Environmental Product Declaration

Environmental Product Declaration (EPD) in accordance with ISO 14025:2006 and EN 15804:2012+A2.2019/AC:2021 for

Product Name: ECO-CRIB transportable prefabricated rental vehicle |
Product Category Rules (PCR): PCR 2019:14, Construction products, version 1.3.3 | C-PCR-013 to PCR 2019:14, Prefabricated buildings intended as special-purpose transportable units, version 2021-11-26 and UN CPC code 387

Programme: The International EPD® System, www.environdec.com
Programme operator: EPD International AB
Regional programme: EPD Australasia, www.epd-australasia.com

EPD Registration No: EPD-IES-0016091 | Publication Date: 2024-09-09 | Version Number 1.0 | Date of Revision: N/A | Valid until: 2029-09-09 | Geographical Scope: ECO-CRIB transportable prefabricated rental vehicle is manufactured in Australia and the product is currently produced for the Australian market.

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.

EPD produced by:

GECA
Website: www.geca.eco
Email: info@geca.org.au
Phone: 02 9699 2850

EPD Program Operator:

Address of the Programme operator: EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, **E:** info@environdec.com
Address of the Regional programme: EPD Australasia, 315a Hardy Street, Nelson 7010 New Zealand
P: +64 9 889 2909 **P:** +61 2 8005 8206 **E: info@epd-australasia.com**

PCR Information:

PCR: PCR 2019:14, Construction products, version 1.3.3
C-PCR-013 to PCR 2019:14, Prefabricated buildings intended as special-purpose transportable units, version 2021-11-26 and UN CPC code 387

PCR review conducted by:
The Technical Committee of the International EPD® System.

Third Party Verifier

Independent verification of the declaration and data, according to ISO 14025:2006:

☑ EPD verification by individual verifier

Jonas Bengtsson, Edge Impact
Greenhouse, Level 3, 180 George Street, Sydney
NSW 2000, Australia

Approved by: The International EPD® System

Procedure Follow-up

Procedure for follow-up of data during EPD validity involves third party verifier:
☑ Yes ☐ No

[Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

Company Information

Declaraton Owner:

ECO-SITE Pty Ltd.
Website: https://ecosite.com.au/
Email: callum@ecosite.com.au

ECO-SITE Pty Ltd. provides transportable prefabricated renting services for various purposes, including construction sites and events.

ECO-SITE Pty Ltd. has worked with industry leaders to redefine and redevelop temporary site facility rental, offering a holistic approach to deliver sustainability, liveability, and convenience.

ECO-SITE provides a range of rental vehicle products, including ECO-CRIB, ECO-OFFICE, ECO-AID, and ECO-LOO.

These are transportable prefabricated buildings with spacious open designs, incorporating state-of-the-art appliances, fixtures, and lighting to enhance the overall experience for employees at construction sites.

The inclusion of solar panels in ECO-SITE products ensures that the entire facility is powered sustainably.

Hiring an ECO-SITE product powered with solar energy instead of any other motorhome can reduce the environmental impacts of projects like roads or buildings during the construction phase.

Name and location of production site: Tottenham, Victoria, Australia.

Important Notice

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

This EPD is verified to be compliant with EN 15804.

EPDs within the same product category but from different programs or utilising different PCRs may not be comparable.

Product Information

Product Name:
ECO-CRIB transportable prefabricated rental vehicle.

Product Identification:
The ECO-CRIB product is a transportable prefabricated rental vehicle equipped with solar panels, ensuring that the entire facility is powered in an environmentally sustainable manner.

Product Description:
ECO-CRIB is the most common model within the range of ECO-SITE products. The ECO-CRIB model of ECO-SITE products is divided into three distinct parts. The body of the rental vehicle is made from two primary materials: extruded polystyrene foam (XPS) and glass fibre- reinforced polyester. Aluminium is used for solar rails, door and external trims, and black checker plates. The floor is made from plywood, and the inverter box is a medium-density fibreboard. The chassis holding the body is made from plain carbon steel. The chassis has a battery pack, potable water tank, wastewater tank and wheels attached.

Amenities inside the rental vehicle are,

- Two toilets with the door attached at the rear end of the van
- A kitchen with a refrigerator, kettle, microwave
- Air conditioner and LED lights
- A washbasin
- Seating area
- A plumbing system
- Water supply and solar-powered electricity

UN CPC Code:
UN CPC GROUP: 387 (Prefabricated Buildings)
HS 2007: 9406

Geographical Scope:
Australia

LCA Information

Functional unit:

One day of effective usage of a prefabricated building (effective usage is the number of days when the building is accessible for use) (EPD International, 2021).

Reference service life:

The reference service life (RSL) is ten years with 250 days/year of use.

Time representativeness:

Primary data were collected from the manufacturing site for the 2021/22 financial year.

Database(s) and LCA software used:

The life cycle inventory used for this LCA combines generic and specific data. Generic and specific data have been selected in accordance with section 6.3.7 of EN15804. Specific data includes specific processes involved in the manufacturing of the ECO-SITE product, structural designs of the product, the materials/ parts of the product, amount of the parts, the materials used to make those parts, suppliers of the materials and packaging information. The manufacturer provided the specific data via worksheets, online meetings and emails. All the data provided by the manufacturers are based on the ECO-SITE product ECO-CRIB model.

Most of the generic data (e.g. for energy, resource and transport processes) for life cycle assessment are taken from ecoinvent 3.9.1 and AUSLCI v1.42. It is to be noted that the ecoinvent dataset was chosen only if the relevant datasets are not available in the AusLCI dataset. Considering the manufacturing location of material in Australia, the ecoinvent datasets have been modified adopting the Australian electricity dataset. A few datasets have been taken from Industry Data 2.0 only when the relevant datasets are not in AusLCI and ecoinvent datasets. Only a few datasets have been chosen from AusLCI SD datasets due to the unavailability of relevant datasets. The life cycle impact assessment (LCIA) was carried out using the software SimaPro 9.5. Generic and background data from the literature and LCA databases represent a reference year within 10 years.

