Beijing XCHARGE Technology Co., Ltd

ENVIRONMENTAL PRODUCT DECLARATION

PRODUCT:

C6EU Charging Station

PLANTS:

Shuangyang Road No.12, Yizhuang, Daxing District, Beijing, P.R. China

in compliance with ISO 14025 and EN15804

Program Operator	The Norwegian EPD Foundation
Publisher	EPDItaly

Declaration Number	*NEPD-4528-3785-EN*
Registration Number	MR-EPDITALY0066

Issue Date	05/06/2023
Valid to	05/06/2028

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Global Program Operator

Environmental Product Declaration

In accordance with 14025 and EN15804 +A2

C6EU Charging Station

XCHARGE

Owner of the declaration:
Beijing XCHARGE Technology Co., Ltd

Product name:
C6EU Charging Station

Declared unit:
1 pcs

Product category /PCR:
PCR EPDItaly017 – Charging Stations

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-4528-3785-EN

Registration number:
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The Norwegian
EPD Foundation

General information

Product:
C6EU Charging Station

Program operator:
The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway

Declaration number:

NEPD-4528-3785-EN

This declaration is based on Product Category Rules:
PCR EPDItaly017 – Charging Stations

Statements:
The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidences.

Declared unit:
1 pcs C6EU Charging Station

Declared unit with option:
Manufacturing, distribution, installation, use & maintenance and end-of-life stage

Functional unit:
Production of 1 pcs C6EU charging station and maintained for a period of 20 years

Verification:
Independent verification of the declaration and data, according to ISO14025:2010

internal ☐ external ☑

Sign

Vito D'Incognito
Independent verifier approved by EPD Norway

Owner of the declaration:
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Manufacturer:
Beijing XCHARGE Technology Co., Ltd

Place of production:
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Management system:
ISO 9001, ISO 14001, ISO 45001, ISO/IEC 20000-1, ISO/IEC 27001, IATF 16949

Organisation no:
911101083397675346

Issue date:
05.06.2023

Valid to:
05.06.2028

Year of study:
2022

Comparability:
EPDs from other programmes may not be comparable

The EPD has been worked out by:
Daqi Wang & Jiliu WU

Approved

Manager of EPD Norway

Product

Product description:

As Red Dot award 2016 winner, C6EU is a revolutionary fast charger designed to meet the future charging demands in commercial and public sectors. A brief C6EU product introduction is showed in table below.

Parameters	
Weights	About 385 kg (120 kW)
Weights of packaging	65 kg
Dimensions (L*W*H)	615*740*1750 mm
Connector	Single/Double CCS Combo2 or CCS Combo 2 + CHAdeMO 2.0
Connection	IEC 61851-23 CHAdeMO

Product specification:

All BOM components of 1 pcs C6EU charging station of 120kW were divided into 4 main categories by homogeneous material – metal, plastic, PCBA, other – and 10 sub-categories to match specific material types in BS EN 50693: 2019.

Materials	KG	%
metal, aluminium	12.91	3.36%
metal, copper	73.87	19.22%
metal, ferrous	15.59	4.05%
metal, other	1.91	0.50%
metal, steel	198.43	51.62%
other	56.86	14.79%
PCBA	0.25	0.06%
plastic, ABS	0.59	0.15%
plastic, other	23.69	6.16%
plastic, PS	0.28	0.07%

All packaging components of 1 pcs C6EU charging station were divided into several categories as well.

Materials	KG	%
Wood	55.47	85.31%
metal, steel	5.05	7.77%
plastic, other	4.50	6.92%

Technical data:
A brief C6EU technical data is showed in table below.

Parameters	
Configuration	CCS2 – CHAdeMO -
Output performance referred to CCS2	60 kW, 120 kW, 150 kW
Output voltage	200-1000 VDC
Output current	300 A Rated (400A boost within 20min)
Power Intensity Transfer	2.18 kWh/mins (General)
Input voltage	3-phase 400 Vac +/- 10%, 50/60 Hz
RSL	20 Years
Standby Power	33 W
Charging Sockets	Double Sockets

Market:
Worldwide, mainly France, Spain, Romania, Britain, Germany, Italy, Sweden, Russia, HK (China), Brazil, Chile, Peru.

