



# ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804 + A1

Owner of the Declaration – Ecocem

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Declaration number: EPDIE-18-15

ECO Platform EPD no: 820

Issue date 31.01.2019

Valid to 31.01.2024

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EPD Programme - EPD Ireland  
Programme Operator - Irish Green Building Council  
[www.epdireland.org](http://www.epdireland.org)



## ECOCEM PRODUCTS

Ecocem GGBS

Ecocem CEM III/A

Ecocem CEM III/C

# 1 General information

PROGRAMME OPERATOR	OWNER OF DECLARATION
Irish Green Building Council, 19 Mountjoy Square, Dublin D01 E8P5	Ecocem Ireland Portview House, 3rd Floor Thorncastle Street Ringsend Dublin, Ireland www.ecocem.ie info@ecocem.ie 353 1 678 1800
DECLARATION NUMBER	PRODUCTION SITE
EPDIE-18-15	Ecocem Ireland, 84 Pigeonhouse RD, Dublin, Ireland
ECOPLATFORM NO.	DECLARED UNIT
820	1 metric tonne of product for use as hydraulic binder.
APPLICABLE PRODUCT CATEGORY RULES	DECLARED PRODUCT
EN 15804:2012+A1:2013, EPD Ireland PCR Part A July 2018	Ecocem GGBS, Ecocem CEM III/A, Ecocem CEM III/C
DATE OF ISSUE	SCOPE OF EPD
31.01.2019	Manufacturer specific product
DATE OF EXPIRY	LCA CONSULTANT OR PERSON RESPONSIBLE FOR LCA
31.01.2024	EcoReview, Kilkenny, Co. Kilkenny, Ireland, +353 87 258 9783/+31 646 264 9327 info@ecoreview.i/www.ecoreview.eu
TYPE OF EPD :SINGLE OR MULTI PRODUCT	LCA SOFTWARE AND DEVELOPER IF APPLICABLE
Multi Product	Ecochain
PRODUCT CLASSIFICATION OR NACE CODE	NAME AND VERSION OF INVENTORY USE
Manufacture of cement	EcoInvent 3.4
COMPARABILITY	
Environmental Product Declarations from different programmes may not be directly comparable if not compliant with EN 15804:2012+A1:2013. 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+A1:2013	
Internally <input type="checkbox"/> Externally <input checked="" type="checkbox"/>	
SIGNATURE OF PROGRAMME OPERATOR	SIGNATURE VERIFIER
Pat Barry - CEO - Irish Green Building Council  	Chris Foster - EuGeos Limited 

## 2 Scope and Type of EPD:

All relevant inputs and outputs such as emissions, energy and materials, have been taken into account in this LCA. In accordance with I.S. EN 15804, the total neglected input flows per module do not exceed 5% of energy usage and mass. The EcoChain tool incorporates the Ecoinvent background database. Thus the Ecoinvent boundary approach is relevant.

The system boundary defines the stages of the life of the construction product included in the study. This LCA covers the Product Stage (modules A1 to A3) as illustrated in the figure below.

This is a Cradle to Gate EPD. The Modules that are declared are shown in the table below.

PRODUCT STAGE			CONSTRUCTION ON PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse – Recovery – Recycling potential
<b>A1</b>	<b>A2</b>	<b>A3</b>	<b>A4</b>	<b>A5</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>B4</b>	<b>B5</b>	<b>B6</b>	<b>B7</b>	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>C4</b>	<b>D</b>
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

