BAMCORE®

BamCore Prime Wall™ System (Generation 3)

The BamCore Prime Wall™ is a high-performance framing solution for commercial and residential low-rise construction. This patented hybrid bamboo-wood system eliminates up to 90% of thermal bridges for enhanced energy efficiency. BamCore's Load Optimized Biogenic Industrialized Construction (LOBIC) methodology and 3D BIM technology enable builders to reduce waste and double efficiency, halving time and crew size without requiring cranes. Twice as strong, the Prime Wall outperforms conventional stud-built walls and stores more carbon than is emitted during harvest and manufacturing. This revolutionary system offers cost, time, and labor savings while swiftly aligning with ESG goals.

Performance dashboard

Features & functionality

When comparing the high-performance Prime Wall™ to conventional 2 x 6 wood framing:

Nearly twice as strong[1], it can stop a small caliber bullet[2]

50% improved thermal performance lowers operating costs & emissions[3]

50% improved acoustic dampening[4]

50+% faster to install with half the crew and no cranes

Low to no rework waste

Nail patterns & MEP mapping for fast, easy installation

1 ASTM E72 Assembly Vertical load
2 NIJ-STD-0108.01 ballistics
3 ASTM C1363 Assembly Thermal Resistance
4 ASTM E90 Assembly Acoustic Transmission

Environment & materials

Timber bamboo vs wood:

Sequesters 4x more MT CO_2 per hectare

Sustainably harvest 20% annually (vs. 25-75 year rotation cycles)

No clear-cutting, avoiding a mass carbon event and loss of biodiversity

Needs one fifth the land area to grow

Restores degraded lands & provides phytoremediation

Certifications, rating systems & disclosures:

NGBS Certified Green

Visit BamCore for more product information:

The Prime Wall™

MasterFormat® 06 12, 06 16, 06 17

Technical Evaluation Report TER 1507-03
Typical Details 1
Typical Details 2
For technical help, contact BamCore or call (707) 737-0288

See LCA, interpretation & rating systems

NGBS GREEN™ NGBS.COM

SM Transparency Report (EPD)™

VERIFICATION	LCA
3rd-party reviewed	✔
	Transparency Report (EPD)
3rd-party verified	✔

Validity: 2023/10/23 – 2028/10/22
Decl #: BAM – 20231023 – 001

This environmental product declaration (EPD) was externally verified by Industrial Ecology Consultants, according to ISO 21930:2017; UL Part A; UL Part B: Structural and Architectural Wood Products EPD Requirements; and ISO 14025:2006.

Industrial Ecology Consultants
35 Bracebridge Rd
Newton, MA 02459
www.industrial-ecology.com
(617) 553-4929

Industrial Ecology Consultants

SUMMARY

Reference PCR
ULE PCR Part B: Structural and Architectural Wood Products EPD requirements v1.1, 2019

Regions; system boundaries
North America; Cradle-to-gate

Declared unit / reference service life:
1 cubic meter (m^3) of wall panel; 75 years

LCIA methodology: TRACI 2.1

LCA software; LCI database
SimaPro Developer 9.5; ecoinvent 3.8

LCA conducted by: BamCore & Sustainable Minds

Public LCA:
Life Cycle Assessment of BamCore Prime Wall Panel

BamCore
5900 Pruitt Ave
#110
Windsor, CA 95492
bamcore.com
(707) 737-0288

Contact us

LCA results & interpretation

Prime Wall

Life cycle assessment

Scope and summary

☑ Cradle to gate ○ Cradle to gate with options ○ Cradle to grave

Product description

The BamCore Prime Wall™ system serves as a structural framing system for commercial and residential buildings. The panels are made from a hybrid of bamboo and plywood and serve as interior and exterior of the dual-panel wall assembly. The panels are attached to top and bottom wood plates and connected to adjacent panels with lap joints. The panels are customized to project-specific engineered plans via off-site fabrication.

