EPD®

THE INTERNATIONAL EPD® SYSTEM

ENVIRONMENTAL PRODUCT DECLARATION

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

Gypsum block – Alba® 100

Date of issue: 2018-03-09
Revision date 2022-09-29
Validity: 5 years
Valid until: 2027-09-12
Version 2
Scope of the EPD®: Switzerland

EPD VERIFIED

The environmental impacts of this product have been assessed over its whole life cycle. Its Environmental Product Declaration has been verified by an independent third party.

Rigips SAINT-GOBAIN

Registration number
The International EPD® System:
S-P-01228

ECO PLATFORM EPD VERIFIED

General information

Manufacturer: Rigips AG

Program used: International EPD® System **http://www.environdec.com/**

EPD registration number/declaration number: S-P-01228

PCR identification PCR 2019 :14 Construction products (EN 15804:A2) (1.1)

Site of manufacture: The production site is Granges, Switzerland

Owner of the declaration: Rigips AG

Product / product family name and manufacturer represented: Alba® 100, Rigips AG

Declaration issued:2018-03-09 **Revision date:**2022-09-29 **Valid until:**2027-09-12

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: Vladimír Kočí based on the PCR mentioned above.

EPD Prepared by: Nadeen Hassan (EANDO AB, Nadeen.hassan@eando.se)

Scope: The LCA is based on 2021 production data for one site in Switzerland.
This EPD covers information modules A1 to C4 + module D (cradle to grave) as defined in EN 15804:A2

The declared unit is 1 m² of Alba® 100 with a weight of 100 kg/m².

Declaration of Hazardous substances (Candidate list of Substances of Very High Concern): none

EPD® program operator	The International EPD® System. Operated by EPD® International AB. www.environdec.com.
PCR review conducted by	The Technical Committee of the International EPD® System
CEN standard EN 15804:2012+A2:2019 serves as the core PCR[a]	
PCR:	PCR 2019:14 Construction Products, version 1.1
Independent verification of the declaration, according to EN ISO 14025:2010 Internal ☐ External ☒	
Third party verifier:	Vladimír Kočí, LCA Studio, Czech Republic
Accredited or approved by	The International EPD® System

The EPD owner 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 15804:2012+A2. For further information about comparability, see EN 15804:2012+A2 and ISO 14025.

Product description

Product description and use:

This Environmental Product Declaration (EPD®) describes the environmental impacts of 1 m² of Alba® 100.

A calcium sulfate base with added water. Some glass fibers and additives are also used.
The size is 100x1000x1000 mm in thickness, length and width. Wall and ceiling gypsum block (panel) are used for dry construction.

Description of the main components and/or materials for 1 m² of product for the calculation of the EPD®:

PARAMETER	VALUE (expressed per declared unit)
Quantity for 1 m^2 of product	100 kg
Thickness	100 mm
Surfacing	None
Packaging for the transportation and distribution	Wooden pallet: 3,1 kg/m^2 LDPE bag: 0,1025 kg/m^2 Polystyrol PS 15 Board: 0,00597 kg/m^2
Product used for the Installation	Jointing compound: 0,9 kg/m² Mixing water: 0,0925 l/m²

During the life cycle of the product no hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has 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	Cradle to grave and module D
DECLARED UNIT	The declared unit is 1 m² of Alba® 100 with a weight of 100 kg
SYSTEM BOUNDARIES	Mandatory Stages = A1-A3 ; B1-B7 ; C1-C4 and D
REFERENCE SERVICE LIFE (RSL)	60 years This 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	Life Cycle Inventory data for a minimum of 99% of total inflows to the upstream and core module shall be included 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	Production data, recycling, energy and waste data have been calculated on a mass basis.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Scope includes: Switzerland Data included is collected from one production site Granges, Switzerland Data collected for the year 2021 Background data: Ecoinvent 3.8 and GaBi ts 10.6.2
PRODUCT CPC CODE	15200 Gypsum

According to EN 15804:2012+A2:2019, 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 programs.

