



Environmental Product Declaration

In accordance with ISO 14025:2006
and EN 15804:2012+A2:2019 for:

Hope CEM I
from
Breedon Group

Programme: The International EPD® System,
www.environdec.com

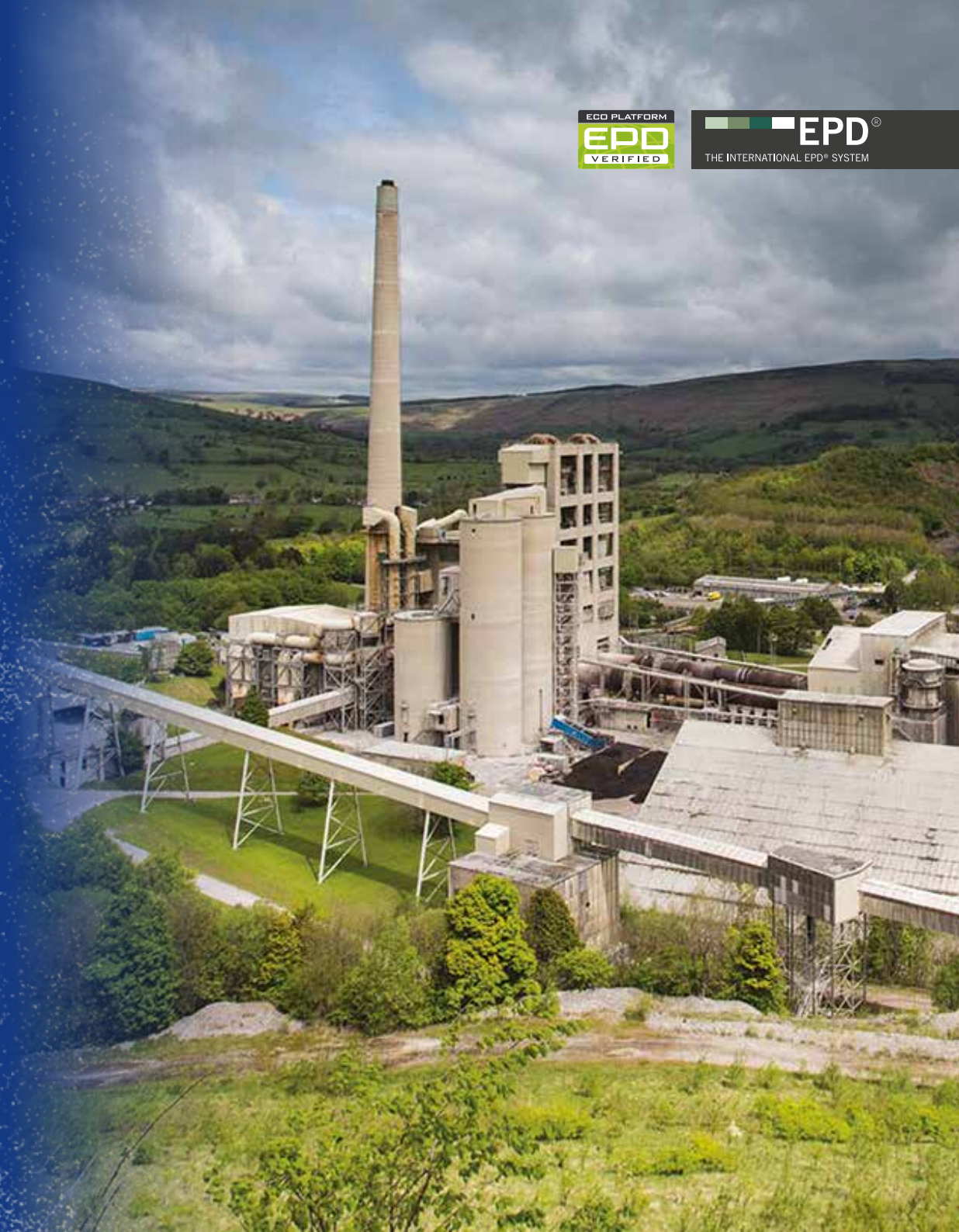
Programme operator: EPD International AB

