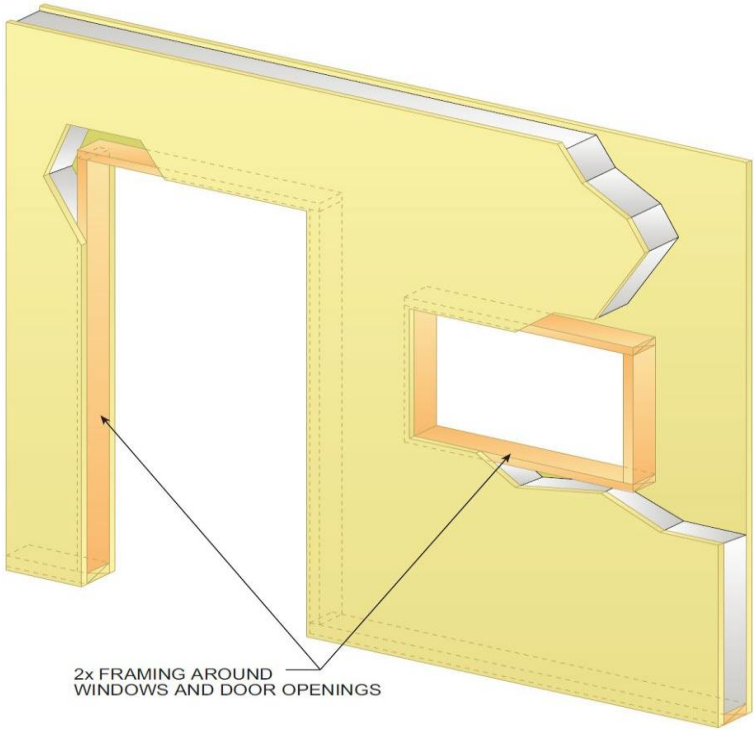
ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Structural Insulated Panel Association

Structural Insulated Panel Association - Blank 6.5” (SIPA B6.5)



Structural insulated panels (SIPs) are high-performance building panels used in floors, walls, and roofs for residential and light commercial buildings. The panels are made by sandwiching a core of rigid foam insulation between two structural oriented strand board (OSB) facings. SIPs are manufactured under factory-controlled conditions and can be custom designed for each project. The result is a building system that is extremely strong, energy-efficient and cost effective. Building with SIPs saves time, money, and labor.

EPD HUB, HUB-2458
Published on 06.12.2024, last updated on 06.12.2024, valid until 06.12.2029

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Structural Insulated Panel Association (SIPA)
Address	8482 3296 North Federal Hwy US 1 #39848 Ft. Lauderdale, FL 33339
Contact details	info@sips.org
Website	https://www.sips.org/

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.1, 5 Dec 2023
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-B7, and modules C1-C4, D
EPD author	David MacLean – McMac CX
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	Haiha Nguyen, as an authorized verifier acting for EPD Hub Limited

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Structural Insulated Panel (SIP)
Additional labels	SIP – Blank 6.5” (B6.5)
Product reference	-
Place of production	Eleven (11) manufacturers from: • Radford Virginia USA • Watertown South Dekota USA • Cottonwood, Minnesota USA • Louisville, Kentucky USA • Blissfield, Michigan USA • Hebron, Ohio USA • Holland, Michigan USA • Tijuana, Baja California MEXICO • Puyallup, Washington USA • Jacksonville, Arkansas USA • Galion, Ohio USA
Period for data	2023
Averaging in EPD	Multiple products and multiple manufacturing sites averaging
Variation in GWP-fossil for A1-A3	5%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m² of structurally insulated panel
Declared unit mass	18.643 kg
GWP-fossil, A1-A3 (kgCO2e)	2.31E+01
GWP-total, A1-A3 (kgCO2e)	-8.16E-01
Secondary material, inputs (%)	1.85
Secondary material, outputs (%)	0
Total energy use, A1-A3 (kWh)	165
Total water use, A1-A3 (m3e)	2.05

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	0	North America
Minerals	0	North America
Fossil materials	14.32	North America
Bio-based materials	85.68	North America

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	6.53
Biogenic carbon content in packaging, kg C	0

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m² of structurally insulated panel
Mass per declared unit	18.643 kg
Functional unit	The functional unit used is 1 m² of installed product with a thickness of 6.5" (16.51 cm) achieving an average thermal resistance RSI = 3.7 m2k/w (21 R-Value).
Reference service life	75 Years

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

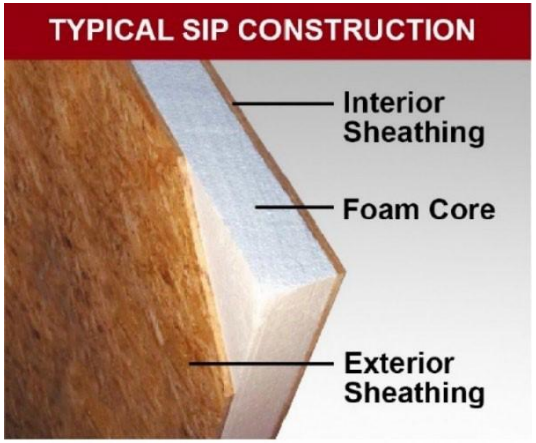
The Structural Insulated Panel Association (SIPA) is a 501c6 non-profit association dedicated to increasing the use and acceptance of structural insulated panels (SIPs) in sustainable building by providing an industry forum for promotion, communication, education, quality assurance, and technical and marketing research. Structural Insulated Panels (SIPs) are a high-performance, panelized building system that offers superior thermal performance, airtightness, and durability for energy-efficient homes and light commercial buildings. Builders and design professionals seeking to reduce energy use and minimize the carbon footprint of their buildings utilize SIPs as a cost-effective solution for exterior walls, floors, and roof systems that also cuts down on framing time, significantly reduces construction waste, and ensures greater jobsite quality control through prefabrication. SIPs are an enabling technology to meet to the Architecture 2030 Challenge for net-zero, carbon neutral buildings today.

PRODUCT DESCRIPTION

Structural insulated panels (SIPs) are high-performance building panels used in floors, walls, and roofs for residential and light commercial buildings. The panels are made by sandwiching a core of rigid foam insulation between two structural oriented strand board (OSB) facings. SIPs are manufactured under factory-controlled conditions and can be custom designed for each project. The result is a building system that is extremely strong, energy-efficient and cost effective. Building with SIPs saves time, money, and labor.

Further information can be found at https://www.sips.org

PRODUCT STYLES



This EPD covers three (3) product variations common to all manufacturer members of the Structural Insulated Panel Association (SIPA). These are:

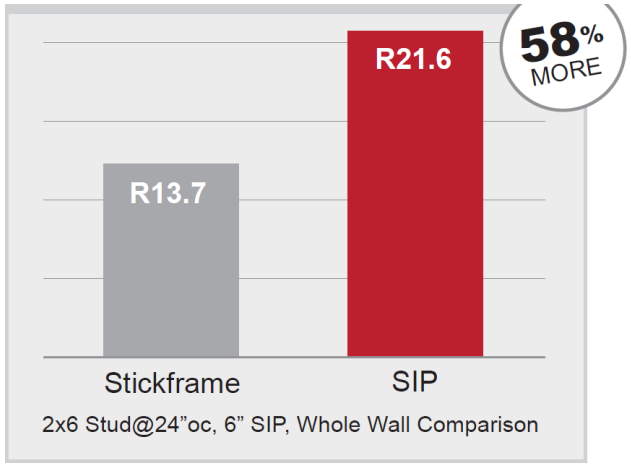
1. Blanks: "Blanks" are full panels with no opening cut for doors or windows.

2. Blanks with Openings: These are "Blank" panels with door and window openings factory cut per client construction documents under controlled conditions. This results in jobsite waste minimization, labor savings, and accelerated construction.

3. Ready to Assemble: These are "Blanks with Opening" panels whose fenestration perimeters are factory finished with dimensional lumber, making them immediately ready for acceptance of doors and windows at the jobsite. This results in additional jobsite waste minimization, labor savings, and accelerated construction compared to "Blanks with Openings".

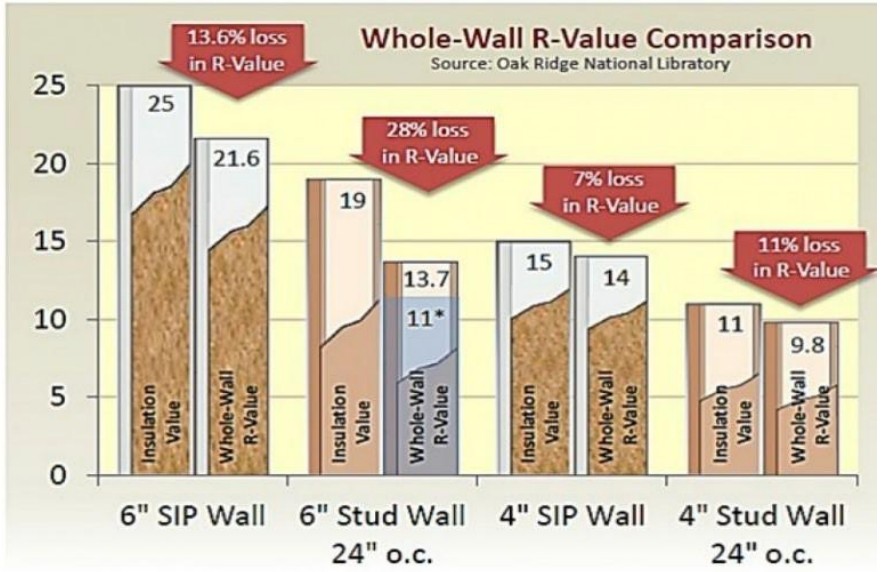
See further details in Table 4: SIP Scaling for Environmental Impacts.

