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The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

- in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Saint-Gobain Finland Oy / Weber
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-2831-1462-EN
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ECO Platform reference number:	
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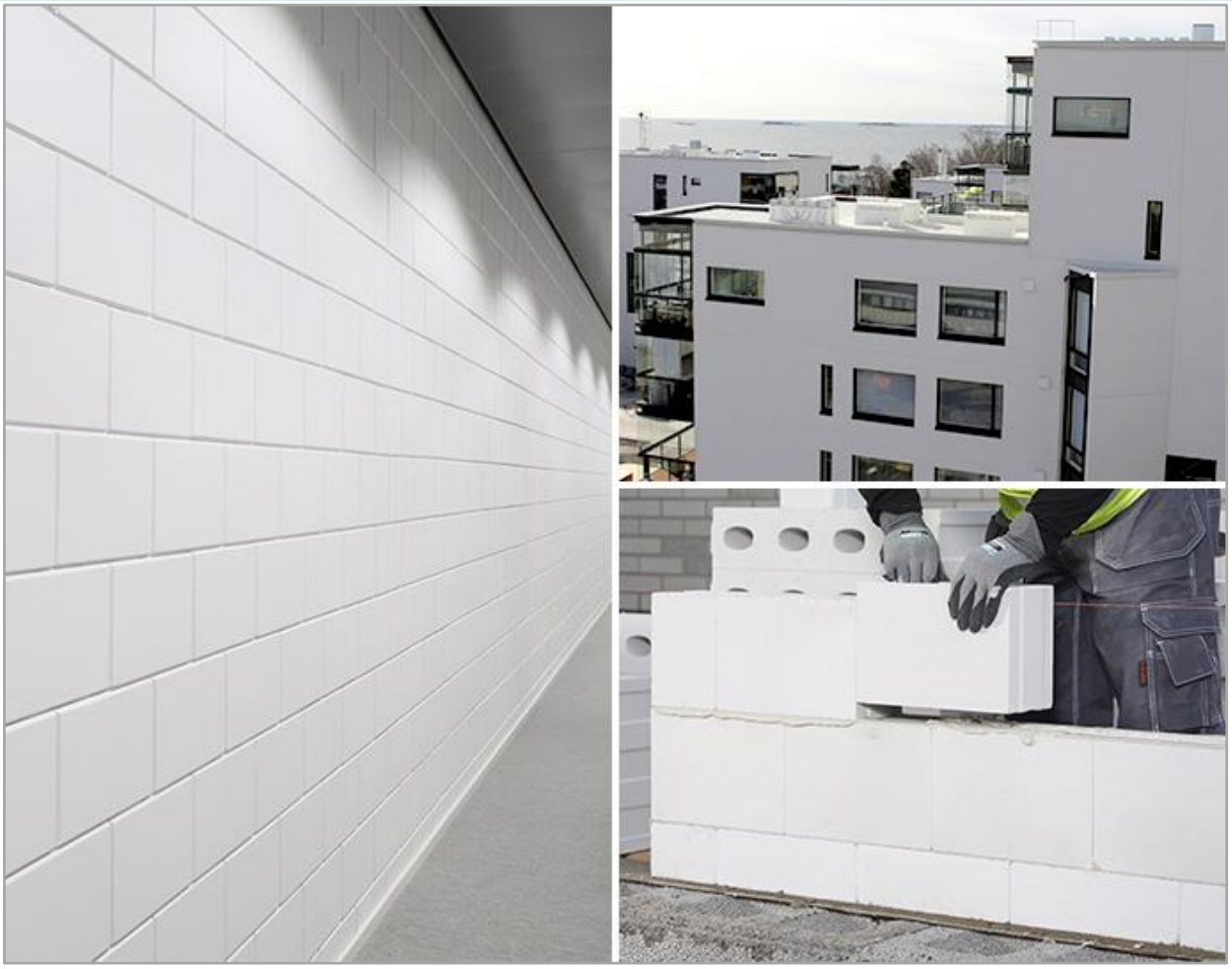
Valid to:	06.05.2026

