



ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804+A2 & ISO 14025

Free-form slate and slate manufactured by sawing/pressing

RTS_460_26

Scope of the declaration

This environmental declaration covers the environmental impact of slate stone products manufactured in Finland.

The environmental declaration has been prepared in accordance with standards EN15804:2012+A2:2019 and ISO 14025. The RTS PCR method guide (Finnish version, 12.2.2024) has been used as additional guidance.

The environmental declaration describes the stages of the product's life cycle from cradle to gate with options

xx.xx.2025

Rakennustieto RTS Building Information
Foundation
Malminkatu 16 A
00100 Helsinki
<https://www.rakennustieto.fi/>





General information, purpose of the declaration and verification

1. Owner of the declaration

Kivi ry,
Paraatikatu 1, 15700 LAHTI
Sini Laine, Executive Director
+358 50 330 1630
sini.laine@kivi.info

2. Product name and number

Free-form slate and slate manufactured by sawing/pressing in Finland.

3. Data period

January 1, 2024–January 31, 2024

4. Place of production and manufacturers

Place of production: Finland

Manufacturers: Stonegroup Finland Oy and Ikikivi Oy

5. EPD averaging

The EPD statement for slate is a production volume-weighted average of the manufacturing data reported by two different manufacturers.

6. Further information

<https://kivi.info/>

7. Product category rules and scope of the declaration

The EPD has been prepared in accordance with standards EN 15804+A2:2019 and ISO 14025. The RTS PCR method guide (Finnish version, 12.2.2024) has been used in its preparation.

The scope of the EPD is from cradle to gate with options (A1-A4, A5 and C1-C4, D).

The geographical representativeness is Finland.

The manufacturer has sole ownership and responsibility for the EPD. EPDs belonging to the same product group but prepared with different programs are not necessarily comparable. EPDs for construction products are not necessarily comparable if they are not in accordance with EN 15804 and if they are not compared in a construction context.

8. Author of the life cycle assessment and declaration

Olivia Kuronen and Sanni Mallat
Sitowise Oy
www.sitowise.com
Date of study: 05.08.2025

9. Verification

Independent, third-party verification of the environmental product declaration has been carried out in accordance with EN ISO 14025:2010, EN 15804+A2:2019 and RTS PCR standards. The impartial verifier is Valtteri Kainila, Ramboll Finland Oy.
Verification date. **xx.xx.2025.**



10. Date of issue and validity of the environmental declaration

xx.xx.2025 Valid: xx.xx.xx- xx.xx.xx

European standard EN 15804+A2:2019 serves as the core PCR
An independent verification body in accordance with the international standard EN ISO 14025:2010 is Internal ☐ External ☒
Third-party verification has been carried out by: Valtteri Kainila Ramboll Finland Oy

Product information

11. Product description

This environmental declaration represents average slate products in Finland. The end products are either free form slates or slate tiles or slate bricks manufactured by sawing/pressing.

12. Declared unit

1 ton of slate: 1 ton of free-form slate, 1 ton of slate tile and brick manufactured by sawing/pressing.

The table below shows the coefficients required for unit conversions. The table shows examples of data for both paving stones (free from slate) and processed facade stones (slate manufactured by sawing/pressing) per square meter.

Explanation	Value	Unit
Declared unit	1	t
Standard thickness (free-form)	40	
Standard thickness (tile/brick)	80	mm
Volume of a slate (free-form)	0.04	m ³
Volume of slate (tile/brick)	0.08	m ³
Stone density	2700	kg/m ³
Weight per square meter (free-form)	0.108	t/m ²
Weight per square meter (tile/brick)	0.216	t/m ²

13. Technical description of the product and its use

Free-form stones are natural slate stone products that have been drilled and blasted from rock and split by hand. Facade stones, tiles and brick, are refined products that are manufactured either by sawing the slate stone into slabs or breaking into bricks. The effects of facade stones that have been sawn into slabs and broken into bricks are the same.

Slate is used for paving outdoor areas, cladding the interior surfaces of buildings, and on facades.