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.

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

A3, manufacturing.
This module includes the manufacture of products and the manufacture of packaging. The production of packaging material is taken into account at this stage. The processing of any waste arising from this stage is also included.

Manufacturing process flow diagram

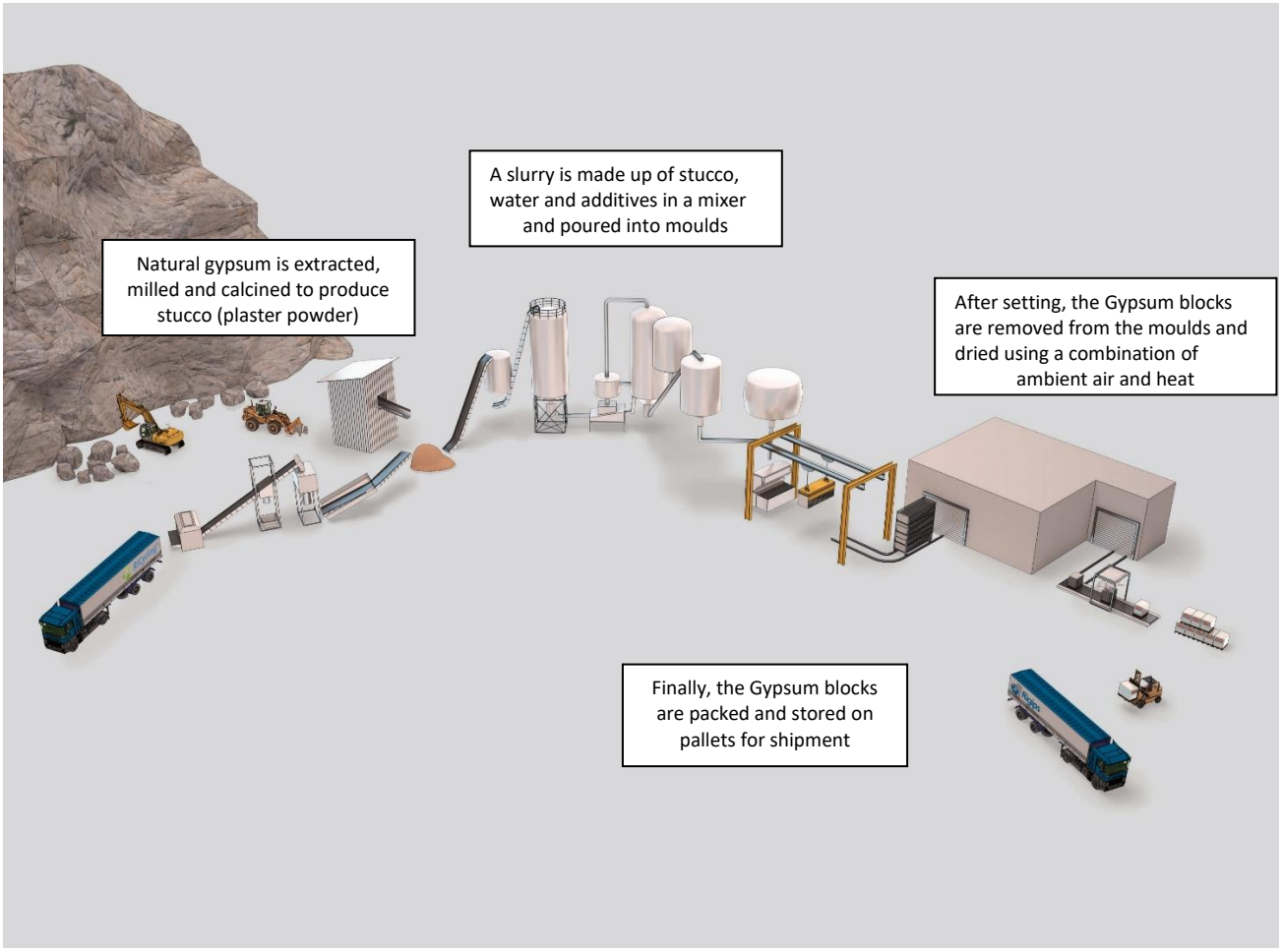


Figure 1: Manufacturing process flow diagram

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.