EPD registration number: S-P-13667

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Valid until: 2029-05-21

*An EPD should provide current information and may be updated
if conditions change. The stated validity is therefore subject to
the continued registration and publication at www.environdec.com*



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product category rules (PCR): PCR 2019:14
- Construction Products - Version 1.3.2
c-PCR-001 Cement and building limes (EN 16908)

PCR review was conducted by: *This PCR was developed within CEN standardisation, and adopted as a c-PCR by the International EPD® System. There was thus no additional open consultation period and no additional review in addition to those within standardisation.*

Independent third-party verification of the declaration and data, according to ISO 14025:2006:

EPD process certification EPD verification

Third party verifier:
Angela Schindler, Umweltberatung, Salem, Germany

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:

Yes No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:



Breedon Group
Breedon on the Hill,
Derby, UK.

www.breedongroup.com



Contact: Spencer Green
spencer.green@breedongroup.com



Description of the organisation:
Breedon is a leading vertically-integrated construction materials group in Great Britain, Ireland and the USA, supplying the construction industry with the essential materials needed to build the places where we live and work, play and in-between.



Product-related or management system-related certifications:
ISO 14001, ISO 45001, ISO 9001, ISO 50001



Name and location of production site(s):
Hope Cement Works, Hope Valley, S33 6RP

Product information



Product name:
Hope Cement CEM I



Product identification:
CEM I 52.5N according to BS EN 197 Part 1



Product description:
Cement is a hydraulic binder. It is a finely ground inorganic material which, when mixed with water, forms a paste which sets and hardens by means of hydration reactions and processes. After hardening, it retains its strength and stability even under water.



UN CPC code:
3744 Cement



Geographical Scope:
United Kingdom

LCA information

Functional unit / declared unit:
1 tonne

Reference service life:
not applicable

Time representativeness:
All material and energy flows within the scope of the study are based on the plant specific data collected for the year 2022.