This Industry Average EPD FUNCTIONAL UNIT is based on one (1) square meter (1 m²) of "SIP B6.5" "Blank" with a nominal thickness of 16.51 cm (6.5 inches) and an average thermal resistance of RSI = 3.7 m2k/w (21 R-Value). This SIP model most closely compares dimensionally to highest minimum-code stick-built solutions in the marketplace, but with significantly better thermal, indoor air quality, constructability, labor, sustainability, resiliency, Greenhouse Warming Potential (GWP), and embodied carbon advantages.



Exceptional Thermal Performance

SIPs deliver unrivaled insulation and airtightness, which reduces energy costs over the building's lifetime. SIPs are known to be up to 50% more energy-efficient than traditional stick-built timber framing. A SIP building envelope has minimal thermal bridging and delivers excellent airtightness, which lends itself ideally to LEED and net-zero-ready building standards.



R-VALUES WITH SIPS

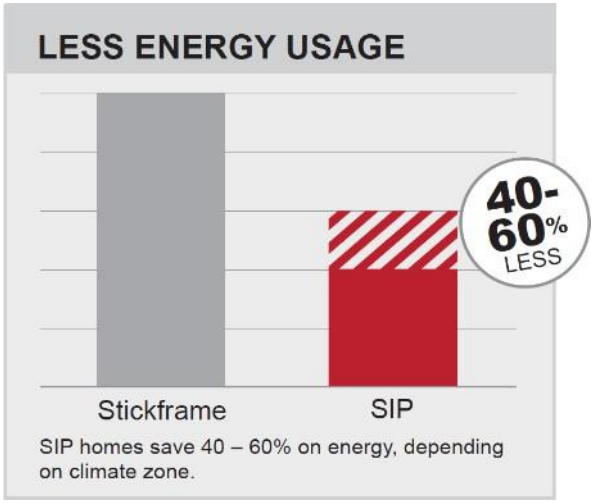
Healthier Indoor Air Quality

A SIP home or commercial building allows better control over indoor air quality because the airtight building envelope limits incoming air to controlled ventilation which filters out contaminants and allergens. The SIP envelope doesn't have the voids or thermal bridging of conventional stick framing that can cause condensation leading to potentially hazardous mold, mildew, or rot.

BETTER AIR QUALITY WITH SIPS

Sustainability Credentials

SIPs are highly energy-efficient and therefore contribute positively to the environment by reducing CO2 levels. They also use significantly less energy during the manufacturing process compared to traditional construction methods and have lower embodied energy than traditional construction materials, such as steel, concrete and masonry.



A SUSTAINABLE BUILDING PRODUCT

Faster Construction with Less Labor

SIP walls and roofs are designed and precisely manufactured offsite. This allows the building to be assembled onsite quickly and made watertight in a matter of days. This reduces costs such as project management, scaffolding, framing labor and much more. A BASF time-motion study confirmed that SIP panels reduce jobsite labor needs by 55%.

SIPS VS. STICK FRAMING

RESILIENCE - Durability of SIPs Exposed to Moisture
https://www.sips.org/documents/SIPA_TB_09_Durability-of-SIPs-Exposed-to-Moisture.pdf

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruct./ Demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

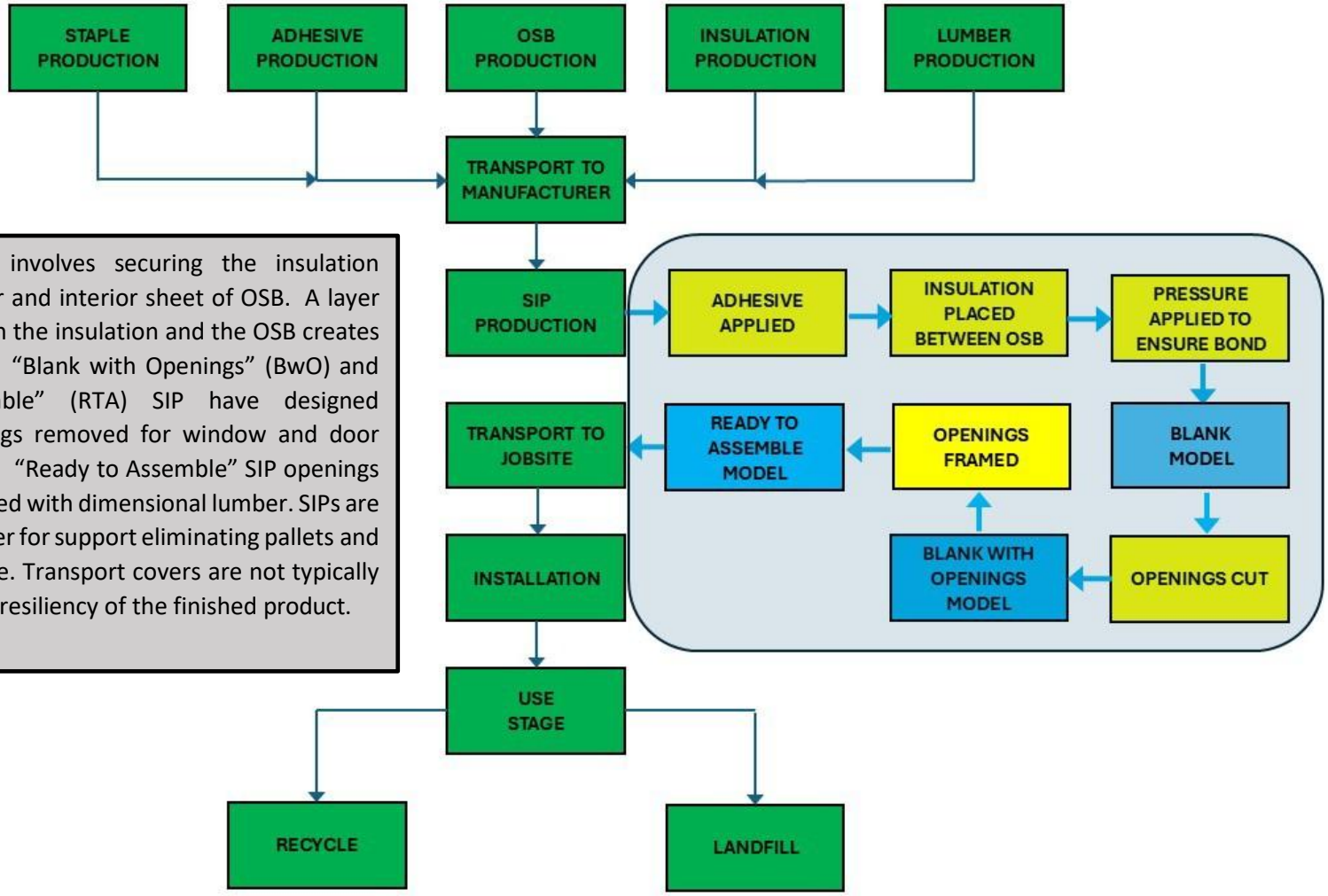
PRODUCT USE AND MAINTENANCE (B1-B7)

There are no air, soil, or water impacts during the use phase once the SIP product is installed as it never comes in direct contact with the exterior or interior of the building and therefore requires no maintenance.

PRODUCT END OF LIFE (C1-C4, D)

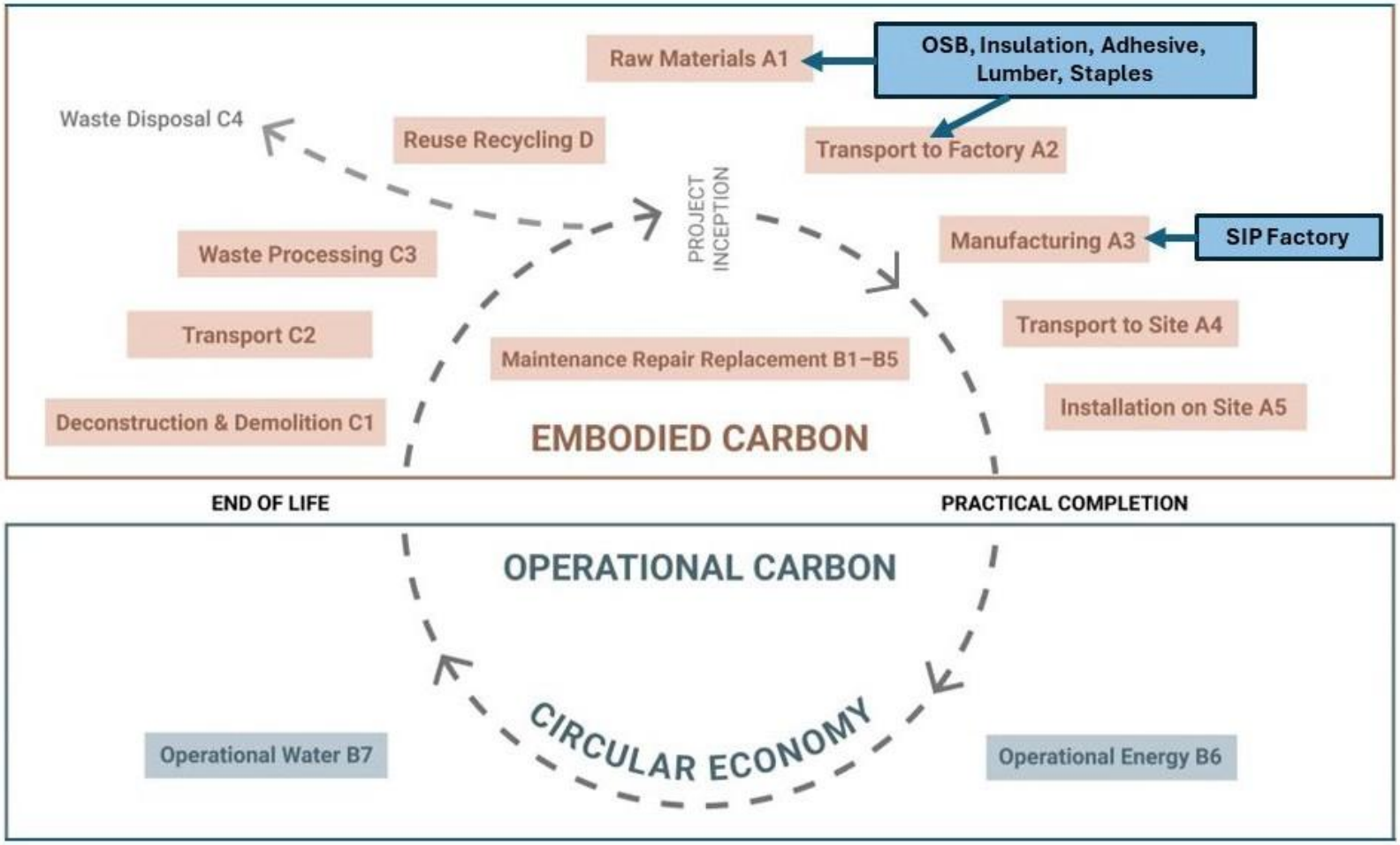
End of Life for this product has been estimated.