Declared unit

The declared unit is one cubic meter (m^3) of wall panel. The results in this report are also expressed in one square foot (ft^2) of nominal 1-1/4 inch (in) thick BamCore Prime Wall™ panel so that they can be more easily applied.

Manufacturing data

Reporting period: September 2021 – August 2022
Locations: Primary data were collected from BamCore's plant in Ocala, Florida. Secondary data were collected from selected raw material suppliers and external literature.

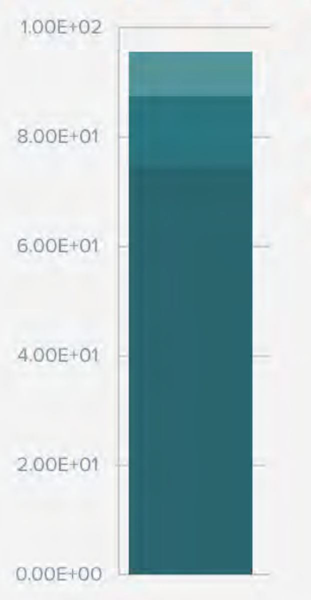
Sensitivity analysis

Sensitivity analyses were performed to check the robustness of the results where the highest potential environmental impacts are occurring. As a significant portion of impacts are attributed to the electricity consumed at the manufacturing facility, the amount of electricity consumed at each site was changed ±20%. The results show that GWP impacts in the A3 stage vary by ±18% while changes in overall cradle-to-gate emissions change by ~7%.

Material composition greater than 1% by weight

MATERIAL	% WT.
Plywood	50-60%
Bamboo	40-50%
Adhesive	1-3%
Others	<1%

Total impacts by life cycle stage [mPts/decl unit]



LIFE CYCLE STAGE	MPTS/DECL. UNIT
Raw material acquisition	7.49E+01
Transportation	8.11E+00
Manufacturing	1.30E+01

What's causing the greatest impacts

All life cycle stages

Across all the environmental indicators considered within the production stage (A1-A3), raw material acquisition (A1) contributes the most to the total impacts, with manufacturing operations (A3) contributing the second most. Another key finding is that the cradle-to-gate (A1-A3) global warming impact potential to produce a Prime Wall™ panel is less than the biogenic carbon storage across the same system boundary, confirming the carbon-negativity of the product across the production stage.

Raw materials acquisition

Raw material acquisition (A1) contributes the most to the total impacts across the panel's cradle-to-gate life cycle. Harvesting and processing of plywood and bamboo are the main contributors in this stage.

Transportation

Transportation of raw materials (A2) is a relatively small contributor to the cradle-to-gate life cycle impacts of a panel in comparison with the other life cycle stages (A1 and A3). Materials are transported via truck and sea freight.

Manufacturing

Manufacturing (A3) is the second highest contributor to most impact categories. As is expected for highly engineered products, the primary driver of environmental impacts within the manufacturing stage is the energy required to run the machinery. However, impacts from the manufacturing stage are lower than the upstream transportation for three impact categories: smog, acidification, and ecotoxicity.

Taking a dynamic approach

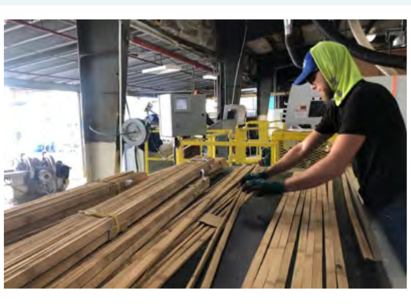
Biobased construction materials provide carbon storage for the life of the building and in the process drive building decarbonization. When discussing carbon storage in buildings, the choice of accounting method is important because it can lead to counter-productive conclusions. Static life cycle assessments consider the potential impact of greenhouse gases at a fixed time horizon (typically 100 years). Static LCAs often report biogenic carbon either using a '0/0' approach, implying any carbon sequestered initially will be re-emitted, or a '-1/+1' approach, including it as "negative emissions" in life cycle stage A and an equivalent positive emission in life cycle stage C. In both cases, the speed of the carbon capture (rotation cycle) of the biogenic material is completely ignored.

