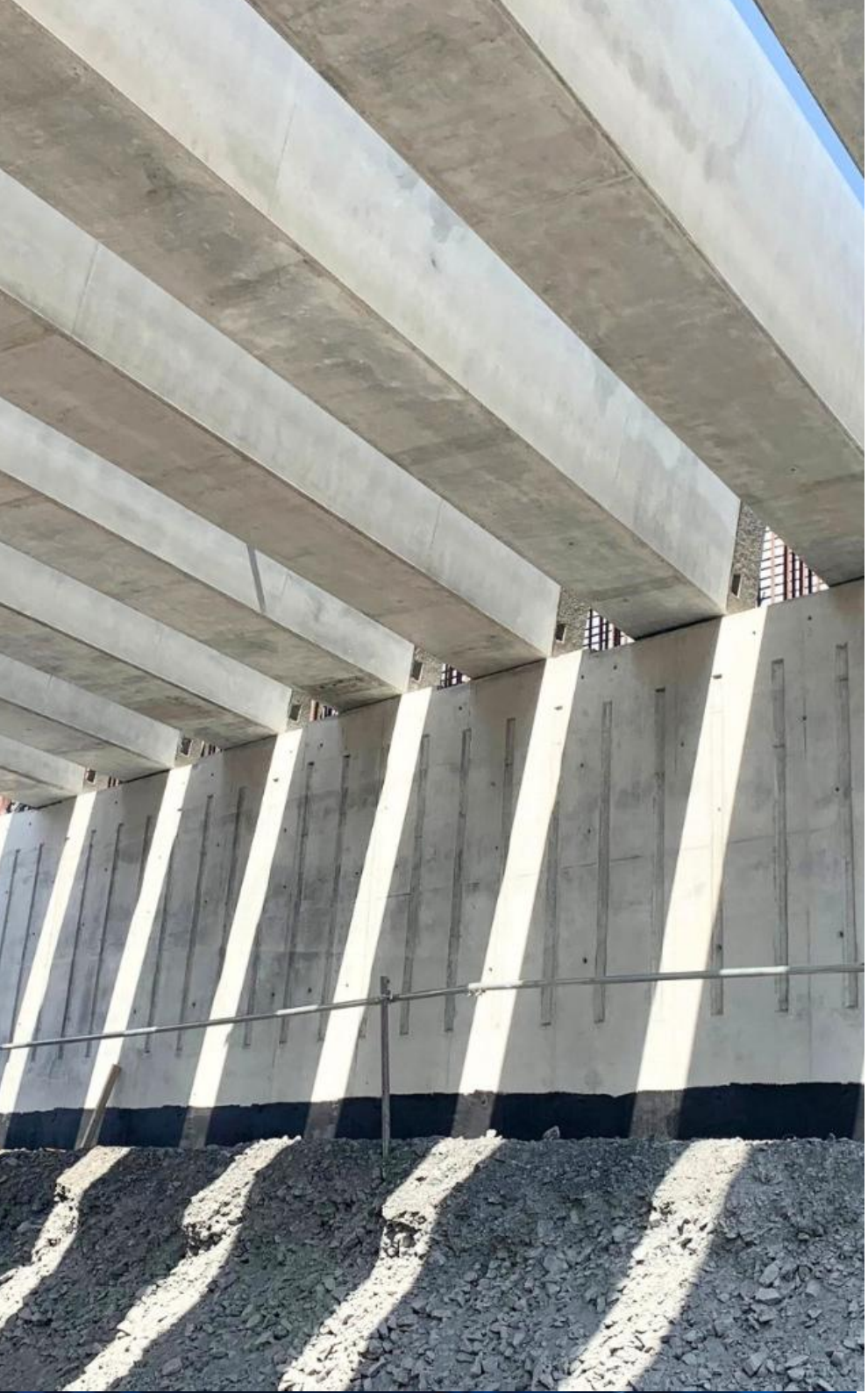


ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Precast Bridge Beam - W Beam
Shay Murtagh Precast Limited

EPD HUB, HUB-5930
Published on 06.04.2026, last updated on 06.04.2026, valid until 05.04.2031

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Shay Murtagh Precast Limited
Address	Raharney, Mullingar, Co. Westmeath, Ireland, N91 WY91
Contact details	sales@shaymurtagh.ie
Website	https://www.shaymurtagh.ie/

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025 EN 16757 Product Category Rules for concrete and concrete elements
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	
Scope of the EPD	Cradle to gate with modules C1-C4, D
EPD author	Fatima Salgado, Shay Murtagh Precast Ltd
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited

This EPD is intended for business-to-business and/or business-to-consumer communication. 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	Precast Bridge Beam - W Beam
Additional labels	-
Product reference	-
Place(s) of raw material origin	Europe
Place of production	Raharney, Mullingar, Ireland
Place(s) of installation and use	UK & Ireland
Period for data	06/2023 - 06/2024
Averaging in EPD	No grouping
Variation in GWP-fossil for A1-A3 (%)	-
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	92,8

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m3 of precast concrete bridge beam
Declared unit mass	2696 kg
Mass of packaging	0 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	334
GWP-total, A1-A3 ($kgCO_2e$)	330
Secondary material, inputs (%)	15,8
Secondary material, outputs (%)	71,2
Total energy use, A1-A3 (kWh)	1350
Net freshwater use, A1-A3 (m^3)	4,1

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

The Shay Murtagh Group is a leading manufacturer of precast concrete solutions, serving clients across the UK and Ireland. With nearly 50 years of experience in the construction industry, we continue to operate as a family-owned business — a structure that reinforces our core values of engineering excellence, responsible delivery, and long-term social value.
Our operations span design, manufacturing, and installation, ensuring full control over quality, sustainability, and innovation across every project.
Group Structure:

- Shay Murtagh Precast – Headquarters and main manufacturing facility (Ireland)
- Shay Murtagh Ltd – Construction and installation division
- Evans Concrete Products – Architectural precast specialist (UK)
- Structural Research – Design and digital engineering centre (Portugal)

Together, we offer integrated precast solutions that support low-carbon construction, circular economy principles, and best-in-class performance — aligning with EN 15804 standards and industry sustainability targets.

PRODUCT DESCRIPTION

W-beams are pre-tensioned, pre-stressed concrete beams consisting of high-strength concrete, high-yield steel reinforcement, and pre-stressing steel strands. These strands are tensioned prior to casting, and the concrete is poured around them. Once the concrete reaches the specified strength, the pre-stressing force is transferred to the beam, introducing axial compression and a relieving moment that enhances load-bearing capacity by eliminating or reducing tensile stresses.
Structural concrete is valued for its strength, durability, and versatility. These inherent properties are further enhanced in pre-stressed concrete elements, making W-beams a preferred solution for a wide range of bridge types and spans.

Applications
Precast pre-stressed W-beams are ideal for:

- Road bridges
- Rail bridges
- Footbridges
- Highway and civil infrastructure requiring long-span capabilities
- Large-span structural elements in commercial or industrial developments

W-beams are suitable for various deck configurations, including beam-and-slab and voided slab systems, and are adaptable to simply supported, continuous, or integral span designs.

Technical Information
The minimum concrete strength class for precast bridge beams is C40/50, and the most common concrete grade is C50/60, although higher classes can be used based on project requirements. 15.7mm diameter superstrands are used for the prestressing steel, and the steel reinforcement typically consists of B12 and B10 shear reinforcement. However, additional reinforcement up to 32mm in diameter can be used on a project-specific basis.

Types - W1 to W19
Depth - 800 to 2300 (mm)
Height of centroid above soffit (Yc) - 303,0 to 1067,0 (mm)
Area - 572206 to 1200356 (mm2)
Second moment of area (Ixx) - 35,2006 to 745,112 (mm4x109)
Self- weight - 14.31 to 30.01 (kN/m)

Standards | Subject
Prestressed beams are designed for a 120-year service life as standard. A 120-year service life is based upon compliance with the design and product standards.

BS EN 206:2013 (+A1:2016) Concrete. Specification, performance, production and conformity
BS 8500-1 (+A1 2012) Concrete. Complementary British Standard to BS EN 206-1. Method of specifying and guidance for the specifier.
BS 8500-2 (+A1 2012) Concrete. Complementary British Standard to BS EN 206-1. Specifications for constituent materials and concrete.
BS 4449:2005+A3:2016 Steel for the reinforcement of concrete. Weldable reinforcing steel, bar, coil and decoiled product. Specification.
BS 8666:2020 Scheduling, dimensioning, bending and cutting of steel reinforcement for concrete. Specification
BS EN 15050:2007 (+A1:2012) Precast concrete products. Bridge Elements

Further information can be found at:
https://www.shaymurtagh.ie/

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	8,2	Europe
Minerals	91,8	Europe
Fossil materials	0	
Bio-based materials	0	

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

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

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m3 of precast concrete bridge beam
Mass per declared unit	2696 kg
Functional unit	-
Reference service life	120

SUBSTANCES, REACH - VERY HIGH CONCERN

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

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		
×	×	×	ND	ND	ND	ND	ND	ND	ND	ND	ND	×	×	×	×	×		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Not declared = ND.

