

EPD

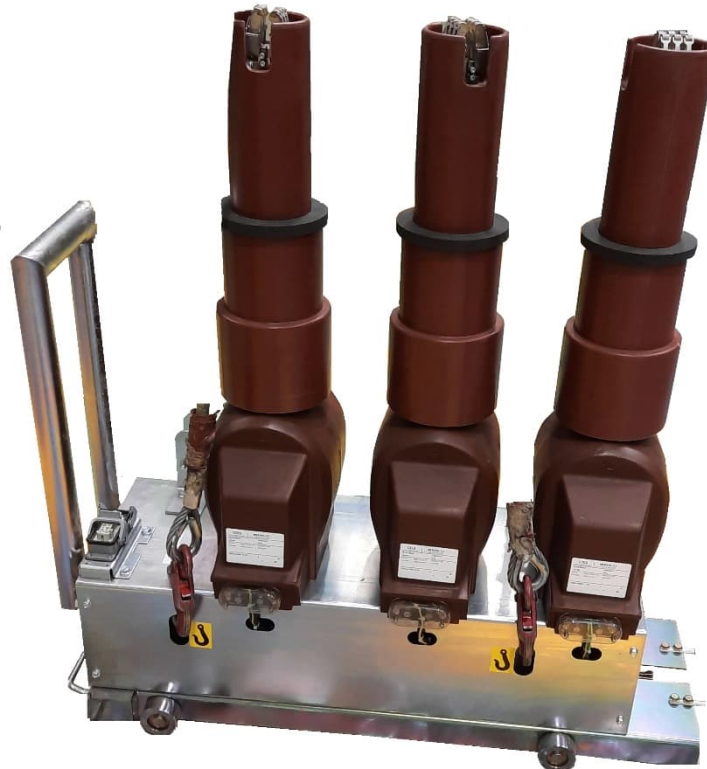
Environmental Product Declaration

VD4/RU-TV 12 DY734/1

VD4/RU-TV 17 DY734/2

VD4/RU-TV 24 DY734/3

Production site: Dalmine, Italy



DOCUMENT KIND Environmental Product Declaration	IN COMPLIANCE WITH ISO 14025 and EN50693			
PROGRAM OPERATOR EPDItaly	PUBLISHER EPDItaly			
EPDITALY REGISTRATION NUMBER EPDITALY0329	ISSUE DATE 2022-07-25			
VALID TO 2027-07-25	STATUS Approved	SECURITY LEVEL Public		
OWNING ORGANIZATION ABB S.p.A.	DECLARATION NUMBER 2RDA044521	REV. A	LANG. en	PAGE 1/18

EPD Owner	ABB Switzerland Ltd, Group Technology Management
Manufacturer name and address	ABB S.p.A. Via Friuli, 4, 24044 Dalmine, Bergamo (Italy)
Organization no	CHE-101.538.426
Company Contact	Seila Rodriguez Vilches – seila.rodriguez-vilches@ch.abb.com Sustainability Product Manager
Program operator	EPDItaly – info@epditaly.it Via Gaetano De Castillia n° 10 - 20124 Milano, Italia
Declared product & Functional unit or declared unit	VD4/RU-TV 12 DY734/1 VD4/RU-TV 17 DY734/2 VD4/RU-TV 24 DY734/3 FU: single voltage transformer truck, which measures and detects the busbar voltage during a service of 20 years, including related accessories and packaging.
Product Description	The scope of the medium voltage transformer truck is to measure the busbar voltage inside the switchgear.
CPC code	46211 - Electrical apparatus for switching or protecting electrical circuits, or for making connexions to or in electrical circuits, for a voltage exceeding 1000 V
Independent verification	This declaration has been developed referring to EPDItaly, following the "Regolamento di EPDItaly"; further information and the document itself are available at: www.epditaly.it . EPD document valid within the following geographical area: Italy and other countries worldwide according to sales market conditions. Independent verification of the declaration and data was carried out according to ISO 14025: 2010. <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL Third-party verification carried out by: ICMQ spa Accredited by: ACCREDIA
Reference PCR and version number	PCR: EPDItaly007 – PCR for Electronic and Electrical Products and Systems, Rev. 2, 2020/10/21.
Other reference documents	EN 50693:2019 - Product category rules for life cycle assessments of electronic and electrical products and systems Regulations of the EPDItaly Programme rev. 5.2 (16 February 2022)
Product RSL description	20 years
Markets of applicability	World (raw materials), Italy (production, use and end-of-life)
LCA study	This EPD is based on the LCA study described in the LCA report 2RDA044512.
EPD type	Product specific
EPD scope	"Cradle to grave"
Year of reported primary data	2021
LCA software	SimaPro 9.3.0.2. (2021)
LCI database	ecoinvent v3.8 (2021)
LCIA methodology	EN 50693:2019
Author of the life cycle assessment	Gozde Kaya Avsar – gozde.kaya-avsar@it.abb.com Environmental Sustainability Specialist

