Environmental Product Declaration

Paneltech Solid Collection and Designer Collection Panels

Charcoal, Graphite, Gunmetal, Pewter,
Sand, and Slate

PaperStone®, created from recycled paper and a proprietary resin, is both durable and easy to install. PaperStone offers a warm alternative to stone and quartz, and is a great choice for homes, restaurants, office buildings, and higher education.

PaperStone®
The Earth's Surface™

PaperStone, a composite panel product made from recycled paper and a proprietary resin system, is manufactured in our "Paneltech" manufacturing facility located in Washington State. PaperStone is renowned for its unique warm feel combined with incredible strength and durability, all while being FSC and NSF certified.

Paneltech is committed to making innovative green products that contribute to an eco-friendly, holistic lifestyle that is elegant and responsible. This EPD will aid building professionals in selecting products that can aid in the achievements of LEED credits. We are hopeful that this EPD will demonstrate our commitment to managing the environmental impact our company has on the world and hope it encourages other manufacturers to do so as well."

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025 and ISO 21930. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Environment 2211 Newmarket Pkwy, Marietta, GA 30067 USA
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	NSF Sustainability: Product Category Rule for Residential Countertops, valid through March 2023
MANUFACTURER NAME AND ADDRESS	Paneltech International, LLC 2999 John Stevens Way Hoquiam, WA 98550
DECLARATION NUMBER	4790515575.101.1
DECLARED PRODUCT & FUNCTIONAL UNIT OF DECLARED UNIT	Paneltech Solid Collection and Designer Collection Panels Functional Unit = 1 m2 of countertop over 10 year product lifetime
REFERENCE PCR AND VERSION NUMBER	NSF Sustainability: Product Category Rule for Residential Countertops, valid through March 2023
DESCRIPTION OF PRODUCT(S) APPLICATION/USE	PaperStone® Solid and Designer Collection Countertop Panels in colors Charcoal, Graphite, Gunmetal, Pewter, Sand, and Slate.
PRODUCT RSL DESCRIPTION	10 Years
MARKETS OF APPLICABILITY	Global
DATE OF ISSUE	January 31, 2023
PERIOD OF VALIDITY	5 years
EPD TYPE	Product Specific
DATASET VARIABILITY	N/A
EPD SCOPE	Cradle-to-Grave
YEAR(S) OF REPORTED PRIMARY DATA	2021
LCA SOFTWARE & VERSION NUMBER	SimaPro
LCI DATABASE(S) & VERSION NUMBER	Ecoinvent v3.5 & USLCI v2.0
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1; CML 4.1
The sub-category PCR review was conducted by:	NSF - PCR Review Panel – nsf.org
This declaration was independently verified in accordance with ISO 14025: 2006. The NSF Sustainability: Product Category Rule for Residential Countertops, valid through March 2023, based on ISO 21930 serves as the core PCR. ☐ INTERNAL ☒ EXTERNAL	Cooper McCollum, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	James Mellentine, Thrive ESG

Environmental declarations from different programs (ISO 14025) may not be comparable.

This EPD was not written to support comparative assertions. Even for similar products, differences in functional unit, use and end-of-life stage assumptions, and data quality may produce incomparable results. It is not recommended to compare EPDs with another organization as there may be differences in methodology, assumptions, allocation methods, data quality such as variability in datasets, and results of variability in assessment software tools used.

General Information

Description of Company/Organization

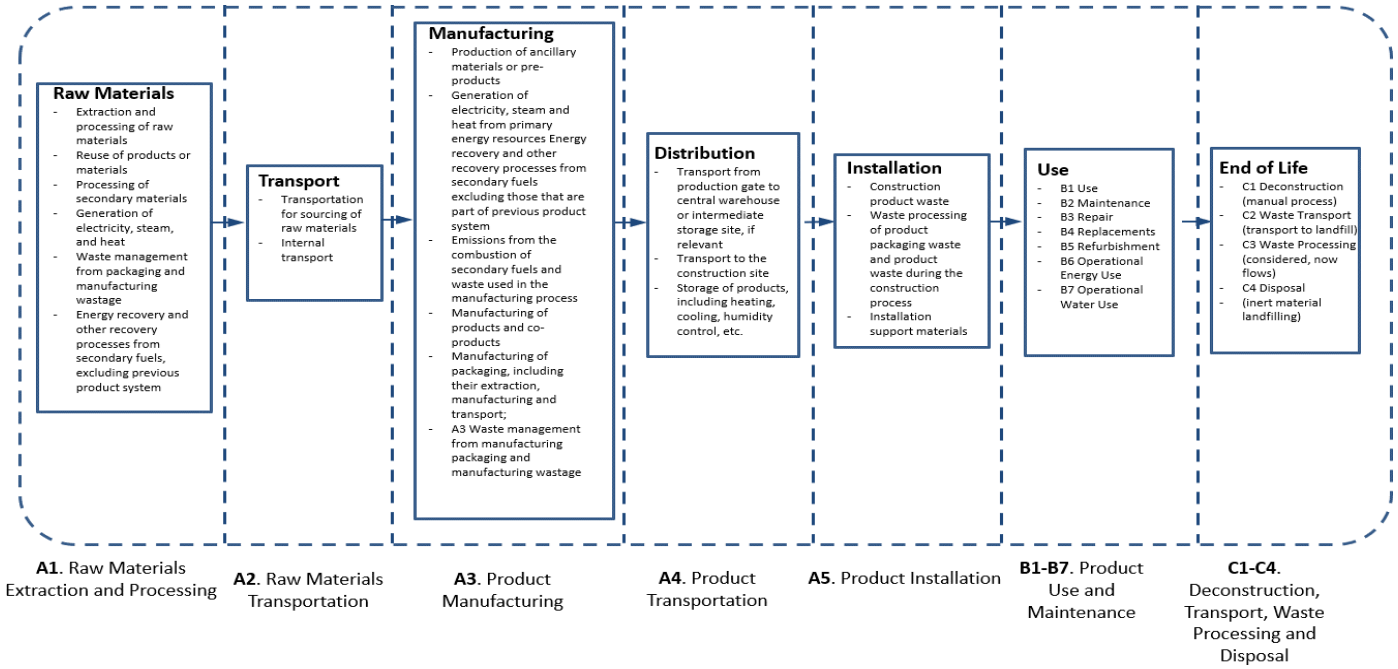
Paneltech is a forward-thinking company comprised of individuals who share a common goal: to make valuable surfaces the right way. This means high-quality products that are both functionally superior and environmentally sound.

Product Description

Product Type: Composite Panel Product
PaperStone is a hardwood-like, highly workable, non-brittle composite panel.
Additional Features:
- Heat resistant
- Stain resistant
- Easily workable
- Food Safe Certified

PaperStone is a beautiful and heavy-duty composite surface known for its performance, its warm touch, its contemporary appearance, and its environmental sustainability. It has steel-like strength in span and stone-like durability, but it can be worked in the same fashion as dense hardwoods.