MANUFACTURING PROCESS



SIP manufacturing involves securing the insulation between an exterior and interior sheet of OSB. A layer of adhesive between the insulation and the OSB creates a permanent bond. "Blank with Openings" (BwO) and "Ready to Assemble" (RTA) SIP have designed fenestration openings removed for window and door insertion at jobsites. "Ready to Assemble" SIP openings are edged and secured with dimensional lumber. SIPs are stacked on each other for support eliminating pallets and other shipping waste. Transport covers are not typically necessary given the resiliency of the finished product.

SIP LIFE CYCLE



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging materials	No allocation
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

ESTIMATES AND ASSUMPTIONS

- The transportation distance for the OSB, insulation, adhesive, lumber, and metal fasteners raw material were averaged between all eleven (11) manufacturers.
    - OSB: 980 KM Truck
    - Insulation: 564 KM Truck
    - Adhesive: 178 KM Truck
    - Lumber: 402 KM Truck (RTA Product Only)
    - Metal Fasteners: 378 KM Truck (RTA Product Only)
- The reference service life (RSL) of the products was modelled as 75 years, however SIPs do not deteriorate under normal conditions.
- Finished SIP are flat shipped stacked on top of each other without any spacers.
- 50% of the transport uses no protection from the weather.
- 50% of the transports deploy an industry general purpose reusable woven tarp that returns with the transport company to be reused hundreds of times by the trucking company.
- Transportation distance of packaging material to manufacture site is assumed to be 200 kilometers by truck.
- Transportation distance of manufacturer waste to disposal is assumed to be 50 kilometers by truck.
- Installation waste is assumed to be 20% for Blanks (B), 0% for Blanks with Openings (BwO), and 0% for Ready to Assemble (RTA).
- Transportation distance of the installation waste to disposal is assumed to be 100 kilometers.
- The use phase (modules B1-B7) is assumed to have no impacts, as there is no energy or water use associated with these modules.
- For the product end-of-life, the treatments of the product are assumed to be 80% recycling and the remainder in a landfill.

Transportation distance of the product at the end-of-life to disposal is assumed to be 100 kilometers.

AVERAGES AND VARIABILITY

Type of average	Same Product Ingredients Multiple Manufacturers
Averaging method	Averaged by shares of total mass
Variation in GWP-fossil for A1-A3	5%

This EPD is product specific with respect to the material ingredients. Energy usage averaged based on real time 2023 energy data collected from the following United States SIP manufacturers:

1. ACME Panel Company www.ACMEpanel.com
2. Enercept www.enercept.com
3. Extreme Panel Technologies www.extremepanel.com
4. FischerSIPS www.fischersips.com
5. Insulspan www.insulspan.com
6. Lamit by Armstrong www.armstrongceilings.com/commerical
7. PorterSIPS www.portercorp.com
8. Preflex (Innovacion en Modulacion) www.preflexinc.com
9. Premier Building Systems www.premierbuildingsystems.com
10. Thermafoam R-Control LLC www.thermafoamrcontrol.com
11. Urban Industries, Inc. www.urbanindustries.com

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent v3.8 and One Click LCA databases were used as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

ENVIRONMENTAL IMPACTS – TRACI 2.1. / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	1.90E+01	1.63E+00	2.65E+00	2.33E+01	3.46E-01	4.98E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.51E-04	1.73E-01	0.00E+00	1.27E+00	0.00E+00
Ozone Depletion	kg CFC_{-11}e	1.96E-06	2.99E-07	3.93E-07	2.65E-06	6.37E-08	5.52E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.14E-11	3.19E-08	0.00E+00	4.69E-08	0.00E+00
Acidification	kg SO_2e	5.55E-01	3.31E-01	3.96E-01	1.28E+00	7.05E-02	2.87E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.88E-05	3.52E-02	0.00E+00	8.05E-02	0.00E+00
Eutrophication	kg Ne	2.59E-02	6.92E-04	2.11E-04	2.68E-02	1.47E-04	5.57E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.61E-08	7.37E-05	0.00E+00	8.49E-04	0.00E+00
POCP (“smog”)	kg O_3e	1.88E+00	5.35E-03	3.32E-03	1.89E+00	1.14E-03	3.79E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.35E-07	5.69E-04	0.00E+00	1.58E-03	0.00E+00
ADP-fossil	MJ	2.65E+02	3.38E+00	4.00E+00	2.72E+02	7.19E-01	5.47E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.60E-04	3.59E-01	0.00E+00	5.98E-01	0.00E+00

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	9.52E+01	2.78E-01	8.51E-01	9.63E+01	5.92E-02	1.93E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.51E-04	2.96E-02	0.00E+00	9.75E-02	0.00E+00
Renew. PER as material	MJ	4.19E+02	0.00E+00	-1.22E+01	4.07E+02	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	0.00E+00	0.00E+00	0.00E+00	-4.07E+02	0.00E+00
Total use of renew. PER	MJ	5.14E+02	2.78E-01	-1.14E+01	5.03E+02	5.92E-02	1.93E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.51E-04	2.96E-02	0.00E+00	-4.07E+02	0.00E+00
Non-re. PER as energy	MJ	4.29E+02	2.47E+01	4.50E+01	4.99E+02	5.26E+00	1.02E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.81E-03	2.63E+00	0.00E+00	4.49E+00	0.00E+00
Non-re. PER as material	MJ	2.13E+02	0.00E+00	-5.89E+00	2.07E+02	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	0.00E+00	0.00E+00	0.00E+00	-2.07E+02	0.00E+00
Total use of non-re. PER	MJ	6.41E+02	2.47E+01	3.91E+01	7.05E+02	5.26E+00	1.02E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.81E-03	2.63E+00	0.00E+00	-2.02E+02	0.00E+00
Secondary materials	kg	3.45E-01	6.85E-03	3.41E-03	3.55E-01	1.46E-03	7.16E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.52E-07	7.30E-04	0.00E+00	1.61E-03	0.00E+00
Renew. secondary fuels	MJ	3.24E-04	6.92E-05	1.09E-05	4.04E-04	1.47E-05	9.61E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.59E-09	7.36E-06	0.00E+00	6.31E-05	0.00E+00
Non-ren. secondary fuels	MJ	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	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
Use of net fresh water	m^3	2.04E+00	3.20E-03	7.92E-03	2.05E+00	6.81E-04	4.11E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.84E-06	3.40E-04	0.00E+00	4.93E-03	0.00E+00