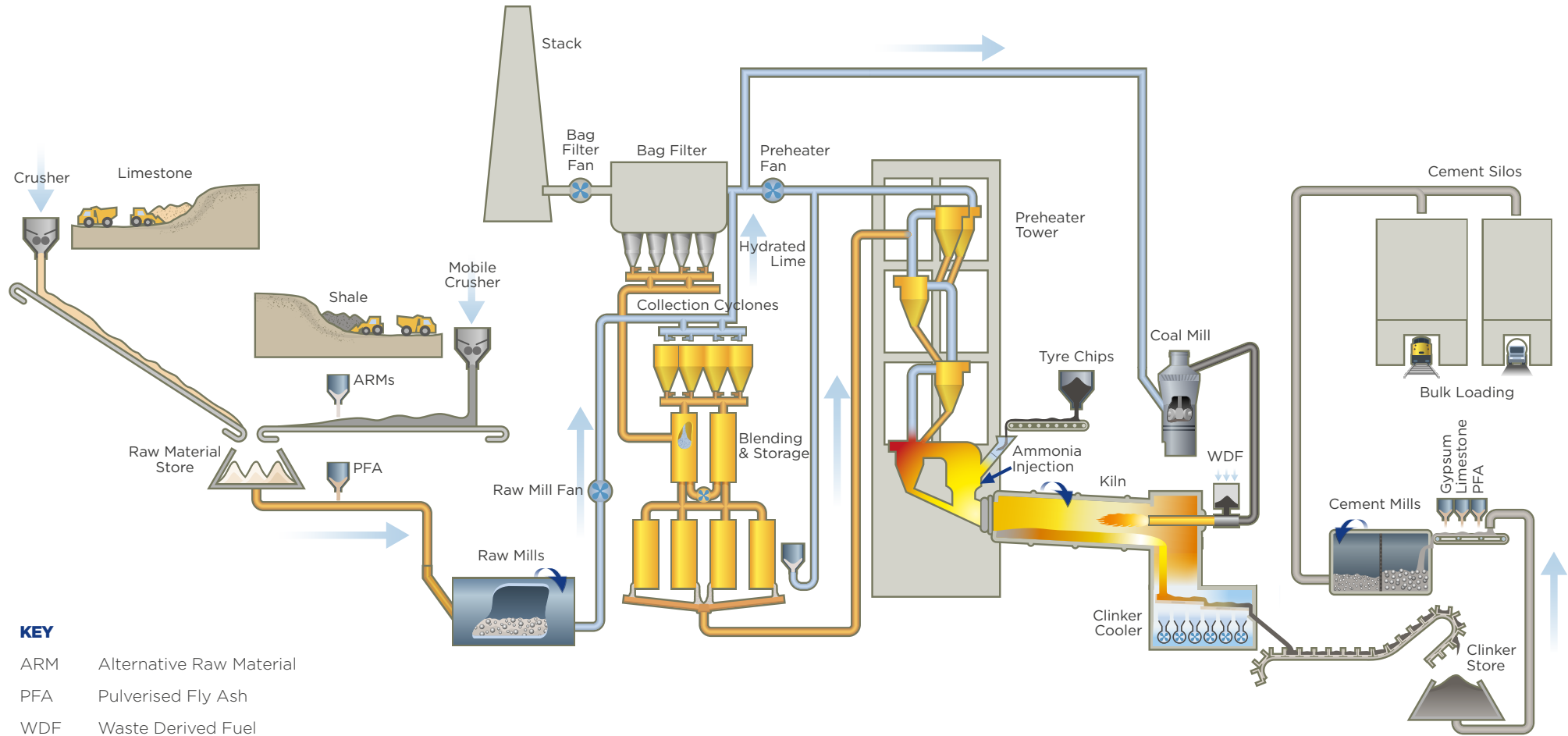
Database(s) and LCA software used:
The LCA software used is the GCCA EPD tool, version 4.2. The GCCA tool uses the ecoinvent database version 3.5 together with GCCA custom emission factors for processes not included in the ecoinvent database, notably cement kiln processes. The LCI methodology is described in detail in the reference document "GCCA Industry EPD Tool for Cement and Concrete (v4.2) - LCA Model, International Version".

Description of system boundaries:
The EPD type is "Cradle to gate" (A1-A3). This system includes the extraction and production of raw materials, transportation of raw materials to the cement plant, cement manufacturing process (including on-site transportation) and treatment of waste produced within processes throughout the cement plant.

This product meets the exemption criteria with Section 5.2 of BS EN 15804:2012+A2:2019, in that it is physically integrated with other products during installation, so cannot be physically separated from them at end of life. Therefore, the EPD is based on a cradle to gate assessment and impacts are declared against modules A1-A3 only.



System diagram



More information



The stages A1 – A3 below detail the production of cement:

Clinker is the main raw material for Portland cement and is the core production process that takes place at Hope cement works. As shown in the system diagram; The main raw materials, limestone and shale, are quarried on site and crushed to smaller sizes. PFA is added to the shale and these are then ground and blended to create a homogenous mix. The mix is then pre-heated before being fed into the cement kiln, where it is burned with a mixture of coal, kerosene, and alternative fuels: tyre-derived products and solid recovered fuel (SRF). The material that emerges from the kiln is clinker. The clinker is then cooled and transported by conveyor to the clinker store, and from there to the cement mills, as and when needed to produce cement.

A1 Raw materials supply:

The raw materials are limestone, shale for the clinker, and then gypsum, and minor additional constituents (inorganic, comprising no more than 5% of the cement), are added to the clinker to make the final cement product.

A2 Transport:

This module covers the impacts of the transport of the raw materials and fuels to the production site.

A3 Manufacturing:

The clinker is inter-ground with additions of limestone and gypsum, and minor additional constituents of chromate-reducing agents and a grinding aid (to increase grinding efficiency) and piped to cement storage silos on site.