Flow Diagram



Manufacturer Specific EPD

This product-specific EPD was developed based on the Cradle-to-Grave Life Cycle Assessment. The EPD accounts for raw material extraction and processing, transport, product manufacturing, distribution, installation, maintenance, and disposal. Manufacturing data were gathered directly from company personnel. When updated company-specific data were not available the ratio of production units, within the 2021 calendar year, was used as a proxy. For any product group EPDs, an impact assessment was completed for each product and the highest and lowest impacts were reported as conservative representations of the product group. Product grouping was considered appropriate if the individual product impacts differed by no more than ±10% in any impact category.

Application

PaperStone® is commonly used for architectural millwork, kitchen and bath countertops, commercial surfaces, interior/exterior wall cladding and partitions, musical instruments, and many other architectural applications.

Material Composition

The primary product components and/or materials must be indicated as a percentage mass to enable the user of the EPD to understand the composition of the product in delivery status.

The average composition of the minimum and maximum impact countertop products is as follows:

Material	Minimum	Maximum
Colorant	0.89%	4.56%
Recycled Paper	44.96%	53.08%
Virgin Paper	5.00%	0.00%
Resin	49.15%	42.35%
Total	**100.00%**	**100.00%**

Technical Data

For the declared product, the following technical data in the delivery status must be provided with reference to the test standard:

Technical Data		
Requirement	**Specification**	**Unit**
Water Absorption (by weight)	0.82	%
Density	1.4 - 1.45	g/cm3
Internal Bond	1225	psi
Modulus of Rupture - Face - X Direction	24320	psi
Modulus of Rupture - Face - Y Direction	24080	psi
Modulus of Rupture - Edge - X Direction	21834	psi
Modulus of Rupture - Edge - Y Direction	21413	psi
Modulus of Elasticity - X Direction	1724.25	ksi
Modulus of Elasticity - Y Direction	1666.58	ksi
Compressive Strength - Z Direction (Face)	45324	psi
Compressive Strength - X Direction	23200	psi
Compressive Strength - Y Direction	22560	psi
Coefficient of Thermal Expansion - Z Direction	2.62	10-5 in/in/°C
Coefficient of Thermal Expansion - X Direction	3.64	10-5 in/in/°C
Coefficient of Thermal Expansion - Y Direction	3.48	10-5 in/in/°C
Izod Impact Strength - Face - X Direction	3.29	ft/lb/in-width
Izod Impact Strength - Face - Y Direction	2.76	ft/lb/in-width
Izod Impact Strength - Edge - X Direction	0.73	ft/lb/in-width
Izod Impact Strength - Edge - Y Direction	75	ft/lb/in-width
Hardness Test - Barcol Meter	47 avg	Barber Coleman
UV Exposure	Slight darkening of lighter colors, dark colors are stable	
Formaldehyde	No detected residues (less than 1 part per million)	
ASTM E84 Fire Test Results - Flamespread	(20) Class A Rating	
ASTM E84 Fire Test Results - Smoke	(110) Class A Rating	

Placing on the Market / Application Rules

The PaperStone® composite panel products conform to the certifications and sustainability regulations below:
- ASTM E84 Fire Test
- FSC (Forest Stewardship Council) Certified by the SmartWood program of the Rainforest Alliance
- NSF Certified

Properties of Declared Product as Shipped

The panels are placed horizontally on a wooden pallet. Cardboard slips are placed between panels and paper shipping labels are applied. The amount of product placed on each pallet has been calculated based off of the total number of pallets used in 2021 and the total quantity of product produced.

Methodological Framework

Functional Unit

The declaration refers to the functional unit of 1 square meter of Paneltech Solid Collection and Designer Collection Panels as specified in the Countertop PCR.

Name	Minimum Value	Minimum Unit	Maximum Value	Maximum Unit
Functional Unit	One square meter of installed countertop over a 10 year lifetime, see separate ISO 21930 tables for consideration of 75 year building life.			
Mass	8.29	kg/m^2	8.44	kg/m^2
Thickness	6.35	mm	6.35	mm
Lifetime	10	years	10	years

System Boundary

This is a cradle to grave Environmental Product Declaration. The following life cycle phases were considered:

	Product Stage			Construction Process Stage		Use Stage							End of Life Stage*				Benefits and Loads Beyond the System Boundaries
	Raw material supply	Transport	Manufacturing	Transport from gate to the site	Construction/ installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction /demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling potential
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	X	X	X	X	X	MND	X	MND	X	MND	MND	MND	X	X	X	X	MND
PCR System Boundary Stages	Material Acquisition		Construction	Installation		Use							End-of-Life				

Description of the System Boundary Stages Corresponding to the PCR
(X = Included; MND = Module Not Declared)

*This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues.

Reference Service Life

The reference service life of a properly installed countertop is 10 years. The building estimated service life is 75 years. The results in the body of this report are shown over a 10 year period, as specified in the PCR. At the end of the report the tables specific to ISO 21930 requirements are included, which consider the 75 year building lifetime.

Allocation

Allocation was determined on a per mass basis for primary data. For secondary data, cut-off methodology was used.

Cut-off Criteria

Processes whose total contribution to the final result, with respect to their mass and in relation to all considered impact categories, is less than 1% can be neglected. The sum of the neglected processes may not exceed 5% by mass of the considered impact categories. For that a documented assumption is admissible.

For Hazardous Substances the following requirements apply:

- The Life Cycle Inventory (LCI) of hazardous substances will be included, if the inventory is available.
- If the LCI for a hazardous substance is not available, the substance will appear as an input in the LCI of the product, if its mass represents more than 0.1% of the product composition.
- If the LCI of a hazardous substance is approximated by modeling another substance, documentation will be provided.

This EPD is in compliance with the cut-off criteria. No processes were neglected or excluded unless stated. Capital items for the production processes (machine, buildings, etc.) were not taken into consideration.

Data Sources

Primary data were collected for every process in the product system under the control of Paneltech. Secondary data from the SimaPro Ecoinvent and USLCI databases were utilized. These data were evaluated and have temporal, geographic, and technical coverage appropriate to the scope of the residential countertop product category.

Data Quality

The data sources used are complete and representative of North America in terms of the geographic and technological coverage and are a recent vintage (i.e., less than ten years old). The data used for primary data are based on direct information sources of the manufacturer. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows. Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty.

Period Under Review

The period under review is the full calendar year of 2021.

Treatment of Biogenic Carbon

The uptake and release of biogenic carbon throughout the product life cycle follows ISO 21930:2017 Section 7.2.7.

Comparability and Benchmarking

A comparison or an evaluation of EPD data is only possible if all data sets to be compared were created according to ISO 21930 and the building context, respectively the product-specific characteristics of performance, are taken into account. Environmental declarations from different programs may not be comparable. Full conformance with the PCR for Residential Countertop products allows EPD comparability only when all stages of a countertop product's life cycle have been considered. However, variations and deviations are possible.