Transport is calculated on the basis of 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 27 t and consumption of 0,38 liters per km
Distance	120 km
Capacity utilisation (including empty returns)	85% (30% empty returns)
Bulk density of transported products	1000 kg/m^3
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)	Jointing compound 0,9 kg/m^2
Water use	0,0925 l/m^2
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	None
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	Gypsum block: 4 kg/m^2 Jointing compound: 0,036 kg/m^2 (Packaging) LDPE bag: 0,1025 kg/m^2 Polystyrol PS 15 Board: 0,00597 kg/m^2 Wooden pallet: 3,1 kg/m^2
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)	Gypsum block to landfill: 3,84 kg/m^2 Gypsum block to internal recycling: 0,16 kg/m^2 Jointing compound to landfill: 0,02688 kg/m^2 Jointing compound to internal recycling: 0,00112 kg/m^2 (Packaging) LDPE bag to landfill: 0,1025 kg/m^2 Polystyrol PS 15 Board to landfill: 0,00597 kg/m^2 Wooden pallet to internal recycling: 3,1 kg/m^2
Direct emissions to ambient air, soil and water	None

Use stage (excluding potential savings), B1-B7

Description of the stage:
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 60 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.

End-of-life stage C1-C4

Description of the stage: This stage includes the next modules:

C1, de-construction, demolition;
C2, transport to waste processing;
C3, waste processing for reuse, recovery and/or recycling;
C4, disposal, including provision and all transport, provision of all materials, products and related energy and water use.

Description of the scenarios and additional technical information for the end-of-life:

PARAMETER	VALUE (expressed per functional unit)
Collection process specified by type	4% collected separately for recycling and 96% collected with mixed deconstruction and demolition waste to landfill
Recovery system specified by type	4 kg recycled
Disposal specified by type	96 kg disposed in landfill
Assumptions for scenario development (e.g. transportation)	Gypsum board waste is transported 100 km by truck from deconstruction/demolition sites to treatment plant and 150 km to be internally recycled.

Reuse/recovery/recycling potential, D

The gypsum product is 4% (96% to landfill) collected and recycled.

LCA results

As specified in EN 15804:2012+A2:2019 and also the Product-Category Rules, the environmental impacts are declared and reported using the baseline characterization factors are from the ILCD. Specific data has been supplied by the plant, and generic data come from GABI and Ecoinvent databases.
All emissions to air, water, and soil, and all materials and energy used have been included.

LCA data results are detailed on the following tables and they refer to a functional unit of is 1 m² of Alba® 100.

Description of the system boundary (X = Included in LCA, MNA = Module Not Assessed)

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
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

- Specific data used: > 85%
- Variation - product: not applicable
- Variation – sites: Not applicable