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Comparability	EPDs published within the same product category, though originating from different programs, may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible.
Liability	EPDItaly declines any responsibility regarding the manufacturer's information, data and results of the life cycle assessment.

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ABB Purpose & Embedding Sustainability

ABB is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels. With a history of excellence stretching back more than 130 years, ABB’s success is driven by about 110 thousand talented employees in over 100 countries.

ABB's Electrification business offers a wide-ranging portfolio of products, digital solutions and services, from the substation to the socket, enabling safe, smart and sustainable electrification. Offerings encompass digital and connected innovations for low and medium voltage, including EV infrastructure, solar inverters, modular substations, distribution automation, power protection, wiring accessories, switchgear, enclosures, cabling, sensing and control.

ABB is committed to continually promoting and embedding sustainability across its operations and value chain, aspiring to become a role model for others to follow. With its ABB Purpose, ABB is focusing on reducing harmful emissions, preserving natural resources and championing ethical and humane behavior.



Apparatus
Factory

Switchgear
Factory

Figure 1 ABB Dalmine

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General Information

ABB S.p.A Electrification Distribution Solutions facility in Dalmine (ELDS Division) produces medium voltage circuit breakers, disconnectors, and contactors, medium voltage switchboards for primary and secondary distribution, low voltage switchboards, complete packages and services for substations. Smart systems and technologies for electrical distribution are supplied to utilities, industrial, and tertiary sector customers. Dalmine exports 85% of the volumes produced.

ABB ELDS division, Italy adopts and implements for its own activities an integrated Quality/Environmental/Health Management System in compliance with the following standards:

- UNI EN ISO 9001/2015 - Quality Management Systems- Requirements
- UNI EN ISO 14001/2015 – Environmental Management Systems-Requirements
- UNI EN ISO 45001:2018 - Occupational Health and Safety Management System

The manufacturing of voltage transformer trucks (DY734/1, DY734/2 and DY734/3) is located in ABB facility of Dalmine, Italy.

The scope of the voltage transformer truck is to measure the busbar voltage inside the switchgear.

In the factory, the different components and subassemblies are assembled on the so-called One Primary Line. All components and subassemblies are produced by ABB's suppliers and are only assembled in the factory.

Product DY734 cluster declared in this EPD includes the following voltage transformer trucks:

Voltage Transformer Truck	VD4/RU-TV 12 DY734/1	VD4/RU-TV 17 DY734/2	VD4/RU-TV 24 DY734/3
Rated voltage [kV]	12	17.5	24

These three products are considered identical, as they only differ in terms of the voltage applied at the primary side of the voltage transformer. The accessories associated with these products are also included in the study.

