Vijai Electricals Limited

ENVIRONMENTAL PRODUCT DECLARATION

Product name: TR - 400 kVA Transformer – 110081 & 110169 (Standard & Super-Green)

Production site: Plot No. 1A, Sector 12, IIE SIDCUL, Haridwar, Uttarakhand, India

In accordance with ISO 14025 and EN 50693:2019

Program Operator	EPDItaly
Publisher	EPDItaly

Declaration Number	*EPD-IT-24-005*
Registration Number	EPDITALY1233

Issue date	28/01/2026
Valid to	28/01/2031

400 kVA Standard Transformer

400 kVA Super Green Transformer

GENERAL INFORMATION

EPD OWNER

Name of the company	Vijai Electricals Ltd
Registered office	Plot No. 1A, Sector 12, IIE SIDCUL, Haridwar, Uttarakhand, India; Pin 249403
Contacts for information on the EPD	+91-1334-664111 ; +91-9999473641 Email :vineesh.kumar@vijai.co.in, brijpal.singh@vijai.co.in

PROGRAM OPERATOR

EPDItaly	Via Gaetano De Castillia n° 10 - 20124 Milano, Italy

INFORMATION ON THE EPD

Product name (s)	TR - 400 kVA Transformer - Standard (110081) and Super Green Transformer (110169)
Site (s)	Plot No. 1A, Sector 12, IIE SIDCUL, Haridwar, Uttarakhand, India
Functional unit	The functional unit for this study refers to the operation of each transformer under ONAN power conditions, over 35 years RSL, 365 days per year, 24 hours per day. The ONAN power values are: TR 400kVA ONAN 20/0,42kV - GST001/1056; 110081 – Standard TR 400kVA ONAN 20/0,42kV - GST001/1056; 110169 - Super Green Version
Field of application of the product (s)	Electronic and Electrical Products and Systems
EPD type	Cradle to Grave
CPC Code (number) https://unstats.un.org/unsd/classifications/Econ	46121 – Electrical transformers

VERIFICATION INFORMATION	
PCR (title, version, date of publication or update)	PCR EPDItaly 007, PCR for electronic and electrical products and systems – Rev. 3.2 subPCR: EPDItaly018 - ELECTRONIC AND ELECTRICAL PRODUCTS AND SYSTEMS – POWER TRANSFORMERS, Rev 3.6, 01/02/2021.
EPD Italy Regulation (version, date of publication or update)	EPDItaly Regulations Rev 6.0 PCR EPDItaly007v.3.2, mandatory from 19/01/2026
Project Report LCA	Environmental Product Declaration of distribution transformers TR - 400 kVA - 110081 Standard Transformer & TR - 400 kVA - 110169 - Super Green Version
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 S.p.A., via Gaetano De Castillia n ° 10 - 20124 Milan, Italy. Accredited by Accredia.
Comparability Statement	Environmental statements published within the same product category, but from different programs, may not be comparable.
Liability Statement	The EPD Owner releases EPD Italy from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence. EPD Italy disclaims any responsibility for the information, data and results provided by the EPD Owner for life cycle assessment.

OTHER INFORMATION	
Technical support	Sphera India Pvt Ltd. sphera

1 COMPANY INFORMATION

Vijai Electricals Ltd. is a globally recognized leader in the design, manufacturing, and supply of high-performance transformers, conductors, and complete Transmission & Distribution (T&D) solutions. With over four decades of excellence, we have established ourselves as a trusted partner in the electrical industry, catering to domestic and international markets.

Their state-of-the-art manufacturing facilities, backed by cutting-edge technology and a skilled workforce, enable us to deliver innovative and sustainable solutions for the energy sector. They are committed to delivering quality, reliability, and customer satisfaction, adhering to stringent national and international standards such as IS, IEC, BSEN, AIEEE, and ANZS. Vijai Electricals is dedicated to contributing to the global energy transition by promoting energy-efficient and eco-friendly solutions.