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 (not applicable for this product) and other ancillary materials (A1). There are some necessary ancillary materials which fall below the 1% cut-off criteria, including steel lifters, reinforcement spacers, lifting wires, timber bearers, etc. The raw materials are transported to the manufacturing plant. In this case, the model includes road and ship transport for each raw material (A2). 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 (A3). A market-based approach is used in modelling the electricity mix utilised in the factory. The electricity used during production is supplied in a combination of the grid electricity and solar panels installed on the factory's roof (A3).

The precast concrete elements are manufactured as follows:

1. Mould Preparation
The mould bed is thoroughly cleaned of debris, and unit lengths are marked. Stopends are positioned and checked for alignment. All internal mould surfaces are wiped with a lightly oiled cloth to remove dust before the release agent is applied.

2. Reinforcement & Strand Setup
Reinforcement links are placed within the mould boundaries. Strand positions are marked, and the correct type, diameter, and grade of pre-stressing strand are verified. Strands are pulled through the mould bed, cut, and fitted with barrels and wedges. A final setup check is conducted by the Production Engineer.

3. Stressing Operation
The stressing pump is calibrated to the required force according to design specifications. Strands are tensioned in sequence using the stressing jack, and wedge lock-in is visually confirmed. Strand extensions and stopend positions are rechecked post-stressing.

4. Final Setup Before Pour
Reinforcement is tied securely to the strands with shear links spaced and fixed. Concrete spacers and lifting loops are installed as per design drawings. Once complete, mould sides are closed and locked into place.

5. Concrete Pouring & Finishing
The area is cleared and concrete is ordered in 1.45 m³ batches (or as required). Concrete is poured evenly into the mould via skip and gantry, ensuring controlled flow and uniform distribution. Samples are taken for

quality control. Once the initial set is reached, the surface is wire-brushed (scabbled), and moulds are cleaned.

6. Detensioning & Storage

After curing, concrete cubes are tested before detensioning. Once released, beams are lifted, stripped, inspected, and placed on timber bearers. Each beam is labelled with a cast date and unique ID number, both marked and stickered. Where required, ends are identified as pier or abutment locations before storage in the yard.

Waste from production is minimised and reused as much as possible:
- Steel scrap is diverted for recycling.
- Concrete is used to make other products: in particular, the concrete waste is used to produce an internal product that is used for the installation of the other products.

We allocated the waste by mass in A3 (production losses).
The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc.), and its use is ensured throughout the validity period of this EPD.

After final inspection, the products are placed on timber bearers and labelled with the cast date and a unique identification number, both clearly marked and affixed with stickers. The products are then moved to the storage yard. When scheduled for delivery to the site, they are lifted and loaded onto a trailer.

TRANSPORT AND INSTALLATION (A4-A5)

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

The average distance of transportation from the production plant to the job site was calculated based on sales data, obtaining an average of 633 km, and the transportation method is by lorry and ship. The vehicle capacity utilisation volume factor is assumed to be 1, which means full load. In reality, it may vary, but as the role of transportation emissions in total results is small, the variety in load is assumed to be negligible. To be conservative, empty returns are included in this study as implemented through an average load factor in the Ecoinvent transport datapoints. Transportation does not cause losses. Environmental impacts from the installation are not considered in this EPD (A5) due to the multiple variations of the project sites.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

At the end-of-life, during the demolition phase, 100% of the waste is assumed to be collected as separate construction waste. Energy consumption for demolition is assumed to be 0.07 kWh/kg based on Gervasio, H. & Dimova, S., JRC Technical report: Model for Life Cycle Assessment (LCA) of buildings, 2018. The source of energy is diesel fuel used by building machines (C1).