14. Product standard

SFS-EN 1341:2013, Paving slabs, Natural stone paving slabs for outdoor use



EN 771-6:2012, Masonry units, Masonry structures in load-bearing and non-load-bearing applications, Specifications for masonry units. Part 6: Natural stone masonry units

15. Physical properties

1. Free-form slate

Free-form slate is most commonly a 1-3 or 3-6 cm thick free-form piece of stone that has been sliced into slabs by hand. The diagonal of the stone typically varies between 200 and 1000 mm. The basic unit of slate is a square slab. The number of stones in a square slab varies between approximately 1–12 pieces/m². Asquare slab weighs approximately 40–110 kg/m².

2. Sawn or pressed slate (other names: slate tile, masonry slate, masonry stone, masonry slate, paving stone)

Stone bricks made of slate are most commonly referred to as facade stones or masonry slates. Products made by sawing slate are referred to as slate tiles or paving stones. The depth of masonry slate, i.e., slate that can be stacked on top of each other with mortar, is usually 80–120 mm. The length and thickness vary depending on the type of stone. The weight of masonry slate is approximately 150–250 kg/m². In slate for masonry, the edge of the stone remains visible. The size of products made by sawing varies depending on the product. The weight is typically 30–200 kg/m².

16. Product raw materials

Main raw materials of the	Share	Usability			Origin
		Renewable	Non-	Recycled	
Natural	100		X		Finland

17. Biogenic carbon

Biogenic carbon content of the product per unit as reported at the factory gate.

Biogenic carbon contained in the product kg C	0
Biogenic carbon contained in the product packaging kg C	0.46 kg

18. List of REACH SVHC substances contained in the product according to the European Chemicals Agency (ECHA)

The product does not contain any SVHC substances listed in the REACH Regulation.



19. Environmental impacts per 1 kg of product

Table1 . Environmental impacts of free-form slate per 1 kg of product

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	2,15E-02	2,42E-02	1,76E-03	0,00E+00	6,09E-03	6,20E-05	1,56E-03	-7,95E-03
ADP-minerals & metals ⁴⁾	kg Sbe	2,91E-08	6,76E-08	1,39E-10	0,00E+00	1,70E-08	1,49E-10	2,48E-09	-2,08E-08
ADP-fossil resources	MJ	2,99E-01	3,51E-01	3,94E-04	0,00E+00	8,83E-02	1,42E-03	3,83E-02	-1,06E-01
Water use ⁵⁾	m ³ e depr.	1,90E-03	1,74E-03	4,03E-05	0,00E+00	4,36E-04	3,63E-05	1,11E-04	-4,26E-03
Biogenic carbon content in the	kg C	0,00E+00	NA	NA	NA	NA	NA	NA	NA
Biogenic carbon content in the	kg C	0,46E+00	NA	NA	NA	NA	NA	NA	NA
Use of secondary material	kg/kg	0,00E+00	NA	NA	NA	NA	NA	NA	NA

Table 2. Environmental impacts of sawn or pressed slate per 1 kg of product

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	4,48E-02	2,42E-02	1,76E-03	0,00E+00	6,09E-03	6,20E-05	1,56E-03	-2,57E-03
ADP-minerals & metals ⁴⁾	kg Sbe	3,78E-08	6,76E-08	1,39E-10	0,00E+00	1,70E-08	1,49E-10	2,48E-09	-1,35E-08
ADP-fossil resources	MJ	6,04E-01	3,51E-01	3,94E-04	0,00E+00	8,83E-02	1,42E-03	3,83E-02	-3,14E-02
Water use ⁵⁾	m ³ e depr.	2,67E-03	1,74E-03	4,03E-05	0,00E+00	4,36E-04	3,63E-05	1,11E-04	-3,79E-03
Biogenic carbon content in the	kg C	0,00E+00	NA	NA	NA	NA	NA	NA	NA
Biogenic carbon content in the	kg C	0,46E+00	NA	NA	NA	NA	NA	NA	NA
Use of secondary material	kg/kg	0,00E+00	NA	NA	NA	NA	NA	NA	NA

The modules whose information is presented in this report are marked with a tick below. Mandatory items to be reported are marked in blue in the table. The report type is "from cradle to factory gate option".

