ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

OSO Charge smart control

OSO Hotwater AS

Construction product considered as Electronic or Electric Equipment

Programme: The international EPD® system, www.environdec.com
Programme operator: EPD International AB
EPD registration number: EPD-IES-0024678
Publication date: 20.06.2025
Valid until: 19.06.2030
Geographical scope: Europe

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

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GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	OSO Hotwater
Address	Industriveien 1, 3300 Hokksund, Norway.
Contact details	info@osohotwater.com
Website	osohotwater.no

PRODUCT IDENTIFICATION

Product name	OSO Charge
Additional label(s)	
Product number / reference	11011373, 11011374, 11011380, 11011911, 11011912, 11012673, 11012674
Place(s) of production	Poland
CPC code	44831

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison.

EPD INFORMATION

EPD program operator	The International EPD System
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the Int'l EPD System PCR 2019:14 Construction products, version 1.3.4 is used. Additional requirements for construction products considered as Electronic or Electric Equipment (section 4.3.3 of PCR 1.3.4).
EPD author	OSO Hotwater AS
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☒ External verification
Verification date	19.06.2025
EPD verifier	Elisabet Amat, GREENIZE Projects
EPD number	EPD-IES-0024678
ECO Platform nr.	
Publishing date	20.06.2025
EPD valid until	19.06.2030

PRODUCT INFORMATION

PRODUCT DESCRIPTION

The OSO Charge smart control unit is an electronic device for optimizing the operation of a water heater. This control unit uses temperature sensors to monitor the water temperature and optimizes the heating process. The controller communicates with Azure cloud through LTE or Wi-Fi with embedded communication modules and the controller program may be updated over an external interface. The control unit is connected in series with the power supply to the water heater, and it may turn the heating element on or off at temperatures within the range of the thermostat incorporated within the heater itself.

PRODUCT APPLICATION

The OSO Charge smart control is an advanced device engineered to optimize the energy performance of water heating systems while reducing environmental impacts. Designed for retrofit or integrated seamlessly with OSO water heaters, it combines smart scheduling, energy efficiency, and innovative load-shifting capabilities to help users achieve significant cost and environmental savings.

The OSO Charge smart control enhances water heater efficiency by leveraging smart technology to adapt heating schedules based on usage patterns, electricity price fluctuations, and grid demand. This results in lower energy consumption and reduced environmental impact over the product's lifecycle.

The unit is also able to optimize Photovoltaic installations by autonomously plan the production of solar energy to provide hot water.

TECHNICAL SPECIFICATIONS

OSO Charge Smart control has 7 slightly different versions:
11011373: 16A/1x230V, WiFi
11011374: 16A/1x230V, WiFi, LTE
11011380: 25A/1x240V, WiFi, LTE
11011911: Integrated Assembly (Wi-Fi)
11011912: Integrated Assembly (Wi-Fi)
11012673: Integrated Assembly (Wi-Fi)
11012674: Integrated Assembly (Wi-Fi)

11011380 is the declared unit, having the highest stacking. The other units are reduced versions of the declared unit.

PRODUCT STANDARDS

Safety standards:
IEC 60730-1:2013/AMD1:2015
IEC 60730-1:2013/AMD2:2020
IEC 60730-1:2013
IEC 60730-2-9:2015/AMD1:2018
IEC 60730-2-9:2015
EN IEC 60730-2-9:2019/A1:2019
EN 60730-1:2016
EN 60335-1:2012;A11
EN 60335-2-21:2003;A1;A2
NEK EN 50106:2008
EMF standard:
EN 62233:2008

Radio standards:
EN 300 328 v2.2.2(2019-07)
EN 301 908-1 v13.1.1
EN 301 908-13 v11.1.2

EMC standards:
EN 55014-1:2017 + A11:2020
EN 55014-2:2015
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 301 489-17:2017

PHYSICAL PROPERTIES OF THE PRODUCT

https://osohotwater.no/smart-varmtvannsbereder/

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at www.osohotwater.no

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-%	Biogenic material, kg C/DU
Steel	0.13	0	0	0
Aluminium	0.06	0	0	0
Copper	0.41	0	0	0
ABS	0.03	0	0	0
Rubber	0.02	0	0	0
Other plastics	0.78	0	0	0
Total:	1.43	0	0	0

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product or declared unit	Packaging materials
Cardboard box	0.2	14%	0.065	Cardboard
Total:	0.2	14%	0.065	

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

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 various materials are sourced with focus on sustainable business, OSO Hotwater selects responsible suppliers based on Green Procurement. No hazardous materials are included in the product or used during production. Assembly of the control unit is done at a factory in Poland.