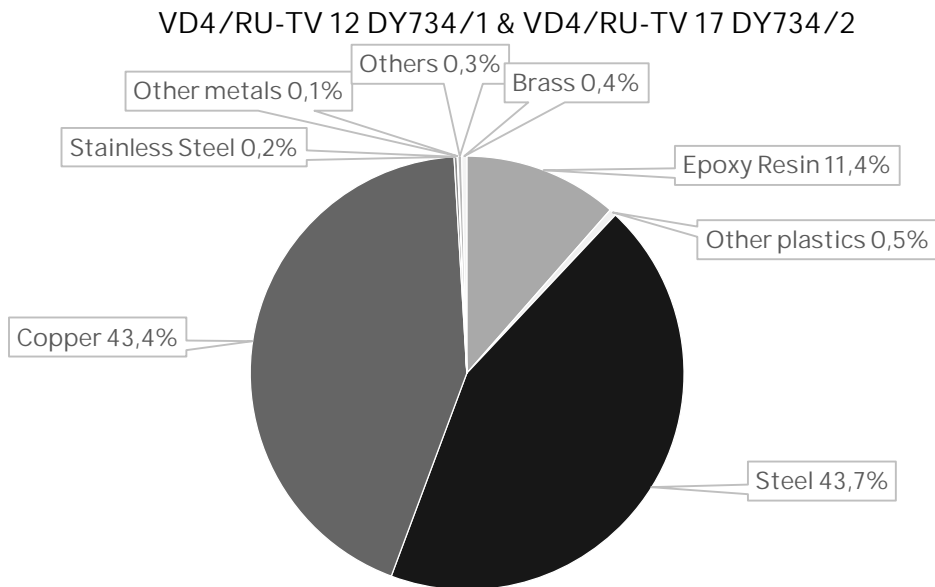
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Constituent materials

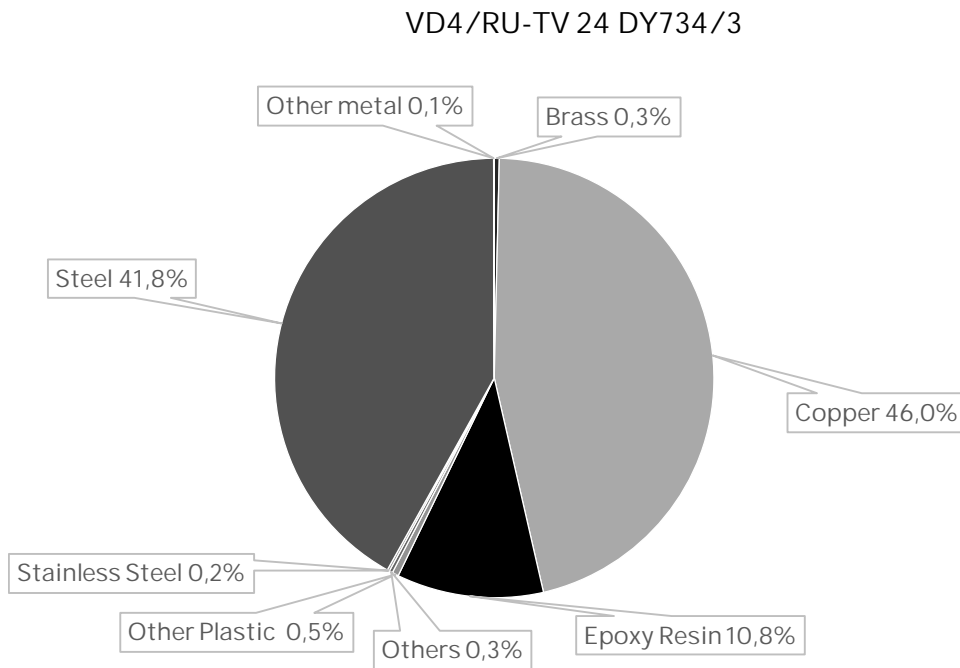
The voltage transformer truck (DY734/1 and DY734/2) is about 153.35 kg. Some small parts were excluded because of lack of data, as their mass is estimated to be well below 2% of the total weight, according to the EPDItaly-012 cut-off criteria.

VD4/RU-TV 12 DY734/1 & VD4/RU-TV 17 DY734/2				
Materials	Name	CAS Number	Weight [kg]	%
Plastics	Epoxy Resin	90598-46-2	17.55	11.4
	Other plastics and rubbers	-	0.81	0.5
Metals	Steel	68316-05-2	67.01	43.7
	Copper	7440-50-8	66.52	43.4
	Stainless Steel	65997-19-5	0.32	0.2
	Brass	-	0.58	0.4
	Other metals	-	0.12	0.1
Others	-	-	0.44	0.3
Total			153.35	100



The voltage transformer truck DY734/3 mass considered in this study is 170.45 kg. Some small parts were excluded because of lack of data, as their mass is estimated to be well below 2% of the total weight, according to the EPDIItaly-012 cut-off criteria.