Estimates and Assumptions

End of Life
The end-of-life scenario was modeled based on the 2017 US EPA solid waste and waste diversion statistics. The study assumes 80% being disposed as the average US municipal solid waste disposition, with the rest sent to incineration.

Units

The LCA results within this EPD are reported in SI units.

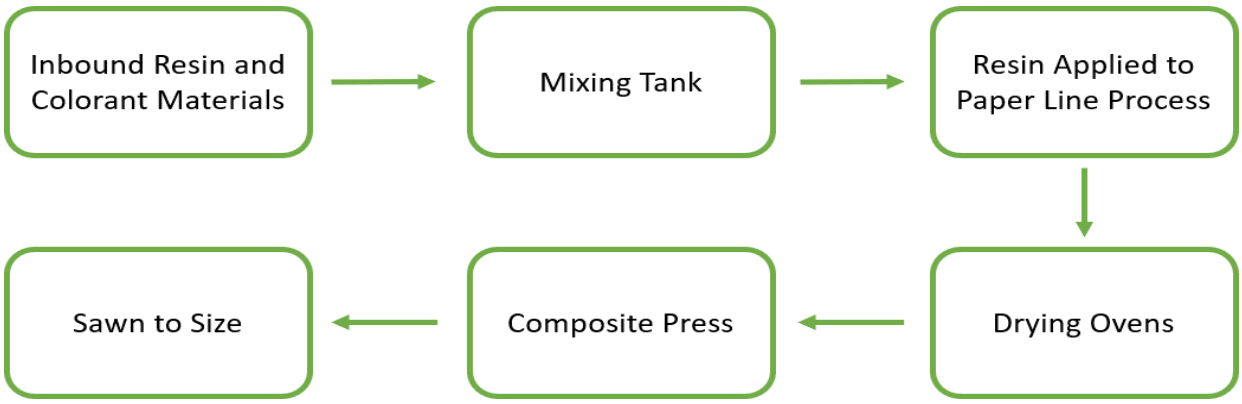
Additional Environmental Information

Background data

For life cycle modeling of the considered products, the SimaPro version 9.2.0.2 software was used. The SimaPro Ecoinvent database contains consistent and documented datasets which are documented in the LCA report and on the Ecoinvent website. To ensure comparability of results in the LCA, Ecoinvent and USLCI databases were used wherever possible.

Manufacturing

The primary manufacturing processes are completed by Tier 1 suppliers in the USA. The final manufacturing processes occur in Hoquiam, Washington.



Packaging

All packaging is fully recyclable. The packaging material is composed of cardboard, paper, and wood.

Material	Value
Wood	94.7%
Cardboard	4.9%
Paper	0.4%
Total	100%

Transformation

Transport to Building Site (A4)			
Name	**Min**	**Max**	**Unit**
Fuel type	Diesel		-
Liters of fuel	38		l/100km
Vehicle type	Truck - 17% Ship - 83%	Truck - 9% Ship - 61%	
Capacity utilization (including empty runs)	90		%
Capacity utilization volume factor	1		-
Transport distance	7.44E+04	1.10E+05	kgkm/m2
Gross density of products transported	8.29	8.44	kg/m2

Product Installation

PaperStone is NSF Certified and will not "off gas". Industry standard safety protocol should be followed during all fabrication and installation processes.

Installation into the building (A5)			
Name	**Min**	**Max**	**Unit**
Auxiliary materials - Osmo TopOil	0.08	0.08	kg
Auxiliary materials - Bee's Wax Sealant	0.02	0.02	kg
Auxiliary materials - Adhesive	0.10	0.10	kg
Water consumption	-	-	m^3
Other resources	-	-	kg
Electricity consumption	0.04	0.04	kWh
Other energy carriers	-	-	MJ
Product loss per functional unit	2.49	2.53	kg
Waste materials at construction site	1.87	2.19	kg
Output substance (recycle)	-	-	kg
Output substance (landfill)	1.99	2.02	kg
Output substance (incineration)	0.50	0.51	kg
Packaging waste (recycle)	1.40	1.64	kg
Packaging waste (landfill)	0.37	0.44	kg
Packaging waste (incineration)	0.09	0.11	kg
Direct emissions to ambient air*, soil, and water	3.36	3.93	kg CO_2
VOC emissions	-	-	kg

*CO2 emissions to air from disposal of packaging

Reference Service Life		
Name	**Value**	**Unit**
Reference Service Life	10	years
Estimated Building Service Life	75	years
Number of Replacements	6.5	number

Product Use

This study assumes that countertops are cleaned every other day with soap and water. It is also assumed that once during the products' lifetime an additional coating of oil and wax will be required for the refinishing process.

Maintenance (B2)		
Name	**Value**	**Unit**
Cleaning once every two days	1825	Cycles/ESL
Water consumption (from tap, evaporated)	0.11	m^3
Detergent	2.91	kg
Electricity consumption (refinishing)	0.02	kWh
Osmo TopOil	0.08	kg
Bee's wax coating	0.02	kg
Other energy carriers specified by type	-	kWh
Power output of equipment	-	kW
Waste materials from maintenance	-	kg
Direct emissions to ambient air, soil, and water	-	kg
Further assumptions for scenario development	Countertops cleaned with soap and water once every two days over a 10-year period.	

Disposal

The end-of-life scenario was modeled based on the 2017 US EPA solid waste and waste diversion statistics. The study assumes 80% being disposed as the average US municipal solid waste disposition, with the rest sent to incineration.

End of life (C1-C4)			
Name	**Min**	**Max**	**Unit**
Collected separately	1.66	1.69	kg
Collected as mixed construction waste	6.63	6.75	kg
Reuse	0.00	0.00	kg
Recycling	0.00	0.00	kg
Landfilling	6.63	6.75	kg
Incineration	1.66	1.69	kg
Energy conversion	0.00	0.00	-
Material for final deposition	8.29	8.44	kg
Removals of biogenic carbon	10.20	10.38	kg

Minimum Results

TRACI 2.1 Impact Assessment with IPCC 2021 for GWP

Parameter	Parameter	Unit	Raw Material Acquisition	Construction	Installation	Use	Disposal	Total
GWP	Global warming potential	kg CO_2-Eq.	1.9E+01	9.4E+00	8.5E+00	2.8E+00	4.1E+00	**4.4E+01**
GWP - Biogenic	Biogenic Global warming potential	kg CO_2-Eq.	3.3E-02	1.2E-02	4.7E-03	8.8E-03	1.9E-03	**6.0E-02**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.8E-06	7.8E-07	8.0E-07	2.3E-07	5.0E-07	**4.1E-06**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	1.0E-01	3.5E-02	6.7E-02	1.3E-02	5.5E-03	**2.2E-01**
EP	Eutrophication potential	kg N-Eq.	5.0E-02	4.1E-03	1.1E-02	1.9E-02	1.0E-02	**9.4E-02**
SP	Smog formation potential	kg O_3-Eq.	1.5E+00	4.4E-01	1.5E+00	1.2E-01	8.1E-02	**3.6E+00**
FFD	Fossil fuel depletion	MJ-surplus	3.3E+01	1.8E+01	1.8E+01	1.7E+00	2.3E+00	**7.3E+01**

