

Environmental Product Declaration

According to ISO 14025 and EN 15804+A2

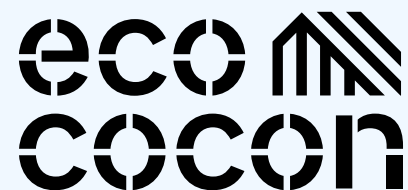


Standard and Braced Straw Panel



Owner of Declaration
Publisher
Program operator
Calculation number
Issue Date

EcoCocon s.r.o.
Hedgehog Company B.V.
N.a.
EPD-2022-7601
7-11-2022



General information

Company

Manufacturer	EcoCocon s.r.o.
Address	Záhradnícka 60, 821 08 Bratislava, Slovakia
Production location	Kybartia, Lithuania
E-mail	info@ecococon.eu
Website	https://ecococon.eu/

EPD information

EPD for	Standard and Braced Straw Panels
Projectnumber	EPD-2022-7601
Date of Issue	7-10-2022
Date of validity	7-10-2027
Product Category Rules	EN15804+A2 / NMD Assessment Method
Declared unit	1 m ²
Reference Service Life	75 years

Scope of declaration

This is a cradle-to-grave EPD for the EcoCocon Straw Panel, serving as a constructive and insulating element. The declared life cycle stages are as shown below (x = included, MND = module not declared)

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
x	x	x	x	x	x	x	x	x	x	MND	MND	x	x	x	x	x

Verification statement of the background LCA

CEN standard EN15804, as basis for NMD Assessment method serves as core PCR. Independent verification of the background LCA report and data, according to EN ISO 14040/14044:

Internal External

Third party verifier:



Pieter Stadhouders, EcoReview NL B.V.

Product description

The EcoCocon Straw Panel is a straw insulated wall panel, which always has a depth of 40 cm. The exact dimensions of the EcoCocon panels vary. This EPD is based on the background LCA for panel types Standard and Braced. The panel types Inclined, Sill, Lintel and Column are not included. The product consists of a wooden frame with straw filling. The wall panels serve as constructive and insulating elements.

Calculation rules

Production (A1-A3)

The Straw Panel is produced in Kybartai, Lithuania. Within the production stage modules the following is included:

- The provision of resources, energy and additives;
- Transport of resources to the production location;
- On-site production processes including energy;
- Transport and treatment of production residues

Construction stage (A4-A5)

In line with the Assessment Method, the distance to the construction site is measured to Utrecht, The Netherlands. The distance of 1526 km runs from the production site in Kybartai, Lithuania. Additives, energy and materials required during the installation stage are included in module A5.

Use stage (B1-B5)

No relevant material and energy inputs are required in this module. Neither any hazardous emissions to air, soil or water are emitted during the use stage. The potential impact of this stage is therefore negligible and declared as 0.

End-of-life stage (C1-C4)

Resources and energy required during the deconstruction stage are included in module C1. After deconstruction, the panels transported and processed according to the standard waste treatment scenarios as prescribed by the Assessment Method.

Benefits and loads beyond the system boundary (D)

The potential loads and benefits of recycling and reuse of materials are included in this EPD. Next to that, the potential benefits from incineration are calculated and included as well. The product consists of a wooden frame with straw filling.

Allocation

Straw is a by-product of wheat production. The environmental impact of straw is derived through economical allocation, based on EU average prices in september 2021.

Biogenic carbon content

The biogenic carbon content of the Straw panel is 25,75 kg C per m² panel.

Environmental impact per declared unit

The LCA results are presented in accordance with the Assessment Method. Set 1 is in accordance with EN15804+A1:2013, and is supplemented with the correct characterization factors as described in the Assessment method. Set 2, in accordance with EN15804+A2:2019, is an addition to the first set and contains additional environmental impact categories.

