KNAUF

EPD®

THE INTERNATIONAL EPD® SYSTEM

ENVIRONMENTAL PRODUCT DECLARATION

PILOMAX REPAIR MORTAR

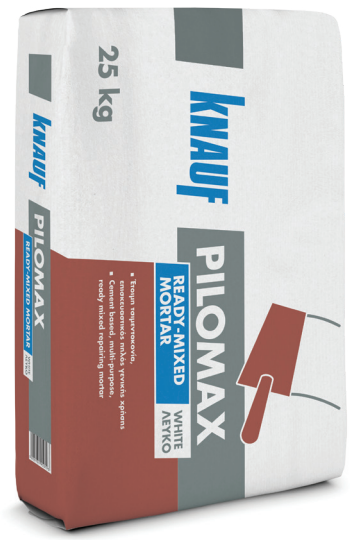
by Knauf Cyprus

In accordance with ISO 14025:2006
and EN 15804:2012+A2:2019/AC 2021

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.ecoinvent.org

ECO PLATFORM EPD VERIFIED

Programme:	**The International EPD® System**
Programme operator:	**EPD International AB**
EPD registration number:	**EPD-IES-0024060**
Publication date:	**2025-06-10**
Valid until:	**2029-10-07**



Valid until:
2029-10-07

Build on us.

Contents

Programme related information

Programme Owner:

The International EPD System
Box 210 60 SE-100 31, Stockholm, Sweden
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Programme Operator: EPD International AB

EPD Owner:

KNAUF CYPRUS LTD
1 Christou Zeipekki Str, Vasa 4504, Cyprus
https://knauf.com/el-CY

Accountabilities for PCR, LCA and third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serve as the core Product Category Rules (PCR)
Product Category Rules (PCR):
PCR 2019:14 Construction products, version 1.3.4
PCR review was conducted by: The Technical Committee of the International EPD® System.
See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact

Life Cycle Assessment (LCA)
LCA Accountability:

ENVIROMETRICS S.A.
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email: info@envirometrics.gr
www.envirometrics.gr

Third party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
☒ EPD verification by certification body

Third party verification:

Business Quality Verification P.C,
Accredited by E.S.Y.D, Accreditation No. 1218
5 Konitsis street, Marousi, GR 15125, Greece
https://bqv.gr/

Business Quality Verification P.C. is an approved certification body accountable for the third-party verification

Procedure for follow-up during EPD validity involves third party verifier
☐ **Yes** ☒ **No**

The EPD does not give information on the release of dangerous substances into soil, water and indoor air because the horizontal standards on measurement of the release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available.

The EPD owner has the sole ownership, liability, and responsibility of the EPD. EPDs within the same product category but registered in different EPD programs 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 characterization 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

Knauf is one of the world's leading manufacturers of modern insulation materials, drylining systems, plasters and accessories, thermal insulation composite systems, paints, floor screed, floor systems, and construction equipment and tools. Established in 1932, when brothers Alfons and Karl Knauf secured the mining rights to gypsum deposits in the Schengen community (Obermosel) in Germany, accounts more than 250 production facilities and sales organizations in over 86 countries, 35,000 employees worldwide, and sales of 10 billion Euro (in 2019), the Knauf Group is without doubt one of the big players on the market – in Europe, the USA, South America, Russia, Asia, Africa, and Australia.

Knauf Cyprus (located in 1 Christou Zeipekki Str, Vasa 4504, Cyprus) is a part of the Knauf Group, a multinational company headquartered in Germany that specializes in building materials and systems. Knauf Cyprus focuses on providing a wide range of construction solutions and materials, including gypsum-based products, insulation, and more. Knauf Cyprus, like its parent company, emphasizes sustainability in its operations and products. Key sustainability initiatives include:

- **Resource Efficiency: Utilizing raw materials efficiently and reducing waste.**
- **Energy Efficiency: Developing products that contribute to the energy efficiency of buildings.**
- **Environmental Protection: Implementing practices to minimize environmental impact, such as reducing CO_2 emissions and using recycled materials.**

Knauf Cyprus is committed to innovation and quality, continuously developing new products and improving existing ones to meet the evolving needs of the construction industry. This commitment ensures that Knauf remains a trusted partner for builders, architects, and contractors.