CML 4.1 Impact Assessment

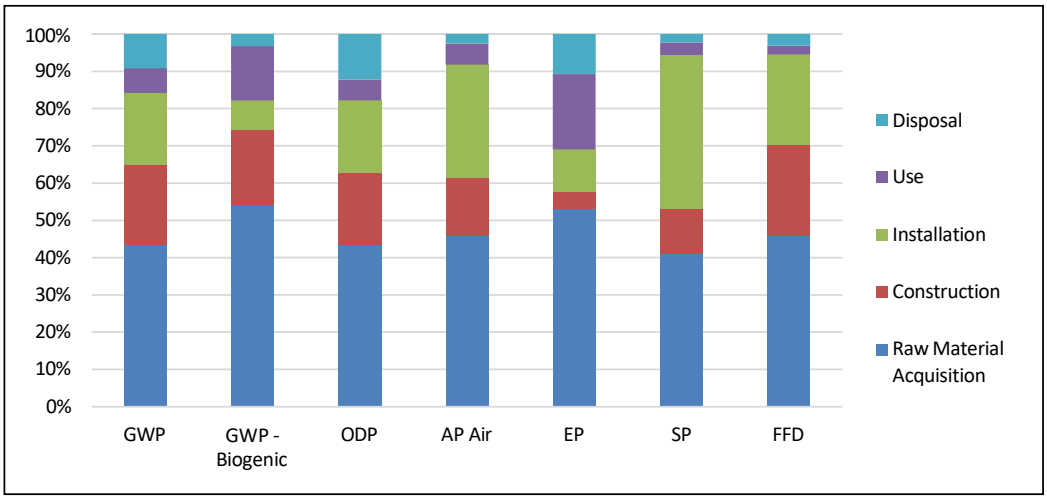
Parameter	Parameter	Unit	Raw Material Acquisition	Construction	Installation	Use	Disposal	Total
GWP	Global warming potential	kg CO_2-Eq.	1.9E+01	9.4E+00	8.5E+00	2.8E+00	4.1E+00	**4.4E+01**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.5E-06	6.4E-07	6.2E-07	2.0E-07	4.4E-07	**3.4E-06**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	9.4E-02	3.5E-02	6.0E-02	1.1E-02	5.3E-03	**2.1E-01**
EP	Eutrophication potential	kg$(PO_4)^{-3}$-Eq.	2.6E-02	3.5E-03	1.1E-02	9.6E-03	4.4E-03	**5.5E-02**
POCP	Formation potential of tropospheric ozone	kg ethane-Eq.	6.0E-03	7.6E-03	3.5E-03	1.6E-03	2.1E-04	**1.9E-02**
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	1.6E-04	8.7E-06	5.4E-05	2.7E-05	8.3E-06	**2.6E-04**
ADPF	Abiotic depletion potential for fossil resources	MJ	3.0E+02	1.4E+02	1.4E+02	1.6E+01	1.9E+01	**6.2E+02**

Life Cycle Inventory Data

Parameter - Material Resources	Unit	Raw Material Acquisition	Construction	Installation	Use	Disposal	Total
Virgin renewable resources	kg	4.1E-01	1.9E+00	2.0E-02	2.0E-02	0.0E+00	**2.3E+00**
Recycled resources	kg	3.7E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**3.7E+00**
Virgin non-renewable resources	kg	4.1E+00	7.1E-03	1.8E-01	3.0E+00	0.0E+00	**7.3E+00**
Parameter - Emissions to Air	**Unit**	**Raw Material Acquisition**	**Construction**	**Installation**	**Use**	**Disposal**	**Total**
SOx	kg	3.8E-02	2.3E-02	3.3E-02	3.5E-03	2.8E-03	**1.0E-01**
NOx	kg	2.6E-09	2.9E-09	7.1E-07	6.7E-07	9.0E-10	**1.4E-06**
CO2	kg	0.0E+00	0.0E+00	2.0E-02	2.0E-02	0.0E+00	**4.0E-02**
Methane	kg	5.4E-03	6.5E-03	9.2E-03	3.7E-04	1.8E-05	**2.1E-02**
N2O	kg	4.6E-04	2.1E-04	6.1E-04	7.7E-04	7.2E-05	**2.1E-03**
CO	kg	3.4E-04	5.9E-06	6.7E-05	6.3E-05	2.6E-09	**4.8E-04**
Parameter - Water Usage and Emissions to Water	**Unit**	**Raw Material Acquisition**	**Construction**	**Installation**	**Use**	**Disposal**	**Total**
Phosphates	kg	1.4E-02	1.1E-03	6.4E-03	1.3E-03	3.5E-03	**2.6E-02**
Nitrates	kg	1.0E-02	1.1E-03	4.0E-03	5.8E-02	9.2E-04	**7.4E-02**
Dioxin	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**
Arsenic	kg	4.3E-05	3.3E-06	3.6E-05	4.7E-06	3.5E-06	**9.0E-05**
Lead	kg	3.8E-04	2.2E-05	7.0E-04	6.4E-05	2.1E-05	**1.2E-03**
Mercury	kg	1.6E-06	1.2E-07	1.3E-06	2.5E-07	1.6E-07	**3.4E-06**
Cadmium	kg	1.2E-05	8.5E-07	1.6E-05	1.7E-06	6.0E-07	**3.1E-05**
Chromium	kg	1.4E-05	2.0E-06	1.4E-05	2.3E-06	1.1E-07	**3.2E-05**
Water Consumption	m3	4.9E-01	1.3E-02	4.7E-02	2.0E-01	1.5E-02	**7.6E-01**
Parameter - Energy Type and Usage	**Unit**	**Raw Material Acquisition**	**Construction**	**Installation**	**Use**	**Disposal**	**Total**
Primary Energy Demand	MJ	3.8E+02	2.6E+02	3.0E+02	4.5E+01	2.2E+01	**1.0E+03**
Fossil Fuel Based Energy	MJ	3.3E+02	1.5E+02	3.0E+02	2.0E+01	2.1E+01	**8.2E+02**
Nuclear Energy	MJ	7.0E-02	1.6E-02	8.4E-03	2.2E+00	1.7E-03	**2.3E+00**
Renewable Energy (wind, geothermal, solar)	MJ	8.1E-01	1.2E-01	6.9E-01	1.5E-01	1.5E-01	**1.9E+00**
Renewable Energy (water)	MJ	3.5E+00	4.6E-01	2.9E+00	4.6E-01	4.6E-01	**7.7E+00**
Biomass Energy	MJ	4.7E+01	1.1E+02	1.5E+00	6.5E+01	1.8E-01	**2.3E+02**
Parameter - Waste Management	**Unit**	**Raw Material Acquisition**	**Construction**	**Installation**	**Use**	**Disposal**	**Total**
Incineration with energy recovery	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**
Incineration without energy recovery	kg	0.0E+00	0.0E+00	9.7E-02	0.0E+00	1.7E+00	**1.8E+00**
Landfill (non-hazardous solid waste)	kg	1.3E+00	0.0E+00	2.2E+00	4.5E-01	7.4E+00	**1.1E+01**
Hazardous waste	kg	2.5E-04	0.0E+00	2.4E-04	1.0E-04	7.0E-05	**6.7E-04**
Landfill avoidance (recycling)	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**

Minimum Results Interpretation

The raw material acquisition stage accounts for the majority of the product impacts, which mostly comes from upstream impacts from materials used. Construction and installation are typically the secondary drivers of impact. Installation accounts for more impact in acidification and smog formation. Use accounts for more impact in eutrophication.



