests may be used as elements of a fire risk assessment that takes into account all of the factors pertinent to an assessment of the fire hazard of a particular end use. Values are reported to the nearest five rating.

Table 2. *Technical specifications for PINK Next Gen™ Fiberglas™ Sonobatts®*

Property	Test Method	Result
Thermal Resistance	ASTM C518	R11 and R19
Surface Burning Characteristics[1] (flame spread/smoke developed) Unfaced Kraft faced	ASTM E84	< 25 / <50 NR / NR
Critical Radiant Flux (W/cm^2)	ASTM E970	> 0.12
Water Vapor Permeance (perms) Water Vapor Permeance Unfaced (perms) Kraft Facing (perms)	ASTM E96	N/A 1
Water Vapor Sorption (by weight)	ASTM C1104	< 5%
Odor Emission	ASTM C1304	Pass
Corrosion Resistance	ASTM C665, Part 13.8	Pass
Fungi Resistance	ASTM C1338	Pass
Property Combustion Characteristics (fiberglass only)	ASTM E136	Pass (noncombustible)

Table 3. *Technical specifications for PINK Next Gen™ Fiberglas™ Sound Attenuation Batts*

Property	Test Method	Result
Surface Burning Characteristics[1] (flame spread/smoke developed) Unfaced	ASTM E84	< 25 / <50
Water Absorption (Maximum by Volume)		< 5%
Dimensional Stability (Linear Shrinkage)		< 0.1%

Table 4. *Technical specifications for PINK Next Gen™ Fiberglas™ PROPINK FastBatt®*

Property	Test Method	Result
Dimensional Stability (shrinkage)		< 0.1%
Surface Burning Characteristics[1] (flame spread/smoke developed) Kraft Faced	ASTM E84[1]	NR
Critical Radiant Flux (W/cm^2)	ASTM E970	> 0.12
Water Vapor Permeance (perms) Kraft Faced	ASTNM E96[2]	1
Water Absorption (by weight)	ASTM C1104	< 5%
Odor Emission	ASTM C1104	pass
Corrosion Resistance	ASTM C665, part 13.8	Pass
Fungi Resistance (fiberglass only)	ASTM C1338	pass

[1]ASTM E84 is used solely to measure and describe properties of products in response to heat and flame under controlled laboratory conditions, and should not be used to describe or approve the fire hazard of materials under actual fire conditions. However, the results of these tests may be used as elements of a fire risk assessment that takes into account all of the factors of the fire hazard of a particular end use. Values are reported to the nearest five rating.

[2]Dessicant method.

Table 5. *Technical specifications for Canadian PINK Next Gen™ Fiberglas®*

Property	Test Method	Result
Compliance	CCMC CAN / ULC-S702 ASTM C665	Evaluation Report No. 05650-L Type 1 Type 1
Thermal	CAN / ULC-S702	R12 – R54
Fire	CAN / ULC-S114 CAN / ULC-S129 CAN / ULC-S102 CAN / ULC-S102.2	Non-Combustible Smolder Resistance Average mass Loss ≤ 2% Individual mass Loss ≤ 3% Flame Spread 0; Smoke Spread 0 Flame Spread 0, Smoke Spread 0
Moisture	ASTM C1338	Fungi Resistance (pass)
Corrosion	ASTM C665	Steel, Aluminum, Copper (non-corrosive)

Table 6. *Technical specifications for Canadian QuietZone®*

Property	Test Method	Result
Compliance	CAN / ULC-S702 ASTM C665	Type 1 Type 1
Fire	CAN / ULC-S114 CAN / ULC-S129 CAN / ULC-S102 CAN / ULC-S102.2	Non-Combustible Smolder Resistance Mean Mass Loss ≤ 0.02% Flame Spread 0; Smoke Spread 0 Flame Spread 0, Smoke Spread 0
Moisture	ASTM C1338	Fungi Resistance (pass)
Corrosion	ASTM C665	Steel, Aluminum, Copper (non-corrosive)

2.4 Properties of Declared Product as Delivered

When installed in typical building and construction assemblies according to all applicable Owens Corning® specifications, recommendations, and guidelines, PINK Next Gen™ Fiberglas™ insulation delivers its advertised R-value. For additional product property details, visit the specific product pages through www.owenscorning.com.

Table 7. *PINK Next Gen™ Fiberglas™ (US) Product Properties as Delivered*

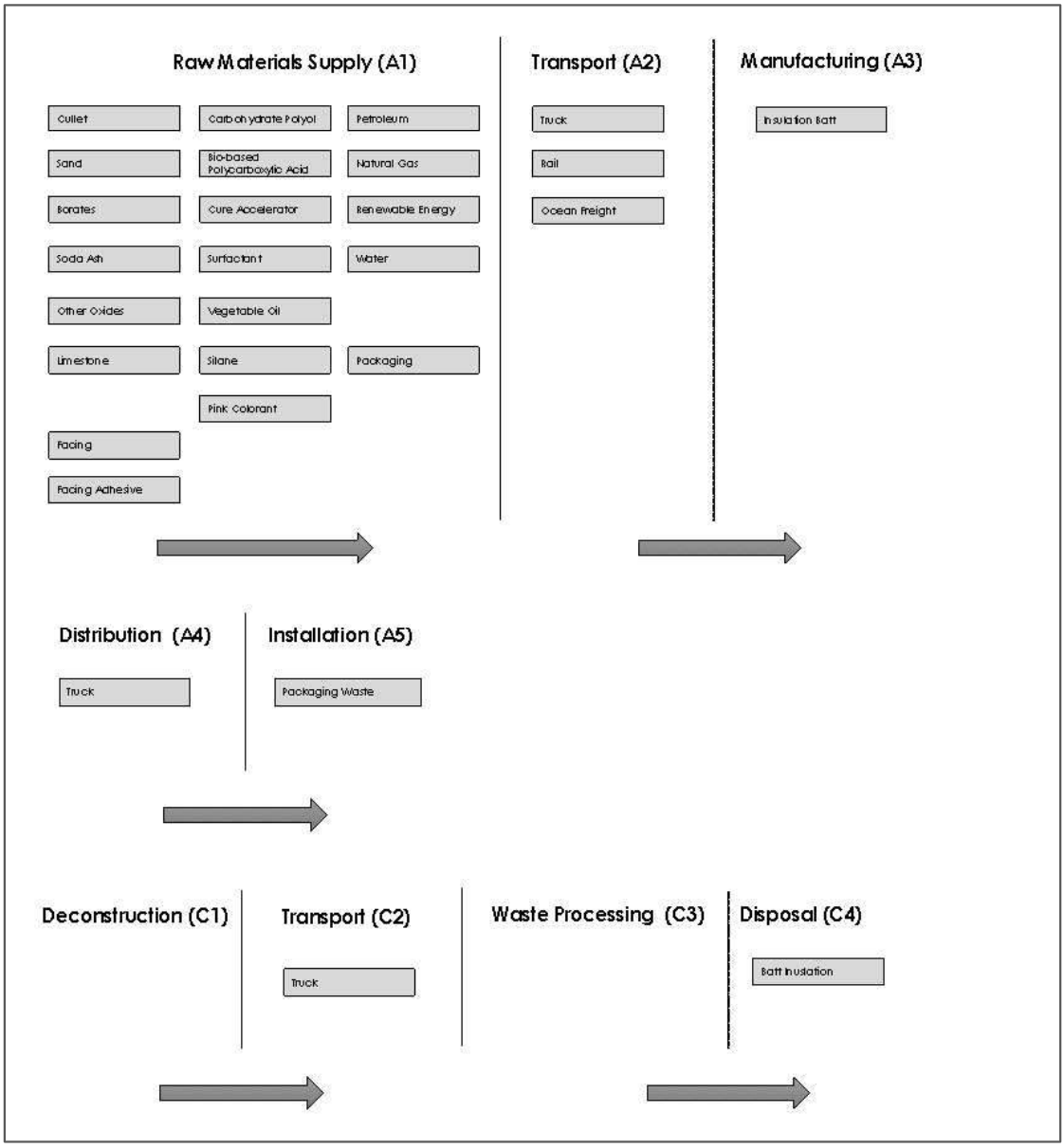
	Width	Length	Thickness	R-Value
Wood Frame Construction	15″ (381 mm), 15 ¼″ (387 mm), 23″ (584 mm), 23 ¼″ (603 mm)	93″ (2,362 mm), 105" (2,667 mm)	3 ½″ (89 mm)	11
	15″ (381 mm), 15 ¼″ (387 mm), 23″ (584 mm)	93″ (2,362 mm), 105" (2,667 mm), 384″ (9,753 mm)	3 ½″ (89 mm)	13
	15″ (381 mm), 15 ¼″ (387 mm), 23″ (584 mm)	93″ (2,362 mm), 105" (2,667 mm)	3 ½″ (89 mm)	15
	15″ (381 mm), 15 ¼″ (387 mm), 19 ¼″ (489 mm), 23″ (584 mm), 48″ (1,219 mm)	48″ (1,219 mm), 93″ (2,362 mm), 105" (2,667 mm), 470″ (11,938 mm)	6 ¼″ (159 mm), 6 ½″ (165 mm)	19[2,3]
	15″ (381 mm)	93″ (2,362 mm), 105" (2,667 mm)	5 ½″ (139 mm)	20
	15″ (381 mm), 15 ¼″ (387 mm), 23″ (584 mm), 23 ¼″ (603 mm)	93″ (2,362 mm), 105" (2,667 mm)	5 ½″ (139 mm)	21
	23″ (584 mm)	48″ (1,219 mm)	6 ¾″ (171 mm)	22
	15″ (381 mm)	93″ (2,362 mm), 105" (2,667 mm)	5 ½″ (139 mm)	23
	15″ (381 mm), 16″ (406 mm), 19 ¼″ (489 mm), 23″ (584 mm), 24″ (609 mm)	48″ (1,219 mm), 300″ (7,620 mm) Rolls	9″ (229 mm), 10″ (254 mm)	30
	15 ½″ (394 mm), 23 ¾″ (603 mm)	48″ (1,219 mm)	8 ¼″ (209 mm)	30C
	15 ½″ (394 mm), 23 ¾″ (603 mm)	48″ (1,219 mm)	10 ¼″ (260 mm)	38C
	16″ (406 mm), 19 ¼″ (489 mm), 24″ (609 mm)	48″ (1,219 mm)	12 ½″ (317 mm)	38
	16″ (406 mm), 24″ (609 mm)	48″ (1,219 mm)	14″ (356 mm)	49
	Width	**Length**	**Thickness**	**R-Value**
Metal Frame Construction	16″ (406 mm), 24″ (609 mm)	96″ (2,438 mm)	2 ½ (63.5 mm)	8
	16″ (406 mm), 24″ (609 mm)	96″ (2,438 mm)	3 ½″ (89 mm)	11
	16″ (406 mm), 24″ (609 mm)	96″ (2,438 mm)	3 ½″ (89 mm)	13
	16″ (406 mm), 24″ (609 mm)	96″ (2,438 mm)	3 ½″ (89 mm)	15
	16″ (406 mm), 24″ (609 mm)	96″ (2,438 mm)	6 ½″ (165 mm)	19[1]
	16″ (406 mm), 24″ (609 mm)	96″ (2,438 mm)	6″ (152 mm)	21
	24″ (609 mm)	48″ (1,219 mm)	6 ¾″ (171 mm)	22
	16″ (406 mm), 24″ (609 mm)	96″ (2,438 mm)	8″ (203 mm)	25

