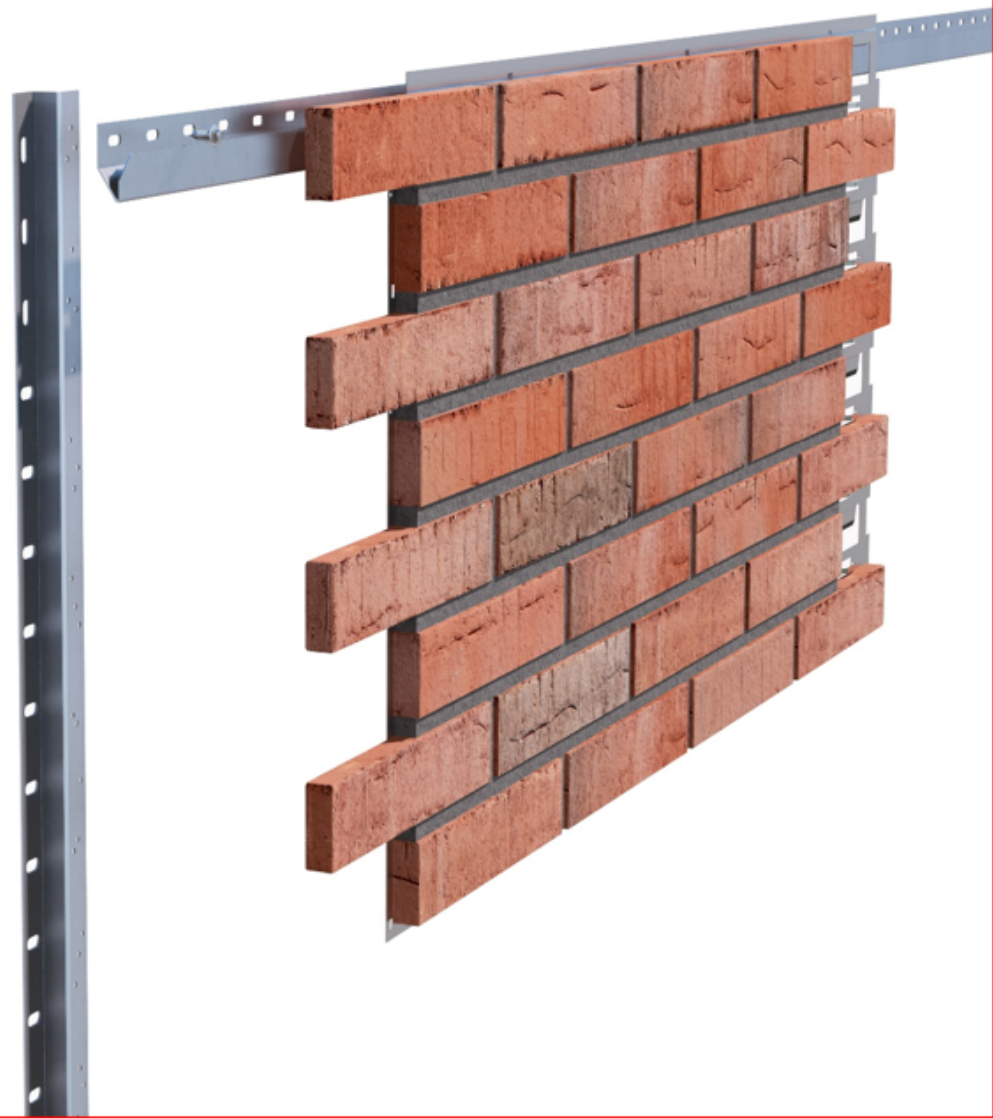
Environmental Product Declaration (EPD)
According to ISO 14025 and EN 15804

# BRIX Brick Cladding System



| | |
|---|---|
| Registration number: | EPD-Kiwa-EE-187199-EN |
| Issue date: | 11-11-2024 |
| Valid until: | 11-11-2029 |
| Declaration owner: | BRIX Facades Oy |
| Publisher: | Kiwa-Ecobility Experts |
| Programme operator: | Kiwa-Ecobility Experts |
| Status: | verified |