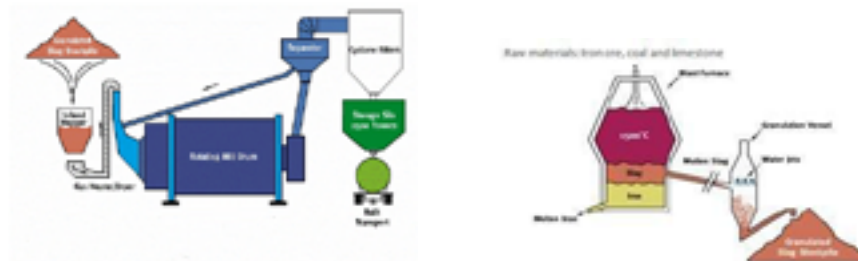
X - Module declared

MND - Module not declared

### 3.1 Detailed product description

Ecocem is a (latent) hydraulic binder produced by grinding granulated blast furnace slag (GBS). After grinding it becomes GGBS that conforms with the EN 15167 standard. This product is called “Ecocem”. Ecocem is an “intermediate” product, i.e. a constituent for the production of concrete, as well as mortar, masonry mortar, and other cementitious-bound materials. Concrete producers determine the proportions of binders used (ordinary cement and Ecocem), so they are able to apply the optimal mix. This means that the use of Ecocem will vary with the intended application and requirements of the final concrete product.

Besides producing Ecocem (GGBS), Ecocem Ireland also produces two different mixes of Ecocem and Portland cement. Ecocem CEM III/A contains up to 65% GGBS. Ecocem CEM III/C contains up to 95% GGBS.