Indicators A1										
	A1-A3	A4	A5	B1-B5	C1	C2	C3	C4	D	Total
ADPE	2,94E-03	3,33E-04	5,96E-04	0,00E+00	5,22E-07	1,95E-05	3,93E-06	3,41E-07	-8,26E-04	3,07E-03
ADPF	1,93E+02	1,99E+02	1,72E+01	0,00E+00	4,55E+00	1,17E+01	6,11E+00	7,61E-01	-5,07E+01	3,80E+02
GWP	1,43E+01	1,30E+01	1,23E+00	0,00E+00	3,31E-01	7,63E-01	5,12E-01	2,26E-01	-4,07E+00	2,64E+01
ODP	1,59E-06	2,31E-06	1,29E-07	0,00E+00	5,68E-08	1,35E-07	5,88E-08	7,87E-09	-1,00E-06	3,29E-06
POCP	1,16E-02	7,85E-03	7,56E-04	0,00E+00	3,33E-04	4,61E-04	2,23E-03	7,08E-05	-1,21E-02	1,11E-02
AP	8,91E-02	5,72E-02	6,29E-03	0,00E+00	2,47E-03	3,36E-03	1,17E-02	2,10E-04	-7,20E-02	9,84E-02
EP	3,47E-02	1,12E-02	1,40E-03	0,00E+00	5,62E-04	6,59E-04	3,02E-03	8,64E-05	-2,33E-02	2,84E-02

Toxicity indicators for Dutch market

HTP	9,69E+00	5,48E+00	1,20E+00	0,00E+00	1,21E-01	3,21E-01	1,40E+00	1,96E-02	-6,39E+00	1,19E+01
FAETP	5,99E-01	1,60E-01	2,72E-02	0,00E+00	1,70E-03	9,38E-03	1,11E-02	3,19E-04	-1,25E-01	6,84E-01
MAETP	4,84E+02	5,75E+02	3,91E+01	0,00E+00	5,91E+00	3,37E+01	2,92E+01	1,31E+00	-1,74E+02	9,94E+02
TETP	2,53E-01	1,94E-02	1,43E-02	0,00E+00	2,19E-04	1,14E-03	1,49E-03	6,37E-05	-1,13E-02	2,79E-01
ECI	2,38E+00	1,57E+00	2,20E-01	0,00E+00	4,00E-02	9,00E-02	2,30E-01	2,00E-02	-1,33E+00	3,22E+00
ADPF	9,27E-02	9,57E-02	8,26E-03	0,00E+00	2,19E-03	5,61E-03	2,94E-03	3,66E-04	-2,44E-02	1,83E-01

ADPE = Abiotic depletion potential for non-fossil resources [kg Sb-eq]; **ADPF** = Abiotic depletion potential for fossil resources [MJ]; **GWP** = Global warming potential [kg CO₂-eq]; **ODP** = Depletion potential of the stratospheric ozone layer [kg CFC-11-eq]; **POCP** = Formation potential of tropospheric ozone photochemical oxidants [kg ethene-eq]; **AP** = Acidification potential of land and water [kg SO₂-eq]; **EP** = Eutrophication potential [kg PO₄ 3--eq]; **HTP** = Human toxicity potential [kg 1,4-DB-eq]; **FAETP** = Freshwater aquatic ecotoxicity potential [kg 1,4-DB-eq]; **MAETP** = Marine aquatic ecotoxicity potential [kg 1,4-DB-eq]; **TETP** = Terrestrial ecotoxicity potential [kg 1,4-DB-eq]; **ECI** = Environmental Costs Indicator [euro]; **ADPF** = Abiotic depletion potential for fossil resources [kg Sb-eq]

Resource use										
Parameter	A1-A3	A4	A5	B1-B5	C1	C2	C3	C4	D	Total
PERE	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERM	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	8,39E+02	2,48E+00	-1,69E+01	0,00E+00	3,01E-02	1,45E-01	3,00E-01	1,32E-02	-9,06E+02	-8,11E+01
PENRE	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRM	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	2,08E+02	2,10E+02	1,79E+01	0,00E+00	4,88E+00	1,23E+01	5,94E+00	8,00E-01	-5,08E+01	4,10E+02
SM	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	1,24E+00	2,41E-02	4,39E-02	0,00E+00	2,65E-04	1,41E-03	2,67E-02	7,86E-04	-1,53E-02	1,32E+00
Waste categories										
Parameter	A1-A3	A4	A5	B1-B5	C1	C2	C3	C4	D	Total
HWD	8,18E-04	5,02E-04	1,16E-04	0,00E+00	1,24E-05	2,94E-05	1,48E-05	1,16E-06	-3,21E-04	1,17E-03
NHWD	3,04E+00	1,26E+01	2,23E-01	0,00E+00	5,32E-03	7,36E-01	3,57E-01	-2,98E+00	-1,32E+00	1,26E+01
RWD	1,01E-03	1,30E-03	8,84E-05	0,00E+00	3,17E-05	7,62E-05	1,77E-05	4,48E-06	-2,74E-04	2,26E-03
Output flows										
Parameter	A1-A3	A4	A5	B1-B5	C1	C2	C3	C4	D	Total
CRU	0,00E+00	0,00E+00	9,10E-02	0,00E+00	0,00E+00	0,00E+00	8,00E-01	0,00E+00	0,00E+00	8,91E-01
MFR	0,00E+00	0,00E+00	2,08E-01	0,00E+00	0,00E+00	0,00E+00	2,29E+00	0,00E+00	0,00E+00	2,50E+00
MER	9,28E-01	0,00E+00	2,70E+00	0,00E+00	0,00E+00	0,00E+00	5,43E+01	0,00E+00	0,00E+00	5,79E+01
EEE	0,00E+00	0,00E+00	4,27E+00	0,00E+00	0,00E+00	0,00E+00	1,42E+02	0,00E+00	0,00E+00	1,47E+02
EET	0,00E+00	0,00E+00	7,35E+00	0,00E+00	0,00E+00	0,00E+00	2,45E+02	0,00E+00	0,00E+00	2,53E+02