Reference service life, product:
20 years

Reference service life, building:
N/A

LCA: Calculation rules

Declared unit:
1 pcs C6EU charging station

Data quality:
Data quality is assessed during data collecting period, by personal contact and cross-certification. All activity data used for modelling is from 2022/01/01 to 2022/12/31. Besides, Ecoinvent v3.8 is the only database used in LCA model.

Allocation:
There are two allocations in this study: co-product and recovery operations.

Co-product

XCHARGE mainly operates assembly process in their plant area, including C6EU and other models of charging station. This process cannot be divided into several ones and thus allocation of in- and outflows has been carried out with regard to the share of the total production relevant volume (including assembly, test, lighting, etc) for each charging station under one

year. Inflows that have been allocated is only electricity consumption in XCHARGE plant. There are no outflows because no manufacturing related waste is reported by XCHARGE plant.

Recovery operations

Defined in EN 50693, for recovery and recycling processes, which take place outside the boundaries of the product system, only impacts related to the transport of the waste to the treatment platform should be taken into account. Moreover, for un-recycled materials (waste that goes to landfill or incineration), all environmental burdens are allocated to this product system.

System boundary:

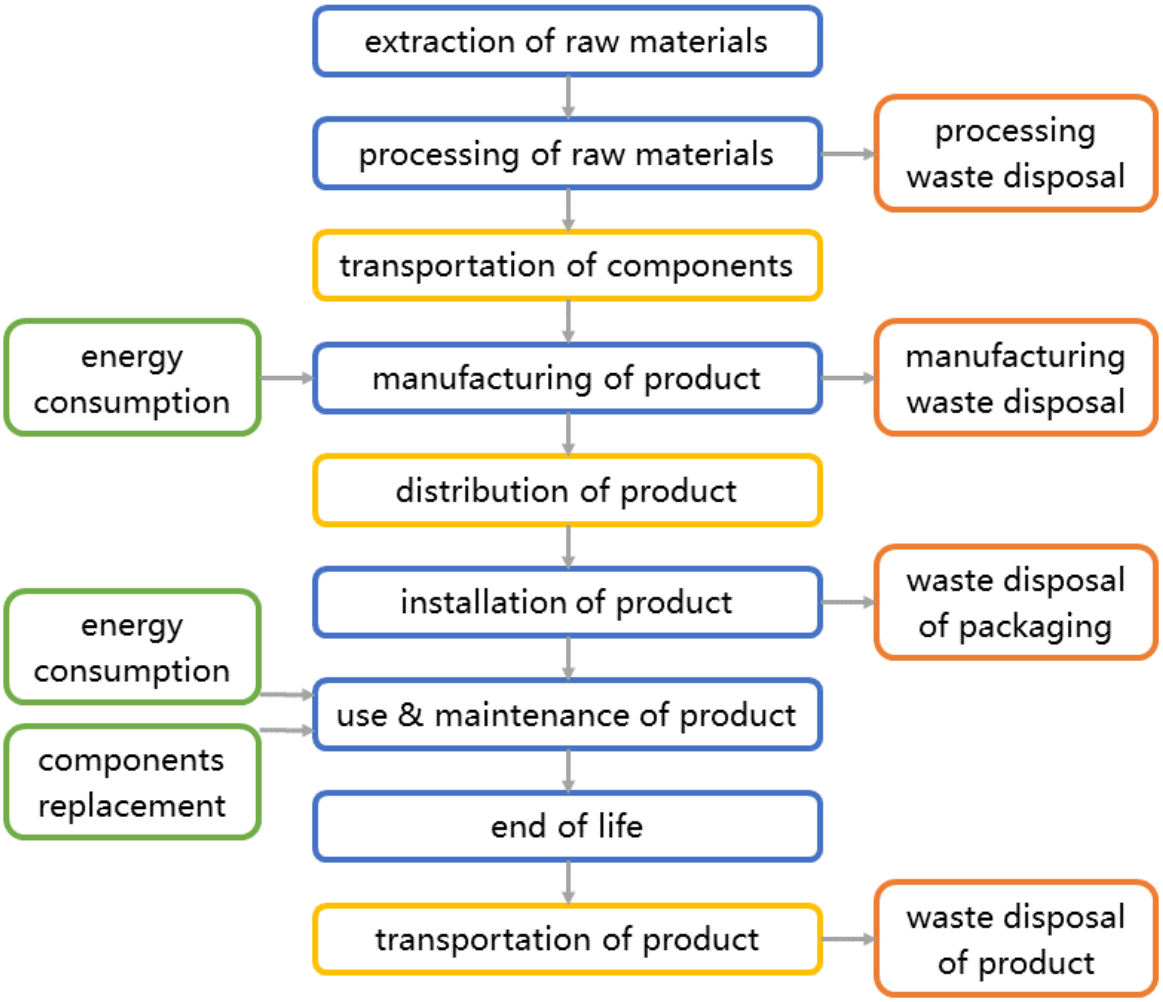

Figure above shows the flowchart on the life cycle of the charging stations. The flowchart shows which processor are included. This study only takes in to account the charging stations and no capital goods/infrastructure that may be needed during production and use. The use, phase only covers standby consumption.

Cut-off criteria:

Flows must not be omitted to avoid hiding significant impacts. The EPD Italy Regulations and PCR EPDItaly007 apply; specifically, the following flows and operations may be cut-off:

Production, use and disposal of the packaging components and semi-finished intermediates.

Materials making up the charging station itself whose total mass does not exceed 2% of the total weight of the device.

Water consumption.

Materials and energy flows related to the installation stage.

Materials and energy flows related to dismantling phase.

Devices external to the product itself required for installation.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