Product Information

Ready-made cement mortar ideal for the multifaceted needs of modern construction. It is classified as CSIV - W0 type mortar according to EN 998-1.

- **For indoor and outdoor use**
- **For masonry and floors**
- **As a general-purpose repair clay.**
- **For building various brick or cement stone masonry.**
- **As a 2nd coat of plaster on various masonry**

		**Cement** (kg per kg of mortar)	**Calcium carbonate** (kg per kg of mortar)	**Lime** (kg per kg of mortar)	**Other (Cellulose, EVA, plasticizers)** (kg per kg of mortar)	**Biogenic carbon content** (kg C biogenic per DU)
PILOMAX REPAIR		0,15-0,20	0,80-0,85	-	<0,01	0
Packaging (kg per kg of mortar)	**PE Film**	6,49E-04				0
	Paper sacks	8,00E-03				0*
	Pallets	1,73E-02				0*

**In fact, there is a biogenic carbon content in these packaging materials, but since it is unknown, a conservative assumption of zero content is made, according to the PCR 2019:14*

UN CPC code: 375

According to the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Regulation, the product does not contain any substance included in the Candidate List of Substances of Very High Concern (SVHCs) for authorization with concentrations higher than 0,1% weight by weight (w/w).

System boundaries

	X= Included, ND= Module Not Declared															
	Product stage			Construction stage		Use stage							End-of-life stage				Resource recovery stage
	Raw Materials Supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction and demolition	Transport	Waste processing for reuse, recovery and/or recycling	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	A4	**A5**	B1	B2	B3	B4	B5	B6	B7	**C1**	**C2**	**C3**	**C4**	**D**
Module Declared	**X**	**X**	**X**	ND	**X**	ND	ND	ND	ND	ND	ND	ND	**X**	**X**	**X**	**X**	**X**
Geography	**EU**	**EU**	**CY**	**-**									**EU**	**EU**	**EU**	**EU**	**EU**
GWP-GHG share of Specific data used	**15,58%**			-									-	-	-	-	-
Variation-products	**0%**			-									-	-	-	-	-
Variation-sites	**0%**			-									-	-	-	-	-

A1: Raw Material Supply

Production starts with the material supply. This module includes the mining and pretreatment processes before production (processing of raw materials, generation of electricity and fuels required for the manufacturing, recycling process of secondary materials). Cement, calcium carbonate and other additives such as calcium formate, fibers and other dispersions are the main raw materials used for mortars production.

A2: Transportation of raw materials to manufacturer

Transportation module includes the delivery of raw, auxiliary and packaging materials from suppliers to the gate of manufacturing plant in Vasa, Cyprus. All raw materials (calcium carbonate, cement, lime, additives), and packaging materials are imported from suppliers located in Cyprus or generally European manufacturers. In this module, an assumption regarding the transportation means was made. More specifically, a EURO 5 lorry 16-32 t dataset was used.

A3: Manufacturing

This module includes all emissions that may occur during the manufacturing process (direct emissions in water/air from fuels combustion and water treatment, manufacturing waste treatment). Personnel-related activities, such as transportation of employees to and from work, and production of infrastructure and capital goods are not included in the scope of this study.

The manufacturing process for mortars starts with proportioning of raw materials, where they are proportioned according to specific formulations designed to meet the desired properties of the mortar. Then, the mixing process takes place. The mixing process involves dry mixing, where dry ingredients (cement, calcium carbonate etc.) are thoroughly mixed to ensure a uniform distribution of materials, and wet mixing, where water and any liquid admixtures are added to the dry mix. This is typically done in a high-shear mixer to ensure thorough blending and consistency.

A5: Installation

In this module, impacts that occur during installation stage are included. In this case, water needed for mortars installation and waste treatment of packaging materials are included.