[1] Delivers R-18 in a 6″ cavity
[2] 6 ¼″ Delivers R-18 in 5 ½″ cavity
[3] 6 ½″ Delivers R-17 in 5 ½″ cavity

Table 8. *PINK Next Gen™ Fiberglas® (Canada) Product Properties as Delivered*

Application	Width	Thickness	Length	Coverage	RSI	R-Value
Wood Frame	279 mm – 584 mm (11″ – 23″)	89 mm (3.5″)	1194 mm – 1346 mm (47″ – 53″)	9.10 m^2 – 14.24 m^2 (97.9 ft^2 – 153.3 ft^2)	2.1	12
Steel Frame	406 mm – 610 mm (16″ – 24″)	92 mm (3.625″)	1219 mm (48″)	9.91 m^2 – 14.86 m^2 (106.7 ft^2 – 160.0 ft^2)	2.1	12
Wood Frame	381 mm - 584 mm (15" - 23")	89 mm (3.5")	1194 mm (47")	7.28 m^2 – 11.16 m^2 (78.3 ft^2 – 120.1 ft^2)	2.4	14
Steel Frame	413 mm (16.25")	92 mm (3.625")	1219 mm (48")	8.05 m^2 (86.7 ft^2)	2.4	14
Wood Frame	279 mm - 584 mm (11" - 23")	152/140 mm (6"/5.5")	1194 mm - 1346 mm (47" - 53")	7.28 m^2 – 11.40 m^2 (78.3 ft^2 – 122.7 ft^2)	3.5/3.3	20/19
Steel Frame	406 mm - 610 mm (16" - 24")	152 mm (6")	1219 mm (48")	7.93 m^2 – 11.89 m^2 (85.3 ft^2 – 128.0 ft^2)	3.5	20
Wood Frame	381 mm - 584 mm (15" - 23")	140 mm (5.5")	1194 mm - 1346 mm (47" - 53")	4.55 m^2 – 6.97 m^2 (49.0 ft^2 – 75.1 ft^2)	3.9	22
Steel Frame	413 mm (16.25")	152 mm (6")	1219 mm (48")	5.03 m^2 (54.2 ft^2)	4	22.5
Wood Frame	375 mm - 578 mm (14.75" - 22.75")	140 mm (5.5")	1194 mm (47")	3.13 m^2 – 4.83 m^2 (33.7 ft^2 – 52.0 ft^2)	4.2	24
Steel Frame	413 mm (16.25")	152 mm (6")	1219 (48")	3.52 m^2 (37.9 ft^2)	4.2	24
Unrestricted Cavity	381 mm - 610 mm (15" - 24")	216 mm (8.5")	1219 mm (48")	4.64 m^2 – 7.43 m^2 (50.0 ft^2 – 70.0 ft^2)	4.9	28
Cavity Restricted	381 mm - 584 mm (15" - 23")	178 mm (7")	1219 mm (48")	2.79 m^2 – 4.27 m^2 (30.0 ft^2 – 46.0 ft^2)	4.9	28
Unrestricted Cavity	406 mm - 610 mm (16" - 24")	235 mm (9.25")	1219 mm (48")	3.96 m^2 – 5.95 m^2 (42.7 ft^2 – 64.0 ft^2)	5.4	31
Unrestricted Cavity	406 mm - 610 mm (16" - 24")	267 mm (10.5")	1219 mm (48")	3.47 m^2 – 5.20 m^2 (37.3 ft^2 – 56.0 ft^2)	6.1	35
Unrestricted Cavity	406 mm - 610 mm (16" - 24")	279 mm (11")	1219 mm (48")	2.97 m^2 – 4.46 m^2 (32.0 ft^2 – 48.0 ft^2)	7	40
Unrestricted Cavity	406 mm - 610 mm (16" - 24")	300 mm (11.8")	1219 mm (48")	2.97 m^2 – 4.46 m^2 (32.0 ft^2 – 48.0 ft^2)	7	40
Unrestricted Cavity	610 mm (24")	406 mm (16")	1219 mm (48")	3.72 m^2 (40.0 ft^2)	9.5	54

2.5 Flow Diagram



2.6 Material Composition

PINK Next Gen™ Fiberglas™ insulation consists of two major components, fiberglass and the binder system. The fiberglass is made from various inorganic materials, which are referred to as batch minerals. The use of glass cullet in the batch results in an average recycled content of 65% in unfaced PINK Next Gen™ Fiberglas™ insulation final products and an average recycled content of 55% in faced final products. The binder system consists of organic materials.

Table 9. *Batch and Binder Composition*

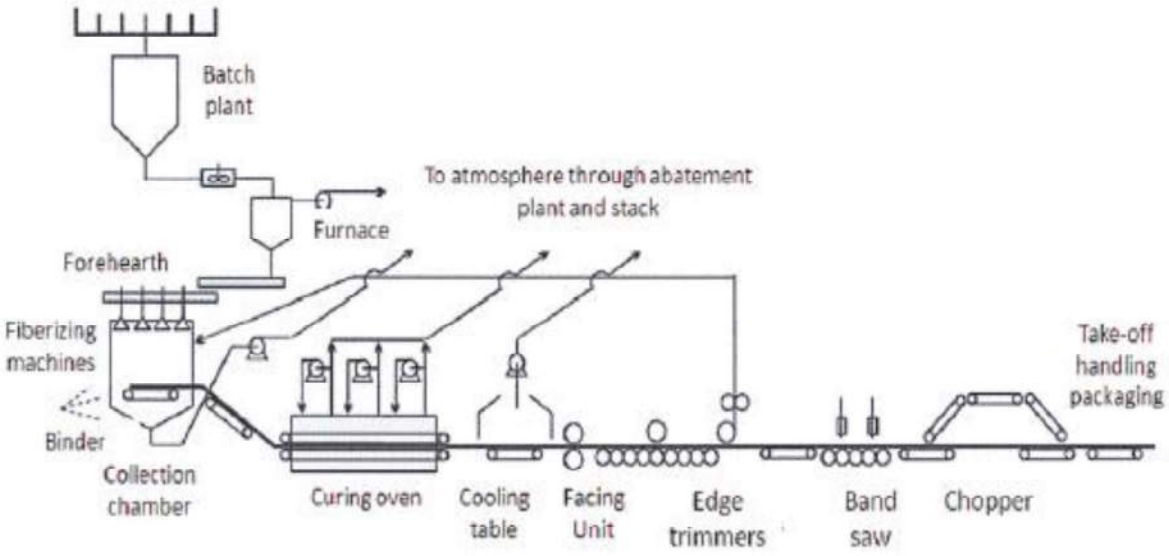
Component	Composition % (by Mass)
Batch	
Cullet	25-75%
Borates/Ulexite	10-30%
Sand	8-25%
Soda Ash	0.5-6%
Lime	0-5%
Other Oxides	1-2%
Binder	
Carbohydrate Polyol	2-10%
Bio-based Polycarboxylic Acid	1-5%
Cure Accelerator	0.2-1%
Surfactant	0-0.1%
Vegetable Oil	0-3.5%
Silane	0.03-0.1%
Pink Colorant	0.1-0.2%

2.7 Manufacture

Owens Corning North American Insulation manufacturing locations can be found across the United States and Canada. Product covered by this Environmental Product Declaration was produced in the following locations:

Delmar Plant Delmar, NY, USA	**Nephi Plant**[1] Nephi, UT, USA
Edmonton Plant Edmonton, Alberta, Canada	**Newark Plant** Newark, OH, USA
Eloy Plant Eloy, AZ, USA	**Toronto Plant** Toronto, Ontario, Canada
Fairburn Plant Fairburn, GA, USA	**Waxahachie Plant** Waxahachie, TX, USA
Kansas City Plant Kansas City, KS, USA	

[1] The Nephi plant was not included in the underlying LCA study due to limited data at the time of the study.