VD4/RU-TV 24 DY734/3				
Materials	Name	CAS Number	Weight [kg]	%
Plastics	Epoxy Resin	90598-46-2	18.41	10.8
	Other plastics and rubbers	-	0.81	0.48
Metals	Steel	68316-05-2	71.28	41.82
	Copper	7440-50-8	78.49	46.05
	Stainless Steel	65997-19-5	0.32	0.19
	Brass		0.58	0.34
	Other metals	-	0.12	0.07
Others	-	-	0.44	0.26
Total			170.45	100



The packaging is composed of a wooden cage and plastic film, resulting in a total weight of 55.71 kg.



LCA background information

Functional Unit

The functional unit is a single voltage transformer truck, which measures and detects the busbars voltage, during a service of 20 years, including related accessories and packaging.

System Boundaries

The life cycle of the voltage transformer truck, an EEPS (Electronic and Electrical Products and Systems), is a “from cradle to grave” analysis and covers the following main life cycle stages: manufacturing, including the relevant upstream process (e.g. acquisition of raw material, preparation of semi-finished goods, etc.) and the main manufacturing and processing steps; distribution; installation, including the relevant steps for the preparation of the product for use; use including the required maintenance steps within the RSL (reference service life of the product) associated to the reference product; end-of-life stage, including the necessary steps until final disposal or recovery of the product system.

The following table shows the stages of the product life cycle and the information stages according to EN 50693 for the evaluation of electronic and electrical products and systems.

The stages of the product life cycle and the information considered for the evaluation of the cluster DY734 are:

- Manufacturing upstream includes raw materials, and production activities of ABB suppliers, including transport of semi-finished items and subassemblies to ABB Dalmine.
- Manufacturing core includes local consumptions (ABB Dalmine) due to manufacturing of the products (DY734) the relevant assembling and waste due to manufacturing. This includes also packaging production.
- Distribution stage includes the impacts related to the distribution of the product at the installation site.
- Installation stage includes the end of life of the packaging.
- Use and maintenance stages include the impact related to energy consumption during the service life of the product.
- End of life includes the operations for the disposal of the product at the end of its service life.

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Temporal and geographical boundaries

The component suppliers are sourced all over the world: Africa, Asia and Europe. All primary data collected from ABB are from 2021, which is a representative production year. Secondary data are provided by ecoinvent v3.8

The selected ecoinvent processes in the LCA model have global representativeness, due to the unclear origin of each component. In this way, a conservative approach has been adopted.

The results of this study are only applicable to DY734 voltage transformer truck produced in Dalmine.

Boundaries in the life cycle

Capital goods, such as buildings, machinery, tools and infrastructure, and the packaging for internal transport which cannot be allocated directly to the production of the reference product, may be excluded from the system boundary.

Infrastructures, when present, such as processes deriving from the ecoinvent database have not been excluded.

Data quality

In this EPD, both primary and secondary data are used. Site-specific foreground data have been provided by ABB. The main data sources are the bill of materials available on the enterprise resource planning. For all processes for which primary are not available, generic data originating from the ecoinvent v3.8 database, allocation cut-off by classification, are used. The ecoinvent database is available in the SimaPro 9.3.0.2 software used for the calculations.

Environmental impact indicators

The information obtained from the inventory analysis is aggregated according to the effects related to the various environmental issues. According to PCR EPDIItaly007 and EN 50693 the environmental impact indicators must be determined using the characterization factors and impact assessment methods specified in EN 15804:2012+A2:2019.

PCR EPDIItaly007 and the EN 50693 standard establish four indicators for climate impact (GWP-GHG): GWP (total) which includes all greenhouse gases; GWP (fossil fuels); GWP (biogenic carbon) which includes the emissions and absorption of biogenic carbon dioxide and biogenic carbon stored in the product; GWP (land use).

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Allocation rules

An allocation key is used for consumption related to the manufacturing process in the production site, as well as for company waste.

Allocation coefficients are based on the one primary line's surface area for methane and water consumption. Allocation coefficient for waste generated is based on the apparatus line surface area. Electricity consumption has direct measurement data for apparatus line and is divided by the total production volume in 2021. Concerning end-of-life allocation, the "cut-off" approach has been applied. As a result, the ecoinvent database "allocation, cut-off by classification" has been applied. With this approach, outputs subject to recycling are considered as inputs to the next life cycle, and neither environmental burdens nor environmental gains deriving from the recycling process are allocated to the waste stream.