Maximum Results

TRACI 2.1 Impact Assessment with IPCC 2021 for GWP

Parameter	Parameter	Unit	Raw Material Acquisition	Construction	Installation	Use	Disposal	Total
GWP	Global warming potential	kg CO_2-Eq.	1.5E+01	1.4E+01	9.1E+00	2.8E+00	4.1E+00	**4.5E+01**
GWP - Biogenic	Biogenic Global warming potential	kg CO_2-Eq.	1.7E-02	1.4E-02	4.7E-03	8.8E-03	2.0E-03	**4.7E-02**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.3E-06	1.2E-06	8.1E-07	2.3E-07	5.1E-07	**4.1E-06**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	7.5E-02	5.2E-02	8.4E-02	1.3E-02	5.6E-03	**2.3E-01**
EP	Eutrophication potential	kg N-Eq.	7.2E-02	5.3E-03	1.2E-02	1.9E-02	1.0E-02	**1.2E-01**
SP	Smog formation potential	kg O_3-Eq.	1.3E+00	7.4E-01	2.0E+00	1.2E-01	8.3E-02	**4.2E+00**
FFD	Fossil fuel depletion	MJ-surplus	3.9E+01	2.7E+01	1.9E+01	1.7E+00	2.4E+00	**8.8E+01**

CML 4.1 Impact Assessment

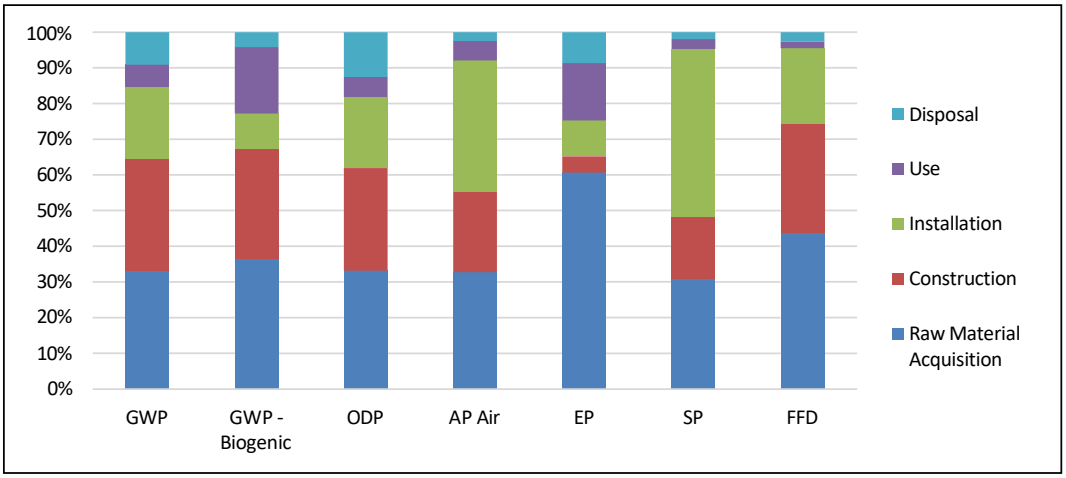
Parameter	Parameter	Unit	Raw Material Acquisition	Construction	Installation	Use	Disposal	Total
GWP	Global warming potential	kg CO_2-Eq.	1.5E+01	1.4E+01	9.1E+00	2.8E+00	4.1E+00	**4.5E+01**
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	1.1E-06	9.5E-07	6.2E-07	2.0E-07	4.5E-07	**3.3E-06**
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	7.0E-02	5.3E-02	7.3E-02	1.1E-02	5.4E-03	**2.1E-01**
EP	Eutrophication potential	kg$(PO_4)^{-3}$-Eq.	3.2E-02	4.8E-03	1.4E-02	9.6E-03	4.4E-03	**6.4E-02**
POCP	Formation potential of tropospheric ozone	kg ethane-Eq.	6.6E-03	2.6E-02	3.7E-03	1.6E-03	2.1E-04	**3.8E-02**
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	4.9E-02	1.2E-05	5.4E-05	2.7E-05	8.4E-06	**5.0E-02**
ADPF	Abiotic depletion potential for fossil resources	MJ	3.1E+02	2.1E+02	1.4E+02	1.6E+01	1.9E+01	**7.0E+02**

