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Sungrow Power Supply Co., Ltd.

ENVIRONMENTAL PRODUCT DECLARATION

MV Turnkey Solution for PowerTitan 2.0 MVS Liquid Cooling Energy Storage System MVS3460-LS

No.788, Mingchuan Road,Boyan Technology Park, Hi-tech Zone, Hefei City, 230088 Anhui, P.R. China

In accordance with ISO 14025:2006 and EN 50693:2019

Program Operator	EPDItaly
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GENERAL INFORMATION

EPD OWNER	
Name of the company	Sungrow Power Supply Co., Ltd.
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PROGRAM OPERATOR	
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INFORMATION ON THE EPD	
Product name (s)	MV Turnkey Solution for PowerTitan 2.0 MVS Liquid Cooling Energy Storage System MVS3460-LS
Site (s)	SUNGROW ENERGY STORAGE TECHNOLOGY CO., LTD. No.788, Mingchuan Road, Boyan Technology Park, Hi-tech Zone, Hefei City, 230088 Anhui, P.R. China
Short description and technical information of the product (s)	MVS 3460-LS (transformer + RMU (ring main unit) + smart control cabinet)
Field of application of the product (s)	Solar power
Declaration product & function unit for declared unit	1 single piece of MV Turnkey Solution for PowerTitan 2.0 MVS Liquid Cooling Energy Storage System MVS3460-LS
Product (s) reference standards (if any)	EN 50693:2019 – Product category rules for life cycle assessment of electronic and electrical products and systems
Type of EPD	Product-specific EPD
CPC Code (number) https://unstats.un.org/unsd/classifications/Econ	462 Electricity distribution and control apparatus, and parts thereof
LCA software	Simapro 10.2.0.0
LCI database	Ecoinvent 3.11

VERIFICATION INFORMATION	
PCR (title, version, date of publication or update)	EPDItaly007 - Electronic and electrical products and systems, Rev. 3.2, 12/10/2025, reviewed by Ing. Ugo Pannuti, ICMQ Spa (Moderator), Eng. Elena Neri, Indaco2 (Committee)
EPDItaly Regulation (version, date of publication or update)	Regulations of the EPDItaly Programme, Rev. 6.0, 10/30/2023
Project Report LCA	Life Cycle Assessment Report of Transformer (MVS3460-LS) for Environmental Product Declaration, V9, 20 May 2026
Independent Verification Statement	Independent verification of the declaration and data, carried out according to ISO 14025: 2010. ☐ Internal ☑ External Third party verification carried out by: ICMQ
Comparability Statement	Environmental statements published within the same product category, but from different programs, may not be comparable.

	In particular, EPDs of construction products may not be comparable if they do not comply with EN 50693:2019.
Liability Statement	The EPD Owner releases EPDItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence. EPDItaly disclaims any responsibility for the information, data and results provided by the EPD Owner for life cycle assessment.

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1. Company information

As a global renowned renewable energy company, Sungrow Power Supply Co., Ltd. (Stock code: 300274) specializes in R&D, production, sales and services of new energy equipment, such as solar energy, wind energy, energy storage, hydrogen energy, electric vehicles and charging, mainly provides photovoltaic inverters, wind converters and motor driver, energy storage system, floating PV system, motor controller and on-board charger for EV, EV charging station, renewable hydrogen production system, smart operation and maintenance, and commits itself to providing first-class life cycle solutions of clean energy.

Since the establishment in 1997, the Company has been concentrating on the field of new energy power generation, adhering to market demand orientation, and taking technological innovation as the propellant for development. The Company has cultivated a professional R&D team with solid R&D experiences and strong capabilities of independent innovation. Sungrow has led the drafting of multiple national standards, and is one of the few companies in the industry that have mastered a number of independent core technologies.

Photovoltaic inverters, Sungrow's core products, have been accredited by TÜV, CSA, SGS, and other international authorities, and sold to more than 180 countries and regions in the world. Sungrow's cumulative installed capacity of power electronic converters across the world has been above 740GW by the end of December 2024.

The Company has successively won the awards of China Grand Awards for Industry, National Manufacturing Single Champion Demonstration Enterprise, Top 50 Innovative Chinese Companies, National Intellectual Property Demonstration Enterprise, Global Top 500 New Energy Enterprises, and Best Companies to Work For in Asia. Sungrow is a company with state-level post-doctoral research workstation, a national high-tech industrialization demonstration base, a national enterprise technology center, a national industrial design center, a national green factory, and ranks among the best in the global new energy power generation industry in terms of comprehensive strength.