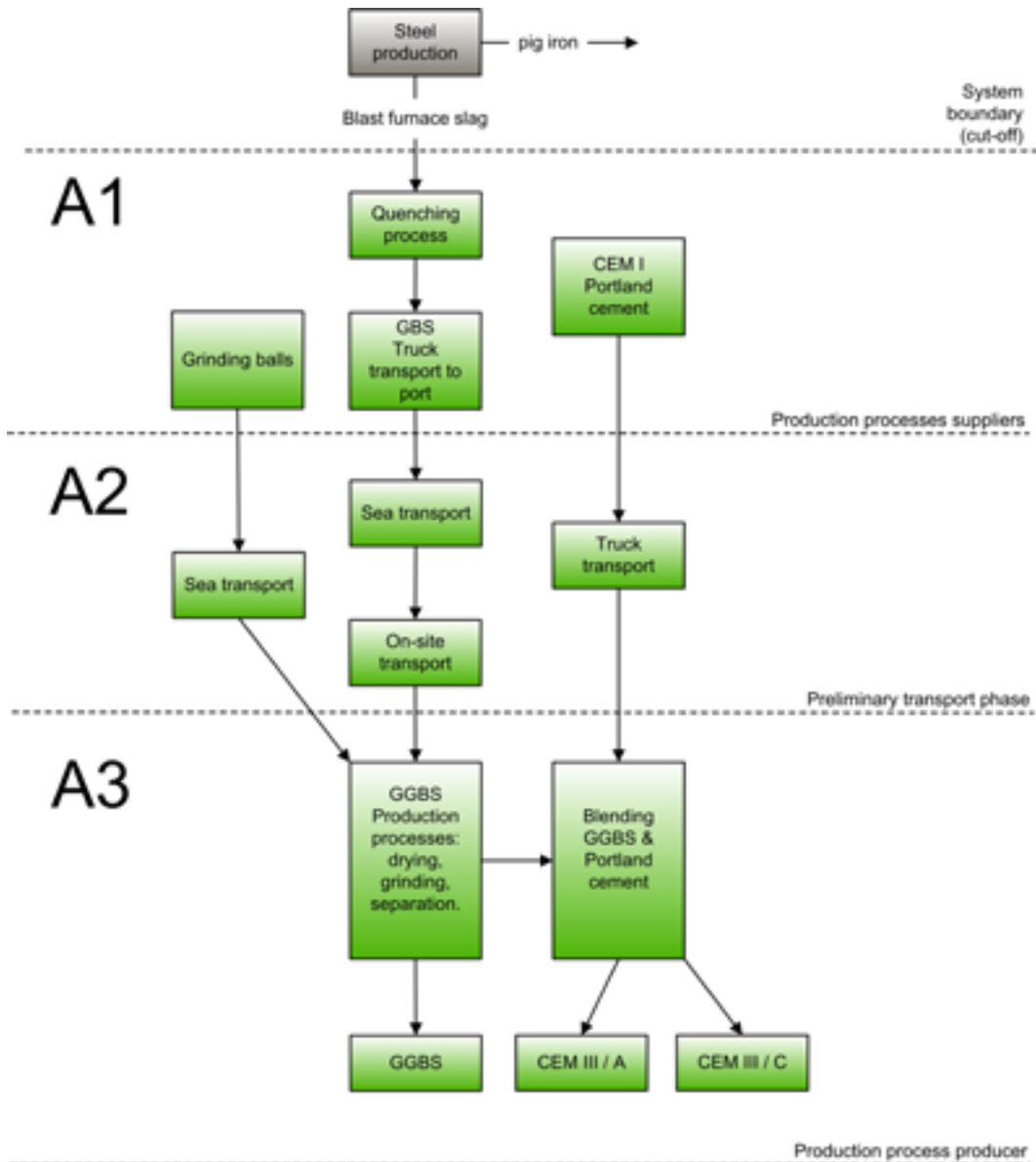


Ecocem is made only from GBS. Blast furnace slag (BS) is a residual portion of the reaction between the raw materials: iron ore, coal and limestone, as schematically illustrated in Figure 2. In the blast furnace, the iron ore is heated to about 1500 ° C. In the melt that is formed, the heavier molten iron sinks to the bottom and the remaining materials, mostly molten limestone, which forms the slag, are tapped off. The molten slag is then rapidly cooled under high pressure water jets, a process called quenching, where it is cooled into small granular pieces. This resulting product is granulated blast furnace slag (GBS). The GBS is imported to Ecocem’s plant from different locations throughout Europe. At the production facility in Dublin, the various slags are pre-mixed in the storage yard before milling, to ensure a consistent quality.

When the GBS is pre-mixed, it is transported with a shovel and fed into a hopper at the production facility is (Figure 2 right side). At this time, the GBS still contains about 10% moisture. By means of a gas dryer, this moisture is evaporated from the GBS which is then fed into the ball mill to be ground until it reaches the appropriate fineness. In the separator, the fine particles that meet the required fineness are separated and discharged into the storage silo. At this stage the product is a ground GBS, referred to as GGBS (ground granulated blast furnace slag). Ground material that is still too coarse is fed back into the ball mill to be ground further. From the storage silo the Ecocem product (GGBS) is ready to be transported to the customer.

To create Ecocem CEM III/A and Ecocem CEM III/C is blended with CEM I Portland cement.

### 3.2 Process Diagram, system boundaries



In the production of iron, all emissions are allocated to the iron. The slag is considered as a by-product with low economic value. There are no emissions attributed to slag. In accordance with the CEN/TC 51 PCR for cement and building lime

## 4 LCA results - Ecocem GGBS - Mandatory impact and LCI indicators

The results of the underlying LCA is provided in this section as environmental impacts, resource use, output flows and additional information on biogenic carbon. All pre-set parameters of EN 15804 are required. CML Version 3,9 is used as the characterisation methodology. Additional information about biogenic carbon is optional.

### Environmental Impact per metric tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO2-Eq.]	4.61E+00	1.41E+01	1.33E+01	3.20E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ODP	[kg CFC11-Eq.]	2.51E-07	2.25E-06	1.64E-06	4.15E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO2-Eq.]	5.31E-02	2.76E-01	2.85E-02	3.57E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO4) -Eq.]	3.35E-03	2.45E-02	5.90E-03	3.38E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	3.05E-03	8.97E-03	2.34E-03	1.44E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	1.28E-02	9.72E-02	1.02E-01	2.12E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	2.09E+01	2.06E+02	2.27E+02	4.54E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources.

Note - MND - Module not declared INA - Indicator not assessed

## 4 LCA results - Ecocem CEM III/A - Mandatory impact and LCI indicators

The results of the underlying LCA is provided in this section as environmental impacts, resource use, output flows and additional information on biogenic carbon. All pre-set parameters of EN 15804 are required. CML Version 3,9 is used as the characterisation methodology. Additional information about biogenic carbon is optional.

### Environmental Impact per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
GWP	[kg CO <sub>2</sub> -Eq.]	4.50E+02	5.23E+00	2.52E-02	4.55E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	
ODP	[kg CFC11-Eq.]	1.42E-05	9.63E-07	1.27E-09	1.52E-05	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO <sub>2</sub> -Eq.]	9.50E-01	2.66E-02	1.97E-04	9.77E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO <sub>4</sub> ) -Eq.]	1.28E-01	5.18E-03	4.81E-05	1.34E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	3.60E-02	9.66E-04	2.27E-05	3.70E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	1.01E+00	3.87E-02	8.92E-07	1.05E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	1.87E+03	8.44E+01	2.93E-01	1.95E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources.

