Statement of Verification

BREG EN EPD No: 000840 Issue: 01

This is to verify that the Environmental Product Declaration provided by:

Polyfoam XPS

are in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

1m3 of Polyfoam XPS Extra at an average density of 32.40 kg/m3 sold under the names Polyfoam Floorboard Extra and Polyfoam Roofboard Extra.

Company Address

Polyfoam XPS Limited
Hunter House Industrial Estate
Hartlepool
TS25 2BE

PolyFoam XPS

Signed for BRE Global Limited

Hayley Thomson
Operator

21 August 2026	21 August 2026	20 August 2031
Date of this Issue	Date of First Issue	Expiry Date

BRE Global Verified EPD

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ECO PLATFORM EPD VERIFIED

Environmental Product Declaration

EPD Number: 000840

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2025 Product Category Rules for Type III environmental product declaration of construction products to EN 15804+A2 PN 514 Rev 3.2.
Commissioner of LCA study	**LCA consultant/Tool**
Polyfoam XPS Limited	Pat Hermon, Roger Connick & Mustafa Ali / BRE LINA A2
Declared/Functional Unit	**Applicability/Coverage**
1m^3 of Polyfoam XPS Extra at an average density of 32.40 kg/m3 sold under the names Polyfoam Floorboard Extra and Polyfoam Roofboard Extra.	Product Average.
EPD Type	**Background database**
Cradle to Gate with options	Ecoinvent 3.8

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☒Internal ☐ External
(Where appropriate [b])Third party verifier: Kim Allbury
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Hunter House Industrial Estate
Hartlepool
TS25 2BE

Construction Product:

Product Description

Polyfoam XPS Extra grade is lightweight and strong insulation product range used for thermal insulation in buildings and other end use applications. Through its Floorboard and Roofboard ranges, Polyfoam XPS Ltd offers high quality, high performance, rigid, closed cell, extruded polystyrene (XPS) insulation for use in domestic, commercial and industrial buildings alike. The principal performance characteristic of thermal insulation is its thermal conductivity (lambda). Compressive strength and resistance to moisture absorption are also key properties of XPS in many applications. The product is stable under normal temperature conditions and in recommended use; it does not require maintenance or replacement. In normal conditions of use, the product is not exposed to either internal or external environments. The product is non-hazardous in finished form. Polyfoam XPS Extra grade includes Extra Floorboard, Extra Roofboard and Extra Grade Laminate products. Each product has a range of thicknesses and profiles. This LCA analysis has been conducted for 1m^3 of Polyfoam XPS Extra at an average density of 32.40 kg/m3 sold under the names Polyfoam Floorboard Extra and Polyfoam Roofboard Extra.

Technical Information

These technical properties are applicable for both roofboard and floorboard products.

Property	Value, Unit
Thermal conductivity (EN 12667)	0.031W/mK
Compressive strength	300kPa
XPS Extra water vapour resistivity (EN 12086)	705MNs/g.m

Property	Value, Unit
Fire Classification (in accordance with BS EN 13501-1:2002	Class F
Gross dry density	30-38 kg/m^3
Continuous service temperature limits	Up to +70 °C

Technical properties for this product can be accessed online here:
Polyfoam-Technical-Datasheet-Floorboard-Extra-POL-TD-01-01A.pdf
Polyfoam-Technical-Datasheet-Roofboard-Extra-Slimline-Zero-POL-TD-02-03.pdf

