# ENVIRONMENTAL PRODUCT DECLARATION

## IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Green roof and ground cover vegetation mat: Svenska NaturTak Sedummatta och ängsmatta.

Svenska NaturTak AB

**EPD HUB, HUB-3671**

Published on 03.08.2025, last updated on 11.08.2025, valid until 02.08.2030

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.1 (5 Dec 2023) and JRC characterization factors EF 3.1.

Created with One Click LCA

# GENERAL INFORMATION

## MANUFACTURER

| | |
|---|---|
| Manufacturer | Svenska NaturTak AB |
| Address | Borrebackevägen 73 218 74 Tygelsjö |
| Contact details | info@svenskaNaturTak.se |
| Website | https://svenskaNaturTak.se/ |

## EPD STANDARDS, SCOPE AND VERIFICATION

| | |
|---|---|
| Program operator | EPD Hub, hub@epdhub.com |
| Reference standard | EN 15804+A2:2019 and ISO 14025 |
| PCR | EPD Hub Core PCR Version 1.1, 5 Dec 2023 |
| Sector | Construction product |
| Category of EPD | Third party verified EPD |
| Parent EPD number | - |
| Scope of the EPD | Cradle to gate with options, A4-A5, B2 and modules C1-C4, D |
| EPD author | Magnus Kemi |
| EPD verification | Independent verification of this EPD and data, according to ISO 14025:<br>☐ Internal verification ☑ External verification |
| EPD verifier | Silvia Vilčeková, as an authorized verifier acting for EPD Hub Limited |

The manufacturer 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 and if they are not compared in a building context.

## PRODUCT

| | |
|---|---|
| Product name | Green roof and meadow vegetation mat: Svenska NaturTak Sedummatta och ängsmatta |
| Additional labels | - |
| Product reference | - |
| Place of production | Tygelsjö, Sweden |
| Place(s) of installation and use | Sweden |
| Period for data | 01.01.2024-31.12.2024 |
| Averaging in EPD | No averaging |
| Variation in GWP-fossil for A1-A3 | - |

## ENVIRONMENTAL DATA SUMMARY

| | |
|---|---|
| **Declared unit** | One square meter of sedum mat |
| **Declared unit mass** | 21,5 kg |
| **GWP-fossil, A1-A3 ($kgCO_2e$)** | 6,30E+00 |
| **GWP-total, A1-A3 ($kgCO_2e$)** | -9,66E+00 |
| **Secondary material, inputs (%)** | 2,79 |
| **Secondary material, outputs (%)** | 46,9 |
| **Total energy use, A1-A3 (kWh)** | 50,3 |
| **Net freshwater use, A1-A3 ($m^3$)** | 0,47 |

# PRODUCT AND MANUFACTURER

## ABOUT THE MANUFACTURER

Svenska NaturTak AB operates in the field of green roofs. The goal is to provide Sweden's roofs and walls with sustainable, high-quality vegetation. The sedum and meadow mats are grown on the company's own fields in Skåne at the same location as the roof modules are assembled, which enables environmental considerate cultivation and production practices close to the final customer. Svenska NaturTak has been proud growers and suppliers of sedum and meadow mats since 2011. The company is today distributors for Optigreen International AG, one of Europe's leading companies in green roofs, which have been producing and developing products for both roofs and walls for 50 years. Svenska NaturTak also collaborate with Seduna, who carries out installations all over Sweden.