System diagram:

System diagram for this EPD is depicted in Figure 1.

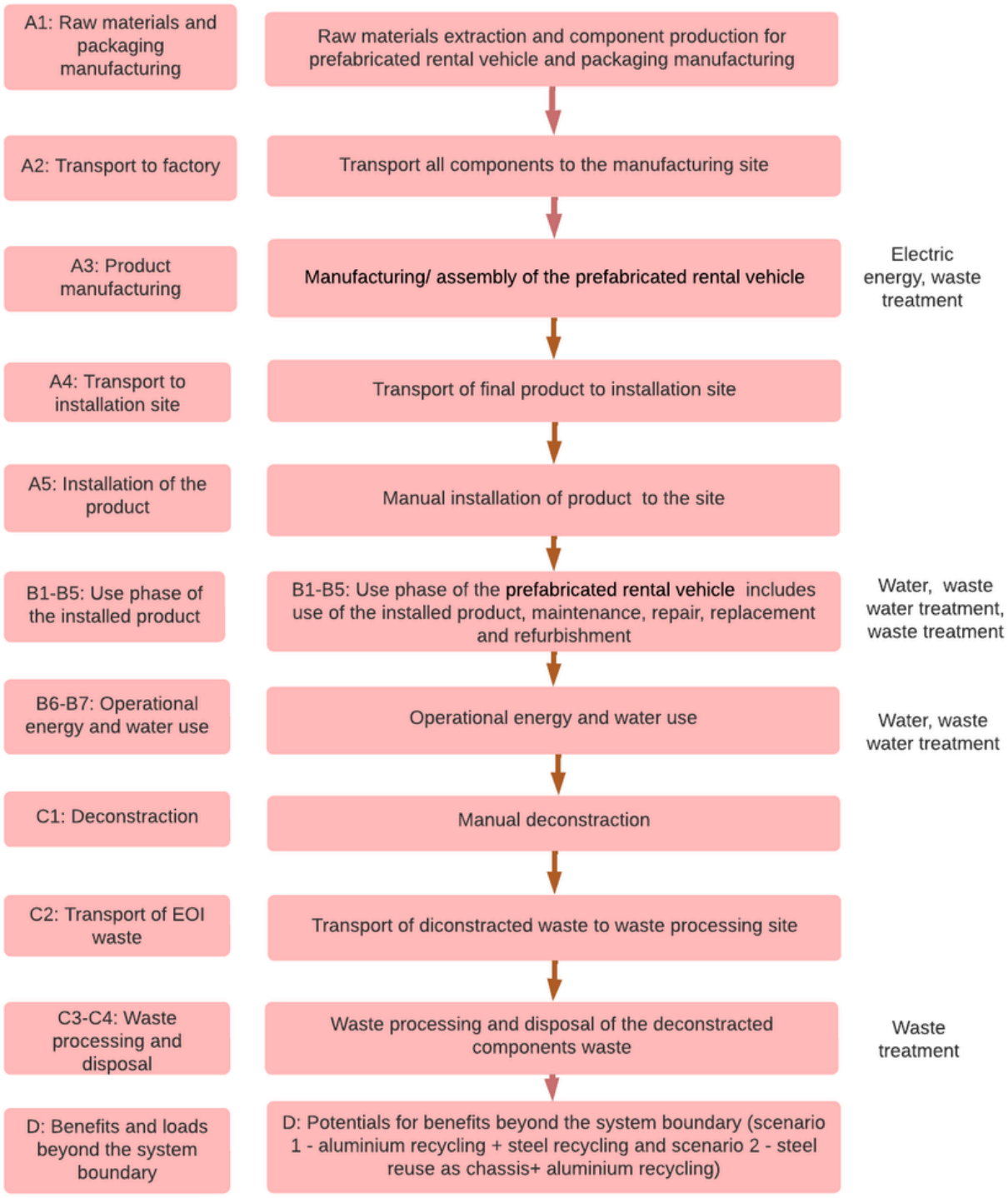

Figure 1. System diagram

Description of system boundaries:

This life cycle assessment covers the lifecycle scope from cradle to grave and module D (A, B, C and D). Per Section 5.2 of EN15804, the system boundary (Table 1) describes the life cycle stages and the processes included in the LCA. The stages include raw material supply (A1), transportation (A2), manufacturing (A3), transport to the final site (A4), Construction installation (A5), use (B1), maintenance (B2), repair-replacement-refurbishment (B3-B5), operational energy use to operate building-integrated technical systems (B6), operational water use (B7), deconstruction (C1), transport at end-of-life (C2), waste processing (C3), waste disposal (C4) as well as reuse, recycling, and recovery (D).

The scope selected for this study is based on the EPD type 'Cradle to grave and module D'. However, this study does not count the manufacturing of production equipment, buildings, vehicle production, maintenance and other capital goods, business travels of personnel, and labour work. The excluded processes are assumed to have a negligible contribution to the overall LCA results. While the principal criterion is to include all flows that contribute to more than 1% of the environmental impacts if in doubt, smaller flows were rather included than excluded because the exact contribution would be difficult to determine from the start.

All modules included in this EPD are marked as X in Table 1 below.

Table 1 System boundary

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	AU	AU	AU	AU	AU	AU	AU	AU	AU	AU	AU	AU	AU	AU	AU	AU	AU
Specific data used	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Allocation:

In the manufacturing of the ECO-SITE product ECO-CRIB model, no co-product or by-product is obtained. Therefore, allocating any production process to more than one product is unnecessary In the International EPD System framework, the methodological choices for allocation for reuse, recycling, and recovery have been set according to the polluter pays principle (PPP). This means that the generator of the waste shall carry the full environmental impact until the point in the product's life cycle at which the waste is transported to a scrapyard or the gate of a waste processing plant (collection site). The subsequent waste user shall carry the environmental impact from the processing and refinement of the waste but not the environmental impact caused in any previous life cycles.