Alternatively, dynamic life cycle assessments account for the timing of emissions. The key difference is the focus on the rotation period or the time a new plant needs to grow to reach harvest maturity. This is important as the carbon benefit of bio-based construction is not the transfer of biogenic carbon from nature to the building stock, but the carbon sequestration that occurs with the replacement plant. Results of dynamic LCAs show that fast-growing materials achieve net atmospheric cooling impacts much sooner due to their shorter rotations. This is because the emissions from the production of the building material are directly compensated by the regrowth of the new plant, resulting in a net cooling effect on the atmosphere from the regrowth. The faster the regrowth, the faster or more near-term the lowering of atmospheric temperatures. In contrast, materials with longer rotation periods contribute in the short term to atmospheric warming and only achieve a cooling effect decades after implementation into a building.

Wall assemblies made of fast-growing fibers like bamboo (which is harvestable annually after reaching maturity in 6-9 years) are found to have a negative impact on radiative forcing and, in fact, prove to be better than climate neutral. For these reasons, BamCore is an adamant supporter of leveraging dynamic approaches and adopting fast-growing bio-based materials for use in the built environment. BamCore believes that over time, the policies driving carbon accounting will align more fully with the underlying science of carbon sequestration and climate change.

See how we make it greener

LCA results

LIFE CYCLE STAGE	RAW MATERIAL SUPPLY	UPSTREAM TRANSPORT	MANUFACTURING
Information modules: **Included (X)** | Excluded (MND)* *Modules A4, A5, B, C, and D are excluded.	(X) A1 Raw material supply 	(X) A2 Transport 	(X) A3 Manufacturing 

SM Single Score

Learn about SM Single Score results

Impacts per cubic meter of wall panel	7.49E+01 mPts	8.11E+00 mPts	1.30E+01 mPts
Materials or processes contributing >20% to total impacts in each life cycle stage	Energy consumed during bamboo harvesting and pre-processing (electricity and fuels).	Truck transportation to bamboo pre-processing facility and production facility.	Energy consumed during panel production (electricity and fuels).

TRACI v2.1 results per declared unit (1 cubic meter)

LIFE CYCLE STAGE		A1 RAW MATERIAL SUPPLY	A2 TRANSPORT	A3 MANUFACTURING
Ecological damage				
Impact category	Unit			
Acidification	kg SO_2 eq	3.22E+00	1.46E+00	6.24E-01
Eutrophication	kg N eq	3.91E+00	6.34E-02	1.49E-01
Global warming	kg CO_2 eq	3.44E+02	1.26E+02	3.38E+02
Ozone depletion	kg CFC-11 eq	7.35E-06	1.92E-06	3.39E-06
Human health damage				
Impact category	Unit			
Carcinogenics	CTU_h	4.51E-04	1.08E-05	1.38E-05
Non-carcinogenics	CTU_h	5.32E-01	1.01E-01	2.65E-01
Respiratory effects	kg $PM_{2.5}$ eq	5.04E-06	9.90E-08	7.80E-07
Smog	kg O_3 eq	9.72E+01	2.67E+01	7.90E+00
Additional environmental information				
Impact category	Unit			
Fossil fuel depletion	MJ, LHV	6.76E+02	2.49E+02	4.85E+02
Ecotoxicity	CTU_e	1.30E+03	2.06E+02	3.03E+01

See the additional content required by the UL Part B for Structural and Architectural Wood Products on page 4 of the **Transparency Report PDF**.