This module corresponds to the LCA analysis 'from cradle to gate' and considers the impacts related to the production of the charging station, starting from the raw materials up to when the product leaves the factory gate.

Manufacturing stage

	Unit	Value
Raw material	Kg	419.31
Material loss	Kg	34.93
Packaging material	Kg	65.02
Electricity consumption	kWh	145.30

This module includes the impact to the distribution of the product at the installation site. Three transportation phases are considered: plant gate to freight/sea stations, train/sea transport to export countries/areas, distribution locations to installation sites. Distances in the first two phases are estimated by map tool, and the average distance in the third phase is assumed as 300 km. In the absence of any primary data on the fleet of vehicles used, a EURO 4 category vehicle is considered in this study.

Distribution stage

Type	Type of vehicle	Distance	Description	Source
Lorry	16-32 metric ton, euro 4	150 km to port or 800 km to station	gate to port or station	ecoinvent 3.8
Train	-	various from destination	cross border by train or sea	ecoinvent 3.8
Container Ship	-	various from destination	cross border by train or sea	ecoinvent 3.8
Lorry	3.5-7.5 metric ton, euro 4	300 km	to installation	ecoinvent 3.8

This module includes impacts arising from the installation of the charging station in the operational site. According to the product instruction, assuming the installation is fully manual and there is little waste and scrap generated during the installation stage, so the only outflow is the end of life (Eol) for packaging, including transports, waste quantities and recovery rates.

In this study, we assumed all packaging material would be collected and transported to a disassembly site, then delivered to recycle/disposal sites. For these two transport phases, the distances of 80 km are assumed. The lorry is assumed to be a EURO 4 category vehicle with a load capacity of 3.5 – 7.5 tons.

Installation stage

	Unit	Value / pcs
Waste packaging	Kg	65.02
Transportation, waste to disassembly, lorry, 3.5-7.5 metric ton, euro 4	Km	80
Transportation, waste to recovery, lorry, 3.5-7.5 metric ton, euro 4	Km	80
Transportation, waste to landfill, lorry, 3.5-7.5 metric ton, euro 4	Km	80

According to PCR EPDItaly017, use phase only considers the energy absorbed by the charging station to keep operating and ready to transfer electric power to the connected vehicles. Therefore, the environmental burden of using the charging stations is based on the standby consumption.