# 1 General information

## 1.1 PRODUCT

BRIX Brick Cladding System

## 1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-187199-EN

## 1.3 VALIDITY

**Issue date:** 11-11-2024

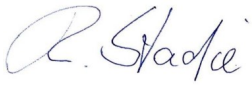
**Valid until:** 11-11-2029

## 1.4 PROGRAMME OPERATOR

Kiwa-Ecobility Experts
Wattstraße 11-13
13355 Berlin
DE

Raoul Mancke

*(Head of programme operations, Kiwa-Ecobility Experts)*



Dr. Ronny Stadie

*(Verification body, Kiwa-Ecobility Experts)*

## 1.5 OWNER OF THE DECLARATION

**Manufacturer:** BRIX Facades Oy

**Address:** Mjösundintie 1101 , 25730 Mjösund FINLAND

**E-mail:** samuli@brix.fi

**Website:** www.brix.fi

**Production location:** BRIX Facades Oy

**Address production location:** Mjösundintie 1101, 25730 Mjösund FINLAND

## 1.6 VERIFICATION OF THE DECLARATION

The independent verification is in accordance with the ISO 14025:2011. The LCA is in compliance with ISO 14040:2006 and ISO 14044:2006. The EN 15804:2012+A2:2019 serves as the core PCR.

☐ Internal ☒ External

Lucas Pedro Berman, Senda

## 1.7 STATEMENTS

The owner of this EPD shall be liable for the underlying information and evidence. The programme operator Kiwa-Ecobility Experts shall not be liable with respect to manufacturer data, life cycle assessment data and evidence.

## 1.8 PRODUCT CATEGORY RULES

Kiwa-Ecobility Experts (Kiwa-EE) – General Product Category Rules (2022-02-14).

Institut Bauen und Umwelt e.V. - Part B: Requirements on the EPD for Bricks (2024-04-30).

## 1.9 COMPARABILITY

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804+A2. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, the definition of the system boundary, declared modules, data selection (primary or secondary data,

# 1 General information

background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPD program operators may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

## 1.10 CALCULATION BASIS

**LCA method R<THINK:** Ecobility Experts | EN15804+A2

**LCA software*:** Simapro 9.1

**Characterization method:** EN 15804 +A2 Method v1.0

**LCA database profiles:** EcoInvent version 3.6

**Version database:** v3.17 (2024-05-22)

** Simapro is used for calculating the characterized results of the Environmental profiles within R<THINK.*

## 1.11 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'BRIX Brick Cladding System' with the calculation identifier ReTHiNK-87199.

# 2 Product

## 2.1 PRODUCT DESCRIPTION

The BRIX Brick Cladding System is a combined structure of kiln-fired brick, polymer-modified mortar, a pressed metal frame and mounting system. The BRIX Brick Cladding System is made of the following components: comprising of brick slips, factory embedded to the backing steel sheet with mortar to form a panel, mounting system. The actual declared weight is 49,61 kg/m2.

| Main components (kg/m2) | |
|---|---|
| Brick | 30,00 |
| Mortar horizontal | 5,80 |
| Metal frame | 4,56 |
| Stone granules | 3,50 |
| Horizontal Rail | 1,68 |
| Water | 1,55 |
| Vertical Rail | 1,24 |
| Mortar vertical | 0,91 |
| Soudal glue | 0,34 |
| Stofix screw | 0,04 |
| Self-drilling screw | 0,01 |

## 2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

The BRIX Brick Cladding System is used to improve the weather resistance of a wall and provide a decorative finish. The system is installed with a ventilated cavity behind the cladding. It is suitable for several kinds of external wall structures as masonry, concrete, steel and timber frame substrates.

## 2.3 REFERENCE SERVICE LIFE

**RSL PRODUCT**

For clay construction products, the RSL is 150 years (Tiles & Bricks Europe. June 2020).

**USED RSL (YR) IN THIS LCA CALCULATION:**

150

## 2.4 TECHNICAL DATA

| Feature | Testing method | Result |
|---|---|---|
| Fire behavior | EN 13501-1 | A2-s1-d0 |
| Facade element of water conductivity | ETAG 034 | When passing through the cladding, the water flows freely downwards. The fastening system prevents water from accumulating in the structures. The ventilation slot behind the facade element ventilates the space |