TRACI v2.1 results per square foot

LIFE CYCLE STAGE		A1 RAW MATERIAL SUPPLY	A2 TRANSPORT	A3 MANUFACTURING
Ecological damage				
Impact category	Unit			
Acidification	kg SO_2 eq	9.49E-03	4.30E-03	1.84E-03
Eutrophication	kg N eq	1.15E-02	1.87E-04	4.40E-04
Global warming	kg CO_2 eq	1.01E+00	3.73E-01	9.96E-01
Ozone depletion	kg CFC-11 eq	2.17E-08	5.66E-09	1.00E-08
Human health damage				
Impact category	Unit			
Carcinogenics	CTU_h	1.33E-06	3.20E-08	4.08E-08
Non-carcinogenics	CTU_h	1.57E-03	2.99E-04	7.82E-04
Respiratory effects	kg $PM_{2.5}$ eq	1.49E-08	2.92E-01	2.30E-09
Smog	kg O_3 eq	2.87E-01	7.88E-02	2.33E-02
Additional environmental information				
Impact category	Unit			
Fossil fuel depletion	MJ, LHV	1.99E+00	7.34E-01	1.43E+00
Ecotoxicity	CTU_e	3.82E+00	6.07E-01	8.95E-02

See the additional content required by the UL Part B for Structural and Architectural Wood Products on page 4 of the **Transparency Report PDF**.

References

LCA Background Report
BamCore Prime Wall™ Panel LCA Background Report (public version), BamCore 2023. SimaPro Developer 9.5, ecoinvent 3.8 database.

PCRs

ISO 21930:2017 serves as the core PCR along UL Part A.

ULE PCR Part A: Life Cycle Assessment Calculation Rules and Report Requirements v3.2
December, 2018. Technical Advisory Panel members reviewed and provided feedback on content written by UL Environment and USGBC. Past and present members of the Technical Advisory Panel are listed in the PCR.

ULE PCR Part B: Structural and Architectural Wood Products EPD requirements v1.1
May 2020. PCR review conducted by: Dr. Thomas Gloria (Industrial Ecology Consultants); Dr. Indro Ganguly (University of Washington); and Dr. Sahoo (University of Georgia).

Sustainable Minds serves as the program operator: SM Transparency Report™ / EPD Framework Governance and Program Rules Version 3.2 | August, 2023

ISO 14025, "Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services"

Download PDF SM Transparency Report, which includes the additional EPD content required by the UL Environment PCR.

SM Transparency Reports (TR) are ISO 14025 Type III environmental declarations (EPD) that enable purchasers and users to compare the potential environmental performance of products on a life cycle basis. Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance using EPD information shall consider all relevant information modules over the full life cycle of the products within the building. This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 §5.5 are met. It should be noted that different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. These six impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes. Comparison of the environmental performance of structural and architectural wood 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 construction works energy use phase as instructed under this PCR. Full conformance with the PCR for structural and architectural wood 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, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

Rating systems

The intent is to reward project teams for selecting products from manufacturers who have verified improved life-cycle environmental performance.

LEED BD+C: New Construction | v4 - LEED v4
Building product disclosure and optimization
Environmental product declarations

○ Industry-wide (generic) EPD	½product
☑ Product-specific Type III EPD	1 product

LEED BD+C: New Construction | v4.1 - LEED v4.1
Building product disclosure and optimization
Environmental product declarations

○ Industry-wide (generic) EPD	1 product
☑ Product-specific Type III EPD	1.5 product

Collaborative for High Performance Schools National Criteria
MW 7.1 – Environmental Product Declarations

☑ Third-party certified type III EPD	2 points

Green Globes for New Construction and Sustainable Interiors
Materials and resources

- ☑ NC 3-5-1-2 Path B: Prescriptive Path for Building Core and Shell
- ☑ NC 3-5-2-2 and SI 4-1-2 Path B: Prescriptive Path for Interior Fit-outs

BREEAM New Construction 2018
Mat 02 - Environmental impacts from construction products
Environmental Product Declarations (EPD)

○ Industry-average EPD	.5 points
○ Multi-product specific EPD	.75 points
☑ Product-specific EPD	1 point

SM Transparency Report (EPD)™

VERIFICATION	LCA
3rd-party reviewed	☑
	Transparency Report (EPD)
3rd-party verified	☑