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.

Data used in the transport calculation were cross-referenced with our data of deliveries over several decades and provides a reliable scenario of average transport to installation site, from Norway to the Netherlands. Installation of the product is a manual process and has no environmental impact. Packaging materials are to be sorted and sent to the nearest recycling centre for proper end-of-life processing. Packing material end of life scenario based on most common scenario in the geographical scope which is Norway and Central Europe:

- Polyethylene: Incineration
- Polypropylene: Incineration
- Paper: Recycling
- Paperboard and cardboard: Recycling
- Wooden pallet: Reuse

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD cover the use stage, but the unit does not require any maintenance, refurbishment, and has negligible energy consumption:

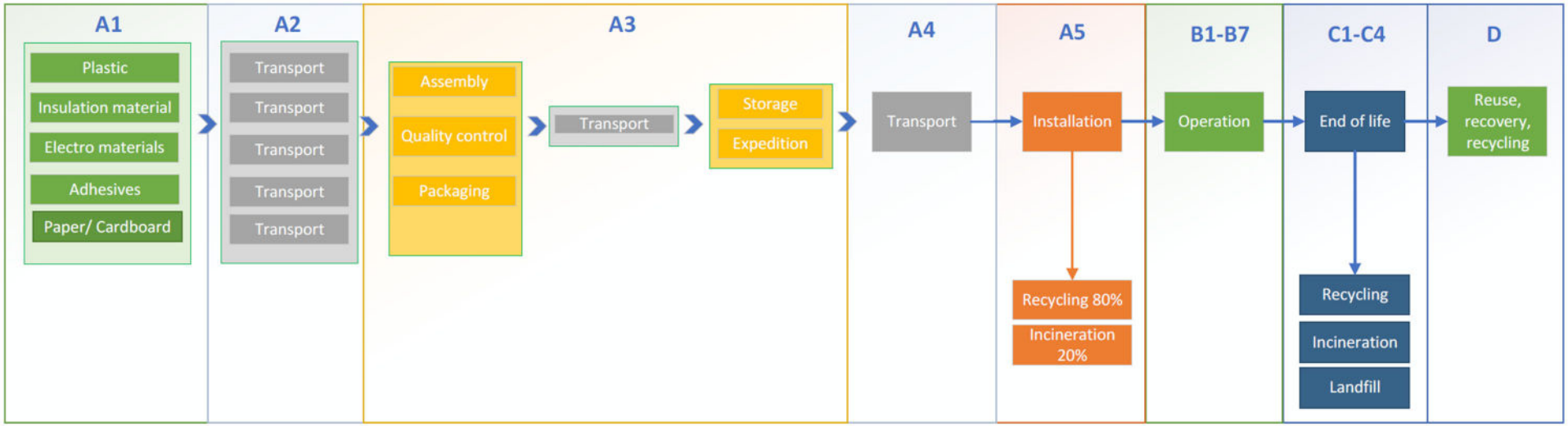
B1 – Emissions from the use stage: not applicable
B2 – Maintenance: the product does not need maintenance
B3 – Repair: not applicable
B4 – Reuse: not applicable
B5 – Refurbishment: not applicable
B6 – Operational energy use: energy consumption during product operation has been included
B7 – Operational water use: not applicable

PRODUCT END OF LIFE (C1-C4, D)

Decommissioning the product is a manual process with no need for auxiliary materials or energy. A large proportion of the product is to be recycled, such as steels, brass and plastics. Other types of materials are modelled as landfill as a conservative scenario.