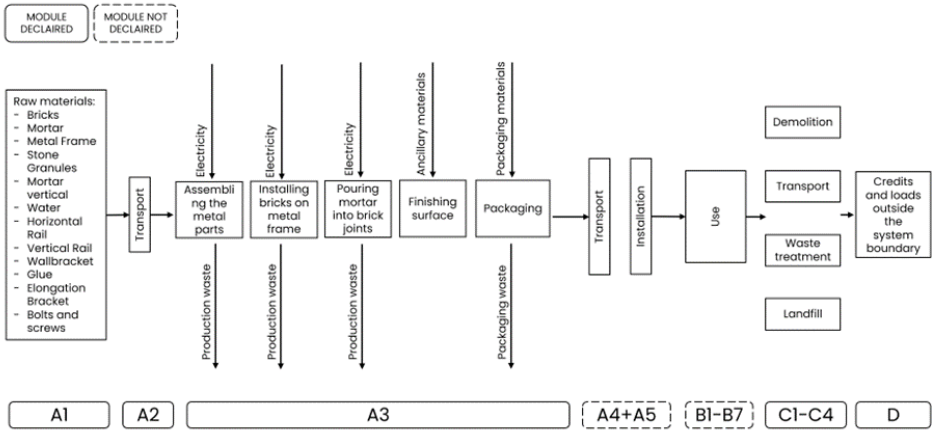
## 2.5 SUBSTANCES OF VERY HIGH CONCERN

The product contains less than 0.1% of substances included in the “Candidate list of substances of very high concern for authorisation” (SVHC).

## 2.6 DESCRIPTION PRODUCTION PROCESS

The BRIX Brick panel is manufactured in a factory located in Mjösund, Finland. The production process in the manufacturing plant can be divided into several stages: frame and bricks cutting, brick cladding, frame bonding, drying, supplementation by mounting system, packing.
The panels are packed on a solid timber boxes one on top of the other. Cardboard is placed between the panels. The box is protected from the weather with a plastic hood.

# 2 Product


MODULE DECLAIRED
MODULE NOT DECLAIRED
Raw materials:
- Bricks
- Mortar
- Metal Frame
- Stone Granules
- Mortar vertical
- Water
- Horizontal Rail
- Vertical Rail
- Wallbracket
- Glue
- Elongation Bracket
- Bolts and screws
Transport
Electricity
Assembling the metal parts
Production waste
Electricity
Installing bricks on metal frame
Production waste
Electricity
Pouring mortar into brick joints
Production waste
Ancillary materials
Finishing surface
Packaging materials
Packaging
Packaging waste
Transport
Installation
Use
Demolition
Transport
Waste treatment
Landfill
Credits and loads outside the system boundary
A1
A2
A3
A4+A5
B1-B7
C1-C4
D

# 3 Calculation rules

## 3.1 DECLARED UNIT

**The declared unit is one square meter BRIX Brick Cladding System**

Reference unit: square meter (m2)

## 3.2 CONVERSION FACTORS

| Description | Value | Unit |
|---|---|---|
| Reference unit | 1 | m2 |
| Weight per reference unit | 49.609 | kg |
| Conversion factor to 1 kg | 0.020158 | m2 |

## 3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate with modules C1-C4 and module D EPD. The life cycle stages included are as shown below:

(X = module included, ND = module not declared)

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

The modules of the EN15804 contain the following:

| | |
|---|---|
| Module A1 = Raw material supply | Module B5 = Refurbishment |
| Module A2 = Transport | Module B6 = Operational energy use |
| Module A3 = Manufacturing | Module B7 = Operational water use |
| Module A4 = Transport | Module C1 = De-construction / Demolition |
| Module A5 = Construction - Installation process | Module C2 = Transport |
| Module B1 = Use | Module C3 = Waste Processing |
| Module B2 = Maintenance | Module C4 = Disposal |
| Module B3 = Repair | Module D = Benefits and loads beyond the product system boundaries |
| Module B4 = Replacement | |

## 3.4 REPRESENTATIVENESS

This EPD is representative for BRIX Brick Cladding System, a product of BRIX Facades Oy. The results of this EPD are representative for Finland.

## 3.5 CUT-OFF CRITERIA

**Product Stage (A1-A3)**

All input flows (e.g. raw materials, transportation, energy use, packaging, etc.) and output flows (e.g. production waste) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass.

# 3 Calculation rules

List of excluded processes:
- The manufacture of equipment used in production, buildings or any other capital goods
- The transport of personnel to the plant;
- The transportation of personnel within the plant
- Research and development activities
- Long-term emissions

**End of life stage (C1-C4)**

When the end of the life stage of the building is reached, the de-construction/demolition begins. This EPD includes de-construction/demolition (C1), the necessary transport (C2) from the demolition site to the sorting location and distance to final disposal. The end of life stage includes the final disposal to landfill (C4), incineration (C3) and needed recycling processes up to the end-of-waste point (C3). Loads and benefits of recycling, re-use and exported energy are part of module D.