Validity: 2023/10/23 – 2028/10/22
Decl #: BAM – 20231023 – 001

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Industrial Ecology Consultants
35 Bracebridge Rd
Newton, MA 02459
www.industrial-ecology.com
(617) 553-4929

Industrial Ecology Consultants

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Regions; system boundaries
North America; Cradle-to-gate
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BamCore
5900 Pruitt Ave
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bamcore.com
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Contact us

How we make it greener

Prime Wall

Collapse all

See LCA results by life cycle stage

RAW MATERIALS ACQUISITION

BamCore is actively seeking out opportunities to work with suppliers to improve the efficiency and sustainability of their harvesting and processing operations. High-yield recovery is one of the key ways BamCore is trying to increase biogenic fiber utilization as a way of increasing efficiency and decreasing waste. Bamboo culm flattening and veneer peeling are both examples of approaches we are exploring. Similar to efforts around reducing the impact of waste generated from BamCore's manufacturing processes, the company is exploring alternative uses for the waste generated during bamboo harvesting, such as biochar.

TRANSPORTATION

All packaging plywood that BamCore receives from suppliers (predominantly as pallets) is reused to transport panels between BamCore facilities and to end customers. In addition, wood dunnage and non-conforming panels are reused as packaging materials. The company is also evaluating more sustainable transportation partners including those that use alternative biofuel for shipping or leverage electric fleets.

MANUFACTURING

BamCore recycles/reuses materials whenever possible. For example, plastic sheets and wood dunnage are reused multiple times within operations and outgoing pallets are all made with plywood from incoming pallets or rejected panels. Furthermore, steel strapping used in Ocala is recycled and all bamboo sawdust is sent to a chicken farm. BamCore is also looking into non-toxic, bio-based adhesives to further reduce embodied emissions. To address energy consumption, BamCore is working to reduce the overall use of electricity, as well as utilize clean energy sources, predominantly by installing solar panels at their facility. Lastly, to reduce impacts of waste generation, alternative uses for the bio-based material are being explored, such as burning for energy or producing biochar, which has several environmental benefits of its own.

OTHER (USE, END OF LIFE)

BamCore delivers a greener building envelope on multiple dimensions. The Prime Wall™ presents a 76% lower mold risk than a 2x6 wall (Thermal and Mold Index Comparison). The Prime Wall™ also significantly mitigates sound pollution, enjoying an OITC rating of 42 – a substantial and perceptible 10-point improvement over a 2x6 stud wall. Additionally, BamCore aims to further decarbonize its Prime Wall™ through a series of innovations funded by the DOE's HESTIA program. These include replacing the wood core with faster-growing, annually harvested alternatives, substituting high embodied carbon insulation with bio-based equivalents, and replacing gypsum with a thin, factory-applied fire-resistive layer. The initiative also seeks to leverage circular design practices to enhance material reusability and end-of-life options.

SM Transparency Report (EPD)™

VERIFICATION LCA

3rd-party reviewed ✔

Transparency Report (EPD)

3rd-party verified ✔

Validity: 2023/10/23 – 2028/10/22

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www.industrial-ecology.com
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SUMMARY

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BamCore
5900 Pruitt Ave
#110
Windsor, CA 95492
bamcore.com
(707) 737-0288

Contact us

Additional EPD content required by: ULE PCR Part B: Structural and Architectural Wood Products

BamCore Prime Wall™ Panel

Data

Background This product-specific declaration was created by collecting product data for one cubic meter of BamCore's Prime Wall™ panel from the Ocala, FL facility.

Allocation The allocation methods used were examined according to the updated allocation rules in ISO 21930:2017. No co-product allocation was necessary since the Ocala facility produced a single panel type. The manufacturing inputs and outputs were divided evenly among the panels produced by area.