Module D assesses the benefits from recycling and incinerations of the components of the smart control unit, as well as the benefits related to cardboard packaging waste treatment. Recycled materials are considered to replace virgin raw materials production, and incinerated materials are considered to be used in energy generation.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2023

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 unit of smart control unit for hotwater tanks
Mass per declared unit	1.43 kg
Functional unit	
Reference service life	17

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0.065

SYSTEM BOUNDARY

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	D	D
Geography, by two-letter ISO country code or regions. The International EPD System only.																		
EU	EU	PL	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU	EU		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

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

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 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.

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 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.

An in-depth analysis of all materials and process stages ensures all environmental aspects are included in this Life Cycle Assessment.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

The allocations in the Ecoinvent 3.10 datasets used in this study follow the Ecoinvent system model 'Allocation, cut-off, EN15804'.

AVERAGES AND VARIABILITY

The International EPD System additional data requirements
Data specificity and GWP-GHG variability for GWP-GHG for A1-A3.

Supply-chain specific data for GWP-GHG	<10%
Variation in GWP-GHG between products	0 %
Variation in GWP-GHG between sites	0 %

ENVIRONMENTAL IMPACT DATA

- The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. Note: additional environmental impact data may be presented in annexes.
- Usage of results from A1-A3 without considering the results of module C is not encouraged

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF 3.1

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	3,70E+01	3,61E-01	2,51E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,29E-01	0,00E+00	0,00E+00	3,31E-02	6,43E-01	4,98E-01	-2,16E+00
GWP – fossil	kg CO_2e	3,71E+01	3,61E-01	1,05E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,28E-01	0,00E+00	0,00E+00	3,31E-02	6,43E-01	4,98E-01	-1,92E+00
GWP – biogenic	kg CO_2e	-2,40E-01	5,44E-06	2,40E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,56E-06	0,00E+00	0,00E+00	-2,34E-01
GWP – LULUC	kg CO_2e	5,70E-02	1,24E-04	4,48E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,98E-04	0,00E+00	0,00E+00	1,08E-05	1,46E-05	7,00E-06	-3,53E-03
Ozone depletion pot.	kg $CFC_{-11}e$	1,25E-06	6,97E-09	1,61E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,03E-09	0,00E+00	0,00E+00	6,58E-10	3,46E-10	3,27E-10	-1,79E-08
Acidification potential	mol H^+e	4,43E-01	2,13E-03	4,33E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,93E-03	0,00E+00	0,00E+00	1,04E-04	2,43E-04	1,48E-04	-4,31E-02
EP-freshwater[2)]	kg Pe	5,39E-03	2,62E-06	1,58E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,17E-05	0,00E+00	0,00E+00	2,54E-07	5,98E-07	2,07E-07	-1,46E-03
EP-marine	kg Ne	4,98E-02	6,20E-04	3,00E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,36E-04	0,00E+00	0,00E+00	3,45E-05	8,83E-05	9,69E-05	-1,15E-02
EP-terrestrial	mol Ne	6,01E-01	6,85E-03	1,42E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,71E-03	0,00E+00	0,00E+00	3,79E-04	9,37E-04	6,80E-04	-1,76E-01
POCP ("smog")[3)]	kg NMVOCe	2,09E-01	2,43E-03	5,91E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,92E-04	0,00E+00	0,00E+00	1,62E-04	2,47E-04	1,95E-04	-3,47E-02
ADP-minerals & metals[4)]	kg Sbe	1,05E-02	1,09E-06	5,39E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,42E-06	0,00E+00	0,00E+00	1,08E-07	6,40E-07	4,65E-08	-5,33E-04
ADP-fossil resources	MJ	5,07E+02	5,00E+00	1,28E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,62E+00	0,00E+00	0,00E+00	4,65E-01	2,37E-01	2,26E-01	-2,33E+01
Water use[5)]	m^3e depr.	1,34E+01	2,31E-02	2,06E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,07E-01	0,00E+00	0,00E+00	2,25E-03	4,33E-02	3,09E-02	-6,61E-01