8) PER = Primary energy resources.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	-5.90E+00	1.64E+00	3.44E+00	-8.16E-01	3.50E-01	4.81E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.65E-04	1.75E-01	0.00E+00	2.45E+01	0.00E+00
GWP – fossil	kg CO_2e	1.87E+01	1.64E+00	2.72E+00	2.31E+01	3.50E-01	4.80E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.64E-04	1.75E-01	0.00E+00	5.38E-01	0.00E+00
GWP – biogenic	kg CO_2e	-2.47E+01	0.00E+00	7.19E-01	-2.40E+01	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	0.00E+00	0.00E+00	0.00E+00	2.40E+01	0.00E+00
GWP – LULUC	kg CO_2e	2.39E-02	6.06E-04	3.52E-04	2.49E-02	1.29E-04	5.04E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.11E-07	6.45E-05	0.00E+00	1.84E-04	0.00E+00
Ozone depletion pot.	kg CFC_{-11}e	1.84E-06	3.78E-07	4.62E-07	2.68E-06	8.05E-08	5.65E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.62E-11	4.02E-08	0.00E+00	5.92E-08	0.00E+00
Acidification potential	mol H^+e	1.19E-01	6.96E-03	9.02E-03	1.35E-01	1.48E-03	2.76E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E-06	7.41E-04	0.00E+00	1.64E-03	0.00E+00
EP-freshwater[2)]	kg Pe	9.64E-04	1.35E-05	8.75E-05	1.07E-03	2.86E-06	2.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.75E-08	1.43E-06	0.00E+00	3.49E-06	0.00E+00
EP-marine	kg Ne	3.11E-02	2.07E-03	1.25E-03	3.44E-02	4.40E-04	7.20E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.06E-07	2.20E-04	0.00E+00	1.12E-03	0.00E+00
EP-terrestrial	mol Ne	3.33E-01	2.28E-02	1.38E-02	3.70E-01	4.86E-03	7.62E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.36E-06	2.43E-03	0.00E+00	6.16E-03	0.00E+00
POCP ("smog")[3)]	kg NMVOCe	1.26E-01	7.30E-03	4.53E-03	1.37E-01	1.55E-03	2.83E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.05E-07	7.77E-04	0.00E+00	2.23E-03	0.00E+00
ADP-minerals & metals[4)]	kg Sbe	1.37E-04	3.85E-06	2.62E-06	1.43E-04	8.20E-07	2.89E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.96E-09	4.10E-07	0.00E+00	6.54E-07	0.00E+00
ADP-fossil resources	MJ	6.12E+02	2.47E+01	4.50E+01	6.82E+02	5.26E+00	1.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.81E-03	2.63E+00	0.00E+00	4.49E+00	0.00E+00
Water use[5)]	m^3e depr.	1.18E+01	1.10E-01	2.74E-01	1.22E+01	2.35E-02	2.45E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.79E-05	1.18E-02	0.00E+00	2.86E-02	0.00E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	2.24E-06	1.89E-07	4.21E-08	2.47E-06	4.03E-08	5.09E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.40E-12	2.02E-08	0.00E+00	3.31E-08	0.00E+00
Ionizing radiation[6)]	kBq U235e	9.87E-01	1.18E-01	7.56E-01	1.86E+00	2.50E-02	3.82E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E-04	1.25E-02	0.00E+00	2.24E-02	0.00E+00
Ecotoxicity (freshwater)	CTUe	5.57E+02	2.22E+01	2.93E+01	6.08E+02	4.73E+00	1.24E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-03	2.36E+00	0.00E+00	4.65E+00	0.00E+00
Human toxicity, cancer	CTUh	3.00E-08	5.46E-10	8.85E-10	3.14E-08	1.16E-10	6.33E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E-13	5.81E-11	0.00E+00	1.45E-10	0.00E+00
Human tox. non-cancer	CTUh	4.46E-07	2.20E-08	1.23E-08	4.80E-07	4.68E-09	9.79E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.48E-12	2.34E-09	0.00E+00	4.39E-09	0.00E+00
SQP[7)]	-	3.11E+01	2.84E+01	3.49E+00	6.30E+01	6.06E+00	1.60E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.38E-03	3.03E+00	0.00E+00	1.09E+01	0.00E+00

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	6.37E-01	3.27E-02	1.56E-01	8.26E-01	6.97E-03	1.67E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.05E-05	3.48E-03	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste	kg	1.47E+01	5.38E-01	4.25E+00	1.94E+01	1.14E-01	7.64E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.69E-03	5.72E-02	0.00E+00	1.86E+01	0.00E+00
Radioactive waste	kg	5.04E-04	1.65E-04	1.73E-04	8.43E-04	3.52E-05	1.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.88E-08	1.76E-05	0.00E+00	0.00E+00	0.00E+00

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	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	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
Materials for recycling	kg	4.96E-02	0.00E+00	3.05E-02	8.01E-02	0.00E+00	1.60E-02	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	0.00E+00	0.00E+00	0.00E+00
Materials for energy rec	kg	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	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
Exported energy	MJ	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	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

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	1.89E+01	1.63E+00	2.69E+00	2.32E+01	3.46E-01	5.01E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.55E-04	1.73E-01	0.00E+00	1.50E+00	0.00E+00
Ozone depletion Pot.	kg CFC_{-11}e	1.63E-06	2.99E-07	3.94E-07	2.32E-06	6.38E-08	4.86E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-11	3.19E-08	0.00E+00	4.70E-08	0.00E+00
Acidification	kg SO_2e	9.27E-02	5.41E-03	7.66E-03	1.06E-01	1.15E-03	2.16E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-06	5.76E-04	0.00E+00	1.24E-03	0.00E+00
Eutrophication	kg PO_4^3e	2.90E-02	1.23E-03	4.81E-03	3.50E-02	2.62E-04	1.91E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-06	1.31E-04	0.00E+00	6.04E-02	0.00E+00
POCP (“smog”)	kg C_2H_4e	3.22E-02	2.11E-04	4.94E-04	3.29E-02	4.49E-05	6.65E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.98E-08	2.25E-05	0.00E+00	3.19E-04	0.00E+00
ADP-elements	kg Sbe	1.24E-04	3.73E-06	2.63E-06	1.30E-04	7.94E-07	2.63E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.96E-09	3.97E-07	0.00E+00	6.31E-07	0.00E+00
ADP-fossil	MJ	4.03E+02	2.47E+01	4.50E+01	4.73E+02	5.26E+00	9.65E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.81E-03	2.63E+00	0.00E+00	4.49E+00	0.00E+00

ENVIRONMENTAL IMPACTS – ISO 21930

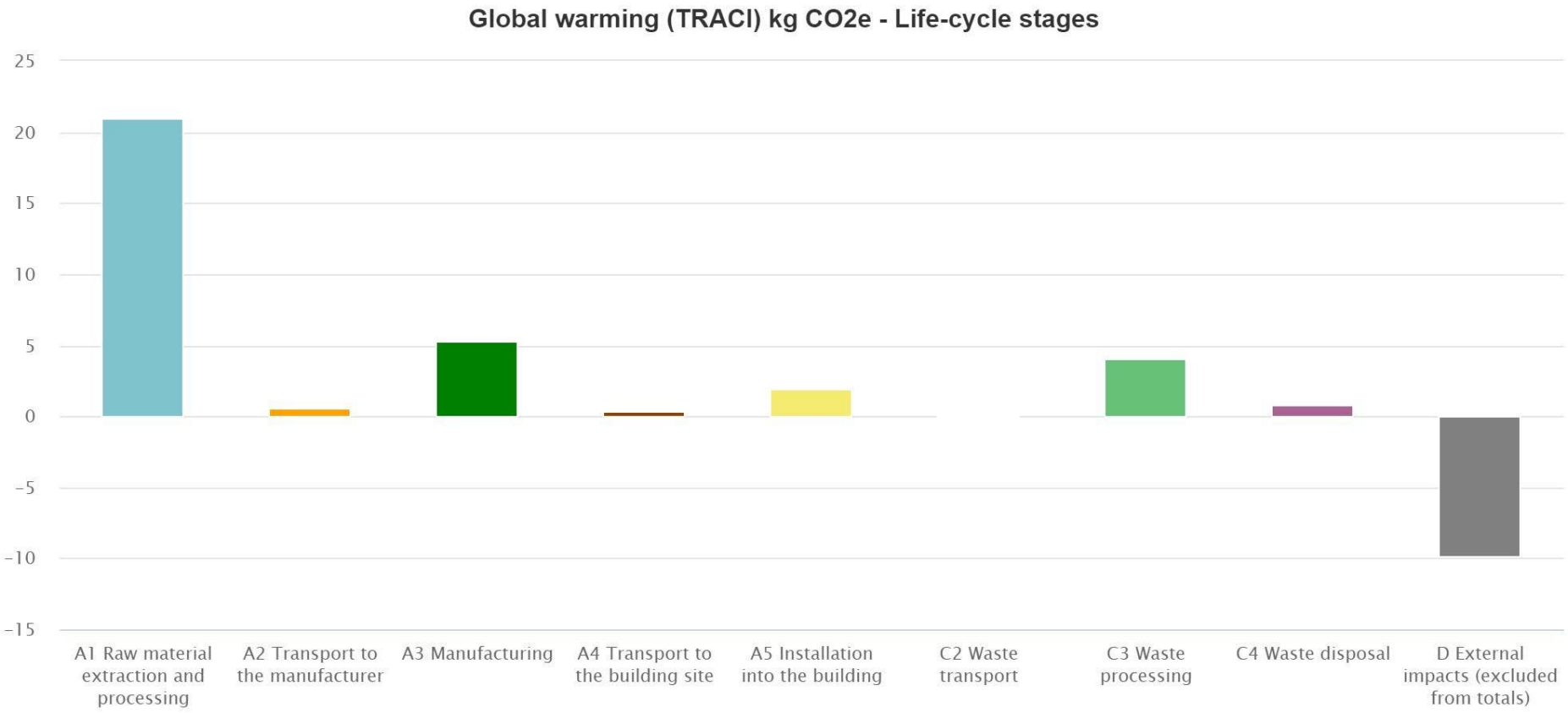
Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Radioactive waste, high	kg	4.91E-05	1.38E-06	3.29E-05	8.34E-05	2.95E-07	1.68E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.22E-09	1.47E-07	0.00E+00	4.22E-07	0.00E+00
Radioactive waste, int/low	kg	4.55E-04	1.64E-04	1.41E-04	7.61E-04	3.49E-05	1.65E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.06E-08	1.74E-05	0.00E+00	2.70E-05	0.00E+00