Note - MND - Module not declared INA - Indicator not assessed

## 4 LCA results - Ecocem CEM III/C - Mandatory impact and LCI indicators

The results of the underlying LCA is provided in this section as environmental impacts, resource use, output flows and additional information on biogenic carbon. All pre-set parameters of EN 15804 are required. CML Version 3,9 is used as the characterisation methodology. Additional information about biogenic carbon is optional.

### Environmental Impact per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO <sub>2</sub> -Eq.]	1.16E+02	1.05E+00	2.52E-02	1.17E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ODP	[kg CFC11-Eq.]	6.16E-06	1.92E-07	1.27E-09	6.36E-06	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
AP	[kg SO <sub>2</sub> -Eq.]	4.76E-01	5.33E-03	1.97E-04	4.82E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EP	[kg (PO <sub>4</sub> ) -Eq.]	5.27E-02	1.04E-03	4.81E-05	5.38E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
POCP	[kg ethene-Eq.]	1.87E-02	1.93E-04	2.27E-05	1.89E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPE	[kg Sb-Eq.]	3.72E-01	7.73E-03	8.92E-07	3.80E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
ADPF	[MJ]	7.37E+02	1.69E+01	2.93E-01	7.55E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources.

Note - MND - Module not declared INA - Indicator not assessed



## Ecocem GGBS- Resource use per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	7.12E+00	4.56E+00	3.20E+02	3.32E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	7.12E+00	4.56E+00	3.20E+02	3.32E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	7.67E+01	2.15E+02	2.27E+02	5.19E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	7.67E+01	2.15E+02	2.27E+02	5.19E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	INA	INA	INA	INA	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	INA	INA	INA	INA	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	INA	INA	INA	INA	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	3.53E+01	1.48E-02	1.82E-02	3.53E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

PERE = Use of renewable primary energy excluding renewable primary energy resources 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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water. INA = Indicator not assessed. MND = Module not declared.

SM, RFS and NRSF are not calculated by the EcoChain software

## Ecocem CEM III/A - Resource use per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	2.81E+02	1.10E+00	5.02E+00	2.87E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	2.81E+02	1.10E+00	5.02E+00	2.87E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	2.11E+03	8.59E+01	2.73E-01	2.20E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	2.11E+03	8.59E+01	2.73E-01	2.20E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	INA	INA	INA	INA	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	INA	INA	INA	INA	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	INA	INA	INA	INA	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m <sup>3</sup> ]	1.82E+01	4.68E-03	1.74E-04	1.82E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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SM, RFS and NRSF are not calculated by the EcoChain software

## Ecocem CEM III/C - Resource use per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	3.22E+02	2.20E-01	5.02E+00	3.27E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PERT	[MJ]	3.22E+02	2.20E-01	5.02E+00	3.27E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRE	[MJ]	8.37E+02	1.72E+01	2.73E-01	8.55E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
PENRT	[MJ]	8.37E+02	1.72E+01	2.73E-01	8.55E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
SM	[kg]	INA	INA	INA	INA	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RSF	[MJ]	INA	INA	INA	INA	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NRSF	[MJ]	INA	INA	INA	INA	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
FW	[m³]	3.19E+01	9.36E-04	1.74E-04	3.19E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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SM, RFS and NRSF are not calculated by the EcoChain software

## Ecocem GGBS - Output flows and waste categories per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	1.22E-04	1.43E-03	7.30E-04	2.29E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD	[kg]	2.80E-01	1.31E+00	2.10E+00	3.69E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	5.09E-05	1.32E-03	2.59E-04	1.63E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software

## Ecocem CEM III/A - Output flows and waste categories per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	1.06E-02	5.93E-04	4.48E-06	1.12E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD	[kg]	8.55E+00	4.82E+00	3.17E+02	1.34E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	9.27E-03	5.43E-04	6.66E-07	9.81E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software