The diagram above represents the manufacturing process for bonded fiberglass insulation product, such as batt or roll. All varieties of product described are not produced at all locations listed above, but there are no significant process differences between locations.

2.8 Packaging

PINK Next Gen™ Fiberglas™ insulation is compression packaged in exclusive SpaceSaver™ packaging. Fiberglass insulation batts are packaged in copolymer polyethylene bags. All batts in rolls or continuous rolls are evenly rolled and packaged individually for unitizing. The rolls are unitized in a SpaceSaver™ sleeve made from polypropylene. Some products include a Kraft paper overwrap.

Table 10. *Packaging for 1 m^2 of PINK Next Gen™ Fiberglas™ insulation*

Packaging Material
Bonded Bags (LDPE)
Sleeves (polypropylene)
Overwraps (paper)
Liners (polyethylene)

Per the PCR regional packaging scenarios, the following dispositions are assumed:

Table 11. *Waste Treatment of Packaging*

Country/Region	Material Type	Recycling Rate	Landfill Rate	Incineration Rate
Canada	Plastics	78%	22%	0%
	Other	20%	80%	0%
United States	Plastics	15%	68%	17%
	Pulp (cardboard, paper)	75%	20%	5%

2.9 Transportation

The outbound transportation or distribution includes the transportation of the finished product to customers primarily by diesel semi-truck. The weighted average outbound transportation distance from the specified location to the building site is 575 km.

2.10 Product Installation

PINK Next Gen™ Fiberglas™ insulation is easy to handle and install. Sized for installation in either wood or metal frame construction, it is designed to be friction fit into place. The insulation should completely fill, and fit snugly within, all framing cavities, with no voids, areas of compression, or gaps between the insulation and framing members. Trimming and fabrication can be done with a utility knife and can be cut to fit into odd-shaped cavities and small spaces. PINK Next Gen™ Fiberglas™ insulation is soft as cotton and shed-resistant. It also has excellent recovery and stiffness, enabling fast installation.

Wall Installation

If the friction fit of faced batts does not sufficiently hold the insulation in place, a minimal amount of staples can be utilized to secure the insulation to the framing.

Floor Installation

PINK Next Gen™ Fiberglas™ insulation should friction fit in 2x lumber joists and trusses. For I-joists, the insulation will sit on the bottom flage. It must be full 16 inches or 24 inches wide when used with I-joists. Insulation should be pushed in with just enough force to ensure it is fully in the cavity but not compressed. Each batt should be installed until the length of the cavity is filled. The last piece should be measured and cut to fit. If needed, wire ties may be added to hold insulation in place until finish ceiling is added. Acoustic applications do not require the cavity to be filled. Since location of the batt in the cavity does not affect acoustic performance, it is recommended that the batt is placed at the bottom of the cavity, so it can be supported by the finish ceiling.

Crawl Space Installation

For crawl spaces, PINK Next Gen™ Fiberglas™ insulation must be full 16 inches or 24 inches wide when used with I-joints. Insulation should be pushed in with just enough force to ensure it is fully in contact with the air barrier of the conditioned space side of the assembly, but not compressed. The last piece should be measured and cut to fit. Mechanical support shall be provided to maintain insulation contact with air barrier of the conditioned side of the assembly, and such support shall be installed at intervals no greater than 2 feet and so as to not compress the insulation.

Attic Installation

Baffles should be installed as needed along the soffit to ensure ventilation path along the roof deck. Installation should begin in areas farthest from the attic access and work back to the attic access. Full-width batts will butt together over framing if insulation is taller than the thickness of framing (e.g., trusses). Three inches of space should remain around non-IC rated light fixtures, but insulation can remain in contact with and go over IC rated light fixtures.

2.11 Use

Insulation is a passive device that requires no extra utilities or maintenance to operate over its useful life.

2.12 Reference Service Life and Estimated Building Service Life

As prescribed in the applicable PCR, the Reference Service Life (RSL) of the insulation product is 75 years, which aligns with an assumed building Estimated Service Life (ESL) of 75 years, for the purposes of this study.

2.13 Re-use Phase

PINK Next Gen™ Fiberglas™ insulation can be reused if it remains clean and dry. Recycling programs do not currently exist for fiberglass insulation.

2.14 Disposal

It was assumed that all materials removed from the decommissioning of a building were taken to a local construction waste landfill, using 100 miles (or 161 km) as the average distance to landfill.

3. LCA: Calculation Rules

3.1 Functional Unit

1m^2 of installed insulation material with a thickness that gives an average thermal resistance RSI = 1m^{2}K/W and with a building service life of 75 years, including packaging.

Product Average

The results of this declaration represent an average performance for the listed products. Reported area weights for included products and production locations were taken from quality control data to create a weighted average which was used to determine the functional unit mass for the LCA.

Table 12. *Functional unit and reference flows*

Functional Unit	Thickness to Achieve FU (m)	Reference flow (kg/m^2)
1 m² of insulation with a thickness required for an average thermal resistance RSI = 1 m²K/W	4.40E-02	3.54E-01

Table 13. *Declared Unit Properties of Facing Materials*

Facing	Mass of Declared Unit (1 m^2)
Foil	1.32E-01
Foil-Scrim-Kraft (FSK)	1.76E-01
Kraft with Asphalt	1.00E-01
Kraft with LDPE	7.05E-02

3.2 System Boundary

This declaration is a product-specific EPD and is cradle-to-installation with end-of-life. Details of the system boundaries may be found in the diagrams below.

Table 14. *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	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	MND	X	MND