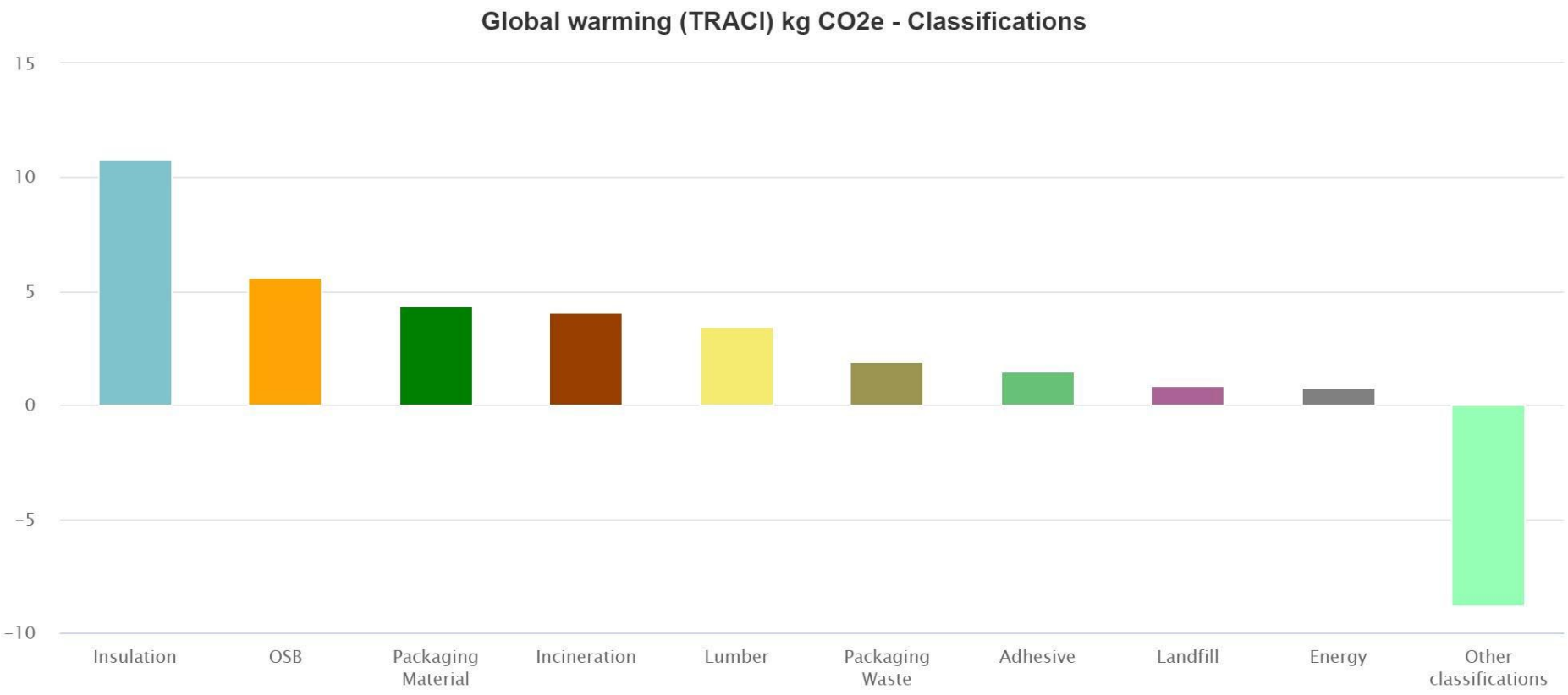
ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

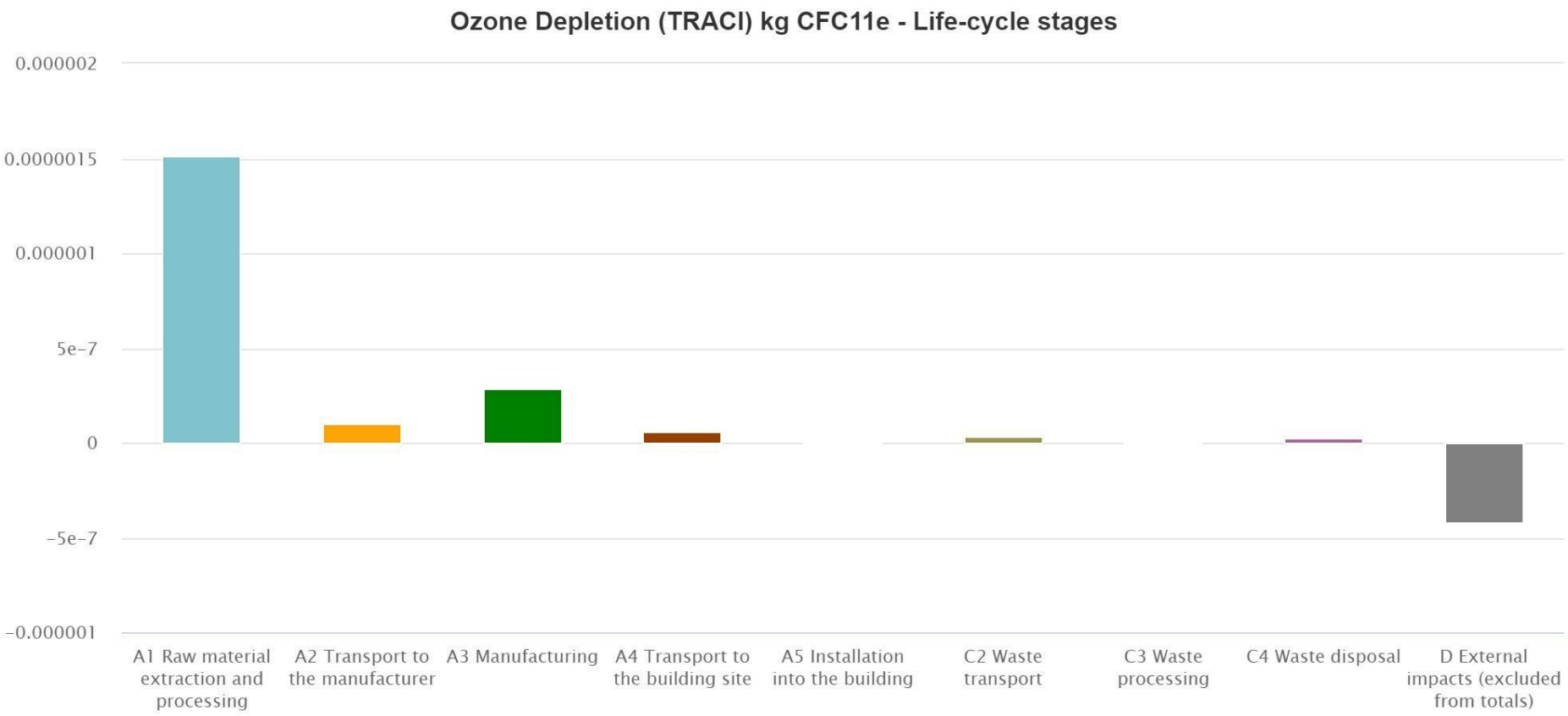
Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	1.87E+01	1.64E+00	2.72E+00	2.31E+01	3.50E-01	4.80E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.64E-04	1.75E-01	0.00E+00	5.38E-01	0.00E+00

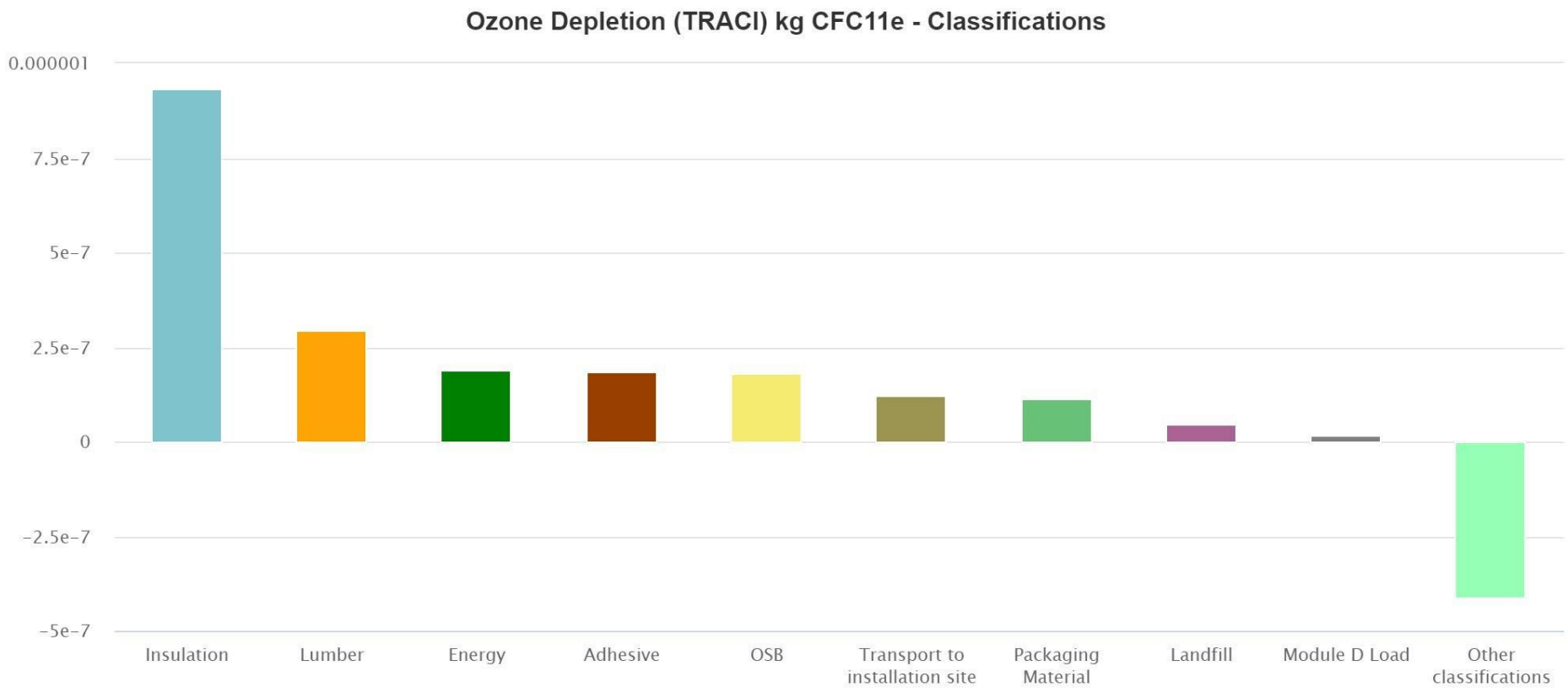
9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterisation factors for the flows - CH4 fossil, CH4 biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO2 is set to zero.