Environmental Impacts

	Environmental 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
	Climate Change [kg CO2 eq.]	1,11E+01	5,97E-01	5,32E+00	0	0	0	0	0	0	0	4,53E-01	4,98E-01	0	1,28E+00	-0,0013
	Climate Change (fossil) [kg CO2 eq.]	1,80E+01	5,94E-01	8,82E-01	0	0	0	0	0	0	0	4,53E-01	4,99E-01	0	1,47E+00	-0,0012
	Climate Change (biogenic) [kg CO2 eq.]	-6,86E+00	-8,21E-04	4,44E+00	0	0	0	0	0	0	0	5,49E-04	-4,66E-03	0	-1,94E-01	-7E-06
	Climate Change (land use change) [kg CO2 eq.]	5,35E-03	3,31E-03	9,04E-04	0	0	0	0	0	0	0	5,55E-06	3,35E-03	0	4,23E-03	-3E-06
	Ozone depletion [kg CFC-11 eq.]	7,49E-06	3,56E-14	3,00E-07	0	0	0	0	0	0	0	2,62E-14	4,82E-14	0	5,45E-15	-1E-14
	Acidification terrestrial and freshwater [Mole of H+ eq.]	2,37E-02	3,36E-03	1,91E-03	0	0	0	0	0	0	0	1,30E-03	2,87E-03	0	1,06E-02	-6E-06
	Eutrophication freshwater [kg P eq.]	4,65E-04	1,77E-06	2,13E-05	0	0	0	0	0	0	0	9,87E-08	1,78E-06	0	2,53E-06	-4E-09
	Eutrophication potential [kg Phosphate eq.]	4,81E-03	5,84E-04	4,08E-04	0	0	0	0	0	0	0	8,85E-05	5,00E-04	0	9,54E-04	-9,9E-07
	Eutrophication marine [kg N eq.]	7,09E-03	1,64E-03	6,70E-04	0	0	0	0	0	0	0	2,47E-04	1,39E-03	0	2,72E-03	-3E-06
	Eutrophication terrestrial [Mole of N eq.]	7,75E-02	1,82E-02	7,19E-03	0	0	0	0	0	0	0	2,70E-03	1,54E-02	0	2,98E-02	-3E-05
	Photochemical ozone formation - human health [kg NMVOC eq.]	2,37E-02	3,10E-03	1,79E-03	0	0	0	0	0	0	0	7,78E-04	2,64E-03	0	8,22E-03	-6E-06
	Resource use, mineral and metals [kg Sb eq.]	2,28E-05	4,97E-08	9,24E-07	0	0	0	0	0	0	0	1,68E-08	5,01E-08	0	1,32E-07	-3E-10
	Resource use, energy carriers [MJ]	3,38E+02	7,94E+00	1,56E+01	0	0	0	0	0	0	0	5,52E+00	6,59E+00	0	1,93E+01	-0,0165
	Water scarcity [m³ world equiv.]	4,29E+00	5,33E-03	1,84E-01	0	0	0	0	0	0	0	8,32E-04	5,55E-03	0	1,54E-01	-3E-05

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]	4,04E+01	4,51E-01	1,77E+00	0	0	0	0	0	0	0	2,29E-02	4,52E-01	0	2,53E+00	-0,0055
	Primary energy resources used as raw materials (PERM) [MJ]	5,27E+01	0	2,11E+00	0	0	0	0	0	0	0	0	0	0	0	0
	Total use of renewable primary energy resources (PERT) [MJ]	9,31E+01	4,51E-01	3,88E+00	0	0	0	0	0	0	0	2,29E-02	4,52E-01	0	2,53E+00	-0,0055
	Use of non-renewable primary energy (PENRE) [MJ]	3,38E+02	7,96E+00	1,56E+01	0	0	0	0	0	0	0	5,53E+00	6,62E+00	0	1,93E+01	-0,0165
	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]	3,38E+02	7,96E+00	1,56E+01	0	0	0	0	0	0	0	5,53E+00	6,62E+00	0	1,93E+01	-0,0165
	Input of secondary material (SM) [kg]	3,60E+00	0	1,44E-01	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]	1,13E-01	5,10E-04	4,90E-03	0	0	0	0	0	0	0	3,45E-05	5,22E-04	0	4,87E-03	-3E-06

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]	5,62E-06	3,81E-11	2,37E-07	0	0	0	0	0	0	0	2,66E-11	3,48E-11	0	2,94E-07	-9E-13
	Non-hazardous waste disposed (NHWD) [kg]	9,36E-02	1,14E-03	3,97E+00	0	0	0	0	0	0	0	1,32E-03	1,07E-03	0	9,70E+01	-8E-06
	Radioactive waste disposed (RWD) [kg]	1,72E-02	9,80E-06	6,94E-04	0	0	0	0	0	0	0	6,43E-06	1,20E-05	0	2,20E-04	-6E-07
	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]	3,96E-01	0	3,28E+00	0	0	0	0	0	0	0	0	0	4,04E+00	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]	0,00E+00
	Biogenic carbon content in packaging [kg]	1,29E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

There is no biogenic carbon in the Gypsum product. The biogenic carbon in packaging is due to the use of wooden pallet.