Scenario Information (module A5)	Unit
Ancillary materials for installation (specified by material)	None
Water use	0,5 l per kg of mortar
Quantitative description of energy type kWh or MJ (regional mix) and consumption during theinstallation process	None
Waste materials on the building site before waste processing, generated by the product's installation (specified by type)	Packaging waste (for disposal) **Wooden pallets:** 1,73E-02 kg per kg of mortar **PE films:** 6,49E-04 kg per kg of mortar **Carton box:** 8,00E-03 kg per kg of mortar

C1: De-construction and demolition

The end-of-life stages begin with the deconstruction and demolition from the installation, and then they are transferred for recycling and disposal. Usually, this phase results in little impact because the product is generally part of a larger system (e.g., machine or building), and for that reason, impacts from dismantling should be allocated to all components of that system. For this reason, the impact of the dismantling phase was considered negligible.

C2: Transportation to waste processing

The discarded product is transported either to the recycling site or to landfills for final disposal. As a conservative assumption, a distance of 50 km to waste processing sites is assumed.

C3: Waste processing for reuse, recovery and/or recycling

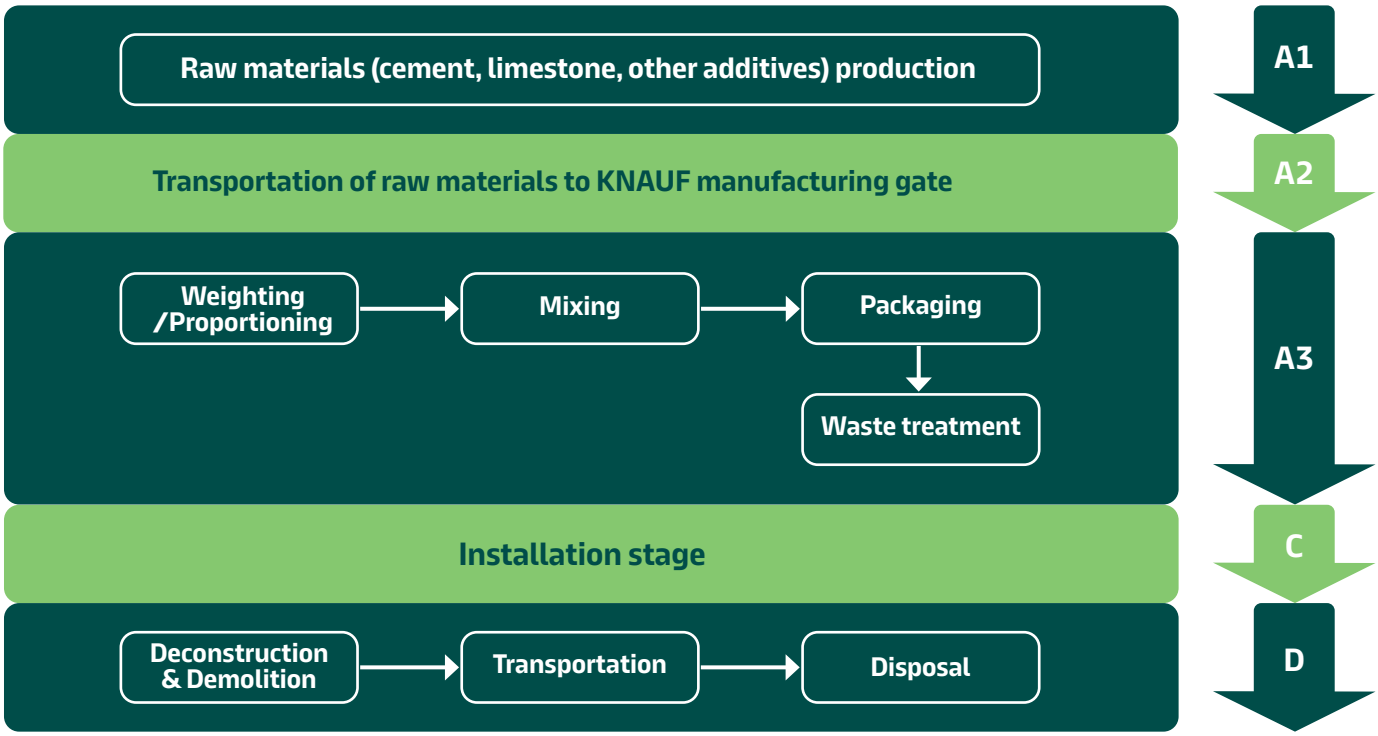
As a conservative assumption, all mortars waste after the demolition process will be landfilled. So, there are no environmental impacts assigned to this module.