## PRODUCT DESCRIPTION

Svenska NaturTak's sedum and meadow mats are used to create green roof and meadow constructions that provides a green environment, which can be installed on different types of buildings. Besides providing an unique aesthetic impression, green roofs and ground covers provide benefits such as an environment for pollinators, reduction of urban heat islands, and delay and reduction of flood water from heavy precipitation, meaning that the sedum and meadow mats potentially contribute positively to climate change adaptation, as well as biodiversity and ecosystems. The mats also potentially contributes to climate change mitigation through sequestration of $CO_2$. The vegetation mats basically consists of sedum vegetation and a various of meadow flowers grown in growth substrates which are placed on top of retainers. The mats are assembled and grown in Svenska NaturTak's farm to fit the specific purpose of the customer.  The vegetation are sedum plants are suitable for both dry and wet conditions, can grow in a thin layer of soil, and are appealing for pollinators. The sedum and meadow plants are cultivated on Svenska NaturTak's own fields in Tygelsjö using environmental considerate cultivation practices with a low use of fertilizers, pesticides, artificial irrigation, and other agricultural processes. The growth substrate is a mix between mineral and biobased growth media produced in Sweden and Iceland. The retainer is a load-bearing structure that consists of a fleece cloth and a coconut fiber mat, which reinforce the substrate, protects the sedum against erosion and the underlying roof from roots, and retains rain water to enhance irrigation. The retainer materials are produced in France and Sri Lanka. Further information can be found at https://svenskaNaturTak.se/.

## PRODUCT RAW MATERIAL MAIN COMPOSITION

| Raw material category | Amount, mass % | Material origin |
|---|---|---|
| Metals | 0 | - |
| Minerals | 58,6 | Iceland/Sweden |
| Fossil materials | 0,2 | France |
| Bio-based materials | 41,2 | Sweden/Sri Lanka |

## BIOGENIC CARBON CONTENT

Product’s biogenic carbon content at the factory gate

| | |
|---|---|
| Biogenic carbon content in product, kg C | 0,98 |
| Biogenic carbon content in packaging, kg C | 0,57 |

## FUNCTIONAL UNIT AND SERVICE LIFE

| | |
|---|---|
| Declared unit | One square meter of sedum mat |
| Mass per declared unit | 21,5 kg |
| Functional unit | - |
| Reference service life | 40 |

## SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

# PRODUCT LIFE-CYCLE

## SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

| Product stage | | | Assembly stage | | Use stage | | | | | | | End of life stage | | | | Beyond the system boundaries | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D | | |
| x | x | x | x | x | MND | x | MND | MND | MND | MND | MND | x | x | x | x | x | | |
| Raw materials | Transport | Manufacturing | Transport | Assembly | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstruction/ demolition | Transport | Waste processing | Disposal | Reuse | Recovery | Recycling |

*Modules not declared = MND. Modules not relevant = MNR*

## MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The LCA covers the production processes of an average square meter of vegetation mat cultivated and assembled in Tygelsjö and then shipped and installed. The consumption of production and packaging material is based on the manufacturer's experience and measurements. The consumption of electricity, diesel, pesticides, and fertilizer are allocated averages based on measured total consumption and production. The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production, ancillary fuels, and materials such as diesel and fertilizers, energy and materials used for assembling the final product, and handling of waste formed in the production processes at the manufacturing facility. The packaging material included is a reused sea pallet that fits 25 $m^2$ of sedum mat.

The vegetation mat is produced by sowing seeds and cuttings of sedum plants and flowers in a growth substrate based on mineral and compost, which are placed above the retainers which are a coconut fiber mat and a fleece cloth. Water and fertilizers are applied after planting and during the time of growth. When the plants are ready the complete assembly is harvested and shipped to the construction site. The cuttings are harvested from other assemblies which have come further in the growth process. All manufacturing takes place in Tygelsjö, where also traditional farming is done. The cultivation practices includes the use of diesel powered tractors and machinery. The consumption of fuels, water, and fertilizers are based on the manufacturer's measurements.

The study considers the material losses occurring during the manufacturing processes. Manufacturing losses only occur as small amounts of spillage of coconut fiber mat and fleece as spillage of the other components can be reused in new assemblies. The mineral based substrates are modelled based on EPDs for production of the specific products used. While the biobased substrate and the retainers are modelled with the use of generic datapoints.

Transport modes and distances are based on the manufacturer's information. All road transport is modelled as a >32 ton EURO 6 lorry based on the manufacturer's information, while sea transports are modelled as a dry bulk ship, a transport ferry, and a container ship. Transportation distances from supplier's production to Svenska NaturTak are provided by the manufacturer or approximated by using Google Maps.