Product phase			Construction phase		Use phase							End of life				Impacts outside the life cycle		
A	A	A	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
X	X	X	X	X	NR	NR	NR	NR	NR	NR	NR	X	X	X	X	X	X	X
Raw material supply	Transport	Manufacturing	Transport	Construction – installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction, demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

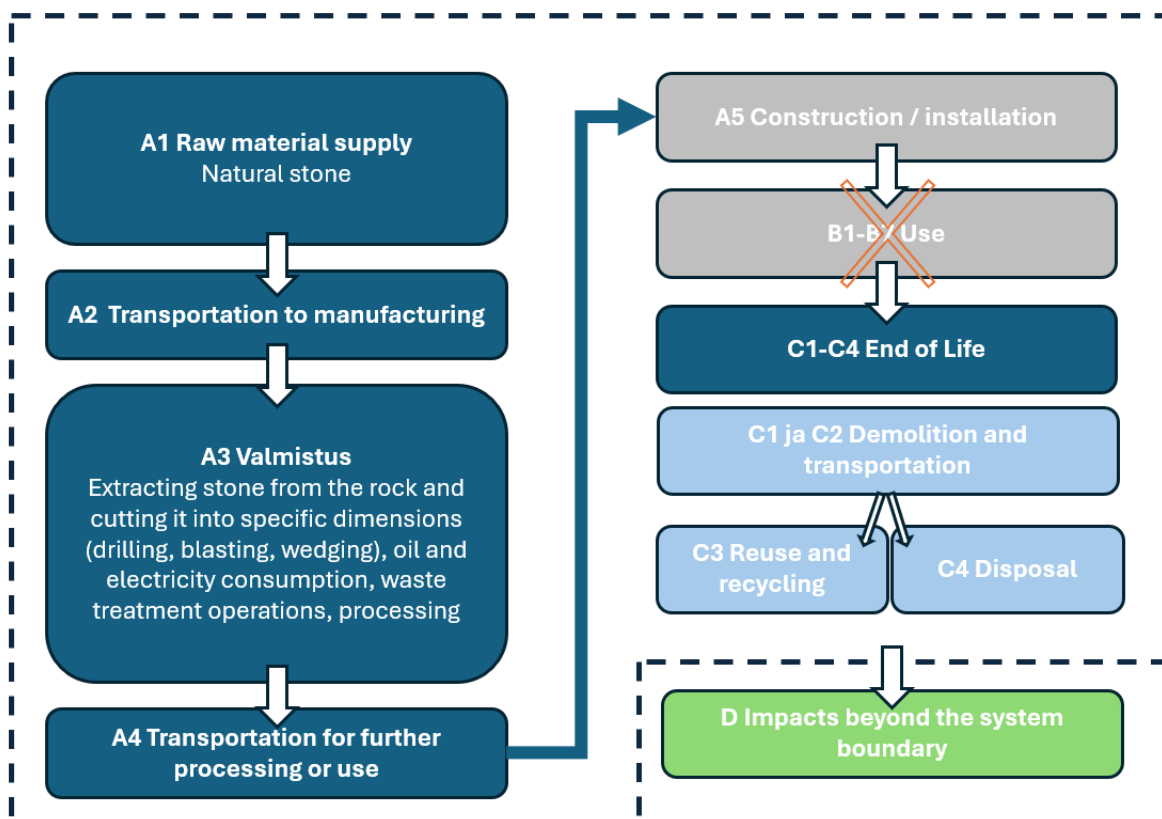
NR= not relevant

	Mandatory modules
	Mandatory in accordance with the rules and conditions in section 5.2 of the RTS EPD Methodology Guide
	Optional modules based on scenarios

20. Production process

The production of slate products consists of drilling and blasting rock, transporting the resulting quarry to the production area, where the stones are sorted, wedged, and packed by hand. The stones are then transported for further processing, where they are made into facade stones either by sawing or breaking them into bricks. Sawing and breaking are done with electric-powered machines, and wheel loaders are used for loading and unloading materials.

The system boundaries of the process are presented below.



