tuyango
SAINT-GOBAIN

ENVIRONMENTAL PRODUCT DECLARATION

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

YESO PROYECTABLE

Version: 02
Date of publication: 2018/05/04
Date of revision: 2024/12/19
Validity: 5 years
Valid until: 2029/12/19
Scope of the EPD®: Argentina

EPD®
THE INTERNATIONAL EPD® SYSTEM
Argentina EPD

The International EPD®
Programme operator: EPD international AB
System Registration number:
EPD-IES-0000946:001 (S-P-00946)

ECO PLATFORM EPD VERIFIED

EPD VERIFIED

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

SAINT-GOBAIN

Company information

Owner of the EPD: Saint-Gobain Argentina S.A. (Tuyango)
Production plant: Av. Tuyango, 1 - Piedras Blancas - Entre Ríos, Argentina
Programme used: EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works – Environmental product declaration - core rules for the product category of construction product and The International EPD® System
PCR identification: PCR 2019:14 version 1.3.3 for Construction products
Complementary PCR: c-PCR-031 to PCR 2019:14. Gypsum-based construction products (EN 17328:2024)
UN CPC code: 37410 Plaster
Product / product family name and manufacturer represented: Yeso Proyectable 9.5 kg/m² produced by Saint-Gobain Argentina S.A. (Tuyango)
EPD Prepared by: LCA Team, Saint-Gobain Research Brasil
Contact: Sartor, Lucas de Bona (lucas.sartor@saint-gobain.com); Exposito, Caio Cesar Dente (caio.exposito@saint-gobain.com)
Geographical scope of the EPD®: Argentina
EPD registration number: EPD-IES-0000946:001 (S-P-00946)
Declaration issued: 2024-12-04 **Valid until:** 2029-12-04
Demonstration of verification: an independent verification of the declaration was made, according to ISO 14025:2010. This verification was external and conducted by the following third party based on the PCR mentioned above.

Programme information

Programme	The international EPD© System
Address:	EPD© International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard UNE-EN 15804 serves as the Core Product Category Rules (PCR) and ISO standard ISO 21930 the framework for assessing the sustainability of construction products through LCA.
Product category rules (PCR): PCR 2019:14 for Construction products, version 1.3.3
Complementary PCR: c-PCR-031 to PCR 2019:14. Gypsum-based construction products (EN 17328:2024)
PCR review was conducted by: El Comité Técnico del Sistema Internacional EPD© President: Claudia A. Peña. Contact via info@environdec.com
Life Cycle Assessment (LCA)
LCA accountability: LATAM LCA Team, Saint-Gobain Research Brasil
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third party verifier: Pablo Arena (aparena@gmail.com) Approved by: The International EPD© System
Procedure for follow-up of data during EPD validity involves third part 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.

Product description

Product description and use

This Environmental Product Declaration (EPD®) describes the environmental impacts of 1 m² of applied plaster with a surface density of 9.5 kg/m² for gypsum plaster applied indoors with projection machines, with a useful life of 50 years.

Yeso Proyectable is a premixed single-layer plaster based on gypsum to be applied indoors with spraying machines. It allows to replace traditional cement, lime and sand plasters in a single application, with an excellent finish and final hardness, shortening construction times.

Technical data

Parameter	Value / Description
Consumption	9.5 kg/m² for each cm of thickness.
Dosage	0.8 water liters/1 kg yeso
Relative density	1.0

Description of the main product materials of product

Products Components	Weight, kg	Post-consumer recycled material, weight-% of product	Biogenic material, weight - % of product	Biogenic material, kg C/product
Gypsum	9.0 – 9.4	0	0	0
Aggregates	0.01 – 0.05	0	0	0
Additives	0.1 - 0.2	0	< 1	4.9E-03
Sum	9.5	0	< 1	4.9E-03

Description of the main product materials of packaging

Packaging materials	Weight, kg	Weight-% (versus the product)	Biogenic material, kg C/product
Polypropylene bag	1.9E-02	< 1	0
Wooden pallet	1.1E-01	1.2	4.6E-02
Sum	1.3E-01	1.4	4.6E-02