The energy mix used for all electricity consumption in manufacturing and assembly is a mix between the company's own electricity production with solar cells and the Swedish average energy mix. The study considers losses during electricity transmission and distribution.

## TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

Transportation impacts from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions. The transport to the construction site is set to 100 km with a >32 ton EURO 6 lorry to represent an average installation based on the manufacturer's experience.

The specific energy and water consumption used for installation depends on the specific project, here an average roof installation process according to the manufacturer's experience is applied. First, the assembly is unloaded with a forklift or medium sized wheel loader and then a mobile crane is used to lift the assembly on top of the roof where it is manually fixed onto the underlying roof construction. The energy consumption of the wheel loader and the crane is modelled as diesel used in a construction vehicle with the use of the manufacturer's information on working efficiency per hour and average fuel consumption in construction vehicles from Erlandsson (2013). It is assumed that the wheel loader is transported for 50 km to the construction site with an Euro 6 >32 ton lorry with a round-trip, and that the mobile crane is installed on the lorry that transports the sedum mat to the construction site. Losses during installation are set to zero as the assembly is adapted for each specific project.

## PRODUCT USE AND MAINTENANCE (B1-B7)

Product maintenance (B2) includes annual application of 50 grams of the same type of fertilizer as used under production. For the first two transportation legs it is assumed that the same transport modes and distances as for A1-A3 are used. For the third and last leg a >32t Euro 6 lorry and a distance of 50 km is assumed. No other inputs are considered based on the manufacturer's information. The product life time is set to 40 years based on the manufacturer's experience. The other use stage modules (B1, B3-7) are not included as they are irrelevant.

## PRODUCT END OF LIFE (C1-C4, D)

The end-of-life stage C1-C4 & D includes:

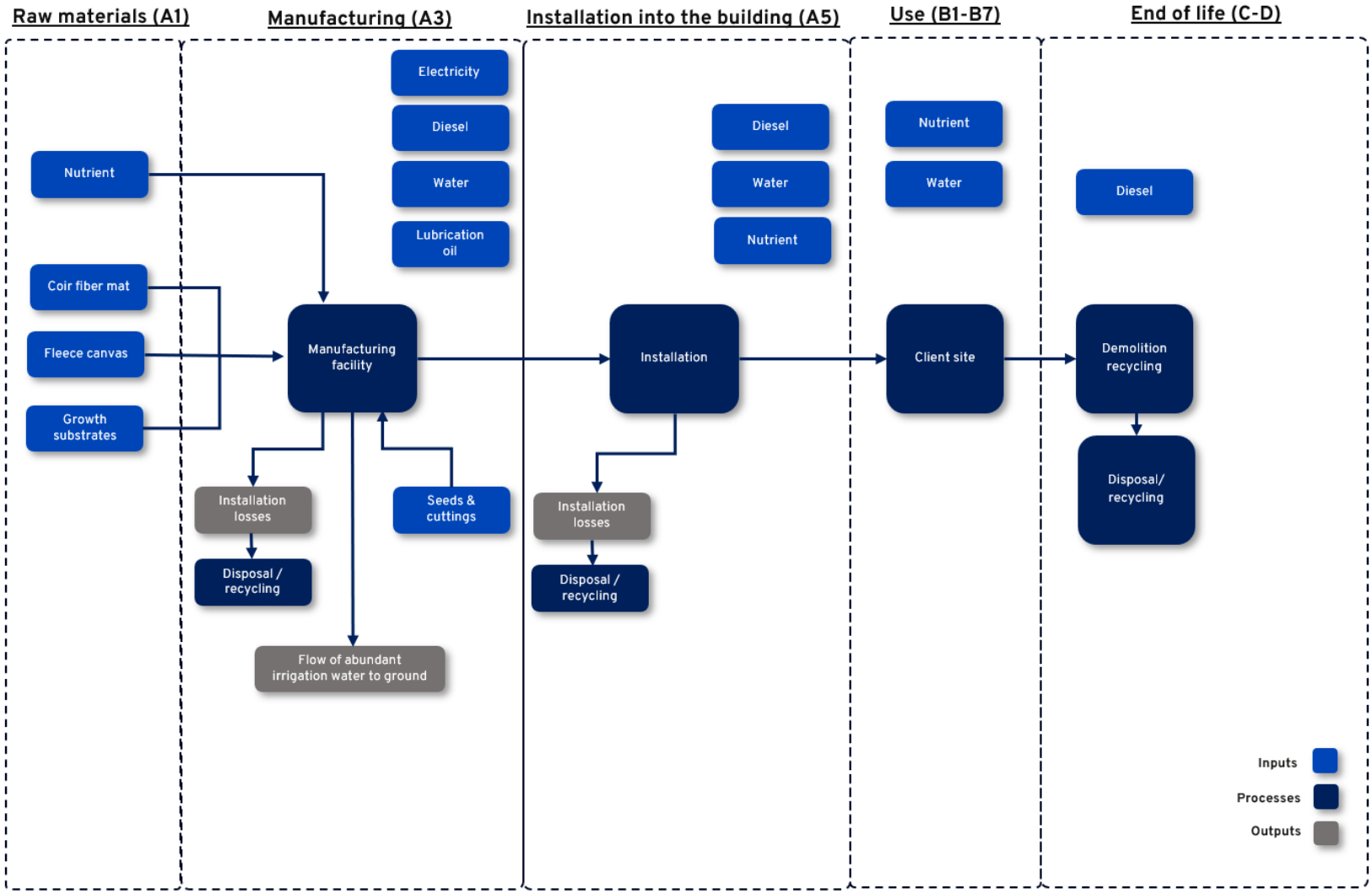
- Deconstruction/demolition (C1)
- Transport to waste management facility (C2)
- Waste processing for reuse, recovery and/or recycling (C3)
- Waste disposal (C4)
- Net benefits and loads beyond the system boundary (D)