21. Cut off criteria

The study does not exclude any modules or processes that are mandatory based on the applied standards and the PCR. The study does not exclude hazardous materials or substances. The study takes into account all significant raw material and energy consumption. All inputs and outputs of unit processes for which data is available are included in the calculation.

22. Allocation, estimates, and assumptions

Allocation is necessary if, for example, data on certain materials, energy, water, or waste cannot be measured separately for the product under investigation. In this study, allocation was used when the production data of different operators were averaged using a weighted average per reported unit.

Of the producers, Ikikivi Oy only produces paving stones from slate. Stonegroup Finland Oy also manufactures processed slate tiles and bricks from slate. Therefore, only the input data reported by Stonegroup Finland Oy was used in the brick and slab modelling.

Ikikivi Oy's production data is partly directly related to slate. The data on fuels was obtained by allocating annual consumption data and has been allocated between slate and other stone products manufactured by Ikikivi Oy according to physical production volumes and sales prices.

If waste is generated in the processes and the waste has value and is sold on as waste rock, the environmental impacts allocated to the waste rock have been taken into account in the processing of the initial data.



23.Averages and variation

The free-form slate product consists of production data reported by two different producers, and the size and weight of the final product may vary. Raw materials per ton produced have been calculated using the weighted average principle.

The data on sawn and pressed slate is based solely on information provided by Stonegroup Finland Oy.

24.LCA software and bibliography

This EPD was created using the One Click LCA EPD Generator software. The LCA and EPD were prepared in accordance with standards and ISO 14040/14044. The EPD Generator uses the Ecoinvent v3.10.1 database (allocation, Cut-off, EN 15804+A2) from 2024 as its source of environmental data.



Environmental impact data

The impacts are presented per declared unit, 1 ton of free form slate and slate manufactured by sawing/pressing stone. The environmental impacts consist mainly of emissions from the energy used in the production phase. The results are presented in scientific form, example of data interpretation: $3.54\text{E}-2 = 3.54 \cdot 10^{-2} = 0.0354$.

The environmental impacts of free-form slate products vary between -6 and 99% compared to the average.

Free-form slate product

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A	A	A	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	2,15E+01	2,42E+01	1,76E+00	0,00E+00	6,09E+00	6,20E-02	1,56E+00	-7,95E+00
GWP – fossil	kg CO ₂ e	2,31E+01	2,42E+01	1,41E-01	0,00E+00	6,08E+00	6,17E-02	1,56E+00	-8,35E+00
GWP – biogenic	kg CO ₂ e	-1,61E+00	0,00E+00	1,61E+00	0,00E+00	1,38E-03	1,33E-04	-4,96E-04	4,01E-01
GWP – LULUC	kg CO ₂ e	5,93E-03	1,08E-02	2,07E-05	0,00E+00	2,72E-03	1,83E-04	8,92E-04	-3,93E-03
Ozone depletion pot.	kg CFC ₁₁ e	3,45E-07	3,58E-07	4,42E-10	0,00E+00	8,98E-08	1,03E-09	4,52E-08	-1,07E-07
Acidification potential	mol H ⁺ e	1,97E-01	8,26E-02	2,46E-04	0,00E+00	2,07E-02	3,11E-04	1,11E-02	-6,50E-02
EP-freshwater ²⁾	kg Pe	1,32E-03	1,89E-03	9,47E-06	0,00E+00	4,73E-04	5,29E-05	1,28E-04	-1,14E-03
EP-marine	kg Ne	8,78E-02	2,71E-02	1,25E-04	0,00E+00	6,81E-03	5,47E-05	4,22E-03	-2,56E-02
EP-terrestrial	mol Ne	9,69E-01	2,95E-01	1,12E-03	0,00E+00	7,41E-02	4,82E-04	4,61E-02	-2,87E-01
POCP ("smog") ³⁾	kg NMVOCe	2,89E-01	1,22E-01	3,13E-04	0,00E+00	3,06E-02	1,63E-04	1,65E-02	-8,47E-02
ADP-minerals & metals ⁴⁾	kg Sbe	2,91E-05	6,76E-05	1,39E-07	0,00E+00	1,70E-05	1,49E-07	2,48E-06	-2,08E-05
ADP-fossil resources	MJ	2,99E+02	3,51E+02	3,94E-01	0,00E+00	8,83E+01	1,42E+00	3,83E+01	-1,06E+02
Water use ⁵⁾	m ³ e depr.	1,90E+00	1,74E+00	4,03E-02	0,00E+00	4,36E-01	3,63E-02	1,11E-01	-4,26E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.



ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A	A	C1	C2	C3	C4	D
Particulate emissions	Incidence	5,39E-06	2,42E-06	3,58E-09	0,00E+00	6,09E-07	1,41E-09	2,52E-07	-1,58E-06
Ionizing radiation ⁶⁾	kBq U235e	2,57E-01	3,06E-01	8,24E-04	0,00E+00	7,69E-02	3,84E-02	2,41E-02	-3,14E-01
Ecotoxicity (freshwater)	CTUe	2,41E+01	4,97E+01	3,74E-01	0,00E+00	1,25E+01	1,57E-01	3,21E+00	-1,33E+01
Human toxicity, cancer	CTUh	4,85E-09	4,00E-09	4,58E-11	0,00E+00	1,00E-09	2,27E-11	2,88E-10	-1,90E-09
Human toxicity, non-carcinogenic	CTUh	5,92E-08	2,28E-07	2,38E-09	0,00E+00	5,71E-08	1,06E-09	6,61E-09	-3,54E-08
SQP ⁷⁾	-	1,58E+02	3,54E+02	3,39E-01	0,00E+00	8,89E+01	2,44E-01	7,54E+01	-6,79E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This 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; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A	A	C1	C2	C3	C4	D
Renew. PER as energy ⁸⁾	MJ	1,39E+01	1,39E+01	4,82E+00	0,00E+00	1,21E+00	3,22E-01	3,70E-01	-6,54E+00
Renew. PER as material	MJ	1,41E+01	1,41E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	2,81E+01	2,81E+01	4,82E+00	0,00E+00	1,21E+00	3,22E-01	3,70E-01	-1,01E+01
Non-re. PER as energy	MJ	2,94E+02	2,95E+02	3,51E+02	0,00E+00	8,83E+01	1,42E+00	3,83E+01	-1,05E+02
Non-re. PER as material	MJ	9,33E-01	9,33E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	2,95E+02	2,96E+02	3,51E+02	0,00E+00	8,83E+01	1,42E+00	3,83E+01	-1,05E+02
Secondary materials	kg	2,15E-01	2,16E-01	1,50E-01	0,00E+00	3,76E-02	8,73E-04	9,63E-03	-8,83E-02
Renew. secondary fuels	MJ	4,84E-01	4,84E-01	1,90E-03	0,00E+00	4,77E-04	9,48E-07	1,99E-04	-1,21E-01
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m ³	4,58E-02	4,60E-02	5,20E-02	0,00E+00	1,30E-02	1,16E-03	3,98E-02	-1,02E-01

8) PER = Primary energy resource



END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	6,70E-01	5,95E-01	9,16E-03	0,00E+00	1,50E-01	3,83E-03	4,23E-02	-4,06E-01
Non-hazardous waste	kg	1,05E+01	1,10E+01	1,04E+00	0,00E+00	2,77E+00	2,61E-01	5,00E+02	-7,08E+00
Radioactive waste	kg	6,42E-05	7,49E-05	2,08E-07	0,00E+00	1,88E-05	9,87E-06	5,87E-06	-7,68E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,50E+02
Materials for recycling	kg	0,00E+00	0,00E+00	1,10E-01	0,00E+00	0,00E+00	2,50E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	9,74E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00