During the life cycle of the product any hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has not been used in a percentage higher than 0.1% of the weight of the product. The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

LCA calculation information

EPD TYPE DECLARED	Cradle to grave and module D
FUNCTIONAL UNIT	1 m² of applied plaster with a surface density of 9.5 kg/m² for gypsum plaster applied indoors with projection machines, with a useful life of 50 years.
SYSTEM BOUNDARIES	Cradle to grave + Module D = (A + B + C) + D
REFERENCE SERVICE LIFE (RSL)	The Reference Service Life (RSL) of the Mortar product is considered to be 50 years. This 50-year value is the amount of time that we recommend our products last for without refurbishment and corresponds to standard building design life.
CUT-OFF RULES	Due to there are not enough information, the process energy and materials representing less than 1% of the whole energy and mass used are excluded (since do not cause significant impacts). The addition of all the inputs and outputs excluded are not bigger than the 5% of the whole mass and energy used, as well of the emissions to environment occurred. Flows related to human activities such as employee transport are excluded. The construction of plants, production of machines and transportation systems are excluded since the related flows are supposed to be negligible compared to the production of the building product when compared at these systems lifetime level.
ALLOCATIONS	Allocation has been avoided when possible. For the energy, the auxiliaries used and wastes generated during manufacturing a physical allocation based on mass was applied. Allocation criteria are based on mass. The polluter pays as well the modularity principles have been followed.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Scope includes: Argentina Data is collected from one production site in Entre Ríos, Saint-Gobain Argentina S.A. (Tuyango) Data collected for the period 2023.
BACKGROUND DATA SOURCE	Ecoinvent 3.9.1 and GaBi ts 9.2
SOFTWARE	GaBi 10

According to EN 15804:2012+A2:2019/AC:2021, EPDs of construction products may not be comparable if they do not comply with this standard. According to ISO 21930, EPDs might not be comparable if they are from different programmes.

LCA scope

System boundaries (X=included, MND=module not declared)

	PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	Raw material supply	Transport	Manufacturing	Transport	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-recovery
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	GLO	GLO	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR
Specific data used	>85% GWP- GHG																
Variation products	One site one product																
Variation sites	One site one product																

Life cycle stages

Flow diagram of the Life Cycle

Product stage, A1-A3

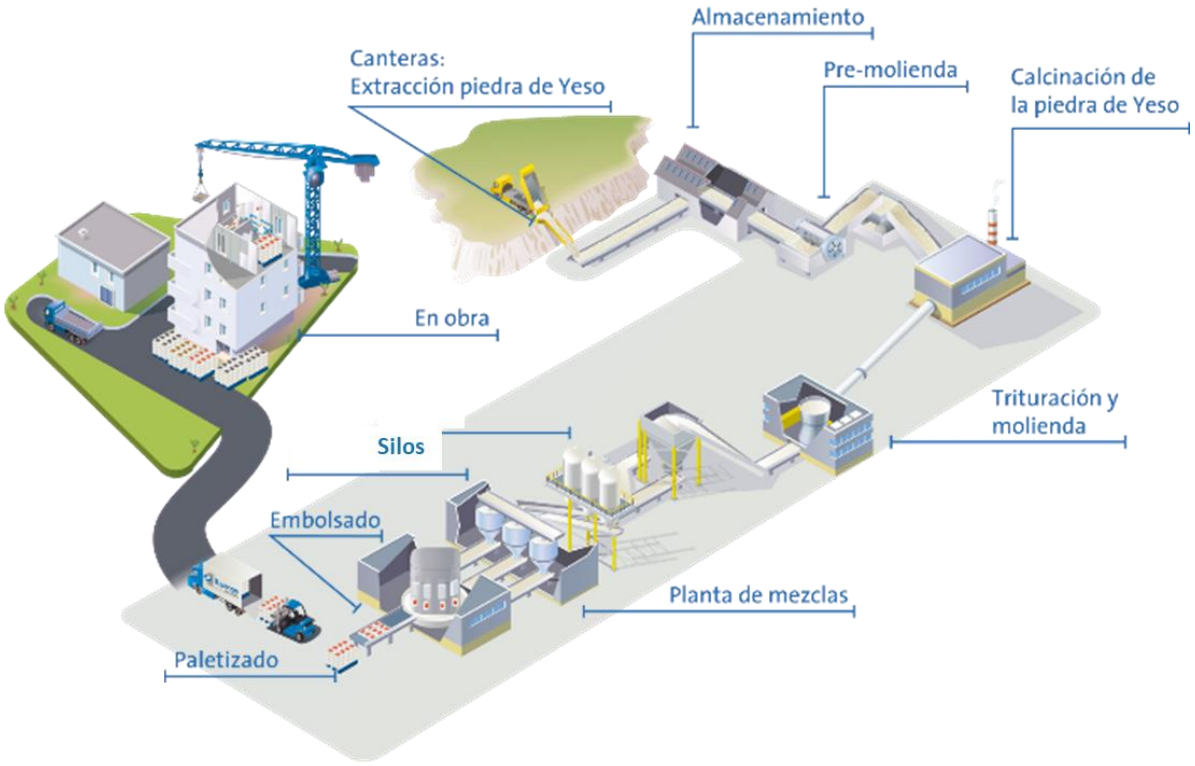
Description of the stage: the product stage of plaster products is subdivided into 3 modules A1, A2 and A3 respectively “Raw material supply”, “transport to manufacturer” and “manufacturing”.