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials [MJ]; **PERM** = Use of renewable primary energy resources used as raw materials [MJ]; **PERT** = Total use of renewable primary energy resources [MJ]; **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials [MJ]; **PENRM** = Use of non-renewable primary energy resources used as raw materials [MJ]; **PENRT** = Total use of non-renewable primary energy resources [MJ]; **PET** = Total Energy [MJ]; **SM** = Use of secondary material [kg]; **RSF** = Use of renewable secondary fuels [MJ]; **NRSF** = Use of non-renewable secondary fuels [MJ]; **FW** = Use of net fresh water [m³]; **HWD** = Hazardous waste disposed [kg]; **NHWD** = Non-hazardous waste disposed [kg]; **RWD** = Radioactive waste disposed [kg]; **CRU** = Components for re-use [kg]; **MFR** = Materials for recycling [kg]; **MER** = Materials for energy recovery [kg]; **EEE** = Exported energy, electric [MJ]; **EET** = Exported energy, thermal [MJ]

Indicators A2

	A1-A3	A4	A5	B1-B5	C1	C2	C3	C4	D	Total
GWP-total	-1,09E+02	1,31E+01	1,84E+00	0,00E+00	3,34E-01	7,70E-01	1,20E+02	3,34E-01	-1,03E+00	2,64E+01
GWP-f	1,45E+01	1,31E+01	1,23E+00	0,00E+00	3,34E-01	7,70E-01	5,20E-01	3,24E-02	-4,16E+00	2,64E+01
GWP-b	-1,23E+02	6,06E-03	6,07E-01	0,00E+00	1,35E-04	3,55E-04	1,19E+01	3,02E-01	3,17E+00	0,00E+00
GWP-luluc	7,84E-02	4,81E-03	2,00E-03	0,00E+00	2,72E-05	2,82E-04	1,94E-04	1,56E-05	-3,94E-02	4,63E-02
ODP	1,77E-06	2,90E-06	1,56E-07	0,00E+00	7,15E-08	1,70E-07	6,47E-08	9,85E-09	-1,02E-06	4,13E-06
AP	1,26E-01	7,61E-02	8,77E-03	0,00E+00	3,46E-03	4,46E-03	1,73E-02	2,76E-04	-1,12E-01	1,25E-01
EP-fw	2,84E-03	1,32E-04	1,05E-04	0,00E+00	1,42E-06	7,76E-06	1,25E-05	6,65E-07	-3,82E-04	2,72E-03
EP-m	4,48E-02	2,68E-02	2,45E-03	0,00E+00	1,53E-03	1,57E-03	7,96E-03	1,79E-04	-3,26E-02	5,28E-02
EP-T	4,32E-01	2,96E-01	2,92E-02	0,00E+00	1,68E-02	1,73E-02	9,13E-02	1,02E-03	-5,31E-01	3,52E-01
POCP	7,36E-02	8,44E-02	5,83E-03	0,00E+00	4,61E-03	4,95E-03	2,39E-02	3,65E-04	-9,61E-02	1,01E-01
ADP-mm	2,94E-03	3,33E-04	5,96E-04	0,00E+00	5,22E-07	1,95E-05	3,93E-06	3,41E-07	-8,26E-04	3,07E-03
ADP-f	1,95E+02	1,98E+02	1,68E+01	0,00E+00	4,60E+00	1,16E+01	5,52E+00	7,53E-01	-4,79E+01	3,85E+02
WDP	4,63E+01	7,08E-01	1,59E+00	0,00E+00	6,48E-03	4,15E-02	1,81E-01	3,23E-02	-5,35E-01	4,83E+01
PM	2,72E-06	1,18E-06	1,16E-07	0,00E+00	9,14E-08	6,91E-08	1,40E-07	5,22E-09	-1,57E-06	2,74E-06
IR	1,20E+00	8,29E-01	8,17E-02	0,00E+00	1,96E-02	4,86E-02	1,55E-02	2,95E-03	-1,78E-01	2,02E+00
ETP-fw	5,32E+02	1,77E+02	-4,79E+00	0,00E+00	2,79E+00	1,04E+01	1,37E+01	7,55E-01	-1,08E+03	-3,49E+02
HTP-c	3,75E-08	5,72E-09	4,06E-09	0,00E+00	9,67E-11	3,36E-10	1,61E-08	2,08E-11	-1,24E-08	5,14E-08
HTP-nc	5,30E-07	1,93E-07	3,86E-08	0,00E+00	2,38E-09	1,13E-08	5,21E-08	8,08E-10	-3,37E-07	4,92E-07
SQP	5,00E+03	1,72E+02	-5,70E+01	0,00E+00	5,92E-01	1,01E+01	2,11E+00	3,21E-01	-4,40E+03	7,26E+02