Ordinary scheduled maintenance is included in the system. Based on XCHARGE's recommendation, the air filter should be exchanged once per year.

RSL is the service life of the product, announced to be 20 years by XCHARGE.

Use & maintenance

	Unit	Value / pcs / yr
Electricity consumption	kWh	289.08
Auxiliary, filter replacement	Kg	1.42
Transportation, waste to disassembly, lorry, 3.5-7.5 metric ton, euro 4	Km	80
Transportation, waste to recovery, lorry, 3.5-7.5 metric ton, euro 4	Km	80
Transportation, waste to landfill, lorry, 3.5-7.5 metric ton, euro 4	Km	80

When finishing the service life, the charging station would be delivered to a disassemble place, then all materials entering the final period of waste treatment: disposal and recycling. In absence of primary data, the default values for material recovery rates were used: all BOM components were divided into 4 main categories by homogeneous material – metal, plastic, PCBA, other – and 10 sub-categories to match specific material types in BS EN 50693: 2019. Moreover, the reference figures for recovery were grabbed there, except recovery proportion, other parts were assumed to disposal. Due to the lack of data for other regions, this method was used for all scenarios in this study. In addition, there are no recycled parts in used raw material, from XCHARGE engineers.

End of Life stage

	Unit	Value / pcs
Hazardous waste disposed	Kg	0
Collected as mixed construction waste	Kg	0
Reuse	Kg	0
Recycling	Kg	225.90
Energy recovery	Kg	0
To landfill	Kg	158.50

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Core environmental impact indicators

Indicator	Unit	Manufacturing		Distribution	Installation	Use & maintenance	End-of-life
		Upstream	Core	Downstream			
GWP-total	kg CO2 eq.	7.42E+03	1.65E+02	3.65E+02	1.22E+01	2.89E+03	1.19E+02
GWP-fossil	kg CO2 eq.	7.39E+03	1.65E+02	3.64E+02	6.63E+00	2.74E+03	4.02E+01
GWP-biogenic	kg CO2 eq.	1.88E+01	-9.51E-01	4.33E-01	5.59E+00	1.33E+02	7.85E+01
GWP-LULUC	kg CO2 eq.	1.19E+01	1.96E-02	3.36E-01	3.93E-03	1.85E+01	2.20E-02
ODP	kg CFC11 eq.	7.06E-04	8.65E-07	5.61E-05	1.35E-06	2.07E-04	7.29E-06
AP	mol H^+ eq.	1.09E+02	8.66E-01	3.39E+00	3.12E-02	1.75E+01	1.73E-01
EP-freshwater	kg P eq.	1.10E+01	3.08E-02	5.57E-02	6.49E-04	1.52E+00	4.52E-03
EP-marine	kg N eq.	1.23E+01	1.84E-01	1.18E+00	3.12E-02	3.08E+00	2.58E-01
EP-terrestial	mol N eq.	1.32E+02	1.96E+00	1.28E+01	1.10E-01	3.12E+01	5.90E-01
POCP	kg NMVOC eq.	4.11E+01	5.08E-01	3.50E+00	3.32E-02	8.43E+00	1.89E-01
ADP-M&M	kg Sb eq.	3.16E+00	4.85E-04	1.60E-03	3.52E-05	2.43E-02	2.04E-04
ADP-fossil	MJ	9.36E+04	1.45E+03	4.88E+03	9.46E+01	4.58E+04	5.14E+02
WDP	m^3	3.17E+03	1.72E+01	2.94E+01	9.72E-01	1.05E+03	3.52E+00