At the end-of-life, 100 % of the waste is assumed to be collected as separate construction waste. The end-of-life is assumed to take place in Sweden and therefore all assumptions and scenarios are made to be representative of Swedish waste treatment processes. The demolition processes are modelled as diesel use in a building machine. The diesel consumption is based on that demolition work consumes 10 kWh/ton of building material, which is based

on Erlandsson & Petterson (2015). The waste sedum plants, growth substrate, fleece, and coconut fiber mat are initially manually separated and sorted at the demolition site. The transport of waste material to waste treatment is set to 50 km with a >32 ton EURO 6 lorry. It is assumed that there are no or only negligible mass losses during demolition, transport, and handling of the waste. The waste is further sorted and crushed in the waste treatment plant. It is assessed that 100 % of the waste sedum plants and the biobased growth substrate are handled with anaerobic digestion, that 80 % of the mineral growth substrate is recycled and the remaining 20 % is sent to landfill, while 100 % of the fleece and coconut fiber mat are incinerated with energy recovery.

Module D includes reuse, recovery and/or recycling potentials conveyed as benefits and net impacts. Based on Erlandsson & Holm (2015) it is assumed that the recycled waste mineral substrates are used as filling material and thereby replaces the production of gravel. Benefits from the incineration of waste includes heat and electricity based on the energy content of the incinerated materials. Loads and impacts from the recycling processes are included in the waste treatment processes in Module C. The recycled content of the original product is set to 0 % based on raw material data. The study does not include any benefits from the anaerobic digestion of biobased waste as the output amount is considered as negligible.

# MANUFACTURING PROCESS



# LIFE-CYCLE ASSESSMENT

## CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1 % of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5 % of energy usage or mass.

## ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

| Data type | Allocation |
|---|---|
| Raw materials | - |
| Packaging material | - |
| Ancillary materials | - |
| Manufacturing energy and waste | - |

## AVERAGES AND VARIABILITY

| | |
|---|---|
| Type of average | No averaging |
| Averaging method | Not applicable |
| Variation in GWP-fossil for A1-A3 | Not applicable |

The results of this EPD represents the average production, installation, and end-of-life treatment of Svenska NaturTak's vegetation mats. No other products are produced and installed with the same procedures as Svenska NaturTak's sedum mats.

## LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology ‘allocation, Cut-off, EN 15804+A2‘.

CEER. 2020. 2nd CEER Report on Power Losses. Council of European Energy Regulators.

Erlandsson, M. 2013. Generell byggproduktinformation (BPI) för bygg- och fastighetssektorn: Miljödata för arbetsfordon. IVL

Erlandsson, M., Holm, D. 2015. Livslängdsdata samt återvinningsscenarion för mer transparenta och jämförbara livscykelberäkningar för byggnader. IVL

Erlandsson, M., Petterson, D. 2015. Klimatpåverkan för byggnader med olika Energiprestanda: Underlagsrapport till kontrollstation 2015. IVL

# ENVIRONMENTAL IMPACT DATA

## CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2

| Impact category | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GWP – total[1)] | kg $CO_2$e | -8,73E+00 | 7,30E-01 | -8,82E-01 | -8,88E+00 | 4,45E-01 | 2,92E+00 | MND | 2,40E-02 | MND | MND | MND | MND | MND | 1,82E-01 | 1,15E-01 | 6,42E-01 | 1,44E+01 | -2,59E-01 |
| GWP – fossil | kg $CO_2$e | 5,16E+00 | 7,30E-01 | 1,19E+00 | 7,08E+00 | 4,45E-01 | 8,46E-01 | MND | 2,40E-02 | MND | MND | MND | MND | MND | 1,82E-01 | 1,15E-01 | 6,49E-01 | 8,59E-02 | -2,59E-01 |
| GWP – biogenic | kg $CO_2$e | -1,44E+01 | 0,00E+00 | -2,07E+00 | -1,64E+01 | 0,00E+00 | 2,07E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | -7,43E-03 | 1,44E+01 | 0,00E+00 |
| GWP – LULUC | kg $CO_2$e | 4,66E-01 | 3,27E-04 | 2,31E-03 | 4,69E-01 | 1,73E-04 | 2,04E-04 | MND | 6,44E-06 | MND | MND | MND | MND | MND | 1,86E-05 | 5,16E-05 | 4,17E-04 | 1,14E-05 | -3,42E-04 |
| Ozone depletion pot. | kg $CFC_{-11}$e | 5,60E-08 | 1,40E-08 | 2,01E-08 | 9,02E-08 | 9,28E-09 | 1,42E-08 | MND | 4,85E-10 | MND | MND | MND | MND | MND | 2,78E-09 | 1,70E-09 | 5,13E-09 | 4,52E-10 | -2,82E-09 |
| Acidification potential | mol $H^+$e | 1,25E-01 | 6,20E-03 | 8,26E-03 | 1,39E-01 | 1,05E-03 | 6,11E-03 | MND | 1,63E-04 | MND | MND | MND | MND | MND | 1,64E-03 | 3,94E-04 | 3,26E-03 | 1,85E-04 | -1,72E-03 |
| EP-freshwater[2)] | kg Pe | 3,04E-02 | 4,48E-05 | -1,79E-04 | 3,03E-02 | 3,11E-05 | 4,27E-05 | MND | 2,75E-06 | MND | MND | MND | MND | MND | 5,24E-06 | 8,99E-06 | 1,60E-04 | -1,71E-02 | -1,54E-04 |
| EP-marine | kg Ne | 6,08E-02 | 1,49E-03 | 2,96E-03 | 6,52E-02 | 2,75E-04 | 2,87E-03 | MND | 2,04E-05 | MND | MND | MND | MND | MND | 7,61E-04 | 1,29E-04 | 8,09E-04 | 1,01E-04 | -2,42E-04 |
| EP-terrestrial | mol Ne | 5,37E-01 | 1,65E-02 | 3,30E-02 | 5,86E-01 | 2,98E-03 | 2,97E-02 | MND | 4,66E-04 | MND | MND | MND | MND | MND | 8,33E-03 | 1,41E-03 | 8,38E-03 | 1,05E-03 | -2,42E-03 |
| POCP ("smog")[3)] | kg NMVOCe | 2,49E-02 | 5,78E-03 | 1,06E-02 | 4,13E-02 | 1,82E-03 | 9,32E-03 | MND | 7,03E-05 | MND | MND | MND | MND | MND | 2,48E-03 | 5,80E-04 | 3,81E-03 | 2,99E-04 | -7,70E-04 |
| ADP-minerals & metals[4)] | kg Sbe | 4,61E-05 | 1,77E-06 | 8,10E-06 | 5,59E-05 | 1,27E-06 | 9,21E-07 | MND | 2,05E-07 | MND | MND | MND | MND | MND | 6,51E-08 | 3,22E-07 | 9,96E-07 | 3,74E-08 | -2,69E-07 |
| ADP-fossil resources | MJ | 5,29E+01 | 1,05E+01 | 1,66E+01 | 8,00E+01 | 6,68E+00 | 1,15E+01 | MND | 2,80E-01 | MND | MND | MND | MND | MND | 2,38E+00 | 1,68E+00 | 6,33E+00 | -7,51E-01 | -4,32E+00 |
| Water use[5)] | $m^3$e depr. | 2,11E+01 | 4,91E-02 | 3,28E-01 | 2,14E+01 | 3,42E-02 | 5,12E-02 | MND | 1,38E-02 | MND | MND | MND | MND | MND | 5,94E-03 | 8,27E-03 | 3,55E-02 | 1,43E-02 | -7,05E-02 |