Cut-off criteria for the inclusion of mass and energy flows are 1% of renewable primary resource (energy), 1% of non-renewable primary resource (energy) usage, 1% of the total mass input of that unit process, and 1% of environmental impacts. The total of neglected input flows per module does not exceed 5% of energy usage, mass, and environmental impacts. The only exceptions to these criteria are substances with hazardous and toxic properties, which must be listed even when the given process unit is under the cut-off criterion of 1% of the total mass. No known flows are deliberately excluded from this declaration; therefore, these criteria have been met. Biogenic carbon is included in impact category calculations. No carbonation nor calcination occur during the production of plywood and bamboo.

Quality Temporal and technological representativeness are considered to be high. Geographical representativeness is considered to be good. All relevant process steps for the product system were considered and modeled. Data is also considered to be complete as no know flows are deliberately excluded from this analysis other than those defined to be outside of the system boundary. Proxy and generic datasets have been used for some materials and processes, but are considered to be sufficiently representative.

Declared unit properties

Parameter	Value (m^3)	Value (ft^2)	Unit
Product weight	584 (1287)	1.72 (3.80)	kg (lb)
Application thickness (initial pass)	N/A	0.0318 (1.25)	m (in)
Density	584 (36.4)		kg/m^3 (lb/ft^3)
Moisture content	10		%

Scenarios and additional technical information

Product-specific packaging includes new steel banding that may be reused once and then recycled, new wood dunnage that may be used four times and then landfilled, reused plywood covers that may be reused, and new plastic sheets that may be reused.

Hazardous waste

BamCore's Prime WallTM panel does not contain substances that are identified as hazardous according to the Resource Conservation and Recovery Act (RCRA), Subtitle C.

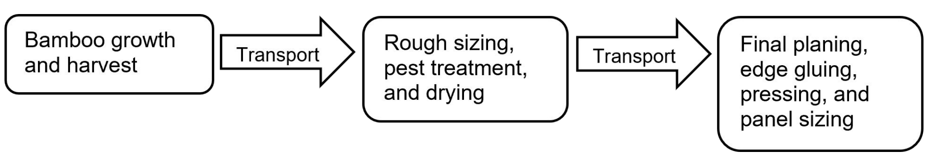
Major system boundary exclusions:

- Capital goods and infrastructure
- Maintenance and operation of support equipment
- Human labor and employee transport
- Building operational energy and water use not associated with final product
- Fabrication activities

Major assumptions and limitations:

- Actual operations at each of the suppliers' plantations and pre-processing facilities vary. Some bamboo suppliers provided partial primary data for their operations. For gaps in data, an average from other suppliers was assumed.
- Generic data sets used for material inputs, transport, and waste processing are considered good quality, but actual impacts from material suppliers, transport carriers, and local waste processing may vary.
- LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.
- This EPD covers only the cradle-to-gate impacts of products using a declared unit. The results listed in this EPD cannot be used to compare between products.

Production flow diagram



LCIA results, resource use, output & waste flows, and carbon emissions & removals per one cubic meter (1 m^3) of wall panel