Vijai Electricals Limited is committed to creating enduring value for all stakeholders, society, and the economy by delivering world-class electrical products and solutions that embody quality, reliability, and efficiency. With a strong emphasis on innovation and the adoption of advanced technologies, the company actively supports the global transition toward sustainable energy systems. Guided by its core values of integrity, quality, innovation, customer satisfaction, and sustainability, Vijai Electricals fosters a culture of continuous learning, collaboration, and ethical business practices. By empowering employees and partners, and strengthening its global market presence, the company strives to contribute meaningfully to societal growth while promoting environmentally responsible operations.

2 PRODUCTS DESCRIPTION

Distribution transformers convert high network voltages to medium or low network voltages, so electricity can be transmitted more safely to the final consumers. The transformers are oil immersed, three phase ONAN transformer 400kVA 20/0.42 KV. The manufacturing of a 400 kVA transformer involves sequential stages beginning with the cutting of CRGO material for the core, followed by inspection and assembly. Channels and clamps are prepared and inspected to ensure structural integrity. Insulation materials are processed and integrated during the core-coil assembly to maintain dielectric separation. High-voltage (HV) and low-voltage (LV) conductors are wound into coils, inspected, reworked if necessary, and dried to remove moisture. The dried coils are combined with the insulated core to form the core-coil assembly (CCA), which is again inspected and dried before being placed into a painted tank. Simultaneously, transformer oil undergoes filtration and quality testing; nonconforming oil is re-filtered until it meets specifications. The tanked transformer is filled with tested oil to provide insulation and cooling, followed by a final inspection ensuring mechanical and electrical compliance. Throughout the process, multiple inspection and rework loops guarantee that only conforming components proceed to the next stage, ensuring the final transformer meets reliability and performance standards. The Haridwar Site of Vijai Electricals Limited produces the following transformer products:

- **TR 400kVA ONAN 20/0,42kV - GST001/1056; 110081 – Standard**
- **TR 400kVA ONAN 20/0,42kV - GST001/1056; 110169 – Super Green Version**

Geographical scope: The transformer studied will be installed in Italy.
The EoL is assumed to take place in Italy.
The nominal weight of each transformer is described on the table below:

Table 1: Nominal weight of each transformer

Transformer name	Description	Nominal weight, shown on the plate [kg]
110081 - Standard Transformer	400kVA ONAN 20/0, 42kV	2015
110169 - Super Green Transformer	400kVA ONAN 20/0, 42kV	2005

3 FUNCTIONAL UNIT

The functional unit for this study refers to the operation of each transformer under ONAN power conditions, over 35 years RSL, 365 days per year, 24 hours per day. The respective ONAN power values are shown below:

Table 2: ONAN power values considered for the functional unit on each transformer

Transformer name	Description	ONAN power value [kVA]
110081 - Standard Transformer	400kVA 20/0, 42kV	400
110169 - Super Green Transformer	400kVA 20/0, 42kV	400

Reference service life:
35 years

Time representativeness:
The data collection for materials in the products is representative of the year FY2025 i.e. April 2024 to March 2025.
The data collection for energy and consumables used during manufacturing is representative of FY2025 i.e. April 2024 to March 2025.

Geographical representativeness:
The upstream processes for the components and assembly are primarily representative to India and other geographies wherever required. The energy consumption during the use stage is representative to Italy.

Allocation:
This EPD considers that the transformer uses the entire given amount of input raw materials for each production process defined. Hence, there is no need to allocate raw materials among different types of transformers. However, the use of energy, infrastructure, and other consumables is shared with other types of transformers during manufacturing in the year of reference 2024-25. Therefore, since other co-products are generated during the transformers production process, allocation rules are required for the foreground data: calculation of electricity, welding gases, and diesel consumption, on the transformer studied. Modularity and polluter payer principles have been followed.

Cut-off criteria:
The EN 50693:2019 requires that in case of data gaps or insufficient input data for a unit process, the cut-off criteria shall be 1% of renewable and non-renewable primary energy usage, and 1% of the total mass of this unit process. The total neglected flows from a product stage must be no more than 5% of product inputs by mass or 5% of primary energy contribution.