A1, raw material supply.
This includes the extraction and processing of all raw materials and energy which occur upstream from the manufacturing process. The production of packaging material is taken into account at this stage.

A2, transport to the manufacturer.
The raw materials and packaging are transported to the manufacturing site. The modelling includes road, boat and/or train transportations.

A3, manufacturing.
This module includes the manufacture of products. The processing of any waste arising from this stage is also included.

Manufacturing process flow diagram



Manufacturing in detail:
The gypsum and other raw materials undergo meticulous storage in silos designed for optimal quality control. The process begins with the pre-milling of the dihydrate gypsum to reduce its particle size, followed by the calcination of the gypsum, converted to a hemihydrate state. This calcined gypsum is milled and crushed, following by the mix stage with the raw materials in a high-capacity mixer, ensuring uniformity. The homogenized mixture is then transferred to a specialized hopper for efficient downstream processing. Finally, the plaster, prepared with meticulous attention to detail, is packaged and shipped.

Construction process stage, A4-A5

Description of the stage: the construction process is divided into 2 modules: A4, transport to the building site and A5, installation in the building

A4, transport to the building site.
This module includes transport from the production gate to the building site. A weighted average, based on sales volume for the building site is considered to obtain the average distance in this module. Transport is calculated based on a scenario with the parameters described in the following table.

PARAMETER	VALUE (expressed per functional unit)
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Long distance truck. Maximum load weight of 36 t and consumption of 33 liters per 100 km
Distance	546 km
Capacity utilisation	92%
Volume capacity utilisation factor	1

A5, installation into the building.
The accompanying table quantifies the parameters for installing the product at the building site. All installation materials and their waste processing are included.

PARAMETER	VALUE (expressed per functional unit)
Ancillary materials for installation (specified by materials)	None
Water use	6.65 liters/m²
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	0.20 MJ/m²
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	Plaster: 0.95 kg (10%) (product + water, after evaporation) Polypropylene bag: 0.0186 kg Wooden pallet: 0.111 kg
Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal (specified by route)	Plaster: 0.95 kg (to landfill) Polypropylene bag: 0.000932 kg (to landfill) and 0.0177 kg (to recycling) Wooden pallet: 0.00553 kg (to landfill) and 0.105 kg (to recycling)
Direct emissions to ambient air, soil and water	None

- The product wastage is 10%, where 8% comes from scraping and floating and 2% lost in packaging and mixer, with an assumption that 100% goes to the landfill, located 40 km away.
- The processing of packaging waste arising during the construction phase is included up to the end-of-waste state or disposal of final residues. The pallet used in product transportation is 5% landfilled and 95% recycled. The packaging used to protect plaster is 5% landfilled and 95% recycled. 40 km to the landfill site and 60 km to the recycling site has been considered, reflecting the average distance from the product installation sites to the study region.