*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

| Impact category | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Particulate matter | Incidence | 9,55E-07 | 5,89E-08 | 6,74E-08 | 1,08E-06 | 4,34E-08 | 1,78E-07 | MND | 1,72E-09 | MND | MND | MND | MND | MND | 4,66E-08 | 1,16E-08 | 2,31E-07 | 2,83E-09 | -1,49E-08 |
| Ionizing radiation[6)] | kBq U235e | 1,10E-01 | 1,11E-02 | 4,87E-02 | 1,70E-01 | 8,05E-03 | 8,74E-03 | MND | 7,38E-04 | MND | MND | MND | MND | MND | 1,05E-03 | 1,46E-03 | 8,90E-03 | -1,68E-04 | -6,86E-02 |
| Ecotoxicity (freshwater) | CTUe | 1,75E+02 | 1,14E+00 | 3,34E+00 | 1,80E+02 | 7,87E-01 | 9,92E-01 | MND | 1,13E-01 | MND | MND | MND | MND | MND | 1,31E-01 | 2,37E-01 | 1,36E+01 | 1,50E-01 | -4,81E-01 |
| Human toxicity, cancer | CTUh | -6,57E-09 | 1,31E-10 | 2,22E-09 | -4,22E-09 | 7,41E-11 | 1,16E-10 | MND | 1,46E-11 | MND | MND | MND | MND | MND | 1,87E-11 | 1,91E-11 | 2,03E-10 | -1,93E-11 | -5,11E-11 |
| Human tox. non-cancer | CTUh | -5,30E-07 | 5,89E-09 | 2,41E-08 | -5,00E-07 | 4,32E-09 | 4,09E-09 | MND | 3,41E-10 | MND | MND | MND | MND | MND | 2,96E-10 | 1,08E-09 | 5,97E-09 | 8,37E-10 | -2,16E-09 |
| SQP[7)] | - | 2,97E+02 | 8,48E+00 | 1,77E+02 | 4,83E+02 | 6,72E+00 | 4,24E+00 | MND | 4,47E-02 | MND | MND | MND | MND | MND | 1,67E-01 | 1,69E+00 | 3,36E+00 | 7,81E-01 | -1,57E+00 |

