WexEnergy

High Profile SK50 ***Solar****Skin*™, High Profile ***Polar****Skin*™

Environmental Product Declaration

Conducted in accordance with ISO 14025 and ISO 21930

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EPDs are not intended to make comparisons with other products due to varying background data in LCA softwares and/or varying Program Operator rules or Product Category rules. The EPD and PCR process are informational only and do not warrant performance.

EPD SUMMARY

PROGRAM OPERATOR	ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA, 19428. https://www.astm.org/
EPD REGISTRATION NUMBER	EPD 979
DATE OF ISSUE	May 27, 2025
VALID UNTIL	May 26, 2030
EPD HOLDER	WexEnergy 260 E. Main Street, Suite 6855, Rochester, NY 14604 https://wexenergy.com/ +1 585 213 5101
DECLARED PRODUCT & UNIT	High Profile SK50 SolarSkin and High Profile PolarSkin - per 1 m^2
MARKET OF APPLICABILITY	North America, intended for B2B communication
EPD TYPE	Product specific, cradle-to-gate scope
LCA SOFTWARE	SimaPro 9.6.0.1
LCI DATABASE	Ecoinvent 3.10
REFERENCE PCR	ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services – serves as the core PCR
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	ASTM Program Operator for Product Category Rules (PCR) and Environmental Product Declarations (EPDs), General Program Instructions, Version: 8.0, Revised 04/29/20

The declaration and LCA data were independently verified in accordance with ISO 14044:2006, ISO 14025:2006, and ISO 21930:2017. Verification was performed: __Internally _X_Externally	
Life cycle assessment practitioner:	Kim Bawden, LCA CP, Rochester Institute of Technology (RIT) on behalf of New York State Pollution Prevention Institute (NYSP2I) Caroline Ding, Engineer, RIT on behalf of NYSP2I https://www.rit.edu/affiliate/nysp2i/ Disclaimer: Funding provided by the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation. The opinions, results, findings and/or interpretations of data contained herein are the responsibility of Rochester Institute of Technology and do not necessarily represent the opinions, interpretations or policy of New York State.
Third-party verifier:	Lindita Bushi, PhD. Athena Sustainable Materials Institute

Disclaimer: This EPD is only comparable if they comply with ISO 21930, 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.
Contact program operator for additional explanatory material.

1. *WexEnergy* LLC

Exterior windows are an important element of every building impacting everything from occupant comfort and energy use to interior and exterior aesthetics. WexEnergy's mission is to easily and affordably deliver improvement to interior comfort and reduce energy use while maintaining occupant viewing of the outdoors.

WexEnergy is the only worldwide source for snap-on, interior window insulation designed to keep windows operable and manufactured for circular economies. WexEnergy window insulation products are ultra-light-weight, so balance of system costs for shipping and installation are kept to a minimum and building use is not disrupted. WexEnergy's solar heat gain reducing products combine an optimal insulating layer with the properties delivered by window films to deliver unparalleled glazing retrofit performance.

WexEnergy is committed to sustainability through its comprehensive, innovative approach to material choices and product design. WexEnergy seeks ways to minimize carbon footprint and conserve natural resources in its operations and in the products it sells. WexEnergy focuses on creating energy-efficient products that enhance building envelope performance and improve occupant comfort while reducing energy consumption. WexEnergy also manages its material sourcing and manufacturing processes, utilizing materials that are recyclable and investing in technologies that minimize waste and emissions. WexEnergy strives to contribute to a more sustainable future through our entire supply chain.

WexEnergy, headquartered in Rochester, NY, is a leader in window retrofit technologies involving design and development of easy-to-use and affordable building envelope solutions with sustainability in mind.