This assessment involved very comprehensive data collection, and all collected data were modelled; no known flows have been omitted. The transportation of personnel to the plant: transportation of personnel within the plant, research and development activities & long-term emissions were also excluded in this study.

Database(s) and LCA software:
The LCA model is created using the LCA for Experts Software system for life cycle engineering, developed by Sphera. The Managed LCA Content provides life cycle inventory data for several of the raw and process materials obtained from the background system. The most recent database version is CUP2025.1.

4 SYSTEM BOUNDARIES

Cradle-to-grave, including Manufacturing, Distribution, Installation, Use & Maintenance, End-of-Life stages, and benefits and loads of the next product system.

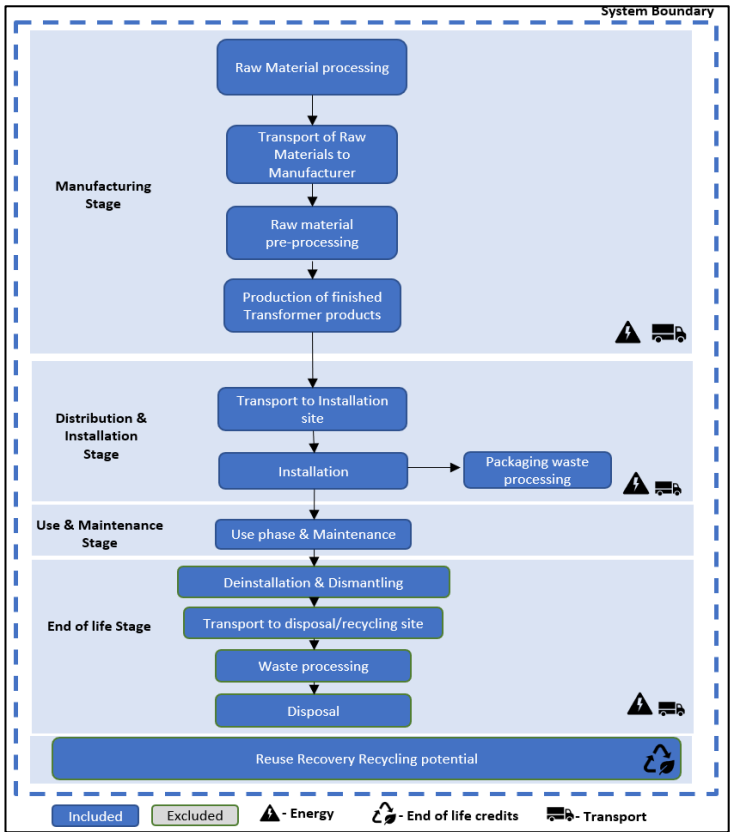

Figure 1: System boundary of main production processes, transportation, installation, use, and EoL stages.

4.1 MODULES DECLARED

Table 3: Modules of the production life cycle included in the EPD according to PCR EDPItaly007 and consistent with EN 50693:2019 (X = declared module: MND = module not declared)

Phases	Manufacturing stage	Distribution stage	Installation stage	Use & maintenance stage	End-Of-Life stage	Benefits & Loads
Phases declared	X	X	X	X	X	MND

4.2 MANUFACTURING

In the manufacturing stage, all processes involved in the production of the transformers have been considered within the study. These include pre-product manufacturing, different sources of energy (thermal energy, fuel, and electric power consumption), direct generation of waste from production, as well as relevant emissions data. The product stage includes provision of all materials, products and energy, as well as waste processing up to the end-of waste state or disposal of final residues during the product stage. To produce the two 400 kVA Transformer products, electricity consumption results in a GHG-GWP impact of 0.527 kg CO_2 equivalent per kWh, with electricity sourced from a specific energy mix provided for the state's power corporation (in this case Uttarakhand Power Corporation Ltd.)

4.3 DISTRIBUTION

The transportation of the product considers the truck transport from Vijai Electrical Plant in Haridwar, Uttarakhand to Dadri by road, 208 km away. From Dadri, it is transported 1158 km by Rail Transport to Mundra Port in Gujarat, India. From Mundra, the transformer is transported from the Indian port to port Genoa, in Italy approximately, 19923 km & 421km by truck to final location of installation.