Main Product Contents

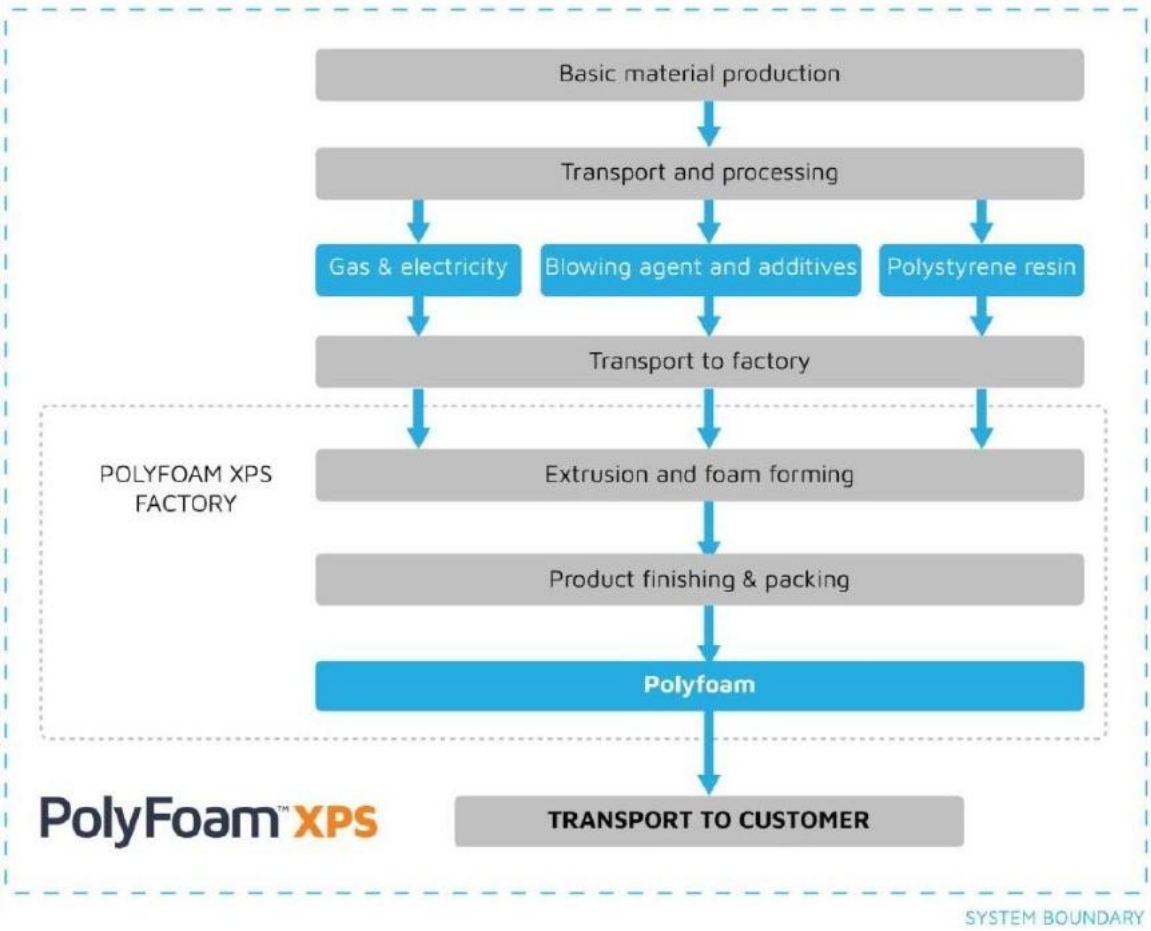
Material/Chemical Input	%
Polystyrene	> 95
Blowing agent	4.5 - 5
Colourants & process additives	< 0.5

Manufacturing Process

Raw materials are delivered to site. They are then drawn to an automated batch unit, then fed into a feeder system which transfers the raw material into a tandem extruder (primary and secondary screws), which is electrically and oil-heated to pre-determined and automatically controlled temperatures. This system melts, mixes and transports the plastic mix. A blowing agent is injected into the molten plastic mix; cooling is then applied to the mix. The mix, which is now referred to as Foam, is extruded and shaped by a radius die. The foam emerges into a vacuum chamber and undergoes a controlled expansion. The extruder foam is cut into required lengths, widths, and edge profiled where required. The product is then packaged and labelled

according to specification; it is then transferred to our warehouse storage. The energy used during manufacturing includes purchased grid electricity and natural gas. Production wastes including offcuts and scraps are recycled internally. non-production waste is recycled externally except for general waste which is incinerated.

Process flow diagram



Production waste will be sent for internal recycling.

Construction Installation

Upon arrival at the site, the XPS Extra product is unwrapped with all packing waste sent to recycling. The product is generally loose laid in ground floor and roofing applications. At wall, floor or roof junctions, perimeter and penetrations the product can be cut to suit using hand tools. The product can be fixed or adhered if required. The fixings have not been included in this LCA due to lack of available data and this information has been declared in the cut-off criteria section.

End of Life

It is assumed that 100% of the XPS insulation will be removed at end of life using non-powered hand tools.