Figure 1 Sungrow Power Supply Co., Ltd.

2. Product Information

Sungrow offers a wide range of products for residential, commercial, and utility-scale applications. The product that under study is 1 single piece of MV Turnkey Solution for PowerTitan 2.0 MVS Liquid Cooling Energy Storage System MVS3460-LS.

Figure 2 MV Turnkey Solution for PowerTitan 2.0 MVS Liquid Cooling Energy Storage System MVS3460-LS

The product general and technical information are listed in below table

Table 1 Product information MVS3460-LS

Product Name	MVS3460-LS
MV transformer	
Rated power	3460 kVA
MV / LV voltage	11 kV ~ 33 kV / 0.69 kV
Transformer vector	Dy11
Insulation level	A
Rated frequency	50 Hz / 60 Hz
Impedance	7 % (Tolerance -5 % ~ 10 %)
Material of winding (MV / LV)	Aluminum / Aluminum
Cooling method	ONAN
Degree of protection	Transformer body: IP68 Other parts: IP55
RMU	
Rated voltage	24 kV / 36 kV
Rated current	630 A (50 Hz) / 600 A (60 Hz)
Units	DCV / CCV / CV / DV
Relay protection	ANSI 50 , 50N , 51 , 51N
Rated short-time withstand current	20 kA / 3 s or 25 kA / 1 s
Smart control cabinet	
Protection	AC Breaker
Surge protection	Type II
Meter for main circuit	Optional
AC insulation detection	Support
Temperature control method	Air cooling and HVAC
Degree of protection	IP55
UPS	15 min (Default) 2 / 3 / 4 h (Optional)
General data	
Dimensions (W * H * D)	6058 mm * 2896 mm * 2438 mm
Cable entry	Bottom Entry
Degree of protection	IP55
Anti-corrosion Degree	C4
Operation temperature range	-40 °C ~ 60 °C > 40 °C derating (Default) > 45 °C derating (Optional)
Operation humidity range	0 % - 100 %
Max. operating altitude	4500 m
Communication	Ethernet , Optical fiber , RS485
Standard	IEC 62271-202, IEC 61439

The production process of MV Turnkey Solution for PowerTitan 2.0 MVS Liquid Cooling Energy Storage System MVS3460-LS reference figure below:

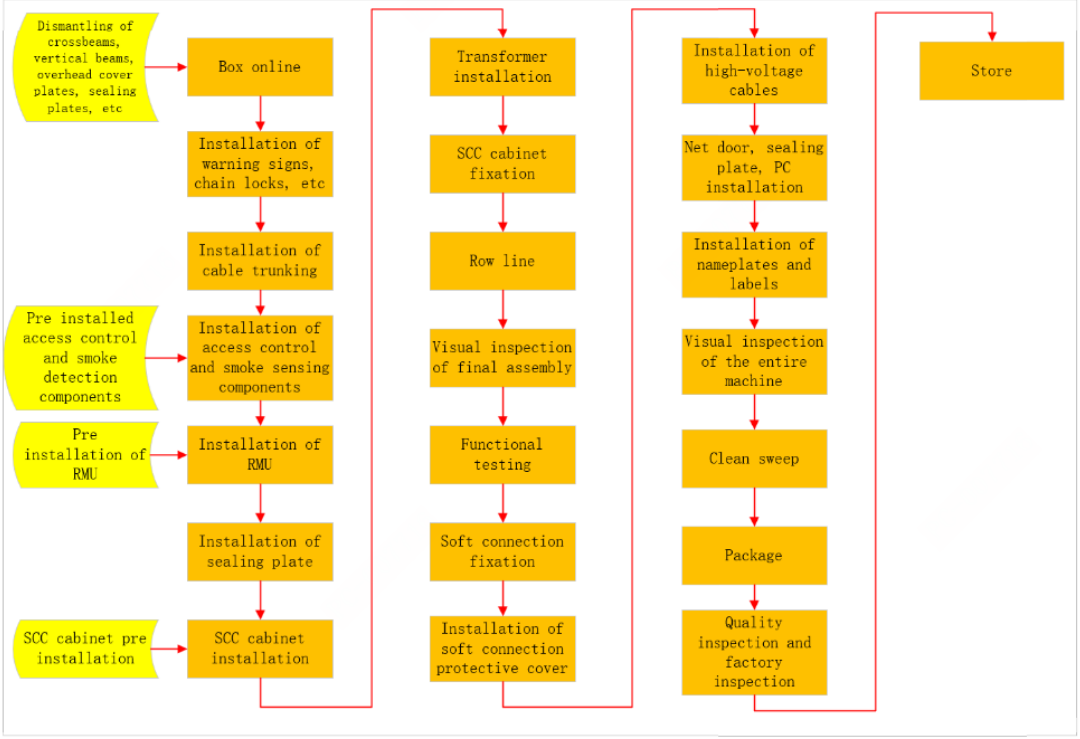

Figure 3 Production process flow chart

The MVS process flow is divided into 15 process steps:

Step 1: Pre-processing of the box body, the main tasks include disassembling the sheet metal components of the container, installing related devices and pre-installing the sealing plates;

Step 2: Installation of the ring network cabinet, the main tasks include installing the ring network cabinet support and sealing plates, as well as the cabinet body itself;

Step 3: Installation of the transformer, the main tasks include hoisting and positioning fixing of the transformer;

Step 4: Installation of the SCC cabinet, the main tasks include positioning and fixing of the SCC cabinet and its support;

Step 5: Wiring of the entire machine, the main tasks include laying the connecting wires between the SCC cabinet, the transformer and the ring network cabinet;

Step 6: Installation of the crossbeam, the main tasks include restoring the crossbeam of the entire machine;

Step 7: Installation of grounding wires and wiring fixation, the main tasks include

installing grounding wires for each component and fixing the cable clamps;

Step 8: System visual inspection, the main tasks include checking the completed processes and confirming that they are installed correctly;

Step 9: Function testing, the main tasks include conducting the withstand voltage test, safety regulations test and function detection of the entire machine;

Step 10: Installation of high-voltage lines, the main tasks include installing the high-voltage lines between the ring network cabinet and the transformer and their fixed supports;

Step 11: Installation of soft connections, the main tasks include installing the copper braided belt between the transformer and the SCC cabinet and related sheet metal protective covers;

Step 12: Installation of the sealing plate of the net door, the main tasks include installing the sealing plate and the net door inside the SCC cabinet;

Step 13: Installation of the nameplate marking, the main tasks include installing the nameplate of the entire machine and pasting relevant sticker labels;

Step 14: Visual inspection of packaging, the main tasks include checking the completed processes and confirming that they are installed correctly;

Step 15: Packaging and storage, the main tasks include cleaning the interior of the entire machine, placing the shipping accessories and packaging and storing the entire machine.

3. Life Cycle Assesment Information

A Life Cycle Assessment (LCA) is a methodology for assessing the environmental impacts associated with the entire life cycle of a particular product or process. LCA consists of 4 stages (Goal and Scope, Inventory Analysis, Impact Assessment, and review/presentation) which must follow similar procedures to a PCR (Product Category Rules) and helps to evaluate the carbon footprint and natural resources of a product or process. In this EPD, LCA is conducted to obtain environmental impact information.

3.1 Functional unit

According to core PCR EPDItaly 007, the functional unit is 1 single piece of MV Turnkey Solution for PowerTitan 2.0 MVS Liquid Cooling Energy Storage System MVS3460-LS.

3.2 System, temporal, and geographical boundaries

The system boundary includes the whole life cycle of the analyzed product, according to a "from cradle to grave" application, covering the following life cycle stages:

PHASES	MANUFACTURING STAGE	DISTRIBUTION STAGE	INSTALLATION STAGE	USE & Maintenance STAGE	END-OF-LIFE STAGE De-installation	BENEFITS & LOADS BEYOND THE SYSTEM BOUNDARIES*
	IN ACCORDANCE TO EN 50693					
Phases declared	X	X	X	X	X	Opt.
Data quality indicator[10]	%	-				

Figure 4 System boundary

The data collection period is January–December 2024.

Manufacturing stage

The manufacturing stage consists of acquisition of raw materials, raw materials transport, and manufacturing, three processes.