4.4 INSTALLATION

The installation stage of a transformer involves:

- Use of machinery (cranes and forklifts) in the installation process and its electricity is accounted for
- The installation of the transformer is assumed to use a 25–50-ton crane and a 3-ton forklift.
- Packaging disposal and the corresponding waste treatment for packaging material.

In this stage, the end-of-life of the packaging material (wooden pallet) is considered. The wood is incinerated with energy recovery at a waste incineration plant.

4.5 USE

Operational energy as well as Maintenance of the transformers is considered in the use stage. Throughout their service life of 35 years, the transformers will operate 24 hours a day. As part of maintenance, it is assumed that the insulating oil is changed twice throughout the service life of the transformers. The installation site of the transformer is in Italy. To represent the electricity consumption in this stage, the electricity grid mix from Italy was used.

The study considered the power rates of the transformer when working at partial load with Oil Natural Air Natural (ONAN). Complying with the PCR for transformers, when operating at partial load of 70%, the calculations are adopted with ONAN.

The energy used is calculated following the equation according to PCR EPDItaly018, 2021:

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

Where:

E_d = The energy used by the power transformers for 35 years [kWh]

P_{load} = Load losses of the transformers [kW]

P_{noload} = No-load losses of the transformers [kW]

k_{load} = Average load factor (0.70 for all transformers)

t_{year} = Total number of hours in a year (8760 hours)

RSL = Reference service life (35 years)

P_{aux} = Power loss due to auxiliary activities at no load (zero in all transformers, calculation adopted for ONAN)

f_{aux} = Fraction of time in which ancillary equipment is operating (zero in all transformers, calculation adopted for ONAN)

The parameters of each transformer used in the equation are described in the table below:

Table 4: Parameters used in the equation for energy use of both transformers.

Transformer name	P_{load} [kW]	k_{load}	P_{noload} [kW]	t_{year} [h]	RSL [years]	$P_{aux} * f_{aux} * t_{year} * RSL$
110081 – 400kVA Standard Transformer	3.25	0.7	0.387	8760	35	0
110169 – 400kVA Super Green Transformer	3.25	0.7	0.387	8760	35	0

The calculated Ed value for both the Transformer products is given in the table below:

Transformer name	Ed [kWh]
110081 – 400kVA Standard Transformer	606,914.70
110169 – 400kVA Super Green Transformer	606,914.70

4.6 DISASSEMBLY AND EOL

Within this EPD, disassembly of the product, the transportation of the dismantled components to their End of Life (EoL) destination, and the waste processing for recovery or recycling and landfill is considered. In this study, end-of-life (EoL) treatment has been considered based on a net scrap approach for various components such as Steel and Aluminum used in the production for each transformer.

The disassembly of the transformer is assumed to use a 25-50-ton crane. The electricity used by the crane is considered in the End-of-Life stage, as the oil is removed from the transformers by gravity with no extra equipment needed. Apart from this, the electricity for metal sorting is also taken into consideration based on ADEME guidelines. The transportation of the product from its use location to the disassembly point is assumed by 500 km by truck.

The EoL of metals like Steel and Aluminum uses a net scrap approach for disposal and recycling. The transportation distance considered for the sorted metals and other materials from dismantling site to processing sites is assumed to be 100kms.