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 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Renew. PER as energy[8)] | MJ | 1,15E+02 | 1,53E-01 | 1,40E+01 | 1,29E+02 | 1,09E-01 | -1,76E+01 | MND | 1,17E-02 | MND | MND | MND | MND | MND | 1,50E-02 | 2,30E-02 | -3,58E+01 | -6,99E+00 | -8,28E-01 |
| Renew. PER as material | MJ | 4,80E+00 | 0,00E+00 | 1,82E+01 | 2,30E+01 | 0,00E+00 | -1,82E+01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | -4,80E+00 | 0,00E+00 |
| Total use of renew. PER | MJ | 1,20E+02 | 1,53E-01 | 3,22E+01 | 1,52E+02 | 1,09E-01 | -3,57E+01 | MND | 1,17E-02 | MND | MND | MND | MND | MND | 1,50E-02 | 2,30E-02 | -3,58E+01 | -1,18E+01 | -8,28E-01 |
| Non-re. PER as energy | MJ | 5,30E+01 | 1,05E+01 | 1,54E+01 | 7,88E+01 | 6,68E+00 | 1,15E+01 | MND | 2,81E-01 | MND | MND | MND | MND | MND | 2,38E+00 | 1,68E+00 | 6,33E+00 | -7,51E-01 | -4,33E+00 |
| Non-re. PER as material | MJ | 0,00E+00 | 0,00E+00 | 1,20E+00 | 1,20E+00 | 0,00E+00 | -1,20E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Total use of non-re. PER | MJ | 5,30E+01 | 1,05E+01 | 1,66E+01 | 8,00E+01 | 6,68E+00 | 1,03E+01 | MND | 2,81E-01 | MND | MND | MND | MND | MND | 2,38E+00 | 1,68E+00 | 6,33E+00 | -7,51E-01 | -4,33E+00 |
| Secondary materials | kg | 5,99E-01 | 4,76E-03 | 7,74E-02 | 6,81E-01 | 2,89E-03 | 4,98E-03 | MND | 9,39E-05 | MND | MND | MND | MND | MND | 9,87E-04 | 7,13E-04 | 3,48E-03 | 2,50E-04 | -5,41E-04 |
| Renew. secondary fuels | MJ | 9,62E-02 | 4,75E-05 | 6,13E-01 | 7,09E-01 | 3,64E-05 | 2,95E-05 | MND | 6,46E-07 | MND | MND | MND | MND | MND | 2,58E-06 | 9,06E-06 | 1,47E-05 | 2,70E-06 | -1,89E-06 |
| Non-ren. secondary fuels | MJ | 3,08E+00 | 0,00E+00 | 0,00E+00 | 3,08E+00 | 0,00E+00 | 0,00E+00 | MND | 0,00E+00 | 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 | $m^3$ | 4,62E-01 | 1,38E-03 | 8,01E-03 | 4,71E-01 | 9,86E-04 | -5,58E-04 | MND | 3,32E-04 | MND | MND | MND | MND | MND | 1,57E-04 | 2,48E-04 | -4,97E-03 | 4,85E-04 | -3,05E-03 |

*8) PER = Primary energy resources.*

## END-OF-LIFE – WASTE

| Impact category | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hazardous waste | kg | 1,11E+00 | 1,52E-02 | 6,80E-02 | 1,19E+00 | 9,66E-03 | 1,69E-02 | MND | 6,05E-04 | MND | MND | MND | MND | MND | 2,65E-03 | 2,84E-03 | 3,10E-02 | 3,16E-03 | -2,01E-02 |
| Non-hazardous waste | kg | 5,87E+00 | 2,83E-01 | 1,28E+00 | 7,44E+00 | 1,93E-01 | 2,90E+00 | MND | 1,37E-02 | MND | MND | MND | MND | MND | 3,60E-02 | 5,25E-02 | 9,57E+00 | 4,29E-01 | -7,56E-01 |
| Radioactive waste | kg | 5,79E-05 | 2,73E-06 | 1,39E-05 | 7,46E-05 | 1,99E-06 | 2,16E-06 | MND | 1,88E-07 | MND | MND | MND | MND | MND | 2,58E-07 | 3,57E-07 | 2,16E-06 | 8,02E-08 | -1,92E-05 |