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	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	2,29E-06	2,64E-08	7,66E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,94E-09	0,00E+00	0,00E+00	2,59E-09	2,10E-09	1,48E-09	-3,69E-07
Ionizing radiation[6)]	kBq U235e	1,47E+00	2,15E-03	1,00E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,68E-02	0,00E+00	0,00E+00	2,12E-04	4,04E-04	1,20E-04	-6,88E-02
Ecotoxicity (freshwater)	CTUe	1,01E+03	1,29E+00	6,94E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,36E+00	0,00E+00	0,00E+00	1,25E-01	1,36E+00	7,16E+00	-3,51E+02
Human toxicity, cancer	CTUh	1,74E-07	2,41E-09	1,10E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,79E-10	0,00E+00	0,00E+00	2,31E-10	2,29E-10	1,40E-10	-2,08E-08
Human tox. non-cancer	CTUh	3,27E-06	3,03E-09	4,19E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,76E-09	0,00E+00	0,00E+00	2,98E-10	2,32E-09	2,30E-09	-3,83E-08
SQP[7)]	-	2,33E+02	2,73E+00	8,33E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,69E+00	0,00E+00	0,00E+00	2,76E-01	2,58E-01	3,22E-01	-3,66E+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	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	5,72E+01	8,00E-02	-2,56E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,09E+00	0,00E+00	0,00E+00	7,88E-03	2,60E-02	5,74E-03	-9,94E+00
Renew. PER as material	MJ	2,05E+00	0,00E+00	-2,05E+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	0,00E+00	0,00E+00	2,44E+00
Total use of renew. PER	MJ	5,92E+01	8,00E-02	-4,61E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,09E+00	0,00E+00	0,00E+00	7,88E-03	2,60E-02	5,74E-03	-7,49E+00
Non-re. PER as energy	MJ	4,89E+02	5,00E+00	1,28E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,62E+00	0,00E+00	0,00E+00	4,65E-01	-9,48E+00	-2,04E+01	-2,33E+01
Non-re. PER as material	MJ	1,36E+01	0,00E+00	-6,70E-03	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	-5,51E+00	-8,12E+00	2,18E-01
Total use of non-re. PER	MJ	5,02E+02	5,00E+00	1,21E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,62E+00	0,00E+00	0,00E+00	4,65E-01	-1,50E+01	-2,85E+01	-2,31E+01
Secondary materials	kg	4,74E-01	2,28E-03	1,19E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,26E-03	0,00E+00	0,00E+00	2,13E-04	2,67E-04	1,28E-04	2,50E-01
Renew. secondary fuels	MJ	3,65E-02	2,67E-05	9,42E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,01E-05	0,00E+00	0,00E+00	2,69E-06	1,02E-05	3,53E-06	9,00E-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	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	4,15E-01	6,32E-04	-1,14E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,58E-03	0,00E+00	0,00E+00	6,17E-05	7,70E-04	-9,56E-04	-3,15E-02

8) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	4,96E+00	7,10E-03	7,59E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,93E-02	0,00E+00	0,00E+00	6,69E-04	1,22E-02	8,48E-03	-3,85E-01
Non-hazardous waste	kg	1,93E+02	1,46E-01	9,74E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,49E+00	0,00E+00	0,00E+00	1,41E-02	3,19E-01	2,24E+00	1,02E+00
Radioactive waste	kg	9,61E-04	1,49E-06	6,56E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,40E-05	0,00E+00	0,00E+00	1,48E-07	3,05E-07	7,92E-08	-4,94E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	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	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
Materials for recycling	kg	0,00E+00	0,00E+00	1,30E-01	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	3,75E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	7,10E-02	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	2,94E+00	0,00E+00	0,00E+00

KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	2,60E+01	2,53E-01	-1,39E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,31E-01	0,00E+00	0,00E+00	2,32E-02	4,51E-01	3,49E-01	-1,52E+00
ADP-minerals & metals	kg Sbe	7,38E-03	7,47E-07	3,70E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,09E-06	0,00E+00	0,00E+00	7,41E-08	4,37E-07	2,52E-08	-3,73E-04
ADP-fossil	MJ	3,55E+02	3,51E+00	8,96E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,34E+00	0,00E+00	0,00E+00	3,26E-01	1,66E-01	1,59E-01	-1,63E+01
Water use	m^3e depr.	9,41E+00	1,62E-02	1,44E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,45E-01	0,00E+00	0,00E+00	1,57E-03	3,04E-02	2,17E-02	-4,63E-01
Secondary materials	kg	3,33E-01	1,60E-03	8,36E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,84E-04	0,00E+00	0,00E+00	1,49E-04	1,87E-04	8,96E-05	1,75E-01
Biog. C in product[9)]	kg C		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

9) Biog. C in product = Biogenic carbon content in product

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[10)]	kg CO_2e	3,71E+01	3,61E-01	1,05E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,28E-01	0,00E+00	0,00E+00	3,31E-02	6,43E-01	4,98E-01	-1,92E+00

10) 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 1.3.2 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.

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Market for electricity residual, low voltage, Poland, ecoinvent 3.10.1
Electricity CO_2e / kWh	0.93
District heating data source and quality	Not applicable
District heating CO_2e / kWh	Not applicable

Transport scenario documentation (A4)

Scenario parameter	Value
Specific transport CO_2e emissions, kg CO_2e/ tkm	Truck: 0.19 kg CO_2e / tkm Sea: 0.12 kg CO_2e / tkm
Average transport distance, km	1253 km
Capacity utilization (including empty return) %	50%
Bulk density of transported products	250 m3
Volume capacity utilization factor	<1

Operational energy use (A6)

Scenario parameter	Value
Electricity data source and quality	Market group for electricity, low voltage, Europe, ecoinvent 3.10.1
Electricity CO_2e / kWh	0.33

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	1.43
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	0.37
Recovery process – kg for energy	0.26
Disposal (total) – kg for final deposition	0.80
Scenario assumptions e.g. transportation	The following distances are considered in the EoL scenario: - to recycling: 250 km - to incineration: 100 km - to landfill: 50 km

BIBLIOGRAPHY

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.

Ecoinvent database v3.10.1 (2024) and One Click LCA database.

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

Int'l EPD System PCR 2019:14 Construction products, version 1.3.4

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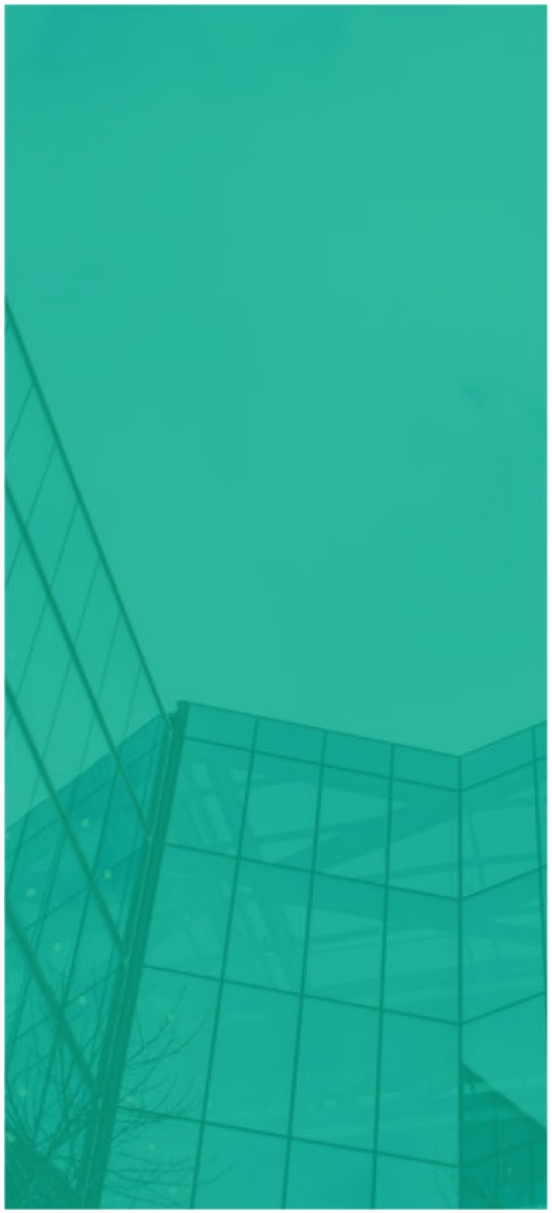
EPD International (2021). General Programme Instructions of the international EPD® system. Version 5.0. www.environdec.com.