Use stage (excluding potential savings), B1-B7

The use stage, related to the building fabric includes:

B1, use or application of the installed product;
B2, maintenance;
B3, repair;
B4, replacement;
B5, refurbishment;
B6, operational energy use;
B7, operational water use.

Description of scenarios and additional technical information:
The product has a reference service life of 50 years. This assumes that the product will last in situ with no requirements for maintenance, repair, replacement, or refurbishment throughout this period. Therefore, it has no impact at this stage. Mortar products are not related to any electricity or water use during the operation of the building.

End-of-life stage, C1-C4

The de-construction and/or dismantling processes mainly use energy for mechanical operations. An average distance from the demolition site to landfills and recycling plants in the study region site have been taken into account.

PARAMETER	VALUE (expressed per functional unit)
Amount per kg of consumed fuel	0.0437 MJ/kg (diesel consumption in construction machine)
Collection process specified by type	100% collected with mixed deconstruction and demolition waste to landfill
Recovery system specified by type	0 kg recycled
Disposal specified by type	8.55 kg to landfill
Assumptions for scenario development (e.g. transportation)	Truck trailer with 36 t payload

The transport characteristics used in this stage (real payload, diesel consumption of the truck and percentage of empty return) correspond to the default values defined in the EN15804:2012+A2:2019/AC:2021 standard.

Reuse/recovery/recycling potential, D

Module D considers the benefits and loads beyond the system boundary resulting from recycling and energy recovery processes.

100% of wastes are landfilled. It implies a 0% benefit from recycling process in this module.

LCA results

As specified in EN 15804:2012+A2:2019/AC:2021 and the PCR 2019:14 Construction Products, version 1.3.3 is not recommending the use of the results of modules A1-A3 (A1-A5 for services) without considering the results of module C. The Characterization Factors EN15804 are based on EF 3.1 package. Furthermore, 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. All emissions to air, water, and soil, and all materials and energy used have been included.

The environmental impacts are declared and reported using the baseline characterization factors are from the ILCD. Raw materials and energy consumption, as well as transport distances have been taken directly from the manufacturing plant (Production and transport data according to period 2023).

All the results refer to a functional unit of 1 m² of installed plaster with a weight of 9.5 kg/m² and an expected average service life of 50 years.

Environmental Impacts

		Product stage	Construction stage		Use stage							End of life stage				Reuse, Recovery Recycling
	Environmental indicators	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Climate Change - total [kg CO2 eq.]	8.23E-01	2.14E-01	2.40E-01	0	0	0	0	0	0	0	3.35E-02	2.12E-02	0	1.47E-01	0
	Climate Change, fossil [kg CO2 eq.]	1.01E+00	2.14E-01	6.89E-02	0	0	0	0	0	0	0	3.35E-02	2.10E-02	0	1.30E-01	0
	Climate Change, biogenic [kg CO2 eq.]	-1.87E-01	0.00E+00	1.70E-01	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0	1.62E-02	0
	Climate Change, land use and land use change [kg CO2 eq.]	3.05E-05	3.87E-06	1.45E-04	0	0	0	0	0	0	0	5.91E-07	1.92E-04	0	3.73E-04	0
	Ozone depletion [kg CFC-11 eq.]	4.19E-08	2.44E-14	1.21E-09	0	0	0	0	0	0	0	2.50E-15	2.70E-15	0	4.81E-16	0
	Acidification [Mole of H+ eq.]	2.02E-03	3.37E-04	3.06E-04	0	0	0	0	0	0	0	9.66E-05	1.24E-04	0	9.30E-04	0
	Eutrophication, freshwater [kg P eq.]	2.37E-05	4.29E-08	1.92E-05	0	0	0	0	0	0	0	7.38E-09	7.58E-08	0	2.23E-07	0
	Eutrophication, marine [kg N eq.]	4.10E-03	1.43E-04	1.51E-04	0	0	0	0	0	0	0	1.84E-05	6.06E-05	0	2.39E-04	0
	Eutrophication, terrestrial [Mole of N eq.]	4.81E-03	1.58E-03	8.09E-04	0	0	0	0	0	0	0	2.02E-04	6.72E-04	0	2.63E-03	0
	Photochemical ozone formation, human health [kg NMVOC eq.]	1.52E-03	3.12E-04	2.10E-04	0	0	0	0	0	0	0	5.79E-05	1.15E-04	0	7.25E-04	0
	Resource use, mineral and metals [kg Sb eq.][1]	2.42E-07	2.92E-09	2.39E-07	0	0	0	0	0	0	0	3.13E-10	1.37E-09	0	1.16E-08	0
	Resource use, fossils [MJ][1]	1.75E+01	2.91E+00	1.22E+00	0	0	0	0	0	0	0	4.10E-01	2.82E-01	0	1.70E+00	0
	Water deprivation potential [m³ world equiv.][1]	2.74E-01	2.20E-04	3.08E-01	0	0	0	0	0	0	0	5.69E-05	2.51E-04	0	1.36E-02	0