Slate manufactured by sawing or pressing

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	4,48E+01	2,42E+01	1,76E+00	0,00E+00	6,09E+00	6,20E-02	1,56E+00	-2,57E+00
GWP – fossil	kg CO ₂ e	4,64E+01	2,42E+01	1,41E-01	0,00E+00	6,08E+00	6,17E-02	1,56E+00	-2,56E+00
GWP – biogenic	kg CO ₂ e	-1,61E+00	0,00E+00	1,61E+00	0,00E+00	1,38E-03	1,33E-04	-4,96E-04	-2,52E-03
GWP – LULUC	kg CO ₂ e	8,34E-03	1,08E-02	2,07E-05	0,00E+00	2,72E-03	1,83E-04	8,92E-04	-2,45E-03
Ozone depletion pot.	kg CFC-11 e	7,03E-07	3,58E-07	4,42E-10	0,00E+00	8,98E-08	1,03E-09	4,52E-08	-2,05E-08
Acidification potential	mol H ⁺ e	4,07E-01	8,26E-02	2,46E-04	0,00E+00	2,07E-02	3,11E-04	1,11E-02	-1,56E-02
EP-freshwater ²⁾	kg Pe	2,00E-03	1,89E-03	9,47E-06	0,00E+00	4,73E-04	5,29E-05	1,28E-04	-8,15E-04
EP-marine	kg Ne	1,85E-01	2,71E-02	1,25E-04	0,00E+00	6,81E-03	5,47E-05	4,22E-03	-3,68E-03
EP-terrestrial	mol Ne	2,03E+00	2,95E-01	1,12E-03	0,00E+00	7,41E-02	4,82E-04	4,61E-02	-4,43E-02
POCP ("smog") ³⁾	kg NMVOCe	6,07E-01	1,22E-01	3,13E-04	0,00E+00	3,06E-02	1,63E-04	1,65E-02	-1,23E-02
ADP-minerals & metals ⁴⁾	kg Sbe	3,78E-05	6,76E-05	1,39E-07	0,00E+00	1,70E-05	1,49E-07	2,48E-06	-1,35E-05
ADP-fossil resources	MJ	6,04E+02	3,51E+02	3,94E-01	0,00E+00	8,83E+01	1,42E+00	3,83E+01	-3,14E+01
Water use ⁵⁾	m ³ e depr.	2,67E+00	1,74E+00	4,03E-02	0,00E+00	4,36E-01	3,63E-02	1,11E-01	-3,79E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.



ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Particulate emissions	Incidence	1,13E-05	2,42E-06	3,58E-09	0,00E+00	6,09E-07	1,41E-09	2,52E-07	-2,34E-07
Ionizing radiation ⁶⁾	kBq U235e	4,00E-01	3,06E-01	8,24E-04	0,00E+00	7,69E-02	3,84E-02	2,41E-02	-2,49E-01
Ecotoxicity (freshwater)	CTUe	4,09E+01	4,97E+01	3,74E-01	0,00E+00	1,25E+01	1,57E-01	3,21E+00	-7,32E+00
Human toxicity, cancer	CTUh	7,25E-09	4,00E-09	4,58E-11	0,00E+00	1,00E-09	2,27E-11	2,88E-10	-6,91E-10
Human toxicity, non-carcinogenic	CTUh	9,76E-08	2,28E-07	2,38E-09	0,00E+00	5,71E-08	1,06E-09	6,61E-09	-2,06E-08
SQP ⁷⁾	-	1,80E+02	3,54E+02	3,39E-01	0,00E+00	8,89E+01	2,44E-01	7,54E+01	-2,84E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This 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; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy ⁸⁾	MJ	1,59E+01	4,82E+00	- 1,58E+01	0,00E+00	1,21E+00	3,22E-01	3,70E-01	-3,06E+00
Renew. PER as material	MJ	1,41E+01	0,00E+00	- 1,41E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	3,01E+01	4,82E+00	- 2,99E+01	0,00E+00	1,21E+00	3,22E-01	3,70E-01	-3,06E+00
Non-re. PER as energy	MJ	5,99E+02	3,51E+02	- 5,73E+00	0,00E+00	8,83E+01	1,42E+00	3,83E+01	-3,14E+01
Non-re. PER as material	MJ	9,33E-01	0,00E+00	-9,33E- 01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	6,00E+02	3,51E+02	- 6,67E+00	0,00E+00	8,83E+01	1,42E+00	3,83E+01	-3,14E+01
Secondary materials	kg	3,42E-01	1,50E-01	7,66E-04	0,00E+00	3,76E-02	8,73E-04	9,63E-03	-3,44E-02
Renew. secondary fuels	MJ	4,84E-01	1,90E-03	5,27E-06	0,00E+00	4,77E-04	9,48E-07	1,99E-04	-2,32E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m ³	6,68E-02	5,20E-02	3,63E-04	0,00E+00	1,30E-02	1,16E-03	3,98E-02	-9,02E-02

8) PER = Primary energy resources.