GWP-total = Climate change [kg CO2 eq]; **GWP-f** = Climate change - Fossil [kg CO2 eq]; **GWP-b** = Climate change - Biogenic [kg CO2 eq]; **GWP-luluc** = Climate change - Land use and LU change [kg CO2 eq]; **ODP** = Ozone depletion [kg CFC11 eq]; **AP** = Acidification [mol H+ eq]; **EP-fw** = Eutrophication, freshwater [kg P eq]; **EP-m** = Eutrophication, marine [kg N eq]; **EP-T** = Eutrophication, terrestrial [mol N eq]; **POCP** = Photochemical ozone formation [kg NMVOC eq]; **ADP-mm** = Resource use, minerals and metals [kg Sb eq]; **ADP-f** = Resource use, fossils [MJ]; **WDP** = Water use [m3 depriv.]; **PM** = Particulate matter [disease inc.]; **IR** = Ionising radiation [kBq U-235 eq]; **ETP-fw** = Ecotoxicity, freshwater [CTUe]; **HTP-c** = Human toxicity, cancer [CTUh]; **HTP-nc** = Human toxicity, non-cancer [CTUh]; **SQP** = Land use [Pt]

Environmental impact of declared unit: A4 per km

The tables on pages 8-10 display the impact in A4 per km. The environmental profile can be calculated for different transportation distances in combination with the total impact without A4.

Indicators A1		
	A4 per km	Total without A4
ADPE	2,18E-07	2,74E-03
ADPF	1,30E-01	1,82E+02
GWP	8,53E-03	1,33E+01
ODP	1,51E-09	9,81E-07
POCP	5,15E-06	3,29E-03
AP	3,75E-05	4,11E-02
EP	3,75E-05	1,72E-02

Toxicity indicators for Dutch market

HTP	3,59E-03	6,37E+00
FAETP	1,05E-04	5,24E-01
MAETP	3,77E-01	4,19E+02
TETP	1,27E-05	2,59E-01
ADPF	6,27E-05	8,75E-02

ADPE = Abiotic depletion potential for non-fossil resources [kg Sb-eq]; **ADPF** = Abiotic depletion potential for fossil resources [MJ]; **GWP** = Global warming potential [kg CO₂-eq]; **ODP** = Depletion potential of the stratospheric ozone layer [kg CFC-11-eq]; **POCP** = Formation potential of tropospheric ozone photochemical oxidants [kg ethene-eq]; **AP** = Acidification potential of land and water [kg SO₂-eq]; **EP** = Eutrophication potential [kg PO₄³⁻⁻-eq]; **HTP** = Human toxicity potential [kg 1,4-DB-eq]; **FAETP** = Freshwater aquatic ecotoxicity potential [kg 1,4-DB-eq]; **MAETP** = Marine aquatic ecotoxicity potential [kg 1,4-DB-eq]; **TETP** = Terrestrial ecotoxicity potential [kg 1,4-DB-eq]; **ADPF** = Abiotic depletion potential for fossil resources [kg Sb-eq]