The following waste materials are sorted, recycled, and credited as secondary materials as benefits of the next product system:

- Steel

The following materials are used for energy recovery processes and credited as secondary materials in thermal energy and electricity processes, the masses of each material going to the waste treatment are described on

tables 5 to 6:

- Oil
- Wood
- Carboard

Table 5: Waste treatment of dismantled products from 110081 – Standard 400 kVA Transformer

Material	Amount [kg]	Waste treatment
Steel	1066.44	Recycling
	56.12	Landfill
Insulating Oil	327	Incineration
Wood	4.1	Incineration
Insulation Board	82	Incineration
Aluminum	364.5	Recycling
	40.5	Landfill

Table 6: Waste treatment of dismantled products from 110169 – Super Green 400 kVA Transformer

Material	Amount [kg]	Waste treatment
Steel	758.15	Recycling
	58.32	Landfill
Insulating Oil	327	Incineration
Wood	4.1	Incineration
Insulation Board	82	Incineration
Aluminum	364.5	Recycling
	40.5	Landfill

5 CONTENT DECLARATION

The transformers produced by Vijai Electricals contain the following materials and modules:

- Magnetic steel
- Insulating oil
- Aluminum conductor
- Hot rolled steel sheet
- Other metal
    - Materials or subcomponents are made of smaller parts, with no electronic parts.

Tables 7 & 8 below specifies the weight distribution in the Standard (110081) & Super-Green (110169) transformer

Table 7: Input material content for 400 kVA Standard (110081) transformers

Materials	Mass [kg]	Mass [%]
Magnetic steel	729	36.18%
LV conductor (Aluminum)	405	20.10%
Insulating oil	327	16.23%
Steel sheet	373.5	18.54%
Insulation	82	4.07%
Wood	4.1	0.20%
Accessories[1]	9	0.45%
Other metal[2]	58.4	2.90%
Other Materials	17	0.84%
Painting	10	0.50%
Transformer Weight	**2015**	**100.00%**

1 Accessories include materials or subcomponents with electronic parts.
2 Other metal includes parts made of steel such as screws, bolts etc.

Table 8: Input material content for 400 kVA Super-Green (110169) transformer

Materials	Mass [kg]	Mass [%]
Magnetic steel	729	36.36%
LV conductor (Aluminum)	405	20.20%
Insulating oil	327	16.31%
Steel sheet	373.5	18.63%
Insulation	82	4.09%
Wood	4.1	0.20%
Accessories[1]	9	0.45%
Other metal[2]	58.4	2.91%
Other Materials	7	0.35%
Painting	10	0.50%
Transformer Weight	**2005**	**100.00%**

1 Accessories include materials or subcomponents with electronic parts.

2 Other metal includes parts made of steel such as screws, bolts etc.

5.1 SUBSTANCES OF VERY HIGH CONCERN (SVHC)

The painting process involves the usage of powder paintings and coatings that contain the following hazardous substances:

Table 9: Hazardous substances contained in powder paintings and coatings

Hazardous substances	CAS number	Hazardous substances	CAS number
Polyurethane	9009-54-5	Hardener/Cross linker	12451-62-9
Ethyl acrylate	140-88-5	2-methoxy-1-methylethyl acetate	108-65-6
Epoxy resin	25085-99-8	Additives	7631-86-9/119-53-9
Zinc phosphate	7779-90-0	Saturated Carboxylated Polyester resin	1860-26-0
Pigments	1333-86-4	Bisphenol A epichlorhydrin	25036-25-3
Xylene	1330-20-7	2-butoxyethanol	111-76-2
Ethylbenzene	100-41-4	Bisphenol-A-Epichlorhydrinharze	25036-25-3
Xylol	1330-20-7	Hexamethylene-1.6-diisocyanate homopolymer	28182-81-2
Barium sulfate	7727-43-7	hexamethylene-di-isocyanate	822-06-0
2-methylpropan-1-ol	78-83-1	Bisphenol A epichlorhydrin	25036-25-3
1-methoxy-2-propanol	107-98-2	4-hydroxy-2,2,6,6-tetramethyl-1-piperidineethanol	59535-09-0
Toluene	108-88-3		

***None of the substances listed above are considered as substances of very high concern (SVHC) on REACH Candidate List published by the European Chemicals Agency.