Flows related to human activities such as employee transport are excluded. The construction of capital assets such as buildings, manufacture of machines and transportation systems are also excluded since the related flows are assumed to be negligible compared to the manufacture of the building material when compared to these systems over a full lifetime of operation.

No raw material or fuel cut offs have been applied in the LCA, all inputs have been considered within the system boundary.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation

Module	Product stage		Construction process stage			Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Geography	UK	UK	UK	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND
Specific data used	>90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation - products						-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites						-	-	-	-	-	-	-	-	-	-	-	-



Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Hope Cement Clinker	895.57	0	0 and 0
Gypsum	57.65	0	0 and 0
Limestone, crushed	42.17	0	0 and 0
Ferrous sulphate	2.57	0	0 and 0
Grinding aids	0.26	0	0 and 0
Other additive	0.01	0	0 and 0
TOTAL	1000	0	0 and 0
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
None (delivered in bulk)			
Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
None			



Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per functional or declared unit			
Indicator	Description	Unit	Tot.A1-A3
GWP - GHG	Global Warming Potential, GHG	kg CO ₂ eq.	807.7 ²
GWP-total	Global Warming Potential, total	kg CO ₂ eq.	807.7 ¹
GWP-fossil	Global Warming Potential, fossil fuels	kg CO ₂ eq.	807.4 ¹
GWP-biogenic	Global Warming Potential, biogenic	kg CO ₂ eq.	0.1813 ¹
GWP-luluc	Global Warming Potential, land use and land use change	kg CO ₂ eq.	7.020E-02
ODP	Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	7.196E-06
AP	Acidification potential, Accumulated Exceedance	mol H+ eq.	2.078
EP-freshwater	Eutrophication potential, fraction of nutrients reaching freshwater end compartment	kg P eq.	7.836E-02
EP-marine	Eutrophication potential, fraction of nutrients reaching marine end compartment	kg N eq.	5.023E-03
EP-terrestrial	Eutrophication potential, Accumulated Exceedance	mol N eq.	5.908
POCP	Formation potential of tropospheric ozone	kg NMVOC eq.	1.443
ADP-minerals & metals*	Abiotic depletion potential for non- fossil resources	kg Sb eq.	2.01E-04
ADP-fossil*	Abiotic depletion potential for fossil resources potential	MJ, net calorific value	2031
WDP	Water (user) deprivation potential, deprivation-weighted water consumption	m ³ world eq. deprived	20.55

**Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

1) The indicated values (gross values) include the greenhouse gas emissions from the incineration of secondary fuels at clinker production. The net GWP-tot (excluding the emissions from the incineration of secondary fuels at clinker production) is 753.1 kg CO₂-eq. The net GWP-fos is 752.9 kg CO₂-eq. The net GWP-bio is 7.259E-2 kg CO₂-eq.

2) The indicated values (gross values) include the greenhouse gas emissions from the incineration of secondary fuels at clinker production. The net GWP-GHG (excluding the emissions from the incineration of secondary fuels at clinker production) is 753.1 kg CO₂-eq.

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

It should be noted that the net/gross differentiation applies to GWP indicators only and is ignored for other indicators where gross is applied by default

Potential environmental impact - mandatory indicators according to EN 15804

Results per functional or declared unit			
Indicator	Description	Unit	Tot.A1-A3
PM	Potential incidence of disease due to PM emissions	Disease incidence	1.10E-05
IRP	Potential Human exposure efficiency relative to U235	kBq U235 eq.	2.169
ETP	Potential Comparative Toxic Unit for ecosystems	CTUe	44.69
HTPC	Potential Comparative Toxic Unit for humans - cancer	CTUh	1.40E-06
HTPNC	Potential Comparative Toxic Unit for humans - non-cancer	CTUh	2.50E-05
SQP	Potential soil quality index	dimensionless	8505