2. Product System

2.1 Product Description

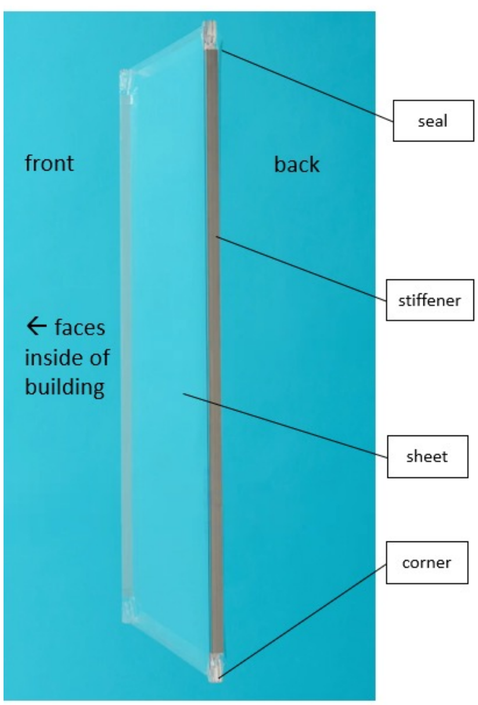

Figure 1. Diagram of *WexWindows*

This EPD covers WexEnergy's High-Profile SK50 SolarSkin (SolarSkin) and High-Profile PolarSkin (PolarSkin), which are transparent snap-on window panels in WexEnergy's WexWindows™ product line. These window panels create optimal insulating air gaps adjacent to the existing windowpanes. The air gap created by SolarSkin and PolarSkin covered in this EPD is 0.625 inch thick. The panels do not impede the function of the original windows and allow emergency exit through the windows.

A WexWindows panel consists of three components: the sheet, the seal, and the corners, as shown in Figure 1. The sheet is made of glycol-modified polyethylene terephthalate (PETG) and is 0.02 inch thick. The seal ensures that there is no air leakage between the window panel and the retrofitted window. The stiffener strengthens the overall panel. The corners attach the WexWindow panel to the retrofitted window. Additionally, an installation kit is provided with each SolarSkin or PolarSkin. Both products increase thermal insulation at the window, but SolarSkin has a solar window film that reduces solar heat gain while PolarSkin does not.

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2.2 Intended Application and Use

WexEnergy's SolarSkin and PolarSkin can be used on existing windows of various types of commercial and residential buildings such as office buildings, hotels, educational institutions, healthcare facilities, retail establishments, apartments, condominiums, co-op buildings, and single-family homes. They fit rectangular windows, including double-hung, sliders, casement, awning, and fixed.

2.3 Placing on the Market

WexEnergy's interior glazing insulation panels are ordered by size; the panels in this EPD are offered in sizes up to 48" x 54".

WexEnergy's interior glazing insulation panels meet the following performance standards:

- ASTM E84 – 21a Standard Test Method for Surface Burning Characteristics of Building Materials
- New York City Department of Buildings, Building Code Chapter 8, Administrative Code Sections AC 28-105 and AC28-113

2.4 Manufacturing

For both SolarSkin and PolarSkin, PETG substrates are brought to a facility and cut to custom size sheets. For SolarSkin, the substrate is run through a laminator where the solar window film material is laminated to the substrate. To assemble the panel, edges are bent, and stiffeners, seals, corners and fasteners are attached to the custom sized sheet.

2.5 Product Material Composition

WexEnergy's SolarSkin and PolarSkin are made from PETG, aluminum, polyethylene terephthalate (PET), solar window film, adhesives, and other plastic components. See Figure 2 for the percent material composition by weight for each product. Packaging of the products are not included in Figure 2.