C4: Disposal

As stated above, all mortars waste after the demolition process will be landfilled.

D: Reuse-Recovery-Recycling-potential

Since mortars are assumed to be landfilled after their life cycle, there are no potential benefits and the results of this module are zero.



LCA Information

Declared unit

The declared unit is 1 kg of PILOMAX Repair Mortar.

Goal and scope

This EPD assesses the environmental impacts of the production of 1 kg of PILOMAX Repair Mortarfrom Cradle-to-gate (modules A1-A3) with modules A5, C and D.

System Boundary

The type of EPD is cradle-to-gate (modules A1-A3) with modules A5, C and D.

Time representativeness

Time representativeness for the mortars is the whole year 2023.

Data quality

ISO 14044 was applied in terms of data collection and quality requirements.

Data regarding the quantities of each raw and packaging material consumed were acquired through ERP system.

Quantities of electricity and fuels were acquired from bills and invoices.

Quantities of manufacturing wastes were acquired from electronic waste registry.

All generic data used in the assessment was sourced from *openLCA v.2.0* and *Ecoinvent V.3.9.1+15804 add on* database which is valid for 2023. The selection of the datasets was held in order to be the more representative with regard to the geographical scope, technology, and time.

Regarding electricity, the latest version of Electricity Mix Report of Cyprus published by Association of Issuing Bodies (AIB) is used. The climate impact (in GWP-GHG) is 595,03 g CO_2/kWh.

The end-of-life and construction stages are based on the most representative scenarios for this product.

Reference package used: EN 15804 reference package based on EF 3.1

Geographical scope

Worldwide

Co-product allocation

Allocation rules have been performed in accordance with the requirements of ISO 14044:2006. Wherever possible, allocation was avoided by dividing the unit process to be allocated into two or more sub-processes and collecting the input and output data related to these sub-processes. Where allocation cannot be avoided, the inputs and outputs of the system were partitioned between its different products or functions in a way that reflects the underlying physical or economic relationships between them.

In this case, allocation based on the mass of produced quantities was applied to the following streams:

- **Fuels used for the manufacturing process (diesel and LPG)**
- **Electricity consumed for the manufacturing process and other utilities**
- **Wastes generated throughout the manufacturing process**

End-of-life allocation

End-of-life allocation generally follows the requirements of *ISO 14044 & EN 15804*.

The allocation of waste shall follow the polluter-pays principle, which is made operational according to the following rules. Waste processing processes shall be assigned to the product system that generates the waste until the end-of-waste state is reached. The system boundary to the subsequent product system is set where the waste (e.g., the discarded product) reaches the end-of-waste state, i.e., when the material has become a usable flow (e.g., for reuse, energy recovery and/or recycling). The end-of-waste state is reached when all the following criteria are fulfilled:

- **the recovered material or product (including, e.g., energyware such as fuel, electricity and heat) is commonly used for specific purposes**
- **a market or demand, identified, for example by a positive economic value, exists for such a recovered material or product**
- **the recovered material or product fulfils the technical requirements for the specific purposes for which it is used and meets the existing legislation and standards applicable to its use**
- **the use of the recovered material or product will not lead to overall adverse environmental or human health impacts, which shall be understood as the content of hazardous substances below limit values in applicable legislation**

The following rules indicate that disposal of waste mortars in C4 and waste packaging materials in A5 and A3 module shall be fully assigned to this product system.

Cut-off

The cut-off criteria adopted is as stated in "EN 15804:2012+A2:2019". Where there is insufficient data or data gaps for a unit process, the cut-off criteria are 1% of the total mass of input of that process. The total of neglected input flows per module is a maximum of 5% of energy usage and mass. In this case, cut-off was applied to some hydrophobic agents, plasticizers and thickeners. The percentage of cut-off streams is 0,26%.