Any allocations directly embedded in the LCA database processes were adopted. According to the manufacturer's data, the energy for manufacturing processes is allocated based on electricity consumption and the production amount of ECO-SITE products in the Tottenham manufacturing unit.

The ECO-CRIB product was assumed to have a lifespan of ten years, with accessibility for use estimated at 250 days per year. To align with the functional unit of c-PCR, impact allocation has been carried out based on the number of days the product is accessible for use (250 days per year).

Cut-off rules:

According to EN 15804, the life cycle inventory data shall include a minimum of 95% of total inflows (mass and energy) per module. In case of insufficient input data for a unit process, the cut-off criteria shall be 1% of primary energy usage and 1% of the total mass input of that unit process. Proxy data or extrapolation should be used to achieve 100% completeness if only 95% of total inflow data is available. Inflows not included in the LCA shall be documented in the EPD. For this study, 100% of the inflows required for ECO-SITE product manufacture are considered.

Electricity:

The electricity consumption mix was sourced from AusLCI database for grid electricity of Victoria consisting of coal (40.55%), hydro (2.8%), wind (8%), biogas (1.05%), natural gas (43.82%), heat pump (3.06%), photovoltaic (0.7%), with a GWP-GHG impact of 0.931 kg CO_2eq./kWh based on EF3.1.

Assumptions and limitations:

Assumption for kitchen appliances weight:

- Mini freezer weight was assumed 30 kg based on the reference.
- Electric kettle weight was assumed 2 kg based on the reference.
- Microwave oven weight was assumed 25 kg based on the reference.

Assumptions for packaging:

The ECO-SITE product manufacturers provided information about the type of packaging materials used by the suppliers. However, the estimation of the weight of these packaging materials was complex and could vary depending on the suppliers. Hence, we assumed the packaging materials from the suppliers are assumed to be 9% of the total weight of the materials from suppliers (Kooijman, 2000).

Assumptions for module B2:

The maintenance phase covers cleaning at the end of the renting period. It was assumed that 500L of water and 3 kg of soap are consumed over a ten-year lifespan. This involves internal and external cleaning of the caravan, water tank, and wastewater tank.

Assumptions for module B4:

The products needing replacement over the ten years of reference life were the invertors, tyres, and tube lights. While the warranty report of the invertor stated five years, it was concluded that two invertors would be needed for ten years of lifespan. The tyres are subjected to wear and tear; hence, it is assumed that each tyre would be replaced twice in the reference life of ten years. The LED lights are subject to degradation and dimming due to use, resulting in complete burnout. Therefore, we assumed that in ten years, each LED light will be replaced after being used for 50,000 hours, i.e., five years (Eugen, 2020). There are five LED lights, and each will be replaced after five years.

Assumptions for module B7:

The operational water consumption would be due to the use of the kitchen and toilet. It is assumed that around 20 litres of water are used daily on a construction site by at least five people accommodating the ECO-SITE. We are operating from the premise that the van is not being used on weekends or public holidays as the construction would be closed at that time. Hence, it is assumed that there are 250 working days each year. For the 10-year reference life, the total working days are 2500. The operational water consumption is, therefore, 50,000 L for ten years (Compact RV, 2021).

Assumptions for end-of-life:

The end-of-life scenario is divided into Scenario 1 and Scenario 2. In Scenario 1, the LCA is modelled with an assumption that 100% aluminium and steel parts are recycled at the end of their life. In Scenario 2, the LCA is modelled with the assumption that only 100% of the aluminium is recycled, and the manufacturers reuse the chassis made of steel for a new product. The assumption is that recycling occurs in the Australian market. The rest of the product ends up in a sanitary landfill.

Content declaration for products and packaging

Table 2 Content declaration for product and packaging

Product components		Weight, kg	Post-consumer recycled material, weight-% of product	Biogenic material, weight-% of product	Biogenic material, kg C/product or declared unit
A 1 Walls-Roof-Doors	Polystyrene foam	123.30	0		
A1 Walls-Roof	Reinforced fibre-epoxy	359.09	0		
A1 Chassis	Steel	493.00	0		
A1 Angle cladding-Checker plate	Aluminium	136.50	0		
A1 Wastewater tank	high density polyethylene	60.00	0		
A1 Water Tank	Polypropylene	20.00	0		
A1 Floor	Plywood	76.48	0	3.42%	0.0159 kg C/kg product
A1 Appliances (refrigerator, microwave, electric kettle)	Appliance	51.58	0		
A1 Water Tank, kitchen sink	Steel	3.00	0		

Product components		Weight, kg	Post-consumer recycled material, weight-% of product	Biogenic material, weight-% of product	Biogenic material, kg C/product or declared unit
A1 Components for Solar power generation	Inverter	177.00	0		
A1 Toilet	Ceramic	15.00	0		
A1 Urinals	Ceramic	7.00	0		
A1 Components for Solar power generation	Photovoltaic panel	243.88	0		
A1 Invertor box (MDF)	Medium density fibreboard	3.72	0	0.167%	0.0009 kg C/ kg product
A1 Window glass	Glass	16.51	0		
A1 Window security screen	Aluminium	17.84	0		
A1 tyre (total 4 tyre weight 104 kg)	Tyre	104.00	0		

Product components		Weight, kg	Post-consumer recycled material, weight-% of product	Biogenic material, weight-% of product	Biogenic material, kg C/product or declared unit
A1 Components for Solar power generation	Battery cell, Li-ion	140.00	0		
A1 Pipes, copper pipe	Copper	0.17	0		
A1 Pipes, PVC pipe	PVC	0.30	0		
A1 Pipes, water pipe	HDPE	0.02	0		
A1 Appliances	Light emitting diode, LED,	0.75	0		
A1 Appliances	Light emitting diode, LED,	0.25	0		
A1 Appliances-Air conditioner	Air Conditioner	153.00	0		
A1 Kitchen cupboard	Glued laminated timber	30.20	0	1.35%	0.0057 kg C/kg product
Total material weight		2232.59			

Packaging material		Weight, kg	Weight-% (versus the product)	Biogenic material, kg C/product or declared unit
A1 Packaging	Folding boxboard carton	102.28	5	0.0578 kg C/kg product
A1 Packaging	Packaging film, low density polyethylene	102.28	5	0
Total packaging weight		204.56		

The products included in this EPD do not contain any substances of very high concern as defined by European REACH regulation in concentrations >0.1% (m/m).