OSO Charge LCA background report, 2024



ABOUT THE MANUFACTURER

Manufacturer	OSO Hotwater
EPD author	OSO Hotwater AS
EPD verifier	Elisabet Amat, GREENIZE Projects
EPD program operator	The International EPD System
Background data	This EPD is based on Ecoinvent 3.10 (Allocation, cut-off, EN15804) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Construction products

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 EN 15804, 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 background report (project report) for this EPD

Why does verification transparency matter? Read more online.

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Elisabet Amat, GREENIZE Projects
EPD verification started on	27.11.2024
EPD verification completed on	19.06.2025
Supply-chain specific data %	10%
Approver of the EPD verifier	The International EPD System

Author & tool verification	Answer
EPD author	OSO Hotwater AS
EPD Generator module	Construction products
Independent software verifier	Ugo Pretato and Elia Rillo - Studio Fieschi & Soci Srl.
Software verification date	05 January 2024

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 EN 15804:2012+A2:2019.

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.

Signature

VERIFICATION AND REGISTRATION (INTERNATIONAL EPD SYSTEM)

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)	
PCR	PCR 2019:14 Construction products, version 1.3.2
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☒ External verification
Third party verifier	Elisabet Amat, GREENIZE Projects
	Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up during EPD validity involves third party verifier	☐ yes ☒ no

EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com

ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

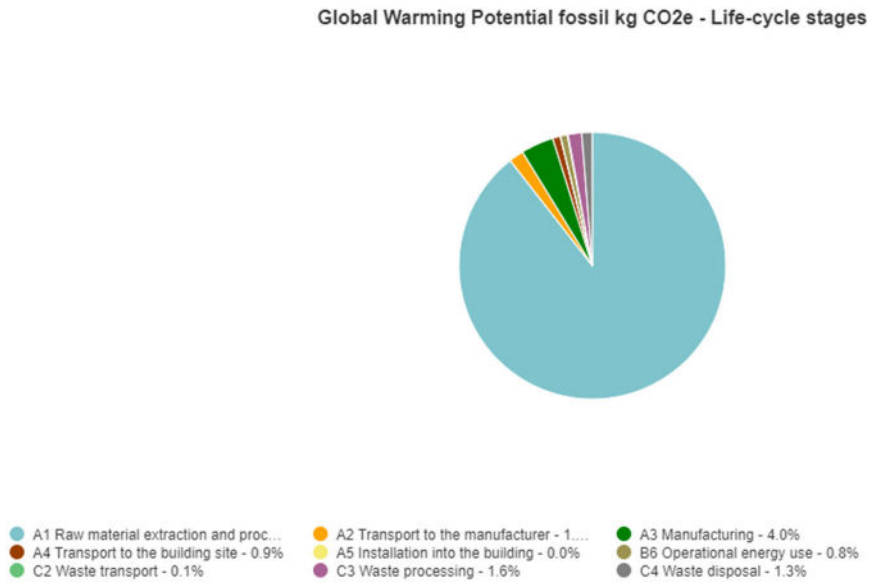
Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	3,70E+01	3,59E-01	3,27E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,28E-01	0,00E+00	0,00E+00	3,29E-02	6,43E-01	4,96E-01	-1,91E+00
Ozone depletion Pot.	kg CFC_{-11}e	1,32E-06	5,55E-09	1,30E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,04E-09	0,00E+00	0,00E+00	5,23E-10	3,00E-10	2,77E-10	-1,51E-08
Acidification	kg SO_2e	3,75E-01	1,66E-03	3,33E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,64E-03	0,00E+00	0,00E+00	7,87E-05	1,82E-04	1,07E-04	-2,96E-02
Eutrophication	kg PO_4^3e	9,31E-02	2,95E-04	2,62E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,12E-04	0,00E+00	0,00E+00	2,00E-05	4,76E-05	7,02E-05	-9,92E-03
POCP (“smog”)	kg C_2H_4e	3,20E-02	1,18E-04	8,53E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,94E-05	0,00E+00	0,00E+00	7,49E-06	1,16E-05	1,25E-05	-1,50E-03
ADP-elements	kg Sbe	1,05E-02	1,07E-06	5,27E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,41E-06	0,00E+00	0,00E+00	1,06E-07	6,24E-07	3,59E-08	-5,31E-04
ADP-fossil	MJ	5,07E+02	5,00E+00	1,28E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,61E+00	0,00E+00	0,00E+00	4,65E-01	2,37E-01	2,26E-01	-2,33E+01