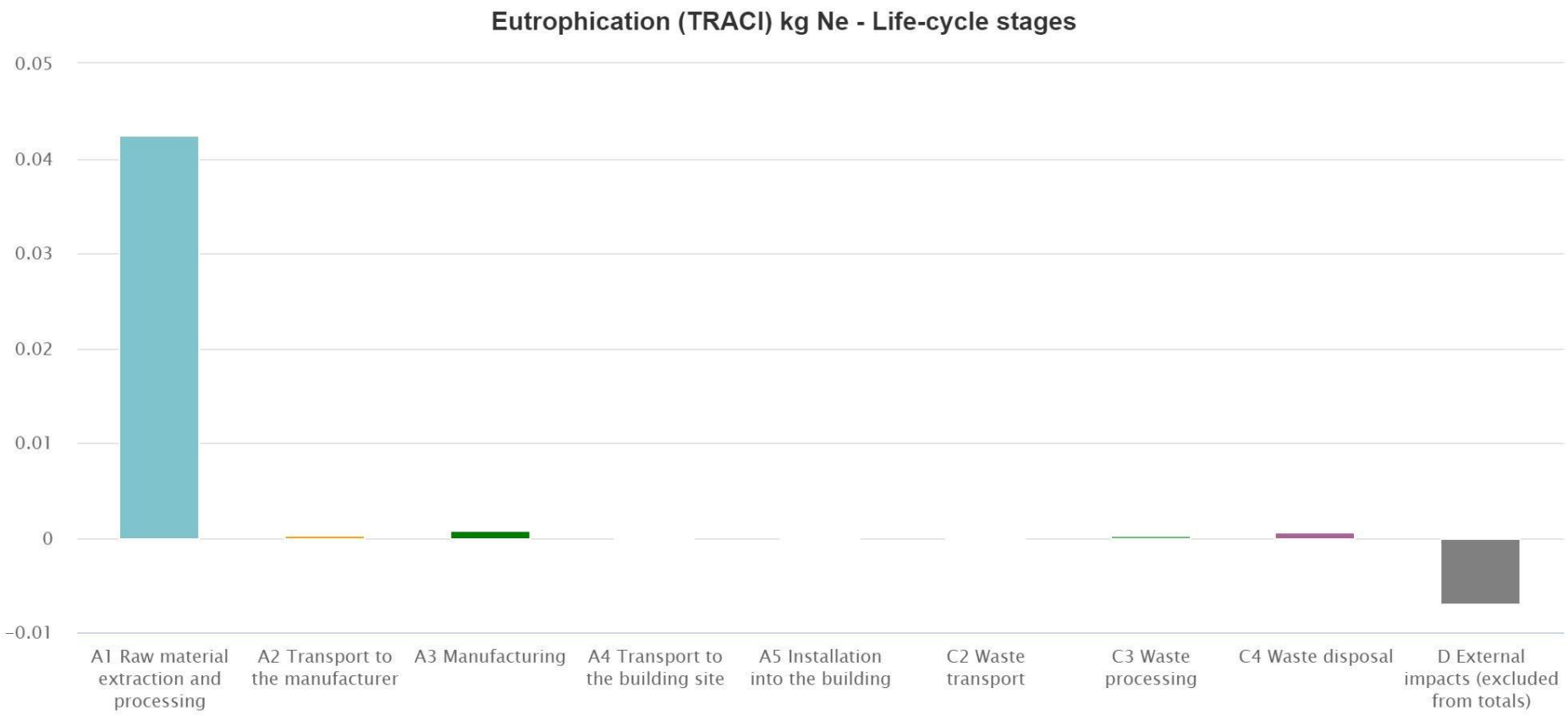
GRAPHS

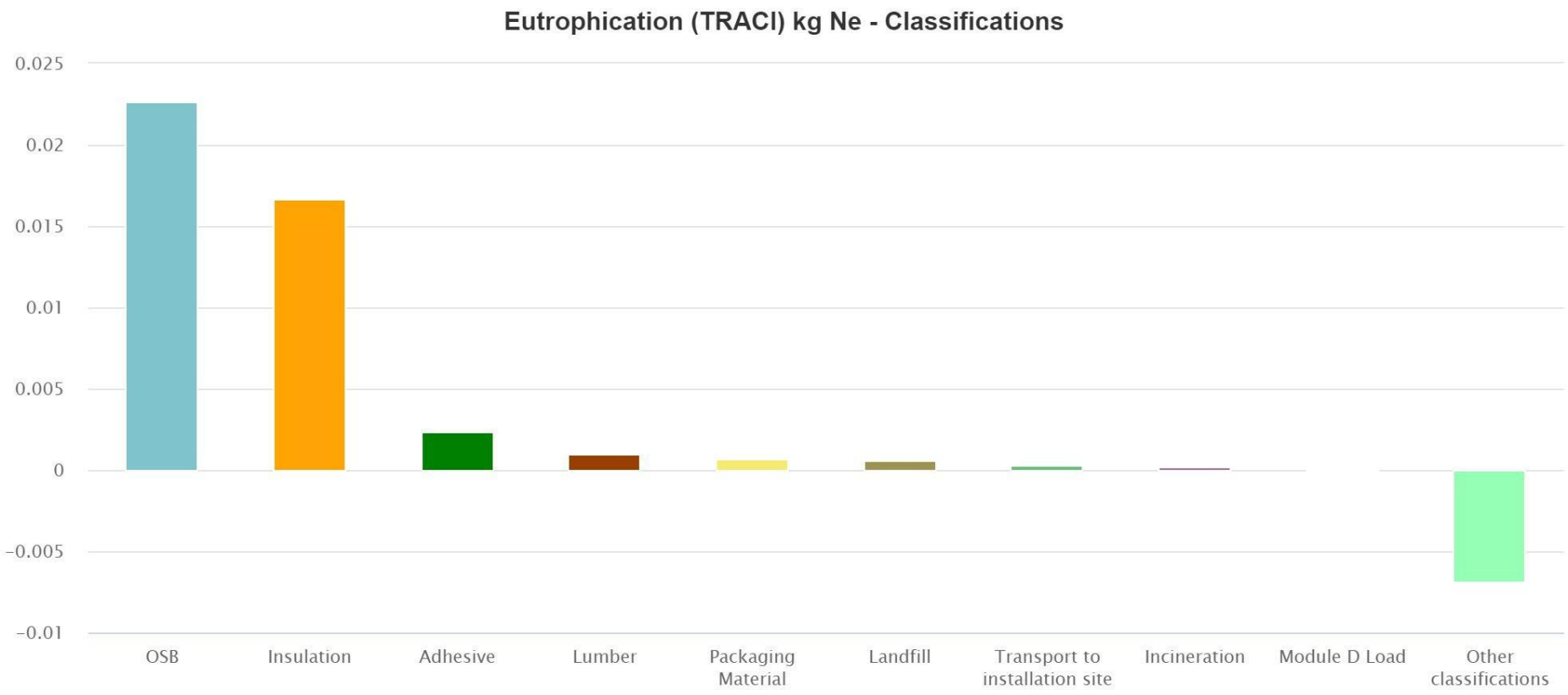

Global warming (TRACI) kg CO2e - Life-cycle stages
25
20
15
10
5
0
-5
-10
-15
A1 Raw material extraction and processing
A2 Transport to the manufacturer
A3 Manufacturing
A4 Transport to the building site
A5 Installation into the building
C2 Waste transport
C3 Waste processing
C4 Waste disposal
D External impacts (excluded from totals)