Environmental impact indicators

The results tables describe the different environmental indicators for each product per functional unit, for each declared module. The EN 15804 reference package based on EF 3.1 is used.

Table 3 Environmental impact indicators described.

Environmental Indicators	Explanation
Core environmental impact indicators	
Global Warming Potential – total (GWP-total), kg CO_2 eq.	Climate change can cause adverse effects on ecosystem health, human health, and material welfare. The indicators within this category are related to emissions of greenhouse gases into the air. Fossil CO_2 eq: This is defined as greenhouse gas emissions caused due to fossil fuels in Carbon-di-oxide equivalent. Biogenic CO_2 eq: This is defined as greenhouse gas emissions caused by the natural carbon cycle. CO eq from land transformation: This is defined as Greenhouse emissions caused due to direct or indirect land use by humans.
Global Warming Potential – fossil (GWP-fossil), kg CO_2 eq.	
Global Warming Potential – biogenic (GWP-biogenic), kg CO_2 eq.	
Global Warming Potential – land use and land use change (GWP-luluc), kg CO_2 eq.	
Stratospheric ozone depletion potential (ODP), kg CFC 11 eq.	Stratospheric ozone depletion can have harmful effects on human health, animal health, terrestrial and aquatic ecosystems, and biochemical cycles. The indicators within this category are related to hydrocarbons containing combined bromine, fluorine and chlorine, and chlorofluorocarbons (CFCs).
Acidification potential (AP), mol H+ eq.	This category considers acidifying substances that cause a wide range of effects on soil, groundwater, surface water, organisms, ecosystems, and materials.
Eutrophication potential – aquatic freshwater (EP-freshwater), kg P eq.	The eutrophication process in freshwater bodies due to emissions of phosphorus-containing substances is called freshwater eutrophication.

Eutrophication potential – aquatic marine (EP-marine), kg N eq.	The eutrophication process occurring in marine water bodies due to the emission of nitrogen-containing substances is called marine water eutrophication.
Eutrophication potential – terrestrial (EP-terrestrial), mol N eq.	Air pollution due to excess atmospheric nitrogen or ammonia deposition is called terrestrial eutrophication.
Formation potential of tropospheric ozone (POCP), kg NMVOC eq.	Formation potential of tropospheric ozone.
Abiotic depletion potential – non fossil resources (ADPE), kg Sb eq.[1]	Abiotic depletion potential for non-fossil resources.
Abiotic depletion potential – fossil resources (ADPF), MJ [1]	Abiotic depletion for fossil resources potential (ADP-fossil).
Additional environmental impact indicators	
Particulate matter (PM), disease inc.	Potential incidence of disease due to PM emissions.
Ionizing radiation, human health [2](IR), kBq U-235 eq	Human health impact caused due to releases of radioactive material to the environment.
Eco-toxicity -freshwater, (ETP-fw), CTUe[1]	Comparative Toxic Unit for ecosystems (CTUe) expressing an estimate of the potentially affected fraction of species (PAF) integrated over time and volume per unit mass of a chemical emitted (PAF m3 year/kg).
Human toxicity, cancer (HTP-c), CTUh [1]	Comparative Toxic Unit for human (CTUh) expressing the estimated increase in morbidity in the total human population per unit mass of a chemical emitted (cases per kilogram).

Human toxicity, non-cancer effects, (HTP-nc), CTUh [1]	Comparative Toxic Unit for human (CTUh) expressing the estimated increase in morbidity in the total human population per unit mass of a chemical emitted (cases per kilogram).
Land use related impacts (SQP), Pt [1]	Human health impact caused due to releases of radioactive material to the environment.
Eco-toxicity -freshwater, (ETP-fw), CTUe [1]	Potential soil quality index.
Additional GWP-GHG indicator	
GWP-GHG [3]	The GWP-GHG indicator includes all greenhouse gases included in GWP-total but excludes biogenic CO_2 uptake and emissions and biogenic carbon stored in the product. The assessment method of this indicator: Baseline model of 100 years of the IPCC based on IPCC 2021.
Resource use parameters	
Primary energy resources – Renewable - Excluding use as raw materials (PERE), MJ, net calorific value	PERE includes (first use) bio-based materials which are used as an energy source such as hydropower, solar and wind power.
Primary energy resources – non-renewable - Excluding use as raw materials (PENRE), MJ, net calorific value	PENRE includes (first use) materials such as oil, gas, coal and uranium which are used as an energy source.
Primary energy resources – Renewable - Used as raw materials (PERM), MJ, net calorific value	PERM includes (first use) bio-based materials which are used as raw materials (e.g. wood, hemp, etc.).
Primary energy resources – Non-renewable - Used as raw materials (PENRM), MJ, net calorific value	PENRM includes (first use) primary resources such as oil, gas and coal which are used as raw materials (e.g. plastic-based products).