Environmental performance of 1 kg of PILOMAX Repair Mortar

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. The results of module A1-A3 are generally discouraged to be used without considering the results of module C.

ENVIRONMENTAL IMPACTS	Unit	A1-A3	A5	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	2.23E-01	1.83E-03	0.00E+00	1.89E-01	0.00E+00	1.18E-02	0.00E+00
GWP-fossil	kg CO2 eq	2.09E-01	4.75E-04	0.00E+00	1.88E-01	0.00E+00	1.17E-02	0.00E+00
GWP-biogenic	kg CO2 eq	1.40E-02	1.35E-03	0.00E+00	1.65E-04	0.00E+00	7.14E-05	0.00E+00
GWP-luluc	kg CO2 eq	2.55E-04	4.60E-07	0.00E+00	9.14E-05	0.00E+00	8.53E-06	0.00E+00
GWP-GHG	kg CO2 eq	2.09E-01	4.75E-04	0.00E+00	1.88E-01	0.00E+00	1.17E-02	0.00E+00
ODP	kg CFC-11 eq	2.42E-09	1.07E-11	0.00E+00	4.10E-09	0.00E+00	2.77E-10	0.00E+00
AP	mol H+ eq	6.56E-04	2.74E-06	0.00E+00	6.14E-04	0.00E+00	8.34E-05	0.00E+00
EP-freshwater	kg P eq	3.65E-05	1.48E-07	0.00E+00	1.32E-05	0.00E+00	3.07E-06	0.00E+00
EP-marine	kg N eq	1.82E-04	8.21E-06	0.00E+00	2.11E-04	0.00E+00	3.12E-05	0.00E+00
EP-terrestrial	mol N eq	1.92E-03	9.15E-06	0.00E+00	2.23E-03	0.00E+00	3.34E-04	0.00E+00
POCP	kg NMVOC eq	6.05E-04	3.57E-06	0.00E+00	9.17E-04	0.00E+00	1.13E-04	0.00E+00
ADPe	kg Sb eq	5.83E-07	1.38E-09	0.00E+00	6.19E-07	0.00E+00	2.47E-08	0.00E+00
ADPf	MJ	1.52E+00	8.66E-03	0.00E+00	2.69E+00	0.00E+00	2.56E-01	0.00E+00
WDP	m3 eq	3.12E-02	1.04E-04	0.00E+00	1.32E-02	0.00E+00	1.41E-03	0.00E+00

The results of this environmental impact indicators of ADPf, ADPe and WDP shall be used with care as the uncertainties of these results are high or as there is limited experienced with the indicator.
GWP-GHG indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide emissions and uptake and biogenic carbon stored in the product, with characterization factors (CFs) based on IPCC (2013).

RESOURCE USE	Unit	A1-A3	A5	C1	C2	C3	C4	D
PERE	MJ	7.83E-01	5.02E-04	0.00E+00	4.14E-02	0.00E+00	4.36E-03	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	7.83E-01	5.02E-04	0.00E+00	4.14E-02	0.00E+00	4.36E-03	0.00E+00
PENRE	MJ	1.42E+00	8.10E-03	0.00E+00	2.46E+00	0.00E+00	2.34E-01	0.00E+00
PENRM	MJ	9.87E-02	5.60E-04	0.00E+00	2.33E-01	0.00E+00	2.19E-02	0.00E+00
PENRT	MJ	1.52E+00	8.66E-03	0.00E+00	2.69E+00	0.00E+00	2.56E-01	0.00E+00
SM	kg	1.06E-02	4.25E-05	0.00E+00	2.91E-03	0.00E+00	2.26E-04	0.00E+00
RSF	MJ	2.27E-03	1.67E-05	0.00E+00	7.86E-04	0.00E+00	4.67E-05	0.00E+00
NRSF	MJ	5.76E-03	1.91E-05	0.00E+00	1.54E-03	0.00E+00	1.16E-04	0.00E+00
FW	m3	7.52E-04	4.98E-04	0.00E+00	3.21E-04	0.00E+00	2.57E-04	0.00E+00