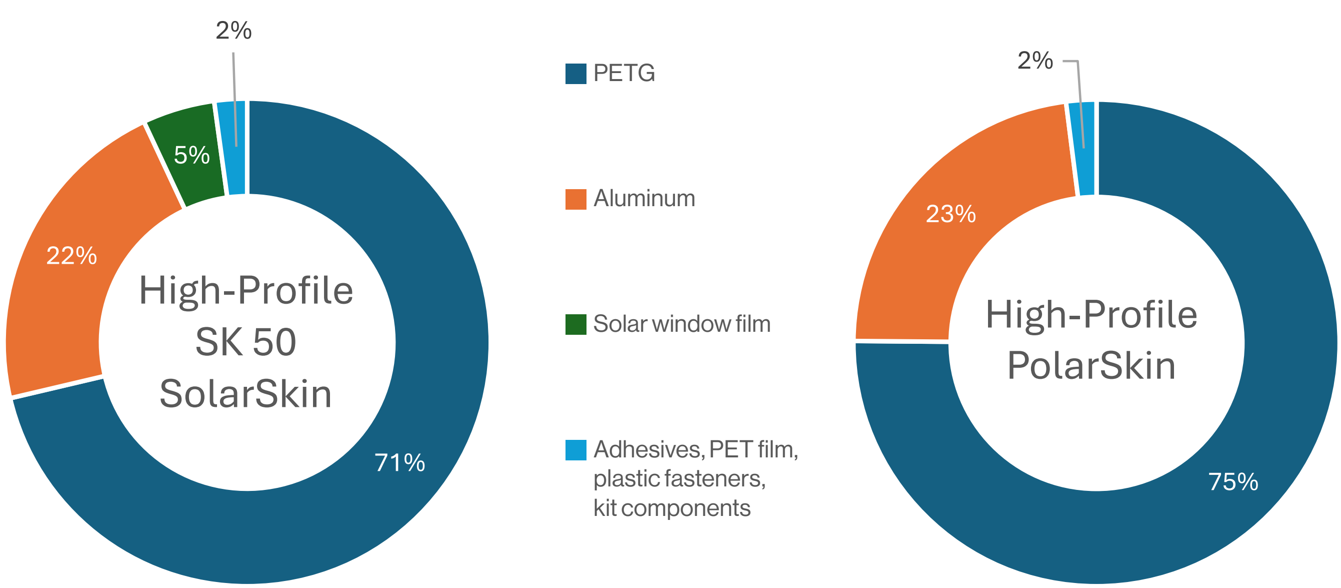

Figure 2. Material Composition of the *WexWindows* Products

2.6 Packaging

The completed panel is packaged in a corrugated cardboard divider and multiple filled dividers are packaged together in a corrugated cardboard box. Additional packaging materials include liners and labels. The packaging material weight is 1.27 kg/m^2 for SolarSkin and 1.32 kg/m^2 for PolarSkin.

2.7 Environment and Health During Manufacturing and Use

To minimize environmental waste, computer applications are used to maximize the use of plastic out of each substrate, minimizing scrap plastic.

WexEnergy's window insulation panels have no negative impacts on the environment or health during normal use. Insulation panels, with or without specialized layers, enhance building occupant safety and comfort. Specialized layers used in SolarSkin are designed to reflect infrared radiation while allowing visible light to pass through. This design helps improve energy efficiency in buildings and minimize the need for heating and cooling a space, ultimately reducing energy consumption and associated greenhouse gas emissions.

In addition, WexEnergy's insulation panels enhance thermal comfort by reducing convective drafts and cold spots near windows. This helps maintain a more stable indoor temperature, leading to increased occupant comfort and reduced reliance on HVAC systems. Because WexEnergy's products are transparent to visible light while reflecting infrared radiation, buildings can benefit from natural daylight, reducing artificial indoor lighting required during daylight hours.

2.8 Re-use and End-of-Life

During deconstruction, WexEnergy window insulation panels may be easily and safely removed from windows. The plastic materials used in the product are predominantly PETG based materials that can enter mechanical or molecular recycling streams.

3. LCA Framework

3.1 Declared Unit

The selected declared unit (DU) for this study is one square meter (1 m^2) of WexWindows panel. A functional unit is not reported since the system boundaries are cradle-to-gate and no use phase over a reference service life has been modeled.