50 km has been selected as a reasonable average distance to a waste processing facility, and if required, the end-user of the EPD can calculate impacts for a bespoke distance by dividing the C2 impacts by 50 and multiplying them by a bespoke distance.

The BRE Global PCR (PN514 Rev 3.2, 2025) generic disposal route for XPS insulation has been used. Therefore, the recovered XPS Extra foam will be sent to an incineration with energy recovery plant without the need for any pre-processing. There are no landfill waste emissions from the C1 or C3 stages, therefore no impacts are attributable to module C4. The 100% incineration with energy recovery scenario assumes the XPS insulation has the same calorific value as EPS insulation (46 MJ per kg, British Plastics Federation).

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1m^3 of Polyfoam XPS Extra at an average density of 32.40 kg/m^3 sold under the names Polyfoam Floorboard Extra and Polyfoam Roofboard Extra.

System boundary

The system boundary of the EPD is defined using the modular approach set out in EN 15804. This Cradle to Gate with Options EPD includes the product stage (A1-A3); transport to the construction site (A4); construction/installation (A5); demolition (C1); transport (C2), waste processing (C3) and//or disposal at end-of-life (C4) and benefits and loads beyond the system (D).

Data sources, quality and allocation

Specific primary data derived from Polyfoam XPS Ltd have been modelled using the LINA A2 tool for the period 01/01/2023 – 31/12/2023. Secondary data have been obtained for all remaining upstream and downstream processes that are beyond the control of the manufacturer (i.e. raw material production) from the ecoinvent 3.8 database. All ecoinvent datasets are complete within the context used and conform to the system boundary and the criteria for the exclusion of inputs and outputs, according to the requirements specified in EN15804+A2:2019. The XPS Extra is not the only product manufactured at the Hartlepool site. A physical allocation by mass of the site process data has therefore been carried out, according to EN 15804 and ISO 14044 guidance, to determine the correct quantities of packaging, energy, water, emissions to air and waste attributable to the XPS Extra production. This is because packaging, energy consumption and emissions are considered proportional to the mass of product throughout. The mass balance for the XPS Extra was within tolerance, and no uplift of the input materials was required to cover production output and waste. In addition, no proxy datasets were used for the LCA modelling.

A location based approach was used for electricity in this LCA. Table E.2 from EN15804+A2 standard was used to assess the data quality. The quality level of time is Good while that of geography,and technological representativeness is Very Good as specific UK datasets have been selected from the ecoinvent LCI, the background LCI datasets are from ecoinvent v3.8 which was compiled in 2021, and manufacturer-specific primary data has been modelled. Therefore, the most appropriate LCA data have been used. The GWP of the electricity dataset used for this EPD is: 1 kWh UK electricity = 2.39E-01 kgCO2eq (Electricity GB (kWh) market for electricity, medium voltage). This is a 2022 UK consumption (or location-based) electricity mix dataset. The GWP of the natural gas dataset used for this EPD is: 1 kWh UK natural gas = 2.32E-01 kgCO2eq (Natural gas, at industrial furnace kWh, GB).

Cut-off criteria

All raw materials and energy inputs to the manufacturing process have been included except for direct emissions to water and soil, which are not measured. The inventory process in this LCA includes all data related to raw materials, packaging material and consumable items. Process energy, water use and discharge, and non-production waste emissions are also included. The fixings have not been included in this LCA as no fixings are provided by the manufacturer. All production waste (cut-offs, scrap etc) is recycled on-site and fed back into the system as regrind input material. This has been excluded as an input and a waste emission as per the requirements of the BRE 2025 PCR.