Limitations and simplifications

The raw material life cycle stage includes the extraction of raw materials but neglects the production of various components at ABB's suppliers (e.g., glue, grease, and adhesive), as their mass represent less than 2% of that of the whole voltage transformer truck, as stated in the paragraph of cut-off criteria of EPDIItaly-012: "Materials making up the switch itself whose total mass does not exceed 2% of the total weight of the device".

This same applies to packaging, where small parts such as screws and fasteners are even a smaller fraction of the total mass. Also sticking labels and grease have been excluded since they are negligible.

Surface treatments like zinc coating, silver plating and painting have been considered in the LCA model. Burnishing and oiled treatments have been excluded by operational choice.

Scraps for metalworking and plastic processes are included when already defined in ecoinvent.

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Inventory analysis

The ecoinvent v3.8 cut-off by classification system processes are used to model the background system of the processes. Secondary material constituents are taken from ecoinvent database.

Due to the large amounts of components in the voltage transformer truck, raw material inputs are modeled with data from ecoinvent representing a global market coverage. These datasets are assumed to be representative.

Manufacturing stage

Steel is the most frequently used material, followed by copper including epoxy resin. All steel components (hot rolled, cold rolled, galvanized, low-alloyed steel) are modeled with the same kind of steel: "Steel, low-alloyed {GLO} market for", as it is representative of the large majority of the steel parts.

The single-use packaging is also included in the analysis in the manufacturing core stage. ABB receives packaging components from outside suppliers and packages the voltage transformer truck before shipping them.

The distance from the subassembly manufacturing factory to ABB facility is calculated.

The manufacturing of the Medium Voltage transformer truck is located in ABB facility of Dalmine, Italy. In the factory, the different components and subassemblies are assembled into the transformer truck.

The energy mix used for the production phase is representative for Dalmine production site and includes green energy only (hydroelectric 62%, wind 16% and photovoltaic 6% and internal production photovoltaic 16%).

The waste generated by the production and assembly processes is included in the calculation.

The negative impact of biogenic climate change in the manufacturing core phase is due to *Oriented strand board {RER} market for / Cut-off, S* derive from plants that absorb CO₂ during growth.

Distribution

The transport distances from ABB plant to the place of use are assumed to be 300 km.

Installation

The installation phase only implies manual activities, and no energy is consumed. This phase also includes the disposal of the packaging of the medium voltage transformer truck.

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Use

Use and maintenance are modeled according to the PCR EPDIItaly007.

For the use phase, the general Italian medium voltage electricity mix from ecoinvent v3.8 is used.

During the use phase, the voltage transformer truck dissipates some electricity due to presence of voltage transformers (one of each phase). They are calculated according to the electricity absorbed by one voltage transformer truck with the following rules:

- RSL of 20 years;
- No reduction factor;
- No time reduction coefficient;

The formula for the calculation of the electricity consumed is described as follows, where P_{use} is the power consumed by the circuit breaker at a given value of current:

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

	VD4/RU-TV 12 DY734/1	VD4/RU-TV 17 DY734/2	VD4/RU-TV 24 DY734/3
P_{use} [W]	2	2	2
E_{use} [kWh]	1050	1050	1050

Since no maintenance happens during the use phase, the environmental impacts linked to this procedure have been omitted from the analysis.

End of life

The transport distances from the place of use to the place of disposal are assumed to be 100 km.

The end-of-life stage is modeled according to IEC/TR 62635. The percentages for end-of-life treatments of voltage transformer trucks are taken from IEC/TR 62635, while the data for packaging waste scenarios are provided by ISPRA.

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Environmental indicators

The following tables show the environmental impact indicators of the life cycle of a single voltage transformer truck, as indicated by PCR EPDItaly007 and EN 50693:2019.

The indicators are divided into the contribution of the processes to the different modules (upstream, core and downstream) and stages (manufacturing, distribution, installation, use and end-of-life).