LCA results interpretation

The following figure refers to a functional unit of 1 m² of Alba® 100.

[1] This indicator corresponds to the abiotic depletion potential of fossil resources.
[2] This indicator corresponds to the total use of primary energy.
[3] This indicator corresponds to the use of net fresh water.
[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.

Global Warming Potential

The majority of contribution to this environmental impact is from the production modules (A1 – A3). This is primarily because the sources of greenhouse gas emissions are predominant in this part of the life cycle. CO_2 is generated upstream from the production of electricity and is also released on site by the combustion of

natural gas. We can see that other sections of the life cycle also contribute to the GWP; however, the production modules contribute to over 50 % of the contribution. Combustion of fuel in transport vehicles will generate the second highest percentage of greenhouse gas emissions together with the waste during the installation stage. Moreover, A5 represents the second highest contributor to the GWP indicator mainly due to the biogenic carbon released from the use of the wooden pallet at that stage.

Non-renewable resources consumptions

The consumption of non – renewable resources is once more found to have the highest value in the production modules. This is because a large quantity of natural gas is consumed within the factory, and non – renewable fuels used to generate the large amount of electricity we use. The contribution to this impact from the other modules is very small and primarily due to the non – renewable resources consumed during transportation

Energy consumption

Energy in the form of electricity in Modules A1 – A3 have the highest contribution to total energy consumption. Energy in the form of electricity and natural gas is consumed in a vast quantity during the manufacture of Gypsum block so we would expect the production modules to contribute the most to this impact category.

Water consumption

Water is used within the manufacturing facility; therefore, we see the highest contribution in the production phase. Water is also recycled on site, however, the contribution is lower compared to the manufacturing facility consumption. The second highest contribution occurs in the installation site due to the water used on the joint components.