KAHI® masonry units

Saint-Gobain Finland Oy

www.epd-norge.no



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General information

Product
KAHI® masonry units

Program operator
The Norwegian EPD Foundation
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Declaration number
NEPD-2831-1462-EN

ECO Platform reference number

This declaration is based on Product Category Rules
CEN Standard EN 15804 serve as core PCR.
The Product Category Rules, NPCR Construction products and services – Part A and PCR – Part B for Concrete and concrete elements.

Statement of liability
The owner of the declaration shall be liable for the underlying information and evidence.
EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidence.

Declared unit
1 kg of product

Functional unit
-

Verification
The CEN Norm EN 15804 serves as the core PCR.
Independent verification of the declaration and data, according to ISO14025:2010.

☑ Externally

Third party verifier:
<sign>
David Althoff Palm, Ramboll Sweden AB

Independent verifier approved by EPD-Norway

Owner of the declaration
Saint-Gobain Finland Oy

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Phone: +358 40 028 9933
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Manufacturer
Saint-Gobain Finland Oy

Place of production
Kiikala calcium silicate masonry unit plant, Finland

Place of usage
Helsinki

Management system
EN/ISO 9001:2015
EN/ISO 14001:2015
OHSAS 18001:2007

Org. No.
FI09515553

Issue date
06.05.2021

Valid to
06.05.2026

Year of study
2021

Comparability
EPD of construction products may not be comparable if they do not comply with EN15804 and seen in a building context.

The EPD has been worked out by
The EPD has been worked out by the use of the tool SimaPro, release 9.1.0.11, by Ecobio Oy by Neea Huttunen and Aleksi Laurila.

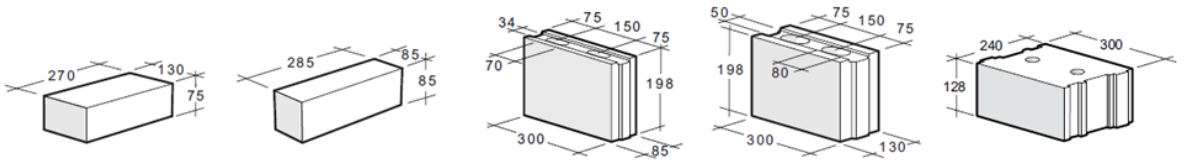
Approved:
Håkon Hauan
Managing Director of EPD-Norway

Product description

Product description and description of use:

The EPD covers KAHI® masonry units used in interior and exterior wall constructions (widths 75 - 240 mm). The products can be used both in load-bearing and in non-load-bearing structures. Additionally, they can be used in wall constructions that are subject to sound insulation and fire resistance requirements. The life cycle information of the group of products does not differ from one another, the fluctuation range of environmental impacts is not significant.

KAHI® masonry units consist of bricks and blocks. The units have a width of 75 mm, 85 mm, 130 mm, 198 mm or 240 mm. The heights of the units are 75 mm, 85 mm, 98 mm, 128 mm or 198 mm. The majority of the units contain voids for HVAC installations. Some of the units do not contain such installation voids. The most typical units are illustrated below.



Product Standard

KAHI® masonry units are designed, produced and CE marked according to SFS-EN 771-2/SFS 7001.

Physical characteristics

The products are supplied from production as ready-to-use, stacked on wooden pallets and wrapped in plastic. The products are primarily intended for masonry structures.

For specific physical properties, please see the Declaration of Performance (DoP-FI-500001-500082) on www.fi.weber.

Main product components and raw materials

The products consist of sand, water, burnt lime and additives. KAHI® masonry units do not contain Substances of Very High Concern (SVHC).