Parameter	Unit	A1	A2	A3	A5	C1-C4	Total
LCIA results (per 1 m^3)							
Ozone depletion	kg CFC-11 eq	7.35E-06	1.92E-06	3.39E-06	MND	MND	**1.27E-05**
Global warming	kg CO_2 eq	3.44E+02	1.26E+02	3.38E+02	MND	MND	**8.08E+02**
Smog	kg O_3 eq	9.72E+01	2.67E+01	7.90E+00	MND	MND	**1.32E+02**
Acidification	kg SO_2 eq	3.22E+00	1.46E+00	6.24E-01	MND	MND	**5.30E+00**
Eutrophication	kg N eq	3.91E+00	6.34E-02	1.49E-01	MND	MND	**4.13E+00**
Respiratory effects	kg $PM_{2.5}$ eq	5.04E-06	9.90E-08	7.80E-07	MND	MND	**5.92E-06**
Carcinogenics	CTUh	4.51E-04	1.08E-05	1.38E-05	MND	MND	**4.76E-04**
Non-carcinogenics	CTUh	5.32E-01	1.01E-01	2.65E-01	MND	MND	**8.99E-01**
Additional environmental information							
Ecotoxicity	CTUe	1.30E+03	2.06E+02	3.03E+01	MND	MND	**1.53E+03**
Fossil fuel depletion	MJ surplus	6.76E+02	2.49E+02	4.85E+02	MND	MND	**1.41E+03**
Resource use indicators (per 1 m^3)							
Renewable primary energy used as energy carrier (fuel)	MJ, LHV	1.89E+04	2.55E+00	3.50E+02	MND	MND	**1.93E+04**
Renewable primary resources with energy content used as material	MJ, LHV	1.17E+04	0	0	MND	MND	**1.17E+04**
Total use of renewable primary resources with energy content	MJ, LHV	3.06E+04	2.55E+00	3.50E+02	MND	MND	**3.10E+04**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	4.17E+03	1.65E+03	6.52E+03	MND	MND	**1.23E+04**
Non-renewable primary resources with energy content used as material	MJ, LHV	7.99E+02	0	0	MND	MND	**7.99E+02**
Total use of non-renewable primary resources with energy content	MJ, LHV	4.97E+03	1.65E+03	6.52E+03	MND	MND	**1.31E+04**
Secondary materials	kg	0	0	1.66E+01	MND	MND	**1.66E+01**
Renewable secondary fuels	MJ, LHV	0	0	0	MND	MND	**0**
Non-renewable secondary fuels	MJ, LHV	0	0	0	MND	MND	**0**
Recovered energy	MJ, LHV	0	0	0	MND	MND	**0**
Use of net fresh water resources	m^3	3.43E+03	1.19E+01	1.10E+03	MND	MND	**4.54E+03**
Output flows and waste category indicators (per 1 m^3)							
Hazardous waste disposed	kg	0	0	0	MND	MND	**0**
Non-hazardous waste disposed	kg	0	0	1.46E+01	MND	MND	**1.46E+01**
High-level radioactive waste, conditioned, to final repository	kg	2.92E-09	9.40E-11	2.50E-08	MND	MND	**2.80E-08**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	2.14E-07	3.24E-10	1.99E-07	MND	MND	**4.13E-07**
Components for re-use	kg	0	0	0	MND	MND	**0**
Materials for recycling	kg	0	0	3.07E+01	MND	MND	**3.07E+01**
Materials for energy recovery	kg	0	0	0	MND	MND	**0**
Exported energy	MJ, LHV	0	0	0	MND	MND	**0**
Carbon emissions and removals (per 1 m^3)							
Biogenic carbon removal from product	kg CO_2	1.04E+03	0	0	0	0	**1.04E+03**
Biogenic carbon emission from product	kg CO_2	0	0	0	0	1.04E+03	**1.04E+03**
Biogenic carbon removal from packaging	kg CO_2	1.47E+02	0	0	0	0	**1.47E+02**
Biogenic carbon emission from packaging	kg CO_2	0	0	0	1.47E+02	0	**1.47E+02**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	0	0	**0**

LCIA results, resource use, output & waste flows, and carbon emissions & removals per one square foot (1 ft^2) of wall panel