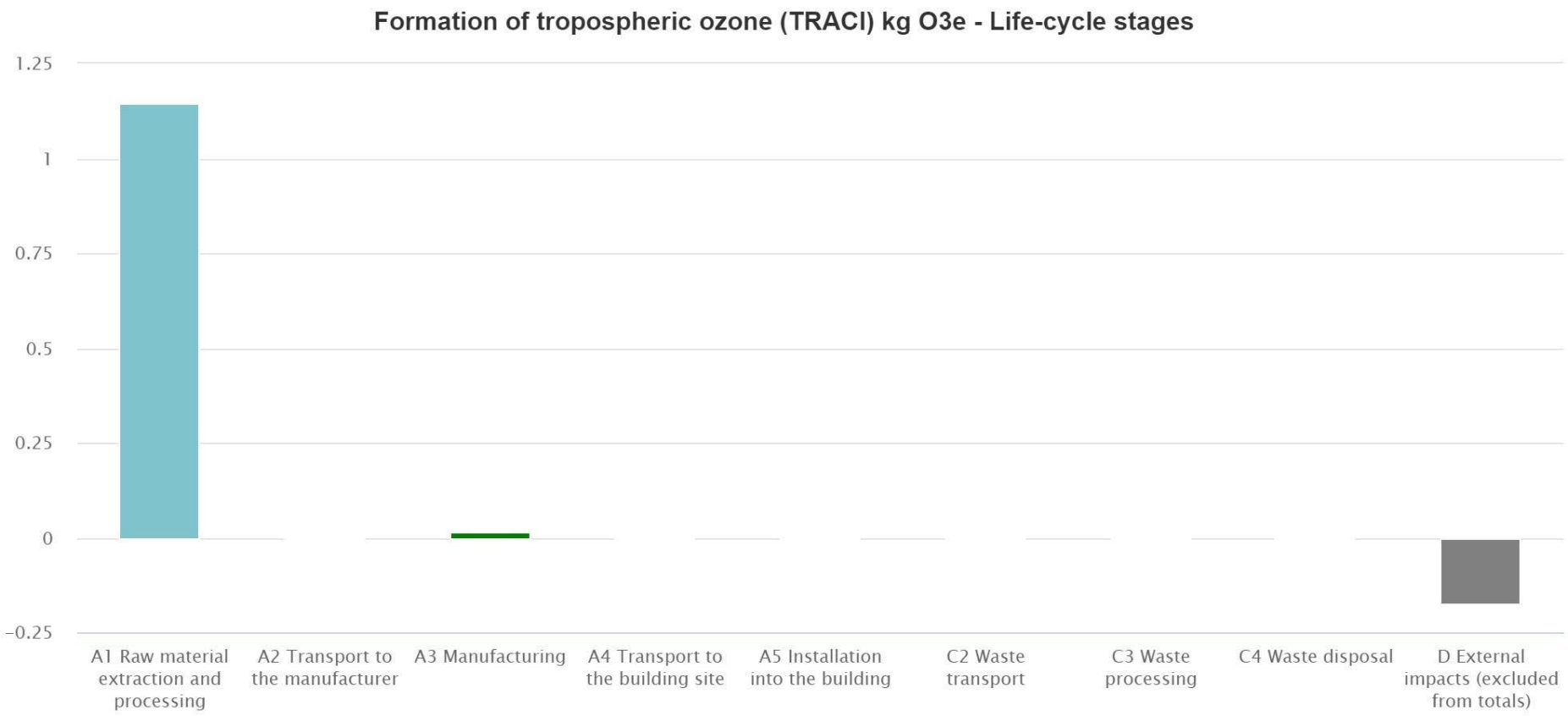

Global warming (TRACI) kg CO2e - Classifications
15
10
5
0
-5
-10
Insulation
OSB
Packaging Material
Incineration
Lumber
Packaging Waste
Adhesive
Landfill
Energy
Other classifications

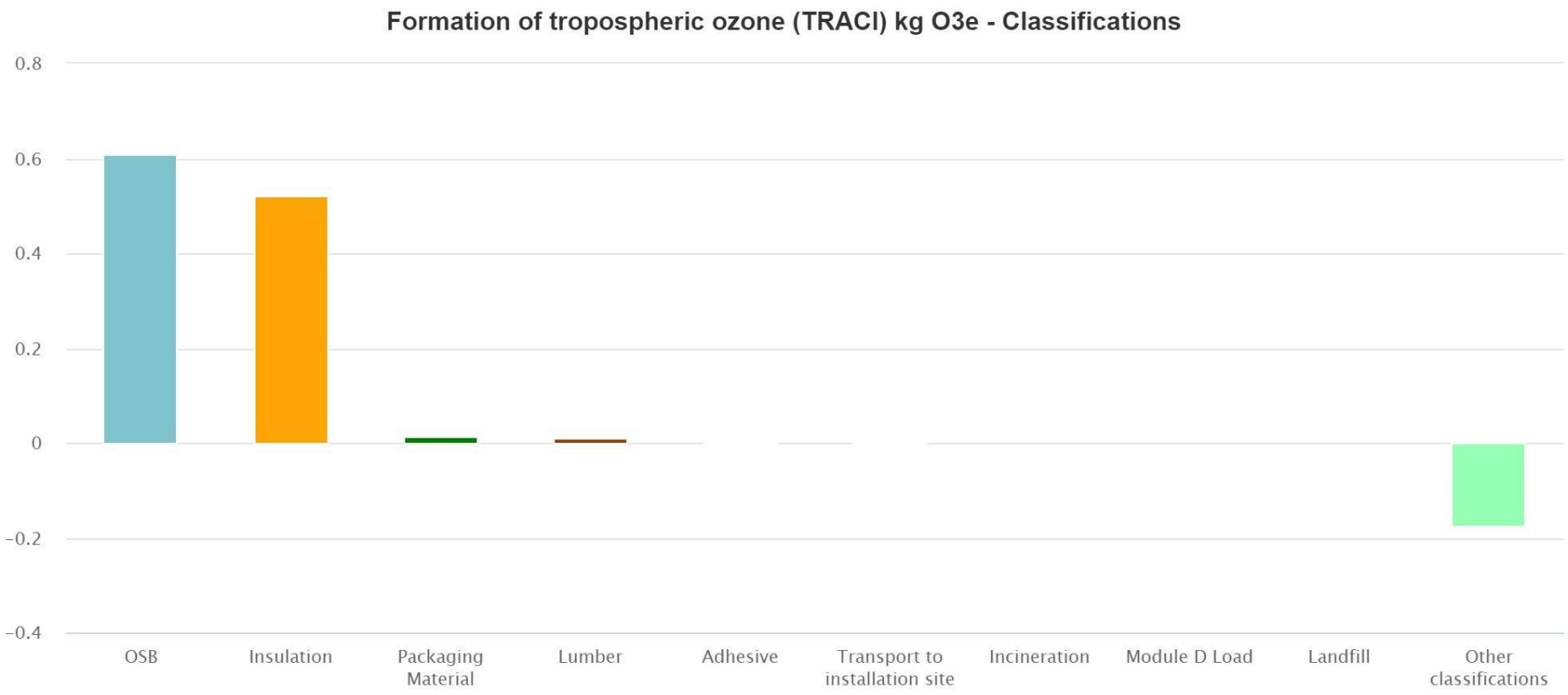

Ozone Depletion (TRACI) kg CFC11e - Life-cycle stages
0.000002
0.0000015
0.000001
5e-7
0
-5e-7
-0.000001
A1 Raw material extraction and processing
A2 Transport to the manufacturer
A3 Manufacturing
A4 Transport to the building site
A5 Installation into the building
C2 Waste transport
C3 Waste processing
C4 Waste disposal
D External impacts (excluded from totals)