Primary energy resources – Renewable – Total (PERT), MJ, net calorific value	PERT are the total use of renewable primary energy resources (primary energy and primary energy resources which are used as raw materials).
Primary energy resources – Non-renewable – Total (PENRT), MJ, net calorific value	PENRT are the total use of non- renewable primary energy resources (primary energy and primary energy resources which are used as raw materials).
Use of secondary material (SM), kg	Secondary materials are materials recycled from previous use or waste (e.g. scrap metal, broken concrete, broken glass, plastic and wood) that are used as material input from another product system. These include both renewable and non-renewable resources, with or without energy content, depending on the status of the material when it was originally extracted from the environment.
Use of renewable secondary fuels (RSF), MJ, net calorific value	Renewable secondary fuels are renewable materials with energy content that have crossed the system boundary between product systems and are used as fuel input (energy source) in another product system (e.g. biomass residue pellets, chipped waste wood).
Use of non-renewable secondary fuels (NRSF), MJ, net calorific value	Non-renewable secondary fuels are non-renewable materials with energy content that have crossed the system boundary between product systems and are used as fuel input (energy source) in another product system (e.g. processed solvents, shredded tyres).
Net freshwater use (FW), m^3	The use of net fresh water.

Waste flow parameters	
Hazardous waste disposed (HWD) [kg]	It calculates the amount of hazardous waste that has been disposed of.
Non-hazardous waste disposed NHWD, [kg]	It calculates the amount of non-hazardous waste that has been disposed of.
Radioactive waste disposed RWD, [kg]	It calculates the amount of radioactive waste that has been disposed of.
Output flows	
Components for reuse (CRU), kg	It calculates the amount of components for reuse.
Materials for recycling (MFR), kg	It calculates the amount of materials for recycle.
Materials for energy recovery (MER), kg	It calculates the amount of materials for energy recovery.
Exported energy-electrical, MJ	It calculates the amount of recovered energy from exported system.
Exported energy- thermal (EET), MJ	It calculates the amount of recovered energy from thermally exported system.

Results of the environmental performance indicators

Table 4 Main environmental impact result per functional unit of 'One day of effective usage of a prefabricated building' - scenario 1 of D module, aluminium recycling + steel recycling

Core environmental indicators		Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D, aluminium recycling + steel recycling
Global Warming Potential – total	GWP-total	kg CO_2 eq	7.0E+00	8.7E-02	0.0E+00	0.0E+00	5.5E-03	0.0E+00	6.5E-01	0.0E+00	0.0E+00	5.3E-02	0.0E+00	1.2E-02	4.6E-02	2.6E-01	-8.7E-01
Global Warming Potential – fossil	GWP-fossil	kg CO_2 eq	7.0E+00	8.7E-02	0.0E+00	0.0E+00	3.7E-03	0.0E+00	6.4E-01	0.0E+00	0.0E+00	3.4E-02	0.0E+00	1.2E-02	7.0E-09	1.5E-01	-8.7E-01
Global Warming Potential – biogenic	GWP-biogenic	kg CO_2 eq	7.1E-03	3.3E-05	0.0E+00	0.0E+00	1.1E-04	0.0E+00	1.1E-02	0.0E+00	0.0E+00	1.9E-02	0.0E+00	1.7E-06	1.7E-05	1.1E-01	-7.5E-04
Global Warming Potential – land use and land use change	GWP-luluc	kg CO_2 eq	6.6E-03	7.4E-07	0.0E+00	0.0E+00	1.7E-03	0.0E+00	1.6E-04	0.0E+00	0.0E+00	2.4E-07	0.0E+00	3.3E-08	8.1E-05	2.1E-06	-9.9E-04
Stratospheric ozone depletion potential	ODP	kg CFC11 eq	2.1E-05	1.4E-08	0.0E+00	0.0E+00	5.4E-10	0.0E+00	1.5E-08	0.0E+00	0.0E+00	9.3E-10	0.0E+00	2.2E-09	5.1E-10	3.5E-09	-1.0E-08
Formation potential of tropospheric ozone	POCP	kg NMVOC eq	2.7E-02	5.3E-04	0.0E+00	0.0E+00	2.4E-05	0.0E+00	1.6E-03	0.0E+00	0.0E+00	7.4E-05	0.0E+00	7.9E-05	8.9E-05	2.4E-04	-3.4E-03
Acidification potential	AP	mol H^+ eq	4.4E-02	6.6E-04	0.0E+00	0.0E+00	3.1E-05	0.0E+00	2.7E-03	0.0E+00	0.0E+00	1.4E-04	0.0E+00	7.2E-05	1.8E-04	1.0E-03	-5.0E-03
Eutrophication potential – aquatic freshwater	EP-freshwater	kg P eq	2.4E-03	3.1E-06	0.0E+00	0.0E+00	5.1E-07	0.0E+00	3.5E-04	0.0E+00	0.0E+00	1.8E-06	0.0E+00	7.5E-08	2.1E-06	5.0E-06	-3.2E-04
Eutrophication potential – aquatic marine	EP-marine	kg N eq	7.9E-03	2.0E-04	0.0E+00	0.0E+00	2.3E-05	0.0E+00	5.2E-04	0.0E+00	0.0E+00	3.0E-04	0.0E+00	2.9E-05	3.2E-05	1.1E-04	-9.3E-04
Eutrophication potential – terrestrial	EP-terrestrial	mol N eq	8.1E-02	2.1E-03	0.0E+00	0.0E+00	1.2E-04	0.0E+00	4.8E-03	0.0E+00	0.0E+00	2.7E-04	0.0E+00	3.2E-04	3.5E-04	6.9E-04	-9.6E-03
Water deprivation potential	WDP[1]	m^3 depriv.	3.5E+00	2.6E-02	0.0E+00	0.0E+00	1.6E-02	0.0E+00	2.5E-01	0.0E+00	0.0E+00	1.3E+00	0.0E+00	1.5E-03	1.2E-02	8.5E-02	-8.9E-02
Abiotic depletion potential – fossil resources	ADPF[1]	MJ	8.4E+01	1.3E+00	0.0E+00	0.0E+00	4.4E-02	0.0E+00	8.1E+00	0.0E+00	0.0E+00	2.6E-01	0.0E+00	1.6E-01	5.6E-01	3.9E-01	-8.5E+00
Abiotic depletion potential – non fossil resources	ADPE[1]	kg Sb eq	1.1E-04	3.2E-07	0.0E+00	0.0E+00	2.1E-08	0.0E+00	2.9E-05	0.0E+00	0.0E+00	7.6E-08	0.0E+00	6.3E-09	8.9E-08	2.8E-07	-2.4E-06