**Benefits and Loads beyond the system boundary (Module D)**

This stage contains the potential loads and benefits of recycling and re-use of raw materials/products. The loads contain the needed recycling processes from end-of-waste point up to the point-of-equivalence of the substituted primary raw material and a load for secondary material that will be lost at the end-of-life stage.

The loads and benefits of recycling and reuse are included in this module. The benefits are calculated based on the primary content and the primary equivalent.

## 3.6 ALLOCATION

The production-related energy, packaging material and waste data is based on the total annual production rate (m2). The flows allocated to the products were divided among production rate according to their masses. The data for raw material flows is per product, therefore no allocation was needed.

## 3.7 DATA COLLECTION & REFERENCE PERIOD

All process-specific data was collected 30.4.2023-30.4.2024.

## 3.8 ESTIMATES AND ASSUMPTIONS

This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs. All estimations and assumptions are given below:

- Consumption of diesel (0.5 l/ m2 of BRIX Brick Cladding System) is assumed for the demolition of end-of-life products.
- The waste scenario for steel parts was determined based on NMD ID 73, which relates to Steel, light. According to this standard, the waste treatment process comprises 87% recycling, 12% Re-use, and 1 % landfill.
- The waste scenario for concrete parts was determined based on NMD ID 32, which relates to coarse ceramic (i.a. brickwork, tiles) . According to this standard, the waste treatment process comprises 99% recycling and 1 % landfill.

## 3.9 DATA QUALITY

All process-specific data was collected 30.4.2023-30.4.2024 and is therefore up-to-date. The data is based on the annual average. In order to ensure comparability of the results, only consistent background data of the Ecoinvent database was used in the LCA (e.g., records on energy, transportation, and supplies). The database is regularly reviewed and thus complies with the requirements of EN 15804 (background data not older than 10 years). All consistent datasets contained in the Ecoinvent database are documented and can be viewed in the online Ecoinvent documentation. The life cycle was modelled with the R<THiNK EPD App.

The scenarios included are currently in use and are representative for one of the most likely scenario alternatives.

According to the criteria of the "UN Environmental Global Guidance on LCA database development" mentioned in EN 15804+A2, the data quality for all three representativeness categories (geographical, technical and time) can be described as good.

## 3.10 POWER MIX

In this EPD, the local based approach was considered for the LCA, therefore no guaranties of origin (GO) are needed.

# 4 Scenarios and additional technical information

## 4.1 DE-CONSTRUCTION, DEMOLITION (C1)

The following information describes the scenario for demolition at end of life.

| Description | Amount | Unit |
|---|---|---|
| Diesel, burned in machine (incl. emissions) | 0.500 | l |

## 4.2 TRANSPORT END-OF-LIFE (C2)

The following distances and transport conveyance are assumed for transportation during end of life for the different types of waste processing.

| Waste Scenario | Transport conveyance | Not removed (stays in work) [km] | Landfill [km] | Incineration [km] | Recycling [km] | Re-use [km] |
|---|---|---|---|---|---|---|
| Steel, light (NMD ID 73) | Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 0 |
| coarse ceramic (i.a. brickwork, tiles) (NMD ID 32) | Lorry (Truck), unspecified (default) \| market group for (GLO) | 0 | 100 | 150 | 50 | 0 |

The transport conveyance(s) used in the scenario(s) for transport during end of life has the following characteristics.

| | Value and unit |
|---|---|
| Vehicle type used for transport | Lorry (Truck), unspecified (default) \| market group for (GLO) |
| Fuel type and consumption of vehicle | not available |
| Capacity utilisation (including empty returns) | 50 % (loaded up and return empty) |
| Bulk density of transported products | inapplicable |
| Volume capacity utilisation factor | 1 |

## 4.3 END OF LIFE (C3, C4)

The scenario(s) assumed for end of life of the product are given in the following tables. First the assumed percentages per type of waste processing are displayed, followed by the assumed amounts.