3.2 System Boundaries

The system boundaries are cradle-to-gate, or the production life cycle stage as stated in ISO 21930. Three modules are included in this life cycle stage: A1 – Extraction and Upstream Production, A2 - Transportation, and A3 – Manufacturing. Construction (A4-A5), Use (B1-B7), and End-of-Life (C1-C4) are excluded from this study.

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Table 1. Life cycle stages included and excluded.

PRODUCTION STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END-OF-LIFE STAGE			
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Extraction and up-stream production	Transport to factory	Manufacturing	Transport to site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction/Dem-olition	Transport to waste pro-cessing or disposal	Waste processing	Disposal of waste
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Key: X = included; MND = module not declared (excluded)

Extraction and Upstream production (module A1): This module includes the extraction of raw materials and further processing of those materials to be used to manufacture SolarSkin and PolarSkin.

Transport to factory (module A2): This module includes transportation of raw materials and processed raw materials to WexEnergy's manufacturing facility.

Manufacturing (module A3): This module includes manufacturing and assembly of SolarSkin and PolarSkin at WexEnergy's facility. 2024 energy use, material use, emissions, and waste management were included. The region of the electricity grid mix used is US-NPCC based on manufacturing facility location.

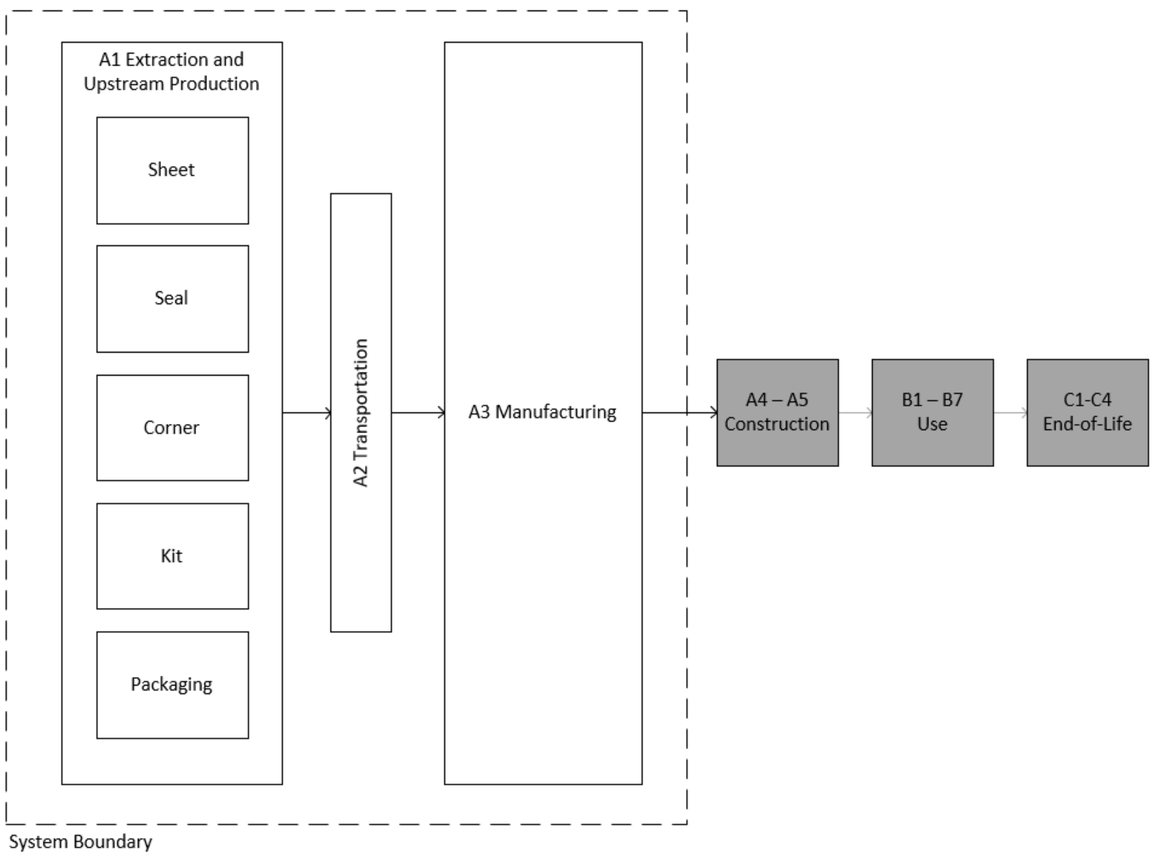

Figure 3. System boundary of the cradle-to-gate LCA on High Profile SK50 *SolarSkin* and High Profile *PolarSkin*

3.3 Allocation

In terms of the manufacturing life cycle, WexEnergy manufactures only one product at a time, eliminating the need to allocate impacts across product systems. Allocation of inputs and outputs was completed through normalization of the reference flow to the functional unit on a mass basis.

Transportation impacts are allocated by mass and distance traveled and are represented as "metric ton-kilometer" distances.

3.4 Cut-off Criteria

There are no unit processes excluded from the study based on cut-off rules stated in ISO 21930.

3.5 Software and Background Data

SimaPro 9.6.0.1 was used to model SolarSkin and PolarSkin. The data library used in the program is ecoinvent 3.10 - allocation, cut-off by classification – unit, and the life cycle impact assessment method used is TRACI 2.1 V1.09 / US-Canadian 2008.

3.6 Data Quality

DATA QUALITY PARAMETER	DATA QUALITY DISCUSSION