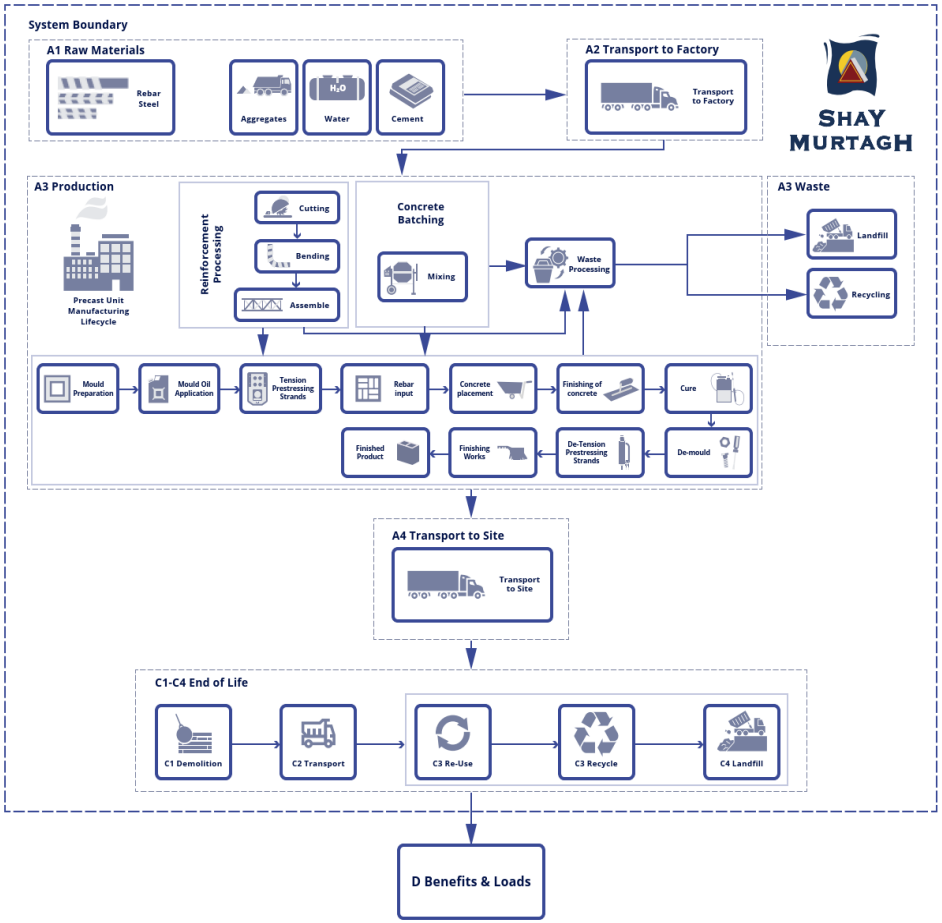
The dismantled concrete is delivered to the nearest construction waste treatment plant. It is estimated that there is no mass loss during the use of the product; therefore, the end-of-life product is assumed to have the same

weight as the declared product. Transportation distance to the closest disposal area is estimated as 50 km, and the transportation method is lorry, which is the most common (C2).

At the waste treatment plant, waste that can be reused, recycled or recovered for energy is separated and diverted for further use. It can be assumed that 100% of the concrete is transported to a waste treatment plant, where the concrete can be crushed, separated and diverted for further use. About 70% of concrete (Gervasio, H. & Dimova, S., JRC Technical report: Model for Life Cycle Assessment (LCA) of buildings, 2018) and 85% of reinforcement steel is recycled (World Stainless 2024). The process losses of the waste treatment plant are assumed to be negligible (C3). The remaining 30% of concrete and 15% reinforcement steel are disposed of in a landfill (C4).

Due to the recycling potential of concrete, concrete can be crushed and used as a secondary raw material, which avoids the use of virgin raw materials. The 70% of the concrete going to waste processing is converted into secondary raw materials after recycling. The recycled material content in the concrete itself is assumed to be 0 %. The recycled steel has been modelled to avoid the use of primary materials. The scrap content in the studied product has been acknowledged, and only the mass of primary steel in the product provides the benefit in order to avoid double-counting (D).

MANUFACTURING PROCESS



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.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on pages 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterisation factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

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 material	Not applicable
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-A3, %	-

This EPD is product and factory-specific.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.4. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11/3.12 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11/3.12 environmental data sources follow the methodology ‘allocation, Cut-off, EN 15804+A2‘.