OUTPUT FLOWS AND WASTE CATEGORIES	Unit	A1-A3	A5	C1	C2	C3	C4	D
HWD	kg	2.06E-03	1.75E-05	0.00E+00	2.49E-03	0.00E+00	3.36E-04	0.00E+00
NHWD	kg	1.29E-02	2.60E-02	0.00E+00	1.28E-01	0.00E+00	1.00E+00	0.00E+00
RWD	kg	2.12E-06	1.67E-08	0.00E+00	8.67E-07	0.00E+00	8.06E-08	0.00E+00
CRU	kg	-2.82E-22	-1.33E-24	0.00E+00	-1.07E-22	0.00E+00	1.89E-23	0.00E+00
MFR	kg	4.23E-03	3.54E-05	0.00E+00	2.64E-03	0.00E+00	1.60E-04	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

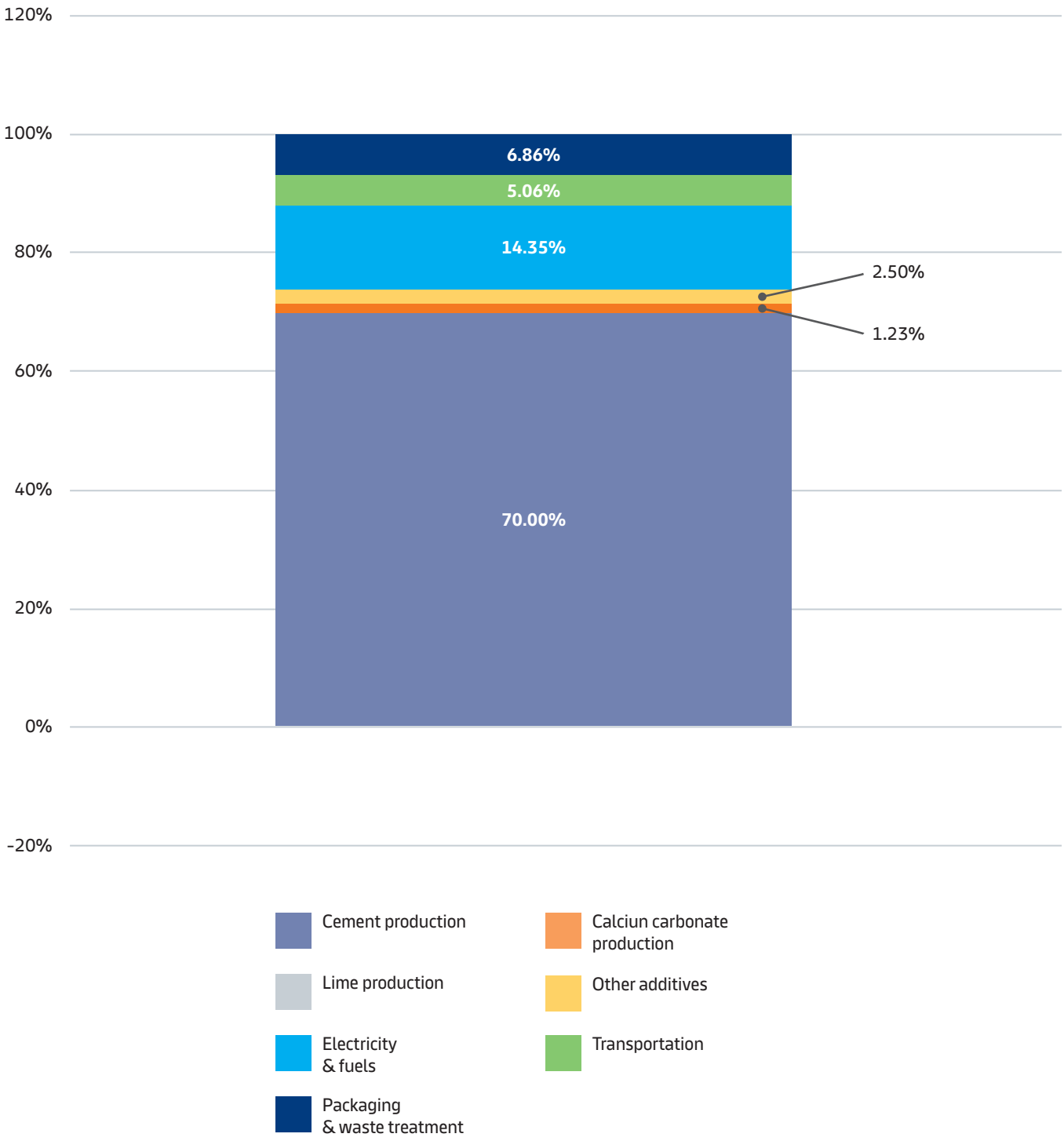
ADDITIONAL IMPACTS	Unit	A1-A3	A5	C1	C2	C3	C4	D
PM	Disease incidence	5.72E-09	4.96E-11	0.00E+00	1.50E-08	0.00E+00	1.80E-09	0.00E+00
IRP	kBq U235 eq	8.31E-03	6.56E-05	0.00E+00	3.57E-03	0.00E+00	3.35E-04	0.00E+00
ETP-FW	CTUe	6.32E-01	4.39E-03	0.00E+00	1.32E+00	0.00E+00	1.11E-01	0.00E+00
HTP-c	CTUh	7.96E-11	8.28E-13	0.00E+00	8.58E-11	0.00E+00	6.57E-12	0.00E+00
HTP-nc	CTUh	1.43E-09	1.30E-11	0.00E+00	1.89E-09	0.00E+00	7.45E-11	0.00E+00
SQP	dimensionless	4.21E+00	1.34E-02	0.00E+00	1.59E+00	0.00E+00	5.80E-01	0.00E+00