Source of primary data	Primary data were provided by WexEnergy and collected by NYSP2I.
Source of secondary data	Secondary data were from EPD of solar window film, a supplier for WexEnergy, and literature values. NYSP2I mapped materials and processes to equivalent technologies in the ecoinvent database.
Geographical completeness	Material and process data in the model were chosen to reflect the US geography. WexEnergy parts are also sourced in the US. If the source location was not known, a global market was chosen. If a global market was not available, a rest-of-world market was chosen. Electricity grid region specific to supplier and manufacturing facility locations were used.
Temporal completeness	Material, process, energy, and transportation data were collected in 2024 and represents the most recent data available. Ecoinvent version 3.10, released in March 2024 (ecoinvent, 2024) was used to identify and quantify material impacts.
Technological completeness	Material, process, and energy data were mapped to the equivalent technology in ecoinvent 3.10. The solar window film was modeled with its EPD, and a supplier for WexEnergy provided LCA results of their products for use in this study. Values from literature were used as surrogates when data for upstream production was not available.

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4. LCA Results

The Life Cycle Impact Assessment results were calculated using Tool for the Reduction and Assessment of Chemical and other Environmental Impacts (TRACI) v 2.1, an impact assessment method published by the USEPA. The results for SolarSkin are shown as absolute values in Table 2 and as percentages in Table 3. The results for PolarSkin are shown as absolute values in Table 5 and as percentages in Table 6. Additional indicators required by ISO 21930 were calculated in accordance with the standard and ACLCA Guidance to Calculating Non-LCIA Inventory Metric in Accordance with ISO 21930:2017. They are shown in Table 4 for SolarSkin and in Table 7 for PolarSkin. In both tables, RPRE = renewable primary resources used as an energy carrier, RPRM = renewable primary resources with energy content used as material, NRPRE = Non-renewable primary resources used as an energy carrier, NRPRM = Non-renewable primary resources with energy content used as material, SM = secondary material, RSF = renewable secondary fuels, NRSF =non- renewable secondary fuels, RE = recovered energy. Please note that LCIA results are relative expressions and do not predict impacts on category endpoints, the exceedance of thresholds, safety margins or risks.