Additional impact categories and indicators		Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D, aluminium recycling + steel recycling
Ionising radiation	IR[2]	kBq U-235 eq	5.0E-01	4.8E-05	0.0E+00	0.0E+00	5.0E-05	0.0E+00	5.7E-03	0.0E+00	0.0E+00	1.2E-04	0.0E+00	1.5E-06	1.9E-05	2.1E-04	-1.6E-02
Particulate matter	PM	disease inc.	4.9E-07	4.2E-09	0.0E+00	0.0E+00	5.9E-10	0.0E+00	2.4E-08	0.0E+00	0.0E+00	1.6E-09	0.0E+00	1.6E-09	1.5E-09	5.3E-09	-7.3E-08
Human toxicity, non-cancer	HTP-nc[1]	CTUh	1.4E-07	1.7E-11	0.0E+00	0.0E+00	8.9E-11	0.0E+00	2.7E-09	0.0E+00	0.0E+00	4.8E-11	0.0E+00	1.5E-12	2.0E-11	3.4E-10	-1.6E-08
Human toxicity, cancer	HTP-c[1]	CTUh	8.6E-09	3.3E-12	0.0E+00	0.0E+00	4.0E-12	0.0E+00	9.3E-11	0.0E+00	0.0E+00	2.1E-12	0.0E+00	3.7E-13	2.2E-12	4.2E-11	-3.0E-09
Eco-toxicity, freshwater	ETP-fw[1]	CTUe	4.5E+01	1.7E-01	0.0E+00	0.0E+00	8.0E-02	0.0E+00	2.1E+00	0.0E+00	0.0E+00	2.8E-02	0.0E+00	3.1E-02	1.2E-02	2.6E-01	-3.3E+00
Land use impacts	SQP	Pt	3.7E+01	3.9E-01	0.0E+00	0.0E+00	1.3E-01	0.0E+00	2.5E+00	0.0E+00	0.0E+00	1.6E-01	0.0E+00	3.2E-02	1.3E-01	4.1E-01	-2.0E+00
GWP-GHG		kg CO_2 eq	7.1E+00	8.7E-02	0.0E+00	0.0E+00	5.5E-03	0.0E+00	6.5E-01	0.0E+00	0.0E+00	5.3E-02	0.0E+00	1.2E-02	0.0E+00	1.9E-01	-8.7E-01

Other environmental information describing waste categories		Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D, aluminium recycling + steel recycling
Hazardous waste disposed	HWD	kg	1.3E-03	1.6E-06	0.0E+00	0.0E+00	9.1E-08	0.0E+00	6.6E-05	0.0E+00	0.0E+00	3.1E-06	0.0E+00	5.6E-08	5.0E-05	7.9E-07	-2.9E-05
Non-hazardous waste disposed	NHWD	kg	1.0E+00	8.4E-03	0.0E+00	0.0E+00	5.9E-04	0.0E+00	6.8E-02	0.0E+00	0.0E+00	4.3E-04	0.0E+00	1.4E-04	0.0E+00	1.6E-01	-2.3E-01
Radioactive waste disposed	RWD	kg	5.4E-05	6.6E-09	0.0E+00	0.0E+00	1.3E-08	0.0E+00	1.3E-06	0.0E+00	0.0E+00	1.6E-08	0.0E+00	1.8E-10	2.7E-09	3.7E-08	-3.9E-06

Parameters describing resource use		Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D, aluminium recycling + steel recycling
Primary energy resources – Non-renewable - Total	PENRT	MJ	8.4E+01	1.3E+00	0.0E+00	0.0E+00	4.4E-02	0.0E+00	8.1E+00	0.0E+00	0.0E+00	2.6E-01	0.0E+00	1.6E-01	5.6E-01	3.9E-01	-8.54
Primary energy resources – Non-renewable - Used as raw materials	PENRM	MJ	4.4E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.2E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-4.4E+00	0.00
Primary energy resources – non-renewable - Excluding use as raw materials	PENRE	MJ	8.0E+01	1.3E+00	0.0E+00	0.0E+00	4.4E-02	0.0E+00	6.9E+00	0.0E+00	0.0E+00	2.6E-01	0.0E+00	1.6E-01	5.6E-01	4.8E+00	-8.54
Primary energy resources – Renewable - Total	PERT	MJ	5.6E+00	1.1E-02	0.0E+00	0.0E+00	7.1E-02	0.0E+00	4.6E-01	0.0E+00	0.0E+00	1.5E-02	0.0E+00	5.6E-04	0.0E+00	1.4E-02	-0.16
Primary energy resources – Renewable - Used as raw materials	PERM	MJ	7.6E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-7.6E-01	0.00
Primary energy resources – Renewable - Excluding use as raw materials	PERE	MJ	4.8E+00	1.1E-02	0.0E+00	0.0E+00	7.1E-02	0.0E+00	4.6E-01	0.0E+00	0.0E+00	1.5E-02	0.0E+00	5.6E-04	0.0E+00	7.8E-01	-0.16
Net use of fresh water		m^3	1.1E-01	5.9E-04	0.0E+00	0.0E+00	3.4E-04	0.0E+00	5.6E-03	0.0E+00	0.0E+00	1.8E-02	0.0E+00	3.4E-05	2.5E-04	2.0E-03	0.00
Use of secondary material	SM	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Use of renewable secondary fuels	RSF	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00
Use of non-renewable secondary fuels	NRSF	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00