LCA calculation information

DECLARED UNIT	1 kg of KAHI® masonry units
SYSTEM BOUNDARIES	Cradle to Gate with options. Mandatory stages: A1-A3, A4-A5, C1-C4, D.
REFERENCE SERVICE LIFE (RSL)	N/A
CUT-OFF RULES	See below
ALLOCATIONS	See below
ELECTRICITY USED FOR THE MANUFACTORING PROCESS	Renewable electricity mix (reference year 2019). Renewable electricity is produced 55 % with hydropower and 45 % with biomass.
LCA SOFTWARE	SimaPro (release 9.1.0.11) Database data from 2019 (ecoinvent 3.6) All background data is less than 10 years old.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Data is collected from Finland, 2019

Cut-off criteria

The cut-off criterion used in Saint-Gobain EPD will be the mass criterion with the following details:

- Taking into account all input and output flows in a unit process i.e. taking into account the value of all flows in the unit process and the corresponding LCI whenever available
- No simplification of the LCI by additional exclusions of material flows

Data collected at the manufacturing site was used. The inventory process in this LCA includes all data related to raw material, packaging material and consumable items, and the associated transport to the manufacturing site. Process energy and water use, direct production waste and emissions to air and water are included. Scenarios have been developed to account for downstream processes such as demolition and waste treatment in accordance with the requirements of EN 15804:2012+A1:2013.

All inputs and outputs to the manufacturing plants have been included and made transparent. All assumptions regarding the materials have also been included.

All hazardous and toxic materials and substances are considered in the inventory even though they are below the cut off criteria

There are excluded processes in the inventory:

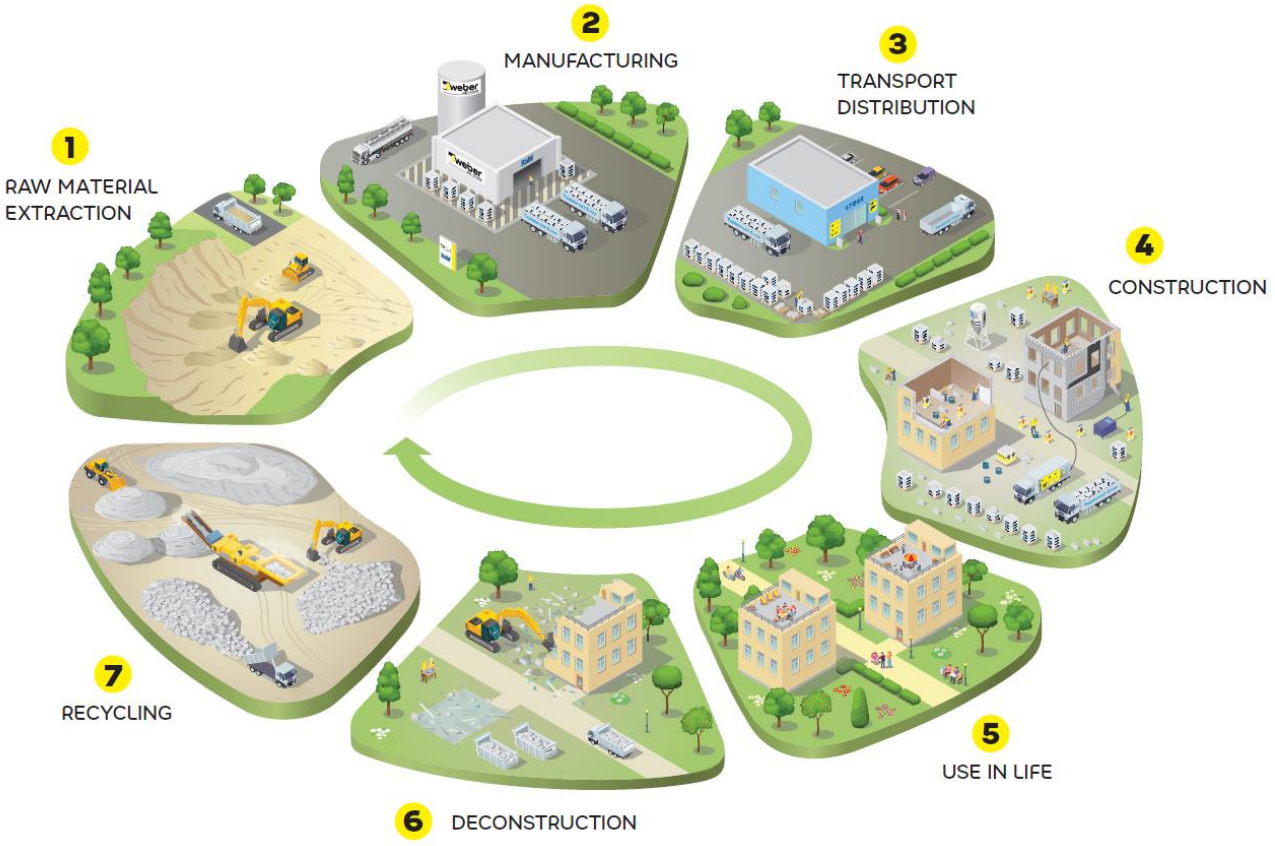
- Flows related to human activities such as employee transport and administration activity
- Storage of products
- Transport of packaging materials
- Transport of waste to treatment

