

Short Report

Calculation of the life cycle assessment for facade elements Litho-Stone upcycling

Project no: EAL-23-0393
Order no: EAL-00205-23

Auftraggeber: Lithodecor Fassaden GmbH
Mylauer Straße
08491 Netzschkau

Project manager: B. Sc. Bastian Bartsch

Altenberge, 06.11.2023

Objective of the study and implementation

Lithodecor Fassaden GmbH wants to fulfill its ecological responsibility and aims to make its production processes more sustainable. Furthermore *Lithodecor Fassaden GmbH* is receiving more and more requests from customers to show their products in terms of their ecological balance. The life cycle assessments of these products should also be used to participate in tenders.

Declared unit

The declared unit of the study is 1 m² of *Litho-Stone upcycling* facade element from production at Netzschkau.

Product description

The *Litho-Stone upcycling* facade element is a lightweight construction element consisting of a lightweight concrete panel with aluminum brackets, which is glued to a natural stone panel for a visual finish. The natural stone slabs used here are obtained from old natural stone slabs or old natural stone facade elements.

System limit

The present study is a cradle-to-gate analysis.

Electricity mix

To represent the electrical energy flow the electricity mix for Germany relevant to the reference year 2020 was used.

Cut-off criteria

The ceramic holders were not taken into account in the study due to the small amount used and the fact that no suitable data set could be found in the modeling software.

Allocations

No allocation method was used in the life cycle assessment study under consideration.

Data quality

The data quality can generally be described as very good and meets the requirements of the objective of the present study.

EAL-00205-23 / Lithodecor Fassaden GmbH / Calculation of the life cycle assessment for facade elements
 13.03.2023 / bnb_wce / **page 3 of 5**

Calculation method, evaluation method

The data collected in the study was processed using the *LCA for experts software* of the provider *Sphera*. The *EN15804+A2* method was used for the quantitative aggregation of the life cycle inventory data with regard to their environmental impacts.

Results of the LCA

category	unit	raw materials A1	transport A2	production A3	total
Environmental impact indicators					
Climate change - total	kg CO ₂ -equiv.	12,84	1,92	22,89	37,66
Climate change - fossil	kg CO ₂ -equiv.	12,66	1,92	22,70	37,28
Climate change - biogen	kg CO ₂ -equiv.	0,18	-8,25E-03	0,19	0,36
Climate change, land use and land use change	kg CO ₂ -equiv.	3,32E-03	1,05E-02	2,99E-03	1,68E-02
Ozone depletion potential	kg CFC-11-equiv.	5,59E-11	4,54E-13	4,32E-10	4,89E-10
Acidification potential	Mol H ⁺ -equiv.	2,99E-02	9,16E-03	2,67E-02	6,57E-02
Eutrophication, fresh water	kg P- equiv.	4,58E-05	4,24E-06	7,87E-05	1,29E-04
Eutrophication, marine ecosystems	kg N- equiv.	6,58E-03	4,31E-03	9,09E-03	2,04E-02
Eutrophication, terrestrial ecosystems	Mol N-equiv.	7,07E-02	4,91E-02	9,98E-02	2,20E-01
Photochemical ozone formation potential, human Health	kg NMVOC-equiv.	2,07E-02	8,64E-03	2,40E-02	5,34E-02
Resource consumption, minerals and metals	kg Sb-equiv.	1,04E-06	1,26E-07	2,70E-06	3,86E-06
Resource consumption, fossil	MJ	196,05	26,21	353,83	576,09
Water use	m ³ world-equiv.	0,56	0,01	0,42	0,99
Resource usage indicators					

EAL-00205-23 / Lithodecor Fassaden GmbH / Calculation of the life cycle assessment for facade elements
 13.03.2023 / bnb_wce / **page 4 of 5**

Consumption of renewable primary energy (PERE)	MJ	30,19	1,59	195,11	226,89
Primary energy for material use (PERM)	MJ	0,00	0,00	0,00	0,00
Total consumption of renewable primary energy (PERT)	MJ	30,19	1,59	195,11	226,89
Consumption of non-renewable primary energy (PENRE)	MJ	196,18	26,26	353,90	576,34
Use of non-renewable primary energy resources as raw materials (PENRM)	MJ	0,00	0,00	0,00	0,00
Total consumption of non-renewable primary energy (PENRT)	MJ	196,18	26,26	353,90	576,34
Input of secondary materials (SM)	kg	0,00	0,00	0,00	0,00
Consumption of secondary fuels (RSF)	MJ	0,00	0,00	0,00	0,00
Consumption of non-renewable secondary fuels (NRSF)	MJ	0,00	0,00	0,00	0,00
Fresh water consumption (FW)	m ³	3,06E-02	1,43E-03	6,08E-02	9,29E-02
Output flows and waste categories					
Hazardous Waste for Disposal (HWD)	kg	1,28E-08	5,85E-11	-5,00E-10	1,24E-08
Non-hazardous waste for disposal (NHWD)	kg	0,99	3,82E-03	13,04	14,03
radioactive waste for disposal (RWD)	kg	3,00E-03	3,43E-05	1,76E-02	2,07E-02
Components for reuse (CRU)	kg	0,00	0,00	0,00	0,00
Materials for recycling (MFR)	kg	0,00	0,00	0,00	0,00

EAL-00205-23 / Lithodecor Fassaden GmbH / Calculation of the life cycle assessment for facade elements
13.03.2023 / bnb_wce / **page 5 of 5**

Materials for energy recovery (MER)	kg	0,00	0,00	0,00	0,00
Exported energy electrical (EEE)	MJ	0,00	0,00	0,00	0,00
Exported energy thermal (EET)	MJ	0,00	0,00	0,00	0,00

Matthias Mundt

Specialist in toxicology
Head of Toxicology and Chemicals Law

Bastian Bartsch

B.Sc. Industrial engineering
project manager