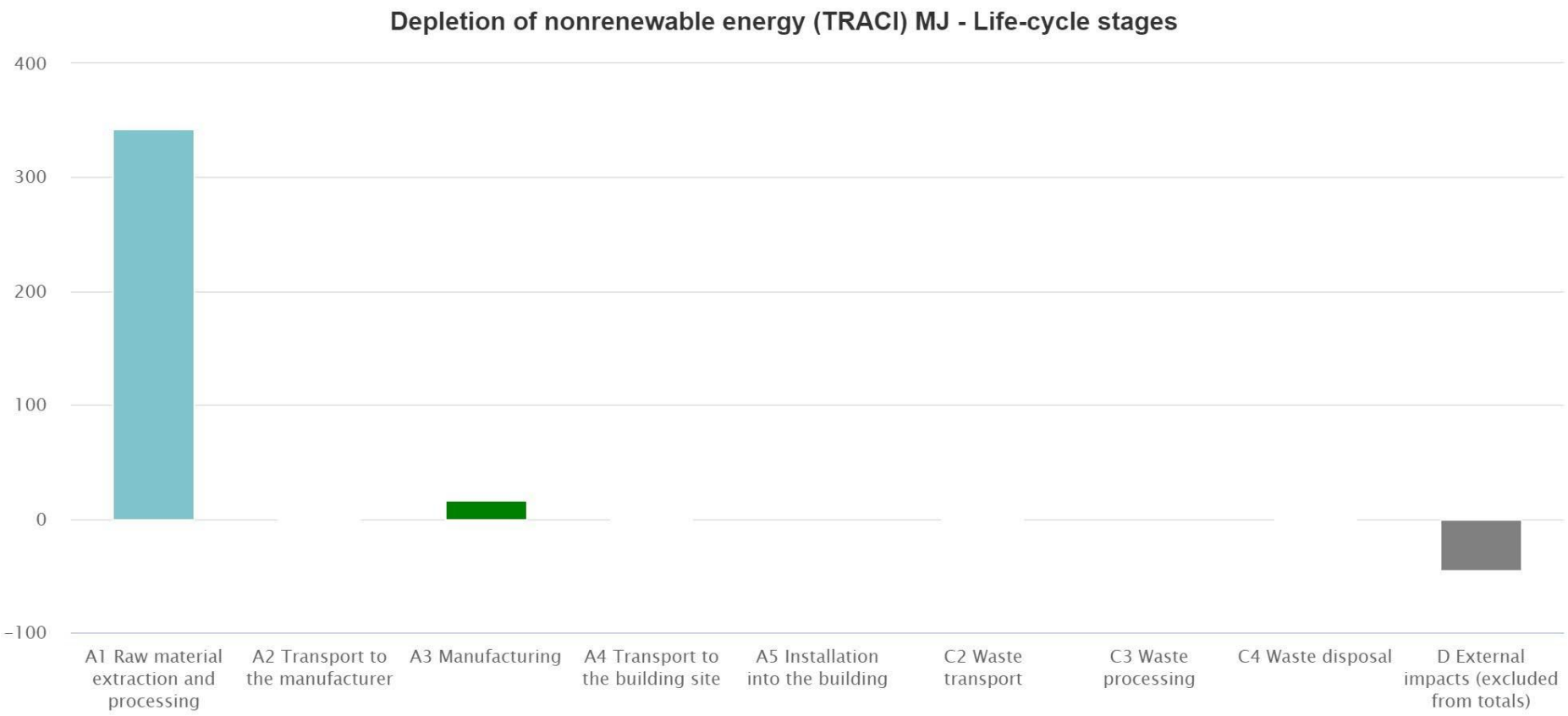

Ozone Depletion (TRACI) kg CFC11e - Classifications
0.000001
7.5e-7
5e-7
2.5e-7
0
-2.5e-7
-5e-7
Insulation
Lumber
Energy
Adhesive
OSB
Transport to installation site
Packaging Material
Landfill
Module D Load
Other classifications

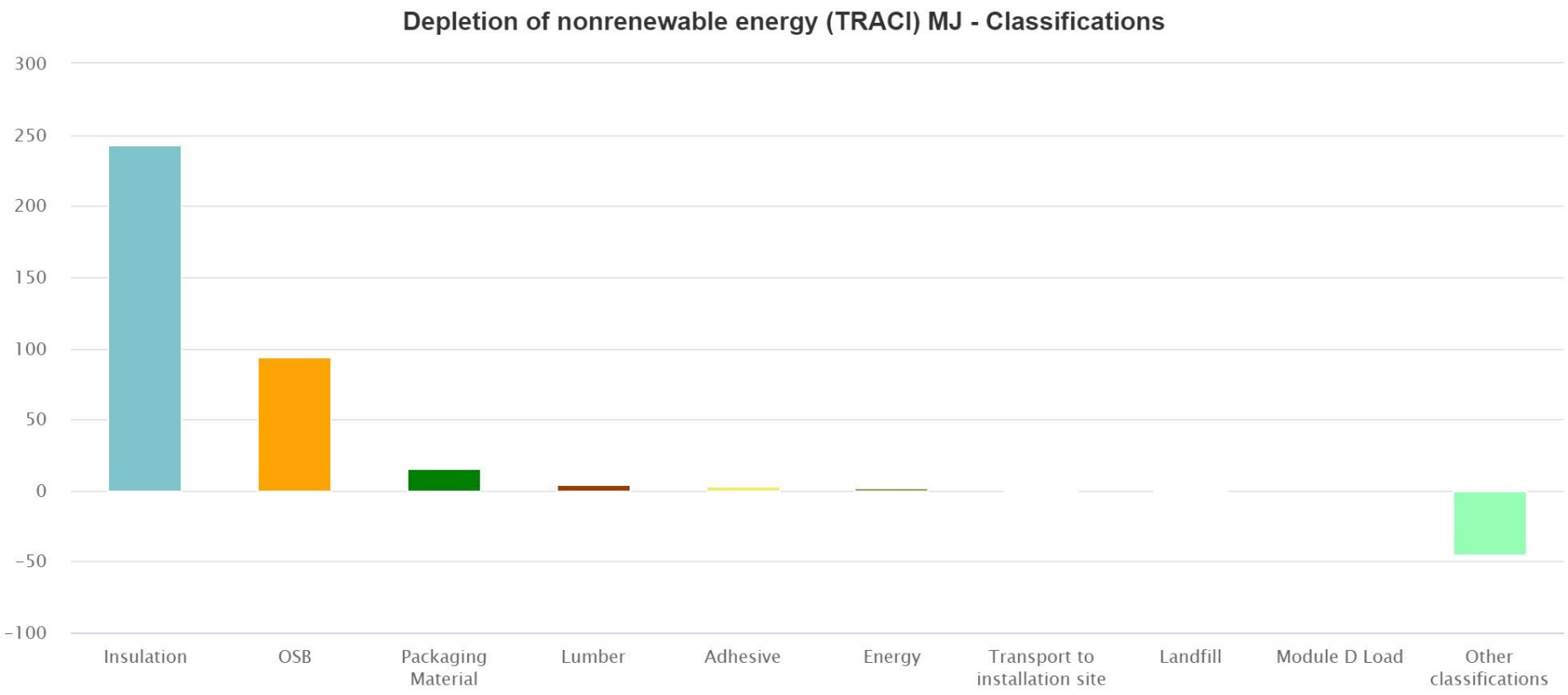

Eutrophication (TRACI) kg Ne - Life-cycle stages
0.05
0.04
0.03
0.02
0.01
0
−0.01
A1 Raw material extraction and processing
A2 Transport to the manufacturer
A3 Manufacturing
A4 Transport to the building site
A5 Installation into the building
C2 Waste transport
C3 Waste processing
C4 Waste disposal
D External impacts (excluded from totals)


Eutrophication (TRACI) kg Ne - Classifications
0.025
0.02
0.015
0.01
0.005
0
−0.005
−0.01
OSB
Insulation
Adhesive
Lumber
Packaging Material
Landfill
Transport to installation site
Incineration
Module D Load
Other classifications


Formation of tropospheric ozone (TRACI) kg O3e - Life-cycle stages
1.25
1
0.75
0.5
0.25
0
−0.25
A1 Raw material extraction and processing
A2 Transport to the manufacturer
A3 Manufacturing
A4 Transport to the building site
A5 Installation into the building
C2 Waste transport
C3 Waste processing
C4 Waste disposal
D External impacts (excluded from totals)


Formation of tropospheric ozone (TRACI) kg O3e - Classifications
0.8
0.6
0.4
0.2
0
−0.2
−0.4
OSB
Insulation
Packaging Material
Lumber
Adhesive
Transport to installation site
Incineration
Module D Load
Landfill
Other classifications


Depletion of nonrenewable energy (TRACI) MJ - Life-cycle stages
400
300
200
100
0
-100
A1 Raw material extraction and processing
A2 Transport to the manufacturer
A3 Manufacturing
A4 Transport to the building site
A5 Installation into the building
C2 Waste transport
C3 Waste processing
C4 Waste disposal
D External impacts (excluded from totals)


Depletion of nonrenewable energy (TRACI) MJ - Classifications
300
250
200
150
100
50
0
-50
-100
Insulation
OSB
Packaging Material
Lumber
Adhesive
Energy
Transport to installation site
Landfill
Module D Load
Other classifications

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online

This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

- I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.
- I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.
- I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited
06.12.2024

VERIFIED ISO 14025

STRUCTURAL INSULATED PANEL ASSOCIATION (SIPA) – PRODUCT ENVIRONMENTAL IMPACTS BY MODEL VARIATIONS

SIPA Product Name	Thickness (in / cm)	Weight 1 m2 (lbs / kg)	TRACI 2.1.0 GWP Total A1-A3 (kgCO2e)	EN 15804+A2 GWP Total A1-A3 (kgCO2e)	EN 15804+A2 GWP Biogenic A1-A3 (kgCO2e)	Performance at 75°F (R & RSI-Values)	Performance at 0°F (R & RSI-Values)
Blank 4.5 (B4.5)	4.5" 11.43 cm	39.28 lbs 17.815 kg	18.75	-5.26	-23.95	R-13.9 RSI-2.448	R-17.1 RSI-3.011
Blank 6.5 (B6.5) - Functional Unit	6.5" 16.51 cm	41.10 lbs 18.643 kg	23.29	-0.82	-23.95	R-21.1 RSI-3.716	R-26.1 RSI-4.596
Blank 8.25 (B8.25)	8.25" 20.96 cm	42.70 lbs 19.368 kg	26.68	2.47	-23.95	R-27.4 RSI-4.825	R-34.0 RSI-5.987
Blank 10.25 (B10.25)	10.25" 26.04 cm	44.52 lbs 20.196 kg	30.59	6.24	-23.95	R-34.6 RSI-6.093	R-43.0 RSI-7.572
Blank 12.25 (B12.25)	12.25" 31.12 cm	46.35 lbs 21.024 kg	34.45	9.97	-23.95	R-41.8 RSI-7.361	R-52.0 RSI-9.157
Blank 4.5 with openings (BwO4.5)	4.5" 11.43 cm	39.28 lbs 17.815 kg	22.74	-1.37	-23.95	R-13.9 RSI-2.448	R-17.1 RSI-3.011
Blank 6.5 with openings (BwO6.5)	6.5" 16.51 cm	41.10 lbs 18.643 kg	27.18	2.92	-23.95	R-21.1 RSI-3.716	R-26.1 RSI-4.596
Ready to Assemble 4.5 (RTA4.5)	4.5" 11.43 cm	40.75 lbs 18.486 kg	23.15	-0.94	-23.93	R-13.9 RSI-2.448	R-17.1 RSI-3.011
Ready to Assemble 6.5 (RTA6.5)	6.5" 16.51 cm	43.31 lbs 19.644 kg	29.88	5.74	-23.92	R-21.1 RSI-3.716	R-26.1 RSI-4.596