6 ENVIRONMENTAL PERFORMANCE

6.1 TRANSFORMER 110081 – Standard 400kVA Transformer

Table 10: Environmental impact: 110081– Standard 400 kVA - 20/0, 42kV Transformer over 35 years RSL with 365 days of operation time

Parameter	Unit	Manufacturing Stage	Distribution Stage	Installation Stage	Use & Maintenance Stage	End-Of-Life Stage
GWP total	kg CO_2-eq.	5.06E+03	5.74E+01	4.00E+02	2.43E+05	1.01E+03
GWP fossil	kg CO_2-eq.	5.20E+03	5.64E+01	3.48E+02	2.39E+05	8.93E+02
GWP biogenic	kg CO_2-eq.	-1.52E+02	1.03E+00	4.86E+01	3.22E+03	1.14E+02
GWP luluc	kg CO_2-eq.	2.86E+00	3.77E-02	3.58E+00	6.43E+02	5.24E+00
ODP	kg CFC-11-eq.	4.56E-09	4.74E-11	4.67E-11	5.51E-06	7.46E-10
AP	mole of H^+-eq.	1.94E+01	2.20E-01	3.38E+00	5.32E+02	4.22E+00
EP - freshwater	kg P eq.	3.13E-03	1.52E-05	9.40E-04	7.37E-01	1.47E-03
EP - marine	kg N eq.	8.39E+00	5.44E-02	1.71E+00	1.07E+02	2.08E+00
EP - terrestrial	mole of N eq.	9.21E+01	6.03E-01	1.87E+01	1.35E+03	2.28E+01
POCP	Kg NMVOC eq.	1.17E+01	1.60E-01	4.60E+00	2.60E+02	5.37E+00
ADPE	kg Sb eq.	7.60E-04	1.64E-06	2.31E-05	4.67E-02	4.10E-05
ADPF	MJ	6.05E+04	7.27E+02	4.44E+03	3.51E+06	7.79E+03
WDP	m^3 world eq.	4.37E+02	1.17E+00	6.76E+00	9.95E+04	7.68E+01

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photo-chemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP=Water user deprivation potential, deprivation-weighted water consumption

Table 11: Use of resources 110081 – 400 kVA - 20/0, 42kV transformer over 35 years RSL with 365 days of operation time

Parameter	Unit	Manufacturing Stage	Distribution Stage	Installation Stage	Use & Maintenance Stage	End-Of-Life Stage
PERE	[MJ]	3.10E+03	2.81E+01	8.69E+02	3.36E+06	1.82E+03
PERM	[MJ]	1.48E+03	0.00E+00	-5.40E+02	0.00E+00	-9.39E+02
PERT	[MJ]	4.58E+03	2.81E+01	3.29E+02	3.36E+06	8.80E+02
PENRE	[MJ]	6.05E+04	7.27E+02	4.44E+03	3.51E+06	7.79E+03
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	6.05E+04	7.27E+02	4.44E+03	3.51E+06	7.79E+03
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
FW	[m3]	1.33E+01	4.05E-02	2.83E-01	2.63E+03	2.12E+00

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of Non-Renewable primary energy as energy carrier; PENRM = Use of Non-Renewable primary energy as raw materials; PENRT = Total use of Non-Renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of Non-Renewable secondary fuels; FW = Use of net fresh water

Table 12: Output flows and waste categories: 110081 – 400 kVA - 20/0, 42kV transformer over 35 years RSL with 365 days of operation time

Parameter	Unit	Manufacturing Stage	Distribution Stage	Installation Stage	Use & Maintenance Stage	End-Of-Life Stage
HWD	[kg]	3.83E-06	5.94E-08	1.67E-07	3.30E-03	1.04E-06
NHWD	[kg]	2.89E+02	6.97E-02	1.54E+00	3.61E+03	2.15E+02
RWD	[kg]	1.32E-01	1.87E-03	6.48E-03	1.35E+02	1.01E-01
CRU	[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	0.00E+00
MER	[kg]	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	6.85E+02
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.27E+03

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

6.2 TRANSFORMER 110169 - Super Green Transformer

Table 13: Environmental impact: 110169 – 400 kVA - 20/0,42kV transformer over 35 years RSL with 365 days of operation time