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

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	3,06E+02	1,18E+01	1,21E+01	3,30E+02	6,57E+03	ND	ND	ND	ND	ND	ND	ND	ND	6,81E+01	1,97E+01	4,67E+00	4,86E+00	-1,74E+01
GWP – fossil	kg CO_2e	3,05E+02	1,18E+01	1,77E+01	3,34E+02	6,56E+03	ND	ND	ND	ND	ND	ND	ND	ND	6,80E+01	1,87E+01	4,66E+00	4,85E+00	-1,73E+01
GWP – biogenic	kg CO_2e	6,21E-01	2,50E-03	-1,26E+01	-1,20E+01	1,41E+00	ND	ND	ND	ND	ND	ND	ND	ND	6,94E-03	3,04E-01	4,79E-03	2,02E-03	-1,65E-02
GWP – LULUC	kg CO_2e	5,35E-01	5,12E-03	7,03E+00	7,57E+00	2,60E+00	ND	ND	ND	ND	ND	ND	ND	ND	6,97E-03	6,48E-01	6,45E-03	2,78E-03	-1,57E-02
Ozone depletion pot.	kg $CFC\text{-}_{11}$e	1,54E-05	2,33E-07	8,90E-07	1,66E-05	1,35E-04	ND	ND	ND	ND	ND	ND	ND	ND	1,04E-06	6,74E-07	6,39E-08	1,35E-07	-1,35E-07
Acidification potential	mol H^+e	9,82E-01	7,37E-02	8,27E-02	1,14E+00	2,33E+01	ND	ND	ND	ND	ND	ND	ND	ND	6,14E-01	6,06E-02	5,25E-02	3,40E-02	-1,06E-01
EP-freshwater[2)]	kg Pe	5,36E-03	7,60E-04	3,63E-03	9,75E-03	4,47E-01	ND	ND	ND	ND	ND	ND	ND	ND	1,96E-03	1,53E-03	3,11E-03	4,24E-04	-5,28E-03
EP-marine	kg Ne	2,69E-01	1,76E-02	1,59E-02	3,02E-01	6,01E+00	ND	ND	ND	ND	ND	ND	ND	ND	2,85E-01	2,61E-02	1,15E-02	1,30E-02	-2,51E-02
EP-terrestrial	mol Ne	3,17E+00	1,94E-01	1,47E-01	3,51E+00	6,56E+01	ND	ND	ND	ND	ND	ND	ND	ND	3,12E+00	2,26E-01	1,29E-01	1,43E-01	-3,04E-01
POCP ("smog")[3)]	kg NMVOCe	8,01E-01	7,60E-02	5,04E-02	9,27E-01	3,21E+01	ND	ND	ND	ND	ND	ND	ND	ND	9,30E-01	8,69E-02	3,84E-02	5,14E-02	-8,40E-02
ADP-minerals & metals[4)]	kg Sbe	1,01E-03	3,05E-05	6,83E-03	7,87E-03	1,82E-02	ND	ND	ND	ND	ND	ND	ND	ND	2,44E-05	7,16E-05	3,01E-04	7,25E-06	-9,28E-05
ADP-fossil resources	MJ	1,94E+03	1,71E+02	2,58E+02	2,36E+03	9,78E+04	ND	ND	ND	ND	ND	ND	ND	ND	8,90E+02	2,69E+02	6,66E+01	1,19E+02	-2,08E+02
Water use[5)]	m^3e depr.	6,11E+01	8,34E-01	3,40E+00	6,54E+01	4,92E+02	ND	ND	ND	ND	ND	ND	ND	ND	2,22E+00	1,90E+00	1,28E+00	5,01E+00	-2,60E+01

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, EF 3.1

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	1,11E-05	1,02E-06	5,44E-07	1,27E-05	6,20E-04	ND	ND	ND	ND	ND	ND	ND	ND	1,75E-05	1,76E-06	6,94E-07	7,82E-07	-1,61E-06
Ionizing radiation[6]	kBq U235e	1,59E+01	1,91E-01	8,29E-01	1,69E+01	1,15E+02	ND	ND	ND	ND	ND	ND	ND	ND	3,94E-01	2,33E-01	7,52E-01	7,13E-02	-1,46E+00
Ecotoxicity (freshwater)	CTUe	3,96E+03	1,93E+01	3,58E+01	4,01E+03	1,14E+04	ND	ND	ND	ND	ND	ND	ND	ND	4,90E+01	2,94E+02	4,40E+01	7,64E+01	-4,97E+01
Human toxicity, cancer	CTUh	3,27E-02	2,07E-09	3,21E-09	3,27E-02	1,11E-06	ND	ND	ND	ND	ND	ND	ND	ND	7,00E-09	4,18E-09	3,92E-09	8,81E-10	-4,63E-09
Human tox. non-cancer	CTUh	1,33E-05	1,02E-07	1,54E-07	1,35E-05	6,17E-05	ND	ND	ND	ND	ND	ND	ND	ND	1,11E-07	2,03E-07	2,64E-07	1,98E-08	-1,35E-07
SQP[7]	-	6,93E+03	1,51E+02	7,02E+02	7,78E+03	9,51E+04	ND	ND	ND	ND	ND	ND	ND	ND	6,24E+01	2,71E+02	1,12E+02	2,34E+02	-1,95E+02

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.