Resource use		
Parameter	A4 per km	Total without A4
PERE	0,00E+00	0,00E+00
PERM	0,00E+00	0,00E+00
PERT	1,62E-03	-8,36E+01
PENRE	0,00E+00	0,00E+00
PENRM	0,00E+00	0,00E+00
PENRT	1,38E-01	2,00E+02
SM	0,00E+00	0,00E+00
RSF	0,00E+00	0,00E+00
NRSF	0,00E+00	0,00E+00
FW	1,58E-05	1,30E+00
Waste categories		
Parameter	A4 per km	Total without A4
HWD	3,29E-07	6,72E-04
NHWD	8,23E-03	6,61E-02
RWD	8,52E-07	9,58E-04
Output flows		
Parameter	A4 per km	Total without A4
CRU	0,00E+00	8,91E-01
MFR	0,00E+00	2,50E+00
MER	0,00E+00	5,79E+01
EEE	0,00E+00	1,47E+02
EET	0,00E+00	2,53E+02

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials [MJ]; **PERM** = Use of renewable primary energy resources used as raw materials [MJ]; **PERT** = Total use of renewable primary energy resources [MJ]; **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials [MJ]; **PENRM** = Use of non-renewable primary energy resources used as raw materials [MJ]; **PENRT** = Total use of non-renewable primary energy resources [MJ]; **PET** = Total Energy [MJ]; **SM** = Use of secondary material [kg]; **RSF** = Use of renewable secondary fuels [MJ]; **NRSF** = Use of non-renewable secondary fuels [MJ]; **FW** = Use of net fresh water [m³]; **HWD** = Hazardous waste disposed [kg]; **NHWD** = Non-hazardous waste disposed [kg]; **RWD** = Radioactive waste disposed [kg]; **CRU** = Components for re-use [kg]; **MFR** = Materials for recycling [kg]; **MER** = Materials for energy recovery [kg]; **EEE** = Exported energy, electric [MJ]; **EET** = Exported energy, thermal [MJ]

Indicators A2		
	A4 per km	Total without A4
GWP-total	8,61E-03	1,33E+01
GWP-f	8,60E-03	1,32E+01
GWP-b	3,97E-06	0,00E+00*
GWP-luluc	3,15E-06	4,15E-02
ODP	1,90E-09	1,23E-06
AP	4,99E-05	4,85E-02
EP-fw	8,68E-08	2,58E-03
EP-m	1,76E-05	2,59E-02
EP-T	1,94E-04	5,68E-02
POCP	5,53E-05	1,70E-02
ADP-mm	2,18E-07	2,73E-03
ADP-f	1,30E-01	1,87E+02
WDP	4,64E-04	4,76E+01
PM	7,72E-10	1,57E-06
IR	5,43E-04	1,19E+00
ETP-fw	1,16E-01	-5,25E+02
HTP-c	3,75E-12	4,56E-08
HTP-nc	1,27E-10	2,99E-07
SQP	1,13E-01	5,55E+02

GWP-total = Climate change [kg CO₂ eq]; **GWP-f** = Climate change - Fossil [kg CO₂ eq]; **GWP-b** = Climate change - Biogenic [kg CO₂ eq]; **GWP-luluc** = Climate change - Land use and LU change [kg CO₂ eq]; **ODP** = Ozone depletion [kg CFC11 eq]; **AP** = Acidification [mol H⁺ eq]; **EP-fw** = Eutrophication, freshwater [kg P eq]; **EP-m** = Eutrophication, marine [kg N eq]; **EP-T** = Eutrophication, terrestrial [mol N eq]; **POCP** = Photochemical ozone formation [kg NMVOC eq]; **ADP-mm** = Resource use, minerals and metals [kg Sb eq]; **ADP-f** = Resource use, fossils [MJ]; **WDP** = Water use [m³ depriv.]; **PM** = Particulate matter [disease inc.]; **IR** = Ionising radiation [kBq U-235 eq]; **ETP-fw** = Ecotoxicity, freshwater [CTUe]; **HTP-c** = Human toxicity, cancer [CTUh]; **HTP-nc** = Human toxicity, non-cancer [CTUh]; **SQP** = Land use [Pt]

* The GWP-biogenic Total value should always be zero according to EN 15804+A2.