Parameter	Unit	Manufacturing Stage	Distribution stage	Installation stage	Use & maintenance stage	End-Of-Life stage
GWP total	kg CO_2-eq.	4.11E+03	5.72E+01	4.00E+02	2.43E+05	1.00E+03
GWP fossil	kg CO_2-eq.	4.26E+03	5.61E+01	3.48E+02	2.39E+05	8.81E+02
GWP biogenic	kg CO_2-eq.	-1.53E+02	1.03E+00	4.86E+01	3.22E+03	1.14E+02
GWP luluc	kg CO_2-eq.	2.47E+00	3.75E-02	3.58E+00	6.43E+02	5.23E+00
ODP	kg CFC-11-eq.	4.06E-09	4.72E-11	4.67E-11	5.51E-06	7.45E-10
AP	mole of H^+-eq.	1.65E+01	2.19E-01	3.38E+00	5.32E+02	4.12E+00
EP - freshwater	kg P eq.	2.90E-03	1.51E-05	9.40E-04	7.37E-01	1.46E-03
EP - marine	kg N eq.	7.88E+00	5.41E-02	1.71E+00	1.07E+02	2.04E+00
EP - terrestrial	mole of N eq.	8.66E+01	6.00E-01	1.87E+01	1.35E+03	2.22E+01
POCP	Kg NMVOC eq.	1.02E+01	1.59E-01	4.60E+00	2.60E+02	5.28E+00
ADPE	kg Sb eq.	5.96E-04	1.64E-06	2.31E-05	4.67E-02	4.06E-05
ADPF	MJ	5.17E+04	7.24E+02	4.44E+03	3.51E+06	7.62E+03
WDP	m^3 world eq.	3.89E+02	1.16E+00	6.76E+00	9.95E+04	7.67E+01

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photo-chemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP=Water user deprivation potential, deprivation-weighted water consumption

Table 14: Use of resources: 110169 – 400 kVA - 20/0, 42kV transformer over 35 years RSL with 365 days of operation time

Parameter	Unit	Manufacturing Stage	Distribution stage	Installation stage	Use & maintenance stage	End-Of-Life stage
PERE	[MJ]	2.80E+03	2.80E+01	8.69E+02	3.36E+06	1.82E+03
PERM	[MJ]	1.48E+03	0.00E+00	-5.40E+02	0.00E+00	-9.39E+02
PERT	[MJ]	4.28E+03	2.80E+01	3.29E+02	3.36E+06	8.79E+02
PENRE	[MJ]	5.17E+04	7.24E+02	4.44E+03	3.51E+06	7.62E+03
PENRM	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	5.17E+04	7.24E+02	4.44E+03	3.51E+06	7.62E+03
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
FW	[kg]	1.22E+01	4.03E-02	2.83E-01	2.63E+03	2.11E+00

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of Non-Renewable primary energy as energy carrier; PENRM = Use of Non-Renewable primary energy as raw materials; PENRT = Total use of Non-Renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of Non-Renewable secondary fuels; FW = Use of net fresh water

Table 15: Output flows and waste categories: 110169 – 400 kVA - 20/0 transformer over 35 years RSL with 365 days of operation time

Parameter	Unit	Manufacturing Stage	Distribution stage	Installation stage	Use & maintenance stage	End-Of-Life stage
HWD	[kg]	3.33E-06	5.91E-08	1.67E-07	3.30E-03	1.04E-06
NHWD	[kg]	2.11E+02	6.94E-02	1.54E+00	3.61E+03	2.17E+02
RWD	[kg]	1.15E-01	1.86E-03	6.48E-03	1.35E+02	1.00E-01
CRU	[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	0.00E+00
MER	[kg]	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
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

7 LIFE CYCLE INVENTORY ANALYSIS - CHARACTERIZATION FACTORS AND METHODS USED

For all indicators the characterization factors from EC-JRC (http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml) mentioned were applied. All LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

The environmental parameters apply data based on the LCI describing the use of renewable and non-renewable material resources, renewable and non-renewable primary energy, and water.

The results from the impact assessment are only relative statements which give no information about the endpoint of the impact categories, exceeding threshold values, safety margins or risk.

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