Allocation

There are no allocations made in this EPD.

Co-product allocation is not taken into account in this EPD as the environmental impacts of the co-products have such low effects on the overall environmental effects. Therefore, economic allocation is not included in this EPD.

Life cycle of the product



System boundaries of the product system

System boundaries (X = included, MND = Module not declared)																
Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Construction installation stage	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Product stage, A1- A3

Description of the stage:

The product stage of the KAHI® masonry units is subdivided into 3 modules A1, A2 and A3 respectively “Raw material supply”, “transport” and “manufacturing”.

The aggregation of the modules A1, A2 and A3 is a possibility considered by the EN 15804 standard. This rule is applied in this EPD.

A1, Raw material supply

This module takes into account the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process.

The raw material supply covers extraction of sand, liquefied petroleum gas, light fuel oil and production of quicklime as well as production of packaging materials such as EUR-pallets, packaging film, steel mold plates and polypropylene binding straps. Sand and quarry operations are based on generic data. Required electricity usage is also covered in raw-material supply.

A2, Transport to the manufacturer

The raw materials are transported to the manufacturing site. In our case, the modeling includes: road and sea transportations (lorry and freight ship) of each raw material to the Kiikala plant.

A3, Manufacturing

Manufacturing includes grinding and screening of sand as well as dosing and mixing of raw materials. Molding, steam hardening and packaging are also included.

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.

Description of scenarios and additional technical information:

A4, Transport to the building site:

This module includes transport from the production gate in Kiikala plant to the building site. Transport is calculated on the basis of a scenario with the parameters described in the following table.

PARAMETER	VALUE
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Lorry, 16-32 metric ton
Distance	90 km
Capacity utilization (including empty returns)	37 % (ecoinvent 3.6)
Bulk density of transported products	1850 kg/m^3*
Volume capacity utilization factor	1.00

***KAHI® masonry unit has a wider range for density in the CE-marking, 1400 – 2000 kg/m3, but the production has been based on density around 1850 kg/m3 for the last five years.**

A5, Installation into the building:

This module includes:

- Wastage of products: 1 %. These losses are recycled as material or energy.
- Additional production processes to compensate for the loss
- Processing of packaging wastes: they are 100 % collected and modeled as material recycling or energy recovery
- Production and use of cement mortar for installation

This module does not include:

- Energy for installation of the KAHI® masonry units, as the installation is done manually, and does not require energy
- Water for installation of the KAHI® masonry units, as the installation doesn't include use of water

PARAMETER	VALUE
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	1 %
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)	Packaging wastes are 100 % collected and modeled as material recycling and energy recovery KAHI® masonry unit losses are modeled to be recycled as material

Use stage (excluding potential savings), B1- B7

Description of the stage:

The use stage is divided into the following modules:

- B1: Use
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6: Operational energy use
- B7: Operational water use

Description of scenarios and additional technical information:

Once installation is complete, no actions or technical operations are required during the use stages until the end-of-life stage. Therefore, use stage is not considered relevant for this EPD and is not included in the model.