Life Cycle Inventory Data

Parameter - Material Resources	Unit	Raw Material Acquisition	Construction	Installation	Use	Disposal	Total
Virgin renewable resources	kg	0.0E+00	2.2E+00	2.0E-02	2.0E-02	0.0E+00	**2.2E+00**
Recycled resources	kg	4.5E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**4.5E+00**
Virgin non-renewable resources	kg	4.0E+00	8.3E-03	1.8E-01	3.0E+00	0.0E+00	**7.1E+00**
Parameter - Emissions to Air	**Unit**	**Raw Material Acquisition**	**Construction**	**Installation**	**Use**	**Disposal**	**Total**
SOx	kg	4.1E-03	3.2E-02	3.8E-02	7.0E-06	2.9E-03	**7.7E-02**
NOx	kg	2.8E-11	7.1E-07	6.7E-07	0.0E+00	9.2E-10	**1.4E-06**
CO2	kg	0.0E+00	2.0E-02	2.0E-02	0.0E+00	0.0E+00	**4.0E-02**
Methane	kg	7.4E-03	5.7E-03	1.0E-02	1.8E-05	2.2E-09	**2.3E-02**
N2O	kg	1.5E-04	5.5E-04	1.1E-03	3.4E-07	7.3E-05	**1.8E-03**
CO	kg	1.1E-06	6.6E-05	7.3E-05	2.6E-09	0.0E+00	**1.4E-04**
Parameter - Water Usage and Emissions to Water	**Unit**	**Raw Material Acquisition**	**Construction**	**Installation**	**Use**	**Disposal**	**Total**
Phosphates	kg	2.4E-02	1.3E-03	6.5E-03	1.3E-03	3.6E-03	**3.7E-02**
Nitrates	kg	4.0E-03	1.4E-03	4.0E-03	5.8E-02	9.4E-04	**6.8E-02**
Dioxin	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**
Arsenic	kg	1.1E-03	4.4E-06	3.6E-05	4.7E-06	3.5E-06	**1.2E-03**
Lead	kg	3.5E-03	3.1E-05	7.0E-04	6.4E-05	2.2E-05	**4.3E-03**
Mercury	kg	6.3E-06	1.5E-07	1.3E-06	2.5E-07	1.7E-07	**8.2E-06**
Cadmium	kg	8.9E-05	1.2E-06	1.6E-05	1.7E-06	6.1E-07	**1.1E-04**
Chromium	kg	1.7E-05	2.9E-06	1.5E-05	2.3E-06	1.1E-07	**3.7E-05**
Water Consumption	m3	4.4E-01	1.6E-01	2.1E-02	0.0E+00	2.4E-01	**8.6E-01**
Parameter - Energy Type and Usage	**Unit**	**Raw Material Acquisition**	**Construction**	**Installation**	**Use**	**Disposal**	**Total**
Primary Energy Demand	MJ	3.7E+02	3.7E+02	3.1E+02	8.6E+01	2.3E+01	**1.2E+03**
Fossil Fuel Based Energy	MJ	3.4E+02	2.3E+02	3.0E+02	1.7E+01	2.1E+01	**9.0E+02**
Nuclear Energy	MJ	1.2E+01	1.1E+00	5.9E+00	9.4E-01	1.0E+00	**2.1E+01**
Renewable Energy (wind, geothermal, solar)	MJ	1.3E+00	1.4E-01	6.7E-01	1.4E-01	1.4E-01	**2.4E+00**
Renewable Energy (water)	MJ	2.1E+01	5.6E-01	2.8E+00	4.6E-01	4.7E-01	**2.5E+01**
Biomass Energy	MJ	2.1E+00	1.3E+02	1.5E+00	2.4E+01	1.9E-01	**1.6E+02**
Parameter - Waste Management	**Unit**	**Raw Material Acquisition**	**Construction**	**Installation**	**Use**	**Disposal**	**Total**
Incineration with energy recovery	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**
Incineration without energy recovery	kg	0.0E+00	0.0E+00	9.7E-02	0.0E+00	1.7E+00	**1.8E+00**
Landfill (non-hazardous solid waste)	kg	1.7E+00	0.0E+00	3.1E+00	4.5E-01	7.5E+00	**1.3E+01**
Hazardous waste	kg	4.5E-04	0.0E+00	3.1E-04	1.0E-04	7.1E-05	**9.4E-04**
Landfill avoidance (recycling)	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	**0.0E+00**

Maximum Results Interpretation

The raw material acquisition stage accounts for the majority of the product impacts, which mostly comes from upstream impacts from materials used. Construction and installation are typically the secondary drivers of impact. Installation accounts for more impact in acidification and smog formation while construction accounts for more impact in global warming potential, ozone depletion, and fossil fuel depletion. Use accounts for more impact in eutrophication.



Additional Environmental Information

Environmental and Health During Manufacturing

Paneltech and PaperStone® are committed to producing high quality products with minimal environmental impact where health and safety is the primary focus for all employees and associates. Paneltech and PaperStone® have a well established Safety Program that ensures that all environmental and OSHA laws are met or exceeded for the health and safety of all employees and contractors. Environmental operations, GHG, energy, water, waste, VOC, health, and safety are constantly monitored. Inspections, audits, and reviews are conducted often to ensure applicable standards are met and our new 100% recycled waste management program has resulted in zero hazardous waste production.

Environmental and Health During Installation

There is no harmful emissive potential. No damage to health or impairment is expected under normal use corresponding to the intended use of the product.

Extraordinary Effects

Fire
Paneltech's products are tested using ASTM E84 Fire Test and are rated Class A by both the Flamespread Index and the Smoke Developed Index.

Water
No danger to the environment can be anticipated during flooding.

Mechanical Destruction
No danger to the environment can be anticipated during mechanical destruction.

Delayed Emissions

Global warming potential is calculated using the IPCC AR6 and CML 4.1 impact assessment methodologies. Delayed emissions are not considered.

Environmental Activities and Certifications

Paneltech is a leader in the composite-panel manufacturing industry and one that was a pioneer in regards to the use of recycled paper. We strive to provide products that promote sustainability, health, and happiness. We utilize the industries highest concentration of recycled paper while combining it with our very own proprietary, non-petroleum based, resin systems. Within our plant, we continue to strive to minimize waste, improve energy efficiencies, as well work towards the implementation of new, increasingly environmentally friendly ingredients.

Further Information

Paneltech International, LLC
2999 John Stevens Way
Hoquiam, WA 98550

Additional Results per ISO 21930

This section shows similar results as shown above; however, the results shown in this section are based off of guidelines outlined in ISO 21930, while the results shown above follow the guidelines outlined in the Residential Countertops PCR.

Minimum Results per Functional Unit Over the Building Lifetime of 75 Years - Including 6.5 Replacements

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	B4	C1	C2	C3	C4
GWP	Global warming potential	kg CO_2-Eq.	2.8E+01	3.0E+00	5.4E+00	2.9E+00	2.8E+02	0.0E+00	1.5E-02	0.0E+00	4.0E+00
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	2.6E-06	1.1E-10	8.0E-07	2.3E-07	2.7E-05	0.0E+00	5.9E-13	0.0E+00	5.0E-07
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	1.4E-01	4.0E-02	2.7E-02	1.3E-02	1.4E+00	0.0E+00	9.2E-05	0.0E+00	5.4E-03
EP	Eutrophication potential	kg N-Eq.	4.6E-02	2.2E-03	8.4E-03	1.9E-02	5.6E-01	0.0E+00	5.1E-06	0.0E+00	1.0E-02
SP	Smog formation potential	kg O_3-Eq.	1.9E+00	1.1E+00	3.4E-01	1.2E-01	2.3E+01	0.0E+00	2.5E-03	0.0E+00	7.9E-02
FFD	Fossil fuel depletion	MJ-surplus	5.6E+01	5.8E+00	1.3E+01	1.8E+00	5.2E+02	0.0E+00	3.0E-02	0.0E+00	2.4E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	B4	C1	C2	C3	C4
GWP	Global warming potential	kg CO_2-Eq.	2.8E+01	3.0E+00	5.5E+00	2.8E+00	2.9E+02	0.0E+00	1.5E-02	0.0E+00	4.0E+00
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	2.2E-06	1.1E-10	6.2E-07	2.0E-07	2.3E-05	0.0E+00	5.9E-13	0.0E+00	5.0E-07
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	1.3E-01	3.2E-02	2.8E-02	1.1E-02	1.3E+00	0.0E+00	9.2E-05	0.0E+00	5.4E-03
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	3.0E-02	6.0E-03	4.9E-03	9.6E-03	3.9E-01	0.0E+00	5.1E-06	0.0E+00	1.0E-02
POCP	Formation potential of tropospheric ozone	kg ethane-Eq.	1.4E-02	8.8E-04	2.6E-03	1.6E-03	6.5E-01	0.0E+00	2.5E-03	0.0E+00	7.9E-02
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	1.7E-04	0.0E+00	5.4E-05	2.7E-05	1.6E+01	0.0E+00	3.0E-02	0.0E+00	2.4E+00
ADPF	Abiotic depletion potential for fossil resources	MJ	4.4E+02	3.9E+01	9.9E+01	1.6E+01	3.9E+03	0.0E+00	1.6E-02	0.0E+00	4.0E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	B4	C1	C2	C3	C4
RPR_E	Renewable primary energy as energy carrier	MJ	1.6E+02	0.0E+00	1.7E+00	6.3E+01	1.5E+03	0.0E+00	0.0E+00	0.0E+00	7.8E-01
RPR_M	Renewable primary energy resources as material utilization	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	3.2E+02	3.9E+01	6.3E+01	1.9E+01	3.0E+03	0.0E+00	2.0E-01	0.0E+00	2.0E+01
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	1.3E+02	0.0E+00	3.8E+01	0.0E+00	1.1E+03	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SM	Use of secondary material	kg	3.7E+00	0.0E+00	0.0E+00	0.0E+00	2.4E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RSF	Use of renewable secondary fuels	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NRSF	Use of nonrenewable secondary fuels	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RE	Energy recovered from disposed waste	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
FW	Use of net fresh water	m^3	5.0E-01	0.0E+00	2.1E-02	2.0E-01	4.8E+00	0.0E+00	0.0E+00	0.0E+00	1.5E-02