## END-OF-LIFE – OUTPUT FLOWS

| Impact category | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | 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 | MND | 0,00E+00 | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Materials for recycling | kg | 2,37E-03 | 0,00E+00 | 0,00E+00 | 2,37E-03 | 0,00E+00 | 3,80E-01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 1,01E+01 | 0,00E+00 | -8,44E-07 |
| Materials for energy rec | kg | 4,04E-05 | 0,00E+00 | 2,40E-03 | 2,44E-03 | 0,00E+00 | 0,00E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 4,50E-01 | -2,25E-15 |
| Exported energy | MJ | 7,35E-01 | 0,00E+00 | 0,00E+00 | 7,35E-01 | 0,00E+00 | 1,90E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | 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 | 8,00E-01 | MND | 0,00E+00 | MND | MND | MND | MND | MND | 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 | 1,10E+00 | MND | 0,00E+00 | MND | MND | MND | MND | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

## ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

| Impact category | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Global Warming Pot. | kg $CO_2$e | 5,70E+00 | 7,25E-01 | 1,19E+00 | 7,61E+00 | 4,42E-01 | 8,68E-01 | MND | 2,38E-02 | MND | MND | MND | MND | MND | 1,81E-01 | 1,15E-01 | 1,21E+00 | 8,95E-02 | -2,84E-01 |
| Ozone depletion Pot. | kg $CFC_{-11}$e | 4,67E-08 | 1,12E-08 | 1,64E-08 | 7,43E-08 | 7,38E-09 | 1,12E-08 | MND | 3,96E-10 | MND | MND | MND | MND | MND | 2,20E-09 | 1,36E-09 | 4,22E-09 | 2,69E-10 | -5,59E-09 |
| Acidification | kg $SO_2$e | 7,17E-02 | 4,97E-03 | 6,11E-03 | 8,28E-02 | 8,32E-04 | 4,35E-03 | MND | 1,17E-04 | MND | MND | MND | MND | MND | 1,15E-03 | 3,01E-04 | 2,63E-03 | 1,26E-04 | -1,62E-03 |
| Eutrophication | kg $PO_4^3$e | 1,34E-01 | 6,67E-04 | 1,66E-02 | 1,51E-01 | 2,08E-04 | 1,04E-03 | MND | 3,41E-05 | MND | MND | MND | MND | MND | 2,69E-04 | 7,32E-05 | 5,09E-04 | 5,22E-05 | -1,68E-04 |
| POCP (“smog”) | kg $C_2H_4$e | 1,67E-03 | 3,00E-04 | 6,26E-04 | 2,60E-03 | 8,49E-05 | 3,43E-04 | MND | 5,22E-06 | MND | MND | MND | MND | MND | 8,64E-05 | 2,68E-05 | 8,00E-04 | 8,31E-06 | -8,57E-05 |
| ADP-elements | kg Sbe | 2,52E-05 | 1,73E-06 | 7,98E-06 | 3,49E-05 | 1,24E-06 | 8,96E-07 | MND | 2,04E-07 | MND | MND | MND | MND | MND | 6,33E-08 | 3,14E-07 | 9,73E-07 | 3,47E-08 | -2,66E-07 |
| ADP-fossil | MJ | 4,88E+01 | 1,03E+01 | 1,56E+01 | 7,46E+01 | 6,55E+00 | 1,14E+01 | MND | 2,68E-01 | MND | MND | MND | MND | MND | 2,36E+00 | 1,65E+00 | 6,19E+00 | -7,41E-01 | -3,11E+00 |

## ENVIRONMENTAL IMPACTS – GWP-GHG

| Impact category | Unit | A1 | A2 | A3 | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GWP-GHG[9)] | kg $CO_2e$ | 5,62E+00 | 7,30E-01 | 1,19E+00 | 7,55E+00 | 4,45E-01 | 8,47E-01 | MND | 2,40E-02 | MND | MND | MND | MND | MND | 1,82E-01 | 1,15E-01 | 6,49E-01 | 8,60E-02 | -2,59E-01 |

*9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterisation factors for the flows - CH4 fossil, CH4 biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO2 is set to zero.*

# VERIFICATION STATEMENT

## VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

## THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Silvia Vilčeková, as an authorized verifier acting for EPD Hub Limited
03.08.2025