Voltage Transformer Truck DY734/1 and DY734/2

Impact category	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use	End of life
GWP - total	kg CO ₂ eq.	1.51E+03	9.64E+02	5.33E+01	1.03E+01	1.57E+01	4.58E+02	4.64E+00
GWP - fossil	kg CO ₂ eq.	1.52E+03	9.49E+02	1.32E+02	1.03E+01	1.23E+00	4.19E+02	4.63E+00
GWP - biogenic	kg CO ₂ eq.	-1.27E+01	1.34E+01	-7.88E+01	9.38E-03	1.45E+01	3.81E+01	3.75E-03
GWP - luluc	kg CO ₂ eq.	1.53E+00	1.34E+00	1.22E-01	4.09E-03	5.25E-04	5.44E-02	1.26E-03
ODP	kg CFC-11 eq.	1.97E-03	1.88E-03	2.82E-05	2.41E-06	2.57E-07	5.79E-05	6.65E-07
AP	mol H ⁺ eq.	4.35E+01	4.08E+01	7.13E-01	5.24E-02	7.10E-03	1.94E+00	1.49E-02
EP - freshwater	kg P eq.	3.35E+00	3.24E+00	1.86E-02	6.71E-04	1.46E-04	9.69E-02	2.00E-04
POCP	kg NMVOC eq.	1.05E+01	8.73E+00	7.74E-01	5.62E-02	8.12E-03	9.20E-01	1.64E-02
ADP - minerals and metals	kg Sb eq.	9.55E-01	9.53E-01	6.09E-04	3.62E-05	3.94E-06	9.20E-04	9.63E-06
ADP - fossil	MJ, net calorific value	2.01E+04	1.13E+04	2.15E+03	1.58E+02	1.78E+01	6.44E+03	4.44E+01
WDP	m ³ eq.	1.04E+03	7.38E+02	3.19E+01	4.75E-01	5.26E-02	2.74E+02	3.71E-01

GWP-fossil: Global Warming Potential fossil; 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; EP-freshwater: Eutrophication potential-freshwater compartment; POCP: Formation potential of tropospheric ozone; ADP-minerals & metals: Abiotic Depletion for non-fossil resources potential; ADP-fossil: Abiotic Depletion for non-fossil resources potential, WDP: Water deprivation potential.

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ENVIRONMENTAL PRODUCT DECLARATION

Resource use parameters	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use	End of life
PENRE	MJ, low cal. value	1.95E+04	1.07E+04	2.12E+03	1.58E+02	1.78E+01	6.44E+03	4.44E+01
PERE	MJ, low cal. value	4.68E+03	2.09E+03	9.20E+02	2.22E+00	2.74E-01	1.67E+03	6.48E-01
PENRM	MJ, low cal. value	6.03E+02	5.70E+02	3.31E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ, low cal. value	6.84E+02	0.00E+00	6.84E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ, low cal. value	2.01E+04	1.13E+04	2.15E+03	1.58E+02	1.78E+01	6.44E+03	4.44E+01
PERT	MJ, low cal. value	5.37E+03	2.09E+03	1.60E+03	2.22E+00	2.74E-01	1.67E+03	6.48E-01
FW	m ³	2.73E+01	1.87E+01	9.22E-01	1.76E-02	2.42E-03	7.56E+00	1.05E-02
MS	kg	3.51E+01	3.51E+01	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	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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; MS: Use of secondary materials; RFS: Use of renewable secondary fuels, NRSF: Use of non-renewable secondary fuels.

Waste production indicators	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use	End of life
HWD	kg	9.96E-01	9.85E-01	4.95E-03	4.11E-04	4.33E-05	6.44E-03	1.09E-04
NHWD	kg	4.50E+02	3.00E+02	8.48E+01	8.11E+00	1.11E+01	1.99E+01	2.64E+01
RWD	kg	6.53E-02	3.32E-02	1.21E-02	1.07E-03	1.12E-04	1.85E-02	2.96E-04
MER	kg	1.73E+00	0.00E+00	1.70E-01	0.00E+00	1.55E+00	0.00E+00	8.08E-03
MFR	kg	1.85E+02	1.80E+01	3.50E+00	0.00E+00	3.47E+01	0.00E+00	1.29E+02
CRU	kg	0.00E+00	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	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HWD: hazardous waste disposed; 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.