[1]The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

Resources Use

	Resources Use indicators	Product stage	Construction stage		Use stage							End of life stage				Reuse, recovery, recycling
		A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Use of renewable primary energy (PERE) [MJ]	3.33E+00	1.62E-01	2.01E-01	0	0	0	0	0	0	0	1.89E-03	2.06E-02	0	2.23E-01	0
	Primary energy resources used as raw materials (PERM) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total use of renewable primary energy resources (PERT) [MJ]	3.33E+00	1.62E-01	2.01E-01	0	0	0	0	0	0	0	1.89E-03	2.06E-02	0	2.23E-01	0
	Use of non-renewable primary energy (PENRE) [MJ]	1.75E+01	2.92E+00	1.22E+00	0	0	0	0	0	0	0	4.11E-01	2.83E-01	0	1.70E+00	0
	Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total use of non-renewable primary energy resources (PENRT) [MJ]	1.75E+01	2.92E+00	1.22E+00	0	0	0	0	0	0	0	4.11E-01	2.83E-01	0	1.70E+00	0
	Input of secondary material (SM) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Use of renewable secondary fuels (RSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Use of non-renewable secondary fuels (NRSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Use of net fresh water (FW) [m3]	6.45E-03	1.25E-05	7.19E-03	0	0	0	0	0	0	0	2.46E-06	2.25E-05	0	4.29E-04	0

Waste Category & Output flows

	Waste Category & Output Flows	Product stage	Construction stage		Use stage							End of life stage				Reuse, recovery, recycling
		A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Hazardous waste disposed (HWD) [kg]	2,78E-07	6,51E-13	8,46E-09	0	0	0	0	0	0	0	1,52E-12	8,78E-13	0	2,59E-08	0
	Non-hazardous waste disposed (NHWD) [kg]	3,56E-03	8,62E-05	9,58E-01	0	0	0	0	0	0	0	9,69E-05	4,32E-05	0	8,56E+00	0
	Radioactive waste disposed (RWD) [kg]	4,49E-06	3,36E-06	2,70E-06	0	0	0	0	0	0	0	4,92E-07	5,31E-07	0	1,94E-05	0
	Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials for Recycling (MFR) [kg]	6,31E-03	0	1,23E-01	0	0	0	0	0	0	0	0	0	0	0	0
	Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exported electrical energy (EEE) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exported thermal energy (EET) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Information on biogenic carbon content

		Product stage
	Biogenic Carbon Content	**A1 / A2 / A3**
	Biogenic carbon content in product [kg]	4.90E-03
	Biogenic carbon content in packaging [kg]	4.60E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 (approx. 3,67) kg CO_2.