Table 2. High Profile SK50 *SolarSkin* Impact Assessment Results – absolute values

Per 1 m² declared unit			Extraction and upstream production	Transport to facility	Manufacturing
Impact category	**Unit**	**Total**	**A1**	**A2**	**A3**
Ozone depletion	kg CFC-11 eq	1.65E-05	1.64E-05	8.80E-09	1.22E-07
Global warming	kg CO_2 eq	12.374	9.414	0.477	2.483
Smog	kg O_3 eq	0.723	0.503	0.052	0.168
Acidification	kg SO_2 eq	0.055	0.041	0.002	0.012
Eutrophication	kg N eq	0.040	0.029	5.28E-04	0.011

Table 3. High Profile SK50 *SolarSkin* Impact Assessment Results – percentages

Per 1 m² declared unit			Extraction and upstream production	Transport to facility	Manufacturing
Impact category	**Unit**	**Total**	**A1**	**A2**	**A3**
Ozone depletion	kg CFC-11 eq	1.65E-05	99.2%	0.1%	0.7%
Global warming	kg CO_2 eq	12.374	76.1%	3.9%	20.1%
Smog	kg O_3 eq	0.723	69.5%	7.2%	23.3%
Acidification	kg SO_2 eq	0.055	75.1%	3.6%	21.2%
Eutrophication	kg N eq	0.040	71.3%	1.3%	27.3%

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Table 4. High Profile SK50 *SolarSkin* Additional Inventory Indicator Results

Per 1 m^2 declared unit			Extraction and upstream production	Transport to facility	Manufacturing
Impact category	**Unit**	**Total**	**A1**	**A2**	**A3**
Use of Primary Resources					
RPR_E	MJ	28.053	7.397	0.097	20.560
RPR_M	MJ	10.918	0.080	N/A	10.838
$NRPR_E$	MJ	215.475	177.374	6.901	31.200
$NRPR_M$	MJ	24.533	24.531	N/A	0.002
Use of Secondary Resources					
SM	kg	0.707	0.071	N/A	0.637
RSF	MJ	0	N/A	N/A	0
NRSF	MJ	0	N/A	N/A	0
RE	MJ	0	N/A	N/A	0
Abiotic Depletion Potential for Fossil Resources (ADP_{fossil}), Consumption of Freshwater Resources					
ADP_{fossil}	MJ, NCV	199.307	164.612	6.792	27.903
Consumption of freshwater	m^3	0.062	0.045	0.001	0.015
Emissions and Removals of CO_2					
Biogenic CO_2, products	kg CO_2e	-2.83E-04	-2.83E-04	N/A	N/A
Biogenic CO_2, packaging	kg CO_2e	-2.100	N/A	N/A	-2.100
Greenhouse gas emissions from land use change	kg CO_2e	0.022	0.012	0.002	0.008
CO_2 from calcination and carbonation	kg CO_2e	0	N/A	N/A	N/A
Biogenic CO_2, renewable waste combustion	kg CO_2e	0.002	N/A	N/A	0.002
CO_2, non-renewable waste combustion	kg CO_2e	0.120	0.112	N/A	0.008
Waste Flows					
Hazardous waste disposed	kg	0.008	0.008	N/A	0
Non-hazardous waste disposed	kg	0.282	0.262	N/A	0.020
High-level radioactive waste	m^3	1.35E-08	1.11E-08	8.39E-11	2.31E-09
Intermediate and low-level radioactive waste	m^3	1.42E-07	1.19E-07	6.62E-10	2.22E-08
Output Flows					
Components for reuse	kg	0	N/A	N/A	N/A
Materials for recycling	kg	0	0	N/A	0
Materials for energy recovery	kg	0	0	N/A	0
Exported energy	MJ	0.280	0.256	N/A	0.024

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Table 5. High Profile *PolarSkin* Impact Assessment Results – absolute values