ANNEX 2 : ADDITIONAL IMPACT CATEGORIES - ISO 21930

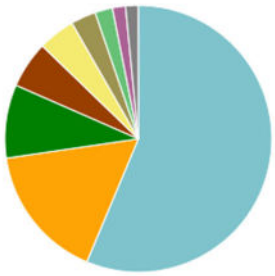
Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
RW-high level[13)]	kg	2,83E-04	3,72E-07	1,85E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,22E-05	0,00E+00	0,00E+00	3,67E-08	7,62E-08	2,23E-08	-1,28E-05
RW-int. and low	kg	6,79E-04	1,12E-06	4,71E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,18E-05	0,00E+00	0,00E+00	1,11E-07	2,29E-07	5,69E-08	-3,66E-05
Recovered energy	MJ	5,90E-01	1,92E-03	5,91E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,53E-02	0,00E+00	0,00E+00	1,94E-04	2,50E-04	1,49E-04	-2,40E-01

13) RW = Radioactive waste

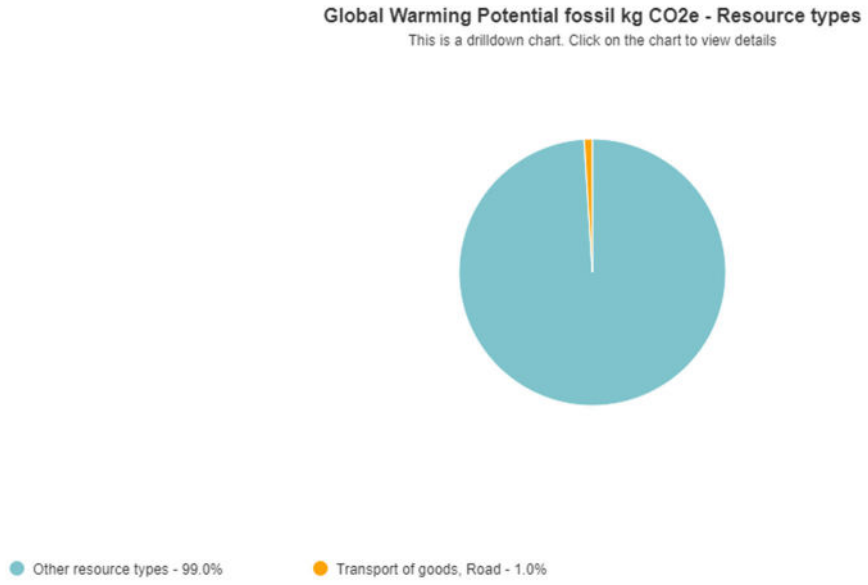
ANNEX 3 : LIFE-CYCLE ASSESSMENT RESULT VISUALIZATION



Global Warming Potential fossil kg CO2e - Classifications



- PCBA - 56.3%
- Housing - 5.7%
- Plate - 2.1%
- Sensor - 16.4%
- Energy use - 4.5%
- Module D loads - 1.6%
- Mains Cable - 8.9%
- Product waste treatment - 3.0%
- Screws - 1.5%


Global Warming Potential fossil kg CO2e - Resource types
This is a drilldown chart. Click on the chart to view details
Other resource types - 99.0%
Transport of goods, Road - 1.0%