Parameter	Unit	A1	A2	A3	A5	C1-C4	Total
LCIA results (per 1 ft^2)							
Ozone depletion	kg CFC-11 eq	2.17E-08	5.66E-09	1.00E-08	MND	MND	**3.74E-08**
Global warming	kg CO_2 eq	1.01E+00	3.73E-01	9.96E-01	MND	MND	**2.38E+00**
Smog	kg O_3 eq	2.87E-01	7.88E-02	2.33E-02	MND	MND	**3.89E-01**
Acidification	kg SO_2 eq	9.49E-03	4.30E-03	1.84E-03	MND	MND	**1.56E-02**
Eutrophication	kg N eq	1.15E-02	1.87E-04	4.40E-04	MND	MND	**1.22E-02**
Respiratory effects	kg $PM_{2.5}$ eq	1.49E-08	2.92E-01	2.30E-09	MND	MND	**1.75E-08**
Carcinogenics	CTUh	1.33E-06	3.20E-08	4.08E-08	MND	MND	**1.40E-06**
Non-carcinogenics	CTUh	1.57E-03	2.99E-04	7.82E-04	MND	MND	**2.65E-03**
Additional environmental information							
Ecotoxicity	CTUe	3.82E+00	6.07E-01	8.95E-02	MND	MND	**4.52E+00**
Fossil fuel depletion	MJ surplus	1.99E+00	7.34E-01	1.43E+00	MND	MND	**4.16E+00**
Resource use indicators (per 1 ft^2)							
Renewable primary energy used as energy carrier (fuel)	MJ, LHV	5.57E+01	7.52E-03	1.03E+00	MND	MND	**5.67E+01**
Renewable primary resources with energy content used as material	MJ, LHV	3.44E+01	0	0	MND	MND	**3.44E+01**
Total use of renewable primary resources with energy content	MJ, LHV	9.01E+01	7.52E-03	1.03E+00	MND	MND	**9.11E+01**
Non-renewable primary resources used as an energy carrier (fuel)	MJ, LHV	1.23E+01	4.87E+00	1.92E+01	MND	MND	**3.64E+01**
Non-renewable primary resources with energy content used as material	MJ, LHV	2.36E+00	0	0	MND	MND	**2.36E+00**
Total use of non-renewable primary resources with energy content	MJ, LHV	1.47E+01	4.87E+00	1.92E+01	MND	MND	**3.88E+01**
Secondary materials	kg	0	0	4.88E-02	MND	MND	**4.88E-02**
Renewable secondary fuels	MJ, LHV	0	0	0	MND	MND	**0**
Non-renewable secondary fuels	MJ, LHV	0	0	0	MND	MND	**0**
Recovered energy	MJ, LHV	0	0	0	MND	MND	**0**
Use of net fresh water resources	m^3	1.01E+01	3.50E-02	3.24E+00	MND	MND	**1.34E+01**
Output flows and waste category indicators (per 1 ft^2)							
Hazardous waste disposed	kg	0	0	0.00E+00	MND	MND	**0**
Non-hazardous waste disposed	kg	0	0	4.32E-02	MND	MND	**4.32E-02**
High-level radioactive waste, conditioned, to final repository	kg	8.61E-11	2.77E-13	7.37E-11	MND	MND	**1.60E-10**
Intermediate- and low-level radioactive waste, conditioned, to final repository	kg	6.33E-10	9.56E-13	5.87E-10	MND	MND	**1.22E-09**
Components for re-use	kg	0	0	0	MND	MND	**0**
Materials for recycling	kg	0	0	9.05E-02	MND	MND	**9.05E-02**
Materials for energy recovery	kg	0	0	0	MND	MND	**0**
Exported energy	MJ, LHV	0	0	0	MND	MND	**0**
Carbon emissions and removals (per 1 ft^2)							
Biogenic carbon removal from product	kg CO_2	3.08E+00	0	0	0	0	**3.08E+00**
Biogenic carbon emission from product	kg CO_2	0	0	0	0	3.08E+00	**3.08E+00**
Biogenic carbon removal from packaging	kg CO_2	4.33E-01	0	0	0	0	**4.33E-01**
Biogenic carbon emission from packaging	kg CO_2	0	0	0	4.33E-01	0	**4.33E-01**
Biogenic carbon emission from combustion of waste from renewable sources used in production processes	kg CO_2	0	0	0	0	0	**0**
Calcination carbon emissions	kg CO_2	0	0	0	0	0	**0**
Carbonation carbon removals	kg CO_2	0	0	0	0	0	**0**
Carbon emissions from combustion of waste from non-renewable sources used in production processes	kg CO_2	0	0	0	0	0	**0**