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

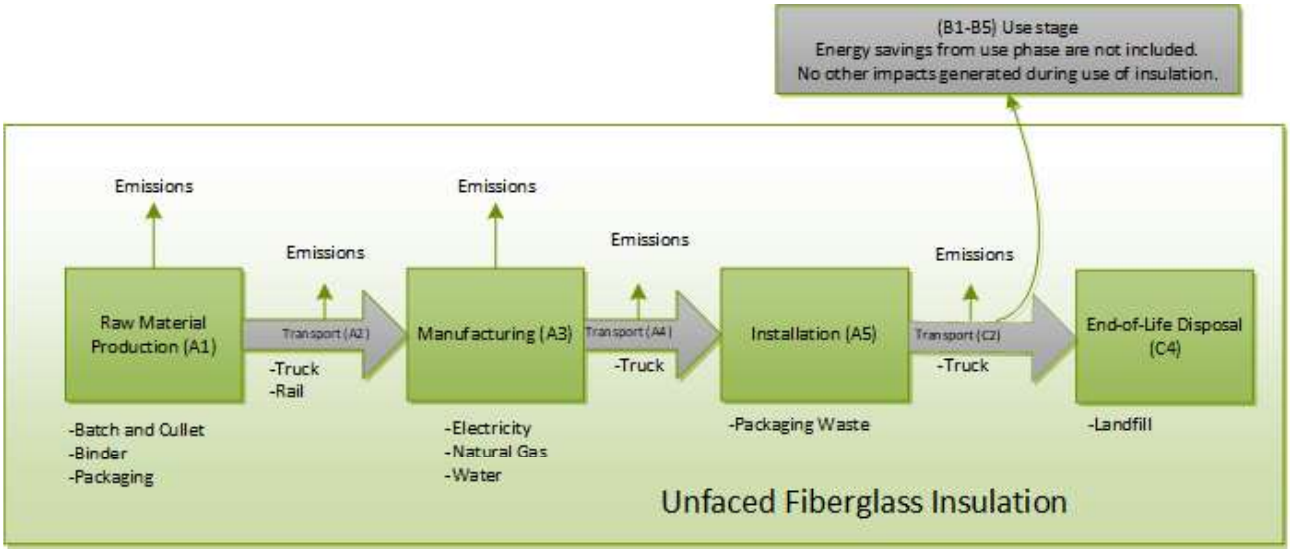


Figure 1. *Flow diagram/System Boundary for Unfaced Insulation*

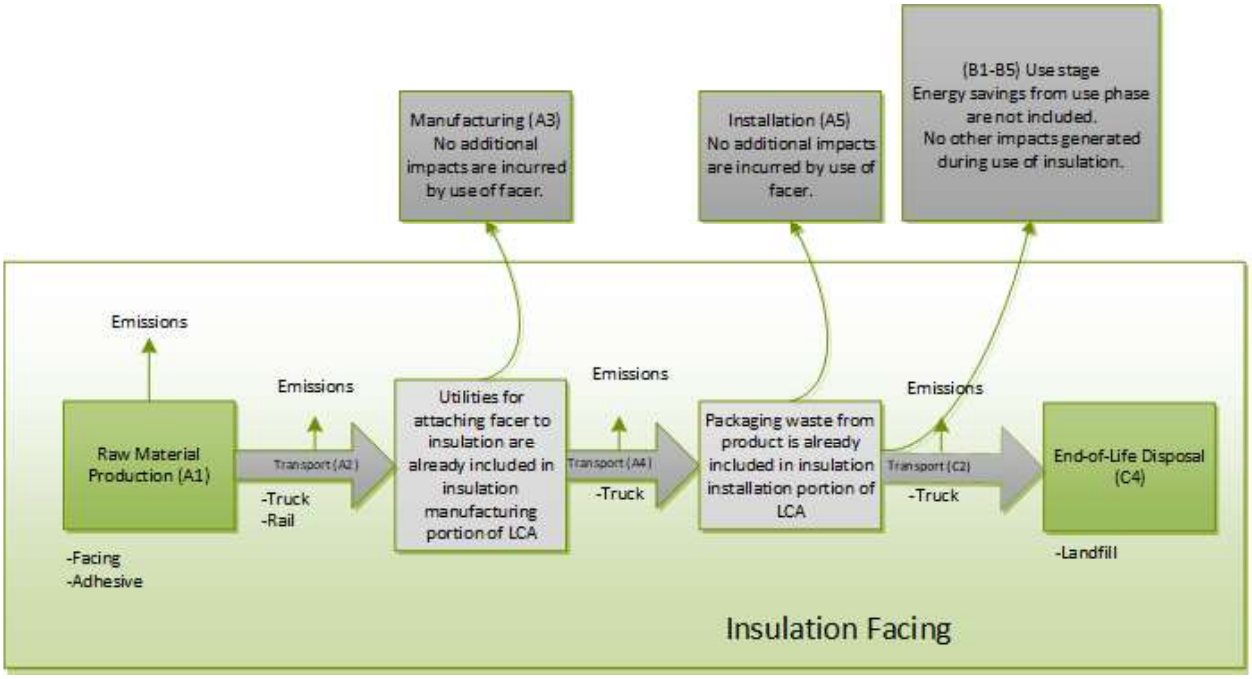


Figure 2. *Flow diagram/System Boundary for Insulation Facing*

3.3 Estimates and Assumptions

Since insulation is a passive device, it is assumed that no utility source or maintenance is needed during the use stage.

3.4 Cut-off criteria

The underlying LCA study is in compliance with the cutoff criteria specified in the PCR. Due to the long lifetime of equipment, capital goods and infrastructure flows were excluded as having a negligible impact on the conclusions of the LCA.

3.5 Background Data

Primary manufacturing data was collected from the included manufacturing locations listed in the Manufacturing section. Secondary data primarily reference the ecoinvent 3.9.1 database.

Table 15. *Data Sources*

Flow		Dataset	Database Source(s)
Product Materials			
Cullet	Batch	Glass cullet, sorted {RoW}| treatment of waste glass from unsorted public collection, sorting | Cut-off, U	Ecoinvent 3.9.1
Borates/Ulexite	Batch	Borax, anhydrous, powder {RoW}| borax production, anhydrous, powder | Cut-off, U	Ecoinvent 3.9.1
Sand	Batch	Silica sand {RoW}| silica sand production | Cut-off, U	Ecoinvent 3.9.1
Soda Ash	Batch	Soda ash, dense {GLO}| modified Solvay process, Hou's process | Cut-off, U	Ecoinvent 3.9.1
Lime	Batch	Dolomite {RoW}| dolomite production | Cut-off, U	Ecoinvent 3.9.1
		Limestone, crushed, for mill {RoW}| limestone production, crushed, for mill | Cut-off, U	Ecoinvent 3.9.1
Other Oxides	Batch	Manganese dioxide {GLO}| manganese dioxide production | Cut-off, U	Ecoinvent 3.9.1
Carbohydrate Polyol	Binder	Maize starch {RoW}| maize starch production | Cut-off, U	Ecoinvent 3.9.1
		Tap water {RoW}| market for tap water | Cut-off, U	Ecoinvent 3.9.1
Bio-based Polycarboxylic Acid	Binder	Citric acid {RNA}| citric acid production | Cut-off, U	Ecoinvent 3.9.1
		Tap water {RoW}| market for tap water | Cut-off, U	Ecoinvent 3.9.1
Cure Accelerator	Binder	Sodium phosphate {RoW}| sodium phosphate production | Cut-off, U	Ecoinvent 3.9.1
		Tap water {RoW}| market for tap water | Cut-off, U	Ecoinvent 3.9.1
Surfactant	Binder	Sodium sulfite {RoW}| sodium sulfite production | Cut-off, U	Ecoinvent 3.9.1
		Tall oil, crude {RER}| containerboard production, fluting medium, semichemical | cut-off, U	Ecoinvent 3.9.1
		Tap water {RoW}| market for tap water | Cut-off, U	Ecoinvent 3.9.1
Vegetable Oil	Binder	Vegetable oil, refined {GLO}| soybean oil, refined, to generic market for vegetable oil, refined | Cut-off, U	Ecoinvent 3.9.1
Silane	Binder	Silicon tetrahydride {GLO}| silicon hydrochloration | Cut-off, U	Ecoinvent 3.9.1
		Tap water {RoW}| market for tap water | Cut-off, U	Ecoinvent 3.9.1
Pink Colorant	Binder	Triethanolamine {RoW}| ethanolamine production | Cut-off, U	Ecoinvent 3.9.1
		Propylene glycol, liquid {RoW}| propylene glycol production, liquid | Cut-off, U	Ecoinvent 3.9.1
		Tap water {RoW}| market for tap water | Cut-off, U	Ecoinvent 3.9.1
Bags	Packaging	Polyethylene, low density, granulate {RoW}| polyethylene production, low density, granulate | Cut-off, U	Ecoinvent 3.9.1
		Extrusion, plastic film {RoW}| extrusion, plastic film | Cut-off, U	Ecoinvent 3.9.1
Sleeves	Packaging	Polypropylene, granulate {RoW}| polypropylene production, granulate | Cut-off, U	Ecoinvent 3.9.1
		Extrusion, plastic film {RoW}| extrusion, plastic film | Cut-off, U	Ecoinvent 3.9.1
Overwraps	Packaging	Kraft paper {RoW}| kraft paper production | Cut-off, U	Ecoinvent 3.9.1
Liners	Packaging	Polyethylene, low density, granulate {RoW}| polyethylene production, low density, granulate | Cut-off, U	Ecoinvent 3.9.1
		Extrusion, plastic film {RoW}| extrusion, plastic film | Cut-off, U	Ecoinvent 3.9.1
Electricity/Heat/Resources for Manufacturing			
Electricity - Delmar		Electricity, medium voltage {NPCC, US only}| market for electricity, medium voltage | Cut-off, U	Ecoinvent 3.9.1
Electricity - Edmonton		Electricity, medium voltage {CA-AB}| market for electricity, medium voltage | Cut-off, U	Ecoinvent 3.9.1
Electricity - Eloy		Electricity, medium voltage {AZ}| market for electricity, medium voltage | Cut-off, U	Ecoinvent 3.9.1

Flow	Dataset	Database Source(s)
Electricity – Fairburn	Electricity, medium voltage {SERC}| market for electricity, medium voltage | Cut-off, U	Ecoinvent 3.9.1
Electricity – Kansas City	Electricity, medium voltage {MRO, US only}| market for electricity, medium voltage | Cut-off, U	Ecoinvent 3.9.1
Electricity – Newark	Electricity, medium voltage {RFC}| market for electricity, medium voltage | Cut-off, U	Ecoinvent 3.9.1
Electricity - Toronto	Electricity, medium voltage {CA-ON}| market for electricity, medium voltage | Cut-off, U	Ecoinvent 3.9.1
Electricity – Waxahachie	Electricity, medium voltage {TRE}| market for electricity, medium voltage | Cut-off, U	Ecoinvent 3.9.1
Natural Gas – Canadian Plants (Volume)	Natural gas, high pressure {CA}| market for natural gas, high pressure | Cut-off, U	Ecoinvent 3.9.1
Natural Gas – US Plants (volume)	Natural gas, high pressure {US}| market for natural gas, high pressure | Cut-off, U	Ecoinvent 3.9.1
Water – All Plants, except Toronto	Tap water {RoW}| market for tap water | Cut-off, U	Ecoinvent 3.9.1
Water – Toronto	Tap water {CA-QC}| market for tap water | Cut-off, U	Ecoinvent 3.9.1
Oxygen	Oxygen, liquid {RoW}| market for oxygen, liquid | Cut-off, U	Ecoinvent 3.9.1
Transportation		
Rail	Transport, freight train {US}| transport, freight train, diesel | Cut-off, U	Ecoinvent 3.9.1
Truck	Transport, freight, lorry >32 metric ton, EURO6 {RoW}| transport, freight, lorry >32 metric ton, EURO6 | Cut-off, U	Ecoinvent 3.9.1
Oceanic vessel (ship)	Transport, freight, sea, container ship {GLO}| market for transport, freight, sea, container ship | Cut-off, U	Ecoinvent 3.9.1

3.6 Data Quality

Primary data was based on measured and calculated data from all current North American Owens Corning plants which were producing the product in calendar year 2022. For the Toronto Plant, data from 2021 were used to align more closely with the current product design. It meets requirements for completeness along with temporal, geographical and technological representativeness. Background data was taken from the ecoinvent database, which is on the approved database list in the PCR.