LCA Results (1m^3 of Polyfoam XPS Extra at an average density of 32.40 kg/m^3 sold under the names Polyfoam Floorboard Extra and Polyfoam Roofboard Extra.)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP	EP-freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC11 eq	mol H^+ eq	kg $(PO_4)^{3-}$ eq
Product stage	Raw material supply	A1	1.14E+02	1.13E+02	9.18E-01	1.65E-03	1.67E-06	3.89E-01	3.82E-03
	Transport	A2	1.32E+00	1.32E+00	9.38E-04	5.84E-04	2.99E-07	1.09E-02	7.90E-05
	Manufacturing	A3	1.57E+01	1.55E+01	1.84E-01	1.52E-02	1.18E-06	3.32E-02	2.09E-03
	Total (Consumption grid)	A1-3	1.31E+02	1.30E+02	1.10E+00	1.74E-02	3.15E-06	4.33E-01	5.99E-03
Construction process stage	Transport	A4	2.70E-01	2.69E-01	2.30E-04	1.06E-04	6.23E-08	1.09E-03	1.73E-05
	Construction	A5	6.78E+00	6.50E+00	2.74E-01	8.89E-04	1.59E-07	2.18E-02	3.05E-04
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.70E-01	2.69E-01	2.30E-04	1.06E-04	6.23E-08	1.09E-03	1.73E-05
	Waste processing	C3	1.03E+02	1.03E+02	2.77E-03	3.57E-04	8.49E-08	1.30E-02	1.34E-04
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.03E+01	-2.98E+01	-4.47E-01	-3.53E-02	-2.05E-06	-1.72E-01	-1.77E-02

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
GWP-biogenic = Global warming potential, biogenic;
GWP-luluc = Global warming potential, land use and land use change;

ODP = Depletion potential of the stratospheric ozone layer;
AP = Acidification potential, accumulated exceedance; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			EP-marine	EP-terrestrial	POCP	ADP-mineral& metals	ADP-fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m^3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	5.95E-02	6.35E-01	3.38E-01	3.82E-05	2.56E+03	8.54E+01	4.17E-06
	Transport	A2	2.92E-03	3.22E-02	9.06E-03	4.19E-06	1.95E+01	8.26E-02	1.03E-07
	Manufacturing	A3	1.09E-02	1.10E-01	1.70E-01	8.92E-05	3.97E+02	1.62E+00	2.39E-07
	Total (Consumption grid)	A1-3	7.33E-02	7.77E-01	5.17E-01	1.32E-04	2.98E+03	8.71E+01	4.51E-06
Construction process stage	Transport	A4	3.29E-04	3.60E-03	1.10E-03	9.36E-07	4.07E+00	1.83E-02	2.32E-08
	Construction	A5	3.72E-03	3.93E-02	2.60E-02	6.71E-06	1.49E+02	4.36E+00	2.28E-07
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.29E-04	3.60E-03	1.10E-03	9.36E-07	4.07E+00	1.83E-02	2.32E-08
	Waste processing	C3	6.64E-03	6.53E-02	1.58E-02	2.92E-06	9.53E+00	1.13E+00	6.16E-08
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.55E-02	-2.50E-01	-6.99E-02	-1.88E-05	-4.87E+02	-1.34E+01	-1.14E-06

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts							
			IRP	ETP-fw	HTP-c	HTP-nc	SQP
			kBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	2.41E-01	1.74E+02	2.05E-08	2.44E-07	2.40E+01
	Transport	A2	9.88E-02	1.48E+01	5.48E-10	1.49E-08	1.20E+01
	Manufacturing	A3	1.24E+01	1.89E+02	5.33E-09	1.19E-07	1.56E+02
	Total (Consumption grid)	A1-3	1.27E+01	3.78E+02	2.64E-08	3.78E-07	1.92E+02
Construction process stage	Transport	A4	2.09E-02	3.18E+00	1.03E-10	3.33E-09	2.80E+00
	Construction	A5	6.37E-01	1.92E+01	1.39E-09	1.93E-08	9.78E+00
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.09E-02	3.18E+00	1.03E-10	3.33E-09	2.80E+00
	Waste processing	C3	2.03E-02	5.32E+02	6.81E-09	2.60E-07	3.14E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-8.59E+00	-4.20E+02	-7.14E-09	-2.25E-07	-1.38E+02

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, primary energy

			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	1.46E+01	0.00E+00	1.46E+01	1.32E+03	1.21E+03	2.53E+03
	Transport	A2	2.57E-01	0.00E+00	2.57E-01	1.92E+01	0.00E+00	1.92E+01
	Manufacturing	A3	8.86E+01	4.18E+00	9.28E+01	5.12E+02	4.57E+00	5.17E+02
	Total (Consumption grid)	A1-3	1.03E+02	4.18E+00	1.08E+02	1.85E+03	1.21E+03	3.07E+03
Construction process stage	Transport	A4	5.73E-02	0.00E+00	5.73E-02	4.00E+00	0.00E+00	4.00E+00
	Construction	A5	3.27E+00	2.11E+00	5.39E+00	8.97E+01	6.34E+01	1.53E+02
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	5.73E-02	0.00E+00	5.73E-02	4.00E+00	0.00E+00	4.00E+00
	Waste processing	C3	2.33E-01	0.00E+00	2.33E-01	-1.24E+03	1.25E+03	9.48E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-7.38E+01	0.00E+00	-7.38E+01	-4.90E+02	0.00E+00	-4.90E+02