END OF LIFE – WASTE

Impact category	Unit	A1-A3	A	A	C1	C2	C3	C4	D
Hazardous waste	kg	1,01E+00	5,95E-01	9,16E-03	0,00E+00	1,50E-01	3,83E-03	4,23E-02	-2,38E-01
Non-hazardous waste	kg	1,52E+01	1,10E+01	1,04E+00	0,00E+00	2,77E+00	2,61E-01	5,00E+02	-4,45E+00
Radioactive waste	kg	9,93E-05	7,49E-05	2,08E-07	0,00E+00	1,88E-05	9,87E-06	5,87E-06	-6,07E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A	A	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,50E+02
Materials for recycling	kg	0,00E+00	0,00E+00	1,10E-01	0,00E+00	0,00E+00	2,50E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	9,74E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Scenario documentation and technical information

25.Manufacturing energy scenario documentation

Parameter	Value
Origin of electricity	Electricity, medium voltage, residual mix (Reference product: electricity, high voltage), Ecoinvent
Electricity CO ₂ -eq. /kWh	0.67 kgCO ₂ /kWh
Fuel oil	Diesel, burned in building machine (Reference product: diesel, burned in building machine), Ecoinvent
Fuel oil kg CO ₂ eq. /MJ	0.1 kg CO ₂ e / MJ



26. Additional technical information, transport to the construction site

Parameter	Value	Data quality and source
Specific emissions from transport	0.11 kg CO ₂ eq. /tkm	Transport, freight, lorry >32 metric tons, EURO5. Ecoinvent 3.10.
Average transport distance for A4	225 km	Average product transport distance

27. End of life process description

Process description	Unit	Value kg/tonne
Demolition process for the product and the amount of construction waste generated, broken down as follows:	kg collected as sorted	500
	kg collected as mixed construction waste	500
The construction waste recovery process and the construction waste generated, broken down as follows:	kg components for reuse (same purpose)	250
	kg for material recycling	250
	kg energy recovery	0
Construction waste disposal process and amount of waste to be disposed of	kg of product or material for final disposal	500
Waste transportation	km	The estimated transportation distance is 113 kilometers.



28. Review of producer-specific results

To ensure the transparency required by the program operator, it is important to indicate when presenting average results if the total global warming potential (GWP total A1-A3) of an individual product differs by more than 10 percent from the GWP result of the average product. To meet this requirement and to ensure the reliability of the results, a comprehensive sensitivity analysis has been carried out in the work. For the sensitivity analysis, a separate version of the LCA model has been created for each producer in the One Click LCA software, in which the flows of the A1-A3 stages have been adjusted to correspond to the producer-specific values.

It should be noted that since the average output data has been calculated by weighting the production volumes reported by different producers, the output data reported by individual producers for their products and thus the GWP results may differ significantly from the average of the main model. An individual producer may also not utilize all the material or resource flows used in the manufacturing of the average product.

The following table presents the producer-specific GWP values of the participating producers in relation to the average value, as well as a brief explanation of the differences in the producer-specific models.

Producer:	GWP total (kg CO ₂ e/ 1 t of stone)	Difference from average (%)	Reason for difference:
Average result, free-form slate	2.15E+01		
Ikikivi Oy	4.27E+01	99 %	Most significant difference: double the average fuel oil consumption.
Stonegroup Finland Oy	2.03E+01	-6 %	Most significant difference: lower than average diesel consumption compared to the average.

29. References

Ecoinvent Database version 3.10.1 (allocation, Cut-off, EN 15804+A2), 2024.

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

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

LCA background report for stone products 05.08.2025.