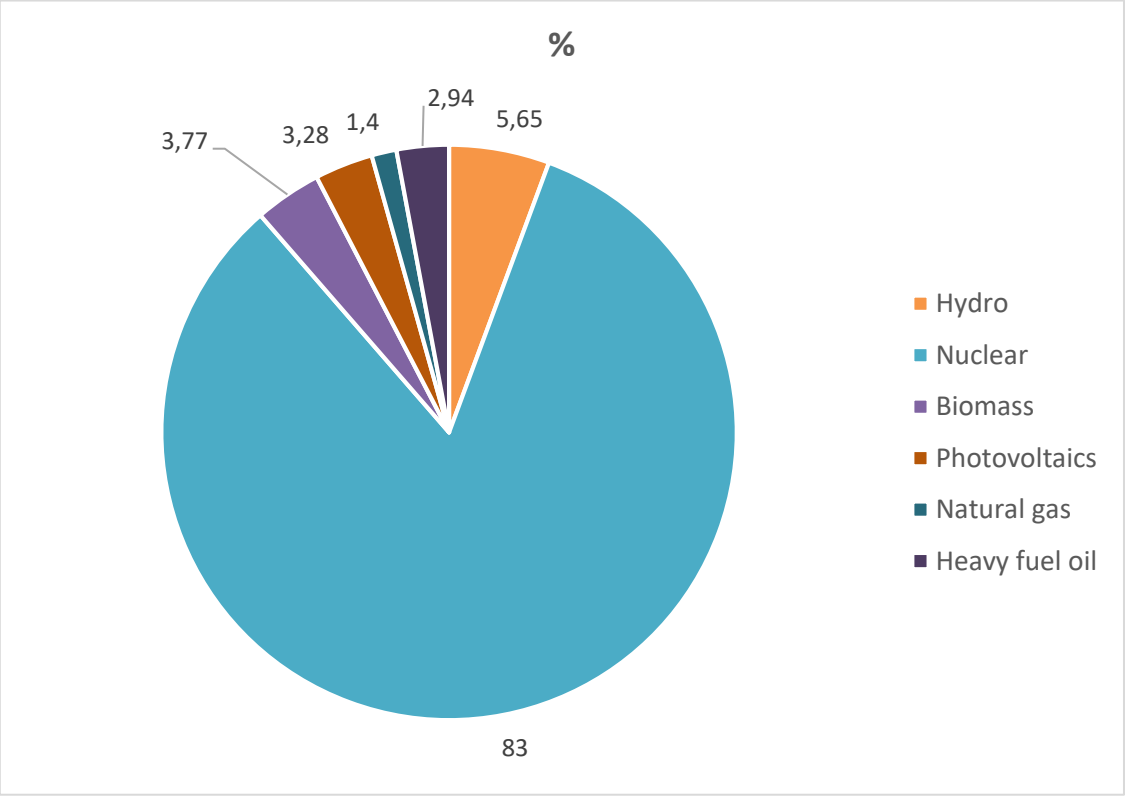
Waste production

Waste production does not follow the same trend as the above environmental impacts. The largest contributor is the end of life module. This is because once it reaches the end of life state, 4% of the product is recycled and 96% is landfilled. There is also an impact associated with the production module, since we do generate waste on site, the impact associated with installation is due to the loss rate of product during implementation.

Appendix:

Electricity description

TYPE OF INFORMATION	DESCRIPTION
Location	Switzerland
Geographical representativeness description	Hydro: 5,65 % Nuclear: 83 % Biomass:3,77 % Photovoltaics:3,28 % Natural gas: 1,4 % Fuel oil: 2,94 %
Reference year	2020
Type of data set	Cradle to gate
Source	European Residual Mixes 2019. Association of Issuing Bodies 2020
GWP excl. biogenic (kg CO_2 eq./kWh)	0,04



Differences versus previous versions

The change compared to previous version published on 2018-03-09 is the switch from EN 15804+A1 to EN 15804+A2.

Environmental impacts according to EN 15804:2012 + A1

The following tables presents results of 1 m² of installed Alba® 100, with a reference service life of 60 years according to EN 15804:2012 +A1.

	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
Global Warming Potential (GWP) [kg CO2 eq.]	1,77E+01	5,85E-01	8,65E-01	0	0	0	0	0	0	0	4,46E-01	4,92E-01	0	1,44E+00	-1,23E-03
Ozone depletion (ODP) [kg R11 eq.]	9,88E-06	3,76E-17	3,95E-07	0	0	0	0	0	0	0	2,05E-17	4,30E-17	0	7,27E-15	-3,14E-18
Acidification potential (AP) [kg R11 eq.]	1,88E-02	2,29E-03	1,46E-03	0	0	0	0	0	0	0	1,08E-03	1,96E-03	0	8,47E-03	-4,04E-06
Eutrophication potential (EP) [kg Phosphate eq.]	4,81E-03	5,84E-04	4,08E-04	0	0	0	0	0	0	0	8,85E-05	5,00E-04	0	9,54E-04	-9,96E-07
Photochemical ozone creation [kg Ethene eq.]	2,14E-03	8,15E-05	1,31E-04	0	0	0	0	0	0	0	8,19E-05	7,00E-05	0	6,82E-04	-3,90E-07
Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sb eq.]	3,04E-03	5,50E-08	1,22E-04	0	0	0	0	0	0	0	1,74E-08	5,55E-08	0	5,09E-07	-2,17E-05
Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ]	2,91E+02	7,93E+00	1,37E+01	0	0	0	0	0	0	0	5,52E+00	6,59E+00	0	1,88E+01	-1,51E-02

Bibliography

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5. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures
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