Table 16. *Data quality assessment*

Data Quality Parameter	Data Quality Discussion
Time-related Coverage: Age of data and the minimum length of time over which data is collected	Primary data were based on Owens Corning's annual operations during calendar year 2022 (2021 for the Toronto Plant), consistent with the goal and scope of this analysis. The time coverage of secondary data used from the LCI databases is discussed in the Background Data section.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	The geographical coverage for this study is the USA and Canada. As such, data were sourced from two facilities in Canada and six facilities in the USA. Facility details can be found in each product section since not all products are produced at all facilities. The geographical coverage of the secondary data used from the LCI databases is discussed in the Background Data section.
Technology Coverage: Specific technology or technology mix	Technological representativeness was based on primary manufacturing data from the eight Owens Corning facilities included in the study.
Precision: Measure of the variability of the data values for each data expressed	Primary data were based on measured and calculated data from all the Owens Corning plants which manufacture products covered by this study. The facility data were collected for the reference year 2022 (2021 for Toronto), and several sources were used to compare collected values and ensure precision. The data precision is therefore deemed to be of high quality for all measured and calculated data.
Completeness: Percentage of flow that is measured or estimated	All relevant process steps within the system boundary were considered. The primary data provided for fiberglass insulation manufacturing were benchmarked with data collected for previous models which have undergone third party review.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest	Data sets used in the underlying LCA study were selected based on the most appropriate temporal, geographical, and technological representation of the actual processes and technology. These data sets reflect average processes from multiple sources, and thus generally represent the actual technology utilized to produce the materials. Still, it is often unknown the extent to which secondary data sets deviate from the specific system being studied
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	To ensure consistency, only primary data of the same level of detail and equivalent time interval (i.e., one calendar year) were used, and allocation was conducted similarly for all data categories and life cycle stages. All background data were sourced from the ecoinvent 3.9.1 database selecting the most appropriate geography.
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	The reproducibility of the study results is merited by the scope information provided in the underlying LCA report. Due to confidentiality of the data values, however, certain details were omitted from this public facing EPD, which may limit reproducibility by the public.
Sources of the Data: Description of all primary and secondary data sources	Primary data for raw material consumption, inbound transportation, annual production, energy consumption, water consumption, emissions to air, waste generation, packaging usage, distribution of finished goods, waste generation during installation, and installation practices were used in this study. Secondary data sets were selected from the ecoinvent 3.9.1 database.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Because the quality of secondary data is not as good as primary data, the use of secondary data becomes an inherent limitation of the study. Secondary data may cover a broad range of technologies, time periods, and geographical locations. Because hundreds of data sets are linked together and because it is often unknown how much the secondary data used deviate from the specific system being studied, quantifying data uncertainty for the complete system becomes very challenging. As a result, it is not possible to provide a reliable quantified assessment of overall data uncertainty for this study.

3.7 Period under review

The period of review is calendar year 2022 for all plants except Toronto. During 2022, Toronto ran an alternate technology on its products, but reverted in 2023, so the 2021 calendar year was selected as most representative of product moving forward.

3.8 Allocation

Allocation of primary data was used in this study. In some cases, primary data collected from manufacturing sites were provided on a facility-wide basis and then allocated to the specific insulation product based on production volume (by mass). The types of production activities for the products manufactured at a given manufacturing facility are similar, so mass allocation is considered an acceptable allocation strategy.

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. In addition, comparability of EPDs is limited to those applying a functional unit.

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of Building Envelope Thermal Insulation 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 constructions works energy use phase as instructed under this PCR. Full conformance with the PCR for Building Envelope Thermal Insulation products allows EPD comparability only when all stages of a life cycle have been considered, when they comply with all referenced standards, use the same sub-category Part B PCR, and use equivalent scenarios with respect to construction works. However, variation and deviations are possible.

4. LCA: Scenarios and Additional Technical Information

4.1 Transport to the Building Site (A4)

Table 17. *Product distribution parameters, per functional unit, for fiberglass insulation*

Name	Unit	Unfaced Fiberglass Insulation	Foil-faced Fiberglass Insulation	FSK-faced Fiberglass Insulation	Kraft-asphalt-faced Fiberglass Insulation	Kraft-LDPE-faced Fiberglass Insulation
Vehicle type	-	EURO6, lorry >32 metric ton				
Fuel type	-	Low-sulfur diesel				
Liters of fuel	l/100km	8.02E-04	1.10E-03	1.20E-03	1.03E-03	9.62E-04
Transport distance	km	6.13E+02	6.01E+02	1.00E+03	1.51E+03	1.14E+03
Capacity utilization	%	50				
Gross density of products transported	kg/m^3	8.05E+00	1.10E+01	1.20E+01	1.03E+01	9.65E+00
Capacity utilization volume factor	-	≥1				

4.2 Installation into the Building (A5)

Table 18. *Installation summary, per functional unit, for fiberglass insulation*

Name	Unit	Unfaced Fiberglass Insulation	Foil-faced Fiberglass Insulation	FSK-faced Fiberglass Insulation	Kraft-asphalt-faced Fiberglass Insulation	Kraft-LDPE-faced Fiberglass Insulation
Ancillary materials (per m^2)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Water consumption specified by water source and fate	m^3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other resources	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Electricity consumption	kwh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other energy carriers	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Product loss per functional unit	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Waste materials at the construction site before waste processing, generated by product installation	kg	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03
Output materials resulting from on-site waste processing	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mass of packaging waste specified by type	kg	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03
Recycle (US / Canada)	kg	*1.22E-03 / 6.35E-03*	*1.22E-03 / 6.35E-03*	*1.22E-03 / 6.35E-03*	*1.22E-03 / 6.35E-03*	*1.22E-03 / 6.35E-03*
Landfill (US / Canada)	kg	*5.54E-03 / 1.79E-03*	*5.54E-03 / 1.79E-03*	*5.54E-03 / 1.79E-03*	*5.54E-03 / 1.79E-03*	*5.54E-03 / 1.79E-03*
Incineration (US / Canada)	kg	*1.38E-03 / 0.00E+00*	*1.38E-03 / 0.00E+00*	*1.38E-03 / 0.00E+00*	*1.38E-03 / 0.00E+00*	*1.38E-03 / 0.00E+00*
Biogenic carbon contained in packaging	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Direct emissions to ambient air, soil, and water	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VOC content	$\mu g/m^3$	None detected				

4.3 Reference Service Life

Table 19. *Reference Service Life, per functional unit, for unfaced fiberglass insulation*

Name	Unit	Unfaced Fiberglass Insulation	Foil-faced Fiberglass Insulation	FSK-faced Fiberglass Insulation	Kraft-asphalt-faced Fiberglass Insulation	Kraft-LDPE-faced Fiberglass Insulation	Comment
RSL	years	75					N/A
Declared product properties (at the gate) and finishes, etc	Not applicable						Insulation properties require installation into a building
Design application parameters (if instructed by the manufacturer), including references to the appropriate practices and application codes	Install per instructions						N/A
An assumed quality of work, when installed in accordance with the manufacturer's instructions	Will meet R-value						Installer should install per manufacturer instructions
Outdoor environment, (if relevant for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	Not applicable						Indoor application
Indoor environment, (if relevant for indoor applications), e.g. temperature, moisture, chemical exposure	Product should be kept dry						N/A
Use conditions, e.g. frequency of use, mechanical exposure	Not applicable						Insulation is a passive product which is not used directly during life
Maintenance, e.g. required frequency, type and quality of replacement components	None needed						Insulation does not need maintenance during its use

4.4 End-of-Life (C1-C4)

Table 20. *End-of-Life summary, per functional unit, for fiberglass insulation*

End-of-life		Unit	Unfaced Fiberglass Insulation	Foil-faced Fiberglass Insulation	FSK-faced Fiberglass Insulation	Kraft-asphalt-faced Fiberglass Insulation	Kraft-LDPE-faced Fiberglass Insulation
Assumptions for scenario development		Although reuse and recycling of fiberglass insulation at its end of life is possible, there are no formal programs for collection and transport. It is assumed that all product is sent to landfill at end of life.					
Collection process	Collected separately	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Collected with mixed construction waste	kg	3.54E-01	4.86E-01	5.30E-01	4.54E-01	4.25E-01
Disposition	Reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Landfill	kg	3.54E-01	4.86E-01	5.30E-01	4.54E-01	4.25E-01
Removals of biogenic carbon (excluding packaging)[1]		kg CO_2	4.60E-02				

[1]Biogenic carbon removals resulting from the use of bio-based binder.

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. All values in the tables below are rounded to three significant digits. The following impact indicators, specified by the PCR, are reported below

Table 21. *Life Cycle Impact Assessment Indicators and characterization methods used*

Abbreviation	Impact Category	Unit	Characterization Method
GWP 100a	Global Warming Potential, IPCC 2013	[kg CO_2]	IPCC 2013 (AR5)
ODP	Ozone Depletion Potential	kg CFC-11 eq	TRACI 2.1
AP	Acidification Potential	kg SO2 eq	TRACI 2.1
EP	Eutrophication Potential	Kg N eq	TRACI 2.1
SFP	Smog Formation Potential	kg O3 eq	TRACI 2.1
ADP_{fossil}	Abiotic Resource Depletion Potential of Non-renewable (fossil) energy resources (ADPfossil)	MJ, LHV	CML-baseline v4.7
GWP 100a	Global Warming Potential, IPCC 2021	kg CO_2 eq	IPCC 2021 (AR6)

These 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.