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;
PERM = Use of renewable primary energy resources used as raw materials;
PERT = Total use of renewable primary energy resources;
PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
PENRM = Use of non-renewable primary energy resources used as raw materials;
PENRT = Total use of non-renewable primary energy resource

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	1.94E+00	0.00E+00	0.00E+00	1.99E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	2.05E-03
	Manufacturing	A3	5.11E-02	3.24E-04	0.00E+00	9.95E-02
	Total (Consumption grid)	A1-3	5.37E-02	3.24E-04	0.00E+00	2.09E+00
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	4.54E-04
	Construction	A5	2.90E-03	1.62E-05	0.00E+00	1.05E-01
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	4.54E-04
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	2.65E-02
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	-3.34E-01

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	1.76E+00	5.65E+00	1.16E-04
	Transport	A2	2.21E-02	3.61E-01	1.33E-04
	Manufacturing	A3	5.80E-01	9.42E+00	3.24E-03
	Total (Consumption grid)	A1-3	2.36E+00	1.54E+01	3.49E-03
Construction process stage	Transport	A4	4.49E-03	7.97E-02	2.75E-05
	Construction	A5	1.20E-01	9.21E-01	1.75E-04
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	4.49E-03	7.97E-02	2.75E-05
	Waste processing	C3	8.49E-01	3.37E+01	1.62E-05
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.96E+00	-1.07E+02	-2.55E-03

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	4.48E-05	1.39E-07	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	9.83E-02	2.45E-06	2.60E-01	0.00E+00	5.33E-02
	Total (Consumption grid)	A1-3	0.00E+00	9.83E-02	2.59E-06	2.60E-01	0.00E+00	5.33E-02
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	6.43E-02	1.29E-07	1.30E-02	0.00E+00	2.67E-03
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	0.00E+00	3.24E+01	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	A generic transport to site distance of 50 km has been selected as a reasonable average. End-users of the EPD can use this information to calculate a bespoke transport to site distance if required, i.e. divide the module A4 impacts by 50 and multiply them by a bespoke distance.		
	Fuel type / Vehicle type	Litre of fuel type per distance or vehicle type	16-32 tonne lorry
	Distance:	km	50
	Capacity utilisation (incl. empty returns)	%	26
	Bulk density of transported products	kg/m^3	32.4
A5 – Installation in the building	Upon arrival at the site, the XPS Extra product is unwrapped with all packing waste sent to recycling. The product is generally loose laid in ground floor and roofing applications. At wall, floor or roof junctions, perimeter and penetrations the product can be cut to suit using hand tools. The product can be fixed or adhered if required. The fixings have not been included in this LCA analysis as no fixings are provided by the manufacturer and this information has been declared in the cut-off criteria section. The BRE Global PCR (PN514 Rev 3.2, 2025) generic installation wastage rate for XPS insulation has been used.		
	XPS waste – 100% incineration with energy recovery	%	5
Packaging waste	Pallets – 100% to recycling	Kg	0.13
	Plastic wrap – 100% to recycling	Kg	0.07
C1 – Deconstruction	It is assumed that 100% of the XPS insulation will be removed at end of life using non-powered hand tools.		
C2 – Transportation	50 km has been selected as a reasonable average distance to a waste processing facility, and if required, the end user of the EPD can calculate impacts for a bespoke distance by dividing the C2 impacts by 50 and multiplying them by a bespoke distance.		
C3 – Pre-processing	The BRE Global PCR (PN514 Rev 3.2, 2025) generic disposal route for XPS insulation has been used. Therefore, the recovered XPS foam will be sent to an incineration with energy recovery plant without the need for any pre-processing. There are no landfill waste emissions from the C1 or C3 stages, therefore no impacts are attributable to module C4. The 100% incineration with energy recovery scenario assumes the XPS insulation has the same calorific value as EPS insulation (46 MJ per kg, British Plastics Federation).		
C4 – Disposal	There are no landfill waste emissions from the C1 or C3 stages, therefore no impacts are attributable to module C4.		
Module D	The XPS insulation will be incinerated for energy recovery at end of life. It is assumed that the XPS insulation will be incinerated in the UK, so the UK electricity dataset has been selected. The dataset used to calculate the avoided impacts of electricity consumption in a future system was 'Electricity, medium voltage {GB}| market for | Alloc Def, U'. This process is energy-efficient, with 37.4% of the		