Use of resources

Results per functional or declared unit			
Indicator	Description	Unit	Tot.A1-A3
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	1059
PERM	Use of renewable primary energy resources used as raw materials	MJ, net calorific value	0
PERT	Total use of renewable primary energy resources	MJ, net calorific value	1059
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ, net calorific value	2031
PENRM	Use of non-renewable primary energy resources used as raw materials	MJ, net calorific value	0
PENRT	Total use of non-renewable primary energy resources	MJ, net calorific value	2031
SM	Use of secondary materials	kg	92.03
RSF	Use of renewable secondary fuels	MJ, net calorific value	359.1
NRSF	Use of non-renewable secondary fuels	MJ, net calorific value	538.8
NFW	Net use of fresh water	m ³	0.5333

Waste production and output flows | Waste production¹

Results per functional or declared unit			
Indicator	Description	Unit	Tot.A1-A3
HWD	Hazardous waste disposed	kg	5.089E-03
NHWD	Non-hazardous waste disposed	kg	0
RWD	Radioactive waste disposed	kg	ND

Note: Values above relate to the A1-A3 stages only, and do not cover the full lifecycle waste flows.

¹ The waste indicators in the Global Cement and Concrete Association (GCCA) tool exclusively pertain to the foreground system, diverging from the requirements outlined in EN 15804+A2, which mandates consideration of the entire life cycle. Consequently, this deviation from the standard results in an inherent incomparability with other Environmental Product Declarations (EPDs) with regards to waste indicators.

Waste production and output flows | Output flows

Results per functional or declared unit			
Indicator	Description	Unit	Tot.A1-A3
CRU	Components for re-use	kg	0
MFR	Materials for recycling	kg	2.102
MER	Materials for energy recovery	kg	0
EE	Exported energy	MJ per energy carrier	0

Note: Values above relate to the A1-A3 stages only, and do not cover the full lifecycle waste flows.



Additional information

Electricity Mix

Hope Cement works consumed grid electricity from a green electricity tariff during the study period, these are backed by guarantees of origin certificates.

In the table (right) is the breakdown taken from the supplier fuel mix disclosure, as entered into the LCA tool.

Category	Designation (what)	Unit	Quantity
Electricity, purchased from the grid			
	Biomass	%	33.8
	Hydro	%	4.6
	Solar	%	23.5
	Wind	%	38.1

Gross vs Net

This EPD follows the UK Minerals Products Association approach to the declaration of 'gross' CO₂ emission as opposed to 'net' in the interests of transparency and comparability.

Extract from the UK MPA EPD for UK Average CEM I:

"The GWP-fossil values reported in this EPD are based on 'gross' CO₂ emissions, including combustion of both fossil and waste-derived fuels (also called 'alternative' or 'secondary' fuels). Some cement EPDs exclude the combustion of waste-derived fuels, and report GWP values based on 'net' CO₂ emissions. When comparing EPDs, it is important to note that 'net' GWP values, which exclude CO₂ emissions from the combustion of waste-derived fuels, will be lower than 'gross' GWP values which include them."