# 4 Scenarios and additional technical information

| Waste Scenario | Region | Not removed (stays in work) [%] | Landfill [%] | Incineration [%] | Recycling [%] | Re-use [%] |
|---|---|---|---|---|---|---|
| Steel, light (NMD ID 73) | NL | 0 | 1 | 0 | 87 | 12 |
| coarse ceramic (i.a. brickwork, tiles) (NMD ID 32) | NL | 0 | 1 | 0 | 99 | 0 |

| Waste Scenario | Not removed (stays in work) [kg] | Landfill [kg] | Incineration [kg] | Recycling [kg] | Re-use [kg] |
|---|---|---|---|---|---|
| Steel, light (NMD ID 73) | 0.000 | 0.075 | 0.000 | 6.542 | 0.902 |
| coarse ceramic (i.a. brickwork, tiles) (NMD ID 32) | 0.000 | 0.421 | 0.000 | 41.669 | 0.000 |
| **Total** | **0.000** | **0.496** | **0.000** | **48.210** | **0.902** |

## 4.4 BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

The presented Benefits and loads beyond the system boundary in this EPD are based on the following calculated Net output flows in kilograms and Energy recovery displayed in MJ Lower Heating Value.

| Waste Scenario | Net output flow [kg] | Energy recovery [MJ] |
|---|---|---|
| Steel, light (NMD ID 73) | 7.444 | 0.000 |
| coarse ceramic (i.a. brickwork, tiles) (NMD ID 32) | 41.669 | 0.000 |
| **Total** | **49.113** | **0.000** |

# 5 Results

For the impact assessment, the characterization factors of the LCIA method EN 15804 +A2 Method v1.0 are used. Long-term emissions (>100 years) are not considered in the impact assessment. The results of the impact assessment are only relative statements that do not make any statements about end-points of the impact categories, exceedance of threshold values, safety margins or risks. The following tables show the results of the indicators of the impact assessment, of the use of resources as well as of waste and other output flows.

## 5.1 ENVIRONMENTAL IMPACT INDICATORS PER SQUARE METER

### CORE ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| AP | mol H+ eqv. | 2.45E-1 | 9.47E-3 | 1.96E-2 | 2.74E-1 | 1.71E-2 | 1.93E-3 | 4.25E-4 | 2.48E-5 | -4.48E-2 |
| GWP-total | kg CO2 eqv. | 4.45E+1 | 1.84E+0 | -1.88E+0 | 4.45E+1 | 1.64E+0 | 3.32E-1 | 6.82E-2 | 2.62E-3 | -1.10E+1 |
| GWP-b | kg CO2 eqv. | 1.32E+0 | 9.85E-4 | -5.19E+0 | -3.87E+0 | 4.56E-4 | 1.53E-4 | 3.93E-4 | 5.16E-6 | 1.06E-1 |
| GWP-f | kg CO2 eqv. | 4.34E+1 | 1.84E+0 | 3.30E+0 | 4.86E+1 | 1.64E+0 | 3.32E-1 | 6.78E-2 | 2.61E-3 | -1.11E+1 |
| GWP-luluc | kg CO2 eqv. | 3.86E-2 | 6.50E-4 | 1.60E-2 | 5.53E-2 | 1.29E-4 | 1.22E-4 | 1.29E-5 | 7.29E-7 | 6.41E-3 |
| EP-m | kg N eqv. | 4.41E-2 | 3.21E-3 | 4.49E-3 | 5.18E-2 | 7.57E-3 | 6.79E-4 | 1.69E-4 | 8.53E-6 | -8.36E-3 |
| EP-fw | kg P eq | 2.63E-3 | 1.46E-5 | 2.08E-4 | 2.85E-3 | 5.97E-6 | 3.35E-6 | 2.11E-6 | 2.93E-8 | -4.10E-4 |
| EP-T | mol N eqv. | 4.69E-1 | 3.54E-2 | 4.82E-2 | 5.53E-1 | 8.30E-2 | 7.48E-3 | 1.88E-3 | 9.43E-5 | -9.77E-2 |
| ODP | kg CFC 11 eqv. | 4.02E-6 | 4.21E-7 | 4.08E-7 | 4.85E-6 | 3.54E-7 | 7.33E-8 | 8.79E-9 | 1.08E-9 | -3.18E-7 |
| POCP | kg NMVOC eqv. | 1.63E-1 | 1.01E-2 | 1.52E-2 | 1.88E-1 | 2.28E-2 | 2.14E-3 | 5.13E-4 | 2.73E-5 | -6.26E-2 |
| ADP-f | MJ | 5.62E+2 | 2.79E+1 | 5.84E+1 | 6.48E+2 | 2.26E+1 | 5.01E+0 | 9.11E-1 | 7.30E-2 | -8.32E+1 |
| ADP-mm | kg Sb-eqv. | 9.98E-4 | 5.01E-5 | 6.75E-5 | 1.12E-3 | 2.51E-6 | 8.41E-6 | 1.91E-7 | 2.39E-8 | -1.54E-5 |
| WDP | m3 world eqv. | 2.61E+3 | 7.80E-2 | 7.93E+1 | 2.69E+3 | 3.02E-2 | 1.79E-2 | 4.13E-3 | 3.27E-3 | -4.41E+0 |