End-of-life stage, C1- C4

Description of the stage:

The stage includes the following different modules of end-of-life:

C1, De-construction, demolition

The de-construction and/or dismantling of products are part of the demolition of the entire building. The deconstruction is considered to be made by excavation.

C2, Transport to waste processing

Transport is included and calculated on the basis of a scenario with the parameters described in the End-of-life table below.

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

The product is considered to be 100 % recycled as material after crushing process.

C4, Disposal

There is no disposal to landfill as the generated waste is crushed and recycled as material.

D, Recycling

The crushed KAHI® masonry units are recycled for soil construction, substituting the use of virgin crushed gravel. This is possible but clear statistics supporting this is not currently available.

Description of scenarios and additional technical information: See below

PARAMETER	DESCRIPTION
Collection process specified by type	The entire product is collected with excavation process in demolition of the building
Recovery system specified by type	Material recycling for 100 % of the product
Disposal specified by type	The entire product is recycled using waste brick treatment process (crushing)
Assumptions for scenario development (e.g. transportation)	50 % of waste is processed on-site and 50 % is transported to waste processing Lorry, 16-32 metric ton 15 km (estimated distance to waste processing site)

Reuse/recovery/recycling potential, D

Module D considers the use of crushed KAHI® masonry units for substituting gravel used for filling of land. Net new scrap is calculated based on the formula presented below.

	Unit	Value
Net new scrap (kg)	kg	-1

Recycled input* MRin = 0 kg
Ouput to recycling MRout = 1 kg
Net new scrap = MRout - MRin = 0 kg - 1 kg = -1 kg

LCA results

LCA model, aggregation of data and potential environmental impact are calculated with the SimaPro software 9.1.0.11 and ecoinvent 3.6 database to obtain the inventory of generic data. Biogenic carbon is not reported in the context of GWP.

Raw materials and energy consumption, as well as transport distances have been taken directly from the manufacturing plant of Saint-Gobain Finland Oy / Weber in Kiikala (Production data according 2019).

Resume of the LCA results detailed on the following tables.

ENVIRONMENTAL IMPACTS PER 1 KG OF PRODUCT

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D 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	
Global Warming Potential (GWP) - *kg CO_2 equiv/DU*	1,30E-01	1,48E-02	6,74E-03	MND	MND	MND	MND	MND	MND	MND	2,81E-04	2,45E-03	3,05E-04	0,00E+00	-3,61E-03
The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1.															
Ozone Depletion (ODP) *kg CFC-11 equiv/DU*	1,22E-08	2,72E-09	2,80E-10	MND	MND	MND	MND	MND	MND	MND	4,76E-11	4,49E-10	3,41E-11	0,00E+00	-5,13E-10
Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.															
Acidification potential (AP) *kg SO_2 equiv/DU*	2,98E-04	4,76E-05	1,32E-05	MND	MND	MND	MND	MND	MND	MND	2,08E-06	7,86E-06	1,44E-06	0,00E+00	-2,30E-05
Acid depositions have negative impacts on natural ecosystems and the man-made environment incl, buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.															
Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/DU*	5,43E-05	1,08E-05	5,43E-06	MND	MND	MND	MND	MND	MND	MND	4,97E-07	1,78E-06	1,02E-06	0,00E+00	-7,65E-06
Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.															
Photochemical ozone creation (POPC) *kg Ethene equiv/DU*	2,27E-05	2,01E-06	6,86E-07	MND	MND	MND	MND	MND	MND	MND	5,07E-08	3,31E-07	6,26E-08	0,00E+00	-1,03E-06
Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.															
Abiotic depletion potential for non-fossil resources (ADP-elements) - *kg Sb equiv/DU*	4,32E-07	4,06E-07	2,35E-08	MND	MND	MND	MND	MND	MND	MND	4,93E-10	6,70E-08	1,06E-09	0,00E+00	-8,87E-07
Abiotic depletion potential for fossil resources (ADP-fossil fuels) - *MJ/DU*	1,04E+00	2,22E-01	2,81E-02	MND	MND	MND	MND	MND	MND	MND	3,86E-03	3,66E-02	3,45E-03	0,00E+00	-4,23E-02
Consumption of non-renewable resources, thereby lowering their availability for future generations.															