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	1,79E+03	2,62E+00	1,21E+02	1,92E+03	1,56E+03	ND	ND	ND	ND	ND	ND	ND	ND	5,64E+00	5,58E+00	1,28E+01	1,11E+00	-1,89E+01
Renew. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	1,79E+03	2,62E+00	1,21E+02	1,92E+03	1,56E+03	ND	ND	ND	ND	ND	ND	ND	ND	5,64E+00	5,58E+00	1,28E+01	1,11E+00	-1,89E+01
Non-re. PER as energy	MJ	2,52E+03	1,71E+02	2,48E+02	2,94E+03	9,78E+04	ND	ND	ND	ND	ND	ND	ND	ND	8,90E+02	2,74E+02	6,66E+01	1,19E+02	-2,08E+02
Non-re. PER as material	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	2,52E+03	1,71E+02	2,48E+02	2,94E+03	9,78E+04	ND	ND	ND	ND	ND	ND	ND	ND	8,90E+02	2,74E+02	6,66E+01	1,19E+02	-2,08E+02
Secondary materials	kg	4,26E+02	7,74E-02	1,07E-01	4,26E+02	4,24E+01	ND	ND	ND	ND	ND	ND	ND	ND	3,70E-01	1,26E-01	7,53E-02	2,96E-02	-2,32E-01
Renew. secondary fuels	MJ	7,68E-04	8,35E-04	2,18E-03	3,78E-03	5,18E-01	ND	ND	ND	ND	ND	ND	ND	ND	9,66E-04	1,66E-03	3,23E-03	6,17E-04	-1,60E-03
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	4,02E+00	2,37E-02	6,21E-02	4,10E+00	1,41E+01	ND	ND	ND	ND	ND	ND	ND	ND	5,88E-02	6,60E-02	3,61E-02	1,23E-01	-6,17E-01

8) PER = Primary energy resources.

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	1,02E+00	2,51E-01	1,75E+00	3,02E+00	1,41E+02	ND	ND	ND	ND	ND	ND	ND	ND	9,91E-01	5,81E-01	3,97E-01	1,35E-01	-1,62E+00
Non-hazardous waste	kg	5,03E+01	4,78E+00	1,63E+02	2,18E+02	2,79E+03	ND	ND	ND	ND	ND	ND	ND	ND	1,35E+01	8,92E+00	1,53E+01	3,12E+00	-2,90E+01
Radioactive waste	kg	3,18E-02	4,72E-05	1,60E-04	3,20E-02	2,85E-02	ND	ND	ND	ND	ND	ND	ND	ND	9,67E-05	5,65E-05	1,93E-04	1,74E-05	-3,53E-04

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	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	2,87E+01	0,00E+00	0,00E+00	2,87E+01	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	1,92E+03	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	ND	ND	ND	ND	ND	ND	ND	ND	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	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	1. Electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted, Ireland, Ecoinvent, 2. Hydrotreated vegetable oil (HVO) from rapeseed oil (2030 projection), Rest-of-Europe, ProBas, 3. Market for electricity, medium voltage, Ireland, Ecoinvent,
Electricity CO2e / kWh	0.0802 kgCO2e/kWh -1.175548 kgCO2e/MJ 0.38 kgCO2e/kWh
District heating data source and quality	-
District heating CO2e / kWh	-

Transport to the building site (A4) - Scenario documentation

Scenario parameter	Value
Fuel and vehicle type. E.g., electric truck, diesel-powered truck	Transport, freight, lorry >32 metric ton, EURO6, Europe
Average transport distance, km	633
Capacity utilisation (including empty return) %	50
Bulk density of transported products	-
Volume capacity utilisation factor	1

End of life (C1-C4) - Scenario documentation

Scenario information	Value
Collection process: collected separately (kg)	2696
Collection process: Mixed waste (kg)	0
Recovery: re-use (kg)	0
Recovery: recycling (kg)	1920
Recovery: energy recovery (kg)	0
Disposal (kg)	776
Scenario assumptions e.g. transportation (mode, km) & other	Transportation: 50 km to nearest recycling or landfilling sites.

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez
Tool verification validity: 27 March 2025 - 26 March 2028

HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited
06.04.2026

VERIFIED ISO 14025