**AP**=Acidification (AP) | **GWP-total**=Global warming potential (GWP-total) | **GWP-b**=Global warming potential - Biogenic (GWP-b) | **GWP-f**=Global warming potential - Fossil (GWP-f) | **GWP-luluc**=Global warming potential - Land use and land use change (GWP-luluc) | **EP-m**=Eutrophication marine (EP-m) | **EP-fw**=Eutrophication, freshwater (EP-fw) | **EP-T**=Eutrophication, terrestrial (EP-T) | **ODP**=Ozone depletion (ODP) | **POCP**=Photochemical ozone formation - human health (POCP) | **ADP-f**=Resource use, fossils (ADP-f) | **ADP-mm**=Resource use, minerals and metals (ADP-mm) | **WDP**=Water use (WDP)

# 5 Results

### ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN15804+A2

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| ETP-fw | CTUe | 1.30E+3 | 2.24E+1 | 8.40E+1 | 1.41E+3 | 1.36E+1 | 4.47E+0 | 7.38E-1 | 4.74E-2 | -3.66E+2 |
| PM | disease incidence | 2.56E-6 | 1.33E-7 | 2.61E-7 | 2.95E-6 | 4.54E-7 | 2.99E-8 | 9.38E-9 | 4.82E-10 | -6.97E-7 |
| HTP-c | CTUh | 3.03E-7 | 6.32E-10 | 1.25E-8 | 3.16E-7 | 4.75E-10 | 1.45E-10 | 1.75E-11 | 1.10E-12 | -9.84E-9 |
| HTP-nc | CTUh | 2.15E-6 | 2.44E-8 | 1.63E-7 | 2.34E-6 | 1.17E-8 | 4.88E-9 | 4.96E-10 | 3.37E-11 | 1.78E-6 |
| IR | kBq U235 eqv. | 1.95E+0 | 1.22E-1 | 4.42E-1 | 2.51E+0 | 9.67E-2 | 2.10E-2 | 2.89E-3 | 3.00E-4 | 1.35E-1 |
| SQP | Pt | 2.10E+2 | 1.93E+1 | 6.15E+2 | 8.45E+2 | 2.88E+0 | 4.34E+0 | 1.52E-1 | 1.53E-1 | -2.05E+1 |

**ETP-fw**=Ecotoxicity, freshwater (ETP-fw) | **PM**=Particulate Matter (PM) | **HTP-c**=Human toxicity, cancer (HTP-c) | **HTP-nc**=Human toxicity, non-cancer (HTP-nc) | **IR**=Ionising radiation, human health (IR) | **SQP**=Land use (SQP)

### CLASSIFICATION OF DISCLAIMERS TO THE DECLARATION OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

| ILCD classification | Indicator | Disclaimer |
|---|---|---|
| ILCD type / level 1 | Global warming potential (GWP) | None |
| | Depletion potential of the stratospheric ozone layer (ODP) | None |
| | Potential incidence of disease due to PM emissions (PM) | None |
| ILCD type / level 2 | Acidification potential, Accumulated Exceedance (AP) | None |
| | Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater) | None |
| | Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine) | None |
| | Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | None |
| | Formation potential of tropospheric ozone (POCP) | None |
| | Potential Human exposure efficiency relative to U235 (IRP) | 1 |
| ILCD type / level 3 | Abiotic depletion potential for non-fossil resources (ADP-minerals&metals) | 2 |
| | Abiotic depletion potential for fossil resources (ADP-fossil) | 2 |
| | Water (user) deprivation potential, deprivation-weighted water consumption (WDP) | 2 |
| | Potential Comparative Toxic Unit for ecosystems (ETP-fw) | 2 |

# 5 Results

| ILCD classification | Indicator | Disclaimer |
|---|---|---|
| | Potential Comparative Toxic Unit for humans (HTP-c) | 2 |
| | Potential Comparative Toxic Unit for humans (HTP-nc) | 2 |
| | Potential Soil quality index (SQP) | 2 |