RESOURCE USE PER 1 KG OF PRODUCT

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D 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	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/DU*	6,74E-01	3,19E-03	1,13E-02	MND	MND	MND	MND	MND	MND	MND	3,12E-05	5,27E-04	1,05E-03	0,00E+00	-1,43E-02
Use of renewable primary energy used as raw materials *MJ/DU*	1,19E+01	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/DU*	1,26E+01	3,19E-03	1,13E-02	MND	MND	MND	MND	MND	MND	MND	3,12E-05	5,27E-04	1,05E-03	0,00E+00	-1,43E-02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/DU*	1,10E+00	2,28E-01	3,53E-02	MND	MND	MND	MND	MND	MND	MND	3,93E-03	3,76E-02	7,60E-03	0,00E+00	-6,32E-02
Use of non-renewable primary energy used as raw materials - *MJ/DU*	2,94E-05	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/DU*	1,10E+00	2,28E-01	3,53E-02	MND	MND	MND	MND	MND	MND	MND	3,93E-03	3,76E-02	7,60E-03	0,00E+00	-6,32E-02
Use of secondary material *kg/DU*	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels - *MJ/DU*	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Use of non-renewable secondary fuels - *MJ/DU*	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water - *m^3/DU*	1,68E-03	2,38E-05	2,87E-05	MND	MND	MND	MND	MND	MND	MND	2,41E-07	3,93E-06	5,16E-06	0,00E+00	-3,63E-04