Per 1 m^2 declared unit			Extraction and upstream production	Transport to facility	Manufacturing
Impact category	**Unit**	**Total**	**A1**	**A2**	**A3**
Ozone depletion	kg CFC-11 eq	1.55E-05	1.54E-05	5.87E-09	1.22E-07
Global warming	kg CO_2 eq	10.731	7.928	0.319	2.484
Smog	kg O_3 eq	0.653	0.450	0.035	0.168
Acidification	kg SO_2 eq	0.051	0.038	0.001	0.012
Eutrophication	kg N eq	0.038	0.027	3.52E-04	0.011

Table 6. High Profile *PolarSkin* Impact Assessment Results – percentages

Per 1 m^2 declared unit			Extraction and upstream production	Transport to facility	Manufacturing
Impact category	**Unit**	**Total**	**A1**	**A2**	**A3**
Ozone depletion	kg CFC-11 eq	1.55E-05	99.2%	0.04%	0.8%
Global warming	kg CO_2 eq	10.731	73.9%	3.0%	23.2%
Smog	kg O_3 eq	0.653	68.9%	5.3%	25.7%
Acidification	kg SO_2 eq	0.051	74.5%	2.6%	22.9%
Eutrophication	kg N eq	0.038	70.1%	0.9%	29.0%

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Table 7. High Profile *PolarSkin* Additional Inventory Indicator Results

Per 1 m^2 declared unit			Extraction and upstream production	Transport to facility	Manufacturing
Impact category	**Unit**	**Total**	**A1**	**A2**	**A3**
Use of Primary Resources					
RPR_E	MJ	26.291	5.666	0.064	20.560
RPR_M	MJ	10.918	0.080	N/A	10.838
$NRPR_E$	MJ	171.848	136.041	4.606	31.200
$NRPR_M$	MJ	24.278	24.277	N/A	0.002
Use of Secondary Resources					
SM	kg	0.707	0.071	N/A	0.637
RSF	MJ	0	N/A	N/A	0
NRSF	MJ	0	N/A	N/A	0
RE	MJ	0	N/A	N/A	0
Abiotic Depletion Potential for Fossil Resources (ADP_{fossil}), Consumption of Freshwater Resources					
ADP_{fossil}	MJ, NCV	161.946	129.509	4.533	27.904
Consumption of freshwater	m^3	0.051	0.035	0.001	0.015
Emissions and Removals of CO_2					
Biogenic CO_2, products	kg CO_2e	-2.83E-04	-2.83E-04	N/A	N/A
Biogenic CO_2, packaging	kg CO_2e	-2.100	N/A	N/A	-2.100
Greenhouse gas emissions from land use change	kg CO_2e	0.020	0.011	0.001	0.008
CO_2 from calcination and carbonation	kg CO_2e	0	N/A	N/A	N/A
Biogenic CO_2, renewable waste combustion	kg CO_2e	0.002	N/A	N/A	0.002
CO_2, non-renewable waste combustion	kg CO_2e	0.114	0.105	N/A	0.009
Waste Flows					
Hazardous waste disposed	kg	0	0	N/A	0
Non-hazardous waste disposed	kg	0.263	0.240	N/A	0.023
High-level radioactive waste	m^3	5.65E-09	3.29E-09	5.60E-11	2.31E-09
Intermediate and low-level radioactive waste	m^3	1.02E-07	7.94E-08	4.42E-10	2.22E-08
Output Flows					
Components for reuse	kg	0	N/A	N/A	N/A
Materials for recycling	kg	0	0	N/A	0
Materials for energy recovery	kg	0	0	N/A	0
Exported energy	MJ	0.268	0.241	N/A	0.028

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5. Additional Environmental Information

5.1 Additional Certifications

SolarSkin and PolarSkin are made with polyester-based, GREENGUARD® Certified and Cradle-to-Cradle™ Certified materials.

5.2 Regulated Hazardous Substances

No substances required to be reported as hazardous are associated with SolarSkin and PolarSkin.

5.3 Release of Dangerous Substances

No dangerous substances are known to be released from SolarSkin and PolarSkin.

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