## Ecocem CEM III/C - Output flows and waste categories per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	3.96E-03	1.19E-04	4.48E-06	4.08E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
NHWD	[kg]	4.66E+00	9.63E-01	3.17E-02	5.66E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
RWD	[kg]	3.16E-03	1.09E-04	6.66E-07	3.27E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software

## 5 LCA results - Optional impact indicators

### Ecocem GGBS - Environmental Impact per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Human toxicity potential	kg 1,4-DB-eq	5.80E+00	8.69E+00	8.54E+00	2.30E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	1.27E-01	1.48E-01	6.25E-02	3.38E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	3.56E+03	3.64E+03	1.16E+03	8.36E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	1.32E-02	2.89E-02	3.21E-01	3.63E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed

## 5 LCA results - Optional impact indicators

### Ecocem CEM III/A - Environmental Impact per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Human toxicity potential	kg 1,4-DB-eq	4.81E+01	2.24E+00	9.52E-02	5.04E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	1.01E+00	8.00E-02	6.93E-04	1.09E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	3.86E+04	1.02E+03	2.39E+00	3.96E+04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	8.27E-01	1.21E-02	4.98E-03	8.44E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed



## 5 LCA results - Optional impact indicators

### Ecocem CEM III/C - Environmental Impact per tonne

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Human toxicity potential	kg 1,4-DB-eq	2.80E+01	4.49E-01	9.52E-02	2.86E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	4.72E-01	1.60E-02	6.93E-04	4.88E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	1.44E+04	2.03E+02	2.39E+00	1.46E+04	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	4.56E-01	2.43E-03	4.98E-03	4.63E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Note - MND - Module not declared INA - Indicator not assessed

## 7 Calculation rules:

### Methodology and reproducibility

The process descriptions and quantities in this study are reproducible in accordance to the reference standards that have been used. The references of all sources, both primary and public sources and literature, have been documented in the LCA report. In addition, to facilitate the reproducibility of this LCA, a full set of data records has been generated which can be accessed via the EcoChain tool. This data portfolio contains a summary of all the data used in this LCA, and correspondingly, in the Ecocem Ireland EcoChain account.

### Data quality

Data flows have been modeled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources.

### Data collection period

The dataset is representative for the production processes used in 2017

## 8 Scenarios and additional technical information

### A1. Raw materials supply

This module considers the extraction and processing of all raw materials and energy which occur upstream to the Ecocem manufacturing process, as well as waste processing up to the end-of waste state.

### A2. Transport of raw materials to manufacturer

This includes the transport distance of the raw materials to the manufacturing facility via road, boat and/or train.

### A3. Manufacturing

This module covers the manufacturing of Ecocem Products and includes all processes linked to production such as, mixing, packing and internal transportation. Use of electricity, fuels and auxiliary materials used during production is taken into account as well. Electricity has been purchased from Bord Gais based on wind certificates MPRN 10018873108

## 9 Mandatory additional information on release of dangerous substances to indoor air, soil and water

None of the substances contained in the product are listed in the “Candidate List of Substances of Very High Concern for authorisation”, or they do not exceed the limit for registration with the European Chemicals Agency.

## 10 Other optional additional environmental information

No additional information.

## 11 References

CEN/TC 51 PCR for cement and building lime, 2015

CML - Department of Industrial Ecology, CML-IA Characterisation Factors, Dated August 2016, Leiden University, Leiden, Netherlands Available at: <https://www.universiteitleiden.nl/en/research/research-output/science/cml-ia-characterisation-factors>

EcoChain, 2017, web: <http://app.ecochain.com>.

EN 15804: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products', I.S. EN 15804:2012+A1:2013.

ISO 14040: Environmental management - Life cycle assessment – Principles and Framework', International Organization for Standardization, ISO14040:2006.

ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO14044:2006.

ISO 14025: Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures', International Organization for Standardization, ISO14025:2006.

Product Category Rules : Part A. Implementation and use of I.S. EN 15804:2012 and CEN TR 16970:2016 in Ireland. EPD Ireland, Irish Green Building Council, July 2018.