**Disclaimer 1** – 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.

**Disclaimer 2** – 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.

## 5.2 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI)

**PARAMETERS DESCRIBING RESOURCE USE**

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| PERE | MJ | 1.18E+2 | 3.94E-1 | 5.13E+1 | 1.70E+2 | 1.22E-1 | 6.27E-2 | 5.18E-2 | 5.90E-4 | 1.44E+0 |
| PERM | MJ | 6.12E+0 | 0.00E+0 | 4.47E+1 | 5.09E+1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| PERT | MJ | 1.24E+2 | 3.94E-1 | 9.61E+1 | 2.20E+2 | 1.22E-1 | 6.27E-2 | 5.18E-2 | 5.90E-4 | 1.44E+0 |
| PENRE | MJ | 5.93E+2 | 2.97E+1 | 5.99E+1 | 6.83E+2 | 2.40E+1 | 5.32E+0 | 9.71E-1 | 7.76E-2 | -8.67E+1 |
| PENRM | MJ | 1.14E+1 | 0.00E+0 | 2.07E+0 | 1.35E+1 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| PENRT | MJ | 6.05E+2 | 2.97E+1 | 6.19E+1 | 6.96E+2 | 2.40E+1 | 5.32E+0 | 9.71E-1 | 7.76E-2 | -8.67E+1 |
| SM | Kg | 2.44E-3 | 0.00E+0 | 7.33E-5 | 2.52E-3 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| RSF | MJ | 1.11E-6 | 0.00E+0 | 3.33E-8 | 1.14E-6 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| NRSF | MJ | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| FW | M3 | 4.58E-1 | 2.95E-3 | 5.08E-2 | 5.11E-1 | 1.16E-3 | 6.10E-4 | 3.04E-4 | 7.79E-5 | -9.57E-2 |

**PERE**=renewable primary energy ex. raw materials | **PERM**=renewable primary energy used as raw materials | **PERT**=renewable primary energy total | **PENRE**=non-renewable primary energy ex. raw materials | **PENRM**=non-renewable primary energy used as raw materials | **PENRT**=non-renewable primary energy total | **SM**=use of secondary material | **RSF**=use of renewable secondary fuels | **NRSF**=use of non-renewable secondary fuels | **FW**=use of net fresh water

# 5 Results

## OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| HWD | Kg | 1.01E-1 | 7.31E-5 | 3.07E-3 | 1.04E-1 | 6.14E-5 | 1.27E-5 | 1.59E-6 | 1.09E-7 | -1.29E-3 |
| NHWD | Kg | 2.14E+1 | 1.34E+0 | 1.24E+0 | 2.39E+1 | 2.67E-2 | 3.18E-1 | 1.27E-1 | 4.96E-1 | -1.00E+0 |
| RWD | Kg | 2.46E-3 | 1.90E-4 | 3.21E-4 | 2.97E-3 | 1.57E-4 | 3.29E-5 | 4.09E-6 | 4.80E-7 | 2.55E-5 |

**HWD**=hazardous waste disposed | **NHWD**=non hazardous waste disposed | **RWD**=radioactive waste disposed

## ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

| Abbr. | Unit | A1 | A2 | A3 | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|
| CRU | Kg | 0.00E+0 | 0.00E+0 | 2.71E-2 | 2.71E-2 | 0.00E+0 | 0.00E+0 | 9.02E-1 | 0.00E+0 | 0.00E+0 |
| MFR | Kg | 0.00E+0 | 0.00E+0 | 1.40E+0 | 1.40E+0 | 0.00E+0 | 0.00E+0 | 4.82E+1 | 0.00E+0 | 0.00E+0 |
| MER | Kg | 1.16E-2 | 0.00E+0 | 3.49E-4 | 1.20E-2 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| EET | MJ | 0.00E+0 | 0.00E+0 | -8.64E-2 | -8.64E-2 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| EEE | MJ | 0.00E+0 | 0.00E+0 | -5.02E-2 | -5.02E-2 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |

**CRU**=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy Thermic | **EEE**=Exported Energy Electric

# 5 Results

## 5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER SQUARE METER

### BIOGENIC CARBON CONTENT

The following Information describes the biogenic carbon content in (the main parts of) the product at the factory gate per square meter:

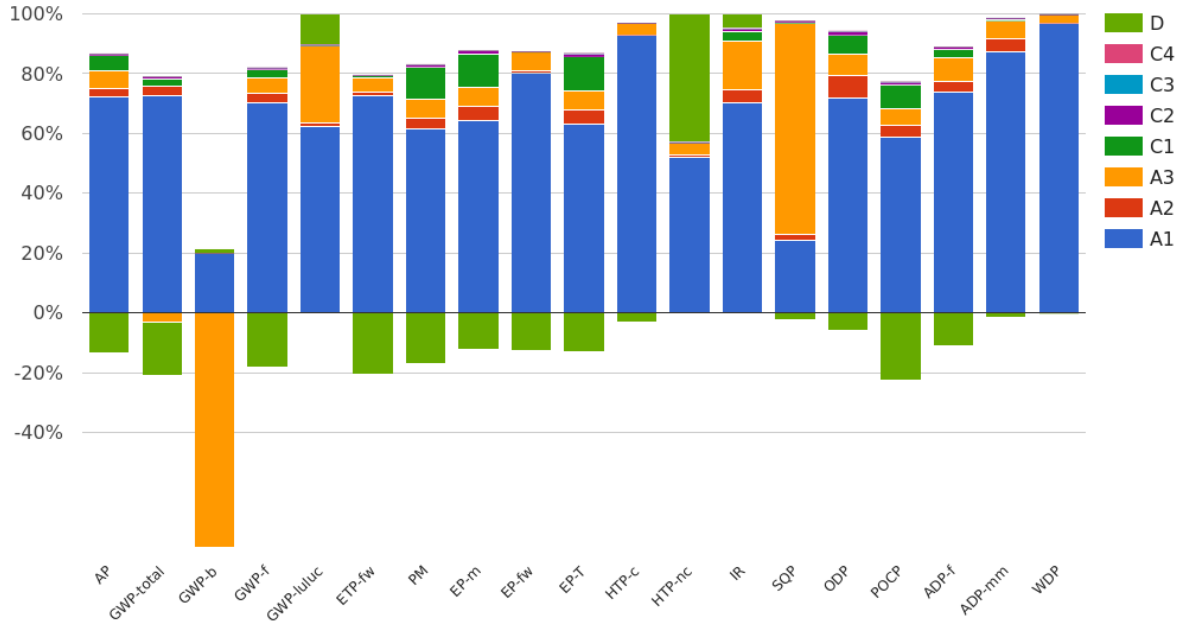
| Biogenic carbon content | Amount | Unit |
|---|---|---|
| Biogenic carbon content in the product | 0 | kg C |
| Biogenic carbon content in accompanying packaging | 1.429 | kg C |

### UPTAKE OF BIOGENIC CARBON DIOXIDE

The following amount of carbon dioxide uptake is taken into account. Related uptake and release of carbon dioxide in downstream processes are not taken into account in this number although they do appear in the presented results. One kilogram of biogenic Carbon content is equivalent to 44/12 kg of biogenic carbon dioxide uptake.

| Uptake Biogenic Carbon dioxide | Amount | Unit |
|---|---|---|
| Packaging | 5.238 | kg CO2 (biogenic) |

# 6 Interpretation of results




As shown in the figure below, the raw material supply (A1) dominates in most environmental core indicators. The highest influence on the Global Warming Potential (GWP-total) have raw material supply (A1). Transports (A2, C2) and waste processing (C3) have rather a minor impact within all core indicators.

The majority of the CO2 emissions within the impact category GWP-biogenic originate from the packaging. Since the module A5, which includes the waste processing of packaging, is not declared there seems to be a disbalance of biogenic CO2 emissions. Therefore, the alleged disbalance can be explained by the fact that module A5 is not included in the EPD.

# 7 References

**ISO 14040**
ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

**ISO 14044**
ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14040:2006

**ISO 14025**
ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

**EN 15804+A2**
EN 15804+A2: 2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

**General PCR Ecobility Experts**
Kiwa-Ecobility Experts (Kiwa-EE) – General Product Category Rules (2022-02-14)

**Specific PCR**
Institut Bauen und Umwelt e.V. - Part B: Requirements on the EPD for Bricks. (2024-04-30)

**EN 771-1 : 2012+A1:2015**
The Standard for Specification for masonry units - Clay masonry units.

**EN 10346 : 2015**
Continuously hot-dip coated steel flat products for cold forming.

**EN 10088-2 : 2014**
Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes.

**EN 998-2 : 2016**
Specification for mortar for masonry - Part 2: Masonry mortar.

**Internal guidance document on TBE PCR for clay construction products**
(Tiles & Bricks Europe. June 2020).

**End-of-waste Criteria for Iron and Steel Scrap: Technical Proposals (EUR 24397 EN - 2010): NMD ID 32.**

**End of Waste criteria Recycling granulates from stony waste: Regulation No. IENM/ BSK-2015/18222 of 5 February 2015: NMD ID 73.**

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