Indicators describing output flows	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D, aluminium recycling + steel recycling
Components for reuse	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Materials for recycling	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.6E-01	0.0E+00	0.0E+00
Materials for energy recovery	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Exported energy	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Exported energy, thermal	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table 5 Environmental impact result per functional unit of 'One day of effective usage of a prefabricated building' for additional scenario - scenario 2 of D module, aluminium recycling + steel chassis reuse

Core environmental indicators		Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D, aluminium recycling + steel chassis reuse
Global Warming Potential – total	GWP-total	kg CO_2 eq	7.0E+00	8.7E-02	0.0E+00	0.0E+00	5.5E-03	0.0E+00	6.5E-01	0.0E+00	0.0E+00	5.3E-02	0.0E+00	1.2E-02	1.1E-03	2.6E-01	-1.1E+00
Global Warming Potential – fossil	GWP-fossil	kg CO_2 eq	7.0E+00	8.7E-02	0.0E+00	0.0E+00	3.7E-03	0.0E+00	6.4E-01	0.0E+00	0.0E+00	3.4E-02	0.0E+00	1.2E-02	4.5E-10	1.5E-01	-1.1E+00
Global Warming Potential – biogenic	GWP-biogenic	kg CO_2 eq	7.1E-03	3.3E-05	0.0E+00	0.0E+00	1.1E-04	0.0E+00	1.1E-02	0.0E+00	0.0E+00	1.9E-02	0.0E+00	1.7E-06	5.8E-06	1.1E-01	-9.6E-04
Global Warming Potential – land use and land use change	GWP-luluc	kg CO_2 eq	6.6E-03	7.4E-07	0.0E+00	0.0E+00	1.7E-03	0.0E+00	1.6E-04	0.0E+00	0.0E+00	2.4E-07	0.0E+00	3.3E-08	2.9E-06	2.1E-06	-1.1E-03
Stratospheric ozone depletion potential	ODP	kg CFC11 eq	2.1E-05	1.4E-08	0.0E+00	0.0E+00	5.4E-10	0.0E+00	1.5E-08	0.0E+00	0.0E+00	9.3E-10	0.0E+00	2.2E-09	2.5E-11	3.6E-09	-1.4E-08
Formation potential of tropospheric ozone	POCP	kg NMVOC eq	2.7E-02	5.3E-04	0.0E+00	0.0E+00	2.4E-05	0.0E+00	1.6E-03	0.0E+00	0.0E+00	7.4E-05	0.0E+00	7.9E-05	3.2E-06	2.4E-04	-4.4E-03
Acidification potential	AP	mol H^+ eq	4.4E-02	6.6E-04	0.0E+00	0.0E+00	3.1E-05	0.0E+00	2.7E-03	0.0E+00	0.0E+00	1.4E-04	0.0E+00	7.2E-05	6.1E-06	1.0E-03	-6.0E-03
Eutrophication potential – aquatic freshwater	EP-freshwater	kg P eq	2.4E-03	3.1E-06	0.0E+00	0.0E+00	5.1E-07	0.0E+00	3.5E-04	0.0E+00	0.0E+00	1.8E-06	0.0E+00	7.5E-08	3.2E-07	5.0E-06	-4.6E-04
Eutrophication potential – aquatic marine	EP-marine	kg N eq	7.9E-03	2.0E-04	0.0E+00	0.0E+00	2.3E-05	0.0E+00	5.2E-04	0.0E+00	0.0E+00	3.0E-04	0.0E+00	2.9E-05	1.2E-06	1.1E-04	-1.2E-03
Eutrophication potential – terrestrial	EP-terrestrial	mol N eq	8.1E-02	2.1E-03	0.0E+00	0.0E+00	1.2E-04	0.0E+00	4.8E-03	0.0E+00	0.0E+00	2.7E-04	0.0E+00	3.2E-04	1.4E-05	6.9E-04	-1.2E-02
Water deprivation potential	WDP[1]	m^3 depriv.	3.5E+00	2.6E-02	0.0E+00	0.0E+00	1.6E-02	0.0E+00	2.5E-01	0.0E+00	0.0E+00	1.3E+00	0.0E+00	1.5E-03	5.5E-04	8.5E-02	-1.6E-01
Abiotic depletion potential – fossil resources	ADPF[1]	MJ	8.4E+01	1.3E+00	0.0E+00	0.0E+00	4.4E-02	0.0E+00	8.1E+00	0.0E+00	0.0E+00	2.6E-01	0.0E+00	1.6E-01	1.3E-02	3.9E-01	-1.1E+01
Abiotic depletion potential – non fossil resources	ADPE[1]	kg Sb eq	1.1E-04	3.2E-07	0.0E+00	0.0E+00	2.1E-08	0.0E+00	2.9E-05	0.0E+00	0.0E+00	7.6E-08	0.0E+00	6.3E-09	3.2E-08	2.8E-07	-3.3E-06