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	B4	C1	C2	C3	C4
HWD	Hazardous waste disposed	kg	2.6E-04	1.5E-04	2.9E-04	1.0E-04	5.7E-03	0.0E+00	0.0E+00	0.0E+00	7.0E-05
NHWD	Non-hazardous waste disposed	kg	1.3E+00	1.7E+00	1.7E+00	4.5E-01	8.2E+01	0.0E+00	0.0E+00	0.0E+00	7.4E+00
HLRW	High-level radioactive waste	kg	2.6E-04	5.4E-05	3.1E-04	5.0E-05	5.1E-03	0.0E+00	0.0E+00	0.0E+00	1.2E-04
ILLRW	Intermediate- and low-level radioactive waste	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CRU	Components for re-use	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MR	Materials for recycling	kg	0.0E+00	0.0E+00	1.5E+00	0.0E+00	9.5E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MER	Materials for energy recovery	kg	0.0E+00	0.0E+00	9.7E-02	0.0E+00	1.1E+01	0.0E+00	0.0E+00	1.7E+00	0.0E+00
EE	Recovered energy exported from system	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

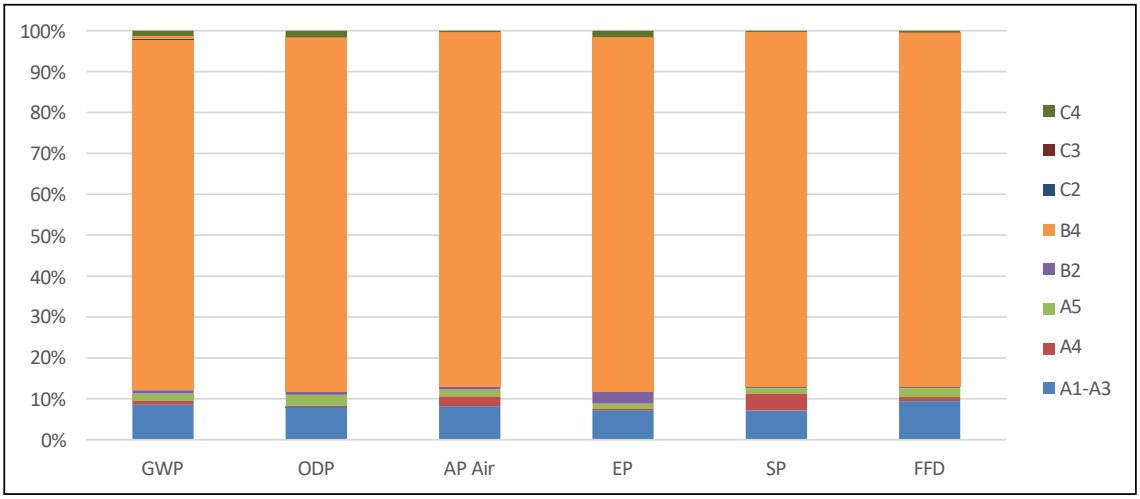
Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	B4	C1	C2	C3	C4
BCRP	Biogenic Carbon Removal from Product	kg CO_2	5.10E+00	0.00E+00	0.00E+00	0.00E+00	3.32E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	0.00E+00	0.00E+00	1.53E+00	0.00E+00	3.32E+01	0.00E+00	0.00E+00	0.00E+00	3.57E+00
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	2.44E+00	0.00E+00	0.00E+00	0.00E+00	1.59E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.00E+00	0.00E+00	2.44E+00	0.00E+00	1.59E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	Calcination Carbon Emissions	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	Carbonation Carbon Removal	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Minimum Product LCA Interpretation

The production stage (A1-A3) accounts for the majority of the product impacts, which mostly comes from energy used in the production process as well as some upstream impacts from materials used. Distribution (A4) accounts for more impact in acidification and smog formation. Maintenance (B2) accounts for more impact in eutrophication. The replacement (B4) stage accounts for the majority of impact in all categories since it duplicates these impacts per the number of times the product is replaced. This study accounts for six and a half replacements over the course of a 75-year building lifetime.



Maximum Results per Functional Unit Over the Building Lifetime of 75 Years - Including 6.5 Replacements