Ionizing radiation potential (IRP) 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.

Interpretation

The results were interpreted using a dominance analysis of the core environmental impacts. The figure below illustrates the contribution of each stream to the GWP-GHG indicator.

GWP-GHG Contribution



List of abbreviations

LCA	Life Cycle assessment
EPD	Environmental Product Declaration
PCR	Product category rules
GLO	Global
RER	Europe
RoW	Rest of the world
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	Ozone Depletion Potential
AP	Acidification Potential
EP-freshwater	Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine	Eutrophication Potential fraction of nutrients reaching marine end compartment
EP- terrestrial	Eutrophication potential, Accumulated Exceedance
POCP	Formation potential of tropospheric ozone photochemical oxidants
ADPe	Abiotic depletion potential for non-fossil resources
ADPf	Abiotic depletion potential for fossil resources
WDP	Water use
PERE	Use of renewable primary energy excluding 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 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
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
EE	Exported Energy
PM	Particulate matter emissions
IRP	Ionizing radiation, human health
ETP-FW	Ecotoxicity, freshwater
HTP-c	Human toxicity, cancer
HTP-nc	Human toxicity, non-cancer
SQP	Land use related impacts/Soil quality

References

- **General Programme Instructions** of the International EPD® System. Version 4.0
- **PCR 2019:14** v.1.3.4 Construction products.
- **EN 15804:2012+A2:2019**, Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products
- **ISO 14020:2000** Environmental labels and declarations — General principles
- **ISO 14025:2006** Environmental labels and declarations - Type III environmental declarations — Principles and procedures
- **ISO 14040:2006** Environmental management - Life cycle assessment-Principles and framework
- **ISO 14044:2006** Environmental management - Life cycle assessment - Requirements and guidelines
- **TACKLING RECYCLING ASPECTS IN EN15804** - Christian Leroy, Jean-Sebastien Thomas, Nick Avery, Jan Bollen, Ladji Tikana
- Ecoinvent / Ecoinvent Centre, *www.ecoinvent.org*
- Residual Energy Mix 2023, Association of Issuing Bodies
- National Inventory Report for Cyprus

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Build on us.