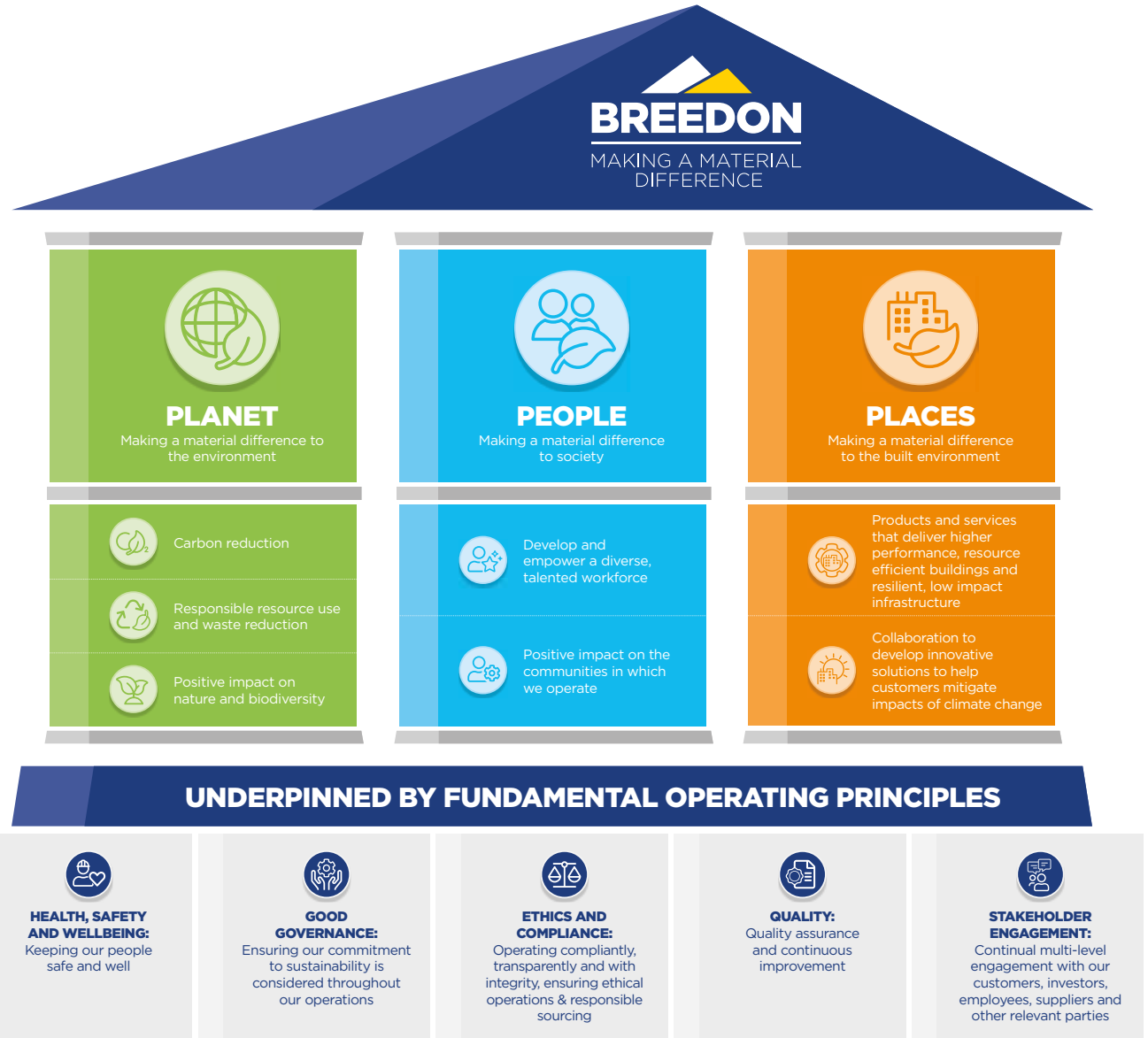
Sustainability at Breedon Group

Hope cement works is part of Breedon Group PLC, a leading vertically-integrated construction materials group in Great Britain, Ireland and the USA.

Our purpose is to make a material difference to the lives of our colleagues, customers and communities, and our products play an essential part in creating a sustainable built environment for everyone.

Our sustainability strategy and framework focuses on our most material areas of impact; **Planet, People** and **Places**, underpinned by our **Principles**.

As part of our Places focus we have made a commitment to improve the product labelling and transparency and as result are creating EPDs for several Breedon products.



References

Programme information: General Programme Instructions of the International EPD® System. Version 4.0.

ISO 14040

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

ISO 14044

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

ISO 14025

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

EN 15804

2021+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products EN 15804:2012+A2:2019.

BS-EN-16908

Cement and building lime. Environmental product declarations. Product Category Rules complementary to EN 15804

Quantis, "GCCA Industry EPD Tool for Cement and concrete - LCA model, International Version" (Tool version 4.2), December 2023

GCCA Industry EPD tool for clinker, cement, aggregates, concrete and precast products, <https://concrete-epd-tool.org>

UK Average CEM I EPD, Mineral Products Association (MPA) UK, available at: www.environdec.com



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