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	B4	C1	C2	C3	C4
GWP	Global warming potential	kg CO_2-Eq.	2.9E+01	3.6E+00	5.5E+00	2.9E+00	2.9E+02	0.0E+00	1.5E-02	0.0E+00	4.1E+00
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	2.5E-06	1.4E-10	8.1E-07	2.3E-07	2.6E-05	0.0E+00	5.9E-13	0.0E+00	5.1E-07
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	1.3E-01	5.7E-02	2.7E-02	1.3E-02	1.5E+00	0.0E+00	9.2E-05	0.0E+00	5.5E-03
EP	Eutrophication potential	kg N-Eq.	6.9E-02	3.1E-03	8.5E-03	1.9E-02	7.1E-01	0.0E+00	5.1E-06	0.0E+00	1.0E-02
SP	Smog formation potential	kg O_3-Eq.	2.1E+00	1.6E+00	3.4E-01	1.2E-01	2.8E+01	0.0E+00	2.5E-03	0.0E+00	8.0E-02
FFD	Fossil fuel depletion	MJ-surplus	7.2E+01	6.8E+00	1.3E+01	1.8E+00	6.3E+02	0.0E+00	3.0E-02	0.0E+00	2.5E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	B4	C1	C2	C3	C4
GWP	Global warming potential	kg CO_2-Eq.	2.9E+01	3.6E+00	5.5E+00	2.8E+00	2.9E+02	0.0E+00	1.5E-02	0.0E+00	4.1E+00
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	2.0E-06	1.3E-10	6.2E-07	2.0E-07	2.2E-05	0.0E+00	5.9E-13	0.0E+00	5.1E-07
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	1.2E-01	4.6E-02	2.8E-02	1.1E-02	1.4E+00	0.0E+00	9.2E-05	0.0E+00	5.5E-03
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	3.7E-02	8.7E-03	4.9E-03	9.6E-03	4.6E-01	0.0E+00	5.1E-06	0.0E+00	1.0E-02
POCP	Formation potential of tropospheric ozone	kg ethane-Eq.	3.3E-02	1.1E-03	2.6E-03	1.6E-03	7.9E-01	0.0E+00	2.5E-03	0.0E+00	8.0E-02
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	4.9E-02	0.0E+00	5.4E-05	2.7E-05	1.7E+01	0.0E+00	3.0E-02	0.0E+00	2.5E+00
ADPF	Abiotic depletion potential for fossil resources	MJ	5.2E+02	4.6E+01	9.9E+01	1.6E+01	4.5E+03	0.0E+00	1.6E-02	0.0E+00	4.1E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	B4	C1	C2	C3	C4
RPR_E	Renewable primary energy as energy carrier	MJ	1.6E+02	0.0E+00	1.7E+00	6.3E+01	1.4E+03	0.0E+00	0.0E+00	0.0E+00	8.0E-01
RPR_M	Renewable primary energy resources as material utilization	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
$NRPR_E$	Nonrenewable primary energy as energy carrier	MJ	4.2E+02	4.6E+01	6.7E+01	1.9E+01	3.7E+03	0.0E+00	2.0E-01	0.0E+00	2.0E+01
$NRPR_M$	Nonrenewable primary energy as material utilization	MJ	1.1E+02	0.0E+00	3.4E+01	0.0E+00	9.7E+02	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SM	Use of secondary material	kg	4.5E+00	0.0E+00	0.0E+00	0.0E+00	2.9E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RSF	Use of renewable secondary fuels	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NRSF	Use of nonrenewable secondary fuels	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RE	Energy recovered from disposed waste	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
FW	Use of net fresh water	m^3	1.8E-01	0.0E+00	2.2E-02	2.0E-01	2.7E+00	0.0E+00	0.0E+00	0.0E+00	1.5E-02

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	B4	C1	C2	C3	C4
HWD	Hazardous waste disposed	kg	4.5E-04	2.3E-04	2.9E-04	1.0E-04	7.5E-03	0.0E+00	0.0E+00	0.0E+00	7.1E-05
NHWD	Non-hazardous waste disposed	kg	1.7E+00	2.6E+00	1.8E+00	4.5E-01	1.0E+02	1.0E+00	0.0E+00	1.0E+00	7.5E+00
HLRW	High-level radioactive waste	kg	3.2E-04	6.9E-05	3.1E-04	5.0E-05	2.6E+01	2.0E+00	0.0E+00	2.0E+00	1.2E-04
ILLRW	Intermediate- and low-level radioactive waste	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
CRU	Components for re-use	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MR	Materials for recycling	kg	0.0E+00	0.0E+00	1.5E+00	0.0E+00	9.5E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MER	Materials for energy recovery	kg	0.0E+00	0.0E+00	9.7E-02	0.0E+00	1.2E+01	0.0E+00	0.0E+00	1.7E+00	0.0E+00
EE	Recovered energy exported from system	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.5E+02	0.0E+00	0.0E+00	1.1E+02	0.0E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Results below contain direct greenhouse gas emissions and removals throughout the life cycle of the product.

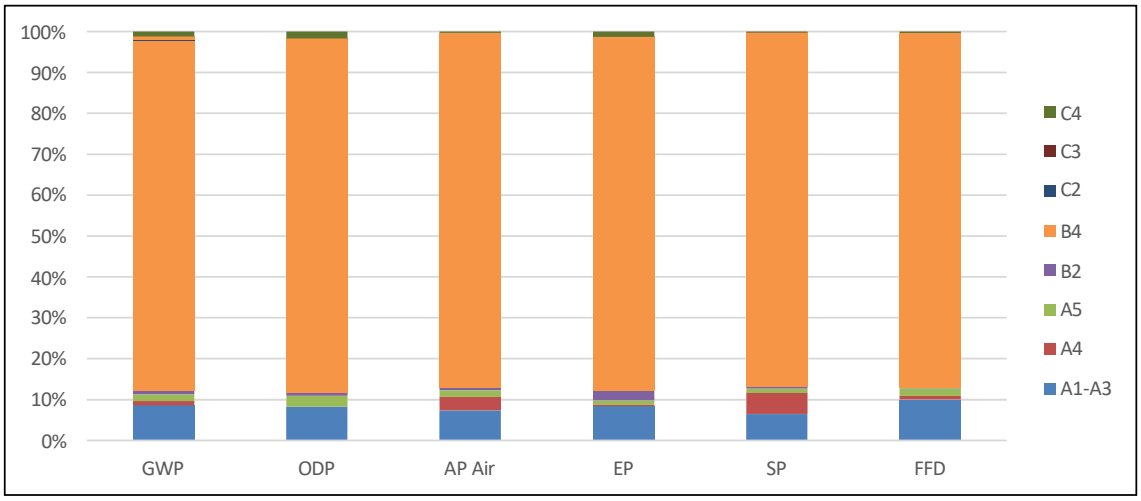
Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	B2	B4	C1	C2	C3	C4
BCRP	Biogenic Carbon Removal from Product	kg CO_2	5.52E+00	0.00E+00	0.00E+00	0.00E+00	3.59E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEP	Biogenic Carbon Emissions from Product	kg CO_2	0.00E+00	0.00E+00	1.66E+00	0.00E+00	3.59E+01	0.00E+00	0.00E+00	0.00E+00	3.86E+00
BCRK	Biogenic Carbon Removal from Packaging	kg CO_2	2.75E+00	0.00E+00	0.00E+00	0.00E+00	1.79E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEK	Biogenic Carbon Emissions from Packaging	kg CO_2	0.00E+00	0.00E+00	2.75E+00	0.00E+00	1.79E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
BCEW	Biogenic Carbon Emissions from Combustion of Waste from Renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCE	Calcination Carbon Emissions	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CCR	Carbonation Carbon Removal	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CWNR	Carbon Emissions from Combustion of Waste from Non-renewable Sources Used in Production Process	kg CO_2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

**All use phase and disposal stages have been considered and only those with non-zero values have been reported*

Maximum Product LCA Interpretation

The production stage (A1-A3) accounts for the majority of the product impacts, which mostly comes from energy used in the production process as well as some upstream impacts from materials used. Distribution (A4) accounts for more impact in acidification and smog formation. Maintenance (B2) accounts for more impact in eutrophication. The replacement (B4) stage accounts for the majority of impact in all categories since it duplicates these impacts per the number of times the product is replaced. This study accounts for six and a half replacements over the course of a 75-year building lifetime.



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