Table 22. *Additional transparency indicators used*

Resources	Unit	Waste and Outflows	Unit
RPR_E: Renewable primary energy 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]
RPR_T: Total use of renewable primary resources with energy content	[MJ, LHV]	**HLRW**: High-level radioactive waste, conditioned, to final repository	[kg] or [m^3]
$NRPR_E$: Non-renewable primary resources used as an energy carrier (fuel)	[MJ, LHV]	**ILLRW**: Intermediate- and low-level radioactive waste, conditioned, to final repository	[kg] or [m^3]
$NRPR_M$: Non-renewable primary resources with energy content used as material	[MJ, LHV]	**CRU**: Components for re-use	[kg]
$NRPR_T$: Total use of non-renewable primary resources with energy content	[MJ, LHV]	**MR**: Materials for recycling	[kg]
SM: Secondary materials	[kg]	**MER**: Materials for energy recovery	[kg]
RSF: Renewable secondary fuels	[MJ, LHV]	**EE**: Recovered energy exported from the product system	MJ, heating value ([Hi] lower heating value) per energy carrier
NRSF: Non-renewable secondary fuels	[MJ, LHV]		
RE: Recovered energy	[MJ, LHV]		
FW: Use of net fresh water resources	[m^3]		

Table 23. *Carbon Emissions and Removals*

Parameter	Unit
BCRP: Biogenic Carbon Removal from Product	[kg CO2]
BCEP: Biogenic Carbon Emission from Product	[kg CO2]
BCRK: Biogenic Carbon Removal from Packaging	[kg CO2]
BCEK: Biogenic Carbon Emission from Packaging	[kg CO2]
BCEW: Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes	[kg CO2]
CCE: Calcination Carbon Emissions	[kg CO2]
CCR: Carbonation Carbon Removals	[kg CO2]
CWNR: Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes	[kg CO2]

Table 24. *North American Life Cycle Impact Assessment (LCIA) results for 1 m^2 unfaced insulation at R_{SI} = 1*

Impact Category	Unit	A1 – A3	A4	A5	C2	C4
GWP 100[1]	[kg CO_2 eq]	6.59E-01	2.21E-02	3.32E-03	5.80E-03	2.16E-03
ODP	[kg CFC-11 eq]	6.95E-09	4.11E-10	4.55E-12	1.08E-10	6.70E-11
AP	[kg SO_2 eq]	1.86E-03	5.21E-05	9.69E-07	1.37E-05	1.45E-05
EP	[kg N eq]	3.41E-03	1.88E-05	5.86E-05	4.93E-06	2.48E-06
SFP	[kg O_3 eq]	3.11E-02	9.35E-04	2.45E-05	2.46E-04	3.86E-04
ADP_{fossil}	[MJ, LHV]	8.73E+00	3.28E-01	3.29E-03	8.62E-02	5.30E-02
IPCC GWP 100a (2021)[2]	[kg CO_2 eq]	6.58E-01	2.21E-02	3.31E-03	5.79E-03	2.15E-03

[1]The GWP 100 impacts are based on 100-year time horizon GWP factors provided by the IPCC 2013 Fifth Assessment Report (AR5).
[2]100-year time horizon GWP factors as provided by the Sixth Assessment Report (AR6) shall be used for conformance with ISO 21930, Section 7.3.

Table 25. *North American Life Cycle Impact Assessment (LCIA) results for 1 m^2 of facing material*

Foil						
Impact Category	**Unit**	**A1 - A3**	**A4**	**A5**	**C2**	**C4**
GWP 100[1]	[kg CO_2 eq]	5.16E-01	7.67E-03	0.00E+00	2.15E-03	8.04E-04
ODP	[kg CFC-11 eq]	6.17E-08	1.43E-10	0.00E+00	3.99E-11	2.50E-11
AP	[kg SO_2 eq]	2.70E-03	1.81E-05	0.00E+00	5.06E-06	5.42E-06
EP	[kg N eq]	1.94E-03	6.52E-06	0.00E+00	1.83E-06	9.23E-07
SFP	[kg O_3 eq]	3.37E-02	3.24E-04	0.00E+00	9.09E-05	1.44E-04
ADP_{fossil}	[MJ, LHV]	7.22E+00	1.14E-01	0.00E+00	3.19E-02	1.97E-02
IPCC GWP 100a (2021)[2]	[kg CO_2 eq]	5.16E-01	7.65E-03	0.00E+00	2.14E-03	8.02E-04
FSK						
Impact Category	**Unit**	**A1 - A3**	**A4**	**A5**	**C2**	**C4**
GWP 100[1]	[kg CO_2 eq]	6.98E-01	1.02E-02	0.00E+00	2.86E-03	1.07E-03
ODP	[kg CFC-11 eq]	1.36E-08	1.90E-10	0.00E+00	5.33E-11	3.33E-11
AP	[kg SO_2 eq]	3.70E-03	2.41E-05	0.00E+00	6.75E-06	7.22E-06
EP	[kg N eq]	2.37E-03	8.69E-06	0.00E+00	2.43E-06	1.23E-06
SFP	[kg O_3 eq]	4.75E-02	4.33E-04	0.00E+00	1.21E-04	1.91E-04
ADP_{fossil}	[MJ, LHV]	8.10E+00	1.52E-01	0.00E+00	4.25E-02	2.63E-02
IPCC GWP 100a (2021)[2]	[kg CO_2 eq]	6.97E-01	1.02E-02	0.00E+00	2.86E-03	1.07E-03
Kraft-asphalt						
Impact Category	**Unit**	**A1 - A3**	**A4**	**A5**	**C2**	**C4**
GWP 100[1]	[kg CO_2 eq]	1.53E-01	2.60E-02	0.00E+00	1.64E-03	6.10E-04
ODP	[kg CFC-11 eq]	5.15E-09	4.84E-10	0.00E+00	3.05E-11	1.89E-11
AP	[kg SO_2 eq]	5.88E-04	6.14E-05	0.00E+00	3.86E-06	4.11E-06
EP	[kg N eq]	1.03E-03	2.21E-05	0.00E+00	1.39E-06	7.01E-07
SFP	[kg O_3 eq]	9.61E-03	1.10E-03	0.00E+00	6.94E-05	1.09E-04
ADP_{fossil}	[MJ, LHV]	3.46E+00	3.87E-01	0.00E+00	2.43E-02	1.50E-02
IPCC GWP 100a (2021)[2]	[kg CO_2 eq]	1.53E-01	2.60E-02	0.00E+00	1.64E-03	6.09E-04

Kraft-LDPE						
Impact Category	Unit	A1 - A3	A4	A5	C2	C4
GWP 100[1]	[kg CO_2 eq]	1.13E-01	5.47E-03	0.00E+00	1.16E-03	4.30E-04
ODP	[kg CFC-11 eq]	1.95E-09	1.02E-10	0.00E+00	2.15E-11	1.34E-11
AP	[kg SO_2 eq]	4.88E-04	1.29E-05	0.00E+00	2.72E-06	2.90E-06
EP	[kg N eq]	1.04E-03	4.65E-06	0.00E+00	9.83E-07	4.94E-07
SFP	[kg O_3 eq]	8.12E-03	2.31E-04	0.00E+00	4.89E-05	7.68E-05
ADP_{fossil}	[MJ, LHV]	1.76E+00	8.12E-02	0.00E+00	1.72E-02	1.06E-02
IPCC GWP 100a (2021)[2]	[kg CO_2 eq]	1.12E-01	5.46E-03	0.00E+00	1.15E-03	4.29E-04

[1]The GWP 100 impacts are based on 100-year time horizon GWP factors provided by the IPCC 2013 Fifth Assessment Report (AR5).
[2]100-year time horizon GWP factors as provided by the Sixth Assessment Report (AR6) shall be used for conformance with ISO 21930, Section 7.3.

Table 26. *Resource Use Indicator Results for 1 m^2 unfaced insulation at R_{SI} = 1*

Resource Use	Unit	A1 – A3	A4	A5	C2	C4
RPR_E	[MJ, LHV]	1.16E+00	4.21E-03	5.14E-05	1.11E-03	4.54E-04
RPR_M	[MJ, LHV]	5.14E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	[MJ, LHV]	1.06E+01	3.33E-01	3.35E-03	8.74E-02	5.36E-02
$NRPR_M$	[MJ, LHV]	3.11E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	[kg]	2.56E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	7.64E-03	5.31E-05	1.68E-06	1.39E-05	5.69E-05

Table 27. *Resource Use Indicator Results for 1 m^2 of facing material*

Foil						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
RPR_E	[MJ, LHV]	2.75E+00	1.46E-03	0.00E+00	4.09E-04	1.69E-04
RPR_M	[MJ, LHV]	9.14E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	[MJ, LHV]	7.36E+00	1.16E-01	0.00E+00	3.24E-02	2.00E-02
$NRPR_M$	[MJ, LHV]	2.29E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	2.34E-03	1.84E-05	0.00E+00	5.16E-06	2.12E-05

FSK						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
RPR_E	[MJ, LHV]	2.62E+00	1.95E-03	0.00E+00	5.46E-04	2.25E-04
RPR_M	[MJ, LHV]	7.81E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	[MJ, LHV]	8.42E+00	1.54E-01	0.00E+00	4.31E-02	2.66E-02
$NRPR_M$	[MJ, LHV]	1.99E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	4.45E-03	2.46E-05	0.00E+00	6.88E-06	2.83E-05
Kraft-asphalt						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
RPR_E	[MJ, LHV]	2.67E+00	4.96E-03	0.00E+00	3.12E-04	1.28E-04
RPR_M	[MJ, LHV]	1.97E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	[MJ, LHV]	3.53E+00	3.92E-01	0.00E+00	2.47E-02	1.52E-02
$NRPR_M$	[MJ, LHV]	1.59E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	1.02E-03	6.26E-05	0.00E+00	3.94E-06	1.61E-05
Kraft-LDPE						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
RPR_E	[MJ, LHV]	2.70E+00	1.04E-03	0.00E+00	2.20E-04	9.04E-05
RPR_M	[MJ, LHV]	9.69E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
$NRPR_E$	[MJ, LHV]	1.87E+00	8.24E-02	0.00E+00	1.74E-02	1.07E-02
$NRPR_M$	[MJ, LHV]	4.08E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SM	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RE	[MJ, LHV]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m^3]	1.08E-03	1.31E-05	0.00E+00	2.78E-06	1.13E-05