Additional impact categories and indicators		Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D, aluminium recycling + steel chassis reuse
Ionising radiation	IR[2]	kBq U-235 eq	5.0E-01	4.8E-05	0.0E+00	0.0E+00	5.0E-05	0.0E+00	5.7E-03	0.0E+00	0.0E+00	1.2E-04	0.0E+00	1.5E-06	6.4E-06	2.1E-04	-2.2E-02
Particulate matter	PM	disease inc.	4.9E-07	4.2E-09	0.0E+00	0.0E+00	5.9E-10	0.0E+00	2.4E-08	0.0E+00	0.0E+00	1.6E-09	0.0E+00	1.6E-09	5.0E-11	5.3E-09	-8.8E-08
Human toxicity, non-cancer	HTP-nc[1]	CTUh	1.4E-07	1.7E-11	0.0E+00	0.0E+00	8.9E-11	0.0E+00	2.7E-09	0.0E+00	0.0E+00	4.8E-11	0.0E+00	1.5E-12	2.2E-12	3.4E-10	-2.0E-08
Human toxicity, cancer	HTP-c[1]	CTUh	8.6E-09	3.3E-12	0.0E+00	0.0E+00	4.0E-12	0.0E+00	9.3E-11	0.0E+00	0.0E+00	2.1E-12	0.0E+00	3.7E-13	1.3E-13	4.2E-11	-4.2E-09
Eco-toxicity, freshwater	ETP-fw[1]	CTUe	4.5E+01	1.7E-01	0.0E+00	0.0E+00	8.0E-02	0.0E+00	2.1E+00	0.0E+00	0.0E+00	2.8E-02	0.0E+00	3.1E-02	1.2E-02	2.6E-01	-4.3E+00
Land use impacts	SQP	Pt	3.7E+01	3.9E-01	0.0E+00	0.0E+00	1.3E-01	0.0E+00	2.5E+00	0.0E+00	0.0E+00	1.6E-01	0.0E+00	3.2E-02	6.7E-03	4.1E-01	-2.7E+00
GWP-GHG		kg CO_2 eq	7.1E+00	8.7E-02	0.0E+00	0.0E+00	5.5E-03	0.0E+00	6.5E-01	0.0E+00	0.0E+00	5.3E-02	0.0E+00	1.2E-02	0.0E+00	1.9E-01	-1.1E+00
Other environmental information describing waste categories		Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D, aluminium recycling + steel chassis reuse
Hazardous waste disposed	HWD	kg	1.3E-03	1.6E-06	0.0E+00	0.0E+00	9.1E-08	0.0E+00	6.6E-05	0.0E+00	0.0E+00	3.1E-06	0.0E+00	5.6E-08	5.0E-05	7.9E-07	-4.3E-05
Non-hazardous waste disposed	NHWD	kg	1.0E+00	8.4E-03	0.0E+00	0.0E+00	5.9E-04	0.0E+00	6.8E-02	0.0E+00	0.0E+00	4.3E-04	0.0E+00	1.4E-04	0.0E+00	1.6E-01	-9.6E-02
Radioactive waste disposed	RWD	kg	5.4E-05	6.6E-09	0.0E+00	0.0E+00	1.3E-08	0.0E+00	1.3E-06	0.0E+00	0.0E+00	1.6E-08	0.0E+00	1.8E-10	9.2E-10	3.7E-08	-5.3E-06

Parameters describing resource use		Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D, aluminium recycling + steel chassis reuse
Primary energy resources – Non-renewable - Total	PENRT	MJ	8.4E+01	1.3E+00	0.0E+00	0.0E+00	4.4E-02	0.0E+00	8.1E+00	0.0E+00	0.0E+00	2.6E-01	0.0E+00	1.6E-01	1.3E-02	3.9E-01	-1.1E+01
Primary energy resources – Non-renewable - Used as raw materials	PENRM	MJ	4.4E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.2E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-4.4E+00	0.0E+00
Primary energy resources – non-renewable - Excluding use as raw materials	PENRE	MJ	8.0E+01	1.3E+00	0.0E+00	0.0E+00	4.4E-02	0.0E+00	6.9E+00	0.0E+00	0.0E+00	2.6E-01	0.0E+00	1.6E-01	1.3E-02	4.8E+00	-1.1E+01
Primary energy resources – Renewable - Total	PERT	MJ	5.6E+00	1.1E-02	0.0E+00	0.0E+00	7.1E-02	0.0E+00	4.6E-01	0.0E+00	0.0E+00	1.5E-02	0.0E+00	5.6E-04	0.0E+00	1.4E-02	-6.6E-02
Primary energy resources – Renewable - Used as raw materials	PERM	MJ	7.6E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	-7.6E-01	0.0E+00
Primary energy resources – Renewable - Excluding use as raw materials	PERE	MJ	4.8E+00	1.1E-02	0.0E+00	0.0E+00	7.1E-02	0.0E+00	4.6E-01	0.0E+00	0.0E+00	1.5E-02	0.0E+00	5.6E-04	0.0E+00	7.8E-01	-6.6E-02
Net use of fresh water		m^3	1.1E-01	5.9E-04	0.0E+00	0.0E+00	3.4E-04	0.0E+00	5.6E-03	0.0E+00	0.0E+00	1.8E-02	0.0E+00	3.4E-05	1.3E-05	2.0E-03	-5.3E-03
Use of secondary material	SM	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Use of renewable secondary fuels	RSF	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Use of non-renewable secondary fuels	NRSF	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Indicators describing output flows	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D, aluminium recycling + steel chassis reuse
Components for reuse	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.0E-01	0.0E+00	0.0E+00
Materials for recycling	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.9E-02	0.0E+00	0.0E+00
Materials for energy recovery	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Exported energy	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Exported energy, thermal	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

NOTE: The range/ variability of the LCIA results if significant; the description of the range can be qualitative or quantitative.

NOTE: The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risk

[1] *The results of this environmental impact indicator shall be used with care as uncertainties on these results are high or as there is limited experience with the indicator.*

[2] *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.*

[3] *This indicator is calculated using the characterisation factors from the IPCC AR5 report (IPCC 2013) and has been included in the EPD following the PCR. The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product.*

References

Compact RV. (2021). Compact RV. Retrieved August 30, 2021, from Compact RV: https://www.compactrv.net/water/water-usage/

EN 15804:2012+A2:2019. (2020). Sustainability of construction works – EN 15804:2012+A2:2019. German: Sustainability of construction works.

EPD International. (2021). C-PCR-013 to PCR 2019:14, Prefabricated buildings intended as special-purpose transportable units, version 2021-11-26 UN CPC 387. Envirodec.

Eugen. (2020, April). LED Lighting Info. Retrieved from https://ledlightinginfo.com/can-led-lights-be-left-on-24-7

Kooijman, J. M. (2000). Environmental Impact of Packaging. London: Performance in the Household.

OFF-GRID
ECOSITE

Ecosite Pty Ltd
ABN: 47 632 829 951
www.ecosite.com.au
callum@ecosite.com.au