	combustion heat recovered after incineration. The efficiency rate of 37.4% has been calculated by taking the weighted average of the number of waste incineration plants available in the UK. According to the Environmental Agency's 2013 article on "CHP Ready Guidance for Combustion and Energy from Waste Power Plants" in the UK, EFW plants have an efficiency of 33%, and CHP plants have an efficiency of 55%. Additionally, according to Azapagic, A., & Jeswani, H. K. (2016), there are currently 25 MSW incinerators with energy recovery in the UK. It is assumed that 20 plants generate heat and power at 33%, while 5 plants generate electricity at 55%. Therefore, a weighted average calculation is used to determine the efficiency, which is calculated at 37.5%.		
	Products Recycled Content (post consumer)	Kg	0
	Recovered for recycling	Kg	0
	Recovered for re-use	Kg	0
	Recovered for energy	Kg	32.40

Interpretation

Figure 1 shows GWP fossil, biogenic and luluc from different life cycle stages. The highest GWP-fossil impacts are attributed to Polystyrene production in module A1 (raw material supply). This is followed by incineration of Polystyrene in C3 module (waste processing). On the other hand the D module shows negative emissions which is mainly due to the benefits ascribed to energy recovery from incineration. GWP-biogenic is the highest in A5 module (Construction-Installation), driven mainly by wood waste incineration. The highest GWP-luluc could be traced to the A3 module (Manufacturing) and was driven mainly by Electricity use.

Figure 2 shows the detailed process contribution to the total GWP. The highest and second highest impacts were caused by the production and incineration of polystyrene respectively. Electricity use contributed to the third highest impacts. On the other hand, energy recovery from incineration had positive impacts as highlighted by negative emissions shown in Figure 2. These are mainly due to the mitigation of fossil energy use for heating and electricity production.