Table 28. *Waste and Output Flow Indicator Results for 1 m² unfaced insulation at R_{SI} = 1*

Resource Use	Unit	A1 – A3	A4	A5	C2	C4
HWD	[kg]	3.37E-05	2.10E-06	2.15E-08	5.52E-07	2.84E-07
NHWD	[kg]	1.16E-01	2.90E-02	1.26E-02	7.61E-03	7.08E-01
HLRW	[kg]	1.92E-05	2.11E-08	2.52E-10	5.55E-09	2.27E-09
ILLRW	[kg]	1.81E-05	5.14E-08	6.23E-10	1.35E-08	5.65E-09
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	[kg]	1.91E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 29. *Waste and Output Flow Indicator Results for 1 m² of facing material*

Foil						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
HWD	[kg]	1.10E-04	7.29E-07	0.00E+00	2.04E-07	1.06E-07
NHWD	[kg]	1.01E-01	1.00E-02	0.00E+00	2.81E-03	2.64E-01
HLRW	[kg]	5.59E-07	7.34E-09	0.00E+00	2.05E-09	8.44E-10
ILLRW	[kg]	1.34E-06	1.78E-08	0.00E+00	5.00E-09	2.10E-09
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FSK						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
HWD	[kg]	1.15E-04	9.72E-07	0.00E+00	2.72E-07	1.41E-07
NHWD	[kg]	1.45E-01	1.34E-02	0.00E+00	3.75E-03	2.64E-01
HLRW	[kg]	1.11E-06	9.78E-09	0.00E+00	2.74E-09	1.13E-09
ILLRW	[kg]	2.82E-06	2.38E-08	0.00E+00	6.67E-09	2.81E-09
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kraft-asphalt						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
HWD	[kg]	2.45E-05	2.48E-06	0.00E+00	1.56E-07	8.03E-08
NHWD	[kg]	9.39E-02	3.41E-02	0.00E+00	2.15E-03	2.00E-01
HLRW	[kg]	3.43E-07	2.49E-08	0.00E+00	1.57E-09	6.41E-10
ILLRW	[kg]	7.75E-07	6.06E-08	0.00E+00	3.82E-09	1.60E-09
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kraft-LDPE						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
HWD	[kg]	1.26E-05	5.20E-07	0.00E+00	1.10E-07	5.66E-08
NHWD	[kg]	4.50E-02	7.17E-03	0.00E+00	1.52E-03	1.41E-01
HLRW	[kg]	4.25E-07	5.23E-09	0.00E+00	1.11E-09	4.52E-10
ILLRW	[kg]	1.03E-06	1.27E-08	0.00E+00	2.69E-09	1.13E-09
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 30. *Carbon Emissions and Removals Indicator Results for 1 m² unfaced insulation at R_{SI} = 1*

Resource Use	Unit	A1 – A3	A4	A5	C2	C4
BCRP	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	[kg CO_2]	2.55E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 31. *Carbon Emissions and Removals Indicator Results for 1 m2 facing material*

Foil						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
BCRP	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FSK						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
BCRP	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kraft-asphalt						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
BCRP	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Kraft-LDPE						
Resource Use	Unit	A1 – A3	A4	A5	C2	C4
BCRP	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCRK	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	[kg CO_2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Calculating Environmental Impact Values for R-values other than the Functional Unit

The functional unit for the study is in metric units of RSI = 1 m^2K/W. That is equivalent to R = 5.68 in US Customary Units, which is the value one would find stated on the label of an insulation package as sold in North America. In order to determine the impact for the desired R-value of product sold, the scaling factor of the appropriate R-value as listed in the charts below should be used to multiply the impact category value as listed for the functional unit in the Impact Assessment Results tables above.

Impacts =

Product	Scaling Factor for 1 m2 at listed R-value and full thickness
United States	
R-11	1.67
R-13	2.29
R-15	3.70
R-19	2.54
R-20	3.58
R-21	3.69
R-22	3.24
R-23	5.52
R-25	4.02
R-30	4.35
R-30C	5.12
R-38	2.68
R-38C	6.74
R-49	7.28
Canada	
R-12	1.90
R-14	2.93
R-20	3.00
R-22	4.51
R-24	6.83
R-28	4.36
R-31	4.99
R-35	6.02
R-40	6.81
R-54	8.75

X

Impact Category	Unit	Functional Unit Result
GWP 100[1]	[kg CO_2 eq]	6.92E-01
ODP	[kg CFC-11 eq]	7.54E-09
AP	[kg SO_2 eq]	1.94E-03
EP	[kg N eq]	3.49E-03
SFP	[kg O_3 eq]	3.27E-02
ADP_{fossil}	[MJ, LHV]	9.20E+00
IPCC GWP 100a (2021)[2]	[kg CO_2 eq]	6.91E-01

+

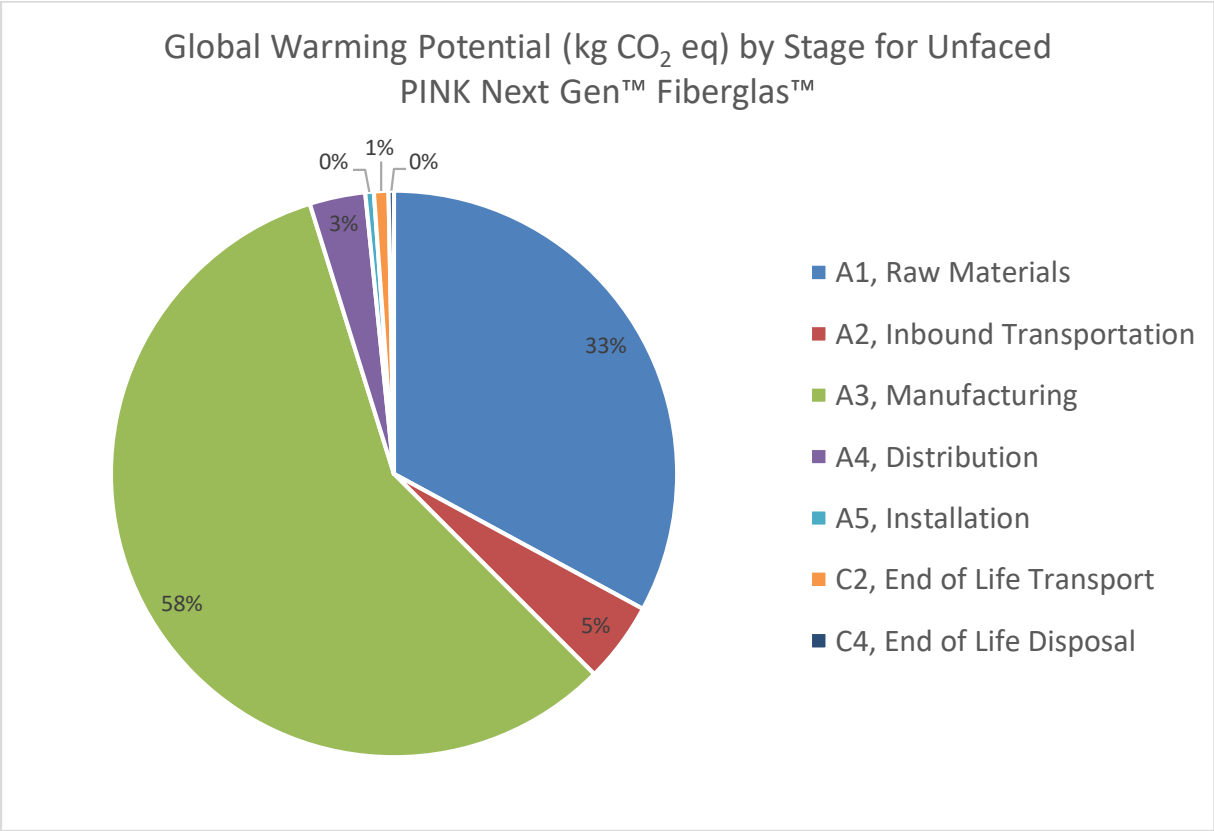
Facing Environmental Impact for 1 m^2

Table 32. *Example: Environmental Impact Values for R-13 Fiberglass Insulation with Kraft Facing*

Impact Category	Unit	Functional Unit	R-13	Kraft Facing	R-13 with Kraft Facing
GWP 100	[kg CO_2 eq]	6.92E-01	1.58E+00	1.22E-01	1.71E+00
ODP	[kg CFC-11 eq]	7.54E-09	1.73E-08	4.58E-09	2.18E-08
AP	[kg SO_2 eq]	1.94E-03	4.44E-03	5.16E-04	4.96E-03
EP	[kg N eq]	3.49E-03	7.99E-03	1.00E-03	9.00E-03
SFP	[kg O_3 eq]	3.27E-02	7.49E-02	8.36E-03	8.32E-02
ADP_{fossil}	[MJ, LHV]	9.20E+00	2.11E+01	3.00E+00	2.41E+01

6. LCA: Interpretation

The manufacturing stage drives most of the environmental impact categories, followed by the raw materials stage. Manufacturing impacts are primarily driven by energy use (electricity and natural gas) for glass melting.