GWP-total: *Global Warming Potential;* ***GWP-fossil:*** *Global Warming Potential fossil fuels;* ***GWP-biogenic:*** *Global Warming Potential biogenic;* ***GWP-LULUC:*** *Global Warming Potential land use and land use change;* ***ODP:*** *Depletion potential of the stratospheric ozone layer;* ***AP:*** *Acidification potential, Accumulated Exceedance;* ***EP-freshwater:*** *Eutrophication potential, fraction of nutrients reaching freshwater end compartment; See "additional requirements" for indicator given as PO4 eq.* ***EP-marine:*** *Eutrophication potential, fraction of nutrients reaching freshwater end compartment;* ***EP-terrestial:*** *Eutrophication potential, Accumulated Exceedance;* ***POCP****: Formation potential of tropospheric ozone;* ***ADP-M&M****: Abiotic depletion potential for non-fossil resources (minerals and metals);* ***ADP-fossil:*** *Abiotic depletion potential for fossil resources;* ***WDP:*** *Water deprivation potential, deprivation weighted water counsumption*

Additional environmental impact indicators

Indicator	Unit	Manufacturing		Distribution	Installation	Use & maintenance	End-of-life
		Upstream	Core	Downstream			
PM	Disease incidence	5.58E-04	1.22E-05	4.15E-05	4.61E-07	1.07E-04	2.37E-06
IRP	kBq U235 eq.	8.03E+02	2.30E+00	2.75E+01	4.95E-01	8.71E+02	2.76E+00
ETP-fw	CTUe	9.57E+05	4.28E+03	5.13E+03	8.68E+01	5.36E+04	3.29E+03
HTP-c	CTUh	4.35E-05	4.12E-08	2.85E-07	3.41E-09	1.42E-06	2.07E-08
HTP-nc	CTUh	8.88E-04	1.81E-06	4.47E-06	8.41E-08	3.83E-05	5.56E-07
SQP	Dimensionless	6.44E+04	3.28E+02	2.98E+03	7.45E+01	8.48E+03	3.12E+02

PM: *Particulate matter emissions;* ***IRP:*** *Ionising radiation, human health;* ***ETP-fw:*** *Ecotoxicity (freshwater);* ***ETP-c:*** *Human toxicity, cancer effects;* ***HTP-nc:*** *Human toxicity, non-cancer effects;* ***SQP:*** *Land use related*

Resource use

Parameter	Unit	Manufacturing		Distribution	Installation	Use & maintenance	End-of-life
		Upstream	Core	Downstream			
RPEE	MJ	7.28E+01	4.37E+01	7.04E+01	8.26E-01	5.62E+03	4.91E+00
RPEM	MJ	6.04E+03	0.00E+00	0.00E+00	0.00E+00	1.12E+02	0.00E+00
TPE	MJ	6.11E+03	4.37E+01	7.04E+01	8.26E-01	5.73E+03	4.91E+00
NRPE	MJ	2.00E+03	1.45E+03	4.88E+03	9.46E+01	4.09E+04	5.14E+02
NRPM	MJ	9.16E+04	0.00E+00	0.00E+00	0.00E+00	4.91E+03	0.00E+00
TRPE	MJ	9.36E+04	1.45E+03	4.88E+03	9.46E+01	4.58E+04	5.14E+02
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
W	m^3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water

End of life - Waste

Parameter	Unit	Manufacturing		Distribution	Installation	Use & maintenance	End-of-life
		Upstream	Core	Downstream			
HW	KG	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHW	KG	3.49E+01	0.00E+00	0.00E+00	6.10E+01	8.58E+00	1.58E+02
RW	KG	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life – output flow

Parameter	Unit	Manufacturing		Distribution	Installation	Use & maintenance	End-of-life
		Upstream	Core	Downstream			
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	0.00E+00	0.00E+00	0.00E+00	4.04E+00	1.58E+01	2.26E+02
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: 9,0 E-03 = 9,0*10-3 = 0,009

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	0.00E+00
Biogenic carbon content in the accompanying packaging	kg C	2.77E+01

Additional requirements

Greenhous gas emission from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process.

National electricity grid	Unit	Value
market for electricity, low voltage, state Grid Corporation of China (ecoinvent 3.8)	kg CO2 -eq/kWh	1.13

Bibliography

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EPDItaly017 - SUB PCR EN 50693_charging_stations_1

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ISO 14044:2006 + A1:2018 + A2:2020 (2020) Environmental management — Life cycle assessment — Requirements and guidelines

ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures

EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

Ecoinvent Database, Version 3.8

SimaPro Software, Version 9.4

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