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Voltage Transformer Truck DY734/3

Impact category	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use	End of life
GWP - total	kg CO ₂ eq.	1.62E+03	1.08E+03	5.33E+01	1.12E+01	1.57E+01	4.58E+02	5.03E+00
GWP - fossil	kg CO ₂ eq.	1.63E+03	1.06E+03	1.32E+02	1.12E+01	1.23E+00	4.19E+02	5.02E+00
GWP - biogenic	kg CO ₂ eq.	-1.16E+01	1.45E+01	-7.88E+01	1.01E-02	1.45E+01	3.81E+01	4.09E-03
GWP - luluc	kg CO ₂ eq.	1.72E+00	1.53E+00	1.22E-01	4.43E-03	5.25E-04	5.44E-02	1.39E-03
ODP	kg CFC-11 eq.	1.97E-03	1.88E-03	2.82E-05	2.61E-06	2.57E-07	5.79E-05	7.36E-07
AP	mol H ⁺ eq.	5.06E+01	4.79E+01	7.13E-01	5.66E-02	7.10E-03	1.94E+00	1.65E-02
EP - freshwater	kg P eq.	3.91E+00	3.79E+00	1.86E-02	7.26E-04	1.46E-04	9.69E-02	2.21E-04
POCP	kg NMVOC eq.	1.19E+01	1.01E+01	7.74E-01	6.08E-02	8.12E-03	9.20E-01	1.81E-02
ADP – minerals and metals	kg Sb eq.	1.12E+00	1.12E+00	6.09E-04	3.92E-05	3.94E-06	9.20E-04	1.07E-05
ADP – fossil	MJ, net calorific value	2.15E+04	1.26E+04	2.15E+03	1.70E+02	1.78E+01	6.44E+03	4.91E+01
WDP	m ³ eq.	1.16E+03	8.54E+02	3.19E+01	5.13E-01	5.26E-02	2.74E+02	4.02E-01

GWP-fossil: Global Warming Potential fossil; 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; EP-freshwater: Eutrophication potential-freshwater compartment; POCP: Formation potential of tropospheric ozone; ADP-minerals & metals: Abiotic Depletion for non-fossil resources potential; ADP-fossil: Abiotic Depletion for non-fossil resources potential, WDP: Water deprivation potential.

Resource use parameters	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use	End of life
PENRE	MJ, low cal. value	2.08E+04	1.20E+04	2.12E+03	1.70E+02	1.78E+01	6.44E+03	4.91E+01
PERE	MJ, low cal. value	5.00E+03	2.40E+03	9.20E+02	2.40E+00	2.74E-01	1.67E+03	7.15E-01
PENRM	MJ, low cal. value	6.30E+02	5.93E+02	3.31E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ, low cal. value	6.84E+02	6.44E+00	6.84E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ, low cal. value	2.15E+04	1.26E+04	2.15E+03	1.70E+02	1.78E+01	6.44E+03	4.91E+01
PERT	MJ, low cal. value	5.69E+03	2.41E+03	1.60E+03	2.40E+00	2.74E-01	1.67E+03	7.15E-01
FW	m ³	3.01E+01	2.16E+01	9.22E-01	1.90E-02	2.42E-03	7.56E+00	1.14E-02
MS	kg	3.89E+01	3.89E+01	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	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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; MS: Use of secondary materials; RFS: Use of renewable secondary fuels, NRSF: Use of non-renewable secondary fuels.

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ENVIRONMENTAL PRODUCT DECLARATION

Waste production indicators	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use	End of life
HWD	kg	1.18E+00	1.17E+00	4.95E-03	4.45E-04	4.33E-05	6.44E-03	1.21E-04
NHWD	kg	4.95E+02	3.42E+02	8.48E+01	8.77E+00	1.11E+01	1.99E+01	2.83E+01
RWD	kg	6.97E-02	3.75E-02	1.21E-02	1.15E-03	1.12E-04	1.85E-02	3.27E-04
MER	kg	1.73E+00	0.00E+00	1.70E-01	0.00E+00	1.55E+00	0.00E+00	8.08E-03
MFR	kg	2.02E+02	1.95E+01	3.50E+00	0.00E+00	3.47E+01	0.00E+00	1.44E+02
CRU	kg	0.00E+00	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	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

HWD: hazardous waste disposed; 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.

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