6.1 Sensitivity Analysis

Comparison between the individual plant and overall average indicator result totals shows some variations. Despite these variations, it is still appropriate to group the PINK Next Gen™ products made at these facilities into a single network average, because the data reflect a consistent time window and there is no significant variation in methods or materials used to manufacture the products.

6.2 Assumptions and Limitations

The ability of LCA to consider the entire life cycle of products makes it an attractive tool for the assessment of potential environmental impacts. Nevertheless, similar to other environmental management analysis tools, LCA has several limitations related to data quality and unavailability of potentially relevant data. It should be kept in mind that the impact assessment results are relative expressions and do not predict impacts on category endpoints, exceeding thresholds, or risks.

The study was conducted by including the relevant system boundaries and best available data for PINK Next Gen™ products, using a consistent data collection method and timeframe for each facility. In cases where data were reported for the entire facility rather than for the specific insulation materials product, mass allocation was used to allocate the facility-wide impacts to the specific product. This assumes that all products equally consume facility inputs and contribute to facility outputs.

7. Additional Environmental Information

7.1 Environment and Health during Manufacture

Depending on the plant facility, the following environmental equipment may be used to control emissions: electrostatic precipitator, scrubber, and/or fabric filter (baghouse).

7.2 Energy Savings During Use

Insulation is a passive device that requires no extra utilities to operate over its useful life. Insulation of a building is responsible for reducing the energy burden associated with heating and cooling of a building. The example below provides the net energy savings (energy saved minus life cycle energy of fiberglass), as well as the carbon dioxide equivalent savings computed using the US EPA Greenhouse Gas Equivalencies Calculator.

Example Basis:

- A two-story 2400 square foot home located in different climate zones throughout the US and Canada, insulated with PINK Next Gen™ Fiberglas™ insulation to meet the 2015 International Energy Conservation Code for US locations and Ontario Building Code A3 Package 2017 for Toronto.
    - *Note: Zone 2 OBC (Toronto), and IECC Zones 6A and 7 require an additional, continuous insulation layer. For these, the carbon and energy data for Owens Corning® FOAMULAR® NGX™ at R-5 (Zones 6A and 7) and R-7.5 (Toronto) were used in combination with the PINK Next Gen™ Fiberglas™ carbon and energy data.

Table 33. *Energy and Carbon Savings for PINK Next Gen™ Fiberglas™ Insulation Used in Various US and Canada Climate Zones*

	*Zone 2 OBC	Zone 1A	Zone 2A	Zone 3A	Zone 3C	Zone 4A	Zone 5B	Zone 5 A	*Zone 6A	*Zone 7
	Toronto	Miami	New Orleans	Atlanta	San Francisco	Baltimore	Seattle	Chicago	Minneapolis	Duluth
Heating and Cooling Energy Savings										
Total Life Cycle MJ for PINK Next Gen™ Fiberglas™ Insulation Products Used in Home	59,929	12,272	10,380	16,060	16,060	21,258	21,258	21,258	45,114	45,114
Total Annual MJ Energy Saved for an Insulated vs. Non-insulated Home	167,754	4,220	17,936	51,698	77,019	97,065	92,845	122,386	174,084	213,121
Payback Time (months) for Heating and Cooling Energy Saved	4.3	34.9	6.9	3.7	2.5	2.6	2.7	2.1	3.1	2.5
MJ Saved over the 75 Year Use Phase of Building	12,521,612	304,245	1,334,816	3,861,270	5,760,370	7,258,627	6,942,111	9,157,728	13,011,202	15,938,982
Carbon Equivalent Savings										
Total kg CO2 eq for PINK Next Gen™ Fiberglas™ Products Used in Home (Embodied Carbon)	4,713	640	541	837	837	1,108	1,108	1,108	3,274	3,274
Annual Savings kg CO2 eq from heating and cooling (Operational Carbon)	33,000	831	3,500	10,200	15,200	19,100	18,300	24,100	34,300	42,000
Payback Time (months) for CO2 eq. Saved	1.7	9.2	1.9	1.0	0.7	0.7	0.7	0.6	1.1	0.9
Annual Number of Passenger Vehicles Driven	7.3	0.2	0.8	2.3	3.4	4.3	4.1	5.4	7.6	9.3

7.3 Environment and Health during Installation

This product is considered an article. 29 CFR 1910.1200(c) definition of an article is as follows: "Article" means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical (as determined under paragraph (d) of this section), and does not pose a physical hazard or health risk to employees.

Manufactured articles which meet the definition of the Canadian Hazardous Products Act (any article that is formed to a specific shape or design during manufacture, the intended use of which when in that form is dependent in whole or in part on its shape or design, and that, when being installed, if the intended use of the article requires it to be installed, and under normal conditions of use, will not release or otherwise cause an individual to be exposed to a hazardous product) are not regulated by the Canadian Hazardous Products Regulation SOR/2015-17.

The product's Safe Use Instruction Sheet includes exposure guidelines, engineering controls and individual protection measures. The following individual protection measures can be considered:

- Eye/face protection – Wear safety glasses with side shields (or goggles)
- Skin and body protection – Wear protective gloves, long-sleeved shirt and long pants
- Respiratory protection – When facing airborne/dust concentration above the exposure limits, use an appropriate certified respirator. A properly fitted NIOSH approved disposable N 95 type dust respirator or better is recommended.
- General hygiene considerations – Wash hands before breaks and immediately after handling products. Remove and wash contaminated clothing before re-use.

7.4 Extraordinary Effects

No extraordinary effects or environmental impacts are expected due to destruction of the product by fire, water, or mechanical means.

7.5 Delayed Emissions

No delayed emissions are expected from this product.

7.6 Environmental Activities and Certifications

PINK Next Gen™ Fiberglas™ Insulation products have the following certifications and sustainable features:

- Faced insulation certified by SCS Global Services to contain an average of 55% recycled glass content, 37% post-consumer and balance 18% pre-consumer
- Unfaced insulation certified by SCS Global Services to contain an average of 65% recycled glass content, 47% post-consumer and balance 18% pre-consumer
- GREENGUARD Gold: Certified products are certified to GREENGUARD standards for low chemical emissions into indoor air during product usage.
- Declare
- UL Formaldehyde Free Validated Certification
- Seal and Insulate with ENERGY STAR

Made with Renewable Energy and Reduced Carbon Footprint

PINK Next Gen™ Fiberglas™ insulation are available upon request with SCS Global Services certification for "Made with Renewable Electricity" and "Reduced Carbon Footprint". The updated environmental impacts for the products by matching the amount of electricity used in manufacturing with wind energy produced as part of Owens Corning's Power Purchase Agreement were calculated and can be found in the tables below. The values for life cycle stages A1-A3 below reflect calculations based on the 2022 plant dataset and the electricity impacts per the SimaPro implementation of the ecoinvent versions of the NERC power grids. Certificates published on the SCS Global Services website are based on calculations using updated NERC and eGrid power grid data and updated manufacturing production data per the certifcation guideline, so variation between the values is expected.

Table 34. *Changes in Environmental Impact Category Results Due to the use of Renewable Energy*

Impact category	Unit	2022 Dataset – Grid Electricity	2022 Dataset – REC Electricity	Change with REC	% Change
Ozone depletion	kg CFC-11 eq	7.54E-09	6.20E-09	-1.34E-09	-18%
Global warming	kg CO2 eq	6.82E-01	5.02E-01	-1.79E-01	-26%
Smog	kg O3 eq	3.27E-02	2.79E-02	-4.75E-03	-15%
Acidification	kg SO2 eq	1.94E-03	1.52E-03	-4.21E-04	-22%
Eutrophication	kg N eq	3.49E-03	2.44E-03	-1.05E-03	-30%
Carcinogenics	CTUh	5.59E-08	4.84E-08	-7.58E-09	-14%
Non carcinogenics	CTUh	1.18E-07	8.08E-08	-3.74E-08	-32%
Respiratory effects	kg PM2.5 eq	1.01E-03	7.95E-04	-2.18E-04	-22%
Ecotoxicity	CTUe	6.42E+00	6.21E+00	-2.16E-01	-3%
Fossil fuel depletion	MJ surplus	1.23E+00	9.96E-01	-2.36E-01	-19%

7.7 Further Information

Further information on the product can be found on the manufacturers' website at www.owenscorning.com.

8. References

- Life Cycle Assessment of Owens Corning Fiberglass Insulation: Unfaced and Faced Batts and Rolls and Loosefill.
- 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/AMD 1:2017/ AMD 2:2020 Environmental Management – Life cycle assessment – Requirements and Guidelines.
- PCR Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements. Version 4.0. UL Environment. Mar. 2022
- PCR Guidance for Building-Related Products and Services Part B: Building Envelope Thermal Insulation EPD Requirements. Version 3.0. April 2023.
- ISO 21930: 2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services.
- SCS Type III Environmental Declaration Program: Program Operator Manual. V11.0 November 2021. SCS Global Services.
- IECC-2015, International Energy Conservation Code
- Ontario Building Code A3 Package 2017 for Toronto
- ASTM C665, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
- ASTM C518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- ASTM C1104/C1104M-13a, Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation
- ASTM C1338, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
- ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials
- ASTM E970, Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source
- ASTM C1304, Standard Test Method for Assessing the Odor Emission of Thermal Insulation Materials
- ASTM E96, Standard Test Method for Water Vapor Transmission of Materials
- US EPA Greenhouse Gas Equivalencies Calculator (https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator)
- SCS Global Services Guideline for Claims of "Made with Renewable Energy" or "Reduced Carbon Footprint" Based on Power Purchase Agreement, February 2018

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