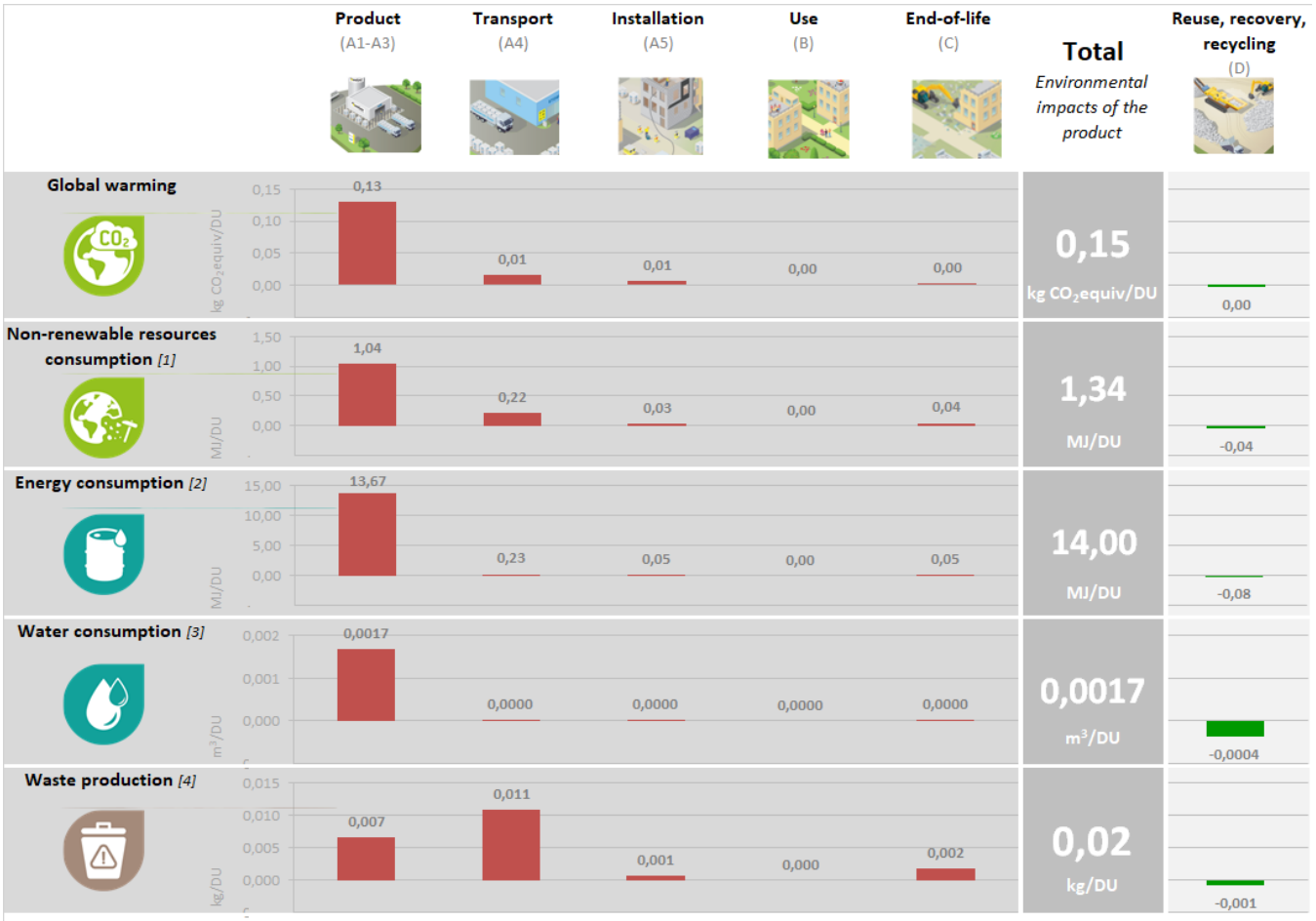
WASTE CATEGORIES PER 1 KG OF PRODUCT

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D 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	
Hazardous waste disposed *kg/DU*	1,47E-06	5,93E-07	5,10E-08	MND	MND	MND	MND	MND	MND	MND	1,08E-08	9,78E-08	3,07E-09	0,00E+00	-2,34E-07
Non-hazardous waste disposed *kg/DU*	6,53E-03	1,08E-02	6,45E-04	MND	MND	MND	MND	MND	MND	MND	7,11E-06	1,78E-03	2,23E-05	0,00E+00	-7,90E-04
Radioactive waste disposed *kg/DU*	7,18E-06	1,54E-06	1,85E-07	MND	MND	MND	MND	MND	MND	MND	2,65E-08	2,55E-07	4,43E-08	0,00E+00	-4,24E-07

OUTPUT FLOWS PER 1 KG OF PRODUCT

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D 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	
Components for re-use *kg/DU*	0	0	0	MND	MND	MND	MND	MND	MND	MND	0	0	0	0	0
Materials for recycling *kg/DU*	0,0002	0	0,01	MND	MND	MND	MND	MND	MND	MND	0	0	1	0	0
Materials for energy recovery *kg/DU*	0,0003	0	0,02	MND	MND	MND	MND	MND	MND	MND	0	0	0	0	0
Exported energy *MJ/DU*	0	0	0	MND	MND	MND	MND	MND	MND	MND	0	0	0	0	0

LCA interpretation



[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.