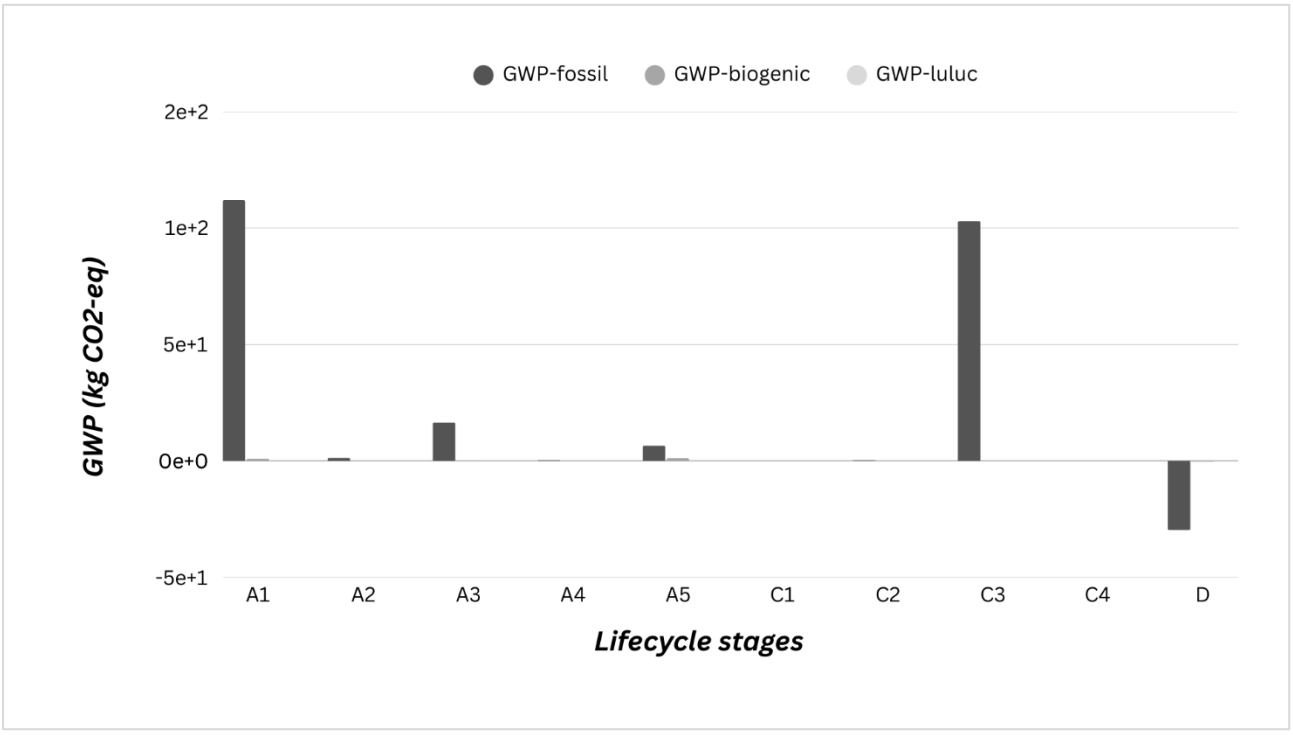


Figure 1

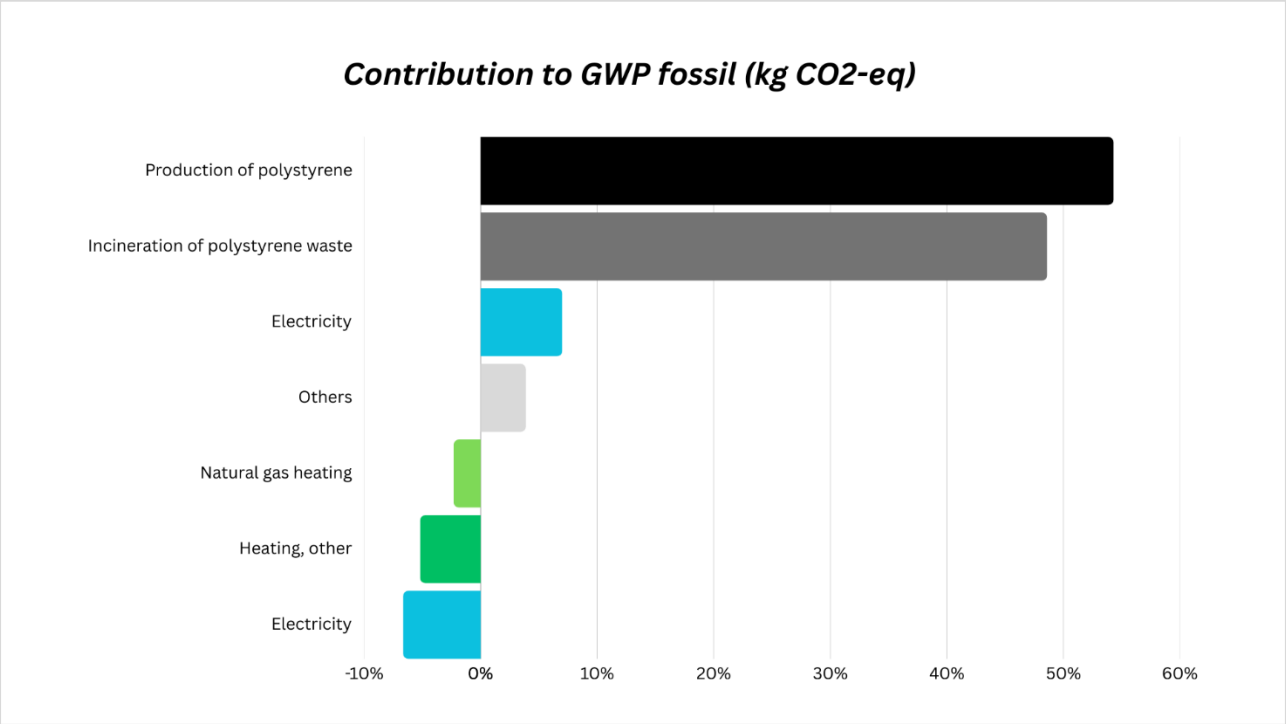


Figure 2

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