Table 2 Material composition of the products (in accordance with EN IEC 62474)

IEC 62474 Class name	IEC 62474 ID	Percentage
Steel components	M-100, M-119	81.00%
Mineral oil	M-410	12.28%

Plastic components	M-200, M-302, M208	1.52%
Aluminum alloy	M-120	1.29%
Copper	M-121	1.26%
Others	/	1.70%
Total materials		99.05%
Total Cut-off		0.95%
Total finished product		100%

Note: No substance in the product greater than 0.10% by weight is present on the "List of Potentially Hazardous Substances" candidates for authorization under the REACH legislation.

Table 3 Material transport

Item	Value
Land transport (tkm)	15,284.41

Table 4 Onsite datasets

Process	Unit	MVS 3460-LS
Input (energy)		
Electricity consumption	kWh	1760.48
Output (emissions)		
Hazardous waste (incineration)	kg	10.47
General waste (incineration)	kg	33.55
General waste (recycling)	kg	301.91
Particulates - to air	kg	0.0012
NMVOC - to air	kg	0.0048
Waste transport	tkm	21.81

Distribution stage

This module includes the impacts related to the distribution of the product at the installation site.

Table 5 Product transport

Trasport	MVS 3460-LS (tkm)
Plant to port and Port to use site, by lorry	15,053.43
Port to port, by ship	28,6015.17

Installation stage

The products are fully assembled inside a container at the factory in China. No additional packaging materials are required for transportation.

On-site installation mainly involves lifting the container to the designated position using a diesel crane, with a lifting height of 0.5 meters.

For theoretical effective work of lifting

$$W = m \times g \times h$$

Where:
W is Effective gravitational potential energy, J
m is total mass of the products, kg
g is Gravitational acceleration, take 9.8 m/s^2
h is Lifting height, 0.5 m

For Actual energy consumption of diesel crane

Considering the mechanical efficiency of the crane, the actual input energy consumption is calculated as below:

$$E_{actual} = \frac{W}{\eta}$$

Where:
E_{actual} is Actual energy consumption, J
η is comprehensive mechanical efficiency of diesel crane (20%)

E_{actual} = 372,329.21 J = 0.3723 MJ

Based on the energy value and the net calorific value (NCV) of diesel (43Tj/Gg, IPCC 2006), the activity data of diesel consumption can be calculated. Diesel activity data = 8.66 kg

Use and maintenance phase

For transformer parts

Use phase considers several types of losses which occur during the transformer operations; all the losses specified below shall be computed and calculated according to IEC 60076-1 technical standard.

Load Losses: this kind of losses is caused by the winding impedance and vary according to the loading on the transformer. They shall be calculated at rated frequency and temperature.

No load Losses: this represents the active power absorbed by the transformer when the machine is energized and the secondary circuit is open.

$$E_d[kWh] = [P_{load} * k_{load}^2 + P_{noload}] * t_{year} * RSL + P_{aux} * f_{aux} * t_{year} * RSL$$

For switch and smart control unit

According to PCR, the following formula shall be used to calculate the electricity used during the product's service life to keep the battery active.

$$E_{use}[kWh] = \frac{P_{use} \times 8760 \times RSL \times a}{1000}$$

Table 6 Power consumption of product

Product	P_{load} (kW)	k_{load}	P_{aux} (kW)	f_{aux}	$E_d[kWh]$	$E_{use}[kWh]$
MVS 3460-LS	31.65	0.7	0.28	100%	5,745,224.10	243,352.80

For the maintenance of the electric products, the products are designed to be free of maintenance during its service life.

End of Life Stage

For end-of life (EoL) stage, assumptions are made due to lack of data. De-installation stage of system is assumed to be manually done with no energy use. Transportation distance from the plant site to the waste treatment site is assumed to be 1000 km according to PCR. For waste processing, the system is shredded and post-processed.

Table 7 Disposal scenarios

IEC 62474 Class name	Material recovery rate R_2	Energy recovery rate R_3	Disposal rate $(1 - R_2 - R_3)$ landfill or incineration without energy recovery
Steel	80%	0%	20%
Other minerals	0%	0%	100%
Aluminum	70%	0%	30%
Copper	60%	0%	40%
Other plastic	0%	50%	50%
Other non-ferrous metals	60%	0%	40%

3.3 Impact categories

The methodology chosen to evaluate the potential environmental impacts of the product subject of this study includes all the impact categories required by the Standard EN 50693:2019. The models used are those shown in EN 15804 + A2: 2019, as implemented in the SimaPro software. The categories analyzed are therefore:

Table 8 LCA evaluation result - impact categories - MVS 3460-LS

Impact category	Unit
Climate change	kg CO2 eq
Climate change - Biogenic	kg CO2 eq
Climate change - Fossil	kg CO2 eq
Climate change - Land use and LU change	kg CO2 eq
Ozone depletion	kg CFC11 eq
Acidification	mol H+ eq
Eutrophication, freshwater	kg P eq
Eutrophication, marine	kg N eq
Eutrophication, terrestrial	mol N eq
Photochemical ozone formation	kg NMVOC eq
Resource use, minerals and metals	kg Sb eq
Resource use, fossils	MJ
Water use	m3 depriv.

*Please also noted that the EN 15804+A2 method is based on the EF 3.1 version for this study.
**The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

3.4 Cut-off

For the processes within the system boundary, all available energy and material flow data have been included in the model. The cut-off criteria were set to 2% in this study according to PCR.

- All inputs and outputs to a (unit) process will be included in the calculation for which data is available. Data gaps may be filled by conservative assumptions with average or generic data. Any assumptions for such choices will be documented.
- According to PCR, data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts shall be included. But in this study, the additives and catalysts are all included.

3.5 Allocation Principles

The allocation is made in accordance with the provisions of EN 50693 and Core PCR Allocation refers to the partitioning of input or output flows of a process or a product system between the product systems under study and one or more other product systems. In this study there are three types of allocation procedures considered:

Multi-input allocation: For data sets in this study, raw materials as well as packaging materials are based on the BOM from Sungrow, no allocation is used at the stage. As for the manufacturing process, the energy consumption and emission are allocated based on working hours of different product, i.e. the electricity consumption and the emissions are calculated based on the amount of time spent producing product.

Multi-output allocation: No other by-products are produced from the production, hence there is no production of byproducts that need to be used to allocate the situation End-of-life allocation: For end-of-life allocation of background data (energy and materials), the model "allocation cut-off by classification (ISO standard) is used. The underlying philosophy of this approach is that primary (first) production of materials is always allocated to the primary user of a material. If material is recycled, the primary producer does not receive any credit for the provision of any recyclable materials. Consequently, recyclable materials are available burden-free for recycling processes, and secondary (recycled) materials bear only the impacts of the recycling processes For end-of life stage of the product, the polluter pays principle (PPP) and modularity are followed in this report, This means that the waste transportation to the treatment site and the waste processing is considered in this report, while the benefit, the load from waste treatment for recycling purposes such as de-pollution and crushing, etc., is allocated to the next life cycle of substituted products, but not the primary producers, hence no burden or benefit will be allocated to the primary producer of the electric products (cut-off approach).

3.6 Limitation and Assumption

The results are only valid for the situation defined by the assumptions described in the present report, and they are subject to change if these manufacturing conditions change. The following assumptions are used in this assessment:

Table 9 List of assumption

Life cycle stages	Item	Assumption
Manufacturing stage	Materials	none
	Means of transport	Fright lorry, lorry
	Waste disposal	Treatments including physicochemical treatment, washing and others are replaced by incineration, due to lack of data from the manufacturer and appropriate data in the database for modelling, and the quantity is relatively Small
Distribution stage	Means of transport	Fright, lorry and Fright, sea Non-European Market: 19 000 km, 95% covered by ship, 5% covered by truck

Installation stage	Energy and materials use	The products are fully assembled inside a container at the factory in China. No additional packaging materials are required for transportation. On-site installation mainly involves lifting the container to the designated position using a diesel crane.
	Waste transport	Fright, lorry
Use & Maintenance stage	Replacement	No replacement for system within RSL
End-of-life stage	De-installation	The de-installation is assumed to be done manually; no energy and materials use in this stage
	Waste transport	Freight, lorry
	Waste treatment	Treatments including physicochemical treatment, washing and others are replaced by incineration, due to lack of data from the manufacturer and appropriate data in the database for modelling, and the quantity is relatively Small
	Waste disposal	The disposal scenario follows PEF EoL default values in Europe and IEC/TR 62635 guidelines

3.7 Data quality

Steps were taken to ensure that the life cycle inventory data were reliable and representative. The type of data that was used is clearly stated in the Inventory Analysis, being it measured or calculated from primary sources or whether data are from the life cycle inventory databases.