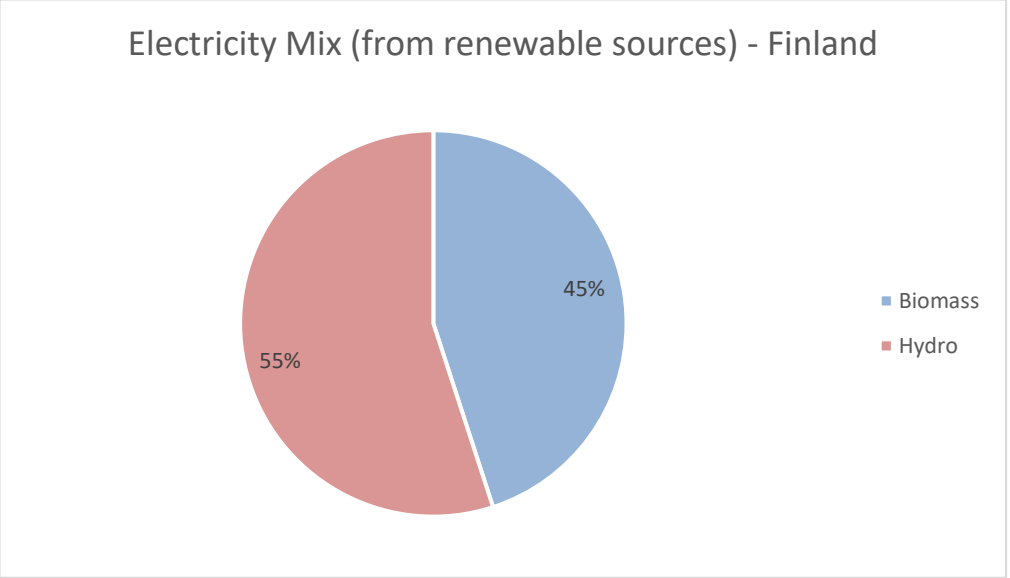
ADDITIONAL INFORMATION

Additional Norwegian requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

The LCA calculations have been made taking into account the fact that during the manufacturing only 100% renewable electricity is used. Electricity is produced 55 % with hydropower and 45 % with biomass.

TYPE OF INFORMATION	DESCRIPTION
Location	Representative of average production in Finland
Geographical representativeness description	Split of energy sources in Finland: - Hydro: 55% - Biomass: 45%
Reference year	2019
Type of data set	Cradle to gate from ecoinvent database
Source	Ecoinvent database version 3.6 and thinkstep



The dataset used to model the renewable electricity mix used for these calculations come from ecoivent database.

DATA SOURCE	AMOUNT	UNIT
ecoinvent 3.6 and thinkstep	0.027	kg CO_2 eq /kWh

Dangerous substances

The products consist of sand, water and burnt lime. No hazardous substances are released, above national threshold values, from the KAHI® masonry units during the use phase according to tests conducted by Weber. The leaching tests are performed according to the SFS-EN 12457-3 and SFS-EN 13137 standards.

Indoor environment

The product fulfills the Finnish M1 criteria. Emission class M1 to the best quality and emission class M3 includes material with the highest emission rates. The M1 certification is available in the following links: www.Weber.fi

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

- Product Category Rules:
  - NPCR Construction products and services – Part A (2017)
  - NPCR 020:2018 Part B for Concrete and concrete elements
- Environmental labels and declarations - Type III environmental declarations -Principles and procedures (ISO 14025:2006)
- Environmental management - Life cycle assessment – Requirements and guidelines (ISO 14044:2006)
- Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products (EN 15804:2012+A1:2013)
- Sustainability in building construction - Environmental declaration of building products (ISO 21930:2017)
- Ecoinvent database 3.6
- LCA report – Saint-Gobain Finland Oy 2021, author: Ecobio Oy
- LCA report, Information for the Environmental Product Declaration of Weber product. Saint-Gobain Finland Oy/ Weber, June 2019

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