Additional voluntary indicators from EN 15804 (according to ISO 21930:2017)

	Product stage	Construction stage		Use stage							End of life stage				D Reuse, recovery, recycling
Impacts Indicators	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
GWP-GHG (kg CO2 eq.)[2]	2.59E+00	1.88E-01	1.97E-01	0	0	0	0	0	0	0	3.55E-02	4.86E-02	0	1.19E-01	0

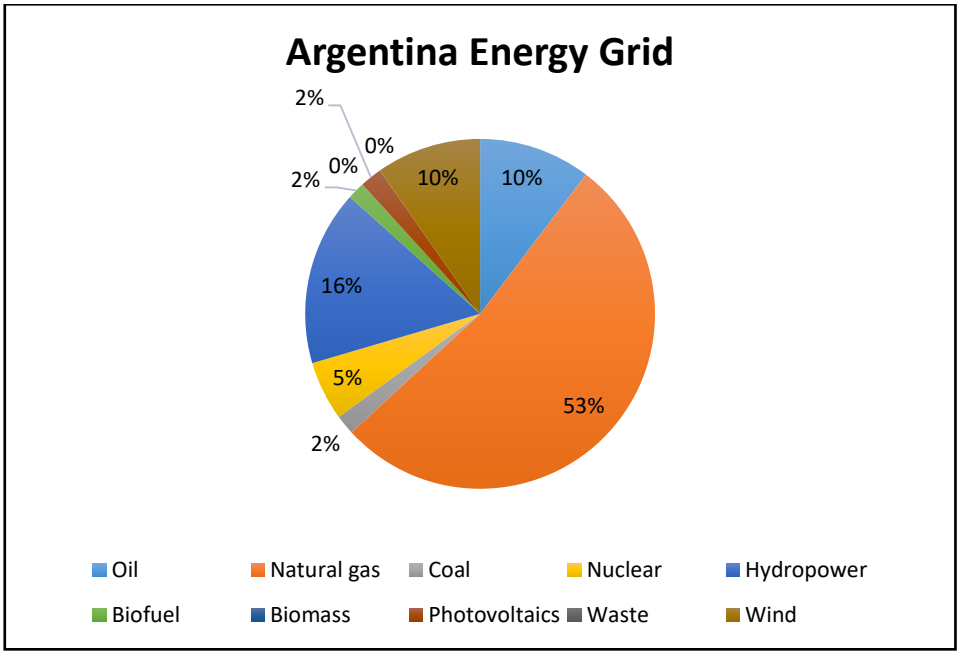
[2] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Additional information

Electricity information

The factory based in Tuyango plant uses the following electricity description.

TYPE OF INFORMATION	DESCRIPTION
Location	Representative of Electricity purchased by Saint-Gobain Argentina S.A. (Tuyango) Argentina
Geographical representativeness description	Split of energy sources in Brazil - Coal: 2% - Oil: 10% - Biofuel: 2% - Natural gas: 53% - Nuclear: 5% - Hydro: 16% - Photoelectrical: 2% - Wind: 10%
Reference year	2022
Type of data set	Cradle to gate from Thinkstep database
Source	International Energy Agency (IEA). Electricity Information - 2024
GWP-GHG (kg CO_2 eq. / kWh)	0.56



Data quality

Inventory data quality is judged by geographical, temporal, and technological representativeness. To cover these requirements and to ensure reliable results, first-hand industry data crossed with LCA background datasets were used. The data was collected from internal records and reporting documents from Saint-Gobain Argentina S.A. (Tuyango). After evaluating the inventory, according to the defined ranking in the LCA report, the assessment reflects good inventory data quality for the geographical, temporal and technological categories.

References

1. EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.
2. EPD International. (2024). Complementary Product Category Rule (c-PCR-031) to PCR 2019:14 for Gypsum-based Construction Products. EPD International.
3. EPD International (2021) General Program Instructions for the International EPD® System. Version 4.0. www.environdec.com.
4. EPD International. (2024). Product Category Rule PCR 2019:14 Construction products. Version 1.3.3.
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8. ISO 21930:2007 Sustainability in building construction – Environmental declaration of building products
9. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures.
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11. ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.
12. LCA Report of mortar products by Tuyango – Saint-Gobain (version 1:2024).