Within this study, the data quality requirements were as follows:

- **Specific data** of the considered system (such as materials or energy flows that enter the production system). These data were calculated and submitted by Sungrow Power Supply Co., Ltd.
- **Generic data** related to the life cycle impacts of the material or energy flow that enters the production system. These data were sourced from the databases Ecoinvent 3.11 “allocation, cut-off by classification - unit” in SimaPro 10.2. SimaPro is the world’s most widely used LCA software and the data in it comes predominantly from Ecoinvent and some other datasets, with the world’s most complete and widely used set of data on industrial processes, material production, packaging production, transport and so on.
- Existing LCI data is, at most, 10 years old. Newly collected LCI data is current or up to 3 years old.
- The LCI data is related to the geographical locations where the processes occur.

- The technology represents the average technologies during the period of study.

Table 10 Data quality requirement and self-evaluation

Quality requirement	Specific requirement	Data quality	Good / fair / poor
Time-related coverage (age of data and the minimum length of time over which data should be collected)	Existing LCI data were, at most, 10 years old.	<10 years	Good
	Newly collected LCI data were current or up to 3 years old	2021-2024	Good
Geographical coverage (geographical area from which data for unit processes should be collected to satisfy the goal of the study)	Transportation and energy data should represent the region (in China)	Transportation and energy use Ecoinvent data with adaptation to China regional character	Good
Technology coverage (specific technology or technology mix)	Specific technology for products production should be represented in the analysis	For all products fabrication as well as raw material manufacturing, the technology is the most recent.	Good
Precision (measure of the variability of the data values for each data expressed, e.g. variance)	Data for products Manufacturing should be directly measured	Data for products manufacturing were collected from measured or calculated value.	Fair to good
Completeness	95% of flow is measured or estimated	All the unit processes within the scope of the life cycle are included, with less than 2% cut off	Good
Representativeness	qualitative assessment of the degree to which the data set reflects the true population of interest, i.e., geographical coverage, period and technology coverage	See geographical coverage, period and technology coverage requirement above, all criteria are met	Good
Consistency	qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The study methodology is applied uniformly to the various components of the analysis	Good

Reproducibility	qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Yes	Good
Sources of the data	The foreground data including product manufacturing and should be from primary producer	Yes	Good
Uncertainty of the information	Data, models, and assumptions should be verified	All the primary data and assumptions were confirmed, and models were built following ISO 14040/44.	Good

4. Inventory analysis

This EPD uses primary data where available. Where access to this type of data was not possible, datasets from the Ecoinvent v3.11 database were used as a reference.

Data collection was carried out by creating a sheet to collect input and output data, in terms of mass, energy consumption within the production site. The data collection sheet was verified and checked through mass balances and reporting of any inconsistencies, which were clarified and resolved.

In the study, SimaPro 10.2 software was used to establish the model for the life cycle of products and calculate LCA results.

In upstream module, inventory for raw material and its transportation distance are collected.

In core module, inputs are the energy used during production while outputs are the waste generated. The product consumes electricity and water during the manufacturing phase, of which all were being supplied externally. All electricity consumption comes from grid electricity and no additional green power or green certificates are purchased. According to the China Energy Yearbook, grid electricity is supplied from all major power plants in China, with a mix of fossil, natural gas, wind, solar, and nuclear energy sources. The energy and resources usage per functional unit in the production stage of the product is calculated by dividing the annual energy or resource consumption by the total output of the company's product.

As for distribution, the product is manufactured in China and to be used in Italy. Downstream distribution distances are estimated from the GAODE map and SEARATE website for shipment distances, inland transport is by truck freight, and sea transport is by ship.

In the installation stage, the energy use is negligible since the installation process is mainly done manually. According to the product category rules (PCR), end of life of the packaging materials, scraps of cable and steel are considered in this stage.

The electricity consumption during the use stage of the systems includes two different parts, which are the energy required by the battery to operate, and the energy loss due to charge and discharge cycles.

During the end-of-life disposal stage, the product is manually dismantled into components and then sorted for further processing. Some metals or plastics are recycled according to EN50693 standards, while the remaining materials are either landfilled or incinerated.

5. Environmental Impact Assessment

Potential Environmental impact of each lifecycle stage is shown below.

Table 11 LCA evaluation result - impact categories - MVS 3460-LS

Impact category	Unit	Manufacturing stage	Distribution stage	Installation stage	Use stage	End-of-life stage
Climate change	kg CO2 eq	8.06E+04	4.56E+03	8.30E+00	2.24E+06	8.87E+03
Climate change - Fossil	kg CO2 eq	7.63E+04	4.55E+03	8.29E+00	2.12E+06	8.85E+03
Climate change - Biogenic	kg CO2 eq	4.28E+03	3.83E+00	6.21E-03	1.19E+05	1.82E+01
Climate change - Land use and LU change	kg CO2 eq	9.12E+01	6.90E+00	1.31E-03	1.46E+02	7.12E+00
Ozone depletion	kg CFC11 eq	7.22E-04	6.73E-05	8.18E-07	5.14E-02	3.93E-05
Acidification	mol H+ eq	4.37E+02	9.28E+01	3.68E-02	6.47E+03	1.08E+01
Eutrophication, freshwater	kg P eq	6.07E+00	1.37E-02	3.56E-05	5.33E+01	5.45E-02
Eutrophication, marine	kg N eq	8.60E+01	2.44E+01	5.55E-03	1.09E+03	4.13E+00
Eutrophication, terrestrial	mol N eq	9.39E+02	2.70E+02	5.89E-02	1.24E+04	4.53E+01
Photochemical ozone formation	kg NMVOC eq	3.28E+02	7.39E+01	7.38E-02	5.27E+03	1.40E+01
Resource use, minerals and metals	kg Sb eq	3.98E+00	1.71E-04	4.28E-06	3.14E-02	3.98E-04
Resource use, fossils*	MJ	9.48E+05	5.73E+04	4.77E+02	3.62E+07	3.04E+04
Water use*	m3 depriv.	1.65E+04	4.29E+01	5.91E-01	1.06E+06	1.99E+02

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

Table 12 Resource use/waste production - MVS 3460-LS

Impact category	Unit	Manufacturing stage	Distribution stage	Installation stage	Use stage	End-of-life stage
PENRE	MJ	1.02E+06	6.16E+04	4.77E+02	3.77E+07	3.26E+04
PERE	MJ	6.59E+04	9.67E+01	1.24E+00	8.34E+06	3.19E+02
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.02E+06	6.16E+04	4.77E+02	3.77E+07	3.26E+04
PERT	MJ	6.59E+04	9.67E+01	1.24E+00	8.34E+06	3.19E+02
FW	m3	5.27E+02	1.91E+00	1.19E-02	2.96E+04	6.31E+00
SM	kg	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HWD	kg	7.24E+02	4.26E-01	1.01E-01	5.51E+02	1.64E+02
NHWD	kg	3.39E+03	2.47E+00	5.33E-01	5.68E+03	4.69E+03
RWD	kg	9.17E-01	2.40E-03	2.45E-05	8.18E+01	9.45E-03
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E+04
CRU	kg	1.69E+03	1.19E+00	0.00E+00	2.60E+03	2.44E+02
ETE	MJ	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

Caption:

PENRE: Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material; **PERE**: Use of renewable primary energy excluding renewable primary energy resources used as raw material; **PENRM**: Use of non-renewable primary energy resources used as raw material; **PERM**: Use of renewable primary energy resources used as raw material; **PENRT**: Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials); **PERT**: Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials); **FW**: Net use of fresh water; **SM**: Use of secondary raw materials; **RSF**: Use of renewable secondary fuels; **NRSF**: Use of non-

renewable secondary fuels; **HWD**: Hazardous landfill waste; **NHWD**: Non-hazardous waste disposed; **RWD**: Radioactive waste disposed; **MER**: Materials for energy recovery; **MFR**: Material for recycling; **CRU**: Components for reuse; **ETE**: Exported thermal energy; **EEE**: Exported electricity energy.

6. References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

REGULATIONS OF THE EPDItaly PROGRAMME, Version 6.0, 10/30/2023

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ISO 14040:2006/Amd 1:2020. Environmental management - Life cycle assessment - Principles and framework - Amendment 1

ISO 14044:2006/Amd 2:2020. Environmental management - Life cycle assessment - Requirements and guidelines - Amendment 2

EPDItaly007 - Electronic and Electrical Products and Systems, Version 3.2, 12/10/2025

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EN 50693:2019, Product category rules for life cycle assessments of electronic and electrical products and systems

IEC/TR 62635:2012, Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment

IEC 60076-1-2011, Power transformers - Part 1 general

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